Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

August 28, 2019

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

RE: **Notice of Exempt Modification for T-Mobile:**
801485 - T-Mobile Site ID: CT11545A
2715 Mountain Road, Suffield, CT 06093
Latitude: 42° 0′ 41.80″ / Longitude: -72° 43′ 43.60″

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 180-foot mount on the existing 190-foot Monopole Tower, located at 2715 Mountain Road, Suffield, CT. The tower is owned by Crown Castle and the property is owned by the Town of Suffield. T-Mobile now intends to replace six (6) existing antennas with three (3) new 1900 MHz antennas and three (3) new 600/700 MHz antennas. The new antennas will be installed at the 180-ft level of the tower. T-Mobile is also proposing tower mount modifications. As shown on the enclosed mount analysis.

Planned Modifications:
Tower:

Remove:
(6) 1 5/8" Coax

Remove and Replace:
(3) EMS RR90-17-XXDP Antenna **(REMOVE)** - (3) RFS-APX16DWV-16DWV-S-E-A20 Antenna 1900 MHz **(REPLACE)**

(3) LNX 6515DS-A1M Antenna **(REMOVE)** - (3) RFS-APXVAARR24_43-U-NA20 Antenna 600/700 MHz **(REPLACE)**

(6) TMA **(REMOVE) –** (3) TMA **(REPLACE)**

Install New:
(1) 1 5/8" Hybrid Fiber Line
(3) Radio 4449 B12/B71

Existing to Remain:
(12) 1 5/8" Coax
(3) TMA

Ground:

Upgrade to existing ground cabinet. (Internally)
Remove (6) B12 Radios.
Upgrade existing breakers.

The facility was approved by the Town of Suffield's Economic Development Commission via a Special Use Permit on May 1, 2000. The approval was given with conditions which this proposed exempt modification complies with.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Melissa Mack, First Selectman for the Town of Suffield, as both the municipality and property owner, Bill Hawkins, Director of Planning and Crown Castle is the tower owner.

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

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

3. The proposed modification 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 Communication 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-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Anne Marie Zsamba.

Sincerely,

Anne Marie Zsamba
Real Estate Specialist
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
(201) 236-9224
AnneMarie.Zsamba@crowncastle.com

Attachments
cc:

Melissa Mack, First Selectman
Town of Suffield
Town Hall – Selectman's Office
83 Mountain Road
Suffield, CT 06078
860-668-3838

Bill Hawkins, Director of Planning
Town of Suffield
Planning Department
230C Mountain Road
Suffield, CT 06078
860-668-3848

Crown Castle, Tower Owner

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

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

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

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

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

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

Exhibit A

Original Facility Approval

303/733

Recorded
6-21-00

May 4, 2000

Ms. Elaine Sarsynski, Director
Suffield Economic Development Commission
83 Mountain Road
Suffield, Connecticut 06078

Re: File #740 – Request of the Suffield Economic Development Commission for a special use permit for the approval of sites for telecommunication towers located on Town properties: WPCA, Highway Department, and Transfer Station.

Dear Ms. Sarsynski:

At a duly called Special Meeting of the Suffield Zoning and Planning Commission held on Monday, May 1, 2000, the Commission voted to approve the Town of Suffield's special use permit request for the for three (3) proposed telecommunication sites located as designated:

1. Town of Suffield Transfer Station site on the west side of Mountain Road (Route 168), on undeveloped land west of the Transfer Station operations (Site A);
2. Town of Suffield Public Works garage/maintenance facility off of Mountain Road, on land immediately adjacent to the Maintenance Facility Building (Site B); and
3. Town of Suffield Sewage Treatment Plant on the east side of East Street (Route 159), on undeveloped land along the north side of the Treatment's Plant's access driveway (Site C).

with the following conditions:

1. The heights of the respective mono-pole towers, including antennae, shall not exceed 199-feet (Site A); 120-feet (Site B); and 174-feet (Site C);
2. Each tower shall be certified as "self-collapsing" by a Connecticut registered professional engineer;
3. Details drawings are to be submitted with each request for building permits for both the towers and related facilities;
4. FCC licenses shall be produced prior to the issuance of the permits for company leasing space on the towers;
5. The Zoning Enforcement Officer shall review each proposal for zoning conformance prior to the issuance of the building permits;
6. All utilities are to be underground;
7. Site plans are to be revised.

A mylar and four (4) copies of site plans for each of the three approved sites must be submitted to this office as soon as possible for signatures.

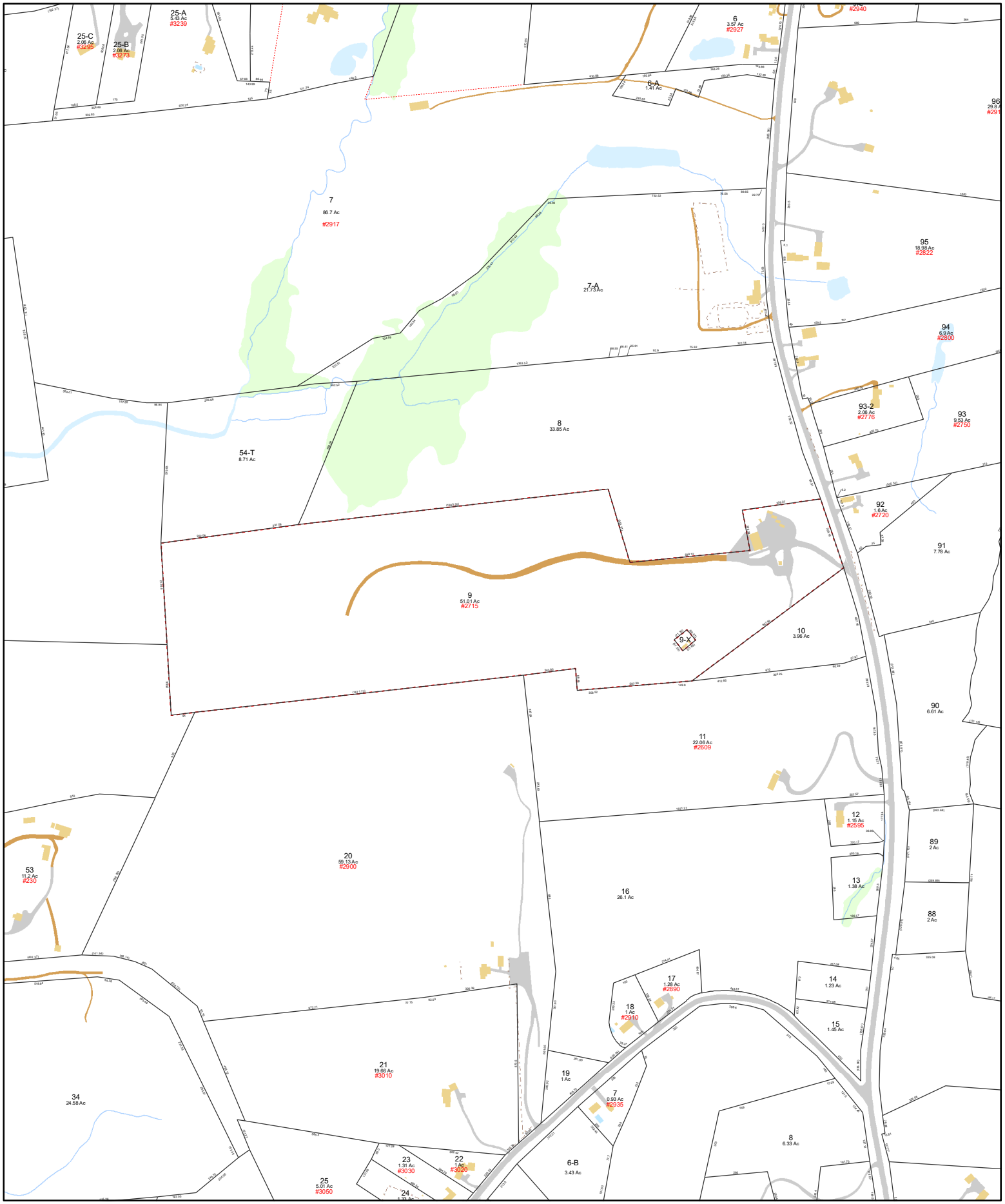
Please remit a check in the amount of $10.00 (payable to the Town of Suffield), ***along with this original letter***, to the Office of the Town Clerk, 83 Mountain Road. This fee is required to cover the cost of recording the Special Use Permit in the Office of the Town Clerk.

Exhibit B

Property Card

Town of Suffield, Connecticut - Assessment Parcel Map

Parcel: 9-9-9 **Address: 2715 MOUNTAIN RD**



N W E S

0 140 280 560 840 1,120 Feet

Scale 1:6,600

Map Produced: February 2019
Grand List: October 2018

Town of Suffield, CT

Property Listing Report

Map Block Lot **9-9-9** | Account **09002**

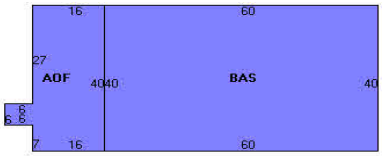
Property Information

Property Location	2715 MOUNTAIN RD
Owner	SUFFIELD TOWN OF
Co-Owner	TOWN HALL
Mailing Address	83 MOUNTAIN RD SUFFIELD CT 06078
Land Use	903I Municipal MDL-96
Land Class	E
Zoning Code	R90
Census Tract	4772

Neighborhood	A
Acreage	51.01
Utilities	
Lot Setting/Desc	
Additional Info	

Photo

Sketch



Primary Construction Details

Year Built	2006
Stories	1
Building Style	Outbuildings
Building Use	Residential
Building Condition	Average
Floors	Concrete
Total Rooms	

Bedrooms	
Full Bathrooms	
Half Bathrooms	
Bath Style	
Kitchen Style	
Roof Style	Gable
Roof Cover	Metal

Exterior Walls	STEEL
Interior Walls	Minimum
Heating Type	None
Heating Fuel	Coal or Wood
AC Type	None
Gross Bldg Area	3076
Total Living Area	3076

Report Created On **8/28/2019**

Town of Suffield, CT

Property Listing Report | Map Block Lot 9-9-9 | Account 09002

Valuation Summary

(Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings	156600	109620
Extras	0	0
Improvements	171400	119980
Outbuildings	14800	10360
Land	445100	311570
Total	616500	431550

Outbuilding and Extra Items

Type	Description
Shed	240 S.F.
Scale - Electric	20 TONS

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
First Floor	2400	2400
Office	676	676
Total Area	1152	0

Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
SUFFIELD TOWN OF	180/ 870	6/5/1985	0
KEMENT WILLIAM B & IRENE N	147/ 933	5/4/1977	0

Report Created On 8/28/2019

Town of Suffield, CT

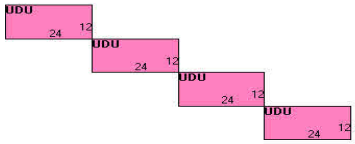
Property Listing Report

Map Block Lot **9-9-9**

Account **09002**

Photo

Sketch



Primary Construction Details

Year Built	2006	Kitchen Style	n/a
Stories	1	Roof Style	Flat
Building Style	Outbuildings	Roof Cover	Metal
Building Use	Residential	Exterior Walls	Pre-finsh Metl
Building Condition	Average	Interior Walls	Minimum
Floors	Concrete	Heating Type	None
Total Rooms		Heating Fuel	Coal or Wood
Bedrooms		AC Type	None
Bathrooms		Gross Bldg Area	
Bath Style	n/a	Total Living Area	
Half Baths			

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Utility,	1152	0
Total Area		

Report Created On **8/28/2019**

Exhibit C

Construction Drawings

T-MOBILE SITE NAME:

CT545/CROWN SUFFIELD

T-MOBILE SITE NUMBER:

CT11545A

CROWN BU: 801485 / APP#: 494420

67D04G CONFIGURATION

2715 MOUNTAIN RD
SUFFIELD, CT 06093

EXISTING 190'-6" MONOPOLE

PROJECT SUMMARY

SITE TYPE:	EXISTING EQUIPMENT UPGRADE
SITE ADDRESS:	2715 MOUNTAIN RD SUFFIELD, CT 06093
JURISDICTION:	HARTFORD COUNTY

NAD83

LATITUDE:	42.011665° N
LONGITUDE:	72.728816° W
TOWER OWNER:	CROWN CASTLE 3200 HORIZON DRIVE, SUITE 150 KING OF PRUSSIA, PA 19406 JASON SMITH (610) 635-3225
CUSTOMER/APPLICANT:	T-MOBILE 4 SYLVAN WAY PARSIPPANY, NJ 07054 (973) 397-4800
OCCUPANCY TYPE:	UNMANNED
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION

LOCATION MAP

NO SCALE

DRAWING INDEX

SHEET #	SHEET DESCRIPTION	REV. #
T-1	TITLE SHEET	1
A-1	OVERALL SITE PLAN	1
A-2	ANTENNA/CABLE SCHEDULE AND AZIMUTH PLANS	1
A-3	TOWER ELEVATION	1
A-4	ANTENNA AND RRU DETAILS	1
E-1	PANEL SCEHDULE AND ONE-LINE DIAGRAM	1

CONTACT INFORMATION

A&E FIRM:	B+T GROUP 1717 S. BOULDER, STE. 300 TULSA, OK 74119	ELECTRIC PROVIDER:	CT LIGHT & POWER (860) 947-2000
CONTACT:	MIKE OAKES	TELCO PROVIDER:	AT&T (855) 637-9527
PHONE:	(918) 587-4630		

DRIVING DIRECTIONS

DEPART FROM BRADLEY INTERNATIONAL AIRPORT ON TERMINAL RD. ROAD NAME CHANGES TO BRADLEY FIELD CONNECTOR. KEEP RIGHT ONTO RAMP. KEEP STRAIGHT ONTO CT-20. TURN RIGHT ONTO CT-187 [N MAIN ST]. KEEP LEFT ONTO N MAIN ST. ROAD NAME CHANGES TO S STONE ST. TURN LEFT ONTO CT-168 [MOUNTAIN RD]. TURN LEFT ONTO ACCESS ROAD AND ARRIVE AT CT545/CROWN SUFFIELD.

A/E DOCUMENT REVIEW STATUS

TITLE	SIGNATURE	DATE
T-MOBILE PROP:		
T-MOBILE R.F. MGR.:		
T-MOBILE NetOps:		
T-MOBILE CONST. MGR.:		
INTERCONNECT:		
T-MOBILE SITE DEV. MGR.:		
PROPERTY OWNER:		
PLANNING:		

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND MAY IMPOSE CHANGES OR MODIFICATIONS.

CODE COMPLIANCE

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

CODE TYPE	CODE
BUILDING/DWELLING	2018 CT BUILDING CODE
STRUCTURAL	2018 CT BUILDING CODE
MECHANICAL	2018 CT BUILDING CODE
ELECTRICAL	NEC 2017

PROJECT DESCRIPTION

THE PROPOSED PROJECT INCLUDES:

- REMOVE (1) DUS41.
- REMOVE (6) RUS01 B12 RADIOS FROM GROUND.
- REMOVE (6) EXISTING ANTENNAS AT 182'-0".
- REMOVE (6) EXISTING TMAS AT 182'-0".
- INSTALL (6) NEW ANTENNAS AT 182'-0".
- INSTALL (3) NEW RRUS AT 182'-0".
- INSTALL (3) NEW TMAS AT 182'-0".
- INSTALL (1) NEW 6x12 HCS CABLE.
- INSTALL (2) NEW BB 6630s.

DO NOT SCALE DRAWINGS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 11X17. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

CALL CONNECTICUT ONE CALL
(800) 922-4455
CALL 3 WORKING DAYS
BEFORE YOU DIG!

811

B+T GRP

CROWN CASTLE

T-Mobile

CT11545A
BU #: 801485
CT545/CROWN SUFFIELD
2715 MOUNTAIN RD
SUFFIELD, CT 06093
EXISTING 190'-6" MONOPOLE

PROJECT NO:	84855.012.01
CHECKED BY:	GEH

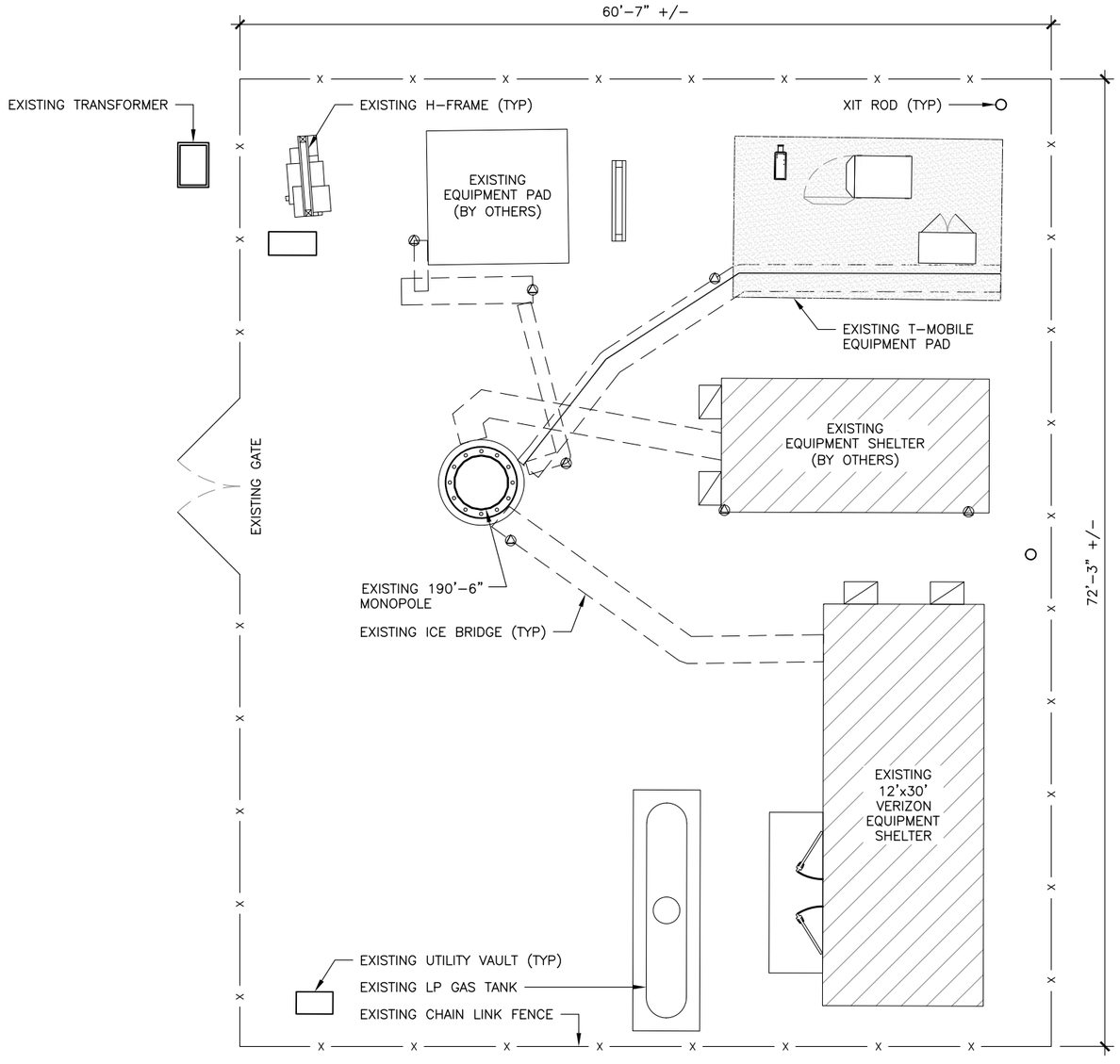
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
0	7/22/19	RMC	CONSTRUCTION
1	8/20/19	MLC	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/20

STATE OF CONNECTICUT
31627
LICENSED PROFESSIONAL ENGINEER
8/20/19

SHEET NUMBER:	REVISION:
T-1	1



1 OVERALL SITE PLAN

SCALE: 0' 4' 8' 16' 32'

N

GENERAL NOTES:

1. SUBJECT PROPERTY IS SITUATED AT 2715 MOUNTAIN RD, SUFFIELD, CT 06093.
2. APPLICANT: T-MOBILE
   A DELAWARE LIMITED LIABILITY COMPANY
   4 SYLVAN WAY
   PARSIPPANY, NEW JERSEY 07054
   (973) 397-4800

   TOWER OWNER: CROWN CASTLE INTERNATIONAL

- THE APPLICANT IS TO UPDATE THEIR NETWORK BY INSTALLING SIX (6) NEW PANEL ANTENNAS, THREE (3) TMAS, THREE (3) RRUS, AND ONE (1) ADDITIONAL CABLE MOUNTED ON AN EXISTING MONOPOLE.

3. THIS FACILITY SHALL BE VISITED ON THE AVERAGE OF ONCE A MONTH FOR MAINTENANCE AND SHALL BE MONITORED FROM A REMOTE FACILITY.
4. THE EXISTING SITE IS LOCATED AT LATITUDE OF 42.011665° N± AND LONGITUDE OF 72.728816° W±. THE HORIZONTAL DATUM ARE IN TERMS OF NORTH AMERICAN DATUM OF 1983 (NAD 83).
5. THIS SET OF PLANS HAS BEEN PREPARED FOR THE PURPOSES OF MUNICIPAL AND AGENCY REVIEW AND APPROVAL. THIS SET OF PLANS SHALL NOT BE UTILIZED AS CONSTRUCTION DOCUMENTS UNTIL ALL CONDITIONS OF APPROVAL HAVE BEEN SATISFIED AND EACH OF THE DRAWINGS HAVE BEEN REVISED TO INDICATED "ISSUED FOR CONSTRUCTION"
6. ALL MATERIALS, WORKMANSHIP, AND CONSTRUCTION FOR THE SITE IMPROVEMENTS SHOWN HEREON SHALL BE IN ACCORDANCE WITH:

   6.A. CURRENT PREVAILING MUNICIPAL AND/OR COUNTY SPECIFICATIONS, STANDARDS, AND REQUIREMENTS.
   6.B. CURRENT PREVAILING UTILITY COMPANY AUTHORITY SPECIFICATIONS, STANDARDS AND REQUIREMENTS.

7. THE CONTRACTOR SHALL NOTIFY B+T GROUP, P.A. IMMEDIATELY IF ANY FIELD-CONDITIONS ENCOUNTERED DIFFER FROM THOSE REPRESENTED HEREON, AND/OR IF SUCH CONDITIONS WOULD OR COULD RENDER THE DESIGNS SHOWN HEREON INAPPROPRIATE AND/OR INEFFECTIVE.
8. THE CONTRACTOR IS RESPONSIBLE TO PROTECT, REPAIR AND/OR REPLACE ANY DAMAGED STRUCTURES, UTILITIES OR LANDSCAPED AREA WHICH MAY BE DISTURBED DURING THE CONSTRUCTION OF THIS FACILITY.
9. THE CONSTRUCTION CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ALL CONSTRUCTION MEANS AND METHODS. THE CONSTRUCTION CONTRACTOR IS ALSO RESPONSIBLE FOR ALL JOB SITE SAFETY.
10. SITE INFORMATION SHOWN TAKEN FROM CROWN CASTLE SITE PLANS AND FROM CROWN CASTLE INSPECTION PHOTOS.
11. NO GUARANTEE IS MADE NOR SHOULD BE ASSUMED AS TO THE COMPLETENESS OR ACCURACY OF THE HORIZONTAL OR VERTICAL LOCATIONS. ALL PARTIES UTILIZING THIS INFORMATION SHALL FIELD VERIFY THE ACCURACY AND COMPLETENESS OF THE INFORMATION SHOWN PRIOR TO CONSTRUCTION ACTIVITIES.
12. ALL IMPROVEMENTS SHALL BE SUBJECT TO INSPECTION AND APPROVAL BY THE TOWNSHIP ENGINEER WHO WILL BE GIVEN PROPER NOTIFICATION PRIOR TO THE START OF ANY CONSTRUCTION.

B+T GRP

CROWN CASTLE

T-Mobile

CT11545A
BU #: 801485

CT545/CROWN SUFFIELD

2715 MOUNTAIN RD
SUFFIELD, CT 06093

EXISTING 190'-6" MONOPOLE

PROJECT NO:	84855.012.01
CHECKED BY:	GEH

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
0	7/22/19	RMC	CONSTRUCTION
1	8/20/19	MLC	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/20

STATE OF CONNECTICUT
8/20/19
31627
LICENSED
PROFESSIONAL ENGINEER

SHEET NUMBER: A-1

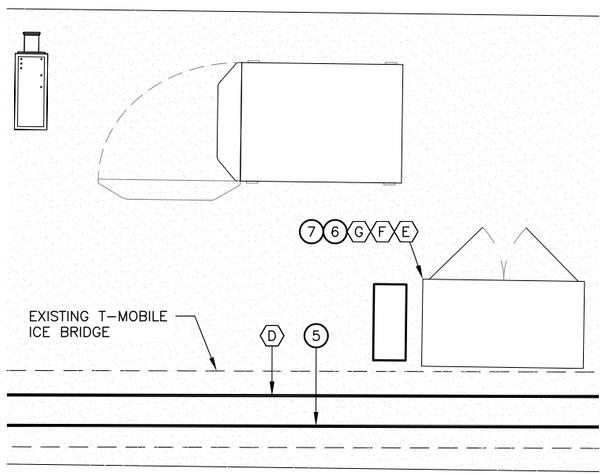
REVISION: 1

LEGEND

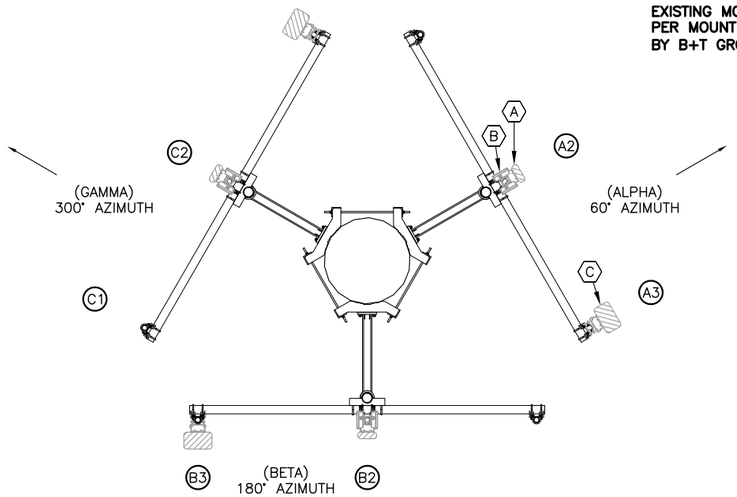
EXISTING/DEMOLITION NOTES		INSTALLATION NOTES	
A	EXISTING EMS RR90-17-XXDP ANTENNA TO BE REMOVED (TOTAL OF 3)	1	INSTALL RFS APX16DWV-16DWV-S-E-A20 ANTENNAS ON EXISTING MOUNT. PROVIDE NEW 2 7/8" OD SCH.40 PIPE MAST (LENGTH TO BE V.I.F) (TYP. OF 1 PER SECTOR, TOTAL OF 3)
B	EXISTING TMA TO BE REMOVED (TYP. OF 2 PER SECTOR, TOTAL OF 6) (SEE INSTALLATION NOTE 2)	2	INSTALL NEW TMA BEHIND ANTENNA (TYP. OF 1 PER SECTOR, TOTAL OF 3)
C	EXISTING ANDREW LNX-6515DS-A1M ANTENNA TO BE REMOVED (TOTAL OF 3)	3	INSTALL RFS APXVAARR24_43-U-NA20 (8FT) ANTENNAS ON EXISTING MOUNT. PROVIDE NEW 2 7/8" OD SCH.40 PIPE MAST (LENGTH TO BE V.I.F.) (TYP. OF 1 PER SECTOR, TOTAL OF 3)
D	EXISTING 1 5/8" COAX TO REMAIN (TOTAL OF 12)	4	INSTALL RADIO 4449 B12/B71 (TYP. OF 1 PER SECTOR, TOTAL OF 3)
E	EXISTING RBS 6201 ODE TO REMAIN	5	INSTALL (1) 6x12 HCS FIBER. RUN FROM EQUIPMENT TO ANTENNAS FOLLOWING EXISTING ROUTING
F	EXISTING (1) DUS41 TO BE REMOVED	6	INSTALL (2) NEW BB 6630s
G	EXISTING RUS01 B12 TO BE REMOVED (TOTAL OF 6)	7	UPGRADE EXISTING 60A BREAKER TO 100A BREAKER

ANTENNA AND CABLE SCHEDULE

SECTOR	POSITION	EXISTING ANTENNAS	PROPOSED ANTENNA CONFIGURATION		E-TILT	M-TILT	ANTENNA CENTERLINE	TMA/RRU	CABLES	JUMPER TYPE	CABLE LENGTH
60° – ALPHA	A1	RFS APX16DWV-16DWV-S-E-A20	LTE GSM	–	2°	0°	182'-0"	1/0	(2) 1 5/8" COAX	1/2" COAX	232'-0"
	A3	RFS APXVAARR24_43-U-NA20	LTE	B71+ B12	2°/2°	0°		0/1	(1) 6x12 HCS FIBER	DC/FIBER	232'-0"
180° – BETA	B1	RFS APX16DWV-16DWV-S-E-A20	LTE GSM	–	2°	0°	182'-0"	1/0	(2) 1 5/8" COAX	1/2" COAX	232'-0"
	B3	RFS APXVAARR24_43-U-NA20	LTE	B71+ B12	2°/2°	0°		0/1	SHARED FIBER	DC/FIBER	–
300° – GAMMA	C1	RFS APX16DWV-16DWV-S-E-A20	LTE GSM	–	2°	0°	182'-0"	1/0	(2) 1 5/8" COAX	1/2" COAX	232'-0"
	C3	RFS APXVAARR24_43-U-NA20	LTE	B71+ B12	2°/2°	0°		0/1	SHARED FIBER	DC/FIBER	–



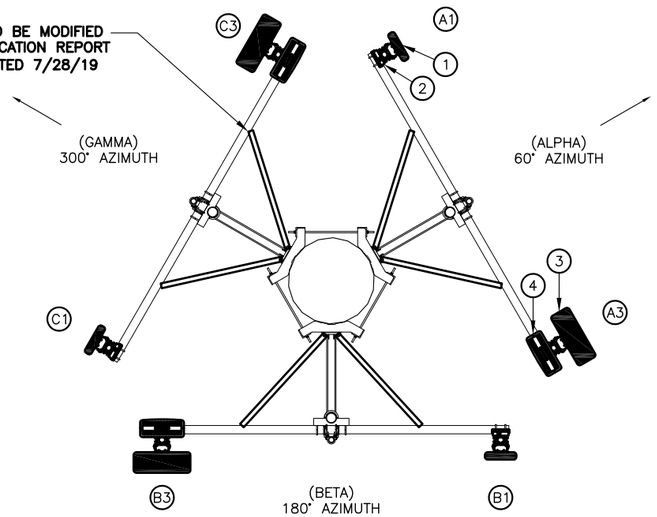
1 ENLARGED AREA PLAN
SCALE: 0' 1' 2' 4' 10'



2 EXISTING ANTENNA ORIENTATION
SCALE: 0' 1' 4' 8' 16'

N

EXISTING MOUNT TO BE MODIFIED PER MOUNT MODIFICATION REPORT BY B+T GROUP DATED 7/28/19



3 PROPOSED ANTENNA ORIENTATION
SCALE: 0' 1' 4' 8' 16'

N

B+T GRP

CROWN CASTLE

T-Mobile

CT11545A
BU #: 801485
CT545/CROWN SUFFIELD
2715 MOUNTAIN RD
SUFFIELD, CT 06093
EXISTING 190'-6" MONOPOLE

PROJECT NO:	84855.012.01
CHECKED BY:	GEH

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
0	7/22/19	RMC	CONSTRUCTION
1	8/20/19	MLC	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/20

STATE OF CONNECTICUT
8/20/19
31627
LICENSED PROFESSIONAL ENGINEER

SHEET NUMBER:	REVISION:
A-2	1

LEGEND			
EXISTING/DEMOLITION NOTES		INSTALLATION NOTES	
A	EXISTING EMS RR90-17-XXDP ANTENNA TO BE REMOVED (TOTAL OF 3)	1	INSTALL RFS APX16DWV-16DWV-S-E-A20 ANTENNAS ON EXISTING MOUNT. PROVIDE NEW 2 7/8" OD SCH.40 PIPE MAST (LENGTH TO BE V.I.F) (TYP. OF 1 PER SECTOR, TOTAL OF 3)
B	EXISTING TMA TO BE REMOVED (TYP. OF 2 PER SECTOR, TOTAL OF 6) (SEE INSTALLATION NOTE 2)	2	INSTALL NEW TMA BEHIND ANTENNA (TYP. OF 1 PER SECTOR, TOTAL OF 3)
C	EXISTING ANDREW LNX-6515DS-A1M ANTENNA TO BE REMOVED (TOTAL OF 3)	3	INSTALL RFS APXVAARR24_43-U-NA20 (8FT) ANTENNAS ON EXISTING MOUNT. PROVIDE NEW 2 7/8" OD SCH.40 PIPE MAST (LENGTH TO BE V.I.F.) (TYP. OF 1 PER SECTOR, TOTAL OF 3)
D	EXISTING 1 5/8" COAX TO REMAIN (TOTAL OF 12)	4	INSTALL RADIO 4449 B12/B71 (TYP. OF 1 PER SECTOR, TOTAL OF 3)
		5	INSTALL (1) 6x12 HCS FIBER. RUN FROM EQUIPMENT TO ANTENNAS FOLLOWING EXISTING ROUTING

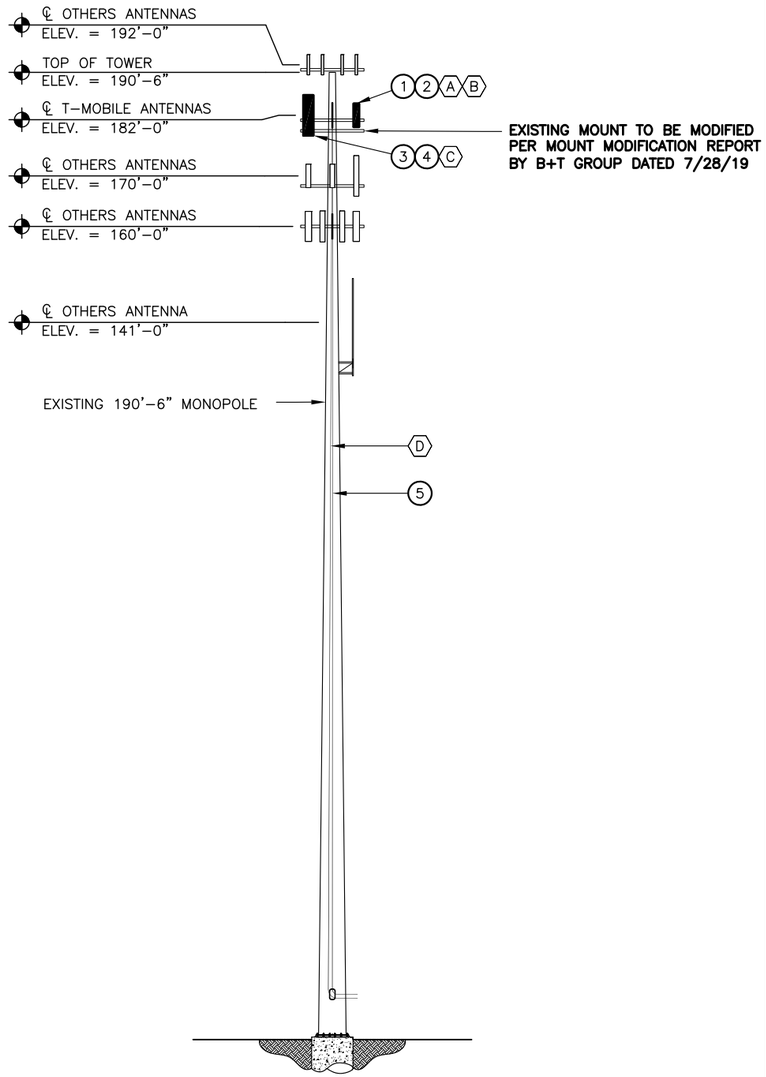
STRUCTURAL ANALYSIS NOTE:

REFER TO STRUCTURAL ANALYSIS OR STRUCTURAL LETTER FOR APPROVAL OF ADDITIONAL NEW APPURTENANCES.

LEGEND:

NEW

EXISTING



1 TOWER ELEVATION

SCALE: 1"=30'

0' 15' 30' 45' 60'

B+T GRP

CROWN CASTLE

T-Mobile

CT11545A
BU #: 801485

CT545/CROWN SUFFIELD

2715 MOUNTAIN RD
SUFFIELD, CT 06093

EXISTING 190'-6" MONOPOLE

PROJECT NO:	84855.012.01
CHECKED BY:	GEH

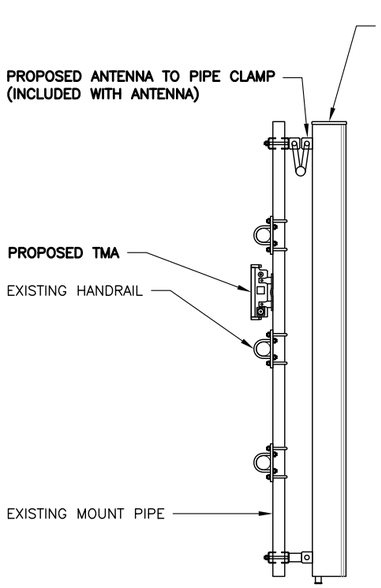
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
0	7/22/19	RMC	CONSTRUCTION
1	8/20/19	MLC	CONSTRUCTION

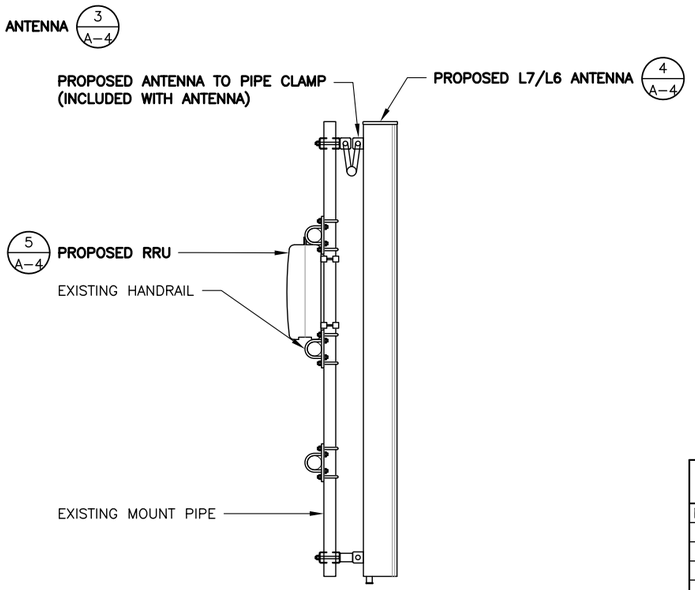
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/20

STATE OF CONNECTICUT
31627
LICENSED
PROFESSIONAL ENGINEER
8/20/19

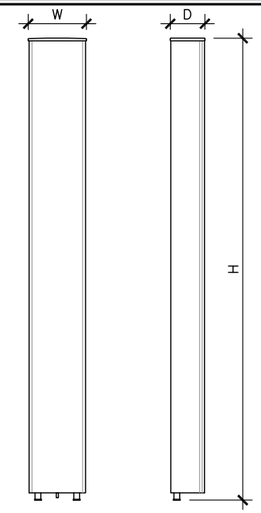
SHEET NUMBER:	REVISION:
A-3	1



1 PROPOSED L19/G19 ANTENNA & RRU MOUNTING DETAIL
SCALE: 3/8" = 1'-0"

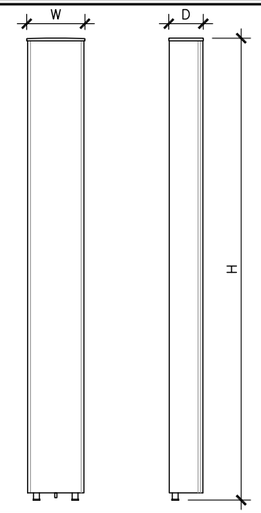


2 PROPOSED L7/L6 ANTENNA & RRU MOUNTING DETAIL
SCALE: 3/8" = 1'-0"



ANTENNA SPECS	
MANUFACTURER	RFS
MODEL #	APX16DWV-16DWV-S-E-A20
WIDTH	13.3"
DEPTH	3.15"
HEIGHT	55.9"
WEIGHT	40.7 LBS

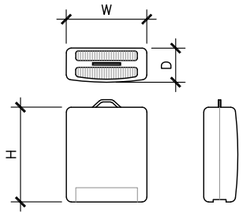
3 L19/G19 ANTENNA DETAIL
SCALE: 3/8" = 1'-0"



ANTENNA SPECS	
MANUFACTURER	RFS
MODEL #	APXVAARR24_43-U-NA20
WIDTH	24.0"
DEPTH	8.7"
HEIGHT	95.9"
WEIGHT	128.0 LBS

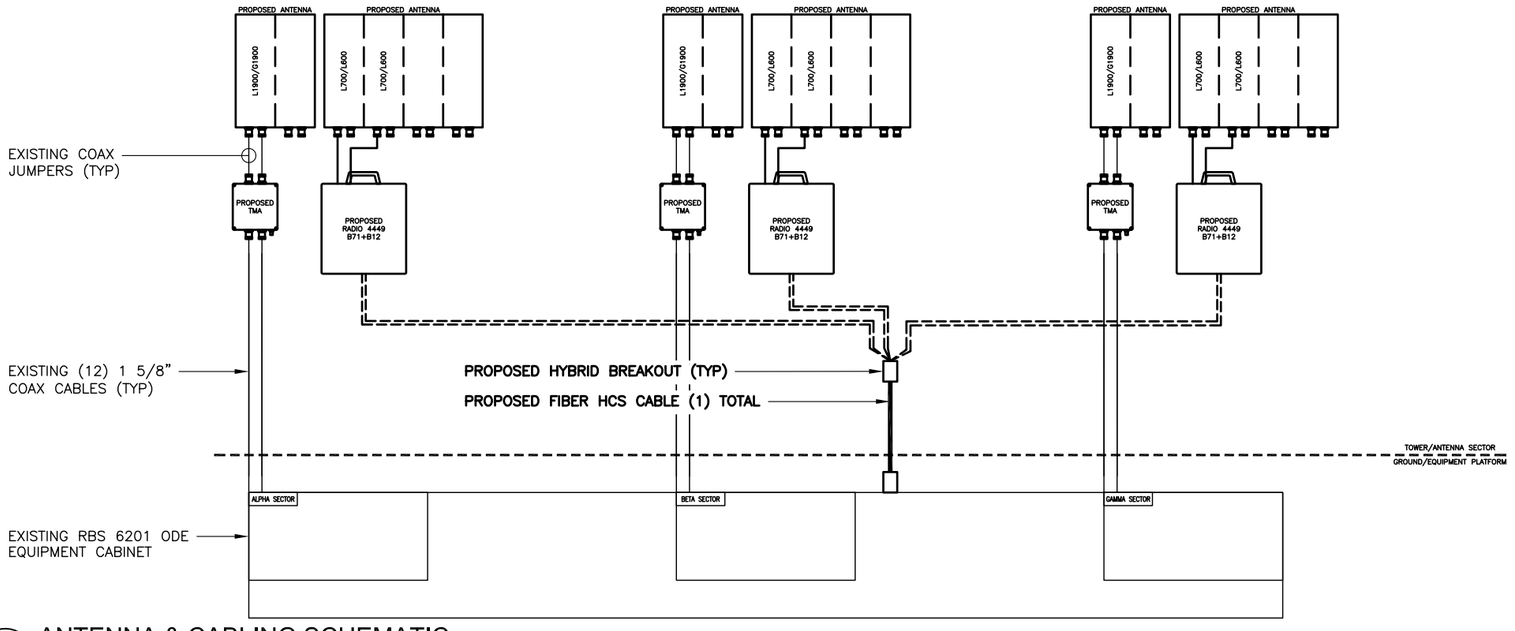
4 L7/L6 ANTENNA DETAIL
SCALE: 3/8" = 1'-0"

NOTES:
1. TAG ALL EXISTING AND PROPOSED CABLES/JUMPERS PER T-MOBILE SPECIFICATIONS.
2. SEE RF SCHEDULE FOR CABLE AND JUMPER LENGTHS.
3. REFER TO ANTENNA ORIENTATION ON SHEET A-2 FOR EXACT ANTENNA POSITIONING.



RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	4449
WIDTH	13.2"
DEPTH	10.4"
HEIGHT	14.9"
WEIGHT	74 LBS

5 REMOTE RADIO UNIT (RRU)
SCALE: 3/8" = 1'-0"



6 ANTENNA & CABLING SCHEMATIC
SCALE: N.T.S.

B+T GRP

CROWN CASTLE

T-Mobile

CT11545A
BU #: 801485
CT545/CROWN SUFFIELD
2715 MOUNTAIN RD
SUFFIELD, CT 06093
EXISTING 190'-6" MONOPOLE

PROJECT NO:	84855.012.01
CHECKED BY:	GEH

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
0	7/22/19	RMC	CONSTRUCTION
1	8/20/19	MLC	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/20

STATE OF CONNECTICUT
8/20/19
31627
LICENSED
PROFESSIONAL ENGINEER

SHEET NUMBER: A-4
REVISION: 1

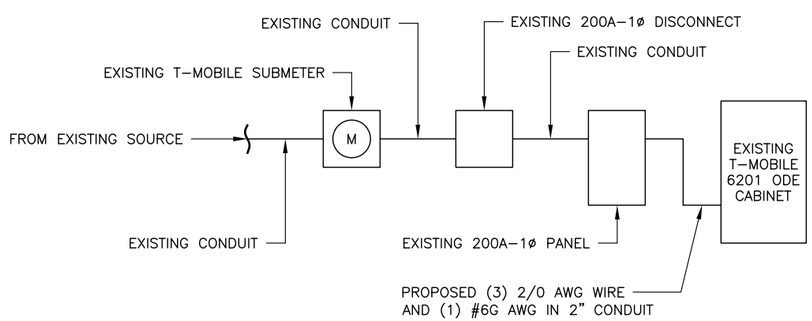
FINAL PANEL SCHEDULE							
LOAD	POLES	AMPS	BUS L1	BUS L2	AMPS	POLES	LOAD
			1	2	30A	2	EQUIPMENT
			3	4			
			21	22	**100A**	2	RBS 6201 ODE
EQUIPMENT	1	20A	23	24			

RATED VOLTAGE: ■120/240 ☐_____. 1 PHASE, 3 WIRE		BRANCH POLES: ☐12 ■24 ☐30 ☐42	APPROVED MF'RS
RATED AMPS: ☐100 ■200 ☐400 ☐_____.		CABINET: ■SURFACE ☐FLUSH	NEMA ☐1 ■3R ☐4X
☐MAIN LUGS ONLY	MAIN 200 AMPS ■BREAKER ☐FUSED SWITCH	■HINGED DOOR	■KEYED DOOR LATCH
☐FUSED ■CIRCUIT BREAKER	BRANCH DEVICES	☐_____ TO BE GFCI BREAKERS	FULL NEUTRAL BUS / GROUND BAR
ALL BREAKERS MUST BE RATED TO INTERRUPT A SHORT CIRCUIT ISC OF 10,000 AMPS SYMMETRICAL			

REPLACE EXISTING BREAKER IN POSITION 22 AND 24 WITH A NEW 2P 100A BREAKER
REPLACE EXISTING WIRES FOR EXISTING 6201 ODE CABINET WITH (3) 2/0 AWG THWN (COPPER) AND (1) #6G AWG. MINIMUM CONDUIT SIZE TO BE 2".
IF 100A BREAKER WILL NOT PROPERLY FIT IN EXISTING PANEL, REPLACE (E) PANEL WITH SQUARE D PANEL QO12040M200RB (OR APPROVED EQUAL).
UPGRADE FEEDER WIRES TO MEET AMPACITY IF NEW PANEL IS REQUIRED.
FINAL PANEL DESIGN AND CALCULATIONS FOR WIRE SIZE WERE BASED OFF OF EXISTING PHOTOS

1 FINAL T-MOBILE PANEL DETAIL

SCALE: N.T.S.



2 ONE-LINE DIAGRAM

SCALE: N.T.S.

B+T GRP

CROWN CASTLE

T-Mobile

CT11545A
BU #: 801485
CT545/CROWN SUFFIELD
2715 MOUNTAIN RD
SUFFIELD, CT 06093
EXISTING 190'-6" MONOPOLE

PROJECT NO:	84855.012.01
CHECKED BY:	GEH

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
0	7/22/19	RMC	CONSTRUCTION
1	8/20/19	MLC	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/20

STATE OF CONNECTICUT
8/20/19
31627
LICENSED PROFESSIONAL ENGINEER

SHEET NUMBER:	REVISION:
E-1	1

Exhibit D

Structural Analysis Report

Date: **August 01, 2019**

Heather Simeone
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

Subject:	**Structural Analysis Report**	
Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11545A
	Carrier Site Name:	CT545/Crown Suffield
Crown Castle Designation:	**Crown Castle BU Number:**	801485
	Crown Castle Site Name:	CT Suffield 1 CAC 801485
	Crown Castle JDE Job Number:	576458
	Crown Castle Work Order Number:	1775783
	Crown Castle Order Number:	494420 Rev. 0
Engineering Firm Designation:	**B+T Group Project Number:**	84855.014.01
Site Data:	**2715 Mountain Rd., Suffield, Hartford County, CT** **Latitude *42° 0' 41.8"*, Longitude *-72° 43' 43.6"*** **190.5 Foot - Monopole Tower**	

Dear Heather Simeone,

B+T Group is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

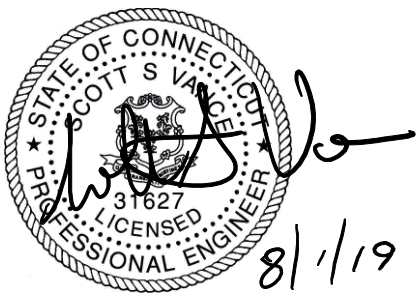
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Proposed Equipment Configuration **Sufficient Capacity – 80.7%**

This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: John Landon

Respectfully submitted by: B+T Engineering, Inc.
COA: PEC.0001564 Expires: 02/10/2020



Scott S. Vance, P.E.

tnxTower Report - version 8.0.5.0

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 190.5 ft. Monopole tower designed by FWT Inc. in May of 2000. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-F. The foundation has been modified by B+T Group in July of 2012 and those modifications were incorporated in this analysis.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	120 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	2 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
180.0	182.0	3	Ericsson	KRY 112 489/2	13	1-5/8
		3	Ericsson	RADIO 4449 B12/B71		
		3	RFS Celwave	APX16DWV-16DWV-S-E-A20		
		3	RFS Celwave	APXVAARR24_43-U-NA20		
		3	Site Pro1	PRK-SFS-L Reinforcement Kit		
		3	--	Horizontal Pipe 2-1/2" Std. x 13'-0" Long		
	180.0	1	--	T-Arm Mount [TA 701-3]		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
191.0	192.0	12	Decibel	DB844H90-XY	12	1-5/8
	191.0	1	--	Platform Mount [LP 712-1]		
168.0	170.0	3	Ericsson	RRUS-11	12 2 1	1-5/8 3/4 3/8
		1	KMW Comm.	AM-X-CD-14-65-00T-RET		
		6	Powerwave Tech.	7770.00		
		6	Powerwave Tech.	LGP21401		
		6	Powerwave Tech.	LGP21901		
		2	Powerwave Tech.	P65-17-XLH-RR		
		1	Raycap	DC6-48-60-18-8F		
	168.0	1	--	Platform Mount [LP 303-1]		
160.0	160.0	3	Alcatel Lucent	B13 RRH 4X30	19	1-5/8
		3	Alcatel Lucent	B66A RRH4X45		
		4	Antel	LPA-80063-6CF-EDIN		
		2	Antel	LPA-80063-6CF-EDIN-5		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		6	Commscope	SBNHH-1D65B		
		2	RFS Celwave	DB-T1-6Z-8AB-0Z		
		1	--	Platform Mount [LP 714-1]		
132.0	141.0	1	Dbspectra	DS4C06F36D-D	2	7/8
	132.0	1	Andrew	DB5004		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Online Order Information	T-Mobile Co-Locate, Rev# 0	494420	CCI Sites
Tower Manufacturer Drawing	FWT Inc., Job No. 21281000	942443	CCI Sites
Mount Modification Drawing	B+T Group, Project No. 84855.013.01 Date: 07/11/2019	8556509	CCI Sites
Tower Modification Drawing	B+T Group, Project No. 84855.001	3268394	CCI Sites
Post Modification Inspection	TEP, Project No. 127143, Date: 03/29/2013	3770639	CCI Sites
Foundation Drawing	FWT Inc. Job No. 21281000	1118796	CCI Sites
Geotech Report	Clough, Harbour & Associates LLP, Project No. 8961.07.06	2240855	CCI Sites
Antenna Configuration	Crown CAD Package	Date: 06/03/2019	CCI Sites

3.1) Analysis Method

tnxTower (version 8.0.5.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. B+T Group should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	190.5 - 143.17	Pole	TP27.778x14.75x0.25	1	-12.826	1293.663	71.0	Pass
L2	143.17 - 93.753	Pole	TP40.88x26.292x0.375	2	-24.365	2854.110	65.2	Pass
L3	93.753 - 46.083	Pole	TP53.251x38.663x0.375	3	-39.142	3726.628	73.8	Pass
L4	46.083 - 0	Pole	TP65.185x50.597x0.375	4	-60.126	4738.335	80.7	Pass
							Summary	
						Pole (L4)	80.7	Pass
						Rating =	80.7	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	68.1	Pass
1	Base Plate	Base	34.7	Pass
1	Base Foundation (Structural)	Base	63.0	Pass
1	Base Foundation (Soil Interaction)	Base	40.8	Pass

Structure Rating (max from all components) =	80.7%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.
2) Rating per TIA-222-H Section 15.5.

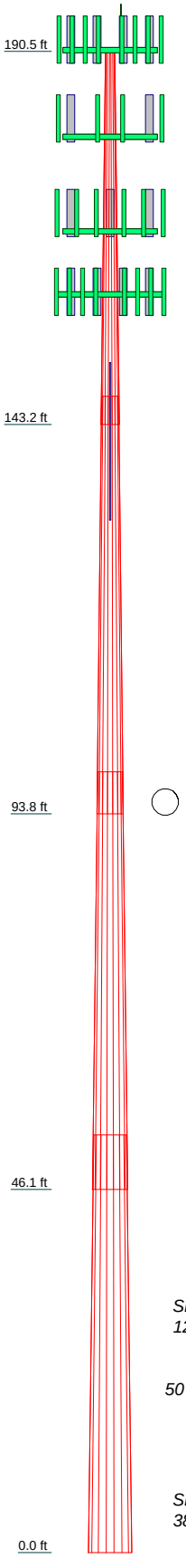
4.1) Recommendations

The tower and its foundations have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

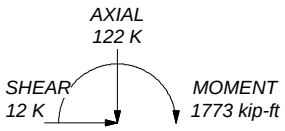
APPENDIX A

TNXTOWER OUTPUT

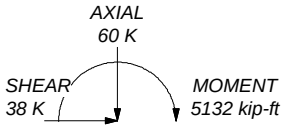
Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	47.330	18	0.250	3.583	14.750	27.778		2.7
2	53.000	18	0.375	5.330	26.292	40.880		7.1
3	53.000	18	0.375	6.917	38.663	53.251		9.8
4	53.000	18	0.375		50.597	65.185		12.3
							A572-65	31.9



ALL REACTIONS ARE FACTORED



TORQUE 1 kip-ft
50 mph WIND - 2.000 in ICE



TORQUE 2 kip-ft
REACTIONS - 120 mph WIND

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 120 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 2.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TIA-222-H Annex S
9. TOWER RATING: 80.7%

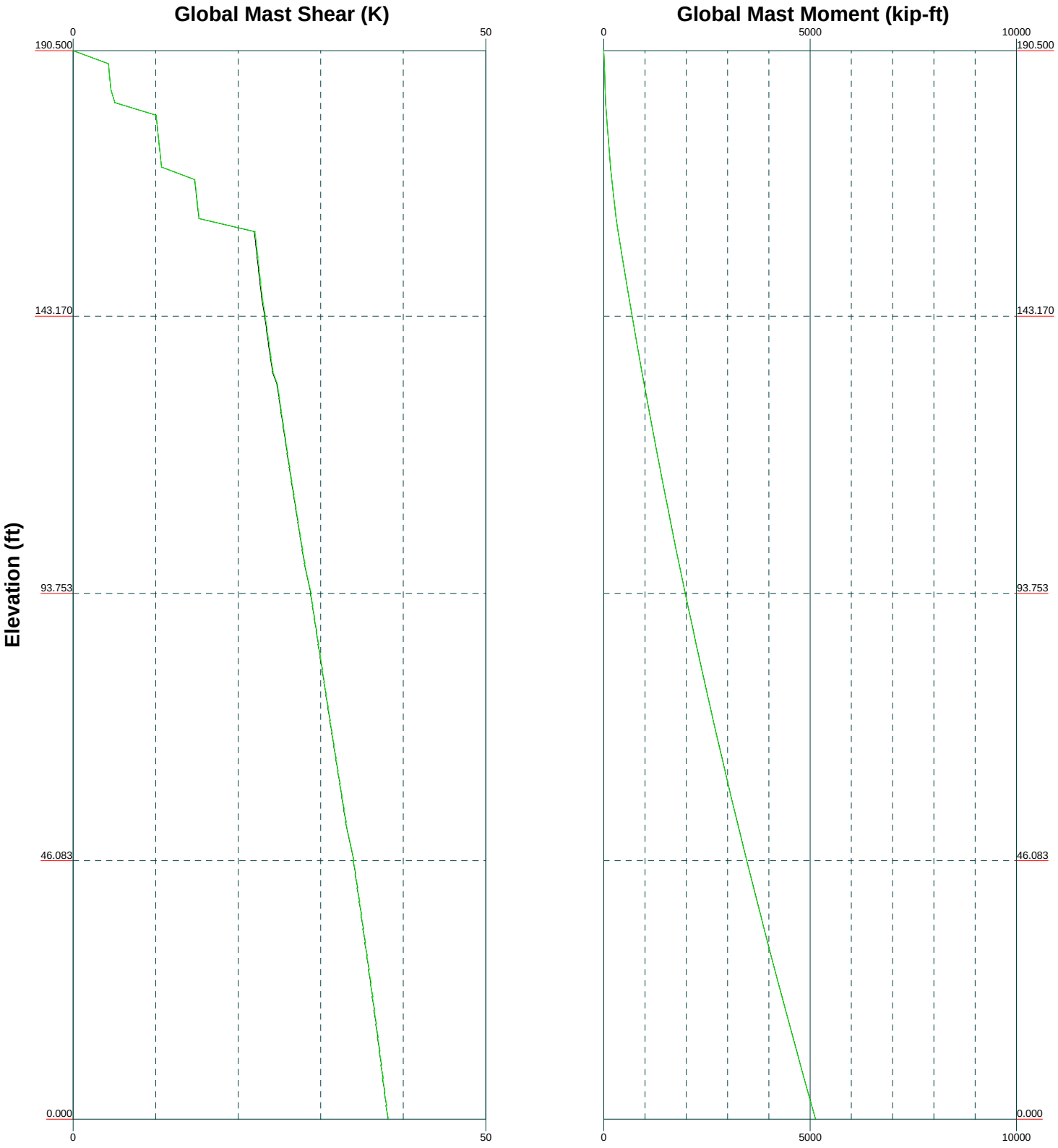
B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 84855.014.01 - CT SUFFIELD 1 CAC 801485, CT (BU# 80148		
Project:		
Client: Crown Castle	Drawn by: Akshay Nayak	App'd:
Code: TIA-222-H	Date: 08/01/19	Scale: NTS
Path:		Dwg No. E-1

TIA-222-H - 120 mph/50 mph 2.000 in Ice Exposure C

Maximum Values

Vx Vz Mx Mz

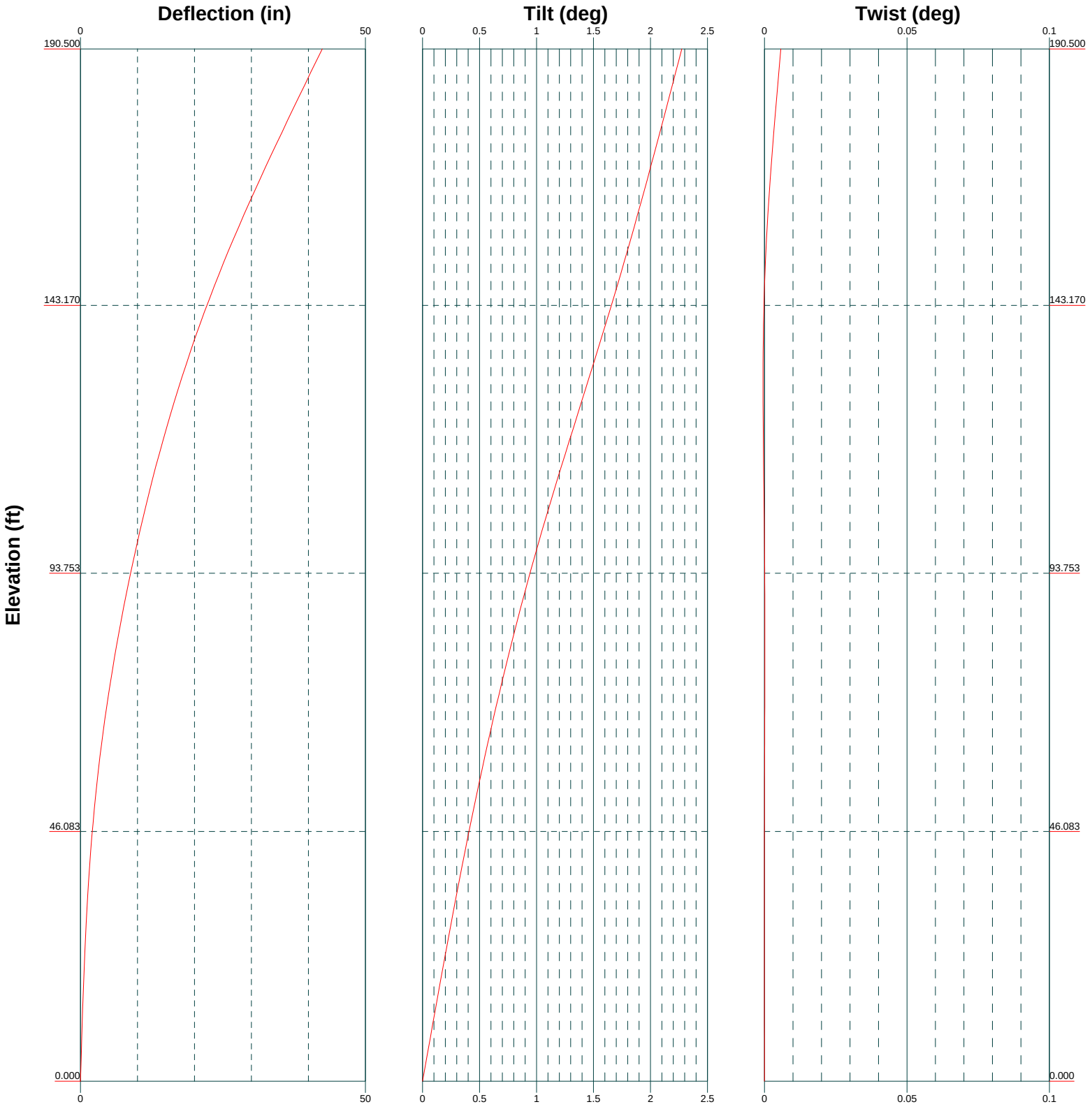


B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 84855.014.01 - CT SUFFIELD 1 CAC 801485, CT (BU# 80148		
Project:		
Client: Crown Castle	Drawn by: Akshay Nayak	App'd:
Code: TIA-222-H	Date: 08/01/19	Scale: NTS
Path:		Dwg No. E-4

TIA-222-H - Service - 60 mph

Maximum Values

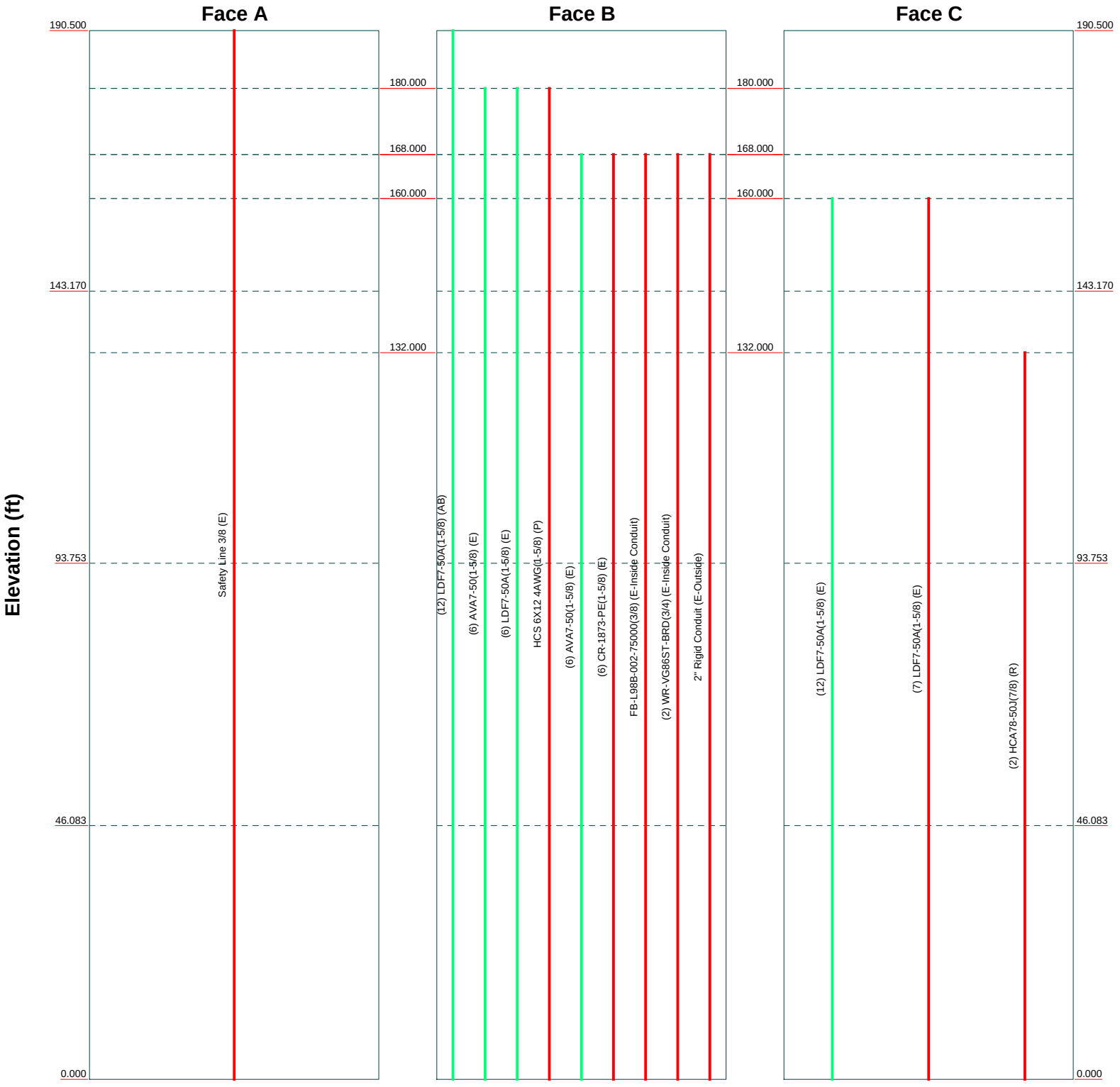


B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: ***84855.014.01 - CT SUFFIELD 1 CAC 801485, CT (BU# 80148***		
Project:		
Client: Crown Castle	Drawn by: Akshay Nayak	App'd:
Code: TIA-222-H	Date: 08/01/19	Scale: NTS
Path:		Dwg No. E-5

Feed Line Distribution Chart
0' - 190'6"

Round | Flat | App In Face | App Out Face | Truss Leg



B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 84855.014.01 - CT SUFFIELD 1 CAC 801485, CT (BU# 80148		
Project:		
Client: Crown Castle	Drawn by: Akshay Nayak	App'd:
Code: TIA-222-H	Date: 08/01/19	Scale: NTS
Path:		Dwg No. E-7

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower is located in Hartford County, Connecticut.
Tower base elevation above sea level: 371.000 ft.
Basic wind speed of 120 mph.
Risk Category II.
Exposure Category C.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.000 ft.
Nominal ice thickness of 2.000 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 60 mph.
TIA-222-H Annex S.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.05.
Tower analysis based on target reliabilities in accordance with Annex S.
Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Tapered Pole Section Geometry

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
L1	190.500-143.170	47.330	3.583	18	14.750	27.778	0.250	1.000	A572-65 (65 ksi)
L2	143.170-93.753	53.000	5.330	18	26.292	40.880	0.375	1.500	A572-65 (65 ksi)
L3	93.753-46.083	53.000	6.917	18	38.663	53.251	0.375	1.500	A572-65 (65 ksi)
L4	46.083-0.000	53.000		18	50.597	65.185	0.375	1.500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	14.939	11.506	305.625	5.148	7.493	40.788	611.651	5.754	2.156	8.624
	28.168	21.843	2091.262	9.772	14.111	148.198	4185.275	10.924	4.449	17.796

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
L2	27.641	30.847	2617.684	9.200	13.356	195.990	5238.812	15.427	3.967	10.58
	41.453	48.211	9993.130	14.379	20.767	481.201	19999.410	24.110	6.535	17.426
L3	40.691	45.572	8440.358	13.592	19.641	429.737	16891.822	22.790	6.145	16.386
	54.015	62.936	22230.612	18.771	27.052	821.788	44490.476	31.474	8.712	23.232
L4	53.253	59.777	19048.497	17.829	25.703	741.090	38122.058	29.894	8.245	21.987
	66.133	77.140	40935.651	23.008	33.114	1236.205	81925.167	38.577	10.813	28.833

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 190.500-143.170				1	1	1			
L2 143.170-93.753				1	1	1			
L3 93.753-46.083				1	1	1			
L4 46.083-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
HCS 6X12 4AWG(1-5/8) (P)	B	No	Surface Ar (CaAa)	180.000 - 0.000	1	1	-0.170 -0.150	1.660		0.002
CR-1873-PE(1-5/8) (E)	B	No	Surface Ar (CaAa)	168.000 - 0.000	6	6	0.240 0.400	1.873		0.001
FB-L98B-002-75000(3/8) (E-Inside Conduit)	B	No	Surface Ar (CaAa)	168.000 - 0.000	1	1	0.220 0.240	0.000		0.000
WR-VG86ST-BRD(3/4) (E-Inside Conduit)	B	No	Surface Ar (CaAa)	168.000 - 0.000	2	2	0.220 0.240	0.000		0.001
2" Rigid Conduit (E-Outside)	B	No	Surface Ar (CaAa)	168.000 - 0.000	1	1	0.220 0.240	2.000		0.003
LDF7-50A(1-5/8) (E) **P**	C	No	Surface Ar (CaAa)	160.000 - 0.000	7	6	-0.150 0.050	1.980		0.001
HCA78-50J(7/8) (R) **P**	C	No	Surface Ar (CaAa)	132.000 - 0.000	2	2	0.350 0.400	1.103		0.000
Safety Line 3/8 (E) **P**	A	No	Surface Ar (CaAa)	190.500 - 0.000	1	1	0.270 0.280	0.375		0.000

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
LDF7-50A(1-5/8) (AB)	B	No	No	Inside Pole	190.500 - 0.000	12	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
P									
AVA7-50(1-5/8) (E)	B	No	No	Inside Pole	180.000 - 0.000	6	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
LDF7-50A(1-5/8) (E)	B	No	No	Inside Pole	180.000 - 0.000	6	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
P									
AVA7-50(1-5/8) (E)	B	No	No	Inside Pole	168.000 - 0.000	6	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
P									
LDF7-50A(1-5/8) (E)	C	No	No	Inside Pole	160.000 - 0.000	12	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
P									

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	190.500-143.170	A	0.000	0.000	1.775	0.000	0.010
		B	0.000	0.000	38.984	0.000	1.222
		C	0.000	0.000	19.994	0.000	0.262
L2	143.170-93.753	A	0.000	0.000	1.853	0.000	0.011
		B	0.000	0.000	73.621	0.000	1.717
		C	0.000	0.000	67.145	0.000	0.805
L3	93.753-46.083	A	0.000	0.000	1.788	0.000	0.010
		B	0.000	0.000	71.019	0.000	1.656
		C	0.000	0.000	67.148	0.000	0.787
L4	46.083-0.000	A	0.000	0.000	1.728	0.000	0.010
		B	0.000	0.000	68.654	0.000	1.601
		C	0.000	0.000	64.913	0.000	0.760

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	190.500-143.170	A	1.996	0.000	0.000	20.672	0.000	0.284
		B		0.000	0.000	105.277	0.000	2.666
		C		0.000	0.000	33.392	0.000	0.757

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
L2	143.170-93.753	A	1.930	0.000	0.000	21.584	0.000	0.297
		B		0.000	0.000	196.024	0.000	4.378
		C		0.000	0.000	127.683	0.000	2.616
L3	93.753-46.083	A	1.831	0.000	0.000	20.184	0.000	0.269
		B		0.000	0.000	185.589	0.000	4.102
		C		0.000	0.000	129.925	0.000	2.561
L4	46.083-0.000	A	1.641	0.000	0.000	18.601	0.000	0.237
		B		0.000	0.000	174.404	0.000	3.797
		C		0.000	0.000	123.324	0.000	2.373

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	190.500-143.170	4.057	2.196	3.699	0.520
L2	143.170-93.753	5.013	4.872	4.454	2.619
L3	93.753-46.083	5.759	5.778	5.195	3.306
L4	46.083-0.000	6.370	6.352	5.961	3.828

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	5	HCS 6X12 4AWG(1-5/8)	143.17 - 180.00	1.0000	1.0000
L1	8	CR-1873-PE(1-5/8)	143.17 - 168.00	1.0000	1.0000
L1	9	FB-L98B-002-75000(3/8)	143.17 - 168.00	1.0000	1.0000
L1	10	WR-VG86ST-BRD(3/4)	143.17 - 168.00	1.0000	1.0000
L1	11	2" Rigid Conduit	143.17 - 168.00	1.0000	1.0000
L1	14	LDF7-50A(1-5/8)	143.17 - 160.00	1.0000	1.0000
L1	19	Safety Line 3/8	143.17 - 190.50	1.0000	1.0000
L1	17	HCA78-50J(7/8)	143.17 - 132.00	1.0000	1.0000
L2	5	HCS 6X12 4AWG(1-5/8)	93.75 - 143.17	1.0000	1.0000
L2	8	CR-1873-PE(1-5/8)	93.75 - 143.17	1.0000	1.0000
L2	9	FB-L98B-002-75000(3/8)	93.75 - 143.17	1.0000	1.0000
L2	10	WR-VG86ST-BRD(3/4)	93.75 - 143.17	1.0000	1.0000
L2	11	2" Rigid Conduit	93.75 - 143.17	1.0000	1.0000
L2	14	LDF7-50A(1-5/8)	93.75 - 143.17	1.0000	1.0000
L2	17	HCA78-50J(7/8)	93.75 - 132.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L2	19	Safety Line 3/8	93.75 - 143.17	1.0000	1.0000
L3	5	HCS 6X12 4AWG(1-5/8)	46.08 - 93.75	1.0000	1.0000
L3	8	CR-1873-PE(1-5/8)	46.08 - 93.75	1.0000	1.0000
L3	9	FB-L98B-002-75000(3/8)	46.08 - 93.75	1.0000	1.0000
L3	10	WR-VG86ST-BRD(3/4)	46.08 - 93.75	1.0000	1.0000
L3	11	2" Rigid Conduit	46.08 - 93.75	1.0000	1.0000
L3	14	LDF7-50A(1-5/8)	46.08 - 93.75	1.0000	1.0000
L3	17	HCA78-50J(7/8)	46.08 - 93.75	1.0000	1.0000
L3	19	Safety Line 3/8	46.08 - 93.75	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod 5/8" x 6'	B	From Leg	1.000	0.000	190.500	No Ice	0.375	0.375	0.006
(E)			0.000			1/2" Ice	0.989	0.989	0.010
			3.000			1" Ice	1.619	1.619	0.019
						2" Ice	2.464	2.464	0.047
P									
(4) DB844H90-XY w/ Mount Pipe	A	From Leg	4.000	0.000	191.000	No Ice	3.104	4.984	0.028
			0.000			1/2" Ice	3.476	5.600	0.068
(AB)			1.000			1" Ice	3.848	6.227	0.113
						2" Ice	4.604	7.529	0.224
(4) DB844H90-XY w/ Mount Pipe	B	From Leg	4.000	0.000	191.000	No Ice	3.104	4.984	0.028
			0.000			1/2" Ice	3.476	5.600	0.068
(AB)			1.000			1" Ice	3.848	6.227	0.113
						2" Ice	4.604	7.529	0.224
(4) DB844H90-XY w/ Mount Pipe	C	From Leg	4.000	0.000	191.000	No Ice	3.104	4.984	0.028
			0.000			1/2" Ice	3.476	5.600	0.068
(AB)			1.000			1" Ice	3.848	6.227	0.113
						2" Ice	4.604	7.529	0.224
Platform Mount [LP 712-1]	C	None		0.000	191.000	No Ice	24.560	24.560	1.335
(AB)						1/2" Ice	27.920	27.920	1.915
						1" Ice	31.270	31.270	2.548
						2" Ice	37.980	37.980	3.971
P									
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	A	From Leg	4.000	0.000	180.000	No Ice	6.290	2.760	0.061
			0.000			1/2" Ice	6.860	3.270	0.105
(P)			2.000			1" Ice	7.450	3.790	0.157
						2" Ice	8.680	4.900	0.290
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	B	From Leg	4.000	0.000	180.000	No Ice	6.290	2.760	0.061
			0.000			1/2" Ice	6.860	3.270	0.105
(P)			2.000			1" Ice	7.450	3.790	0.157
						2" Ice	8.680	4.900	0.290
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	C	From Leg	4.000	0.000	180.000	No Ice	6.290	2.760	0.061
			0.000			1/2" Ice	6.860	3.270	0.105
(P)			2.000			1" Ice	7.450	3.790	0.157
						2" Ice	8.680	4.900	0.290
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.000	0.000	180.000	No Ice	14.690	6.870	0.186
			0.000			1/2" Ice	15.460	7.550	0.315

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
(P)			2.000			1" Ice	16.230	8.250	0.458
						2" Ice	17.820	9.670	0.788
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.000 0.000	0.000	180.000	No Ice 1/2" Ice	14.690 15.460	6.870 7.550	0.186 0.315
(P)			2.000			1" Ice	16.230	8.250	0.458
						2" Ice	17.820	9.670	0.788
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.000 0.000	0.000	180.000	No Ice 1/2" Ice	14.690 15.460	6.870 7.550	0.186 0.315
(P)			2.000			1" Ice	16.230	8.250	0.458
						2" Ice	17.820	9.670	0.788
KRY 112 489/2	A	From Leg	4.000	0.000	180.000	No Ice	0.559	0.365	0.015
(P)			0.000 2.000			1/2" Ice 1" Ice	0.658 0.764	0.448 0.542	0.020 0.027
						2" Ice	0.998	0.752	0.046
KRY 112 489/2	B	From Leg	4.000	0.000	180.000	No Ice	0.559	0.365	0.015
(P)			0.000 2.000			1/2" Ice 1" Ice	0.658 0.764	0.448 0.542	0.020 0.027
						2" Ice	0.998	0.752	0.046
KRY 112 489/2	C	From Leg	4.000	0.000	180.000	No Ice	0.559	0.365	0.015
(P)			0.000 2.000			1/2" Ice 1" Ice	0.658 0.764	0.448 0.542	0.020 0.027
						2" Ice	0.998	0.752	0.046
RADIO 4449 B12/B71	A	From Leg	4.000	0.000	180.000	No Ice	1.650	1.300	0.075
(P)			0.000 2.000			1/2" Ice 1" Ice	1.810 1.978	1.445 1.597	0.092 0.112
						2" Ice	2.336	1.924	0.161
RADIO 4449 B12/B71	B	From Leg	4.000	0.000	180.000	No Ice	1.650	1.300	0.075
(P)			0.000 2.000			1/2" Ice 1" Ice	1.810 1.978	1.445 1.597	0.092 0.112
						2" Ice	2.336	1.924	0.161
RADIO 4449 B12/B71	C	From Leg	4.000	0.000	180.000	No Ice	1.650	1.300	0.075
(P)			0.000 2.000			1/2" Ice 1" Ice	1.810 1.978	1.445 1.597	0.092 0.112
						2" Ice	2.336	1.924	0.161
6' x 2" Mount Pipe	A	From Leg	4.000	0.000	180.000	No Ice	1.425	1.425	0.022
(E)			0.000 1.000			1/2" Ice 1" Ice	1.925 2.294	1.925 2.294	0.033 0.048
						2" Ice	3.060	3.060	0.090
6' x 2" Mount Pipe	B	From Leg	4.000	0.000	180.000	No Ice	1.425	1.425	0.022
(E)			0.000 1.000			1/2" Ice 1" Ice	1.925 2.294	1.925 2.294	0.033 0.048
						2" Ice	3.060	3.060	0.090
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	180.000	No Ice	1.425	1.425	0.022
(E)			0.000 1.000			1/2" Ice 1" Ice	1.925 2.294	1.925 2.294	0.033 0.048
						2" Ice	3.060	3.060	0.090
13' horizontal x 2.875" Pipe Mount	A	From Leg	4.000	0.000	180.000	No Ice	3.737	3.737	0.020
(P)			0.000 1.500			1/2" Ice 1" Ice	5.070 6.419	5.070 6.419	0.047 0.083
						2" Ice	8.873	8.873	0.180
13' horizontal x 2.875" Pipe Mount	B	From Leg	4.000	0.000	180.000	No Ice	3.737	3.737	0.020
(P)			0.000 1.500			1/2" Ice 1" Ice	5.070 6.419	5.070 6.419	0.047 0.083
						2" Ice	8.873	8.873	0.180
13' horizontal x 2.875" Pipe Mount	C	From Leg	4.000	0.000	180.000	No Ice	3.737	3.737	0.020
(P)			0.000 1.500			1/2" Ice 1" Ice	5.070 6.419	5.070 6.419	0.047 0.083

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
						2" Ice	8.873	8.873	0.180
(2) L 2.5x2.5x3/16x6' (P)	A	From Leg	3.000 0.000 1.500	0.000	180.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.500 1.918 2.343 3.215	0.005 0.024 0.049 0.123	0.025 0.034 0.048 0.091
(2) L 2.5x2.5x3/16x6' (P)	B	From Leg	3.000 0.000 1.500	0.000	180.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.500 1.918 2.343 3.215	0.005 0.024 0.049 0.123	0.025 0.034 0.048 0.091
(2) L 2.5x2.5x3/16x6' (P)	C	From Leg	3.000 0.000 1.500	0.000	180.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.500 1.918 2.343 3.215	0.005 0.024 0.049 0.123	0.025 0.034 0.048 0.091
(2) L 2.5x2.5x3/16x6' (P)	A	From Leg	3.000 0.000 1.750	0.000	180.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.500 1.918 2.343 3.215	0.005 0.024 0.049 0.123	0.025 0.034 0.048 0.091
(2) L 2.5x2.5x3/16x6' (P)	B	From Leg	3.000 0.000 1.750	0.000	180.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.500 1.918 2.343 3.215	0.005 0.024 0.049 0.123	0.025 0.034 0.048 0.091
(2) L 2.5x2.5x3/16x6' (P)	C	From Leg	3.000 0.000 1.750	0.000	180.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.500 1.918 2.343 3.215	0.005 0.024 0.049 0.123	0.025 0.034 0.048 0.091
Side Arm Mount [SO 102-3] (P)	C	None		0.000	181.500	No Ice 1/2" Ice 1" Ice 2" Ice	3.600 4.180 4.750 5.900	3.600 4.180 4.750 5.900	0.075 0.105 0.135 0.195
Side Arm Mount [SO 102-3] (P)	C	None		0.000	181.750	No Ice 1/2" Ice 1" Ice 2" Ice	3.600 4.180 4.750 5.900	3.600 4.180 4.750 5.900	0.075 0.105 0.135 0.195
T-Arm Mount [TA 701-3] (E)	C	None		0.000	180.000	No Ice 1/2" Ice 1" Ice 2" Ice	23.940 30.040 36.160 48.720	23.940 30.040 36.160 48.720	1.092 1.476 1.948 3.157
P									
P65-17-XLH-RR w/ Mount Pipe (E)	A	From Leg	4.000 0.000 2.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice	11.704 12.424 13.153 14.517	8.938 10.450 11.986 14.313	0.092 0.178 0.273 0.498
P65-17-XLH-RR w/ Mount Pipe (E)	B	From Leg	4.000 0.000 2.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice	11.704 12.424 13.153 14.517	8.938 10.450 11.986 14.313	0.092 0.178 0.273 0.498
AM-X-CD-14-65-00T-RET w/ Mount Pipe (E)	C	From Leg	4.000 0.000 2.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.232 5.618 6.012 6.827	4.015 4.633 5.257 6.532	0.035 0.080 0.131 0.254
(2) 7770.00 w/ Mount Pipe (E)	A	From Leg	4.000 0.000 2.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.746 6.179 6.607 7.488	4.254 5.014 5.711 7.155	0.055 0.103 0.157 0.287
(2) 7770.00 w/ Mount Pipe (E)	B	From Leg	4.000 0.000 2.000	0.000	168.000	No Ice 1/2" Ice 1" Ice	5.746 6.179 6.607	4.254 5.014 5.711	0.055 0.103 0.157

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	7.488	7.155	0.287
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.000	0.000	168.000	No Ice	5.746	4.254	0.055
(E)			0.000			1/2" Ice	6.179	5.014	0.103
			2.000			1" Ice	6.607	5.711	0.157
						2" Ice	7.488	7.155	0.287
RRUS-11	A	From Leg	4.000	0.000	168.000	No Ice	2.784	1.187	0.048
(E-V.offset per TIA)			0.000			1/2" Ice	2.992	1.334	0.068
			2.000			1" Ice	3.207	1.490	0.092
						2" Ice	3.658	1.833	0.150
RRUS-11	B	From Leg	4.000	0.000	168.000	No Ice	2.784	1.187	0.048
(E-V.offset per TIA)			0.000			1/2" Ice	2.992	1.334	0.068
			2.000			1" Ice	3.207	1.490	0.092
						2" Ice	3.658	1.833	0.150
RRUS-11	C	From Leg	4.000	0.000	168.000	No Ice	2.784	1.187	0.048
(E-V.offset per TIA)			0.000			1/2" Ice	2.992	1.334	0.068
			2.000			1" Ice	3.207	1.490	0.092
						2" Ice	3.658	1.833	0.150
(2) LGP21401	A	From Leg	4.000	0.000	168.000	No Ice	1.104	0.207	0.014
(E-V.offset per TIA)			0.000			1/2" Ice	1.239	0.274	0.021
			2.000			1" Ice	1.381	0.348	0.030
						2" Ice	1.688	0.521	0.055
(2) LGP21401	B	From Leg	4.000	0.000	168.000	No Ice	1.104	0.207	0.014
(E-V.offset per TIA)			0.000			1/2" Ice	1.239	0.274	0.021
			2.000			1" Ice	1.381	0.348	0.030
						2" Ice	1.688	0.521	0.055
(2) LGP21401	C	From Leg	4.000	0.000	168.000	No Ice	1.104	0.207	0.014
(E-V.offset per TIA)			0.000			1/2" Ice	1.239	0.274	0.021
			2.000			1" Ice	1.381	0.348	0.030
						2" Ice	1.688	0.521	0.055
(2) LGP21901	A	From Leg	4.000	0.000	168.000	No Ice	0.231	0.158	0.006
(E-V.offset per TIA)			0.000			1/2" Ice	0.294	0.213	0.008
			2.000			1" Ice	0.365	0.276	0.011
						2" Ice	0.528	0.423	0.022
(2) LGP21901	B	From Leg	4.000	0.000	168.000	No Ice	0.231	0.158	0.006
(E-V.offset per TIA)			0.000			1/2" Ice	0.294	0.213	0.008
			2.000			1" Ice	0.365	0.276	0.011
						2" Ice	0.528	0.423	0.022
(2) LGP21901	C	From Leg	4.000	0.000	168.000	No Ice	0.231	0.158	0.006
(E-V.offset per TIA)			0.000			1/2" Ice	0.294	0.213	0.008
			2.000			1" Ice	0.365	0.276	0.011
						2" Ice	0.528	0.423	0.022
DC6-48-60-18-8F	A	From Leg	4.000	0.000	168.000	No Ice	1.212	1.212	0.033
(E-V.offset per TIA)			0.000			1/2" Ice	1.892	1.892	0.055
			2.000			1" Ice	2.105	2.105	0.080
						2" Ice	2.570	2.570	0.138
Platform Mount [LP 303-1]	C	None		0.000	168.000	No Ice	14.690	14.690	1.250
(E-12'/TIA)						1/2" Ice	18.010	18.010	1.569
						1" Ice	21.340	21.340	1.942
						2" Ice	28.080	28.080	2.852
P									
(2) LPA-80063-6CF-EDIN	A	From Leg	4.000	0.000	160.000	No Ice	9.970	10.248	0.052
w/ Mount Pipe			0.000			1/2" Ice	10.541	11.422	0.145
(E)			0.000			1" Ice	11.077	12.309	0.247
						2" Ice	12.173	14.130	0.480
(2) LPA-80063-6CF-EDIN	B	From Leg	4.000	0.000	160.000	No Ice	9.970	10.248	0.052
w/ Mount Pipe			0.000			1/2" Ice	10.541	11.422	0.145
(E)			0.000			1" Ice	11.077	12.309	0.247

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
						2" Ice	12.173	14.130	0.480
(2) LPA-80063-6CF-EDIN-5 w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	9.970 10.541 11.077 12.173	10.248 11.422 12.309 14.130	0.052 0.145 0.247 0.480
(2) SBNHH-1D65B w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.090 4.490 4.890 5.720	3.300 3.680 4.070 4.870	0.066 0.130 0.204 0.386
(2) SBNHH-1D65B w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.090 4.490 4.890 5.720	3.300 3.680 4.070 4.870	0.066 0.130 0.204 0.386
(2) SBNHH-1D65B w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.090 4.490 4.890 5.720	3.300 3.680 4.070 4.870	0.066 0.130 0.204 0.386
B13 RRH 4X30 (E)	A	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.055 2.241 2.433 2.841	1.320 1.475 1.638 1.997	0.056 0.073 0.093 0.142
B13 RRH 4X30 (E)	B	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.055 2.241 2.433 2.841	1.320 1.475 1.638 1.997	0.056 0.073 0.093 0.142
B13 RRH 4X30 (E)	C	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.055 2.241 2.433 2.841	1.320 1.475 1.638 1.997	0.056 0.073 0.093 0.142
B66A RRH4X45 (E)	A	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.580 2.794 3.015 3.479	1.630 1.811 1.999 2.396	0.057 0.077 0.101 0.158
B66A RRH4X45 (E)	B	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.580 2.794 3.015 3.479	1.630 1.811 1.999 2.396	0.057 0.077 0.101 0.158
B66A RRH4X45 (E)	C	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.580 2.794 3.015 3.479	1.630 1.811 1.999 2.396	0.057 0.077 0.101 0.158
DB-T1-6Z-8AB-0Z (E)	A	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.800 5.070 5.348 5.926	2.000 2.193 2.393 2.815	0.044 0.080 0.120 0.213
DB-T1-6Z-8AB-0Z (E)	B	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.800 5.070 5.348 5.926	2.000 2.193 2.393 2.815	0.044 0.080 0.120 0.213
6' x 2" Mount Pipe (E-Empty)	A	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.022 0.033 0.048 0.090
6' x 2" Mount Pipe (E-Empty)	B	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.022 0.033 0.048 0.090

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
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	160.000	No Ice	1.425	1.425	0.022
(E-Empty)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
Platform Mount [LP 714-1]	C	None		0.000	160.000	No Ice	37.510	37.510	1.600
(E-14'/TIA)						1/2" Ice	41.700	41.700	2.496
						1" Ice	45.890	45.890	3.458
						2" Ice	54.290	54.290	5.583
P									
DS4C06F36D-D	A	From Leg	2.000	0.000	132.000	No Ice	5.820	5.820	0.050
(R)			0.000			1/2" Ice	7.793	7.793	0.092
			9.000			1" Ice	9.783	9.783	0.146
						2" Ice	13.813	13.813	0.292
Side Arm Mount [SO 301-1]	A	From Leg	1.000	0.000	132.000	No Ice	0.460	0.910	0.023
(R-DB5004)			0.000			1/2" Ice	0.650	1.300	0.033
			0.000			1" Ice	0.870	1.710	0.047
						2" Ice	1.410	2.620	0.091
P									

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp

Comb. No.	Description
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	190.5 - 143.17	Pole	Max Tension	30	0.000	0.002	-0.000
			Max. Compression	26	-46.372	-4.401	2.532
			Max. Mx	8	-12.844	-604.349	-0.889
			Max. My	2	-12.828	0.624	605.597
			Max. Vy	8	22.844	-604.349	-0.889
			Max. Vx	2	-22.934	0.624	605.597
			Max. Torque	25			-1.493
L2	143.17 - 93.753	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-66.154	-9.309	3.410
			Max. Mx	8	-24.370	-1820.344	-4.599
			Max. My	2	-24.365	3.581	1823.860
			Max. Vy	8	28.064	-1820.344	-4.599
			Max. Vx	2	-28.098	3.581	1823.860
			Max. Torque	11			2.254
L3	93.753 - 46.083	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-89.877	-14.852	2.518
			Max. Mx	8	-39.144	-3231.382	-8.411
			Max. My	2	-39.142	6.171	3235.073
			Max. Vy	8	33.077	-3231.382	-8.411
			Max. Vx	2	-33.106	6.171	3235.073
			Max. Torque	11			2.241
L4	46.083 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-121.649	-21.478	1.113
			Max. Mx	8	-60.126	-5128.901	-12.727
			Max. My	2	-60.126	8.763	5132.379
			Max. Vy	8	38.175	-5128.901	-12.727
			Max. Vx	2	-38.202	8.763	5132.379
			Max. Torque	11			2.232

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	30	121.649	-11.733	-0.009
	Max. H_x	20	60.155	38.129	0.076
	Max. H_z	3	45.116	0.076	38.156
	Max. M_x	2	5132.379	0.076	38.156
	Max. M_z	8	5128.901	-38.129	-0.076
	Max. Torsion	11	2.229	-32.889	-19.066
	Min. Vert	11	45.116	-32.889	-19.066
	Min. H_x	9	45.116	-38.129	-0.076
	Min. H_z	14	60.155	-0.076	-38.156
	Min. M_x	14	-5131.311	-0.076	-38.156
	Min. M_z	20	-5119.963	38.129	0.076
	Min. Torsion	23	-2.227	32.889	19.066

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	50.129	0.000	0.000	-0.419	-3.591	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	60.155	-0.076	-38.156	-5132.379	8.763	1.183
0.9 Dead+1.0 Wind 0 deg - No Ice	45.116	-0.076	-38.156	-5057.323	9.730	1.186
1.2 Dead+1.0 Wind 30 deg - No Ice	60.155	18.891	-32.854	-4419.788	-2542.169	0.084
0.9 Dead+1.0 Wind 30 deg - No Ice	45.116	18.891	-32.854	-4355.081	-2503.939	0.083
1.2 Dead+1.0 Wind 60 deg - No Ice	60.155	32.905	-18.987	-2552.011	-4426.416	-1.038
0.9 Dead+1.0 Wind 60 deg - No Ice	45.116	32.905	-18.987	-2514.627	-4360.708	-1.043
1.2 Dead+1.0 Wind 90 deg - No Ice	60.155	38.129	0.076	12.728	-5128.901	-1.883
0.9 Dead+1.0 Wind 90 deg - No Ice	45.116	38.129	0.076	12.665	-5052.964	-1.890
1.2 Dead+1.0 Wind 120 deg - No Ice	60.155	32.889	19.066	2567.319	-4428.219	-2.222
0.9 Dead+1.0 Wind 120 deg - No Ice	45.116	32.889	19.066	2529.946	-4362.446	-2.229
1.2 Dead+1.0 Wind 150 deg - No Ice	60.155	19.023	32.930	4431.837	-2564.996	-1.964
0.9 Dead+1.0 Wind 150 deg - No Ice	45.116	19.023	32.930	4367.231	-2526.424	-1.970
1.2 Dead+1.0 Wind 180 deg - No Ice	60.155	0.076	38.156	5131.311	-17.708	-1.181
0.9 Dead+1.0 Wind 180 deg - No Ice	45.116	0.076	38.156	5056.573	-16.333	-1.183
1.2 Dead+1.0 Wind 210 deg - No Ice	60.155	-18.891	32.854	4418.735	2533.202	-0.082
0.9 Dead+1.0 Wind 210 deg - No Ice	45.116	-18.891	32.854	4354.322	2497.320	-0.081

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+1.0 Wind 240 deg - No Ice	60.155	-32.905	18.987	2550.984	4417.453	1.038
0.9 Dead+1.0 Wind 240 deg - No Ice	45.116	-32.905	18.987	2513.887	4354.091	1.043
1.2 Dead+1.0 Wind 270 deg - No Ice	60.155	-38.129	-0.076	-13.744	5119.963	1.880
0.9 Dead+1.0 Wind 270 deg - No Ice	45.116	-38.129	-0.076	-13.398	5046.386	1.887
1.2 Dead+1.0 Wind 300 deg - No Ice	60.155	-32.889	-19.066	-2568.352	4419.303	2.219
0.9 Dead+1.0 Wind 300 deg - No Ice	45.116	-32.889	-19.066	-2530.689	4355.862	2.227
1.2 Dead+1.0 Wind 330 deg - No Ice	60.155	-19.023	-32.930	-4432.896	2556.075	1.964
0.9 Dead+1.0 Wind 330 deg - No Ice	45.116	-19.023	-32.930	-4367.993	2519.838	1.970
1.2 Dead+1.0 Ice+1.0 Temp	121.649	0.000	-0.000	-1.113	-21.478	0.001
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	121.649	-0.009	-11.734	-1753.222	-19.945	0.344
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	121.649	5.859	-10.157	-1517.615	-895.987	-0.027
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	121.649	10.156	-5.859	-875.667	-1537.750	-0.390
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	121.649	11.733	0.009	0.612	-1773.278	-0.649
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	121.649	10.166	5.875	876.424	-1539.469	-0.733
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	121.649	5.874	10.166	1517.100	-898.971	-0.621
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	121.649	0.009	11.734	1750.977	-23.399	-0.343
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	121.649	-5.859	10.157	1515.387	852.644	0.028
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	121.649	-10.156	5.859	873.445	1494.421	0.391
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	121.649	-11.733	-0.009	-2.842	1729.962	0.649
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	121.649	-10.166	-5.875	-878.669	1496.152	0.734
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	121.649	-5.874	-10.166	-1519.352	855.640	0.622
Dead+Wind 0 deg - Service	50.129	-0.018	-8.984	-1200.410	-0.630	0.287
Dead+Wind 30 deg - Service	50.129	4.448	-7.736	-1033.750	-597.081	0.021
Dead+Wind 60 deg - Service	50.129	7.748	-4.471	-597.045	-1037.668	-0.250
Dead+Wind 90 deg - Service	50.129	8.978	0.018	2.644	-1201.938	-0.454
Dead+Wind 120 deg - Service	50.129	7.744	4.489	599.967	-1038.098	-0.537
Dead+Wind 150 deg - Service	50.129	4.479	7.754	1035.953	-602.443	-0.476
Dead+Wind 180 deg - Service	50.129	0.018	8.984	1199.509	-6.817	-0.287
Dead+Wind 210 deg - Service	50.129	-4.448	7.736	1032.850	589.633	-0.021
Dead+Wind 240 deg - Service	50.129	-7.748	4.471	596.139	1030.209	0.250
Dead+Wind 270 deg - Service	50.129	-8.978	-0.018	-3.543	1194.491	0.454
Dead+Wind 300 deg - Service	50.129	-7.744	-4.489	-600.872	1030.663	0.537
Dead+Wind 330 deg - Service	50.129	-4.479	-7.754	-1036.842	594.991	0.476

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-50.129	0.000	0.000	50.129	0.000	0.000%
2	-0.076	-60.155	-38.156	0.076	60.155	38.156	0.000%
3	-0.076	-45.116	-38.156	0.076	45.116	38.156	0.000%
4	18.891	-60.155	-32.854	-18.891	60.155	32.854	0.000%
5	18.891	-45.116	-32.854	-18.891	45.116	32.854	0.000%
6	32.905	-60.155	-18.987	-32.905	60.155	18.987	0.000%
7	32.905	-45.116	-18.987	-32.905	45.116	18.987	0.000%
8	38.129	-60.155	0.076	-38.129	60.155	-0.076	0.000%
9	38.129	-45.116	0.076	-38.129	45.116	-0.076	0.000%
10	32.889	-60.155	19.066	-32.889	60.155	-19.066	0.000%
11	32.889	-45.116	19.066	-32.889	45.116	-19.066	0.000%
12	19.023	-60.155	32.930	-19.023	60.155	-32.930	0.000%
13	19.023	-45.116	32.930	-19.023	45.116	-32.930	0.000%
14	0.076	-60.155	38.156	-0.076	60.155	-38.156	0.000%
15	0.076	-45.116	38.156	-0.076	45.116	-38.156	0.000%
16	-18.891	-60.155	32.854	18.891	60.155	-32.854	0.000%
17	-18.891	-45.116	32.854	18.891	45.116	-32.854	0.000%
18	-32.905	-60.155	18.987	32.905	60.155	-18.987	0.000%
19	-32.905	-45.116	18.987	32.905	45.116	-18.987	0.000%
20	-38.129	-60.155	-0.076	38.129	60.155	0.076	0.000%
21	-38.129	-45.116	-0.076	38.129	45.116	0.076	0.000%
22	-32.889	-60.155	-19.066	32.889	60.155	19.066	0.000%
23	-32.889	-45.116	-19.066	32.889	45.116	19.066	0.000%
24	-19.023	-60.155	-32.930	19.023	60.155	32.930	0.000%
25	-19.023	-45.116	-32.930	19.023	45.116	32.930	0.000%
26	0.000	-121.649	0.000	-0.000	121.649	0.000	0.000%
27	-0.009	-121.649	-11.733	0.009	121.649	11.734	0.000%
28	5.858	-121.649	-10.157	-5.859	121.649	10.157	0.000%
29	10.156	-121.649	-5.859	-10.156	121.649	5.859	0.000%
30	11.733	-121.649	0.009	-11.733	121.649	-0.009	0.000%
31	10.165	-121.649	5.874	-10.166	121.649	-5.875	0.000%
32	5.874	-121.649	10.166	-5.874	121.649	-10.166	0.000%
33	0.009	-121.649	11.733	-0.009	121.649	-11.734	0.000%
34	-5.858	-121.649	10.157	5.859	121.649	-10.157	0.000%
35	-10.156	-121.649	5.859	10.156	121.649	-5.859	0.000%
36	-11.733	-121.649	-0.009	11.733	121.649	0.009	0.000%
37	-10.165	-121.649	-5.874	10.166	121.649	5.875	0.000%
38	-5.874	-121.649	-10.166	5.874	121.649	10.166	0.000%
39	-0.018	-50.129	-8.984	0.018	50.129	8.984	0.000%
40	4.448	-50.129	-7.736	-4.448	50.129	7.736	0.000%
41	7.748	-50.129	-4.471	-7.748	50.129	4.471	0.000%
42	8.978	-50.129	0.018	-8.978	50.129	-0.018	0.000%
43	7.744	-50.129	4.489	-7.744	50.129	-4.489	0.000%
44	4.479	-50.129	7.754	-4.479	50.129	-7.754	0.000%
45	0.018	-50.129	8.984	-0.018	50.129	-8.984	0.000%
46	-4.448	-50.129	7.736	4.448	50.129	-7.736	0.000%
47	-7.748	-50.129	4.471	7.748	50.129	-4.471	0.000%
48	-8.978	-50.129	-0.018	8.978	50.129	0.018	0.000%
49	-7.744	-50.129	-4.489	7.744	50.129	4.489	0.000%
50	-4.479	-50.129	-7.754	4.479	50.129	7.754	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	0.00005310
3	Yes	4	0.00000001	0.00078666
4	Yes	6	0.00000001	0.00021237
5	Yes	6	0.00000001	0.00006145
6	Yes	6	0.00000001	0.00021434
7	Yes	6	0.00000001	0.00006207
8	Yes	5	0.00000001	0.00007209
9	Yes	4	0.00000001	0.00092788
10	Yes	6	0.00000001	0.00020878
11	Yes	6	0.00000001	0.00005989
12	Yes	6	0.00000001	0.00021784
13	Yes	6	0.00000001	0.00006310
14	Yes	5	0.00000001	0.00010097
15	Yes	5	0.00000001	0.00004363
16	Yes	6	0.00000001	0.00021090
17	Yes	6	0.00000001	0.00006106
18	Yes	6	0.00000001	0.00020996
19	Yes	6	0.00000001	0.00006062
20	Yes	5	0.00000001	0.00012067
21	Yes	5	0.00000001	0.00005353
22	Yes	6	0.00000001	0.00021789
23	Yes	6	0.00000001	0.00006319
24	Yes	6	0.00000001	0.00020878
25	Yes	6	0.00000001	0.00005996
26	Yes	4	0.00000001	0.00013865
27	Yes	6	0.00007230	0.00041114
28	Yes	6	0.00007136	0.00080638
29	Yes	6	0.00007136	0.00080727
30	Yes	6	0.00007224	0.00041453
31	Yes	6	0.00007134	0.00078561
32	Yes	6	0.00007131	0.00080880
33	Yes	6	0.00007225	0.00040800
34	Yes	6	0.00007143	0.00075840
35	Yes	6	0.00007143	0.00075767
36	Yes	6	0.00007231	0.00040346
37	Yes	6	0.00007143	0.00078542
38	Yes	6	0.00007146	0.00076264
39	Yes	4	0.00000001	0.00015484
40	Yes	4	0.00000001	0.00098362
41	Yes	5	0.00000001	0.00006406
42	Yes	4	0.00000001	0.00016642
43	Yes	4	0.00000001	0.00093509
44	Yes	5	0.00000001	0.00006663
45	Yes	4	0.00000001	0.00016020
46	Yes	4	0.00000001	0.00095059
47	Yes	4	0.00000001	0.00093904
48	Yes	4	0.00000001	0.00017177
49	Yes	5	0.00000001	0.00006632
50	Yes	4	0.00000001	0.00092925

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	190.5 - 143.17	42.417	42	2.275	0.004
L2	146.753 - 93.753	23.483	42	1.706	0.003
L3	99.083 - 46.083	9.898	42	1.012	0.001
L4	53 - 0	2.686	42	0.475	0.000

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
191.000	(4) DB844H90-XY w/ Mount Pipe	42	42.417	2.275	0.004	24882
190.500	Lightning Rod 5/8" x 6'	42	42.417	2.275	0.004	24882
181.750	Side Arm Mount [SO 102-3]	42	38.371	2.166	0.004	14218
181.500	Side Arm Mount [SO 102-3]	42	38.256	2.163	0.004	13823
180.000	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	42	37.567	2.144	0.004	11848
168.000	P65-17-XLH-RR w/ Mount Pipe	42	32.168	1.992	0.003	5528
160.000	(2) LPA-80063-6CF-EDIN w/ Mount Pipe	42	28.733	1.887	0.003	4077
132.000	DS4C06F36D-D	42	18.447	1.491	0.002	3283

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	190.5 - 143.17	180.939	2	9.718	0.018
L2	146.753 - 93.753	100.329	2	7.297	0.011
L3	99.083 - 46.083	42.307	2	4.329	0.004
L4	53 - 0	11.476	2	2.033	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
191.000	(4) DB844H90-XY w/ Mount Pipe	2	180.939	9.718	0.018	6116
190.500	Lightning Rod 5/8" x 6'	2	180.939	9.718	0.018	6116
181.750	Side Arm Mount [SO 102-3]	2	163.722	9.254	0.017	3493
181.500	Side Arm Mount [SO 102-3]	2	163.233	9.241	0.017	3396
180.000	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	2	160.302	9.161	0.016	2910
168.000	P65-17-XLH-RR w/ Mount Pipe	2	137.324	8.513	0.014	1354
160.000	(2) LPA-80063-6CF-EDIN w/ Mount Pipe	2	122.697	8.069	0.013	996
132.000	DS4C06F36D-D	2	78.845	6.380	0.008	789

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	190.5 - 143.17 (1)	TP27.778x14.75x0.25	47.330	0.000	0.0	21.061	-12.826	1232.060	0.010
L2	143.17 - 93.753 (2)	TP40.88x26.292x0.375	53.000	0.000	0.0	46.465	-24.365	2718.200	0.009
L3	93.753 - 46.083 (3)	TP53.251x38.663x0.375	53.000	0.000	0.0	60.670	-39.142	3549.170	0.011
L4	46.083 - 0 (4)	TP65.185x50.597x0.375	53.000	0.000	0.0	77.140	-60.126	4512.700	0.013

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	190.5 - 143.17 (1)	TP27.778x14.75x0.25	605.798	828.937	0.731	0.000	828.937	0.000
L2	143.17 - 93.753 (2)	TP40.88x26.292x0.375	1823.867	2703.675	0.675	0.000	2703.675	0.000
L3	93.753 - 46.083 (3)	TP53.251x38.663x0.375	3235.075	4242.492	0.763	0.000	4242.492	0.000
L4	46.083 - 0 (4)	TP65.185x50.597x0.375	5132.383	6161.175	0.833	0.000	6161.175	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	190.5 - 143.17 (1)	TP27.778x14.75x0.25	22.977	369.618	0.062	1.485	859.142	0.002
L2	143.17 - 93.753 (2)	TP40.88x26.292x0.375	28.099	815.459	0.034	1.191	2787.842	0.000
L3	93.753 - 46.083 (3)	TP53.251x38.663x0.375	33.106	1064.750	0.031	1.185	4752.925	0.000
L4	46.083 - 0 (4)	TP65.185x50.597x0.375	38.202	1353.810	0.028	1.183	7683.858	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	190.5 - 143.17 (1)	0.010	0.731	0.000	0.062	0.002	0.745 ✔	1.050	4.8.2 ✔

Section No.	Elevation ft	Ratio $P_u/\phi P_n$	Ratio $M_{ux}/\phi M_{nx}$	Ratio $M_{uy}/\phi M_{ny}$	Ratio $V_u/\phi V_n$	Ratio $T_u/\phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L2	143.17 - 93.753 (2)	0.009	0.675	0.000	0.034	0.000	0.685 ✔	1.050	4.8.2 ✔
L3	93.753 - 46.083 (3)	0.011	0.763	0.000	0.031	0.000	0.775 ✔	1.050	4.8.2 ✔
L4	46.083 - 0 (4)	0.013	0.833	0.000	0.028	0.000	0.847 ✔	1.050	4.8.2 ✔

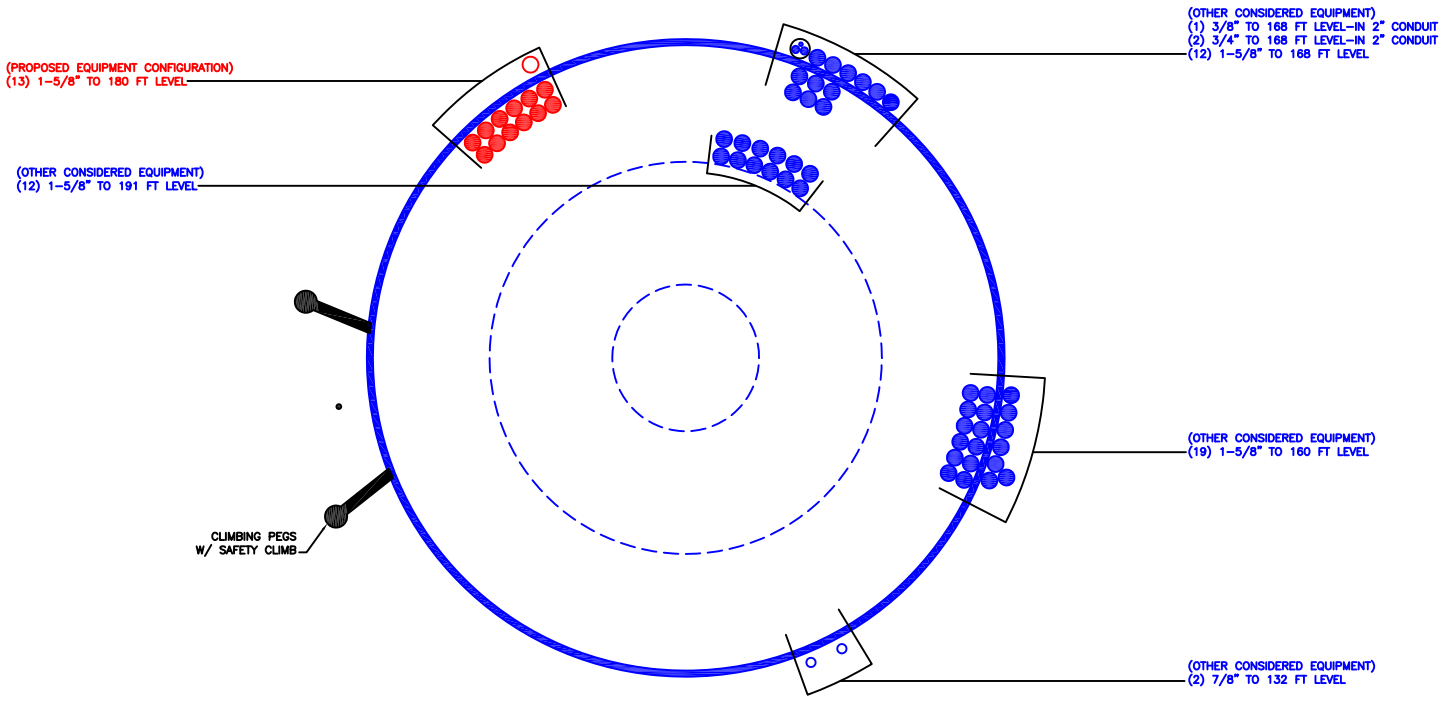
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	190.5 - 143.17	Pole	TP27.778x14.75x0.25	1	-12.826	1293.663	71.0	Pass
L2	143.17 - 93.753	Pole	TP40.88x26.292x0.375	2	-24.365	2854.110	65.2	Pass
L3	93.753 - 46.083	Pole	TP53.251x38.663x0.375	3	-39.142	3726.628	73.8	Pass
L4	46.083 - 0	Pole	TP65.185x50.597x0.375	4	-60.126	4738.335	80.7	Pass
							Summary	
						Pole (L4)	80.7	Pass
						RATING =	**80.7**	**Pass**

Program Version 8.0.5.0

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 801485

APPENDIX C

ADDITIONAL CALCULATIONS

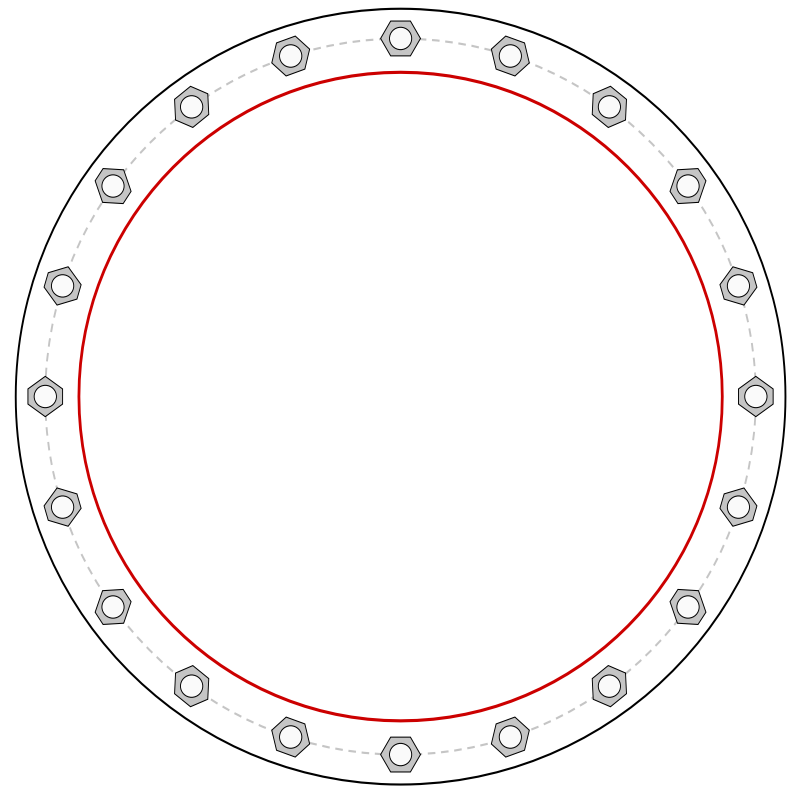
Monopole Base Plate Connection

Site Info	
BU #	801485
Site Name	SUFFIELD 1 CAC 801485
Order #	494420, Rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	0.75

Applied Loads	
Moment (kip-ft)	5132.39
Axial Force (kips)	60.13
Shear Force (kips)	38.20

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(20) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 72" BC

Base Plate Data

78" OD x 2.75" Plate (A633 Grade E; Fy=60 ksi, Fu=75 ksi)

Stiffener Data

N/A

Pole Data

65.185" x 0.375" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

Pu_c = 174.02	ϕPn_c = 243.75	**Stress Rating**
Vu = 1.91	ϕVn = 73.13	**68.1%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	19.69	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**34.7%**	**Pass**

Pier and Pad Foundation

BU # :	801485
Site Name:	CT SUFFIELD 1 CA
App. Number:	494420, Rev. 0

TIA-222 Revision:	H
Tower Type:	Monopole

Top & Bot. Pad Rein. Different?:	☑
Block Foundation?:	☐

Superstructure Analysis Reactions

Compression, P_{comp}:	60	kips
Base Shear, Vu_comp:	38	kips
Moment, M_u:	5132	ft-kips
Tower Height, **H**:	190.5	ft
BP Dist. Above Fdn, bp_{dist}:	3	in

Pier Properties

Pier Shape:	Circular	
Pier Diameter, **dpier**:	8	ft
Ext. Above Grade, **E**:	0.5	ft
Pier Rebar Size, **Sc**:	9	
Pier Rebar Quantity, **mc**:	43	
Pier Tie/Spiral Size, **St**:	5	
Pier Tie/Spiral Quantity, **mt**:	9	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties

Depth, **D**:	6.5	ft
Pad Width, **W**:	32	ft
Pad Thickness, **T**:	5	ft
Pad Rebar Size (Top), Sp_{top}:	9	
Pad Top Rebar Quantity (Top), mp_{top}:	42	
Pad Rebar Size (Bottom), **Sp**:	9	
Pad Rebar Quantity (Bottom), **mp**:	34	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties

Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	3	ksi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties

Total Soil Unit Weight, γ:	120	pcf
Ultimate Gross Bearing, Qult:	12.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	30	degrees
SPT Blow Count, N_{blows}:		
Base Friction, μ:		
Neglected Depth, **N**:	2.00	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	7	ft

<--Toggle between Gross and Net

Foundation Analysis Checks

	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	412.97	38.00	**8.8%**	**Pass**
Bearing Pressure (ksf)	9.00	1.87	**19.8%**	**Pass**
*Overturning (kip*ft)*	13248.31	5407.50	**40.8%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	7878.93	5208.00	**63.0%**	**Pass**
Pier Compression (kip)	23994.73	78.10	**0.3%**	**Pass**
*Pad Flexure (kip*ft)*	8302.75	1862.25	**21.4%**	**Pass**
Pad Shear - 1-way (kips)	1744.90	195.62	**10.7%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.164	0.017	**9.9%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	13203.03	3124.80	**22.5%**	**Pass**

**Rating per TIA-222-H Section 15.5*

Soil Rating*:	**40.8%**
Structural Rating*:	**63.0%**

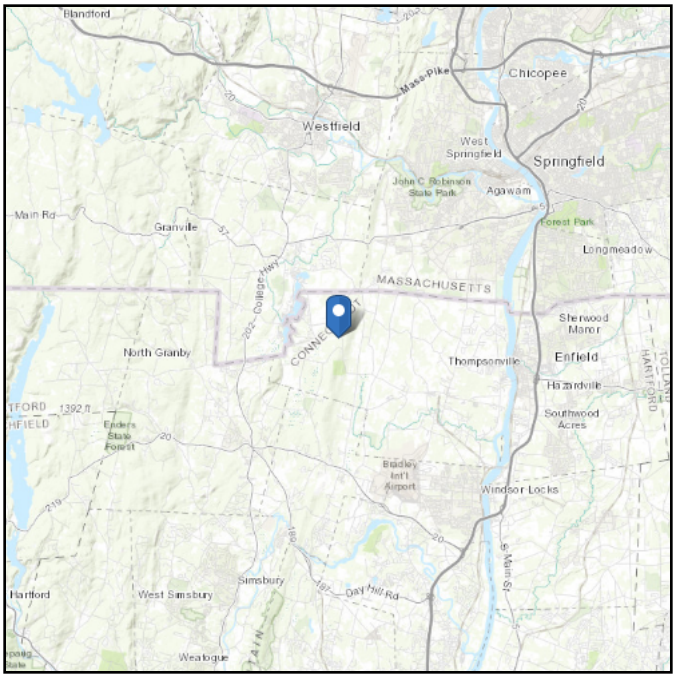
Version 3.2.0

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 370.57 ft (NAVD 88)
Latitude: 42.011611
Longitude: -72.728778



Wind

Results:

Wind Speed:	119 Vmph
10-year MRI	76 Vmph
25-year MRI	86 Vmph
50-year MRI	91 Vmph
100-year MRI	98 Vmph

Data Source: ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014

Date Accessed: Thu Aug 01 2019

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

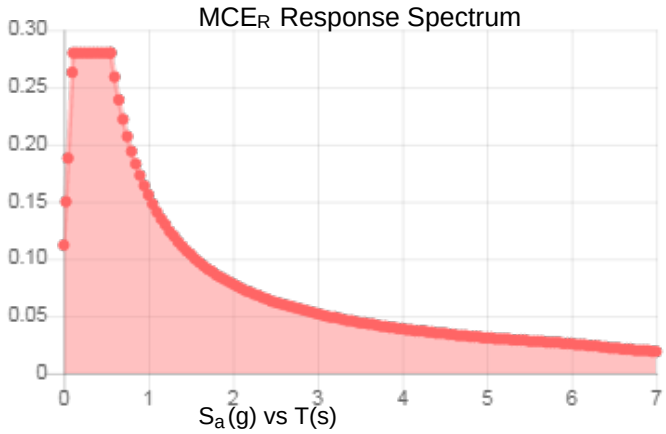
Seismic

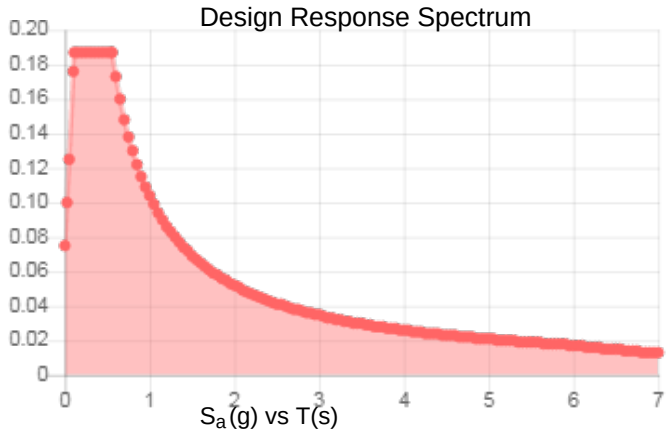
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.175	S_{DS} :	0.187
S_1 :	0.065	S_{D1} :	0.104
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.086
S_{MS} :	0.28	PGA_M :	0.137
S_{M1} :	0.156	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Thu Aug 01 2019

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Thu Aug 01 2019

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Exhibit E

Mount Analysis

Date: July 28, 2019

Charles McGuirt
Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
btwo@btgrp.com

Subject:	**Mount Modification Report**	
Carrier Designation:	**T-Mobile Equipment Change-Out**	
	Carrier Site Number:	CT11545A
	Carrier Site Name:	CT545/Crown Suffield
Crown Castle Designation:	**Crown Castle BU Number:**	801485
	Crown Castle Site Name:	CT Suffield 1 CAC 801485
	Crown Castle JDE Job Number:	576458
	Crown Castle Order Number:	494420, Rev.0
Engineering Firm Designation:	**B+T Group Report Designation:**	84855.013.01
Site Data:	**2715 Mountain Rd, Suffield, CT, Hartford, 06093** **Latitude 42° 0' 41.80" Longitude -72° 43' 43.60"**	
Structure Information:	**Tower Height & Type:**	**190.5 ft. Monopole**
	Mount Elevation:	**180 ft.**
	Mount Type:	**13 ft. T-Arm Mount**

Dear McGuirt,

B+T Group is pleased to submit this **"Mount Modification Report"** to determine the structural integrity of T-Mobile's antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

The purpose of the analysis is to determine acceptability of the mount's stress level. Based on our analysis we have determined the stress level to be:

T-Arm Mount (typical) **Sufficient**
***Sufficient upon completion of the changes listed in the 'Recommendations' section of this report.**

This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2018 Connecticut Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount structural analysis prepared by: Joseph Variamparampil

Respectfully submitted by: B&T Engineering, Inc.
COA: PEC.0001564 Expires: 02/10/2020

7/29/19

Scott S. Vance, P.E.

TABLE OF CONTENTS

1) INTRODUCTION

This is a 12' T-Arm Mount.

2) ANALYSIS CRITERIA

Building Code:	2015 IBC
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	120 mph
Exposure Category:	C
Topographic Factor at Base:	1
Topographic Factor at Mount:	1
Ice Thickness:	2 in
Wind Speed with Ice:	50 mph
Seismic S_s:	0.175
Seismic S_1:	0.065
Live Loading Wind Speed:	30 mph
Man Live Load at Mid/End-Points:	250 lb.
Man Live Load at Mount Pipes:	0 lb.

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft.)	Antenna Centerline (ft.)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
180	182	3	RFS/Celwave	APX16DWV-16DWV-S-E-A20	13' T-Arm Mount
		3	RFS/Celwave	APXVAARR24_43-U-NA20	
		3	Ericsson	KRY 112 489/2	
		3	Ericsson	RADIO 4449 B12/B71	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
CCI Order	Existing Loading Proposed Loading	Date: 05/31/2019	Crown Castle
Mount Analysis Report	B+T Group	Date: 07/11/2019	On File

3.1) Analysis Method

RISA-3D (Version 17.0.2), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

A tool internally developed by B+T Group, was used to calculate wind loading on all appurtenances, dishes and mount members for various loading cases. Selected output from the analysis is included in Appendix B.

This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 *Tower Mount Analysis* (Revision C).

3.2) Assumptions

1. The mount was properly fabricated and installed in accordance with its original design and manufacturer's specifications.
2. The mount has been maintained in accordance with the manufacturer's specifications and is free of damage.
3. The configuration of antennas, mounts, and other appurtenances are as specified in Table-1.
4. All mount components have been assumed to be in sufficient condition to carry their full design capacity for the analysis.
5. Mount areas and weights are determined from field measurements, standard material properties, and/or manufacturer product data.
6. Due to insufficient data from provided field measurements, the following assumptions are made and will need to be field verified

Component	Section	Length	Note
Face Horizontal	3" STD Pipe	13'-0"	-
Stand-off Tube	4x4x1/4 Tube	4'-0"	-
Mount Pipes	2" STD Pipe	6'-0"	-

7. Serviceability with respect to antenna twist, tilt, roll or lateral translation is not checked and is left to the carrier or tower owner to ensure conformance.
8. All prior structural modifications, if any are assumed to be correctly installed and fully effective.
9. All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
10. The analysis will be required to be revised if the existing conditions in the field differ from those shown in the above-referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.
11. The following material grades were assumed (Unless Noted Otherwise):
    (a) Connection Bolts : ASTM A325
    (b) Steel Pipe : ASTM A53 (GR. 35)
    (c) HSS (Round) : ASTM 500 (GR. B-42)
    (d) HSS (Rectangular) : ASTM 500 (GR. B-46)
    (e) Channel : ASTM A36 (GR. 36)
    (f) Steel Solid Rod : ASTM A36 (GR. 36)
    (g) Steel Plate : ASTM A36 (GR. 36)
    (h) Steel Angle : ASTM A36 (GR. 36)
    (i) UNISTRUT : ASTM A570 (GR. 33)

This analysis may be affected if any assumptions are not valid or have been made in error. B+T Group should be notified to determine the effect on the structural integrity of the antenna mounting system.

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (T-Arm Mount)

Notes	Component	Critical Member	Centerline (ft.)	% Capacity	Pass / Fail
1,2	Horizontal Pipe	M1	180	33.6	Pass
	Stand-off Tube	M4	180	47.4	Pass
	Vertical Pipes	M17	180	48.2	Pass
	Connection Unistruts	M15	180	30.6	Pass
	Connection Plates	M13	180	11.5	Pass
	Mount Pipes	M10	180	48.4	Pass
1,2,3	Horizontal Pipe	M25	180	40.8	Pass
	Reinforcement Angles	M29	180	55.4	Pass

Structure Rating (max from all components) =	**55.4%**

Notes:
1) See additional documentation in "Appendix B" for calculations supporting the % capacity consumed.
2) All sectors are typical
3) Proposed Modification Member

4.1) RECOMMENDATIONS

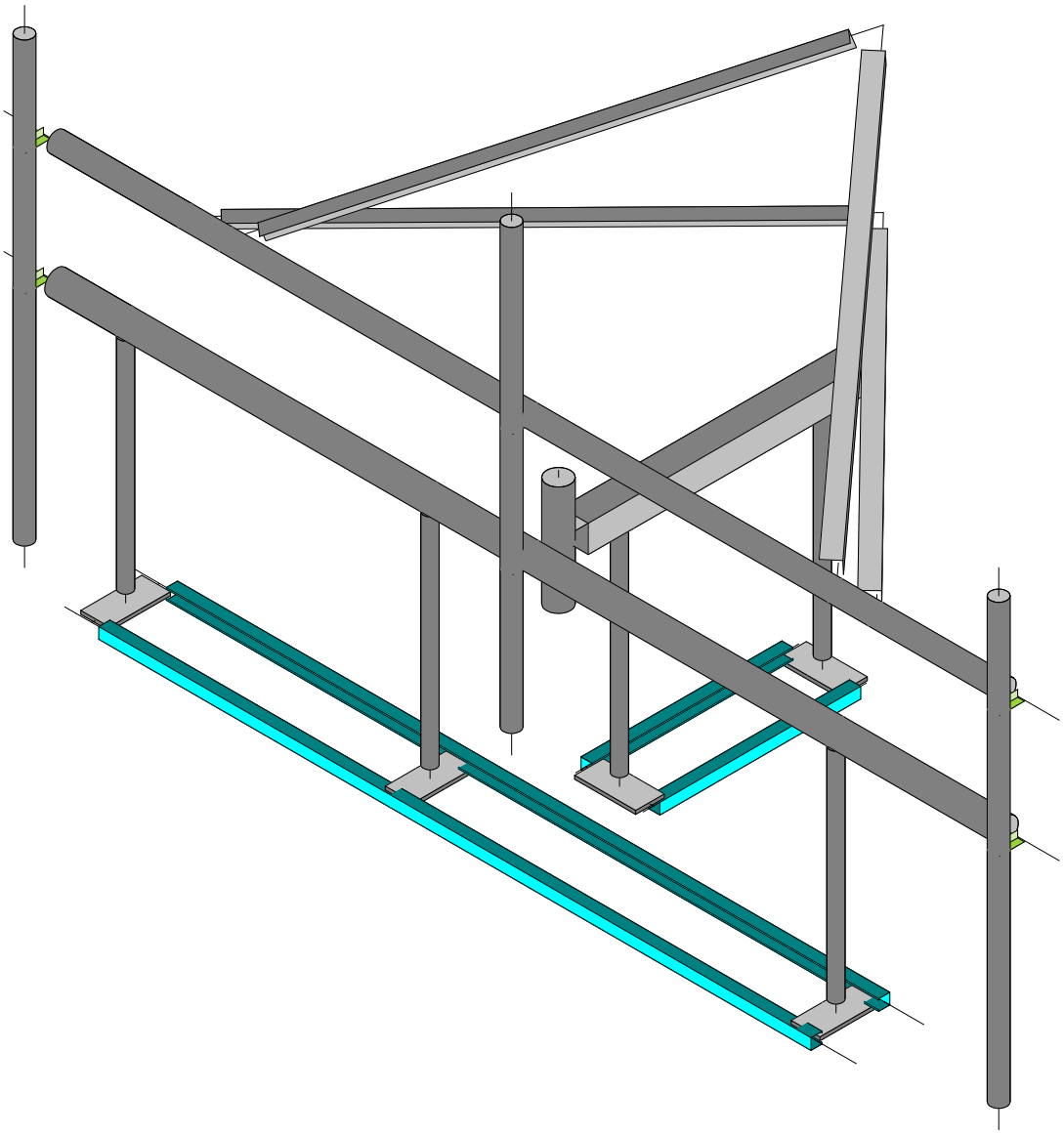
The mount has sufficient capacity to carry the proposed loading configuration. In order for the results of the analysis to be considered valid, the structural modifications listed below must be completed.

1. Installation of (2) Stabilizer Kits, SitePro1 Part# PRK-SFS-L connected to new 2.5” STD Horizontal Pipe

Engineering detail drawings have been provided in Appendix C – Mount Modification Design Drawings..

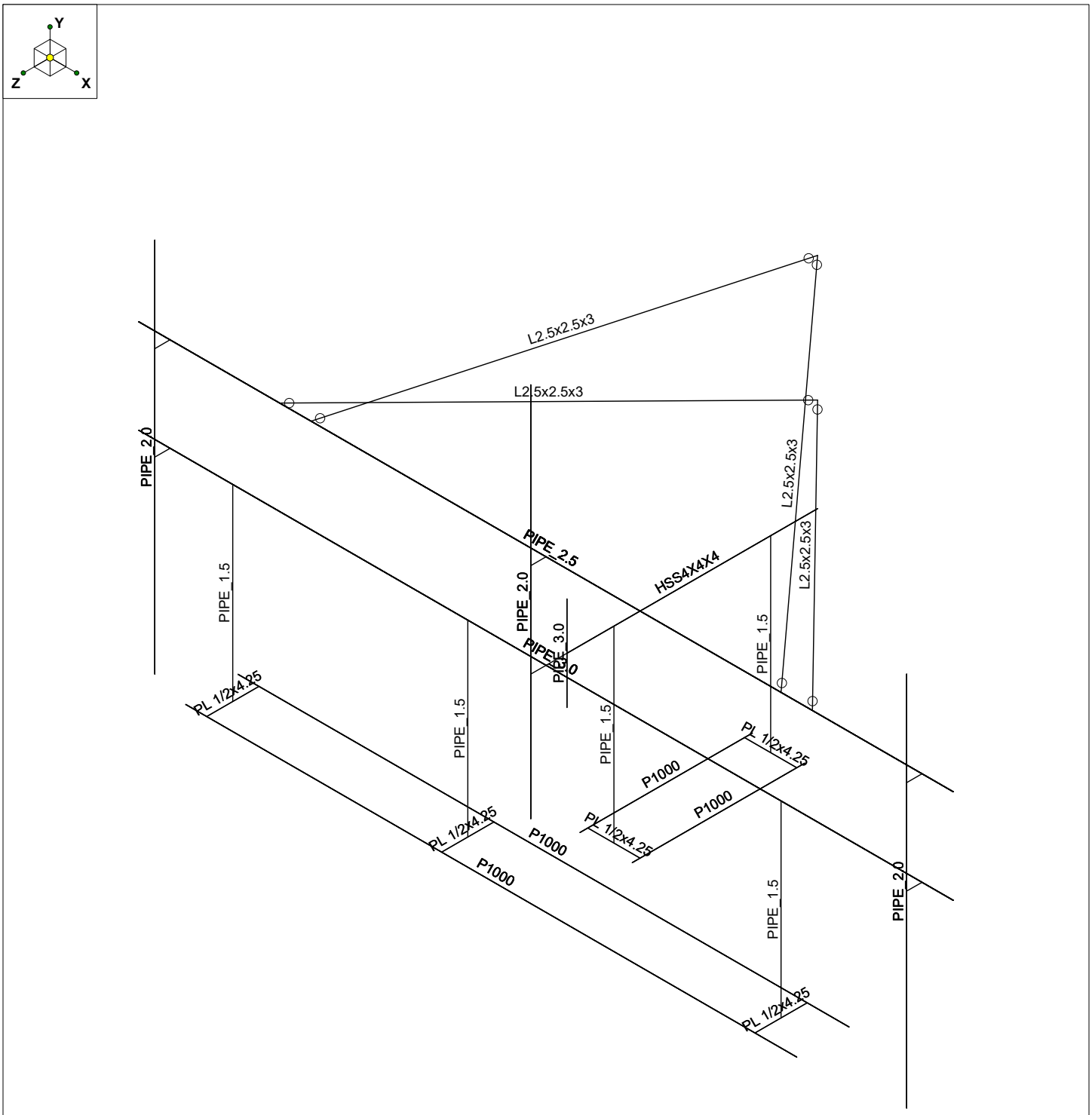
APPENDIX A

WIRE FRAME AND RENDERED MODELS



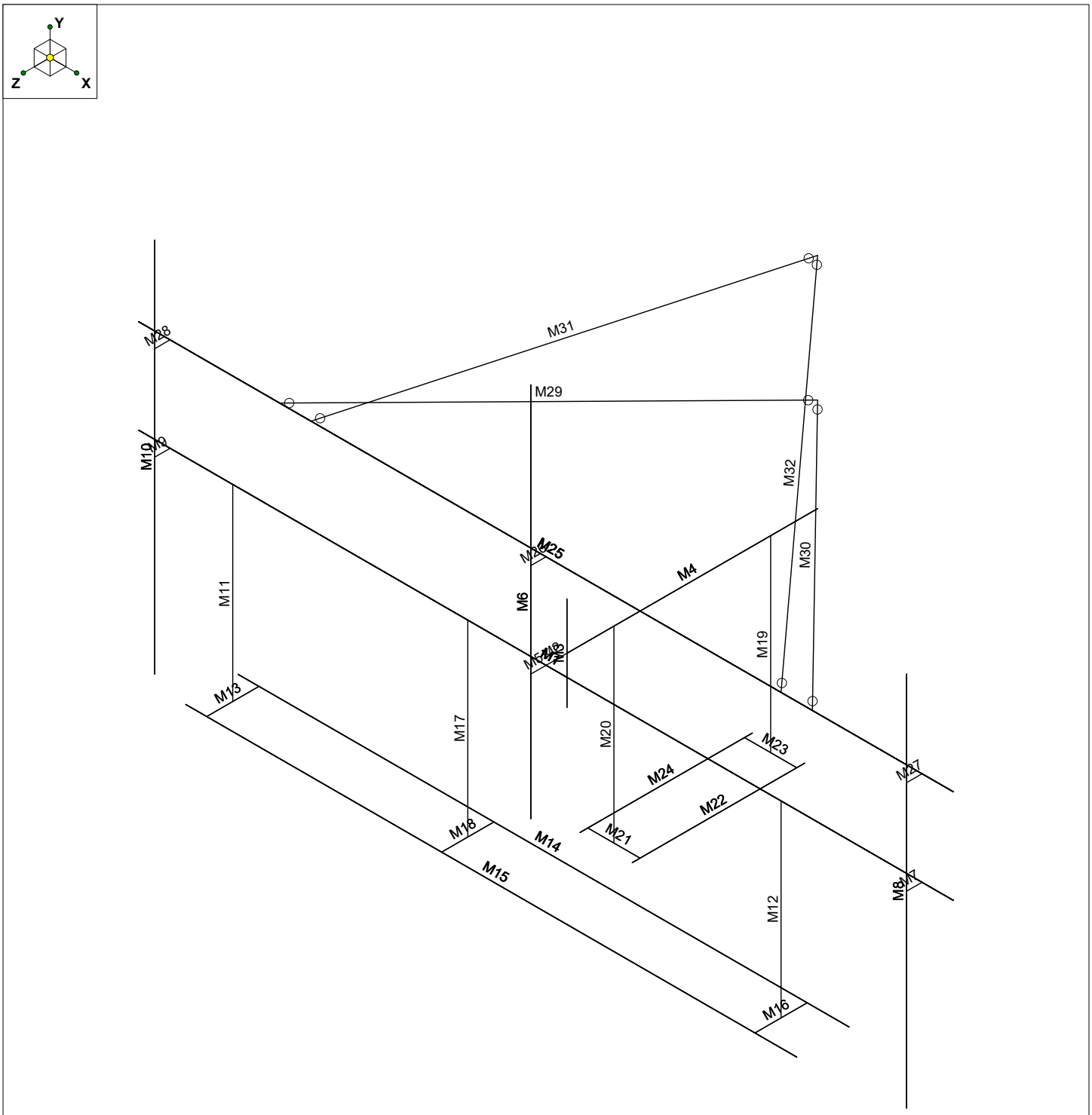
Envelope Only Solution

B+T Group	801485 - CT Suffield 1 CAC 801485	SK - 1
JV		July 26, 2019 at 8:23 AM
84855.013.01		84855_013_01_CT Suffield 1 CAC...



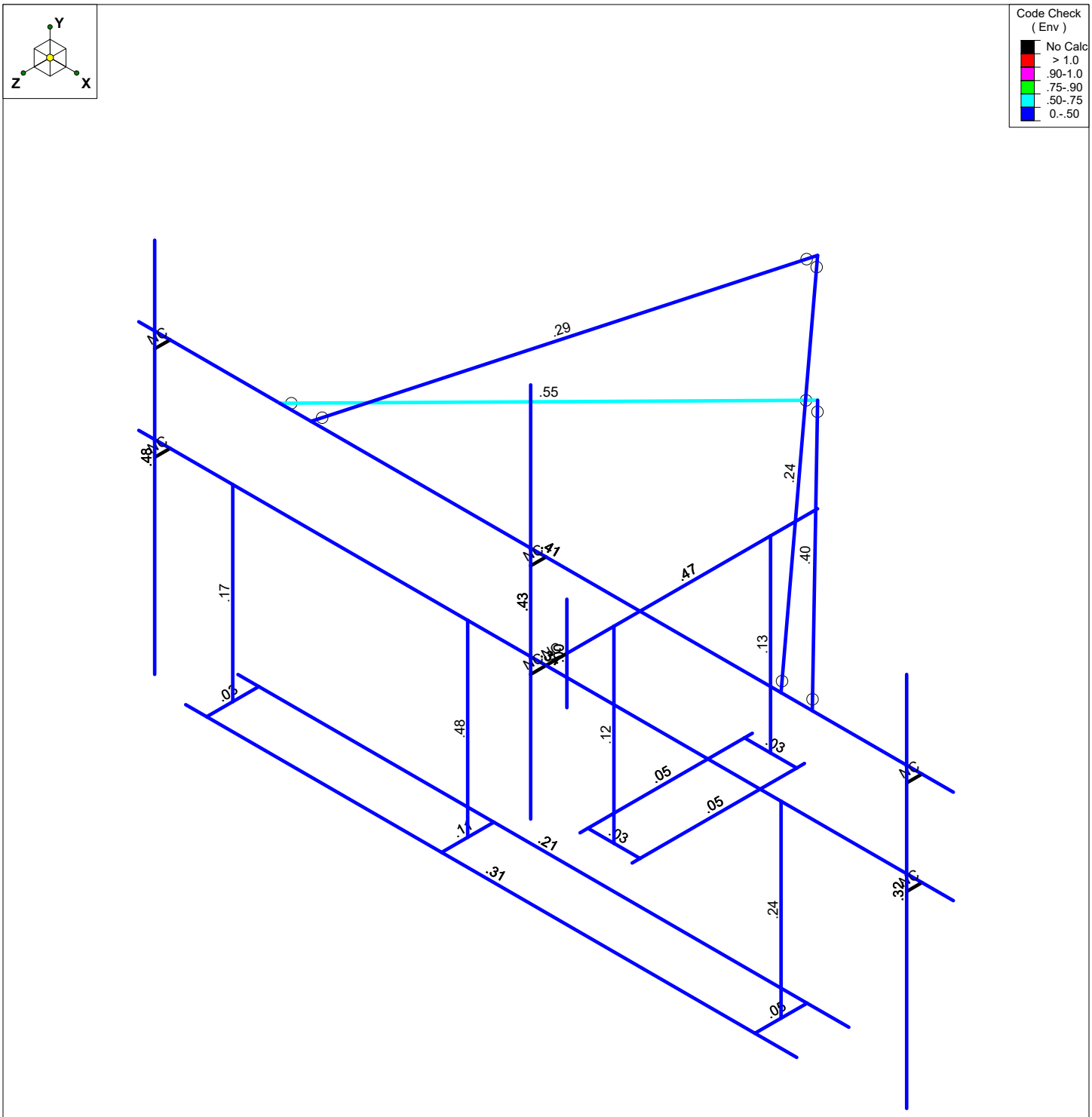
Envelope Only Solution

B+T Group	801485 - CT Suffield 1 CAC 801485	SK - 2
JV		July 26, 2019 at 8:23 AM
84855.013.01		84855_013_01_CT Suffield 1 CAC...



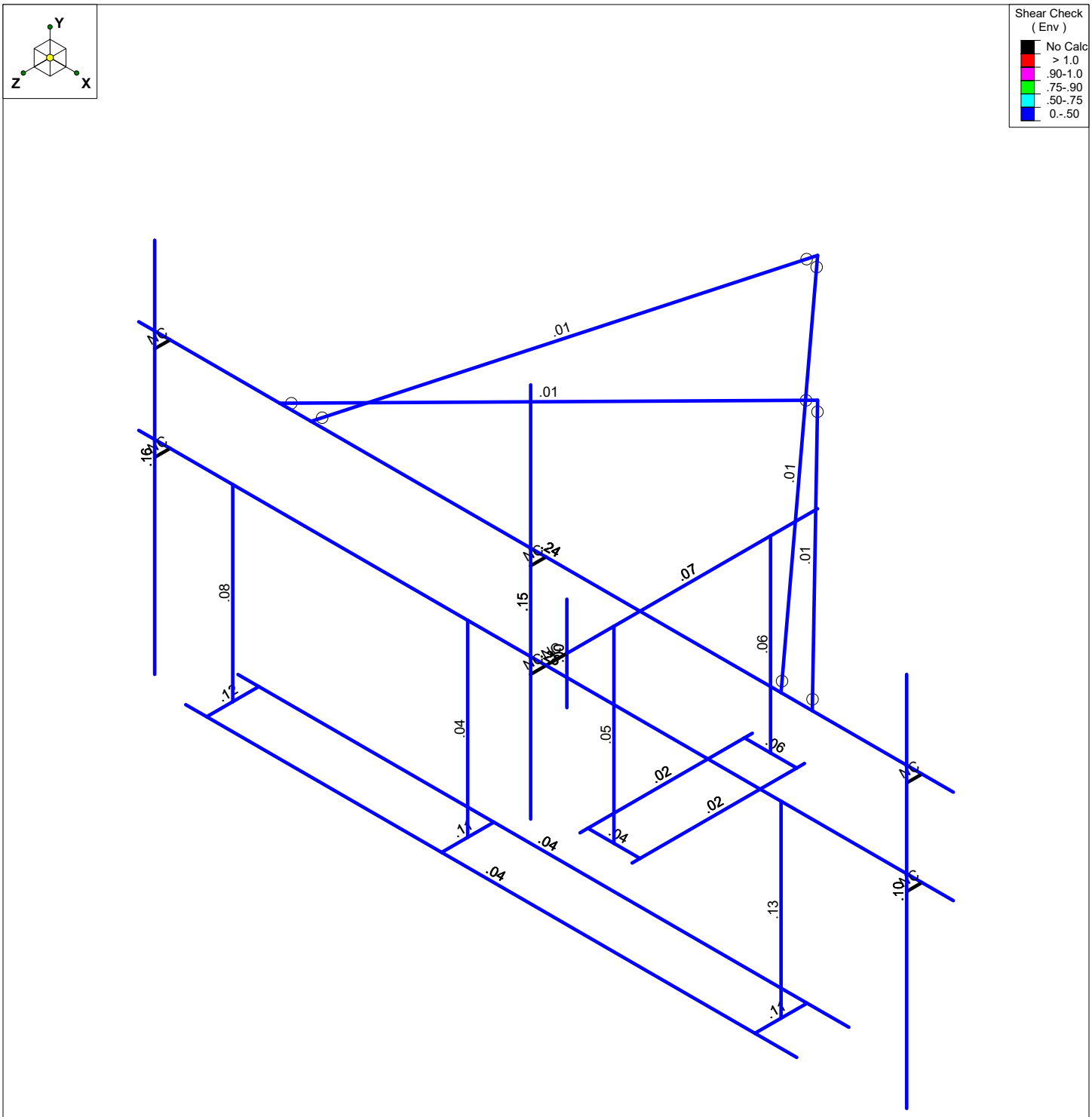
Envelope Only Solution

B+T Group	801485 - CT Suffield 1 CAC 801485	SK - 3
JV		July 26, 2019 at 8:24 AM
84855.013.01		84855_013_01_CT Suffield 1 CAC...



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

B+T Group	801485 - CT Suffield 1 CAC 801485	SK - 4
JV		July 26, 2019 at 8:24 AM
84855.013.01		84855_013_01_CT Suffield 1 CAC...



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

B+T Group	801485 - CT Suffield 1 CAC 801485	SK - 5
JV		July 26, 2019 at 8:24 AM
84855.013.01		84855_013_01_CT Suffield 1 CAC...

APPENDIX B

SOFTWARE INPUT CALCULATIONS AND SOFTWARE ANALYSIS OUTPUT

PROJECT	**84855.010.01 - CT SUFFIELD**		**KSC**
SUBJECT	**T-Arm Mount Mount Analysis**		
DATE	**07/26/19**	PAGE	OF

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

Manufacturer	Model	Qty	Aspect Ratio	C_a flat/round	EPA_N*K_a (ft^2)	EPA_T*K_a (ft^2)	$EPA_{N\text{-}Ice}*K_a$ (ft^2)	$EPA_{T\text{-}Ice}*K_a$ (ft^2)	$F_{A\ No\ Ice\ (N)}$	$F_{A\ No\ Ice\ (T)}$	$F_{A\ Ice\ (N)}$	$F_{A\ Ice\ (T)}$
RFS/CELWAVE	APX16DWV-16DWV-S-E-A20	0.5	4.20	1.28	2.32	0.55	3.42	1.50	0.15	0.05	0.03	0.01
RFS/CELWAVE	APX16DWV-16DWV-S-E-A20	0.5	4.20	1.28	2.32	0.55	3.42	1.50	0.15	0.05	0.03	0.01
Ericsson	KRY 112 489/2	1	1.80	1.20	0.42	0.27	1.07	0.85	0.02	0.02	0.00	0.00
RFS/CELWAVE	APXVAARR24_43-U-NA20	0.5	7.21	1.41	3.99	0.94	5.67	2.48	0.28	0.09	0.05	0.02
RFS/CELWAVE	APXVAARR24_43-U-NA20	0.5	7.21	1.41	3.99	0.94	5.67	2.48	0.28	0.09	0.05	0.02
Ericsson	RADIO 4449 B12/B71	1	1.13	1.20	1.23	0.86	2.21	1.72	0.07	0.05	0.01	0.01

Hot Rolled Steel Properties

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

Cold Formed Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E5 F)	Density[k/ft^3]	Yield[ksi]	Fu[ksi]
1	A653 SS Gr33	29500	11346	.3	.65	.49	33	45
2	A653 SS Gr50/1	29500	11346	.3	.65	.49	50	65

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	MF-H1	PIPE_3.0	Beam	Pipe	A53 Gr.B	Typical	2.07	2.85	2.85	5.69
2	MF-P1	PIPE_2.0	Column	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
3	F1-V1	PIPE_1.5	Column	Pipe	A53 Gr.B	Typical	.749	.293	.293	.586
4	F1-ST1	HSS4X4...	Beam	Tube	A500 Gr....	Typical	3.37	7.8	7.8	12.8
5	F1-C1	PL 1/2x4....	Beam	RECT	A36 Gr.36	Typical	2.125	.044	3.199	.164
6	F1-P1	PIPE_3.0	Column	Pipe	A53 Gr.B	Typical	2.07	2.85	2.85	5.69
7	New Horizontal Pipe	PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical	1.61	1.45	1.45	2.89
8	New Reinforcement Angles	L2.5x2.5x3	Beam	Single Angle	A36 Gr.36	Typical	.901	.535	.535	.011

Cold Formed Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	CF1	P1000	Beam	CS	A653 SS Gr33	Typical	.517	.165	.222	.002

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N1	N2			MF-H1	Beam	Pipe	A53 Gr.B	Typical
2	M2	N7	N5			RIGID	None	None	RIGID	Typical
3	M3	N3	N4			F1-P1	Column	Pipe	A53 Gr.B	Typical
4	M4	N5	N6			F1-ST1	Beam	Tube	A500 Gr.B...	Typical
5	M5	N7	N8			RIGID	None	None	RIGID	Typical
6	M6	N9	N10			MF-P1	Column	Pipe	A53 Gr.B	Typical
7	M7	N11	N12			RIGID	None	None	RIGID	Typical
8	M8	N13	N14			MF-P1	Column	Pipe	A53 Gr.B	Typical
9	M9	N15	N16			RIGID	None	None	RIGID	Typical
10	M10	N17	N18			MF-P1	Column	Pipe	A53 Gr.B	Typical
11	M11	N19	N20			F1-V1	Column	Pipe	A53 Gr.B	Typical
12	M12	N21	N22			F1-V1	Column	Pipe	A53 Gr.B	Typical
13	M13	N23	N24		90	F1-C1	Beam	RECT	A36 Gr.36	Typical
14	M14	N25	N26			CF1	Beam	CS	A653 SS ...	Typical
15	M15	N27	N28		180	CF1	Beam	CS	A653 SS ...	Typical
16	M16	N29	N30		90	F1-C1	Beam	RECT	A36 Gr.36	Typical
17	M17	N31	N32			F1-V1	Column	Pipe	A53 Gr.B	Typical
18	M18	N33	N34		90	F1-C1	Beam	RECT	A36 Gr.36	Typical
19	M19	N35	N36			F1-V1	Column	Pipe	A53 Gr.B	Typical
20	M20	N37	N38			F1-V1	Column	Pipe	A53 Gr.B	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
21	M21	N39	N40		90	F1-C1	Beam	RECT	A36 Gr.36	Typical
22	M22	N41	N42			CF1	Beam	CS	A653 SS ...	Typical
23	M23	N43	N44		90	F1-C1	Beam	RECT	A36 Gr.36	Typical
24	M24	N45	N46		180	CF1	Beam	CS	A653 SS ...	Typical
25	M25	N47	N48			New Horizonta...	Beam	Pipe	A53 Gr.B	Typical
26	M26	N50	N51			RIGID	None	None	RIGID	Typical
27	M27	N52	N53			RIGID	None	None	RIGID	Typical
28	M28	N54	N55			RIGID	None	None	RIGID	Typical
29	M29	N49	N56		180	New Reinforce...	Beam	Single Angle	A36 Gr.36	Typical
30	M30	N49	N57		90	New Reinforce...	Beam	Single Angle	A36 Gr.36	Typical
31	M31	N58	N59		180	New Reinforce...	Beam	Single Angle	A36 Gr.36	Typical
32	M32	N58	N60		90	New Reinforce...	Beam	Single Angle	A36 Gr.36	Typical

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torq...	Kyy	Kzz	Cb	Functi...
1	M1	MF-H1	13			Lbyy						Lateral
2	M3	F1-P1	1.5			Lbyy						Lateral
3	M4	F1-ST1	4			Lbyy						Lateral
4	M6	MF-P1	6			Lbyy						Lateral
5	M8	MF-P1	6			Lbyy						Lateral
6	M10	MF-P1	6			Lbyy						Lateral
7	M11	F1-V1	3			Lbyy						Lateral
8	M12	F1-V1	3			Lbyy						Lateral
9	M13	F1-C1	.833			Lbyy						Lateral
10	M16	F1-C1	.833			Lbyy						Lateral
11	M17	F1-V1	3			Lbyy						Lateral
12	M18	F1-C1	.833			Lbyy						Lateral
13	M19	F1-V1	3			Lbyy						Lateral
14	M20	F1-V1	3			Lbyy						Lateral
15	M21	F1-C1	.833			Lbyy						Lateral
16	M23	F1-C1	.833			Lbyy						Lateral
17	M25	New Horizo...	13			Lbyy						Lateral
18	M29	New Reinfo...	6.07			Lbyy						Lateral
19	M30	New Reinfo...	6.07			Lbyy						Lateral
20	M31	New Reinfo...	6.07			Lbyy						Lateral
21	M32	New Reinfo...	6.07			Lbyy						Lateral

Cold Formed Steel Design Parameters

	Label	Shape	Length...	Lbyy[ft]	Lbzz[ft]	Lcomp to...	Lcomp bo...	L-torque[ft]	Kyy	Kzz	Cb	R	a[ft]	Funct...
1	M14	CF1	9.75			Lbyy								Lateral
2	M15	CF1	9.75			Lbyy								Lateral
3	M22	CF1	2.75			Lbyy								Lateral
4	M24	CF1	2.75			Lbyy								Lateral

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N1	-6.5	0	4.333333	0	
2	N2	6.5	0	4.333333	0	
3	N3	0.	-.75	4	0	
4	N4	0.	.75	4	0	
5	N5	0.	0	4	0	
6	N6	0	0	0	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
7	N7	0.	0	4.333333	0	
8	N8	0.	0	4.578333	0	
9	N9	0.	4	4.578333	0	
10	N10	0.	-2	4.578333	0	
11	N11	6	0	4.333333	0	
12	N12	6	0	4.578333	0	
13	N13	6	3	4.578333	0	
14	N14	6	-3	4.578333	0	
15	N15	-6	0	4.333333	0	
16	N16	-6	0	4.578333	0	
17	N17	-6	3	4.578333	0	
18	N18	-6	-3	4.578333	0	
19	N19	-5	0	4.333333	0	
20	N20	-5	-3	4.333333	0	
21	N21	3.75	0	4.333333	0	
22	N22	3.75	-3	4.333333	0	
23	N23	-5	-3	3.916667	0	
24	N24	-5	-3	4.75	0	
25	N25	-5.333333	-3	3.916667	0	
26	N26	4.416667	-3	3.916667	0	
27	N27	-5.333333	-3	4.75	0	
28	N28	4.416667	-3	4.75	0	
29	N29	3.75	-3	3.916667	0	
30	N30	3.75	-3	4.75	0	
31	N31	-1.25	0	4.333333	0	
32	N32	-1.25	-3	4.333333	0	
33	N33	-1.25	-3	3.916667	0	
34	N34	-1.25	-3	4.75	0	
35	N35	0.	0	.75	0	
36	N36	0.	-3	.75	0	
37	N37	0.	0	3.25	0	
38	N38	0.	-3	3.25	0	
39	N39	-0.416667	-3	3.25	0	
40	N40	0.416667	-3	3.25	0	
41	N41	0.416667	-3	.625	0	
42	N42	0.416667	-3	3.375	0	
43	N43	-0.416667	-3	.75	0	
44	N44	0.416667	-3	.75	0	
45	N45	-0.416667	-3	.625	0	
46	N46	-0.416667	-3	3.375	0	
47	N47	-6.5	1.5	4.333333	0	
48	N48	6.5	1.5	4.333333	0	
49	N49	0	1.5	0	0	
50	N50	0.	1.5	4.333333	0	
51	N51	0.	1.5	4.578333	0	
52	N52	6	1.5	4.333333	0	
53	N53	6	1.5	4.578333	0	
54	N54	-6	1.5	4.333333	0	
55	N55	-6	1.5	4.578333	0	
56	N56	-4.25	1.5	4.333333	0	
57	N57	4.25	1.5	4.333333	0	
58	N58	0	3.5	0	0	
59	N59	-3.75	1.5	4.333333	0	
60	N60	3.75	1.5	4.333333	0	

Member Point Loads (BLC 1 : Dead)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M8	Y	-.02	%15
2	M8	Y	-.02	%85
3	M8	Y	-.015	%25
4	M8	Y	0	0
5	M8	Y	0	0
6	M10	Y	-.02	%5
7	M10	Y	-.02	%95
8	M10	Y	-.075	%25
9	M10	Y	0	0
10	M10	Y	0	0

Member Point Loads (BLC 2 : 0 Wind - No Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M8	Z	-.147	%15
2	M8	Z	-.147	%85
3	M8	Z	-.025	%25
4	M8	Z	0	0
5	M8	Z	0	0
6	M10	Z	-.278	%5
7	M10	Z	-.278	%95
8	M10	Z	-.073	%25
9	M10	Z	0	0
10	M10	Z	0	0

Member Point Loads (BLC 3 : 90 Wind - No Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M8	X	-.048	%15
2	M8	X	-.048	%85
3	M8	X	-.016	%25
4	M8	X	0	0
5	M8	X	0	0
6	M10	X	-.094	%5
7	M10	X	-.094	%95
8	M10	X	-.051	%25
9	M10	X	0	0
10	M10	X	0	0

Member Point Loads (BLC 4 : 0 Wind - Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M8	Z	-.025	%15
2	M8	Z	-.025	%85
3	M8	Z	-.004	%25
4	M8	Z	0	0
5	M8	Z	0	0
6	M10	Z	-.048	%5
7	M10	Z	-.048	%95
8	M10	Z	-.013	%25
9	M10	Z	0	0
10	M10	Z	0	0

Member Point Loads (BLC 5 : 90 Wind - Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M8	X	-.008	%15
2	M8	X	-.008	%85

Member Point Loads (BLC 5 : 90 Wind - Ice) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
3	M8	X	-.003	%25
4	M8	X	0	0
5	M8	X	0	0
6	M10	X	-.016	%5
7	M10	X	-.016	%95
8	M10	X	-.009	%25
9	M10	X	0	0
10	M10	X	0	0

Member Point Loads (BLC 6 : 0 Wind - Service)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M8	Z	-.009	%15
2	M8	Z	-.009	%85
3	M8	Z	-.002	%25
4	M8	Z	0	0
5	M8	Z	0	0
6	M10	Z	-.017	%5
7	M10	Z	-.017	%95
8	M10	Z	-.005	%25
9	M10	Z	0	0
10	M10	Z	0	0

Member Point Loads (BLC 7 : 90 Wind - Service)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M8	X	-.003	%15
2	M8	X	-.003	%85
3	M8	X	-.001	%25
4	M8	X	0	0
5	M8	X	0	0
6	M10	X	-.006	%5
7	M10	X	-.006	%95
8	M10	X	-.003	%25
9	M10	X	0	0
10	M10	X	0	0

Member Point Loads (BLC 8 : Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M8	Y	-.108	%15
2	M8	Y	-.108	%85
3	M8	Y	-.026	%25
4	M8	Y	0	0
5	M8	Y	0	0
6	M10	Y	-.186	%5
7	M10	Y	-.186	%95
8	M10	Y	-.067	%25
9	M10	Y	0	0
10	M10	Y	0	0

Member Point Loads (BLC 13 : Maint LL 1)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.25	%5

Member Point Loads (BLC 14 : Maint LL 2)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]

Member Point Loads (BLC 14 : Maint LL 2) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.25	%95

Member Point Loads (BLC 15 : Maint LL 3)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M4	Y	-.25	%5

Member Distributed Loads (BLC 2 : 0 Wind - No Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	-.015	-.015	0	0
2	M3	Z	-.01	-.01	0	0
3	M4	Z	-.023	-.023	0	0
4	M6	Z	-.011	-.011	0	0
5	M8	Z	-.011	-.011	0	0
6	M10	Z	-.011	-.011	0	0
7	M11	Z	-.007	-.007	0	0
8	M12	Z	-.007	-.007	0	0
9	M13	Z	-.003	-.003	0	0
10	M16	Z	-.003	-.003	0	0
11	M17	Z	-.007	-.007	0	0
12	M18	Z	-.003	-.003	0	0
13	M19	Z	-.007	-.007	0	0
14	M20	Z	-.007	-.007	0	0
15	M21	Z	-.003	-.003	0	0
16	M23	Z	-.003	-.003	0	0
17	M25	Z	-.013	-.013	0	0
18	M29	Z	-.019	-.019	0	0
19	M30	Z	-.019	-.019	0	0
20	M31	Z	-.019	-.019	0	0
21	M32	Z	-.019	-.019	0	0
22	M14	Z	-.012	-.012	0	0
23	M15	Z	-.012	-.012	0	0
24	M22	Z	-.011	-.011	0	0
25	M24	Z	-.011	-.011	0	0

Member Distributed Loads (BLC 3 : 90 Wind - No Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	-.015	-.015	0	0
2	M3	X	-.01	-.01	0	0
3	M4	X	-.023	-.023	0	0
4	M6	X	-.011	-.011	0	0
5	M8	X	-.011	-.011	0	0
6	M10	X	-.011	-.011	0	0
7	M11	X	-.007	-.007	0	0
8	M12	X	-.007	-.007	0	0
9	M13	X	-.003	-.003	0	0
10	M16	X	-.003	-.003	0	0
11	M17	X	-.007	-.007	0	0
12	M18	X	-.003	-.003	0	0
13	M19	X	-.007	-.007	0	0
14	M20	X	-.007	-.007	0	0
15	M21	X	-.003	-.003	0	0
16	M23	X	-.003	-.003	0	0
17	M25	X	-.013	-.013	0	0
18	M29	X	-.019	-.019	0	0

Member Distributed Loads (BLC 3 : 90 Wind - No Ice) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
19	M30	X	-.019	-.019	0	0
20	M31	X	-.019	-.019	0	0
21	M32	X	-.019	-.019	0	0
22	M14	X	-.012	-.012	0	0
23	M15	X	-.012	-.012	0	0
24	M22	X	-.011	-.011	0	0
25	M24	X	-.011	-.011	0	0

Member Distributed Loads (BLC 4 : 0 Wind - Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	-.003	-.003	0	0
2	M3	Z	-.004	-.004	0	0
3	M4	Z	-.009	-.009	0	0
4	M6	Z	-.003	-.003	0	0
5	M8	Z	-.003	-.003	0	0
6	M10	Z	-.003	-.003	0	0
7	M11	Z	-.003	-.003	0	0
8	M12	Z	-.003	-.003	0	0
9	M13	Z	-.009	-.009	0	0
10	M16	Z	-.009	-.009	0	0
11	M17	Z	-.003	-.003	0	0
12	M18	Z	-.009	-.009	0	0
13	M19	Z	-.003	-.003	0	0
14	M20	Z	-.003	-.003	0	0
15	M21	Z	-.009	-.009	0	0
16	M23	Z	-.009	-.009	0	0
17	M25	Z	-.003	-.003	0	0
18	M29	Z	-.01	-.01	0	0
19	M30	Z	-.01	-.01	0	0
20	M31	Z	-.01	-.01	0	0
21	M32	Z	-.01	-.01	0	0
22	M14	Z	-.009	-.009	0	0
23	M15	Z	-.009	-.009	0	0
24	M22	Z	-.009	-.009	0	0
25	M24	Z	-.009	-.009	0	0

Member Distributed Loads (BLC 5 : 90 Wind - Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	-.003	-.003	0	0
2	M3	X	-.004	-.004	0	0
3	M4	X	-.009	-.009	0	0
4	M6	X	-.003	-.003	0	0
5	M8	X	-.003	-.003	0	0
6	M10	X	-.003	-.003	0	0
7	M11	X	-.003	-.003	0	0
8	M12	X	-.003	-.003	0	0
9	M13	X	-.009	-.009	0	0
10	M16	X	-.009	-.009	0	0
11	M17	X	-.003	-.003	0	0
12	M18	X	-.009	-.009	0	0
13	M19	X	-.003	-.003	0	0
14	M20	X	-.003	-.003	0	0
15	M21	X	-.009	-.009	0	0
16	M23	X	-.009	-.009	0	0
17	M25	X	-.003	-.003	0	0
18	M29	X	-.01	-.01	0	0

Member Distributed Loads (BLC 5 : 90 Wind - Ice) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
19	M30	X	-.01	-.01	0	0
20	M31	X	-.01	-.01	0	0
21	M32	X	-.01	-.01	0	0
22	M14	X	-.009	-.009	0	0
23	M15	X	-.009	-.009	0	0
24	M22	X	-.009	-.009	0	0
25	M24	X	-.009	-.009	0	0

Member Distributed Loads (BLC 6 : 0 Wind - Service)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	-.0005	-.0005	0	0
2	M3	Z	-.0005	-.0005	0	0
3	M4	Z	-.001	-.001	0	0
4	M6	Z	-.0003	-.0003	0	0
5	M8	Z	-.0003	-.0003	0	0
6	M10	Z	-.0003	-.0003	0	0
7	M11	Z	-.0003	-.0003	0	0
8	M12	Z	-.0003	-.0003	0	0
9	M13	Z	-.0002	-.0002	0	0
10	M16	Z	-.0002	-.0002	0	0
11	M17	Z	-.0003	-.0003	0	0
12	M18	Z	-.0002	-.0002	0	0
13	M19	Z	-.0003	-.0003	0	0
14	M20	Z	-.0003	-.0003	0	0
15	M21	Z	-.0002	-.0002	0	0
16	M23	Z	-.0002	-.0002	0	0
17	M25	Z	-.0004	-.0004	0	0
18	M29	Z	-.001	-.001	0	0
19	M30	Z	-.001	-.001	0	0
20	M31	Z	-.001	-.001	0	0
21	M32	Z	-.001	-.001	0	0
22	M14	Z	-.0008	-.0008	0	0
23	M15	Z	-.0008	-.0008	0	0
24	M22	Z	-.0007	-.0007	0	0
25	M24	Z	-.0007	-.0007	0	0

Member Distributed Loads (BLC 7 : 90 Wind - Service)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	-.0005	-.0005	0	0
2	M3	X	-.0005	-.0005	0	0
3	M4	X	-.001	-.001	0	0
4	M6	X	-.0003	-.0003	0	0
5	M8	X	-.0003	-.0003	0	0
6	M10	X	-.0003	-.0003	0	0
7	M11	X	-.0003	-.0003	0	0
8	M12	X	-.0003	-.0003	0	0
9	M13	X	-.0002	-.0002	0	0
10	M16	X	-.0002	-.0002	0	0
11	M17	X	-.0003	-.0003	0	0
12	M18	X	-.0002	-.0002	0	0
13	M19	X	-.0003	-.0003	0	0
14	M20	X	-.0003	-.0003	0	0
15	M21	X	-.0002	-.0002	0	0
16	M23	X	-.0002	-.0002	0	0
17	M25	X	-.0004	-.0004	0	0
18	M29	X	-.001	-.001	0	0

Member Distributed Loads (BLC 7 : 90 Wind - Service) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
19	M30	X	-.001	-.001	0	0
20	M31	X	-.001	-.001	0	0
21	M32	X	-.001	-.001	0	0
22	M14	X	-.0008	-.0008	0	0
23	M15	X	-.0008	-.0008	0	0
24	M22	X	-.0007	-.0007	0	0
25	M24	X	-.0007	-.0007	0	0

Member Distributed Loads (BLC 8 : Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.017	-.017	0	0
2	M3	Y	-.017	-.017	0	0
3	M4	Y	-.023	-.023	0	0
4	M6	Y	-.014	-.014	0	0
5	M8	Y	-.014	-.014	0	0
6	M10	Y	-.014	-.014	0	0
7	M11	Y	-.012	-.012	0	0
8	M12	Y	-.012	-.012	0	0
9	M13	Y	-.019	-.019	0	0
10	M16	Y	-.019	-.019	0	0
11	M17	Y	-.012	-.012	0	0
12	M18	Y	-.019	-.019	0	0
13	M19	Y	-.012	-.012	0	0
14	M20	Y	-.012	-.012	0	0
15	M21	Y	-.019	-.019	0	0
16	M23	Y	-.019	-.019	0	0
17	M25	Y	-.015	-.015	0	0
18	M29	Y	-.017	-.017	0	0
19	M30	Y	-.017	-.017	0	0
20	M31	Y	-.017	-.017	0	0
21	M32	Y	-.017	-.017	0	0
22	M14	Y	-.014	-.014	0	0
23	M15	Y	-.014	-.014	0	0
24	M22	Y	-.014	-.014	0	0
25	M24	Y	-.014	-.014	0	0

Member Distributed Loads (BLC 31 : BLC 1 Transient Area Loads)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M13	Y	-.003	-.005	2.637e-16	.208
2	M13	Y	-.005	-.006	.208	.417
3	M13	Y	-.006	-.005	.417	.625
4	M13	Y	-.005	-.003	.625	.833
5	M14	Y	-.002	-.004	0	1.95
6	M14	Y	-.004	-.004	1.95	3.9
7	M14	Y	-.004	-.004	3.9	5.85
8	M14	Y	-.004	-.004	5.85	7.8
9	M14	Y	-.004	-.002	7.8	9.75
10	M15	Y	-.002	-.004	0	1.95
11	M15	Y	-.004	-.004	1.95	3.9
12	M15	Y	-.004	-.004	3.9	5.85
13	M15	Y	-.004	-.004	5.85	7.8
14	M15	Y	-.004	-.002	7.8	9.75
15	M16	Y	-.007	-.007	8.049e-16	.833
16	M21	Y	-.0006278	-.003	0	.167
17	M21	Y	-.003	-.004	.167	.333
18	M21	Y	-.004	-.004	.333	.5

Member Distributed Loads (BLC 31 : BLC 1 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
19	M21	Y	-.004	-.003	.5	.667
20	M21	Y	-.003	-.0002475	.667	.833
21	M22	Y	-.001	-.004	0	.55
22	M22	Y	-.004	-.004	.55	1.1
23	M22	Y	-.004	-.004	1.1	1.65
24	M22	Y	-.004	-.003	1.65	2.2
25	M22	Y	-.003	-.001	2.2	2.75
26	M23	Y	-.0002476	-.003	0	.167
27	M23	Y	-.003	-.004	.167	.333
28	M23	Y	-.004	-.004	.333	.5
29	M23	Y	-.004	-.003	.5	.667
30	M23	Y	-.003	-.0006275	.667	.833
31	M24	Y	-.001	-.003	0	.55
32	M24	Y	-.003	-.004	.55	1.1
33	M24	Y	-.004	-.004	1.1	1.65
34	M24	Y	-.004	-.004	1.65	2.2
35	M24	Y	-.004	-.001	2.2	2.75

Member Distributed Loads (BLC 32 : BLC 8 Transient Area Loads)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M13	Y	-.003	-.005	2.637e-16	.208
2	M13	Y	-.005	-.006	.208	.417
3	M13	Y	-.006	-.005	.417	.625
4	M13	Y	-.005	-.003	.625	.833
5	M14	Y	-.003	-.005	0	1.95
6	M14	Y	-.005	-.005	1.95	3.9
7	M14	Y	-.005	-.005	3.9	5.85
8	M14	Y	-.005	-.004	5.85	7.8
9	M14	Y	-.004	-.002	7.8	9.75
10	M15	Y	-.002	-.005	0	1.95
11	M15	Y	-.005	-.005	1.95	3.9
12	M15	Y	-.005	-.005	3.9	5.85
13	M15	Y	-.005	-.004	5.85	7.8
14	M15	Y	-.004	-.002	7.8	9.75
15	M16	Y	-.008	-.008	8.049e-16	.833
16	M21	Y	-.0006906	-.003	0	.167
17	M21	Y	-.003	-.004	.167	.333
18	M21	Y	-.004	-.005	.333	.5
19	M21	Y	-.005	-.004	.5	.667
20	M21	Y	-.004	-.0002722	.667	.833
21	M22	Y	-.002	-.004	0	.55
22	M22	Y	-.004	-.005	.55	1.1
23	M22	Y	-.005	-.004	1.1	1.65
24	M22	Y	-.004	-.004	1.65	2.2
25	M22	Y	-.004	-.001	2.2	2.75
26	M23	Y	-.0002723	-.004	0	.167
27	M23	Y	-.004	-.005	.167	.333
28	M23	Y	-.005	-.004	.333	.5
29	M23	Y	-.004	-.003	.5	.667
30	M23	Y	-.003	-.0006902	.667	.833
31	M24	Y	-.001	-.004	0	.55
32	M24	Y	-.004	-.004	.55	1.1
33	M24	Y	-.004	-.005	1.1	1.65
34	M24	Y	-.005	-.004	1.65	2.2
35	M24	Y	-.004	-.002	2.2	2.75

Member Area Loads (BLC 1 : Dead)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[ksf]
1	N27	N25	N26	N28	Y	Two Way	-.01
2	N46	N45	N41	N42	Y	Two Way	-.01

Member Area Loads (BLC 8 : Ice)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[ksf]
1	N27	N25	N26	N28	Y	Two Way	-.011
2	N46	N45	N41	N42	Y	Two Way	-.011

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
1	Dead	DL		-1			10		2	
2	0 Wind - No Ice	WLZ					10	25		
3	90 Wind - No Ice	WLX					10	25		
4	0 Wind - Ice	WLZ					10	25		
5	90 Wind - Ice	WLX					10	25		
6	0 Wind - Service	WLZ					10	25		
7	90 Wind - Service	WLX					10	25		
8	Ice	OL1					10	25	2	
9	Live Load a	LL								
10	Live Load b	LL								
11	Live Load c	LL								
12	Live Load d	LL								
13	Maint LL 1	LL					1			
14	Maint LL 2	LL					1			
15	Maint LL 3	LL					1			
16	Maint LL 4	LL								
17	Maint LL 5	LL								
18	Maint LL 6	LL								
19	Maint LL 7	LL								
20	Maint LL 8	LL								
21	Maint LL 9	LL								
22	Maint LL 10	LL								
23	Maint LL 11	LL								
24	Maint LL 12	LL								
25	Maint LL 13	LL								
26	Maint LL 14	LL								
27	Maint LL 15	LL								
28	Maint LL 16	LL								
29	Maint LL 17	LL								
30	Maint LL 18	LL								
31	BLC 1 Transient Area Loads	None						35		
32	BLC 8 Transient Area Loads	None						35		

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	1.4 Dead	Yes	Y		1	1.4																		
2	1.2 D + 1.0 - 0 W	Yes	Y		1	1.2	2	1																
3	1.2 D + 1.0 - 30 W	Yes	Y		1	1.2	2	.866	3	.5														
4	1.2 D + 1.0 - 60 W	Yes	Y		1	1.2	3	.866	2	.5														
5	1.2 D + 1.0 - 90 W	Yes	Y		1	1.2	3	1																
6	1.2 D + 1.0 - 120 W	Yes	Y		1	1.2	3	.866	2	-.5														
7	1.2 D + 1.0 - 150 W	Yes	Y		1	1.2	2	-.866	3	.5														

Load Combinations (Continued)

	Description	So...	P...	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
8	1.2 D + 1.0 - 180 W	Yes	Y		1	1.2	2	-1																
9	1.2 D + 1.0 - 210 W	Yes	Y		1	1.2	2	-.866	3	-.5														
10	1.2 D + 1.0 - 240 W	Yes	Y		1	1.2	3	-.866	2	-.5														
11	1.2 D + 1.0 - 270 W	Yes	Y		1	1.2	3	-1																
12	1.2 D + 1.0 - 300 W	Yes	Y		1	1.2	3	-.866	2	.5														
13	1.2 D + 1.0 - 330 W	Yes	Y		1	1.2	2	.866	3	-.5														
14	1.2 D + 1.0 - 0 W/I...	Yes	Y		1	1.2	4	1			8	1												
15	1.2 D + 1.0 - 30 W...	Yes	Y		1	1.2	4	.866	5	.5	8	1												
16	1.2 D + 1.0 - 60 W...	Yes	Y		1	1.2	5	.866	4	.5	8	1												
17	1.2 D + 1.0 - 90 W...	Yes	Y		1	1.2	5	1			8	1												
18	1.2 D + 1.0 - 120 ...	Yes	Y		1	1.2	5	.866	4	-.5	8	1												
19	1.2 D + 1.0 - 150 ...	Yes	Y		1	1.2	4	-.866	5	.5	8	1												
20	1.2 D + 1.0 - 180 ...	Yes	Y		1	1.2	4	-1			8	1												
21	1.2 D + 1.0 - 210 ...	Yes	Y		1	1.2	4	-.866	5	-.5	8	1												
22	1.2 D + 1.0 - 240 ...	Yes	Y		1	1.2	5	-.866	4	-.5	8	1												
23	1.2 D + 1.0 - 270 ...	Yes	Y		1	1.2	5	-1			8	1												
24	1.2 D + 1.0 - 300 ...	Yes	Y		1	1.2	5	-.866	4	.5	8	1												
25	1.2 D + 1.0 - 330 ...	Yes	Y		1	1.2	4	.866	5	-.5	8	1												
26	1.2 D + 1.5 LL a +...	Yes	Y		1	1.2	6	1			9	1.5												
27	1.2 D + 1.5 LL a +...	Yes	Y		1	1.2	6	.866	7	.5	9	1.5												
28	1.2 D + 1.5 LL a +...	Yes	Y		1	1.2	7	.866	6	.5	9	1.5												
29	1.2 D + 1.5 LL a +...	Yes	Y		1	1.2	7	1			9	1.5												
30	1.2 D + 1.5 LL a +...	Yes	Y		1	1.2	7	.866	6	-.5	9	1.5												
31	1.2 D + 1.5 LL a +...	Yes	Y		1	1.2	6	-.866	7	.5	9	1.5												
32	1.2 D + 1.5 LL a +...	Yes	Y		1	1.2	6	-1			9	1.5												
33	1.2 D + 1.5 LL a +...	Yes	Y		1	1.2	6	-.866	7	-.5	9	1.5												
34	1.2 D + 1.5 LL a +...	Yes	Y		1	1.2	7	-.866	6	-.5	9	1.5												
35	1.2 D + 1.5 LL a +...	Yes	Y		1	1.2	7	-1			9	1.5												
36	1.2 D + 1.5 LL a +...	Yes	Y		1	1.2	7	-.866	6	.5	9	1.5												
37	1.2 D + 1.5 LL a +...	Yes	Y		1	1.2	6	.866	7	-.5	9	1.5												
38	1.2 D + 1.5 LL b +...	Yes	Y		1	1.2	6	1			10	1.5												
39	1.2 D + 1.5 LL b +...	Yes	Y		1	1.2	6	.866	7	.5	10	1.5												
40	1.2 D + 1.5 LL b +...	Yes	Y		1	1.2	7	.866	6	.5	10	1.5												
41	1.2 D + 1.5 LL b +...	Yes	Y		1	1.2	7	1			10	1.5												
42	1.2 D + 1.5 LL b +...	Yes	Y		1	1.2	7	.866	6	-.5	10	1.5												
43	1.2 D + 1.5 LL b +...	Yes	Y		1	1.2	6	-.866	7	.5	10	1.5												
44	1.2 D + 1.5 LL b +...	Yes	Y		1	1.2	6	-1			10	1.5												
45	1.2 D + 1.5 LL b +...	Yes	Y		1	1.2	6	-.866	7	-.5	10	1.5												
46	1.2 D + 1.5 LL b +...	Yes	Y		1	1.2	7	-.866	6	-.5	10	1.5												
47	1.2 D + 1.5 LL b +...	Yes	Y		1	1.2	7	-1			10	1.5												
48	1.2 D + 1.5 LL b +...	Yes	Y		1	1.2	7	-.866	6	.5	10	1.5												
49	1.2 D + 1.5 LL b +...	Yes	Y		1	1.2	6	.866	7	-.5	10	1.5												
50	1.2 D + 1.5 LL c + ...	Yes	Y		1	1.2	6	1			11	1.5												
51	1.2 D + 1.5 LL c + ...	Yes	Y		1	1.2	6	.866	7	.5	11	1.5												
52	1.2 D + 1.5 LL c + ...	Yes	Y		1	1.2	7	.866	6	.5	11	1.5												
53	1.2 D + 1.5 LL c + ...	Yes	Y		1	1.2	7	1			11	1.5												
54	1.2 D + 1.5 LL c + ...	Yes	Y		1	1.2	7	.866	6	-.5	11	1.5												
55	1.2 D + 1.5 LL c + ...	Yes	Y		1	1.2	6	-.866	7	.5	11	1.5												
56	1.2 D + 1.5 LL c + ...	Yes	Y		1	1.2	6	-1			11	1.5												
57	1.2 D + 1.5 LL c + ...	Yes	Y		1	1.2	6	-.866	7	-.5	11	1.5												
58	1.2 D + 1.5 LL c + ...	Yes	Y		1	1.2	7	-.866	6	-.5	11	1.5												
59	1.2 D + 1.5 LL c + ...	Yes	Y		1	1.2	7	-1			11	1.5												
60	1.2 D + 1.5 LL c + ...	Yes	Y		1	1.2	7	-.866	6	.5	11	1.5												
61	1.2 D + 1.5 LL c + ...	Yes	Y		1	1.2	6	.866	7	-.5	11	1.5												
62	1.2 D + 1.5 LL d +...	Yes	Y		1	1.2	6	1			12	1.5												
63	1.2 D + 1.5 LL d +...	Yes	Y		1	1.2	6	.866	7	.5	12	1.5												
64	1.2 D + 1.5 LL d +...	Yes	Y		1	1.2	7	.866	6	.5	12	1.5												

Load Combinations (Continued)

	Description	So...	P...	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
65	1.2 D + 1.5 LL d +...	Yes	Y		1	1.2	7	1			12	1.5												
66	1.2 D + 1.5 LL d +...	Yes	Y		1	1.2	7	.866	6	-.5	12	1.5												
67	1.2 D + 1.5 LL d +...	Yes	Y		1	1.2	6	-.866	7	.5	12	1.5												
68	1.2 D + 1.5 LL d +...	Yes	Y		1	1.2	6	-1			12	1.5												
69	1.2 D + 1.5 LL d +...	Yes	Y		1	1.2	6	-.866	7	-.5	12	1.5												
70	1.2 D + 1.5 LL d +...	Yes	Y		1	1.2	7	-.866	6	-.5	12	1.5												
71	1.2 D + 1.5 LL d +...	Yes	Y		1	1.2	7	-1			12	1.5												
72	1.2 D + 1.5 LL d +...	Yes	Y		1	1.2	7	-.866	6	.5	12	1.5												
73	1.2 D + 1.5 LL d +...	Yes	Y		1	1.2	6	.866	7	-.5	12	1.5												
74	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					13	1.5												
75	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					14	1.5												
76	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					15	1.5												
77	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					16	1.5												
78	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					17	1.5												
79	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					18	1.5												
80	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					19	1.5												
81	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					20	1.5												
82	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					21	1.5												
83	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					22	1.5												
84	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					23	1.5												
85	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					24	1.5												
86	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					25	1.5												
87	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					26	1.5												
88	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					27	1.5												
89	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					28	1.5												
90	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					29	1.5												
91	1.2 D + 1.5 LL Mai...	Yes	Y		1	1.2					30	1.5												

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	N6	max	1.887	5	1.269	20	1.3	14	-.525	13	6.94	4	.184	75
2		min	-1.911	11	-.276	2	-.7	8	-2.671	16	-6.907	10	-.42	23
3	N49	max	.688	75	.117	20	4.734	14	.001	8	0	91	0	75
4		min	-1.114	74	.02	74	-1.699	8	-.001	2	0	1	0	74
5	N58	max	1.161	74	2.545	14	-.078	8	0	8	0	4	0	10
6		min	-.716	75	.006	8	-5.152	14	0	2	0	10	0	4
7	Totals:	max	1.879	5	3.502	20	2.477	2						
8		min	-1.879	11	.898	2	-2.477	8						

Envelope AISC 15th(360-16): LRFD Steel Code Checks

	Member	Shape	Code Check	Lo...	LC	She...	Lo...	...	LC	phi*P...	phi*P...	phi*M...	phi*M.....		Eqn
1	M1	PIPE_3.0	.336	6.5	8	.279	6.5		8	26.387	65.205	5.749	5.749	...	H3-6
2	M3	PIPE_3.0	.001	.75	5	.000	.75		5	64.424	65.205	5.749	5.749	...	H1-1b
3	M4	HSS4X4X4	.474	4	4	.066	.75	z	5	130.4...	139.5...	16.181	16.181	...	H1-1b
4	M6	PIPE_2.0	.432	4	19	.154	4		10	20.867	32.13	1.872	1.872	...	H1-1b
5	M8	PIPE_2.0	.324	1.5	17	.105	3		16	20.867	32.13	1.872	1.872	...	H1-1b
6	M10	PIPE_2.0	.484	1.5	23	.155	3		23	20.867	32.13	1.872	1.872	...	H1-1b
7	M11	PIPE_1.5	.170	0	6	.080	0		7	19.914	23.593	1.105	1.105	...	H1-1b
8	M12	PIPE_1.5	.244	0	9	.132	0		8	19.914	23.593	1.105	1.105	...	H1-1b
9	M13	PL 1/2x4.25	.031	.417	13	.115	.417	y	6	53.476	68.85	.717	6.096	...	H1-1b
10	M16	PL 1/2x4.25	.047	.417	16	.107	.417	y	10	53.476	68.85	.717	6.096	...	H1-1b
11	M17	PIPE_1.5	.482	0	8	.039	0		2	19.914	23.593	1.105	1.105	...	H1-1b
12	M18	PL 1/2x4.25	.108	.417	19	.113	.417	y	11	53.476	68.85	.717	6.096	...	H1-1b
13	M19	PIPE_1.5	.131	0	11	.063	0		10	19.914	23.593	1.105	1.105	...	H1-1b

Envelope AISC 15th(360-16): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Check	Lo...	LC	She...	Lo...	...	LC	phi*P...	phi*P...	phi*M...	phi*M.....		Eqn
14	M20	PIPE_1.5	.118	0	5	.055	0		4	19.914	23.593	1.105	1.105	...	H1-1b
15	M21	PL 1/2x4.25	.032	.417	14	.040	.417	y	8	53.476	68.85	.717	6.096	...	H1-1b
16	M23	PL 1/2x4.25	.034	.417	20	.056	.417	y	8	53.476	68.85	.717	6.096	...	H1-1b
17	M25	PIPE_2.5	.408	2.7...	25	.242	2.7...		14	13.46	50.715	3.596	3.596	...	H1-1b
18	M29	L2.5x2.5x3	.554	2.9...	14	.014	0	z	9	8.914	29.192	.873	1.525	...	H2-1
19	M30	L2.5x2.5x3	.403	2.9...	15	.012	0	y	7	8.914	29.192	.873	1.525	...	H2-1
20	M31	L2.5x2.5x3	.285	3.0...	24	.009	0	y	20	8.914	29.192	.873	1.525	...	H2-1
21	M32	L2.5x2.5x3	.236	3.0...	16	.011	6.07	z	15	8.914	29.192	.873	1.525	...	H2-1

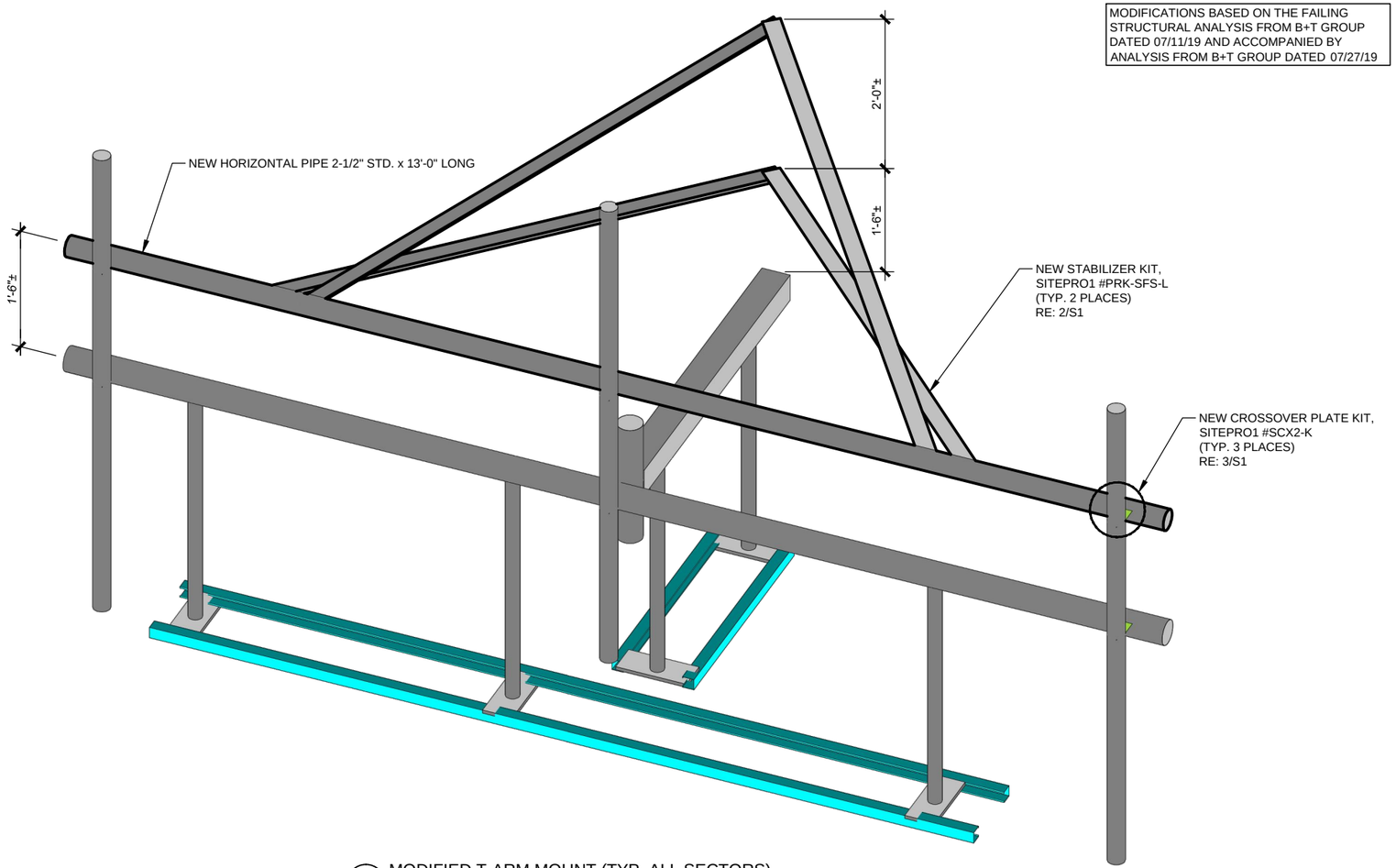
Envelope AISI S100-16: LRFD Cold Formed Steel Code Checks

	Member	Shape	Code ...	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	phi*Pn[k]	phi*Tn[k]	phi*Mny...	phi*Mnz...	phi*V...	phi*V...	Cb	Eqn
1	M14	P1000	.207	4.164	21	.042	4.063	y	18	2.42	15.362	.339	.655	2.36	4.72	2.134	H1.1-2
2	M15	P1000	.306	4.063	8	.040	4.063	y	17	2.42	15.362	.429	.654	2.36	4.72	2.1	H1.2-1
3	M22	P1000	.051	.143	9	.021	.143	y	20	8.987	15.362	.432	.676	2.36	4.72	2.234	H1.2-1
4	M24	P1000	.046	.143	3	.020	.143	y	20	8.987	15.362	.432	.676	2.36	4.72	1.815	H1.2-1

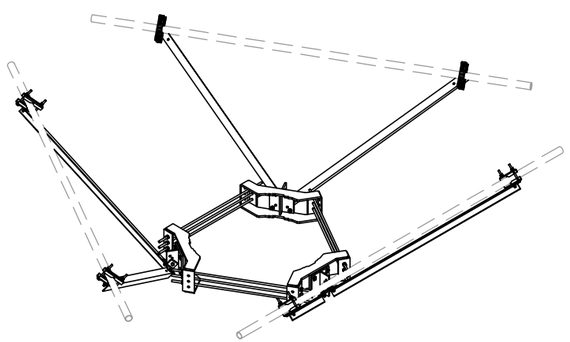
APPENDIX C

MOUNT MODIFICATION DESIGN DRAWINGS (MDD)

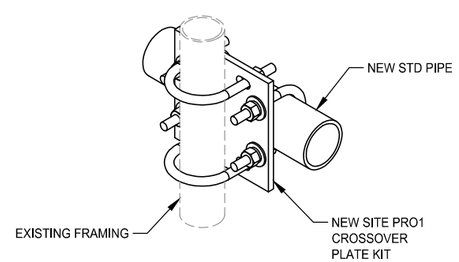
MODIFICATIONS BASED ON THE FAILING STRUCTURAL ANALYSIS FROM B+T GROUP DATED 07/11/19 AND ACCOMPANIED BY ANALYSIS FROM B+T GROUP DATED 07/27/19



1 MODIFIED T-ARM MOUNT (TYP. ALL SECTORS)
SCALE: N.T.S.



2 SITE PRO1 PRK-SFS-L REINFORCEMENT KIT
SCALE: N.T.S.



3 SITE PRO1 SCX2-K CROSSOVER PLATE KIT
SCALE: N.T.S.

GENERAL NOTES

1.1 CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS AND DIMENSIONS PRIOR TO THE MOBILIZING ON THE SITE FOR INSTALLATION OF THE MOUNT MODIFICATION AND SHALL NOTIFY THE ENGINEER OF RECORD IF THE FIELD CONDITIONS VARY FROM WHAT IS SHOWN ON THE DRAWINGS. IN ADDITION, THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF RECORD PRIOR TO MOBILIZING AT THE SITE IF THE MOUNT REINFORCEMENT SHOWN WILL NEED TO BE REVISED TO SATISFY FIELD CONDITIONS

1.2 CONTRACTOR SHALL RELOCATE NON-ANTENNA EQUIPMENT ALONG THE EXISTING PIPE MOUNT THAT IT IS MOUNTED TO, TO ALLOW FOR INSTALLATION OF MOUNT REINFORCEMENT. ENGINEER OF RECORD WILL BE NOTIFIED IF NON-ANTENNA EQUIPMENT NEEDS TO BE RELOCATED TO ANY OTHER EXISTING MEMBERS TO ALLOW FOR INSTALLATION OF MOUNT MODIFICATION.

1.3 MODIFICATION SHALL BE COMPLETED PRIOR TO ADDING THE PROPOSED APPURTENANCES.

1.4 ALL WORK SHALL COMPLY WITH THE TIA-222-H STANDARD, TIA-1019-A STANDARD, AS WELL AS ANY OTHER GOVERNING BUILDING CODES.

1.5 FIELD WORK WILL BE DONE AROUND EXISTING COAXIAL CABLE AND EQUIPMENT. ALL WORK SHALL BE DONE IN A MANNER SUCH THAT NO DAMAGE OCCURS TO THE EXISTING EQUIPMENT OR THE STRUCTURE.

1.6 A MINIMUM OF TWO COATS OF ZINGA COLD GALVANIZING COMPOUND (OR APPROVED EQUIVALENT) SHALL BE APPLIED TO ANY FIELD CUTS OR FIELD DRILLED HOLES.

1.7 THE USE OF A GAS TORCH OR WELDER WILL NOT BE PERMITTED ON THE TOWER WITHOUT THE CONSENT OF THE OWNER.

1.8 ALL FIELD CONNECTIONS SHALL BE MADE WITH A325N BOLTS, U.N.O.

1.9 IN LIEU OF TEMPORARY BRACING, CONTRACTOR MAY HAVE A STABILITY ANALYSIS PERFORMED BY AN ENGINEER LICENSED IN THE STATE THE TOWER IS LOCATED. THE ANALYSIS SHALL USE A MINIMUM WIND SPEED OF 45 mph (3-SEC) PER TIA-1019.

1.10 ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CCUSA POLICY "CUTTING AND WELDING PLAN" (DOC #ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT.

1.11 DIMENSIONS WITH "±" MUST BE WITHIN 3" OF THE INDICATED DIMENSION.

FABRICATION

2.1 ALL WORK SHALL BE DONE IN ACCORDANCE WITH A.I.S.C. "SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."

2.2 STRUCTURAL STEEL SHALL MEET THE FOLLOWING SPECIFICATIONS:

	YIELD	ASTM SPECS
STEEL PIPE, U.N.O.	35ksi	A53 GR.B

2.3 ALL NEW MATERIAL INCLUDING STRUCTURAL STEEL AND FASTENERS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 AND A153.

2.4 WELDING SHALL MEET ANSI/AWS D1.1 STRUCTURAL WELDING CODE (LATEST REVISION). ELECTRODES SHALL BE E80 SERIES.

2.5 CONTRACTOR SHALL PROVIDE SHOP FABRICATION DRAWINGS TO B+T GROUP 5 DAYS PRIOR TO FABRICATION.

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-Mobile

CROWN CASTLE

CT SUFFIELD 1
CAC 801485

2715 MOUNTAIN RD
SUFFIELD, CT 06093
HARTFORD

EXISTING T-ARM
AT 180'-00"

PROJECT NO:	**84855.013.01**
CHECKED BY:	**JV**

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
0	07/27/19	PMS	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/20

STATE OF CONNECTICUT
SCOTT M. VANCE
31627
LICENSED
PROFESSIONAL ENGINEER
7/29/19

SHEET NUMBER:	REVISION:
S1	0

Exhibit F

Power Density/RF Emissions Report

Radio Frequency Emissions Analysis Report

T-MOBILE Existing Facility

Site ID: CT11545A

CT545/Crown Suffield
2715 Mountain Road
Suffield, CT 06093

June 4, 2019

Transcom Engineering Project Number: 737001-0144

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**5.28 %**

June 4, 2019

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

Emissions Analysis for Site: **CT11545A – CT545/Crown Suffield**

Transcom Engineering, Inc ("Transcom") was directed to analyze the proposed upgrades to the T-MOBILE facility located at **2715 Mountain Road, Suffield, CT**, for the purpose of determining whether the emissions from the Proposed T-MOBILE Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were performed for the proposed upgrades to the T-MOBILE antenna facility located at **2715 Mountain Road, Suffield, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-MOBILE is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

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

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

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
LTE	1900 MHz (PCS)	4	40
GSM	1900 MHz (PCS)	1	15
LTE / 5G NR	600 MHz	2	40
LTE	700 MHz	2	20

Table 1: Channel Data Table

The following antennas listed in *Table 2* were used in the modeling for transmission in the 600, 700 MHz, 1900 MHz (PCS) and 2100 MHz (AWS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	RFS APX16DWV-16DWV-S-E-ACU	182
A	2	RFS APXVAARR24_43-U-NA20	182
B	1	RFS APX16DWV-16DWV-S-E-ACU	182
B	2	RFS APXVAARR24_43-U-NA20	182
C	1	RFS APX16DWV-16DWV-S-E-ACU	182
C	2	RFS APXVAARR24_43-U-NA20	182

Table 2: Antenna Data

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

Cable losses were factored in the calculations for this site. Since all **1900 MHz (PCS)** radios are ground mounted the following cable loss values were used. For each ground mounted **1900 MHz (PCS)** radio there was **2.27 dB** of cable loss calculated into the system gains / losses for this site. These values were calculated based upon the manufacturers specifications for **220 feet** of **1-5/8”** coax.

RESULTS

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

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	RFS APX16DWV-16DWV-S-E-ACU	1900 MHz (PCS)	15.9	5	175	4,036.81	0.47
Antenna A2	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	0.67
						Sector A Composite MPE%	**1.14**
Antenna B1	RFS APX16DWV-16DWV-S-E-ACU	1900 MHz (PCS)	15.9	5	175	4,036.81	0.47
Antenna B2	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	0.67
						Sector B Composite MPE%	**1.14**
Antenna C1	RFS APX16DWV-16DWV-S-E-ACU	1900 MHz (PCS)	15.9	5	175	4,036.81	0.47
Antenna C2	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	0.67
						Sector C Composite MPE%	**1.14**

Table 3: T-MOBILE Emissions Levels

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

Site Composite MPE%	
Carrier	**MPE%**
T-MOBILE – Max Per Sector Value	**1.14 %**
AT&T	1.28 %
Nextel	0.16 %
Verizon Wireless	2.70 %
Site Total MPE %:	**5.28 %**

Table 4: All Carrier MPE Contributions

T-MOBILE Sector A Total:	1.14 %
T-MOBILE Sector B Total:	1.14 %
T-MOBILE Sector C Total:	1.14 %
Site Total:	5.28 %

Table 5: Site MPE Summary

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

T-MOBILE _ Frequency Band / Technology Max Power Values (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile 1900 MHz (PCS) LTE	4	922.70	182	4.28	1900 MHz (PCS)	1000	0.43%
T-Mobile 1900 MHz (PCS) GSM	1	346.01	182	0.40	1900 MHz (PCS)	1000	0.04%
T-Mobile 600 MHz LTE / 5G NR	2	788.97	182	1.83	600 MHz	400	0.46%
T-Mobile 700 MHz LTE	2	432.54	182	1.00	700 MHz	467	0.21%
						Total:	**1.14%**

Table 6: T-MOBILE Maximum Sector MPE Power Values

Summary

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

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

T-MOBILE Sector	Power Density Value (%)
Sector A:	1.14 %
Sector B:	1.14 %
Sector C:	1.14 %
T-MOBILE Maximum Total (per sector):	1.14 %
Site Total:	5.28 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **5.28 %** 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.

Scott Heffernan
RF Engineering Director
Transcom Engineering, Inc
PO Box 1048
Sterling, MA 01564