



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

August 27, 2020

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

RE: **Notice of Exempt Modification for T-Mobile:**
845455 - T-Mobile Site ID: CTNH211B
85 Quaker Farms Road, Oxford, CT 06478
Latitude: 41° 23' 2.36" / Longitude: -73° 8' 14.54"

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 131-foot mount on the existing 149-foot Monopole Tower, located at 85 Quaker Farms Road, Oxford, CT. The tower is owned by Crown Castle and the property is owned by William & Elaine Schiavi. T-Mobile now intends to replace three (3) existing antennas with three (3) new 600/700 MHz antennas. The new antennas will be installed at the 131-ft level of the tower. T-Mobile is also proposing tower mount modifications, as shown on the enclosed mount analysis.

Planned Modifications:

Tower:

Remove and Replace:

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

Install New:

(1) Hybrid Fiber Line
(3) Radio 4449 B71/B12 **(REPLACE)**

Existing to Remain:

(12) 1 5/8" Coax
(3) RFS-APXV18-209014-C-A20 Antenna 1900 MHz
(3) TMA

Ground:

Upgrade to existing ground cabinet. (Internally)

The facility was approved by the Connecticut Siting Council in Docket No. 261 on December 22, 2003. The approval was given with conditions which this proposed exempt modification is following.

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

The Foundation for a Wireless World.

CrownCastle.com

R.C.S.A. § 16-50j-73, a copy of this letter is being sent to George R. Temple, First Selectman for the Town of Oxford, Steven Macary, Zoning Enforcement Official, the property owners 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
Site Acquisition Specialist
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
(201) 236-9224
AnneMarie.Zsamba@crowncastle.com

Attachments

cc:

The Honorable George Temple, First Selectman (*via email only to selectman@oxford-ct.gov*)
Oxford Town Hall
486 Oxford Road
Oxford, CT 06478

Steven S. Macary, Zoning Enforcement Official (*via email only to zoningenforce@oxford-ct.gov*)
Oxford Town Hall
486 Oxford Road
Oxford, CT 06478

Melanie A. Bachman

Page 3

William & Elaine Schiavi, Property Owners (*via email only to jwsct@yahoo.com*)
85 Quaker Farms Road
Oxford, CT 06478

Crown Castle, Tower Owner

From: [Zsamba, Anne Marie](#)
To: ["jwsct@yahoo.com"](mailto:jwsct@yahoo.com)
Subject: Notice of Exempt Modification - T-Mobile - 85 Quaker Farms Road - 845455
Date: Thursday, August 27, 2020 10:29:00 AM
Attachments: [EM-T-MOBILE-85 QUAKER FARMS RD OXFORD-845455-CTNH211B-notice.pdf](#)

Dear Mr. Schiavi:

Attached please find T-Mobile's exempt modification application that is being submitted to the Connecticut Siting Council today, August 27, 2020.

In light of the present circumstances with Covid-19, The Council has advised that electronic notification of this filing is acceptable. If you could kindly confirm receipt. Thank you.

Best,
Anne Marie Zsamba

ANNE MARIE ZSAMBA
Site Acquisition Specialist
T: (201) 236-9224
M: (518) 350-3639
F: (724) 416-6112

CROWN CASTLE
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
CrownCastle.com

From: [Zsamba, Anne Marie](#)
To: ["selectman@oxford-ct.gov"](mailto:selectman@oxford-ct.gov)
Subject: Notice of Exempt Modification - T-Mobile - 85 Quaker Farms Road - 845455
Date: Thursday, August 27, 2020 10:28:00 AM
Attachments: [EM-T-MOBILE-85 QUAKER FARMS RD OXFORD-845455-CTNH211B-notice.pdf](#)

Dear First Selectman Temple:

Attached please find T-Mobile's exempt modification application that is being submitted to the Connecticut Siting Council today, August 27, 2020.

In light of the present circumstances with Covid-19, The Council has advised that electronic notification of this filing is acceptable. If you could kindly confirm receipt. Thank you.

Best,
Anne Marie Zsamba

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Site Acquisition Specialist
T: (201) 236-9224
M: (518) 350-3639
F: (724) 416-6112

CROWN CASTLE
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
CrownCastle.com

From: [Zsamba, Anne Marie](#)
To: ["zoningenforce@oxford-ct.gov"](mailto:zoningenforce@oxford-ct.gov)
Subject: Notice of Exempt Modification - T-Mobile - 85 Quaker Farms Road - 845455
Date: Thursday, August 27, 2020 10:28:00 AM
Attachments: [EM-T-MOBILE-85 QUAKER FARMS RD OXFORD-845455-CTNH211B-notice.pdf](#)

Dear ZEO Macary:

Attached please find T-Mobile's exempt modification application that is being submitted to the Connecticut Siting Council today, August 27, 2020.

In light of the present circumstances with Covid-19, The Council has advised that electronic notification of this filing is acceptable. If you could kindly confirm receipt. Thank you.

Best,
Anne Marie Zsamba

ANNE MARIE ZSAMBA
Site Acquisition Specialist
T: (201) 236-9224
M: (518) 350-3639
F: (724) 416-6112

CROWN CASTLE
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
CrownCastle.com

Exhibit A

Original Facility Approval

PLANNING & ZONING COMMISSION
TOWN OF OXFORD
486 Oxford Road
Oxford, CT 06478
(203) 888-2543

Z#: 7-05-116
Date Rec'd: 4-28-05
Date on Agenda: _____
65-Day Expiration: _____

ZONING PERMIT APPLICATION

(This permit is hereby applied for in accordance with the requirements of the Oxford Zoning Regulations)

Property Identification

Street Address: 85 QUAKER FARMS RD
Subdivision Name: _____ Date Approved: _____
Map: 23 Block: 7 Lot: 8 Zoning district: R-A

Owner/Applicant

Owner Name: SCHIAVI
Owner Address: 85 QUAKER FARMS RD
Owner Telephone: _____

Applicant Name: NEW CINGULAR WIRELESS PCS, LLC
Applicant Address: 500 ENTERPRISE DR., ROCKY HILL
Applicant Telephone: 860-513-7636 CT 06067

Miscellaneous Information

* CT SITING COUNCIL CERTIFICATE
Special Exception: Article _____ Section _____ Yes No
Site Plan Approval: Article _____ Section _____ Yes No
Estimated Cost of Construction: \$150,000-
Variance Granted: _____ Date Granted: _____

Signatures/Authorization

Application for Zoning Permit approval as described herein is hereby made. The Oxford Planning & Zoning Commission and its technical staff are authorized to enter the property for the purpose of evaluating this application.

Permit Void If: a) Work or activity not commenced within 1 year of the date of issuance or b) Authorized construction not completed within 2 years of the date of issuance.

This permit, if issued, is based upon the plot plan submitted. Falsification, by misrepresentation or omission, or failure to comply with the conditions of approval of this permit constitute a violation of the Oxford Zoning Regulations.

Signature for Cingular Wireless 4-28-05
Property Owner or Agent _____ Date _____

Purpose

☐ New Home
☐ Addition
☐ Garage
☐ Cottage Business
☐ Swimming Pool IG AG
☐ Sign
☐ Shed
☐ Barn
☐ Change of Use
☐ Excavating/Filling
☐ Trailer
☒ Other CELL SITE

Use

☐ Single-Family Residence
☐ Multi-Family Residence
☒ Commercial
☐ Industrial
☐ Residential/POD
☒ Other CELL SITE

Required Approvals and Dates

☒ Inland Wetlands _____
☐ P.D.D.H. _____
☐ Fire Marshal _____
☐ Z.B.A. _____
☐ W.P.C.A. _____
☐ Floodplain _____
☐ Copy of Deed _____
☒ Driveway Existing
☐ Erosion Control Plan _____
☒ Plot Plan * 4-26-05
☐ Other _____

106.00 Town Fee
70.00 State Fee
136.00 Total Fee

*Draw plot plan of proposed construction and attach. Plan must show property boundaries and dimensions; location of proposed buildings on property with respect to boundaries; location of existing buildings on property; outside dimensions of all buildings proposed or now existing; location of water supply; location of sewage system. All copies must have a complete sketch. Construction and use must be exactly as described in this application. If later changes from this plan are desired prior approval of an amended application is necessary.

Denied ☒ Approved ☐ By: Deputy Vot Date: 4-28-05
Title: ZEC
Reason for Denial _____

ZPA-1
(Adopted 5/15/97)

DOCKET NO. 261 - AT&T Wireless PCS, LLC d/b/a AT&T	}	Connecticut
Wireless application for a Certificate of Environmental	}	
Compatibility and Public Need for the construction, maintenance	}	Siting
and operation of a wireless telecommunications facility at one of	}	
two sites at 85 Quaker Farms Road, Oxford, Connecticut.	}	Council

December 22, 2003

Decision and Order

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, operation, and maintenance of a telecommunications facility including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate either alone or cumulatively with other effects when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the the application and therefore directs that a Certificate of Environmental Compatibility and Public Need, as provided by General Statutes § 16-50k, be issued to AT&T Wireless PCS d/b/a AT&T Wireless for the construction, maintenance and operation of a wireless telecommunications facility at Site B, located at 85 Quaker Farms Road, Oxford, Connecticut. The Council denies certification of Site A, also located at 85 Quaker Farms Road, Oxford, Connecticut.

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

1. The tower shall be constructed as a monopole, no taller than necessary to provide the proposed telecommunications services, sufficient to accommodate the antennas of AT&T and other entities, both public and private, but such tower shall not exceed a height of 153 feet above ground level, including appurtenances. Antennas installed on the monopole shall be flush mounted.
2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be submitted to and approved by the Council prior to the commencement of facility construction and shall include:
 - a) color options for painting the tower, including the color option preferred by the Town of Oxford;
 - b) a final site plan(s) of site development to include specifications for the tower, tower foundation, antennas, equipment building, access road, utility line, and landscaping; and
 - c) construction plans for site clearing, water drainage, and erosion and sedimentation control consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended.
3. The Certificate Holder shall, prior to the commencement of operation, provide the Council worst-case modeling of electromagnetic radio frequency power density of all proposed entities' antennas at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin No. 65, August 1997. The Certificate Holder shall ensure a recalculated report of electromagnetic radio frequency power density is submitted to the Council if and when circumstances in operation cause a change in power density above the levels calculated and provided pursuant to this Decision and Order.

4. Upon the establishment of any new State or federal radio frequency standards applicable to frequencies of this facility, the facility granted herein shall be brought into compliance with such standards.
5. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing. The Certificate Holder shall provide space on the tower for no compensation for any municipal antennas, provided such antennas are compatible with the structural integrity of the tower.
6. If the facility does not initially provide wireless services within one year of completion of construction or ceases to provide wireless services for a period of one year, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made.
7. Any antenna that becomes obsolete and ceases to function shall be removed within 60 days after such antennas become obsolete and cease to function.
8. Unless otherwise approved by the Council, this Decision and Order shall be void if the facility authorized herein is not operational within one year of the effective date of this Decision and Order or within one year after all appeals to this Decision and Order have been resolved.

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

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

The party to this proceeding is:

Applicant

AT&T Wireless PCS, LLC d/b/a AT&T Wireless (AT&T)

Its Representative

Christopher B. Fisher, Esq.
Cuddy & Feder LLP
90 Maple Avenue
White Plains, New York 10601

Exhibit B

Property Card



Town of Oxford
Property Listing Report

Parcel ID 23/57/8/CELL

Account 23578CELL

Property Information

Owner	AT&T
Address	85 QUAKER FARMS RD
Mailing Address	575 MOROSGO DR ATLANTA, GA 30324
Land Use	- Cell Tower
Land Class	I

Census Tract	
Neighborhood	090
Zoning	
Acreage	0
Utilities	
Lot Setting/ Desc	/

Photo



PARCEL VALUATIONS (Assessed value = 70% of Appraised Value)

	Appraised	Assessed
Buildings	0	0
Outbuildings	655600	458900
Improvements	655600	458900
Extras	0	0
Land	0	0
Total	655600	458900
Previous		

Construction Details

Year Built	
Stories	
Building Style	
Building Use	
Building Condition	
Total Rooms	
Bedrooms	
Full Bathrooms	0
Half Bathrooms	
Bath Style	
Kitchen Style	
Roof Style	
Roof Cover	

EXTERIOR WALLS:

Primary	
Secondary	

INTERIOR WALLS:

Primary	
Secondary	

FLOORS:

Primary	
Secondary	

HEATING/AC:

Heating Type	
Heating Fuel	
AC Type	

BUILDING AREA:

Effective Building Area	
Gross Building Area	
Total Living Area	

SALES HISTORY:

Sale Date	10/1/2010
Sale Price	0
Book/ Page	000/ 000



Town of Oxford
Property Listing Report

Parcel ID 23/57/8

Account J0181100

Property Information

Owner	SCHIAVI WILLIAM & ELAINE W
Address	85 QUAKER FARMS RD
Mailing Address	85 QUAKER FARMS RD OXFORD , CT 06478
Land Use	- Res Dwelling
Land Class	R

Census Tract	L 6
Neighborhood	090
Zoning	RESA
Acreage	12.5
Utilities	
Lot Setting/ Desc	/ Clear

Photo



PARCEL VALUATIONS (Assessed value = 70% of Appraised Value)

	Appraised	Assessed
Buildings	206200	144300
Outbuildings	41600	29200
Improvements	247800	173500
Extras	0	0
Land	388300	203000
Total	636100	376500
Previous		

Construction Details

Year Built	
Stories	2
Building Style	Colonial
Building Use	Residential
Building Condition	B-
Total Rooms	
Bedrooms	4 Bedrooms
Full Bathrooms	0
Half Bathrooms	
Bath Style	Average
Kitchen Style	Average
Roof Style	Gable
Roof Cover	Arch Shingles

EXTERIOR WALLS:

Primary	Clapboard
Secondary	Wood Shingle

INTERIOR WALLS:

Primary	Drywall
Secondary	

FLOORS:

Primary	Hardwood
Secondary	Carpet

HEATING/AC:

Heating Type	Hot Water
Heating Fuel	Oil
AC Type	None

BUILDING AREA:

Effective Building Area	
Gross Building Area	
Total Living Area	

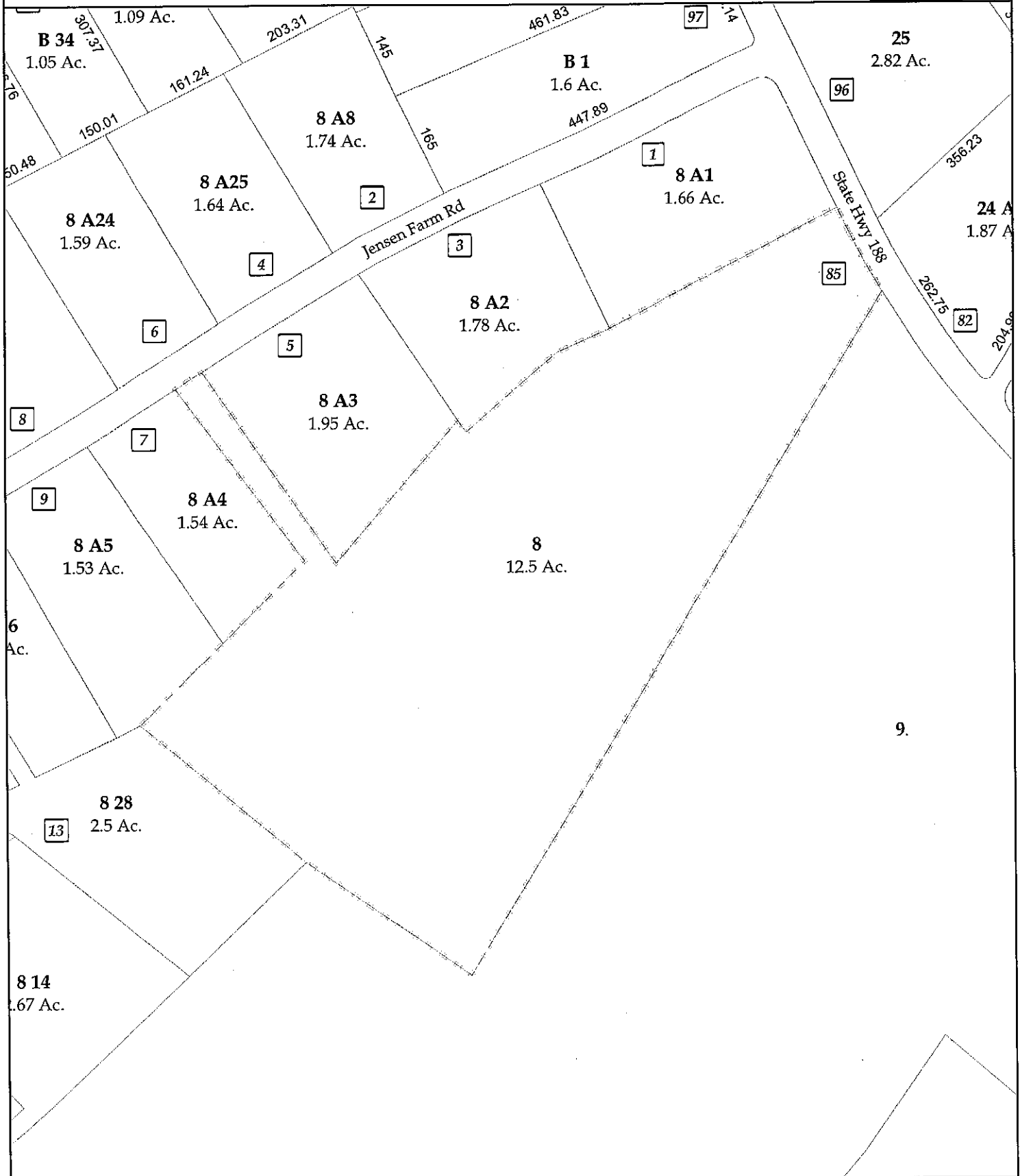
SALES HISTORY:

Sale Date	4/1/1996
Sale Price	0
Book/ Page	187/ 390

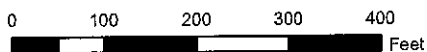
Town of Oxford, Connecticut - Assessment Parcel Map

Parcel: 23-57-8

Location: 85 QUAKER FARMS RD



Approximate Scale: 1 inch = 200 feet



Map Produced: February 2020

Disclaimer: This map is for informational purposes only All information is subject to verification by any user. The Town of Oxford and its mapping contractors assume no legal responsibility for the information contained herein.

Exhibit C

Construction Drawings

■ T ■ ■ ■ Mobile ■

T-MOBILE SITE NAME:
NH211/QUAKER FARMS_COLLO

T-MOBILE SITE NUMBER:
CTNH211B

CROWN BU: 845455 / APP#: 494422
67D04G CONFIGURATION

85 QUAKER FARMS ROAD
OXFORD, CT 06478

EXISTING 149'-0" MONOPOLE



■T■■Mobile■

CTNH211B
BU #: 845455

PROJECT SUMMARY

SITE TYPE:	EXISTING EQUIPMENT UPGRADE
SITE ADDRESS:	85 QUAKER FARMS ROAD OXFORD, CT 06478
JURISDICTION:	NEW HAVEN COUNTY

NAD83	
LATITUDE:	41.384036° N
LONGITUDE:	73.137314° 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

CONTACT INFORMATION

A&E FIRM: B+T GROUP
1717 S. BOULDER, STE. 300
TULSA, OK 74119
CONTACT: MIKE OAKES
PHONE: (918) 587-4630

ELECTRIC PROVIDER: UNITED ILLUMINATING CO.
(203) 499-2000

TELCO PROVIDER: COMCAST
(800) 934-6489

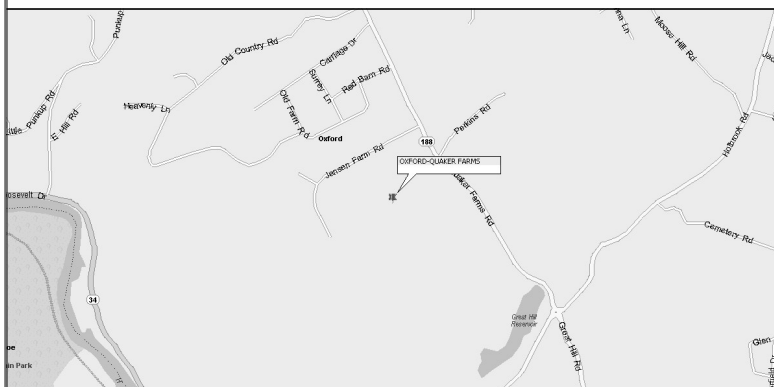
CONTACT: MIKE OAKES
PHONE: (918) 587-4630

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 CONNECTICUT STATE BUILDING CODE
STRUCTURAL	2018 CONNECTICUT STATE BUILDING CODE
MECHANICAL	2018 CONNECTICUT STATE BUILDING CODE
ELECTRICAL	NEC 2017

LOCATION MAP



NO SCALE

DRIVING DIRECTIONS

DEPART FROM TURN 22W NEW HAVEN AIRPORT ON LOCAL ROAD, BEAR LEFT ONTO LOCAL ROAD, TURN RIGHT ONTO WALDO ST, THEN
 UNIMPAVED TURN LEFT ONTO THOMPSON AVE, TURN RIGHT ONTO WALDO ST, ROAD NAME CHANGES TO MAIN AVENUE, TAKE RAMP ONTO
 I-95 [GOVERNOR JOHN DAVIS LOGE TPKE] AT EXIT 47, TAKE RAMP ONTO CT-34, TAKE RAMP ONTO CT-34 [N FRONTAGE RD], TURN
 RIGHT ONTO CT-10 [CT-34], TURN LEFT ONTO CT-34 [DERBY AVE], TURN RIGHT ONTO CT-188 [SQUANQUICK RD] AT ROUNDABOUT, TAKE
 THE THIRD EXIT ONTO CT-188 [GREAT HILL RD], KEEP STRAIGHT ONTO CT-188 [QUAKER FARMS RD], TURN LEFT ONTO JENSEN FARM RD,
 TURN LEFT ONTO LOCAL ROAD, ARRIVE AT OXFORD-QUAKER FARMS.

PROJECT DESCRIPTION

THE PROPOSED PROJECT INCLUDES:

- REMOVE (3) EXISTING ANTENNAS AT 132°-0".
- REMOVE (1) EXISTING DUS41.
- REMOVE (6) EXISTING RU01 B12.
- INSTALL (3) NEW ANTENNAS AT 132°-0".
- INSTALL (3) NEW RRUS AT 132°-0".
- INSTALL (2) NEW BW 6630S.
- INSTALL (1) NEW 6x12 HCS FIBER.
- MODIFY EXISTING MOUNTS PER MOUNT MODIFICATION REPORT BY B+T GROUP DATED 7/21/20.

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.

DRAWING INDEX

[illegible]

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.



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



ISSUED FOR:

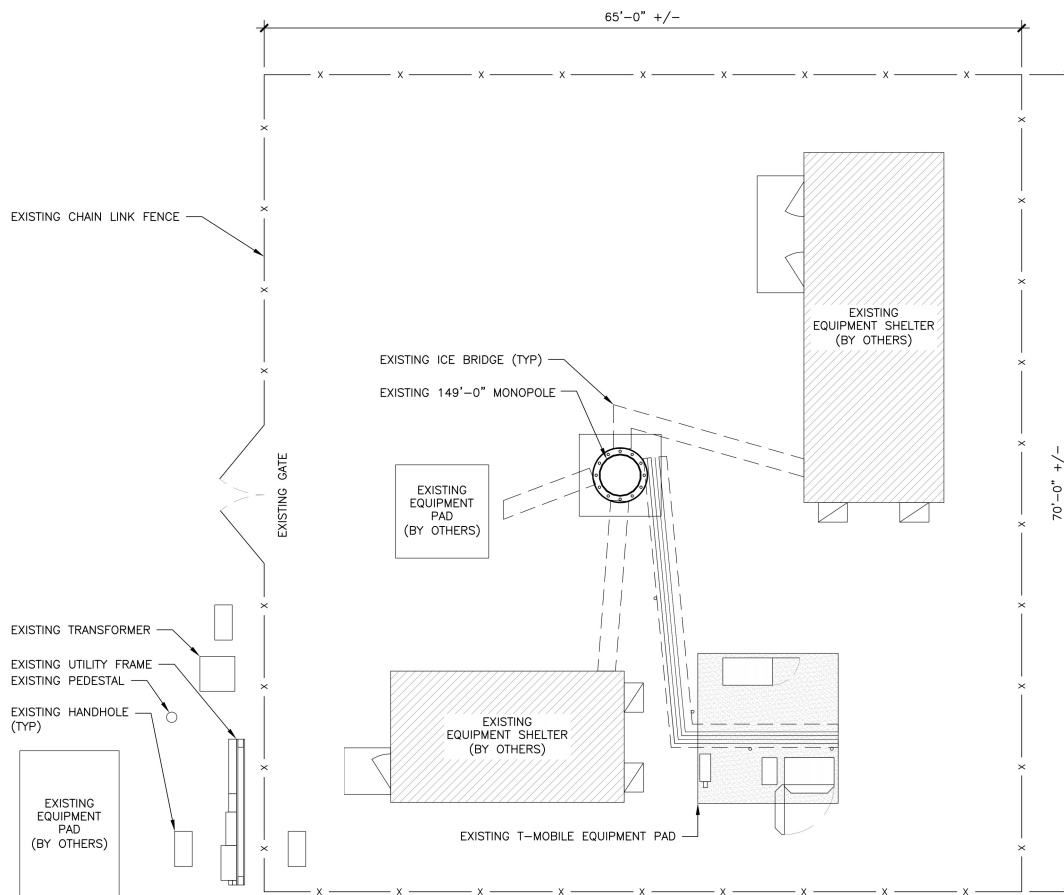
REV	DATE	DRWN	DESCRIPTION
0	8/19/19	STH	CONSTRUCTION
1	6/17/20	GEH	CONSTRUCTION
2	7/27/20	MLC	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21



IT IS A VIOLATION OF LAW FOR ANY PERSON,
UNLESS THEY ARE ACTING UNDER THE DIRECTION
OF A LICENSED PROFESSIONAL ENGINEER,
TO ALTER THIS DOCUMENT.

SHEET NUMBER: T-1	REVISION: 2
-----------------------------	-----------------------



1 OVERALL SITE PLAN
SCALE: 0' 4' 8' 16' 32'



GENERAL NOTES:

- SUBJECT PROPERTY IS SITUATED AT 85 QUAKER FARMS ROAD, OXFORD, CT 06478.
- 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 THREE (3) NEW PANEL ANTENNAS, THREE (3) RRUS, AND ONE (1) ADDITIONAL CABLE MOUNTED ON AN EXISTING MONOPOLE.
- THIS FACILITY SHALL BE VISITED ON THE AVERAGE OF ONCE A MONTH FOR MAINTENANCE AND SHALL BE MONITORED FROM A REMOTE FACILITY.
- THE EXISTING SITE IS LOCATED AT LATITUDE OF 41.384036° N± AND LONGITUDE OF 73.137314° W±. THE HORIZONTAL DATUM ARE IN TERMS OF NORTH AMERICAN DATUM OF 1983 (NAD 83).
- 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"
- ALL MATERIALS, WORKMANSHIP, AND CONSTRUCTION FOR THE SITE IMPROVEMENTS SHOWN HEREON SHALL BE IN ACCORDANCE WITH:
 - CURRENT PREVAILING MUNICIPAL AND/OR COUNTY SPECIFICATIONS, STANDARDS, AND REQUIREMENTS.
 - CURRENT PREVAILING UTILITY COMPANY AUTHORITY SPECIFICATIONS, STANDARDS AND REQUIREMENTS.
- 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.
- 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.
- THE CONSTRUCTION CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ALL CONSTRUCTION MEANS AND METHODS. THE CONSTRUCTION CONTRACTOR IS ALSO RESPONSIBLE FOR ALL JOB SITE SAFETY.
- SITE INFORMATION SHOWN TAKEN FROM CROWN SITE PLANS AND FROM CROWN INSPECTION PHOTOS.
- 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.
- 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.

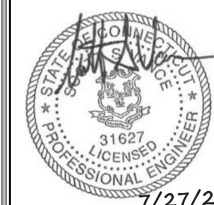


CTNH211B
BU #: 845455
NH211/QUAKER FARMS COLLO
85 QUAKER FARMS ROAD
OXFORD, CT 06478
EXISTING 149'-0" MONOPOLE

PROJECT NO: 136377.004.01
CHECKED BY: RMC

ISSUED FOR:			
REV	DATE	DRWN	DESCRIPTION
0	8/19/19	STH	CONSTRUCTION
1	6/17/20	GEH	CONSTRUCTION
2	7/27/20	MLC	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001964
Expires 2/10/21

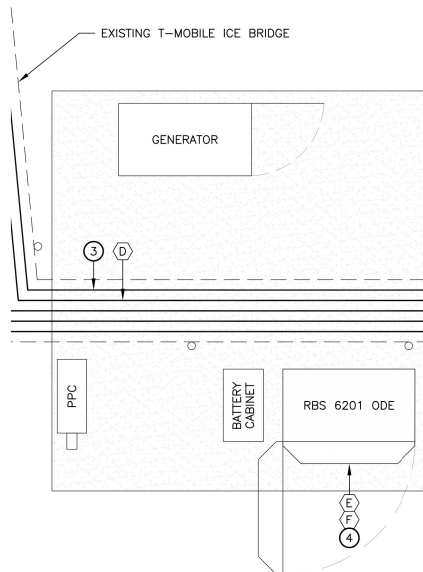


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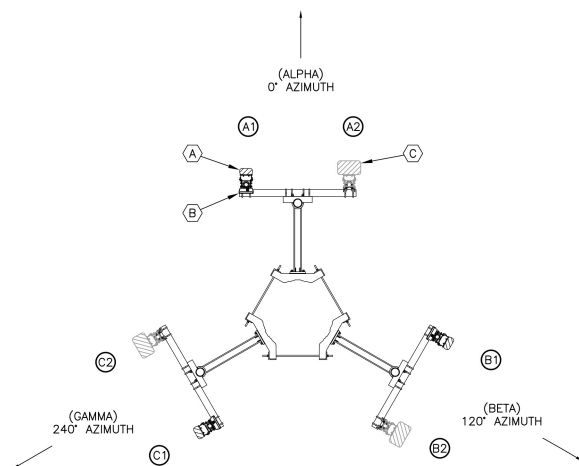
SHEET NUMBER: A-1
REVISION: 2

LEGEND		
EXISTING/DEMOLITION NOTES		INSTALLATION NOTES
(A) EXISTING RFS APXV18-209014-C-A20 ANTENNA TO REMAIN (TOTAL OF 3)	①	INSTALL RFS APXVAARR24_43-U-NA20 (8 FT) 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 REMAIN (TOTAL OF 3)	②	INSTALL RAD O 4449 B12/B71 (TYP. OF 1 PER SECTOR, TOTAL OF 3)
(C) EXISTING ANDREW LNX-6515DS-A1M ANTENNA TO BE REMOVED (TOTAL OF 3)	③	INSTALL (1) 6x12 HCS FIBER. RUN FROM EQUIPMENT TO ANTENNAS FOLLOWING EXISTING ROUTING
(D) EXISTING 1 5/8" COAX TO REMAIN (TOTAL OF 12, 6 UNUSED)	④	INSTALL NEW BB 6630 IN EXISTING RBS 6201 ODE (TOTAL OF 2)
(E) EXISTING DUS41 TO BE REMOVED (TOTAL OF 1)		
(F) EXISTING RUS01 B12 TO BE REMOVED (TOTAL OF 6)		

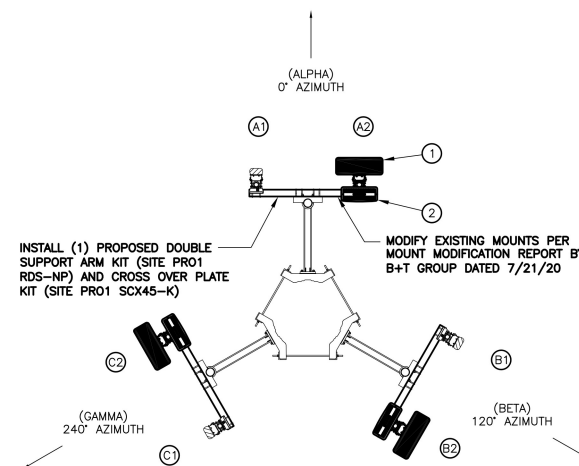
ANTENNA AND CABLE SCHEDULE											
SECTOR	POSITION	EXISTING ANTENNAS	PROPOSED ANTENNA CONFIGURATION	E-TILT	M-TILT	ANTENNA CENTERLINE	TMA/RRU	CABLES	JUMPER TYPE	CABLE LENGTH	
0° - ALPHA	A1	RFS APXV18-209014-C-A20	LTE GSM	-	2°/2'	0°	132'-0"	1/0	(2) 1 5/8" COAX	DC/FIBER & 1/2" COAX	182'-0"
	A2	RFS APXVAARR24_43-U-NA20	LTE	B71 B12	2°/2'	0°		0/1	(1) 6x12 HCS FIBER	DC/FIBER	182'-0"
120° - BETA	B1	RFS APXV18-209014-C-A20	LTE GSM	-	2°/2'	0°	132'-0"	1/0	(2) 1 5/8" COAX	DC/FIBER & 1/2" COAX	182'-0"
	B2	RFS APXVAARR24_43-U-NA20	LTE	B71 B12	2°/2'	0°		0/1	SHARED FIBER	DC/FIBER	-
240° - GAMMA	C1	RFS APXV18-209014-C-A20	LTE GSM	-	2°/2'	0°	132'-0"	1/0	(2) 1 5/8" COAX	DC/FIBER & 1/2" COAX	182'-0"
	C2	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'



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

INSTALL (1) PROPOSED DOUBLE SUPPORT ARM KIT (SITE PR01 RDS-NP) AND CROSS OVER PLATE KIT (SITE PR01 SCX45-K)

MODIFY EXISTING MOUNTS PER MOUNT MODIFICATION REPORT BY B-T GROUP DATED 7/21/20

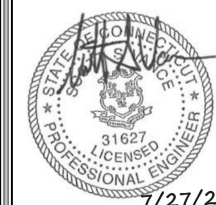


CTNH211B
BU #: 845455
NH211/QUAKER FARMS_COLLO
85 QUAKER FARMS ROAD
OXFORD, CT 06478
EXISTING 149'-0" MONOPOLE

PROJECT NO: 136377.004.01
CHECKED BY: RMC

ISSUED FOR:			
REV	DATE	DRWN	DESCRIPTION
0	8/19/19	STH	CONSTRUCTION
1	6/17/20	GEH	CONSTRUCTION
2	7/27/20	MLC	CONSTRUCTION

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REVISION: 2

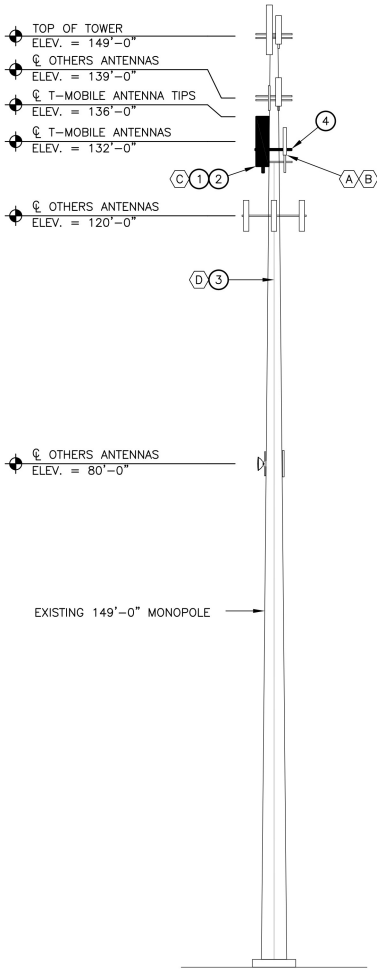
136377.845455_Oxford Quaker Forms.dwg -- Sheet A-3 -- User: jenkins -- Jul 27, 2020 -- 3:21pm

LEGEND		
EXISTING/DEMOLITION NOTES		INSTALLATION NOTES
(A) EXISTING RFS APXV18-209014-C-A20 ANTENNA TO REMAIN (TOTAL OF 3)	(1)	INSTALL RFS APXVAARR24_43-U-NA20 (8 FT) 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 REMAIN (TOTAL OF 3)	(2)	INSTALL RADIO 4449 B12/B71 (TYP. OF 1 PER SECTOR, TOTAL OF 3)
(C) EXISTING ANDREW LNX-6515DS-A1M ANTENNA TO BE REMOVED (TOTAL OF 3)	(3)	INSTALL (1) 6x12 HCS FIBER. RUN FROM EQUIPMENT TO ANTENNAS FOLLOWING EXISTING ROUTING
(D) EXISTING 1 5/8" COAX TO REMAIN (TOTAL OF 12, 6 UNUSED)	(4)	INSTALL DOUBLE SUPPORT ARM KIT PER MA BY B+T GROUP DATED 7/21/20

EXISTING TOWER IS SUFFICIENT PER STRUCTURAL ANALYSIS BY B+T GROUP DATED 7/21/20.

EXISTING MOUNTS TO BE MODIFIED PER MOUNT MODIFICATION BY B+T GROUP DATED 7/21/20.

LEGEND:
■ NEW
□ EXISTING
□ FUTURE



1 TOWER ELEVATION
SCALE: N.T.S.



CTNH211B
BU #: 845455
NH211/QUAKER FARMS_COLL
85 QUAKER FARMS ROAD
OXFORD, CT 06478
EXISTING 149'-0" MONOPOLE

PROJECT NO: 136377.004.01
CHECKED BY: RMC

ISSUED FOR:			
REV	DATE	DRWN	DESCRIPTION
0	8/19/19	STH	CONSTRUCTION
1	6/17/20	GEH	CONSTRUCTION
2	7/27/20	MLC	CONSTRUCTION

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SHEET NUMBER: A-3
REVISION: 2



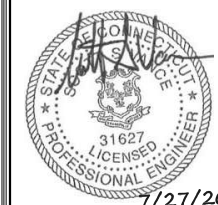
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CTNH211B
BU #: 845455
NH211/QUAKER FARMS, COLLO
85 QUAKER FARMS ROAD
OXFORD, CT 06478
EXISTING 149'-0" MONOPOLE

PROJECT NO: 136377.004.01
CHECKED BY: RMC

ISSUED FOR:			
REV	DATE	DRWN	DESCRIPTION
0	8/19/19	STH	CONSTRUCTION
1	6/17/20	GEH	CONSTRUCTION
2	7/27/20	MLC	CONSTRUCTION

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SHEET NUMBER: E-1
REVISION: 2

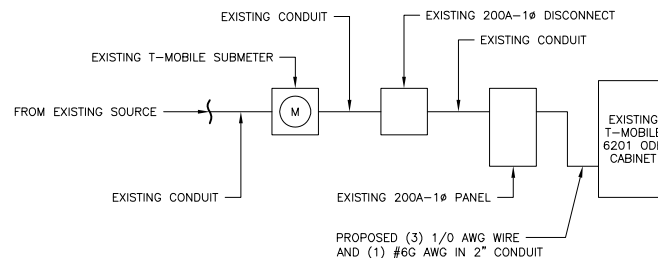
FINAL PANEL SCHEDULE						
LOAD	POLES	AMPS	BUS		POLES	LOAD
			L1	L2		
SURGE	1	60A	1	2	20A	GFI RECEPTACLE
			3	4	15A	LED FLOOD
			5	6		
RBS 6201 ODE	1	100A	7	8		

RATED VOLTAGE: ☒ 120/240 ☐ 1 PHASE, 3 WIRE
RATED AMPS: ☐ 100 ☒ 200 ☐ 400 ☐
CABINET: ☒ SURFACE ☐ FLUSH
NEMA ☐ 1 ☒ 3R ☐ 4X
☐ MAIN LUGS ONLY ☒ MAIN 200 AMPS ☒ BREAKER ☐ FUSED SWITCH
☒ HINGED DOOR
☒ KEYPED 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 5 AND 7 WITH A NEW 100A BREAKER.
REPLACE EXISTING WIRES FOR EXISTING 6201 ODE CABINET WITH (3) 1/0 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 Q012040M200RB (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

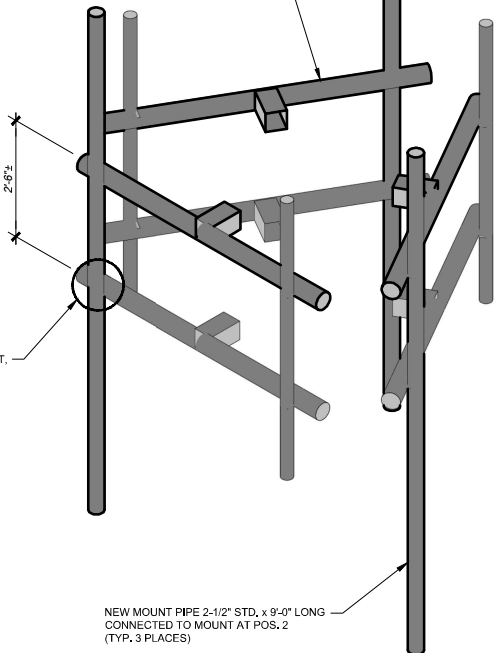
SCALE: N.T.S.



2 ONE-LINE DIAGRAM

SCALE: N.T.S.

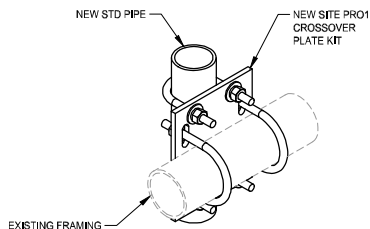
NEW MONOPOLE DOUBLE SUPPORT ARM KIT,
SITEPRO1 #RDS-NP
(TYP. 3 PLACES)
RE: 3/S1



NEW CROSSOVER PLATE KIT,
SITEPRO1 #SCX45-K
(TYP. 3 PLACES)
RE: 2/S1

NEW MOUNT PIPE 2-1/2" STD. x 9'-0" LONG
CONNECTED TO MOUNT AT POS. 2
(TYP. 3 PLACES)

1 MODIFIED T-ARM MOUNT
SCALE: N.T.S.



2 SITE PRO1 SCX45-K CROSSOVER PLATE KIT
SCALE: N.T.S.

MODIFICATIONS BASED ON THE FAILING
STRUCTURAL ANALYSIS FROM B+T GROUP
DATED 07/02/19 AND ACCOMPANIED BY
ANALYSIS FROM B+T GROUP DATED 05/23/20

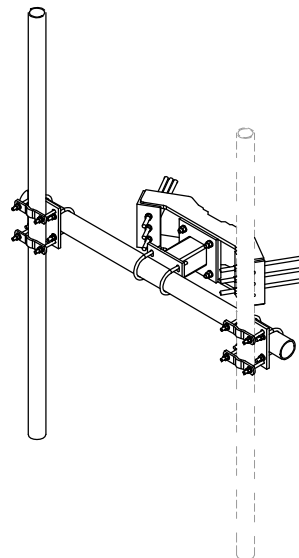
GENERAL NOTES

- 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, ANSI/TIA-322 AND ANSI/ASSE A1048, 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 ANSI/TIA-322 and ANSI/ASSE A1048.
- 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 "x" MUST BE WITHIN 3" OF THE INDICATED DIMENSION.

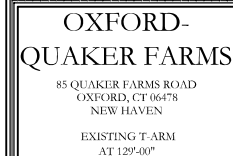
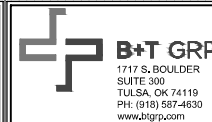
FABRICATION

- 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.



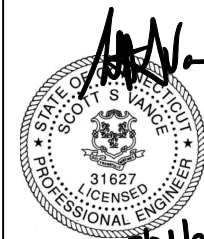
3 SITE PRO1 RDS-NP DOUBLE SUPPORT ARM KIT WITH NEW RING MOUNT
SCALE: N.T.S.



PROJECT NO: 136377.005.01
CHECKED BY: NKM

ISSUED FOR:			
REV	DATE	DRWN	DESCRIPTION
0	05/23/20	PMS	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
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SHEET NUMBER: S1
REVISION: 0

Exhibit D

Structural Analysis Report

Date: **July 21, 2020**



Denice Nicholson
Crown Castle
3 Corporate Dr
Clifton Park, NY 12065

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

Subject: **Structural Analysis Report**

Carrier Designation: **T-Mobile Co-Locate**
Carrier Site Number: CTNH211B
Carrier Site Name: NH211/Quaker Farms_Collo

Crown Castle Designation: **Crown Castle BU Number:** 845455
Crown Castle Site Name: OXFORD-QUAKER FARMS
Crown Castle JDE Job Number: 576607
Crown Castle Work Order Number: 1871765
Crown Castle Order Number: 494422 Rev. 2

Engineering Firm Designation: **Crown Castle Project Number:** 1871765

Site Data: **85 QUAKER FARMS ROAD, OXFORD, New Haven County, CT**
Latitude 41° 23' 2.36", Longitude -73° 8' 14.54"
149 Foot - Monopole Tower

Dear Denice Nicholson,

Crown Castle 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 – 77.1%

This analysis utilizes an ultimate 3-second gust wind speed of 125 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: Donna Campbell

Respectfully submitted by:

Maham Barimani, P.E.
Senior Project Engineer

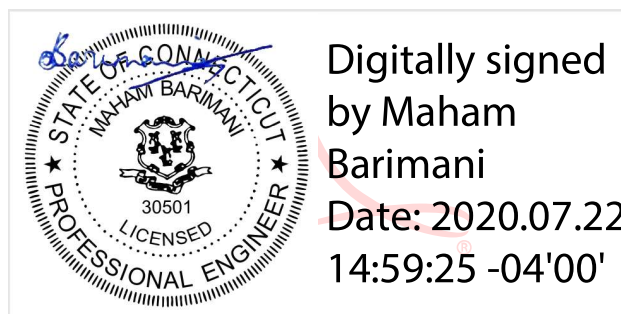


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Table 2 - Other Considered Equipment

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Table 3 - Documents Provided

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3.2) Assumptions

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Table 5 – Tower Component Stresses vs. Capacity – LC7

4.1) Recommendations

5) APPENDIX A

tnxTower Output

6) APPENDIX B

Base Level Drawing

7) APPENDIX C

Additional Calculations

1) INTRODUCTION

This tower is a 149 ft Monopole tower designed by PAUL J FORD.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	125 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1.5 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)
131.0	132.0	3	ericsson	KRY 112 489/2	11	1-1/4 1-5/8
		3	ericsson	RADIO 4449 B12/B71		
		3	rfs celwave	APXV18-209014-C w/ Mount Pipe		
		3	rfs celwave	APXVAARR24_43-U-NA20		
	131.0	1	site pro 1	RDS-NP		
		2	tower mounts	T-Arm Mount [TA 702-3]		

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)
149.0	150.0	3	cci antennas	DMP65R-BU6D w/ Mount Pipe	251	3/8 3/4 1 5/8
		3	commscope	NNH4-65B-R6 w/ Mount Pipe		
		3	ericsson	RADIO 4415 B30		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 8843 B2/B66A		
		3	powerwave technologies	1001983		
		6	powerwave technologies	7020.00		
		6	powerwave technologies	LGP21401		
		1	raycap	DC6-48-60-18-8F		
		1	raycap	DC9-48-60-24-PC16-EV		
	149.0	1	tower mounts	T-Arm Mount [TA 702-3]		
139.0	140.0	3	powerwave technologies	7770.00 w/ Mount Pipe	5	1 5/8
		6	powerwave technologies	TMA DD 1900 with 850 BYPASS		
	139.0	1	tower mounts	Side Arm Mount [SO 104-3]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
120.0	120.0	3	alcatel lucent	RRH2X60-AWS	20	1 5/8
		3	andrew	HBXX-6517DS-A2M w/ Mount Pipe		
		3	andrew	SBNHH-1D65B w/ Mount Pipe		
		3	antel	BXA-80080/6CF w/ Mount Pipe		
		2	rfs celwave	DB-T1-6Z-8AB-0Z		
		1	tower mounts	Side Arm Mount [SO 104-3]		
80.0	80.0	1	antenna systems and solutions inc	FO150-3	3	1/2
		1	pctel	MPRD2449		
		2	tower mounts	Pipe Mount [PM 601-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Wilkinson Engineering	4546778	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Wilkinson Engineering (Mapped)	5113091	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PennSummit Tubular, LLC	5110795	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.7.4), 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. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 Standard.

3.2) Assumptions

- 1) Tower and structures were maintained in accordance with the TIA-222 Standard.
- 2) 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. Crown Castle 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	149 - 111.5	Pole	TP29.487x23x0.1875	1	-7.92	1047.35	42.1	Pass
L2	111.5 - 75.25	Pole	TP35.383x28.4633x0.2188	2	-13.27	1466.49	76.8	Pass
L3	75.25 - 39.75	Pole	TP41.086x34.167x0.2813	3	-20.40	2187.66	77.1	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L4	39.75 - 0	Pole	TP47.4x39.6154x0.375	4	-33.37	3438.05	67.3	Pass
							Summary	
						Pole (L3)	77.1	Pass
						Rating =	77.1	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	68.9	Pass
1	Base Plate	0	59.6	Pass
1	Base Foundation	0	34.1	Pass
1	Base Foundation Soil Interaction	0	64.4	Pass

Structure Rating (max from all components) =	77.1%
---	--------------

Notes:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

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

APPENDIX A
TNXTOWER OUTPUT

Section	1	2	3	4	
Length (ft)	37.50	40.00	40.00	45.00	
Number of Sides	18	18	18	18	
Thickness (in)	0.1875	0.2188	0.2813	0.3750	
Socket Length (ft)	3.75	4.50	5.25		
Top Dia (in)	23.0000	28.4633	34.1670	39.6154	
Bot Dia (in)	29.4870	35.3830	41.0860	47.4000	
Grade		A607-65			
Weight (K)	2.0	3.0	4.5	7.9	17.4

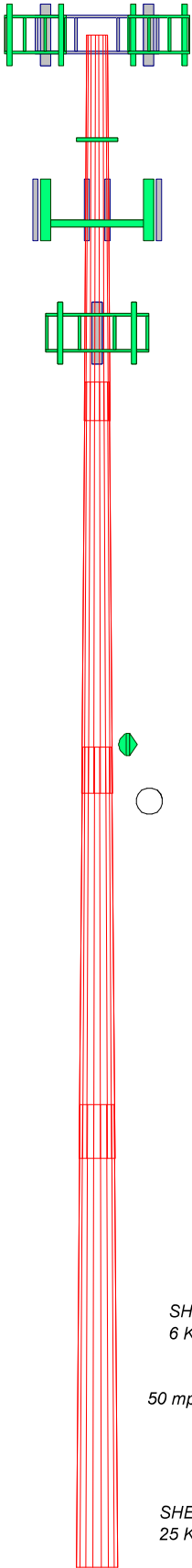
149.0 ft

111.5 ft

75.3 ft

39.8 ft

0.0 ft



MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 125 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 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 0.00 ft
8. TOWER RATING: 77.1%

ALL REACTIONS
ARE FACTORED

AXIAL
59 K

SHEAR
6 K

MOMENT
685 kip-ft

TORQUE 0 kip-ft
50 mph WIND - 1.5000 in ICE

AXIAL
33 K

SHEAR
25 K

MOMENT
2585 kip-ft

TORQUE 1 kip-ft
REACTIONS - 125 mph WIND

 Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 The Pathway to Possible. Phone: (724) 416-2000 FAX:		Job: BU# 845455		
		Project:		
		Client: Crown Castle	Drawn by: DCampbell	App'd:
		Code: TIA-222-H	Date: 07/21/20	Scale: NTS
		Path:	Dwg No. E-1	

C:\Users\dcampbell\Desktop\845455 VJO 1871765\Production\845455 1871765.dgn

Tower Input Data

The tower is a monopole.

This tower is designed using the TIA-222-H standard.

The following design criteria apply:

- 3) Tower is located in New Haven County, Connecticut.
- 4) Tower base elevation above sea level: 607.00 ft.
- 5) Basic wind speed of 125 mph.
- 6) Risk Category II.
- 7) Exposure Category C.
- 8) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- 9) Topographic Category: 1.
- 10) Crest Height: 0.00 ft.
- 11) Nominal ice thickness of 1.5000 in.
- 12) Ice thickness is considered to increase with height.
- 13) Ice density of 56 pcf.
- 14) A wind speed of 50 mph is used in combination with ice.
- 15) Temperature drop of 50 °F.
- 16) Deflections calculated using a wind speed of 60 mph.
- 17) A non-linear (P-delta) analysis was used.
- 18) Pressures are calculated at each section.
- 19) Stress ratio used in pole design is 1.05.
- 20) Tower analysis based on target reliabilities in accordance with Annex S.
- 21) Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
- 22) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
Use Code Stress Ratios	Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retention Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	√ Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-H Bracing Resist.
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Use TIA-222-H Tension Splice
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Exemption
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	

Poles

- √ Include Shear-Torsion Interaction
- Always Use Sub-Critical Flow
- Use Top Mounted Sockets
- Pole Without Linear Attachments
- Pole With Shroud Or No
- Appurtenances
- Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	
L1	149.00-111.50	37.50	3.75	18	23.0000	29.4870	0.1875	0.7500	A607-65 (65 ksi)

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
L2	111.50-75.25	40.00	4.50	18	28.4633	35.3830	0.2188	0.8750	A607-65 (65 ksi)
L3	75.25-39.75	40.00	5.25	18	34.1670	41.0860	0.2813	1.1250	A607-65 (65 ksi)
L4	39.75-0.00	45.00		18	39.6154	47.4000	0.3750	1.5000	A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	It/Q in ²	w in	w/t
L1	23.3259	13.5763	892.6152	8.0984	11.6840	76.3964	1786.4050	6.7894	3.7180	19.829
	29.9130	17.4369	1891.1513	10.4013	14.9794	126.2502	3784.7910	8.7201	4.8597	25.918
L2	29.5274	19.6105	1976.4982	10.0268	14.4594	136.6934	3955.5970	9.8071	4.6245	21.141
	35.8951	24.4150	3814.1390	12.4833	17.9746	212.1965	7633.2967	12.2098	5.8424	26.708
L3	35.4411	30.2494	4388.2314	12.0295	17.3569	252.8241	8782.2369	15.1276	5.5184	19.621
	41.6764	36.4259	7662.4750	14.4857	20.8717	367.1229	15335.0324	18.2164	6.7361	23.951
L4	41.0909	46.7059	9086.0569	13.9303	20.1246	451.4897	18184.0695	23.3574	6.3123	16.833
	48.0734	55.9715	15637.3103	16.6939	24.0792	649.4115	31295.1965	27.9911	7.6824	20.486

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _r	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontal in	Double Angle Stitch Bolt Spacing Redundants in
L1 149.00- 111.50				1	1	1			
L2 111.50- 75.25				1	1	1			
L3 75.25- 39.75				1	1	1			
L4 39.75-0.00				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 r in	Perimeter r in	Weight plf
** 120 ft **										
HB158-1-08U8- S8J18(1-5/8)	C	No	Surface Ar (CaAa)	120.00 - 0.00	8	8	-0.200 0.000	1.9800		1.30
LDF7-50A(1-5/8)	B	No	Surface Ar (CaAa)	131.00 - 0.00	6	6	0.400 0.500	1.9800		0.82

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	CaAa ft ² /ft	Weight plf
** 80 ft **								
LDF4-50A(1/2)	A	No	No	Inside Pole	149.00 - 0.00	3	No Ice 0.00	0.15

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C _A A _A ft ² /ft	Weight plf
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
							2" Ice	0.00	0.15
LDF7-50A(1-5/8)	C	No	No	Inside Pole	120.00 - 0.00	12	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
** 129 ft **									
AVA7-50(1-5/8)	B	No	No	Inside Pole	131.00 - 0.00	6	No Ice	0.00	0.70
							1/2" Ice	0.00	0.70
							1" Ice	0.00	0.70
							2" Ice	0.00	0.70
** 139 **									
AVA7-50(1-5/8)	C	No	No	Inside Pole	139.00 - 0.00	5	No Ice	0.00	0.70
							1/2" Ice	0.00	0.70
							1" Ice	0.00	0.70
							2" Ice	0.00	0.70
** 149 **									
LDF7-50A(1-5/8)	C	No	No	Inside Pole	149.00 - 0.00	1	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
FB-L98B-034-XXX(3/8)	C	No	No	Inside Pole	149.00 - 0.00	2	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	149.00 - 0.00	5	No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
							2" Ice	0.00	0.58

Feed Line/Linear Appurtenances Section Areas

Tower Section n	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	149.00-111.50	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	23.166	0.000	0.18
		C	0.000	0.000	13.464	0.000	0.41
L2	111.50-75.25	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	43.065	0.000	0.33
		C	0.000	0.000	57.420	0.000	1.00
L3	75.25-39.75	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	42.174	0.000	0.32
		C	0.000	0.000	56.232	0.000	0.98
L4	39.75-0.00	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	47.223	0.000	0.36
		C	0.000	0.000	62.964	0.000	1.10

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section n	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	149.00-111.50	A	1.462	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	36.084	0.000	0.55
		C		0.000	0.000	19.937	0.000	0.62
L2	111.50-75.25	A	1.414	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	67.080	0.000	1.02

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft ²	A_F ft ²	$C_A A_A$ In Face ft ²	$C_A A_A$ Out Face ft ²	Weight K
L3	75.25-39.75	C	1.347	0.000	0.000	85.024	0.000	1.88
		A		0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	65.268	0.000	0.98
L4	39.75-0.00	C	1.213	0.000	0.000	82.841	0.000	1.81
		A		0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	72.418	0.000	1.06
		C		0.000	0.000	92.094	0.000	1.98

Feed Line Center of Pressure

Section	Elevation ft	CP_x in	CP_z in	CP_x Ice in	CP_z Ice in
L1	149.00-111.50	3.6787	3.5198	3.0143	2.8167
L2	111.50-75.25	5.0840	7.3049	4.1529	5.8093
L3	75.25-39.75	5.5278	7.9426	4.5571	6.3793
L4	39.75-0.00	5.9254	8.5138	4.9256	6.9022

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	4	HB158-1-08U8-S8J18(1-5/8)	111.50 - 120.00	1.0000	1.0000
L1	8	LDF7-50A(1-5/8)	111.50 - 131.00	1.0000	1.0000
L2	4	HB158-1-08U8-S8J18(1-5/8)	75.25 - 111.50	1.0000	1.0000
L2	8	LDF7-50A(1-5/8)	75.25 - 111.50	1.0000	1.0000
L3	4	HB158-1-08U8-S8J18(1-5/8)	39.75 - 75.25	1.0000	1.0000
L3	8	LDF7-50A(1-5/8)	39.75 - 75.25	1.0000	1.0000
L4	4	HB158-1-08U8-S8J18(1-5/8)	0.00 - 39.75	1.0000	1.0000
L4	8	LDF7-50A(1-5/8)	0.00 - 39.75	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft	$C_A A_A$ Front ft ²	$C_A A_A$ Side ft ²	Weight K
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*** 149 - ATT ***

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
T-Arm Mount [TA 702-3]	C	None		0.0000	149.00	No Ice	4.75	4.75	0.34
						1/2"	5.82	5.82	0.43
						Ice	6.98	6.98	0.55
						1" Ice	9.72	9.72	0.87
						2" Ice			
DMP65R-BU6D w/ Mount Pipe	A	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice	11.96	5.97	0.11
						1/2"	12.70	6.63	0.20
						Ice	13.46	7.30	0.30
						1" Ice	15.02	8.69	0.53
						2" Ice			
DMP65R-BU6D w/ Mount Pipe	B	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice	11.96	5.97	0.11
						1/2"	12.70	6.63	0.20
						Ice	13.46	7.30	0.30
						1" Ice	15.02	8.69	0.53
						2" Ice			
DMP65R-BU6D w/ Mount Pipe	C	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice	11.96	5.97	0.11
						1/2"	12.70	6.63	0.20
						Ice	13.46	7.30	0.30
						1" Ice	15.02	8.69	0.53
						2" Ice			
NNH4-65B-R6 w/ Mount Pipe	A	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice	7.55	4.23	0.12
						1/2"	8.04	4.67	0.21
						Ice	8.53	5.12	0.30
						1" Ice	9.56	6.05	0.53
						2" Ice			
NNH4-65B-R6 w/ Mount Pipe	B	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice	7.55	4.23	0.12
						1/2"	8.04	4.67	0.21
						Ice	8.53	5.12	0.30
						1" Ice	9.56	6.05	0.53
						2" Ice			
NNH4-65B-R6 w/ Mount Pipe	C	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice	7.55	4.23	0.12
						1/2"	8.04	4.67	0.21
						Ice	8.53	5.12	0.30
						1" Ice	9.56	6.05	0.53
						2" Ice			
DC6-48-60-18-8F	A	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice	1.21	1.21	0.02
						1/2"	1.89	1.89	0.04
						Ice	2.11	2.11	0.07
						1" Ice	2.57	2.57	0.13
						2" Ice			
(2) LGP21401	A	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice	1.10	0.21	0.01
						1/2"	1.24	0.27	0.02
						Ice	1.38	0.35	0.03
						1" Ice	1.69	0.52	0.05
						2" Ice			
(2) LGP21401	B	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice	1.10	0.21	0.01
						1/2"	1.24	0.27	0.02
						Ice	1.38	0.35	0.03
						1" Ice	1.69	0.52	0.05
						2" Ice			
(2) LGP21401	C	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice	1.10	0.21	0.01
						1/2"	1.24	0.27	0.02
						Ice	1.38	0.35	0.03
						1" Ice	1.69	0.52	0.05
						2" Ice			
(2) 7020.00	A	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice	0.10	0.17	0.00
						1/2"	0.15	0.24	0.01
						Ice	0.20	0.31	0.01
						1" Ice	0.33	0.48	0.02
						2" Ice			
(2) 7020.00	B	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice	0.10	0.17	0.00
						1/2"	0.15	0.24	0.01
						Ice	0.20	0.31	0.01
						1" Ice	0.33	0.48	0.02
						2" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
(2) 7020.00	C	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.10 0.15 0.20 0.33	0.17 0.24 0.31 0.48	0.00 0.01 0.01 0.02
1001983	A	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.18 0.23 0.30 0.44	0.08 0.13 0.18 0.30	0.00 0.00 0.01 0.01
1001983	B	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.18 0.23 0.30 0.44	0.08 0.13 0.18 0.30	0.00 0.00 0.01 0.01
1001983	C	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.18 0.23 0.30 0.44	0.08 0.13 0.18 0.30	0.00 0.00 0.01 0.01
RADIO 4415 B30	A	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.33	0.64 0.75 0.87 1.13	0.04 0.05 0.07 0.11
RADIO 4415 B30	B	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.33	0.64 0.75 0.87 1.13	0.04 0.05 0.07 0.11
RADIO 4415 B30	C	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.33	0.64 0.75 0.87 1.13	0.04 0.05 0.07 0.11
RRUS 8843 B2/B66A	A	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.32	1.35 1.50 1.65 1.99	0.07 0.09 0.11 0.16
RRUS 8843 B2/B66A	B	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.32	1.35 1.50 1.65 1.99	0.07 0.09 0.11 0.16
RRUS 8843 B2/B66A	C	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.32	1.35 1.50 1.65 1.99	0.07 0.09 0.11 0.16
RRUS 4449 B5/B12	A	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16
RRUS 4449 B5/B12	B	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16
RRUS 4449 B5/B12	C	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
DC9-48-60-24-PC16-EV	A	From Leg	3.00 0.00 1.00	0.0000	149.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.26 2.44 2.64 3.05	1.12 1.26 1.40 1.72	0.03 0.05 0.08 0.13
** 139 - ATT **									
7770.00 w/ Mount Pipe	A	From Leg	1.00 0.00 1.00	0.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
7770.00 w/ Mount Pipe	B	From Leg	1.00 0.00 1.00	0.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
7770.00 w/ Mount Pipe	C	From Leg	1.00 0.00 1.00	0.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
(2) TMA DD 1900 with 850 BYPASS	A	From Leg	1.00 0.00 1.00	0.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.31 0.41 0.51 0.75	0.15 0.21 0.27 0.42	0.02 0.02 0.03 0.05
(2) TMA DD 1900 with 850 BYPASS	B	From Leg	1.00 0.00 1.00	0.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.31 0.41 0.51 0.75	0.15 0.21 0.27 0.42	0.02 0.02 0.03 0.05
(2) TMA DD 1900 with 850 BYPASS	C	From Leg	1.00 0.00 1.00	0.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.31 0.41 0.51 0.75	0.15 0.21 0.27 0.42	0.02 0.02 0.03 0.05
4.5' x 2" Mount Pipe	A	From Leg	1.00 0.00 0.00	0.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.02 1.30 1.58 2.17	1.02 1.30 1.58 2.17	0.00 0.01 0.02 0.05
4.5' x 2" Mount Pipe	B	From Leg	1.00 0.00 0.00	0.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.02 1.30 1.58 2.17	1.02 1.30 1.58 2.17	0.00 0.01 0.02 0.05
4.5' x 2" Mount Pipe	C	From Leg	1.00 0.00 0.00	0.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.02 1.30 1.58 2.17	1.02 1.30 1.58 2.17	0.00 0.01 0.02 0.05
Side Arm Mount [SO 104- 3]	C	None		0.0000	139.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.62 3.30 3.98 5.35	2.62 3.30 3.98 5.35	0.29 0.41 0.53 0.77
** 131 - TMO **									
(2) T-Arm Mount [TA 702- 3]	C	None		0.0000	131.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.75 5.82 6.98 9.72	4.75 5.82 6.98 9.72	0.34 0.43 0.55 0.87
9' x 2" Pipe Mount	A	From Leg	3.00 0.00 0.00	0.0000	131.00	No Ice 1/2" Ice	2.14 3.07 4.01	2.14 3.07 4.01	0.07 0.08 0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
9' x 2" Pipe Mount	B	From Leg	3.00 0.00 0.00	0.0000	131.00	1" Ice	5.13	5.13	0.17
						2" Ice			
						No Ice	2.14	2.14	0.07
						1/2"	3.07	3.07	0.08
						Ice	4.01	4.01	0.10
9' x 2" Pipe Mount	C	From Leg	3.00 0.00 0.00	0.0000	131.00	1" Ice	5.13	5.13	0.17
						2" Ice			
						No Ice	2.14	2.14	0.07
						1/2"	3.07	3.07	0.08
						Ice	4.01	4.01	0.10
APXVAARR24_43-U-NA20	A	From Leg	3.00 0.00 1.00	0.0000	131.00	1" Ice	5.13	5.13	0.17
						2" Ice			
						No Ice	14.67	5.32	0.15
						1/2"	15.43	5.99	0.27
						Ice	16.21	6.68	0.39
APXVAARR24_43-U-NA20	B	From Leg	3.00 0.00 1.00	0.0000	131.00	1" Ice	17.81	8.08	0.66
						2" Ice			
						No Ice	14.67	5.32	0.15
						1/2"	15.43	5.99	0.27
						Ice	16.21	6.68	0.39
APXVAARR24_43-U-NA20	C	From Leg	3.00 0.00 1.00	0.0000	131.00	1" Ice	17.81	8.08	0.66
						2" Ice			
						No Ice	14.67	5.32	0.15
						1/2"	15.43	5.99	0.27
						Ice	16.21	6.68	0.39
APXV18-209014-C w/ Mount Pipe	A	From Face	3.00 0.00 1.00	0.0000	131.00	1" Ice	17.81	8.08	0.66
						2" Ice			
						No Ice	2.55	2.14	0.05
						1/2"	2.95	2.54	0.08
						Ice	3.37	2.95	0.12
APXV18-209014-C w/ Mount Pipe	B	From Face	3.00 0.00 1.00	0.0000	131.00	1" Ice	4.24	3.81	0.22
						2" Ice			
						No Ice	2.55	2.14	0.05
						1/2"	2.95	2.54	0.08
						Ice	3.37	2.95	0.12
APXV18-209014-C w/ Mount Pipe	C	From Face	3.00 0.00 1.00	0.0000	131.00	1" Ice	4.24	3.81	0.22
						2" Ice			
						No Ice	2.55	2.14	0.05
						1/2"	2.95	2.54	0.08
						Ice	3.37	2.95	0.12
RADIO 4449 B12/B71	A	From Leg	3.00 0.00 1.00	0.0000	131.00	1" Ice	4.24	3.81	0.22
						2" Ice			
						No Ice	1.65	1.16	0.07
						1/2"	1.81	1.30	0.09
						Ice	1.98	1.45	0.11
RADIO 4449 B12/B71	B	From Leg	3.00 0.00 1.00	0.0000	131.00	1" Ice	2.34	1.76	0.16
						2" Ice			
						No Ice	1.65	1.16	0.07
						1/2"	1.81	1.30	0.09
						Ice	1.98	1.45	0.11
RADIO 4449 B12/B71	C	From Leg	3.00 0.00 1.00	0.0000	131.00	1" Ice	2.34	1.76	0.16
						2" Ice			
						No Ice	1.65	1.16	0.07
						1/2"	1.81	1.30	0.09
						Ice	1.98	1.45	0.11
KRY 112 489/2	A	From Leg	3.00 0.00 1.00	0.0000	131.00	1" Ice	2.34	1.76	0.16
						2" Ice			
						No Ice	0.56	0.37	0.02
						1/2"	0.66	0.45	0.02
						Ice	0.76	0.54	0.03
KRY 112 489/2	B	From Leg	3.00 0.00 1.00	0.0000	131.00	1" Ice	1.00	0.75	0.05
						2" Ice			
						No Ice	0.56	0.37	0.02
						1/2"	0.66	0.45	0.02
						Ice	0.76	0.54	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
						1" Ice	1.00	0.75	0.05
						2" Ice			
KRY 112 489/2	C	From Leg	3.00	0.0000	131.00	No Ice	0.56	0.37	0.02
			0.00			1/2"	0.66	0.45	0.02
			1.00			Ice	0.76	0.54	0.03
						1" Ice	1.00	0.75	0.05
						2" Ice			
** 120 - VZW **									
SBNHH-1D65B w/ Mount Pipe	A	From Leg	3.00	0.0000	120.00	No Ice	4.09	3.30	0.07
			0.00			1/2"	4.49	3.68	0.13
			0.00			Ice	4.89	4.07	0.20
						1" Ice	5.72	4.87	0.39
						2" Ice			
SBNHH-1D65B w/ Mount Pipe	B	From Leg	3.00	0.0000	120.00	No Ice	4.09	3.30	0.07
			0.00			1/2"	4.49	3.68	0.13
			0.00			Ice	4.89	4.07	0.20
						1" Ice	5.72	4.87	0.39
						2" Ice			
SBNHH-1D65B w/ Mount Pipe	C	From Leg	3.00	0.0000	120.00	No Ice	4.09	3.30	0.07
			0.00			1/2"	4.49	3.68	0.13
			0.00			Ice	4.89	4.07	0.20
						1" Ice	5.72	4.87	0.39
						2" Ice			
BXA-80080/6CF w/ Mount Pipe	A	From Leg	3.00	0.0000	120.00	No Ice	8.01	5.60	0.05
			0.00			1/2"	8.57	6.78	0.11
			0.00			Ice	9.10	7.67	0.18
						1" Ice	10.17	9.48	0.34
						2" Ice			
BXA-80080/6CF w/ Mount Pipe	B	From Leg	3.00	0.0000	120.00	No Ice	8.01	5.60	0.05
			0.00			1/2"	8.57	6.78	0.11
			0.00			Ice	9.10	7.67	0.18
						1" Ice	10.17	9.48	0.34
						2" Ice			
BXA-80080/6CF w/ Mount Pipe	C	From Leg	3.00	0.0000	120.00	No Ice	8.01	5.60	0.05
			0.00			1/2"	8.57	6.78	0.11
			0.00			Ice	9.10	7.67	0.18
						1" Ice	10.17	9.48	0.34
						2" Ice			
HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	3.00	0.0000	120.00	No Ice	7.97	5.99	0.08
			0.00			1/2"	8.73	6.72	0.14
			0.00			Ice	9.51	7.47	0.21
						1" Ice	11.11	9.02	0.40
						2" Ice			
HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	3.00	0.0000	120.00	No Ice	7.97	5.99	0.08
			0.00			1/2"	8.73	6.72	0.14
			0.00			Ice	9.51	7.47	0.21
						1" Ice	11.11	9.02	0.40
						2" Ice			
HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	3.00	0.0000	120.00	No Ice	7.97	5.99	0.08
			0.00			1/2"	8.73	6.72	0.14
			0.00			Ice	9.51	7.47	0.21
						1" Ice	11.11	9.02	0.40
						2" Ice			
RRH2X60-AWS	A	From Leg	3.00	0.0000	120.00	No Ice	3.50	1.82	0.06
			0.00			1/2"	3.76	2.05	0.08
			0.00			Ice	4.03	2.29	0.11
						1" Ice	4.58	2.79	0.17
						2" Ice			
RRH2X60-AWS	B	From Leg	3.00	0.0000	120.00	No Ice	3.50	1.82	0.06
			0.00			1/2"	3.76	2.05	0.08
			0.00			Ice	4.03	2.29	0.11
						1" Ice	4.58	2.79	0.17
						2" Ice			
RRH2X60-AWS	C	From Leg	3.00	0.0000	120.00	No Ice	3.50	1.82	0.06
			0.00			1/2"	3.76	2.05	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
			0.00			Ice	4.03	2.29	0.11
						1" Ice	4.58	2.79	0.17
						2" Ice			
DB-T1-6Z-8AB-0Z	A	From Leg	3.00	0.0000	120.00	No Ice	4.80	2.00	0.04
			0.00			1/2"	5.07	2.19	0.08
			0.00			Ice	5.35	2.39	0.12
						1" Ice	5.93	2.81	0.21
						2" Ice			
DB-T1-6Z-8AB-0Z	B	From Leg	3.00	0.0000	120.00	No Ice	4.80	2.00	0.04
			0.00			1/2"	5.07	2.19	0.08
			0.00			Ice	5.35	2.39	0.12
						1" Ice	5.93	2.81	0.21
						2" Ice			
(2) 4' x 2" Pipe Mount	A	From Leg	1.00	0.0000	120.00	No Ice	0.79	0.79	0.03
			0.00			1/2"	1.03	1.03	0.04
			0.00			Ice	1.28	1.28	0.04
						1" Ice	1.81	1.81	0.07
						2" Ice			
(2) 4' x 2" Pipe Mount	B	From Leg	1.00	0.0000	120.00	No Ice	0.79	0.79	0.03
			0.00			1/2"	1.03	1.03	0.04
			0.00			Ice	1.28	1.28	0.04
						1" Ice	1.81	1.81	0.07
						2" Ice			
(2) 4' x 2" Pipe Mount	C	From Leg	1.00	0.0000	120.00	No Ice	0.79	0.79	0.03
			0.00			1/2"	1.03	1.03	0.04
			0.00			Ice	1.28	1.28	0.04
						1" Ice	1.81	1.81	0.07
						2" Ice			
(2) 6' x 2" Horizontal Mount Pipe	A	From Leg	3.00	0.0000	120.00	No Ice	1.14	0.01	0.02
			0.00			1/2"	1.76	0.04	0.03
			0.00			Ice	2.14	0.09	0.04
						1" Ice	2.90	0.21	0.08
						2" Ice			
(2) 6' x 2" Horizontal Mount Pipe	B	From Leg	3.00	0.0000	120.00	No Ice	1.14	0.01	0.02
			0.00			1/2"	1.76	0.04	0.03
			0.00			Ice	2.14	0.09	0.04
						1" Ice	2.90	0.21	0.08
						2" Ice			
(2) 6' x 2" Horizontal Mount Pipe	C	From Leg	3.00	0.0000	120.00	No Ice	1.14	0.01	0.02
			0.00			1/2"	1.76	0.04	0.03
			0.00			Ice	2.14	0.09	0.04
						1" Ice	2.90	0.21	0.08
						2" Ice			
Side Arm Mount [SO 104- 3]	C	None		0.0000	120.00	No Ice	2.62	2.62	0.29
						1/2"	3.30	3.30	0.41
						Ice	3.98	3.98	0.53
						1" Ice	5.35	5.35	0.77
						2" Ice			
** 80 - Seymour CT ** FO150-3	B	From Leg	0.50	0.0000	80.00	No Ice	1.09	1.09	0.00
			0.00			1/2"	1.35	1.35	0.01
			0.00			Ice	1.62	1.62	0.02
						1" Ice	2.20	2.20	0.06
						2" Ice			
6' x 2" Mount Pipe	A	From Leg	0.50	0.0000	80.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			
Pipe Mount [PM 601-1]	A	From Leg	0.50	0.0000	80.00	No Ice	1.32	1.32	0.07
			0.00			1/2"	1.58	1.58	0.08
			0.00			Ice	1.84	1.84	0.09
						1" Ice	2.40	2.40	0.13
						2" Ice			
6' x 2" Mount Pipe	A	From Leg	0.50	0.0000	80.00	No Ice	1.43	1.43	0.02

Description	Face or Leg	Offset Type	Offsets:	Azimuth	Placement	C _A A _A	C _A A _A	Weight	
			Horz Lateral Vert ft ft ft	Adjustmen t °	ft	Front ft²	Side ft²		K
Pipe Mount [PM 601-1]	A	From Leg	0.00	0.0000	80.00	1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			
			0.50			No Ice	1.32	1.32	0.07
			0.00			1/2"	1.58	1.58	0.08
			0.00			Ice	1.84	1.84	0.09
						1" Ice	2.40	2.40	0.13
						2" Ice			

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft²	Weight K
MPRD2449	B	Paraboloid w/Radome	From Leg	1.00	0.0000		80.00	2.17	No Ice	3.69
				0.00					1/2" Ice	3.98
				0.00					1" Ice	4.27
									2" Ice	4.84

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	149 - 111.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-21.40	-1.21	1.10
			Max. Mx	8	-7.94	-273.42	-0.04
			Max. My	2	-7.92	-0.00	275.91
			Max. Vy	8	14.11	-273.42	-0.04
			Max. Vx	2	-14.24	-0.00	275.91
			Max. Torque	22			-0.74
L2	111.5 - 75.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-30.53	-2.74	0.55
			Max. Mx	8	-13.29	-836.25	-1.98
			Max. My	2	-13.27	1.49	842.70
			Max. Vy	20	-18.03	834.98	2.27
			Max. Vx	2	-18.11	1.49	842.70
			Max. Torque	22			-1.17
L3	75.25 - 39.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.19	-4.10	-0.84
			Max. Mx	8	-20.41	-1520.35	-4.46
			Max. My	2	-20.41	3.66	1530.59
			Max. Vy	20	-21.35	1520.16	3.69
			Max. Vx	2	-21.44	3.66	1530.59
			Max. Torque	22			-1.17
L4	39.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-58.59	-5.83	-2.81
			Max. Mx	20	-33.37	2567.63	5.36
			Max. My	2	-33.37	6.38	2581.39
			Max. Vy	20	-25.00	2567.63	5.36
			Max. Vx	2	-25.08	6.38	2581.39
			Max. Torque	22			-1.16

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	32	58.59	-3.23	-5.60
	Max. H _x	21	25.04	24.97	0.05
	Max. H _z	2	33.39	0.07	25.05
	Max. M _x	2	2581.39	0.07	25.05
	Max. M _z	8	2566.51	-24.92	-0.05
	Max. Torsion	10	1.16	-21.62	-12.57
	Min. Vert	7	25.04	-21.52	12.46
	Min. H _x	9	25.04	-24.92	-0.05
	Min. H _z	15	25.04	-0.04	-25.00
	Min. M _x	14	-2580.11	-0.04	-25.00
	Min. M _z	20	-2567.63	24.97	0.05
	Min. Torsion	22	-1.16	21.65	12.59

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturing Moment, M _x kip-ft	Overturing Moment, M _z kip-ft	Torque kip-ft
Dead Only	27.82	0.00	0.00	0.98	-1.13	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	33.39	-0.07	-25.05	-2581.39	6.38	0.58
0.9 Dead+1.0 Wind 0 deg - No Ice	25.04	-0.07	-25.05	-2553.31	6.67	0.58
1.2 Dead+1.0 Wind 30 deg - No Ice	33.39	12.38	-21.64	-2230.37	-1275.66	-0.02
0.9 Dead+1.0 Wind 30 deg - No Ice	25.04	12.38	-21.64	-2206.14	-1261.28	-0.01
1.2 Dead+1.0 Wind 60 deg - No Ice	33.39	21.52	-12.46	-1283.31	-2217.03	-0.59
0.9 Dead+1.0 Wind 60 deg - No Ice	25.04	21.52	-12.46	-1269.49	-2192.30	-0.58
1.2 Dead+1.0 Wind 90 deg - No Ice	33.39	24.92	0.05	7.74	-2566.51	-1.00
0.9 Dead+1.0 Wind 90 deg - No Ice	25.04	24.92	0.05	7.36	-2537.96	-0.99
1.2 Dead+1.0 Wind 120 deg - No Ice	33.39	21.62	12.57	1298.25	-2227.21	-1.16
0.9 Dead+1.0 Wind 120 deg - No Ice	25.04	21.62	12.57	1283.68	-2202.39	-1.16
1.2 Dead+1.0 Wind 150 deg - No Ice	33.39	12.51	21.71	2240.05	-1289.58	-1.02
0.9 Dead+1.0 Wind 150 deg - No Ice	25.04	12.51	21.71	2215.13	-1275.06	-1.01
1.2 Dead+1.0 Wind 180 deg - No Ice	33.39	0.04	25.00	2580.11	-7.17	-0.57
0.9 Dead+1.0 Wind 180 deg - No Ice	25.04	0.04	25.00	2551.44	-6.74	-0.58
1.2 Dead+1.0 Wind 210 deg - No Ice	33.39	-12.42	21.62	2230.88	1276.09	0.01
0.9 Dead+1.0 Wind 210 deg - No Ice	25.04	-12.42	21.62	2206.05	1262.42	0.01
1.2 Dead+1.0 Wind 240 deg - No Ice	33.39	-21.58	12.46	1285.79	2218.39	0.58
0.9 Dead+1.0 Wind 240 deg - No Ice	25.04	-21.58	12.46	1271.36	2194.38	0.57
1.2 Dead+1.0 Wind 270 deg - No Ice	33.39	-24.97	-0.05	-5.36	2567.63	1.00
0.9 Dead+1.0 Wind 270 deg - No Ice	25.04	-24.97	-0.05	-5.60	2539.78	0.99
1.2 Dead+1.0 Wind 300 deg - No Ice	33.39	-21.65	-12.59	-1297.06	2226.50	1.16
0.9 Dead+1.0 Wind 300 deg - No Ice	25.04	-21.65	-12.59	-1283.10	2202.40	1.16
1.2 Dead+1.0 Wind 330 deg - No Ice	33.39	-12.53	-21.75	-2241.06	1288.76	1.02

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
0.9 Dead+1.0 Wind 330 deg	25.04	-12.53	-21.75	-2216.72	1274.96	1.02
- No Ice						
1.2 Dead+1.0 Ice+1.0 Temp	58.59	0.00	0.00	2.81	-5.83	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	58.59	-0.01	-6.47	-677.05	-4.48	0.12
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	58.59	3.21	-5.59	-585.00	-342.66	-0.04
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	58.59	5.57	-3.22	-335.82	-590.76	-0.19
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	58.59	6.45	0.01	4.05	-682.53	-0.29
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	58.59	5.59	3.24	343.86	-592.71	-0.31
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	58.59	3.23	5.60	592.06	-345.27	-0.25
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	58.59	0.01	6.46	682.01	-6.98	-0.12
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	58.59	-3.22	5.59	590.32	331.45	0.04
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	58.59	-5.58	3.22	341.55	579.74	0.19
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	58.59	-6.45	-0.01	1.65	671.46	0.29
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	58.59	-5.59	-3.25	-338.40	581.26	0.31
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	58.59	-3.24	-5.61	-587.04	333.80	0.25
Dead+Wind 0 deg - Service	27.82	-0.01	-5.44	-556.33	0.50	0.13
Dead+Wind 30 deg - Service	27.82	2.69	-4.70	-480.57	-276.16	-0.00
Dead+Wind 60 deg - Service	27.82	4.67	-2.70	-276.20	-479.30	-0.13
Dead+Wind 90 deg - Service	27.82	5.41	0.01	2.41	-554.72	-0.22
Dead+Wind 120 deg - Service	27.82	4.69	2.73	280.90	-481.51	-0.25
Dead+Wind 150 deg - Service	27.82	2.71	4.71	484.14	-279.17	-0.22
Dead+Wind 180 deg - Service	27.82	0.01	5.43	557.53	-2.42	-0.13
Dead+Wind 210 deg - Service	27.82	-2.70	4.69	482.15	274.51	0.00
Dead+Wind 240 deg - Service	27.82	-4.68	2.70	278.20	477.85	0.13
Dead+Wind 270 deg - Service	27.82	-5.42	-0.01	-0.42	553.21	0.22
Dead+Wind 300 deg - Service	27.82	-4.70	-2.73	-279.17	479.60	0.25
Dead+Wind 330 deg - Service	27.82	-2.72	-4.72	-482.89	277.24	0.22

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-27.82	0.00	0.00	27.82	0.00	0.000%
2	-0.07	-33.39	-25.05	0.07	33.39	25.05	0.000%
3	-0.07	-25.04	-25.05	0.07	25.04	25.05	0.000%
4	12.38	-33.39	-21.64	-12.38	33.39	21.64	0.000%
5	12.38	-25.04	-21.64	-12.38	25.04	21.64	0.000%
6	21.52	-33.39	-12.46	-21.52	33.39	12.46	0.000%
7	21.52	-25.04	-12.46	-21.52	25.04	12.46	0.000%
8	24.92	-33.39	0.05	-24.92	33.39	-0.05	0.000%
9	24.92	-25.04	0.05	-24.92	25.04	-0.05	0.000%
10	21.62	-33.39	12.57	-21.62	33.39	-12.57	0.000%
11	21.62	-25.04	12.57	-21.62	25.04	-12.57	0.000%
12	12.51	-33.39	21.71	-12.51	33.39	-21.71	0.000%
13	12.51	-25.04	21.71	-12.51	25.04	-21.71	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
14	0.04	-33.39	25.00	-0.04	33.39	-25.00	0.000%
15	0.04	-25.04	25.00	-0.04	25.04	-25.00	0.000%
16	-12.42	-33.39	21.62	12.42	33.39	-21.62	0.000%
17	-12.42	-25.04	21.62	12.42	25.04	-21.62	0.000%
18	-21.58	-33.39	12.46	21.58	33.39	-12.46	0.000%
19	-21.58	-25.04	12.46	21.58	25.04	-12.46	0.000%
20	-24.97	-33.39	-0.05	24.97	33.39	0.05	0.000%
21	-24.97	-25.04	-0.05	24.97	25.04	0.05	0.000%
22	-21.65	-33.39	-12.59	21.65	33.39	12.59	0.000%
23	-21.65	-25.04	-12.59	21.65	25.04	12.59	0.000%
24	-12.53	-33.39	-21.75	12.53	33.39	21.75	0.000%
25	-12.53	-25.04	-21.75	12.53	25.04	21.75	0.000%
26	0.00	-58.59	0.00	-0.00	58.59	-0.00	0.000%
27	-0.01	-58.59	-6.47	0.01	58.59	6.47	0.000%
28	3.21	-58.59	-5.59	-3.21	58.59	5.59	0.000%
29	5.57	-58.59	-3.22	-5.57	58.59	3.22	0.000%
30	6.45	-58.59	0.01	-6.45	58.59	-0.01	0.000%
31	5.59	-58.59	3.24	-5.59	58.59	-3.24	0.000%
32	3.23	-58.59	5.60	-3.23	58.59	-5.60	0.000%
33	0.01	-58.59	6.46	-0.01	58.59	-6.46	0.000%
34	-3.22	-58.59	5.59	3.22	58.59	-5.59	0.000%
35	-5.58	-58.59	3.22	5.58	58.59	-3.22	0.000%
36	-6.45	-58.59	-0.01	6.45	58.59	0.01	0.000%
37	-5.59	-58.59	-3.25	5.59	58.59	3.25	0.000%
38	-3.24	-58.59	-5.61	3.24	58.59	5.61	0.000%
39	-0.01	-27.82	-5.44	0.01	27.82	5.44	0.000%
40	2.69	-27.82	-4.70	-2.69	27.82	4.70	0.000%
41	4.67	-27.82	-2.70	-4.67	27.82	2.70	0.000%
42	5.41	-27.82	0.01	-5.41	27.82	-0.01	0.000%
43	4.69	-27.82	2.73	-4.69	27.82	-2.73	0.000%
44	2.71	-27.82	4.71	-2.71	27.82	-4.71	0.000%
45	0.01	-27.82	5.43	-0.01	27.82	-5.43	0.000%
46	-2.70	-27.82	4.69	2.70	27.82	-4.69	0.000%
47	-4.68	-27.82	2.70	4.68	27.82	-2.70	0.000%
48	-5.42	-27.82	-0.01	5.42	27.82	0.01	0.000%
49	-4.70	-27.82	-2.73	4.70	27.82	2.73	0.000%
50	-2.72	-27.82	-4.72	2.72	27.82	4.72	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	4	0.00000001	0.00068198
3	Yes	4	0.00000001	0.00029383
4	Yes	6	0.00000001	0.00009902
5	Yes	5	0.00000001	0.00085110
6	Yes	6	0.00000001	0.00010036
7	Yes	5	0.00000001	0.00086312
8	Yes	5	0.00000001	0.00005112
9	Yes	4	0.00000001	0.00064224
10	Yes	6	0.00000001	0.00009786
11	Yes	5	0.00000001	0.00084052
12	Yes	6	0.00000001	0.00010200
13	Yes	5	0.00000001	0.00087678
14	Yes	5	0.00000001	0.00004882
15	Yes	4	0.00000001	0.00059535
16	Yes	6	0.00000001	0.00009931
17	Yes	5	0.00000001	0.00085393
18	Yes	6	0.00000001	0.00009781
19	Yes	5	0.00000001	0.00084088
20	Yes	5	0.00000001	0.00007811
21	Yes	4	0.00000001	0.00096017
22	Yes	6	0.00000001	0.00010209
23	Yes	5	0.00000001	0.00087810

24	Yes	6	0.00000001	0.00009817
25	Yes	5	0.00000001	0.00084321
26	Yes	4	0.00000001	0.00005440
27	Yes	5	0.00000001	0.00062173
28	Yes	5	0.00000001	0.00090677
29	Yes	5	0.00000001	0.00091024
30	Yes	5	0.00000001	0.00062583
31	Yes	5	0.00000001	0.00090555
32	Yes	5	0.00000001	0.00092195
33	Yes	5	0.00000001	0.00062233
34	Yes	5	0.00000001	0.00088559
35	Yes	5	0.00000001	0.00088076
36	Yes	5	0.00000001	0.00061349
37	Yes	5	0.00000001	0.00089822
38	Yes	5	0.00000001	0.00088433
39	Yes	4	0.00000001	0.00006857
40	Yes	4	0.00000001	0.00062040
41	Yes	4	0.00000001	0.00064515
42	Yes	4	0.00000001	0.00009266
43	Yes	4	0.00000001	0.00059762
44	Yes	4	0.00000001	0.00067283
45	Yes	4	0.00000001	0.00007271
46	Yes	4	0.00000001	0.00062117
47	Yes	4	0.00000001	0.00059623
48	Yes	4	0.00000001	0.00009789
49	Yes	4	0.00000001	0.00067050
50	Yes	4	0.00000001	0.00059665

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	149 - 111.5	24.786	44	1.4250	0.0026
L2	115.25 - 75.25	15.081	44	1.2696	0.0016
L3	79.75 - 39.75	6.998	44	0.8560	0.0009
L4	45 - 0	2.173	44	0.4413	0.0003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.00	T-Arm Mount [TA 702-3]	44	24.786	1.4250	0.0026	41785
139.00	7770.00 w/ Mount Pipe	44	21.812	1.3951	0.0023	20892
131.00	(2) T-Arm Mount [TA 702-3]	44	19.471	1.3651	0.0020	11606
120.00	SBNHH-1D65B w/ Mount Pipe	44	16.365	1.3050	0.0017	7203
80.00	MPRD2449	44	7.044	0.8593	0.0009	4631

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	149 - 111.5	114.634	2	6.6080	0.0118
L2	115.25 - 75.25	69.755	24	5.8838	0.0072
L3	79.75 - 39.75	32.387	24	3.9660	0.0039
L4	45 - 0	10.056	24	2.0433	0.0015

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.00	T-Arm Mount [TA 702-3]	2	114.634	6.6080	0.0120	9259
139.00	7770.00 w/ Mount Pipe	2	100.874	6.4686	0.0105	4628
131.00	(2) T-Arm Mount [TA 702-3]	2	90.044	6.3278	0.0094	2569
120.00	SBNHH-1D65B w/ Mount Pipe	24	75.687	6.0483	0.0079	1592
80.00	MPRD2449	24	32.602	3.9810	0.0040	1009

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	KI/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
L1	149 - 111.5 (1)	TP29.487x23x0.1875	37.50	0.00	0.0	17.050 8	-7.92	997.47	0.008
L2	111.5 - 75.25 (2)	TP35.383x28.4633x0.218 8	40.00	0.00	0.0	23.874 5	-13.27	1396.66	0.010
L3	75.25 - 39.75 (3)	TP41.086x34.167x0.2813	40.00	0.00	0.0	35.615 2	-20.40	2083.49	0.010
L4	39.75 - 0 (4)	TP47.4x39.6154x0.375	45.00	0.00	0.0	55.971 5	-33.37	3274.33	0.010

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	149 - 111.5 (1)	TP29.487x23x0.1875	275.91	639.10	0.432	0.00	639.10	0.000
L2	111.5 - 75.25 (2)	TP35.383x28.4633x0.218 8	842.79	1060.37	0.795	0.00	1060.37	0.000
L3	75.25 - 39.75 (3)	TP41.086x34.167x0.2813	1532.14	1917.64	0.799	0.00	1917.64	0.000
L4	39.75 - 0 (4)	TP47.4x39.6154x0.375	2585.20	3714.79	0.696	0.00	3714.79	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	149 - 111.5 (1)	TP29.487x23x0.1875	14.24	299.24	0.048	0.29	750.83	0.000
L2	111.5 - 75.25 (2)	TP35.383x28.4633x0.218 8	18.12	419.00	0.043	1.02	1261.74	0.001
L3	75.25 - 39.75 (3)	TP41.086x34.167x0.2813	21.49	625.05	0.034	1.02	2183.88	0.000
L4	39.75 - 0 (4)	TP47.4x39.6154x0.375	25.13	982.30	0.026	1.02	4045.32	0.000

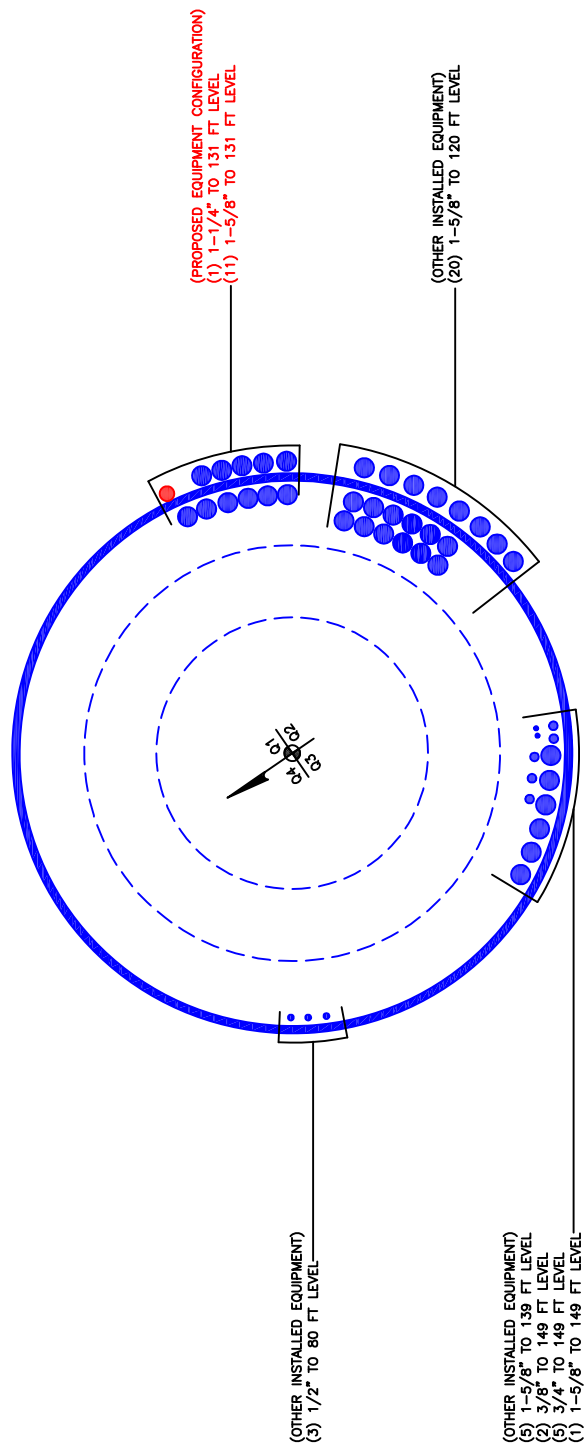
Pole Interaction Design Data

Section No.	Elevation ft	Ratio P_u ϕP_n	Ratio M_{ux} ϕM_{nx}	Ratio M_{uy} ϕM_{ny}	Ratio V_u ϕV_n	Ratio T_u ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	149 - 111.5 (1)	0.008	0.432	0.000	0.048	0.000	0.442	1.050	4.8.2
L2	111.5 - 75.25 (2)	0.010	0.795	0.000	0.043	0.001	0.806	1.050	4.8.2
L3	75.25 - 39.75 (3)	0.010	0.799	0.000	0.034	0.000	0.810	1.050	4.8.2
L4	39.75 - 0 (4)	0.010	0.696	0.000	0.026	0.000	0.707	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	149 - 111.5	Pole	TP29.487x23x0.1875	1	-7.92	1047.35	42.1	Pass
L2	111.5 - 75.25	Pole	TP35.383x28.4633x0.2188	2	-13.27	1466.49	76.8	Pass
L3	75.25 - 39.75	Pole	TP41.086x34.167x0.2813	3	-20.40	2187.66	77.1	Pass
L4	39.75 - 0	Pole	TP47.4x39.6154x0.375	4	-33.37	3438.05	67.3	Pass
							Summary	
							Pole (L3)	77.1 Pass
							RATING =	77.1 Pass

APPENDIX B
BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

Monopole Base Plate Connection

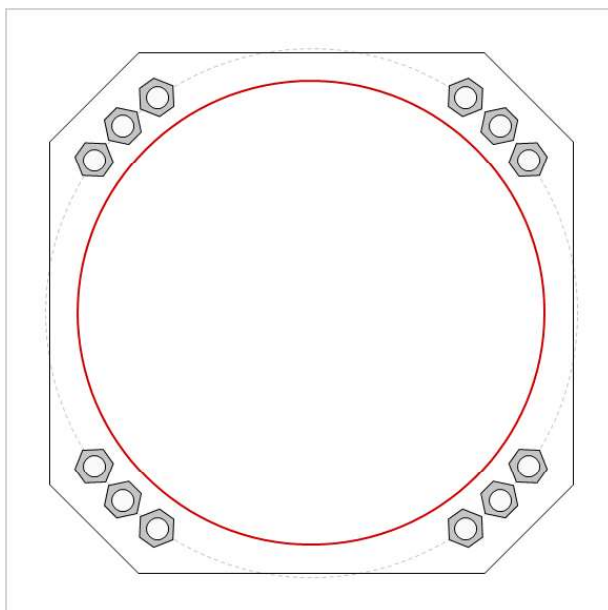


Site Info	
BU #	845455
Site Name	Oxford-Quaker Farms
Order #	494422 Rev 2

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	1

Applied Loads	
Moment (kip-ft)	2585.20
Axial Force (kips)	33.37
Shear Force (kips)	25.13

*TIA-222-H Section 15.5 Applied



Connection Properties

Anchor Rod Data

(12) 2-1/4" ϕ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 54" BC
Anchor Spacing: 4.5 in

Base Plate Data

53" OD x 2.75" Plate (A572-60; $F_y=60$ ksi, $F_u=75$ ksi)

Stiffener Data

N/A

Pole Data

47.4" x 0.375" 18-sided pole (A607-65; $F_y=65$ ksi, $F_u=80$ ksi)

Analysis Results

Anchor Rod Summary

(units of kips, kip-in)

$Pu_c = 194.14$	$\phi Pn_c = 268.39$	Stress Rating
$Vu = 2.09$	$\phi Vn = 120.77$	68.9%
$Mu = n/a$	$\phi Mn = n/a$	Pass

Base Plate Summary

Max Stress (ksi):	33.8	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	59.6%	Pass

Pier and Pad Foundation



BU #: 845455
 Site Name: Oxford-Quaker Farm
 App. Number: 494422 Rev 2

TIA-222 Revision: H
 Tower Type: Monopole

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

Superstructure Analysis Reactions		
Compression, P_{comp} :	33	kips
Base Shear, V_u :	25	kips
Moment, M_u :	2585	ft-kips
Tower Height, H :	149	ft
BP Dist. Above Fdn, bp_{dist} :	3	in

Pier Properties		
Pier Shape:	Square	
Pier Diameter, $dpier$:	7	ft
Ext. Above Grade, E :	0.5	ft
Pier Rebar Size, Sc :	11	
Pier Rebar Quantity, mc :	32	
Pier Tie/Spiral Size, St :	5	
Pier Tie/Spiral Quantity, mt :	10	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier} :	3	in

Pad Properties		
Depth, D :	7.5	ft
Pad Width, W :	20	ft
Pad Thickness, T :	3.5	ft
Pad Rebar Size (Bottom), Sp :	10	
Pad Rebar Quantity (Bottom), mp :	21	
Pad Clear Cover, cc_{pad} :	3	in

Material Properties		
Rebar Grade, F_y :	60	ksi
Concrete Compressive Strength, F'_c :	3	ksi
Dry Concrete Density, δ_c :	150	pcf

Soil Properties		
Total Soil Unit Weight, γ :	125	pcf
Ultimate Gross Bearing, Q_{ult} :	30.000	ksf
Cohesion, C_u :	0.000	ksf
Friction Angle, ϕ :	36	degrees
SPT Blow Count, N_{blows} :	41	
Base Friction, μ :		
Neglected Depth, N :	3.50	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, gw :	none	ft

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	284.14	25.00	8.4%	Pass
Bearing Pressure (ksf)	22.50	3.26	14.5%	Pass
Overturning (kip*ft)	4334.48	2791.25	64.4%	Pass
Pier Flexure (Comp.) (kip*ft)	7538.67	2697.50	34.1%	Pass
Pier Compression (kip)	23390.64	72.69	0.3%	Pass
Pad Flexure (kip*ft)	4295.05	1025.89	22.7%	Pass
Pad Shear - 1-way (kips)	731.44	180.68	23.5%	Pass
Pad Shear - 2-way (Comp) (ksi)	0.164	0.000	0.0%	Pass
Flexural 2-way (Comp) (kip*ft)	7386.86	1618.50	20.9%	Pass

*Rating per TIA-222-H Section 15.5

Soil Rating*:	64.4%
Structural Rating*:	34.1%

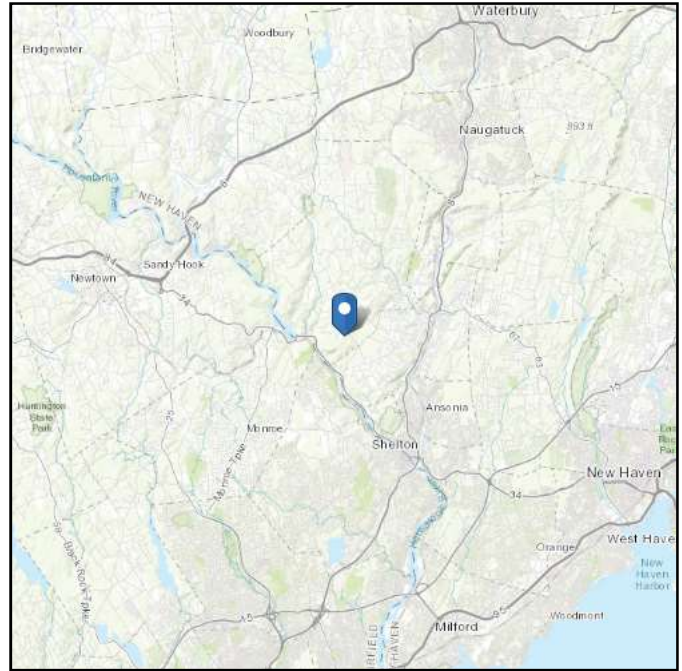
<--Toggle between Gross and Net

ASCE 7 Hazards Report

Address:
No Address at This
Location

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

Elevation: 607.1 ft (NAVD 88)
Latitude: 41.383989
Longitude: -73.137372

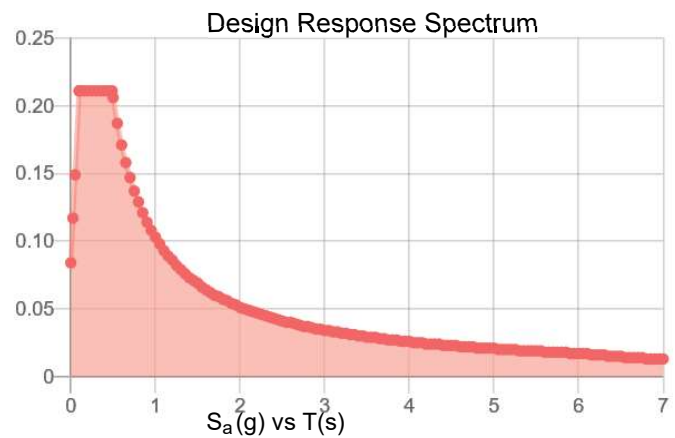
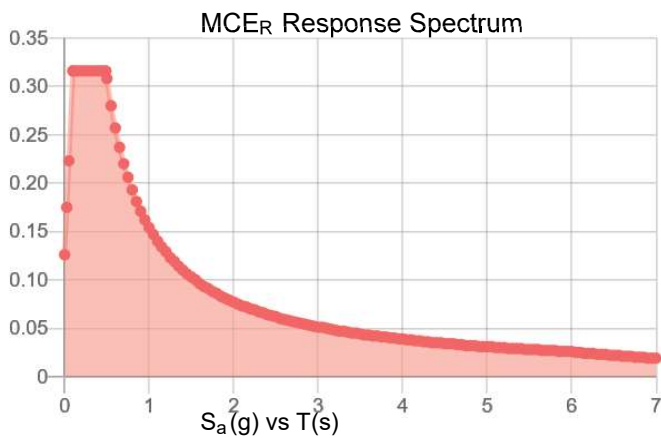


Site Soil Class: D - Stiff Soil

Results:

S_s :	0.197	S_{DS} :	0.211
S_1 :	0.064	S_{D1} :	0.103
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.105
S_{MS} :	0.316	PGA_M :	0.166
S_{M1} :	0.154	F_{PGA} :	1.591
		I_e :	1

Seismic Design Category B



Data Accessed:

Tue Jun 02 2020

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: 0.75 in.

Concurrent Temperature: 15 F

Gust Speed: 50 mph

Data Source: Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8

Date Accessed: Tue Jun 02 2020

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.

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

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In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.

Exhibit E

Mount Analysis



Date: July 21, 2020

Kevin Morrow
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6619

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: CTNH211B
Carrier Site Name: NH211/Quaker Farms_Collo

Crown Castle Designation: **Crown Castle BU Number:** 845455
Crown Castle Site Name: Oxford-Quaker Farms
Crown Castle JDE Job Number: 576607
Crown Castle Order Number: 494422, Rev.0

Engineering Firm Designation: B+T Group Report Designation: 136377.005.01 Rev A

Site Data: 85 Quaker Farms Road, Oxford, CT, New Haven County, 06478
Latitude 41° 23' 2.36" Longitude -73° 8' 14.54"

Structure Information: **Tower Height & Type:** 149 ft. Monopole
Mount Elevation: 131 ft.
Mount Type: 5 ft. T-Arm Mount

Dear Ms. Tarr,

B+T Group is pleased to submit this "Mount Modification Report" to determine the structural integrity of AT&T Mobility'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:

Sector Mount

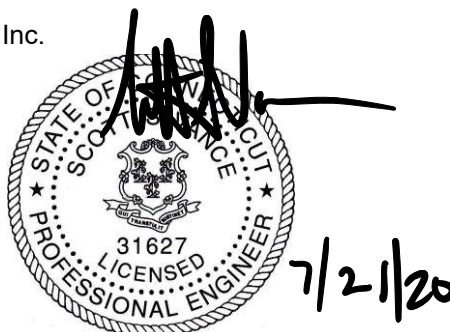
Sufficient

*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 125 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount structural analysis prepared by: Nitin K Manjunath

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



Scott S. Vance, P.E.

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Mount Modification Design Drawings (MDD)

1) INTRODUCTION

This is a 5' T-Arm Mount, mapped by B+T Group.

2) ANALYSIS CRITERIA

Building Code:	2018 Connecticut State Building Code (2015 IBC)
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	125 mph
Exposure Category:	C
Topographic Factor at Base:	1
Topographic Factor at Mount:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Seismic S_s:	0.197
Seismic S_1:	0.064
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
131	132	3	RFS/Celwave	APXV18-209014-C	5' T-Arm Mount
		3	RFS/Celwave	APXVAARR24 43-U-NA20	
		3	Ericsson	KRY 112 489/2	
		3	Ericsson	RADIO 4449 B12/71	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
CCI Order	Existing Loading Proposed Loading	Date: 05/28/2019	Crown Castle
Mount Mapping	B+T Group	Date: 06/15/2019	On File
Mount Analysis		Date: 07/02/2019	

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 "Software Input Calculations".

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. 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.
7. All prior structural modifications, if any are assumed to be correctly installed and fully effective.
8. 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.
9. 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.
10. 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(a) - Mount Component Stresses vs. Capacity (T-Arm Mount, Alpha Sector)

Notes	Component	Critical Member	Centerline (ft.)	% Capacity	Pass / Fail
1,2	Face Horizontal	M3	131	23.6	Pass
	Support Arms	M12	131	14.4	Pass
	Mount Pipes	M1	131	58.8	Pass
Structure Rating (max from all components) =					58.8%

Notes:

- 1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
- 2) All sectors are typical

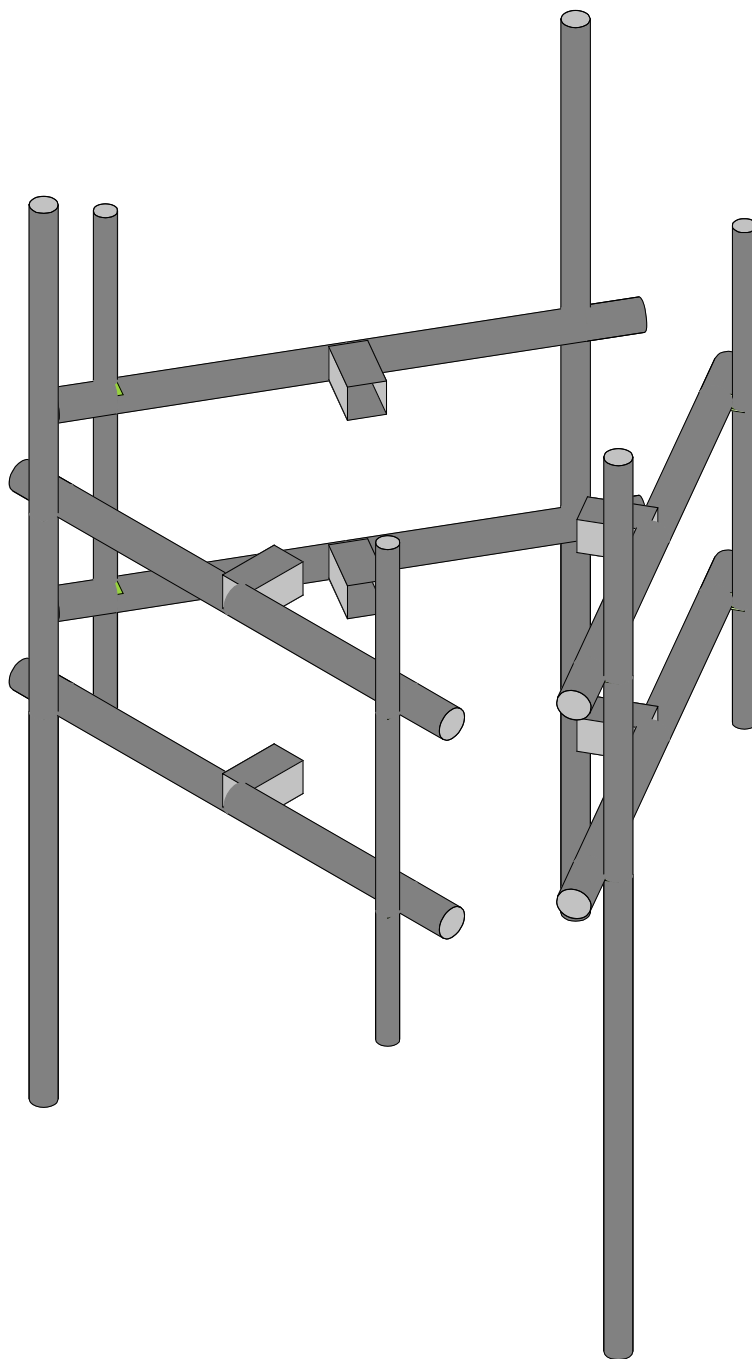
4.1) RECOMMENDATIONS

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. Install new Monopole Double Support Arm Kit, Sitepro1 Part# RDS-NP

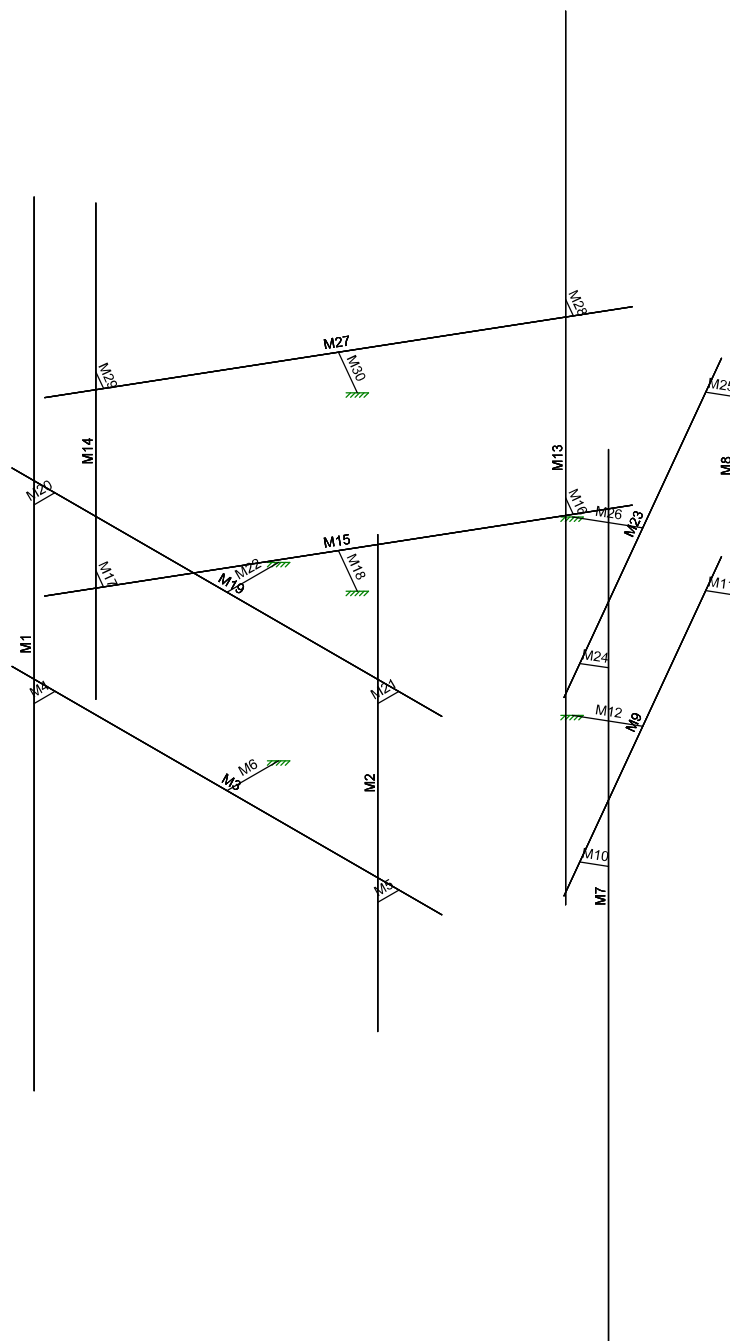
Engineering detail drawings have been provided in Appendix D – Mount Modification Design Drawings.

APPENDIX A
WIRE FRAME AND RENDERED MODELS



Envelope Only Solution

B+T Group	845455 - Oxford-Quaker Farms	SK - 1
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Envelope Only Solution

B+T Group

NKM

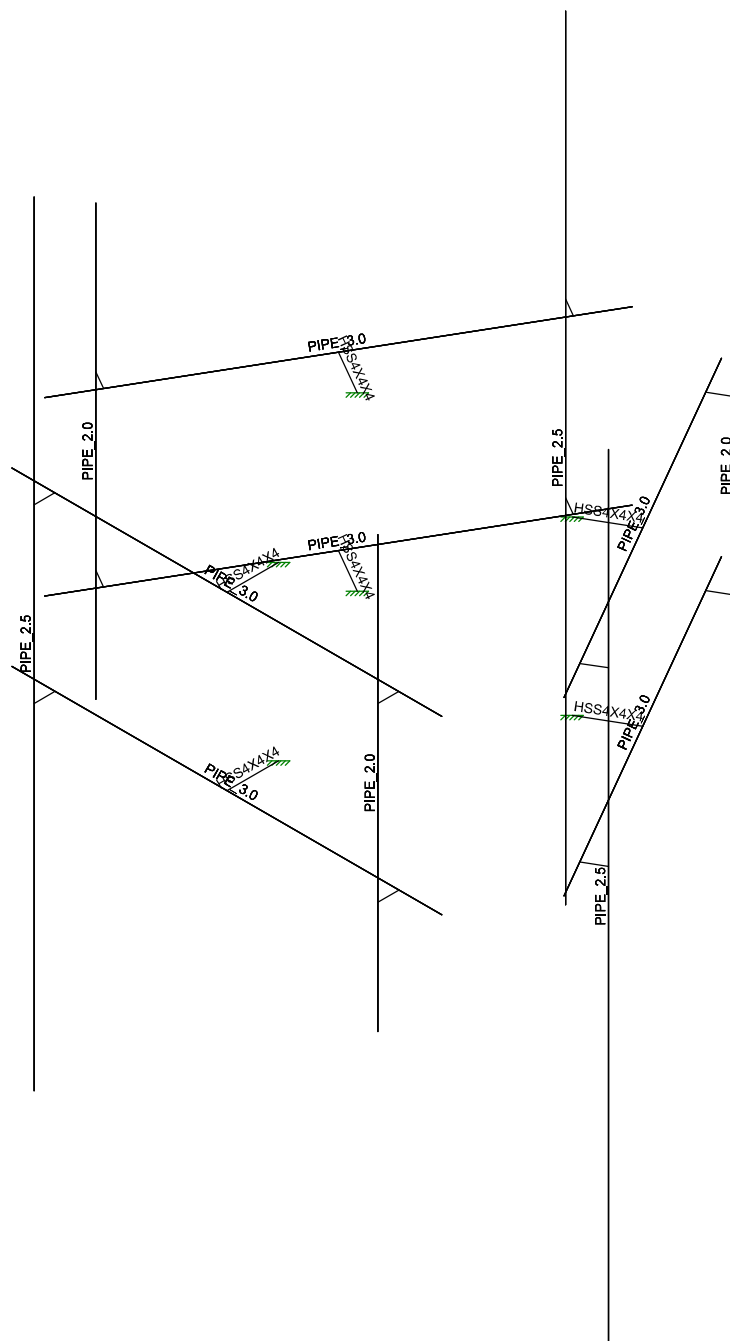
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845455 - Oxford-Quaker Farms

SK - 2

May 26, 2020 at 5:03 PM

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Envelope Only Solution

B+T Group

NKM

136377.002.01

845455 - Oxford-Quaker Farms

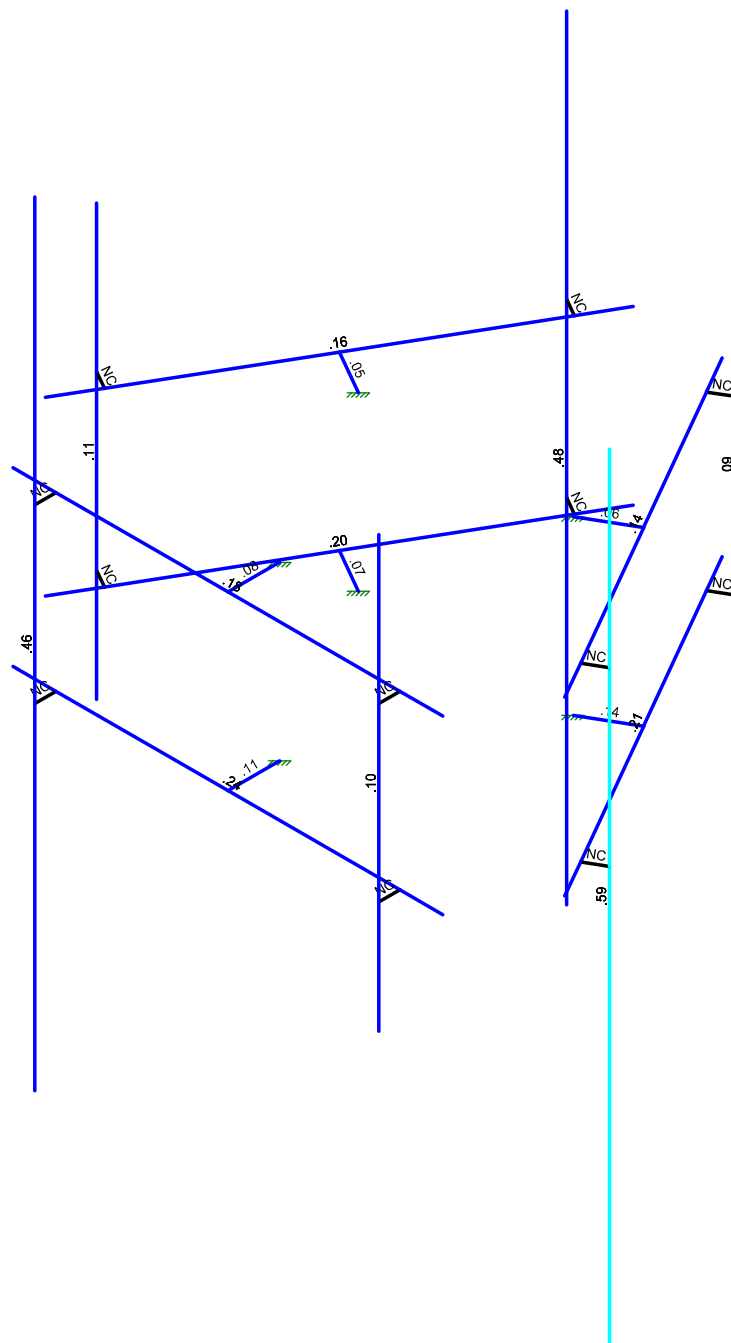
SK - 3

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Code Check (Env)	
■	No Calc
■	> 1.0
■	.90-1.0
■	.75-.90
■	.50-.75
■	0-.50



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

B+T Group

NKM

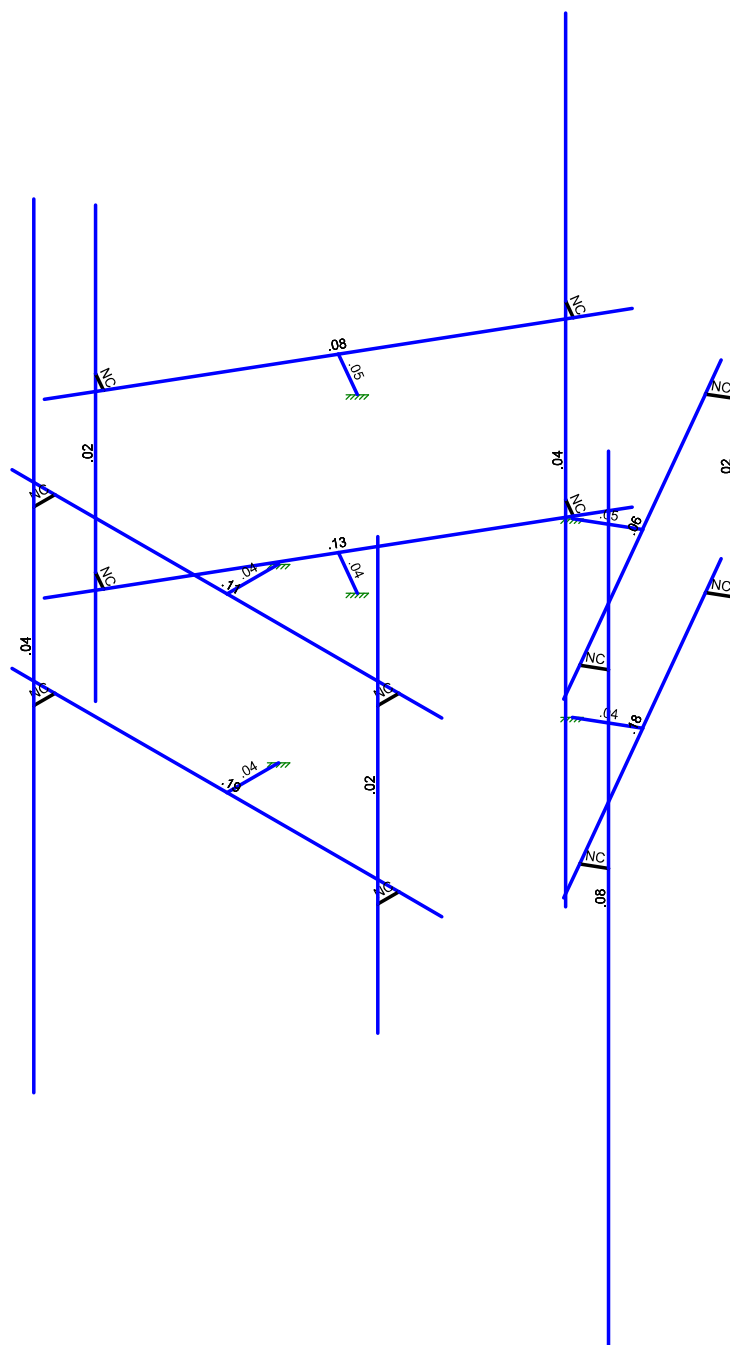
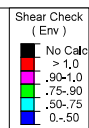
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845455 - Oxford-Quaker Farms

SK - 4

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B+T Group	845455 - Oxford-Quaker Farms	SK - 5
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APPENDIX B
SOFTWARE INPUT CALCULATIONS

PROJECT	136377.005.01 - Oxford-Qual			KSC
SUBJECT	T-Arm Mount Mount Analysis			
DATE	05/26/20	PAGE	OF	

Manufacturer	Model	Qty	Aspect Ratio	C _a flat/round	EPA _{Ni} *K _s (ft ²)	EPA _T *K _s (ft ²)	EPA _{NoIce} *K _s (ft ²)	F _{A No Ice (N)}	F _{A No Ice (T)}	F _{A Ice (N)}	F _{A Ice (T)}
RFS/Celwave	APXV18-209014-C	0.5	8.03	1.43	1.09	0.53	1.77	1.17	0.08	0.05	0.01
RFS/Celwave	APXV18-209014-C	0.5	8.03	1.43	1.09	0.53	1.77	1.17	0.08	0.05	0.01
Ericsson	RADIO 4449 B12/71	1	1.13	1.20	1.23	0.86	1.91	1.46	0.07	0.05	0.01
RFS/Celwave	APXVAARR24_43-U-NA20	0.5	4.00	1.27	7.19	2.61	8.52	3.77	0.45	0.20	0.03
RFS/Celwave	APXVAARR24_43-U-NA20	0.5	4.00	1.27	7.19	2.61	8.52	3.77	0.45	0.20	0.03
Ericsson	RADIO 4449 B12/71	1	1.13	1.20	1.23	0.86	1.91	1.46	0.07	0.05	0.01
RFS/Celwave	APXV18-209014-C	0.5	8.03	1.43	1.09	0.53	1.77	1.17	0.08	0.05	0.01
RFS/Celwave	APXV18-209014-C	0.5	8.03	1.43	1.09	0.53	1.77	1.17	0.08	0.05	0.01
Ericsson	RADIO 4449 B12/71	1	1.13	1.20	1.23	0.86	1.91	1.46	0.07	0.05	0.01
RFS/Celwave	APXVAARR24_43-U-NA20	0.5	4.00	1.27	7.19	2.61	8.52	3.77	0.45	0.20	0.03
RFS/Celwave	APXVAARR24_43-U-NA20	0.5	4.00	1.27	7.19	2.61	8.52	3.77	0.45	0.20	0.03
Ericsson	KRY 112 489/2	1	1.80	1.20	0.42	0.27	0.86	0.67	0.03	0.02	0.00
RFS/Celwave	APXV18-209014-C	0.5	8.03	1.43	1.09	0.53	1.77	1.17	0.08	0.05	0.01
RFS/Celwave	APXV18-209014-C	0.5	8.03	1.43	1.09	0.53	1.77	1.17	0.08	0.05	0.01
Ericsson	KRY 112 489/2	1	1.80	1.20	0.42	0.27	0.86	0.67	0.03	0.02	0.00
RFS/Celwave	APXVAARR24_43-U-NA20	0.5	4.00	1.27	7.19	2.61	8.52	3.77	0.45	0.20	0.03
RFS/Celwave	APXVAARR24_43-U-NA20	0.5	4.00	1.27	7.19	2.61	8.52	3.77	0.45	0.20	0.03
Ericsson	KRY 112 489/2	1	1.80	1.20	0.42	0.27	0.86	0.67	0.03	0.02	0.00

APPENDIX C
SOFTWARE ANALYSIS OUTPUT

Hot Rolled Steel Properties

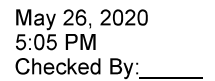
	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/f...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
3	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154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

Hot Rolled Steel Section Sets

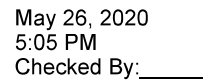
	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	MF-H1	PIPE 3.0	Beam	Pipe	A53 Gr.B	Typical	2.07	2.85	2.85	5.69
2	MF-P1	PIPE 2.0	Column	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
3	F1-S1	HSS4X4X4	Beam	Tube	A500 Gr....	Typical	3.37	7.8	7.8	12.8
4	MF-P2	PIPE 2.5	Column	Pipe	A53 Gr.B	Typical	1.61	1.45	1.45	2.89

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Dead	DL		-1			30			
2	0 Wind - No Ice	WLZ					30	18		
3	90 Wind - No Ice	WLX					30	18		
4	0 Wind - Ice	WLZ					30	18		
5	90 Wind - Ice	WLX					30	18		
6	0 Wind - Service	WLZ					30	18		
7	90 Wind - Service	WLX					30	18		
8	Ice	OL1					30	18		
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					1			
17	Maint LL 5	LL					1			
18	Maint LL 6	LL					1			
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	Maint LL 19	LL								
32	Maint LL 20	LL								
33	Maint LL 21	LL								
34	Maint LL 22	LL								
35	Maint LL 23	LL								
36	Maint LL 24	LL								



RISA-3D Version 17.0.2 [S:\...\136377_002_01_Oxford-Quaker Farms_CT (Original).r3d] Page 2

[illegible]

	Label	Conn Type	Type	Beam Conn	Col/Girder Conn
1	Col/Bm Clip Angle	Shear	Column/Beam Clip Double Angle Shear	Welded	Bolted
2	Col/Bm Shear Tab	Shear	Column/Beam Shear Tab Shear	Bolted	N/A
3	Girder/Bm Clip Angle	Shear	Girder/Beam Clip Single Angle Shear	Welded	Bolted
4	Girder/Bm Shear Tab	Shear	Girder/Beam Shear Tab Shear	Bolted	N/A
5	Flange Plate Moment	Moment	Column/Beam Flange Plate Moment	Bolted	N/A
6	End-Plate Moment	Moment	Column/Beam Extended End-Plate Moment	N/A	N/A
7	Col Shear Splice	Shear	Column Shear Tab Splice	N/A	N/A
8	Col Moment Splice	Moment	Column Moment Plate Splice	N/A	N/A
9	Diagonal Brace	Brace	Diagonal Vertical Brace	N/A	N/A
10	Chevron Brace	Brace	Chevron Vertical Brace	N/A	N/A

Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad...]
No Data to Print ...			

Member Point Loads (BLC 1 : Dead)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Y	-.009	%5
2	M2	Y	-.009	%65
3	M2	Y	-.075	%50
4	M2	Y	0	0
5	M2	Y	0	0
6	M1	Y	-.064	%10
7	M1	Y	-.064	%95
8	M1	Y	-.075	%40
9	M1	Y	0	0
10	M1	Y	0	0
11	M14	Y	-.009	%5
12	M14	Y	-.009	%65
13	M14	Y	-.075	%50
14	M14	Y	0	0
15	M14	Y	0	0
16	M13	Y	-.064	%10
17	M13	Y	-.064	%95
18	M13	Y	-.015	%40
19	M13	Y	0	0
20	M13	Y	0	0
21	M8	Y	-.009	%5
22	M8	Y	-.009	%65
23	M8	Y	-.015	%50
24	M8	Y	0	0
25	M8	Y	0	0
26	M7	Y	-.064	%10
27	M7	Y	-.064	%95
28	M7	Y	-.015	%40
29	M7	Y	0	0
30	M7	Y	0	0

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Z	-.078	%5
2	M2	Z	-.078	%65
3	M2	Z	-.074	%50
4	M2	Z	0	0
5	M2	Z	0	0
6	M1	Z	-.454	%10
7	M1	Z	-.454	%95
8	M1	Z	-.074	%40
9	M1	Z	0	0
10	M1	Z	0	0
11	M14	Z	-.078	%5
12	M14	Z	-.078	%65
13	M14	Z	-.074	%50
14	M14	Z	0	0
15	M14	Z	0	0
16	M13	Z	-.454	%10
17	M13	Z	-.454	%95
18	M13	Z	-.025	%40
19	M13	Z	0	0
20	M13	Z	0	0
21	M8	Z	-.078	%5
22	M8	Z	-.078	%65

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft, %]
23	M8	Z	-.025	%50
24	M8	Z	0	0
25	M8	Z	0	0
26	M7	Z	-.454	%10
27	M7	Z	-.454	%95
28	M7	Z	-.025	%40
29	M7	Z	0	0
30	M7	Z	0	0

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft, %]
1	M2	X	-.045	%5
2	M2	X	-.045	%65
3	M2	X	-.052	%50
4	M2	X	0	0
5	M2	X	0	0
6	M1	X	-.2	%10
7	M1	X	-.2	%95
8	M1	X	-.052	%40
9	M1	X	0	0
10	M1	X	0	0
11	M14	X	-.045	%5
12	M14	X	-.045	%65
13	M14	X	-.052	%50
14	M14	X	0	0
15	M14	X	0	0
16	M13	X	-.2	%10
17	M13	X	-.2	%95
18	M13	X	-.016	%40
19	M13	X	0	0
20	M13	X	0	0
21	M8	X	-.045	%5
22	M8	X	-.045	%65
23	M8	X	-.016	%50
24	M8	X	0	0
25	M8	X	0	0
26	M7	X	-.2	%10
27	M7	X	-.2	%95
28	M7	X	-.016	%40
29	M7	X	0	0
30	M7	X	0	0

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft, %]
1	M2	Z	-.013	%5
2	M2	Z	-.013	%65
3	M2	Z	-.012	%50
4	M2	Z	0	0
5	M2	Z	0	0
6	M1	Z	-.073	%10
7	M1	Z	-.073	%95
8	M1	Z	-.012	%40
9	M1	Z	0	0
10	M1	Z	0	0
11	M14	Z	-.013	%5
12	M14	Z	-.013	%65

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
13	M14	Z	-.012	%50
14	M14	Z	0	0
15	M14	Z	0	0
16	M13	Z	-.073	%10
17	M13	Z	-.073	%95
18	M13	Z	-.004	%40
19	M13	Z	0	0
20	M13	Z	0	0
21	M8	Z	-.013	%5
22	M8	Z	-.013	%65
23	M8	Z	-.004	%50
24	M8	Z	0	0
25	M8	Z	0	0
26	M7	Z	-.073	%10
27	M7	Z	-.073	%95
28	M7	Z	-.004	%40
29	M7	Z	0	0
30	M7	Z	0	0

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	X	-.007	%5
2	M2	X	-.007	%65
3	M2	X	-.008	%50
4	M2	X	0	0
5	M2	X	0	0
6	M1	X	-.032	%10
7	M1	X	-.032	%95
8	M1	X	-.008	%40
9	M1	X	0	0
10	M1	X	0	0
11	M14	X	-.007	%5
12	M14	X	-.007	%65
13	M14	X	-.008	%50
14	M14	X	0	0
15	M14	X	0	0
16	M13	X	-.032	%10
17	M13	X	-.032	%95
18	M13	X	-.003	%40
19	M13	X	0	0
20	M13	X	0	0
21	M8	X	-.007	%5
22	M8	X	-.007	%65
23	M8	X	-.003	%50
24	M8	X	0	0
25	M8	X	0	0
26	M7	X	-.032	%10
27	M7	X	-.032	%95
28	M7	X	-.003	%40
29	M7	X	0	0
30	M7	X	0	0

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Z	-.004	%5
2	M2	Z	-.004	%65

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

	Member Label	Direction	Magnitude[k.k-ft]	Location[ft,%]
3	M2	Z	-.004	%50
4	M2	Z	0	0
5	M2	Z	0	0
6	M1	Z	-.026	%10
7	M1	Z	-.026	%95
8	M1	Z	-.004	%40
9	M1	Z	0	0
10	M1	Z	0	0
11	M14	Z	-.004	%5
12	M14	Z	-.004	%65
13	M14	Z	-.004	%50
14	M14	Z	0	0
15	M14	Z	0	0
16	M13	Z	-.026	%10
17	M13	Z	-.026	%95
18	M13	Z	-.001	%40
19	M13	Z	0	0
20	M13	Z	0	0
21	M8	Z	-.004	%5
22	M8	Z	-.004	%65
23	M8	Z	-.001	%50
24	M8	Z	0	0
25	M8	Z	0	0
26	M7	Z	-.026	%10
27	M7	Z	-.026	%95
28	M7	Z	-.001	%40
29	M7	Z	0	0
30	M7	Z	0	0

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

	Member Label	Direction	Magnitude[k.k-ft]	Location[ft,%]
1	M2	X	-.003	%5
2	M2	X	-.003	%65
3	M2	X	-.003	%50
4	M2	X	0	0
5	M2	X	0	0
6	M1	X	-.011	%10
7	M1	X	-.011	%95
8	M1	X	-.003	%40
9	M1	X	0	0
10	M1	X	0	0
11	M14	X	-.003	%5
12	M14	X	-.003	%65
13	M14	X	-.003	%50
14	M14	X	0	0
15	M14	X	0	0
16	M13	X	-.011	%10
17	M13	X	-.011	%95
18	M13	X	-.0009	%40
19	M13	X	0	0
20	M13	X	0	0
21	M8	X	-.003	%5
22	M8	X	-.003	%65
23	M8	X	-.0009	%50
24	M8	X	0	0
25	M8	X	0	0

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft, %]
26	M7	X	-.011	%10
27	M7	X	-.011	%95
28	M7	X	-.0009	%40
29	M7	X	0	0
30	M7	X	0	0

Member Point Loads (BLC 8 : Ice)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft, %]
1	M2	Y	-.042	%5
2	M2	Y	-.042	%65
3	M2	Y	-.047	%50
4	M2	Y	0	0
5	M2	Y	0	0
6	M1	Y	-.229	%10
7	M1	Y	-.229	%95
8	M1	Y	-.047	%40
9	M1	Y	0	0
10	M1	Y	0	0
11	M14	Y	-.042	%5
12	M14	Y	-.042	%65
13	M14	Y	-.047	%50
14	M14	Y	0	0
15	M14	Y	0	0
16	M13	Y	-.229	%10
17	M13	Y	-.229	%95
18	M13	Y	-.017	%40
19	M13	Y	0	0
20	M13	Y	0	0
21	M8	Y	-.042	%5
22	M8	Y	-.042	%65
23	M8	Y	-.017	%50
24	M8	Y	0	0
25	M8	Y	0	0
26	M7	Y	-.229	%10
27	M7	Y	-.229	%95
28	M7	Y	-.017	%40
29	M7	Y	0	0
30	M7	Y	0	0

Member Point Loads (BLC 13 : Maint LL 1)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft, %]
1	M3	Y	-.25	%5

Member Point Loads (BLC 14 : Maint LL 2)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft, %]
1	M3	Y	-.25	%95

Member Point Loads (BLC 15 : Maint LL 3)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft, %]
1	M15	Y	-.25	%5

Member Point Loads (BLC 16 : Maint LL 4)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft, %]
1	M15	Y	-.25	%95

Member Point Loads (BLC 17 : Maint LL 5)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft, %]
1	M9	Y	-.25	%5

Member Point Loads (BLC 18 : Maint LL 6)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft, %]
1	M9	Y	-.25	%95

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

	Member Label	Direction	Start Magnitude[k/ft,F...]	End Magnitude[k/ft,F...]	Start Location[ft, %]	End Location[ft, %]
1	M1	Z	-.013	-.013	0	0
2	M2	Z	-.011	-.011	0	0
3	M3	Z	-.01	-.01	0	0
4	M6	Z	-.018	-.018	0	0
5	M7	Z	-.013	-.013	0	0
6	M8	Z	-.011	-.011	0	0
7	M9	Z	-.01	-.01	0	0
8	M12	Z	-.018	-.018	0	0
9	M13	Z	-.013	-.013	0	0
10	M14	Z	-.011	-.011	0	0
11	M15	Z	-.01	-.01	0	0
12	M18	Z	-.018	-.018	0	0
13	M19	Z	-.01	-.01	0	0
14	M22	Z	-.018	-.018	0	0
15	M23	Z	-.01	-.01	0	0
16	M26	Z	-.018	-.018	0	0
17	M27	Z	-.01	-.01	0	0
18	M30	Z	-.018	-.018	0	0

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

	Member Label	Direction	Start Magnitude[k/ft,F...]	End Magnitude[k/ft,F...]	Start Location[ft, %]	End Location[ft, %]
1	M1	X	-.013	-.013	0	0
2	M2	X	-.011	-.011	0	0
3	M3	X	-.01	-.01	0	0
4	M6	X	-.018	-.018	0	0
5	M7	X	-.013	-.013	0	0
6	M8	X	-.011	-.011	0	0
7	M9	X	-.01	-.01	0	0
8	M12	X	-.018	-.018	0	0
9	M13	X	-.013	-.013	0	0
10	M14	X	-.011	-.011	0	0
11	M15	X	-.01	-.01	0	0
12	M18	X	-.018	-.018	0	0
13	M19	X	-.01	-.01	0	0
14	M22	X	-.018	-.018	0	0
15	M23	X	-.01	-.01	0	0
16	M26	X	-.018	-.018	0	0
17	M27	X	-.01	-.01	0	0
18	M30	X	-.018	-.018	0	0

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

	Member Label	Direction	Start Magnitude[k/ft,F...]	End Magnitude[k/ft,F...]	Start Location[ft, %]	End Location[ft, %]
1	M1	Z	-.002	-.002	0	0
2	M2	Z	-.002	-.002	0	0
3	M3	Z	-.003	-.003	0	0
4	M6	Z	-.008	-.008	0	0

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

	Member Label	Direction	Start Magnitude[k/ft.F...	End Magnitude[k/ft.F...	Start Location[ft.%]	End Location[ft.%]
5	M7	Z	-0.002	-0.002	0	0
6	M8	Z	-0.002	-0.002	0	0
7	M9	Z	-0.003	-0.003	0	0
8	M12	Z	-0.008	-0.008	0	0
9	M13	Z	-0.002	-0.002	0	0
10	M14	Z	-0.002	-0.002	0	0
11	M15	Z	-0.003	-0.003	0	0
12	M18	Z	-0.008	-0.008	0	0
13	M19	Z	-0.003	-0.003	0	0
14	M22	Z	-0.008	-0.008	0	0
15	M23	Z	-0.003	-0.003	0	0
16	M26	Z	-0.008	-0.008	0	0
17	M27	Z	-0.003	-0.003	0	0
18	M30	Z	-0.008	-0.008	0	0

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

	Member Label	Direction	Start Magnitude[k/ft.F...	End Magnitude[k/ft.F...	Start Location[ft.%]	End Location[ft.%]
1	M1	X	-0.002	-0.002	0	0
2	M2	X	-0.002	-0.002	0	0
3	M3	X	-0.003	-0.003	0	0
4	M6	X	-0.008	-0.008	0	0
5	M7	X	-0.002	-0.002	0	0
6	M8	X	-0.002	-0.002	0	0
7	M9	X	-0.003	-0.003	0	0
8	M12	X	-0.008	-0.008	0	0
9	M13	X	-0.002	-0.002	0	0
10	M14	X	-0.002	-0.002	0	0
11	M15	X	-0.003	-0.003	0	0
12	M18	X	-0.008	-0.008	0	0
13	M19	X	-0.003	-0.003	0	0
14	M22	X	-0.008	-0.008	0	0
15	M23	X	-0.003	-0.003	0	0
16	M26	X	-0.008	-0.008	0	0
17	M27	X	-0.003	-0.003	0	0
18	M30	X	-0.008	-0.008	0	0

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

	Member Label	Direction	Start Magnitude[k/ft.F...	End Magnitude[k/ft.F...	Start Location[ft.%]	End Location[ft.%]
1	M1	Z	-0.0004	-0.0004	0	0
2	M2	Z	-0.0003	-0.0003	0	0
3	M3	Z	-0.0005	-0.0005	0	0
4	M6	Z	-0.001	-0.001	0	0
5	M7	Z	-0.0004	-0.0004	0	0
6	M8	Z	-0.0003	-0.0003	0	0
7	M9	Z	-0.0005	-0.0005	0	0
8	M12	Z	-0.001	-0.001	0	0
9	M13	Z	-0.0004	-0.0004	0	0
10	M14	Z	-0.0003	-0.0003	0	0
11	M15	Z	-0.0005	-0.0005	0	0
12	M18	Z	-0.001	-0.001	0	0
13	M19	Z	-0.0005	-0.0005	0	0
14	M22	Z	-0.001	-0.001	0	0
15	M23	Z	-0.0005	-0.0005	0	0
16	M26	Z	-0.001	-0.001	0	0
17	M27	Z	-0.0005	-0.0005	0	0
18	M30	Z	-0.001	-0.001	0	0

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

	Member Label	Direction	Start Magnitude[k/ft,F...	End Magnitude[k/ft,F...	Start Location[ft, %]	End Location[ft, %]
1	M1	X	-0.004	-0.004	0	0
2	M2	X	-0.003	-0.003	0	0
3	M3	X	-0.005	-0.005	0	0
4	M6	X	-0.001	-0.001	0	0
5	M7	X	-0.004	-0.004	0	0
6	M8	X	-0.003	-0.003	0	0
7	M9	X	-0.005	-0.005	0	0
8	M12	X	-0.001	-0.001	0	0
9	M13	X	-0.004	-0.004	0	0
10	M14	X	-0.003	-0.003	0	0
11	M15	X	-0.005	-0.005	0	0
12	M18	X	-0.001	-0.001	0	0
13	M19	X	-0.005	-0.005	0	0
14	M22	X	-0.001	-0.001	0	0
15	M23	X	-0.005	-0.005	0	0
16	M26	X	-0.001	-0.001	0	0
17	M27	X	-0.005	-0.005	0	0
18	M30	X	-0.001	-0.001	0	0

Member Distributed Loads (BLC 8 : Ice)

	Member Label	Direction	Start Magnitude[k/ft,F...	End Magnitude[k/ft,F...	Start Location[ft, %]	End Location[ft, %]
1	M1	Y	-0.01	-0.01	0	0
2	M2	Y	-0.009	-0.009	0	0
3	M3	Y	-0.011	-0.011	0	0
4	M6	Y	-0.016	-0.016	0	0
5	M7	Y	-0.01	-0.01	0	0
6	M8	Y	-0.009	-0.009	0	0
7	M9	Y	-0.011	-0.011	0	0
8	M12	Y	-0.016	-0.016	0	0
9	M13	Y	-0.01	-0.01	0	0
10	M14	Y	-0.009	-0.009	0	0
11	M15	Y	-0.011	-0.011	0	0
12	M18	Y	-0.016	-0.016	0	0
13	M19	Y	-0.011	-0.011	0	0
14	M22	Y	-0.016	-0.016	0	0
15	M23	Y	-0.011	-0.011	0	0
16	M26	Y	-0.016	-0.016	0	0
17	M27	Y	-0.011	-0.011	0	0
18	M30	Y	-0.016	-0.016	0	0

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N1	-2	-3.9	2.287827	0	
2	N2	-2	5.1	2.287827	0	
3	N3	-2	0.	2.287827	0	
4	N4	-2.5	0.	2.043035	0	
5	N5	2	0.	2.287827	0	
6	N6	2.5	0.	2.043035	0	
7	N7	2	3.7	2.287827	0	
8	N8	2	-1.3	2.287827	0	
9	N9	-2	0.	2.043035	0	
10	N10	2	0.	2.043035	0	
11	N11	0	0	2.043035	0	
12	N12	0	0	1.443035	0	
13	N13	0	0	0	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
14	N14	2.981316	-4.8	0.588138	0	
15	N15	2.981316	4.2	0.588138	0	
16	N16	2.981316	0.	0.588138	0	
17	N17	3.01932	0.	1.143546	0	
18	N18	0.981316	0.	-2.875964	0	
19	N19	0.51932	0.	-3.186581	0	
20	N20	0.981316	3.8	-2.875964	0	
21	N21	0.981316	-1.2	-2.875964	0	
22	N22	2.76932	0.	0.710533	0	
23	N23	0.76932	0.	-2.753568	0	
24	N24	1.76932	0	-1.021518	0	
25	N25	1.249705	0	-0.721518	0	
26	N27	-0.981316	-4.1	-2.875964	0	
27	N28	-0.981316	4.9	-2.875964	0	
28	N29	-0.981316	0.	-2.875964	0	
29	N30	-0.51932	0.	-3.186581	0	
30	N31	-2.981316	0.	0.588138	0	
31	N32	-3.01932	0.	1.143546	0	
32	N33	-2.981316	3.7	0.588138	0	
33	N34	-2.981316	-1.3	0.588138	0	
34	N35	-0.76932	0.	-2.753568	0	
35	N36	-2.76932	0.	0.710533	0	
36	N37	-1.76932	0	-1.021518	0	
37	N38	-1.249705	0	-0.721518	0	
38	N38A	-2	2	2.287827	0	
39	N39	-2.5	2	2.043035	0	
40	N40	2	2	2.287827	0	
41	N41	2.5	2	2.043035	0	
42	N42	-2	2	2.043035	0	
43	N43	2	2	2.043035	0	
44	N44	0	2	2.043035	0	
45	N45	0	2	1.443035	0	
46	N46	0	2	0	0	
47	N47	2.981316	2	0.588138	0	
48	N48	3.01932	2	1.143546	0	
49	N49	0.981316	2	-2.875964	0	
50	N50	0.51932	2	-3.186581	0	
51	N51	2.76932	2	0.710533	0	
52	N52	0.76932	2	-2.753568	0	
53	N53	1.76932	2	-1.021518	0	
54	N54	1.249705	2	-0.721518	0	
55	N55	-0.981316	2	-2.875964	0	
56	N56	-0.51932	2	-3.186581	0	
57	N57	-2.981316	2	0.588138	0	
58	N58	-3.01932	2	1.143546	0	
59	N59	-0.76932	2	-2.753568	0	
60	N60	-2.76932	2	0.710533	0	
61	N61	-1.76932	2	-1.021518	0	
62	N62	-1.249705	2	-0.721518	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot,[k-ft/rad]	Y Rot,[k-ft/rad]	Z Rot,[k-ft/rad]
1	N1						
2	N14						
3	N27						

Joint Boundary Conditions (Continued)

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
4	N12	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
5	N38	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
6	N25	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
7	N45	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
8	N54	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
9	N62	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N2	N1			MF-P2	Column	Pipe	A53 Gr.B	Typical
2	M2	N7	N8			MF-P1	Column	Pipe	A53 Gr.B	Typical
3	M3	N4	N6			MF-H1	Beam	Pipe	A53 Gr.B	Typical
4	M4	N3	N9			RIGID	None	None	RIGID	Typical
5	M5	N5	N10			RIGID	None	None	RIGID	Typical
6	M6	N11	N12			F1-S1	Beam	Tube	A500 Gr.B...	Typical
7	M7	N15	N14			MF-P2	Column	Pipe	A53 Gr.B	Typical
8	M8	N20	N21			MF-P1	Column	Pipe	A53 Gr.B	Typical
9	M9	N17	N19			MF-H1	Beam	Pipe	A53 Gr.B	Typical
10	M10	N16	N22			RIGID	None	None	RIGID	Typical
11	M11	N18	N23			RIGID	None	None	RIGID	Typical
12	M12	N24	N25			F1-S1	Beam	Tube	A500 Gr.B...	Typical
13	M13	N28	N27			MF-P2	Column	Pipe	A53 Gr.B	Typical
14	M14	N33	N34			MF-P1	Column	Pipe	A53 Gr.B	Typical
15	M15	N30	N32			MF-H1	Beam	Pipe	A53 Gr.B	Typical
16	M16	N29	N35			RIGID	None	None	RIGID	Typical
17	M17	N31	N36			RIGID	None	None	RIGID	Typical
18	M18	N37	N38			F1-S1	Beam	Tube	A500 Gr.B...	Typical
19	M19	N39	N41			MF-H1	Beam	Pipe	A53 Gr.B	Typical
20	M20	N38A	N42			RIGID	None	None	RIGID	Typical
21	M21	N40	N43			RIGID	None	None	RIGID	Typical
22	M22	N44	N45			F1-S1	Beam	Tube	A500 Gr.B...	Typical
23	M23	N48	N50			MF-H1	Beam	Pipe	A53 Gr.B	Typical
24	M24	N47	N51			RIGID	None	None	RIGID	Typical
25	M25	N49	N52			RIGID	None	None	RIGID	Typical
26	M26	N53	N54			F1-S1	Beam	Tube	A500 Gr.B...	Typical
27	M27	N56	N58			MF-H1	Beam	Pipe	A53 Gr.B	Typical
28	M28	N55	N59			RIGID	None	None	RIGID	Typical
29	M29	N57	N60			RIGID	None	None	RIGID	Typical
30	M30	N61	N62			F1-S1	Beam	Tube	A500 Gr.B...	Typical

Plate Primary Data

Label	A Joint	B Joint	C Joint	D Joint	Material	Thickness[in]
No Data to Print ...						

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	N12	max	.414	5	.781	18	.89	2	.424	9	1.025	3	.172	75
2		min	-.591	11	-.117	12	-.811	8	-.769	3	-1.098	9	-.326	19
3	N38	max	.495	5	.937	2	.904	2	.471	25	.579	11	.222	5
4		min	-.497	11	-.47	8	-1.034	8	-.193	7	-.625	5	-.438	11
5	N25	max	.677	5	.727	9	1.199	2	.46	7	1.34	8	.861	8
6		min	-.546	11	-.332	3	-1.083	8	-.486	13	-1.413	2	-.56	2

Envelope Joint Reactions (Continued)

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
7	N45	max	.471	5	.782	24	.614	2	.241	3	.742	3	.174	75
8		min	-.294	11	-.117	6	-.693	8	-.586	9	-.67	9	-.324	24
9	N54	max	.153	6	.728	3	.208	2	.28	79	.47	8	.688	2
10		min	-.285	12	-.332	9	-.323	8	-.14	78	-.403	2	-.386	8
11	N62	max	.354	5	.937	8	.551	2	.539	7	.37	12	.08	11
12		min	-.352	11	-.47	2	-.421	8	-.317	13	-.325	6	-.359	77
13	Totals:	max	2.547	5	4.013	25	4.366	2						
14		min	-2.547	11	1.401	4	-4.366	8						

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

Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	...	LC	phi*P...	phi*P...	phi*M...	phi*M...	Eqn
1	M1	PIPE 2.5	.456	5.156	8	.037	5.063	2	26.137	50.715	3.596	3.596	H1-1b
2	M2	PIPE 2.0	.104	3.698	75	.024	1.719	75	23.809	32.13	1.872	1.872	H1-1b
3	M3	PIPE 3.0	.236	2.5	8	.189	2.5	2	57.037	65.205	5.749	5.749	H1-1b
4	M6	HSS4X4X4	.114	.6	3	.044	.6	y 19	139.3...	139.5...	16.181	16.181	H1-1b
5	M7	PIPE 2.5	.588	4.219	8	.085	4.125	2	26.137	50.715	3.596	3.596	H1-1b
6	M8	PIPE 2.0	.090	3.75	79	.021	1.823	79	23.809	32.13	1.872	1.872	H1-1b
7	M9	PIPE 3.0	.206	.521	9	.182	2.5	7	57.037	65.205	5.749	5.749	H1-1b
8	M12	HSS4X4X4	.144	.6	8	.041	.6	y 22	139.3...	139.5...	16.181	16.181	H1-1b
9	M13	PIPE 2.5	.482	4.969	2	.037	4.875	9	26.137	50.715	3.596	3.596	H1-1b
10	M14	PIPE 2.0	.106	3.698	77	.024	1.719	77	23.809	32.13	1.872	1.872	H1-1b
11	M15	PIPE 3.0	.198	.521	2	.134	2.5	3	57.037	65.205	5.749	5.749	H1-1b
12	M18	HSS4X4X4	.069	.6	11	.045	.6	y 2	139.3...	139.5...	16.181	16.181	H1-1b
13	M19	PIPE 3.0	.180	2.5	2	.112	2.5	2	57.037	65.205	5.749	5.749	H1-1b
14	M22	HSS4X4X4	.080	.6	9	.044	.6	y 24	139.3...	139.5...	16.181	16.181	H1-1b
15	M23	PIPE 3.0	.136	.521	3	.056	2.5	2	57.037	65.205	5.749	5.749	H1-1b
16	M26	HSS4X4X4	.061	.6	2	.050	.6	y 3	139.3...	139.5...	16.181	16.181	H1-1b
17	M27	PIPE 3.0	.163	.521	8	.076	2.5	9	57.037	65.205	5.749	5.749	H1-1b
18	M30	HSS4X4X4	.050	.6	6	.053	.6	y 8	139.3...	139.5...	16.181	16.181	H1-1b

APPENDIX D
MOUNT MODIFICATION DESIGN DRAWINGS (MDD)

MODIFICATIONS BASED ON THE FAILING
STRUCTURAL ANALYSIS FROM B+T GROUP
DATED 07/02/19 AND ACCOMPANIED BY
ANALYSIS FROM B+T GROUP DATED 05/23/20

B+T GRP

1777 S BOULDER
TULSA, OK 74119
PH: (918) 587-4830
www.b+trp.com

Mobile

CROWN CASTLE

OXFORD -
QUAKER FARMS

85 QUAKER FARMS ROAD
OXFORD, CT 06478
NEW HAVEN
EXISTING TOWER
AT 129'00"

PROJECT NO: 13637.005.01

CHECKED BY: NKM

ISSUED FOR:			
REV	DATE	DRWN	DESCRIPTION
0	05/23/20	PMS	CONSTRUCTION

B&T ENGINEERING, INC.

31627
PROFESSIONAL ENGINEER
Expires 10/31/20

STATE OF CONNECTICUT
SCOTT S VANCE
31627
PROFESSIONAL ENGINEER
12/1/20

IF A VARIATION OF ANY KIND HAS OCCURRED
FROM THE ORIGINAL DESIGN, THE CONTRACTOR
UNLESS THEY ARE ACTING UNDER THE DIRECTION
OF A LICENSED PROFESSIONAL ENGINEER,
MAY NOT BE RESPONSIBLE FOR THE CONSEQUENCES
OF A FAILURE OF THE STRUCTURE.

SHEET NUMBER: S1

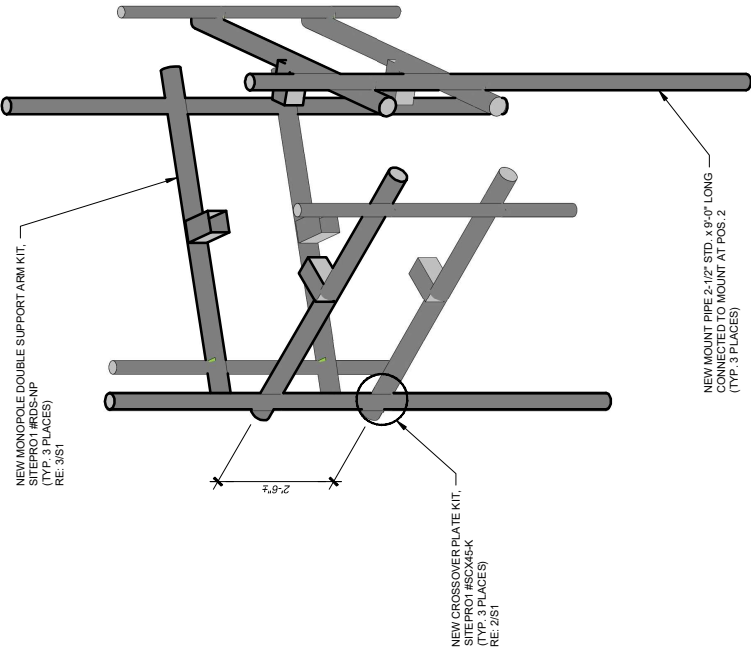
REVISION: 0

GENERAL NOTES

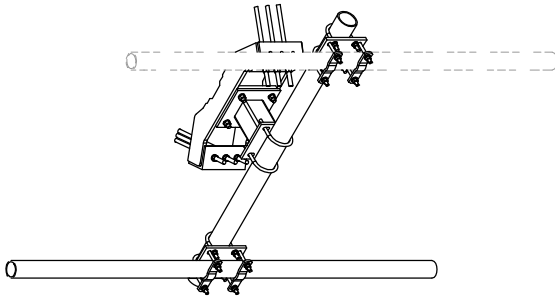
- CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS AND DIMENSIONS PRIOR TO THE MOBILIZATION ON THE SITE FOR INSTALLATION OF THE MOUNT MODIFICATION AND SHALL NOTIFY THE ENGINEER OF RECORD IF THE FIELD CONDITIONS VARY FROM WHAT IS SHOWN ON THE DRAWINGS. IN ADDITION, THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF RECORD PRIOR TO MOBILIZING AT THE SITE IF THE MOUNT BEING PERFORMED SHOWS ANY DEFECTS OR DAMAGE THAT MAY REQUIRE MODIFICATION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF RECORD PRIOR TO MOBILIZING AT THE SITE IF THE MOUNT BEING PERFORMED SHOWS ANY DEFECTS OR DAMAGE THAT MAY REQUIRE MODIFICATION.
- CONTRACTOR SHALL RELOCATE NON-ANTENNA EQUIPMENT ALONG THE EXISTING PIPE MOUNT THAT IT IS MOUNTED TO, TO ALLOW FOR THE INSTALLATION OF THE NEW MOUNT. THE CONTRACTOR SHALL RELOCATE ANY EQUIPMENT THAT MAY BE DAMAGED BY THE MOUNT MODIFICATION. THE CONTRACTOR SHALL RELOCATE ANY EQUIPMENT THAT MAY BE DAMAGED BY THE MOUNT MODIFICATION.
- INSTALLATION OF MOUNT MODIFICATION.
- MODIFICATION SHALL BE COMPLETED PRIOR TO ADDING THE NEW MOUNT TO THE EXISTING MOUNT.
- ALL WORK SHALL COMPLY WITH THE TIA-222-H STANDARD, ANSI/TIA-322 AND ANSI/ASSE A10.48, AS WELL AS ANY OTHER GOVERNING BUILDING CODES.
- FIELD WORK WILL BE DONE AROUND EXISTING COAXIAL CABLE AND EQUIPMENT. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE TIA-222-H STANDARD, ANSI/TIA-322 AND ANSI/ASSE A10.48, AS WELL AS ANY OTHER GOVERNING BUILDING CODES.
- A MINIMUM OF TWO COATS OF ZINC COLD GALVANIZING COMPOUND (OR APPROVED EQUIVALENT) SHALL BE APPLIED TO ANY FIELD CUTS OR FIELD DRILLED HOLES.
- THE USE OF ANY TOOL OR WELDER WILL NOT BE PERMITTED ON THE TOWER WITHOUT THE CONSENT OF THE OWNER.
- ALL FIELD CONNECTIONS SHALL BE MADE WITH A325N BOLTS, U.N.O. IN LIEU OF TEMPORARY BRACING, CONTRACTOR MAY HAVE A STABILITY ANALYSIS PERFORMED BY AN ENGINEER LICENSED IN THE STATE OF CONNECTICUT. THE ANALYSIS SHALL BE BASED ON A MINIMUM WIND SPEED OF 40 MPH (AS PER ASCE 7-10) AND AN ASSUMED 10% OVERSTRESS.
- ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CCUSA POLICY "CUTTING AND WELDING PLAN" (DOC #ENG-PIN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE PROJECT.
- ALL DIMENSIONS WITHIN 3" OF THE INDICATED DIMENSION.

FABRICATION

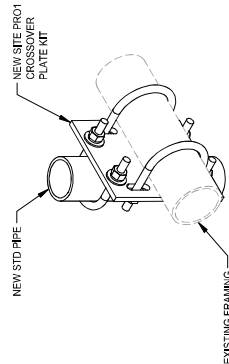
- ALL WORK SHALL BE DONE IN ACCORDANCE WITH A.I.S.C. "SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
- STRUCTURAL STEEL SHALL MEET THE FOLLOWING SPECIFICATIONS:
FIELD
ASTM A572 GR50
STEEL PIPE U.N.O.
- ALL NEW MATERIAL INCLUDING STRUCTURAL STEEL AND FASTENERS SHALL BE SUPPLIED BY THE CONTRACTOR AND FABRICATED IN ACCORDANCE WITH ASTM A133 AND A133.
- WELDING SHALL MEET ANSI/AWS D1.1 STRUCTURAL WELDING CODE (LATEST REVISION). ELECTRODES SHALL BE E60 SERIES.
- CONTRACTOR SHALL PROVIDE SHOP FABRICATION DRAWINGS TO B+T GROUP 5 DAYS PRIOR TO FABRICATION.



1 MODIFIED T-ARM MOUNT
SCALE: N.T.S.



3 SITE PRO1 RDS-NP DOUBLE SUPPORT ARM KIT WITH NEW RING MOUNT
SCALE: N.T.S.



2 SITE PRO1 SCX45-K CROSSOVER PLATE KIT
SCALE: N.T.S.

Exhibit F

Power Density/RF Emissions Report

Transcom Engineering, Inc.

Wireless Network Design and Deployment

Radio Frequency Emissions Analysis Report

T-MOBILE Existing Facility

Site ID: CTNH211B

NH211/Quaker Farms_Collo
85 Quaker Farms Road
Oxford, CT 06478

June 1, 2019

Transcom Engineering Project Number: 737001-0116

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	7.79 %

Transcom Engineering, Inc.

Wireless Network Design and Deployment

June 1, 2019

T-MOBILE

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

Emissions Analysis for Site: **CTNH211B – NH211/Quaker Farms_Collo**

Transcom Engineering, Inc (“Transcom”) was directed to analyze the proposed upgrades to the T-MOBILE facility located at **85 Quaker Farms Road, Oxford, 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The number of $\mu\text{W}/\text{cm}^2$ 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 ($\mu\text{W}/\text{cm}^2$). The general population exposure limits for the 600 & 700 MHz bands are approximately $400 \mu\text{W}/\text{cm}^2$ and $467 \mu\text{W}/\text{cm}^2$ respectively. The general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) bands is $1000 \mu\text{W}/\text{cm}^2$. 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.

Transcom Engineering, Inc.

Wireless Network Design and Deployment

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.

Transcom Engineering, Inc.

Wireless Network Design and Deployment

CALCULATIONS

Calculations were performed for the proposed upgrades to the T-MOBILE antenna facility located at **85 Quaker Farms Road, Oxford, 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

Transcom Engineering, Inc.

Wireless Network Design and Deployment

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 APXV18-209014-C-A20	129
A	2	RFS APXVAARR24 43-U-NA20	129
B	1	RFS APXV18-209014-C-A20	129
B	2	RFS APXVAARR24 43-U-NA20	129
C	1	RFS APXV18-209014-C-A20	129
C	2	RFS APXVAARR24 43-U-NA20	129

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 **2.16 dB** of cable loss calculated into the system gains / losses for this site. These values were calculated based upon the manufacturers specifications for **210 feet** of **1-5/8"** coax.

Transcom Engineering, Inc.

Wireless Network Design and Deployment

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 APXV18-209014-C-A20	1900 MHz (PCS)	14.35	5	175	2,897.60	0.69
Antenna A2	RFS APXVAARR24 43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	1.38
Sector A Composite MPE%							2.07
Antenna B1	RFS APXV18-209014-C-A20	1900 MHz (PCS)	14.35	5	175	2,897.60	0.69
Antenna B2	RFS APXVAARR24 43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	1.38
Sector B Composite MPE%							2.07
Antenna C1	RFS APXV18-209014-C-A20	1900 MHz (PCS)	14.35	5	175	2,897.60	0.69
Antenna C2	RFS APXVAARR24 43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	1.38
Sector C Composite MPE%							2.07

Table 3: T-MOBILE Emissions Levels

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Wireless Network Design and Deployment

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

Site Composite MPE%	
Carrier	MPE%
T-MOBILE – Max Per Sector Value	2.07 %
AT&T	2.61 %
Verizon Wireless	3.11 %
Site Total MPE %:	7.79 %

Table 4: All Carrier MPE Contributions

T-MOBILE Sector A Total:	2.07 %
T-MOBILE Sector B Total:	2.07 %
T-MOBILE Sector C Total:	2.07 %
Site Total:	7.79 %

Table 5: Site MPE Summary

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Wireless Network Design and Deployment

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 ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
T-Mobile 1900 MHz (PCS) LTE	4	662.31	129	6.30	1900 MHz (PCS)	1000	0.63%
T-Mobile 1900 MHz (PCS) GSM	1	248.37	129	0.59	1900 MHz (PCS)	1000	0.06%
T-Mobile 600 MHz LTE / 5G NR	2	788.97	129	3.75	600 MHz	400	0.94%
T-Mobile 700 MHz LTE	2	432.54	129	2.06	700 MHz	467	0.44%
						Total:	2.07%

Table 6: T-MOBILE Maximum Sector MPE Power Values

Transcom Engineering, Inc.

Wireless Network Design and Deployment

Summary

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

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

T-MOBILE Sector	Power Density Value (%)
Sector A:	2.07 %
Sector B:	2.07 %
Sector C:	2.07 %
T-MOBILE Maximum Total (per sector):	2.07 %
Site Total:	7.79 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **7.79 %** 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
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PO Box 1048
Sterling, MA 01564