



56 Prospect Street,
P.O. Box 270
Hartford, CT 06103

Kathleen M. Shanley
Manager – Transmission Siting
Tel: (860) 728-4527

January 8, 2021

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

RE: **Notice of Exempt Modification**
Eversource Site # ES-026 Stonington
Taugwonk Spur Road, Stonington, CT 06378
Latitude: 41-22-55.26 N / Longitude: 71-54-12.9 W

Dear Ms. Bachman:

The Connecticut Light and Power Company doing business as Eversource Energy ("Eversource") currently maintains multiple antennas at various mounting heights on an existing 190-foot monopole located at Taugwonk Spur Road in Stonington. The tower is owned by SBA Properties, Inc., doing business as SBA Communications Corporation ("SBA") and the property is owned by Taugwonk, LLC. See [Attachment A](#), Parcel Map and Property Card. Eversource and SBA have entered into an agreement allowing the modification of Eversource's equipment on the existing tower. See [Attachment B](#), Letter of Authorization. Eversource plans to perform the following scope of work:

- Remove one existing vacant platform at 159 feet above ground level ("AGL");
- Install one new 6-foot 7-inch diameter microwave dish, to be mounted at 155 feet AGL;
- Install one new 3-foot 8-inch tall omni-directional antenna, to be mounted at 150 feet AGL;
- Install one new 5-foot 6-inch tall dipole antenna, to be mounted at 114 feet AGL; and
- Install two new 7/8-inch diameter coaxial cables and one new elliptical waveguide cable.

There will be no changes to the fenced compound, the tower or the existing antennas on the tower. The tower and existing and proposed equipment are depicted on [Attachment C](#), Construction Drawings, dated October 20, 2020 and [Attachment D](#), Structural Analysis, dated December 22, 2020. The antennas will be mounted to the existing tower on 4-foot stand-off mounts. See [Attachment E](#), Mount Analysis. The tower was approved on May 19, 1998, prior to the Connecticut Siting Council's (the "Council") jurisdiction, by the Town of Stonington's Planning & Zoning Commission under application #PZ9820SPA. The Council approved Eversource's use of the tower under Petition No. 912 on August 27, 2009.

The proposed installation is part of Eversource's program to update the current obsolete analog voice radio communications system to a modern digital voice communications system. The new system will enable the highest level of voice communications under all operating conditions, including during critical emergency and storm restoration activities. The new radio system will also provide for remote control of distribution safety equipment.

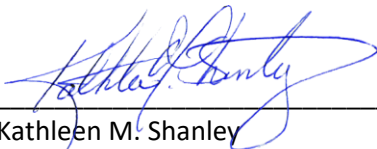
Please accept this letter as notification, pursuant to Regulations of Connecticut State Agencies ("R.C.S.A.") §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this notice is being delivered to Danielle Chesebrough, First Selectman for the Town of Stonington and Keith Brynes, AICP, CZET, Town Planner for the Town of Stonington via private carrier. Proof of delivery is attached. See Attachment E, Proof of Delivery of Notice.

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

1. There will be no change to the height of the existing tower.
2. The proposed modifications will not require 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 new antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard as shown in the attached Radio Frequency Emissions Report, dated November 3, 2020 (Attachment G – Power Density Report).
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, Eversource respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2). One original copy of this notice has been provided via courier to the Council.

Communications regarding this Notice of Exempt Modification should be directed to Kathleen Shanley at (860) 728-4527.

By: 
Kathleen M. Shanley
Manager – Transmission Siting

cc: Honorable Danielle Chesebrough, First Selectman, Town of Stonington
Keith Brynes, AICP, CZET, Town Planner, Town of Stonington
Taugwonk, LLC
SBA

Attachments

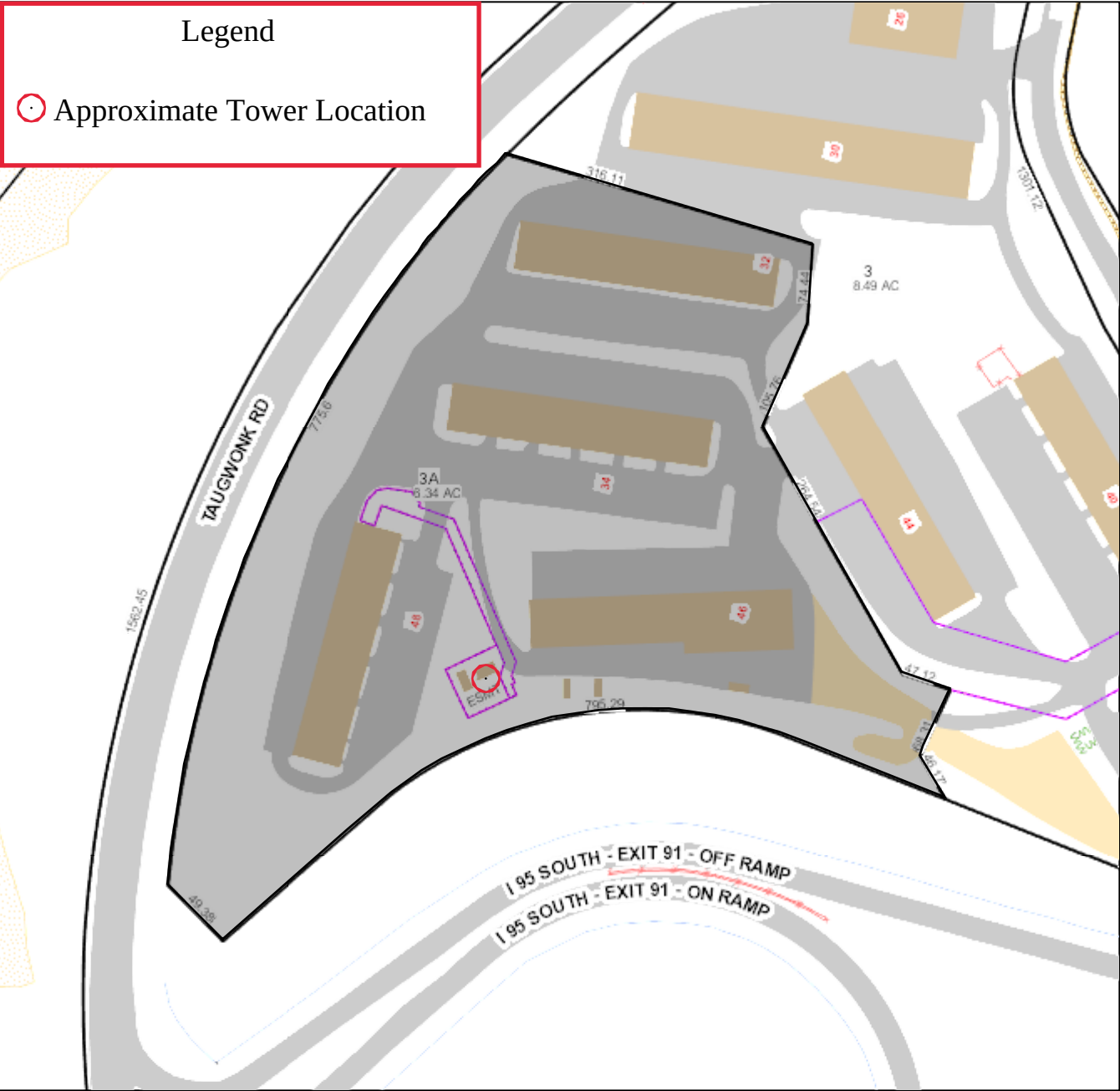
- A. Parcel Map and Property Card
- B. Letter of Authorization
- C. Construction Drawings
- D. Structural Analysis
- E. Mount Evaluation Letter
- F. Proof of Delivery of Notice
- G. Power Density Report

ATTACHMENT A – PARCEL MAP AND PROPERTY CARD

Town of Stonington
Geographic Information System (GIS)



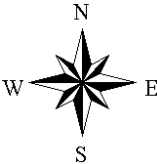
Date Printed: 5/6/2020



MAP DISCLAIMER - NOTICE OF LIABILITY

This map is for assessment purposes only. It is not for legal description or conveyances. All information is subject to verification by any user. The Town of Stonington and its mapping contractors assume no legal responsibility for the information contained herein.

Approximate Scale: 1 inch = 150 feet





Town of Stonington, CT

Property Listing Report

Map Block Lot

84-1-3A

Building # 1

Section # 1

Account

00194501

Property Information

Property Location	TAUGWONK SPUR RD
Owner	TAUGWONK LLC
Co-Owner	
Mailing Address	183 QUARRY RD MILFORD CT 06460
Land Use	3324 COM JOB SHOP(S)
Land Class	C
Zoning Code	LI-130
Census Tract	7054

Street Index	2500
Acreage	6.34
Utilities	
Lot Setting/Desc	Suburban
Survey Map #	NA
School District	
Fire District	Wequetequoock
Trash Day	TH
Polling Place (District)	3

Primary Construction Details

Year Built	2001
Stories	2
Building Style	Job Shop(s)
Building Use	Gar/Svc Statn
Building Condition	AV
Occupancy	24
Extra Fixtures	
Bath Style	NA
Kitchen Style	NA
AC Type	None
Heating Type	Hot Air-no Duc
Heating Fuel	Gas

Bedrooms	0
Full Bathrooms	0
Half Bathrooms	0
Total Rooms	0
Roof Style	Gable/Hip
Roof Cover	Asph/F Gls/Cmp
Interior Floors 1	Concr-Finished
Interior Floors 2	Carpet
Exterior Walls	Concr/Cinder
Exterior Walls 2	Vinyl Siding
Interior Walls	Minim/Masonry
Interior Walls 2	Drywall/Sheet

(*Industrial / Commercial Details)

Building Desc.	COM JOB SHOP(S)
Building Grade	Average
Heat / AC	NONE
Frame Type	MASONRY
Baths / Plumbing	AVERAGE
Ceiling / Wall	CEIL & MIN WL
Rooms / Prtns	ABOVE AVERAGE
Wall Height	10
First Floor Use	4000

Photo



Sketch



Town of Stonington, CT

Property Listing Report

Map Block Lot

84-1-3A

Building #

1

Section #

1

Account

00194501

Valuation Summary (Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings	2144800	1501300
Extras	0	0
Improvements		
Outbuildings	248900	174400
Land	417800	292500
Total	2811500	1968200

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
First Floor	9600	9600
Finished raised bsmt	9600	9600
Total Area	19200	19200

Outbuilding and Extra Features

Type	Description
PAVING-ASPHALT	75000.00 S.F.
CELL TOWER	1.00 UNIT
SHELTER	220.00 UNIT
SHELTER	180.00 UNIT
FENCE-6' CHAIN	211.00 L.F.
LIGHTS-IN W/PL	5.00 UNITS

Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
TAUGWONK LLC	0478/0229	12/14/2001	0
DAMATO INVESTMENTS LLC	0421/0081	7/7/1998	0



Town of Stonington, CT

Property Listing Report

Map Block Lot

84-1-3A

Building #

2

Section #

1

Account

00194501

Photo



Sketch



Primary Construction Details

Year Built	2001
Stories	1
Building Style	Job Shop(s)
Building Use	Gar/Svc Statn
Building Condition	AV
Occupancy	12
Extra Fixtures	
Bath Style	NA
Kitchen Style	NA
AC Type	None
Heating Type	Hot Air-no Duc
Heating Fuel	Gas

Bedrooms	0
Full Bathrooms	0
Half Bathrooms	0
Total Rooms	0
Roof Style	Gable/Hip
Roof Cover	Asph/F Gls/Cmp
Interior Floors 1	Concr-Finished
Interior Floors2	Carpet
Exterior Walls	Concr/Cinder
Exterior Walls 2	Vinyl Siding
Interior Walls	Minim/Masonry
Interior Walls 2	Drywall/Sheet

(*Industrial / Commercial Details)

Building Desc.	COM JOB SHOP(S)
Building Grade	Average
Heat / AC	NONE
Frame Type	MASONRY
Baths / Plumbing	AVERAGE
Ceiling / Wall	CEIL & MIN WL
Rooms / Prtns	ABOVE AVERAGE
Wall Height	10
First Floor Use	4000

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
First Floor	9600	9600

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Total Area	9600	9600



Town of Stonington, CT

Property Listing Report

Map Block Lot

84-1-3A

Building #

3

Section #

1

Account

00194501

Photo



Sketch



Primary Construction Details

Year Built	2001
Stories	1
Building Style	Job Shop(s)
Building Use	Gar/Svc Statn
Building Condition	AV
Occupancy	8
Extra Fixtures	
Bath Style	NA
Kitchen Style	NA
AC Type	None
Heating Type	Hot Air-no Duc
Heating Fuel	Gas

Bedrooms	0
Full Bathrooms	0
Half Bathrooms	0
Total Rooms	0
Roof Style	Gable/Hip
Roof Cover	Asph/F Gls/Cmp
Interior Floors 1	Concr-Finished
Interior Floors2	Carpet
Exterior Walls	Brick/Masonry
Exterior Walls 2	NA
Interior Walls	Minim/Masonry
Interior Walls 2	Drywall/Sheet

(*Industrial / Commercial Details)

Building Desc.	COM JOB SHOP(S)
Building Grade	Average
Heat / AC	NONE
Frame Type	MASONRY
Baths / Plumbing	AVERAGE
Ceiling / Wall	CEIL & MIN WL
Rooms / Prtns	ABOVE AVERAGE
Wall Height	10
First Floor Use	4000

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
First Floor	10600	10600

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Total Area	10600	10600



Town of Stonington, CT

Property Listing Report

Map Block Lot

84-1-3A

Building #

4

Section #

1

Account

00194501

Photo



Sketch



Primary Construction Details

Year Built	2001
Stories	1
Building Style	Job Shop(s)
Building Use	Gar/Svc Statn
Building Condition	AV
Occupancy	1
Extra Fixtures	
Bath Style	NA
Kitchen Style	NA
AC Type	None
Heating Type	Hot Air-no Duc
Heating Fuel	Gas

Bedrooms	0
Full Bathrooms	0
Half Bathrooms	0
Total Rooms	0
Roof Style	Gable/Hip
Roof Cover	Asph/F Gls/Cmp
Interior Floors 1	Concr-Finished
Interior Floors2	Carpet
Exterior Walls	Concr/Cinder
Exterior Walls 2	Vinyl Siding
Interior Walls	Minim/Masonry
Interior Walls 2	Drywall/Sheet

(*Industrial / Commercial Details)

Building Desc.	COM JOB SHOP(S)
Building Grade	Average
Heat / AC	NONE
Frame Type	MASONRY
Baths / Plumbing	AVERAGE
Ceiling / Wall	CEIL & MIN WL
Rooms / Prtns	ABOVE AVERAGE
Wall Height	10
First Floor Use	4000

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
First Floor	8800	8800

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Total Area	8800	8800

ATTACHMENT B – LETTER OF AUTHORIZATION



SBA Communications Corporation
8051 Congress Avenue
Boca Raton, FL 33487-1307

T + 561.995.7670
F + 561.995.7626

sbasite.com

LETTER OF AUTHORIZATION

SBA Site ID: CT00235-B, Stony Brook

Property Located at: Taugwonk Spur Road No. 2, Stonington, CT, 06378-2008

THE CITY/COUNTY OF: Stonington / New London

APPLICATION FOR ZONING/USE/BUILDING PERMIT

This letter authorizes Connecticut Light & Power and its authorized agents to file for all necessary zoning, planning and building permits (local, state and federal) for the purposes of installing, operating and maintaining a telecommunications facility on the existing tower on the property referenced above on behalf of SBA Land, LLC.

All approval conditions that may be granted to Connecticut Light & Power in connection with above referenced facility relating to this specific application are the sole responsibility of Connecticut Light & Power.

SBA Properties, LLC

Jason Silberstein

Executive VP, Site Leasing

Date: 4/14/2020

ATTACHMENT C – CONSTRUCTION DRAWINGS



PROJECT SUMMARY

THE GENERAL SCOPE OF WORK CONSISTS OF THE FOLLOWING:

1. REMOVE EXISTING PLATFORM AT ELEVATION 159'-0"± AGL AND ASSOCIATED EQUIPMENT
2. INSTALL (1) NEW MICROWAVE DISH AT ELEVATION 155'-3 1/2"± AGL
3. INSTALL (1) NEW OMNI/WHIP ANTENNA AT ELEVATION 153'-5 3/4"± AGL
4. RELOCATE EXISTING OMNI ANTENNA AT ELEVATION 155'-6"± AGL AND ASSOCIATED SUPPORT ARM FROM SECTOR D TO SECTOR B
5. INSTALL (1) NEW DIPOLE ANTENNA AT ELEVATION 119'-6"± AGL
6. INSTALL (1) NEW RACK WITH DMR EQUIPMENT IN EXISTING SHELTER
7. RELOCATE EXISTING 336AH BATTERIES (12) TO NORTH STONINGTON
8. INSTALL NEW 448AH BATTERIES (16)

GOVERNING CODES

2018 CONNECTICUT STATE BUILDING CODE (2015 IBC BASIS)
2017 NATIONAL ELECTRIC CODE
TIA-222-H

GENERAL NOTES

THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE; NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS PROPOSED.

SITE INFORMATION

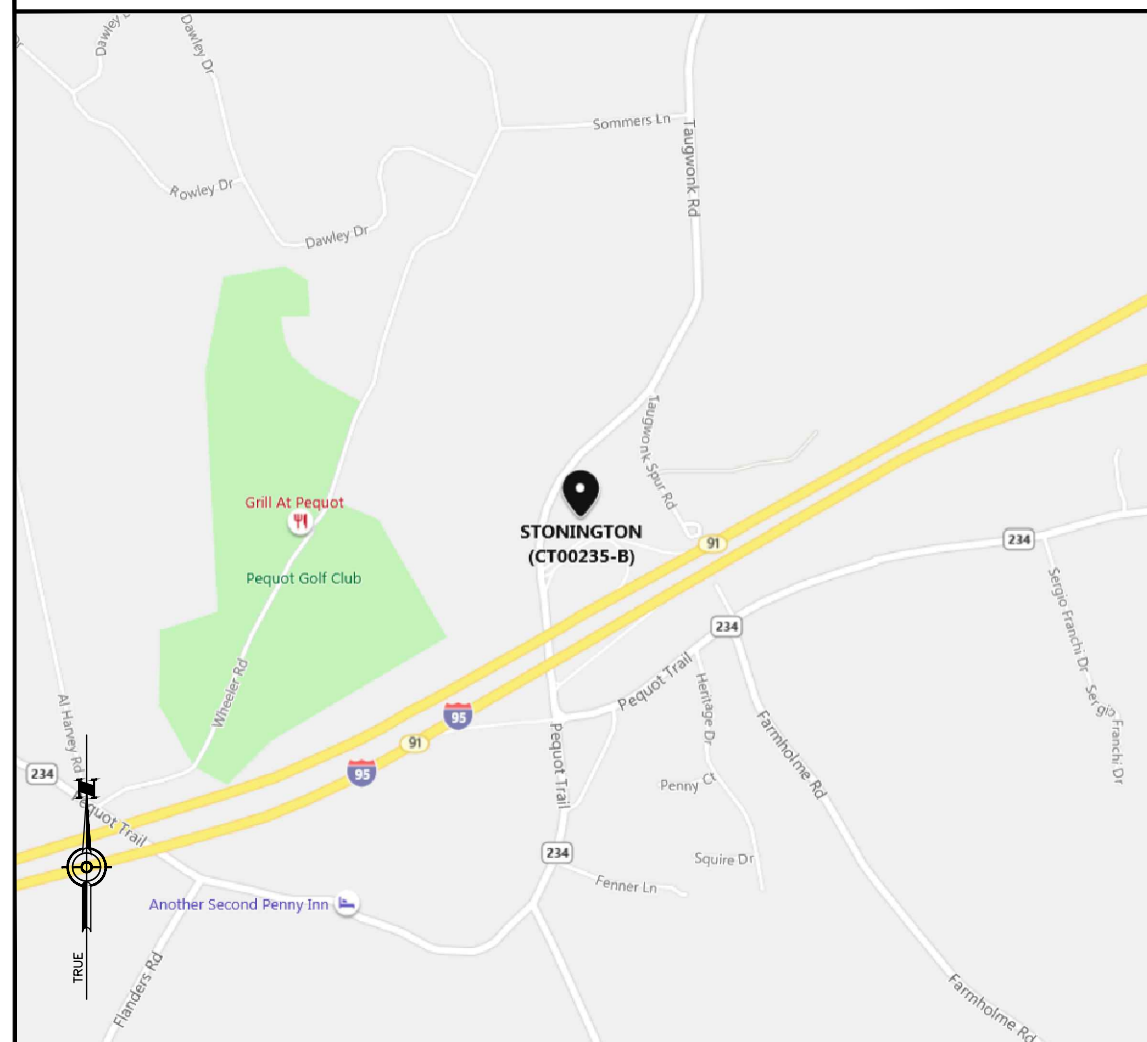
SITE NAME:	STONINGTON (CT00235-B)
SITE ID NUMBER:	#84-1-3A
SITE ADDRESS:	TAUGWONK SPUR RD STONINGTON, CT 06378
MAP:	84
BLOCK:	01
LOT:	3A
ZONE:	LI-130
LATITUDE:	41° 22' 55.26" N
LONGITUDE:	71° 54' 12.9" W
ELEVATION:	142'± AMSL
FEMA/FIRM DESIGNATION:	X
ACREAGE:	6.34± AC (BOOK: 0478, PAGE: 0229)

CONTACT INFORMATION

<u>APPLICANTS:</u> EVERSOURCE ENERGY 107 SELDEN STREET BERLIN, CT 06037	<u>POWER PROVIDER:</u> EVERSOURCE ENERGY (800) 286-2000
<u>PROPERTY OWNER:</u> TAUGWONK LLC 183 QUARRY RD MILFORD, CT 06460	<u>TELCO PROVIDER:</u> FRONTIER (800) 921-8102
<u>EVERSOURCE ENERGY</u> <u>PROJECT MANAGER:</u> NIKOLL PRECI (860) 655-3079	<u>CALL BEFORE YOU D</u> (800) 922-4455

**STONINGTON (CT00235-B)
TAUGWONK SPUR RD
STONINGTON, CT 06378**

LOCATION MAP



NO SCALE

DESIGN TYPE

SITE UPGRADE
MONOPOLE

DRAWING INDEX

SHEET NO:	SHEET TITLE
T-1	TITLE SHEET
C-1	SITE PLAN
C-2	TOWER ELEVATION
C-3	MICROWAVE DISH MOUNT DETAILS
G-1	GROUNDING DETAILS
N-1	NOTES & SPECIFICATIONS
N-2	NOTES & SPECIFICATIONS
N-3	NOTES & SPECIFICATIONS

DO NOT SCALE DRAWINGS

SUBCONTRACTOR SHALL VERIFY ALL PLANS & EXISTING DIMENSIONS & CONDITIONS ON THE JOB SITE & SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME



UNDERGROUND
SERVICE ALERT
UTILITIES PROTECTION CENTER, INC.
811

48 HOURS BEFORE YOU DIG

EVERSOURCE
ENERGY

107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286-2000



BLACK & VEATCH

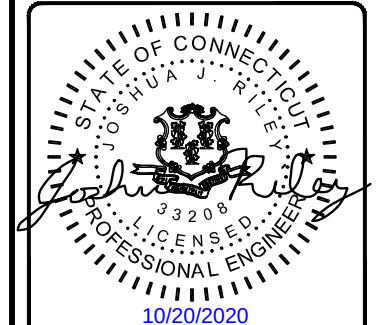
6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458-2522

PROJECT NO: 405025

DRAWN BY: TYW

CHECKED BY:	CAG
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0	10/20/20	ISSUED FOR FILING
REV	DATE	DESCRIPTION



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.

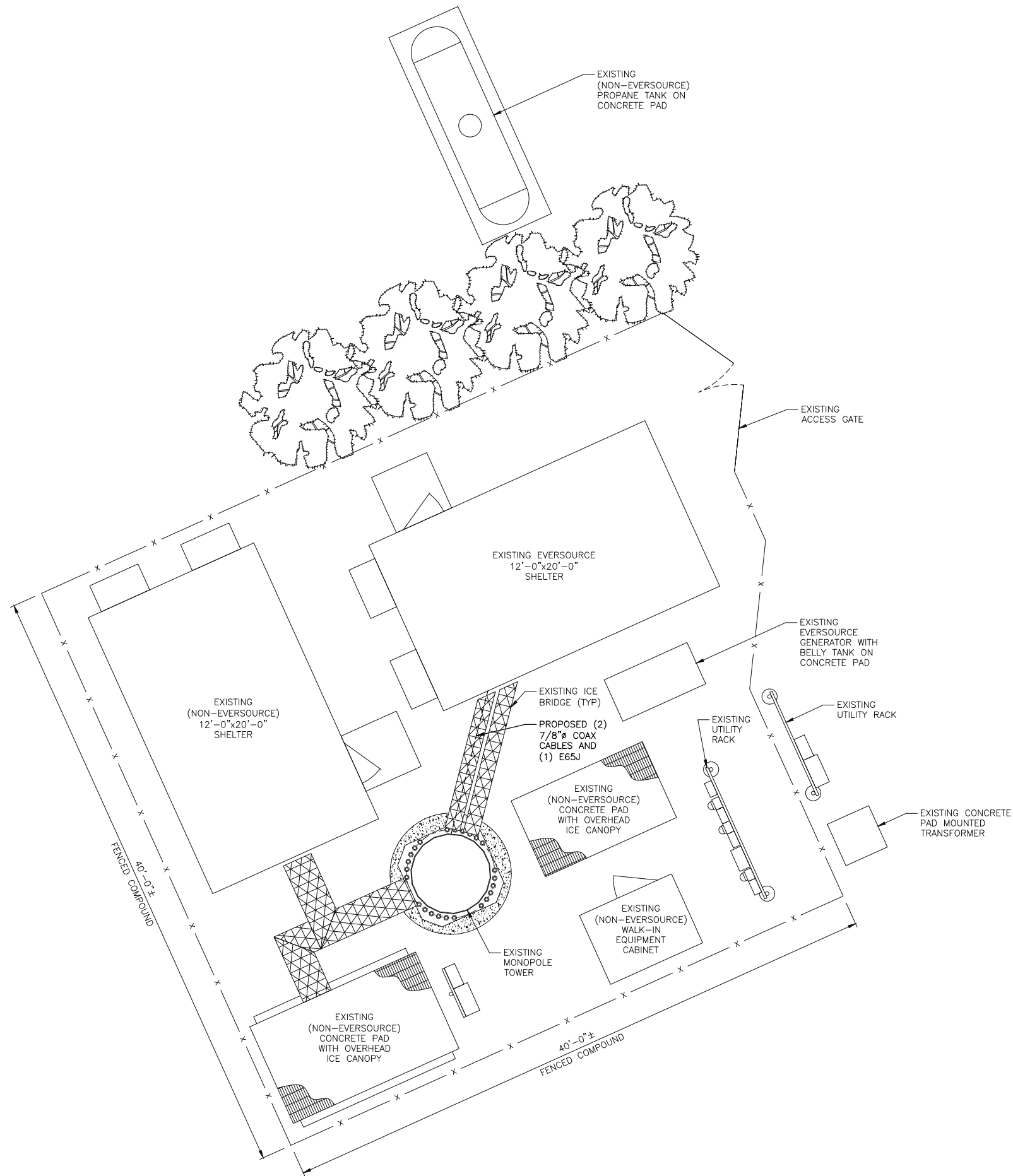
STONINGTON (CT00235-B)
TAUGWONK SPUR RD
STONINGTON, CT 06378

SHEET TITLE

TITLE SHEET

SHEET NUMBER

T-1



SITE PLAN
NO SCALE



107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286-2000



BLACK & VEATCH

6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458-2522

PROJECT NO:	405025
DRAWN BY:	TYW
CHECKED BY:	CAG

0	10/20/20	ISSUED FOR FILING
REV	DATE	DESCRIPTION

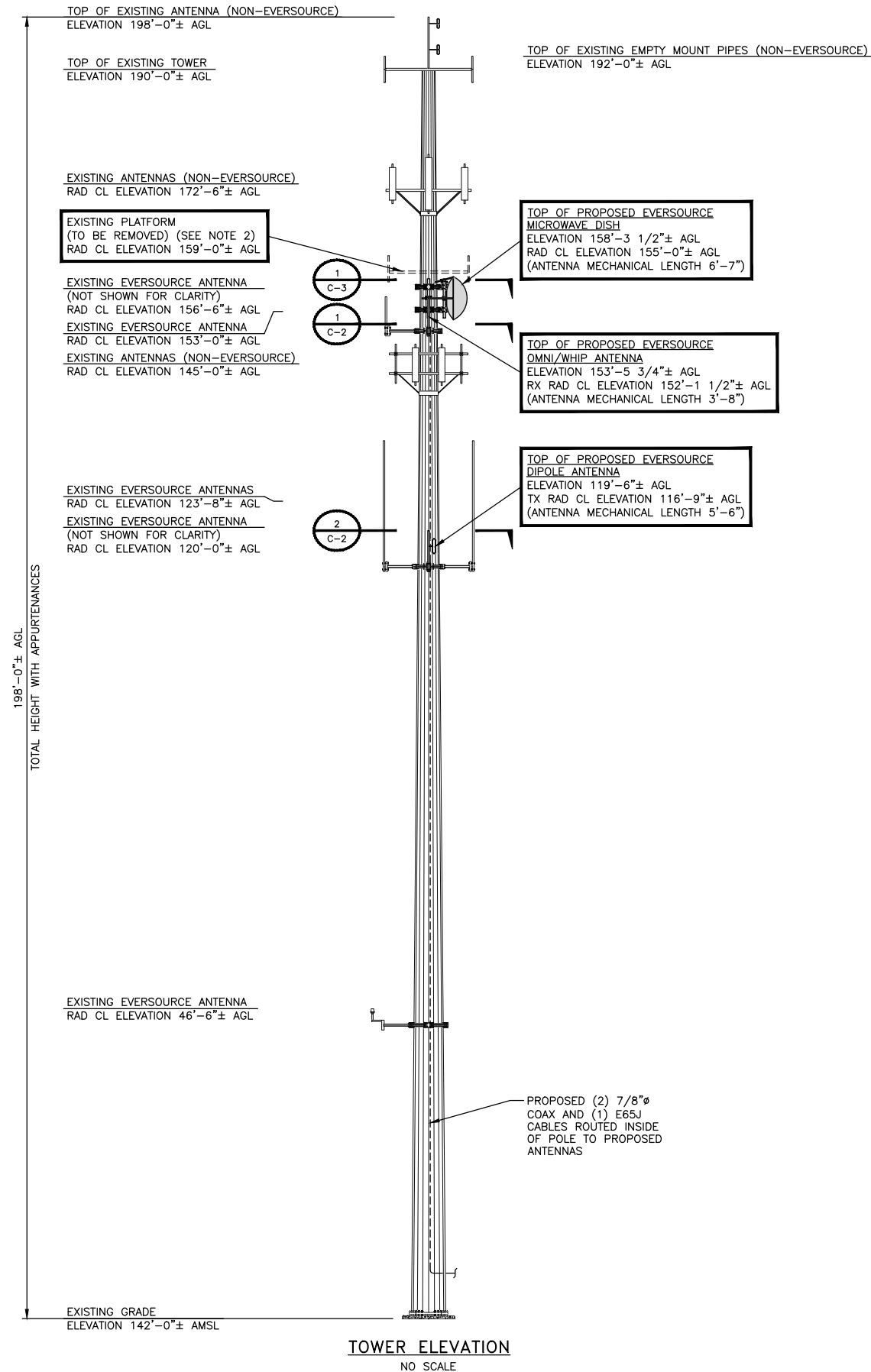


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STONINGTON (CT00235-B)
TAUGWONK SPUR RD
STONINGTON, CT 06378

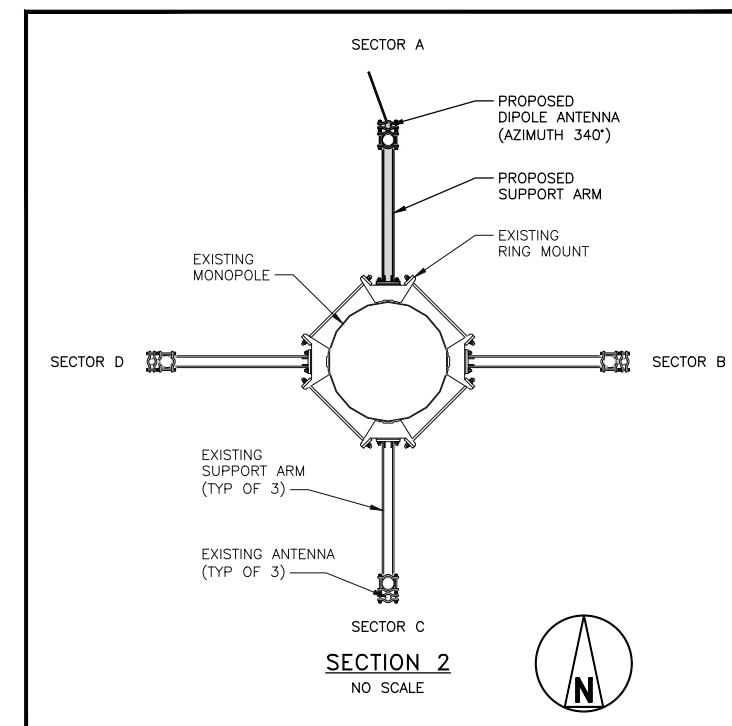
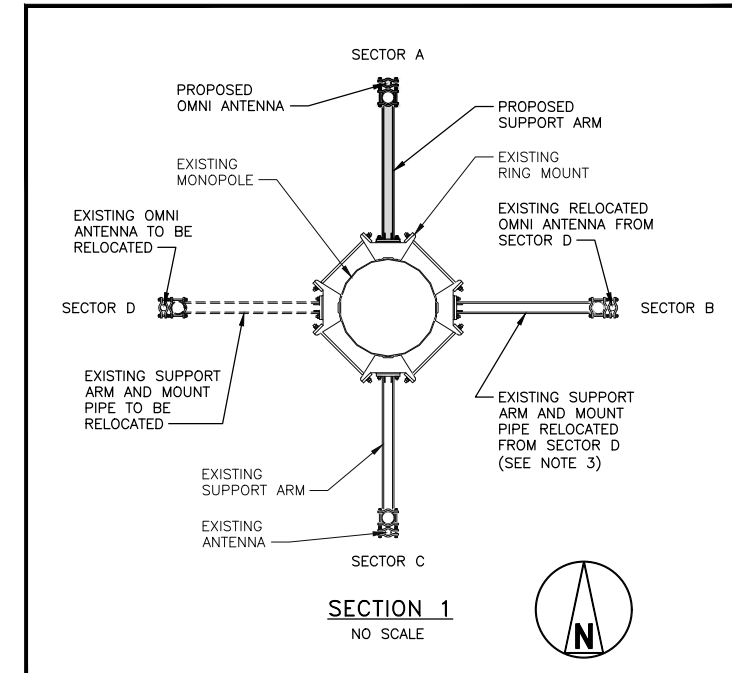
SHEET TITLE
SITE PLAN

SHEET NUMBER
C-1



NOTES

- BLACK & VEATCH HAS NOT EVALUATED THE EXISTING STRUCTURE FOR THIS SITE AND ASSUMES NO RESPONSIBILITY FOR ITS STRUCTURAL INTEGRITY. REFER TO THE STRUCTURAL ANALYSIS BY OTHERS PRIOR TO ANY CONSTRUCTION.
- REMOVE EXISTING PLATFORM AT ELEVATION 159'-0"± AGL AND ASSOCIATED EQUIPMENT.
- EXISTING FASTENERS CANNOT BE REUSED AND MUST BE REPLACED WITH NEW HEX BOLTS, WASHERS, AND HEX NUTS.



EVERSOURCE
ENERGY

107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286-2000

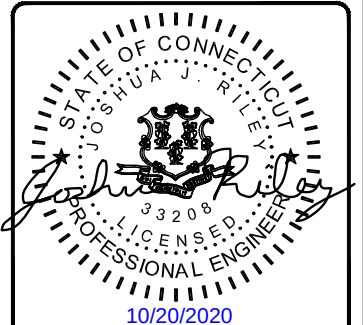


BLACK & VEATCH

6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458-2522

PROJECT NO:	405025
DRAWN BY:	TYW
CHECKED BY:	CAG

REV	DATE	DESCRIPTION
0	10/20/20	ISSUED FOR FILING



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UNLESS THEY ARE ACTING UNDER THE DIRECTION
OF A LICENSED PROFESSIONAL ENGINEER,
TO ALTER THIS DOCUMENT.

STONINGTON (CT00235-B)
TAUGWONK SPUR RD
STONINGTON, CT 06378

SHEET TITLE
TOWER ELEVATION &
ANTENNA EQUIPMENT

SHEET NUMBER

C-2

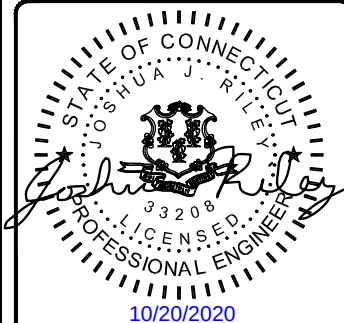


BLACK & VEATCH

6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211
PHONE: (913) 458-2522

PROJECT NO: 405025
DRAWN BY: TYW
CHECKED BY: CAG

0	10/20/20	ISSUED FOR FILING
REV	DATE	DESCRIPTION



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STONINGTON (CT00235-B)
TAUGWONK SPUR RD
STONINGTON, CT 06378

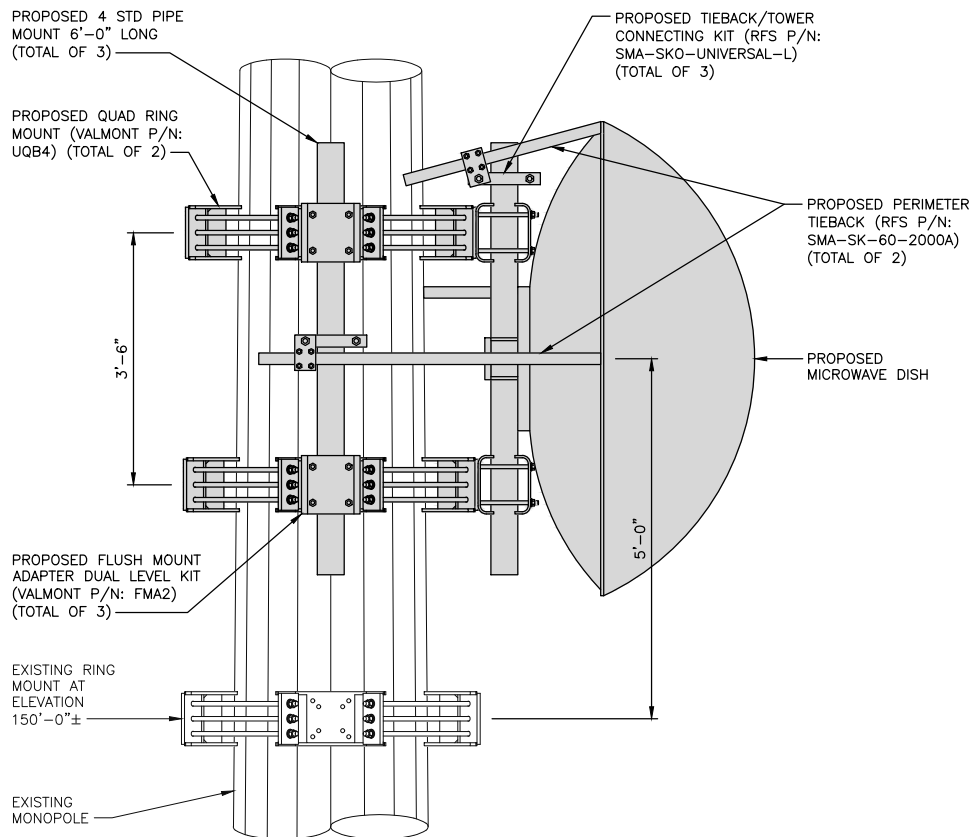
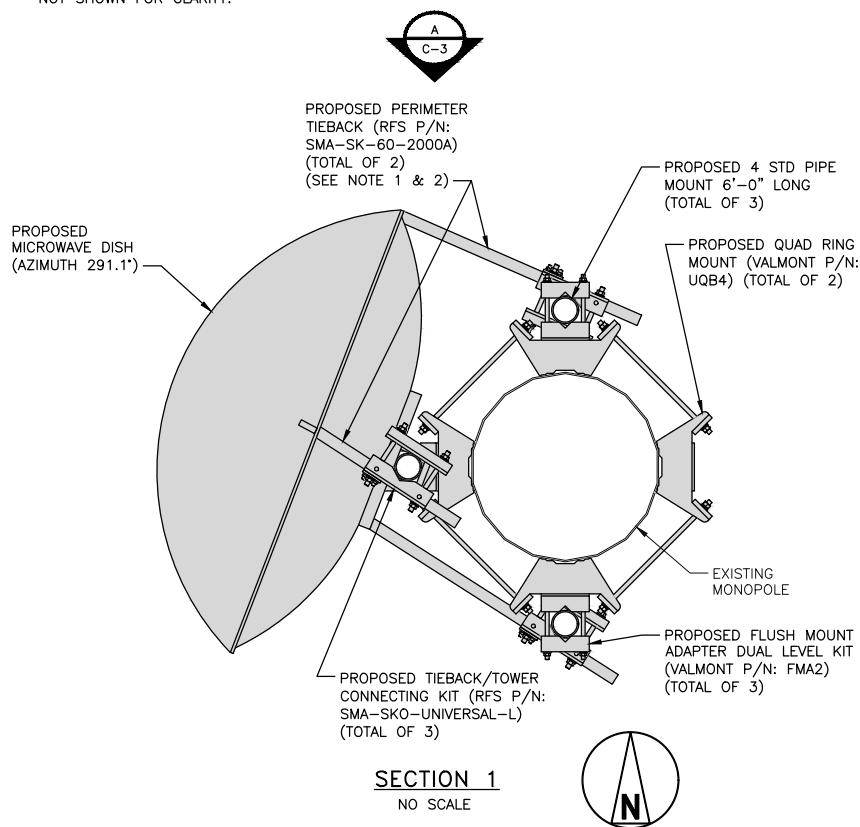
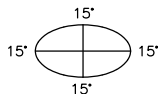
SHEET TITLE
MICROWAVE DISH
MOUNT DETAILS

SHEET NUMBER
C-3

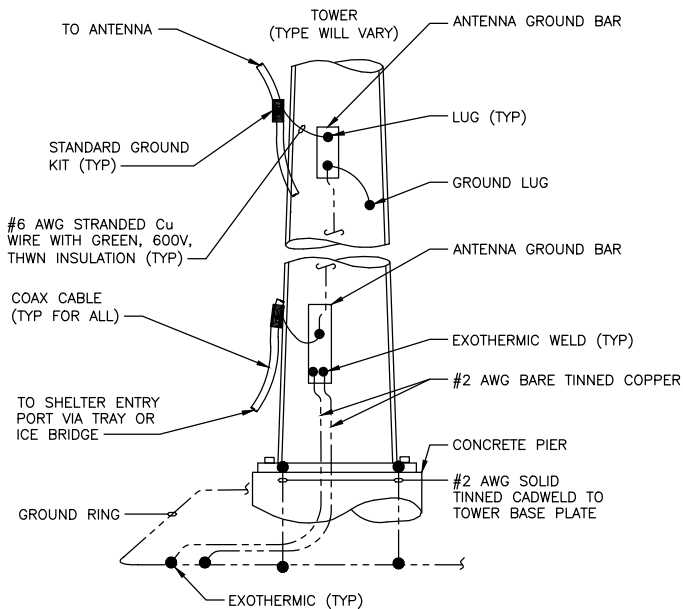
NOTES

1. ATTACH TIEBACKS TO PROPOSED 4" STD MOUNT PIPES AS SHOWN IN SECTIONS 1 & 2. REFER TO ALLOWABLE TIEBACK ANGLE DIAGRAM.
2. TRIM TIEBACK PIPES AS REQUIRED TO MAINTAIN A 6" DISTANCE BETWEEN END OF PIPE AND END OF CLAMP.
3. OTHER EXISTING/PROPOSED MEMBERS NOT SHOWN FOR CLARITY.

ALLOWABLE TIEBACK ANGLE
±15 DEGREES VERTICAL
±15 DEGREES HORIZONTAL



DETAIL A
NO SCALE

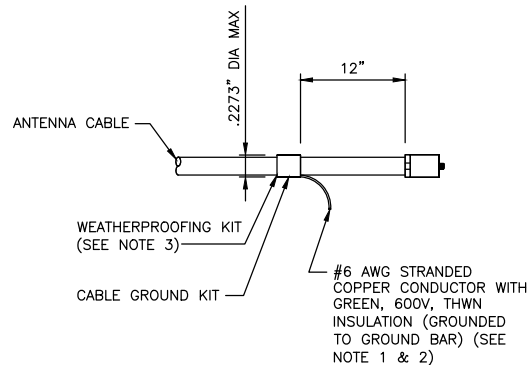


NOTE

1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.

ANTENNA CABLE GROUNDING

NO SCALE

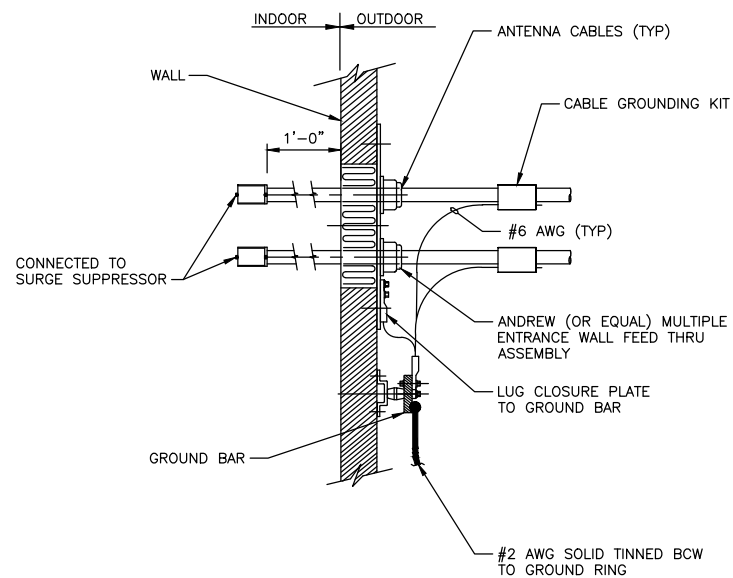


NOTES

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.

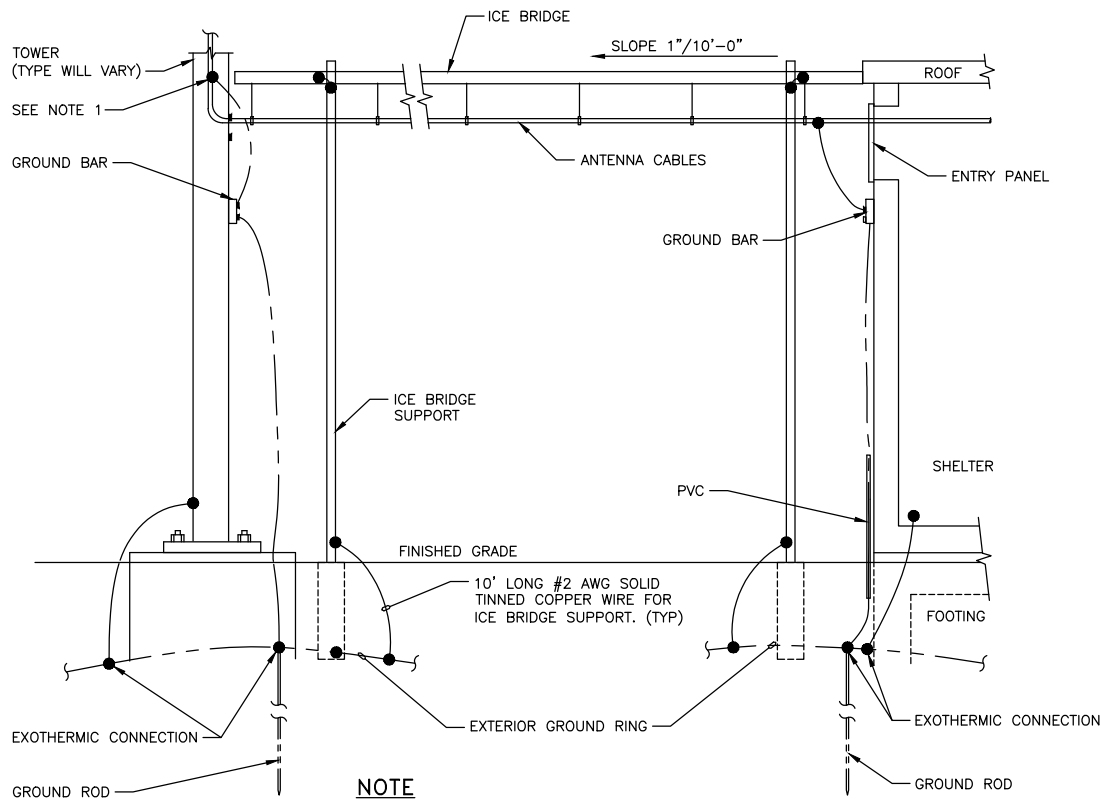
CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

NO SCALE



CABLE INSTALLATION WITH WALL FEED THRU ASSEMBLY

NO SCALE



NOTE

1. PROVIDE GROUND KIT 6" BEFORE TURN

ICE BRIDGE AND ANTENNA CABLE DETAIL

NO SCALE

EVERSOURCE
ENERGY

107 SELDEN STREET
BERLIN, CT 06037
PHONE: (800) 286-2000

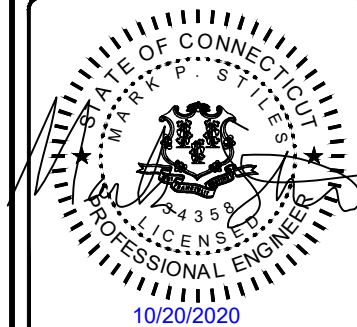


BLACK & VEATCH

6800 W 115TH ST, SUITE 2292
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PROJECT NO:	405025
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STONINGTON (CT00235-B)
TAUGWONK SPUR RD
STONINGTON, CT 06378

SHEET TITLE
GROUNDING
DETAILS

SHEET NUMBER
G-1

DESIGN BASIS

1. GOVERNING CODE: 2018 CONNECTICUT STATE BUILDING CODE (2015 IBC BASIS).

GENERAL CONDITIONS

1. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL BUILDING CODES, PERMIT CONDITIONS AND SAFETY CODES DURING CONSTRUCTION.
2. THE ENGINEER IS NOT: A GUARANTOR OF THE INSTALLING CONTRACTOR'S WORK; RESPONSIBLE FOR SAFETY IN, ON OR ABOUT THE WORK SITE; IN CONTROL OF THE SAFETY OR ADEQUACY OF ANY BUILDING COMPONENT, SCAFFOLDING OR SUPERINTENDING THE WORK.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL PERMITS, INSPECTIONS, TESTING AND CERTIFICATES NEEDED FOR LEGAL OCCUPANCY OF THE FINISHED PROJECT.
4. THE CONTRACTOR IS RESPONSIBLE TO REVIEW THIS COMPLETE PLAN SET AND VERIFY THE EXISTING CONDITIONS SHOWN IN THESE PLANS AS THEY RELATE TO THE WORK PRIOR TO SUBMITTING PRICE. SIGNIFICANT DEVIATIONS FROM WHAT IS SHOWN AFFECTING THE WORK SHALL BE REPORTED IMMEDIATELY TO THE CONSTRUCTION MANAGER.
5. DETAILS INCLUDED IN THIS PLAN SET ARE TYPICAL AND APPLY TO SIMILAR CONDITIONS.
6. EXISTING ELECTRICAL AND MECHANICAL FIXTURES, PIPING, WIRING, AND EQUIPMENT OBSTRUCTING THE WORK SHALL BE REMOVED AND/OR RELOCATED AS DIRECTED BY THE CONSTRUCTION MANAGER. TEMPORARY SERVICE INTERRUPTIONS MUST BE COORDINATED WITH OWNER.
7. THE CONTRACTOR SHALL DILIGENTLY PROTECT THE EXISTING BUILDING/SITE CONDITIONS AND THOSE OF ANY ADJOINING BUILDING/SITES AND RESTORE ANY DAMAGE CAUSED BY HIS ACTIVITIES TO THE PRE-CONSTRUCTION CONDITION.
8. THE CONTRACTOR SHALL SAFEGUARD AGAINST: CREATING A FIRE HAZARD, AFFECTING TENANT EGRESS OR COMPROMISING BUILDING SITE SECURITY MEASURES.
9. THE CONTRACTOR SHALL REMOVE ALL DEBRIS AND CONSTRUCTION WASTE FROM THE SITE EACH DAY. WORK AREAS SHALL BE SWEEPED AND MADE CLEAN AT THE END OF EACH WORK DAY.
10. THE CONTRACTOR'S HOURS OF WORK SHALL BE IN ACCORDANCE WITH LOCAL CODES AND ORDINANCES AND BE APPROVED BY OWNER.
11. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE CONSTRUCTION MANAGER IF ASBESTOS IS ENCOUNTERED DURING THE EXECUTION OF HIS WORK. THE CONTRACTOR SHALL CEASE ALL ACTIVITIES WHERE THE ASBESTOS MATERIAL IS FOUND UNTIL NOTIFIED BY THE CONSTRUCTION MANAGER TO RESUME OPERATIONS.

THERMAL & MOISTURE PROTECTION

1. FIRE-STOP ALL PENETRATIONS FOR ELECTRICAL CONDUITS OR WAVEGUIDE CABLING THROUGH BUILDING WALLS, FLOORS, AND CEILINGS SHALL BE FIRESTOPPED WITH ACCEPTED MATERIALS TO MAINTAIN THE FIRE RATING OF THE EXISTING ASSEMBLY. ALL FILL MATERIAL SHALL BE SHAPED, FITTED, AND PERMANENTLY SECURED IN PLACE. FIRESTOPPING SHALL BE INSTALLED IN ACCORDANCE WITH ASTM E814.
2. HILTI CP620 FIRE FOAM OR 3M FIRE BARRIER FILL, VOID OR CAVITY MATERIAL OR ACCEPTED EQUAL SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND ASSOCIATED UNDERWRITERS LABORATORIES (UL) SYSTEM NUMBER.
3. FIRESTOPPING SHALL BE APPLIED AS SOON AS PRACTICABLE AFTER PENETRATIONS ARE MADE AND EQUIPMENT INSTALLED.
4. FIRESTOPPED PENETRATIONS SHALL BE LEFT EXPOSED AND MADE AVAILABLE FOR INSPECTION BEFORE CONCEALING SUCH PENETRATIONS. FIRESTOPPING MATERIAL CERTIFICATES SHALL BE MADE AVAILABLE AT THE TIME OF INSPECTION.
5. ANY BUILDING ROOF PENETRATION AND/OR RESTORATION SHALL BE PERFORMED SO THAT THE ROOF WARRANTY IN PLACE IS NOT COMPROMISED. CONTRACTOR SHALL ARRANGE FOR OWNER'S ROOFING CONTRACTOR TO PERFORM ANY AND ALL ROOFING WORK IF SO REQUIRED BY EXISTING ROOF WARRANTY. OTHERWISE, ROOF SHALL BE MADE WATERTIGHT WITH LIKE CONSTRUCTION AS SOON AS PRACTICABLE AND AT COMPLETION OF CONSTRUCTION.
6. ALL PENETRATIONS INTO AND/OR THROUGH BUILDING EXTERIOR WALLS SHALL BE SEALED WITH SILICONE SEALER.
7. WHERE CONDUIT AND CABLES PENETRATES FIRE RATED WALLS AND FLOORS, FIRE GROUT ALL PENETRATIONS IN ORDER TO MAINTAIN THE FIRE RATING USING A LISTED FIRE SEALING DEVICE OR GROUT.
8. CONTRACTOR TO REMOVE AND RE-INSTALL ALL FIRE PROOFING AS REQUIRED DURING CONSTRUCTION.

SUBMITTALS

1. CONTRACTOR TO SUBMIT SHOP DRAWINGS TO ENGINEER FOR REVIEW PRIOR TO FABRICATION.
2. CONTRACTOR TO NOTIFY ENGINEER FOR INSPECTION PRIOR TO CLOSING PENETRATIONS.
3. CONTRACTORS SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. THE ENGINEER SHALL BE NOTIFIED OF ANY CONDITIONS WHICH PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
4. ALL STEEL MATERIAL EXPOSED TO WEATHER SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 " ZINC (HOT-DIPPED GALVANIZED) COATINGS" ON IRON AND STEEL PRODUCTS.
5. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NONCONFORMING MATERIALS OR CONDITIONS FOR REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.

STEEL

1. MATERIAL:
- WIDE FLANGE: ASTM A572, GR 50
TUBING: ASTM A500, GR C
PIPE: ASTM A53, GR B AND ASTM 572, GR 50
ANGLE: ASTM A570, GR 50 AND ASTM A36
BOLTS: ASTM A325
GRATING: TYPE GW-2 (1"x3/16" BARS)
MISC. MATERIAL: ASTM A36
- ALL STEEL SHAPES SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A123 WITH A COATING WEIGHT OF 2 OZ/SF.
2. DAMAGED GALVANIZED SURFACES SHALL BE CLEANED WITH A WIRE BRUSH AND PAINTED WITH TWO COATS OF COLD ZINC, "GALVANOX", "DRY GALV", "ZINC IT", OR APPROVED EQUIVALENT, IN ACCORDANCE WITH MANUFACTURER'S GUIDELINES. TOUCH UP DAMAGED NON GALVANIZED STEEL WITH SAME PAINT IN SHOP OR FIELD.
3. DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AISC "MANUAL OF STEEL CONSTRUCTION" 13TH EDITION.
4. THE STEEL STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER COMPLETION. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO INSURE THE SAFETY OF THE BUILDING AND ITS COMPONENT PARTS DURING ERECTION.
5. ALL STEEL ELEMENTS SHALL BE INSTALLED PLUMB AND LEVEL.
6. TOWER MANUFACTURER'S DESIGNS SHALL PREVAIL FOR TOWER.

SITE GENERAL

1. CONTRACTOR SHALL FOLLOW CONDITIONS OF ALL APPLICABLE PERMITS AND WORK IN ACCORDANCE WITH OSHA REGULATIONS.
2. THESE PLANS DEPICT KNOWN UNDERGROUND STRUCTURES, CONDUITS, AND/OR PIPELINES. THE LOCATIONS FOR THESE ELEMENTS ARE BASED UPON THE VARIOUS RECORD DRAWINGS AVAILABLE. THE CONTRACTOR IS HEREBY ADVISED THAT THESE DRAWINGS MAY NOT ACCURATELY DEPICT AS-BUILT LOCATIONS AND OTHER UNKNOWN STRUCTURES. THE CONTRACTOR SHALL THEREFORE DETERMINE THE EXACT LOCATION OF EXISTING UNDERGROUND ELEMENTS AND EXCAVATE WITH CARE AFTER CALLING MARKOUT SERVICE AT 1-800-272-4480 48 HOURS BEFORE DIGGING, DRILLING OR BLASTING.
3. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, FIBER OPTIC, AND OTHER UTILITIES WHERE ENCOUNTERED, SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION, SHALL BE RELOCATED AS DIRECTED BY ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR PIER DRILLING AROUND OR NEAR UTILITIES. CONTRACTOR SHALL HAND DIG UTILITIES AS NEEDED. CONTRACTOR SHALL PROVIDE, BUT IS NOT LIMITED TO, APPROPRIATE A) FALL PROTECTION, B) CONFINED SPACE ENTRY, C) ELECTRICAL SAFETY, AND D) TRENCHING AND EXCAVATION.
4. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES, AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
5. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC, FIBER OPTIC, OR OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED, AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT THE POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF THE CONSTRUCTION MANAGER.
6. CONTRACTOR IS RESPONSIBLE FOR REPAIRING OR REPLACING STRUCTURES OR UTILITIES DAMAGED DURING CONSTRUCTION.
7. CONTRACTOR SHALL PROTECT EXISTING PAVED AND GRAVEL SURFACES, CURBS, LANDSCAPE AND STRUCTURES AND RESTORE SITE OR PRE-CONSTRUCTION CONDITION WITH AS GOOD, OR BETTER, MATERIALS. NEW MATERIALS SHALL MATCH EXISTING THICKNESS AND TYPE.
8. THE CONTRACTOR SHALL SHORE ALL TRENCH EXCAVATIONS GREATER THAN 5 FEET IN DEPTH OR LESS WHERE SOIL CONDITIONS ARE DEEMED UNSTABLE. ALL SHEETING AND/OR SHORING METHODS SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER.
9. THE CONTRACTOR IS RESPONSIBLE FOR MANAGING GROUNDWATER LEVELS IN THE VICINITY OF EXCAVATIONS TO PROTECT ADJACENT PROPERTIES AND NEW WORK. GROUNDWATER SHALL BE DRAINED IN ACCORDANCE WITH LOCAL SEDIMENTATION AND EROSION CONTROL GUIDELINES.



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BLACK & VEATCH

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PROJECT NO:	405025
DRAWN BY:	TYW
CHECKED BY:	CAG

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SHEET TITLE
NOTES
& SPECIFICATIONS

SHEET NUMBER
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ELECTRICAL

1. CONTRACTOR SHALL VERIFY EXISTING ELECTRIC SERVICE TYPE AND CAPACITY AND ORDER NEW ELECTRIC SERVICE FROM LOCAL ELECTRIC UTILITY, WHERE APPLICABLE.
2. ALL ELECTRICAL WORK SHALL BE IN ACCORDANCE WITH ALL APPLICABLE CODES, AND SHALL BE ACCEPTABLE TO ALL AUTHORITIES HAVING JURISDICTION. WHERE A CONFLICT EXISTS BETWEEN CODES, PLAN AND SPECIFICATIONS, OR AUTHORITIES HAVING JURISDICTION, THE MORE STRINGENT AUTHORITIES SHALL APPLY.
3. CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, INSURANCE, EQUIPMENT, INSTALLATION, CONSTRUCTION TOOLS, TRANSPORTATION, ETC, FOR A COMPLETE AND PROPERLY OPERATIVE SYSTEM ENERGIZED THROUGHOUT AND AS INDICATED ON THE DRAWINGS AND AS SPECIFIED HEREIN AND/OR OTHERWISE REQUIRED.
4. ALL ELECTRICAL CONDUCTORS SHALL BE 100% COPPER AND SHALL HAVE TYPE THHN INSULATION UNLESS INDICATED OTHERWISE.
5. CONDUIT SHALL BE THREADED RIGID GALVANIZED STEEL OR EMT WITH ONLY COMPRESSION TYPE COUPLINGS AND CONNECTORS, ALL MADE UP WRENCH TIGHT.
6. ALL BURIED CONDUIT SHALL BE MINIMUM SCH 40 PVC UNLESS NOTED OTHERWISE, OR AS PER LOCAL CODE REQUIREMENTS.
7. PROVIDE FLEXIBLE STEEL CONDUIT OR LIQUID TIGHT FLEXIBLE STEEL CONDUIT TO ALL VIBRATING EQUIPMENT, INCLUDING HVAC UNITS, TRANSFORMERS, MOTORS, ETC, OR WHERE EQUIPMENT IS PLACED UPON A SLAB ON GRADE.
8. ALL BRANCH CIRCUITS AND FEEDERS SHALL HAVE A SEPARATE GREEN INSULATED EQUIPMENT GROUNDING CONDUCTOR BONDED TO ALL ENCLOSURES, PULLBOXES, ETC.
9. CONDUIT AND CABLE WITHIN CORRIDORS SHALL BE CONCEALED AND EXPOSED ELSEWHERE, UNLESS NOTED OTHERWISE.
10. ELECTRICAL MATERIALS INSTALLED ON ROOFTOP SHALL BE LISTED FOR NEMA 3R USE. –AND ALL WIRING WITHIN A VENTILATION DUCT SHALL BE LISTED FOR SUCH USE. IN GENERAL WIRING METHODS WITHIN A DUCT SHALL BE AN MC CABLE WITH SMOOTH OR CORRUGATED METAL JACKET AND HAVE NO OUTER COVERING OVER THE METAL JACKET. INTERLOCKED ARMOR TYPE OF MC CABLE IS NOT ACCEPTABLE FOR THIS APPLICATION. CONTRACTOR CAN ALSO USE TYPE MI CABLE IN THE VENTILATION DUCT PROVIDED IT DOES NOT HAVE ANY OUTER COVERINGS OVER THE METAL EXTERIOR.
11. WIRING DEVICES SHALL BE SPECIFICATION GRADE, AND WIRING DEVICE COVER PLATES SHALL BE PLASTIC WITH ENGRAVING AS SPECIFIED.
12. GROUNDING SYSTEM RESISTANCE SHALL BE MEASURED, RECORDED, AND DATED USING MEGGER DET14 OR SIMILAR INSTRUMENT. GROUND RESISTANCE SHALL NOT EXCEED 5 OHMS. IF THE RESISTANCE VALUE IS EXCEEDED, NOTIFY CONSTRUCTION MANAGER FOR FURTHER INSTRUCTION.
13. COORDINATE WITH BUILDING MANAGEMENT BEFORE PERFORMING ANY WORK INVOLVING EXISTING SYSTEMS OR EQUIPMENT IN ORDER TO DETERMINE THE EFFECT, IF ANY, ON OTHER TENANTS WITHIN THE BUILDING, AND TO DETERMINE THE APPROPRIATE TIME FOR PERFORMING THIS WORK.
14. THE CONTRACTOR SHALL BE REQUIRED TO VISIT THE SITE PRIOR TO SUBMITTING BID IN ORDER TO DETERMINE THE EXTENT OF THE EXISTING CONDITIONS.
15. ALL CONDUCTOR ENDS SHALL BE TAGGED AND ELECTRICAL EQUIPMENT LABELED WITH ENGRAVED IDENTIFICATION PLATES.
16. CONTRACTOR IS RESPONSIBLE FOR ALL CONTROL WIRING AND ALARM TIE–INS.

GROUNDING

1. #6 THWN SHALL BE STRANDED #6 COPPER WITH GREEN THWN INSULATION SUITABLE FOR WET INSTALLATIONS.
2. #2 THWN SHALL BE STRANDED #2 COPPER WITH THWN INSULATION SUITABLE FOR WET INSTALLATIONS.
3. #2 BARE TINNED SHALL BE SOLID COPPER TINNED. ALL BURIED WIRE SHALL MEET THIS CRITERIA.
4. ALL LUGS SHALL BE 2–HOLE, LONG BARREL, TINNED SOLID COPPER UNLESS OTHERWISE SPECIFIED, LUGS SHALL BE THOMAS AND BETTS SERIES 548##BE OR EQUIVALENT (IE #2 THWN – 54856BE, #2 SOLID – 54856BE, AND #6 THWN – 54852BE).
5. ALL HARDWARE, BOLTS, NUTS, AND WASHERS SHALL BE 18–8 STAINLESS STEEL. EVERY CONNECTION SHALL BE BOLT–FLAT WASHER–BUSS–LUG–FLAT WASHER–BELLEVILLE WASHER–NUT IN THAT EXACT ORDER. BACK–TO–BACK LUGGING, BOLT–FLAT WASHER–LUG–BUSS–LUG–FLAT WASHER–BELLEVILLE WASHER–NUT, IN THAT EXACT ORDER, IS ACCEPTED WHERE NECESSARY TO CONNECT MANY LUGS TO A BUSS BAR. STACKING OF LUGS, BUSS–LUG–LUG, IS NOT ACCEPTABLE.
6. WHERE CONNECTIONS ARE MADE TO STEEL OR DISSIMILAR METALS, A THOMAS AND BETTS DRAGON TOOTH WASHER MODEL DTWXXX SHALL BE USED BETWEEN THE LUG AND THE STEEL, BOLT–FLAT WASHER–STEEL–DRAGON TOOTH WASHER–LUG–FLAT WASHER–BELEVILE WASHER–NUT.
7. ALL CONNECTIONS, INTERIOR AND EXTERIOR, SHALL BE MADE WITH THOMAS AND BETTS KPOR–SHIELD. COAT ALL WIRES BEFORE LUGGING AND COAT ALL SURFACES BEFORE CONNECTING.
8. THE MINIMUM BEND RADIUS SHALL BE 8 INCHES FOR #6 WIRE AND SMALLER AND 12 INCHES FOR WIRE LARGER THAN #6.
9. ALL CONNECTIONS TO THE GROUND RING SHALL BE EXOTHERMIC WELD.
10. BOND THE FENCE TO THE GROUND RING AT EACH CORNER, AND AT EACH GATE POST WITH #2 SOLID TINNED WIRE. EXOTHERMIC WELD BOTH ENDS.
11. GROUND KITS SHALL BE SOLID COPPER STRAP WITH #6 WIRE 2–HOLE COMPRESSION CRIMPED LUGS AND SHALL BE SEALED ACCORDING TO MANUFACTURER INSTRUCTIONS.
12. FERROUS METAL CLIPS WHICH COMPLETELY SURROUND THE GROUNDING CONDUCTOR SHALL BE USED.
13. GROUND BARS SHALL BE FURNISHED AND INSTALLED WITH PRE–DRILLED HOLE DIAMETERS AND SPACINGS. GROUND BARS SHALL NEITHER BE FIELD FABRICATED NOR NEW HOLES DRILLED. GROUND LUGS SHALL MATCH THE SPACING ON THE BAR. HARDWARE DIAMETER SHALL BE MINIMUM 3.8 INCH.
14. MGB GROUND CONNECTION SHALL BE EXOTHERMIC WELDED TO THE GROUND SYSTEM.
15. ALL CABLE TRAY AND/OR PLATFORM STEEL SHALL BE BONDED TOGETHER WITH JUMPERS (#6 IN EQUIPMENT ROOM, #2 ELSEWHERE AND HOMERUN).

ANTENNA & CABLE NOTES

1. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL TRANSMISSION CABLES, JUMPERS, CONNECTORS, GROUNDING STRAPS, ANTENNAS, MOUNTS AND HARDWARE. ALL MATERIALS SHALL BE INSPECTED BY THE CONTRACTOR FOR DAMAGE UPON DELIVERY. JUMPERS SHALL BE SUPPLIED AT ANTENNAS AND EQUIPMENT INSIDE SHELTER COORDINATE LENGTH OF JUMP CABLES WITH EVERSOURCE. COORDINATE AND VERIFY ALL OF THE MATERIALS TO BE PROVIDED WITH EVERSOURCE PRIOR TO SUBMITTING BID AND ORDERING MATERIALS.
2. AFTER INSTALLATION, THE TRANSMISSION LINE SYSTEM SHALL BE PIM/SWEEP TESTED FOR PROPER INSTALLATION AND DAMAGE WITH ANTENNAS CONNECTED. CONTRACTOR TO OBTAIN LATEST TESTING PROCEDURES FROM EVERSOURCE PRIOR TO BIDDING.
3. ANTENNA CABLES SHALL BE COLOR CODED AT THE FOLLOWING LOCATIONS:
 - AT THE ANTENNAS.
 - AT THE WAVEGUIDE ENTRY PLATE ON BOTH SIDES OF THE EQUIPMENT SHELTER WALL.
 - JUMPER CABLES AT THE EQUIPMENT ENTER.
4. SYSTEM INSTALLATION:
 - THE CONTRACTOR SHALL INSTALL ALL CABLES AND ANTENNAS TO THE MANUFACTURER’S SPECIFICATIONS. THE CONTRACTOR IS RESPONSIBLE FOR THE PROCUREMENT AND INSTALLATION OF THE FOLLOWING:
 - ALL CONNECTORS, ASSOCIATED CABLE MOUNTING, AND GROUNDING HARDWARE.
 - WALL MOUNTS, STANDOFFS, AND ASSOCIATED HARDWARE.
 - 1/2 INCH HELIAX ANTENNA JUMPERS OF APPROPRIATE LENGTHS.
 - MINIMUM BENDING RADIUS FOR COAXIAL CABLES:
 - 7/8 INCH, RMIN = 15 INCHES
 - 1 5/8 INCH, RMIN = 25 INCHES
6. CABLE SHALL BE INSTALLED WITH A MINIMUM NUMBER OF BENDS WHERE POSSIBLE. CABLE SHALL NOT BE LEFT UNTERMINATED AND SHALL BE SEALED IMMEDIATELY AFTER BEING INSTALLED.
7. ALL CABLE CONNECTIONS OUTSIDE SHALL BE COVERED WITH WATERPROOF SPLICING KIT.
8. CONTRACTOR SHALL VERIFY EXACT LENGTH AND DIRECTION OF TRAVEL IN FIELD PRIOR TO CONSTRUCTION.
9. CABLE SHALL BE FURNISHED WITHOUT SPLICES AND WITH CONNECTORS AT EACH END.



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SHEET TITLE
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SHEET NUMBER

N-2

SYMBOLS

	EXOTHERMIC CONNECTION
	COMPRESSION CONNECTION
	5/8"Øx10-0" COPPER CLAD STEEL GROUND ROD.
	TEST GROUND ROD WITH INSPECTION SLEEVE
	GROUNDING CONDUCTOR
	KEY NOTES
CHAINLINK FENCE	
WOOD FENCE	
LEASE AREA	
ICE BRIDGE	
CABLE TRAY	
GAS LINE	
UNDERGROUND ELECTRICAL/TELCO	
UNDERGROUND ELECTRICAL/CONTROL	
UNDERGROUND ELECTRICAL	
UNDERGROUND TELCO	
PROPERTY LINE (PL)	

ABBREVIATIONS

AC	ALTERNATING CURRENT	MGB	MASTER GROUNDING BAR
AIC	AMPERAGE INTERRUPTION CAPACITY	MIN	MINIMUM
ANI	AUXILIARY NETWORK INTERFACE	MW	MICROWAVE
ATM	ASYNCHRONOUS TRANSFER MODE	MTS	MANUAL TRANSFER SWITCH
ATS	AUTOMATIC TRANSFER SWITCH	NEC	NATIONAL ELECTRICAL CODE
AWG	AMERICAN WIRE GAUGE	OC	ON CENTER
AWS	ADVANCED WIRELESS SERVICES	PP	POLARIZING PRESERVING
BATT	BATTERY	PCU	PRIMARY CONTROL UNIT
BBU	BASEBAND UNIT	PDU	PROTOCOL DATA UNIT
BTC	BARE TINNED COPPER CONDUCTOR	PWR	POWER
BTS	BASE TRANSCEIVER STATION	RECT	RECTIFIER
CCU	CLIMATE CONTROL UNIT	RET	REMOTE ELECTRICAL TILT
CDMA	CODE DIVISION MULTIPLE ACCESS	RMC	RIGID METALLIC CONDUIT
CHG	CHARGING	RF	RADIO FREQUENCY
CLU	CLIMATE UNIT	RUC	RACK USER COMMISSIONING
COMM	COMMON	RRH	REMOTE RADIO HEAD
DC	DIRECT CURRENT	RRU	REMOTE RADIO UNIT
DIA	DIAMETER	RWY	RACEWAY
DWG	DRAWING	SFP	SMALL FORM-FACTOR PLUGGABLE
EC	ELECTRICAL CONDUCTOR	SIAD	SMART INTEGRATED ACCESS DEVICE
EMT	ELECTRICAL METALLIC TUBING	SSC	SITE SOLUTIONS CABINET
FIF	FACILITY INTERFACE FRAME	T1	1544KBPS DIGITAL LINE
GEN	GENERATOR	TDMA	TIME-DIVISION MULTIPLE ACCESS
GPS	GLOBAL POSITIONING SYSTEM	TMA	TOWER MOUNT AMPLIFIER
GSM	GLOBAL SYSTEM FOR MOBILE	TVSS	TRANSIENT VOLTAGE SUPPRESSION SYSTEM
HVAC	HEAT/VENTILATION/AIR CONDITIONING	TYP	TYPICAL
ICF	INTERCONNECTION FRAME	UMTS	UNIVERSAL MOBILE TELECOMMUNICATION SYSTEM
IGR	INTERIOR GROUNDING RING (HALO)	UPS	UNINTERRUPTIBLE POWER SUPPLY (DC POWER PLANT)
LTE	LONG TERM EVOLUTION		

EVERSOURCE
ENERGY

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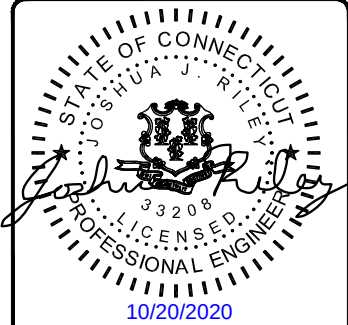


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SHEET TITLE
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N-3

REFERENCE CUTSHEETS

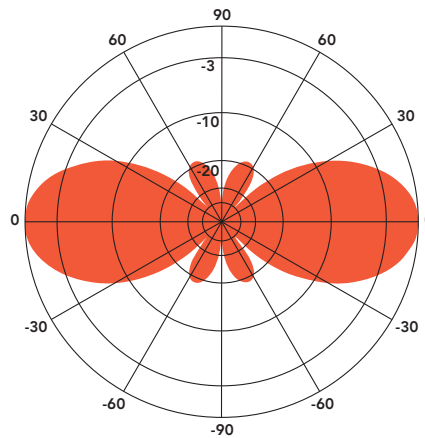
ANT220F2DIN

FIBERGLASS COLLINEAR ANTENNA 2.5 dBd

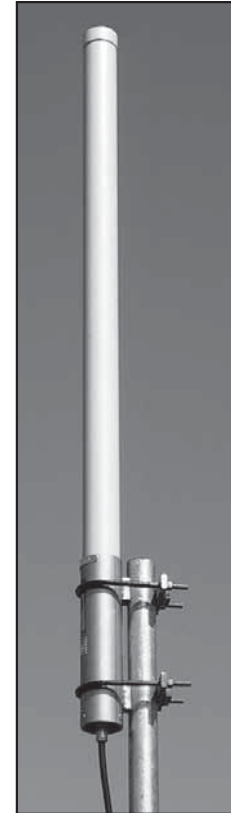
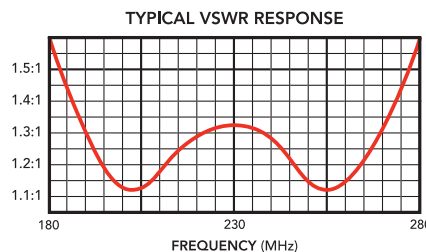
The Telewave ANT220F2 is an extremely rugged collinear antenna, with moderate gain and wide vertical beamwidth. This compact antenna produces 2.5 dBd gain, and is designed for operation in all environmental conditions. The antenna is constructed with brass and copper elements, with a path to ground potential for lightning impulse protection. The ANT220F2 is an excellent choice for wireless PTC systems in urban or rural areas.

All junctions are fully soldered to prevent RF intermodulation, and each antenna is completely protected within a rugged, high-tech radome to ensure survivability in the worst environments. The "Cool Blue" radome provides maximum protection from corrosive gases, ultraviolet radiation, icing, salt spray, acid rain, and wind blown abrasives.

The ANT220F2 includes the ANTC485 dual clamp set for mounting to a 1.5" to 3" O.D. support pipe, and a 24" removable RG-213 DIN-Male jumper.



ANT220F2 - 230 MHz
Vertical Plane
Gain = 2.58 dBd



ONE SITE PRO 1 P/N DCP12K CLAMP SET REQUIRED.

SPECIFICATIONS			
Frequency (continuous)	195-260 MHz	Dimensions (L x base diam.) in.	44 x 2.75
Gain	2.5 dBd	Tower weight (antenna + clamps)	11 lb.
Power rating (typ.)	500 watts	Shipping weight	14 lb.
Impedance	50 ohms	Wind rating / with 0.5" ice	200 / 150 MPH
VSWR	1.5:1 or less	Maximum exposed area	1.1 ft. ²
Pattern	Omnidirectional	Lateral thrust at 100 MPH	44 lb.
Vertical beamwidth	38°	Bending moment at top clamp	47 ft. lb.
Termination	7-16 DIN-F	(100 MPH, 40 PSF flat plate equiv.)	

870 Series 220MHz Exposed Dipoles

The 870 Series 220MHz Exposed Dipoles are available in 1, 2, 4, 8 dipole configurations. All our antennas can be completely customized to your particular applications. Our antennas can be black anodized, adjustable, or fixed, side mount or top mount, and heavy-duty versions are available.

- Each antenna is offered in a 1/4, 3/8 or 1/2 wave spacing versions.
- The 87XA-70 has external cabling and a field-adjustable pattern.
- The 87XF-70 has internal cabling and fixed dipole-mast spacing.
- Heavy-duty versions are available. Please contact our Technical Support team for consultation.

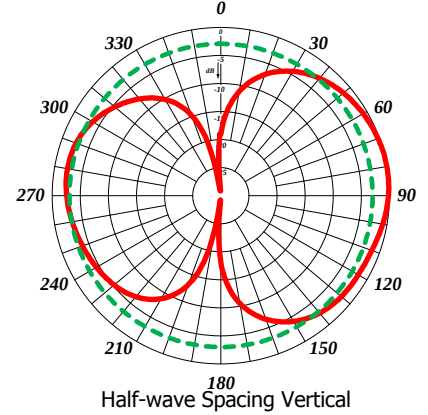
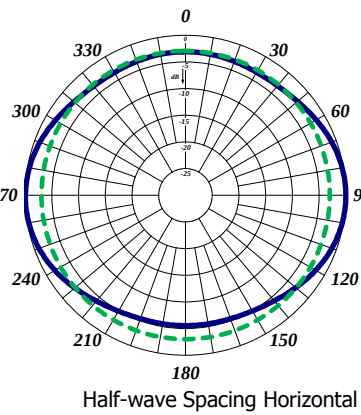
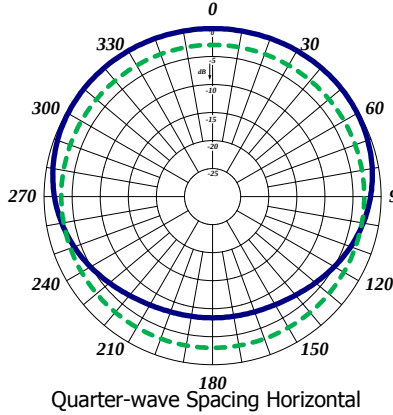
Electrical Specifications	871F-70-2	872F-70-2	874F-70-2
Frequency Range, MHz	215-225	215-225	215-225
Nominal Gain, dBd	2.0-2.5	5.0-5.5	8.0-8.5
Number of Dipoles	1	2	4
Bandwidth 1.5:1 VSWR, MHz	10	10	10
Polarization	Vertical	Vertical	Vertical
Pattern	Offset / bi	Offset / bi	Offset / bi
Power Rating, Watts	200	300	500
Nominal Impedance, Ohms	50	50	50
Lightning Protection	DC Ground	DC Ground	DC Ground
Standard Termination	Type N Male	Type N Male	Type N Male
Mechanical Specifications	871F-70-2	872F-70-2	874F-70-2
Length, in (mm)	66 (1676)	112 (2845)	200 (5080)
Width (1/2 Wave Spacing), in (mm)	31 (787)	31 (787)	32 (813)
Weight, lbs. (kg)	12.5 (5.7)	21 (9.5)	51 (23)
Rated Wind Velocity, No Ice, mph (km/h)	165 (266)	150 (241)	145 (233)
Rated Wind Velocity, 0.5" (13mm) ice, mph (km/h)	140 (225)	130 (209)	105 (177)
Lateral Thrust @ 100 mph, wind, lbs. (kg)	40 (18)	66 (30)	143 (65)
Bending Moment @ top clamp: 100 mph, ft.*lb (kg*m)	58 (8)	150 (21)	610 (84)
Projected Area, ft ² (m ²)	1.5 (0.14)	2.6 (0.24)	5.5 (0.51)
Mounting Information Mast O.D. (mm)	1.9" (48)	1.9" (48)	2.4" (60)
* See next page for ordering information (page 3) *			



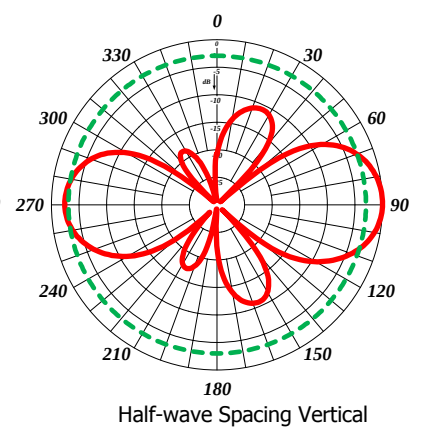
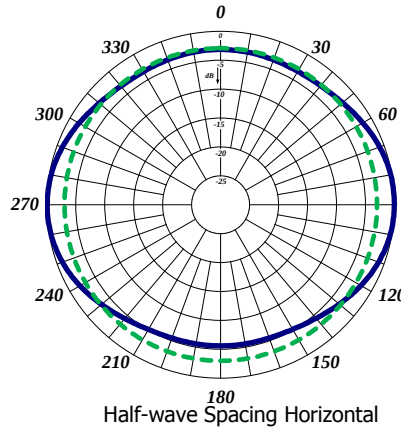
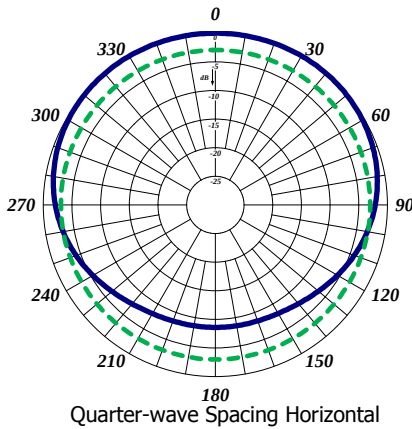
ONE SITE PRO 1 P/N DCP12K CLAMP SET REQUIRED.



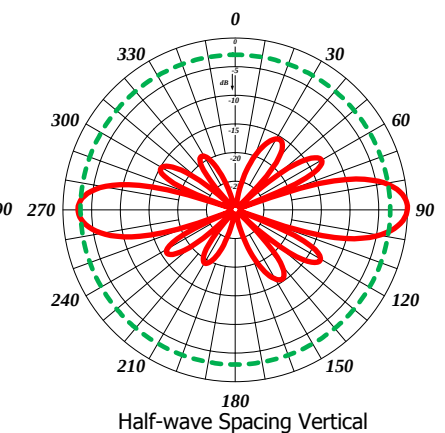
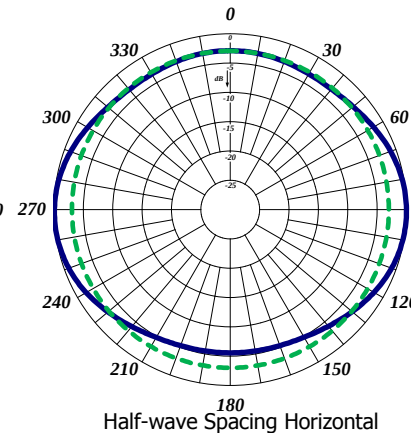
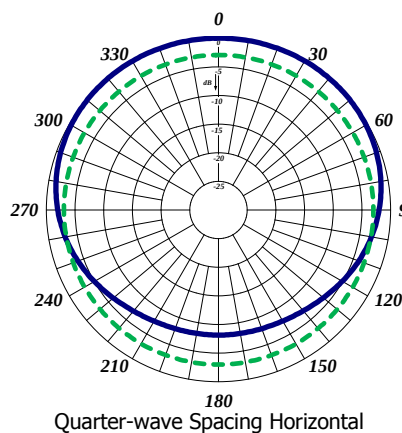
871F-70-2



872F-70-2



874F-70-2

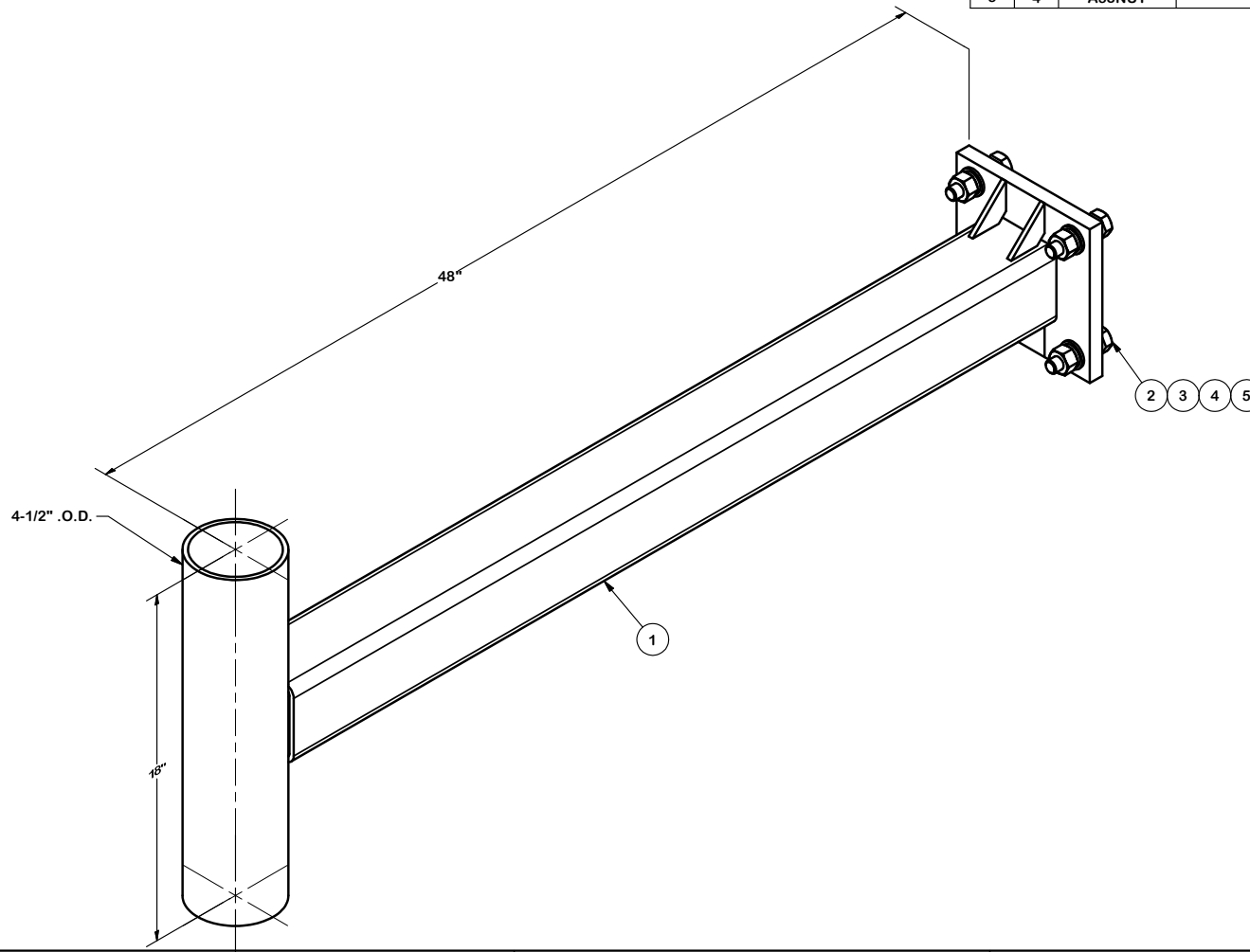


220MHz EXPOSED DIPOLES**215-225 MHz**

Order Information	Heavy Duty	Side Mount	Top Mount	Black Anodized
871-70-2	871F-70-2HD	871F-70-2SM	871F-70-2TM	871F-70-2HDB
872-70-2	872F-70-2HD	872F-70-2SM	872F-70-2TM	872F-70-2HDB
874-70-2	874F-70-2HD	874F-70-2SM	874F-70-2TM	874F-70-2HDB

(2) PROPOSED SUPPORT ARMS.

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	X-SV197-48	SUPPORT ARM WELDMENT - 36"		76.32	76.32
2	4	A58234	5/8" x 2-3/4" HDG A325 HEX BOLT		0.36	1.42
3	4	A58FW	5/8" HDG A325 FLATWASHER		0.03	0.14
4	4	G58LW	5/8" HDG LOCKWASHER		0.03	0.10
5	4	A58NUT	5/8" HDG A325 HEX NUT		0.13	0.52
					TOTAL WT. #	78.50



TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES (± 0.030)
DRILLED AND GAS CUT HOLES (± 0.030) - NO CONING OF HOLES
LASER CUT EDGES AND HOLES (± 0.010) - NO CONING OF HOLES
BENDS ARE $\pm 1/2$ DEGREE
ALL OTHER MACHINING (± 0.030)
ALL OTHER ASSEMBLY (± 0.060)

PROPRIETARY NOTE:
THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION

48"
SUPPORT
ARM

CPD NO.
447

DRAWN BY	CEK 4/14/2011
----------	---------------

ENG. APPROVAL

CLASS	SUB
81	01

	DRAWING USAGE
	CUSTOMER

CHECKED BY	
BMC	4/14/2011



SITE PRO 1

**Engineering
Support Team:
1-888-753-7446**

Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

	PART NO.
--	----------

SV197-48

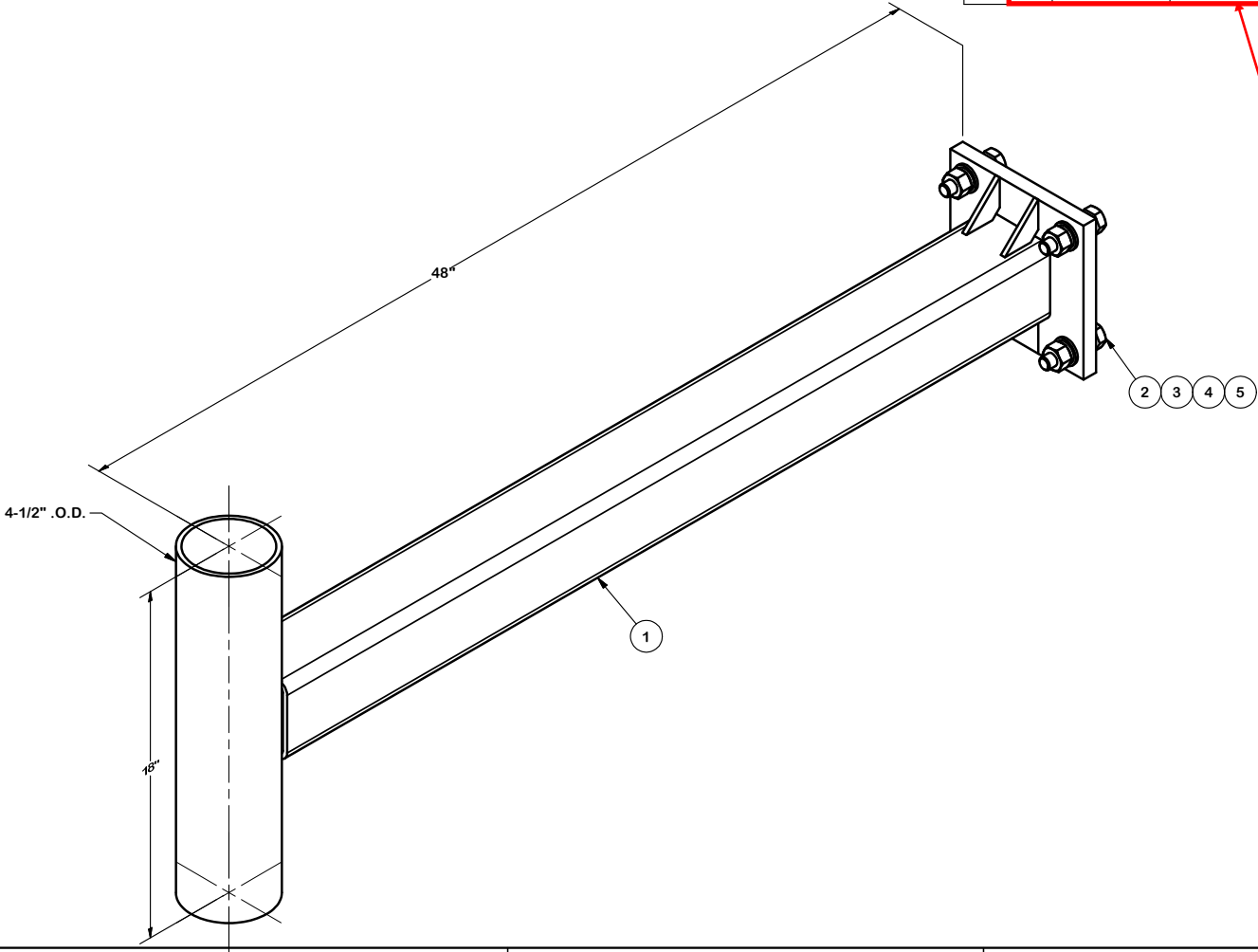
	DWG. NO.
--	----------

SV197-48

PAGE
OF 1

RELOCATE (1) EXISTING SUPPORT ARM AND
REPLACE HEX BOLTS, WASHERS, AND HEX
NUTS. TOTAL OF (1) SET.

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	X-0V137-48	SUPPORT ARM WELDMENT - 48"		76.32	76.32
2	4	A58234	5/8" x 2-3/4" HDG A325 HEX BOLT		0.36	1.42
3	4	A58FW	5/8" HDG A325 FLATWASHER		0.03	0.14
4	4	G58LW	5/8" HDG LOCKWASHER		0.03	0.10
5	4	A58NUT	5/8" HDG A325 HEX NUT		0.13	0.52
TOTAL WT. #						78.50



REPLACEMENT PARTS SET

TOLERANCE NOTES

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SAWED, SHEARED AND GAS CUT EDGES ($\pm 0.030"$)
DRILLED AND GAS CUT HOLES ($\pm 0.030"$) - NO CONING OF HOLES
LASER CUT EDGES AND HOLES ($\pm 0.010"$) - NO CONING OF HOLES
BENDS ARE $\pm 1/2$ DEGREE
ALL OTHER MACHINING ($\pm 0.030"$)
ALL OTHER ASSEMBLY ($\pm 0.060"$)

PROPRIETARY NOTE:
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DESCRIPTION		
48" SUPPORT ARM		

CPD NO.	DRAWN BY	ENG. APPROVAL
4470	CEK 4/14/2011	
CLASS	SUB	DRAWING USAGE
81	01	CUSTOMER

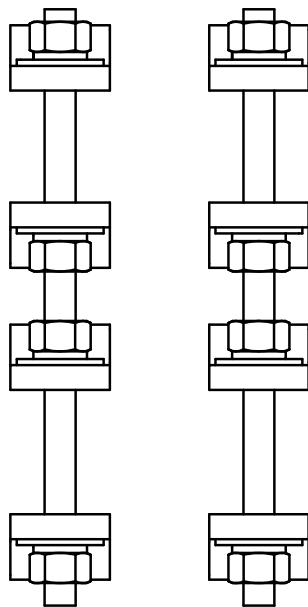
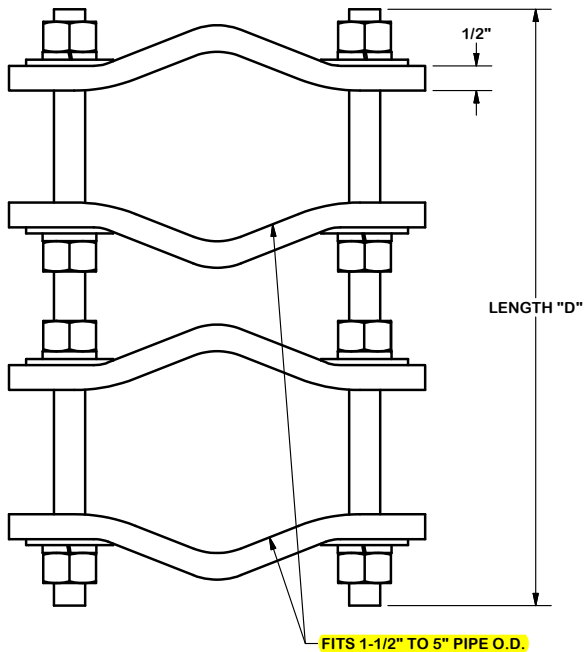
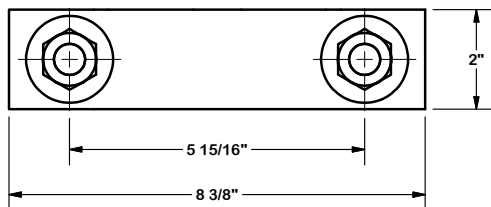
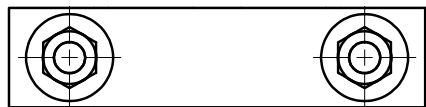
SITE PRO 1
A valmont COMPANY

Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

Engineering
Support Team:
1-888-753-7446

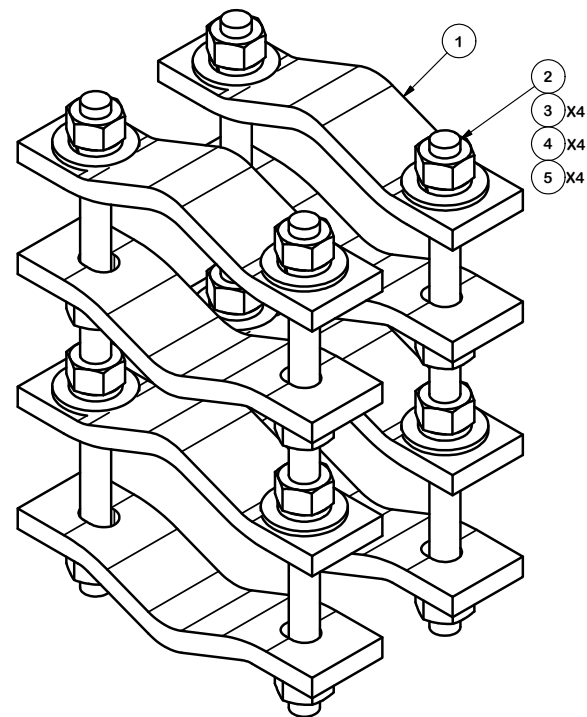
PART NO.	ORDER FASTENER PARTS ONLY	PAGE 1 OF 1
DWG. NO.	ORDER FASTENER PARTS ONLY	

ATTACH PROPOSED ANTENNA TO PROPOSED SUPPORT ARMS
USING CLAMP SET SITE PRO 1 DCP12K (TOTAL OF 2 SETS).



PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	8	DCP	CLAMP HALF, 1/2" THICK, 8-3/8"		2.40	19.20
2	B	C	5/8" THREADED ROD	D	E	F
3	16	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	2.08
4	16	G58LW	5/8" HDG LOCKWASHER		0.03	0.42
5	16	G58FW	5/8" HDG USS FLATWASHER		0.07	1.13

VARIABLE PARTS TABLE						
ASSEMBLY "A"	QTY "B"	PART "C"	LENGTH "D"	UNIT WT. "E"	NET WT. "F"	TOTAL WEIGHT
DCP12K	4	G58R-12	12"	1.05	4.18	27.01
DCP18K	4	G58R-18	18"	1.57	6.27	29.10



TOLERANCE NOTES

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DRILLED AND GAS CUT HOLES ($\pm 0.030"$) - NO CONING OF HOLES
LASER CUT EDGES AND HOLES ($\pm 0.010"$) - NO CONING OF HOLES
BENDS ARE $\pm 1/2$ DEGREE
ALL OTHER MACHINING ($\pm 0.030"$)
ALL OTHER ASSEMBLY ($\pm 0.060"$)

PROPRIETARY NOTE:
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DESCRIPTION

PIPE TO PIPE CLAMP SET
1-1/2" TO 5" PIPE
1/2" THICK CLAMP

CPD NO.	DRAWN BY	ENG. APPROVAL
	KC8 8/21/2012	
CLASS	DRAWING USAGE	CHECKED BY
81	01 CUSTOMER	CEK 1/22/2013



Engineering
Support Team:
1-888-753-7446

Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

PART NO. SEE ASSEMBLY "A"

DWG. NO. DCPxxK

TrunkLine Antenna, Standard (FCC 101, Cat A) , Single Polarized, 6 ft

RFS Microwave Antennas are designed for microwave systems in all common frequency ranges from 4 GHz to 24 GHz. This allows the use of antennas in areas where extreme wind conditions are normal. The antennas utilise a conventional feed system and are available in three performance classes offering complete flexibility when designing a network. Standard Performance antennas are economical solutions for systems where side lobe suppression is of less importance. These antennas are required for use in networks where there is a low interference potential. Antennas are available in 2 ft (0.6m) to 12 ft (3.7m) diameters. Antennas from 4ft up to 12 ft (3.7m) can be equipped with a moulded radome to reduce wind load and to protect the feed against the accumulation of ice and snow.



Antenna

FEATURES / BENEFITS

- ➔ Field-proven reliability and long life
- ➔ Withstanding winds up to 200 km/h (125 mph), an optional sway bar is available for added assurance in case mistakes are made during installation
- ➔ A single-piece configuration and compact packaging to reduce transportation costs
- ➔ Frequencies ranging from 4 GHz to 15 GHz with support for two wideband frequency ranges (5.725-6.875 and 7.125-8.5 GHz) to reduce antenna requirements and simplify logistics

Technical Features

GENERAL SPECIFICATIONS

Product Type		Point to point antennas
Profile		TrunkLine
Performance		Improved Performance
Polarization		Single
Antenna Input		CPR137G
Reflector		1-part
Radome		Optional
Antenna color		White RAL 9010
Swaybar		1: (2.0 m x Ø60 mm)

ELECTRICAL SPECIFICATIONS

Frequency	GHz	5.925 - 6.875
3dB beamwidth	degrees	1.7
Low Band Gain	dBi	38.4
Mid Band Gain	dBi	39.1
High Band Gain	dBi	39.7
F/B Ratio	dB	55.0
XPD	dB	30.0
Max VSWR / R L	VSWR / dB	1.08 (28.3)
Regulatory Compliance		FCC Category A

MECHANICAL SPECIFICATIONS

Diameter	ft (m)	6 (1.8)
Elevation Adjustment	degrees	± 5
Azimuth Adjustment	degrees	± 5
Polarization Adjustment	degrees	± 5
Mounting Pipe Diameter minimum	mm (in)	114 (4.5)
Mounting Pipe Diameter maximum	mm (in)	114 (4.5)
Approximate Weight	kg (lb)	65 (141)
Survival Windspeed	km/h (mph)	200 (125)
Operational Windspeed	km/h (mph)	190 (118)

STRUCTURE

Radome Material		Fiberglass
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FURTHER ACCESSORIES

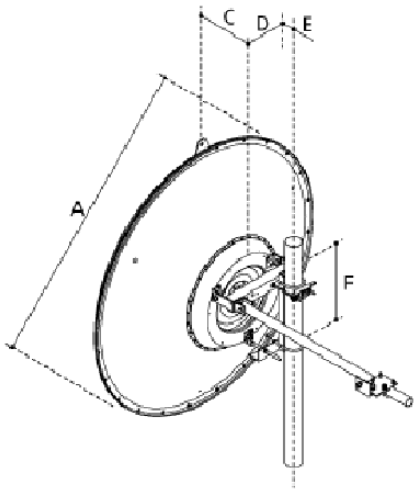
optional Swaybar		1: SMA-SK-60-2000A (2.0 m x Ø60mm)
Further Accessories		SMA-SKO-UNIVERSAL-L : Universal sway bar fixation kit



TrunkLine Antenna, Standard (FCC 101, Cat A) , Single Polarized, 6 ft

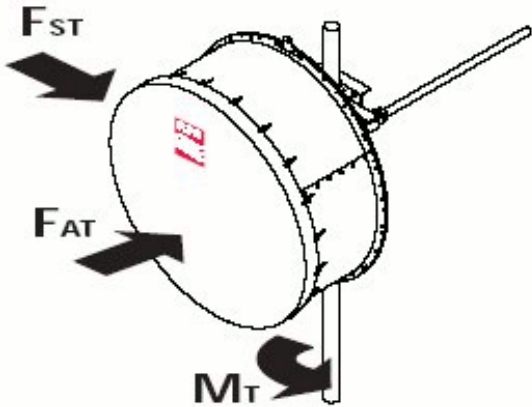
Mount Outline

Dimension A	mm (in)	2000 (79)
Dimension C	mm (in)	364 (14.3)
Dimension D for 114mm (4.5in) Pipe	mm (in)	175 (6.9)
Dimension E	mm (in)	283 (11.1)
Dimension F	mm (in)	590 (23.2)



Wind Load

FST Side force max. @ survival wind speed	N (lb)	2910 (651)
FAT Axial force max. @ survival wind speed	N (lb)	9900 (2217)
MT Torque maximum @ survival wind speed	Nm (lb ft)	3055 (2270)



External Document Links

- Complete Antenna installation
- RPE (IQ-Link format)
- RPE (PDF format)
- RPE (Pathloss format)

Only available in North America

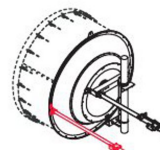
Notes



Perimeter Sway Bar for Parabolic Antennas 6ft

The perimeter sway bar reduces vibration of the reflector and increases stability of the antenna in worst case conditions.

If the perimeter sway bar is installed on a SU6/SUX6/UXA6 "high wind duty" antenna (survival windspeed = 155 mph or 252 km/h), then the operational wind speed of this antenna is increased up to 155 mph (252 km/h).



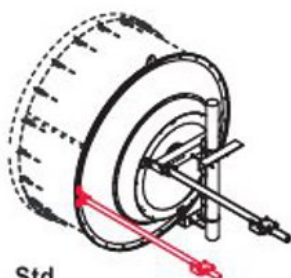
Technical Features

MECHANICAL PROPERTIES

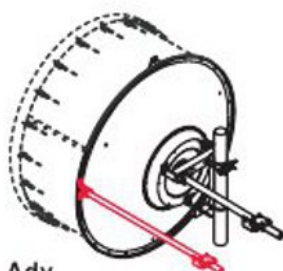
Diameter	m (ft)	1.8 (6)
Weight	kg (lb)	16 (35.3)
Sway bar length	m (ft)	1.9 (6.23)
Sway bar diameter	mm (in)	60 (2.4)

STRUCTURE

Product Type	Reinforcement Hardware
Kit Type	Perimeter Sway Bar
Material	Hot-dip galvanised steel



Std.
Backring



Adv.
Backring

External Document Links

Sway bar installation kit

Notes

The perimeter sway bar includes only the red marked parts and fixing hardware.

Only applicable for antennas PAD, PADX, DA, DAX, SU, SUX, UA, UDA, UXA antennas in 6ft.

Diameter of the sway bar: 60 mm (2.4 in)

Length of the sway bar: 1900 mm (74.8 in)

Addendum



NMT 758-00(e)

Sway Bar / Tower Connecting Kit (SMA-SKO-UNIVERSAL-L) 6-8-10-12-15 ft antennas

The sway bar / tower connecting kit allows the attachment of the sway bar extremity on tower with pipe or L-section structure profiles:

- Tower pipe compatibility: Ø 60 up to **114 mm**
- Tower L-section compatibility: L 60x60 up to L 110x110 mm
- Sway bar compatibility: FS sway bar models (Ø 60 mm)
- Antenna compatibility: from 6Ft to 15Ft

Notes:

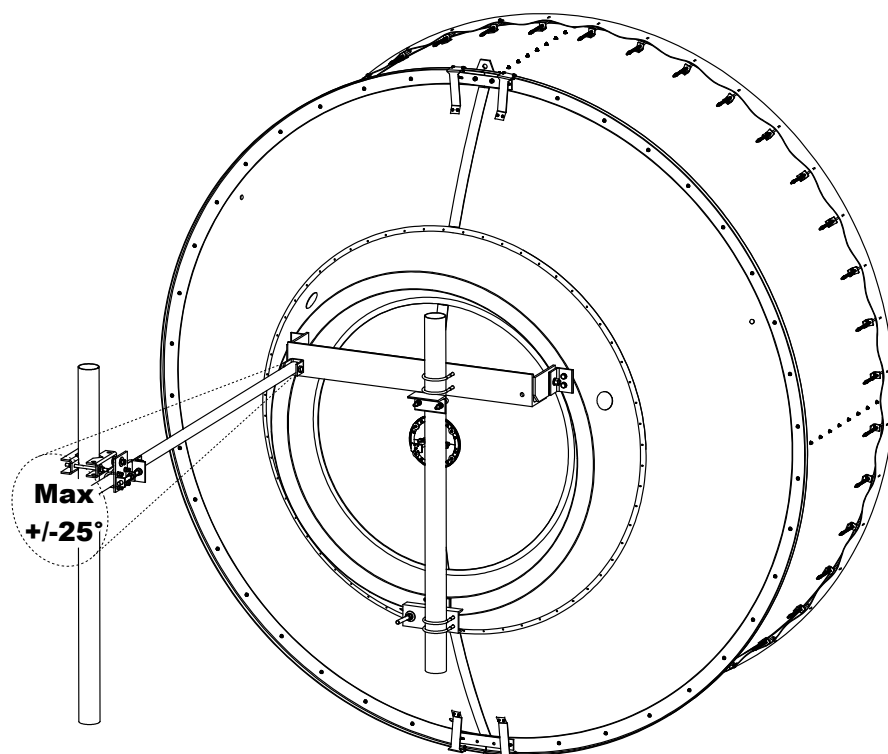
For 6 ft antennas, fine azimuth and elevation adjustments have to be done before the sway bar attachment to the sway bar / tower connecting kit.

For 8, 10 and 12 ft antennas, as the fine azimuth adjustment system is integrated on the sway bar extremity, you must adjust fine elevation before sway bar attachment.

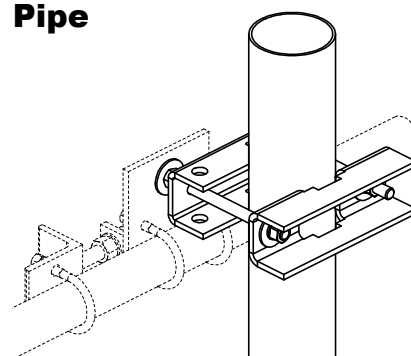


These installation instructions have been written for qualified, skilled personnel. The antenna shall be inspected once per year by qualified personnel to verify proper installation, maintenance, and condition of equipment. It is important to adhere precisely to all parts of the installation instructions. RFS disclaim any responsibility resulting from improper or unsafe installation. RFS reserves the right to alter details at any time, especially with respect to technical improvements.

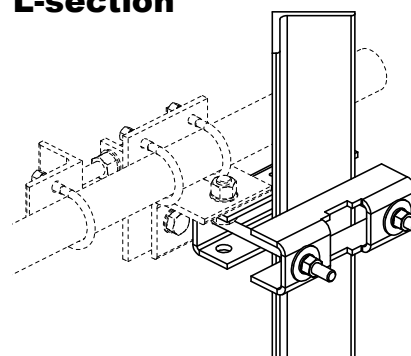
Sway bar kit installation overview (12ft antenna)



OPTION 1 Pipe



OPTION 2 L-section



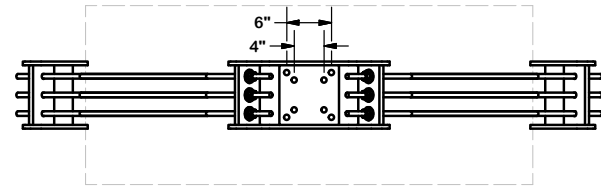
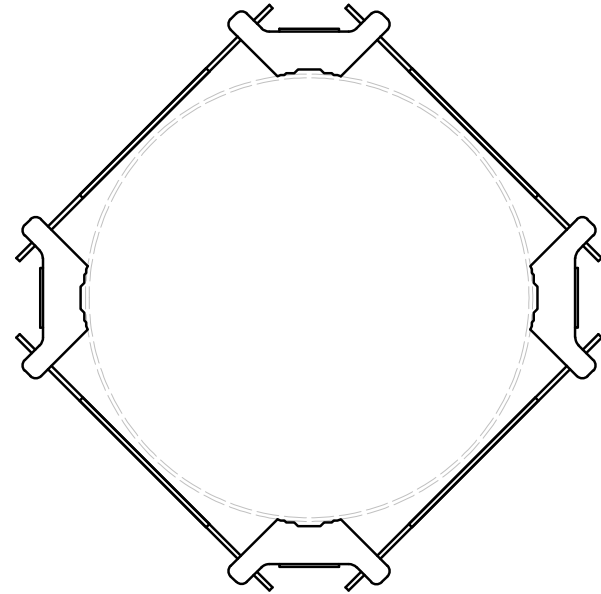
Kit supplies

Description	Qty	Description	Qty
Clamp 1 Univ. Sway-bar Kit 6-15	1	Assembly grease	1
Clamp 2 Univ. Sway-bar Kit 6-15	1		
Equipped threaded rod 1 M16/250	1		
Equipped threaded rod 1 M16/250	1		
Strut Univ. Sway-bar Kit 6-15	1		

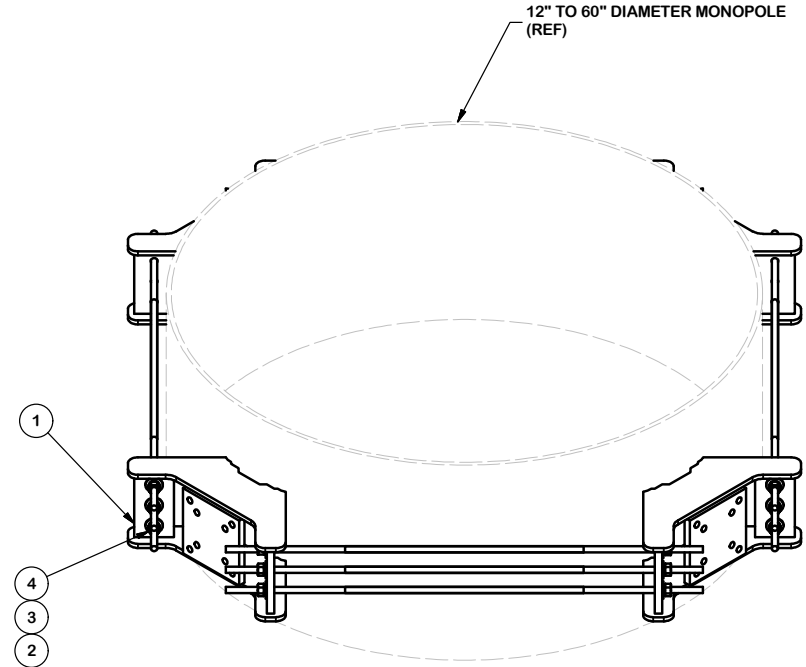
Tools and equipment required for installation

- Torque wrench 140 to 240 Nm with hex open/ring ends adapters M16(24), M20(30)
- Combination wrenches for hexagon bolts M16 (24), M20 (30)

() opening of spanner



PARTS LIST					
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT. NET WT.
1	4	X-UQB4	QUAD BRACKET WELDMENT		61.57 246.27
2	24	G58FW	5/8" HDG USS FLATWASHER	1/8 in	0.07 1.69
3	24	G58LW	5/8" HDG LOCKWASHER		0.03 0.63
4	24	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13 3.12
5	12	G58R-48	5/8" X 48" THREADED ROD (HDG.)		4.43 53.19
6	12	G58R-24	5/8" X 24" THREADED ROD (HDG.)		2.22 26.60
TOTAL WT. #					351.38



(2) PROPOSED RING MOUNTS.

TOLERANCE NOTES

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SAWED, SHEARED AND GAS CUT EDGES ($\pm 0.030''$)
DRILLED AND GAS CUT HOLES ($\pm 0.030''$) - NO CONING OF HOLES
LASER CUT EDGES AND HOLES ($\pm 0.010''$) - NO CONING OF HOLES
BENDS ARE $\pm 1/2$ DEGREE
ALL OTHER MACHINING ($\pm 0.030''$)
ALL OTHER ASSEMBLY ($\pm 0.060''$)

PROPRIETARY NOTE:
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DESCRIPTION
QUAD UNIVERSAL RING MOUNT
FOR POLES 12" TO 60"
(UQB4)

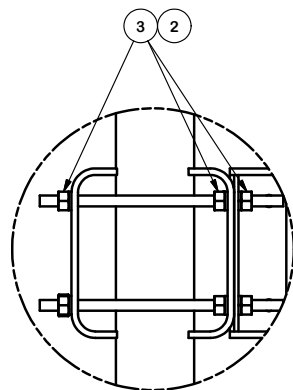
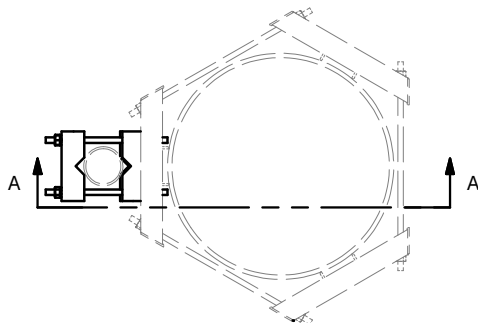
CPD NO. 4893	DRAWN BY CEK 9/20/2010	ENG. APPROVAL
CLASS 81	SUB 01	DRAWING USAGE CUSTOMER
CHECKED BY BMC 9/20/2010		



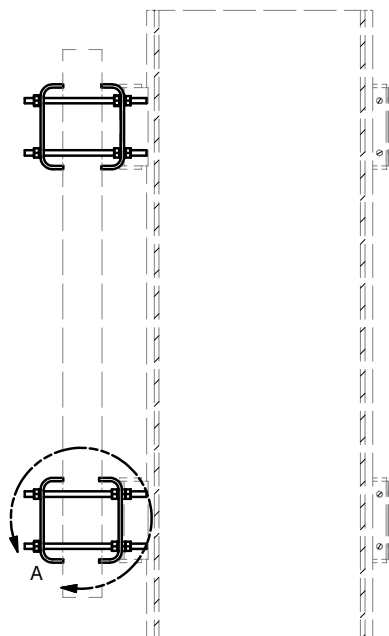
Engineering
Support Team:
1-888-753-7446

Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

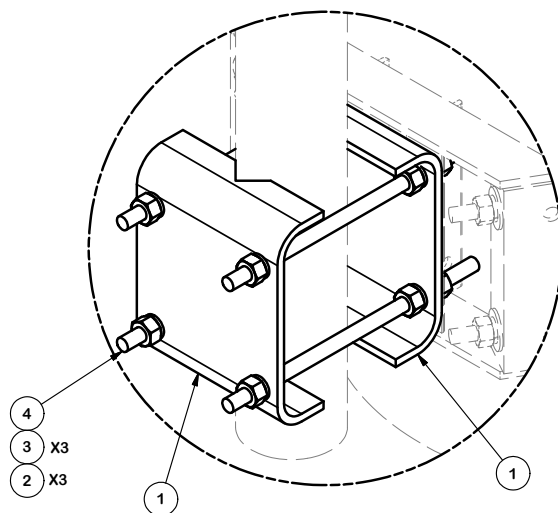
PART NO. UQB4
DWG. NO. UQB4



DETAIL A

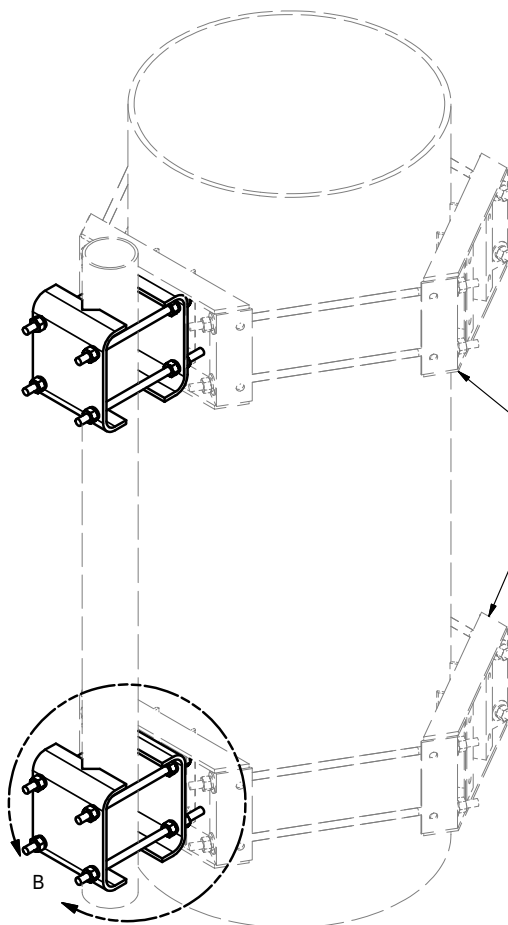


SECTION A-A



DETAIL B

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	4	X-214130	BENT PLATE V-CLAMP	12 5/8 in	11.43	45.72
2	24	G58LW	5/8" HDG LOCKWASHER		0.03	0.63
3	24	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	3.12
4	8	G58R-14	5/8" x 14" THREADED ROD (HDG.)		0.35	2.81
					TOTAL WT. #	57.05



LWRM UNIVERSAL RING MOUNT
FOR POLES 12" TO 45" DIA.
(ORDERED SEPARATELY)

OR

UGLM
MINI RING MOUNT
FOR POLES 10-1/2" TO 28" DIA.
(ORDERED SEPARATELY)

(3) PROPOSED FLUSH MOUNT ADAPTER DUAL LEVEL KITS.

(3) 4.5" OD X 6'-0" LONG MOUNT PIPES SCHEDULE 40
(SITE PRO 1 P/N P472)

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES ($\pm 0.030"$)
DRILLED AND GAS CUT HOLES ($\pm 0.030"$) - NO CONING OF HOLES
LASER CUT EDGES AND HOLES ($\pm 0.010"$) - NO CONING OF HOLES
BENDS ARE $\pm 1/2$ DEGREE
ALL OTHER MACHINING ($\pm 0.030"$)
ALL OTHER ASSEMBLY ($\pm 0.060"$)

PROPRIETARY NOTE:
THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION			
FLUSH MOUNT ADAPTER DUAL LEVEL			
CPD NO.	4195	DRAWN BY	CEK 10/12/2010
CLASS	81	DRAWING USAGE	CUSTOMER
ENG. APPROVAL		CHECKED BY	BMC 10/13/2010



Engineering
Support Team:
1-888-753-7446

Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

PART NO.	FMA2	PAGE	1 OF 1
DWG. NO.	FMA2		



CT_ChapelHillRS_ES_180ft_GT
 Latitude 41 28 08.31 N
 Longitude 072 12 16.66 W
 Azimuth 110.90°
 Elevation 607 ft ASL
 Antenna CL 170.0 ft AGL

Frequency (MHz) = 6130.0
 K = 1.33, 0.67
 %F1 = 100.00, 30.00

CT_Stonington_SBA_190ft_MP
 Latitude 41 22 55.26 N
 Longitude 071 54 12.91 W
 Azimuth 291.10°
 Elevation 141 ft ASL
 Antenna CL 150.0 ft AGL

Microwave Path Data Sheet

Page 2 of 2

COMSEARCH

19700 Janelia Farm Boulevard, Ashburn, VA, 20147

(703)636-5234 www.comsearch.com

PCN Date: 09/18/2019

Job Number 190918COMSDS04

New Path

RCN Number: 19091852

Administrative Information**CHAPEL HILL CT****STONINGTON CT**

City/County /New London
 Status / License Basis Engineering Proposal / PRIMARY OPERATION
 Call Sign WNER798
 Licensee Code S68716
 Licensee Name Eversource Energy Service Company
 Radio Service / Station Class MG -- Microwave Industrial/Business Pool

/New London
 Engineering Proposal / PRIMARY OPERATION
 S68716
 Eversource Energy Service Company
 FXO -- Fixed

Site Information

Latitude (NAD 83) 41 ° 28' 7.3" N
 Longitude (NAD 83) 72 ° 12' 15.2" W
 Ground Elevation (m/ft-AMSL) 182.90 / 600.1
 Antenna Structure Registration #
 Path Azimuth (°) 110.858
 Path Length (km / miles) 26.911 / 16.722

41 ° 22' 55.3" N
 71 ° 54' 12.9" W
 34.63 / 113.6

291.057

Transmit Antenna

44008C
 Manufacturer RFS
 Model PAD6-59B
 Gain(dBi) / Beamwidth(°) / Tilt(°) 38.7 / 1.80 / -0.42
 Centerline (m / ft - AGL) 51.82 / 170.0

44008C
 RFS
 PAD6-59B
 38.7 / 1.80 / 0.24
 45.72 / 150.0

Receive Antenna

Same As Transmit

Manufacturer
 Model
 Gain (dBi) / Beamwidth (°)
 Centerline (m / ft - AGL)

Diversity Receive Antenna

Manufacturer
 Model
 Gain (dBi) / Beamwidth (°)
 Centerline (m / ft - AGL)

Radio Information

TEEV62
 Manufacturer Aviat Networks, Inc.
 Model I600V4HL6-30M 256Q 179
 Model Description ECLIPSE IRU 600 RAC 60-6X MAX TP
 Emission Designator / Modulation 30M0D7W 256 QAM
 Loading 1 CH DIG 179000.000
 Stability (%) 0.0005

	Nominal	Coordinated	Maximum
Power (dBm)		31.0	
Received Level (dBm)		-36.8	
EIRP (dBm)		65.4	

Fixed Loss: Tx / Common (dB) 0.0 / 4.3
 Free Space Loss (dB) 136.9

TEEV62
 Aviat Networks, Inc.
 I600V4HL6-30M 256Q 179
 ECLIPSE IRU 600 RAC 60-6X MAX TP
 30M0D7W 256 QAM
 1 CH DIG 179000.000
 0.0005

	Nominal	Coordinated	Maximum
		31.0	
		-36.8	
		65.7	

0.0 / 4.0

Transmit Frequencies (MHz) 6004.5000V(13T)

6256.5400V(23T)

ATTACHMENT D – STRUCTURAL ANALYSIS REPORT



SBA Communications Corporation
8051 Congress Avenue
Boca Raton, FL 33487-1307

T + 561.995.7670
F + 561.995.7626

sbsite.com

Structural Analysis Report

Client: CL&P

Client Site ID / Name: ES-026 / Stonington
Application #: 104045, v5

SBA Site ID / Name: CT00235-B / Stony Brook

190 ft. Monopole

Taugwonk Spur Road No. 2
Stonington, Connecticut 06378
Lat: 41.382249, Long: -71.903444

Project number: CT00235-CLP-030520_Rev1

Analysis Results

Tower	74.0%	Pass
Foundation	71.0%	Pass

Change in tower stress due to mount modification / replacement	1.62%
--	-------

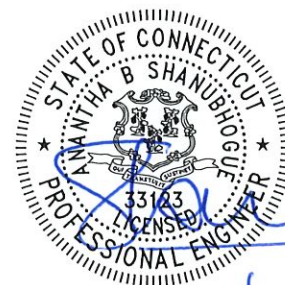
Prepared by:

Breann Parreira
Structural Engineer I
561-981-7388
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Reviewed by:

Anantha Shanubhogue, P.E.
Senior Manager, Structural Engineering
561-981-7390
SShanubhogue@sbsite.com

December 22, 2020



12/22/20



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sbasite.com

Structural Analysis Report

Client: CL&P

Client Site ID / Name: ES-026 / Stonington
Application #: 104045, v5

SBA Site ID / Name: CT00235-B / Stony Brook

190 ft. Monopole

Taugwonk Spur Road No. 2
Stonington, Connecticut 06378
Lat: 41.382249, Long: -71.903444

Project number: CT00235-CLP-030520_Rev1

Analysis Results

Tower	74.0%	Pass
Foundation	71.0%	Pass

Change in tower stress due to mount modification / replacement	1.62%
--	-------

Prepared by:

Breann Parreira
Structural Engineer I
561-981-7388
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Reviewed by:

Anantha Shanubhogue, P.E.
Senior Manager, Structural Engineering
561-981-7390
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December 22, 2020

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 Tower Geometry.....

 Coax Layout.....

 TESPole Report.....

 Foundation Analysis Report.....



Introduction

The purpose of this report is to summarize the analysis results on the 190 ft. Monopole to support the proposed antennas and transmissions lines in addition to those currently installed.

Table 1 List of Documents Used

Item	Document
Tower design/drawings	Summit Manufacturing Inc, Job # 3535, Dated: 05/14/1998
Foundation drawings	Paul J Ford and Company, Project # 29298-318, Dated: 05/06/1998
Geotechnical report	SAGE Environmental Inc, Project # S598, Dated:04/22/98
Modification drawings	N/A
Latest SA	SBAE, CT00235-CLP-080119, Dated 08/14/2019

Analysis Criteria

Table 2 Code Related Data

Jurisdiction (State/County/City)	Connecticut / New London / Stonington
Governing Codes	ANSI/TIA/EIA 222-H, 2018 IBC / 2018 CSBC
Ultimate Wind Speed (3-Sec gust)	140 mph
Wind Speed with Ice (3-Sec gust)	50 mph
Service Wind Speed (3-Sec gust)	60 mph
Ice Thickness	1"
Risk category	II
Exposure Category	C
Topographic Category	1
Crest Height	0 ft.
Ground Elevation	137.29 ft.
Seismic Parameter S_s	0.159
Seismic Parameter S_1	0.058

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

Appurtenance Loading

Existing Loading:

Table 3 Existing Appurtenances

Mount Elev. (ft)	CL Elev. (ft)	Type	Qty	Manufacturer	Model	Feed Line Size	Mount Type Qty.	Carrier
190	194	Dipole	1	Telware	ANT150D3	(1) 7/8"	Direct Mount	SPD
172.5	172.5	Panel	3	Ericsson	Air B2A B4P	(12) 1-5/8" (1) 1-5/8" Fiber	13' Low Profile platform w/Site Pro PDK 1245 Support Kit	T-Mobile
		Panel	3	Ericsson	Air B4A B2P			
		Panel	3	Commscope	LNK-6515DS			
		TMA	3	Ericsson	KRY 112 144/1			
		RRU	3	Ericsson	S11B12			
150	156.5	Omni	1	RFS	458-2	(3) 7/8"	(1) Universal Ring Mount (Site Pro UQB4), (2) 4' Side Arm (Site Pro SV197-48)	CL&P
	156.5	Omni	1	RFS	220-3AN			
	156	Omni	1	PD	1142-2C			
	153	Omni	1	Telewave	ANT450D6			
145	145	Panel	3	RFS	APXVTM14-C-I20	(4) 1-1/4" Fiber	Low Profile Platform, (1) SitePro HRK14-U Handrail Kit, (1) SitePro PRK-SFS-H-L Vbrace Kit, (1) SitePro PRK-1245L reinforcement kit, (6) SitePro SCX1-K Brackets, (3) Pipe2.0STD x 4' long corner braces, (3) Pipe2.0STD x 14' horizontal rails	Sprint Nextel
		Panel	3	Commscope	NNVV-65B-R4			
		RRU	3	ALU	1900 MHz			
		RRU	6	ALU	800 MHz			
		RRU	3	ALU	TD-RRH8x20-25			
114	123.7	Omni	1	RFS	220-7N	(3) 7/8"	(1) Universal Ring Mount (Site Pro UQB4), (3) 4' Side Arm (Site Pro SV197-48)	CL&P
	123	Omni	1	Telewave	ANT450D6			
46.5	46.5	GPS	1	-	GPA	(1) 1/2"	(1) 4' Standoff	Sprint Nextel

Proposed Loading:

Information pertaining to proposed antennas and transmission lines were based upon the Application #: 104045, v5 from CL&P and is listed in Table 4.

Table 4 Proposed Appurtenances

Mount Elev. (ft)	CL Elev. (ft)	Type	Qty	Manufacturer	Model	Feed Line Size	Mount Type Qty.	Carrier
155	155	Dish	1	RFS	PAD6-59A	(1) EJ65 (2"x1.2" Elliptical)	(2) Universal Ring Mount, (Site Pro UQB4), (3) Mount Adapter Kits, (Site Pro FMA2), (2) Perimeter Sway Bar, (RFS SMA-SK-60-2000A), (3) Sway Bar Clamp, (RFS SMA-KO-UNIVERSAL-L), (3) 4.5" OD x 6 ft long mount pipes, (Site Pro P472)	CL&P
150	156.5	Omni	1	RFS	458-2	(4) 7/8" (1) 1/2"	Universal Ring Mount (Site Pro UQB4), (3) 4' Side Arm (Site Pro SV197-48)	
	153	Omni	1	Decibel	DB586-Y			
	152.1	Omni	1	Telewave	ANT220F2			
	150	TTA	1	Powerwave	LGP104NN			
114	123.7	Omni	1	RFS	220-7N	(3) 7/8"	(1) 5.1' Side Arm, (4) 4' Side Arm (SV197-48)	
	120	Omni	1	RFS	220-3AN			
	120	Omni	1	PD	1142-2C			
	116.75	Dipole	1	Comprod	871F-70-220-025			

Analysis Results

Tower

The results of the structural analysis are shown below in table 5. Additional information for the tower analysis is provided within the Appendix.

Table 5 Tower Analysis Summary

	Pole shafts	Anchor Bolts	Base Plate
Max. Usage:	74.0%	73.5%	60.0%
Pass/Fail	Pass	Pass	Pass

Foundation

The results of the foundation analysis are shown below in table 6. Additional information for the foundation analysis is provided within the Appendix.

Table 6 Foundation Analysis Summary

Structural Component	Max Usage (%)	Analysis Result
Foundation	71.0%	Pass

Operational Condition (Rigidity)

The results of the twist and sway values for the final proposed loading from the carrier based on service winds as specified in the Analysis Criteria are shown below in table 7;

Table 7 Twist and Sway (for dishes only)

Elev (ft.)	Model	Calculated Twist/Sway (°)
155	PAD6-59A	0.910

Client must review the operational limits of the Microwave dish

Conclusions

Based on the analysis results, the existing tower and foundation were found to be **sufficient** to safely support the equipment listed in this analysis. No modification to the tower and foundation is needed at this time.

Installation Requirements

This analysis was performed under the assumption that the carrier will place the proposed equipment and feed lines at the installation height listed in Table 4 and in accordance with the coax layout shown. TMAs and RRUs are to be installed on existing mounts behind tenant's antennas unless otherwise noted. No equipment is to be installed directly in the climbing path. All equipment is to be installed per mount manufacturer specifications. In case site conditions do not allow for the required installation parameters to be met the carrier must notify SBA Communications Corporation engineers for approval of an alternative placement.

Assumptions and Limitations

Assumptions

This analysis was completed based on the following assumptions:

- Tower and foundation were built in accordance to manufacturer specifications.
- Tower and foundation has been properly maintained in accordance with the manufacturer's specifications
- All existing structural members were assumed to be in good condition with no physical damage or deterioration associated with corrosion
- Welds and bolts are assumed able to carry their intended original design loads.
- The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Table 3 and 4.
- This analysis may be affected if any assumptions are not valid or have been made in error. SBA should be notified to determine the effect on the structural integrity of the tower.

Limitations

The computer generated analysis performed by the tower software is limited to theoretical capacities of the towers structural members and does not account for any missing or damaged members or connections. The tower and foundation are assumed to have been properly designed, fabricated, installed and maintained, barring any conflicting findings from the most recent inspection.

SBA Communications Corporation has used its due diligence to verify the information provided to perform this analysis. It is unreasonable to perform a more detailed inspection of a tower and its components. This report is not a condition assessment of the tower or foundation.

Appendix

Usage Diagram - Max Ratio 74.00% at 0.0ft

Structure: CT00235-B
Site Name: Stony Brook
Height: 190.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-H
Exposure: C
Gh: 1.1

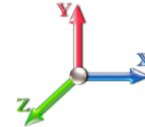
12/22/2020

Page: 1



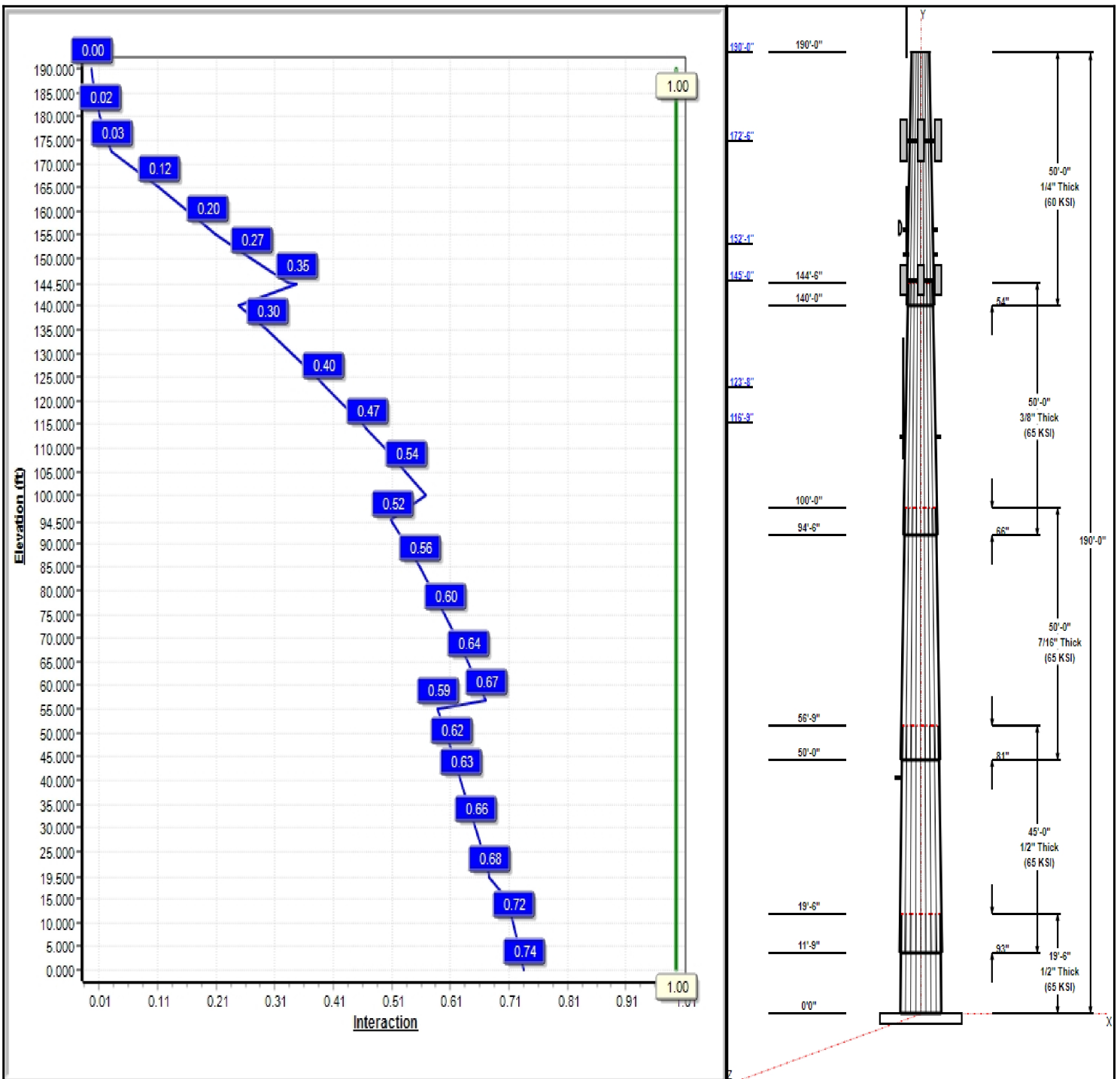
Dead Load Factor: 1.20
Wind Load Factor: 1.00

Load Case : 1.2D + 1.0W 140 mph Wind



Iterations: 25

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Structure: CT00235-B

Type: Tapered
Site Name: Stony Brook
Height: 190.00 (ft)
Base Elev: 0.00 (ft)

Base Shape: 18 Sided
Taper: 0.22003

12/22/2020

Page: 2



Shaft Properties

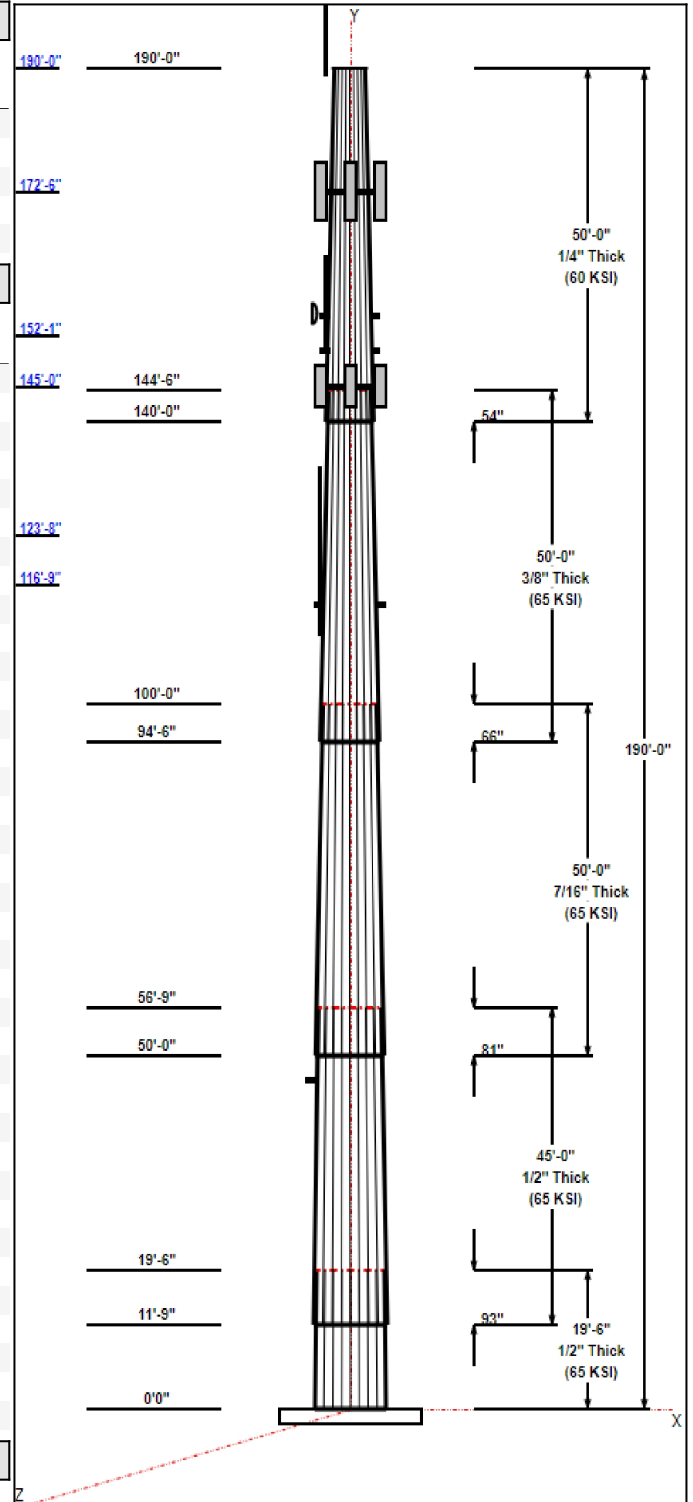
Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	19.50	58.39	62.68	0.500		0.22003	65
2	45.00	51.19	61.09	0.500	Slip	0.22003	65
3	50.00	42.55	53.55	0.438	Slip	0.22003	65
4	50.00	33.51	44.51	0.375	Slip	0.22003	65
5	50.00	24.00	35.00	0.250	Slip	0.22003	60

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
190.00	194.00	1	ANT150D3	SPD
172.50	172.50	3	Ericsson Air21 B2A/B4P	T-Mobile
172.50	172.50	3	Ericsson AIR 21 B4A/B2P	T-Mobile
172.50	172.50	3	LNx-6515DS	T-Mobile
172.50	172.50	3	Ericsson KRY 112 144/1	T-Mobile
172.50	172.50	3	S11B12	T-Mobile
172.50	172.50	1	PRK-1245	T-Mobile
172.50	172.50	1	Low Profile	T-Mobile
156.50	156.50	1	458-2	CL&P
155.00	155.00	2	Universal Ring Mount (Site	CL&P
155.00	155.00	3	Pipe mounts	CL&P
155.00	155.00	1	PAD6-59A	CL&P
153.00	153.00	1	DB586-Y	CL&P
152.10	152.10	1	ANT220F2	CL&P
150.00	150.00	1	LGP104NN	CL&P
150.00	150.00	1	4' Side Arm (Site Pro	CL&P
150.00	150.00	1	Universal Ring Mount (Site	CL&P
150.00	150.00	2	4' Side Arm (Site Pro	CL&P
145.00	145.00	1	Horizontal Rail & SCX1-K	Sprint Nextel
145.00	145.00	1	HRK14	Sprint Nextel
145.00	145.00	1	PRK-1245 (kicker kit)	Sprint Nextel
145.00	145.00	1	(3) SFS-H-L (V-Braces)	Sprint Nextel
145.00	145.00	3	APXVTM14-C-I20	Sprint Nextel
145.00	145.00	3	NNVV-65B-R4	Sprint Nextel
145.00	145.00	3	1900 MHz RRUs	Sprint Nextel
145.00	145.00	6	800 MHz RRUs	Sprint Nextel
145.00	145.00	3	TD-RRH8x20-25	Sprint Nextel
145.00	145.00	1	Low Profile Platform-flat	Sprint Nextel
123.70	123.70	1	220-7N Omni	CL&P
120.00	120.00	1	220-3AN	CL&P
120.00	120.00	1	1142-2C	CL&P
116.75	116.75	1	871F-70-220-025	CL&P
114.00	114.00	3	4' Side Arm (Site Pro	CL&P
114.00	114.00	1	4' Side Arm (Site Pro	CL&P
114.00	114.00	1	5.1' Side Arm (Site Pro) w/	CL&P
46.50	46.50	1	3 ft Standoff	Sprint Nextel
46.50	46.50	1	GPS	Sprint Nextel

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	190.00	Inside	7/8" Coax	SPD
0.00	172.50	Inside	1 5/8" Coax	T-Mobile
0.00	172.50	Inside	1 5/8" Fiber	T-Mobile
0.00	155.00	Inside	E65J	CL&P



Structure: CT00235-B

Type: Tapered	Base Shape: 18 Sided	12/22/2020
Site Name: Stony Brook	Taper: 0.22003	
Height: 190.00 (ft)		
Base Elev: 0.00 (ft)		Page: 3



0.00	150.00	Inside	1/2" Coax	CL&P
0.00	150.00	Inside	7/8" Coax	CL&P
0.00	145.00	Inside	1-1/4" Fiber	Sprint Nextel
0.00	114.00	Inside	7/8" Coax	CL&P
0.00	46.50	Outside	1/2" GPS Line	Sprint Nextel

Anchor Bolts

Qty	Specifications	Grade (ksi)	Arrangement
24	2.25" 18J	75.0	Cluster

Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
3.5000	71.0	50.0	Clipped

Reactions

Load Case	Moment (FT-Kips)	Shear (Kips)	Axial (Kips)
1.2D + 1.0W 140 mph Wind	6386.3	53.3	65.1
0.9D + 1.0W 140 mph Wind	6332.3	53.3	48.8
1.2D + 1.0Di + 1.0W 50 mph Wind	1307.0	11.0	82.6
1.2D + 1.0Ev + 1.0Eh	128.8	0.9	67.3
0.9D + 1.0Ev + 1.0Eh	128.1	0.9	51.0
1.0D + 1.0W 60 mph Wind	1045.0	8.8	54.3

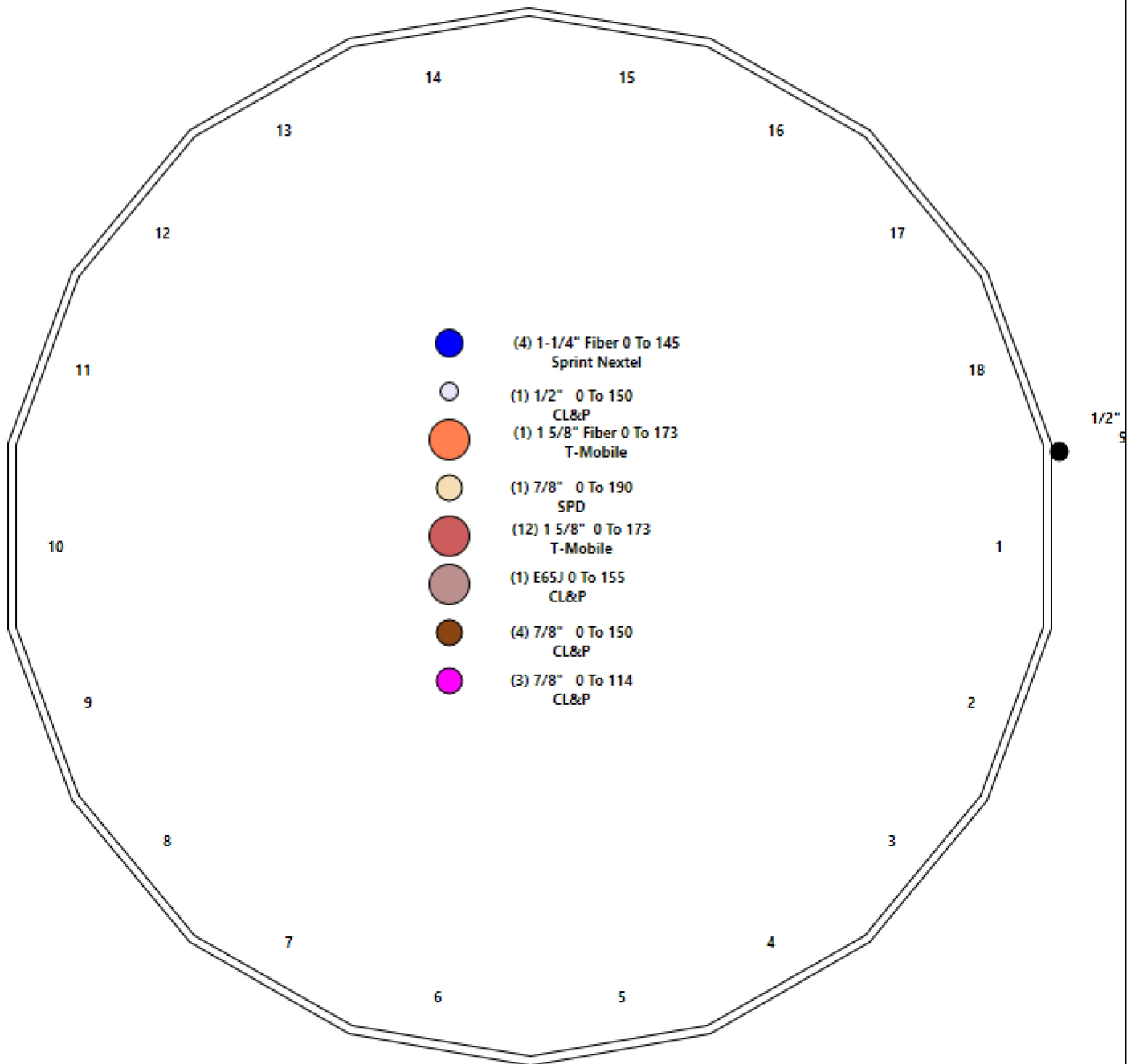
Structure: CT00235-B - Coax Line Placement

Type: Monopole
Site Name: Stony Brook
Height: 190.00 (ft)

12/22/2020



Page: 4



Shaft Properties

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Struct Class: II
		Page: 1



Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	18	19.500	0.5000	65		0.00	6,322
2	18	45.000	0.5000	65	Slip	93.00	13,522
3	18	50.000	0.4375	65	Slip	81.00	11,249
4	18	50.000	0.3750	65	Slip	66.00	7,824
5	18	50.000	0.2500	60	Slip	54.00	3,949
Total Shaft Weight:							42,865

Bottom

Top

Sec. No.	Dia (in)	Elev (ft)	Area (sqin)	Ix (in^4)	W/t Ratio	D/t Ratio	Dia (in)	Elev (ft)	Area (sqin)	Ix (in^4)	W/t Ratio	D/t Ratio	Taper
1	62.68	0.00	98.68	48202.16	20.69	125.36	58.39	19.50	91.87	38896.7	19.18	116.7	0.220026
2	61.09	11.75	96.16	44608.55	20.13	122.19	51.19	56.75	80.45	26119.8	16.64	102.3	0.220026
3	53.55	50.00	73.76	26290.75	20.17	122.41	42.55	100.00	58.48	13104.7	15.74	97.26	0.220026
4	44.51	94.50	52.53	12930.02	19.52	118.70	33.51	144.50	39.44	5471.21	14.35	89.36	0.220026
5	35.00	140.0	27.57	4207.25	23.28	140.01	24.00	190.00	18.84	1343.00	15.52	96.00	0.220026

Load Summary

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Struct Class: II
		Page: 2



Discrete Appurtenances

No.	Elev (ft)	Description	Qty	No Ice			Ice			Hor. Ecc. (ft)	Vert Ecc (ft)
				Weight (lb)	CaAa (sf)	CaAa Factor	Weight (lb)	CaAa (sf)	CaAa Factor		
1	190.00	ANT150D3	1	18.00	2.18	1.00	67.93	7.979	1.00	0.00	4.00
2	172.50	Ericsson Air21 B2A/B4P	3	91.50	6.09	0.86	198.60	6.816	0.86	0.00	0.00
3	172.50	Ericsson AIR 21 B4A/B2P	3	105.80	6.51	0.87	223.14	7.308	0.87	0.00	0.00
4	172.50	LNx-6515DS	3	50.30	11.45	0.84	222.33	12.579	0.84	0.00	0.00
5	172.50	Ericsson KRY 112 144/1 TMAs	3	11.00	0.41	0.70	18.29	0.731	0.75	0.00	0.00
6	172.50	S11B12	3	51.00	2.83	0.71	97.57	3.277	0.71	0.00	0.00
7	172.50	PRK-1245	1	464.91	9.50	1.00	684.32	16.225	1.00	0.00	0.00
8	172.50	Low Profile Platform-flat	1	1200.00	25.00	1.00	1907.91	39.158	1.00	0.00	0.00
9	156.50	458-2	1	22.00	3.72	1.00	94.15	6.917	1.00	0.00	0.00
10	155.00	Universal Ring Mount (Site Pro	2	282.20	0.33	1.00	661.02	0.831	1.00	0.00	0.00
11	155.00	Pipe mounts	3	30.00	2.25	1.00	70.27	2.460	1.00	0.00	0.00
12	155.00	PAD6-59A	1	185.00	35.67	1.00	523.14	38.004	1.00	0.00	0.00
13	153.00	DB586-Y	1	8.25	1.01	1.00	26.21	2.210	1.00	0.00	0.00
14	152.10	ANT220F2	1	11.00	1.04	1.00	33.99	1.659	1.00	0.00	0.00
15	150.00	LGP104NN	1	12.30	0.37	1.00	21.95	0.558	1.00	0.00	0.00
16	150.00	4' Side Arm (Site Pro SV197-48)	1	40.00	2.63	1.00	93.52	6.609	1.00	0.00	0.00
17	150.00	Universal Ring Mount (Site Pro	1	282.20	0.33	1.00	659.78	0.829	1.00	0.00	0.00
18	150.00	4' Side Arm (Site Pro SV197-48)	2	40.00	2.63	1.00	93.52	6.609	1.00	0.00	0.00
19	145.00	Horizontal Rail & SCX1-K	1	302.36	9.97	1.00	540.77	16.444	1.00	0.00	0.00
20	145.00	HRK14	1	302.36	8.13	1.00	540.77	13.409	1.00	0.00	0.00
21	145.00	PRK-1245 (kicker kit)	1	464.91	9.50	1.00	680.54	16.109	1.00	0.00	0.00
22	145.00	(3) SFS-H-L (V-Braces)	1	230.00	9.70	1.00	443.36	16.448	1.00	0.00	0.00
23	145.00	APXVTM14-C-I20	3	56.20	6.34	0.77	155.65	7.064	0.77	0.00	0.00
24	145.00	NNVV-65B-R4	3	77.40	12.27	0.74	267.13	13.238	0.74	0.00	0.00
25	145.00	1900 MHz RRUs	3	44.00	3.80	0.88	116.53	4.723	0.88	0.00	0.00
26	145.00	800 MHz RRUs	6	53.00	2.49	0.92	102.14	3.250	0.92	0.00	0.00
27	145.00	TD-RRH8x20-25	3	70.00	4.05	0.69	138.36	4.576	0.69	0.00	0.00
28	145.00	Low Profile Platform-flat	1	1200.00	25.00	1.00	1895.72	38.914	1.00	0.00	0.00
29	123.70	220-7N Omni	1	22.00	5.32	1.00	156.85	9.754	1.00	0.00	0.00
30	120.00	220-3AN	1	24.00	5.69	1.00	118.33	10.470	1.00	0.00	0.00
31	120.00	1142-2C	1	24.00	2.14	1.00	88.45	5.085	1.00	0.00	0.00
32	116.75	871F-70-220-025	1	30.00	2.52	1.00	257.21	4.653	1.00	0.00	0.00
33	114.00	4' Side Arm (Site Pro SV197-48)	3	40.00	2.63	1.00	92.07	6.501	1.00	0.00	0.00
34	114.00	4' Side Arm (Site Pro SV197-48)	1	40.00	2.63	1.00	92.07	6.501	1.00	0.00	0.00
35	114.00	5.1' Side Arm (Site Pro) w/ ring	1	40.00	2.63	1.00	92.07	6.501	1.00	0.00	0.00
36	46.50	3 ft Standoff	1	40.00	2.63	1.00	87.60	6.169	1.00	0.00	0.00
37	46.50	GPS	1	10.00	1.00	1.00	27.39	1.422	1.00	0.00	0.00
Totals:			66	7,817.29			16,055.78				

Linear Appurtenances

Bottom Elev. (ft)	Top Elev. (ft)	Description	Exposed Width	Exposed
0.00	190.00	(1) 7/8" Coax	0.00	Inside
0.00	172.50	(12) 1 5/8" Coax	0.00	Inside
0.00	172.50	(1) 1 5/8" Fiber	0.00	Inside
0.00	155.00	(1) E65J	0.00	Inside

Discrete Appurtenances

No.	Elev (ft)	Description	Qty	No Ice			Ice			Hor. Ecc. (ft)	Vert Ecc (ft)
				Weight (lb)	CaAa (sf)	CaAa Factor	Weight (lb)	CaAa (sf)	CaAa Factor		
0.00	150.00	(1) 1/2" Coax		0.00	Inside						
0.00	150.00	(4) 7/8" Coax		0.00	Inside						
0.00	145.00	(4) 1-1/4" Fiber		0.00	Inside						
0.00	114.00	(3) 7/8" Coax		0.00	Inside						
0.00	46.50	(1) 1/2" GPS Line		0.50	Outside						

Shaft Section Properties

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Struct Class: II
		Page: 4



Increment Length: 5 (ft)

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fpy (ksi)	S (in^3)	Weight (lb)
0.00		0.5000	62.680	98.676	48202.2	20.69	125.36	77.1	1514.	0.0
5.00		0.5000	61.580	96.930	45688.7	20.31	123.16	77.5	1461.	1664.0
10.00		0.5000	60.480	95.184	43264.1	19.92	120.96	78.0	1409.	1634.3
11.75	Bot - Section 2	0.5000	60.095	94.573	42436.3	19.78	120.19	78.1	1390.	565.0
15.00		0.5000	59.380	93.439	40926.9	19.53	118.76	78.4	1357.	2096.8
19.50	Top - Section 1	0.5000	59.389	93.454	40947.5	19.53	118.78	0.0	0.0	2861.8
20.00		0.5000	59.279	93.280	40718.5	19.49	118.56	78.5	1352.	158.9
25.00		0.5000	58.179	91.534	38474.7	19.11	116.36	78.9	1302.	1572.2
30.00		0.5000	57.079	89.788	36314.9	18.72	114.16	79.4	1253.	1542.5
35.00		0.5000	55.979	88.042	34237.5	18.33	111.96	79.8	1204.	1512.8
40.00		0.5000	54.879	86.296	32240.9	17.94	109.76	80.3	1157.	1483.1
45.00		0.5000	53.779	84.550	30323.4	17.55	107.56	80.8	1110.	1453.4
46.50		0.5000	53.449	84.027	29763.4	17.44	106.90	80.9	1096.	430.2
50.00	Bot - Section 3	0.5000	52.679	82.805	28483.5	17.17	105.36	81.2	1065.	993.5
55.00		0.5000	51.579	81.059	26719.6	16.78	103.16	81.7	1020.	2635.9
56.75	Top - Section 2	0.4375	52.069	71.694	24146.5	19.57	119.01	0.0	0.0	909.4
60.00		0.4375	51.353	70.701	23157.1	19.29	117.38	78.7	888.2	787.4
65.00		0.4375	50.253	69.173	21688.2	18.84	114.86	79.2	850.0	1189.9
70.00		0.4375	49.153	67.645	20282.8	18.40	112.35	79.8	812.8	1163.9
75.00		0.4375	48.053	66.118	18939.5	17.96	109.84	80.3	776.3	1137.9
80.00		0.4375	46.953	64.590	17656.8	17.51	107.32	80.8	740.7	1111.9
85.00		0.4375	45.853	63.062	16433.4	17.07	104.81	81.3	705.9	1085.9
90.00		0.4375	44.753	61.535	15267.9	16.63	102.29	81.8	672.0	1059.9
94.50	Bot - Section 4	0.4375	43.763	60.160	14267.2	16.23	100.03	82.3	642.1	931.7
95.00		0.4375	43.652	60.007	14158.8	16.18	99.78	82.4	638.8	191.5
100.00	Top - Section 3	0.3750	43.302	51.092	11895.4	18.95	115.47	0.0	0.0	1888.4
105.00		0.3750	42.202	49.783	11004.1	18.43	112.54	79.7	513.6	858.1
110.00		0.3750	41.102	48.474	10158.4	17.92	109.61	80.3	486.8	835.9
114.00		0.3750	40.222	47.426	9514.0	17.50	107.26	80.8	465.9	652.7
115.00		0.3750	40.002	47.164	9357.3	17.40	106.67	80.9	460.7	160.9
116.75		0.3750	39.617	46.706	9087.1	17.22	105.65	81.1	451.8	279.5
120.00		0.3750	38.902	45.855	8599.4	16.88	103.74	81.5	435.4	511.8
123.70		0.3750	38.088	44.886	8065.7	16.50	101.57	82.0	417.1	571.2
125.00		0.3750	37.802	44.546	7883.5	16.36	100.80	82.2	410.8	197.8
130.00		0.3750	36.702	43.236	7208.6	15.85	97.87	82.5	386.9	746.8
135.00		0.3750	35.601	41.927	6573.3	15.33	94.94	82.5	363.7	724.5
140.00	Bot - Section 5	0.3750	34.501	40.617	5976.5	14.81	92.00	82.5	341.2	702.2
144.50	Top - Section 4	0.2500	34.011	26.789	3857.8	22.58	136.04	0.0	0.0	1029.1
145.00		0.2500	33.901	26.701	3820.2	22.50	135.60	70.1	221.9	45.5
150.00		0.2500	32.801	25.828	3457.6	21.72	131.20	70.9	207.6	446.9
152.10		0.2500	32.339	25.462	3312.5	21.40	129.36	71.3	201.7	183.3
153.00		0.2500	32.141	25.305	3251.5	21.26	128.56	71.4	199.3	77.7
155.00		0.2500	31.701	24.955	3118.8	20.95	126.80	71.7	193.8	171.0
156.50		0.2500	31.371	24.694	3021.6	20.72	125.48	72.0	189.7	126.7
160.00		0.2500	30.601	24.082	2802.8	20.17	122.40	72.6	180.4	290.5
165.00		0.2500	29.501	23.210	2508.9	19.40	118.00	73.4	167.5	402.3
170.00		0.2500	28.401	22.337	2236.4	18.62	113.60	74.2	155.1	387.5
172.50		0.2500	27.850	21.900	2107.8	18.23	111.40	74.6	149.1	188.2
175.00		0.2500	27.300	21.464	1984.3	17.84	109.20	75.0	143.2	184.4
180.00		0.2500	26.200	20.591	1751.9	17.07	104.80	75.8	131.7	357.8

Increment Length: 5 (ft)

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fpy (ksi)	S (in^3)	Weight (lb)
185.00		0.2500	25.100	19.718	1538.4	16.29	100.40	76.2	120.7	342.9
190.00		0.2500	24.000	18.845	1343.0	15.52	96.00	76.2	110.2	328.1
										42865.3

Wind Loading - Shaft

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020	
Site Name: Stony Brook	Exposure: C		
Height: 190.00 (ft)	Crest Height: 0.00		
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil		
Gh: 1.1	Topography: 1	Struct Class: II	Page: 6

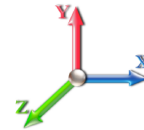


Load Case: 1.2D + 1.0W 140 mph Wind

Iterations 25

Dead Load Factor 1.20

Wind Load Factor 1.00



Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	40.316	44.35	682.90	0.730	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	40.316	44.35	670.91	0.730	0.000	5.00	26.287	19.19	851.0	0.0	1996.8
10.00		1.00	0.85	40.316	44.35	658.92	0.730	0.000	5.00	25.821	18.85	835.9	0.0	1961.2
11.75	Bot - Section 2	1.00	0.85	40.316	44.35	654.73	0.730	0.000	1.75	8.928	6.52	289.0	0.0	678.0
15.00		1.00	0.85	40.316	44.35	646.94	0.730	0.000	3.25	16.703	12.19	540.8	0.0	2516.1
19.50	Top - Section 1	1.00	0.90	42.550	46.80	653.54	0.730	0.000	4.50	22.803	16.65	779.1	0.0	3434.2
20.00		1.00	0.90	42.777	47.05	665.27	0.730	0.000	0.50	2.510	1.83	86.2	0.0	190.6
25.00		1.00	0.95	44.835	49.32	668.44	0.730	0.000	5.00	24.848	18.14	894.6	0.0	1886.6
30.00		1.00	0.98	46.589	51.25	668.51	0.730	0.000	5.00	24.383	17.80	912.2	0.0	1851.0
35.00		1.00	1.01	48.126	52.94	666.35	0.730	0.000	5.00	23.917	17.46	924.3	0.0	1815.3
40.00		1.00	1.04	49.498	54.45	662.50	0.730	0.000	5.00	23.452	17.12	932.1	0.0	1779.7
45.00		1.00	1.07	50.741	55.81	657.32	0.730	0.000	5.00	22.986	16.78	936.6	0.0	1744.1
46.50	Appurtenance(s)	1.00	1.08	51.092	56.20	655.54	0.730	0.000	1.50	6.805	4.97	279.2	0.0	516.3
50.00	Bot - Section 3	1.00	1.09	51.879	57.07	651.05	0.730	0.000	3.50	15.716	11.47	654.7	0.0	1192.1
55.00		1.00	1.12	52.930	58.22	643.88	0.730	0.000	5.00	22.426	16.37	953.2	0.0	3163.0
56.75	Top - Section 2	1.00	1.12	53.280	58.61	641.19	0.730	0.000	1.75	7.739	5.65	331.1	0.0	1091.3
60.00		1.00	1.14	53.909	59.30	646.97	0.730	0.000	3.25	14.221	10.38	615.6	0.0	944.8
65.00		1.00	1.16	54.825	60.31	638.47	0.730	0.000	5.00	21.495	15.69	946.3	0.0	1427.9
70.00		1.00	1.17	55.687	61.26	629.38	0.730	0.000	5.00	21.029	15.35	940.4	0.0	1396.7
75.00		1.00	1.19	56.502	62.15	619.78	0.730	0.000	5.00	20.564	15.01	933.0	0.0	1365.5
80.00		1.00	1.21	57.275	63.00	609.72	0.730	0.000	5.00	20.098	14.67	924.3	0.0	1334.3
85.00		1.00	1.22	58.010	63.81	599.24	0.730	0.000	5.00	19.633	14.33	914.5	0.0	1303.1
90.00		1.00	1.24	58.713	64.58	588.40	0.730	0.000	5.00	19.167	13.99	903.7	0.0	1271.9
94.50	Bot - Section 4	1.00	1.25	59.319	65.25	578.34	0.730	0.000	4.50	16.853	12.30	802.7	0.0	1118.1
95.00		1.00	1.25	59.385	65.32	577.21	0.730	0.000	0.50	1.881	1.37	89.7	0.0	229.8
100.00	Top - Section 3	1.00	1.27	60.029	66.03	565.71	0.730	0.000	5.00	18.554	13.54	894.4	0.0	2266.1
105.00		1.00	1.28	60.649	66.71	563.94	0.730	0.000	5.00	18.088	13.20	880.9	0.0	1029.8
110.00		1.00	1.29	61.246	67.37	551.94	0.730	0.000	5.00	17.623	12.86	866.7	0.0	1003.0
114.00	Appurtenance(s)	1.00	1.30	61.708	67.88	542.15	0.730	0.000	4.00	13.763	10.05	682.0	0.0	783.2
115.00		1.00	1.30	61.822	68.00	539.68	0.730	0.000	1.00	3.394	2.48	168.5	0.0	193.1
116.75	Appurtenance(s)	1.00	1.31	62.019	68.22	535.34	0.730	0.000	1.75	5.895	4.30	293.6	0.0	335.4
120.00	Appurtenance(s)	1.00	1.32	62.378	68.62	527.20	0.730	0.000	3.25	10.797	7.88	540.8	0.0	614.2
123.70	Appurtenance(s)	1.00	1.32	62.778	69.06	517.82	0.730	0.000	3.70	12.052	8.80	607.6	0.0	685.5
125.00		1.00	1.33	62.917	69.21	514.49	0.730	0.000	1.30	4.174	3.05	210.9	0.0	237.4
130.00		1.00	1.34	63.438	69.78	501.59	0.730	0.000	5.00	15.761	11.51	802.9	0.0	896.1
135.00		1.00	1.35	63.944	70.34	488.49	0.730	0.000	5.00	15.296	11.17	785.4	0.0	869.4
140.00	Bot - Section 5	1.00	1.36	64.436	70.88	475.21	0.730	0.000	5.00	14.830	10.83	767.3	0.0	842.6
144.50	Top - Section 4	1.00	1.37	64.867	71.35	463.11	0.730	0.000	4.50	13.139	9.59	684.4	0.0	1235.0
145.00	Appurtenance(s)	1.00	1.37	64.914	71.41	468.67	0.730	0.000	0.50	1.437	1.05	74.9	0.0	54.6
150.00	Appurtenance(s)	1.00	1.38	65.379	71.92	455.08	0.730	0.000	5.00	14.111	10.30	740.8	0.0	536.2
152.10	Appurtenance(s)	1.00	1.38	65.570	72.13	449.33	0.730	0.000	2.10	5.788	4.23	304.7	0.0	219.9
153.00	Appurtenance(s)	1.00	1.38	65.652	72.22	446.86	0.730	0.000	0.90	2.455	1.79	129.4	0.0	93.3
155.00	Appurtenance(s)	1.00	1.39	65.832	72.41	441.34	0.730	0.000	2.00	5.402	3.94	285.6	0.0	205.2
156.50	Appurtenance(s)	1.00	1.39	65.965	72.56	437.19	0.730	0.000	1.50	4.003	2.92	212.0	0.0	152.0
160.00		1.00	1.40	66.273	72.90	427.45	0.730	0.000	3.50	9.177	6.70	488.4	0.0	348.5
165.00		1.00	1.41	66.704	73.37	413.42	0.730	0.000	5.00	12.714	9.28	681.0	0.0	482.8
170.00		1.00	1.42	67.124	73.84	399.26	0.730	0.000	5.00	12.249	8.94	660.2	0.0	465.0

Wind Loading - Shaft

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020	
Site Name: Stony Brook	Exposure: C		
Height: 190.00 (ft)	Crest Height: 0.00		
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil		
Gh: 1.1	Topography: 1	Struct Class: II	Page: 7



172.50 Appurtenance(s)	1.00	1.42	67.331	74.06	392.13	0.730	0.000	2.50	5.950	4.34	321.7	0.0	225.8
175.00	1.00	1.42	67.535	74.29	384.96	0.730	0.000	2.50	5.834	4.26	316.4	0.0	221.3
180.00	1.00	1.43	67.937	74.73	370.55	0.730	0.000	5.00	11.318	8.26	617.4	0.0	429.3
185.00	1.00	1.44	68.330	75.16	356.01	0.730	0.000	5.00	10.852	7.92	595.5	0.0	411.5
190.00 Appurtenance(s)	1.00	1.45	68.715	75.59	341.37	0.730	0.000	5.00	10.387	7.58	573.1	0.0	393.7
Totals:								190.00			31,456.7		51,438.3

Discrete Appurtenance Forces

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Struct Class: II

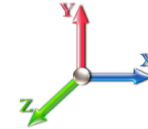


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Load Case: 1.2D + 1.0W 140 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 25

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	190.00	ANT150D3	1	69.017	75.918	1.00	1.00	2.18	21.60	0.000	4.000	165.50	0.00	662.01
2	172.50	Ericsson Air21 B2A/B4P	3	67.331	74.064	0.69	0.80	12.57	329.40	0.000	0.000	930.97	0.00	0.00
3	172.50	Ericsson AIR 21 B4A/B2P	3	67.331	74.064	0.70	0.80	13.59	380.88	0.000	0.000	1006.74	0.00	0.00
4	172.50	LNx-6515DS	3	67.331	74.064	0.67	0.80	23.08	181.08	0.000	0.000	1709.64	0.00	0.00
5	172.50	Ericsson KRY 112 144/1	3	67.331	74.064	0.56	0.80	0.69	39.60	0.000	0.000	51.02	0.00	0.00
6	172.50	S11B12	3	67.331	74.064	0.57	0.80	4.82	183.60	0.000	0.000	357.16	0.00	0.00
7	172.50	PRK-1245	1	67.331	74.064	1.00	1.00	9.50	557.89	0.000	0.000	703.61	0.00	0.00
8	172.50	Low Profile	1	67.331	74.064	1.00	1.00	25.00	1440.00	0.000	0.000	1851.60	0.00	0.00
9	156.50	458-2	1	65.965	72.562	1.00	1.00	3.72	26.40	0.000	0.000	269.93	0.00	0.00
10	155.00	Universal Ring Mount (Site	2	65.832	72.415	1.00	1.00	0.66	677.28	0.000	0.000	47.79	0.00	0.00
11	155.00	Pipe mounts	3	65.832	72.415	1.00	1.00	6.75	108.00	0.000	0.000	488.80	0.00	0.00
12	155.00	PAD6-59A	1	65.832	72.415	1.00	1.00	35.67	222.00	0.000	0.000	2583.03	0.00	0.00
13	153.00	DB586-Y	1	65.652	72.217	1.00	1.00	1.01	9.90	0.000	0.000	72.94	0.00	0.00
14	152.10	ANT220F2	1	65.570	72.127	1.00	1.00	1.04	13.20	0.000	0.000	75.01	0.00	0.00
15	150.00	LGP104NN	1	65.379	71.917	1.00	1.00	0.37	14.76	0.000	0.000	26.61	0.00	0.00
16	150.00	4' Side Arm (Site Pro	1	65.379	71.917	1.00	1.00	2.63	48.00	0.000	0.000	189.14	0.00	0.00
17	150.00	Universal Ring Mount (Site	1	65.379	71.917	1.00	1.00	0.33	338.64	0.000	0.000	23.73	0.00	0.00
18	150.00	4' Side Arm (Site Pro	2	65.379	71.917	1.00	1.00	5.26	96.00	0.000	0.000	378.28	0.00	0.00
19	145.00	Horizontal Rail & SCX1-K	1	64.914	71.405	1.00	1.00	9.97	362.83	0.000	0.000	711.91	0.00	0.00
20	145.00	HRK14	1	64.914	71.405	1.00	1.00	8.13	362.83	0.000	0.000	580.52	0.00	0.00
21	145.00	PRK-1245 (kicker kit)	1	64.914	71.405	1.00	1.00	9.50	557.89	0.000	0.000	678.35	0.00	0.00
22	145.00	(3) SFS-H-L (V-Braces)	1	64.914	71.405	1.00	1.00	9.70	276.00	0.000	0.000	692.63	0.00	0.00
23	145.00	APXVTM14-C-I20	3	64.914	71.405	0.62	0.80	11.72	202.32	0.000	0.000	836.61	0.00	0.00
24	145.00	NNVV-65B-R4	3	64.914	71.405	0.59	0.80	21.79	278.64	0.000	0.000	1556.03	0.00	0.00
25	145.00	1900 MHz RRUs	3	64.914	71.405	0.70	0.80	8.03	158.40	0.000	0.000	573.07	0.00	0.00
26	145.00	800 MHz RRUs	6	64.914	71.405	0.74	0.80	11.00	381.60	0.000	0.000	785.16	0.00	0.00
27	145.00	TD-RRH8x20-25	3	64.914	71.405	0.55	0.80	6.71	252.00	0.000	0.000	478.90	0.00	0.00
28	145.00	Low Profile Platform-flat	1	64.914	71.405	1.00	1.00	25.00	1440.00	0.000	0.000	1785.13	0.00	0.00
29	123.70	220-7N Omni	1	62.778	69.056	1.00	1.00	5.32	26.40	0.000	0.000	367.38	0.00	0.00
30	120.00	220-3AN	1	62.378	68.616	1.00	1.00	5.69	28.80	0.000	0.000	390.43	0.00	0.00
31	120.00	1142-2C	1	62.378	68.616	1.00	1.00	2.14	28.80	0.000	0.000	146.84	0.00	0.00
32	116.75	871F-70-220-025	1	62.019	68.221	1.00	1.00	2.52	36.00	0.000	0.000	171.92	0.00	0.00
33	114.00	4' Side Arm (Site Pro	3	61.708	67.879	1.00	1.00	7.89	144.00	0.000	0.000	535.57	0.00	0.00
34	114.00	4' Side Arm (Site Pro	1	61.708	67.879	1.00	1.00	2.63	48.00	0.000	0.000	178.52	0.00	0.00
35	114.00	5.1' Side Arm (Site Pro) w/	1	61.708	67.879	1.00	1.00	2.63	48.00	0.000	0.000	178.52	0.00	0.00
36	46.50	3 ft Standoff	1	51.092	56.201	1.00	1.00	2.63	48.00	0.000	0.000	147.81	0.00	0.00
37	46.50	GPS	1	51.092	56.201	1.00	1.00	1.00	12.00	0.000	0.000	56.20	0.00	0.00

Totals: 9,380.75

21,782.98

Total Applied Force Summary

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Struct Class: II

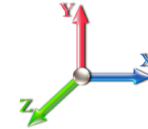


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Load Case: 1.2D + 1.0W 140 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 25

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		851.01	2132.03	0.00	0.00
10.00		835.94	2096.39	0.00	0.00
11.75		289.02	725.31	0.00	0.00
15.00		540.76	2604.03	0.00	0.00
19.50		779.13	3555.85	0.00	0.00
20.00		86.23	204.15	0.00	0.00
25.00		894.59	2021.85	0.00	0.00
30.00		912.18	1986.21	0.00	0.00
35.00		924.28	1950.56	0.00	0.00
40.00		932.13	1914.92	0.00	0.00
45.00		936.57	1879.28	0.00	0.00
46.50	(2) attachments	483.20	616.83	0.00	0.00
50.00		654.69	1286.13	0.00	0.00
55.00		953.15	3297.28	0.00	0.00
56.75		331.11	1138.26	0.00	0.00
60.00		615.61	1032.11	0.00	0.00
65.00		946.29	1562.13	0.00	0.00
70.00		940.35	1530.94	0.00	0.00
75.00		932.99	1499.75	0.00	0.00
80.00		924.35	1468.57	0.00	0.00
85.00		914.54	1437.38	0.00	0.00
90.00		903.67	1406.19	0.00	0.00
94.50		802.74	1238.90	0.00	0.00
95.00		89.70	243.22	0.00	0.00
100.00		894.36	2400.31	0.00	0.00
105.00		880.92	1164.03	0.00	0.00
110.00		866.70	1137.29	0.00	0.00
114.00	(5) attachments	1574.60	1130.59	0.00	0.00
115.00		168.50	218.10	0.00	0.00
116.75	(1) attachments	465.50	415.10	0.00	0.00
120.00	(2) attachments	1078.07	752.96	0.00	0.00
123.70	(1) attachments	974.95	804.29	0.00	0.00
125.00		210.88	269.84	0.00	0.00
130.00		802.88	1021.00	0.00	0.00
135.00		785.38	994.27	0.00	0.00
140.00		767.34	967.53	0.00	0.00
144.50		684.41	1347.38	0.00	0.00
145.00	(23) attachments	8753.18	4339.61	0.00	0.00
150.00	(5) attachments	1358.56	1135.64	0.00	0.00
152.10	(1) attachments	379.75	270.30	0.00	0.00
153.00	(1) attachments	202.38	119.12	0.00	0.00
155.00	(6) attachments	3405.20	1247.93	0.00	0.00
156.50	(1) attachments	481.96	203.83	0.00	0.00
160.00		488.37	407.77	0.00	0.00
165.00		681.02	567.37	0.00	0.00
170.00		660.22	549.55	0.00	0.00

Total Applied Force Summary

Structure: CT00235-B Site Name: Stony Brook Height: 190.00 (ft) Base Elev: 0.000 (ft) Gh: 1.1	Code: EIA/TIA-222-H Exposure: C Crest Height: 0.00 Site Class: D - Stiff Soil Struct Class: II	12/22/2020 Page: 10
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172.50	(17) attachments	6932.42	3380.54	0.00	0.00
175.00		316.36	222.90	0.00	0.00
180.00		617.43	432.43	0.00	0.00
185.00		595.46	414.60	0.00	0.00
190.00	(1) attachments	738.63	418.38	0.00	662.01
Totals:		53,239.67	65,160.95	0.00	662.01

Linear Appurtenance Segment Forces (Factored)

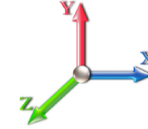
Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Struct Class: II
		Page: 11



Load Case: 1.2D + 1.0W 140 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 25

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1/2" GPS Line	Yes	5.00	0.000	0.50	0.21	0.00	0.008	0.000	40.316	0.00	0.96
10.00	1/2" GPS Line	Yes	5.00	0.000	0.50	0.21	0.00	0.008	0.000	40.316	0.00	0.96
11.75	1/2" GPS Line	Yes	1.75	0.000	0.50	0.07	0.00	0.008	0.000	40.316	0.00	0.34
15.00	1/2" GPS Line	Yes	3.25	0.000	0.50	0.14	0.00	0.008	0.000	40.316	0.00	0.62
19.50	1/2" GPS Line	Yes	4.50	0.000	0.50	0.19	0.00	0.008	0.000	42.550	0.00	0.86
20.00	1/2" GPS Line	Yes	0.50	0.000	0.50	0.02	0.00	0.008	0.000	42.777	0.00	0.10
25.00	1/2" GPS Line	Yes	5.00	0.000	0.50	0.21	0.00	0.008	0.000	44.835	0.00	0.96
30.00	1/2" GPS Line	Yes	5.00	0.000	0.50	0.21	0.00	0.009	0.000	46.589	0.00	0.96
35.00	1/2" GPS Line	Yes	5.00	0.000	0.50	0.21	0.00	0.009	0.000	48.126	0.00	0.96
40.00	1/2" GPS Line	Yes	5.00	0.000	0.50	0.21	0.00	0.009	0.000	49.498	0.00	0.96
45.00	1/2" GPS Line	Yes	5.00	0.000	0.50	0.21	0.00	0.009	0.000	50.741	0.00	0.96
46.50	1/2" GPS Line	Yes	1.50	0.000	0.50	0.06	0.00	0.009	0.000	51.092	0.00	0.29
Totals:											0.0	8.9

Calculated Forces

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020	
Site Name: Stony Brook	Exposure: C		
Height: 190.00 (ft)	Crest Height: 0.00		
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil		
Gh: 1.1	Topography: 1	Struct Class: II	Page: 12

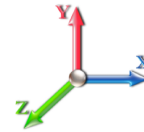


Load Case: 1.2D + 1.0W 140 mph Wind

Iterations 25

Dead Load Factor 1.20

Wind Load Factor 1.00



Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-65.07	-53.35	0.00	-6386.3	0.00	6386.30	6843.68	1731.77	8934.17	8754.18	0.00	0.000	0.000	0.740
5.00	-62.77	-52.70	0.00	-6119.5	0.00	6119.57	6762.41	1701.13	8620.83	8495.95	0.10	-0.185	0.000	0.731
10.00	-60.57	-51.98	0.00	-5856.1	0.00	5856.10	6679.70	1670.49	8313.08	8239.66	0.39	-0.371	0.000	0.721
11.75	-59.76	-51.79	0.00	-5765.1	0.00	5765.13	6650.41	1659.76	8206.69	8150.43	0.54	-0.438	0.000	0.717
15.00	-57.02	-51.37	0.00	-5596.8	0.00	5596.83	6595.55	1639.85	8010.93	7985.40	0.88	-0.562	0.000	0.711
19.50	-53.39	-50.64	0.00	-5365.6	0.00	5365.66	6596.31	1640.12	8013.62	7987.68	1.50	-0.733	0.000	0.681
20.00	-53.10	-50.65	0.00	-5340.3	0.00	5340.34	6587.82	1637.06	7983.70	7962.37	1.57	-0.753	0.000	0.680
25.00	-50.93	-49.88	0.00	-5087.1	0.00	5087.11	6502.11	1606.42	7687.65	7710.45	2.46	-0.935	0.000	0.669
30.00	-48.81	-49.09	0.00	-4837.6	0.00	4837.69	6414.97	1575.78	7397.19	7460.77	3.54	-1.118	0.000	0.657
35.00	-46.72	-48.28	0.00	-4592.2	0.00	4592.23	6326.39	1545.14	7112.32	7213.44	4.81	-1.303	0.000	0.645
40.00	-44.67	-47.45	0.00	-4350.8	0.00	4350.83	6236.38	1514.50	6833.05	6968.54	6.27	-1.489	0.000	0.632
45.00	-42.72	-46.55	0.00	-4113.6	0.00	4113.60	6144.94	1483.86	6559.37	6726.18	7.93	-1.675	0.000	0.620
46.50	-42.04	-46.12	0.00	-4043.7	0.00	4043.78	6117.23	1474.67	6478.36	6653.99	8.47	-1.733	0.000	0.616
50.00	-40.65	-45.54	0.00	-3882.3	0.00	3882.36	6052.06	1453.22	6291.28	6486.46	9.79	-1.865	0.000	0.606
55.00	-37.29	-44.55	0.00	-3654.6	0.00	3654.68	5957.75	1422.58	6028.79	6249.47	11.85	-2.054	0.000	0.592
56.75	-36.09	-44.24	0.00	-3576.7	0.00	3576.71	5057.23	1258.22	5389.92	5369.23	12.61	-2.121	0.000	0.675
60.00	-34.96	-43.69	0.00	-3432.9	0.00	3432.92	5008.75	1240.80	5241.65	5243.49	14.10	-2.245	0.000	0.663
65.00	-33.28	-42.80	0.00	-3214.4	0.00	3214.48	4933.00	1213.99	5017.59	5051.65	16.56	-2.449	0.000	0.644
70.00	-31.65	-41.90	0.00	-3000.4	0.00	3000.49	4855.80	1187.18	4798.42	4861.84	19.23	-2.653	0.000	0.625
75.00	-30.05	-41.01	0.00	-2790.9	0.00	2790.98	4777.18	1160.37	4584.14	4674.14	22.12	-2.856	0.000	0.605
80.00	-28.49	-40.11	0.00	-2585.9	0.00	2585.95	4697.12	1133.56	4374.76	4488.65	25.22	-3.058	0.000	0.583
85.00	-26.97	-39.21	0.00	-2385.4	0.00	2385.42	4615.63	1106.75	4170.27	4305.49	28.53	-3.258	0.000	0.561
90.00	-25.49	-38.31	0.00	-2189.3	0.00	2189.37	4532.70	1079.94	3970.68	4124.73	32.05	-3.456	0.000	0.538
94.50	-24.24	-37.47	0.00	-2016.9	0.00	2016.99	4456.84	1055.81	3795.23	3964.20	35.39	-3.633	0.000	0.516
95.00	-23.94	-37.41	0.00	-1998.2	0.00	1998.26	4448.34	1053.13	3775.98	3946.49	35.77	-3.653	0.000	0.513
100.00	-21.48	-36.43	0.00	-1811.2	0.00	1811.20	3637.80	896.67	3193.62	3210.33	39.70	-3.844	0.000	0.572
105.00	-20.26	-35.54	0.00	-1629.0	0.00	1629.04	3571.83	873.69	3032.02	3070.63	43.82	-4.031	0.000	0.538
110.00	-19.08	-34.65	0.00	-1451.3	0.00	1451.33	3504.43	850.71	2874.63	2932.74	48.15	-4.230	0.000	0.502
114.00	-18.02	-33.03	0.00	-1312.7	0.00	1312.72	3449.48	832.33	2751.73	2823.80	51.76	-4.385	0.000	0.472
115.00	-17.78	-32.86	0.00	-1279.6	0.00	1279.69	3435.59	827.73	2721.42	2796.76	52.68	-4.424	0.000	0.464
116.75	-17.35	-32.39	0.00	-1222.1	0.00	1222.18	3411.16	819.69	2668.79	2749.64	54.31	-4.490	0.000	0.451
120.00	-16.62	-31.30	0.00	-1116.9	0.00	1116.90	3365.32	804.75	2572.42	2662.79	57.41	-4.609	0.000	0.426
123.70	-15.85	-30.28	0.00	-1001.1	0.00	1001.11	3312.40	787.75	2464.85	2565.00	61.03	-4.739	0.000	0.397
125.00	-15.54	-30.08	0.00	-961.75	0.00	961.75	3293.62	781.77	2427.60	2530.92	62.33	-4.784	0.000	0.386
130.00	-14.52	-29.23	0.00	-811.36	0.00	811.36	3212.23	758.79	2286.98	2395.10	67.42	-4.944	0.000	0.345
135.00	-13.53	-28.39	0.00	-665.21	0.00	665.21	3114.95	735.81	2150.56	2251.51	72.67	-5.089	0.000	0.301
140.00	-12.58	-27.57	0.00	-523.25	0.00	523.25	3017.67	712.84	2018.33	2112.36	78.06	-5.218	0.000	0.253
144.50	-11.27	-26.77	0.00	-399.20	0.00	399.20	1688.87	433.97	1215.62	1173.72	83.03	-5.317	0.000	0.351
145.00	-7.74	-17.66	0.00	-385.81	0.00	385.81	1685.31	432.56	1207.71	1167.40	83.58	-5.327	0.000	0.337
150.00	-6.72	-16.21	0.00	-297.50	0.00	297.50	1649.03	418.42	1130.03	1104.65	89.23	-5.454	0.000	0.275
152.10	-6.47	-15.81	0.00	-263.45	0.00	263.45	1633.41	412.48	1098.18	1078.54	91.63	-5.503	0.000	0.250
153.00	-6.37	-15.60	0.00	-249.21	0.00	249.21	1626.65	409.93	1084.67	1067.39	92.67	-5.523	0.000	0.239
155.00	-5.45	-12.10	0.00	-218.00	0.00	218.00	1611.48	404.28	1054.94	1042.73	94.99	-5.563	0.000	0.213
156.50	-5.28	-11.60	0.00	-199.86	0.00	199.86	1599.96	400.04	1032.92	1024.33	96.74	-5.592	0.000	0.199
160.00	-4.91	-11.08	0.00	-159.25	0.00	159.25	1572.65	390.14	982.43	981.73	100.86	-5.651	0.000	0.166
165.00	-4.40	-10.35	0.00	-103.84	0.00	103.84	1532.55	375.99	912.50	921.74	106.80	-5.718	0.000	0.116
170.00	-3.92	-9.64	0.00	-52.07	0.00	52.07	1491.18	361.85	845.15	862.84	112.81	-5.762	0.000	0.064
172.50	-1.25	-2.41	0.00	-27.96	0.00	27.96	1470.02	354.78	812.44	833.83	115.83	-5.775	0.000	0.034

Calculated Forces

Structure: CT00235-B Site Name: Stony Brook Height: 190.00 (ft) Base Elev: 0.000 (ft) Gh: 1.1	Code: EIA/TIA-222-H Exposure: C Crest Height: 0.00 Site Class: D - Stiff Soil Struct Class: II	12/22/2020 Page: 13
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175.00	-1.06	-2.07	0.00	-21.95	0.00	21.95	1448.54	347.71	780.38	805.12	118.85	-5.783	0.000	0.028
180.00	-0.69	-1.41	0.00	-11.60	0.00	11.60	1404.63	333.57	718.20	748.67	124.90	-5.795	0.000	0.016
185.00	-0.34	-0.78	0.00	-4.55	0.00	4.55	1352.25	319.43	658.59	689.91	130.96	-5.802	0.000	0.007
190.00	0.00	-0.74	0.00	-0.66	0.00	0.66	1292.39	305.29	601.57	629.89	137.03	-5.804	0.000	0.001

Wind Loading - Shaft

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020	
Site Name: Stony Brook	Exposure: C		
Height: 190.00 (ft)	Crest Height: 0.00		
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil		
Gh: 1.1	Topography: 1	Struct Class: II	Page: 14



Load Case: 0.9D + 1.0W 140 mph Wind

Iterations 25

Dead Load Factor 0.90

Wind Load Factor 1.00



Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	40.316	44.35	682.90	0.730	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	40.316	44.35	670.91	0.730	0.000	5.00	26.287	19.19	851.0	0.0	1497.6
10.00		1.00	0.85	40.316	44.35	658.92	0.730	0.000	5.00	25.821	18.85	835.9	0.0	1470.9
11.75	Bot - Section 2	1.00	0.85	40.316	44.35	654.73	0.730	0.000	1.75	8.928	6.52	289.0	0.0	508.5
15.00		1.00	0.85	40.316	44.35	646.94	0.730	0.000	3.25	16.703	12.19	540.8	0.0	1887.1
19.50	Top - Section 1	1.00	0.90	42.550	46.80	653.54	0.730	0.000	4.50	22.803	16.65	779.1	0.0	2575.6
20.00		1.00	0.90	42.777	47.05	665.27	0.730	0.000	0.50	2.510	1.83	86.2	0.0	143.0
25.00		1.00	0.95	44.835	49.32	668.44	0.730	0.000	5.00	24.848	18.14	894.6	0.0	1415.0
30.00		1.00	0.98	46.589	51.25	668.51	0.730	0.000	5.00	24.383	17.80	912.2	0.0	1388.2
35.00		1.00	1.01	48.126	52.94	666.35	0.730	0.000	5.00	23.917	17.46	924.3	0.0	1361.5
40.00		1.00	1.04	49.498	54.45	662.50	0.730	0.000	5.00	23.452	17.12	932.1	0.0	1334.8
45.00		1.00	1.07	50.741	55.81	657.32	0.730	0.000	5.00	22.986	16.78	936.6	0.0	1308.0
46.50	Appurtenance(s)	1.00	1.08	51.092	56.20	655.54	0.730	0.000	1.50	6.805	4.97	279.2	0.0	387.2
50.00	Bot - Section 3	1.00	1.09	51.879	57.07	651.05	0.730	0.000	3.50	15.716	11.47	654.7	0.0	894.1
55.00		1.00	1.12	52.930	58.22	643.88	0.730	0.000	5.00	22.426	16.37	953.2	0.0	2372.3
56.75	Top - Section 2	1.00	1.12	53.280	58.61	641.19	0.730	0.000	1.75	7.739	5.65	331.1	0.0	818.5
60.00		1.00	1.14	53.909	59.30	646.97	0.730	0.000	3.25	14.221	10.38	615.6	0.0	708.6
65.00		1.00	1.16	54.825	60.31	638.47	0.730	0.000	5.00	21.495	15.69	946.3	0.0	1070.9
70.00		1.00	1.17	55.687	61.26	629.38	0.730	0.000	5.00	21.029	15.35	940.4	0.0	1047.5
75.00		1.00	1.19	56.502	62.15	619.78	0.730	0.000	5.00	20.564	15.01	933.0	0.0	1024.1
80.00		1.00	1.21	57.275	63.00	609.72	0.730	0.000	5.00	20.098	14.67	924.3	0.0	1000.7
85.00		1.00	1.22	58.010	63.81	599.24	0.730	0.000	5.00	19.633	14.33	914.5	0.0	977.3
90.00		1.00	1.24	58.713	64.58	588.40	0.730	0.000	5.00	19.167	13.99	903.7	0.0	953.9
94.50	Bot - Section 4	1.00	1.25	59.319	65.25	578.34	0.730	0.000	4.50	16.853	12.30	802.7	0.0	838.6
95.00		1.00	1.25	59.385	65.32	577.21	0.730	0.000	0.50	1.881	1.37	89.7	0.0	172.3
100.00	Top - Section 3	1.00	1.27	60.029	66.03	565.71	0.730	0.000	5.00	18.554	13.54	894.4	0.0	1699.5
105.00		1.00	1.28	60.649	66.71	563.94	0.730	0.000	5.00	18.088	13.20	880.9	0.0	772.3
110.00		1.00	1.29	61.246	67.37	551.94	0.730	0.000	5.00	17.623	12.86	866.7	0.0	752.3
114.00	Appurtenance(s)	1.00	1.30	61.708	67.88	542.15	0.730	0.000	4.00	13.763	10.05	682.0	0.0	587.4
115.00		1.00	1.30	61.822	68.00	539.68	0.730	0.000	1.00	3.394	2.48	168.5	0.0	144.8
116.75	Appurtenance(s)	1.00	1.31	62.019	68.22	535.34	0.730	0.000	1.75	5.895	4.30	293.6	0.0	251.5
120.00	Appurtenance(s)	1.00	1.32	62.378	68.62	527.20	0.730	0.000	3.25	10.797	7.88	540.8	0.0	460.6
123.70	Appurtenance(s)	1.00	1.32	62.778	69.06	517.82	0.730	0.000	3.70	12.052	8.80	607.6	0.0	514.1
125.00		1.00	1.33	62.917	69.21	514.49	0.730	0.000	1.30	4.174	3.05	210.9	0.0	178.0
130.00		1.00	1.34	63.438	69.78	501.59	0.730	0.000	5.00	15.761	11.51	802.9	0.0	672.1
135.00		1.00	1.35	63.944	70.34	488.49	0.730	0.000	5.00	15.296	11.17	785.4	0.0	652.0
140.00	Bot - Section 5	1.00	1.36	64.436	70.88	475.21	0.730	0.000	5.00	14.830	10.83	767.3	0.0	632.0
144.50	Top - Section 4	1.00	1.37	64.867	71.35	463.11	0.730	0.000	4.50	13.139	9.59	684.4	0.0	926.2
145.00	Appurtenance(s)	1.00	1.37	64.914	71.41	468.67	0.730	0.000	0.50	1.437	1.05	74.9	0.0	41.0
150.00	Appurtenance(s)	1.00	1.38	65.379	71.92	455.08	0.730	0.000	5.00	14.111	10.30	740.8	0.0	402.2
152.10	Appurtenance(s)	1.00	1.38	65.570	72.13	449.33	0.730	0.000	2.10	5.788	4.23	304.7	0.0	164.9
153.00	Appurtenance(s)	1.00	1.38	65.652	72.22	446.86	0.730	0.000	0.90	2.455	1.79	129.4	0.0	70.0
155.00	Appurtenance(s)	1.00	1.39	65.832	72.41	441.34	0.730	0.000	2.00	5.402	3.94	285.6	0.0	153.9
156.50	Appurtenance(s)	1.00	1.39	65.965	72.56	437.19	0.730	0.000	1.50	4.003	2.92	212.0	0.0	114.0
160.00		1.00	1.40	66.273	72.90	427.45	0.730	0.000	3.50	9.177	6.70	488.4	0.0	261.4
165.00		1.00	1.41	66.704	73.37	413.42	0.730	0.000	5.00	12.714	9.28	681.0	0.0	362.1
170.00		1.00	1.42	67.124	73.84	399.26	0.730	0.000	5.00	12.249	8.94	660.2	0.0	348.7

Wind Loading - Shaft

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Struct Class: II
		Page: 15



172.50 Appurtenance(s)	1.00	1.42	67.331	74.06	392.13	0.730	0.000	2.50	5.950	4.34	321.7	0.0	169.3
175.00	1.00	1.42	67.535	74.29	384.96	0.730	0.000	2.50	5.834	4.26	316.4	0.0	166.0
180.00	1.00	1.43	67.937	74.73	370.55	0.730	0.000	5.00	11.318	8.26	617.4	0.0	322.0
185.00	1.00	1.44	68.330	75.16	356.01	0.730	0.000	5.00	10.852	7.92	595.5	0.0	308.6
190.00 Appurtenance(s)	1.00	1.45	68.715	75.59	341.37	0.730	0.000	5.00	10.387	7.58	573.1	0.0	295.2
Totals:								190.00			31,456.7		38,578.7

Discrete Appurtenance Forces

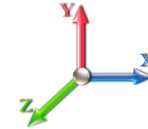
Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Struct Class: II
		Page: 16



Load Case: 0.9D + 1.0W 140 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.00



Iterations 25

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	190.00	ANT150D3	1	69.017	75.918	1.00	1.00	2.18	16.20	0.000	4.000	165.50	0.00	662.01
2	172.50	Low Profile	1	67.331	74.064	1.00	1.00	25.00	1080.00	0.000	0.000	1851.60	0.00	0.00
3	172.50	PRK-1245	1	67.331	74.064	1.00	1.00	9.50	418.42	0.000	0.000	703.61	0.00	0.00
4	172.50	S11B12	3	67.331	74.064	0.57	0.80	4.82	137.70	0.000	0.000	357.16	0.00	0.00
5	172.50	Ericsson KRY 112 144/1	3	67.331	74.064	0.56	0.80	0.69	29.70	0.000	0.000	51.02	0.00	0.00
6	172.50	LNx-6515DS	3	67.331	74.064	0.67	0.80	23.08	135.81	0.000	0.000	1709.64	0.00	0.00
7	172.50	Ericsson AIR 21 B4A/B2P	3	67.331	74.064	0.70	0.80	13.59	285.66	0.000	0.000	1006.74	0.00	0.00
8	172.50	Ericsson Air21 B2A/B4P	3	67.331	74.064	0.69	0.80	12.57	247.05	0.000	0.000	930.97	0.00	0.00
9	156.50	458-2	1	65.965	72.562	1.00	1.00	3.72	19.80	0.000	0.000	269.93	0.00	0.00
10	155.00	PAD6-59A	1	65.832	72.415	1.00	1.00	35.67	166.50	0.000	0.000	2583.03	0.00	0.00
11	155.00	Pipe mounts	3	65.832	72.415	1.00	1.00	6.75	81.00	0.000	0.000	488.80	0.00	0.00
12	155.00	Universal Ring Mount (Site	2	65.832	72.415	1.00	1.00	0.66	507.96	0.000	0.000	47.79	0.00	0.00
13	153.00	DB586-Y	1	65.652	72.217	1.00	1.00	1.01	7.42	0.000	0.000	72.94	0.00	0.00
14	152.10	ANT220F2	1	65.570	72.127	1.00	1.00	1.04	9.90	0.000	0.000	75.01	0.00	0.00
15	150.00	4' Side Arm (Site Pro	2	65.379	71.917	1.00	1.00	5.26	72.00	0.000	0.000	378.28	0.00	0.00
16	150.00	Universal Ring Mount (Site	1	65.379	71.917	1.00	1.00	0.33	253.98	0.000	0.000	23.73	0.00	0.00
17	150.00	4' Side Arm (Site Pro	1	65.379	71.917	1.00	1.00	2.63	36.00	0.000	0.000	189.14	0.00	0.00
18	150.00	LGP104NN	1	65.379	71.917	1.00	1.00	0.37	11.07	0.000	0.000	26.61	0.00	0.00
19	145.00	Low Profile Platform-flat	1	64.914	71.405	1.00	1.00	25.00	1080.00	0.000	0.000	1785.13	0.00	0.00
20	145.00	(3) SFS-H-L (V-Braces)	1	64.914	71.405	1.00	1.00	9.70	207.00	0.000	0.000	692.63	0.00	0.00
21	145.00	Horizontal Rail & SCX1-K	1	64.914	71.405	1.00	1.00	9.97	272.12	0.000	0.000	711.91	0.00	0.00
22	145.00	HRK14	1	64.914	71.405	1.00	1.00	8.13	272.12	0.000	0.000	580.52	0.00	0.00
23	145.00	PRK-1245 (kicker kit)	1	64.914	71.405	1.00	1.00	9.50	418.42	0.000	0.000	678.35	0.00	0.00
24	145.00	TD-RRH8x20-25	3	64.914	71.405	0.55	0.80	6.71	189.00	0.000	0.000	478.90	0.00	0.00
25	145.00	APXVTM14-C-I20	3	64.914	71.405	0.62	0.80	11.72	151.74	0.000	0.000	836.61	0.00	0.00
26	145.00	NNVV-65B-R4	3	64.914	71.405	0.59	0.80	21.79	208.98	0.000	0.000	1556.03	0.00	0.00
27	145.00	1900 MHz RRUs	3	64.914	71.405	0.70	0.80	8.03	118.80	0.000	0.000	573.07	0.00	0.00
28	145.00	800 MHz RRUs	6	64.914	71.405	0.74	0.80	11.00	286.20	0.000	0.000	785.16	0.00	0.00
29	123.70	220-7N Omni	1	62.778	69.056	1.00	1.00	5.32	19.80	0.000	0.000	367.38	0.00	0.00
30	120.00	220-3AN	1	62.378	68.616	1.00	1.00	5.69	21.60	0.000	0.000	390.43	0.00	0.00
31	120.00	1142-2C	1	62.378	68.616	1.00	1.00	2.14	21.60	0.000	0.000	146.84	0.00	0.00
32	116.75	871F-70-220-025	1	62.019	68.221	1.00	1.00	2.52	27.00	0.000	0.000	171.92	0.00	0.00
33	114.00	5.1' Side Arm (Site Pro) w/	1	61.708	67.879	1.00	1.00	2.63	36.00	0.000	0.000	178.52	0.00	0.00
34	114.00	4' Side Arm (Site Pro	1	61.708	67.879	1.00	1.00	2.63	36.00	0.000	0.000	178.52	0.00	0.00
35	114.00	4' Side Arm (Site Pro	3	61.708	67.879	1.00	1.00	7.89	108.00	0.000	0.000	535.57	0.00	0.00
36	46.50	GPS	1	51.092	56.201	1.00	1.00	1.00	9.00	0.000	0.000	56.20	0.00	0.00
37	46.50	3 ft Standoff	1	51.092	56.201	1.00	1.00	2.63	36.00	0.000	0.000	147.81	0.00	0.00

Totals: 7,035.56

21,782.98

Total Applied Force Summary

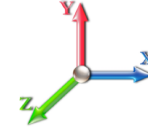
Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Struct Class: II
		Page: 17



Load Case: 0.9D + 1.0W 140 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.00



Iterations 25

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		851.01	1599.02	0.00	0.00
10.00		835.94	1572.29	0.00	0.00
11.75		289.02	543.99	0.00	0.00
15.00		540.76	1953.02	0.00	0.00
19.50		779.13	2666.89	0.00	0.00
20.00		86.23	153.11	0.00	0.00
25.00		894.59	1516.39	0.00	0.00
30.00		912.18	1489.66	0.00	0.00
35.00		924.28	1462.92	0.00	0.00
40.00		932.13	1436.19	0.00	0.00
45.00		936.57	1409.46	0.00	0.00
46.50	(2) attachments	483.20	462.62	0.00	0.00
50.00		654.69	964.60	0.00	0.00
55.00		953.15	2472.96	0.00	0.00
56.75		331.11	853.69	0.00	0.00
60.00		615.61	774.08	0.00	0.00
65.00		946.29	1171.60	0.00	0.00
70.00		940.35	1148.21	0.00	0.00
75.00		932.99	1124.82	0.00	0.00
80.00		924.35	1101.42	0.00	0.00
85.00		914.54	1078.03	0.00	0.00
90.00		903.67	1054.64	0.00	0.00
94.50		802.74	929.18	0.00	0.00
95.00		89.70	182.41	0.00	0.00
100.00		894.36	1800.24	0.00	0.00
105.00		880.92	873.02	0.00	0.00
110.00		866.70	852.97	0.00	0.00
114.00	(5) attachments	1574.60	847.94	0.00	0.00
115.00		168.50	163.58	0.00	0.00
116.75	(1) attachments	465.50	311.33	0.00	0.00
120.00	(2) attachments	1078.07	564.72	0.00	0.00
123.70	(1) attachments	974.95	603.22	0.00	0.00
125.00		210.88	202.38	0.00	0.00
130.00		802.88	765.75	0.00	0.00
135.00		785.38	745.70	0.00	0.00
140.00		767.34	725.65	0.00	0.00
144.50		684.41	1010.54	0.00	0.00
145.00	(23) attachments	8753.18	3254.71	0.00	0.00
150.00	(5) attachments	1358.56	851.73	0.00	0.00
152.10	(1) attachments	379.75	202.73	0.00	0.00
153.00	(1) attachments	202.38	89.34	0.00	0.00
155.00	(6) attachments	3405.20	935.95	0.00	0.00
156.50	(1) attachments	481.96	152.87	0.00	0.00
160.00		488.37	305.82	0.00	0.00
165.00		681.02	425.53	0.00	0.00
170.00		660.22	412.16	0.00	0.00

Total Applied Force Summary

Structure: CT00235-B Site Name: Stony Brook Height: 190.00 (ft) Base Elev: 0.000 (ft) Gh: 1.1	Code: EIA/TIA-222-H Exposure: C Crest Height: 0.00 Site Class: D - Stiff Soil Struct Class: II	12/22/2020 Page: 18
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172.50	(17) attachments	6932.42	2535.41	0.00	0.00
175.00		316.36	167.17	0.00	0.00
180.00		617.43	324.32	0.00	0.00
185.00		595.46	310.95	0.00	0.00
190.00	(1) attachments	738.63	313.79	0.00	662.01
Totals:		53,239.67	48,870.71	0.00	662.01

Linear Appurtenance Segment Forces (Factored)

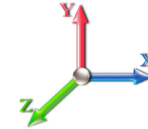
Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Struct Class: II
		Page: 19



Load Case: 0.9D + 1.0W 140 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.00



Iterations 25

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1/2" GPS Line	Yes	5.00	0.000	0.50	0.21	0.00	0.008	0.000	40.316	0.00	0.72
10.00	1/2" GPS Line	Yes	5.00	0.000	0.50	0.21	0.00	0.008	0.000	40.316	0.00	0.72
11.75	1/2" GPS Line	Yes	1.75	0.000	0.50	0.07	0.00	0.008	0.000	40.316	0.00	0.25
15.00	1/2" GPS Line	Yes	3.25	0.000	0.50	0.14	0.00	0.008	0.000	40.316	0.00	0.47
19.50	1/2" GPS Line	Yes	4.50	0.000	0.50	0.19	0.00	0.008	0.000	42.550	0.00	0.65
20.00	1/2" GPS Line	Yes	0.50	0.000	0.50	0.02	0.00	0.008	0.000	42.777	0.00	0.07
25.00	1/2" GPS Line	Yes	5.00	0.000	0.50	0.21	0.00	0.008	0.000	44.835	0.00	0.72
30.00	1/2" GPS Line	Yes	5.00	0.000	0.50	0.21	0.00	0.009	0.000	46.589	0.00	0.72
35.00	1/2" GPS Line	Yes	5.00	0.000	0.50	0.21	0.00	0.009	0.000	48.126	0.00	0.72
40.00	1/2" GPS Line	Yes	5.00	0.000	0.50	0.21	0.00	0.009	0.000	49.498	0.00	0.72
45.00	1/2" GPS Line	Yes	5.00	0.000	0.50	0.21	0.00	0.009	0.000	50.741	0.00	0.72
46.50	1/2" GPS Line	Yes	1.50	0.000	0.50	0.06	0.00	0.009	0.000	51.092	0.00	0.22
Totals:											0.0	6.7

Calculated Forces

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Struct Class: II
		Page: 20

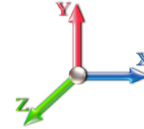


Load Case: 0.9D + 1.0W 140 mph Wind

Iterations 25

Dead Load Factor 0.90

Wind Load Factor 1.00



Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-48.78	-53.32	0.00	-6332.2	0.00	6332.26	6843.68	1731.77	8934.17	8754.18	0.00	0.000	0.000	0.731
5.00	-47.02	-52.62	0.00	-6065.6	0.00	6065.67	6762.41	1701.13	8620.83	8495.95	0.10	-0.183	0.000	0.722
10.00	-45.34	-51.87	0.00	-5802.6	0.00	5802.60	6679.70	1670.49	8313.08	8239.66	0.39	-0.368	0.000	0.712
11.75	-44.71	-51.65	0.00	-5711.8	0.00	5711.82	6650.41	1659.76	8206.69	8150.43	0.54	-0.434	0.000	0.708
15.00	-42.63	-51.20	0.00	-5543.9	0.00	5543.95	6595.55	1639.85	8010.93	7985.40	0.88	-0.557	0.000	0.702
19.50	-39.89	-50.46	0.00	-5313.5	0.00	5313.54	6596.31	1640.12	8013.62	7987.68	1.48	-0.726	0.000	0.672
20.00	-39.65	-50.44	0.00	-5288.3	0.00	5288.31	6587.82	1637.06	7983.70	7962.37	1.56	-0.746	0.000	0.671
25.00	-37.99	-49.65	0.00	-5036.1	0.00	5036.10	6502.11	1606.42	7687.65	7710.45	2.44	-0.926	0.000	0.660
30.00	-36.36	-48.82	0.00	-4787.8	0.00	4787.88	6414.97	1575.78	7397.19	7460.77	3.51	-1.108	0.000	0.648
35.00	-34.76	-47.98	0.00	-4543.7	0.00	4543.76	6326.39	1545.14	7112.32	7213.44	4.77	-1.291	0.000	0.636
40.00	-33.20	-47.12	0.00	-4303.8	0.00	4303.87	6236.38	1514.50	6833.05	6968.54	6.22	-1.474	0.000	0.624
45.00	-31.72	-46.21	0.00	-4068.2	0.00	4068.27	6144.94	1483.86	6559.37	6726.18	7.86	-1.659	0.000	0.611
46.50	-31.20	-45.77	0.00	-3998.9	0.00	3998.95	6117.23	1474.67	6478.36	6653.99	8.39	-1.716	0.000	0.607
50.00	-30.13	-45.17	0.00	-3838.7	0.00	3838.77	6052.06	1453.22	6291.28	6486.46	9.70	-1.847	0.000	0.598
55.00	-27.59	-44.19	0.00	-3612.9	0.00	3612.94	5957.75	1422.58	6028.79	6249.47	11.73	-2.033	0.000	0.584
56.75	-26.68	-43.87	0.00	-3535.6	0.00	3535.61	5057.23	1258.22	5389.92	5369.23	12.49	-2.100	0.000	0.665
60.00	-25.80	-43.30	0.00	-3393.0	0.00	3393.03	5008.75	1240.80	5241.65	5243.49	13.96	-2.222	0.000	0.653
65.00	-24.52	-42.40	0.00	-3176.5	0.00	3176.52	4933.00	1213.99	5017.59	5051.65	16.40	-2.424	0.000	0.635
70.00	-23.27	-41.49	0.00	-2964.5	0.00	2964.54	4855.80	1187.18	4798.42	4861.84	19.05	-2.625	0.000	0.616
75.00	-22.05	-40.58	0.00	-2757.1	0.00	2757.11	4777.18	1160.37	4584.14	4674.14	21.90	-2.826	0.000	0.596
80.00	-20.86	-39.67	0.00	-2554.2	0.00	2554.22	4697.12	1133.56	4374.76	4488.65	24.97	-3.025	0.000	0.575
85.00	-19.70	-38.77	0.00	-2355.8	0.00	2355.86	4615.63	1106.75	4170.27	4305.49	28.24	-3.223	0.000	0.553
90.00	-18.58	-37.87	0.00	-2162.0	0.00	2162.02	4532.70	1079.94	3970.68	4124.73	31.72	-3.419	0.000	0.529
94.50	-17.64	-37.04	0.00	-1991.6	0.00	1991.63	4456.84	1055.81	3795.23	3964.20	35.03	-3.593	0.000	0.508
95.00	-17.39	-36.97	0.00	-1973.1	0.00	1973.11	4448.34	1053.13	3775.98	3946.49	35.41	-3.613	0.000	0.505
100.00	-15.54	-36.01	0.00	-1788.2	0.00	1788.27	3637.80	896.67	3193.62	3210.33	39.29	-3.802	0.000	0.563
105.00	-14.61	-35.12	0.00	-1608.2	0.00	1608.23	3571.83	873.69	3032.02	3070.63	43.37	-3.986	0.000	0.529
110.00	-13.72	-34.24	0.00	-1432.6	0.00	1432.63	3504.43	850.71	2874.63	2932.74	47.65	-4.183	0.000	0.494
114.00	-12.93	-32.62	0.00	-1295.6	0.00	1295.68	3449.48	832.33	2751.73	2823.80	51.21	-4.335	0.000	0.464
115.00	-12.75	-32.46	0.00	-1263.0	0.00	1263.06	3435.59	827.73	2721.42	2796.76	52.13	-4.374	0.000	0.457
116.75	-12.43	-31.99	0.00	-1206.2	0.00	1206.26	3411.16	819.69	2668.79	2749.64	53.74	-4.439	0.000	0.444
120.00	-11.88	-30.89	0.00	-1102.3	0.00	1102.30	3365.32	804.75	2572.42	2662.79	56.80	-4.557	0.000	0.419
123.70	-11.32	-29.89	0.00	-987.99	0.00	987.99	3312.40	787.75	2464.85	2565.00	60.38	-4.685	0.000	0.390
125.00	-11.08	-29.68	0.00	-949.13	0.00	949.13	3293.62	781.77	2427.60	2530.92	61.66	-4.729	0.000	0.380
130.00	-10.31	-28.85	0.00	-800.71	0.00	800.71	3212.23	758.79	2286.98	2395.10	66.70	-4.887	0.000	0.339
135.00	-9.57	-28.02	0.00	-656.48	0.00	656.48	3114.95	735.81	2150.56	2251.51	71.89	-5.031	0.000	0.296
140.00	-8.86	-27.21	0.00	-516.36	0.00	516.36	3017.67	712.84	2018.33	2112.36	77.22	-5.158	0.000	0.249
144.50	-7.89	-26.45	0.00	-393.91	0.00	393.91	1688.87	433.97	1215.62	1173.72	82.13	-5.255	0.000	0.344
145.00	-5.43	-17.44	0.00	-380.69	0.00	380.69	1685.31	432.56	1207.71	1167.40	82.68	-5.265	0.000	0.331
150.00	-4.69	-16.01	0.00	-293.50	0.00	293.50	1649.03	418.42	1130.03	1104.65	88.25	-5.391	0.000	0.270
152.10	-4.51	-15.62	0.00	-259.88	0.00	259.88	1633.41	412.48	1098.18	1078.54	90.63	-5.439	0.000	0.245
153.00	-4.43	-15.41	0.00	-245.82	0.00	245.82	1626.65	409.93	1084.67	1067.39	91.66	-5.458	0.000	0.234
155.00	-3.82	-11.93	0.00	-215.00	0.00	215.00	1611.48	404.28	1054.94	1042.73	93.95	-5.498	0.000	0.209
156.50	-3.70	-11.44	0.00	-197.10	0.00	197.10	1599.96	400.04	1032.92	1024.33	95.68	-5.527	0.000	0.196
160.00	-3.44	-10.93	0.00	-157.05	0.00	157.05	1572.65	390.14	982.43	981.73	99.75	-5.585	0.000	0.163
165.00	-3.07	-10.21	0.00	-102.40	0.00	102.40	1532.55	375.99	912.50	921.74	105.63	-5.651	0.000	0.114
170.00	-2.72	-9.52	0.00	-51.33	0.00	51.33	1491.18	361.85	845.15	862.84	111.56	-5.694	0.000	0.062
172.50	-0.88	-2.37	0.00	-27.54	0.00	27.54	1470.02	354.78	812.44	833.83	114.54	-5.707	0.000	0.034

Calculated Forces

Structure: CT00235-B Site Name: Stony Brook Height: 190.00 (ft) Base Elev: 0.000 (ft) Gh: 1.1	Code: EIA/TIA-222-H Exposure: C Crest Height: 0.00 Site Class: D - Stiff Soil Struct Class: II	12/22/2020 Page: 21
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175.00	-0.75	-2.04	0.00	-21.62	0.00	21.62	1448.54	347.71	780.38	805.12	117.53	-5.715	0.000	0.027
180.00	-0.49	-1.39	0.00	-11.44	0.00	11.44	1404.63	333.57	718.20	748.67	123.51	-5.727	0.000	0.016
185.00	-0.24	-0.77	0.00	-4.49	0.00	4.49	1352.25	319.43	658.59	689.91	129.50	-5.734	0.000	0.007
190.00	0.00	-0.74	0.00	-0.66	0.00	0.66	1292.39	305.29	601.57	629.89	135.50	-5.736	0.000	0.001

Wind Loading - Shaft

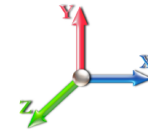
Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020	
Site Name: Stony Brook	Exposure: C		
Height: 190.00 (ft)	Crest Height: 0.00		
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil		
Gh: 1.1	Topography: 1	Struct Class: II	Page: 22



Load Case: 1.2D + 1.0Di + 1.0W 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 24

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	5.142	5.66	0.00	1.200	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	5.142	5.66	0.00	1.200	0.828	5.00	26.977	32.37	183.1	323.8	2320.6
10.00		1.00	0.85	5.142	5.66	0.00	1.200	0.887	5.00	26.561	31.87	180.3	341.2	2302.4
11.75	Bot - Section 2	1.00	0.85	5.142	5.66	0.00	1.200	0.902	1.75	9.191	11.03	62.4	120.6	798.6
15.00		1.00	0.85	5.142	5.66	0.00	1.200	0.924	3.25	17.204	20.64	116.8	230.7	2746.9
19.50	Top - Section 1	1.00	0.90	5.427	5.97	0.00	1.200	0.949	4.50	23.515	28.22	168.5	322.8	3756.9
20.00		1.00	0.90	5.456	6.00	0.00	1.200	0.951	0.50	2.590	3.11	18.7	35.9	226.5
25.00		1.00	0.95	5.719	6.29	0.00	1.200	0.973	5.00	25.659	30.79	193.7	360.4	2247.1
30.00		1.00	0.98	5.942	6.54	0.00	1.200	0.991	5.00	25.208	30.25	197.7	360.4	2211.4
35.00		1.00	1.01	6.139	6.75	0.00	1.200	1.006	5.00	24.755	29.71	200.6	359.1	2174.5
40.00		1.00	1.04	6.314	6.94	0.00	1.200	1.019	5.00	24.301	29.16	202.5	357.0	2136.7
45.00		1.00	1.07	6.472	7.12	0.00	1.200	1.032	5.00	23.846	28.61	203.7	354.2	2098.3
46.50	Appurtenance(s)	1.00	1.08	6.517	7.17	0.00	1.200	1.035	1.50	7.064	8.48	60.8	106.0	622.2
50.00	Bot - Section 3	1.00	1.09	6.617	7.28	0.00	1.200	1.042	3.50	16.324	19.59	142.6	245.6	1437.7
55.00		1.00	1.12	6.751	7.43	0.00	1.200	1.052	5.00	23.303	27.96	207.7	352.8	3515.8
56.75	Top - Section 2	1.00	1.12	6.796	7.48	0.00	1.200	1.056	1.75	8.047	9.66	72.2	123.0	1214.2
60.00		1.00	1.14	6.876	7.56	0.00	1.200	1.062	3.25	14.796	17.76	134.3	226.6	1171.4
65.00		1.00	1.16	6.993	7.69	0.00	1.200	1.070	5.00	22.386	26.86	206.6	344.1	1772.0
70.00		1.00	1.17	7.103	7.81	0.00	1.200	1.078	5.00	21.928	26.31	205.6	339.3	1735.9
75.00		1.00	1.19	7.207	7.93	0.00	1.200	1.086	5.00	21.468	25.76	204.2	334.2	1699.7
80.00		1.00	1.21	7.305	8.04	0.00	1.200	1.093	5.00	21.009	25.21	202.6	328.8	1663.2
85.00		1.00	1.22	7.399	8.14	0.00	1.200	1.099	5.00	20.549	24.66	200.7	323.3	1626.4
90.00		1.00	1.24	7.489	8.24	0.00	1.200	1.106	5.00	20.089	24.11	198.6	317.6	1589.5
94.50	Bot - Section 4	1.00	1.25	7.566	8.32	0.00	1.200	1.111	4.50	17.686	21.22	176.6	281.1	1399.1
95.00		1.00	1.25	7.575	8.33	0.00	1.200	1.112	0.50	1.974	2.37	19.7	31.7	261.5
100.00	Top - Section 3	1.00	1.27	7.657	8.42	0.00	1.200	1.117	5.00	19.485	23.38	196.9	310.9	2576.9
105.00		1.00	1.28	7.736	8.51	0.00	1.200	1.123	5.00	19.024	22.83	194.3	304.7	1334.5
110.00		1.00	1.29	7.812	8.59	0.00	1.200	1.128	5.00	18.563	22.28	191.4	298.4	1301.4
114.00	Appurtenance(s)	1.00	1.30	7.871	8.66	0.00	1.200	1.132	4.00	14.518	17.42	150.8	234.6	1017.8
115.00		1.00	1.30	7.885	8.67	0.00	1.200	1.133	1.00	3.583	4.30	37.3	58.4	251.5
116.75	Appurtenance(s)	1.00	1.31	7.911	8.70	0.00	1.200	1.135	1.75	6.226	7.47	65.0	101.4	436.8
120.00	Appurtenance(s)	1.00	1.32	7.956	8.75	0.00	1.200	1.138	3.25	11.413	13.70	119.9	185.5	799.7
123.70	Appurtenance(s)	1.00	1.32	8.007	8.81	0.00	1.200	1.141	3.70	12.756	15.31	134.8	207.5	893.0
125.00		1.00	1.33	8.025	8.83	0.00	1.200	1.142	1.30	4.422	5.31	46.8	72.5	309.8
130.00		1.00	1.34	8.092	8.90	0.00	1.200	1.147	5.00	16.717	20.06	178.6	271.9	1168.0
135.00		1.00	1.35	8.156	8.97	0.00	1.200	1.151	5.00	16.255	19.51	175.0	265.0	1134.4
140.00	Bot - Section 5	1.00	1.36	8.219	9.04	0.00	1.200	1.155	5.00	15.793	18.95	171.3	258.1	1100.7
144.50	Top - Section 4	1.00	1.37	8.274	9.10	0.00	1.200	1.159	4.50	14.009	16.81	153.0	229.8	1464.8
145.00	Appurtenance(s)	1.00	1.37	8.280	9.11	0.00	1.200	1.160	0.50	1.533	1.84	16.8	25.5	80.1
150.00	Appurtenance(s)	1.00	1.38	8.339	9.17	0.00	1.200	1.163	5.00	15.080	18.10	166.0	247.5	783.7
152.10	Appurtenance(s)	1.00	1.38	8.364	9.20	0.00	1.200	1.165	2.10	6.195	7.43	68.4	102.7	322.6
153.00	Appurtenance(s)	1.00	1.38	8.374	9.21	0.00	1.200	1.166	0.90	2.630	3.16	29.1	43.8	137.1
155.00	Appurtenance(s)	1.00	1.39	8.397	9.24	0.00	1.200	1.167	2.00	5.791	6.95	64.2	96.1	301.3
156.50	Appurtenance(s)	1.00	1.39	8.414	9.26	0.00	1.200	1.168	1.50	4.295	5.15	47.7	71.4	223.5
160.00		1.00	1.40	8.453	9.30	0.00	1.200	1.171	3.50	9.860	11.83	110.0	163.1	511.7
165.00		1.00	1.41	8.508	9.36	0.00	1.200	1.175	5.00	13.693	16.43	153.8	225.7	708.4
170.00		1.00	1.42	8.562	9.42	0.00	1.200	1.178	5.00	13.231	15.88	149.5	218.2	683.2

Wind Loading - Shaft

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020	
Site Name: Stony Brook	Exposure: C		
Height: 190.00 (ft)	Crest Height: 0.00		
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil		
Gh: 1.1	Topography: 1	Struct Class: II	Page: 23



172.50 Appurtenance(s)	1.00	1.42	8.588	9.45	0.00	1.200	1.180	2.50	6.441	7.73	73.0	107.3	333.0
175.00	1.00	1.42	8.614	9.48	0.00	1.200	1.182	2.50	6.326	7.59	71.9	105.4	326.7
180.00	1.00	1.43	8.665	9.53	0.00	1.200	1.185	5.00	12.305	14.77	140.8	203.2	632.5
185.00	1.00	1.44	8.716	9.59	0.00	1.200	1.188	5.00	11.843	14.21	136.2	195.6	607.1
190.00 Appurtenance(s)	1.00	1.45	8.765	9.64	0.00	1.200	1.191	5.00	11.380	13.66	131.7	187.9	581.6
Totals:								190.00			6,934.4		62,750.3

Discrete Appurtenance Forces

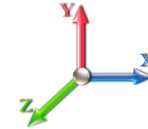
Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Struct Class: II
		Page: 24



Load Case: 1.2D + 1.0Di + 1.0W 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 24

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	190.00	ANT150D3	1	8.803	9.683	1.00	1.00	7.98	50.63	0.000	4.000	77.26	0.00	309.05
2	172.50	Low Profile	1	8.588	9.447	1.00	1.00	39.16	1847.91	0.000	0.000	369.93	0.00	0.00
3	172.50	PRK-1245	1	8.588	9.447	1.00	1.00	16.23	682.21	0.000	0.000	153.28	0.00	0.00
4	172.50	S11B12	3	8.588	9.447	0.57	0.80	5.58	232.42	0.000	0.000	52.76	0.00	0.00
5	172.50	Ericsson KRY 112 144/1	3	8.588	9.447	0.60	0.80	1.32	52.17	0.000	0.000	12.43	0.00	0.00
6	172.50	LNx-6515DS	3	8.588	9.447	0.67	0.80	25.36	160.18	0.000	0.000	239.57	0.00	0.00
7	172.50	Ericsson AIR 21 B4A/B2P	3	8.588	9.447	0.70	0.80	15.26	732.91	0.000	0.000	144.16	0.00	0.00
8	172.50	Ericsson Air21 B2A/B4P	3	8.588	9.447	0.69	0.80	14.07	650.70	0.000	0.000	132.89	0.00	0.00
9	156.50	458-2	1	8.414	9.255	1.00	1.00	6.92	78.05	0.000	0.000	64.02	0.00	0.00
10	155.00	PAD6-59A	1	8.397	9.237	1.00	1.00	38.00	244.14	0.000	0.000	351.03	0.00	0.00
11	155.00	Pipe mounts	3	8.397	9.237	1.00	1.00	7.38	129.82	0.000	0.000	68.17	0.00	0.00
12	155.00	Universal Ring Mount (Site	2	8.397	9.237	1.00	1.00	1.66	1873.33	0.000	0.000	15.35	0.00	0.00
13	153.00	DB586-Y	1	8.374	9.211	1.00	1.00	2.21	-6.39	0.000	0.000	20.35	0.00	0.00
14	152.10	ANT220F2	1	8.364	9.200	1.00	1.00	1.66	4.69	0.000	0.000	15.26	0.00	0.00
15	150.00	4' Side Arm (Site Pro	2	8.339	9.173	1.00	1.00	13.22	157.04	0.000	0.000	121.25	0.00	0.00
16	150.00	Universal Ring Mount (Site	1	8.339	9.173	1.00	1.00	0.83	935.42	0.000	0.000	7.61	0.00	0.00
17	150.00	4' Side Arm (Site Pro	1	8.339	9.173	1.00	1.00	6.61	78.52	0.000	0.000	60.63	0.00	0.00
18	150.00	LGP104NN	1	8.339	9.173	1.00	1.00	0.56	-5.79	0.000	0.000	5.12	0.00	0.00
19	145.00	Low Profile Platform-flat	1	8.280	9.108	1.00	1.00	38.91	1835.72	0.000	0.000	354.42	0.00	0.00
20	145.00	(3) SFS-H-L (V-Braces)	1	8.280	9.108	1.00	1.00	16.45	388.36	0.000	0.000	149.81	0.00	0.00
21	145.00	Horizontal Rail & SCX1-K	1	8.280	9.108	1.00	1.00	16.44	903.60	0.000	0.000	149.77	0.00	0.00
22	145.00	HRK14	1	8.280	9.108	1.00	1.00	13.41	243.63	0.000	0.000	122.13	0.00	0.00
23	145.00	PRK-1245 (kicker kit)	1	8.280	9.108	1.00	1.00	16.11	678.43	0.000	0.000	146.72	0.00	0.00
24	145.00	TD-RRH8x20-25	3	8.280	9.108	0.55	0.80	7.58	457.07	0.000	0.000	69.01	0.00	0.00
25	145.00	APXVTM14-C-I20	3	8.280	9.108	0.62	0.80	13.05	500.66	0.000	0.000	118.89	0.00	0.00
26	145.00	NNVV-65B-R4	3	8.280	9.108	0.59	0.80	23.51	650.42	0.000	0.000	214.12	0.00	0.00
27	145.00	1900 MHz RRUs	3	8.280	9.108	0.70	0.80	9.98	282.39	0.000	0.000	90.86	0.00	0.00
28	145.00	800 MHz RRUs	6	8.280	9.108	0.74	0.80	14.35	549.84	0.000	0.000	130.71	0.00	0.00
29	123.70	220-7N Omni	1	8.007	8.808	1.00	1.00	9.75	161.25	0.000	0.000	85.91	0.00	0.00
30	120.00	220-3AN	1	7.956	8.752	1.00	1.00	10.47	81.63	0.000	0.000	91.64	0.00	0.00
31	120.00	1142-2C	1	7.956	8.752	1.00	1.00	5.08	93.25	0.000	0.000	44.50	0.00	0.00
32	116.75	871F-70-220-025	1	7.911	8.702	1.00	1.00	4.65	267.21	0.000	0.000	40.49	0.00	0.00
33	114.00	5.1' Side Arm (Site Pro) w/	1	7.871	8.658	1.00	1.00	6.50	77.07	0.000	0.000	56.29	0.00	0.00
34	114.00	4' Side Arm (Site Pro	1	7.871	8.658	1.00	1.00	6.50	77.07	0.000	0.000	56.29	0.00	0.00
35	114.00	4' Side Arm (Site Pro	3	7.871	8.658	1.00	1.00	19.50	231.21	0.000	0.000	168.87	0.00	0.00
36	46.50	GPS	1	6.517	7.169	1.00	1.00	1.42	21.39	0.000	0.000	10.20	0.00	0.00
37	46.50	3 ft Standoff	1	6.517	7.169	1.00	1.00	6.17	72.60	0.000	0.000	44.23	0.00	0.00

Totals: 15,470.76

4,055.93

Total Applied Force Summary

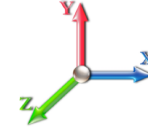
Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Struct Class: II
		Page: 25



Load Case: 1.2D + 1.0Di + 1.0W 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 24

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		183.12	2462.26	0.00	0.00
10.00		180.29	2444.83	0.00	0.00
11.75		62.39	848.55	0.00	0.00
15.00		116.78	2839.77	0.00	0.00
19.50		168.46	3885.90	0.00	0.00
20.00		18.65	240.85	0.00	0.00
25.00		193.69	2390.71	0.00	0.00
30.00		197.73	2355.24	0.00	0.00
35.00		200.59	2318.58	0.00	0.00
40.00		202.52	2281.02	0.00	0.00
45.00		203.72	2242.76	0.00	0.00
46.50	(2) attachments	115.19	759.60	0.00	0.00
50.00		142.58	1531.71	0.00	0.00
55.00		207.67	3650.05	0.00	0.00
56.75		72.19	1261.23	0.00	0.00
60.00		134.30	1258.70	0.00	0.00
65.00		206.64	1906.21	0.00	0.00
70.00		205.59	1870.20	0.00	0.00
75.00		204.23	1833.92	0.00	0.00
80.00		202.59	1797.41	0.00	0.00
85.00		200.70	1760.69	0.00	0.00
90.00		198.58	1723.78	0.00	0.00
94.50		176.63	1519.96	0.00	0.00
95.00		19.73	274.91	0.00	0.00
100.00		196.93	2711.19	0.00	0.00
105.00		194.26	1468.73	0.00	0.00
110.00		191.42	1435.67	0.00	0.00
114.00	(5) attachments	432.28	1510.53	0.00	0.00
115.00		37.30	276.49	0.00	0.00
116.75	(1) attachments	105.50	747.69	0.00	0.00
120.00	(2) attachments	256.01	1055.73	0.00	0.00
123.70	(1) attachments	220.74	1146.67	0.00	0.00
125.00		46.84	342.30	0.00	0.00
130.00		178.55	1292.91	0.00	0.00
135.00		175.00	1259.30	0.00	0.00
140.00		171.34	1225.60	0.00	0.00
144.50		153.00	1577.19	0.00	0.00
145.00	(23) attachments	1563.21	6582.68	0.00	0.00
150.00	(5) attachments	360.60	2050.94	0.00	0.00
152.10	(1) attachments	83.66	364.47	0.00	0.00
153.00	(1) attachments	49.43	146.61	0.00	0.00
155.00	(6) attachments	498.74	2584.06	0.00	0.00
156.50	(1) attachments	111.72	326.92	0.00	0.00
160.00		110.02	570.88	0.00	0.00
165.00		153.78	793.04	0.00	0.00
170.00		149.53	767.80	0.00	0.00

Total Applied Force Summary

Structure: CT00235-B Site Name: Stony Brook Height: 190.00 (ft) Base Elev: 0.000 (ft) Gh: 1.1	Code: EIA/TIA-222-H Exposure: C Crest Height: 0.00 Site Class: D - Stiff Soil Struct Class: II	12/22/2020 Page: 26
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172.50	(17) attachments	1178.05	4733.84	0.00	0.00
175.00		71.93	328.28	0.00	0.00
180.00		140.75	635.63	0.00	0.00
185.00		136.24	610.20	0.00	0.00
190.00	(1) attachments	208.92	635.34	0.00	309.05
Totals:		10,990.29	82,639.53	0.00	309.05

Linear Appurtenance Segment Forces (Factored)

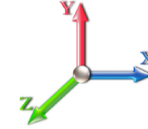
Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Struct Class: II
		Page: 27



Load Case: 1.2D + 1.0Di + 1.0W 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 24

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1/2" GPS Line	Yes	5.00	0.000	0.50	0.90	0.00	0.008	0.000	5.142	0.00	7.42
10.00	1/2" GPS Line	Yes	5.00	0.000	0.50	0.95	0.00	0.008	0.000	5.142	0.00	8.19
11.75	1/2" GPS Line	Yes	1.75	0.000	0.50	0.34	0.00	0.008	0.000	5.142	0.00	2.93
15.00	1/2" GPS Line	Yes	3.25	0.000	0.50	0.64	0.00	0.008	0.000	5.142	0.00	5.65
19.50	1/2" GPS Line	Yes	4.50	0.000	0.50	0.90	0.00	0.008	0.000	5.427	0.00	8.13
20.00	1/2" GPS Line	Yes	0.50	0.000	0.50	0.10	0.00	0.008	0.000	5.456	0.00	0.91
25.00	1/2" GPS Line	Yes	5.00	0.000	0.50	1.02	0.00	0.008	0.000	5.719	0.00	9.37
30.00	1/2" GPS Line	Yes	5.00	0.000	0.50	1.03	0.00	0.009	0.000	5.942	0.00	9.63
35.00	1/2" GPS Line	Yes	5.00	0.000	0.50	1.05	0.00	0.009	0.000	6.139	0.00	9.86
40.00	1/2" GPS Line	Yes	5.00	0.000	0.50	1.06	0.00	0.009	0.000	6.314	0.00	10.06
45.00	1/2" GPS Line	Yes	5.00	0.000	0.50	1.07	0.00	0.009	0.000	6.472	0.00	10.24
46.50	1/2" GPS Line	Yes	1.50	0.000	0.50	0.32	0.00	0.009	0.000	6.517	0.00	3.09
Totals:											0.0	85.5

Calculated Forces

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Struct Class: II
		Page: 28

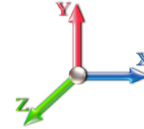


Load Case: 1.2D + 1.0Di + 1.0W 50 mph Wind

Iterations 24

Dead Load Factor 1.20

Wind Load Factor 1.00



Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-82.64	-11.02	0.00	-1307.0	0.00	1307.02	6843.68	1731.77	8934.17	8754.18	0.00	0.000	0.000	0.161
5.00	-80.17	-10.89	0.00	-1251.9	0.00	1251.93	6762.41	1701.13	8620.83	8495.95	0.02	-0.038	0.000	0.159
10.00	-77.72	-10.74	0.00	-1197.5	0.00	1197.50	6679.70	1670.49	8313.08	8239.66	0.08	-0.076	0.000	0.157
11.75	-76.86	-10.70	0.00	-1178.7	0.00	1178.71	6650.41	1659.76	8206.69	8150.43	0.11	-0.090	0.000	0.156
15.00	-74.02	-10.62	0.00	-1143.9	0.00	1143.93	6595.55	1639.85	8010.93	7985.40	0.18	-0.115	0.000	0.155
19.50	-70.13	-10.46	0.00	-1096.1	0.00	1096.15	6596.31	1640.12	8013.62	7987.68	0.31	-0.150	0.000	0.148
20.00	-69.89	-10.47	0.00	-1090.9	0.00	1090.92	6587.82	1637.06	7983.70	7962.37	0.32	-0.154	0.000	0.148
25.00	-67.49	-10.31	0.00	-1038.5	0.00	1038.56	6502.11	1606.42	7687.65	7710.45	0.50	-0.191	0.000	0.145
30.00	-65.13	-10.15	0.00	-986.99	0.00	986.99	6414.97	1575.78	7397.19	7460.77	0.72	-0.229	0.000	0.142
35.00	-62.80	-9.98	0.00	-936.25	0.00	936.25	6326.39	1545.14	7112.32	7213.44	0.98	-0.266	0.000	0.140
40.00	-60.52	-9.81	0.00	-886.34	0.00	886.34	6236.38	1514.50	6833.05	6968.54	1.28	-0.304	0.000	0.137
45.00	-58.27	-9.62	0.00	-837.31	0.00	837.31	6144.94	1483.86	6559.37	6726.18	1.62	-0.342	0.000	0.134
46.50	-57.51	-9.52	0.00	-822.88	0.00	822.88	6117.23	1474.67	6478.36	6653.99	1.73	-0.354	0.000	0.133
50.00	-55.97	-9.40	0.00	-789.58	0.00	789.58	6052.06	1453.22	6291.28	6486.46	2.00	-0.381	0.000	0.131
55.00	-52.32	-9.19	0.00	-742.60	0.00	742.60	5957.75	1422.58	6028.79	6249.47	2.42	-0.419	0.000	0.128
56.75	-51.06	-9.12	0.00	-726.53	0.00	726.53	5057.23	1258.22	5389.92	5369.23	2.58	-0.433	0.000	0.145
60.00	-49.79	-9.01	0.00	-696.89	0.00	696.89	5008.75	1240.80	5241.65	5243.49	2.88	-0.458	0.000	0.143
65.00	-47.88	-8.82	0.00	-651.86	0.00	651.86	4933.00	1213.99	5017.59	5051.65	3.38	-0.499	0.000	0.139
70.00	-46.01	-8.63	0.00	-607.76	0.00	607.76	4855.80	1187.18	4798.42	4861.84	3.93	-0.541	0.000	0.135
75.00	-44.17	-8.44	0.00	-564.62	0.00	564.62	4777.18	1160.37	4584.14	4674.14	4.52	-0.582	0.000	0.130
80.00	-42.37	-8.25	0.00	-522.43	0.00	522.43	4697.12	1133.56	4374.76	4488.65	5.15	-0.623	0.000	0.125
85.00	-40.61	-8.05	0.00	-481.20	0.00	481.20	4615.63	1106.75	4170.27	4305.49	5.82	-0.663	0.000	0.121
90.00	-38.88	-7.86	0.00	-440.92	0.00	440.92	4532.70	1079.94	3970.68	4124.73	6.54	-0.703	0.000	0.116
94.50	-37.36	-7.68	0.00	-405.55	0.00	405.55	4456.84	1055.81	3795.23	3964.20	7.22	-0.738	0.000	0.111
95.00	-37.08	-7.67	0.00	-401.71	0.00	401.71	4448.34	1053.13	3775.98	3946.49	7.29	-0.742	0.000	0.110
100.00	-34.37	-7.46	0.00	-363.36	0.00	363.36	3637.80	896.67	3193.62	3210.33	8.09	-0.781	0.000	0.123
105.00	-32.90	-7.27	0.00	-326.07	0.00	326.07	3571.83	873.69	3032.02	3070.63	8.93	-0.818	0.000	0.115
110.00	-31.46	-7.07	0.00	-289.74	0.00	289.74	3504.43	850.71	2874.63	2932.74	9.81	-0.858	0.000	0.108
114.00	-29.95	-6.63	0.00	-261.45	0.00	261.45	3449.48	832.33	2751.73	2823.80	10.54	-0.889	0.000	0.101
115.00	-29.68	-6.59	0.00	-254.82	0.00	254.82	3435.59	827.73	2721.42	2796.76	10.73	-0.897	0.000	0.100
116.75	-28.93	-6.48	0.00	-243.28	0.00	243.28	3411.16	819.69	2668.79	2749.64	11.06	-0.910	0.000	0.097
120.00	-27.88	-6.22	0.00	-222.21	0.00	222.21	3365.32	804.75	2572.42	2662.79	11.69	-0.934	0.000	0.092
123.70	-26.73	-5.99	0.00	-199.19	0.00	199.19	3312.40	787.75	2464.85	2565.00	12.42	-0.959	0.000	0.086
125.00	-26.39	-5.95	0.00	-191.40	0.00	191.40	3293.62	781.77	2427.60	2530.92	12.68	-0.968	0.000	0.084
130.00	-25.09	-5.76	0.00	-161.66	0.00	161.66	3212.23	758.79	2286.98	2395.10	13.72	-1.000	0.000	0.075
135.00	-23.84	-5.58	0.00	-132.85	0.00	132.85	3114.95	735.81	2150.56	2251.51	14.78	-1.029	0.000	0.067
140.00	-22.61	-5.39	0.00	-104.98	0.00	104.98	3017.67	712.84	2018.33	2112.36	15.87	-1.055	0.000	0.057
144.50	-21.04	-5.21	0.00	-80.72	0.00	80.72	1688.87	433.97	1215.62	1173.72	16.88	-1.075	0.000	0.081
145.00	-14.48	-3.53	0.00	-78.11	0.00	78.11	1685.31	432.56	1207.71	1167.40	16.99	-1.077	0.000	0.076
150.00	-12.44	-3.13	0.00	-60.47	0.00	60.47	1649.03	418.42	1130.03	1104.65	18.13	-1.103	0.000	0.062
152.10	-12.08	-3.04	0.00	-53.89	0.00	53.89	1633.41	412.48	1098.18	1078.54	18.62	-1.113	0.000	0.057
153.00	-11.93	-2.99	0.00	-51.15	0.00	51.15	1626.65	409.93	1084.67	1067.39	18.83	-1.117	0.000	0.055
155.00	-9.36	-2.45	0.00	-45.16	0.00	45.16	1611.48	404.28	1054.94	1042.73	19.30	-1.125	0.000	0.049
156.50	-9.03	-2.33	0.00	-41.49	0.00	41.49	1599.96	400.04	1032.92	1024.33	19.65	-1.131	0.000	0.046
160.00	-8.46	-2.21	0.00	-33.34	0.00	33.34	1572.65	390.14	982.43	981.73	20.49	-1.143	0.000	0.039
165.00	-7.67	-2.04	0.00	-22.30	0.00	22.30	1532.55	375.99	912.50	921.74	21.69	-1.158	0.000	0.029
170.00	-6.91	-1.88	0.00	-12.09	0.00	12.09	1491.18	361.85	845.15	862.84	22.91	-1.167	0.000	0.019
172.50	-2.20	-0.60	0.00	-7.40	0.00	7.40	1470.02	354.78	812.44	833.83	23.52	-1.170	0.000	0.010

Calculated Forces

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Page: 29
Struct Class: II		



175.00	-1.87	-0.52	0.00	-5.89	0.00	5.89	1448.54	347.71	780.38	805.12	24.14	-1.173	0.000	0.009
180.00	-1.24	-0.37	0.00	-3.27	0.00	3.27	1404.63	333.57	718.20	748.67	25.37	-1.176	0.000	0.005
185.00	-0.63	-0.22	0.00	-1.42	0.00	1.42	1352.25	319.43	658.59	689.91	26.60	-1.178	0.000	0.003
190.00	0.00	-0.21	0.00	-0.31	0.00	0.31	1292.39	305.29	601.57	629.89	27.83	-1.179	0.000	0.000

Seismic Segment Forces (Factored)

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Struct Class: II



Page: 30

Load Case: 1.2D + 1.0Ev + 1.0Eh

Iterations 22

Gust Response Factor 1.10

Sds 0.20

Ss 0.18

Dead Load Factor 1.20 **Seismic Load Factor** 1.00

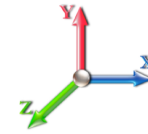
Sd1 0.08

S1 0.05

Wind Load Factor 0.00 **Structure Frequency (f1)** 0.32

SA 0.03

Seismic Importance Factor 1.00



Top Elev (ft)	Description	Wz (lb)	Hz (lb)	Vertical Ev (lb)	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	
5.00		1799.2	2.50	70.63	0.02	
10.00		1769.5	7.50	69.46	0.19	
11.75	Bot - Section 2	612.32	10.88	24.04	0.05	
15.00		2184.6	13.38	85.76	0.90	
19.50	Top - Section 1	2983.4	17.25	117.11	2.78	
20.00		172.38	19.75	6.77	0.01	
25.00		1707.4	22.50	67.02	1.55	
30.00		1677.7	27.50	65.86	2.24	
35.00		1648.0	32.50	64.69	3.01	
40.00		1618.3	37.50	63.52	3.87	
45.00		1588.6	42.50	62.36	4.79	
46.50	Appurtenance(s)	520.79	45.75	20.44	0.60	
50.00	Bot - Section 3	1087.4	48.25	42.69	2.89	
55.00		2770.1	52.50	108.74	22.22	
56.75	Top - Section 2	956.38	55.88	37.54	3.00	
60.00		874.64	58.38	34.33	2.74	
65.00		1324.1	62.50	51.98	7.20	
70.00		1298.1	67.50	50.96	8.07	
75.00		1272.1	72.50	49.94	8.94	
80.00		1246.1	77.50	48.92	9.80	
85.00		1220.1	82.50	47.90	10.65	
90.00		1194.2	87.50	46.88	11.47	
94.50	Bot - Section 4	1052.5	92.25	41.32	9.91	
95.00		204.92	94.75	8.04	0.40	
100.00	Top - Section 3	2022.6	97.50	79.40	40.86	
105.00		992.40	102.50	38.95	10.87	
110.00		970.12	107.50	38.08	11.43	
114.00	Appurtenance(s)	960.06	112.00	37.69	12.15	
115.00		185.91	114.50	7.30	0.48	
116.75	Appurtenance(s)	353.21	115.88	13.86	1.76	
120.00	Appurtenance(s)	641.00	118.38	25.16	6.05	
123.70	Appurtenance(s)	685.65	121.85	26.91	7.33	
125.00		230.28	124.35	9.04	0.86	
130.00		871.65	127.50	34.22	12.98	
135.00		849.37	132.50	33.34	13.31	
140.00	Bot - Section 5	827.09	137.50	32.47	13.59	
144.50	Top - Section 4	1141.5	142.25	44.81	27.71	
145.00	Appurtenance(s)	3618.4	144.75	142.04	288.25	
150.00	Appurtenance(s)	963.37	147.50	37.82	21.22	
152.10	Appurtenance(s)	231.45	151.05	9.09	1.28	
153.00	Appurtenance(s)	101.93	152.55	4.00	0.25	
155.00	Appurtenance(s)	1045.8	154.00	41.05	27.26	
156.50	Appurtenance(s)	174.09	155.75	6.83	0.77	
160.00		349.67	158.25	13.73	3.22	
165.00		486.91	162.50	19.11	6.58	

Seismic Segment Forces (Factored)

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Page: 31
	Struct Class: II	



170.00		472.06	167.50	18.53	6.57
172.50	Appurtenance(s)	2824.1	171.25	110.86	245.77
175.00		186.01	173.75	7.30	1.10
180.00		360.88	177.50	14.17	4.31
185.00		346.02	182.50	13.58	4.19
190.00	Appurtenance(s)	349.17	187.50	13.71	4.50
Totals:		55,024.4		2,159.9	891.9

Total Wind: 53,239.7

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

Calculated Forces

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020	
Site Name: Stony Brook	Exposure: C		
Height: 190.00 (ft)	Crest Height: 0.00		
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil		
Gh: 1.1	Topography: 1	Struct Class: II	Page: 32



Load Case: 1.2D + 1.0Ev + 1.0Eh

Iterations 22

Gust Response Factor 1.10

Sds 0.20

Ss 0.18

Dead Load Factor 1.20 **Seismic Load Factor** 1.00

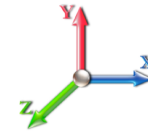
Sd1 0.08

S1 0.05

Wind Load Factor 0.00 **Structure Frequency (f1)** 0.32

SA 0.03

Seismic Importance Factor 1.00



Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-67.32	-0.89	0.00	-128.83	0.00	128.83	6843.68	1731.77	8934.17	8754.18	0.00	0.00	0.00	0.025
5.00	-65.12	-0.90	0.00	-124.37	0.00	124.37	6762.41	1701.13	8620.83	8495.95	0.00	0.00	0.00	0.024
10.00	-62.95	-0.90	0.00	-119.88	0.00	119.88	6679.70	1670.49	8313.08	8239.66	0.01	-0.01	0.00	0.024
11.75	-62.20	-0.90	0.00	-118.30	0.00	118.30	6650.41	1659.76	8206.69	8150.43	0.01	-0.01	0.00	0.024
15.00	-59.51	-0.90	0.00	-115.37	0.00	115.37	6595.55	1639.85	8010.93	7985.40	0.02	-0.01	0.00	0.023
19.50	-55.84	-0.90	0.00	-111.30	0.00	111.30	6596.31	1640.12	8013.62	7987.68	0.03	-0.01	0.00	0.022
20.00	-55.63	-0.90	0.00	-110.85	0.00	110.85	6587.82	1637.06	7983.70	7962.37	0.03	-0.02	0.00	0.022
25.00	-53.54	-0.91	0.00	-106.33	0.00	106.33	6502.11	1606.42	7687.65	7710.45	0.05	-0.02	0.00	0.022
30.00	-51.49	-0.91	0.00	-101.81	0.00	101.81	6414.97	1575.78	7397.19	7460.77	0.07	-0.02	0.00	0.022
35.00	-49.47	-0.91	0.00	-97.28	0.00	97.28	6326.39	1545.14	7112.32	7213.44	0.10	-0.03	0.00	0.021
40.00	-47.49	-0.90	0.00	-92.75	0.00	92.75	6236.38	1514.50	6833.05	6968.54	0.13	-0.03	0.00	0.021
45.00	-45.55	-0.90	0.00	-88.23	0.00	88.23	6144.94	1483.86	6559.37	6726.18	0.16	-0.03	0.00	0.021
46.50	-44.92	-0.90	0.00	-86.88	0.00	86.88	6117.23	1474.67	6478.36	6653.99	0.17	-0.04	0.00	0.020
50.00	-43.59	-0.90	0.00	-83.73	0.00	83.73	6052.06	1453.22	6291.28	6486.46	0.20	-0.04	0.00	0.020
55.00	-40.18	-0.88	0.00	-79.23	0.00	79.23	5957.75	1422.58	6028.79	6249.47	0.25	-0.04	0.00	0.019
56.75	-39.00	-0.87	0.00	-77.70	0.00	77.70	5057.23	1258.22	5389.92	5369.23	0.26	-0.04	0.00	0.022
60.00	-37.94	-0.87	0.00	-74.86	0.00	74.86	5008.75	1240.80	5241.65	5243.49	0.29	-0.05	0.00	0.022
65.00	-36.32	-0.87	0.00	-70.49	0.00	70.49	4933.00	1213.99	5017.59	5051.65	0.34	-0.05	0.00	0.021
70.00	-34.74	-0.86	0.00	-66.16	0.00	66.16	4855.80	1187.18	4798.42	4861.84	0.40	-0.06	0.00	0.021
75.00	-33.19	-0.85	0.00	-61.85	0.00	61.85	4777.18	1160.37	4584.14	4674.14	0.46	-0.06	0.00	0.020
80.00	-31.67	-0.84	0.00	-57.59	0.00	57.59	4697.12	1133.56	4374.76	4488.65	0.53	-0.07	0.00	0.020
85.00	-30.19	-0.83	0.00	-53.37	0.00	53.37	4615.63	1106.75	4170.27	4305.49	0.60	-0.07	0.00	0.019
90.00	-28.74	-0.82	0.00	-49.21	0.00	49.21	4532.70	1079.94	3970.68	4124.73	0.67	-0.07	0.00	0.018
94.50	-27.46	-0.81	0.00	-45.51	0.00	45.51	4456.84	1055.81	3795.23	3964.20	0.75	-0.08	0.00	0.018
95.00	-27.20	-0.81	0.00	-45.10	0.00	45.10	4448.34	1053.13	3775.98	3946.49	0.75	-0.08	0.00	0.018
100.00	-24.72	-0.77	0.00	-41.04	0.00	41.04	3637.80	896.67	3193.62	3210.33	0.84	-0.08	0.00	0.020
105.00	-23.52	-0.76	0.00	-37.19	0.00	37.19	3571.83	873.69	3032.02	3070.63	0.93	-0.09	0.00	0.019
110.00	-22.35	-0.75	0.00	-33.40	0.00	33.40	3504.43	850.71	2874.63	2932.74	1.02	-0.09	0.00	0.018
114.00	-21.18	-0.73	0.00	-30.41	0.00	30.41	3449.48	832.33	2751.73	2823.80	1.10	-0.10	0.00	0.017
115.00	-20.95	-0.73	0.00	-29.67	0.00	29.67	3435.59	827.73	2721.42	2796.76	1.12	-0.10	0.00	0.017
116.75	-20.52	-0.73	0.00	-28.39	0.00	28.39	3411.16	819.69	2668.79	2749.64	1.15	-0.10	0.00	0.016
120.00	-19.75	-0.73	0.00	-26.01	0.00	26.01	3365.32	804.75	2572.42	2662.79	1.22	-0.10	0.00	0.016
123.70	-18.91	-0.72	0.00	-23.33	0.00	23.33	3312.40	787.75	2464.85	2565.00	1.30	-0.10	0.00	0.015
125.00	-18.64	-0.72	0.00	-22.39	0.00	22.39	3293.62	781.77	2427.60	2530.92	1.33	-0.10	0.00	0.015
130.00	-17.58	-0.70	0.00	-18.81	0.00	18.81	3212.23	758.79	2286.98	2395.10	1.44	-0.11	0.00	0.013
135.00	-16.55	-0.69	0.00	-15.30	0.00	15.30	3114.95	735.81	2150.56	2251.51	1.56	-0.11	0.00	0.012
140.00	-15.55	-0.67	0.00	-11.85	0.00	11.85	3017.67	712.84	2018.33	2112.36	1.67	-0.11	0.00	0.011
144.50	-14.16	-0.64	0.00	-8.82	0.00	8.82	1688.87	433.97	1215.62	1173.72	1.78	-0.12	0.00	0.016
145.00	-9.68	-0.35	0.00	-8.50	0.00	8.50	1685.31	432.56	1207.71	1167.40	1.80	-0.12	0.00	0.013
150.00	-8.51	-0.32	0.00	-6.77	0.00	6.77	1649.03	418.42	1130.03	1104.65	1.92	-0.12	0.00	0.011
152.10	-8.23	-0.32	0.00	-6.09	0.00	6.09	1633.41	412.48	1098.18	1078.54	1.97	-0.12	0.00	0.011
153.00	-8.10	-0.32	0.00	-5.80	0.00	5.80	1626.65	409.93	1084.67	1067.39	2.00	-0.12	0.00	0.010
155.00	-6.81	-0.29	0.00	-5.15	0.00	5.15	1611.48	404.28	1054.94	1042.73	2.05	-0.12	0.00	0.009
156.50	-6.60	-0.29	0.00	-4.72	0.00	4.72	1599.96	400.04	1032.92	1024.33	2.09	-0.12	0.00	0.009
160.00	-6.18	-0.29	0.00	-3.70	0.00	3.70	1572.65	390.14	982.43	981.73	2.18	-0.12	0.00	0.008
165.00	-5.60	-0.28	0.00	-2.27	0.00	2.27	1532.55	375.99	912.50	921.74	2.31	-0.13	0.00	0.006
170.00	-5.03	-0.27	0.00	-0.88	0.00	0.88	1491.18	361.85	845.15	862.84	2.44	-0.13	0.00	0.004

Calculated Forces

Structure: CT00235-B Site Name: Stony Brook Height: 190.00 (ft) Base Elev: 0.000 (ft) Gh: 1.1	Code: EIA/TIA-222-H 12/22/2020 Exposure: C Crest Height: 0.00 Site Class: D - Stiff Soil Struct Class: II
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172.50	-1.54	-0.02	0.00	-0.20	0.00	0.20	1470.02	354.78	812.44	833.83	2.51	-0.13	0.001
175.00	-1.31	-0.02	0.00	-0.16	0.00	0.16	1448.54	347.71	780.38	805.12	2.57	-0.13	0.001
180.00	-0.86	-0.01	0.00	-0.08	0.00	0.08	1404.63	333.57	718.20	748.67	2.71	-0.13	0.001
185.00	-0.43	-0.01	0.00	-0.03	0.00	0.03	1352.25	319.43	658.59	689.91	2.84	-0.13	0.000
190.00	0.00	0.00	0.00	0.00	0.00	0.00	1292.39	305.29	601.57	629.89	2.97	-0.13	0.000

Seismic Segment Forces (Factored)

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Struct Class: II



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Load Case: 0.9D + 1.0Ev + 1.0Eh

Iterations 22

Gust Response Factor 1.10

Sds 0.20

Ss 0.18

Dead Load Factor 0.90 **Seismic Load Factor** 1.00

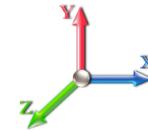
Sd1 0.08

S1 0.05

Wind Load Factor 0.00 **Structure Frequency (f1)** 0.32

SA 0.03

Seismic Importance Factor 1.00



Top Elev (ft)	Description	Wz (lb)	Hz (lb)	Vertical Ev (lb)	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	
5.00		1765.4	2.50	69.30	0.02	
10.00		1735.7	7.50	68.13	0.18	
11.75	Bot - Section 2	600.48	10.88	23.57	0.05	
15.00		2162.7	13.38	84.89	0.90	
19.50	Top - Section 1	2953.0	17.25	115.92	2.79	
20.00		168.99	19.75	6.63	0.01	
25.00		1673.6	22.50	65.69	1.52	
30.00		1643.9	27.50	64.53	2.20	
35.00		1614.2	32.50	63.36	2.96	
40.00		1584.5	37.50	62.20	3.79	
45.00		1554.8	42.50	61.03	4.69	
46.50	Appurtenance(s)	510.65	45.75	20.04	0.59	
50.00	Bot - Section 3	1063.9	48.25	41.76	2.83	
55.00		2736.5	52.50	107.42	22.17	
56.75	Top - Section 2	944.63	55.88	37.08	2.99	
60.00		852.82	58.38	33.48	2.66	
65.00		1290.5	62.50	50.66	6.99	
70.00		1264.6	67.50	49.64	7.83	
75.00		1238.6	72.50	48.62	8.66	
80.00		1212.6	77.50	47.60	9.49	
85.00		1186.6	82.50	46.58	10.29	
90.00		1160.6	87.50	45.56	11.08	
94.50	Bot - Section 4	1022.3	92.25	40.13	9.55	
95.00		201.56	94.75	7.91	0.39	
100.00	Top - Section 3	1989.0	97.50	78.08	40.40	
105.00		958.83	102.50	37.64	10.38	
110.00		936.56	107.50	36.76	10.89	
114.00	Appurtenance(s)	933.21	112.00	36.63	11.73	
115.00		179.67	114.50	7.05	0.45	
116.75	Appurtenance(s)	342.28	115.88	13.44	1.69	
120.00	Appurtenance(s)	620.70	118.38	24.36	5.80	
123.70	Appurtenance(s)	662.54	121.85	26.01	7.00	
125.00		222.16	124.35	8.72	0.82	
130.00		840.43	127.50	32.99	12.33	
135.00		818.15	132.50	32.12	12.62	
140.00	Bot - Section 5	795.87	137.50	31.24	12.86	
144.50	Top - Section 4	1113.4	142.25	43.71	26.95	
145.00	Appurtenance(s)	3615.3	144.75	141.91	294.18	
150.00	Appurtenance(s)	937.87	147.50	36.81	20.56	
152.10	Appurtenance(s)	222.15	151.05	8.72	1.21	
153.00	Appurtenance(s)	97.94	152.55	3.84	0.24	
155.00	Appurtenance(s)	1036.9	154.00	40.71	27.40	
156.50	Appurtenance(s)	167.74	155.75	6.58	0.73	
160.00		334.87	158.25	13.14	3.02	
165.00		465.76	162.50	18.28	6.15	

Seismic Segment Forces (Factored)

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Page: 35
	Struct Class: II	



170.00		450.91	167.50	17.70	6.13
172.50	Appurtenance(s)	2813.6	171.25	110.44	249.39
175.00		185.62	173.75	7.29	1.12
180.00		360.10	177.50	14.13	4.39
185.00		345.24	182.50	13.55	4.26
190.00	Appurtenance(s)	348.39	187.50	13.68	4.58
Totals:		53,939.0		2,117.3	891.9

Total Wind: 53,239.7

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

Calculated Forces

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Struct Class: II



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Load Case: 0.9D + 1.0Ev + 1.0Eh

Iterations 22

Gust Response Factor 1.10

Sds 0.20

Ss 0.18

Dead Load Factor 0.90 **Seismic Load Factor** 1.00

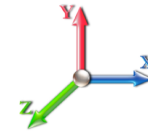
Sd1 0.08

S1 0.05

Wind Load Factor 0.00 **Structure Frequency (f1)** 0.32

SA 0.03

Seismic Importance Factor 1.00



Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-50.99	-0.89	0.00	-128.07	0.00	128.07	6843.68	1731.77	8934.17	8754.18		0.00	0.00	0.022
5.00	-49.32	-0.90	0.00	-123.60	0.00	123.60	6762.41	1701.13	8620.83	8495.95		0.00	0.00	0.022
10.00	-47.68	-0.90	0.00	-119.12	0.00	119.12	6679.70	1670.49	8313.08	8239.66		0.01	-0.01	0.022
11.75	-47.11	-0.90	0.00	-117.55	0.00	117.55	6650.41	1659.76	8206.69	8150.43		0.01	-0.01	0.022
15.00	-45.07	-0.90	0.00	-114.63	0.00	114.63	6595.55	1639.85	8010.93	7985.40		0.02	-0.01	0.021
19.50	-42.29	-0.90	0.00	-110.58	0.00	110.58	6596.31	1640.12	8013.62	7987.68		0.03	-0.01	0.020
20.00	-42.13	-0.90	0.00	-110.13	0.00	110.13	6587.82	1637.06	7983.70	7962.37		0.03	-0.02	0.020
25.00	-40.55	-0.90	0.00	-105.63	0.00	105.63	6502.11	1606.42	7687.65	7710.45		0.05	-0.02	0.020
30.00	-38.99	-0.90	0.00	-101.13	0.00	101.13	6414.97	1575.78	7397.19	7460.77		0.07	-0.02	0.020
35.00	-37.47	-0.90	0.00	-96.62	0.00	96.62	6326.39	1545.14	7112.32	7213.44		0.10	-0.03	0.019
40.00	-35.97	-0.90	0.00	-92.13	0.00	92.13	6236.38	1514.50	6833.05	6968.54		0.13	-0.03	0.019
45.00	-34.50	-0.89	0.00	-87.64	0.00	87.64	6144.94	1483.86	6559.37	6726.18		0.16	-0.03	0.019
46.50	-34.02	-0.89	0.00	-86.30	0.00	86.30	6117.23	1474.67	6478.36	6653.99		0.17	-0.04	0.019
50.00	-33.01	-0.89	0.00	-83.18	0.00	83.18	6052.06	1453.22	6291.28	6486.46		0.20	-0.04	0.018
55.00	-30.43	-0.87	0.00	-78.71	0.00	78.71	5957.75	1422.58	6028.79	6249.47		0.24	-0.04	0.018
56.75	-29.54	-0.87	0.00	-77.19	0.00	77.19	5057.23	1258.22	5389.92	5369.23		0.26	-0.04	0.020
60.00	-28.73	-0.87	0.00	-74.38	0.00	74.38	5008.75	1240.80	5241.65	5243.49		0.29	-0.05	0.020
65.00	-27.51	-0.86	0.00	-70.05	0.00	70.05	4933.00	1213.99	5017.59	5051.65		0.34	-0.05	0.019
70.00	-26.31	-0.85	0.00	-65.75	0.00	65.75	4855.80	1187.18	4798.42	4861.84		0.40	-0.06	0.019
75.00	-25.14	-0.84	0.00	-61.49	0.00	61.49	4777.18	1160.37	4584.14	4674.14		0.46	-0.06	0.018
80.00	-23.99	-0.84	0.00	-57.26	0.00	57.26	4697.12	1133.56	4374.76	4488.65		0.52	-0.06	0.018
85.00	-22.86	-0.83	0.00	-53.08	0.00	53.08	4615.63	1106.75	4170.27	4305.49		0.59	-0.07	0.017
90.00	-21.76	-0.82	0.00	-48.95	0.00	48.95	4532.70	1079.94	3970.68	4124.73		0.67	-0.07	0.017
94.50	-20.79	-0.81	0.00	-45.29	0.00	45.29	4456.84	1055.81	3795.23	3964.20		0.74	-0.08	0.016
95.00	-20.60	-0.81	0.00	-44.88	0.00	44.88	4448.34	1053.13	3775.98	3946.49		0.75	-0.08	0.016
100.00	-18.73	-0.76	0.00	-40.86	0.00	40.86	3637.80	896.67	3193.62	3210.33		0.83	-0.08	0.018
105.00	-17.81	-0.75	0.00	-37.04	0.00	37.04	3571.83	873.69	3032.02	3070.63		0.92	-0.09	0.017
110.00	-16.93	-0.74	0.00	-33.27	0.00	33.27	3504.43	850.71	2874.63	2932.74		1.01	-0.09	0.016
114.00	-16.04	-0.73	0.00	-30.30	0.00	30.30	3449.48	832.33	2751.73	2823.80		1.09	-0.09	0.015
115.00	-15.87	-0.73	0.00	-29.57	0.00	29.57	3435.59	827.73	2721.42	2796.76		1.11	-0.10	0.015
116.75	-15.55	-0.73	0.00	-28.30	0.00	28.30	3411.16	819.69	2668.79	2749.64		1.15	-0.10	0.015
120.00	-14.96	-0.72	0.00	-25.93	0.00	25.93	3365.32	804.75	2572.42	2662.79		1.21	-0.10	0.014
123.70	-14.33	-0.71	0.00	-23.26	0.00	23.26	3312.40	787.75	2464.85	2565.00		1.29	-0.10	0.013
125.00	-14.12	-0.71	0.00	-22.33	0.00	22.33	3293.62	781.77	2427.60	2530.92		1.32	-0.10	0.013
130.00	-13.32	-0.70	0.00	-18.76	0.00	18.76	3212.23	758.79	2286.98	2395.10		1.43	-0.11	0.012
135.00	-12.54	-0.69	0.00	-15.26	0.00	15.26	3114.95	735.81	2150.56	2251.51		1.55	-0.11	0.011
140.00	-11.78	-0.67	0.00	-11.82	0.00	11.82	3017.67	712.84	2018.33	2112.36		1.66	-0.11	0.010
144.50	-10.73	-0.64	0.00	-8.79	0.00	8.79	1688.87	433.97	1215.62	1173.72		1.77	-0.12	0.014
145.00	-7.33	-0.34	0.00	-8.47	0.00	8.47	1685.31	432.56	1207.71	1167.40		1.79	-0.12	0.012
150.00	-6.44	-0.32	0.00	-6.75	0.00	6.75	1649.03	418.42	1130.03	1104.65		1.91	-0.12	0.010
152.10	-6.23	-0.32	0.00	-6.08	0.00	6.08	1633.41	412.48	1098.18	1078.54		1.96	-0.12	0.009
153.00	-6.14	-0.32	0.00	-5.79	0.00	5.79	1626.65	409.93	1084.67	1067.39		1.98	-0.12	0.009
155.00	-5.16	-0.29	0.00	-5.15	0.00	5.15	1611.48	404.28	1054.94	1042.73		2.03	-0.12	0.008
156.50	-5.00	-0.29	0.00	-4.71	0.00	4.71	1599.96	400.04	1032.92	1024.33		2.07	-0.12	0.008
160.00	-4.68	-0.29	0.00	-3.70	0.00	3.70	1572.65	390.14	982.43	981.73		2.16	-0.12	0.007
165.00	-4.24	-0.28	0.00	-2.27	0.00	2.27	1532.55	375.99	912.50	921.74		2.29	-0.13	0.005
170.00	-3.81	-0.27	0.00	-0.88	0.00	0.88	1491.18	361.85	845.15	862.84		2.43	-0.13	0.004

Calculated Forces

Structure: CT00235-B Site Name: Stony Brook Height: 190.00 (ft) Base Elev: 0.000 (ft) Gh: 1.1	Code: EIA/TIA-222-H Exposure: C Crest Height: 0.00 Site Class: D - Stiff Soil Struct Class: II	12/22/2020 Page: 37
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172.50	-1.16	-0.02	0.00	-0.20	0.00	0.20	1470.02	354.78	812.44	833.83	2.49	-0.13	0.001
175.00	-0.99	-0.02	0.00	-0.15	0.00	0.15	1448.54	347.71	780.38	805.12	2.56	-0.13	0.001
180.00	-0.65	-0.01	0.00	-0.08	0.00	0.08	1404.63	333.57	718.20	748.67	2.69	-0.13	0.001
185.00	-0.33	-0.01	0.00	-0.03	0.00	0.03	1352.25	319.43	658.59	689.91	2.82	-0.13	0.000
190.00	0.00	0.00	0.00	0.00	0.00	0.00	1292.39	305.29	601.57	629.89	2.95	-0.13	0.000

Wind Loading - Shaft

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020	
Site Name: Stony Brook	Exposure: C		
Height: 190.00 (ft)	Crest Height: 0.00		
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil		
Gh: 1.1	Topography: 1	Struct Class: II	Page: 38



Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 24

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	6.626	7.29	292.67	0.730	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	6.626	7.29	287.53	0.730	0.000	5.00	26.287	19.19	139.9	0.0	1664.0
10.00		1.00	0.85	6.626	7.29	282.40	0.730	0.000	5.00	25.821	18.85	137.4	0.0	1634.3
11.75	Bot - Section 2	1.00	0.85	6.626	7.29	280.60	0.730	0.000	1.75	8.928	6.52	47.5	0.0	565.0
15.00		1.00	0.85	6.626	7.29	277.26	0.730	0.000	3.25	16.703	12.19	88.9	0.0	2096.8
19.50	Top - Section 1	1.00	0.90	6.993	7.69	280.09	0.730	0.000	4.50	22.803	16.65	128.0	0.0	2861.8
20.00		1.00	0.90	7.030	7.73	285.11	0.730	0.000	0.50	2.510	1.83	14.2	0.0	158.9
25.00		1.00	0.95	7.368	8.10	286.47	0.730	0.000	5.00	24.848	18.14	147.0	0.0	1572.2
30.00		1.00	0.98	7.656	8.42	286.50	0.730	0.000	5.00	24.383	17.80	149.9	0.0	1542.5
35.00		1.00	1.01	7.909	8.70	285.58	0.730	0.000	5.00	23.917	17.46	151.9	0.0	1512.8
40.00		1.00	1.04	8.134	8.95	283.93	0.730	0.000	5.00	23.452	17.12	153.2	0.0	1483.1
45.00		1.00	1.07	8.339	9.17	281.71	0.730	0.000	5.00	22.986	16.78	153.9	0.0	1453.4
46.50	Appurtenance(s)	1.00	1.08	8.396	9.24	280.95	0.730	0.000	1.50	6.805	4.97	45.9	0.0	430.2
50.00	Bot - Section 3	1.00	1.09	8.526	9.38	279.02	0.730	0.000	3.50	15.716	11.47	107.6	0.0	993.5
55.00		1.00	1.12	8.699	9.57	275.95	0.730	0.000	5.00	22.426	16.37	156.6	0.0	2635.9
56.75	Top - Section 2	1.00	1.12	8.756	9.63	274.79	0.730	0.000	1.75	7.739	5.65	54.4	0.0	909.4
60.00		1.00	1.14	8.859	9.75	277.27	0.730	0.000	3.25	14.221	10.38	101.2	0.0	787.4
65.00		1.00	1.16	9.010	9.91	273.63	0.730	0.000	5.00	21.495	15.69	155.5	0.0	1189.9
70.00		1.00	1.17	9.152	10.07	269.73	0.730	0.000	5.00	21.029	15.35	154.5	0.0	1163.9
75.00		1.00	1.19	9.285	10.21	265.62	0.730	0.000	5.00	20.564	15.01	153.3	0.0	1137.9
80.00		1.00	1.21	9.412	10.35	261.31	0.730	0.000	5.00	20.098	14.67	151.9	0.0	1111.9
85.00		1.00	1.22	9.533	10.49	256.82	0.730	0.000	5.00	19.633	14.33	150.3	0.0	1085.9
90.00		1.00	1.24	9.649	10.61	252.17	0.730	0.000	5.00	19.167	13.99	148.5	0.0	1059.9
94.50	Bot - Section 4	1.00	1.25	9.748	10.72	247.86	0.730	0.000	4.50	16.853	12.30	131.9	0.0	931.7
95.00		1.00	1.25	9.759	10.74	247.37	0.730	0.000	0.50	1.881	1.37	14.7	0.0	191.5
100.00	Top - Section 3	1.00	1.27	9.865	10.85	242.45	0.730	0.000	5.00	18.554	13.54	147.0	0.0	1888.4
105.00		1.00	1.28	9.967	10.96	241.69	0.730	0.000	5.00	18.088	13.20	144.8	0.0	858.1
110.00		1.00	1.29	10.065	11.07	236.54	0.730	0.000	5.00	17.623	12.86	142.4	0.0	835.9
114.00	Appurtenance(s)	1.00	1.30	10.141	11.16	232.35	0.730	0.000	4.00	13.763	10.05	112.1	0.0	652.7
115.00		1.00	1.30	10.160	11.18	231.29	0.730	0.000	1.00	3.394	2.48	27.7	0.0	160.9
116.75	Appurtenance(s)	1.00	1.31	10.192	11.21	229.43	0.730	0.000	1.75	5.895	4.30	48.2	0.0	279.5
120.00	Appurtenance(s)	1.00	1.32	10.251	11.28	225.94	0.730	0.000	3.25	10.797	7.88	88.9	0.0	511.8
123.70	Appurtenance(s)	1.00	1.32	10.317	11.35	221.92	0.730	0.000	3.70	12.052	8.80	99.8	0.0	571.2
125.00		1.00	1.33	10.340	11.37	220.50	0.730	0.000	1.30	4.174	3.05	34.7	0.0	197.8
130.00		1.00	1.34	10.425	11.47	214.97	0.730	0.000	5.00	15.761	11.51	131.9	0.0	746.8
135.00		1.00	1.35	10.509	11.56	209.35	0.730	0.000	5.00	15.296	11.17	129.1	0.0	724.5
140.00	Bot - Section 5	1.00	1.36	10.589	11.65	203.66	0.730	0.000	5.00	14.830	10.83	126.1	0.0	702.2
144.50	Top - Section 4	1.00	1.37	10.660	11.73	198.48	0.730	0.000	4.50	13.139	9.59	112.5	0.0	1029.1
145.00	Appurtenance(s)	1.00	1.37	10.668	11.73	200.86	0.730	0.000	0.50	1.437	1.05	12.3	0.0	45.5
150.00	Appurtenance(s)	1.00	1.38	10.744	11.82	195.04	0.730	0.000	5.00	14.111	10.30	121.7	0.0	446.9
152.10	Appurtenance(s)	1.00	1.38	10.776	11.85	192.57	0.730	0.000	2.10	5.788	4.23	50.1	0.0	183.3
153.00	Appurtenance(s)	1.00	1.38	10.789	11.87	191.51	0.730	0.000	0.90	2.455	1.79	21.3	0.0	77.7
155.00	Appurtenance(s)	1.00	1.39	10.819	11.90	189.15	0.730	0.000	2.00	5.402	3.94	46.9	0.0	171.0
156.50	Appurtenance(s)	1.00	1.39	10.841	11.92	187.37	0.730	0.000	1.50	4.003	2.92	34.8	0.0	126.7
160.00		1.00	1.40	10.891	11.98	183.19	0.730	0.000	3.50	9.177	6.70	80.3	0.0	290.5
165.00		1.00	1.41	10.962	12.06	177.18	0.730	0.000	5.00	12.714	9.28	111.9	0.0	402.3
170.00		1.00	1.42	11.031	12.13	171.11	0.730	0.000	5.00	12.249	8.94	108.5	0.0	387.5

Wind Loading - Shaft

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020	
Site Name: Stony Brook	Exposure: C		
Height: 190.00 (ft)	Crest Height: 0.00		
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil		
Gh: 1.1	Topography: 1	Struct Class: II	Page: 39



172.50 Appurtenance(s)	1.00	1.42	11.065	12.17	168.05	0.730	0.000	2.50	5.950	4.34	52.9	0.0	188.2
175.00	1.00	1.42	11.099	12.21	164.98	0.730	0.000	2.50	5.834	4.26	52.0	0.0	184.4
180.00	1.00	1.43	11.165	12.28	158.81	0.730	0.000	5.00	11.318	8.26	101.5	0.0	357.8
185.00	1.00	1.44	11.229	12.35	152.58	0.730	0.000	5.00	10.852	7.92	97.9	0.0	342.9
190.00 Appurtenance(s)	1.00	1.45	11.293	12.42	146.30	0.730	0.000	5.00	10.387	7.58	94.2	0.0	328.1
Totals:								190.00			5,169.6		42,865.3

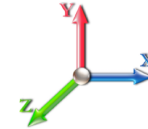
Discrete Appurtenance Forces

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Struct Class: II
		Page: 40



Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations 24

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	190.00	ANT150D3	1	11.342	12.476	1.00	1.00	2.18	18.00	0.000	4.000	27.20	0.00	108.79
2	172.50	Low Profile	1	11.065	12.172	1.00	1.00	25.00	1200.00	0.000	0.000	304.29	0.00	0.00
3	172.50	PRK-1245	1	11.065	12.172	1.00	1.00	9.50	464.91	0.000	0.000	115.63	0.00	0.00
4	172.50	S11B12	3	11.065	12.172	0.57	0.80	4.82	153.00	0.000	0.000	58.70	0.00	0.00
5	172.50	Ericsson KRY 112 144/1	3	11.065	12.172	0.56	0.80	0.69	33.00	0.000	0.000	8.38	0.00	0.00
6	172.50	LNx-6515DS	3	11.065	12.172	0.67	0.80	23.08	150.90	0.000	0.000	280.96	0.00	0.00
7	172.50	Ericsson AIR 21 B4A/B2P	3	11.065	12.172	0.70	0.80	13.59	317.40	0.000	0.000	165.45	0.00	0.00
8	172.50	Ericsson Air21 B2A/B4P	3	11.065	12.172	0.69	0.80	12.57	274.50	0.000	0.000	152.99	0.00	0.00
9	156.50	458-2	1	10.841	11.925	1.00	1.00	3.72	22.00	0.000	0.000	44.36	0.00	0.00
10	155.00	PAD6-59A	1	10.819	11.901	1.00	1.00	35.67	185.00	0.000	0.000	424.49	0.00	0.00
11	155.00	Pipe mounts	3	10.819	11.901	1.00	1.00	6.75	90.00	0.000	0.000	80.33	0.00	0.00
12	155.00	Universal Ring Mount (Site	2	10.819	11.901	1.00	1.00	0.66	564.40	0.000	0.000	7.85	0.00	0.00
13	153.00	DB586-Y	1	10.789	11.868	1.00	1.00	1.01	8.25	0.000	0.000	11.99	0.00	0.00
14	152.10	ANT220F2	1	10.776	11.853	1.00	1.00	1.04	11.00	0.000	0.000	12.33	0.00	0.00
15	150.00	4' Side Arm (Site Pro	2	10.744	11.819	1.00	1.00	5.26	80.00	0.000	0.000	62.17	0.00	0.00
16	150.00	Universal Ring Mount (Site	1	10.744	11.819	1.00	1.00	0.33	282.20	0.000	0.000	3.90	0.00	0.00
17	150.00	4' Side Arm (Site Pro	1	10.744	11.819	1.00	1.00	2.63	40.00	0.000	0.000	31.08	0.00	0.00
18	150.00	LGP104NN	1	10.744	11.819	1.00	1.00	0.37	12.30	0.000	0.000	4.37	0.00	0.00
19	145.00	Low Profile Platform-flat	1	10.668	11.735	1.00	1.00	25.00	1200.00	0.000	0.000	293.37	0.00	0.00
20	145.00	(3) SFS-H-L (V-Braces)	1	10.668	11.735	1.00	1.00	9.70	230.00	0.000	0.000	113.83	0.00	0.00
21	145.00	Horizontal Rail & SCX1-K	1	10.668	11.735	1.00	1.00	9.97	302.36	0.000	0.000	116.99	0.00	0.00
22	145.00	HRK14	1	10.668	11.735	1.00	1.00	8.13	302.36	0.000	0.000	95.40	0.00	0.00
23	145.00	PRK-1245 (kicker kit)	1	10.668	11.735	1.00	1.00	9.50	464.91	0.000	0.000	111.48	0.00	0.00
24	145.00	TD-RRH8x20-25	3	10.668	11.735	0.55	0.80	6.71	210.00	0.000	0.000	78.70	0.00	0.00
25	145.00	APXVTM14-C-I20	3	10.668	11.735	0.62	0.80	11.72	168.60	0.000	0.000	137.49	0.00	0.00
26	145.00	NNVV-65B-R4	3	10.668	11.735	0.59	0.80	21.79	232.20	0.000	0.000	255.72	0.00	0.00
27	145.00	1900 MHz RRUs	3	10.668	11.735	0.70	0.80	8.03	132.00	0.000	0.000	94.18	0.00	0.00
28	145.00	800 MHz RRUs	6	10.668	11.735	0.74	0.80	11.00	318.00	0.000	0.000	129.03	0.00	0.00
29	123.70	220-7N Omni	1	10.317	11.349	1.00	1.00	5.32	22.00	0.000	0.000	60.37	0.00	0.00
30	120.00	220-3AN	1	10.251	11.276	1.00	1.00	5.69	24.00	0.000	0.000	64.16	0.00	0.00
31	120.00	1142-2C	1	10.251	11.276	1.00	1.00	2.14	24.00	0.000	0.000	24.13	0.00	0.00
32	116.75	871F-70-220-025	1	10.192	11.211	1.00	1.00	2.52	30.00	0.000	0.000	28.25	0.00	0.00
33	114.00	5.1' Side Arm (Site Pro) w/	1	10.141	11.155	1.00	1.00	2.63	40.00	0.000	0.000	29.34	0.00	0.00
34	114.00	4' Side Arm (Site Pro	1	10.141	11.155	1.00	1.00	2.63	40.00	0.000	0.000	29.34	0.00	0.00
35	114.00	4' Side Arm (Site Pro	3	10.141	11.155	1.00	1.00	7.89	120.00	0.000	0.000	88.01	0.00	0.00
36	46.50	GPS	1	8.396	9.236	1.00	1.00	1.00	10.00	0.000	0.000	9.24	0.00	0.00
37	46.50	3 ft Standoff	1	8.396	9.236	1.00	1.00	2.63	40.00	0.000	0.000	24.29	0.00	0.00

Totals: 7,817.29

3,579.80

Total Applied Force Summary

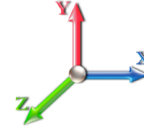
Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Struct Class: II
		Page: 41



Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 24

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		139.85	1776.69	0.00	0.00
10.00		137.38	1746.99	0.00	0.00
11.75		47.50	604.43	0.00	0.00
15.00		88.87	2170.02	0.00	0.00
19.50		128.04	2963.21	0.00	0.00
20.00		14.17	170.12	0.00	0.00
25.00		147.02	1684.88	0.00	0.00
30.00		149.91	1655.17	0.00	0.00
35.00		151.90	1625.47	0.00	0.00
40.00		153.19	1595.77	0.00	0.00
45.00		153.92	1566.06	0.00	0.00
46.50	(2) attachments	79.41	514.03	0.00	0.00
50.00		107.59	1071.77	0.00	0.00
55.00		156.64	2747.73	0.00	0.00
56.75		54.41	948.55	0.00	0.00
60.00		101.17	860.09	0.00	0.00
65.00		155.51	1301.78	0.00	0.00
70.00		154.54	1275.79	0.00	0.00
75.00		153.33	1249.80	0.00	0.00
80.00		151.91	1223.80	0.00	0.00
85.00		150.29	1197.81	0.00	0.00
90.00		148.51	1171.82	0.00	0.00
94.50		131.92	1032.42	0.00	0.00
95.00		14.74	202.68	0.00	0.00
100.00		146.98	2000.26	0.00	0.00
105.00		144.77	970.02	0.00	0.00
110.00		142.43	947.74	0.00	0.00
114.00	(5) attachments	258.77	942.16	0.00	0.00
115.00		27.69	181.75	0.00	0.00
116.75	(1) attachments	76.50	345.92	0.00	0.00
120.00	(2) attachments	177.17	627.47	0.00	0.00
123.70	(1) attachments	160.22	670.25	0.00	0.00
125.00		34.66	224.87	0.00	0.00
130.00		131.94	850.83	0.00	0.00
135.00		129.07	828.56	0.00	0.00
140.00		126.10	806.28	0.00	0.00
144.50		112.47	1122.82	0.00	0.00
145.00	(23) attachments	1438.49	3616.34	0.00	0.00
150.00	(5) attachments	223.27	946.37	0.00	0.00
152.10	(1) attachments	62.41	225.25	0.00	0.00
153.00	(1) attachments	33.26	99.27	0.00	0.00
155.00	(6) attachments	559.61	1039.94	0.00	0.00
156.50	(1) attachments	79.20	169.86	0.00	0.00
160.00		80.26	339.80	0.00	0.00
165.00		111.92	472.81	0.00	0.00
170.00		108.50	457.96	0.00	0.00

Total Applied Force Summary

Structure: CT00235-B Site Name: Stony Brook Height: 190.00 (ft) Base Elev: 0.000 (ft) Gh: 1.1	Code:	EIA/TIA-222-H 12/22/2020 Exposure: C Crest Height: 0.00 Site Class: D - Stiff Soil Struct Class: II
Topography: 1		Page: 42



172.50	(17) attachments	1139.27	2817.12	0.00	0.00
175.00		51.99	185.75	0.00	0.00
180.00		101.47	360.36	0.00	0.00
185.00		97.86	345.50	0.00	0.00
190.00	(1) attachments	121.39	348.65	0.00	108.79
Totals:		8,749.38	54,300.79	0.00	108.79

Linear Appurtenance Segment Forces (Factored)

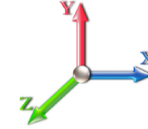
Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Struct Class: II
		Page: 43



Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 24

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1/2" GPS Line	Yes	5.00	0.000	0.50	0.21	0.00	0.008	0.000	6.626	0.00	0.80
10.00	1/2" GPS Line	Yes	5.00	0.000	0.50	0.21	0.00	0.008	0.000	6.626	0.00	0.80
11.75	1/2" GPS Line	Yes	1.75	0.000	0.50	0.07	0.00	0.008	0.000	6.626	0.00	0.28
15.00	1/2" GPS Line	Yes	3.25	0.000	0.50	0.14	0.00	0.008	0.000	6.626	0.00	0.52
19.50	1/2" GPS Line	Yes	4.50	0.000	0.50	0.19	0.00	0.008	0.000	6.993	0.00	0.72
20.00	1/2" GPS Line	Yes	0.50	0.000	0.50	0.02	0.00	0.008	0.000	7.030	0.00	0.08
25.00	1/2" GPS Line	Yes	5.00	0.000	0.50	0.21	0.00	0.008	0.000	7.368	0.00	0.80
30.00	1/2" GPS Line	Yes	5.00	0.000	0.50	0.21	0.00	0.009	0.000	7.656	0.00	0.80
35.00	1/2" GPS Line	Yes	5.00	0.000	0.50	0.21	0.00	0.009	0.000	7.909	0.00	0.80
40.00	1/2" GPS Line	Yes	5.00	0.000	0.50	0.21	0.00	0.009	0.000	8.134	0.00	0.80
45.00	1/2" GPS Line	Yes	5.00	0.000	0.50	0.21	0.00	0.009	0.000	8.339	0.00	0.80
46.50	1/2" GPS Line	Yes	1.50	0.000	0.50	0.06	0.00	0.009	0.000	8.396	0.00	0.24
Totals:											0.0	7.4

Calculated Forces

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Struct Class: II
		Page: 44

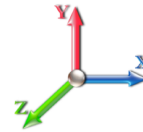


Load Case: 1.0D + 1.0W 60 mph Wind

Iterations 24

Dead Load Factor 1.00

Wind Load Factor 1.00



Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-54.30	-8.76	0.00	-1045.0	0.00	1045.03	6843.68	1731.77	8934.17	8754.18	0.00	0.000	0.000	0.127
5.00	-52.52	-8.65	0.00	-1001.2	0.00	1001.22	6762.41	1701.13	8620.83	8495.95	0.02	-0.030	0.000	0.126
10.00	-50.77	-8.53	0.00	-957.96	0.00	957.96	6679.70	1670.49	8313.08	8239.66	0.06	-0.061	0.000	0.124
11.75	-50.16	-8.50	0.00	-943.03	0.00	943.03	6650.41	1659.76	8206.69	8150.43	0.09	-0.072	0.000	0.123
15.00	-47.99	-8.42	0.00	-915.42	0.00	915.42	6595.55	1639.85	8010.93	7985.40	0.14	-0.092	0.000	0.122
19.50	-45.02	-8.30	0.00	-877.52	0.00	877.52	6596.31	1640.12	8013.62	7987.68	0.24	-0.120	0.000	0.117
20.00	-44.85	-8.30	0.00	-873.36	0.00	873.36	6587.82	1637.06	7983.70	7962.37	0.26	-0.123	0.000	0.117
25.00	-43.16	-8.17	0.00	-831.86	0.00	831.86	6502.11	1606.42	7687.65	7710.45	0.40	-0.153	0.000	0.115
30.00	-41.50	-8.04	0.00	-790.99	0.00	790.99	6414.97	1575.78	7397.19	7460.77	0.58	-0.183	0.000	0.113
35.00	-39.87	-7.90	0.00	-750.80	0.00	750.80	6326.39	1545.14	7112.32	7213.44	0.79	-0.213	0.000	0.110
40.00	-38.27	-7.76	0.00	-711.28	0.00	711.28	6236.38	1514.50	6833.05	6968.54	1.03	-0.243	0.000	0.108
45.00	-36.71	-7.62	0.00	-672.46	0.00	672.46	6144.94	1483.86	6559.37	6726.18	1.30	-0.274	0.000	0.106
46.50	-36.19	-7.54	0.00	-661.04	0.00	661.04	6117.23	1474.67	6478.36	6653.99	1.39	-0.283	0.000	0.105
50.00	-35.12	-7.45	0.00	-634.63	0.00	634.63	6052.06	1453.22	6291.28	6486.46	1.60	-0.305	0.000	0.104
55.00	-32.37	-7.29	0.00	-597.40	0.00	597.40	5957.75	1422.58	6028.79	6249.47	1.94	-0.336	0.000	0.101
56.75	-31.42	-7.24	0.00	-584.65	0.00	584.65	5057.23	1258.22	5389.92	5369.23	2.06	-0.347	0.000	0.115
60.00	-30.55	-7.14	0.00	-561.14	0.00	561.14	5008.75	1240.80	5241.65	5243.49	2.31	-0.367	0.000	0.113
65.00	-29.25	-7.00	0.00	-525.42	0.00	525.42	4933.00	1213.99	5017.59	5051.65	2.71	-0.400	0.000	0.110
70.00	-27.97	-6.85	0.00	-490.44	0.00	490.44	4855.80	1187.18	4798.42	4861.84	3.15	-0.434	0.000	0.107
75.00	-26.72	-6.70	0.00	-456.20	0.00	456.20	4777.18	1160.37	4584.14	4674.14	3.62	-0.467	0.000	0.103
80.00	-25.49	-6.55	0.00	-422.70	0.00	422.70	4697.12	1133.56	4374.76	4488.65	4.13	-0.500	0.000	0.100
85.00	-24.29	-6.41	0.00	-389.94	0.00	389.94	4615.63	1106.75	4170.27	4305.49	4.67	-0.533	0.000	0.096
90.00	-23.12	-6.26	0.00	-357.91	0.00	357.91	4532.70	1079.94	3970.68	4124.73	5.24	-0.565	0.000	0.092
94.50	-22.08	-6.12	0.00	-329.75	0.00	329.75	4456.84	1055.81	3795.23	3964.20	5.79	-0.594	0.000	0.088
95.00	-21.88	-6.11	0.00	-326.69	0.00	326.69	4448.34	1053.13	3775.98	3946.49	5.85	-0.597	0.000	0.088
100.00	-19.88	-5.95	0.00	-296.13	0.00	296.13	3637.80	896.67	3193.62	3210.33	6.49	-0.629	0.000	0.098
105.00	-18.91	-5.81	0.00	-266.36	0.00	266.36	3571.83	873.69	3032.02	3070.63	7.17	-0.659	0.000	0.092
110.00	-17.96	-5.66	0.00	-237.32	0.00	237.32	3504.43	850.71	2874.63	2932.74	7.88	-0.692	0.000	0.086
114.00	-17.02	-5.40	0.00	-214.66	0.00	214.66	3449.48	832.33	2751.73	2823.80	8.47	-0.717	0.000	0.081
115.00	-16.83	-5.37	0.00	-209.26	0.00	209.26	3435.59	827.73	2721.42	2796.76	8.62	-0.723	0.000	0.080
116.75	-16.49	-5.29	0.00	-199.86	0.00	199.86	3411.16	819.69	2668.79	2749.64	8.89	-0.734	0.000	0.078
120.00	-15.86	-5.12	0.00	-182.66	0.00	182.66	3365.32	804.75	2572.42	2662.79	9.39	-0.754	0.000	0.073
123.70	-15.19	-4.95	0.00	-163.73	0.00	163.73	3312.40	787.75	2464.85	2565.00	9.98	-0.775	0.000	0.068
125.00	-14.97	-4.92	0.00	-157.30	0.00	157.30	3293.62	781.77	2427.60	2530.92	10.20	-0.782	0.000	0.067
130.00	-14.12	-4.78	0.00	-132.71	0.00	132.71	3212.23	758.79	2286.98	2395.10	11.03	-0.808	0.000	0.060
135.00	-13.29	-4.64	0.00	-108.82	0.00	108.82	3114.95	735.81	2150.56	2251.51	11.89	-0.832	0.000	0.053
140.00	-12.48	-4.51	0.00	-85.60	0.00	85.60	3017.67	712.84	2018.33	2112.36	12.77	-0.853	0.000	0.045
144.50	-11.36	-4.38	0.00	-65.31	0.00	65.31	1688.87	433.97	1215.62	1173.72	13.59	-0.869	0.000	0.062
145.00	-7.77	-2.89	0.00	-63.12	0.00	63.12	1685.31	432.56	1207.71	1167.40	13.68	-0.871	0.000	0.059
150.00	-6.82	-2.65	0.00	-48.67	0.00	48.67	1649.03	418.42	1130.03	1104.65	14.60	-0.892	0.000	0.048
152.10	-6.60	-2.59	0.00	-43.10	0.00	43.10	1633.41	412.48	1098.18	1078.54	15.00	-0.900	0.000	0.044
153.00	-6.50	-2.55	0.00	-40.77	0.00	40.77	1626.65	409.93	1084.67	1067.39	15.17	-0.903	0.000	0.042
155.00	-5.47	-1.98	0.00	-35.66	0.00	35.66	1611.48	404.28	1054.94	1042.73	15.55	-0.910	0.000	0.038
156.50	-5.30	-1.90	0.00	-32.69	0.00	32.69	1599.96	400.04	1032.92	1024.33	15.83	-0.914	0.000	0.035
160.00	-4.96	-1.81	0.00	-26.05	0.00	26.05	1572.65	390.14	982.43	981.73	16.51	-0.924	0.000	0.030
165.00	-4.49	-1.69	0.00	-16.99	0.00	16.99	1532.55	375.99	912.50	921.74	17.48	-0.935	0.000	0.021
170.00	-4.03	-1.58	0.00	-8.52	0.00	8.52	1491.18	361.85	845.15	862.84	18.46	-0.942	0.000	0.013
172.50	-1.23	-0.39	0.00	-4.57	0.00	4.57	1470.02	354.78	812.44	833.83	18.96	-0.944	0.000	0.006

Calculated Forces

Structure: CT00235-B Site Name: Stony Brook Height: 190.00 (ft) Base Elev: 0.000 (ft) Gh: 1.1	Code: EIA/TIA-222-H 12/22/2020 Exposure: C Crest Height: 0.00 Site Class: D - Stiff Soil Struct Class: II
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175.00	-1.05	-0.34	0.00	-3.59	0.00	3.59	1448.54	347.71	780.38	805.12	19.45	-0.946	0.000	0.005
180.00	-0.69	-0.23	0.00	-1.90	0.00	1.90	1404.63	333.57	718.20	748.67	20.44	-0.948	0.000	0.003
185.00	-0.35	-0.13	0.00	-0.74	0.00	0.74	1352.25	319.43	658.59	689.91	21.44	-0.949	0.000	0.001
190.00	0.00	-0.12	0.00	-0.11	0.00	0.11	1292.39	305.29	601.57	629.89	22.43	-0.949	0.000	0.000

Final Analysis Summary

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020	
Site Name: Stony Brook	Exposure: C		
Height: 190.00 (ft)	Crest Height: 0.00		
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil		
Gh: 1.1	Topography: 1	Struct Class: II	Page: 46



Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)
1.2D + 1.0W 140 mph Wind	53.3	0.00	65.07	0.00	0.00	6386.30
0.9D + 1.0W 140 mph Wind	53.3	0.00	48.78	0.00	0.00	6332.26
1.2D + 1.0Di + 1.0W 50 mph Wind	11.0	0.00	82.64	0.00	0.00	1307.02
1.2D + 1.0Ev + 1.0Eh	0.9	0.00	67.32	0.00	0.00	128.83
0.9D + 1.0Ev + 1.0Eh	0.9	0.00	50.99	0.00	0.00	128.07
1.0D + 1.0W 60 mph Wind	8.8	0.00	54.30	0.00	0.00	1045.03

Max Stresses

Load Case	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Elev (ft)	Stress Ratio
1.2D + 1.0W 140 mph Wind	-65.07	-53.35	0.00	-6386.3	0.00	-6386.3	6843.68	1731.7	8934.17	8754.18	0.00	0.740
0.9D + 1.0W 140 mph Wind	-48.78	-53.32	0.00	-6332.2	0.00	-6332.2	6843.68	1731.7	8934.17	8754.18	0.00	0.731
1.2D + 1.0Di + 1.0W 50 mph Wind	-82.64	-11.02	0.00	-1307.0	0.00	-1307.0	6843.68	1731.7	8934.17	8754.18	0.00	0.161
1.2D + 1.0Ev + 1.0Eh	-67.32	-0.89	0.00	-128.83	0.00	-128.83	6843.68	1731.7	8934.17	8754.18	0.00	0.025
0.9D + 1.0Ev + 1.0Eh	-50.99	-0.89	0.00	-128.07	0.00	-128.07	6843.68	1731.7	8934.17	8754.18	0.00	0.022
1.0D + 1.0W 60 mph Wind	-54.30	-8.76	0.00	-1045.0	0.00	-1045.0	6843.68	1731.7	8934.17	8754.18	0.00	0.127

Base Plate Summary

Structure: CT00235-B	Code: EIA/TIA-222-H	12/22/2020
Site Name: Stony Brook	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Topography: 1	Struct Class: II
		Page: 47



Reactions		Base Plate		Anchor Bolts	
Original Design		Yield (ksi):	50.00	Bolt Circle:	70.00
Moment (kip-ft):	5800.00	Width (in):	71.00	Number Bolts:	24.00
Axial (kip):	60.00	Style:	Clipped	Bolt Type:	2.25" 18J
Shear (kip):	43.00	Polygon Sides:	4.00	Bolt Diameter (in):	2.25
Analysis		Clip Length (in):	13.00	Yield (ksi):	75.00
Moment (kip-ft):	6386.30	Effective Len (in):	8.22	Ultimate (ksi):	100.00
Axial (kip):	65.07	Moment (kip-in):	680.43	Arrangement:	Clustered
Shear (kip):	53.35	Allow Stress (ksi):	67.50	Cluster Dist (in):	6.00
		Applied Stress (ksi):	40.50	Start Angle (deg):	45.00
		Stress Ratio:	0.60	Compression	
				Force (kip):	185.91
				Allowable (kip):	268.39
				Ratio:	0.69
				Tension	
				Force (kip):	179.02
				Allowable (kip):	243.75
				Ratio:	0.73

	Monopole Mat Foundation Design		Date	
			12/22/2020	
	Customer Name:	CL&P	EIA/TIA Standard:	EIA-222-H
	Site Name:		Structure Height (Ft.):	190
	Site Number:	CT00235-B	Engineer Name:	B. Parreira
	Engr. Number:	1337	Engineer Login ID:	

Foundation Info Obtained from:

Structure Type:

Analysis or Design?

Base Reactions (Factored):

Axial Load (Kips):	65.1	Shear Force (Kips):	53.3
Uplift Force (Kips):	0.0	Moment (Kips-ft):	6386.3

Allowable overstress %: 5.0%

Foundation Geometries:

Diameter of Pier (ft.):	8.0	Depth of Base BG (ft.):	11.0
Pier Height A. G. (ft.):	0.50	Thickness of Pad (ft):	4.00
Length of Pad (ft.):	24.5	Width of Pad (ft.):	24.5

Final Length of pad (ft)	24.5	Final width of pad (ft):	24.5
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Material Properties and Reabr Info:

Concrete Strength (psi):	3000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield (ksi):	60	
Vertical Rebar Size #:	11	Tie / Stirrup Size #:	5	
Qty. of Vertical Rebars:	48	Tie Spacing (in):	12.0	
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	11	
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf

Rebar at the bottom of the concrete pad:

Qty. of Rebar in Pad (L):	29	Qty. of Rebar in Pad (W):	29
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Rebar at the top of the concrete pad:

Qty. of Rebar in Pad (L):	29	Qty. of Rebar in Pad (W):	29
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Apply 1.35 factor for e/w Per G: 1.35

Soil Design Parameters:

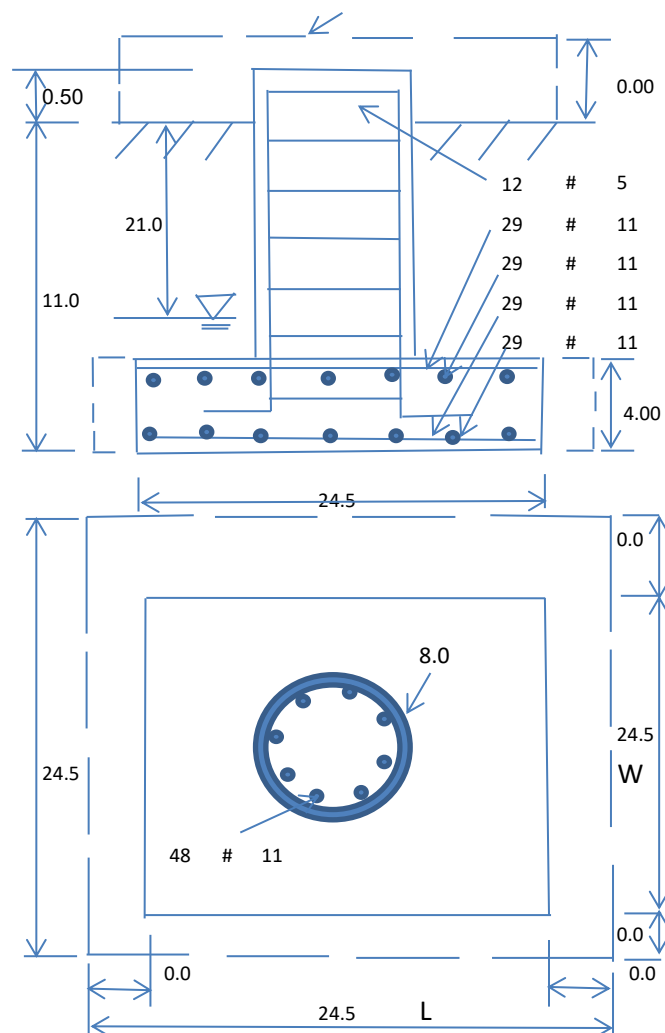
Soil Unit Weight (pcf):	140.0	Soil Buoyant Weight:	77.6	Pcf		
Water Table B.G.S. (ft):	21.0	Unit Weight of Water:	62.4	pcf	Angle from Top of Pad:	30
Ultimate Bearing Pressure (psf):	16000	Ultimate Skin Friction:	0	Psf	Angle from Bottm of Pad:	25
Consider Friction for O.T.M. (Y/N):	No	Consider Friction for bearing (Y/N):	No		Angle from Bottm of Pad:	25
Consider soil hor. resist. for OTM.:	Yes	Reduction factor on the maximum soil bearing pressure:		1.00		

Foundation Analysis and Design:

Uplift Strength Reduction Factor:	0.75	Compression Strength Reduction Factor:	0.75
Total Dry Soil Volume (cu. Ft.):	3849.89	Total Dry Soil Weight (Kips):	538.98
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	538.98	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	2777.99	Total Dry Concrete Weight (Kips):	416.70
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	416.70	Total Vertical Load on Base (Kips):	1020.75

Check Soil Capacities:

Calculated Maxium Net Soil Pressure under the base (psf):	4326	<	Allowable Factored Soil Bearing (psf):	12000	0.36	OK!
Allowable Foundation Overturning Resistance (kips-ft.):	11333.5	>	Design Factored Momont (kips-ft):	6108	0.54	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	1.86					OK!



Check the capacities of Reinforcing Concrete:

Strength reduction factor (Flexure and axial tension):

0.90

Strength reduction factor (Shear):

0.75

Strength reduction factor (Axial compression):

0.65

Wind Load Factor on Concrete Design:

1.00

Load/
Capacity
Ratio**(1) Concrete Pier:**

Vertical Steel Rebar Area (sq. in./each):

1.56

Tie / Stirrup Area (sq. in./each):

0.31

Calculated Moment Capacity (Mn,Kips-Ft):

13572.9

>

Design Factored Moment (Mu, Kips-Ft)

6786.1

0.50

OK!

Calculated Shear Capacity (Kips):

832.8

>

Design Factored Shear (Kips):

53.3

0.06

OK!

Calculated Tension Capacity (Tn, Kips):

4043.5

>

Design Factored Tension (Tu Kips):

0.0

0.00

OK!

Calculated Compression Capacity (Pn, Kips):

9498.6

>

Design Factored Axial Load (Pu Kips):

65.1

0.01

OK!

Moment & Axial Strength Combination:

0.50

OK!

Check Tie Spacing (Design/Required):

1

OK!

Pier Reinforcement Ratio:

0.010

Reinforcement Ratio is satisfied per ACI

(2).Concrete Pad:

One-Way Design Shear Capacity (L-Direction, Kips):

1070.3

>

One-Way Factored Shear (L-D. Kips):

292.6

0.27

OK!

One-Way Design Shear Capacity (W-Direction, Kips):

1070.3

>

One-Way Factored Shear (W-D., Kips):

292.6

0.27

OK!

One-Way Design Shear Capacity (Corner-Corner, Kips):

841.5

>

One-Way Factored Shear (C-C, Kips):

277.4

0.33

OK!

Lower Steel Pad Reinforcement Ratio (L-Direct.):

0.0035

OK!

Lower Steel Pad Reinf. Ratio (W-Direct.):

0.0035

Lower Steel Pad Moment Capacity (L-Direction, Kips-ft):

8652.6

>

Moment at Bottom (L-Dir. K-Ft):

1761.4

0.20

OK!

Lower Steel Pad Moment Capacity (W-Direction, Kips-ft):

8652.6

>

Moment at Bottom (W-Dir. K-Ft):

1761.4

0.20

OK!

Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):

12080.1

>

Moment at Bottom (C-C Dir. K-Ft):

2491.1

0.21

OK!

Upper Steel Pad Reinforcement Ratio (L-Direct.):

0.0035

OK!

Upper Steel Reinf. Ratio (W-Dir.):

0.0035

Upper Steel Pad Moment Capacity (L-Direc. Kips-ft):

8652.6

>

Moment at the top (L-Dir K-Ft):

852.0

0.10

OK!

Upper Steel Pad Moment Capacity (W-Direc. Kips-ft):

8652.6

>

Moment at the top (W-Dir K-Ft):

852.0

0.10

OK!

Upper Steel Pad Moment Capacity (Corner-Corner, K-ft):

12080.1

>

Moment at the top (C-C Dir. K-Ft):

805.7

0.07

OK!

(3).Check Punching Shear Capacity due to Moment in the Pier:

Moment transferred by punching shear:

2554.5

k-ft.

Max. factored shear stress $v_{u,CD}$:

4.5

Psi

Max. factored shear stress $v_{u,AB}$:

9.5

Psi

Factored shear Strength ϕv_n :

164.3

Psi

Max. factored shear stress v_u :

9.5

Psi

Check Usage of Punching Shear Capacity:

0.06

OK!

	Pier Foundation Design For Monopole		Date	
			12/22/2020	
	Customer Name:	CL&P	EIA/TIA Standard:	EIA-222-H
	Site Name:		Structure Height (Ft.):	190
	Site Number:	CT00235-B	Engineer Name:	B. Parreira
	Engr. Number:	1337	Engineer Login ID:	

Foundation Info Obtained from:

Structure Type:

Analysis or Design?

Base Reactions (Factored):

Axial Load (Kips):	65.1	Shear Force (Kips):	53.3
Uplift Force (Kips):	0.0	Moment (Kips-ft):	6386.3

Foundation Geometries:

Mods required -Yes/No ?:	No		ft.
Diameter of Pier (ft.):	8.0	Depth of Base B. G. S. :	24.0 ft.
Pier Height A. G. (ft.):	0.40		

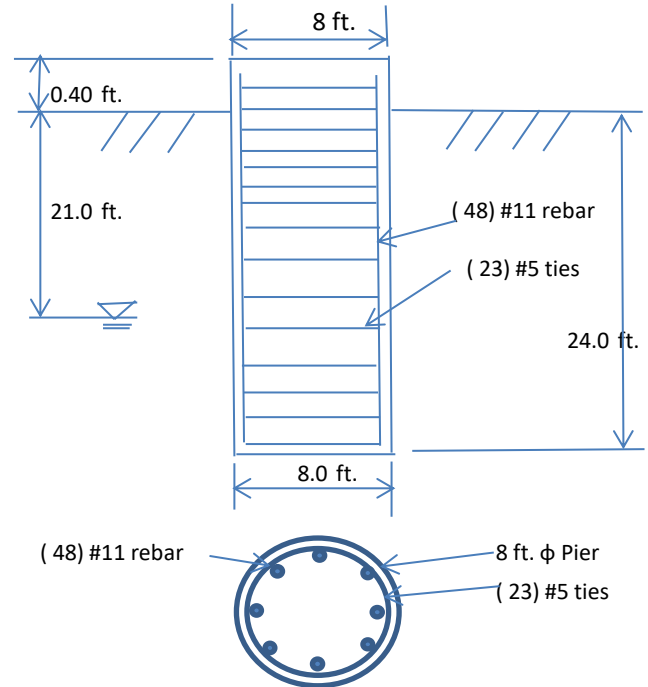
Material Properties and Rebar Info:

Concrete Strength (psi):	3000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield strength:	60	ksi
Vertical Rebar Size #:	11	Tie / Stirrup Size #:	5	
Qty. of Vertical Rebars:	48	Tie Spacing:	18.0	in.
Concrete Cover (in.):	4	Concrete unit weight:	150.0	pcf

Soil Design Parameters:

Water Table B.G.S. (ft):	21.0	Unit weight of water:	62.4	psf
Ratio of Uplift/Axial Skin Friction:	1.0	Pullout failure Angle:	30	(°)
Skin Frictions are to be obtained from:	Soil Report			

Acceptable overstress (5.0%)



Monopole Pier Foundation

Depth of Layers (ft)		γ_{soil}	ϕ	Cohesion	Ultimate Skin Friction (psf)	Ultimate Bearing (psf)	Soil Types					
Top	Bottom	(pcf)	(°)	(psf)								
0.0	4.0	140	0				Sand					
4.0	21.0	140	36				Sand					
21.0	24.0	147	36			16000	Sand					
24.0	29.0	147										

Soil weight Increase Factor for bouyant soils (1.0 to 1.15): 1.1

Foundation Analysis and Design:

Uplift Strength Reduction Factor:	0.75	Soil Bearing Strength Reduction Factor:	0.75
Total Dry Soil Volume from Conical Failure (cu. Ft.):	8910	Dry Soil Weight from Conical Failure:	1247 Kips
Total Buoyant Soil Volume from Conical Failure (cu. Ft.):	75	Buoyant Soil Weight from Conical Failure (K	8 Kips
Total Dry Concrete Volume (cu. Ft.):	1076	Total Dry Concrete Weight:	161.4 Kips
Total Buoyant Concrete Volume (cu. Ft.):	150.8	Total Buoyant Concrete Weight:	13.21 Kips
Total Effective Concrete Weight (Kips):	174.6	Total Effective Soil Weight:	1255.3 Kips
Total Effective Vertical Load on Base (Kips):	75.8		

Check Soil Capacities:

Allowable Foundation Overturning Resistance (kips-ft.):	10240.9	>	Design Factored Moment (kips-ft):	7271	Usage	0.71	OK!
Factor of Safety of Passive Soil Resistance against Moment:	1.41	OK!					

Check the capacities of Reinforcing Concrete:

Strength reduction factor (Flexure and axial tension):	0.90	Strength reduction factor (Shear):	0.75				
Strength reduction factor (Axial compression):	0.65	Wind Load Factor on Concrete Design:	1.00				
Reinforcing Concrete Pier:					Usage		
Vertical Steel Rebar Area (sq. in./each):	1.56	Tie / Stirrup Area (sq. in./each):	0.31				
Calculated Moment Capacity (Mn,Kips-Ft):	13515.8	>	Design Factored Moment (Mu, K-Ft):	6625.5	0.49	OK!	
Calculated Shear Capacity (Kips):	1274.2	>	Design Factored Shear (Kips):	671.3	0.53	OK!	
Calculated Tension Capacity (Tn, Kips):	4043.5	>	Design Factored Tension (Tu Kips):	0.0	0.00	OK!	
Calculated Compression Capacity (Pn, Kips):	9499	>	Design Factored Axial Load (Pu Kips):	65.1	0.01	OK!	
Moment & Axial Strength Combination:	0.49	OK!	Max. Allowable Tie/Stirrup Spacing:	7.75	in.		
Pier Reinforcement Ratio:	0.010	Reinforcement Ratio is satisfied per ACI					

ATTACHMENT E – MOUNT ANALYSIS

November 19, 2020

MOUNT EVALUATION LETTER

Site Number: ES-026
Site Name: STONINGTON
Site Data: Taugwonk Spur Road No. 2
Stonington, CT 06378
Latitude: 41° 22' 55.26"
Longitude: -71° 54' 12.9"

Black & Veatch Corporation is pleased to submit this "Mount Evaluation Letter" to determine the structural integrity of antenna mounting system on the above-mentioned site. The purpose of this evaluation is to determine the capacity of the system in supporting the final loading in the attached "Loading Summary".

Based on our evaluation we have determined the existing antenna mounting system to be:

SUFFICIENT

Structure Rating (max from all components) =	14.7%
---	--------------

Proposed Mounting System
SitePro 1 (SV197-48) 48" Support Arm

This analysis analyzes the worst-case scenario for the proposed Site Pro 1 SV197-48 Support Arm. Both levels are deemed sufficient. The proposed mounting system will be capable of supporting the proposed equipment, under the following conditions:

- Contractor shall be responsible for the means and methods of construction.
- Contractor shall inspect the condition of all existing and proposed structural members, all relevant members and connections and report any deficiencies to the engineer prior to installation of any new antennas and other equipment.

The scope of this evaluation pertains only to the proposed antenna mounting system and does not include examination of the loads imparted by the antenna mounting system to the existing tower and its structural components. This document was prepared based on information provided to Black & Veatch. If existing conditions do not reflect those represented, this analysis is no longer valid.

Please contact Josh Riley in our Overland Park Office
at 913-458-2522 if you have any questions or comments.

Sincerely,
Black & Veatch Corporation

Prepared By: Joohwan Jung
Submitted By: Josh Riley, P.E.

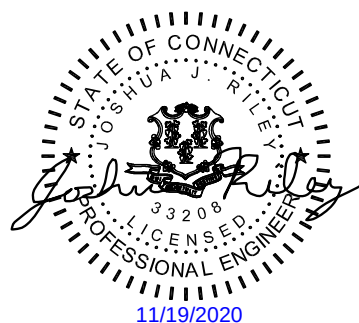




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2. ANALYSIS CRITERIA SUMMARY
3. REFERENCES
4. ASSUMPTIONS
5. RESULTS SUMMARY

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APPENDIX 2: RISA PRINTOUTS

APPENDIX 3: ATTACHMENTS



BLACK & VEATCH

November 18, 2020

STONINGTON

1. LOADING SUMMARY

Appurtenance								
Carrier	Position	Sector	Antenna RAD Center (ft)	Mount Centerline (ft)	Qty	Type	Manufacturer	Model
Eversource	1	-	152.1	150	1	Omni	Telewave	ANT220F2
Eversource	1	-	116.75	114	1	Dipole	COMPROD	871F-70-220-025

This analysis analyzes the worst-case scenario for the proposed Site Pro 1 SV197-48 Support Arm. Both levels are deemed sufficient.



2. ANALYSIS CRITERIA SUMMARY

ANALYSIS CRITERIA	
STANDARD	TIA-222-H
WIND SPEED	Ultimate of 140 mph
WIND SPEED WITH ICE	50 mph with 1.5" radial ice thickness
EXPOSURE CATEGORY	C
RISK CATEGORY	III
TOPO CATEGORY	Flat
CREST HEIGHT	N/A
SPECTRAL RESPONSE FACTORS, S _s & S ₁	0.159 g & 0.058 g

3. REFERENCES

- American Institute of Steel Construction, AISC 15th Edition
- Telecommunications Industry Association Standard, TIA-222-H & 2018 Connecticut State Building Code
- Antenna Mount Assembly Drawing (Model: SV197-48) by SitePro 1, dated 04/14/2011

4. ASSUMPTIONS

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

- The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
- The configuration of antennas, mounts, and other appurtenances are as specified in the Loading Summary and the referenced drawings.
- 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.
- Sector frame center line: located equidistant between top & bottom boom; Platform center line: located at the base perimeter of platform, unless otherwise specified.
- Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM 500 (GR B-46)
Pipe	ASTM A53 (GR B-35)
Connection Bolts	ASTM A325



5. RESULTS SUMMARY

Name	Bending Stress Ratio		Shear Stress Ratio	
	<u>Tension SR</u>		<u>Shear SR</u>	
Arm: HSS4X4X1/4	14.7%	Pass	7.2%	Pass
Connection Pipe: Pipe 4.0 Std	5.7%	Pass	1.4%	Pass
Bolt Checks on M1 in Load Case 10	9.0%	Pass	3.6%	Pass

*Von Mises SR = (Max Von Mises Value From RISA-3D)/(0.9*Fy)

**Capacity rating per TIA-222-H Section 15.5.



BLACK & VEATCH

November 18, 2020

STONINGTON

**APPENDIX 1:
MOUNT ANALYSIS REPORT**



BLACK & VEATCH

Client: Eversource

Site Name: STONINGTON (ES-026)

Computed By: Joohwan Jung

Date: 11/18/2020

Verified By: JW

Title: MOUNT ANALYSIS REPORT

Date: 11/18/2020

Dead and Live Loads

Maintenance Live Load: $L_V = 250$ lb

Installation Live Load: $L_M = 0$ lb

Appurtenance Dead Loads	
Name	Weight (lb)
871F-70-220-025	12.5



Computed By: Joohwan Jung

Date: 11/18/2020

Date: 11/18/2020

Title: MOUNT ANALYSIS REPORT

Date: 11/18/2020

[illegible]



BLACK & VEATCH

Client: Eversource
Site Name: STONINGTON (ES-026)

Computed By: Joohwan Jung

Date: 11/18/2020

Verified By: JW

Title: MOUNT ANALYSIS REPORT

Date: 11/18/2020

Member Wind Loading

Exposure Category = C
Risk Category = III
Topographic Category = 1
Basic Wind Speed, V = 140 mph
Height Above Ground, z = 152.1 ft
Crest Height, H = N/A ft
Velocity Pressure Coefficient, K_z = 1.38
Topographic Factor, K_{zt} = 1.00
Wind Directionality Factor, K_d = 0.95
Shielding Factor, K_s = 0.90
Ground Elevation Factor, K_e = 0.995
Wind Velocity Pressure, q_z = 65.57 psf
Gust Effect Factor, G_h = 1.00

Equations

$$K_z = 2.01 (z / z_g)^{2/\alpha}$$

$$K_h = e^{(f \cdot z / H)}$$

$$K_{zt} = [1 + K_c K_t / K_h]^2$$

$$K_e = e^{-0.00053 z^{0.25}}$$

$$q_z = 0.00256 K_z K_{zt} K_e K_d V^2$$

$$F_A = q_z G_h (EPA)$$

$$F_M = q_z G_h C_f D_p$$

TIA-222-H

2.6.5.2

2.6.6.2.1

2.6.6.2.1

2.6.8

2.6.11.6

2.6.11.2

2.6.11.2

Member Wind Loads

Name	Depth (ft)	Width (ft)	C_f	D_p (ft)	F_M (lb)
Arm: HSS4X4X1/4	0.33	0.33	2	0.33	43.71
Connection Pipe: Pipe 4.0 Std	0.38		1.2	0.38	29.51

**BLACK & VEATCH**

Client: Eversource
 Site Name: STONINGTON (ES-026)

Computed By: Joohwan Jung

Date: 11/18/2020

Verified By: JW

Title: MOUNT ANALYSIS REPORT

Date: 11/18/2020

Appurtenance Ice Dead Loading

Exposure Category = C
 Risk Category = III
 Topographic Category = 1
 Height Above Ground, z = 152.1 ft
 Crest Height, H = N/A ft
 Design Ice Thickness, T_i = 1.50 in
 Importance Factor, I = 1.15
 Topographic Factor, K_{zt} = 1.00
 Height Escalation Factor, K_{iz} = 1.17
 Factored Ice Thickness, T_{iz} = 2.01 in
 Grating Ice Dead Load, D_{Gice} = 9.38 psf

Equations

$$K_h = e^{(f \cdot z / H)}$$

$$K_{zt} = [1 + K_c K_t / K_h]^2$$

$$K_{iz} = (z/33)^{0.10}$$

$$T_{iz} = T_i I K_{iz} (K_{zt})^{0.30}$$

$$DL_{ice} = [(H_{ice} \cdot D_{ice} \cdot W_{ice}) - (H \cdot W \cdot D)] \cdot 56 \text{pcf}$$

TIA-222-H

2.6.6.2.1

2.6.6.2.1

2.6.10

2.6.10

Appurtenance Ice Dead Loads

Name	Height w/ ice (ft)	Width w/ice (ft)	Depth w/ ice (ft)	V_{ice} (ft ³)	DL_{ice} (lb)
871F-70-220-025	5.83	2.92	0.49	2.34	131.13

**BLACK & VEATCH**

Client: Eversource

Site Name: STONINGTON (ES-026)

Computed By: Joohwan Jung

Date: 11/18/2020

Verified By: JW

Title: MOUNT ANALYSIS REPORT

Date: 11/18/2020

Member Ice Dead Loading

Exposure Category = C
 Risk Category = III
 Topographic Category = 1
 Height Above Ground, z = 152.1 ft
 Crest Height, H = N/A ft
 Design Ice Thickness, T_i = 1.50 in
 Importance Factor, I = 1.15
 Topographic Factor, K_{zt} = 1.00
 Height Escalation Factor, K_{iz} = 1.17
 Factored Ice Thickness, T_{iz} = 2.01 in
 Grating Ice Dead Load, D_{Gice} = 9.38 psf

Equations

$$K_h = e^{(f \cdot z / H)}$$

$$K_{zt} = [1 + K_c K_t / K_h]^2$$

$$K_{iz} = (z/33)^{0.10}$$

$$T_{iz} = T_i I K_{iz} (K_{zt})^{0.35}$$

$$A_{iz} = \pi \cdot T_{iz} \cdot (D_c + T_{iz})$$

$$DL_{ice} = A_{iz} \cdot 56 \text{pcf}$$

TIA-222-H

2.6.6.2.1

2.6.6.2.1

2.6.10

2.6.10

2.6.10

Member Ice Dead Loads

Name	Depth w/ ice (ft)	Width w/ ice (ft)	D_c (ft)	A_{iz} (ft ²)	DL_{ice} (lb/ft)
Arm: HSS4X4X1/4	0.67	0.67	0.47	0.34	18.82
Connection Pipe: Pipe 4.0 Std	0.71		0.38	0.29	15.98

**BLACK & VEATCH**Client: Eversource
Site Name: STONINGTON (ES-026)

Computed By: Joohwan Jung

Date: 11/18/2020

Verified By: JW

Title: MOUNT ANALYSIS REPORT

Date: 11/18/2020

Appurtenance Ice Wind Loading

Exposure Category = C
 Risk Category = III
 Topographic Category = 1
 Ice Wind Speed, V_{ice} = 50 mph
 Height Above Ground, z = 152.1 ft
 Crest Height, H = N/A ft
 Velocity Pressure Coefficient, K_z = 1.38 psf
 Topographic Factor, K_{zt} = 1.00
 Wind Directionality Factor, K_d = 0.95
 Shielding Factor, K_a = 0.90
 Ground Elevation Factor, K_e = 0.995
 Ice Wind Velocity Pressure, $q_{z(ice)}$ = 8.364
 Factored Ice Thickness, T_{iz} = 2.01 in
 Gust Effect Factor, G_h = 1

Equations

$$K_z = 2.01 (z / z_g)^{2/\alpha}$$

$$K_h = e^{(f \cdot z / H)}$$

$$K_{zt} = [1 + K_c K_t / K_h]^2$$

$$K_e = e^{-0.00053 z^{0.25}}$$

$$q_z = 0.00256 K_z K_{zt} K_e K_d V^2$$

$$F_{A(ice)} = q_{z(ice)} G_h (EPA)_{A(ice)}$$

$$F_{M(ice)} = q_{z(ice)} G_h C_f D_{p(ice)}$$

TIA-222-H

2.6.5.2

2.6.6.2.1

2.6.6.2.1

2.6.8

2.6.11.6

2.6.11.2

2.6.11.2

Appurtenance Ice Wind Loads

Name	Height w/ Ice (ft)	Width w/ Ice (ft)	Depth w/ Ice (ft)	Normal			Tangential		
				C_a	EPA FT2	F_A (lb)	C_a	EPA FT2	F_A (lb)
871F-70-220-025	5.83	2.92	0.49	-	2.08	17.43	-	2.08	17.43
					4.48			4.48	



Client: Eversource
 Site Name: STONINGTON (ES-026)

Computed By: Joohwan Jung

Date: 11/18/2020

Verified By: JW

BLACK & VEATCH

Title: MOUNT ANALYSIS REPORT

Date: 11/18/2020

Member Ice Wind Loading

Exposure Category = C
 Risk Category = III
 Topographic Category = 1
 Ice Wind Speed, V_{ice} = 50 mph
 Height Above Ground, z = 152.1 ft
 Crest Height, H = N/A ft
 Velocity Pressure Coefficient, K_z = 1.38 psf
 Topographic Factor, K_{zt} = 1.00
 Wind Directionality Factor, K_d = 0.95
 Shielding Factor, K_a = 0.90
 Ground Elevation Factor, K_e = 0.995
 Ice Wind Velocity Pressure, $q_{z(ice)}$ = 8.364
 Factored Ice Thickness, T_{iz} = 2.01 in
 Gust Effect Factor, G_h = 1

Equations

$$K_z = 2.01 (z / z_g)^{2/\alpha}$$

$$K_h = e^{(f \cdot z / H)}$$

$$K_{zt} = [1 + K_c K_t / K_h]^2$$

$$K_e = e^{-0.00053 z^{0.25}}$$

$$q_z = 0.00256 K_z K_{zt} K_e K_d V^2$$

$$F_{A(ice)} = q_{z(ice)} G_h (EPA)_{A(ice)}$$

$$F_{M(ice)} = q_{z(ice)} G_h C_f D_{p(ice)}$$

TIA-222-H

2.6.5.2

2.6.6.2.1

2.6.6.2.1

2.6.8

2.6.11.6

2.6.11.2

2.6.11.2

Member Ice Wind Loads

Name	Depth w/ Ice (ft)	Width w/ Ice (ft)	C_f	$D_{p(ice)}$ (ft)	$F_{M(ice)}$ (lb/ft)
Arm: HSS4X4X1/4	0.67	0.67	2	0.67	11.18
Connection Pipe: Pipe 4.0 Std	0.71		1.2	0.71	7.13

**BLACK & VEATCH**

Client: Eversource
 Site Name: STONINGTON (ES-026)

Computed By: Joohwan Jung

Date: 11/18/2020

Verified By: JW

Title: MOUNT ANALYSIS REPORT

Date: 11/18/2020

Seismic Loading**Equations**

TIA-222-H

Site Class = D
 Spectral Response, S_s = 0.159 g
 Max Spectral Response, S_1 = 0.058 g
 Accel. Site Coefficient, F_a = 1.60
 Vel. Site Coefficient, F_v = 2.40
 Design Spec. Response (1 sec), S_{D1} = 0.093
 Design Spec. Response, S_{D5} = 0.170
 Importance Factor, I = 1.25
 Seismic Response Coefficient, C_s = 0.106
 Amplification Factor, A_s = 3

$S_{D1} = 2/3 F_v S_1$
 $S_{D5} = 2/3 F_a S_s \geq S_{D1}$
 $C_s = 1/2 S_{D5} I \geq 0.03$
 $E_H = A_s C_s W$
 $E_V = A_s 0.2 S_{D5} W$

2.7.5

2.7.5

2.7.7.1.1

2.7.7

2.7.6

Appurtenance Seismic Loads

Name	Weight (lb)	E_H (lb)	E_V (lb)
871F-70-220-025	12.5	3.98	1.27

**BLACK & VEATCH**

Client: AT&T

Site Name: STONINGTON (ES-026)

Work Order:

Title: MOUNT ANALYSIS REPORT

Computed By: Joohwan Jung

Date: 11/18/2020

Verified By: JW

Date: 11/18/2020

Bolt Analysis of Antenna Mount Arm to Tower Connection

The forces acting on the plate are from M1 from RISA-3D Load Combination 10

Design Method: LRFD

Applied Loads:

$P_x =$	0.378	kip
$P_y =$	0.088	kip
$P_z =$	0.218	kip
$M_x =$	6.536	kip-in
$M_y =$	15.059	kip-in
$M_z =$	6.211	kip-in

Bolt Properties:

$d_b =$	0.625	in
$A_b =$	0.307	in ²
$N_b =$	4	

Load Location Coordinates:

$X_o =$	4	in
$Y_o =$	4	in

Bolt Strength: A325 AISC Table (J3.2)

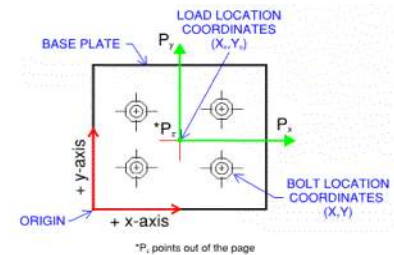
$F_{nt} =$	90	ksi
$F_{nv} =$	54	ksi

Bolt Location Coordinates (in):

Bolt #	X_b	Y_b
#1	1	1
#2	1	7
#3	7	7
#4	7	1

CALCULATIONS

Bolt Group Centroid y-coordinate, $Y_c =$	4	in
Bolt Group Centroid x-coordinate, $X_c =$	4	in
Load Eccentricity in x-direction, $e_x =$	0	in
Load Eccentricity in y-direction, $e_y =$	0	in
Total Moment Including Load Eccentricity, $\Sigma M_x =$	6.54	kip-in
Total Moment Including Load Eccentricity, $\Sigma M_y =$	15.06	kip-in
Total Moment Including Load Eccentricity, $\Sigma M_z =$	6.21	kip-in



Bolt #	Centroid Dist. (in)		Polar Moments of Inertia (in ⁴ /in ²)			Force per Bolt (kip)	
	d_x	d_y	I_x	I_y	I_{xy}	Tension	Shear
#1	-3	-3	9	9	9	0.765	0.425
#2	3	-3	9	9	-9	1.746	0.451
#3	3	3	9	9	9	0.656	0.325
#4	-3	3	9	9	-9	1.855	0.288
SUM:			36	36	0		

Bolt Shear Strength Check

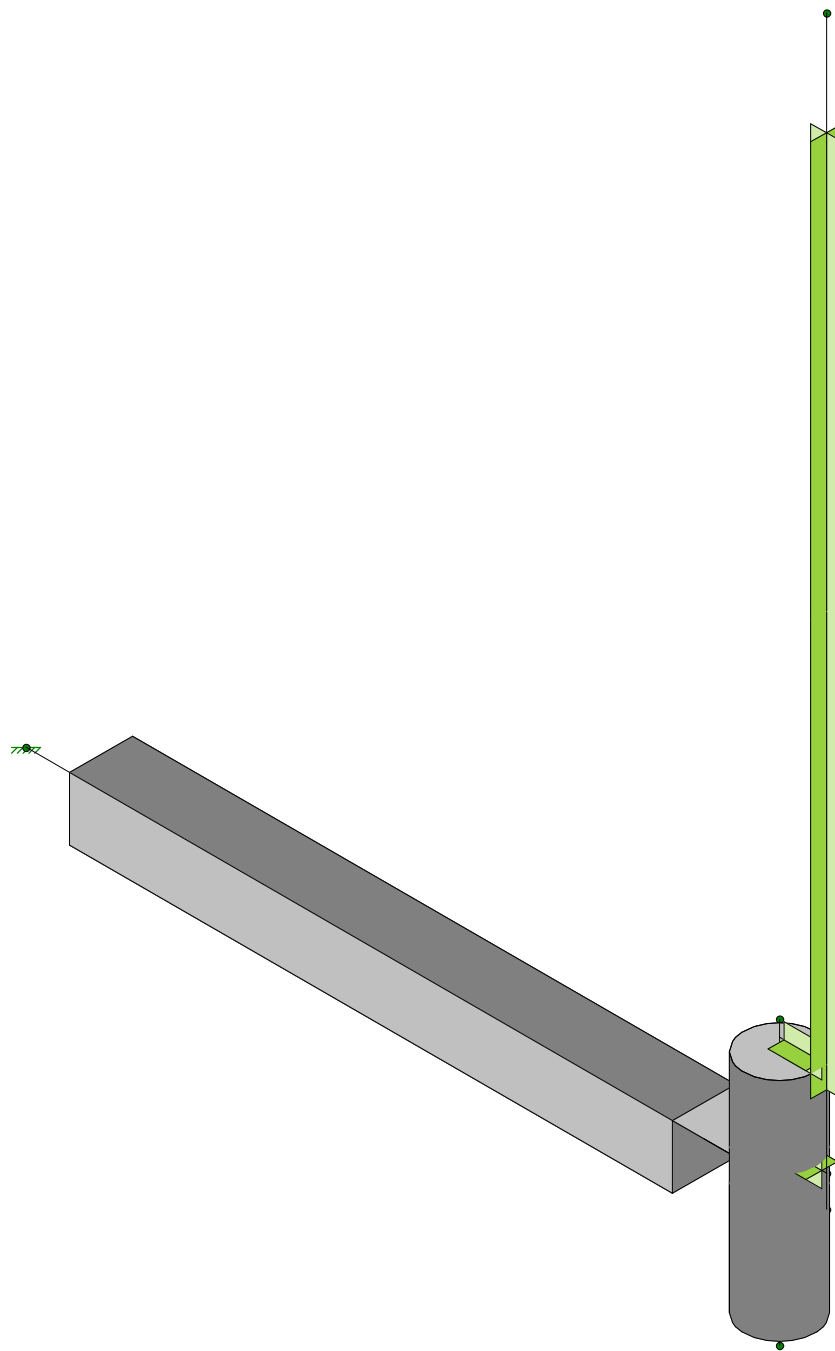
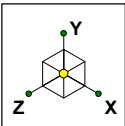
Available Shear Strength per Bolt, $\phi V_n =$	12.43	kip	AISC Eq. (J3-1)
Bolt Shear Stress Ratio, $SR_V =$	3.63%		

Bolt Tensile Strength Check

Nom. Tensile Stress (Including Effects of Shear), $F'_{nt} =$	90	ksi	AISC Eq. (J3-3a)
Available Tensile Strength per Bolt, $\phi T_n =$	20.72	kip	AISC Eq. (J3-2)
Bolt Tension Stress Ratio, $SR_T =$	8.95%		

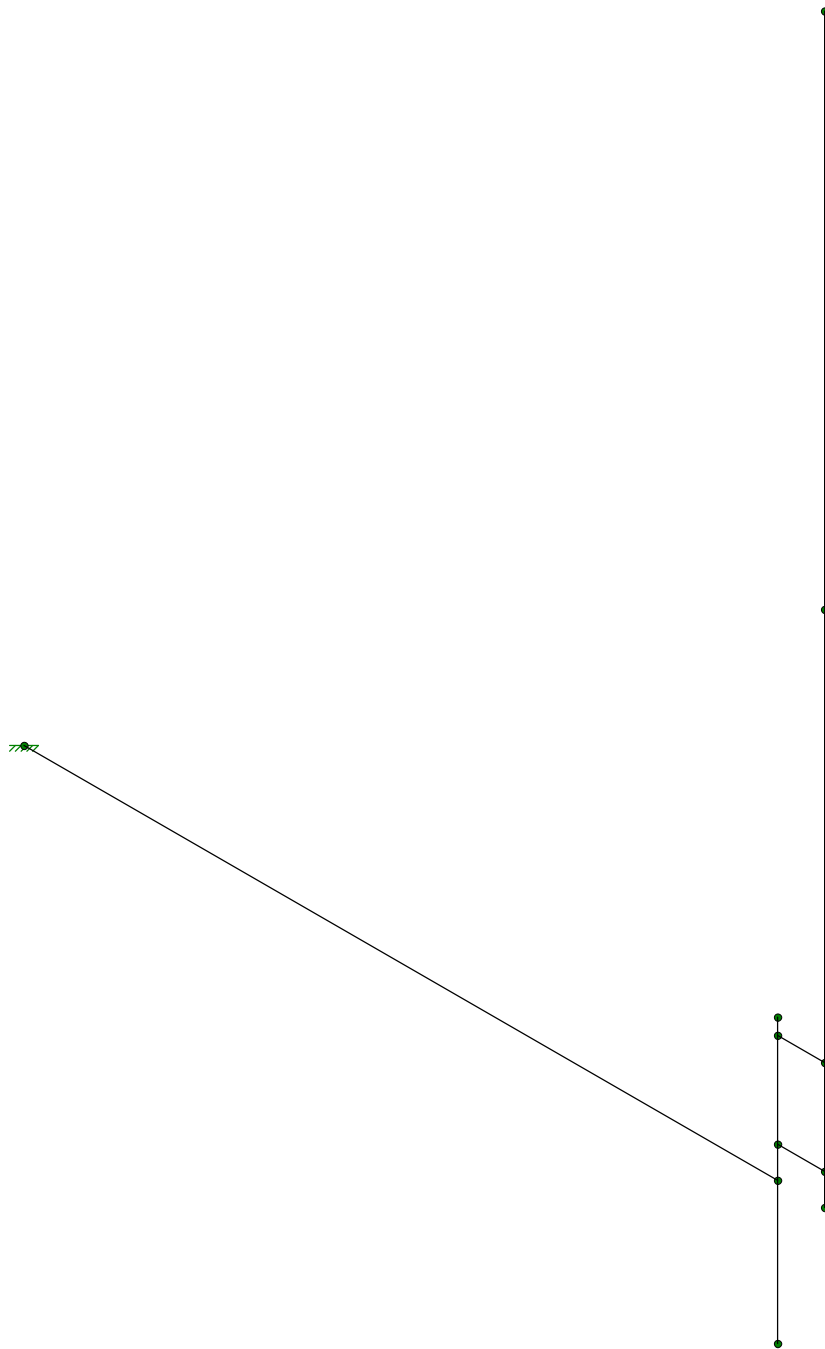
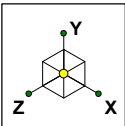
 P_x = Major Axis Load (X-Axis) M_x = Moment About X-Axis d_b = Diameter of Bolt P_y = Minor Axis Load (Y-Axis) M_y = Moment About Y-Axis A_b = Cross-Sectional Area of Bolt P_z = Axial Load (Z-Axis) M_z = Torque About Z-Axis N_b = Number of Bolts $d_x = Y_b - Y_c$ $I_{xy} = d_x d_y$ $SR_V = V_u / \phi V_n$ $F'_{nt} = 1.3F_{nt} - (F_{nt} / \phi F_{nv})(V_u / A_b) \leq F_{nt}$ $d_y = X_b - X_c$ $\Sigma M_x = M_x + P_z(e_y)$ $SR_T = T_u / \phi T_n$ $T_{ui} = \Sigma P_z / N_b - [(\Sigma M_x \Sigma I_y + \Sigma M_y \Sigma I_{xy}) / (\Sigma I_x \Sigma I_y - \Sigma I_{xy}^2)] d_x$ $I_x = d_y^2$ $\Sigma M_y = M_y + P_z(e_x)$ $\phi V_n = 0.75F_{nv}A_b$ $+ [(\Sigma M_y \Sigma I_x + \Sigma M_x \Sigma I_{xy}) / (\Sigma I_x \Sigma I_y - \Sigma I_{xy}^2)] d_y$ $I_y = d_x^2$ $\Sigma M_z = M_z + P_x(e_y) + P_y(e_x)$ $\phi T_n = 0.75F'_{nt}A_b$ $V_{ui} = [(\Sigma P_x / N_b - \Sigma M_z d_y / (\Sigma I_x + \Sigma I_y))^2 + (\Sigma P_y / N_b - \Sigma M_z d_x / (\Sigma I_x + \Sigma I_y))^2]^{1/2}$

**APPENDIX 2:
RISA PRINTOUTS**



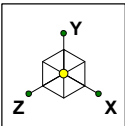
Loads: BLC 7, Wind - 90 Deg (X)
Envelope Only Solution

Black & Veatch Corp.	STONINGTON IFR Risa Model	SK - 1
Joohwan Jung		Nov 18, 2020 at 11:44 AM
405025.2021.2200		STONINGTON IFR Risa Model.r3d

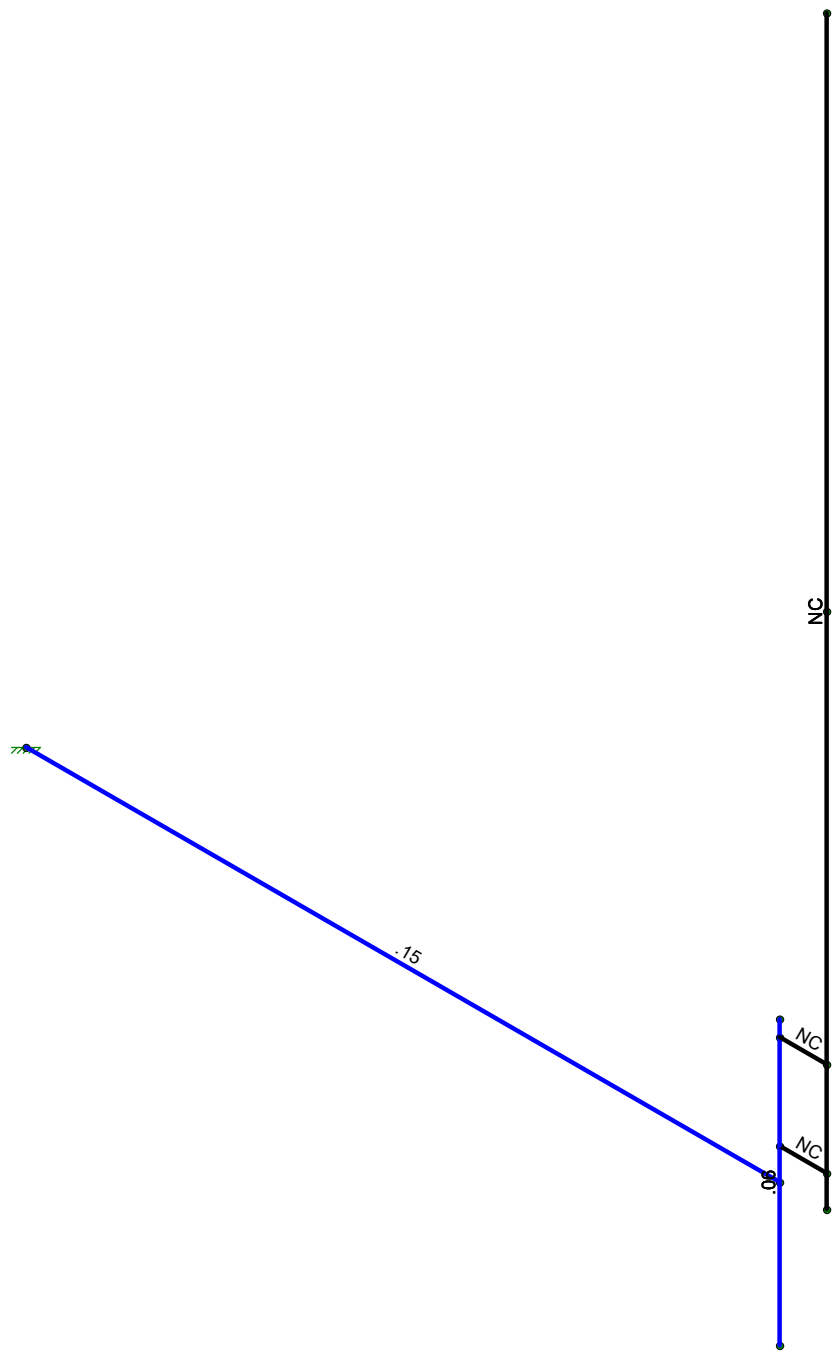


Loads: BLC 7, Wind - 90 Deg (X)
Envelope Only Solution

Black & Veatch Corp.	STONINGTON IFR Risa Model	SK - 2
Joohwan Jung		Nov 18, 2020 at 11:44 AM
405025.2021.2200		STONINGTON IFR Risa Model.r3d



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



Member Code Checks Displayed (Enveloped)
Loads: BLC 7, Wind - 90 Deg (X)
Envelope Only Solution

Black & Veatch Corp.

Joohwan Jung

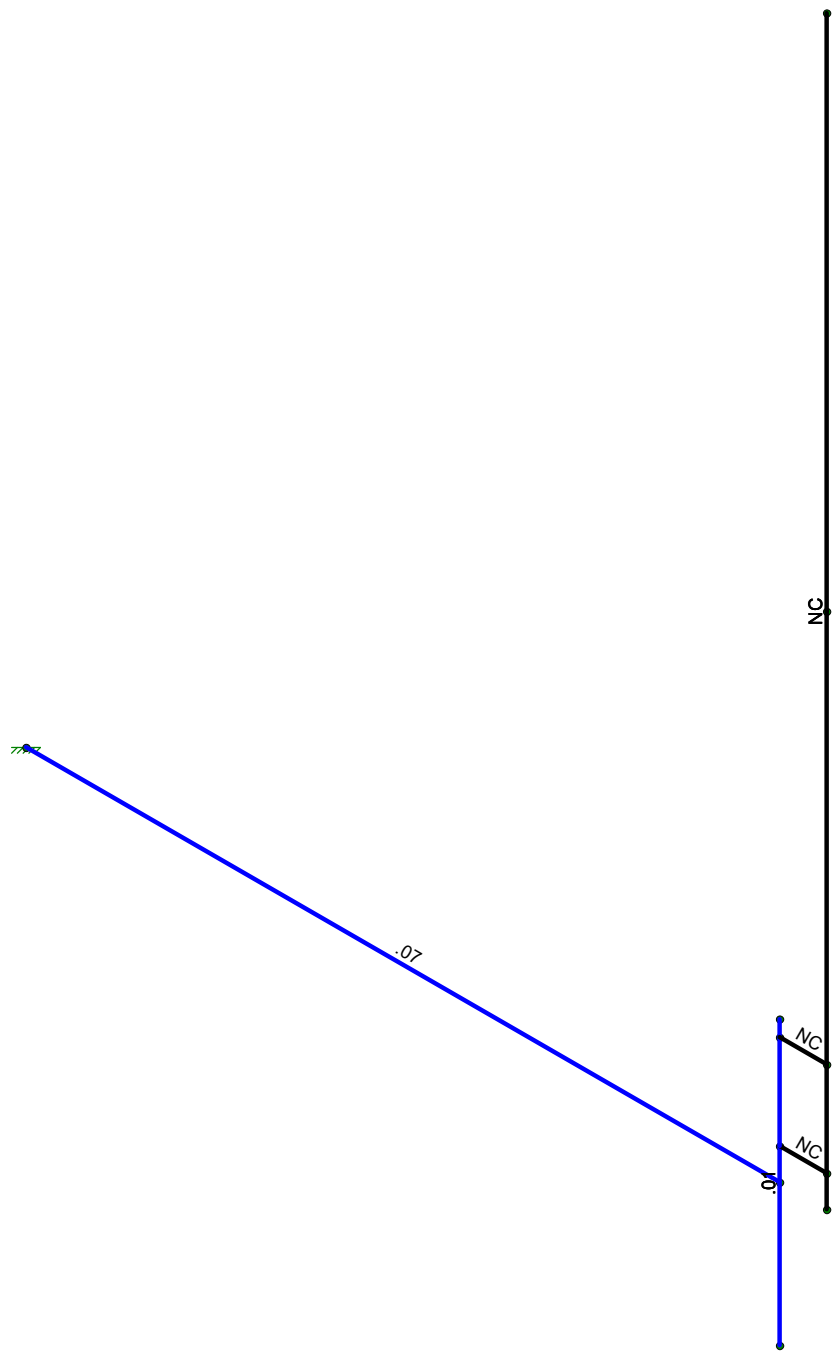
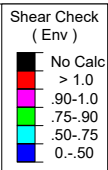
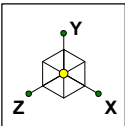
405025.2021.2200

STONINGTON IFR Risa Model

SK - 3

Nov 18, 2020 at 11:44 AM

STONINGTON IFR Risa Model.r3d



Member Shear Checks Displayed (Enveloped)
Loads: BLC 7, Wind - 90 Deg (X)
Envelope Only Solution

Black & Veatch Corp.

Joohwan Jung

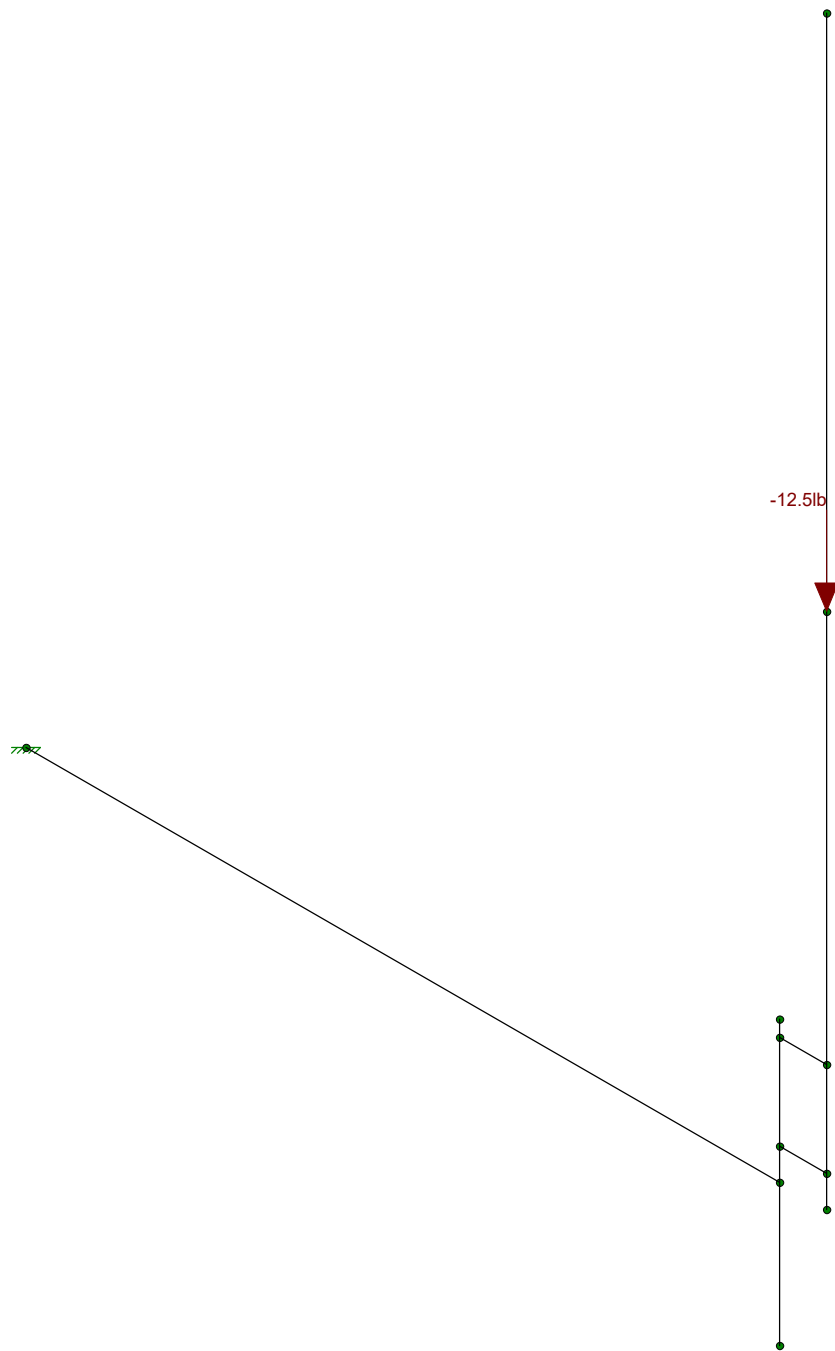
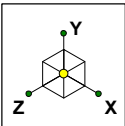
405025.2021.2200

STONINGTON IFR Risa Model

SK - 4

Nov 18, 2020 at 11:44 AM

STONINGTON IFR Risa Model.r3d



Loads: BLC 1, DL
Envelope Only Solution

Black & Veatch Corp.	STONINGTON IFR Risa Model	SK - 5
Joohwan Jung		Nov 18, 2020 at 11:45 AM
405025.2021.2200		STONINGTON IFR Risa Model.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (in/sec^2)	386.4
Wall Mesh Size (in)	24
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 15th(360-16): LRFD
Adjust Stiffness?	Yes(Iterative)
RISACONNECTION CODE	None
Cold Formed Steel Code	None
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building
Stainless Steel Code	None

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

(Global) Model Settings, Continued

Seismic Code	None
Seismic Base Elevation (in)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Arm	HSS4X4X4	Beam	SquareTube	A53 Gr.B	Typical	3.37	7.8	7.8	12.8
2	Boom	PIPE 3.0	Beam	Pipe	A53 Gr.B	Typical	2.07	2.85	2.85	5.69
3	Connection Pipe	PIPE 4.0	Beam	Pipe	A53 Gr.B	Typical	2.96	6.82	6.82	13.6
4	Mount Pipe	PIPE 2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25

General Material Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E5 F)	Density[k/ft^3]
1	gen Conc3NW	3155	1372	.15	.6	.145
2	gen Conc4NW	3644	1584	.15	.6	.145
3	gen Conc3LW	2085	906	.15	.6	.11
4	gen Conc4LW	2408	1047	.15	.6	.11
5	gen Alum	10600	4077	.3	1.29	.173
6	gen Steel	29000	11154	.3	.65	.49
7	RIGID	1e+6		.3	0	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	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	N1	N2			Arm	Beam	SquareTube	A53 Gr.B	Typical
2	M2	N4	N3			Connection Pipe	Beam	Pipe	A53 Gr.B	Typical
3	M3	N5	N7			RIGID	None	None	RIGID	Typical
4	M4	N9	N11			RIGID	None	None	RIGID	Typical
5	M5	N8	N10			RIGID	None	None	RIGID	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
1	M1						Yes				None
2	M2						Yes				None
3	M3						Yes	** NA **			None
4	M4						Yes	** NA **			None
5	M5						Yes	** NA **			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Arm	48									Lateral
2	M2	Connection ...	18									Lateral

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed Area(Me...	Surface(...
1	DL	DL		-1		1			
2	Maintenance LL - LV	LL				1			
3	Installation LL - LM	LL				1			
4	Wind - 0 Deg (X)	WL				1		2	
5	Wind - 30 Deg (X)	WL				1		2	
6	Wind - 60 Deg (X)	WL				1		2	
7	Wind - 90 Deg (X)	WL				1		2	
8	Wind - 120 Deg (X)	WL				1		2	
9	Wind - 150 Deg (X)	WL				1		2	
10	Wind - 180 Deg (X)	WL				1		2	
11	Wind - 210 Deg (X)	WL				1		2	
12	Wind - 240 Deg (X)	WL				1		2	
13	Wind - 270 Deg (X)	WL				1		2	
14	Wind - 300 Deg (X)	WL				1		2	
15	Wind - 330 Deg (X)	WL				1		2	
16	Wind - 0 Deg (Z)	WL				1		2	
17	Wind - 30 Deg (Z)	WL				1		2	
18	Wind - 60 Deg (Z)	WL				1		2	
19	Wind - 90 Deg (Z)	WL				1		2	
20	Wind - 120 Deg (Z)	WL				1		2	
21	Wind - 150 Deg (Z)	WL				1		2	
22	Wind - 180 Deg (Z)	WL				1		2	
23	Wind - 210 Deg (Z)	WL				1		2	
24	Wind - 240 Deg (Z)	WL				1		2	
25	Wind - 270 Deg (Z)	WL				1		2	
26	Wind - 300 Deg (Z)	WL				1		2	
27	Wind - 330 Deg (Z)	WL				1		2	
28	Ice DL	DL				1		2	
29	Ice Wind - 0 Deg (X)	WL				1		2	
30	Ice Wind - 30 Deg (X)	WL				1		2	
31	Ice Wind - 60 Deg (X)	WL				1		2	
32	Ice Wind - 90 Deg (X)	WL				1		2	
33	Ice Wind - 120 Deg (X)	WL				1		2	
34	Ice Wind - 150 Deg (X)	WL				1		2	
35	Ice Wind - 180 Deg (X)	WL				1		2	
36	Ice Wind - 210 Deg (X)	WL				1		2	
37	Ice Wind - 240 Deg (X)	WL				1		2	
38	Ice Wind - 270 Deg (X)	WL				1		2	
39	Ice Wind - 300 Deg (X)	WL				1		2	
40	Ice Wind - 330 Deg (X)	WL				1		2	

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed Area(Me...	Surface(...
41	Ice Wind - 0 Deg (Z)	WL				1		2	
42	Ice Wind - 30 Deg (Z)	WL				1		2	
43	Ice Wind - 60 Deg (Z)	WL				1		2	
44	Ice Wind - 90 Deg (Z)	WL				1		2	
45	Ice Wind - 120 Deg (Z)	WL				1		2	
46	Ice Wind - 150 Deg (Z)	WL				1		2	
47	Ice Wind - 180 Deg (Z)	WL				1		2	
48	Ice Wind - 210 Deg (Z)	WL				1		2	
49	Ice Wind - 240 Deg (Z)	WL				1		2	
50	Ice Wind - 270 Deg (Z)	WL				1		2	
51	Ice Wind - 300 Deg (Z)	WL				1		2	
52	Ice Wind - 330 Deg (Z)	WL				1		2	
53	Lateral Seismic - Eh (X)	ELX	.318			1			
54	Lateral Seismic - Eh (Z)	ELZ			.318	1			
55	Vertical Seismic - Ev (Y)	ELY		-.102		1			

Load Combinations

	Description	S...	PDe...	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	WIND LOAD COMBOS (140 MPH)																			
2	1.2DL + WL (0 DEG)	Y...	Y		1	1.2	4	1	16	1										
3	1.2DL + WL (30 DEG)	Y...	Y		1	1.2	5	1	17	1										
4	1.2DL + WL (60 DEG)	Y...	Y		1	1.2	6	1	18	1										
5	1.2DL + WL (90 DEG)	Y...	Y		1	1.2	7	1	19	1										
6	1.2DL + WL (120 DEG)	Y...	Y		1	1.2	8	1	20	1										
7	1.2DL + WL (150 DEG)	Y...	Y		1	1.2	9	1	21	1										
8	1.2DL + WL (180 DEG)	Y...	Y		1	1.2	10	1	22	1										
9	1.2DL + WL (210 DEG)	Y...	Y		1	1.2	11	1	23	1										
10	1.2DL + WL (240 DEG)	Y...	Y		1	1.2	12	1	24	1										
11	1.2DL + WL (270 DEG)	Y...	Y		1	1.2	13	1	25	1										
12	1.2DL + WL (300 DEG)	Y...	Y		1	1.2	14	1	26	1										
13	1.2DL + WL (330 DEG)	Y...	Y		1	1.2	15	1	27	1										
14																				
15	MOUNT LOAD COMBOS (30 MPH)																			
16	1.4DL	Y...	Y		1	1.4														
17	1.2DL + 1.5LV	Y...	Y		1	1.2	2	1.5												
18	1.2DL + 1.5LM + WL (0 DEG)	Y...	Y		1	1.2	3	1.5	4	.046	16	.046								
19	1.2DL + 1.5LM + WL (30 DEG)	Y...	Y		1	1.2	3	1.5	5	.046	17	.046								
20	1.2DL + 1.5LM + WL (60 DEG)	Y...	Y		1	1.2	3	1.5	6	.046	18	.046								
21	1.2DL + 1.5LM + WL (90 DEG)	Y...	Y		1	1.2	3	1.5	7	.046	19	.046								
22	1.2DL + 1.5LM + WL (120 DEG)	Y...	Y		1	1.2	3	1.5	8	.046	20	.046								
23	1.2DL + 1.5LM + WL (150 DEG)	Y...	Y		1	1.2	3	1.5	9	.046	21	.046								
24	1.2DL + 1.5LM + WL (180 DEG)	Y...	Y		1	1.2	3	1.5	10	.046	22	.046								
25	1.2DL + 1.5LM + WL (210 DEG)	Y...	Y		1	1.2	3	1.5	11	.046	23	.046								
26	1.2DL + 1.5LM + WL (240 DEG)	Y...	Y		1	1.2	3	1.5	12	.046	24	.046								
27	1.2DL + 1.5LM + WL (270 DEG)	Y...	Y		1	1.2	3	1.5	13	.046	25	.046								
28	1.2DL + 1.5LM + WL (300 DEG)	Y...	Y		1	1.2	3	1.5	14	.046	26	.046								
29	1.2DL + 1.5LM + WL (330 DEG)	Y...	Y		1	1.2	3	1.5	15	.046	27	.046								
30																				
31	ICE LOAD COMBOS (1.5", 50 MPH)																			
32	1.2DL + Ice DL + Ice WL (0 DEG)	Y...	Y		1	1.2	28	1	29	1	41	1								
33	1.2DL + Ice DL + Ice WL (30 DEG)	Y...	Y		1	1.2	28	1	30	1	42	1								
34	1.2DL + Ice DL + Ice WL (60 DEG)	Y...	Y		1	1.2	28	1	31	1	43	1								
35	1.2DL + Ice DL + Ice WL (90 DEG)	Y...	Y		1	1.2	28	1	32	1	44	1								
36	1.2DL + Ice DL + Ice WL (120 DEG)	Y...	Y		1	1.2	28	1	33	1	45	1								
37	1.2DL + Ice DL + Ice WL (150 DEG)	Y...	Y		1	1.2	28	1	34	1	46	1								

Load Combinations (Continued)

	Description	S...	PDe...	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
38	1.2DL + Ice DL + Ice WL (180 DEG)	Y...	Y		1	1.2	28	1	35	1	47	1								
39	1.2DL + Ice DL + Ice WL (210 DEG)	Y...	Y		1	1.2	28	1	36	1	48	1								
40	1.2DL + Ice DL + Ice WL (240 DEG)	Y...	Y		1	1.2	28	1	37	1	49	1								
41	1.2DL + Ice DL + Ice WL (270 DEG)	Y...	Y		1	1.2	28	1	38	1	50	1								
42	1.2DL + Ice DL + Ice WL (300 DEG)	Y...	Y		1	1.2	28	1	39	1	51	1								
43	1.2DL + Ice DL + Ice WL (330 DEG)	Y...	Y		1	1.2	28	1	40	1	52	1								
44																				
45	SEISMIC LOAD COMBOS																			
46	1.2DL + Ev (Y) + Eh (X)	Y...	Y		1	1.2	55	1	53	1										
47	1.2DL - Ev (Y) + Eh (X)	Y...	Y		1	1.2	55	-1	53	1										
48	1.2DL + Ev (Y) - Eh (X)	Y...	Y		1	1.2	55	1	53	-1										
49	1.2DL - Ev (Y) - Eh (X)	Y...	Y		1	1.2	55	-1	53	-1										
50	1.2DL + Ev (Y) + Eh (Z)	Y...	Y		1	1.2	55	1	54	1										
51	1.2DL - Ev (Y) + Eh (Z)	Y...	Y		1	1.2	55	-1	54	1										
52	1.2DL + Ev (Y) - Eh (Z)	Y...	Y		1	1.2	55	1	54	-1										
53	1.2DL - Ev (Y) - Eh (Z)	Y...	Y		1	1.2	55	-1	54	-1										
54																				

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N1	max	436.386	2	463.167	17	436.388	5	597.624	5	1450.191	11	1746.444	17
2		min	-436.386	8	80.697	47	-436.388	11	-597.624	11	-1450.191	5	-352.307	2
3	Totals:	max	436.386	2	463.167	17	436.388	5						
4		min	-436.386	8	80.697	47	-436.388	11						

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

Member	Shape	Code Check	Loc[in]	LC	Shear..	Loc[...]	Dir	LC	phi*Pn...	phi*Pnt...	phi*Mn...	phi*Mn...	Cb	Eqn
1	M1	HSS4X4X4	.147	0	10	.072	0	z	11	100881...	106155	12311...	12311...	1...H1-1b
2	M2	PIPE_4.0	.057	9	8	.014	9		11	92571...	93240	10631...	10631...	1...H1-1b

Member Section Forces

	LC	Member Label	Sec	Axial[k]	y Shear[k]	z Shear[k]	Torque[k-in]	y-y Moment[k-in]	z-z Moment[k-in]
1	10	M1	1	-.218	.088	-.378	-6.211	15.059	6.536
2			2	-.196	.074	-.34	-6.211	10.754	5.562
3			3	-.174	.061	-.302	-6.211	6.903	4.753
4			4	-.153	.047	-.264	-6.211	3.506	4.109
5			5	-.131	.033	-.226	-6.211	.564	3.63

**APPENDIX 3:
ATTACHMENTS**

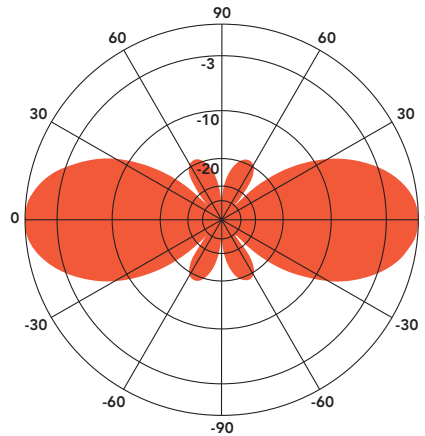
ANT220F2DIN

FIBERGLASS COLLINEAR ANTENNA 2.5 dBd

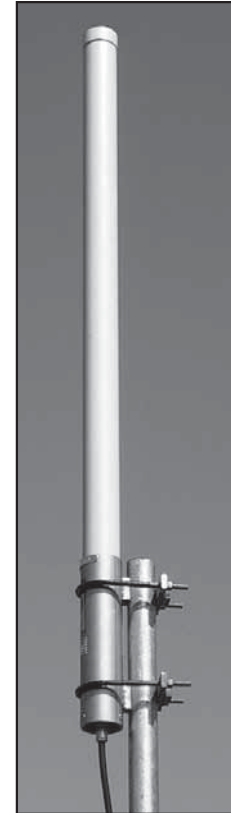
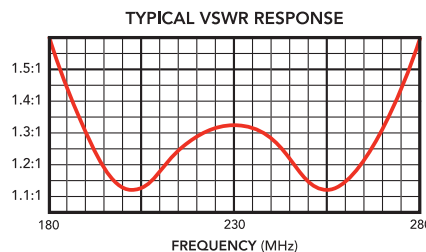
The Telewave ANT220F2 is an extremely rugged collinear antenna, with moderate gain and wide vertical beamwidth. This compact antenna produces 2.5 dBd gain, and is designed for operation in all environmental conditions. The antenna is constructed with brass and copper elements, with a path to ground potential for lightning impulse protection. The ANT220F2 is an excellent choice for wireless PTC systems in urban or rural areas.

All junctions are fully soldered to prevent RF intermodulation, and each antenna is completely protected within a rugged, high-tech radome to ensure survivability in the worst environments. The "Cool Blue" radome provides maximum protection from corrosive gases, ultraviolet radiation, icing, salt spray, acid rain, and wind blown abrasives.

The ANT220F2 includes the ANTC485 dual clamp set for mounting to a 1.5" to 3" O.D. support pipe, and a 24" removable RG-213 DIN-Male jumper.



ANT220F2 - 230 MHz
Vertical Plane
Gain = 2.58 dBd



ONE SITE PRO 1 P/N DCP12K CLAMP SET REQUIRED.

SPECIFICATIONS			
Frequency (continuous)	195-260 MHz	Dimensions (L x base diam.) in.	44 x 2.75
Gain	2.5 dBd	Tower weight (antenna + clamps)	11 lb.
Power rating (typ.)	500 watts	Shipping weight	14 lb.
Impedance	50 ohms	Wind rating / with 0.5" ice	200 / 150 MPH
VSWR	1.5:1 or less	Maximum exposed area	1.1 ft. ²
Pattern	Omnidirectional	Lateral thrust at 100 MPH	44 lb.
Vertical beamwidth	38°	Bending moment at top clamp	47 ft. lb.
Termination	7-16 DIN-F	(100 MPH, 40 PSF flat plate equiv.)	

870 Series 220MHz Exposed Dipoles

The 870 Series 220MHz Exposed Dipoles are available in 1, 2, 4, 8 dipole configurations. All our antennas can be completely customized to your particular applications. Our antennas can be black anodized, adjustable, or fixed, side mount or top mount, and heavy-duty versions are available.

- Each antenna is offered in a 1/4, 3/8 or 1/2 wave spacing versions.
- The 87XA-70 has external cabling and a field-adjustable pattern.
- The 87XF-70 has internal cabling and fixed dipole-mast spacing.
- Heavy-duty versions are available. Please contact our Technical Support team for consultation.

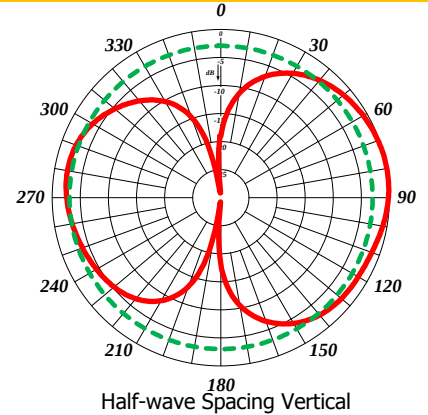
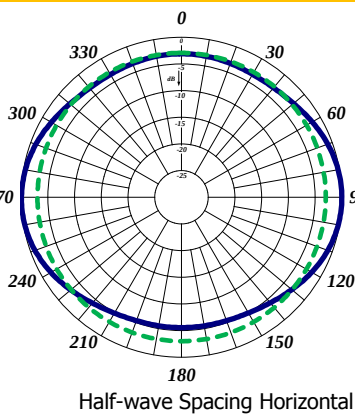
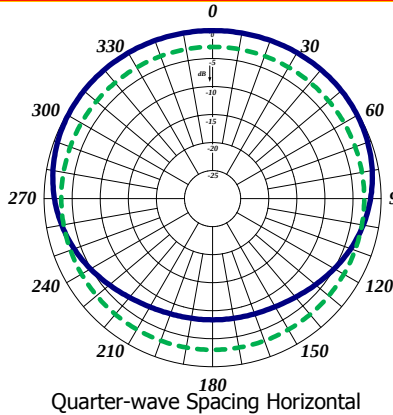
Electrical Specifications	871F-70-2	872F-70-2	874F-70-2
Frequency Range, MHz	215-225	215-225	215-225
Nominal Gain, dBd	2.0-2.5	5.0-5.5	8.0-8.5
Number of Dipoles	1	2	4
Bandwidth 1.5:1 VSWR, MHz	10	10	10
Polarization	Vertical	Vertical	Vertical
Pattern	Offset / bi	Offset / bi	Offset / bi
Power Rating, Watts	200	300	500
Nominal Impedance, Ohms	50	50	50
Lightning Protection	DC Ground	DC Ground	DC Ground
Standard Termination	Type N Male	Type N Male	Type N Male
Mechanical Specifications	871F-70-2	872F-70-2	874F-70-2
Length, in (mm)	66 (1676)	112 (2845)	200 (5080)
Width (1/2 Wave Spacing), in (mm)	31 (787)	31 (787)	32 (813)
Weight, lbs. (kg)	12.5 (5.7)	21 (9.5)	51 (23)
Rated Wind Velocity, No Ice, mph (km/h)	165 (266)	150 (241)	145 (233)
Rated Wind Velocity, 0.5" (13mm) ice, mph (km/h)	140 (225)	130 (209)	105 (177)
Lateral Thrust @ 100 mph, wind, lbs. (kg)	40 (18)	66 (30)	143 (65)
Bending Moment @ top clamp: 100 mph, ft.*lb (kg*m)	58 (8)	150 (21)	610 (84)
Projected Area, ft ² (m ²)	1.5 (0.14)	2.6 (0.24)	5.5 (0.51)
Mounting Information Mast O.D. (mm)	1.9" (48)	1.9" (48)	2.4" (60)
* See next page for ordering information (page 3) *			



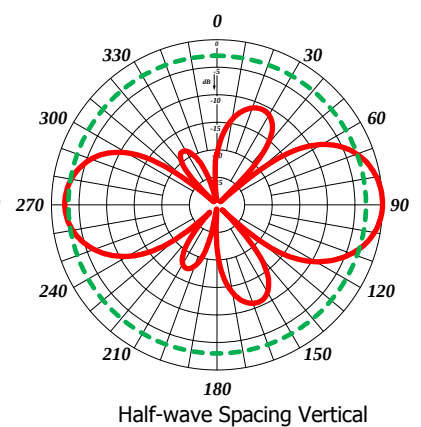
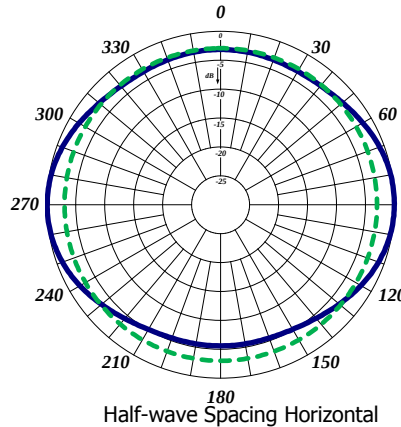
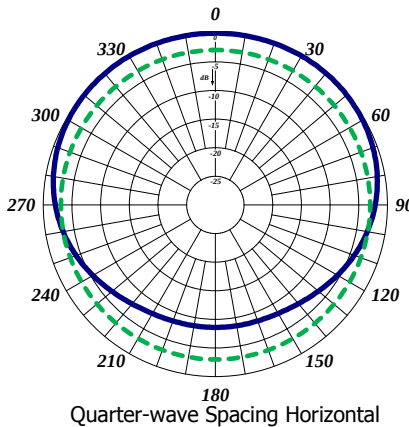
ONE SITE PRO 1 P/N DCP12K CLAMP SET REQUIRED.



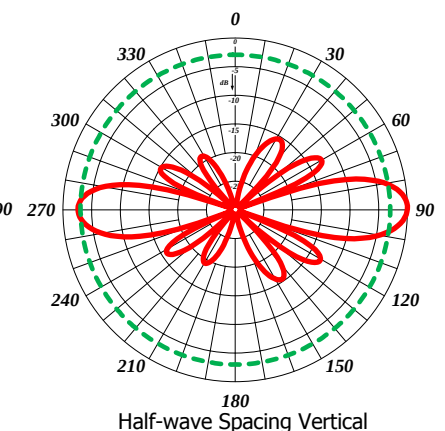
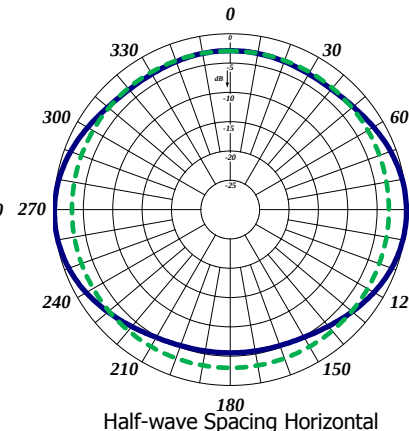
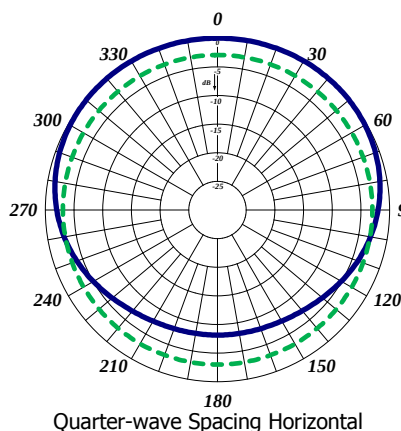
871F-70-2



872F-70-2



874F-70-2

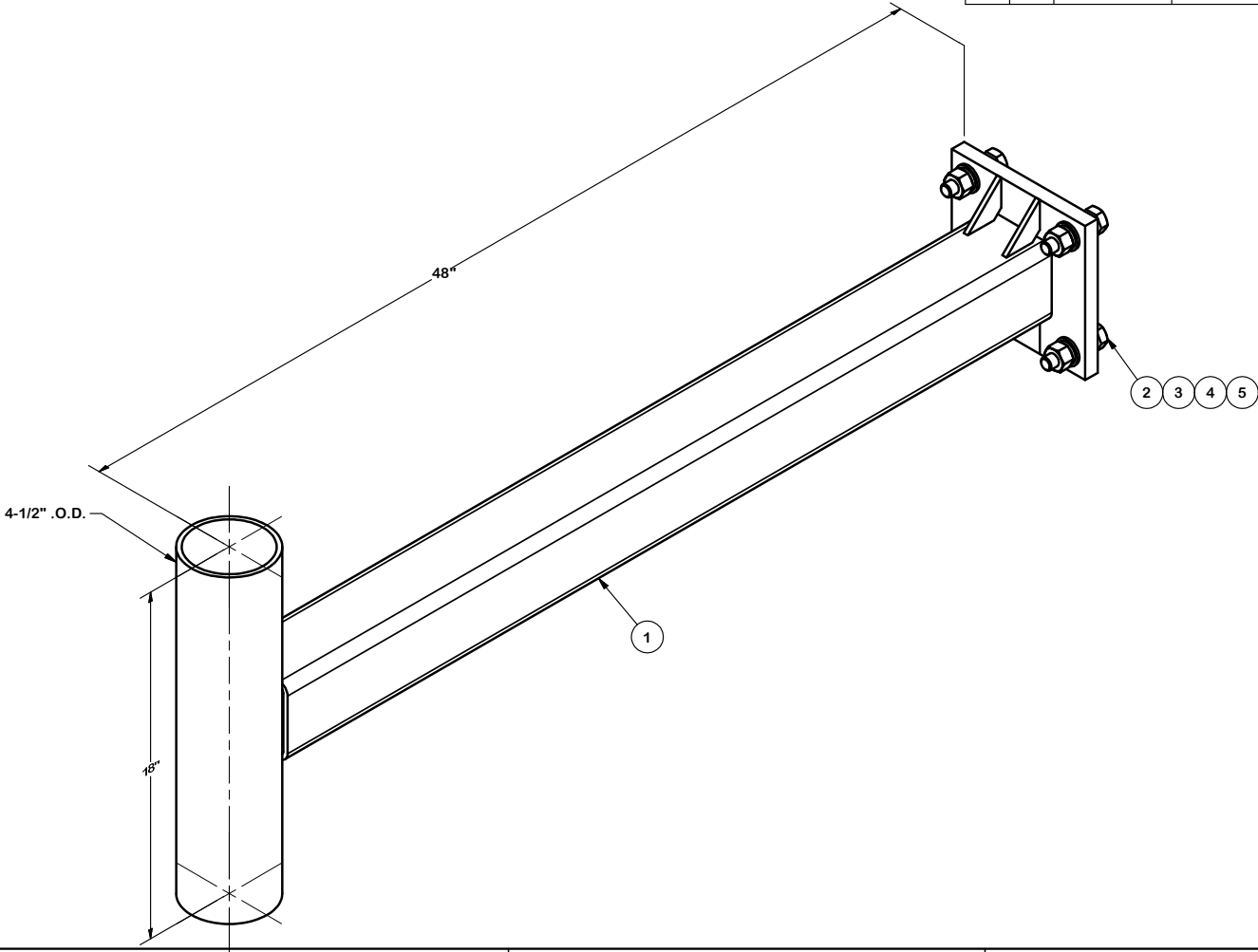


220MHz EXPOSED DIPOLES

215-225 MHz

Order Information	Heavy Duty	Side Mount	Top Mount	Black Anodized
871-70-2	871F-70-2HD	871F-70-2SM	871F-70-2TM	871F-70-2HDB
872-70-2	872F-70-2HD	872F-70-2SM	872F-70-2TM	872F-70-2HDB
874-70-2	874F-70-2HD	874F-70-2SM	874F-70-2TM	874F-70-2HDB

(2) PROPOSED SUPPORT ARMS.



PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	X-SV197-48	SUPPORT ARM WELDMENT - 36"		76.32	76.32
2	4	A58234	5/8" x 2-3/4" HDG A325 HEX BOLT		0.36	1.42
3	4	A58FW	5/8" HDG A325 FLATWASHER		0.03	0.14
4	4	G58LW	5/8" HDG LOCKWASHER		0.03	0.10
5	4	A58NUT	5/8" HDG A325 HEX NUT		0.13	0.52
TOTAL WT. #						78.50

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES ($\pm 0.030"$)
DRILLED AND GAS CUT HOLES ($\pm 0.030"$) - NO CONING OF HOLES
LASER CUT EDGES AND HOLES ($\pm 0.010"$) - NO CONING OF HOLES
BENDS ARE $\pm 1/2$ DEGREE
ALL OTHER MACHINING ($\pm 0.030"$)
ALL OTHER ASSEMBLY ($\pm 0.060"$)

PROPRIETARY NOTE:
THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION		
48" SUPPORT ARM		

CPD NO.	DRAWN BY	ENG. APPROVAL
4470	CEK 4/14/2011	
CLASS	DRAWING USAGE	CHECKED BY
81	CUSTOMER	BMC 4/14/2011

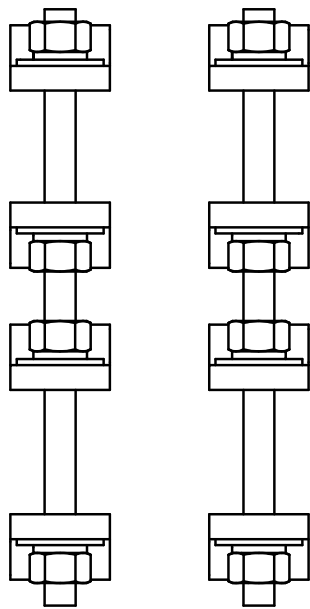
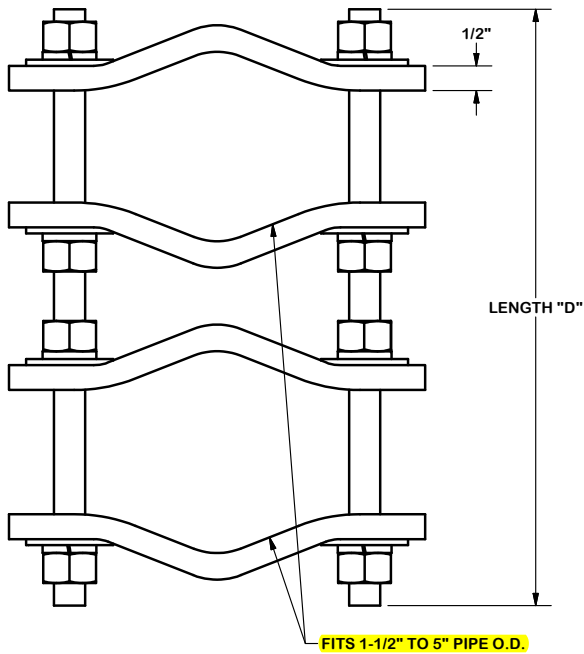
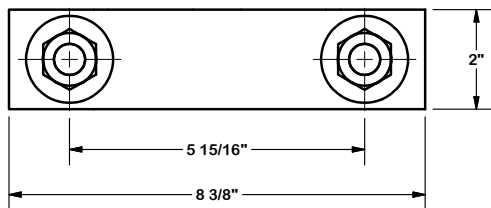
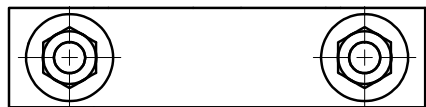
SITE PRO 1
A valmont COMPANY

Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

Engineering
Support Team:
1-888-753-7446

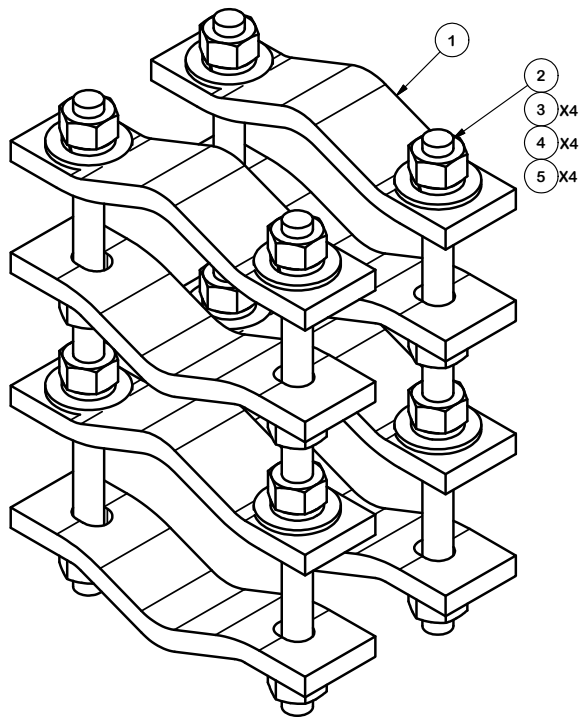
PART NO.	SV197-48	PAGE
DWG. NO.	SV197-48	1 OF 1

ATTACH PROPOSED ANTENNA TO PROPOSED SUPPORT ARMS
USING CLAMP SET SITE PRO 1 DCP12K (TOTAL OF 2 SETS).



PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	8	DCP	CLAMP HALF, 1/2" THICK, 8-3/8"		2.40	19.20
2	B	C	5/8" THREADED ROD	D	E	F
3	16	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	2.08
4	16	G58LW	5/8" HDG LOCKWASHER		0.03	0.42
5	16	G58FW	5/8" HDG USS FLATWASHER		0.07	1.13

VARIABLE PARTS TABLE						
ASSEMBLY "A"	QTY "B"	PART "C"	LENGTH "D"	UNIT WT. "E"	NET WT. "F"	TOTAL WEIGHT
DCP12K	4	G58R-12	12"	1.05	4.18	27.01
DCP18K	4	G58R-18	18"	1.57	6.27	29.10



TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES ($\pm 0.030"$)
DRILLED AND GAS CUT HOLES ($\pm 0.030"$) - NO CONING OF HOLES
LASER CUT EDGES AND HOLES ($\pm 0.010"$) - NO CONING OF HOLES
BENDS ARE $\pm 1/2$ DEGREE
ALL OTHER MACHINING ($\pm 0.030"$)
ALL OTHER ASSEMBLY ($\pm 0.060"$)

PROPRIETARY NOTE:
THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION

PIPE TO PIPE CLAMP SET
1-1/2" TO 5" PIPE
1/2" THICK CLAMP

CPD NO.	DRAWN BY	ENG. APPROVAL
	KC8 8/21/2012	
CLASS	DRAWING USAGE	CHECKED BY
81	01 CUSTOMER	CEK 1/22/2013



Engineering
Support Team:
1-888-753-7446

Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

PART NO. SEE ASSEMBLY "A"

DWG. NO. DCPxxK

November 18, 2020

MOUNT EVALUATION LETTER

Site Number: ES-026
Site Name: STONINGTON
Site Data: Taugwonk Spur Road No. 2
Stonington, CT 06378
Latitude: 41° 22' 55.26"
Longitude: -71° 54' 12.9"

Black & Veatch Corporation is pleased to submit this "Mount Evaluation Letter" to determine the structural integrity of antenna mounting system on the above-mentioned site. The purpose of this evaluation is to determine the capacity of the system in supporting the final loading in the attached "Loading Summary".

Proposed Mounting System
SitePro 1 (UQB4) Quad Ring Mount with 4" STD. pipe and SitePro 1 (FMA2) Flush Mount Adapter Kit

Based on our evaluation we have determined the proposed antenna mounting system to be:

SUFFICIENT

Structure Rating (max from all components) =	10.8%
--	-------

Black & Veatch recommends installing the microwave dish mount in accordance with the attached Black & Veatch Drawing "MICROWAVE DISH MOUNT DETAIL (C-3)". If the microwave dish mount is not installed as specified, this evaluation should be considered invalid. The proposed mounting system will be capable of supporting the proposed equipment, under the assumptions described in Section 4 of the report and the following conditions:

- Contractor shall be responsible for the means and methods of construction.
- Contractor shall inspect the condition of all existing and proposed structural members, all relevant members and connections and report any deficiencies to the engineer prior to installation of any new antennas and other equipment.

The scope of this evaluation pertains only to the proposed antenna mounting system and does not include examination of the loads imparted by the antenna mounting system to the existing tower and its structural components. This document was prepared based on information provided to Black & Veatch. If existing conditions do not reflect those represented, this analysis is no longer valid.

Please contact Josh Riley in our Overland Park Office at 913-458-2522 if you have any questions or comments.

Sincerely,
Black & Veatch Corporation

Prepared By: Joohwan Jung
Submitted By: Josh Riley, P.E.

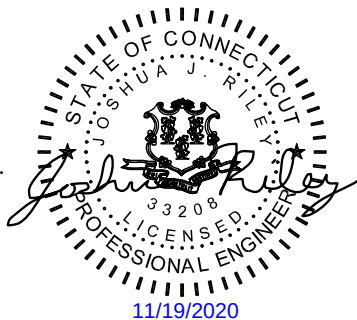




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2. ANALYSIS CRITERIA SUMMARY
3. REFERENCES
4. ASSUMPTIONS
5. RESULTS SUMMARY

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APPENDIX 2: RISA PRINTOUTS

APPENDIX 3: ATTACHMENTS



BLACK & VEATCH

November 18, 2020

STONINGTON

1. LOADING SUMMARY

Appurtenance								
Carrier	Position	Sector	Antenna RAD Center (ft)	Mount Centerline (ft)	Qty	Type	Manufacturer	Model
Eversource	1	-	155	155	1	Dish	RFS	PAD6-W59BC



2. ANALYSIS CRITERIA SUMMARY

ANALYSIS CRITERIA	
STANDARD	TIA-222-H
WIND SPEED	Ultimate of 140 mph
WIND SPEED WITH ICE	50 mph with 1.5" radial ice thickness
EXPOSURE CATEGORY	C
RISK CATEGORY	III
TOPO CATEGORY	Flat
CREST HEIGHT	N/A
SPECTRAL RESPONSE FACTORS, S_s & S_1	0.159 g & 0.058 g

3. REFERENCES

- American Institute of Steel Construction, AISC 15th Edition
- Telecommunications Industry Association Standard, TIA-222-H & 2018 Connecticut State Building Code
- Assembly Drawing (Model: FMA2) by SitePro 1, dated 10/12/2010
- Assembly Drawing (Model: UQB4) by SitePro 1, dated 09/20/2010

4. ASSUMPTIONS

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

- The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
- The configuration of antennas, mounts, and other appurtenances are as specified in the Loading Summary and the referenced drawings.
- 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.
- Sector frame center line: located equidistant between top & bottom boom; Platform center line: located at the base perimeter of platform, unless otherwise specified.
- Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM 500 (GR B-46)
Pipe	ASTM A53 (GR B-35)
Connection Bolts	ASTM A325



BLACK & VEATCH

November 18, 2020

STONINGTON

5. RESULTS SUMMARY

Name	Bending Stress Ratio		Shear Stress Ratio	
Stand off pipe: Pipe 4.0 Std	7.8%	Pass	10.8%	Pass
Stiff Arm: Pipe 2.0 Std	4.7%	Pass	0.4%	Pass

*Von Mises SR = (Max Von Mises Value From RISA-3D)/(0.9*Fy)

**Capacity rating per TIA-222-H Section 15.5.



BLACK & VEATCH

November 18, 2020

STONINGTON

**APPENDIX 1:
MOUNT ANALYSIS REPORT**



BLACK & VEATCH

Client: Eversource

Site Name: STONINGTON (ES-026)

Computed By: Joohwan Jung

Date: 11/18/2020

Verified By: JW

Title: MOUNT ANALYSIS REPORT

Date: 11/18/2020

Dead and Live Loads

Maintenance Live Load: $L_V = 250$ lb

Installation Live Load: $L_M = 0$ lb

Appurtenance Dead Loads	
Name	Weight (lb)
PAD6-W59BC	141



BLACK & VEATCH

Client: Eversource
Site Name: STONINGTON (ES-026)

Computed By: Joohwan Jung

Date: 11/18/2020

Verified By: JW

Title: MOUNT ANALYSIS REPORT

Date: 11/18/2020

Member Wind Loading

Exposure Category = C
Risk Category = III
Topographic Category = 1
Basic Wind Speed, V = 140 mph
Height Above Ground, z = 155 ft
Crest Height, H = N/A ft
Velocity Pressure Coefficient, K_z = 1.39
Topographic Factor, K_{zt} = 1.00
Wind Directionality Factor, K_d = 0.95
Shielding Factor, K_s = 0.90
Ground Elevation Factor, K_e = 0.995
Wind Velocity Pressure, q_z = 65.83 psf
Gust Effect Factor, G_h = 1.00

Equations

$$K_z = 2.01 (z / z_g)^{2/\alpha}$$

$$K_h = e^{(f \cdot z / H)}$$

$$K_{zt} = [1 + K_c K_t / K_h]^2$$

$$K_e = e^{-0.00053 z^{0.25}}$$

$$q_z = 0.00256 K_z K_{zt} K_e K_d V^2$$

$$F_A = q_z G_h (EPA)$$

$$F_M = q_z G_h C_f D_p$$

TIA-222-H

2.6.5.2

2.6.6.2.1

2.6.6.2.1

2.6.8

2.6.11.6

2.6.11.2

2.6.11.2

Member Wind Loads

Name	Depth (ft)	Width (ft)	C_f	D_p (ft)	F_M (lb)
Stand off pipe: Pipe 4.0 Std	0.38		1.2	0.38	29.62
Stiff Arm: Pipe 2.0 Std	0.20		1.2	0.20	15.63



BLACK & VEATCH

Client: Eversource
Site Name: STONINGTON (ES-026)

Title: MOUNT ANALYSIS REPORT

Computed By: Joohwan Jung

Date: 11/18/2020

Verified By: JW

Date: 11/18/2020

Appurtenance Ice Dead Loading

Exposure Category = C
Risk Category = III
Topographic Category = 1
Height Above Ground, z = 155 ft
Crest Height, H = N/A ft
Design Ice Thickness, T_i = 1.50 in
Importance Factor, I = 1.15
Topographic Factor, K_{zt} = 1.00
Height Escalation Factor, K_{iz} = 1.17
Factored Ice Thickness, T_{iz} = 2.01 in
Grating Ice Dead Load, D_{Gice} = 9.40 psf

Equations

$$K_h = e^{(f \cdot z / H)}$$

$$K_{zt} = [1 + K_c K_t / K_h]^2$$

$$K_{iz} = (z/33)^{0.10}$$

$$T_{iz} = T_i I K_{iz} (K_{zt})^{0.30}$$

$$DL_{ice} = [(H_{ice} \cdot D_{ice} \cdot W_{ice}) - (H \cdot W \cdot D)] \cdot 56 \text{pcf}$$

TIA-222-H

2.6.6.2.1

2.6.6.2.1

2.6.10

2.6.10

Appurtenance Ice Dead Loads

Name	Height w/ ice (ft)	Width w/ice (ft)	Depth w/ ice (ft)	V_{ice} (ft ³)	DL_{ice} (lb)
PAD6-W59BC	6.92	6.92	1.53	21.47	1202.07

**BLACK & VEATCH**

Client: Eversource

Site Name: STONINGTON (ES-026)

Computed By: Joohwan Jung

Date: 11/18/2020

Verified By: JW

Title: MOUNT ANALYSIS REPORT

Date: 11/18/2020

Member Ice Dead Loading

Exposure Category = C
 Risk Category = III
 Topographic Category = 1
 Height Above Ground, z = 155 ft
 Crest Height, H = N/A ft
 Design Ice Thickness, T_i = 1.50 in
 Importance Factor, I = 1.15
 Topographic Factor, K_{zt} = 1.00
 Height Escalation Factor, K_{iz} = 1.17
 Factored Ice Thickness, T_{iz} = 2.01 in
 Grating Ice Dead Load, D_{Gice} = 9.40 psf

Equations

$$K_h = e^{(f \cdot z / H)}$$

$$K_{zt} = [1 + K_c K_t / K_h]^2$$

$$K_{iz} = (z/33)^{0.10}$$

$$T_{iz} = T_i I K_{iz} (K_{zt})^{0.35}$$

$$A_{iz} = \pi T_{iz} (D_c + T_{iz})$$

$$DL_{ice} = A_{iz} \cdot 56 \text{ pcf}$$

TIA-222-H

2.6.6.2.1

2.6.6.2.1

2.6.10

2.6.10

2.6.10

Member Ice Dead Loads

Name	Depth w/ ice (ft)	Width w/ ice (ft)	Dc (ft)	A _{iz} (ft ²)	DL _{ice} (lb/ft)
Stand off pipe: Pipe 4.0 Std	0.71		0.38	0.29	16.02
Stiff Arm: Pipe 2.0 Std	0.53		0.20	0.19	10.80



Computed By: Joohwan Jung

Date: 11/18/2020

Title: MOUNT ANALYSIS REPORT

Date: 11/18/2020

TIA-222-H

$$K_z = 2.01 (z / z_g)^{2/\alpha}$$

2.6.5.2

$$K_h = e^{(f \cdot z / H)}$$

2.6.6.2.1

$$K_{zt} = [1 + K_c K_t / K_h]^2$$

2.6.6.2.1

$$K_e = e^{-0.000032 \cdot 25}$$

2.6.8

$$q_z = 0.00256 K_z K_{zt} K_e K_d V^2$$

2.6.11.6

$$F_{A(\text{ice})} = q_{z(\text{ice})} G_h(\text{EPA})_{A(\text{ice})}$$

2.6.11.2

$$F_{M(\text{ice})} = q_{z(\text{ice})} G_h C_f D_{p(\text{ice})}$$

2.6.11.2

Wind Loads

Page 10 of 10

w/ Ice (ft)	C ₃	EPA F ₃
-------------	----------------	--------------------

T2	F_A (lb)
----	------------

--	--

[illegible]



Client: Eversource
 Site Name: STONINGTON (ES-026)

Computed By: Joohwan Jung

Date: 11/18/2020

Verified By: JW

BLACK & VEATCH

Title: MOUNT ANALYSIS REPORT

Date: 11/18/2020

Member Ice Wind Loading

Exposure Category = C
 Risk Category = III
 Topographic Category = 1
 Ice Wind Speed, V_{ice} = 50 mph
 Height Above Ground, z = 155 ft
 Crest Height, H = N/A ft
 Velocity Pressure Coefficient, K_z = 1.39 psf
 Topographic Factor, K_{zt} = 1.00
 Wind Directionality Factor, K_d = 0.95
 Shielding Factor, K_a = 0.90
 Ground Elevation Factor, K_e = 0.995
 Ice Wind Velocity Pressure, $q_{z(ice)}$ = 8.397
 Factored Ice Thickness, T_{iz} = 2.01 in
 Gust Effect Factor, G_h = 1

Equations

$$K_z = 2.01 (z / z_g)^{2/\alpha}$$

$$K_h = e^{(f \cdot z / H)}$$

$$K_{zt} = [1 + K_c K_t / K_h]^2$$

$$K_e = e^{-0.000032 \cdot z}$$

$$q_z = 0.00256 K_z K_{zt} K_e K_d V^2$$

$$F_{A(ice)} = q_{z(ice)} G_h (EPA)_{A(ice)}$$

$$F_{M(ice)} = q_{z(ice)} G_h C_f D_{p(ice)}$$

TIA-222-H

2.6.5.2

2.6.6.2.1

2.6.6.2.1

2.6.8

2.6.11.6

2.6.11.2

2.6.11.2

Member Ice Wind Loads

Name	Depth w/ Ice (ft)	Width w/ Ice (ft)	C_f	$D_{p(ice)}$ (ft)	$F_{M(ice)}$ (lb/ft)
Stand off pipe: Pipe 4.0 Std	0.71		1.2	0.71	7.16
Stiff Arm: Pipe 2.0 Std	0.53		1.2	0.53	5.38

**BLACK & VEATCH**

Client: Eversource
 Site Name: STONINGTON (ES-026)

Computed By: Joohwan Jung

Date: 11/18/2020

Verified By: JW

Title: MOUNT ANALYSIS REPORT

Date: 11/18/2020

Seismic Loading**Equations**

TIA-222-H

Site Class = D
 Spectral Response, S_s = 0.159 g
 Max Spectral Response, S_1 = 0.058 g
 Accel. Site Coefficient, F_a = 1.60
 Vel. Site Coefficient, F_v = 2.40
 Design Spec. Response (1 sec), S_{D1} = 0.093
 Design Spec. Response, S_{D5} = 0.170
 Importance Factor, I = 1.25
 Seismic Response Coefficient, C_s = 0.106
 Amplification Factor, A_s = 3

$S_{D1} = 2/3 F_v S_1$
 $S_{D5} = 2/3 F_a S_s \geq S_{D1}$
 $C_s = 1/2 S_{D5} I \geq 0.03$
 $E_H = A_s C_s W$
 $E_V = A_s 0.2 S_{D5} W$

2.7.5

2.7.5

2.7.7.1.1

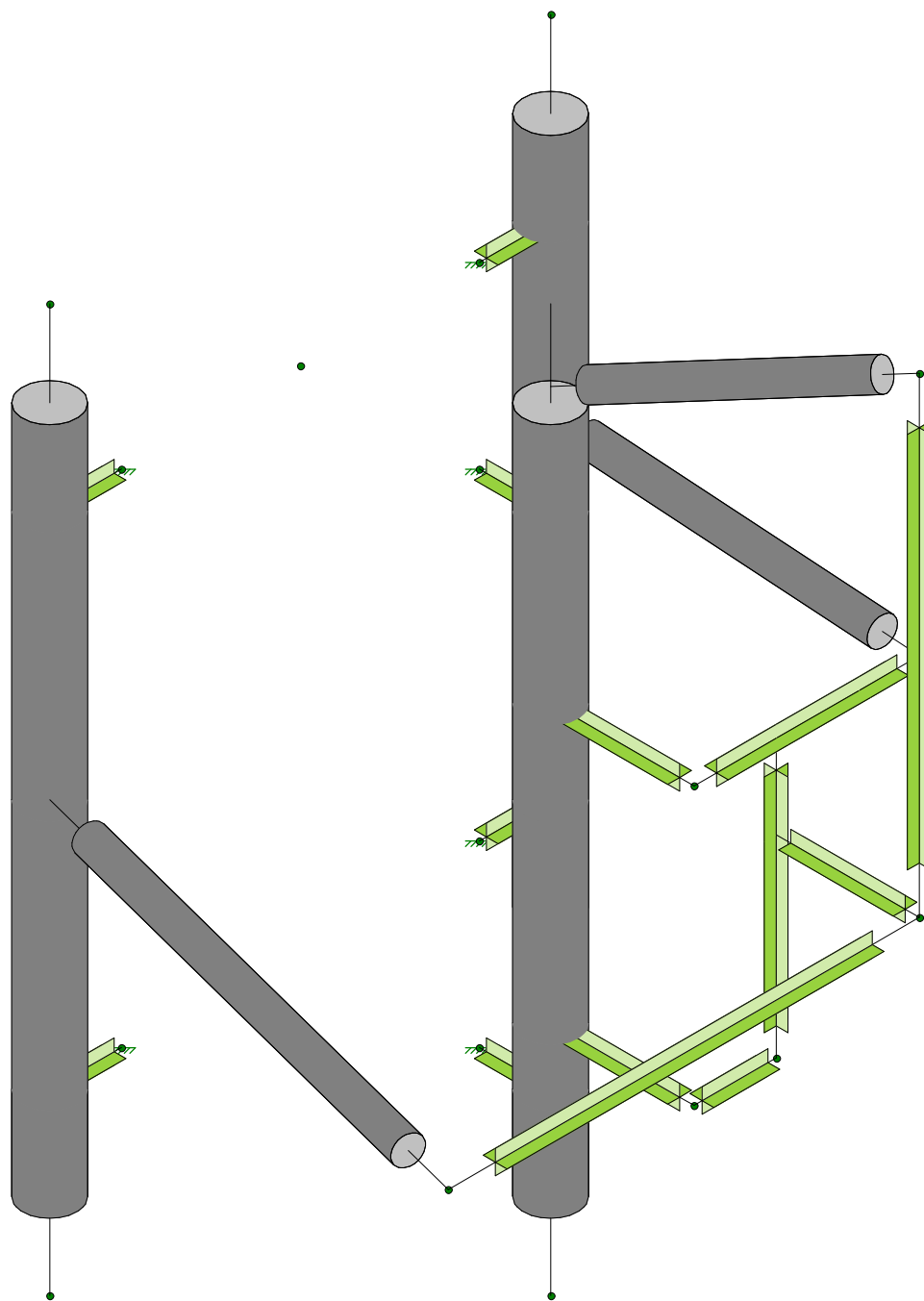
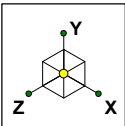
2.7.7

2.7.6

Appurtenance Seismic Loads

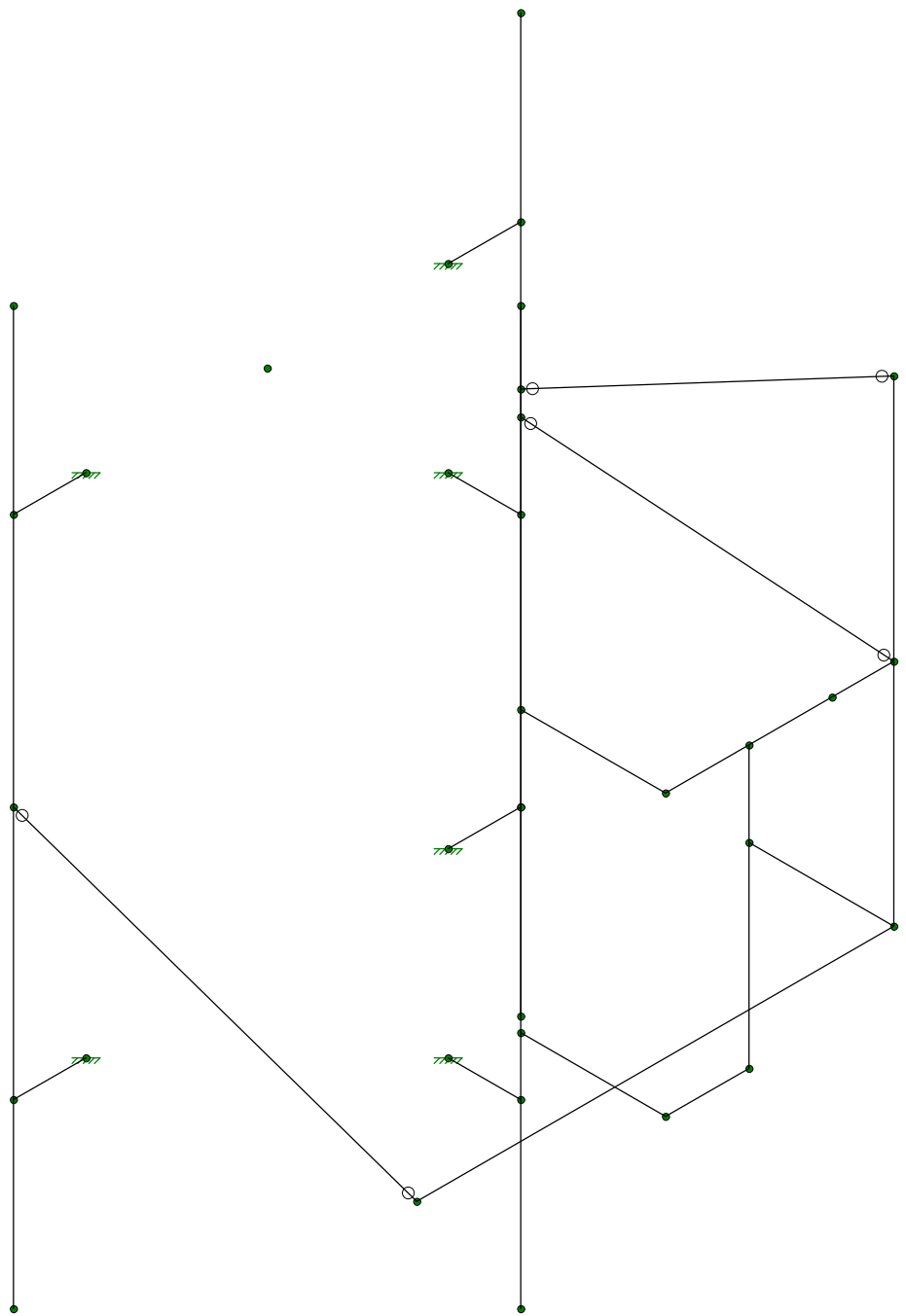
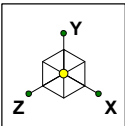
Name	Weight (lb)	E_H (lb)	E_V (lb)
PAD6-W59BC	141	44.84	14.35

**APPENDIX 2:
RISA PRINTOUTS**



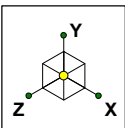
Envelope Only Solution

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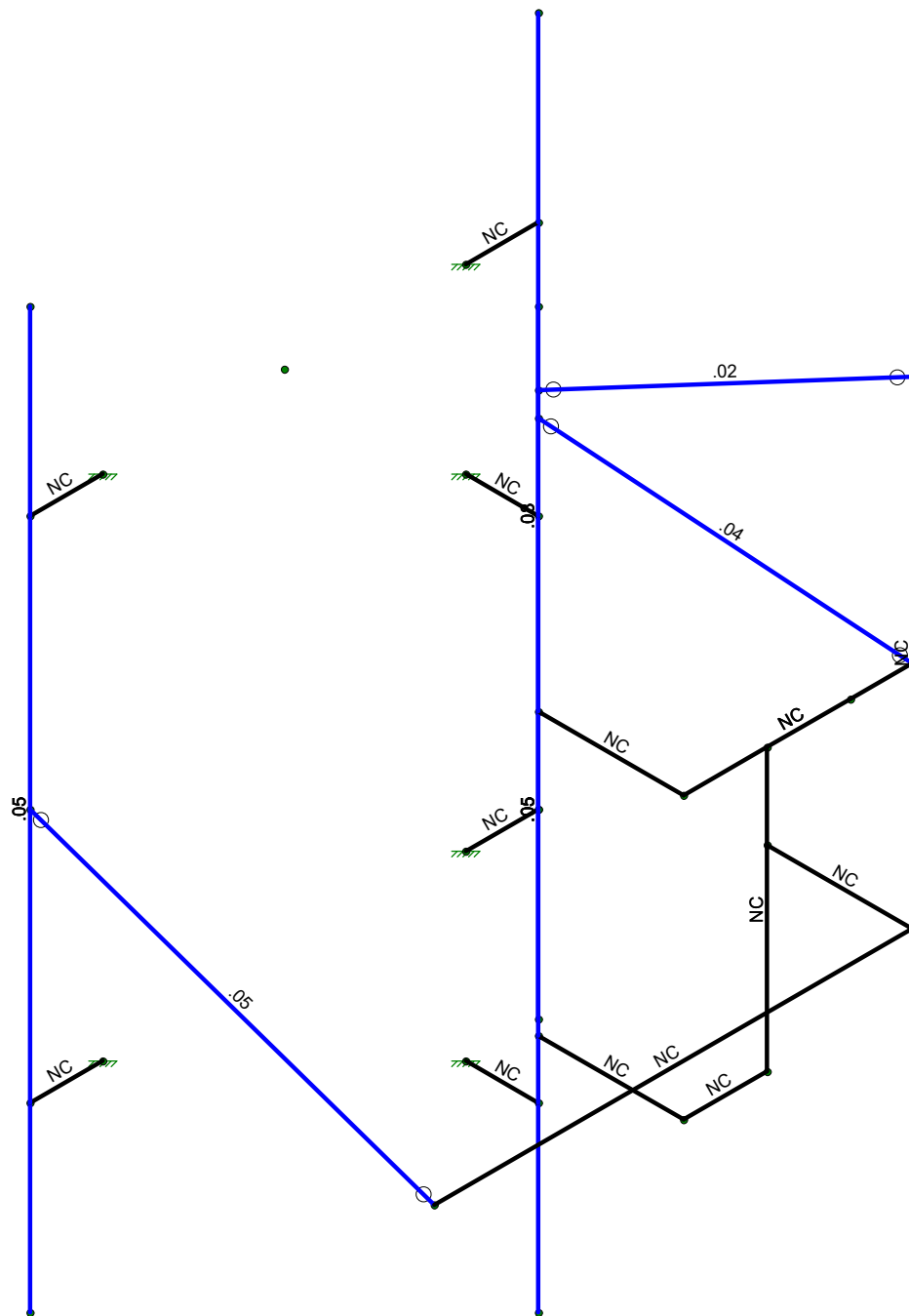


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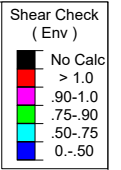


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	.75-.90
	.50-.75
	0-.50

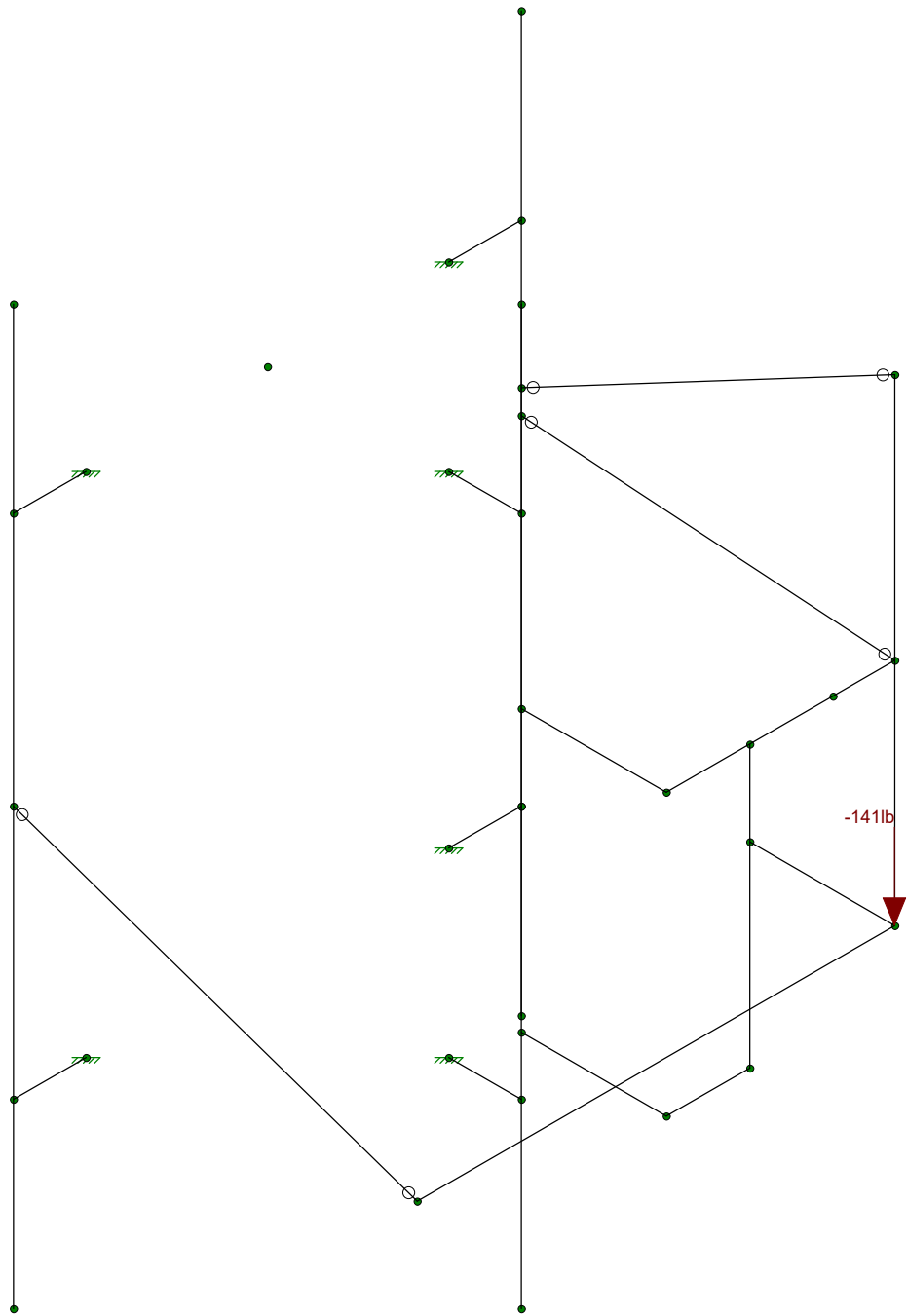
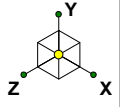


Member Code Checks Displayed (Enveloped)
Envelope Only Solution

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Black & Veatch	STONINGTON IFR Risa Model_Dish	SK - 4
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405025.2021.2200		STONINGTON IFR Risa Model_Di...



Loads: BLC 1, DL
Envelope Only Solution

Black & Veatch

Joohwan Jung

405025.2021.2200

STONINGTON IFR Risa Model_Dish

SK - 5

Nov 18, 2020 at 12:51 PM

STONINGTON IFR Risa Model_Di...

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (in/sec^2)	386.4
Wall Mesh Size (in)	24
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 15th(360-16): LRFD
Adjust Stiffness?	Yes(Iterative)
RISACONNECTION CODE	None
Cold Formed Steel Code	None
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building
Stainless Steel Code	None

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

(Global) Model Settings, Continued

Seismic Code	ASCE 7-16
Seismic Base Elevation (in)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Stand off pipe	PIPE 4.0	Column	Pipe	A53 Gr.B	Typical	2.96	6.82	6.82	13.6
2	Stiff Arm	PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25

General Material Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E5 F)	Density[k/ft^3]
1	gen Conc3NW	3155	1372	.15	.6	.145
2	gen_Conc4NW	3644	1584	.15	.6	.145
3	gen_Conc3LW	2085	906	.15	.6	.11
4	gen_Conc4LW	2408	1047	.15	.6	.11
5	gen Alum	10100	4077	.3	1.29	.173
6	gen Steel	29000	11154	.3	.65	.49
7	gen Plywood	1800	38	0	.3	.035
8	RIGID	1e+6		.3	0	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	N7	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N9	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N21						
4	N22	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
5	N24	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

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]
6	N28	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
7	N30	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	N5			RIGID	None	None	RIGID	Typical
2	M2	N3	N4			RIGID	None	None	RIGID	Typical
3	M3	N4	N6			RIGID	None	None	RIGID	Typical
4	M4	N7	N8			RIGID	None	None	RIGID	Typical
5	M5	N9	N10			RIGID	None	None	RIGID	Typical
6	M6	N11	N12			Stand off pipe	Column	Pipe	A53 Gr.B	Typical
7	M7	N14	N15			RIGID	None	None	RIGID	Typical
8	M8	N15	N19			RIGID	None	None	RIGID	Typical
9	M9	N4	N18			RIGID	None	None	RIGID	Typical
10	M10	N5	N16			RIGID	None	None	RIGID	Typical
11	M11	N16	N17			RIGID	None	None	RIGID	Typical
12	M12	N18	N35			Stiff Arm	Beam	Pipe	A53 Gr.B	Typical
13	M13	N6	N20			Stiff Arm	Beam	Pipe	A53 Gr.B	Typical
14	M14	N19	N34			Stiff Arm	Beam	Pipe	A53 Gr.B	Typical
15	M15	N22	N23			RIGID	None	None	RIGID	Typical
16	M16	N24	N25			RIGID	None	None	RIGID	Typical
17	M17	N26	N27			Stand off pipe	Column	Pipe	A53 Gr.B	Typical
18	M18	N28	N29			RIGID	None	None	RIGID	Typical
19	M19	N30	N31			RIGID	None	None	RIGID	Typical
20	M20	N32	N33			Stand off pipe	Column	Pipe	A53 Gr.B	Typical

Member Advanced Data

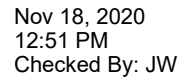
	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
1	M1						Yes	** NA **			None
2	M2						Yes	** NA **			None
3	M3						Yes	** NA **			None
4	M4						Yes	** NA **			None
5	M5						Yes	** NA **			None
6	M6						Yes	** NA **			None
7	M7						Yes	** NA **			None
8	M8						Yes	** NA **			None
9	M9						Yes	** NA **			None
10	M10						Yes	** NA **			None
11	M11						Yes	** NA **			None
12	M12	BenPIN	BenPIN				Yes				None
13	M13	BenPIN	BenPIN				Yes	Default			None
14	M14	BenPIN	BenPIN				Yes	Default			None
15	M15						Yes	** NA **			None
16	M16						Yes	** NA **			None
17	M17						Yes	** NA **			None
18	M18						Yes	** NA **			None
19	M19						Yes	** NA **			None
20	M20						Yes	** NA **			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
1	M6	Stand off pipe	72			Lbyy						Lateral
2	M12	Stiff Arm	46.471			Lbyy						Lateral
3	M13	Stiff Arm	26.718			Lbyy						Lateral
4	M14	Stiff Arm	33.067			Lbyy						Lateral
5	M17	Stand off pipe	72			Lbyy						Lateral
6	M20	Stand off pipe	72			Lbyy						Lateral

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed Area(Me...	Surface(...
1	DL	DL		-1		2			
2	Maintenance LL - LV	LL				1			
3	Installation LL - LM	LL				1			
4	Wind - 0 Deg (X)	WL				2		6	
5	Wind - 30 Deg (X)	WL				2		6	
6	Wind - 60 Deg (X)	WL				2		6	
7	Wind - 90 Deg (X)	WL				2		6	
8	Wind - 120 Deg (X)	WL				2		6	
9	Wind - 150 Deg (X)	WL				2		6	
10	Wind - 180 Deg (X)	WL				2		6	
11	Wind - 210 Deg (X)	WL				2		6	
12	Wind - 240 Deg (X)	WL				2		6	
13	Wind - 270 Deg (X)	WL				2		6	
14	Wind - 300 Deg (X)	WL				2		6	
15	Wind - 330 Deg (X)	WL				2		6	
16	Wind - 0 Deg (Z)	WL				2		6	
17	Wind - 30 Deg (Z)	WL				2		6	
18	Wind - 60 Deg (Z)	WL				2		6	
19	Wind - 90 Deg (Z)	WL				2		6	
20	Wind - 120 Deg (Z)	WL				2		6	
21	Wind - 150 Deg (Z)	WL				2		6	
22	Wind - 180 Deg (Z)	WL				2		6	
23	Wind - 210 Deg (Z)	WL				2		6	
24	Wind - 240 Deg (Z)	WL				2		6	
25	Wind - 270 Deg (Z)	WL				2		6	
26	Wind - 300 Deg (Z)	WL				2		6	
27	Wind - 330 Deg (Z)	WL				2		6	
28	Ice DL	DL				2		6	
29	Ice Wind - 0 Deg (X)	WL				2		6	
30	Ice Wind - 30 Deg (X)	WL				2		6	
31	Ice Wind - 60 Deg (X)	WL				2		6	
32	Ice Wind - 90 Deg (X)	WL				2		6	
33	Ice Wind - 120 Deg (X)	WL				2		6	
34	Ice Wind - 150 Deg (X)	WL				2		6	
35	Ice Wind - 180 Deg (X)	WL				2		6	
36	Ice Wind - 210 Deg (X)	WL				2		6	
37	Ice Wind - 240 Deg (X)	WL				2		6	
38	Ice Wind - 270 Deg (X)	WL				2		6	
39	Ice Wind - 300 Deg (X)	WL				2		6	
40	Ice Wind - 330 Deg (X)	WL				2		6	
41	Ice Wind - 0 Deg (Z)	WL				2		6	
42	Ice Wind - 30 Deg (Z)	WL				2		6	
43	Ice Wind - 60 Deg (Z)	WL				2		6	
44	Ice Wind - 90 Deg (Z)	WL				2		6	
45	Ice Wind - 120 Deg (Z)	WL				2		6	
46	Ice Wind - 150 Deg (Z)	WL				2		6	

Page 5

Load Combinations (Continued)

	Description	S...	PDe...	SRSS	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...
44																			
45	SEISMIC LOAD COMBOS																		
46	1.2DL + Ev (Y) + Eh (X)	Y...	Y		1	1.2	55	1	53	1									
47	1.2DL - Ev (Y) + Eh (X)	Y...	Y		1	1.2	55	-1	53	1									
48	1.2DL + Ev (Y) - Eh (X)	Y...	Y		1	1.2	55	1	53	-1									
49	1.2DL - Ev (Y) - Eh (X)	Y...	Y		1	1.2	55	-1	53	-1									
50	1.2DL + Ev (Y) + Eh (Z)	Y...	Y		1	1.2	55	1	54	1									
51	1.2DL - Ev (Y) + Eh (Z)	Y...	Y		1	1.2	55	-1	54	1									
52	1.2DL + Ev (Y) - Eh (Z)	Y...	Y		1	1.2	55	1	54	-1									
53	1.2DL - Ev (Y) - Eh (Z)	Y...	Y		1	1.2	55	-1	54	-1									
54																			

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N7	max	1605.231	2	1293.89	37	885.728	5	281.867	5	1142.685	11	605.989	37
2		min	-1108.762	8	62.108	13	-924.857	11	-288.795	11	-1096.342	5	-323.29	2
3	N9	max	1047.644	2	365.574	43	1008.134	5	383.627	11	714.952	11	306.099	33
4		min	-1087.361	7	-58.62	6	-961.694	11	-347.095	5	-728.98	5	-84.637	11
5	N22	max	607.574	11	98.809	39	59.612	10	96.94	11	303.787	11	529.001	5
6		min	-604.517	5	36.876	51	-86.99	13	-136.325	5	-302.259	5	-531.672	11
7	N24	max	607.814	11	98.809	39	58.91	10	95.551	5	303.907	11	531.793	11
8		min	-604.775	5	36.876	51	-87.192	13	-136.743	11	-302.387	5	-529.13	5
9	N28	max	342.287	5	91.194	36	115.536	5	53.317	5	229.65	10	423.454	10
10		min	-459.3	10	34.936	53	-118.02	11	-18.136	10	-171.144	5	-346.439	5
11	N30	max	956.397	5	98.069	36	166.202	5	86.587	10	601.853	10	663.69	5
12		min	-1203.705	10	36.686	53	-173.094	11	-40.147	5	-478.198	5	-808.01	10
13	Totals:	max	3498.858	2	2009.69	43	2072.098	5						
14		min	-2947.378	8	387.723	53	-2072.098	11						

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

	Member	Shape	Code Check	Loc[in]	LC	Shear...	Loc[...]	Dir	LC	phi*Pn...	phi*Pnt...	phi*Mn...	phi*Mn...Cb	Eqn
1	M6	PIPE 4.0	.048	15	5	.108	57		10	83097...	93240	10631...	10631...	3...H1-1b
2	M12	PIPE 2.0	.047	0	11	.004	46.4...		5	26842...	32130	1871.6...	1871.6...	1...H1-1b*
3	M13	PIPE 2.0	.015	26.718	13	.003	0		10	30275...	32130	1871.6...	1871.6...	1...H1-1b*
4	M14	PIPE 2.0	.044	33.067	5	.004	0		5	29334...	32130	1871.6...	1871.6...	1...H1-1b*
5	M17	PIPE 4.0	.051	36	11	.022	36		11	83097...	93240	10631...	10631...	1...H1-1b
6	M20	PIPE 4.0	.078	15	10	.043	15		10	83097...	93240	10631...	10631...	1...H1-1b

**APPENDIX 3:
ATTACHMENTS**

TrunkLine Antenna, Standard (FCC 101, Cat A) , Single Polarized, 6 ft

RFS Microwave Antennas are designed for microwave systems in all common frequency ranges from 4 GHz to 24 GHz. This allows the use of antennas in areas where extreme wind conditions are normal. The antennas utilise a conventional feed system and are available in three performance classes offering complete flexibility when designing a network. Standard Performance antennas are economical solutions for systems where side lobe suppression is of less importance. These antennas are required for use in networks where there is a low interference potential. Antennas are available in 2 ft (0.6m) to 12 ft (3.7m) diameters. Antennas from 4ft up to 12 ft (3.7m) can be equipped with a moulded radome to reduce wind load and to protect the feed against the accumulation of ice and snow.



Antenna

FEATURES / BENEFITS

- ➔ Field-proven reliability and long life
- ➔ Withstanding winds up to 200 km/h (125 mph), an optional sway bar is available for added assurance in case mistakes are made during installation
- ➔ A single-piece configuration and compact packaging to reduce transportation costs
- ➔ Frequencies ranging from 4 GHz to 15 GHz with support for two wideband frequency ranges (5.725-6.875 and 7.125-8.5 GHz) to reduce antenna requirements and simplify logistics

Technical Features

GENERAL SPECIFICATIONS

Product Type		Point to point antennas
Profile		TrunkLine
Performance		Improved Performance
Polarization		Single
Antenna Input		CPR137G
Reflector		1-part
Radome		Optional
Antenna color		White RAL 9010
Swaybar		1: (2.0 m x Ø60 mm)

ELECTRICAL SPECIFICATIONS

Frequency	GHz	5.925 - 6.875
3dB beamwidth	degrees	1.7
Low Band Gain	dBi	38.4
Mid Band Gain	dBi	39.1
High Band Gain	dBi	39.7
F/B Ratio	dB	55.0
XPD	dB	30.0
Max VSWR / R L	VSWR / dB	1.08 (28.3)
Regulatory Compliance		FCC Category A

MECHANICAL SPECIFICATIONS

Diameter	ft (m)	6 (1.8)
Elevation Adjustment	degrees	± 5
Azimuth Adjustment	degrees	± 5
Polarization Adjustment	degrees	± 5
Mounting Pipe Diameter minimum	mm (in)	114 (4.5)
Mounting Pipe Diameter maximum	mm (in)	114 (4.5)
Approximate Weight	kg (lb)	65 (141)
Survival Windspeed	km/h (mph)	200 (125)
Operational Windspeed	km/h (mph)	190 (118)

STRUCTURE

Radome Material		Fiberglass
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FURTHER ACCESSORIES

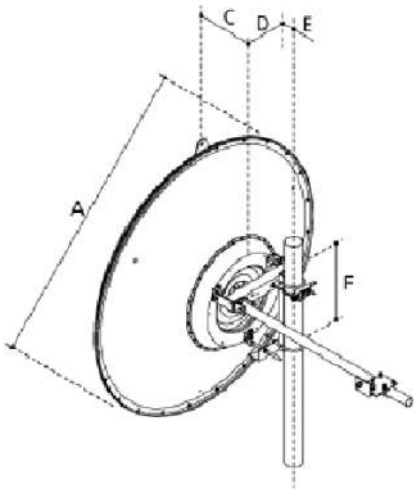
optional Swaybar		1: SMA-SK-60-2000A (2.0 m x Ø60mm)
Further Accessories		SMA-SKO-UNIVERSAL-L : Universal sway bar fixation kit



TrunkLine Antenna, Standard (FCC 101, Cat A) , Single Polarized, 6 ft

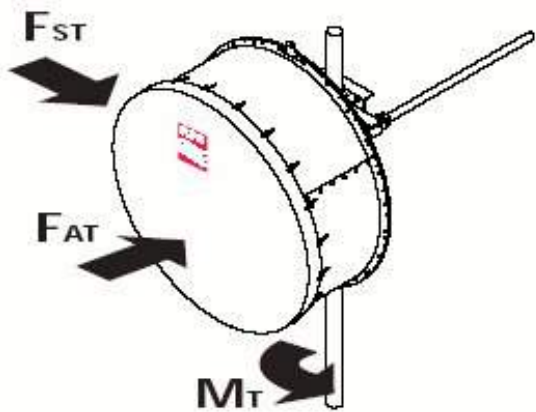
Mount Outline

Dimension A	mm (in)	2000 (79)
Dimension C	mm (in)	364 (14.3)
Dimension D for 114mm (4.5in) Pipe	mm (in)	175 (6.9)
Dimension E	mm (in)	283 (11.1)
Dimension F	mm (in)	590 (23.2)



Wind Load

FST Side force max. @ survival wind speed	N (lb)	2910 (651)
FAT Axial force max. @ survival wind speed	N (lb)	9900 (2217)
MT Torque maximum @ survival wind speed	Nm (lb ft)	3055 (2270)



External Document Links

- Complete Antenna installation
- RPE (IQ-Link format)
- RPE (PDF format)
- RPE (Pathloss format)

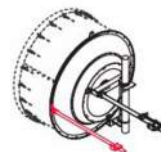
Only available in North America

Notes

Perimeter Sway Bar for Parabolic Antennas 6ft

The perimeter sway bar reduces vibration of the reflector and increases stability of the antenna in worst case conditions.

If the perimeter sway bar is installed on a SU6/SUX6/UXA6 "high wind duty" antenna (survival windspeed = 155 mph or 252 km/h), then the operational wind speed of this antenna is increased up to 155 mph (252 km/h).



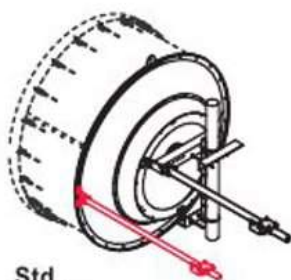
Technical Features

MECHANICAL PROPERTIES

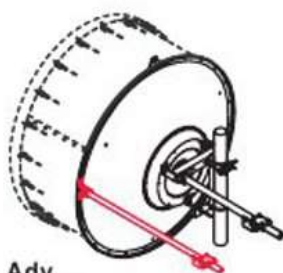
Diameter	m (ft)	1.8 (6)
Weight	kg (lb)	16 (35.3)
Sway bar length	m (ft)	1.9 (6.23)
Sway bar diameter	mm (in)	60 (2.4)

STRUCTURE

Product Type	Reinforcement Hardware
Kit Type	Perimeter Sway Bar
Material	Hot-dip galvanised steel



Std.
Backring



Adv.
Backring

External Document Links

Sway bar installation kit

Notes

The perimeter sway bar includes only the red marked parts and fixing hardware.

Only applicable for antennas PAD, PADX, DA, DAX, SU, SUX, UA, UDA, UXA antennas in 6ft.

Diameter of the sway bar: 60 mm (2.4 in)

Length of the sway bar: 1900 mm (74.8 in)

Addendum



NMT 758-00(e)

Sway Bar / Tower Connecting Kit (SMA-SKO-UNIVERSAL-L) 6-8-10-12-15 ft antennas

The sway bar / tower connecting kit allows the attachment of the sway bar extremity on tower with pipe or L-section structure profiles:

- Tower pipe compatibility: Ø 60 up to **114 mm**
- Tower L-section compatibility: L 60x60 up to L 110x110 mm
- Sway bar compatibility: FS sway bar models (Ø 60 mm)
- Antenna compatibility: from 6Ft to 15Ft

Notes:

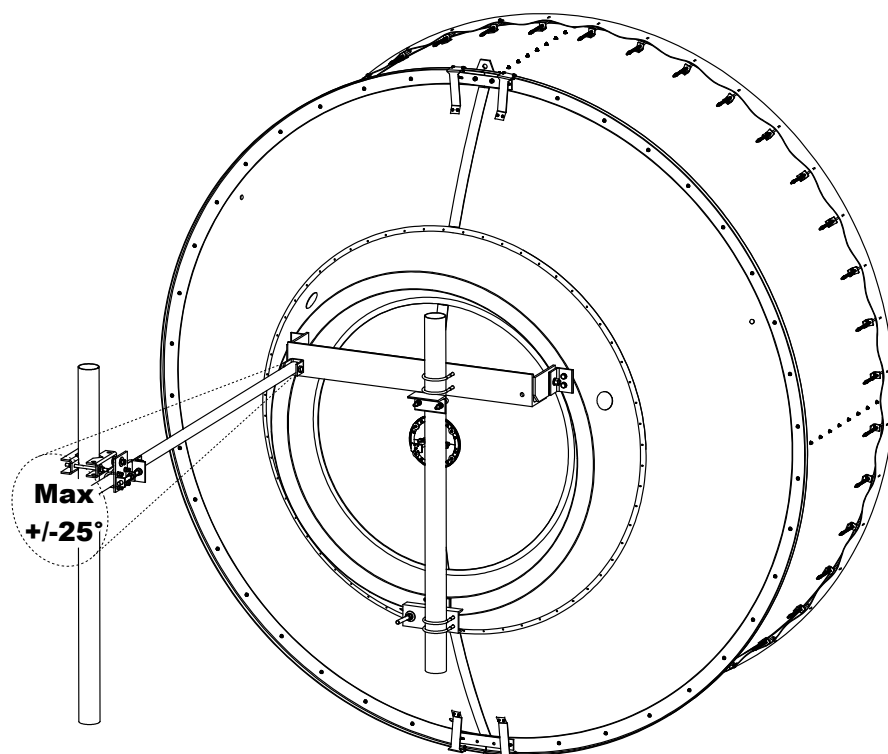
For 6 ft antennas, fine azimuth and elevation adjustments have to be done before the sway bar attachment to the sway bar / tower connecting kit.

For 8, 10 and 12 ft antennas, as the fine azimuth adjustment system is integrated on the sway bar extremity, you must adjust fine elevation before sway bar attachment.

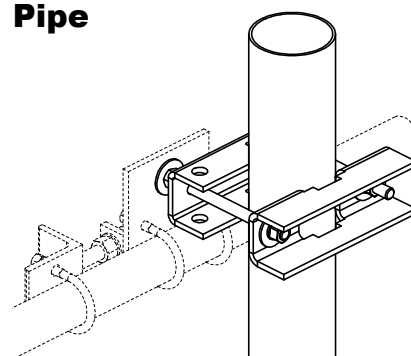


These installation instructions have been written for qualified, skilled personnel. The antenna shall be inspected once per year by qualified personnel to verify proper installation, maintenance, and condition of equipment. It is important to adhere precisely to all parts of the installation instructions. RFS disclaim any responsibility resulting from improper or unsafe installation. RFS reserves the right to alter details at any time, especially with respect to technical improvements.

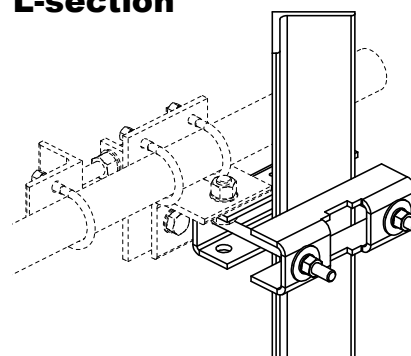
Sway bar kit installation overview (12ft antenna)



OPTION 1 Pipe



OPTION 2 L-section



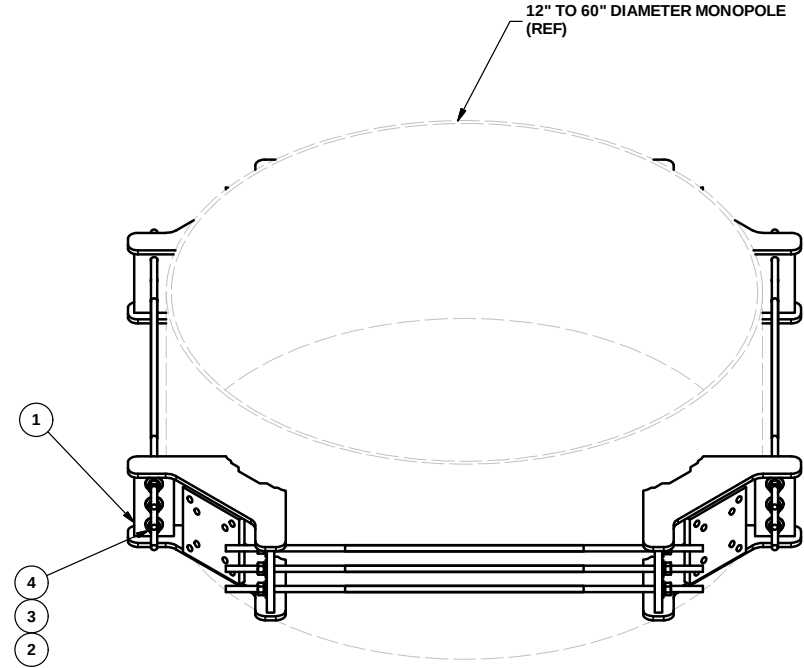
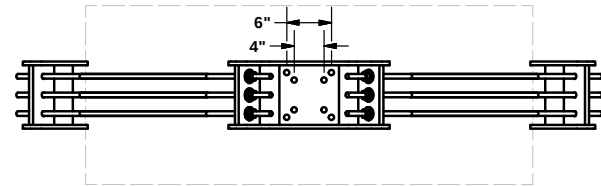
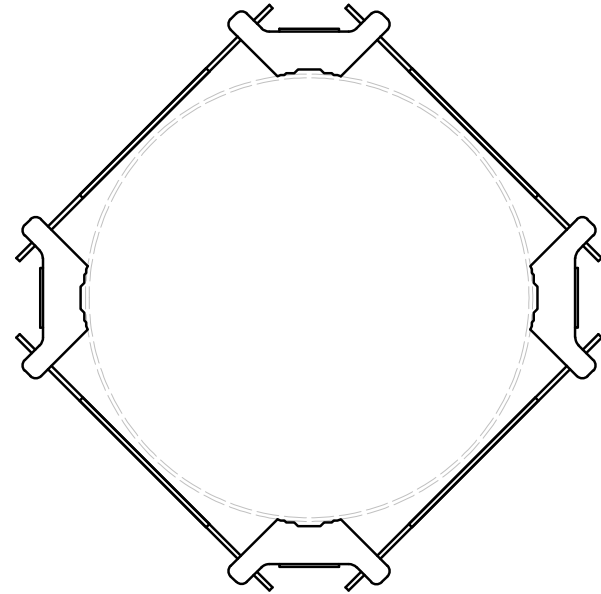
Kit supplies

Description	Qty	Description	Qty
Clamp 1 Univ. Sway-bar Kit 6-15	1	Assembly grease	1
Clamp 2 Univ. Sway-bar Kit 6-15	1		
Equipped threaded rod 1 M16/250	1		
Equipped threaded rod 1 M16/250	1		
Strut Univ. Sway-bar Kit 6-15	1		

Tools and equipment required for installation

- Torque wrench 140 to 240 Nm with hex open/ring ends adapters M16(24), M20(30)
- Combination wrenches for hexagon bolts M16 (24), M20 (30)

() opening of spanner



PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	4	X-UQB4	QUAD BRACKET WELDMENT		61.57	246.27
2	24	G58FW	5/8" HDG USS FLATWASHER	1/8 in	0.07	1.69
3	24	G58LW	5/8" HDG LOCKWASHER		0.03	0.63
4	24	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	3.12
5	12	G58R-48	5/8" X 48" THREADED ROD (HDG.)		4.43	53.19
6	12	G58R-24	5/8" X 24" THREADED ROD (HDG.)		2.22	26.60
					TOTAL WT. #	351.38

(2) PROPOSED RING MOUNTS.

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES (N0.030")
DRILLED AND GAS CUT HOLES (N0.030") - NO CONING OF HOLES
LASER CUT EDGES AND HOLES (N0.010") - NO CONING OF HOLES
BENDS ARE N 1/2 DEGREE
ALL OTHER MACHINING (N0.030")
ALL OTHER ASSEMBLY (N0.060")

PROPRIETARY NOTE:
THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION
QUAD UNIVERSAL RING MOUNT
FOR POLES 12" TO 60"
(UQB4)

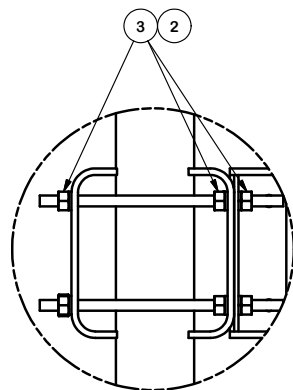
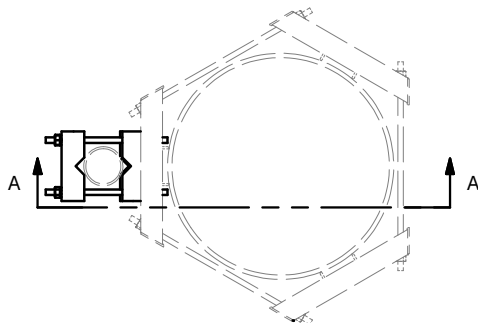
CPD NO. 4893	DRAWN BY CEK 9/20/2010	ENG. APPROVAL
CLASS 81	SUB 01	DRAWING USAGE CUSTOMER
CHECKED BY BMC 9/20/2010		



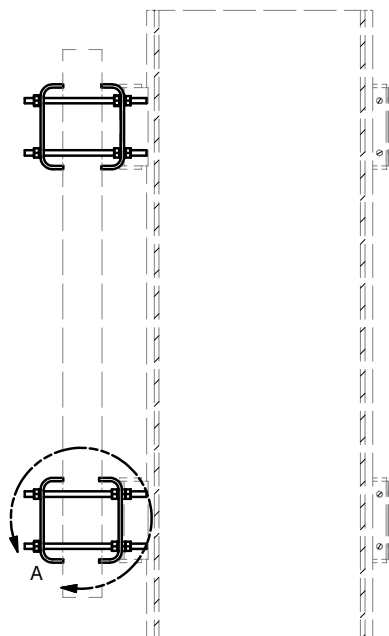
Engineering
Support Team:
1-888-753-7446

Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

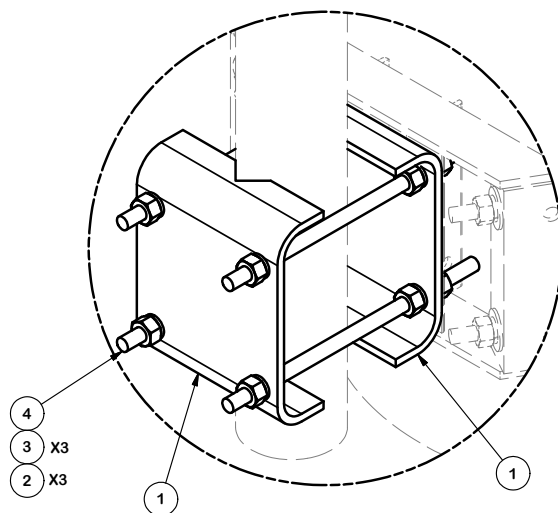
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DWG. NO. UQB4



DETAIL A

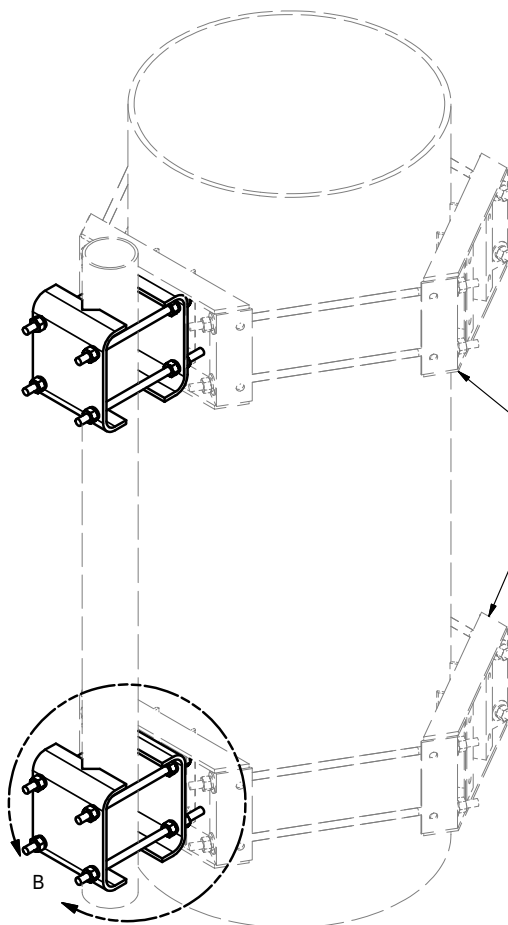


SECTION A-A



DETAIL B

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	4	X-214130	BENT PLATE V-CLAMP	12 5/8 in	11.43	45.72
2	24	G58LW	5/8" HDG LOCKWASHER		0.03	0.63
3	24	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	3.12
4	8	G58R-14	5/8" x 14" THREADED ROD (HDG.)		0.35	2.81
					TOTAL WT. #	57.05



LWRM UNIVERSAL RING MOUNT
FOR POLES 12" TO 45" DIA.
(ORDERED SEPARATELY)

OR

UGLM
MINI RING MOUNT
FOR POLES 10-1/2" TO 28" DIA.
(ORDERED SEPARATELY)

(3) PROPOSED FLUSH MOUNT ADAPTER DUAL LEVEL KITS.

(3) 4.5" OD X 6'-0" LONG MOUNT PIPES SCHEDULE 40
(SITE PRO 1 P/N P472)

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES ($\pm 0.030"$)
DRILLED AND GAS CUT HOLES ($\pm 0.030"$) - NO CONING OF HOLES
LASER CUT EDGES AND HOLES ($\pm 0.010"$) - NO CONING OF HOLES
BENDS ARE $\pm 1/2$ DEGREE
ALL OTHER MACHINING ($\pm 0.030"$)
ALL OTHER ASSEMBLY ($\pm 0.060"$)

PROPRIETARY NOTE:
THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION			
FLUSH MOUNT ADAPTER DUAL LEVEL			
CPD NO. 4195	DRAWN BY CEK 10/12/2010	ENG. APPROVAL	
CLASS 81	SUB 01	DRAWING USAGE CUSTOMER	CHECKED BY BMC 10/13/2010

		Locations: New York, NY Atlanta, GA Los Angeles, CA Plymouth, IN Salem, OR Dallas, TX
Engineering Support Team: 1-888-753-7446		
PART NO.	FMA2	
DWG. NO.	FMA2	

ATTACHMENT F – PROOF OF DELIVERY OF NOTICE

Ref: ES-026 STONNGTON Date: 07Jan21
Dep: BL GRAPHICS Wgt: 1.90 LBS

DV:

SHIPPING: 0.00
SPECIAL: 0.00
HANDLING: 0.00
TOTAL: 0.00

Svcs: PRIORITY OVERNIGHT
TRACK: 9151 3346 9852

ORIGIN ID:RSPA (800) 301-3077

BL COMPANIES
355 RESEARCH PARKWAY

MERIDEN, CT 06450
UNITED STATES US

SHIP DATE: 07JAN21
ACTWGT: 1.90 LB
CAD: 0765627/CAFE3407

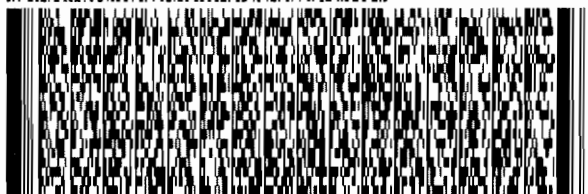
BILL THIRD PARTY

TO **HONORABLE DANIELLE CHESEBROUGH**
TOWN OF STONINGTON
152 ELM STREET

STONINGTON CT 06378

REF: ES-026 STONNGTON

DEPT: BL GRAPHICS



FedEx
Express



J201019110601UV

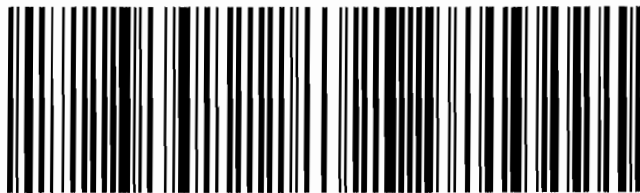
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0201

FRI - 08 JAN 12:00P
PRIORITY OVERNIGHT

00 GONA

06378
CT-US BDL

Part # 156148-434 RIT EXP 03/21 **



56DC1/1136/0542

Ref: ES-026 STONNGTON Date: 07Jan21
Dep: BL GRAPHICS Wgt: 1.90 LBS

SHIPPING: 0.00
SPECIAL: 0.00
HANDLING: 0.00
TOTAL: 0.00

Svcs: PRIORITY OVERNIGHT
TRCK: 9151 3346 9863

ORIGIN ID:RSPA (800) 301-3077

SHIP DATE: 07JAN21
ACTWGT: 1.90 LB MAN
CAD: 0765627/CAFE3407

BL COMPANIES
355 RESEARCH PARKWAY

BILL THIRD PARTY

MERIDEN, CT 06450
UNITED STATES US

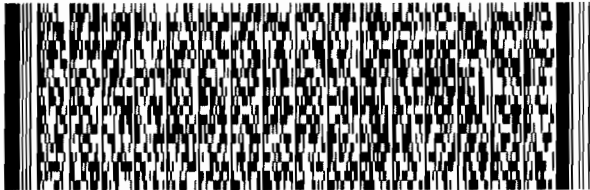
TO KEITH BRYNES, AICP, CZET, TOWN PLAN
TOWN OF STONINGTON
152 ELM STREET

56BCL/1136/05A2

STONINGTON CT 06378

REF: ES-026 STONNGTON

DEPT: BL GRAPHICS



FedEx
Express



J201019110601uv

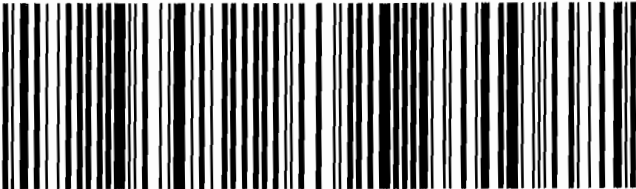
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FRI - 08 JAN 12:00P
PRIORITY OVERNIGHT

00 GONA

06378
CT-US BDL

Part # 155148-424 RIT EXP 09/21



	SHIPPING:	0.00
	SPECIAL:	0.00
	HANDLING:	0.00
0.00	TOTAL:	0.00

Svcs: PRIORITY OVERNIGHT
TRCK: 9151 3346 9874

ORIGIN ID:RSPA (800) 301-3077

BL COMPANIES
355 RESEARCH PARKWAY

MERIDEN, CT 06450
UNITED STATES US

SHIP DATE: 07JAN21
ACTWGT: 1.90 LB MAN
CAD: 0765627/CAFE3407

BILL THIRD PARTY

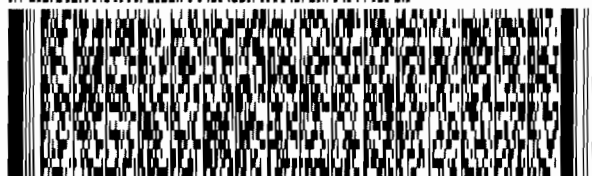
TO

TAUGWONK
183 QUARRY ROAD

MILFORD CT 06460

REF: ES-026 STONNGTON

DEPT: BL GRAPHICS



FedEx
Express



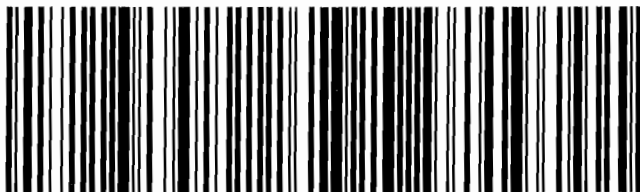
1207079710601 IV

TRK# 9151 3346 9874
0201

FRI - 08 JAN 10:30A
PRIORITY OVERNIGHT

00 OXCA

06460
CT-US BDL



Case # 156143-434 RT 09/21 00

56DC1/1136/05A2

Ref: ES-026 STONNGTON Date: 07Jan21
Dep: BL GRAPHICS Wgt: 1.90 LBS

SHIPPING: 0.00
SPECIAL: 0.00
HANDLING: 0.00
TOTAL: 0.00

Svcs: PRIORITY OVERNIGHT
TRCK: 9151 3346 9885

ORIGIN ID:RSPA (800) 301-3077

BL COMPANIES
355 RESEARCH PARKWAY

MERIDEN, CT 06450
UNITED STATES US

SHIP DATE: 07JAN21
ACTWGT: 1.90 LB MAN
CAD: 0765627/CAFE3407

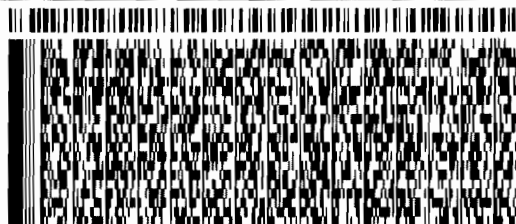
BILL THIRD PARTY

TO **CT00235 - B**
SBA COMMUNICATIONS CORPORATION
8051 CONGRESS AVENUE

BOCA RATON FL 33487

REF: ES-026 STONNGTON

DEPT: BL GRAPHICS



FedEx
Express



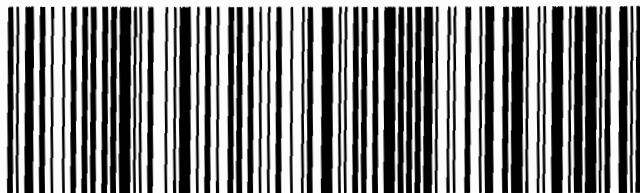
J2010191106014V

TRK# 9151 3346 9885
0201

FRI - 08 JAN 10:30A
PRIORITY OVERNIGHT

XH BCTA

33487
FL - US FLL



Part #: 158148-434 RITE EXP 09/21

56DC1/1136/05A2

Ref: ES-026 STONNGTON Date: 07Jan21
Dep: BL GRAPHICS Wgt: 1.90 LBS
DV:

SHIPPING: 0.00
SPECIAL: 0.00
HANDLING: 0.00
TOTAL: 0.00

Svcs: PRIORITY OVERNIGHT
TRK: 9151 3346 9896

ORIGIN ID:RSPA (800) 301-3077

BL COMPANIES
355 RESEARCH PARKWAY

MERIDEN, CT 06450
UNITED STATES US

SHIP DATE: 07JAN21
ACTWGT: 1.90 LB MAN
CAD: 0765627/CAFE3407

BILL THIRD PARTY

TO

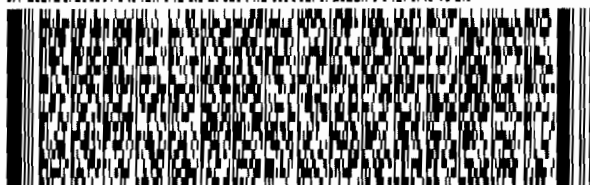
CONNECTICUT SITING COUNCIL
10 FRANKLIN SQUARE

NEW BRITAIN CT 06051

REF: ES-026 STONNGTON

DEPT: BL GRAPHICS

55DC1/1136/05A2



FedEx
Express



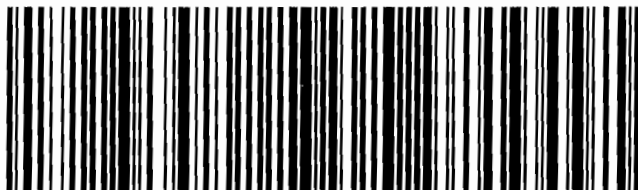
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TRK# 9151 3346 9896
0201

FRI - 08 JAN 10:30A
PRIORITY OVERNIGHT

00 BDLA

06051
CT-US BDL



Part # 156148-034 RIT EXP 08/21 **

ATTACHMENT G - POWER DENSITY REPORT



C Squared Systems, LLC
65 Dartmouth Drive
Auburn, NH 03032
603-644-2800
support@csquaredsystems.com

Calculated Radio Frequency Emissions Report



ES-026 – Stonington

Taugwonk Spur Road

Stonington, CT 06378

November 3, 2020

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1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed Eversource installation on the tower located at Taugwonk Spur Road in Stonington, CT. Eversource is proposing to install two omnidirectional antennas as part of its 220 MHz communications system – one for transmit and one for receive only. Eversource is also proposing to install one microwave dish for its backhaul communications.

This report considers the proposed antenna configuration as detailed by Eversource along with % MPE (Maximum Permissible Exposure) measurements around the existing facility to determine FCC compliance of the proposed facility.



Figure 1: View of ES-026 Stonington

Site Address	Taugwonk Spur Road
Latitude	41° 22' 55.26" N
Longitude	71° 54' 12.9" W
Site Elevation AMSL	142'
Survey Engineer	Marc Salas
Survey Date/Time	6/25/2020; 10:15 AM – 11:15 AM

Table 1: Survey Information

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter (mW/cm^2). The general population exposure limits for the various frequency ranges are defined in the attached “FCC Limits for Maximum Permissible Exposure (MPE)” in Attachment B of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

3. Power Density Calculation Methods

The power density calculation results were generated using the following formula as outlined in FCC bulletin OET 65, and Connecticut Siting Council recommendations:

$$\text{Power Density} = \left(\frac{1.6^2 \times 1.64 \times \text{ERP}}{4\pi \times R^2} \right) \times \text{Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power = 1.64 x ERP

R = Radial Distance = $\sqrt{H^2 + V^2}$

H = Horizontal Distance from antenna

V = Vertical Distance from radiation center of antenna

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

These calculations assume that the antennas are operating at 100 percent capacity and full power, and that all antenna channels are transmitting simultaneously. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not consider actual terrain elevations which could attenuate the signal. As a result, the calculated power density and corresponding % MPE levels reported below are much higher than the actual levels will be from the final installation.

4. Proposed Antenna Configuration

Table 2 below lists the technical details of the proposed Eversource installation. These parameters are applied to the above calculation methods in order to calculate the % MPE values of the proposed equipment. Any receive only antennas are not included in the table as they are not used in the calculations.

Operator	Antenna Model	TX Freq. (MHz)	Ant Gain (dBd)	Power ERP (Watts)	Number of Channels	Vertical Beamwidth	Length (ft)	Antenna Centerline Height (ft)
Eversource	Dipole 871F-70-220	217	2	124	4	110°	5.5	116.75
Eversource	Dish PAD6-59A	6256.54	36.95	2265	1	1.7°	6	155

Table 2: Eversource Antenna Configuration (Proposed)^{1 2}

¹ Transmit power assumes 0 dB of cable loss.

² Antenna height listed for the proposed 217 MHz transmit antenna and microwave antenna is based on the SBA Communications Structural Modification Report dated October 05, 2020. Due to the unavailability of the digital pattern for these specific antennas, the pattern of a like antenna was substituted for each in the calculations.

5. Measurement Procedure

Frequencies from 300 KHz to 50 GHz were measured using the Narda Probe EA 5091, E-Field, shaped, FCC probe in conjunction with the NBM550 survey meter. The EA 5091 probe is “shaped” such that in a mixed signal environment (i.e.: more than one frequency band is used in a particular location), it accurately measures the percent of MPE.

From FCC OET Bulletin No. 65 - Edition 97-01 – “A useful characteristic of broadband probes used in multiple-frequency RF environments is a frequency-dependent response that corresponds to the variation in MPE limits with frequency. Broadband probes having such a “shaped” response permit direct assessment of compliance at sites where RF fields result from antennas transmitting over a wide range of frequencies. Such probes can express the composite RF field as a percentage of the applicable MPEs”.

Probe Description - As suggested in FCC OET Bulletin No. 65 - Edition 97-01, the response of the measurement instrument should be essentially isotropic, (i.e., independent of orientation or rotation angle of the probe). For this reason, the Narda EA 5091 probe was used for these measurements.

Sampling Description - At each measurement location, a spatially averaged measurement is collected over the height of an average human body. The NBM550 survey meter performs a time average measurement while the user slowly moves the probe over a distance range of 20 cm to 200 cm (about 6 feet) above ground level. The results recorded at each measurement location include average values over the spatial distance.

Instrumentation Information - A summary of specifications for the equipment used is provided in the table below.

Manufacturer	Narda Microwave			
Probe	EA 5091, Serial# 01116			
Calibration Date	May 2020			
Calibration Interval	24 Months			
Meter	NBM550, Serial# E-1069			
Calibration Date	May 2020			
Calibration Interval	24 Months			
Probe Specifications	Frequency Range	Field Measured	Standard	Measurement Range
	300 KHz-50 GHz	Electric Field	U.S. FCC 1997 Occupational/Controlled	0.2 – 600 % of Standard

Table 3: Instrumentation Information

Instrument Measurement Uncertainty - The total measurement uncertainty of the NARDA measurement probe and meter is no greater than ± 3 dB (0.5% to 6%), ± 1 dB (6% to 100%), ± 2 dB (100% to 600%). The factors which contribute to this include the probe’s frequency response deviation, calibration uncertainty, ellipse ratio, and isotropic response³. Every effort is taken to reduce the overall uncertainty during measurement collection including pointing the probe directly at the likely highest source of emissions.

³ For further details, please refer to Narda Safety Test Solutions NBM550 Probe Specifications, pg. 64
http://www.narda-sts.us/pdf_files/DataSheets/NBM-Probes_DataSheet.pdf

6. Surveyed and Calculated % MPE Results

Measured and calculated results and a description of each survey location are detailed in the table below. Measurements were recorded on June 25, 2020 between 10:15 AM and 11:15 AM. The calculated % MPE contribution from the proposed equipment was then added to the measured % MPE values in the “Composite % MPE” column. These calculated values incorporate the antenna pattern of the antenna model specified by Eversource (or a similar antenna) to determine the “Off Beam Loss” factor shown in the power density formula from Section 4. All % MPE values are in reference to the FCC Uncontrolled/General Population exposure limit.

Table 4 below lists 20 measurements recorded in the vicinity of the site. The highest spatially averaged measurement was 5.61% (Average Uncontrolled / General Population MPE) and was recorded inside the Taugwonk Commercial Compound (Location 13). The highest composite (measured + calculated) % MPE value is calculated to be 7.01% (Average Uncontrolled / General Population) and is calculated to occur at Location 2, within the Taugwonk Commercial Compound.

Meas. Location	Location Description	Latitude	Longitude	Dist. From Site (feet)	Measured % MPE (Uncontrolled / General)	Calculated % MPE (Eversource Proposed)	Composite % MPE (Uncontrolled / General)
1	Compound Access Gate	41.38208	-71.90349	36	5.07%	0.47%	5.54%
2	Taugwonk Spur Road Commercial Compound	41.38206	-71.90320	107	5.56%	1.45%	7.01%
3	Taugwonk Spur Road Commercial Compound	41.38208	-71.90291	188	5.29%	1.26%	6.55%
4	Taugwonk Spur Road Commercial Compound	41.38229	-71.90335	118	2.53%	1.33%	3.86%
5	Taugwonk Spur Road Commercial Compound	41.38229	-71.90292	208	4.46%	1.10%	5.55%
6	Taugwonk Spur Road Commercial Compound	41.38245	-71.90267	299	5.06%	0.69%	5.75%
7	Taugwonk Spur Road Commercial Compound	41.38253	-71.90326	207	4.50%	1.01%	5.51%
8	Taugwonk Spur Road Commercial Compound	41.38248	-71.90372	174	1.94%	1.07%	3.00%
9	Taugwonk Spur Road Commercial Compound	41.38207	-71.90387	80	3.25%	0.98%	4.23%
10	Taugwonk Spur Road Commercial Compound	41.38178	-71.90414	176	2.47%	1.00%	3.47%
11	Taugwonk Spur Road Commercial Compound	41.38213	-71.90420	174	4.36%	0.90%	5.26%
12	Taugwonk Spur Road Commercial Compound	41.38296	-71.90315	367	2.97%	0.47%	3.44%
13	Taugwonk Spur Road Commercial Compound	41.38327	-71.90289	498	5.61%	0.29%	5.89%
14	Taugwonk Spur Road Commercial Compound	41.38363	-71.90256	653	4.36%	0.18%	4.54%
15	Taugwonk Spur Road Commercial Compound	41.38264	-71.90139	645	5.13%	0.19%	5.32%
16	Taugwonk Spur Road Cell Tower	41.38272	-71.90180	554	3.23%	0.25%	3.48%
17	Taugwonk Spur Road Commercial Compound	41.38231	-71.90226	380	2.10%	0.49%	2.59%
18	Taugwonk Spur Road Commercial Compound	41.38161	-71.90119	673	2.65%	0.18%	2.83%
19	Taugwonk Spur Road Commercial Compound	41.38174	-71.90080	771	1.79%	0.14%	1.93%
20	End of Taugwonk Spur Road	41.38175	-71.89990	1015	2.04%	0.08%	2.13%

Table 4: Measured and Calculated % MPE Results ⁴

⁴ Due to measurement uncertainty at low levels (See Table 3), any readings outside the measurement range of the probe (< 1.00 % FCC General Population/Uncontrolled MPE) are noted as such.

Figure 2 below is an aerial view⁵ of the rooftop location and the surrounding area, along with the measurement locations listed in Table 4.



Figure 2: Measurement Points

⁵ Map showing location of telecommunications facility and the surrounding area. *Google Earth*, <https://earth.google.com/web/>.

7. Conclusion

A number of accessible areas around the commercial compound at Taugwonk Spur Road in Stonington, CT were surveyed and found to be well within the mandated General Population/Uncontrolled limits for Maximum Permissible Exposure, as delineated in the Federal Communications Commission's Radio Frequency exposure rules published in 47 CFR 1.1307(b)(1)-(b)(3).

The highest spatially averaged % MPE measurement of all surveyed points based on the 1997 FCC standard for exposure to the general population is 5.61% MPE. This measurement was recorded at Location 13 within the commercial compound.

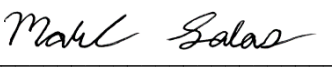
The highest composite (measured + calculated) power density is **7.01% of the FCC General Population MPE limit** with the proposed Eversource equipment is calculated to occur at Location 2 within the commercial compound.

The above analysis concludes that RF exposure at ground level around the building, both currently and with the proposed antenna installation, will be below the maximum power density limits as outlined by the FCC in the OET Bulletin 65 Ed. 97-01.

As noted previously, the calculated % MPE levels are more conservative (higher) than the actual levels will be from the finished installation.

8. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in FCC OET Bulletin 65 Edition 97-01, IEEE Std. C95.1, and IEEE Std. C95.3.


Report Prepared By: Marc Salas
RF Engineer
C Squared Systems, LLC

November 3, 2020

Date


Reviewed/Approved By: Keith Vellante
Director of RF Services
C Squared Systems, LLC

November 3, 2020

Date

Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

IEEE C95.1-2005, IEEE Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz IEEE-SA Standards Board

IEEE C95.3-2002 (R2008), IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to Such Fields, 100 kHz-300 GHz IEEE-SA Standards Board

Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure⁶

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f ²)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

(B) Limits for General Population/Uncontrolled Exposure⁷

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz * Plane-wave equivalent power density

Table 5: FCC Limits for Maximum Permissible Exposure (MPE)

⁶ Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure

⁷ General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure

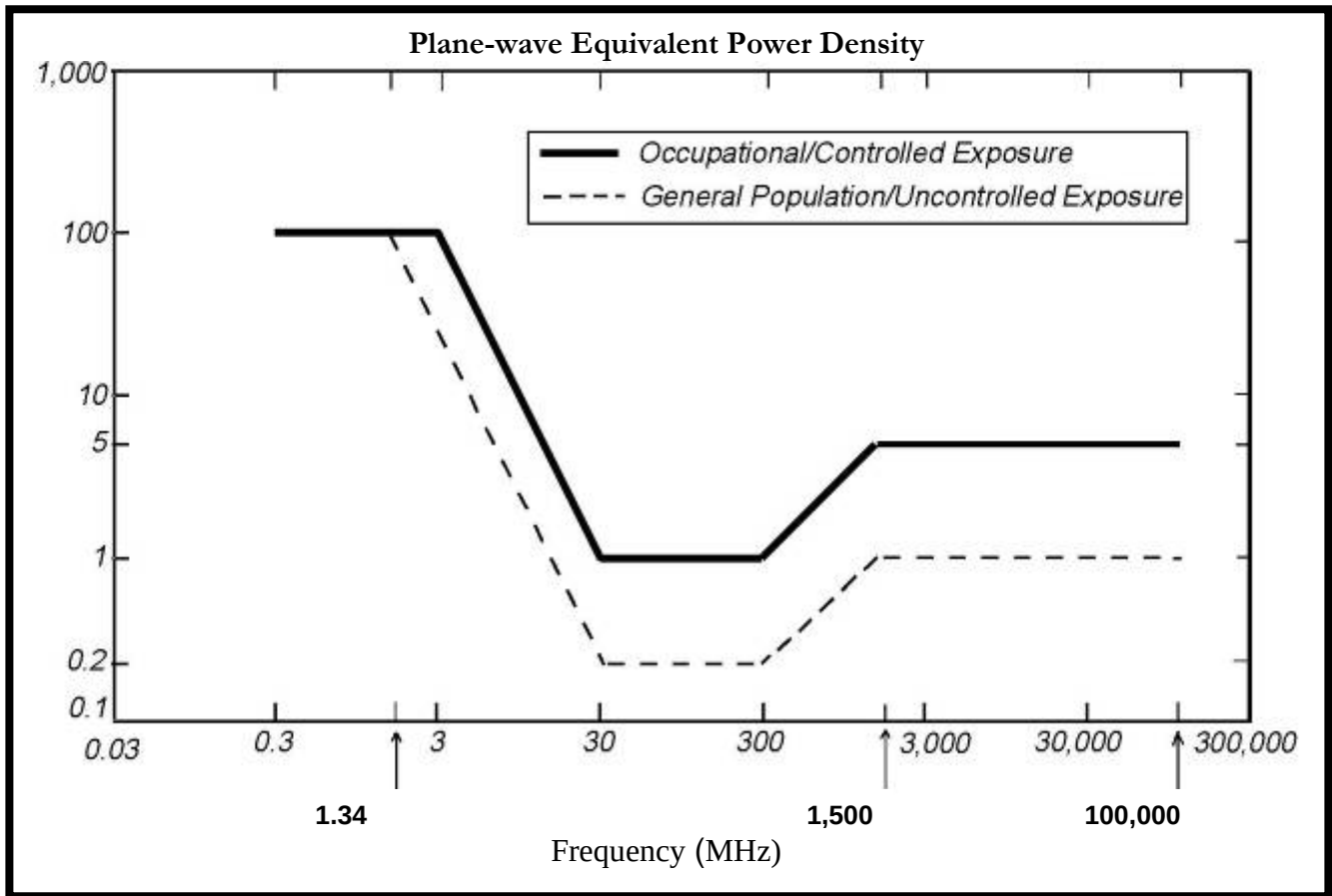
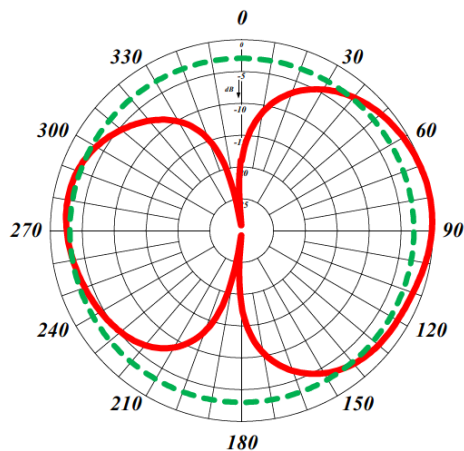


Figure 3: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: Eversource Antenna Data Sheet and Electrical Patterns

217 MHz

Manufacturer: Comprod
 Model #: 871F-70-2
 Frequency Band: 215 - 225 MHz
 Gain: 2 dBd
 Vertical Beamwidth: 110°
 Horizontal Beamwidth: 360°
 Polarization: Vertical
 Length: 5.5'



6256.54 MHz

Manufacturer: RFS
 Model #: PAD6-W59BC
 Frequency Band: 5.925 – 6.875 GHz
 Gain: 36.95 dBd
 Vertical Beamwidth: 1.7°
 Horizontal Beamwidth: 1.7°
 Polarization: Single
 Length: 6'

