

Robidoux, Evan

From: David Barbagallo <david.barbagallo@smartlinkllc.com>
Sent: Monday, April 15, 2019 8:41 AM
To: Robidoux, Evan
Cc: CSC-DL Siting Council; April Grasso; Sharon Keefe
Subject: RE: Council Incomplete Letter for EM-AT&T-070-190319-Route81-Killingworth
Attachments: 10034999_DE113_190321_CTL02045.pdf; 10034999_DE125_190408_CTL02045.pdf; 10034999_AE201_190409_CTL02045_REV3.pdf; em-at&t-070-190319_incompleteltr_Rte81.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Good morning Evan,

Please see the attached requested revised deliverables.

Thanks,



David Barbagallo | Real Estate Specialist

Smartlink

85 Rangeway Rd Bldg. #3 Suite 102

North Billerica | MA 01862-2105

(M) 860-681-7708

(F) 801-346-2771

David.barbagallo@[smartlinkllc.com](mailto:david.barbagallo@smartlinkllc.com)

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From: Robidoux, Evan <Evan.Robidoux@ct.gov>
Sent: Thursday, March 21, 2019 4:12 PM
To: David Barbagallo <david.barbagallo@smartlinkllc.com>
Cc: CSC-DL Siting Council <Siting.Council@ct.gov>
Subject: Council Incomplete Letter for EM-AT&T-070-190319-Route81-Killingworth

Please see the attached correspondence.

Evan Robidoux
Clerk Typist
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

SHEET INDEX

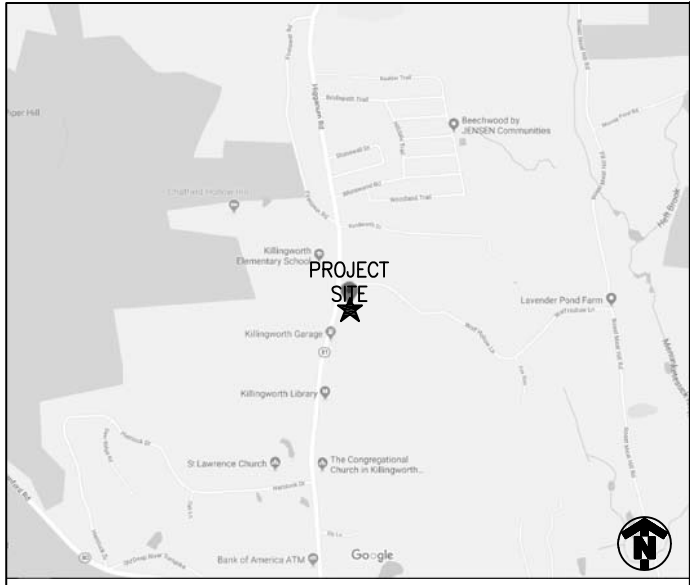
NO.	DESCRIPTION
T1	TITLE SHEET
C1	GENERAL NOTES
C2	OVERALL & ENLARGED SITE PLAN
C3	ELEVATION VIEW
C4	ANTENNA ORIENTATION PLAN
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C5A	EQUIPMENT DETAILS
C6	PLUMBING DIAGRAM
C7	GROUNDING DETAILS

DRIVING DIRECTIONS

FROM 550 COCHITUATE RD.:

GET ON I-90 WEST/MASSACHUSETTS TURNPIKE FROM SPEEN STREET. HEAD NORTHEAST TOWARD SPEEN STREET. TURN RIGHT TOWARD SPEEN STREET. TURN RIGHT ONTO COCHITUATE ROAD. USE THE RIGHT LANE TO TAKE THE RAMP TO I-90/MASSPIKE/SPRINGFIELD/BOSTON. KEEP LEFT AT THE FORK, FOLLOW SIGNS FOR I-90 WEST/MASSACHUSETTS TURNPIKE/WORCESTER/SPRINGFIELD AND MERGE ONTO I-90 WEST/MASSACHUSETTS TURNPIKE. CONTINUE ON I-90 WEST/MASSACHUSETTS TURNPIKE TO YOUR DESTINATION IN HADDAM. TAKE EXIT CT-9 SOUTH. MERGE ONTO I-90 WEST/MASSACHUETTS TURNPIKE. USE THE RIGHT 2 LANES TO TAKE EXIT 9 FOR I-84 TOWARD US-20/HARTFORD/NEW YORK CITY. CONTINUE ONTO I-84. USE THE LEFT 2 LANES TO TAKE EXIT 57 FOR CT-15 SOUTH TOWARD I-91 SOUTH/CHARTER OAK BRIDGE/NEW YORK CITY. CONTINUE ONTO CT-15 SOUTH. CONTINUE ONTO CT-15 SOUTH/US-5 SOUTH. TAKE EXIT 86 TO MERGE ONTO I-91 SOUTH TOWARD NEW HAVEN/NEW YORK CITY. USE THE LEFT LANE TO TAKE EXIT 22S TO MERGE ONTO CT-9 SOUTH TOWARD MIDDLETOWN/OLD SAYBROOK. TAKE EXIT 9 FOR CT-81 TOWARD KILLINGWORTH/CLINTON. TURN RIGHT ONTO CT-81 SOUTH/KILLINGWORTH ROAD.

LOCATION MAP





PROJECT

LTE 2C/3C/4C/RETROFIT

SITE NAME

KILLINGWORTH-RTE 81

CELL SITE ID

CTL02045

FA SITE NUMBER

10034999

PAGE ID

MRCTB035091/MRCTB035254

MRCTB035289/MRCTB035122

SITE ADDRESS

323 ROUTE 81

KILLINGWORTH, CT 06419

STRUCTURE TYPE

SELF SUPPORT



PROJECT MANAGER



1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793

ENGINEER

SCOPE OF WORK (PER LTE RFDS, DATED: 01/23/2019, V4.00):

- HANDICAP ACCESS REQUIREMENTS ARE NOT REQUIRED.
- FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION.
- FACILITY HAS NO PLUMBING OR REFRIGERANTS.
- THIS FACILITY SHALL MEET OR EXCEED ALL FAA AND FCC REGULATORY REQUIREMENTS.
- ALL NEW MATERIAL SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR UNLESS NOTED OTHERWISE. EQUIPMENT, ANTENNAS/RRU AND CABLES FURNISHED BY OWNER AND INSTALLED BY CONTRACTOR.

TOWER SCOPE

- REMOVE (6) PANEL ANTENNAS
- INSTALL (6) PANEL ANTENNAS
- REMOVE (3) RRUS-11
- INSTALL (3) 4415 B25
- INSTALL (3) B2/B66A 8843
- INSTALL (3) B5/12 4449
- INSTALL (1) DC/FIBER DC6-48-60-18-8C-EV AND (1) DC ONLY DC6-48-60-0-8C-EV W/ (1) FIBER AND (4) DC CABLES
- REPLACE EXISTING SECTOR FRAME MOUNTS

GROUND SCOPE

- SWAP DUS WITH 6630
- ADD 2ND 6630 FOR 5G
- ADD (1) DC12 W/(24) TELCO FLEX
- ADD (1) FIBER BOX
- HOME RUN FOR UMTS RETS

PROJECT SUMMARY

SITE NAME: KILLINGWORTH-RET 81

CELL SITE ID: CTL02045

FA SITE #: 10034999

SITE ADDRESS: 323 ROUTE 81
KILLINGWORTH, CT 06419

COUNTY: MIDDLESEX

SITE COORDINATES:
LATITUDE: 41.3694639° N (NAD 83)
LONGITUDE: 72.5642211° W (NAD 83)
ELEVATION: ±448' (AMSL)

RAD CENTER ±133' (AGL)

LANDLORD: VALLEY SHORE COMMUNICATIONS INC.
P.O. BOX 497
WESTBROOK, CT 06498
(203) 399-2435

APPLICANT: AT&T MOBILITY
550 COCHITUATE RD.
FRAMINGHAM, MA 01701

CLIENT REPRESENTATIVE: SMARTLINK, LLC
85 RANGEWAY RD. SUITE 102
NORTH BILLERICA, MA 01862

CONTACT: ED WEISSMAN
(917) 528-1857

ENGINEER: INFINIGY
1033 WATERVLIET SHAKER ROAD
ALBANY, NY 12205

CONTACT: ALEX WELLER
(518) 690-0790

BUILDING CODE: 2015 IBC/2018 CONNECTICUT STATE BUILDING CODE (ANSI/TIA-222-G)
UNIFORM BUILDING CODE
BUILDING OFFICIALS & CODE ADMINISTRATORS
UNIFORM MECHANICAL CODE
UNIFORM PLUMBING CODE
LOCAL BUILDING CODE
CITY/COUNTY ORDINANCES

ELECTRICAL CODE: NATIONAL ELECTRICAL CODE (LATEST EDITION)



Know what's below.
Call before you dig.

TO OBTAIN LOCATION OF PARTICIPANTS UNDERGROUND FACILITIES BEFORE YOU DIG IN CONNECTICUT, CONTACT CALL BEFORE YOU DIG TOLL FREE: 1-800-922-4455 OR www.cbyd.com

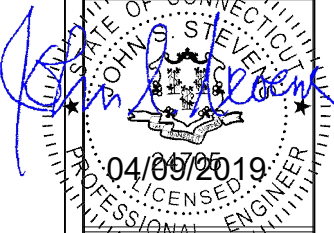
CONNECTICUT STATUTE REQUIRES MIN OF 2 WORKING DAYS NOTICE BEFORE YOU EXCAVATE



INFINIGY ENGINEERING, PLLC
1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793



at&t



04/09/2019

3	ISSUED FOR PERMIT	BMM	04/09/19
2	ISSUED FOR PERMIT	BMM	03/07/19
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No. Submittal / Revision App'd Date

Drawn: BMM Date: 01/31/19
Designed: ASW Date: 01/31/19
Checked: AD Date: 01/31/19

Project Number: 1106-A0001-C

Project Title: KILLINGWORTH-RTE 81
CTL02045
FA# 10034999
323 ROUTE 81
KILLINGWORTH, CT 06419

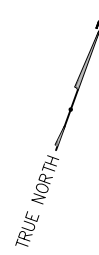
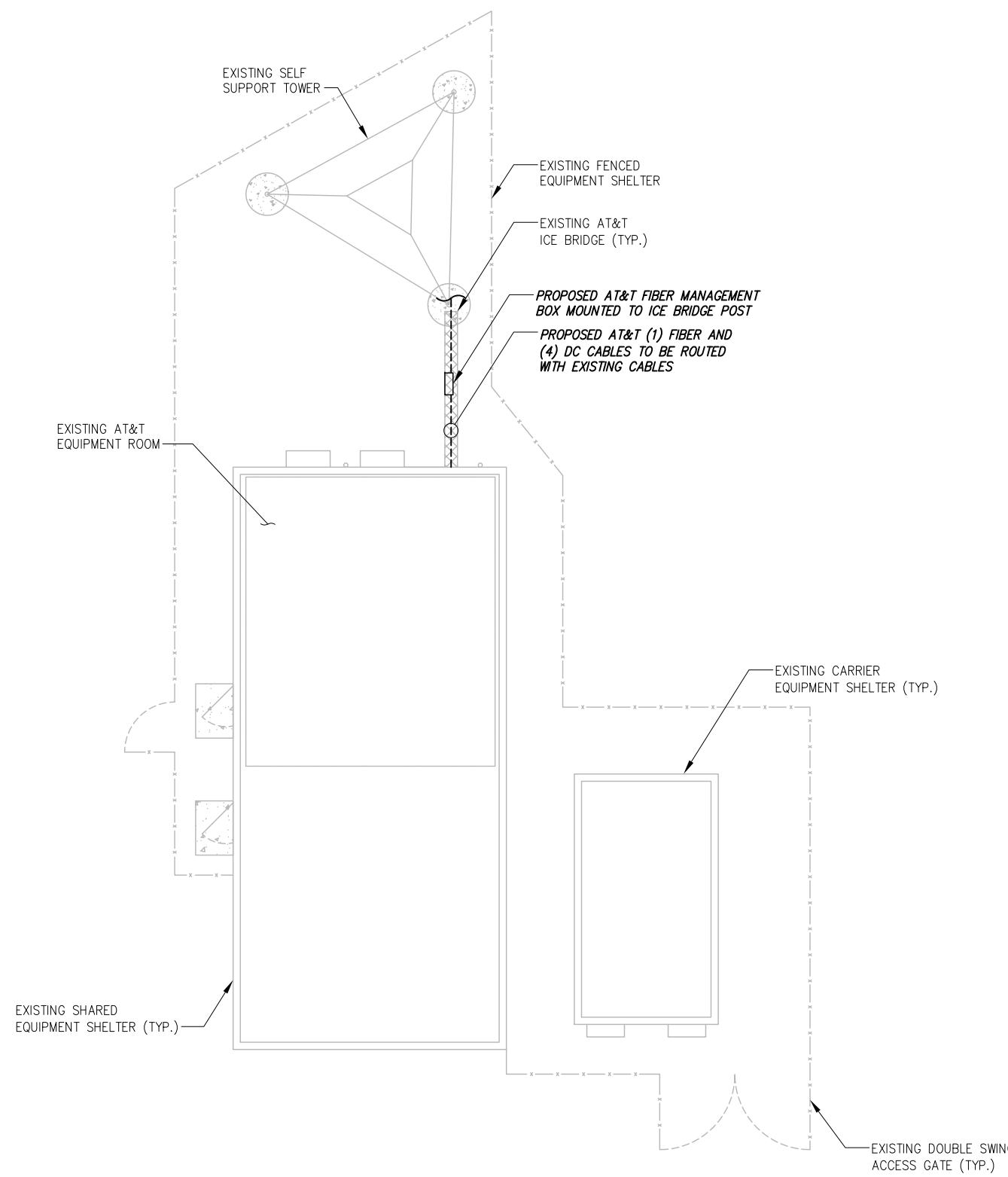
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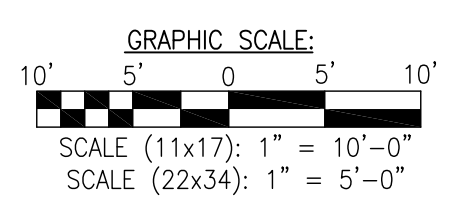
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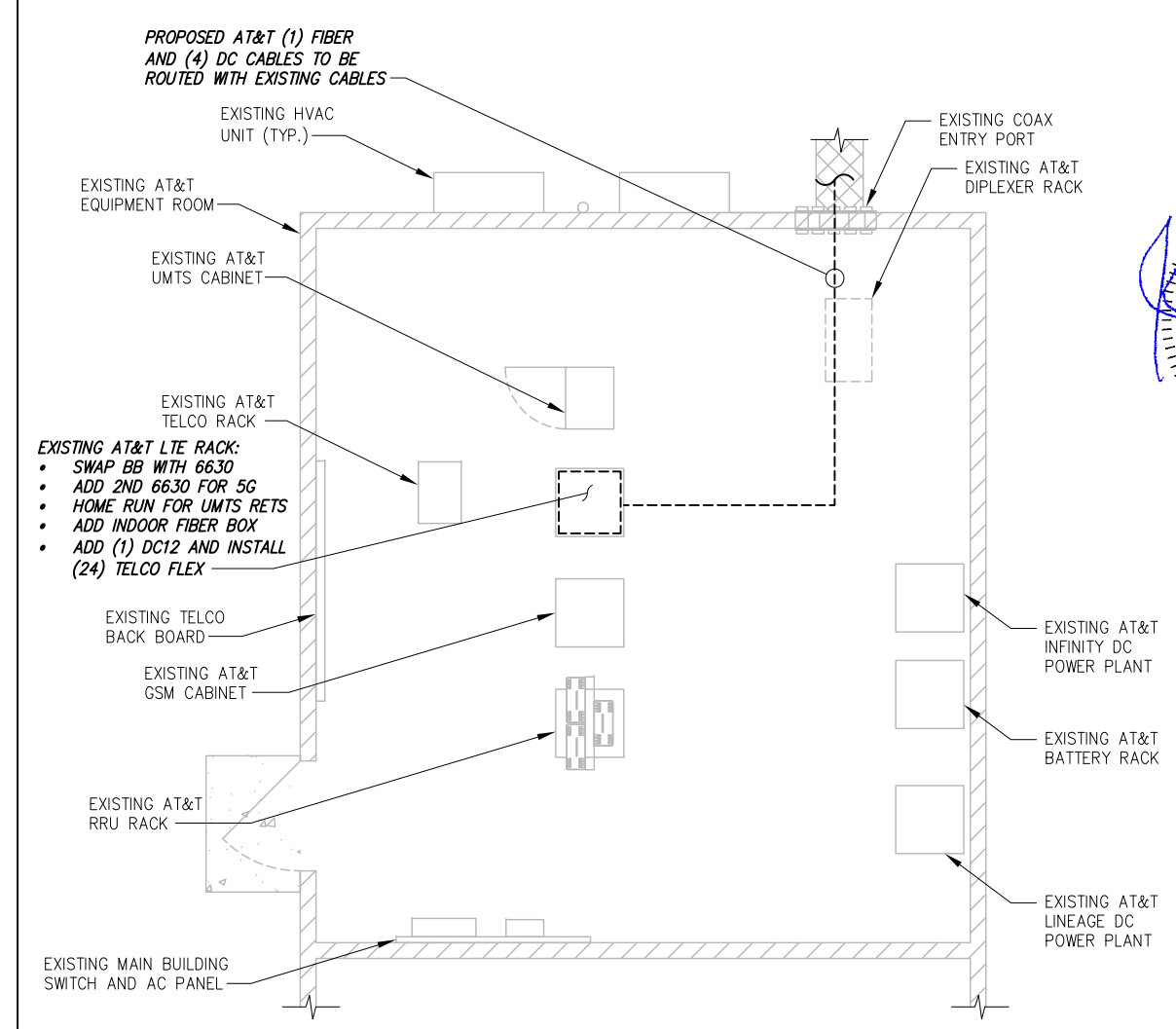
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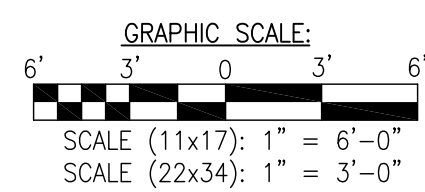
1 SITE PLAN
SCALE: AS NOTED



BASEMAPPING PREPARED FROM A SITE WALK PERFORMED BY INFINIGY ENGINEERING ON 11/17/18 AND PROVIDED INFORMATION, AND DOES NOT REPRESENT AN ACTUAL FIELD SURVEY.



2 ENLARGED EQUIPMENT PLAN
SCALE: AS NOTED



INFINIGY ENGINEERING, PLLC
1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793

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Designed: ASW Date: 01/31/19
Checked: AJD Date: 01/31/19

Project Number: 1106-A0001-C

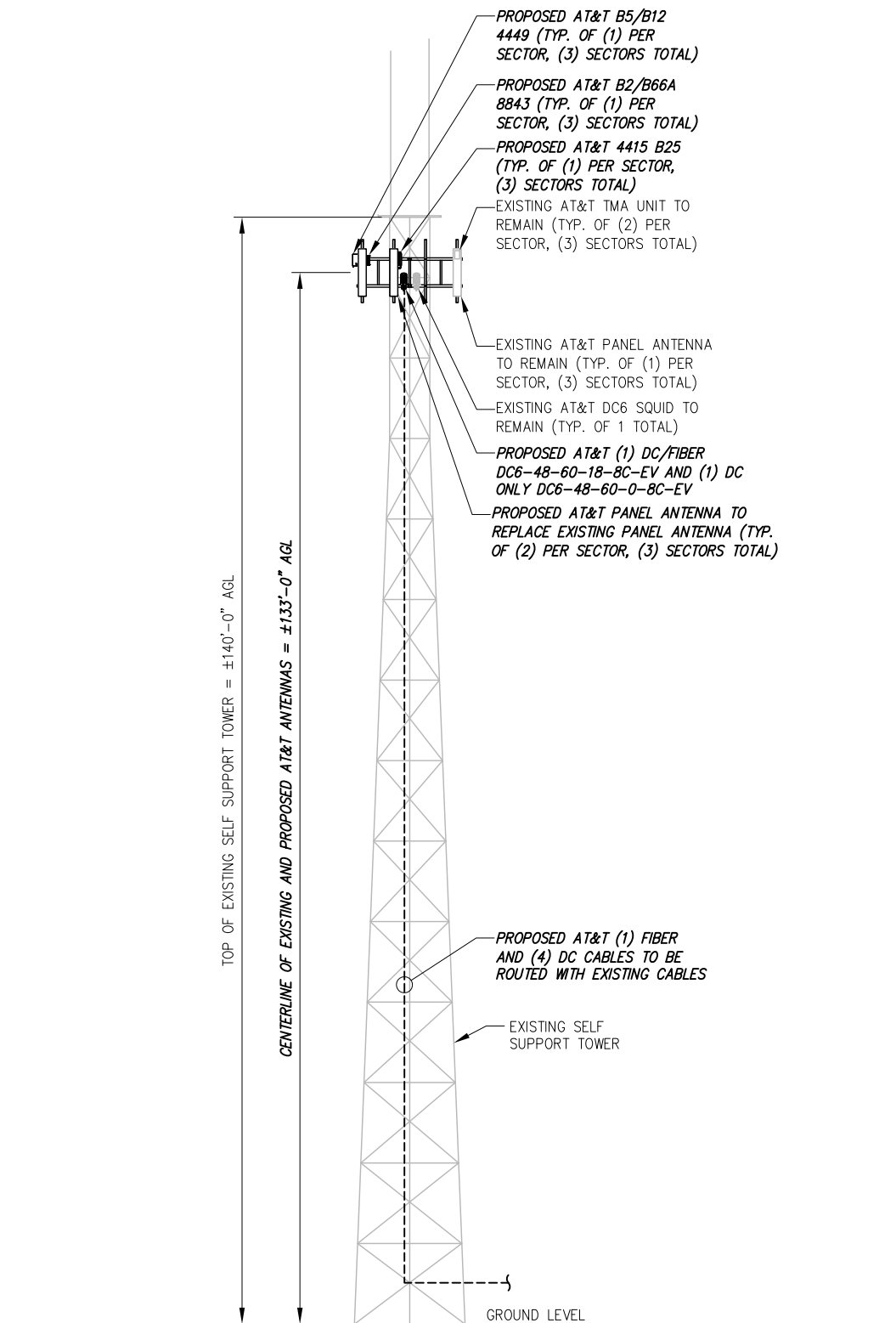
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KILLINGWORTH-RTE 81
CTL02045
FA# 10034999
323 ROUTE 81
KILLINGWORTH, CT 06419

Prepared For:

Drawing Scale: <u>AS NOTED</u>	CD
Date: <u>04/09/19</u>	

Drawing Title:
OVERALL & ENLARGED SITE PLAN

Drawing Number:
C2



NOTE:

- FOR ADDITIONAL STRUCTURAL INFORMATION PERTAINING TO THE TOWER STRUCTURE, SEE 'STRUCTURAL ANALYSIS REPORT' COMPLETED BY INFINIGY, DATED 03/21/19.
- FOR ADDITIONAL STRUCTURAL INFORMATION PERTAINING TO THE ANTENNA MOUNT, SEE 'MOUNT ANALYSIS REPORT' COMPLETED BY INFINIGY, DATED 04/07/19. MOUNT MUST BE REPLACED PRIOR TO INSTALLATION OF THE PROPOSED EQUIPMENT.

SEPARATION NOTE:

- 3 FEET MINIMUM SEPARATION BETWEEN LTE ANTENNA
- 6 FEET MINIMUM SEPARATION BETWEEN 700BC & 700 DE

FINAL ANTENNA CONFIGURATION & CABLE SCHEDULE BASED ON LTE RFDS DATED 01/23/19, V 4.00										
SECTOR	ANTENNA POSITION	ANTENNA STATUS & TECHNOLOGY	ANTENNA MANF/MODEL	TMA/DIPLEXER	RRUS	AZIMUTH	ANTENNA CL HEIGHT	CABLE FEEDER		RAYCAP UNIT
								TYPE	LENGTH	
ALPHA	A-1	(E) UMTS 850	POWERWAVE 7770	(2) (E) LGP21401	--	143°	±133'	(2) (E) 1-5/8" COAX	±180'	(1) (E) DC6 'SQUID' (1) (P) DC6-48-60-18-8C-EV (1) (P) DC6-48-60-0-8C-EV
	A-2	--	--	--	--	--	--	(2) (E) 1-5/8" COAX	--	
	A-3	(P) LTE 1900	KATHREIN 840-370799K	--	(1) (P) 4415 B25	20°	±133'	(1) (E) FIBER CABLE (2) (E) DC CABLES	--	
	A-4	(P) LTE 700/850/AWS /5G 850	KATHREIN 800-10966	--	(1) (P) B5/B12 4449 (1) (P) B2/B66A 8843	20°	±133'	SEE A-3 FOR CABLE INFORMATION	--	
BETA	B-1	(E) UMTS 850	POWERWAVE 7770	(2) (E) LGP21401	--	260°	±133'	(2) (E) 1-5/8" COAX	±180'	
	B-2	--	--	--	--	--	--	(2) (E) 1-5/8" COAX	--	
	B-3	(P) LTE 1900	KATHREIN 800-10991K	--	(1) (P) 4415 B25	143°	±133'	(1) (P) FIBER CABLE (4) (P) DC CABLES	--	
	B-4	(P) LTE 700/850/AWS /5G 850	KATHREIN 800-10965	--	(1) (P) B5/B12 4449 (1) (P) B2/B66A 8843	143°	±133'	SEE A-3 FOR CABLE INFORMATION	--	
GAMMA	G-1	(E) UMTS 850	POWERWAVE 7770	(2) (E) LGP21401	--	20°	±133'	(2) (E) 1-5/8" COAX	±180'	
	G-2	--	--	--	--	--	--	(2) (E) 1-5/8" COAX	--	
	G-3	(P) LTE 1900	KATHREIN 800-10991K	--	(1) (P) 4415 B25	260°	±133'	SEE A-3 FOR CABLE INFORMATION	--	
	G-4	(P) LTE 700/850/AWS /5G 850	KATHREIN 800-10964	--	(1) (P) B5/B12 4449 (1) (P) B2/B66A 8843	260°	±133'	SEE A-3 FOR CABLE INFORMATION	--	

1 ELEVATION VIEW
NOT TO SCALE

2 AT&T ANTENNA SCHEDULE
NOT TO SCALE

INFINIGY
INFINIGY ENGINEERING, PLLC
1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793



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Project Number:			
1106-A0001-C			

Project Title:

KILLINGWORTH-RTE 81

CTL02045

FA# 10034999

323 ROUTE 81
KILLINGWORTH, CT 06419

Prepared For:



Drawing Scale:

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Date:

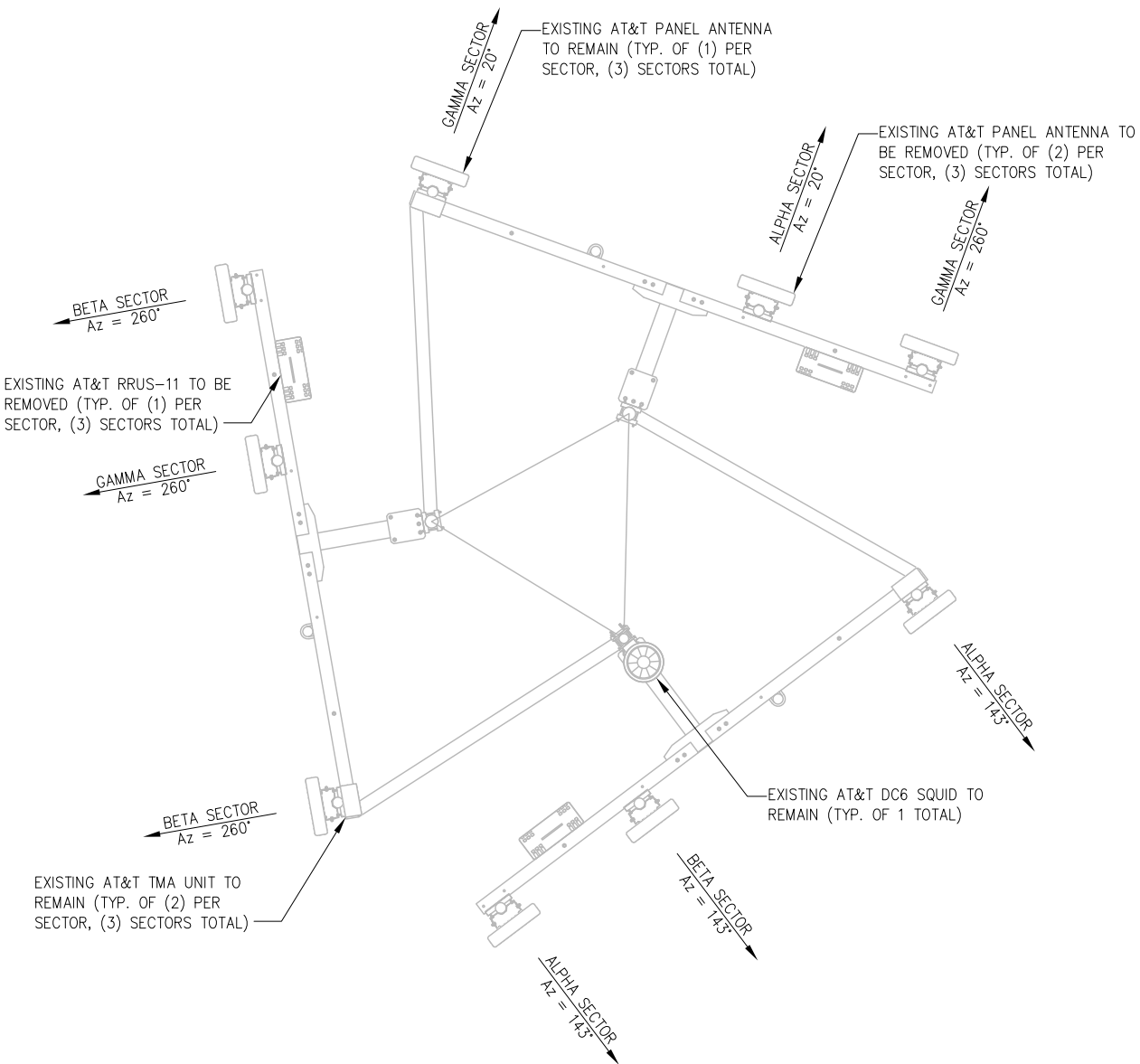
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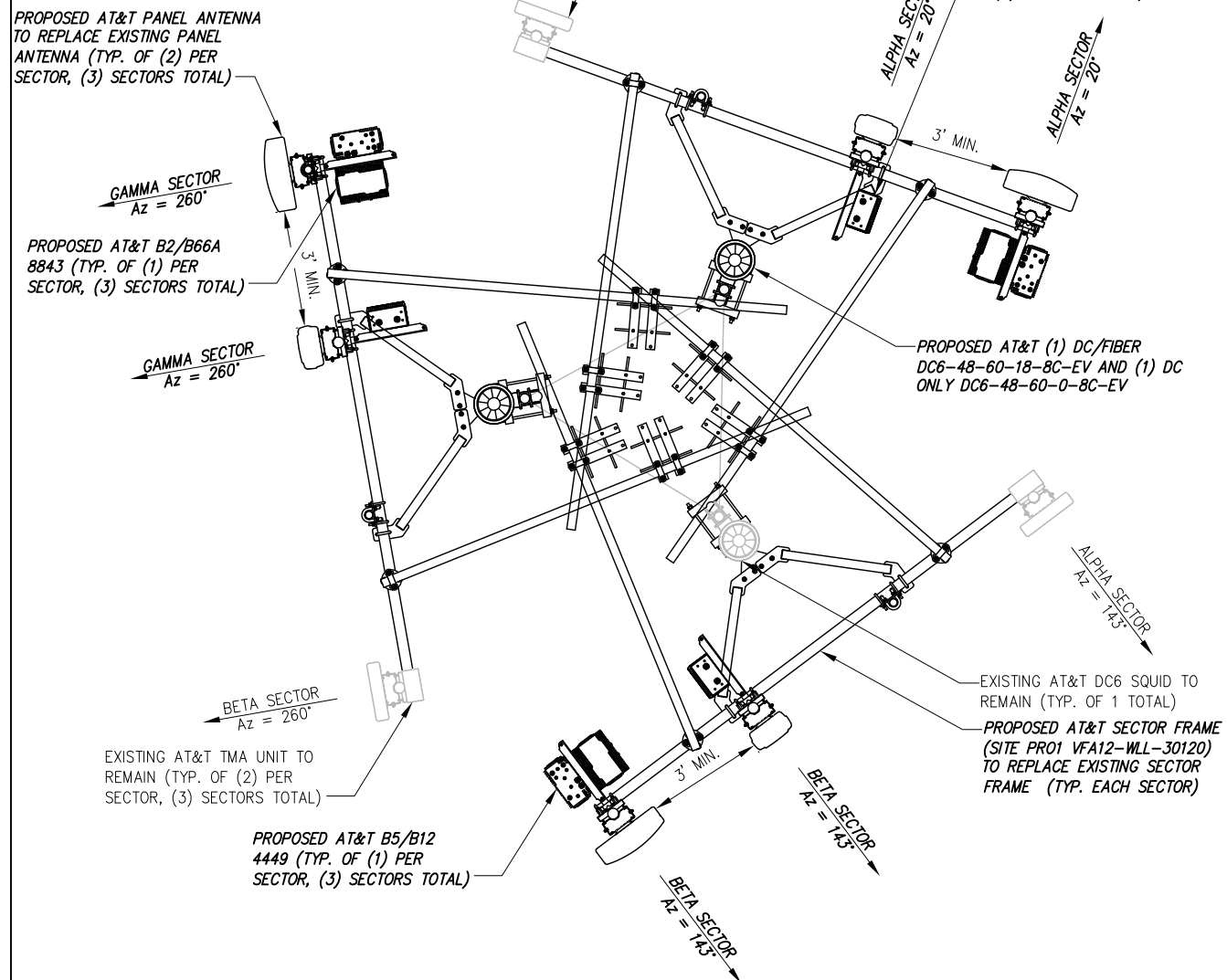
**ELEVATION
VIEW**

Drawing Number

C3



1 ANTENNA ORIENTATION PLAN (EXISTING)
NOT TO SCALE



2 PROPOSED ANTENNA ORIENTATION PLAN
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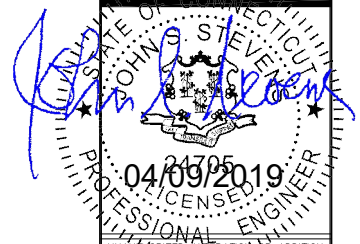
SEPARATION NOTE:

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- FOR ADDITIONAL STRUCTURAL INFORMATION PERTAINING TO THE ANTENNA MOUNT, SEE 'MOUNT ANALYSIS REPORT' COMPLETED BY INFINIGY, DATED 04/07/19. MOUNT MUST BE REPLACED PRIOR TO INSTALLATION OF THE PROPOSED EQUIPMENT.

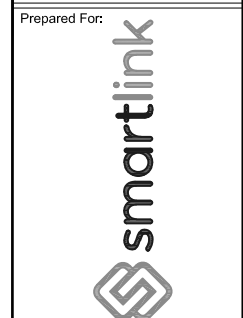
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Designed: ASW Date: 01/31/19			
Checked: AID Date: 01/31/19			
Project Number: 1106-A0001-C			

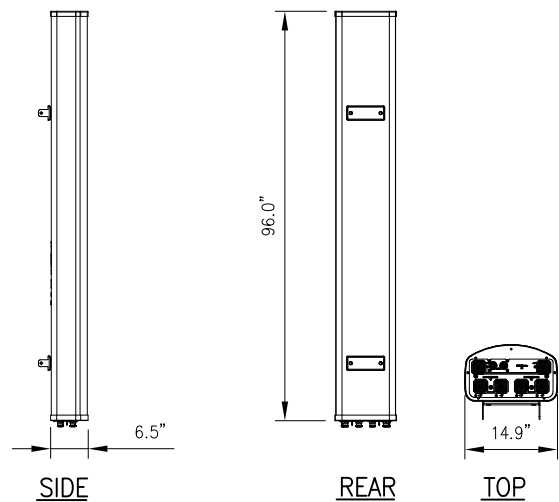
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CTL02045
FA# 10034999
323 ROUTE 81
KILLINGWORTH, CT 06419



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Date:
04/09/19

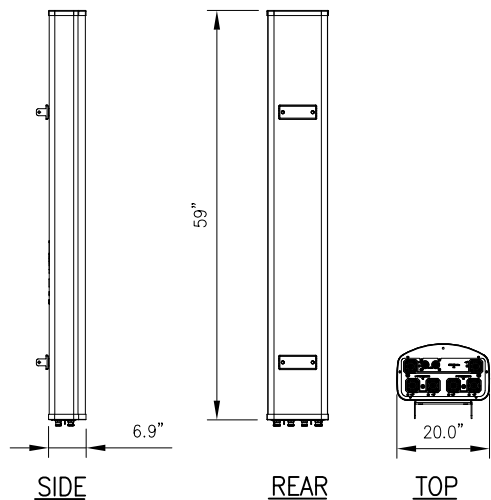
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ANTENNA ORIENTATION PLAN

Drawing Number
C4



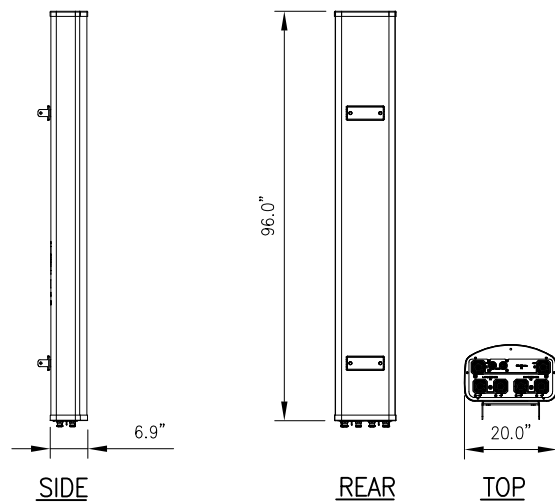
KATHREIN MODEL NO.: 840-370799K	
RADOME MATERIAL:	FIBERGLASS,
RADOME COLOR:	LIGHT GRAY
DIMENSIONS, HxWxD:	96.0"x14.9"x6.5"
WEIGHT, W/	
PRE-MOUNTED BRACKETS:	105.8 LBS
CONNECTOR:	7-16 DIN FEMALE

1 ANTENNA DETAIL
-- NOT TO SCALE



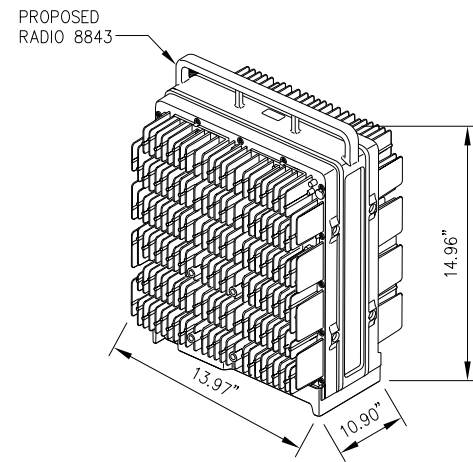
KATHREIN MODEL NO.: 800-10964	
RADOME MATERIAL:	FIBERGLASS,
RADOME COLOR:	LIGHT GRAY
DIMENSIONS, HxWxD:	59"x20.0"x6.9"
WEIGHT, W/	
PRE-MOUNTED BRACKETS:	83.8 LBS
CONNECTOR:	7-16 DIN FEMALE

5 ANTENNA DETAIL
-- NOT TO SCALE



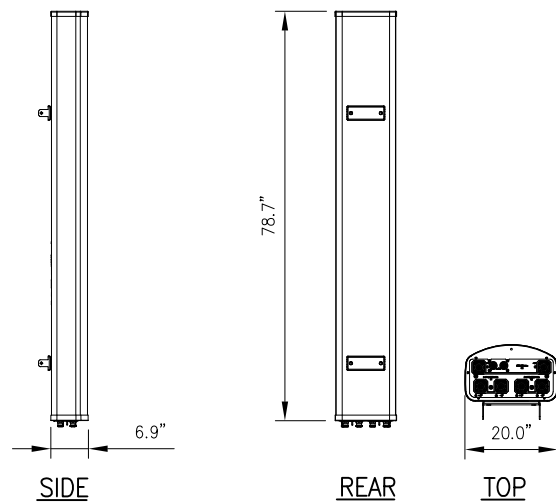
KATHREIN MODEL NO.: 800-10966	
RADOME MATERIAL:	FIBERGLASS,
RADOME COLOR:	LIGHT GRAY
DIMENSIONS, HxWxD:	96.0"x20.0"x6.9"
WEIGHT, W/	
PRE-MOUNTED BRACKETS:	114.6 LBS
CONNECTOR:	7-16 DIN FEMALE

2 ANTENNA DETAIL
-- NOT TO SCALE



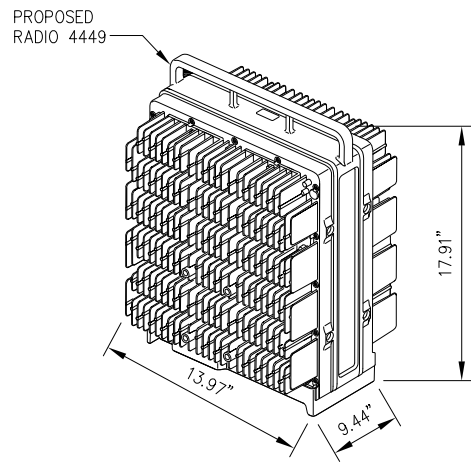
RADIO 8843 SPECIFICATIONS	
• HxWxD, (INCHES) :	14.96"x13.97"x10.90"
• WEIGHT (LBS) :	71.87
• COLOR :	GRAY

6 ERICSSON RADIO 8843 DETAIL
-- NOT TO SCALE



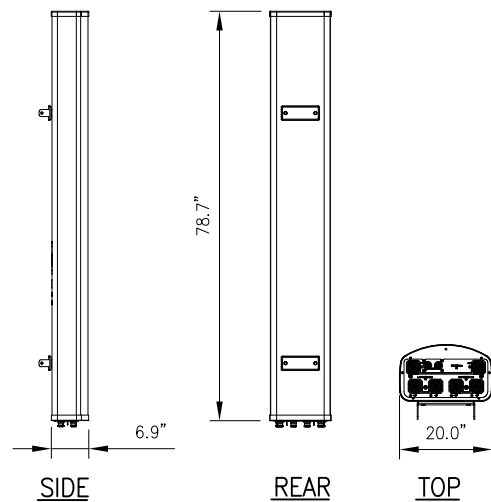
KATHREIN MODEL NO.: 800-10991K	
RADOME MATERIAL:	FIBERGLASS,
RADOME COLOR:	LIGHT GRAY
DIMENSIONS, HxWxD:	78.7"x20.0"x6.9"
WEIGHT, W/	
PRE-MOUNTED BRACKETS:	100.9 LBS
CONNECTOR:	7-16 DIN FEMALE

3 ANTENNA DETAIL
-- NOT TO SCALE



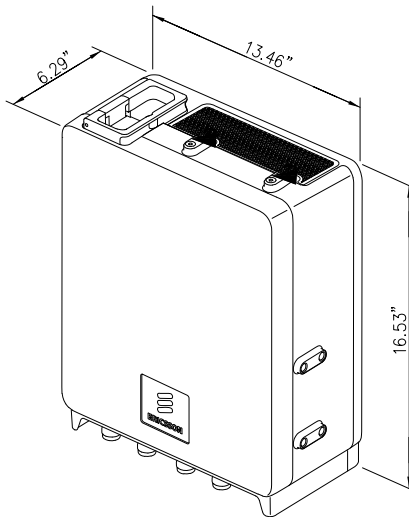
RADIO 4449 SPECIFICATIONS	
• HxWxD, (INCHES) :	17.91"x13.97"x9.44"
• WEIGHT (LBS) :	70.54
• COLOR :	GRAY

7 ERICSSON RADIO 4449 DETAIL
-- NOT TO SCALE



KATHREIN MODEL NO.: 800-10965	
RADOME MATERIAL:	FIBERGLASS,
RADOME COLOR:	LIGHT GRAY
DIMENSIONS, HxWxD:	78.7"x20.0"x6.9"
WEIGHT, W/	
PRE-MOUNTED BRACKETS:	108.6 LBS
CONNECTOR:	7-16 DIN FEMALE

4 ANTENNA DETAIL
-- NOT TO SCALE



RADIO 4415 SPECIFICATIONS	
• HxWxD, (INCHES):	16.53"x13.46"x6.29"
• WEIGHT (LBS):	47.4
• COLOR:	NCS S 1002-B/NCS S 6502-B

8 ERICSSON RADIO 4415 DETAIL
-- NOT TO SCALE

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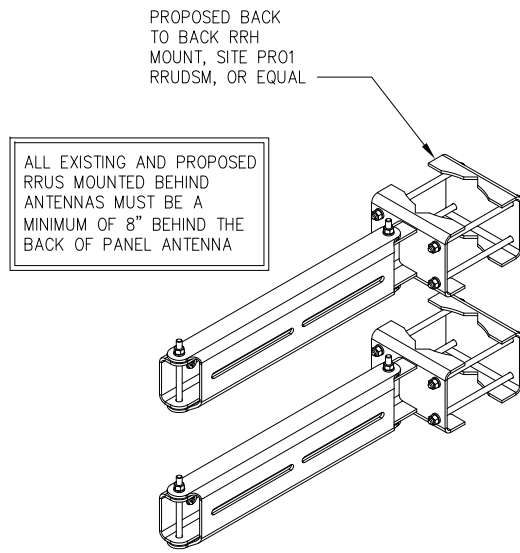
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smartlink

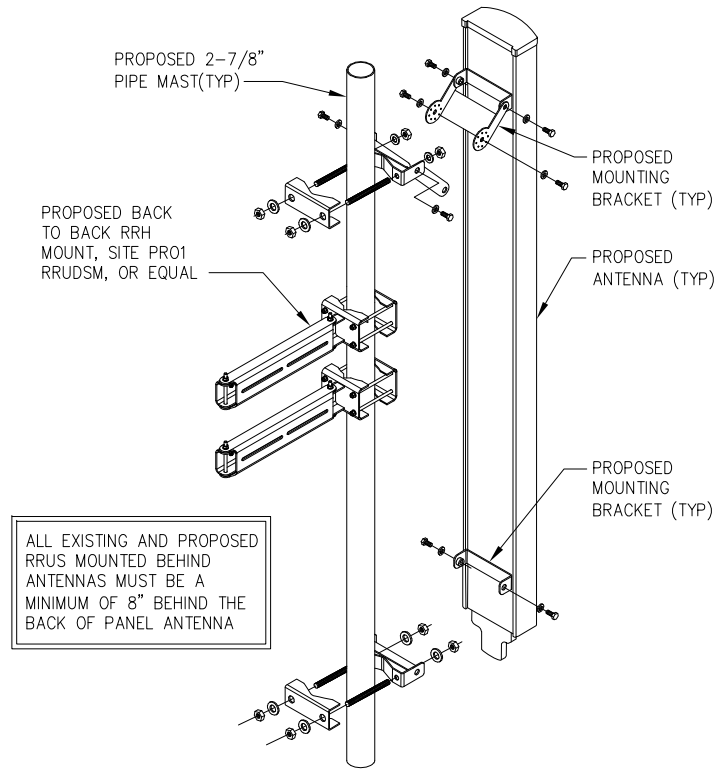
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Date:
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CD

Drawing Title
**EQUIPMENT
DETAILS**

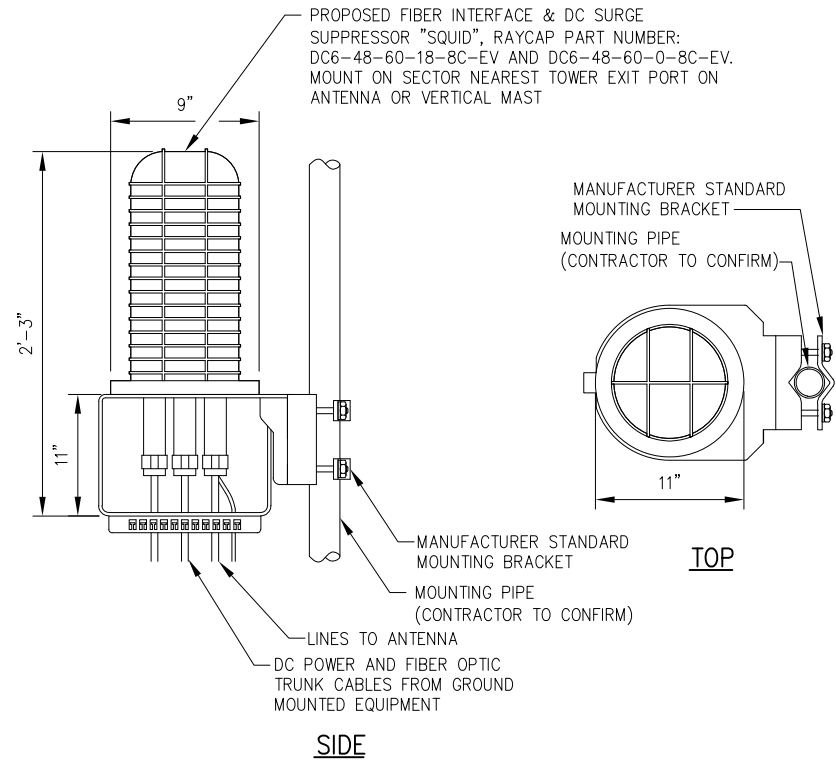
Drawing Number
C5



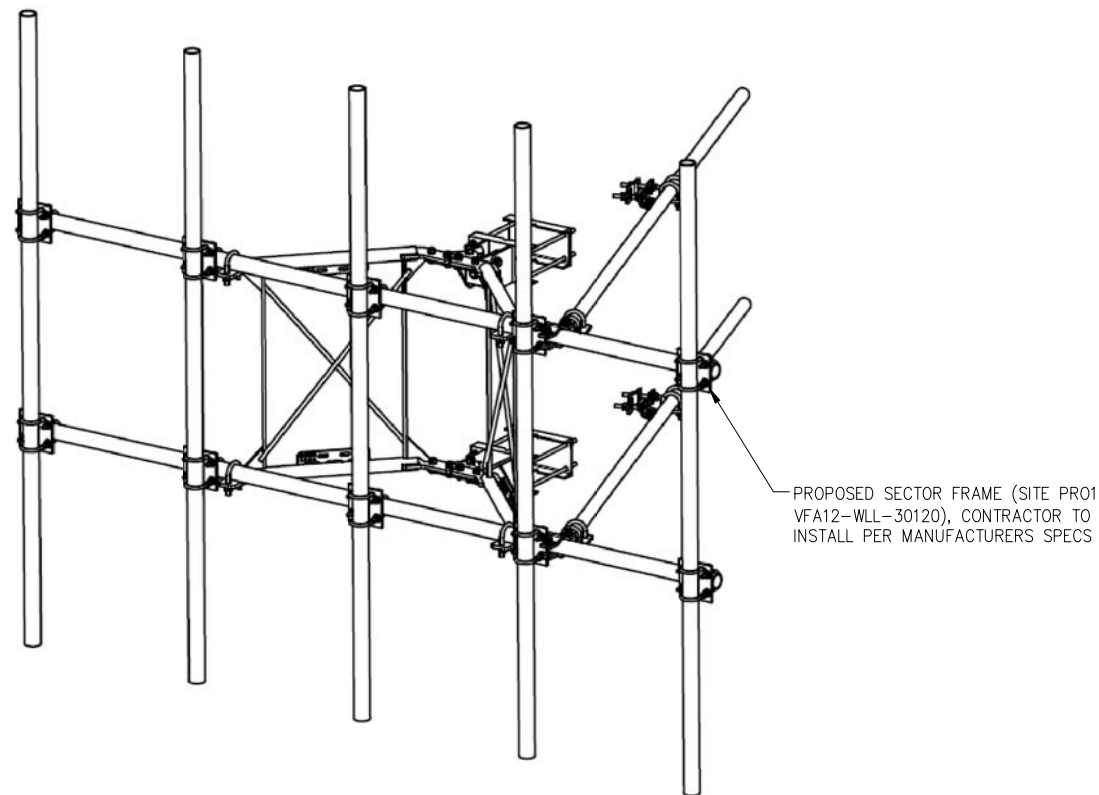
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-- NOT TO SCALE



2 MOUNTING DETAIL
-- NOT TO SCALE



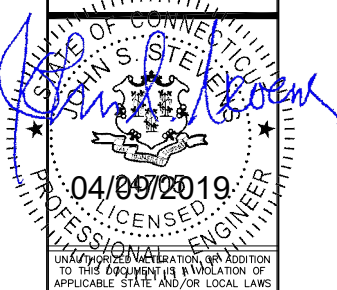
3 SQUID DETAIL
-- NOT TO SCALE



4 SECTOR FRAME DETAIL
-- NOT TO SCALE

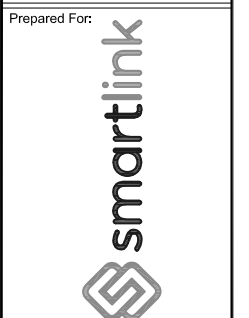
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1033 Watervliet Shaker Rd
Albany, NY 12205
Office # (518) 690-0790
Fax # (518) 690-0793



3	ISSUED FOR PERMIT	BMM	04/09/19
2	ISSUED FOR PERMIT	BMM	03/07/19
1	ISSUED FOR PERMIT	BMM	02/26/19
0	ISSUED FOR REVIEW	BMM	01/31/19
No.	Submittal / Revision	App'd	Date
Drawn:	BMM	Date:	01/31/19
Designed:	ASW	Date:	01/31/19
Checked:	AJD	Date:	01/31/19
Project Number:			
1106-A0001-C			

Project Title:
KILLINGWORTH-RTE 81
CTL02045
FA# 10034999
323 ROUTE 81
KILLINGWORTH, CT 06419

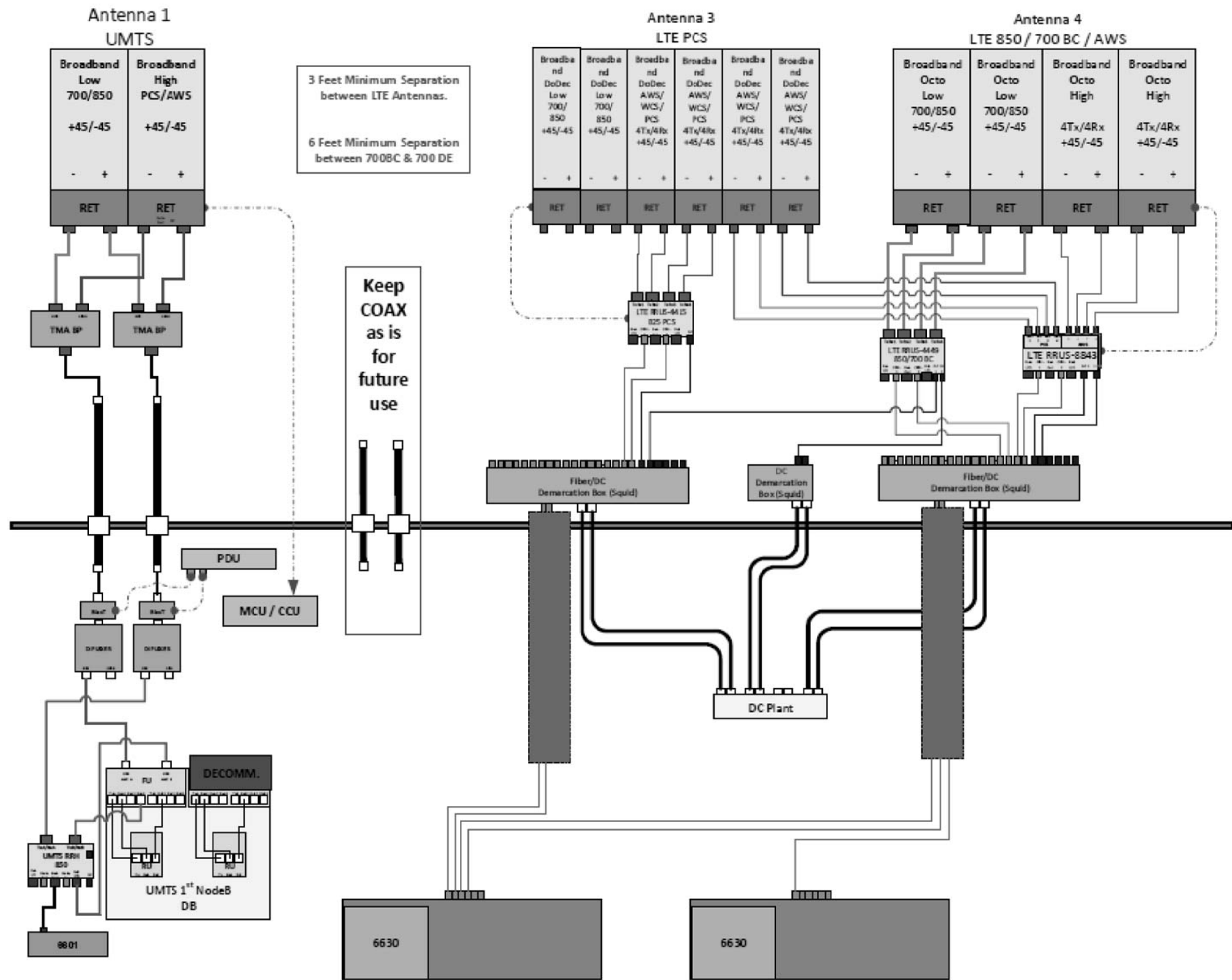


Drawing Scale:
AS NOTED
Date:
04/09/19

CD

Drawing Title
**EQUIPMENT
DETAILS**

Drawing Number
C5A



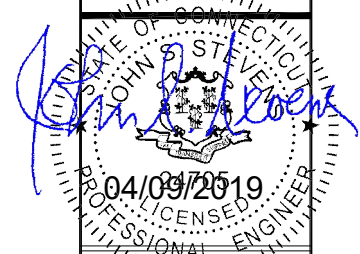
ALPHA/BETA/GAMMA

1 PLUMBING DIAGRAM (FINAL CONFIGURATION)
-- NOT TO SCALE

*BASED ON LTE RFDS, V. 4.0, DATED 01/23/19

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1106-A0001-C			

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KILLINGWORTH-RTE 81
CTL02045
FA# 10034999
323 ROUTE 81
KILLINGWORTH, CT 06419

Prepared For:

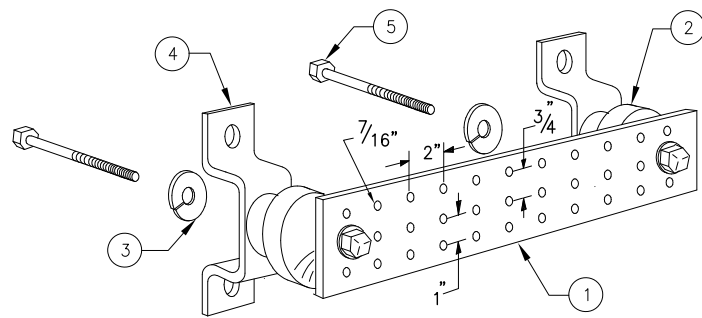


Drawing Scale:
AS NOTED
Date:
04/09/19

CD

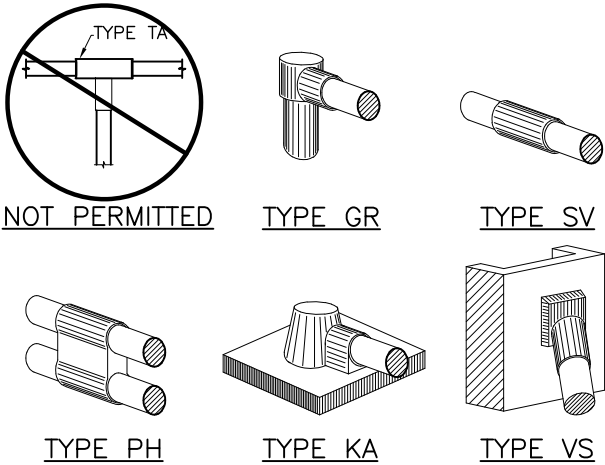
Drawing Title
**PLUMBING
DIAGRAM**

Drawing Number
C6

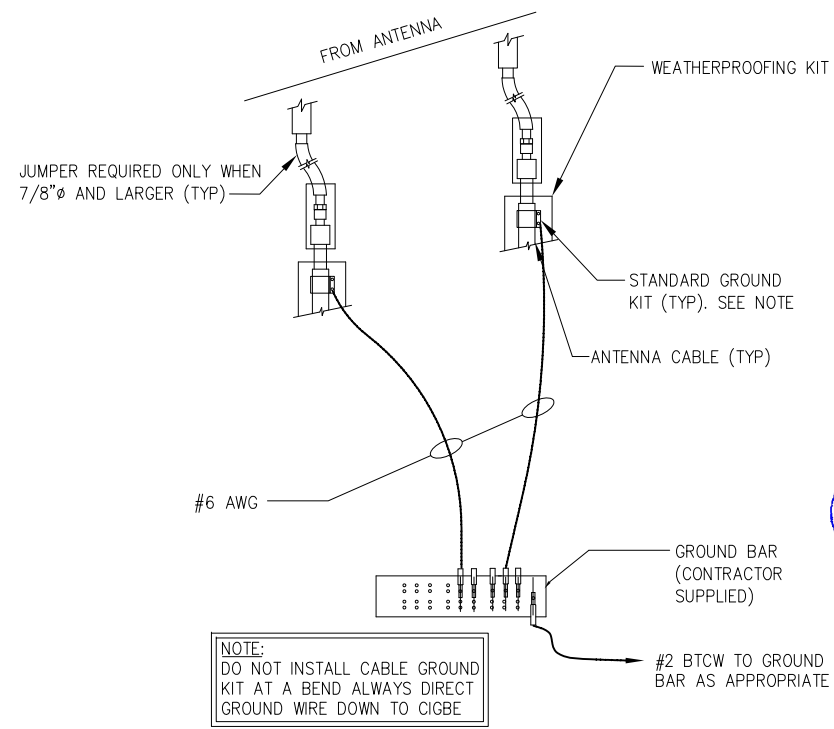


- LEGEND
- 1 - SOLID TINNED COPPER GROUND BAR, 1/4"x 4"x 20" MIN., NEWTON INSTRUMENT CO. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION
 - 2 - INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4
 - 3 - 5/8" LOCKWASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8
 - 4 - WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6056
 - 5 - 5/8-11 X 1" H.H.C.S. BOLTS, NEWTON INSTRUMENT CO. CAT NO. 3012-1
 - 6 - GROUND BAR SHALL BE SIZED TO ACCOMODATE ALL GROUNDING CONNECTIONS REQUIRED PLUS PROVIDE 50% SPARE CAPACITY
 - 7 - GROUND BARS SHALL NEITHER BE FIELD FABRICATED NOR NEW HOLES DRILLED
 - 8 - GROUND LUGS SHALL MATCH THE HOLE SPACING ON THE BAR
 - 9 - HARDWARE DIAMETER SHALL BE MINIMUM 3/8"

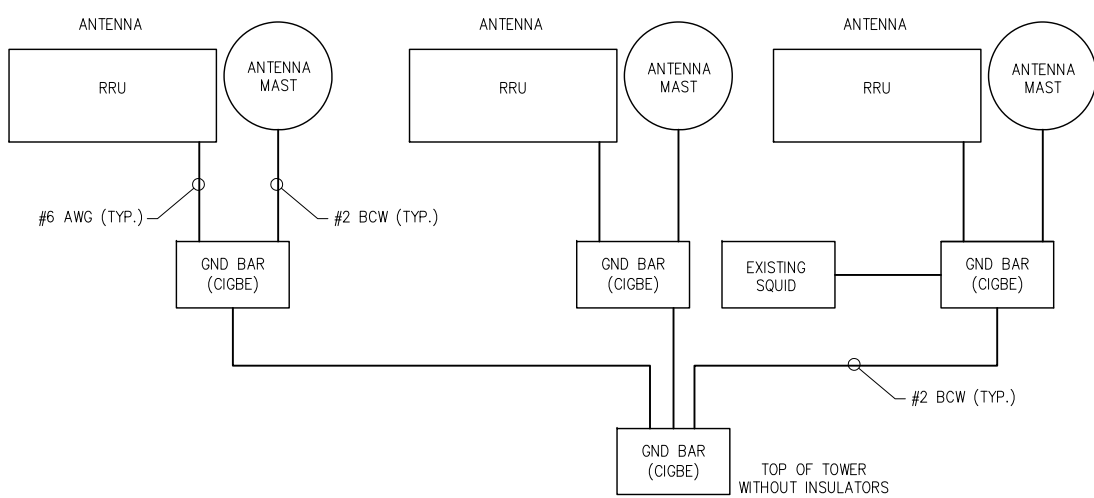
1 GROUND BAR
-- NOT TO SCALE



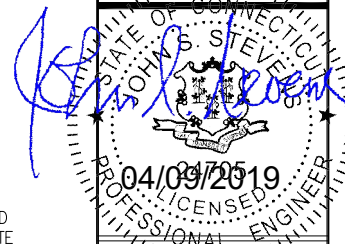
2 CADWELDS (TYPICAL)
-- NOT TO SCALE



3 CONNECTION OF GROUND WIRES TO GROUNDING BARS @ ANTENNAS
-- NOT TO SCALE



4 SCHEMATIC DIAGRAM GROUNDING SYSTEM
-- NOT TO SCALE



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Drawn: BMM Date: 01/31/19
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Project Number:
1106-A0001-C

Project Title:
KILLINGWORTH-RTE 81
CTL02045
FA# 10034999
323 ROUTE 81
KILLINGWORTH, CT 06419

Prepared For:

Drawing Scale: <u>AS NOTED</u>	CD
Date: <u>04/09/19</u>	
Drawing Title GROUNDING DETAILS	
Drawing Number C7	



FROM ZERO TO INFINIGY
the solutions are endless

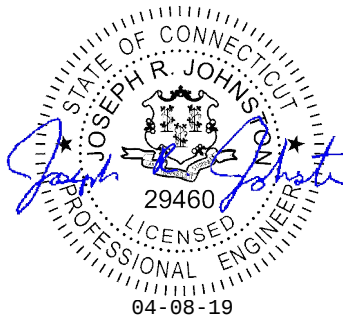
1033 WATERVLIET SHAKER RD, ALBANY, NY 12205

Mount Analysis Report

April 7, 2019

Site Name	Killingworth – RTE 81
Site Number	CTL02045
FA Number	10034999
PACE Number	MRCTB035091/ MRCTB035254/ MRCTB035289/ MRCTB035122
Client	Smartlink
Carrier	AT&T
Infinigy Job Number	499-006
Site Location	323 Route 81 Killingworth, CT 06419 41° 22' 10.07" N NAD83 72° 33' 51.20" W NAD83
Mount Type	Sector Frame
Mount Centerline E.L.	133.0 ft
Passing Mount Usage	72.8%
Overall Result	Pass
Note	Replace existing mounts with (3) SitePro1 VFA12-WLL mounts prior to installation of proposed appurtenances.

Upon reviewing the results of this analysis, it is our opinion that the proposed mount meets the specified TIA code requirements. The proposed antenna mounts and connections are therefore deemed adequate to support the final loading configuration as listed in this report.



Brenden Archer
Project Engineer II

AZ CA CO FL GA MD NC NH NJ NY TX WA



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Introduction.....	3
Supporting Documentation.....	3
Analysis Code Requirements.....	3
Conclusion.....	3
Final Configuration Loading.....	4
Structure Usages.....	4
Mount Connections Reactions.....	4
Assumptions and Limitations.....	5
Calculations.....	Appended

Introduction

Infinigy Engineering has been requested to perform a mount analysis on the existing AT&T mounts. All supporting documents have been obtained from the client and are assumed to be accurate and applicable to this site. The mount was analyzed using RISA-3D Version 17.0.2 analysis software.

Supporting Documentation

Construction Drawings	Infinigy Engineering, Job #499-006, dated January 31, 2019
RFDS	AT&T RFDS ID #2572167, dated January 23, 2019
Previous Tower Analysis	Hudson Design Group, dated November 30, 2012
As-Built Drawings	Hudson Design Group, dated December 7, 2012

Analysis Code Requirements

Wind Speed	101 mph (3-Second Gust, V_{ASD}) / 130 mph (3-Second Gust, V_{ULT})
Wind Speed w/ ice	40 mph (3-Second Gust, V_{ASD}) w/ 1.275" ice
TIA Revision	ANSI/TIA-222-H
Adopted IBC	2015 IBC/ 2018 Connecticut State Building Code
Structure Class	II
Exposure Category	B
Topographic Category	1
Calculated Crest Height	0

Conclusion

Upon reviewing the results of this analysis, it is our opinion that the proposed mount meets the specified TIA code requirements. The proposed antenna mounts and connections are therefore deemed adequate to support the final loading configuration as listed in this report.

If you have any questions, require additional information, or actual conditions differ from those as detailed in this report please contact me via the information below:

Brenden Archer
Project Engineer II | Infinigy
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(O) (518) 690-0790
barcher@infinigy.com | www.infinigy.com

Final Configuration Loading

Mount CL (ft)	Rad. HT (ft)	Verti. O/S (ft)	Hori. O/S (ft) ⁽¹⁾	Qty.	Appurtenance ⁽²⁾⁽³⁾	Carrier
133.0	133.0	0.0	8.0	1	Decibel DB225-A	AT&T
			12.0	3	Powerwave 7770	
			4.0	1	Kathrein 840-370799K	
			4.0	2	Kathrein 800-10991K	
			0.0	1	Kathrein 800-10966	
			0.0	2	Kathrein 800-10965	
			4.0	3	Ericsson RRUS-4415 B25	
			0.0	3	Ericsson RRUS-8843 B2/B66A	
			0.0	3	Ericsson RRUS-4449 B5/B12	
			12.0	6	Powerwave LGP-21401	
			--	3	Raycap DC6-48-60-18-8F	

(1) Horizontal Offset is defined as the distance from the left most edge of the mount face horizontal when viewed facing the tower.

(2) Radios are mounted behind antennas at respective locations see appended documents for vertical locations.

(3) Raycaps are mounted on the tower legs.

Structure Usages

Stand-off	61.6%	Pass
Horizontal	72.8%	Pass
Mount Pipe	43.3%	Pass
Results	72.8%	Pass

Mount Connections

Reaction Data	Design Capacity*	Analysis Reactions	Results
Max Tension (Kips.)	12.34	2.51	20.3%
Max Shear (Kips.)	7.70	1.11	14.4%
Unity Check	--	--	34.7%

*Assumed (2) 1/2" A307 anchors. Contractor to field verify anchors diameter prior to proposed installation.

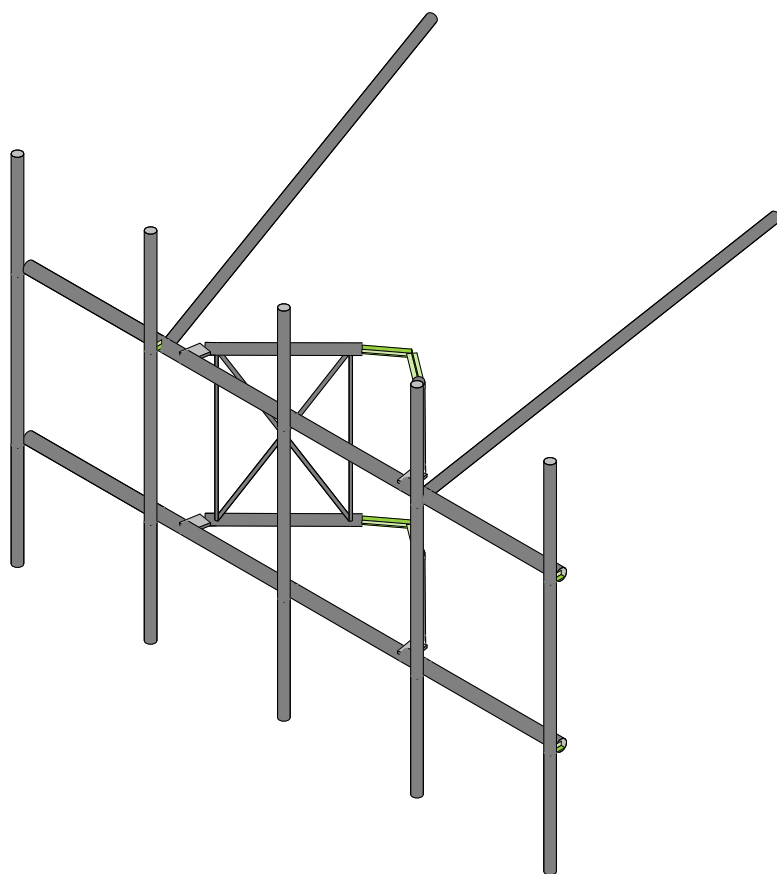
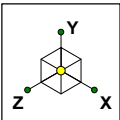
- Anchors reactions are acceptable when compare to code calculated capacities.

Assumptions and Limitations

Our structural calculations are completed assuming all information provided to Infinigy Engineering is accurate and applicable to this site. For the purposes of calculations, we assume an overall structure condition of “like new” and all members and connections to be free of corrosion and/or structural defects. The structure owner and/or contractor shall verify the structure’s condition prior to installation of any proposed equipment. If actual conditions differ from those described in this report Infinigy Engineering should be notified immediately to complete a revised evaluation.

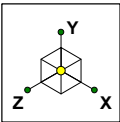
Our evaluation is completed using standard TIA, AISC, ACI, and ASCE methods and procedures. Our structural results are proprietary and should not be used by others as their own. Infinigy Engineering is not responsible for decisions made by others that are or are not based on our supplied assumptions and conclusions.

This report is an evaluation of the proposed carriers mount structure only and does not reflect adequacy of the existing tower, other mounts, or coax mounting attachments. These elements are assumed to be adequate for the purposes of this analysis and are assumed to have been installed per their manufacturer requirements.

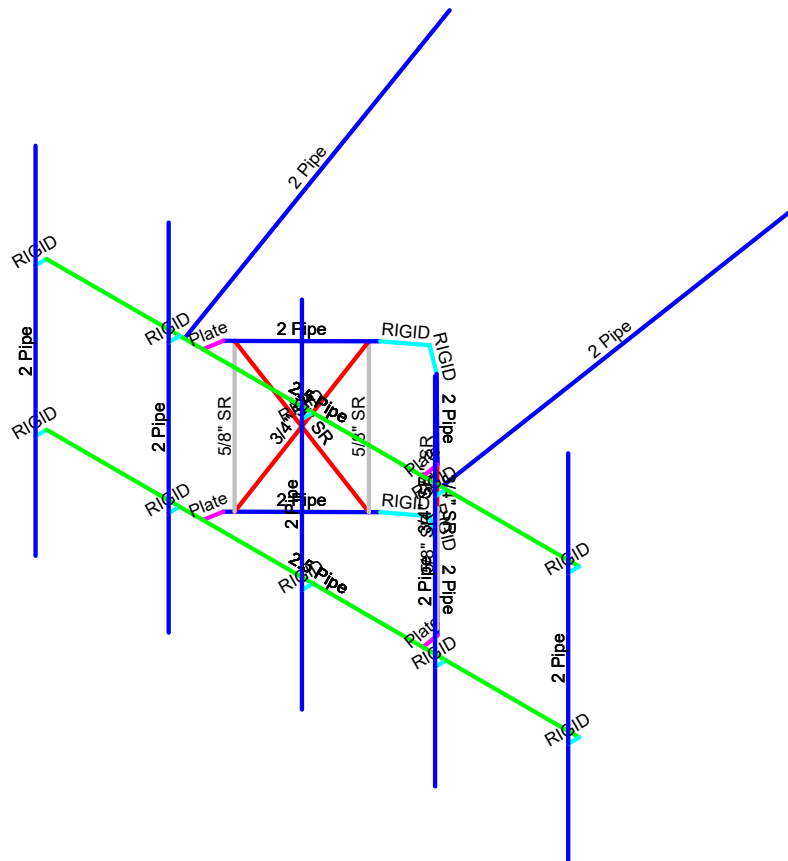


Envelope Only Solution

Infinigy Engineering, PLLC	CTL02045	Final Configuration
BDA		Apr 7, 2019 at 10:17 AM
499-006		Heavy WLL VFA12-HD (TB1).r3d

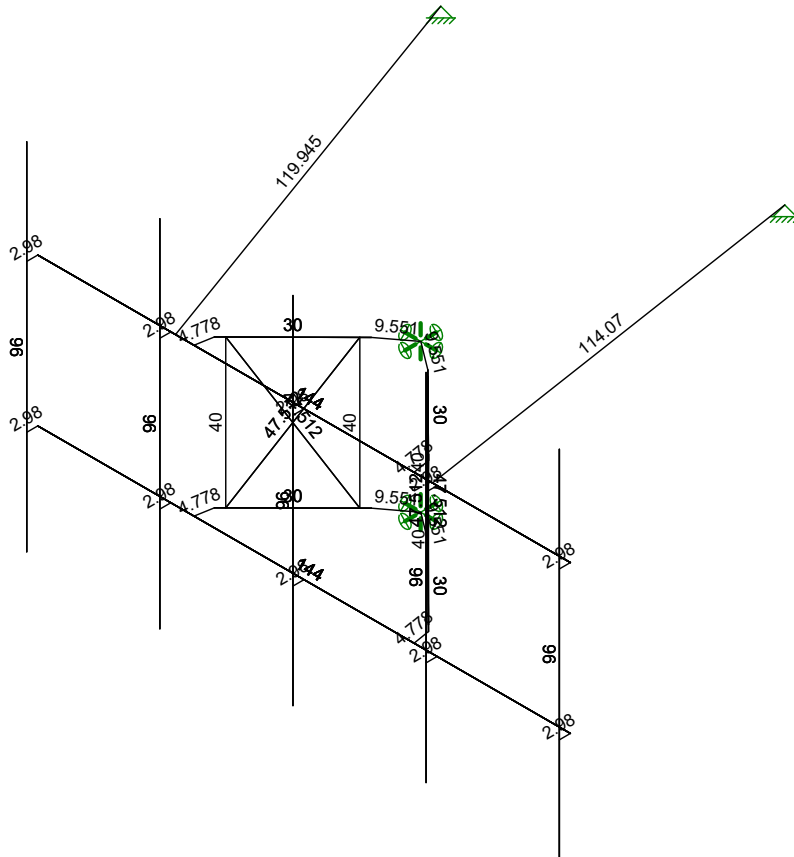


Section Sets	
■	2 Pipe
■	2.5 Pipe
■	3/4" SR
■	5/8" SR
■	Plate
■	RIGID

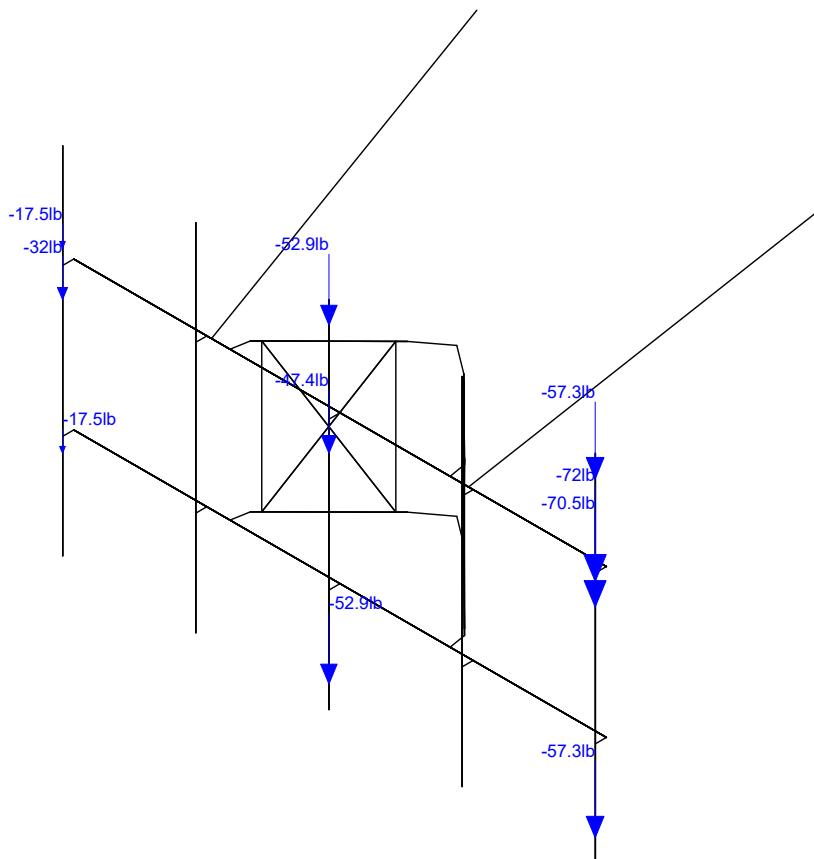
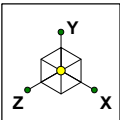


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Infinigy Engineering, PLLC	CTL02045	Final Configuration
BDA		Apr 7, 2019 at 10:17 AM
499-006		Heavy WLL VFA12-HD (TB1).r3d

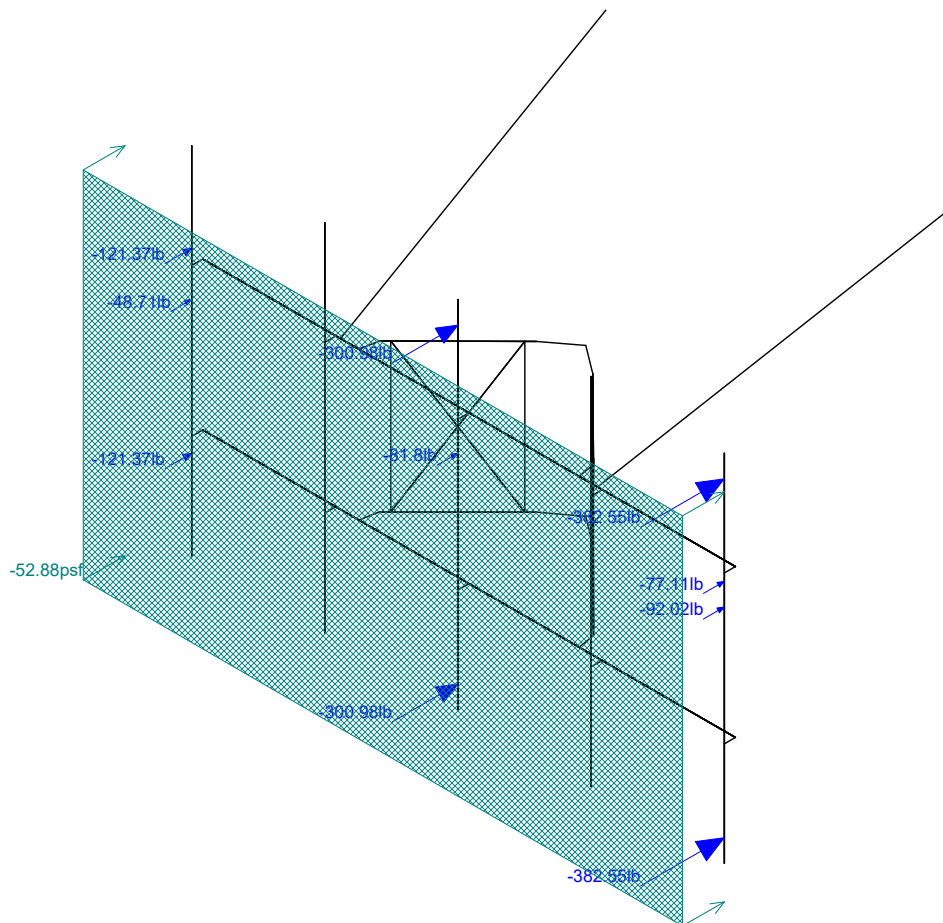
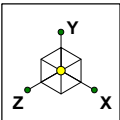


Heavy WLL VFA12-HD (TB1).r3d



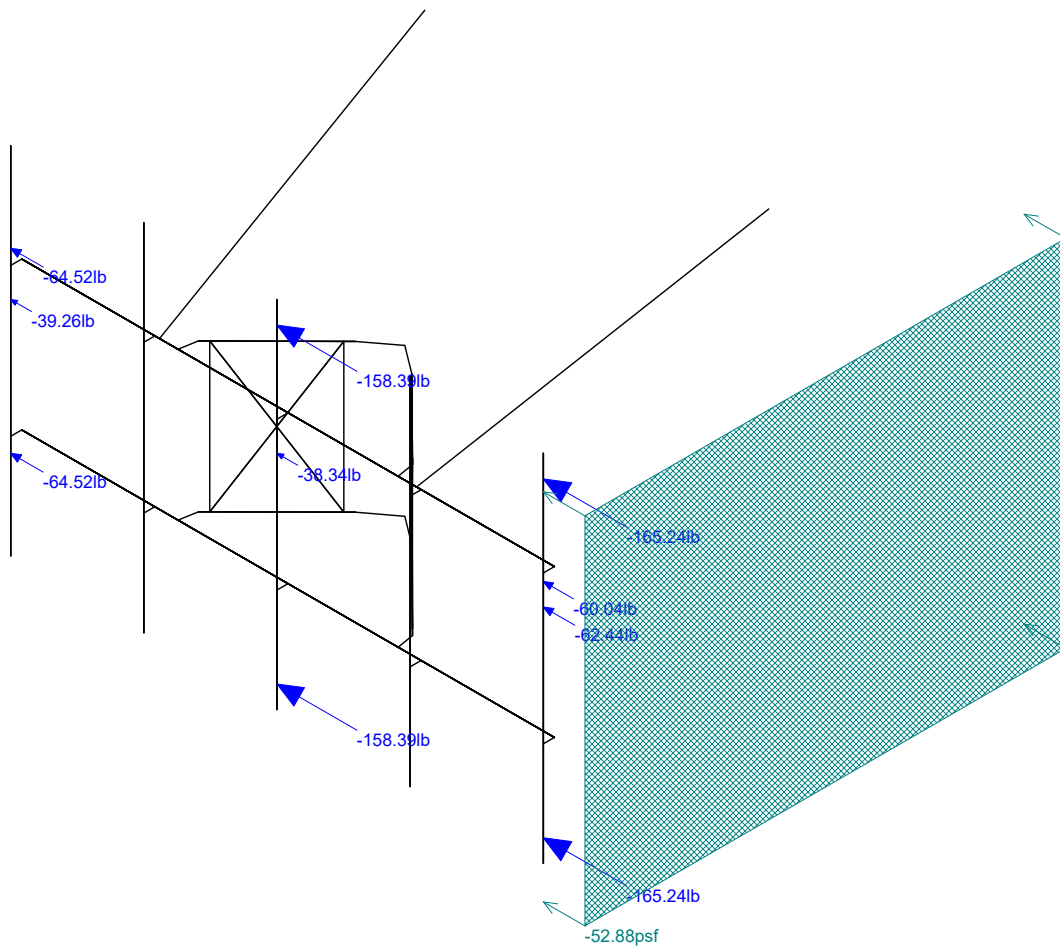
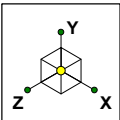
Loads: BLC 1, Self Weight
Envelope Only Solution

Infinigy Engineering, PLLC	CTL02045	Final Configuration
BDA		Apr 7, 2019 at 10:18 AM
499-006		Heavy WLL VFA12-HD (TB1).r3d



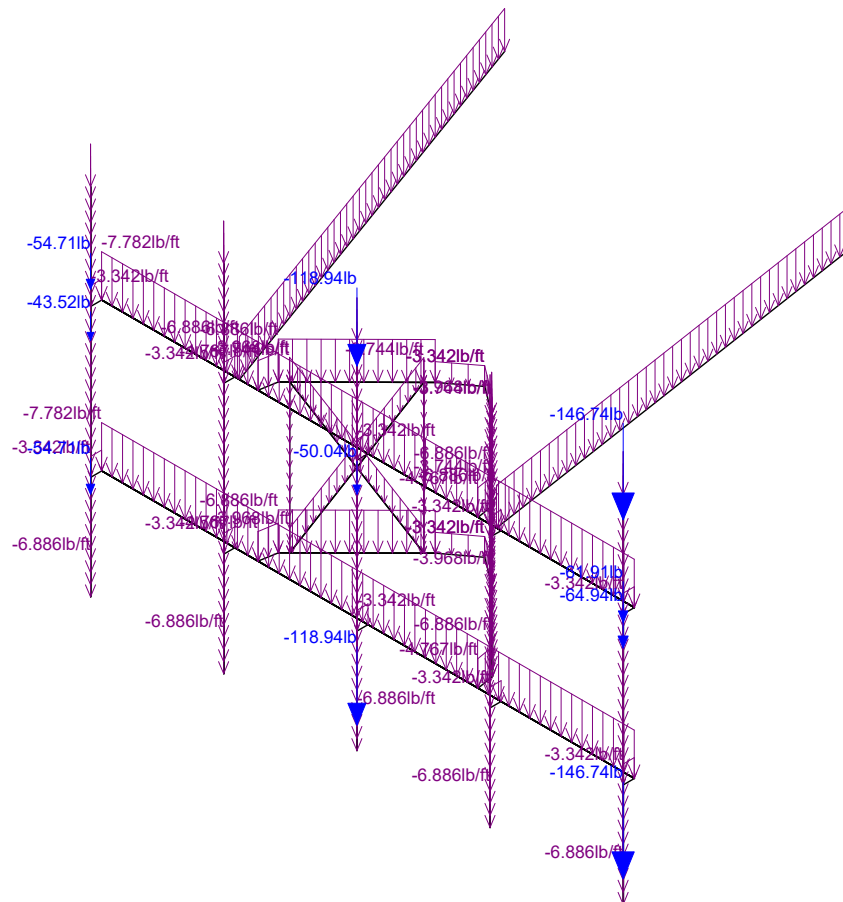
Loads: BLC 2, Wind Load AZI 000
Envelope Only Solution

Infinigy Engineering, PLLC	CTL02045	Final Configuration
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499-006		Heavy WLL VFA12-HD (TB1).r3d

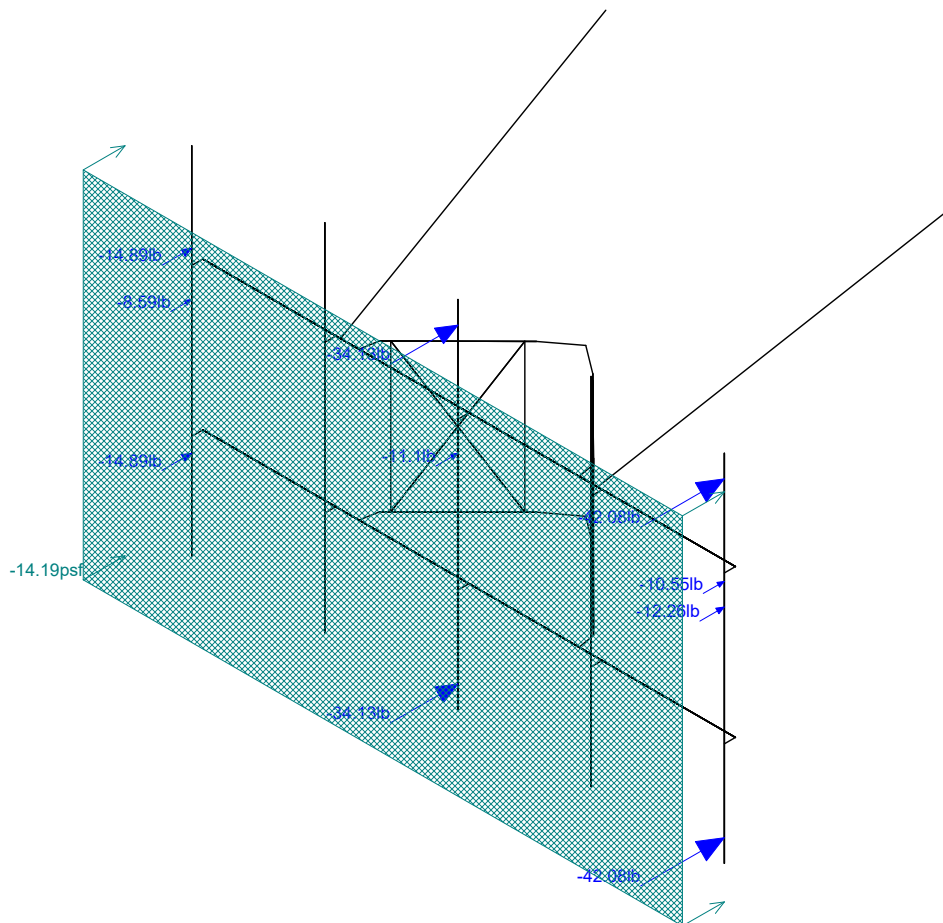
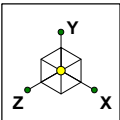


Loads: BLC 3, Wind Load AZI 090
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Infinigy Engineering, PLLC	CTL02045	Final Configuration
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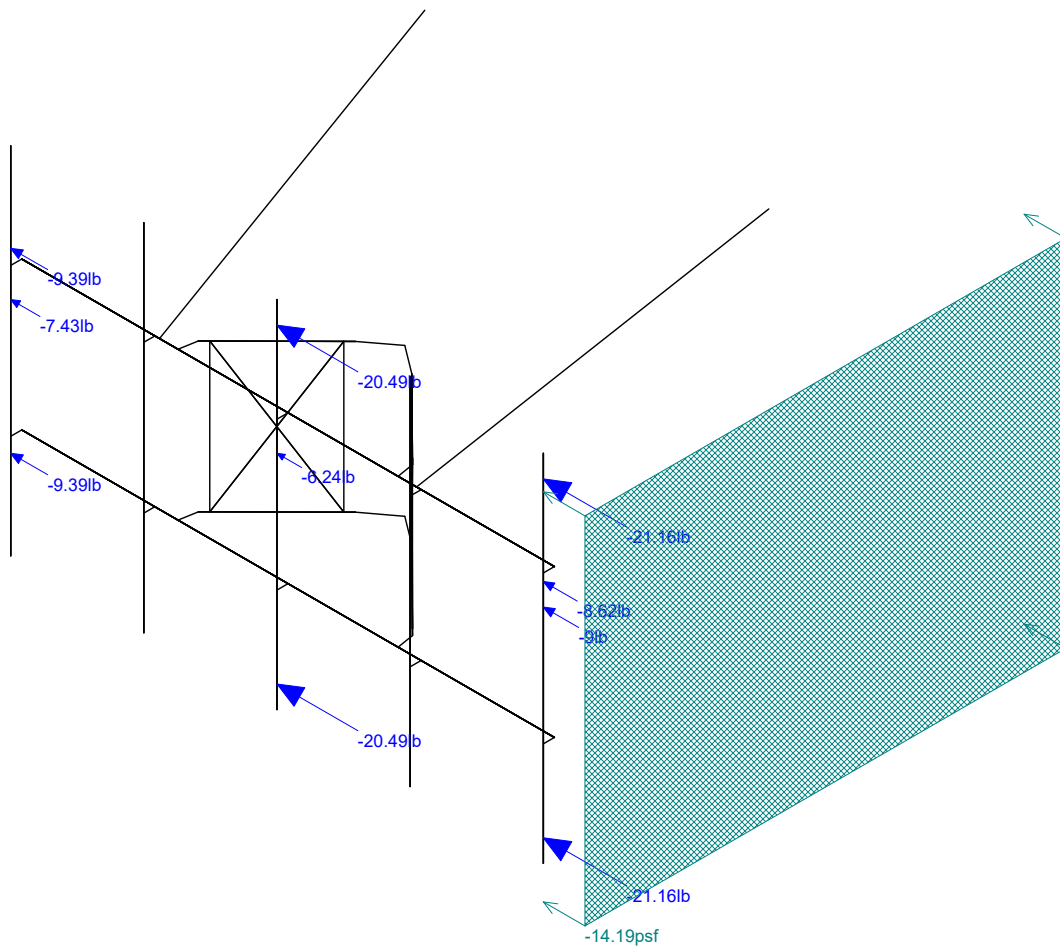
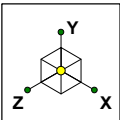


Heavy WLL VFA12-HD (TB1).r3d



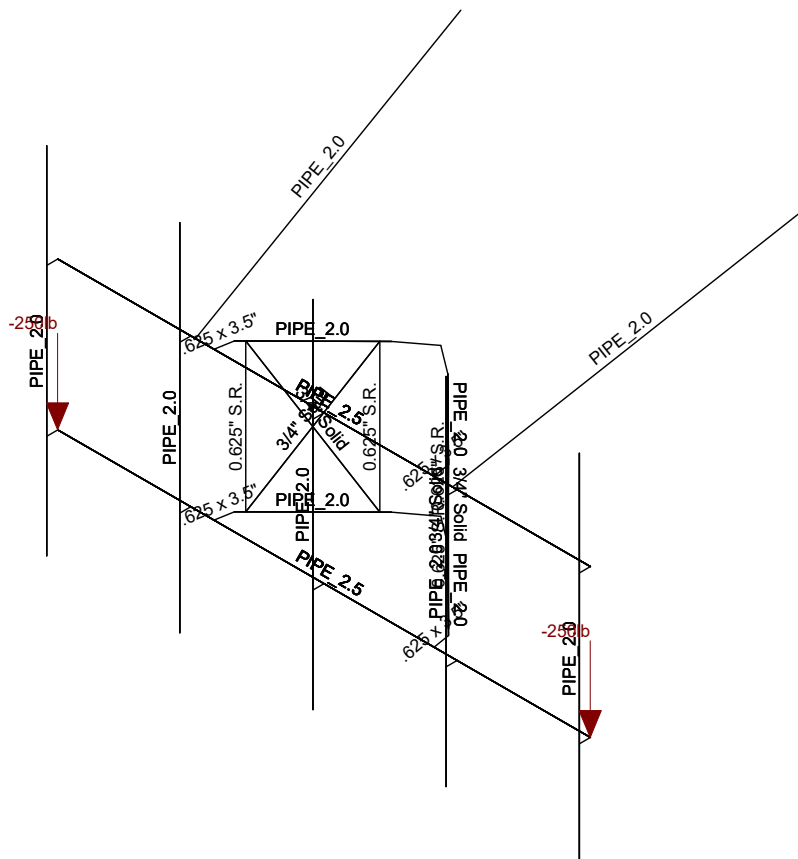
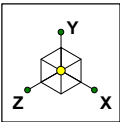
Loads: BLC 5, Wind + Ice Load AZI 000
Envelope Only Solution

Infinigy Engineering, PLLC	CTL02045	Final Configuration
BDA		Apr 7, 2019 at 10:18 AM
499-006		Heavy WLL VFA12-HD (TB1).r3d



Loads: BLC 6, Wind + Ice Load AZI 090
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Infinigy Engineering, PLLC	CTL02045	Final Configuration
BDA		Apr 7, 2019 at 10:18 AM
499-006		Heavy WLL VFA12-HD (TB1).r3d



Loads: BLC 7, Service Live 1
Envelope Only Solution

Infinigy Engineering, PLLC	CTL02045	Final Configuration
BDA		Apr 7, 2019 at 10:18 AM
499-006		Heavy WLL VFA12-HD (TB1).r3d

Site Name: **CTL02045**
 Client: **Smartlink**
 Carrier: **AT&T**
 Engineer: **BDA**
 Date: **4/7/2019**



INFINIGY WIND LOAD CALCULATOR 3.0.2

Site Information Inputs:

Adopted Building Code: **2015 IBC**
 Structure Load Standard: **TIA-222-H**
 Antenna Load Standard: **TIA-222-H**
 Structure Risk Category: **II**
 Structure Type: **Mount - Sector**
 Number of Sectors: **3**
 Structure Shape 1: **Round**

Rooftop Inputs:

Rooftop Wind Speed-Up?: **No**

Wind Loading Inputs:

Design Wind Velocity: **130** mph (ultimate 3-second gust)
 Wind Centerline 1 (z_1): **133.0** ft
 Side Face Angle (θ): **60** degrees
 Exposure Category: **B**
 Topographic Category: **1**

Wind with No Ice		
q_z (psf)	Gh	F_{ST} (psf)
44.07	1.00	52.88

Wind with Ice		
q_z (psf)	Gh	F_{ST} (psf)
4.17	1.00	14.19

Ice Loading Inputs:

Is Ice Loading Needed?: **Yes**
 Ice Wind Velocity: **40** mph (ultimate 3-second gust)
 Base Ice Thickness: **1.275** in

Input Appurtenance Information and Load Placements:

Appurtenance Name	Elevation (ft)	Total Quantity	K_a	Front Shape	Side Shape	q_z (psf)	EPA (ft^2)	F_z (lbs)	F_x (lbs)	$F_z(60)$ (lbs)	$F_x(30)$ (lbs)
Powerwave 7770	133.0	3	1.00	Flat	Flat	44.07	5.51	242.73	129.03	157.46	214.31
Kathrein 840-370799K	133.0	1	1.00	Flat	Flat	44.07	13.66	601.96	316.78	388.08	530.67
Kathrein 800-10991K	133.0	2	1.00	Flat	Flat	44.07	13.81	608.71	257.04	344.96	520.79
Kathrein 800-10966	133.0	1	1.00	Flat	Flat	44.07	17.36	765.10	330.49	439.14	656.45
Kathrein 800-10965	133.0	2	1.00	Flat	Flat	44.07	13.81	608.71	257.04	344.96	520.79
Ericsson RRUS-4415 B25	133.0	3	1.00	Flat	Flat	44.07	1.86	81.80	38.34	49.20	70.93
Ericsson RRUS-4449 B5/B12	133.0	3	1.00	Flat	Flat	44.07	2.09	92.02	62.44	69.84	84.63
Ericsson RRUS-8843 B2/B66A	133.0	3	1.00	Flat	Flat	44.07	1.75	77.11	60.04	64.31	72.85
Powerwave LGP-21401	133.0	6	1.00	Flat	Flat	44.07	0.55	24.36	19.63	20.81	23.18
Raycap DC6-48-60-18-8F	133.0	3	1.00	Round	Round	44.07	1.21	53.39	53.39	53.39	53.39
Decibel DB225-A	133.0	1	1.00	Round	Round	44.07	2.85	125.71	125.71	125.71	125.71

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	N6	N2		90	RIGID	None	None	RIGID	Typical
2	M3	N5	N3		90	RIGID	None	None	RIGID	Typical
3	M5	N5	N8		90	RIGID	None	None	RIGID	Typical
4	M7	N6	N9		90	RIGID	None	None	RIGID	Typical
5	M2	N12	N1		90	Plate	Beam	None	A36 Gr.36	Typical
6	M4	N17	N4		90	Plate	Beam	None	A36 Gr.36	Typical
7	M6	N16	N7		90	Plate	Beam	None	A36 Gr.36	Typical
8	M8	N13	N10		90	Plate	Beam	None	A36 Gr.36	Typical
9	TB1	TF5	TL5			2 Pipe	Beam	Pipe	A53-b	Typical
10	M14	N11	N14			2.5 Pipe	Beam	Pipe	A53-b	Typical
11	M15	N18	N15			2.5 Pipe	Beam	Pipe	A53-b	Typical
12	M16	N1	N2			2 Pipe	Beam	Pipe	A53-b	Typical
13	M17	N4	N3			2 Pipe	Beam	Pipe	A53-b	Typical
14	M18	N7	N8			2 Pipe	Beam	Pipe	A53-b	Typical
15	M19	N10	N9			2 Pipe	Beam	Pipe	A53-b	Typical
16	M24	N50	N51			5/8" SR	Beam	BAR	A36 Gr.36	Typical
17	M25	N54A	N55A			5/8" SR	Beam	BAR	A36 Gr.36	Typical
18	M26	N57A	N56A			5/8" SR	Beam	BAR	A36 Gr.36	Typical
19	M27	N53	N52			5/8" SR	Beam	BAR	A36 Gr.36	Typical
20	M28	N57A	N52			3/4" SR	Beam	BAR	A36 Gr.36	Typical
21	M29	N56A	N53			3/4" SR	Beam	BAR	A36 Gr.36	Typical
22	M30	N51	N54A			3/4" SR	Beam	BAR	A36 Gr.36	Typical
23	M31	N50	N55A			3/4" SR	Beam	BAR	A36 Gr.36	Typical
24	TB2	TF6	TL4			2 Pipe	Beam	Pipe	A53-b	Typical
25	MP1	N60	N56			2 Pipe	Beam	Pipe	A53-b	Typical
26	MP2	N61	N57			2 Pipe	Beam	Pipe	A53-b	Typical
27	MP4	N59	N55B			2 Pipe	Beam	Pipe	A53-b	Typical
28	MP5	N58	N54B			2 Pipe	Beam	Pipe	A53-b	Typical
29	M33	N51A	N11			RIGID	None	None	RIGID	Typical
30	M34	N48	N18			RIGID	None	None	RIGID	Typical
31	M35	N52B	N52A			RIGID	None	None	RIGID	Typical
32	M36	N53B	N53A			RIGID	None	None	RIGID	Typical
33	M37A	N46	N55			RIGID	None	None	RIGID	Typical
34	M38	N47	N54			RIGID	None	None	RIGID	Typical
35	M39A	N50A	N14			RIGID	None	None	RIGID	Typical
36	M40A	N49	N15			RIGID	None	None	RIGID	Typical
37	MP3	N59A	N58A			2 Pipe	Beam	Pipe	A53-b	Typical
38	M38A	N61A	N57B			RIGID	None	None	RIGID	Typical
39	M39	N60A	N56B			RIGID	None	None	RIGID	Typical

Material Takeoff

	Material	Size	Pieces	Length[in]	Weight[K]
1	General				
2	RIGID		14	68	0
3	Total General		14	68	0
4					
5	Hot Rolled Steel				
6	A36 Gr.36	.625 x 3.5"	4	19.1	0
7	A36 Gr.36	3/4" Solid	4	190	0
8	A36 Gr.36	0.625" S.R.	4	160	0
9	A53-b	PIPE 2.0	11	834	.2
10	A53-b	PIPE 2.5	2	288	.1
11	Total HR Steel		25	1491.2	.4

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...)	Surface(...)
1	Self Weight	DL		-1			10			
2	Wind Load AZI 000	WLZ					10		1	
3	Wind Load AZI 090	WLX					10		1	
4	Ice Weight	OL1					10	39		
5	Wind + Ice Load AZI 000	OL2					10		1	
6	Wind + Ice Load AZI 090	OL3					10		1	
7	Service Live 1	LL				2				
8	Seismic Load AZI 000	ELZ								
9	Seismic Load AZI 090	ELX								
10	BLC 2 Transient Area Loads	None						27		
11	BLC 3 Transient Area Loads	None						35		
12	BLC 5 Transient Area Loads	None						27		
13	BLC 6 Transient Area Loads	None						35		

Load Combinations

	Description	S...P...	S...B...Fa...	BLC	Fac...	BLC Fa...	B...F...	B...F...	B...F...	B...F...	B...F...	B...F...	B...F...	B...F...	B...F...
1	1.4D	Y...Y	DL 1.4												
2	1.2D + 1W AZI 000	Y...Y	DL 1.2 WLZ 1												
3	1.2D + 1W AZI 030	Y...Y	DL 1.2 WLZ .866 W...		.5										
4	1.2D + 1W AZI 060	Y...Y	DL 1.2 WLZ .5 W...		.866										
5	1.2D + 1W AZI 090	Y...Y	DL 1.2 W...		1										
6	1.2D + 1W AZI 120	Y...Y	DL 1.2 WLZ -.5 W...		.866										
7	1.2D + 1W AZI 150	Y...Y	DL 1.2 WLZ -.866 W...		.5										
8	1.2D + 1W AZI 180	Y...Y	DL 1.2 WLZ -1												
9	1.2D + 1W AZI 210	Y...Y	DL 1.2 WLZ -.866 W...		-.5										
10	1.2D + 1W AZI 240	Y...Y	DL 1.2 WLZ -.5 W...		-.866										
11	1.2D + 1W AZI 270	Y...Y	DL 1.2 W...		-1										
12	1.2D + 1W AZI 300	Y...Y	DL 1.2 WLZ .5 W...		-.866										
13	1.2D + 1W AZI 330	Y...Y	DL 1.2 WLZ .866 W...		-.5										
14	0.9D + 1W AZI 000	Y...Y	DL .9 WLZ 1												
15	0.9D + 1W AZI 030	Y...Y	DL .9 WLZ .866 W...		.5										
16	0.9D + 1W AZI 060	Y...Y	DL .9 WLZ .5 W...		.866										
17	0.9D + 1W AZI 090	Y...Y	DL .9 W...		1										
18	0.9D + 1W AZI 120	Y...Y	DL .9 WLZ -.5 W...		.866										
19	0.9D + 1W AZI 150	Y...Y	DL .9 WLZ -.866 W...		.5										
20	0.9D + 1W AZI 180	Y...Y	DL .9 WLZ -1												
21	0.9D + 1W AZI 210	Y...Y	DL .9 WLZ -.866 W...		-.5										
22	0.9D + 1W AZI 240	Y...Y	DL .9 WLZ -.5 W...		-.866										
23	0.9D + 1W AZI 270	Y...Y	DL .9 W...		-1										
24	0.9D + 1W AZI 300	Y...Y	DL .9 WLZ .5 W...		-.866										
25	0.9D + 1W AZI 330	Y...Y	DL .9 WLZ .866 W...		-.5										
26	1.2D + 1.0Di	Y...Y	DL 1.2 OL1 1												
27	1.2D + 1.0Di + 1.0Wi AZI 000	Y...Y	DL 1.2 OL1 1 OL2 1												
28	1.2D + 1.0Di + 1.0Wi AZI 030	Y...Y	DL 1.2 OL1 1 OL2 .866 ...		.5										
29	1.2D + 1.0Di + 1.0Wi AZI 060	Y...Y	DL 1.2 OL1 1 OL2 .5 ...		.8...										
30	1.2D + 1.0Di + 1.0Wi AZI 090	Y...Y	DL 1.2 OL1 1 ...		1										
31	1.2D + 1.0Di + 1.0Wi AZI 120	Y...Y	DL 1.2 OL1 1 OL2 -.5 ...		.8...										
32	1.2D + 1.0Di + 1.0Wi AZI 150	Y...Y	DL 1.2 OL1 1 OL2 -.866 ...		.5										
33	1.2D + 1.0Di + 1.0Wi AZI 180	Y...Y	DL 1.2 OL1 1 OL2 -1												
34	1.2D + 1.0Di + 1.0Wi AZI 210	Y...Y	DL 1.2 OL1 1 OL2 -.866 ...		-.5										
35	1.2D + 1.0Di + 1.0Wi AZI 240	Y...Y	DL 1.2 OL1 1 OL2 -.5 ...		-.5										
36	1.2D + 1.0Di + 1.0Wi AZI 270	Y...Y	DL 1.2 OL1 1 ...		-1										
37	1.2D + 1.0Di + 1.0Wi AZI 300	Y...Y	DL 1.2 OL1 1 OL2 .5 ...		-.5										
38	1.2D + 1.0Di + 1.0Wi AZI 330	Y...Y	DL 1.2 OL1 1 OL2 .866 ...		-.5										

Load Combinations (Continued)

	Description	S...	P...	S...B...	Fa...	BLC	Fac...	BLC	Fa...	B...	F...	B...	F...	B...	F...	B...	F...	B...	F...
39	1.2D + 1.5L + 1.0WL (30 mph) AZI 000	Y...	Y	DL	1.2	LL	1.5	WLZ	.053										
40	1.2D + 1.5L + 1.0WL (30 mph) AZI 030	Y...	Y	DL	1.2	LL	1.5	WLZ	.046	...	.0...								
41	1.2D + 1.5L + 1.0WL (30 mph) AZI 060	Y...	Y	DL	1.2	LL	1.5	WLZ	.027	...	.0...								
42	1.2D + 1.5L + 1.0WL (30 mph) AZI 090	Y...	Y	DL	1.2	LL	1.5			...	.0...								
43	1.2D + 1.5L + 1.0WL (30 mph) AZI 120	Y...	Y	DL	1.2	LL	1.5	WLZ	-.027	...	.0...								
44	1.2D + 1.5L + 1.0WL (30 mph) AZI 150	Y...	Y	DL	1.2	LL	1.5	WLZ	-.046	...	.0...								
45	1.2D + 1.5L + 1.0WL (30 mph) AZI 180	Y...	Y	DL	1.2	LL	1.5	WLZ	-.053										
46	1.2D + 1.5L + 1.0WL (30 mph) AZI 210	Y...	Y	DL	1.2	LL	1.5	WLZ	-.046	...	----								
47	1.2D + 1.5L + 1.0WL (30 mph) AZI 240	Y...	Y	DL	1.2	LL	1.5	WLZ	-.027	...	----								
48	1.2D + 1.5L + 1.0WL (30 mph) AZI 270	Y...	Y	DL	1.2	LL	1.5			...	----								
49	1.2D + 1.5L + 1.0WL (30 mph) AZI 300	Y...	Y	DL	1.2	LL	1.5	WLZ	.027	...	----								
50	1.2D + 1.5L + 1.0WL (30 mph) AZI 330	Y...	Y	DL	1.2	LL	1.5	WLZ	.046	...	----								

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	N6	max	1112.608	18	2512.679	34	1110.941	19	-325.676	20	0	50	643.064	5
2		min	-1714.839	12	708.687	15	-2459.863	13	-1486.838	27	0	1	-207.506	23
3	N5	max	868.479	5	155.089	28	1823.54	27	270.204	8	0	50	108.976	32
4		min	-311.801	23	-18.685	21	-632.639	20	-268.868	14	0	1	-30.689	25
5	TL4	max	278.628	3	47.928	35	746.794	3	0	50	0	50	0	50
6		min	-248.253	21	2.328	16	-666.275	21	0	1	0	1	0	1
7	TL5	max	445.031	13	48.338	32	2816.483	13	0	50	0	50	0	50
8		min	-428.879	19	-2.499	25	-2689.707	19	0	1	0	1	0	1
9	Totals:	max	1730.488	5	2745.367	38	2818.974	2						
10		min	-1730.488	11	809.642	19	-2818.934	20						

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

	Member	Shape	Code	Che...	Loc[in]	LC	Shear Ch...	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*P...	phi*M...	phi*M.....	Eqn
1	M14	PIPE 2.5	.728	106.105	8	.269	106.105			7	30825.381	50715	3596....	3596.....	H1-1b
2	M18	PIPE 2.0	.616	30	8	.229	1.579			8	31128.673	32130	1871....	1871.....	H1-1b
3	M19	PIPE 2.0	.495	0	8	.188	30			32	31128.673	32130	1871....	1871.....	H1-1b
4	M17	PIPE 2.0	.469	30	8	.099	1.579			9	31128.673	32130	1871....	1871.....	H1-1b
5	M6	.625 x 3.5"	.461	0	8	.416	4.778		y	8	69777.888	70875	922.8...	5167.....	H1-1b
6	MP5	PIPE 2.0	.433	65.684	8	.067	65.684			8	14916.096	32130	1871....	1871.....	H1-1b
7	M8	.625 x 3.5"	.397	0	32	.202	4.778		y	8	69777.888	70875	922.8...	5167.....	H1-1b
8	M27	0.625" S.R.	.388	0	30	.068	0			8	4134.294	9946.8	96.768	96.768	1 H1-1a
9	MP3	PIPE 2.0	.313	65.684	4	.050	65.684			3	14916.096	32130	1871....	1871.....	H1-1b
10	MP4	PIPE 2.0	.295	65.684	13	.200	65.684			8	14916.096	32130	1871....	1871.....	H1-1b
11	M15	PIPE 2.5	.279	109.895	2	.188	109.895			8	30825.381	50715	3596....	3596.....	H1-1b
12	TB1	PIPE 2.0	.278	0	25	.008	0			12	16061.133	32130	1871....	1871.....	H1-1b
13	M16	PIPE 2.0	.273	30	8	.110	30			35	31128.673	32130	1871....	1871.....	H1-1b
14	M4	.625 x 3.5"	.267	0	9	.120	4.778		y	46	69777.888	70875	922.8...	5167.....	H1-1b
15	MP1	PIPE 2.0	.187	30.316	50	.040	65.684			44	14916.096	32130	1871....	1871.....	H1-1b
16	MP2	PIPE 2.0	.187	65.684	41	.053	30.316			46	14916.096	32130	1871....	1871.....	H1-1b
17	M2	.625 x 3.5"	.166	0	13	.128	0		y	47	69777.888	70875	922.8...	5167.....	H1-1b
18	M28	3/4" Solid	.156	0	7	.060	47.512			8	3789.856	1432...	184.32	184.32	H1-1b
19	TB2	PIPE 2.0	.126	0	4	.007	0			30	14926.593	32130	1871....	1871.....	H1-1b
20	M24	0.625" S.R.	.108	40	38	.020	0			9	4134.294	9946.8	96.768	96.768	H1-...
21	M30	3/4" Solid	.100	0	37	.014	47.512			10	3789.856	1432...	184.32	184.32	H1-1b
22	M26	0.625" S.R.	.069	0	6	.028	0			7	4134.294	9946.8	96.768	96.768	1 H1-1b
23	M25	0.625" S.R.	.052	40	8	.018	0			5	4134.294	9946.8	96.768	96.768	H1-1b
24	M31	3/4" Solid	.003	23.756	18	.015	0			17	3789.856	1432...	184.32	184.32	H1-...
25	M29	3/4" Solid	.000	0	50	.000	0			50	3789.856	1432...	184.32	184.32	1 H1-1a

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	2 Pipe	PIPE 2.0	Beam	Pipe	A53-b	Typical	1.02	.627	.627	1.25
2	2.5 Pipe	PIPE 2.5	Beam	Pipe	A53-b	Typical	1.61	1.45	1.45	2.89
3	3/4" SR	3/4" Solid	Beam	BAR	A36 Gr.36	Typical	.442	.016	.016	.031
4	5/8" SR	0.625" S.R.	Beam	BAR	A36 Gr.36	Typical	.307	.007	.007	.015
5	Plate	.625 x 3.5"	Beam	None	A36 Gr.36	Typical	2.188	.071	2.233	.253

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	N6	Reaction	Reaction	Reaction	Reaction		Reaction
2	N5	Reaction	Reaction	Reaction	Reaction		Reaction
3	TL4	Reaction	Reaction	Reaction			
4	TL5	Reaction	Reaction	Reaction			

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	M3						Yes	** NA **			None
3	M5						Yes	** NA **			None
4	M7						Yes	** NA **			None
5	M2						Yes				None
6	M4						Yes				None
7	M6						Yes				None
8	M8						Yes				None
9	TB1						Yes				None
10	M14						Yes				None
11	M15						Yes				None
12	M16						Yes				None
13	M17						Yes				None
14	M18						Yes				None
15	M19						Yes				None
16	M24						Yes				None
17	M25						Yes				None
18	M26						Yes				None
19	M27						Yes				None
20	M28						Yes				None
21	M29					Tension ...	Yes				None
22	M30						Yes				None
23	M31					Tension ...	Yes				None
24	TB2						Yes				None
25	MP1						Yes				None
26	MP2						Yes				None
27	MP4						Yes				None
28	MP5						Yes				None
29	M33						Yes	** NA **			None
30	M34						Yes	** NA **			None
31	M35						Yes	** NA **			None
32	M36						Yes	** NA **			None
33	M37A						Yes	** NA **			None
34	M38						Yes	** NA **			None
35	M39A						Yes	** NA **			None
36	M40A						Yes	** NA **			None
37	MP3						Yes				None
38	M38A						Yes	** NA **			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
39	M39						Yes	** NA **			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torq...	Kyy	Kzz	Cb	Function
1	M2	Plate	4.778			Lbyy			.65	.65		Lateral
2	M4	Plate	4.778			Lbyy			.65	.65		Lateral
3	M6	Plate	4.778			Lbyy			.65	.65		Lateral
4	M8	Plate	4.778			Lbyy			.65	.65		Lateral
5	TB1	2 Pipe	114.07			Lbyy			.8	.8		Lateral
6	M14	2.5 Pipe	144			Lbyy			.65	.65		Lateral
7	M15	2.5 Pipe	144			Lbyy			.65	.65		Lateral
8	M16	2 Pipe	30			Lbyy			.65	.65		Lateral
9	M17	2 Pipe	30			Lbyy			.65	.65		Lateral
10	M18	2 Pipe	30			Lbyy			.65	.65		Lateral
11	M19	2 Pipe	30			Lbyy			.65	.65		Lateral
12	M24	5/8" SR	40	30	30	Lbyy			.65	.65		Lateral
13	M25	5/8" SR	40	30	30	Lbyy			.65	.65		Lateral
14	M26	5/8" SR	40	30	30	Lbyy			.65	.65		Lateral
15	M27	5/8" SR	40	30	30	Lbyy			.65	.65		Lateral
16	M28	3/4" SR	47.512			Lbyy			.65	.65		Lateral
17	M29	3/4" SR	47.512			Lbyy			.65	.65		Lateral
18	M30	3/4" SR	47.512			Lbyy			.65	.65		Lateral
19	M31	3/4" SR	47.512			Lbyy			.65	.65		Lateral
20	TB2	2 Pipe	119.945			Lbyy			.8	.8		Lateral
21	MP1	2 Pipe	96			Lbyy						Lateral
22	MP2	2 Pipe	96			Lbyy						Lateral
23	MP4	2 Pipe	96			Lbyy						Lateral
24	MP5	2 Pipe	96			Lbyy						Lateral
25	MP3	2 Pipe	96			Lbyy						Lateral

Joint Loads and Enforced Displacements (BLC 7 : Service Live 1)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2/i...
1	N18	L	Y	-250
2	N15	L	Y	-250

Member Point Loads (BLC 1 : Self Weight)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	Y	-17.5	24
2	MP3	Y	-52.9	6
3	MP5	Y	-57.3	6
4	MP3	Y	-47.4	60
5	MP5	Y	-70.5	60
6	MP5	Y	-72	66
7	MP1	Y	-32	60
8	MP1	Y	-17.5	72
9	MP3	Y	-52.9	90
10	MP5	Y	-57.3	90

Member Point Loads (BLC 2 : Wind Load AZI 000)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	Z	-121.37	24
2	MP3	Z	-300.98	6

Member Point Loads (BLC 2 : Wind Load AZI 000) (Continued)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
3	MP5	Z	-382.55	6
4	MP3	Z	-81.8	60
5	MP5	Z	-92.02	60
6	MP5	Z	-77.11	66
7	MP1	Z	-48.71	60
8	MP1	Z	-121.37	72
9	MP3	Z	-300.98	90
10	MP5	Z	-382.55	90

Member Point Loads (BLC 3 : Wind Load AZI 090)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	-64.52	24
2	MP3	X	-158.39	6
3	MP5	X	-165.24	6
4	MP3	X	-38.34	60
5	MP5	X	-62.44	60
6	MP5	X	-60.04	66
7	MP1	X	-39.26	60
8	MP1	X	-64.52	72
9	MP3	X	-158.39	90
10	MP5	X	-165.24	90

Member Point Loads (BLC 4 : Ice Weight)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	Y	-54.71	24
2	MP3	Y	-118.94	6
3	MP5	Y	-146.74	6
4	MP3	Y	-50.04	60
5	MP5	Y	-64.94	60
6	MP5	Y	-61.91	66
7	MP1	Y	-43.52	60
8	MP1	Y	-54.71	72
9	MP3	Y	-118.94	90
10	MP5	Y	-146.74	90

Member Point Loads (BLC 5 : Wind + Ice Load AZI 000)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	Z	-14.89	24
2	MP3	Z	-34.13	6
3	MP5	Z	-42.08	6
4	MP3	Z	-11.1	60
5	MP5	Z	-12.26	60
6	MP5	Z	-10.55	66
7	MP1	Z	-8.59	60
8	MP1	Z	-14.89	72
9	MP3	Z	-34.13	90
10	MP5	Z	-42.08	90

Member Point Loads (BLC 6 : Wind + Ice Load AZI 090)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	-9.39	24
2	MP3	X	-20.49	6
3	MP5	X	-21.16	6
4	MP3	X	-6.24	60
5	MP5	X	-9	60

Member Point Loads (BLC 6 : Wind + Ice Load AZI 090) (Continued)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
6	MP5	X	-8.62	66
7	MP1	X	-7.43	60
8	MP1	X	-9.39	72
9	MP3	X	-20.49	90
10	MP5	X	-21.16	90

Member Distributed Loads (BLC 4 : Ice Weight)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in...]	End Location[in...]
1	M1	Y	-3.342	-3.342	0	%100
2	M3	Y	-3.342	-3.342	0	%100
3	M5	Y	-3.342	-3.342	0	%100
4	M7	Y	-3.342	-3.342	0	%100
5	M2	Y	-4.767	-4.767	0	%100
6	M4	Y	-4.767	-4.767	0	%100
7	M6	Y	-4.767	-4.767	0	%100
8	M8	Y	-4.767	-4.767	0	%100
9	TB1	Y	-6.886	-6.886	0	%100
10	M14	Y	-7.782	-7.782	0	%100
11	M15	Y	-7.782	-7.782	0	%100
12	M16	Y	-6.886	-6.886	0	%100
13	M17	Y	-6.886	-6.886	0	%100
14	M18	Y	-6.886	-6.886	0	%100
15	M19	Y	-6.886	-6.886	0	%100
16	M24	Y	-3.744	-3.744	0	%100
17	M25	Y	-3.744	-3.744	0	%100
18	M26	Y	-3.744	-3.744	0	%100
19	M27	Y	-3.744	-3.744	0	%100
20	M28	Y	-3.968	-3.968	0	%100
21	M29	Y	-3.968	-3.968	0	%100
22	M30	Y	-3.968	-3.968	0	%100
23	M31	Y	-3.968	-3.968	0	%100
24	TB2	Y	-6.886	-6.886	0	%100
25	MP1	Y	-6.886	-6.886	0	%100
26	MP2	Y	-6.886	-6.886	0	%100
27	MP4	Y	-6.886	-6.886	0	%100
28	MP5	Y	-6.886	-6.886	0	%100
29	M33	Y	-3.342	-3.342	0	%100
30	M34	Y	-3.342	-3.342	0	%100
31	M35	Y	-3.342	-3.342	0	%100
32	M36	Y	-3.342	-3.342	0	%100
33	M37A	Y	-3.342	-3.342	0	%100
34	M38	Y	-3.342	-3.342	0	%100
35	M39A	Y	-3.342	-3.342	0	%100
36	M40A	Y	-3.342	-3.342	0	%100
37	MP3	Y	-6.886	-6.886	0	%100
38	M38A	Y	-3.342	-3.342	0	%100
39	M39	Y	-3.342	-3.342	0	%100

Member Distributed Loads (BLC 10 : BLC 2 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in...]	End Location[in...]
1	M1	Z	0	0	0	9.551
2	M3	Z	0	0	0	9.551
3	M5	Z	0	0	0	9.551
4	M7	Z	0	0	0	9.551
5	M2	Z	-4.461	-4.461	0	4.778

Member Distributed Loads (BLC 10 : BLC 2 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in...	End Location[in...
6	M4	Z	-461	-461	0	4.778
7	M6	Z	-461	-461	0	4.778
8	M8	Z	-461	-461	0	4.778
9	TB1	Z	-1.606	-1.606	0	114.07
10	M14	Z	-12.669	-12.669	0	144
11	M15	Z	-12.669	-12.669	0	144
12	M16	Z	-7.437	-7.437	0	30
13	M17	Z	-7.437	-7.437	0	30
14	M18	Z	-7.437	-7.437	0	30
15	M19	Z	-7.437	-7.437	0	30
16	M24	Z	-2.754	-2.754	0	40
17	M25	Z	-2.754	-2.754	0	40
18	M26	Z	-2.754	-2.754	0	40
19	M27	Z	-2.754	-2.754	0	40
20	M28	Z	-3.057	-3.057	0	47.512
21	M30	Z	-3.057	-3.057	0	47.512
22	TB2	Z	-3.577	-3.577	0	119.945
23	MP1	Z	-10.466	-10.466	0	96
24	MP2	Z	-10.466	-10.466	0	96
25	MP4	Z	-10.466	-10.466	0	96
26	MP5	Z	-10.466	-10.466	0	96
27	MP3	Z	-10.466	-10.466	0	96

Member Distributed Loads (BLC 11 : BLC 3 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/ft,F,psf]	Start Location[in...	End Location[in...
1	M1	X	0	0	0	9.551
2	M3	X	0	0	0	9.551
3	M5	X	0	0	0	9.551
4	M7	X	0	0	0	9.551
5	M2	X	-2.715	-2.715	0	4.778
6	M4	X	-2.715	-2.715	0	4.778
7	M6	X	-2.715	-2.715	0	4.778
8	M8	X	-2.715	-2.715	0	4.778
9	TB1	X	-10.342	-10.342	0	114.07
10	M16	X	-7.364	-7.364	0	30
11	M17	X	-7.364	-7.364	0	30
12	M18	X	-7.364	-7.364	0	30
13	M19	X	-7.364	-7.364	0	30
14	M24	X	-2.754	-2.754	0	40
15	M25	X	-2.754	-2.754	0	40
16	M26	X	-2.754	-2.754	0	40
17	M27	X	-2.754	-2.754	0	40
18	M28	X	-3.052	-3.052	0	47.512
19	M30	X	-3.052	-3.052	0	47.512
20	TB2	X	-9.835	-9.835	0	119.945
21	MP1	X	-10.466	-10.466	0	96
22	MP2	X	-10.466	-10.466	0	96
23	MP4	X	-10.466	-10.466	0	96
24	MP5	X	-10.466	-10.466	0	96
25	M33	X	0	0	0	2.98
26	M34	X	0	0	0	2.98
27	M35	X	0	0	0	2.98
28	M36	X	0	0	0	2.98
29	M37A	X	0	0	0	2.98
30	M38	X	0	0	0	2.98
31	M39A	X	0	0	0	2.98

Member Distributed Loads (BLC 11 : BLC 3 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft.F,psf]	End Magnitude[lb/ft.F,psf]	Start Location[in...	End Location[in...
32	M40A	X	0	0	0	2.98
33	MP3	X	-10.466	-10.466	0	96
34	M38A	X	0	0	0	2.98
35	M39	X	0	0	0	2.98

Member Distributed Loads (BLC 12 : BLC 5 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft.F,psf]	End Magnitude[lb/ft.F,psf]	Start Location[in...	End Location[in...
1	M1	Z	0	0	0	9.551
2	M3	Z	0	0	0	9.551
3	M5	Z	0	0	0	9.551
4	M7	Z	0	0	0	9.551
5	M2	Z	-.124	-.124	0	4.778
6	M4	Z	-.124	-.124	0	4.778
7	M6	Z	-.124	-.124	0	4.778
8	M8	Z	-.124	-.124	0	4.778
9	TB1	Z	-.431	-.431	0	114.07
10	M14	Z	-3.4	-3.4	0	144
11	M15	Z	-3.4	-3.4	0	144
12	M16	Z	-1.996	-1.996	0	30
13	M17	Z	-1.996	-1.996	0	30
14	M18	Z	-1.996	-1.996	0	30
15	M19	Z	-1.996	-1.996	0	30
16	M24	Z	-.739	-.739	0	40
17	M25	Z	-.739	-.739	0	40
18	M26	Z	-.739	-.739	0	40
19	M27	Z	-.739	-.739	0	40
20	M28	Z	-.82	-.82	0	47.512
21	M30	Z	-.82	-.82	0	47.512
22	TB2	Z	-.96	-.96	0	119.945
23	MP1	Z	-2.808	-2.808	0	96
24	MP2	Z	-2.808	-2.808	0	96
25	MP4	Z	-2.808	-2.808	0	96
26	MP5	Z	-2.808	-2.808	0	96
27	MP3	Z	-2.808	-2.808	0	96

Member Distributed Loads (BLC 13 : BLC 6 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft.F,psf]	End Magnitude[lb/ft.F,psf]	Start Location[in...	End Location[in...
1	M1	X	0	0	0	9.551
2	M3	X	0	0	0	9.551
3	M5	X	0	0	0	9.551
4	M7	X	0	0	0	9.551
5	M2	X	-.729	-.729	0	4.778
6	M4	X	-.729	-.729	0	4.778
7	M6	X	-.729	-.729	0	4.778
8	M8	X	-.729	-.729	0	4.778
9	TB1	X	-2.775	-2.775	0	114.07
10	M16	X	-1.976	-1.976	0	30
11	M17	X	-1.976	-1.976	0	30
12	M18	X	-1.976	-1.976	0	30
13	M19	X	-1.976	-1.976	0	30
14	M24	X	-.739	-.739	0	40
15	M25	X	-.739	-.739	0	40
16	M26	X	-.739	-.739	0	40
17	M27	X	-.739	-.739	0	40
18	M28	X	-.819	-.819	0	47.512
19	M30	X	-.819	-.819	0	47.512

Member Distributed Loads (BLC 13 : BLC 6 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft.F,psf]	End Magnitude[lb/ft.F,psf]	Start Location[in...	End Location[in...
20	TB2	X	-2.639	-2.639	0	119.945
21	MP1	X	-2.808	-2.808	0	96
22	MP2	X	-2.808	-2.808	0	96
23	MP4	X	-2.808	-2.808	0	96
24	MP5	X	-2.808	-2.808	0	96
25	M33	X	0	0	0	2.98
26	M34	X	0	0	0	2.98
27	M35	X	0	0	0	2.98
28	M36	X	0	0	0	2.98
29	M37A	X	0	0	0	2.98
30	M38	X	0	0	0	2.98
31	M39A	X	0	0	0	2.98
32	M40A	X	0	0	0	2.98
33	MP3	X	-2.808	-2.808	0	96
34	M38A	X	0	0	0	2.98
35	M39	X	0	0	0	2.98

Member Area Loads (BLC 2 : Wind Load AZI 000)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N63	N62	N64	N65	Z	Open Structure	-52.88

Member Area Loads (BLC 3 : Wind Load AZI 090)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N65	N64	N66	N67	X	Open Structure	-52.88

Member Area Loads (BLC 5 : Wind + Ice Load AZI 000)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N63	N62	N64	N65	Z	Open Structure	-14.19

Member Area Loads (BLC 6 : Wind + Ice Load AZI 090)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N65	N64	N66	N67	X	Open Structure	-14.19



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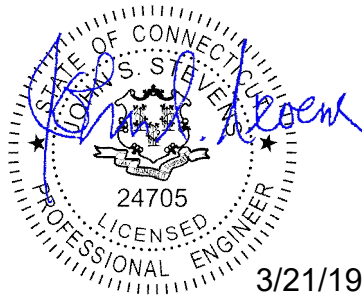
1033 WATERVLIT SHAKER RD, ALBANY, NY 12205

Structural Analysis Report

March 21, 2019

Site Name	Killingworth – RTE 81
Site Number	CTL02045
FA Number	10034999
PACE Number	MRCTB035091/ MRCTB035254/ MRCTB035289/ MRCTB035122
Client	Smartlink
Carrier	AT&T
Infinigy Job Number	499-006
Site Location	323 Route 81 Killingworth, CT 06419 41° 22' 10.07" N NAD83 72° 33' 51.20" W NAD83
Mount Centerline EL.	140.0 ft
Tower Classification	Self-Support
Structural Usage	74.7%
Overall Result	Pass

Upon reviewing the results of this analysis, it is our opinion that the structure meets the specified TIA code requirements. The tower and foundation are therefore deemed adequate to support the existing and proposed loading as listed in this report.



Brenden Archer
Project Engineer II

AZ CA CO FL GA MD NC NH NJ NY TX WA



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Introduction

Infinigy Engineering has been requested to perform a structural analysis on the existing 140' Self-Support. All supporting documents have been obtained from the client and are assumed to be accurate and applicable to this site. The tower was analyzed using tnxTower version 8.0.4.0 tower analysis software.

Supporting Documentation

Construction Drawings	Infinigy Engineering, Job #499-006, dated January 31, 2019
RFDS	AT&T RFDS ID #2572167, dated January 23, 2019
Previous Tower Analysis	Hudson Design Group, dated November 30, 2012
Modification Drawings	Hudson Design Group, dated December 7, 2012

Analysis Code Requirements

Wind Speed	101 mph (3-Second Gust, V_{ASD}) / 130 mph (3-Second Gust, V_{ULT})
Wind Speed w/ ice	40 mph (3-Second Gust, V_{ASD}) w/ 3/4" ice
TIA Revision	ANSI/TIA-222-G
Adopted IBC	2015 IBC/ 2018 Connecticut State Building Code
Structure Class	II
Exposure Category	B
Topographic Category	1
Calculated Crest Height	0

Conclusion

Upon reviewing the results of this analysis, it is our opinion that the structure meets the specified TIA code requirements. The tower and foundation are therefore deemed adequate to support the existing and proposed loading as listed in this report.

If you have any questions, require additional information, or actual conditions differ from those as detailed in this report please contact me via the information below:

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Existing and Reserved Loading

Mount Height (ft)	Qty.	Appurtenance	Mount Type	Coax & Lines	Carrier
145.0	3	Decibel DB-810	Side Arm	(3) 1-5/8"	--
140.0	1	Decibel DB-411-A		(11) 7/8"	--
133.0	1	Decibel DB225-A	Sector Frame	(12) 1-5/8" (1) Fiber (2) DC	AT&T
	6	Powerwave 7770			
	1	Powerwave P65-17-XLH-RR			
	1	KMW AM-X-CD-16-65-00T-RET			
	1	Commscope SBNH-1D4545A			
	3	Ericsson RRUS-11			
	6	Powerwave LGP-21401			
	1	Raycap DC6-48-60-18-8F			
123.0	1	MF-900B	Direct	--	--
80.0	1	Generic 1' Square Panel	Side Arm	--	--
75.0	1	Decibel DB225-A	Direct	--	--
66.0	1	Omni 3"x12'	Side Arm	--	--

To Be Removed

Mount Height (ft)	Qty.	Appurtenance	Mount Type	Coax & Lines	Carrier
133.0	3	Powerwave 7770	Sector Frame	--	AT&T
	1	Powerwave P65-17-XLH-RR			
	1	KMW AM-X-CD-16-65-00T-RET			
	1	Commscope SBNH-1D4545A			
	3	Ericsson RRUS-11			

Proposed Loading

Mount Height (ft)	Qty.	Appurtenance	Mount Type	Coax & Lines	Carrier
133.0	1	Kathrein 840-370799K	VFA12-WLL	(1) Fiber (4) DC	AT&T
	2	Kathrein 800-10991K			
	1	Kathrein 800-10966			
	2	Kathrein 800-10965			
	3	Ericsson RRUS-4415 B25			
	3	Ericsson RRUS-8843 B2/B66A			
	3	Ericsson RRUS-4449 B5/B12			
	2	Raycap DC6-48-60-18-8F			

March 21, 2019

Final Configuration

Mount Height (ft)	Qty.	Appurtenance	Mount Type	Coax & Lines	Carrier
145.0	3	Decibel DB-810	Side Arm	(3) 1-5/8"	--
140.0	1	Decibel DB-411-A		(11) 7/8"	--
133.0	1	Decibel DB225-A	VFA12-WLL	(12) 1-5/8" (2) Fiber (6) DC	AT&T
	3	Powerwave 7770			
	1	Kathrein 840-370799K			
	2	Kathrein 800-10991K			
	1	Kathrein 800-10966			
	2	Kathrein 800-10965			
	3	Ericsson RRUS-4415 B25			
	3	Ericsson RRUS-8843 B2/B66A			
	3	Ericsson RRUS-4449 B5/B12			
	6	Powerwave LGP-21401			
	3	Raycap DC6-48-60-18-8F			
123.0	1	MF-900B	Direct	--	--
80.0	1	Generic 1' Square Panel	Side Arm	--	--
75.0	1	Decibel DB225-A	Direct	--	--
66.0	1	Omni 3"x12'	Side Arm	--	--

Structure Usages

	Summary	
Leg (T7)	62.5	Pass
Diagonal (T2)	74.7	Pass
Secondary Horizontal (T5)	14.0	Pass
Top Girt (T1)	0.4	Pass
RATING =	74.7	Pass

Foundation Reactions

Reaction Data	Analysis Reactions	Result
Base Compression (kip)	16.4	68.8%
Base Shear (kip)	18.2	35.6%
Base Moment (kip-ft)	0.0	53.3%

Deflection, Twist, and Sway

Antenna Elevation (ft)	Deflection (in)	Twist (°)	Sway (°)
133.0	2.617	0.052	0.183

*Per ANSI/TIA-222-G Section 2.8.2 maximum serviceability structural deflection limit is 3% of structure height.

*Per ANSI/TIA-222-G Section 2.8.2 maximum serviceability structural twist and sway limit is 4 degrees.

*Per ANSI/TIA-222-G Section 2.8.3 deflection, Twist, and sway values were calculated using a basic 3-second gust wind speed of 60 mph.

*It is the responsibility of the client to ensure their proposed and/or existing equipment will meet ANSI/TIA-222-G Annex D or other appropriate microwave signal degradation limits based on the provided values above.

Assumptions and Limitations

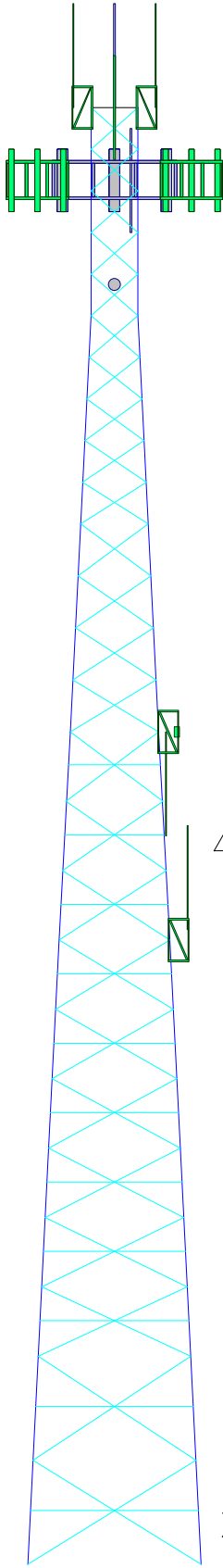
Our structural calculations are completed assuming all information provided to Infinigy Engineering is accurate and applicable to this site. For the purposes of calculations, we assume an overall structure condition of “like new” and all members and connections to be free of corrosion and/or structural defects. The structure owner and/or contractor shall verify the structure’s condition prior to installation of any proposed equipment. If actual conditions differ from those described in this report Infinigy Engineering should be notified immediately to complete a revised evaluation.

Our evaluation is completed using standard TIA, AISC, ACI, and ASCE methods and procedures. Our structural results are proprietary and should not be used by others as their own. Infinigy Engineering is not responsible for decisions made by others that are or are not based on our supplied assumptions and conclusions.

This report is an evaluation of the tower structure only and does not reflect adequacy of any existing antenna mounts, mount connections, or coax mounting attachments. These elements are assumed to be adequate for the purposes of this analysis and are assumed to have been installed per their manufacturer requirements.

Section	T1	T2	T3	T4	T5	T6	T7	
Legs	ROHN 3.5 STD			Rohn 3.5 X-STR	Rohn 3.5 X-STR w/ Third Pipe	Rohn 4 X-STR w/ Third Pipe	ROHN 5 X-STR	
Leg Grade								
Diagonals	L1 1/2x1 1/2x1/8					L2 1/2x2 1/2x5/16	L3x3x3/8	
Diagonal Grade								
Top Girts	L3x3x1/4							
Sec. Horizontals	N.A.					L2 1/2x2 1/2x3/16	L3x3x3/8	
Face Width (ft)				8.58	10.61	12.64	14.67	16.7
# Panels @ (ft)	10 @ 4		4 @ 5		9 @ 6.66667		2 @ 10	
Weight (lb)	834.1	798.6	1113.4	1665.0	2032.3	3125.0	3526.0	13096.6

140.0 ft
120.0 ft
100.0 ft
80.0 ft
60.0 ft
40.0 ft
20.0 ft
0.0 ft



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
DB810K-XC	145	Radio 4449 (ATI)	133
DB810K-XC	145	Radio 4449 (ATI)	133
DB810K-XC	145	RRUS 8843 (ATI)	133
Angle Side Arm	140	RRUS 8843 (ATI)	133
Angle Side Arm	140	RRUS 8843 (ATI)	133
Angle Side Arm	140	(2) LGP21401 (ATI)	133
DB411-A	140	(2) LGP21401 (ATI)	133
DB225-A	133	(2) LGP21401 (ATI)	133
800-10966 (ATI)	133	DC6-48-60-0-8F (ATI)	133
800-10965 (ATI)	133	DC6-48-60-0-8F (ATI)	133
800-10965 (ATI)	133	DC6-48-60-0-8F (ATI)	133
7770 (ATI)	133	Pipe Sector Frame (ATI)	133
7770 (ATI)	133	Pipe Sector Frame (ATI)	133
7770 (ATI)	133	Pipe Sector Frame (ATI)	133
840-370799K (ATI)	133	MF-900B	123
800-10991K (ATI)	133	1' Square Panel	80
800-10991K (ATI)	133	Pipe Side Arm	80
RRUS 4415 (ATI)	133	DB225-A	75
RRUS 4415 (ATI)	133	12' Omni	60
RRUS 4415 (ATI)	133	Pipe Side Arm	60
Radio 4449 (ATI)	133		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower designed for Exposure B to the TIA-222-G Standard.
2. Tower designed for a 101 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 74.7%

ALL REACTIONS
ARE FACTORED

MAX. CORNER REACTIONS AT BASE:

DOWN: 164478 lb
SHEAR: 18156 lb

UPLIFT: -142781 lb
SHEAR: 15685 lb

AXIAL
74868 lb
SHEAR
7920 lb
MOMENT
699609 lb-ft
TORQUE 5406 lb-ft
50 mph WIND - 0.7500 in ICE

AXIAL
23847 lb
SHEAR
28766 lb
MOMENT
2263841 lb-ft
TORQUE 24491 lb-ft
REACTIONS - 101 mph WIND

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Job: **CTL02045**

Project: **499-006**

Client: Smartlink

Drawn by: BArcher

App'd:

Code: TIA-222-G

Date: 02/05/19

Scale: NTS

Path:

C:\Users\BArcher\Desktop\Archer\Towers\CTL02045\Tower\CTL02045 Existing.dwg

Dwg No. E-1

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Tower Input Data

The main tower is a 3x free standing tower with an overall height of 140.00 ft above the ground line.

The base of the tower is set at an elevation of 0.00 ft above the ground line.

The face width of the tower is 4.50 ft at the top and 16.70 ft at the base.

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

The following design criteria apply:

Basic wind speed of 101 mph.

Structure Class II.

Exposure Category B.

Topographic Category 1.

Crest Height 0.00 ft.

Nominal ice thickness of 0.7500 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 50 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

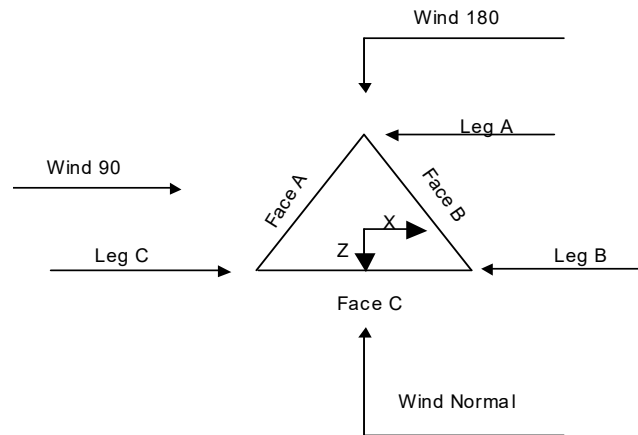
Stress ratio used in tower member design is 1.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	√ SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	√ All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	√ Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Include Angle Block Shear Check
Use Special Wind Profile	√ Project Wind Area of Appurt.	Use TIA-222-G Bracing Resist. Exemption
√ Include Bolts In Member Capacity	√ Autocalc Torque Arm Areas	Use TIA-222-G Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
√ Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	√ Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric	Ignore KL/ry For 60 Deg. Angle Legs	Pole Without Linear Attachments
		Pole With Shroud Or No Appurtenances
		Outside and Inside Corner Radii Are
		Known

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Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	140.00-120.00			4.50	1	20.00
T2	120.00-100.00			4.50	1	20.00
T3	100.00-80.00			6.55	1	20.00
T4	80.00-60.00			8.58	1	20.00
T5	60.00-40.00			10.61	1	20.00
T6	40.00-20.00			12.64	1	20.00
T7	20.00-0.00			14.67	1	20.00

Tower Section Geometry (cont'd)

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	140.00-120.00	4.00	X Brace	No	No	0.0000	0.0000
T2	120.00-100.00	4.00	X Brace	No	No	0.0000	0.0000
T3	100.00-80.00	5.00	X Brace	No	No	0.0000	0.0000
T4	80.00-60.00	6.67	X Brace	No	Yes	0.0000	0.0000
T5	60.00-40.00	6.67	X Brace	No	Yes	0.0000	0.0000
T6	40.00-20.00	6.67	X Brace	No	Yes	0.0000	0.0000
T7	20.00-0.00	10.00	X Brace	No	Yes	0.0000	0.0000

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Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 140.00-120.00	Pipe	ROHN 3.5 STD	A572-50 (50 ksi)	Single Angle	L1 1/2x1 1/2x1/8	A36 (36 ksi)
T2 120.00-100.00	Pipe	ROHN 3.5 STD	A572-50 (50 ksi)	Single Angle	L1 1/2x1 1/2x1/8	A36 (36 ksi)
T3 100.00-80.00	Pipe	Rohn 3.5 X-STR	A572-50 (50 ksi)	Single Angle	L2x2x1/8	A36 (36 ksi)
T4 80.00-60.00	Pipe	Rohn 3.5 X-STR	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T5 60.00-40.00	Arbitrary Shape	Rohn 3.5 X-STR w/ Third Pipe	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 40.00-20.00	Arbitrary Shape	Rohn 4 X-STR w/ Third Pipe	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x5/16	A36 (36 ksi)
T7 20.00-0.00	Pipe	ROHN 5 X-STR	A572-50 (50 ksi)	Single Angle	L3x3x3/8	A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 140.00-120.00	Single Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T4 80.00-60.00	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T5 60.00-40.00	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T6 40.00-20.00	Single Angle	L2 1/2x2 1/2x5/16	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)
T7 20.00-0.00	Single Angle	L3x3x3/8	A36 (36 ksi)	Solid Round		A572-50 (50 ksi)

Tower Section Geometry (cont'd)

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Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T2 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
1 5/8	C	No	No	Ar (CaAa)	140.00 - 8.00	0.0000	0.1	3	3	1.8000 1.9800	1.9800		1.04
7/8	C	No	No	Ar (CaAa)	140.00 - 8.00	0.0000	0.1	2	2	1.1100	1.1100		0.54
7/8	A	No	No	Ar (CaAa)	140.00 - 8.00	0.0000	0.1	9	9	1.1100	1.1100		0.54

1 5/8 (AT&T)	B	No	No	Ar (CaAa)	133.00 - 8.00	0.0000	-0.4	12	6	1.8000 1.9800	1.9800		1.04
1-1/2 (AT&T)	B	No	No	Ar (CaAa)	133.00 - 8.00	0.0000	0	1	1	0.4000 1.8600	1.8600		0.79
1-1/2 (AT&T)	B	No	No	Ar (CaAa)	133.00 - 8.00	0.0000	0	1	1	0.4000 1.8600	1.8600		0.79
1 (AT&T)	B	No	No	Ar (CaAa)	133.00 - 8.00	0.0000	0	2	2	0.4000 1.2500	1.2500		0.58
1 (AT&T)	B	No	No	Ar (CaAa)	133.00 - 8.00	0.0000	0	4	2	0.4000 1.2500	1.2500		0.58

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight lb
T1	140.00-120.00	A	0.000	0.000	19.980	0.000	97.20
		B	0.000	0.000	45.474	0.000	228.07
		C	0.000	0.000	16.320	0.000	84.00
T2	120.00-100.00	A	0.000	0.000	19.980	0.000	97.20
		B	0.000	0.000	69.960	0.000	350.88
		C	0.000	0.000	16.320	0.000	84.00
T3	100.00-80.00	A	0.000	0.000	19.980	0.000	97.20
		B	0.000	0.000	69.960	0.000	350.88
		C	0.000	0.000	16.320	0.000	84.00
T4	80.00-60.00	A	0.000	0.000	19.980	0.000	97.20

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Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight lb
T5	60.00-40.00	B	0.000	0.000	69.960	0.000	350.88
		C	0.000	0.000	16.320	0.000	84.00
		A	0.000	0.000	19.980	0.000	97.20
T6	40.00-20.00	B	0.000	0.000	69.960	0.000	350.88
		C	0.000	0.000	16.320	0.000	84.00
		A	0.000	0.000	19.980	0.000	97.20
T7	20.00-0.00	B	0.000	0.000	69.960	0.000	350.88
		C	0.000	0.000	16.320	0.000	84.00
		A	0.000	0.000	11.988	0.000	58.32
		B	0.000	0.000	41.976	0.000	210.53
		C	0.000	0.000	9.792	0.000	50.40

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight lb
T1	140.00-120.00	A	1.720	0.000	0.000	56.926	0.000	784.60
		B		0.000	0.000	84.538	0.000	1654.40
		C		0.000	0.000	55.563	0.000	700.44
T2	120.00-100.00	A	1.692	0.000	0.000	56.758	0.000	773.57
		B		0.000	0.000	129.245	0.000	2514.93
		C		0.000	0.000	55.179	0.000	689.20
T3	100.00-80.00	A	1.658	0.000	0.000	56.560	0.000	760.62
		B		0.000	0.000	128.287	0.000	2479.45
		C		0.000	0.000	54.727	0.000	676.05
T4	80.00-60.00	A	1.617	0.000	0.000	56.318	0.000	744.84
		B		0.000	0.000	127.114	0.000	2436.39
		C		0.000	0.000	54.173	0.000	660.09
T5	60.00-40.00	A	1.564	0.000	0.000	56.004	0.000	724.45
		B		0.000	0.000	125.590	0.000	2381.02
		C		0.000	0.000	53.454	0.000	639.59
T6	40.00-20.00	A	1.486	0.000	0.000	55.549	0.000	695.02
		B		0.000	0.000	123.372	0.000	2301.69
		C		0.000	0.000	52.409	0.000	610.26
T7	20.00-0.00	A	1.331	0.000	0.000	32.791	0.000	382.49
		B		0.000	0.000	71.385	0.000	1289.16
		C		0.000	0.000	30.205	0.000	332.28

Feed Line Center of Pressure

Section	Elevation ft	CP _x in	CP _z in	CP _x Ice in	CP _z Ice in
T1	140.00-120.00	0.4236	-6.8378	-0.3181	-4.1092
T2	120.00-100.00	1.6787	-10.7850	1.0099	-7.3472
T3	100.00-80.00	1.8164	-13.3510	1.0968	-9.5681
T4	80.00-60.00	1.7757	-14.3991	1.0817	-10.9155
T5	60.00-40.00	1.6810	-14.9615	1.0257	-12.0799
T6	40.00-20.00	1.7325	-16.1633	0.9813	-13.3731
T7	20.00-0.00	1.4810	-13.8961	0.6983	-11.9142

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Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T1	1	1 5/8	120.00 - 140.00	0.6000	0.5118
T1	2	7/8	120.00 - 140.00	0.6000	0.5118
T1	3	7/8	120.00 - 140.00	0.6000	0.5118
T1	5	1 5/8	120.00 - 133.00	0.6000	0.5118
T1	6	1-1/2	120.00 - 133.00	0.6000	0.5118
T1	7	1-1/2	120.00 - 133.00	0.6000	0.5118
T1	8	1	120.00 - 133.00	0.6000	0.5118
T1	9	1	120.00 - 133.00	0.6000	0.5118
T2	1	1 5/8	100.00 - 120.00	0.6000	0.5866
T2	2	7/8	100.00 - 120.00	0.6000	0.5866
T2	3	7/8	100.00 - 120.00	0.6000	0.5866
T2	5	1 5/8	100.00 - 120.00	0.6000	0.5866
T2	6	1-1/2	100.00 - 120.00	0.6000	0.5866
T2	7	1-1/2	100.00 - 120.00	0.6000	0.5866
T2	8	1	100.00 - 120.00	0.6000	0.5866
T2	9	1	100.00 - 120.00	0.6000	0.5866
T3	1	1 5/8	80.00 - 100.00	0.6000	0.6000
T3	2	7/8	80.00 - 100.00	0.6000	0.6000
T3	3	7/8	80.00 - 100.00	0.6000	0.6000
T3	5	1 5/8	80.00 - 100.00	0.6000	0.6000
T3	6	1-1/2	80.00 - 100.00	0.6000	0.6000
T3	7	1-1/2	80.00 - 100.00	0.6000	0.6000
T3	8	1	80.00 - 100.00	0.6000	0.6000
T3	9	1	80.00 - 100.00	0.6000	0.6000
T4	1	1 5/8	60.00 - 80.00	0.6000	0.6000
T4	2	7/8	60.00 - 80.00	0.6000	0.6000
T4	3	7/8	60.00 - 80.00	0.6000	0.6000
T4	5	1 5/8	60.00 - 80.00	0.6000	0.6000
T4	6	1-1/2	60.00 - 80.00	0.6000	0.6000
T4	7	1-1/2	60.00 - 80.00	0.6000	0.6000
T4	8	1	60.00 - 80.00	0.6000	0.6000
T4	9	1	60.00 - 80.00	0.6000	0.6000
T5	1	1 5/8	40.00 - 60.00	0.6000	0.6000
T5	2	7/8	40.00 - 60.00	0.6000	0.6000
T5	3	7/8	40.00 - 60.00	0.6000	0.6000
T5	5	1 5/8	40.00 - 60.00	0.6000	0.6000
T5	6	1-1/2	40.00 - 60.00	0.6000	0.6000
T5	7	1-1/2	40.00 - 60.00	0.6000	0.6000
T5	8	1	40.00 - 60.00	0.6000	0.6000
T5	9	1	40.00 - 60.00	0.6000	0.6000

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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _o No Ice	K _o Ice
T6	1	1 5/8	20.00 - 40.00	0.6000	0.6000
T6	2	7/8	20.00 - 40.00	0.6000	0.6000
T6	3	7/8	20.00 - 40.00	0.6000	0.6000
T6	5	1 5/8	20.00 - 40.00	0.6000	0.6000
T6	6	1-1/2	20.00 - 40.00	0.6000	0.6000
T6	7	1-1/2	20.00 - 40.00	0.6000	0.6000
T6	8	1	20.00 - 40.00	0.6000	0.6000
T6	9	1	20.00 - 40.00	0.6000	0.6000
T7	1	1 5/8	8.00 - 20.00	0.6000	0.6000
T7	2	7/8	8.00 - 20.00	0.6000	0.6000
T7	3	7/8	8.00 - 20.00	0.6000	0.6000
T7	5	1 5/8	8.00 - 20.00	0.6000	0.6000
T7	6	1-1/2	8.00 - 20.00	0.6000	0.6000
T7	7	1-1/2	8.00 - 20.00	0.6000	0.6000
T7	8	1	8.00 - 20.00	0.6000	0.6000
T7	9	1	8.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight lb
Angle Side Arm	A	From Leg	1.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	0.82 1.10 1.40	6.23 8.47 10.20	150.00 230.00 310.00
Angle Side Arm	B	From Leg	1.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	0.82 1.10 1.40	6.23 8.47 10.20	150.00 230.00 310.00
Angle Side Arm	C	From Leg	1.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	0.82 1.10 1.40	6.23 8.47 10.20	150.00 230.00 310.00
DB810K-XC	A	From Leg	2.00 0.00 0.00	0.0000	145.00	No Ice 1/2" Ice 1" Ice	3.63 5.10 6.60	3.63 5.10 6.60	35.00 61.88 98.03
DB810K-XC	B	From Leg	2.00 0.00 0.00	0.0000	145.00	No Ice 1/2" Ice 1" Ice	3.63 5.10 6.60	3.63 5.10 6.60	35.00 61.88 98.03
DB810K-XC	C	From Leg	2.00 0.00 0.00	0.0000	145.00	No Ice 1/2" Ice 1" Ice	3.63 5.10 6.60	3.63 5.10 6.60	35.00 61.88 98.03
DB411-A	C	None		0.0000	140.00	No Ice 1/2" Ice 1" Ice	1.50 2.70 3.90	1.50 2.70 3.90	25.00 32.50 40.00
DB225-A	A	From Leg	3.68 1.56 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	3.21 5.78 8.35	3.21 5.78 8.35	37.00 48.10 59.20
800-10966 (AT&T)	A	From Leg	3.00 -6.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	13.61 14.21 14.82	7.35 7.94 8.54	81.90 155.92 237.75
800-10965 (AT&T)	B	From Leg	3.00 -6.00	0.0000	133.00	No Ice 1/2" Ice	13.81 14.35	5.83 6.32	108.60 185.13

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight lb
800-10965 (AT&T)	C	From Leg	0.00 3.00 -6.00 0.00	0.0000	133.00	1" Ice No Ice 1/2" Ice 1" Ice	14.89 13.81 14.35 14.89	6.82 5.83 6.32 6.82	268.71 108.60 185.13 268.71
7770 (AT&T)	A	From Leg	0.00 3.00 6.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice No Ice	5.51 5.87 6.23 5.51	2.93 3.27 3.63 2.93	35.00 67.63 105.06 35.00
7770 (AT&T)	B	From Leg	0.00 3.00 6.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice No Ice	5.51 5.87 6.23 5.51	2.93 3.27 3.63 2.93	35.00 67.63 105.06 35.00
7770 (AT&T)	C	From Leg	0.00 3.00 6.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice No Ice	5.51 5.87 6.23 5.51	2.93 3.27 3.63 2.93	35.00 67.63 105.06 35.00
840-370799K (AT&T)	A	From Leg	0.00 3.00 -3.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice No Ice	13.66 14.26 14.87 13.81	7.19 7.78 8.37 5.83	105.80 179.35 260.71 100.90
800-10991K (AT&T)	B	From Leg	0.00 3.00 -3.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice No Ice	13.81 14.35 14.89 13.81	5.83 6.32 6.82 5.83	100.90 177.43 261.01 100.90
800-10991K (AT&T)	C	From Leg	0.00 3.00 -3.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice No Ice	13.81 14.35 14.89 13.81	5.83 6.32 6.82 5.83	100.90 177.43 261.01 100.90
RRUS 4415 (AT&T)	A	From Leg	0.00 3.00 -3.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice No Ice	1.85 2.02 2.20 1.85	0.82 0.94 1.07 0.82	44.00 58.11 74.74 44.00
RRUS 4415 (AT&T)	B	From Leg	0.00 3.00 -3.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice No Ice	1.85 2.02 2.20 1.85	0.82 0.94 1.07 0.82	44.00 58.11 74.74 44.00
RRUS 4415 (AT&T)	C	From Leg	0.00 3.00 -3.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice No Ice	1.85 2.02 2.20 1.85	0.82 0.94 1.07 0.82	44.00 58.11 74.74 44.00
Radio 4449 (AT&T)	A	From Leg	0.00 3.00 -6.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice No Ice	4.19 4.45 4.71 4.19	2.45 2.67 2.89 2.45	74.96 109.14 147.18 74.96
Radio 4449 (AT&T)	B	From Leg	0.00 3.00 -6.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice No Ice	4.19 4.45 4.71 4.19	2.45 2.67 2.89 2.45	74.96 109.14 147.18 74.96
Radio 4449 (AT&T)	C	From Leg	0.00 3.00 -6.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice No Ice	4.19 4.45 4.71 4.19	2.45 2.67 2.89 2.45	74.96 109.14 147.18 74.96
RRUS 8843 (AT&T)	A	From Leg	0.00 3.00 -6.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice No Ice	1.75 1.91 2.09 1.75	1.36 1.51 1.67 1.36	72.00 90.38 111.53 72.00
RRUS 8843 (AT&T)	B	From Leg	0.00 3.00 -6.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice No Ice	1.75 1.91 2.09 1.75	1.36 1.51 1.67 1.36	72.00 90.38 111.53 72.00
RRUS 8843 (AT&T)	C	From Leg	0.00 3.00 -6.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice No Ice	1.75 1.91 2.09 1.75	1.36 1.51 1.67 1.36	72.00 90.38 111.53 72.00
(2) LGP21401 (AT&T)	A	From Leg	0.00 3.00 6.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice No Ice	0.82 0.94 1.06 0.82	0.35 0.44 0.54 0.35	17.50 23.31 30.86 17.50
(2) LGP21401 (AT&T)	B	From Leg	0.00 3.00 6.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice No Ice	0.82 0.94 1.06 0.82	0.35 0.44 0.54 0.35	17.50 23.31 30.86 17.50
(2) LGP21401 (AT&T)	C	From Leg	0.00 3.00 6.00	0.0000	133.00	No Ice 1/2" Ice	0.82 0.94	0.35 0.44	17.50 23.31

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	CAAA Front ft ²	CAAA Side ft ²	Weight lb
DC6-48-60-0-8F (AT&T)	A	From Leg	0.00 0.50 0.00 0.00	0.0000	133.00	1" Ice 1.06 No Ice 2.04 1/2" Ice 2.23 1" Ice 2.43	0.54 2.04 2.23 2.43	30.86 32.80 54.09 78.44
DC6-48-60-0-8F (AT&T)	B	From Leg	0.00 0.50 0.00 0.00	0.0000	133.00	No Ice 2.04 1/2" Ice 2.23 1" Ice 2.43	2.04 2.23 2.43	32.80 54.09 78.44
DC6-48-60-0-8F (AT&T)	C	From Leg	0.00 0.50 0.00 0.00	0.0000	133.00	No Ice 2.04 1/2" Ice 2.23 1" Ice 2.43	2.04 2.23 2.43	32.80 54.09 78.44
Pipe Sector Frame (AT&T)	A	From Leg	0.00 0.50 0.00 0.00	0.0000	133.00	No Ice 14.40 1/2" Ice 19.50 1" Ice 24.60	7.20 10.50 13.80	300.00 415.00 530.00
Pipe Sector Frame (AT&T)	B	From Leg	0.00 0.50 0.00 0.00	0.0000	133.00	No Ice 14.40 1/2" Ice 19.50 1" Ice 24.60	7.20 10.50 13.80	300.00 415.00 530.00
Pipe Sector Frame (AT&T)	C	From Leg	0.00 0.50 0.00 0.00	0.0000	133.00	No Ice 14.40 1/2" Ice 19.50 1" Ice 24.60	7.20 10.50 13.80	300.00 415.00 530.00

Pipe Side Arm	B	From Leg	0.00 1.00 0.00 0.00	0.0000	80.00	No Ice 0.46 1/2" Ice 0.62 1" Ice 0.78	3.55 4.93 5.89	150.00 175.00 200.00
1' Square Panel	B	From Leg	0.00 2.00 0.00 0.00	0.0000	80.00	No Ice 1.20 1/2" Ice 1.34 1" Ice 1.48	0.32 0.40 0.49	20.00 27.91 37.76
DB225-A	B	From Leg	0.00 0.50 0.00 0.00	0.0000	75.00	No Ice 3.21 1/2" Ice 5.78 1" Ice 8.35	3.21 5.78 8.35	37.00 48.10 59.20
Pipe Side Arm	B	From Leg	0.00 1.00 0.00 0.00	0.0000	60.00	No Ice 0.46 1/2" Ice 0.62 1" Ice 0.78	3.55 4.93 5.89	150.00 175.00 200.00
12' Omni	B	From Leg	0.00 2.00 0.00 6.00	0.0000	60.00	No Ice 3.60 1/2" Ice 4.83 1" Ice 6.08	3.60 4.83 6.08	12.00 38.06 71.92

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight lb
MF-900B	A	Paraboloid w/o Radome	From Leg	0.50 0.00 0.00	0.0000		123.00	1.33	No Ice 2.66 1/2" Ice 1.58 1" Ice 3.16	13.00 21.09 29.10

Load Combinations

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Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	140 - 120	2.897	39	0.1852	0.0549
T2	120 - 100	2.113	39	0.1740	0.0455

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T3	100 - 80	1.429	39	0.1389	0.0286
T4	80 - 60	0.889	39	0.1080	0.0167
T5	60 - 40	0.491	39	0.0742	0.0110
T6	40 - 20	0.219	39	0.0469	0.0055
T7	20 - 0	0.057	39	0.0229	0.0020

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
145.00	DB810K-XC	39	2.897	0.1852	0.0549	172870
140.00	Angle Side Arm	39	2.897	0.1852	0.0549	172870
133.00	DB225-A	39	2.617	0.1834	0.0523	123478
123.00	MF-900B	39	2.227	0.1773	0.0474	50947
80.00	Pipe Side Arm	39	0.889	0.1080	0.0167	32920
75.00	DB225-A	39	0.776	0.0997	0.0150	34009
60.00	Pipe Side Arm	39	0.491	0.0742	0.0110	38427

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	140 - 120	12.984	2	0.8278	0.2493
T2	120 - 100	9.480	2	0.7783	0.2064
T3	100 - 80	6.415	2	0.6219	0.1299
T4	80 - 60	3.990	2	0.4841	0.0759
T5	60 - 40	2.207	2	0.3326	0.0497
T6	40 - 20	0.984	2	0.2102	0.0249
T7	20 - 0	0.258	2	0.1027	0.0092

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
145.00	DB810K-XC	2	12.984	0.8278	0.2493	39161
140.00	Angle Side Arm	2	12.984	0.8278	0.2493	39161
133.00	DB225-A	2	11.732	0.8198	0.2374	27972
123.00	MF-900B	2	9.986	0.7928	0.2152	11541
80.00	Pipe Side Arm	2	3.990	0.4841	0.0759	7332
75.00	DB225-A	2	3.486	0.4471	0.0681	7573
60.00	Pipe Side Arm	2	2.207	0.3326	0.0497	8561

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Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	140 - 120	ROHN 3.5 STD	20.00	4.00	35.9 K=1.00	2.6795	-21590.80	109730.00	0.197 ¹ ✓
T2	120 - 100	ROHN 3.5 STD	20.03	4.01	36.0 K=1.00	2.6795	-47798.70	109694.00	0.436 ¹ ✓
T3	100 - 80	Rohn 3.5 X-STR	20.03	5.01	46.0 K=1.00	3.6890	-69780.80	142199.00	0.491 ¹ ✓
T4	80 - 60	Rohn 3.5 X-STR	20.03	3.47	31.8 K=1.00	3.6890	-90734.50	154146.00	0.589 ¹ ✓
T5	60 - 40	Rohn 3.5 X-STR w/ Third Pipe	20.03	3.44	30.1 K=1.00	4.7470	-113531.00	199909.00	0.568 ¹ ✓
T6	40 - 20	Rohn 4 X-STR w/ Third Pipe	20.03	3.43	25.6 K=1.00	5.6510	-137241.00	242403.00	0.566 ¹ ✓
T7	20 - 0	ROHN 5 X-STR	20.03	5.18	33.8 K=1.00	6.1120	-158209.00	253029.00	0.625 ¹ ✓

¹ P_u / φP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	140 - 120	L1 1/2x1 1/2x1/8	6.02	2.79	112.9 K=1.00	0.3594	-3349.62	5949.86	0.563 ¹ ✓
T2	120 - 100	L1 1/2x1 1/2x1/8	7.50	3.67	148.9 K=1.00	0.3594	-2735.29	3662.33	0.747 ¹ ✓
T3	100 - 80	L2x2x1/8	9.71	4.81	145.2 K=1.00	0.4844	-3338.29	5190.27	0.643 ¹ ✓
T4	80 - 60	L2 1/2x2 1/2x3/16	12.25	6.13	148.5 K=1.00	0.9020	-4533.26	9237.72	0.491 ¹ ✓
T5	60 - 40	L2 1/2x2 1/2x3/16	13.99	7.00	169.7 K=1.00	0.9020	-5118.97	7077.10	0.723 ¹ ✓
T6	40 - 20	L2 1/2x2 1/2x5/16	15.81	7.88	193.5 K=1.00	1.4600	-6061.27	8812.53	0.688 ¹ ✓
T7	20 - 0	L3x3x3/8	19.03	9.54	195.1 K=1.00	2.1100	-7130.00	12525.40	0.569 ¹ ✓

¹ P_u / φP_n controls

Secondary Horizontal Design Data (Compression)

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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T4	80 - 60	L2 1/2x2 1/2x3/16	10.26	9.93	153.1 K=1.00	0.9020	-679.39	8691.42	0.078 ¹ ✓
T5	60 - 40	L2 1/2x2 1/2x3/16	12.29	11.96	184.5 K=1.00	0.9020	-841.28	5988.96	0.140 ¹ ✓
T6	40 - 20	L2 1/2x2 1/2x5/16	13.65	13.27	209.3 K=1.00	1.4600	-1016.10	7530.99	0.135 ¹ ✓
T7	20 - 0	L3x3x3/8	15.16	14.70	193.2 K=1.00	2.1100	-1066.45	12774.60	0.083 ¹ ✓

¹ P_u / φP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	140 - 120	L3x3x1/4	4.50	4.17	84.5 K=1.00	1.4400	-117.01	32049.10	0.004 ¹ ✓

¹ P_u / φP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	φP _n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	140 - 120	ROHN 3.5 STD	20.00	4.00	35.9	2.6795	18594.40	120579.00	0.154 ¹ ✓
T2	120 - 100	ROHN 3.5 STD	20.03	4.01	36.0	2.6795	43172.40	120579.00	0.358 ¹ ✓
T3	100 - 80	Rohn 3.5 X-STR	20.03	5.01	46.0	3.6890	63287.40	166004.00	0.381 ¹ ✓
T4	80 - 60	Rohn 3.5 X-STR	20.03	3.47	31.8	3.6890	81952.40	166004.00	0.494 ¹ ✓
T5	60 - 40	Rohn 3.5 X-STR w/ Third Pipe	20.03	3.44	30.1	4.7470	101583.00	213615.00	0.476 ¹ ✓
T6	40 - 20	Rohn 4 X-STR w/ Third Pipe	20.03	3.43	25.6	5.6510	121085.00	254295.00	0.476 ¹ ✓
T7	20 - 0	ROHN 5 X-STR	20.03	5.18	33.8	6.1120	137882.00	275039.00	0.501 ¹ ✓

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¹ $P_u / \phi P_n$ controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	140 - 120	L1 1/2x1 1/2x1/8	6.02	2.79	71.9	0.3594	3282.98	11643.80	0.282 ¹ ✓
T2	120 - 100	L1 1/2x1 1/2x1/8	7.50	3.67	94.8	0.3594	2699.55	11643.80	0.232 ¹ ✓
T3	100 - 80	L2x2x1/8	9.71	4.81	92.2	0.4844	3296.28	15693.80	0.210 ¹ ✓
T4	80 - 60	L2 1/2x2 1/2x3/16	12.25	6.13	94.5	0.9020	4250.30	29224.80	0.145 ¹ ✓
T5	60 - 40	L2 1/2x2 1/2x3/16	13.99	7.00	108.0	0.9020	4796.17	29224.80	0.164 ¹ ✓
T6	40 - 20	L2 1/2x2 1/2x5/16	15.81	7.88	124.3	1.4600	5512.81	47304.00	0.117 ¹ ✓
T7	20 - 0	L3x3x3/8	19.03	9.54	125.4	2.1100	6165.22	68364.00	0.090 ¹ ✓

¹ $P_u / \phi P_n$ controls

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T4	80 - 60	L2 1/2x2 1/2x3/16	10.26	9.93	153.1	0.9020	691.05	29224.80	0.024 ¹ ✓
T5	60 - 40	L2 1/2x2 1/2x3/16	12.29	11.96	184.5	0.9020	887.30	29224.80	0.030 ¹ ✓
T6	40 - 20	L2 1/2x2 1/2x5/16	12.97	12.59	198.6	1.4600	1134.47	47304.00	0.024 ¹ ✓
T7	20 - 0	L3x3x3/8	15.16	14.70	193.2	2.1100	1091.43	68364.00	0.016 ¹ ✓

¹ $P_u / \phi P_n$ controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	140 - 120	L3x3x1/4	4.50	4.17	53.8	1.4400	116.31	46656.00	0.002 ¹ ✓

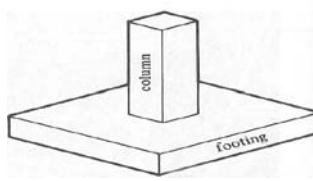
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¹ $P_u / \phi P_n$ controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail	
T1	140 - 120	Leg	ROHN 3.5 STD	3	-21590.80	109730.00	19.7	Pass	
		Diagonal	L1 1/2x1 1/2x1/8	10	-3349.62	5949.86	56.3	Pass	
		Top Girt	L3x3x1/4	4	-117.01	32049.10	0.4	Pass	
T2	120 - 100	Leg	ROHN 3.5 STD	39	-47798.70	109694.00	43.6	Pass	
		Diagonal	L1 1/2x1 1/2x1/8	42	-2735.29	3662.33	74.7	Pass	
T3	100 - 80	Leg	Rohn 3.5 X-STR	72	-69780.80	142199.00	49.1	Pass	
		Diagonal	L2x2x1/8	75	-3338.29	5190.27	64.3	Pass	
T4	80 - 60	Leg	Rohn 3.5 X-STR	99	-90734.50	154146.00	58.9	Pass	
		Diagonal	L2 1/2x2 1/2x3/16	102	-4533.26	9237.72	49.1	Pass	
		Secondary Horizontal	L2 1/2x2 1/2x3/16	108	-679.39	8691.42	7.8	Pass	
T5	60 - 40	Leg	Rohn 3.5 X-STR w/ Third Pipe	129	-113531.00	199909.00	56.8	Pass	
		Diagonal	L2 1/2x2 1/2x3/16	132	-5118.97	7077.10	72.3	Pass	
		Secondary Horizontal	L2 1/2x2 1/2x3/16	138	-841.28	5988.96	14.0	Pass	
T6	40 - 20	Leg	Rohn 4 X-STR w/ Third Pipe	159	-137241.00	242403.00	56.6	Pass	
		Diagonal	L2 1/2x2 1/2x5/16	162	-6061.27	8812.53	68.8	Pass	
		Secondary Horizontal	L2 1/2x2 1/2x5/16	176	-1016.10	7530.99	13.5	Pass	
T7	20 - 0	Leg	ROHN 5 X-STR	189	-158209.00	253029.00	62.5	Pass	
		Diagonal	L3x3x3/8	192	-7130.00	12525.40	56.9	Pass	
		Secondary Horizontal	L3x3x3/8	207	-1066.45	12774.60	8.3	Pass	
							Summary		
							Leg (T7)	62.5	Pass
							Diagonal (T2)	74.7	Pass
							Secondary Horizontal (T5)	14.0	Pass
							Top Girt (T1)	0.4	Pass
							RATING =	74.7	Pass

Date: 2/5/2019
 Site Name: CTL02045
 Client: Smartlink
 Infinigy Job #: 499-006
 Analysis/Design: Analysis
 Column Shape: Circle
 Footing Shape: Square
 Tower Type: Self Support



Infinigy Engineering PLLC
 Pad + Pier Calculations
 ACI 318-11

Loading Data			
TIA Code Revision:	ANSI/TIA-222-G		
Uplift:	0.0	kips	
Axial:	16.4	kips	
Shear:	18.2	kips	
Moment:	0	k-ft	

Soil Data			
Soil Type:	Clay		
Water Table Depth:	7	ft	
Soil Dry Unit Weight:	105.0	pcf	
ø Angle:	30	deg	
Cohesion:	1000	psf	
Ultimate Skin Friction:	500	psf	
Friction Coefficient:	0.4		
Ultimate Bearing Pressure:	6000	psf	

Column Data			
Concrete Strength:	3000	psi	
Column Diameter:	3	ft	
Column Total Length:	9.9	ft	
Column Height above ground:	0.8	ft	
Vertical Rebar Strength:		psi	
Vertical Rebar Size:		(#10) max.	
Vertical Rebar Quantity:		(4) min.	
Tie Rebar Strength:		psi	
Tie Rebar Size:		(#3) max.	
Tie Rebar Spacing:		in	
Rebar Clear Distance:		in	

Footing Data			
Concrete Strength:	3000	psi	
Footing Length:	8.5	ft	
Footing Width:	10.6	ft	
Footing Thickness:	3.100	ft	
Horizontal Rebar Strength:		psi	
Horizontal Rebar Size:			
Horizontal Rebar Quantity:			
Rebar Clear Distance:		in	
Dowel Strength:		psi	
Dowel Size:		(#11) max.	
Dowel Development Length:		in	
Dowel Quantity:			

Concrete Strength Check		
Footing One-Way Shear Ratio:	1.89	%

Soil Stability Check		
φs Bearing:	0.75	
φs Uplift:	0.75	
Bearing Ratio:	4.04	%
Sliding Ratio:	35.59	%
Toe Pressure Ratio:	68.77	%
Overturning Ratio:	53.25	%