NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

Northeast Site Solutions
Denise Sabo
4 Angela's Way, Burlington CT 06013
203-435-3640
denise@northeastsitesolutions.com

June 15, 2022

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

RE: Tower Share Application
33 Janoski Road, Ashford, CT 06278
Latitude: 41.952150
Longitude: -72.195527
Site #: 876345_Crown_Dish

Dear Ms. Bachman:

This letter and attachments are submitted on behalf of Dish Wireless LLC. Dish Wireless LLC plans to install antennas and related equipment to the tower site located at 33 Janoski Road, Ashford, Connecticut.

Dish Wireless LLC proposes to install three (3) 600/1900 MHz 5G antennas and six (6) RRUs, at the 130-foot level of the existing 192-foot self-support tower, one (1) Fiber cable will also be installed. Dish Wireless LLC equipment cabinets will be placed within a 7' x 5' lease area within the fenced compound. Included are plans by NB+C, dated June 8, 2022, Exhibit C. Also included is a structural analysis prepared by Crown Castle, dated September 10, 2021, confirming that the existing tower is structurally capable of supporting the proposed equipment. Attached as Exhibit D. The facility was approved by the Connecticut Siting Council, Docket No. 157 on March 16, 1993. Please see attached Exhibit A.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies 16-50aa, of Dish Wireless LLC intent to share a telecommunications facility pursuant to R.C.S.A. 16-50j-88. In accordance with R.C.S.A., a copy of this letter is being sent to Cathryn Silver-Smith, First Selectman and Michael D'Amato, Zoning Enforcement Officer for the Town of Ashford as well as the tower owner (Crown Castle) and property owner (Carolyn Martin, Martin Living Trust).

The planned modifications of the facility fall squarely within those activities explicitly provided for in R.C.S.A. 16-50j-89.

1. The proposed modification will not result in an increase in the height of the existing structure. The top of the existing tower is 192-feet and the Dish Wireless LLC antennas will be located at a center line height of 130-feet.

2. The proposed modifications will not result in an increase of the site boundary as depicted on the attached site plan.

NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

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

4. The operation of the proposed antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard. The combined site operations will result in a total power density of 15.83% as evidenced by Exhibit F.

Connecticut General Statutes 16-50aa indicates that the Council must approve the shared use of a telecommunications facility provided it finds the shared use is technically, legally, environmentally, and economically feasible and meets public safety concerns. As demonstrated in this letter, Dish Wireless LLC respectfully submits that the shared use of this facility satisfies these criteria.

A. Technical Feasibility. The existing tower has been deemed structurally capable of supporting Dish Wireless LLC proposed loading. The structural analysis is included as Exhibit D.

B. Legal Feasibility. As referenced above, C.G.S. 16-50aa has been authorized to issue orders approving the shared use of an existing tower such as this tower in Ashford. Under the authority granted to the Council, an order of the Council approving the requested shared use would permit Dish Wireless LLC to obtain a building permit for the proposed installation. Further, a Letter of Authorization is included as Exhibit G, authorizing Dish Wireless LLC to file this application for shared use.

C. Environmental Feasibility. The proposed shared use of this facility would have a minimal environmental impact. The installation of Dish Wireless LLC equipment at the 130-foot level of the existing 192-foot tower would have an insignificant visual impact on the area around the tower. Dish Wireless LLC ground equipment would be installed within the existing facility compound. Dish Wireless LLC shared use would therefore not cause any significant alteration in the physical or environmental characteristics of the existing site. Additionally, as evidenced by Exhibit F, the proposed antennas would not increase radio frequency emissions to a level at or above the Federal Communications Commission safety standard.

D. Economic Feasibility. Dish Wireless LLC will be entering into an agreement with the owner of this facility to mutually agreeable terms. As previously mentioned, the Letter of Authorization has been provided by the owner to assist Dish Wireless LLC with this tower sharing application.

E. Public Safety Concerns. As discussed above, the tower is structurally capable of supporting Dish Wireless LLC proposed loading. Dish Wireless LLC is not aware of any public safety concerns relative to the proposed sharing of the existing tower. Dish Wireless LLC intentions of providing new and improved wireless service through the shared use of this facility is expected to enhance the safety and welfare of local residents and individuals traveling through Ashford.

Sincerely,

Denise Sabo

Denise Sabo
Mobile: 203-435-3640
Fax: 413-521-0558
Office: 4 Angela's Way, Burlington CT 06013
Email: denise@northeastsitesolutions.com

NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

Attachments

Cc: Cathryn Silver-Smith, First Selectman
Ashford Town Hall
5 Town Hall Rd.,
Warrenville, CT 06278

Michael D'Amato, Zoning Enforcement Officer
Ashford Town Hall
5 Town Hall Rd.,
Warrenville, CT 06278

Carloyn Martin-Martin Family Living Trust - Property Owner
c/o Sprint Spectrum
PO. Box 8430
Kansas City, MO 64114

Crown Castle, Tower Owner

Exhibit A

Original Facility Approval

FILE SITE #204
SKY HILL
ZONING

RECEIVED
11-13-96 bk.

MINUTES - ASHFORD PLANNING AND ZONING COMMISSION

Annual Meeting - November 12, 1996

Members present: Organ, Lawrence, Nagy, Levaur, Rossman, McCarthy & White.

Alternates present: Bartok & Specyalski.

The meeting was called to order at 9:55 p.m. after the public hearing (Sprint Spectrum, tower & Moratorium, Lake Chaffee).

Specyalski is the voting alternate for this meeting.

At the Annual Town meeting, Alex Hastillo and Kevin McCarthy were elected to 4 year terms on the Commission ending in the year 2000 and Bartok was elected to a 3 year term as Alternate ending in 1999.

Moved and seconded to consider Old and New Business first. Passed without dissent.

The Commission considered the Sprint Spectrum application for a communications tower to be located on Sky Hill. There were no objections at tonights public hearing. The tower will be able to hold three sets of antennas. Sprint Spectrum will operate a PCS digital system. It is regulated by the FCC. There will be no lights on the tower. Access will be off Frontage Road to Janowski Road to avoid the wetlands on the east end of Janowski Road. Moved and seconded to approve with conditions the application for a Special Exception under Section 5.2.3 by Sprint Spectrum L.P., Meriden, CT for a 200' communications tower to be located on land leased from David H. Martin off Janowski Road on Sky Hill.

The conditions are:
1. Utilities to the site which is approximately 2500' from Janowski Road will be located underground in the right of way.
2. Space and installation of fire, emergency and municipal communications equipment to meet present and future needs will be provided at no cost.
3. A copy of the liability insurance will be submitted to the Commission.
4. A site plan including driveway design and sedimentation and erosion control measures will be submitted to the Commission before the construction begins.
5. A copy of the lease will be part of the land records.

Motion passed without dissent.

The Commission considered the proposed Moratorium at Lake Chaffee. Tim Backus, Chairman of the Water Pollution Control Authority was the only person to speak at the public hearing. Moved and seconded to approve the following:

Moratorium at Lake Chaffee

WHEREAS, the Department of Environmental Protection has cited the Town of Ashford and the Lake Chaffee Improvement Association, Inc. to study and report upon potential pollution at Lake Chaffee resulting from construction around the lake; and

WHEREAS, the Department of Environmental Protection has found pollution in the tributaries leading to the lake, and

WHEREAS, there is a reasonable expectation that the recommendation of the study may be to limit new construction in that area, or as an alterative to require that homes in the area be connected to an alternative type of sewage disposal system, and

WHEREAS, this Commission does not want to allow any deterioration of the water in the lake or tributaries;

The Planning and Zoning Commission of the Town of Ashford, pursuant to the authority vested in it by Section 8-2 of Connecticut General Statutes, hereby amends the zoning regulations of the Town of Ashford by adoption of the following Moratorium:

"Until December 31, 1997, there shall be no new house construction allowed within the area of Lake Chaffee Improvement Association, Inc. nor any enclosed addition to any existing house in that area. The Zoning Enforcement Officer may not in that period certify that any new construction is in conformity with the zoning regulations of the town."

Motion passed without dissent.

The reasons for reinstating the moratorium include:
1. There is need for more testing of the water and septic systems in the area.
2. There have been minimal applications for construction since the last moratorium was lifted.
3. The WPCA is seeking on-site solutions.
4. There are several sets of vacant lots that may be valuable for sewage disposal systems.

Specyalski stepped down for the next item of business.

Brialee Campground - Brian Specyalski submitted a plan for a six additional campsites at the campground. It was noted that three of these butt onto adjoining property that is owned by the State of Connecticut. The others have a 100' setback that has been the minimum acceptable to the Commission. Moved and seconded to receive the plan and hold a public hearing on December 9th. Passed without dissent. A new map showing only the three sites that meet the setback requirements will be submitted. The Commission will walk the site a 7 a.m. on Saturday November 16th.

The Commission returned to the top of the agenda.

Moved and seconded to approve the minutes of the October 15th meeting. Passed without dissent.

Moved and seconded to send a letter of appreciation to George Quirk Sr., retiring member for his many years of service to the Commission. Passed without dissent.

There were no bills.

A copy of the revised Small Cities Housing Plan was received from the Office of the Selectmen. It will go to a public hearing in December. Copies will be distributed to the Commission members for review.

The revised fee schedule was approved by Town Meeting in October.

Moved and seconded to add to the agenda the election of officers and reappointment of employees. Passed without dissent.

Moved and seconded to reelect the following officers to serve until the next annual meeting of the Commission: Sidney E. Organ, Chairman, Alex Hastillo, Vice Chairman and John Bartok, Secretary. Passed without dissent. The Secretary will cast one ballot for each.

Moved and seconded to reappoint Rudolph Makray, Zoning Enforcement Officer and John Bartok, Recording Secretary for one year or until the next annual meeting. Passed without dissent.

The Commission agreed to hold a Special Meeting on Monday, December 16th at 7 p.m. to review the draft of the revised Plan of Development.

The meeting adjourned at 10:55 p.m.

Respectfully submitted.

John W. Bartok, Jr.
Recording Secretary

LEGAL NOTICE

Town of Ashford

The Ashford Planning and Zoning Commission at its meeting on November 12, 1996 took the following aotions:

APPROVED with oonditions the applioation of Sprint Speotrum, L.P., Meriden, CT for a 200' communioations tower to be built on the David Matin property looated off Route 89 on Sky Hill.

APPROVED a request by the Ashford Water Pollution Control Authority to reenstate the moratorium at Lake Chaffee until December 31, 1997 that prohibits oonstruction of new houses or enolosed additions to any existing house.

Dated in Ashford, Conneotiout this 14th day of November, 1996.

John W. Bartok,Jr.,Seo.
Ashford Planning and,
Zoning Commission

Exhibit B

Property Card

Ashford

Unique ID: 00007410 **Card No:** 1 Of 1

Location:	33 JANOSKI RD	Map Id:	02 F 1.1	Zone:		Date Printed:	6/16/2022
		Neighborhood:	C3			Last Update:	6/16/2022

Owner Of Record	Volume/Page	Date	Sales Type	Valid	Sale Price
MARTIN CAROLYN M L/U	0200/0736	12/4/2020	Quit Claim	No	0
MARTIN STEVEN REMAINDERMAN, C/O SPRINT SPECTRUM CT-03XC04, PO BOX 8430, KANSAS CITY,			Exempt		

Prior Owner History

MARTIN FAMILY LIV TR DTD 6/20/05	MARTIN CAROLYN M TRUSTEE	0197/0876	1/31/2020	No	0
MARTIN FAMILY LIV TR DTD 6/20/05	MARTIN DAVID H + CAROLYN M TRUSTEES	0194/0885	10/15/2018	No	0
MARTIN DAVID H	C/O SPRINT SPECTRUM CT-03XC204	0109/0811	9/30/1996	No	0

Permit Number	Date	Permit Description
20-39B	4/21/2020	T MOBILE REPLACING 6 EXISTING ANTENNAS
20-16B	2/26/2020	ADD 3 ANTENNAS TO EXISTING TOWER.
19-129B	12/30/2019	REPLACE SIX EXISTING ANTENNALS + REPLACE 2 RRUS. ADD 6 RRUS.
19-13B	3/8/2019	UPGRADE EXISTING T-MOBILE EQPMT
18-54E	11/19/2018	INSTALL CONCRETE PAD + DIESEL GENERATOR.
18-76	9/12/2018	SPRINT TO REPLACE 6 ANTENNAS + ADD 12 REMOTE RADIO HEADS.

Supplemental Data

Census/Tract	VisionPID	65	
Dev Map ID	Incr Reason		
	Conc Fdnt St		
	TC Map#		
	PA490 Info		
Utilities			

Appraised Value

Total Land Value	401,400
Total Building Value	0
Total Outbldg Value	111,600
Total Market Value	513,000

Acres

Land Type	Acres	490	Total Value
Commercial Excess	0.47	0.00	1,400
Commercial Primary Vacant	0.23	0.00	400,000
Total	0.7000	0.00	401,400

State Item Codes

Code	Quantity	Value

Assessment History (Prior Years as of Oct 1)

	2021	2020	2019	2018
Land	280,980	124,000	124,000	124,000
Building	0	0	0	0
Outbuilding	78,120	128,200	128,200	128,200
Total	**359,100**	**252,200**	**252,200**	**252,200**

490 Appraised Totals

Type	Acres	Value	Type	Acres	Value
			Totals	**0.00**	**0**

Application Date: **Expiration Date:**

Comments

Information may be deemed reliable, but not guaranteed. **Revaluation Date:** 10/1/2016

Ashford

Unique ID: 00007410

Location:	33 JANOSKI RD	**Unit**	

Commercial Building Description	Description	Area/Qty
Building Use		
Class		
Overall Condition		
Construction Quality		
Stories		
Year Built		
Remodel		
Percent Complete		
GLA		
Basement		
Basement Area		
HVAC		
Heating Type		
Fuel Type		
Cooling Type		
Interior		
Floors		
Walls		
Wall Height		
Exterior		
Exterior Walls		
Roof Type		
Roof Cover		
Special Features		

Attached Component Computations

Type	Yr Blt	Area/Qty

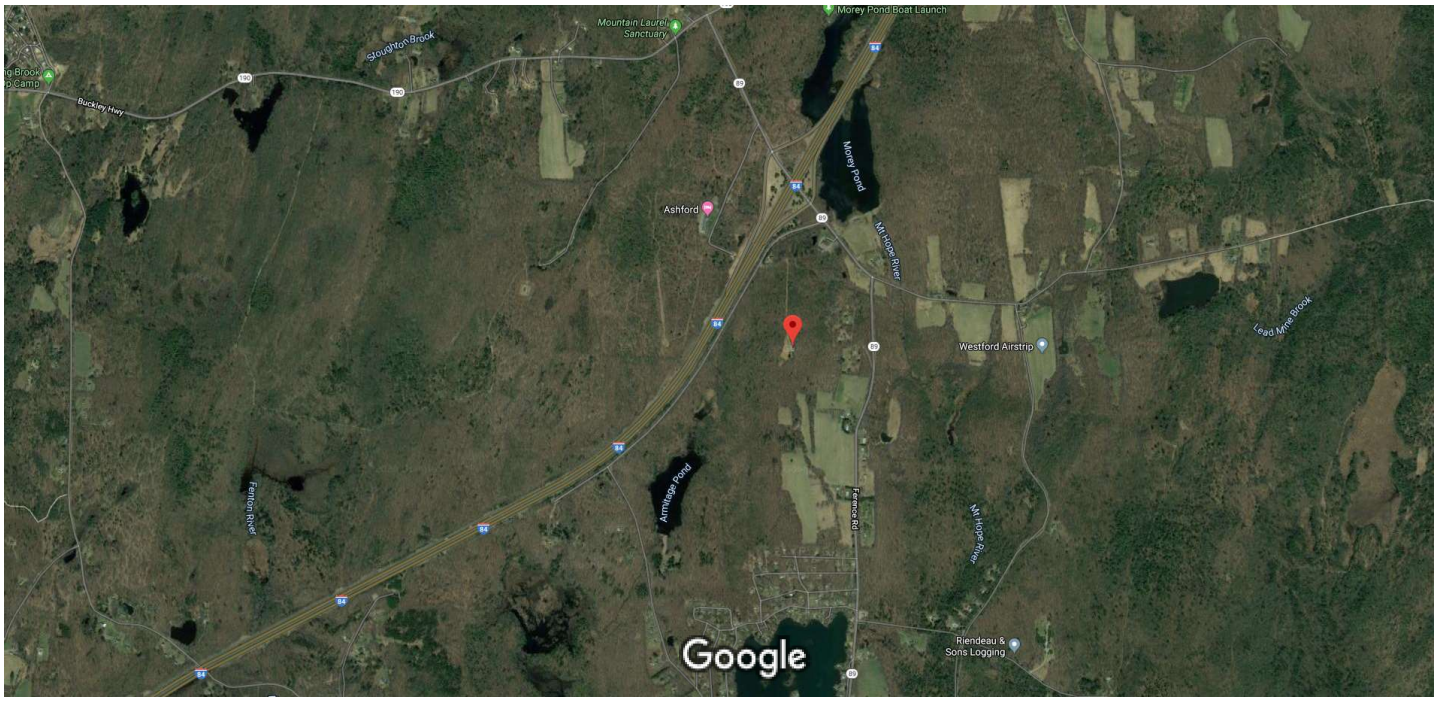
Detached Component Computations

Type	Year	Condition	Area/Qty	Type	Year	Condition	Area/Qty

Google Maps

41°57'07.7"N 72°11'43.9"W

Crown Castle - tower location



Imagery ©2020 CNES / Airbus, MassGIS, Commonwealth of Massachusetts EOEA, Maxar Technologies, U.S. Geological Survey, USDA 1000 ft
Farm Service Agency, Map data ©2020

41°57'07.7"N 72°11'43.9"W

41.952139, -72.195528

Directions | Save | Nearby | Send to your phone | Share

Ashford School District, Ashford, CT 06278

XR23+VQ Ashford, Connecticut

Exhibit C

Construction Drawings

DISH Wireless L.L.C. SITE ID:

BOBOS00874A

DISH Wireless L.L.C. SITE ADDRESS:

33 JANOWSKI ROAD
ASHFORD, CT 06278

CONNECTICUT CODE OF COMPLIANCE

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

CODE TYPE	CODE
BUILDING	2018 CT STATE BUILDING CODE/2015 IBC W/ CT AMENDMENTS
MECHANICAL	2018 CT STATE BUILDING CODE/2015 IMC W/ CT AMENDMENTS
ELECTRICAL	2018 CT STATE BUILDING CODE/2017 NEC W/ CT AMENDMENTS

SHEET INDEX

SCOPE OF WORK

THIS IS NOT AN ALL INCLUSIVE LIST. CONTRACTOR SHALL UTILIZE SPECIFIED EQUIPMENT PART OR ENGINEER APPROVED EQUIVALENT. CONTRACTOR SHALL VERIFY ALL NEEDED EQUIPMENT TO PROVIDE A FUNCTIONAL SITE. THE PROJECT GENERALLY CONSISTS OF THE FOLLOWING:

TOWER SCOPE OF WORK:
- INSTALL (3) PROPOSED PANEL ANTENNAS (1 PER SECTOR)
- INSTALL (3) PROPOSED SECTOR FRAMES
- INSTALL PROPOSED JUMPERS
- INSTALL (6) PROPOSED RRUs (2 PER SECTOR)
- INSTALL (1) PROPOSED OVER VOLTAGE PROTECTION DEVICE (OVP)
- INSTALL (1) PROPOSED HYBRID CABLE
- INSTALL (3) DOUBLE Z-BRACKETS (1 PER SECTOR)

GROUND SCOPE OF WORK:
- INSTALL (1) PROPOSED METAL PLATFORM
- INSTALL (1) PROPOSED PPC CABINET
- INSTALL (1) PROPOSED EQUIPMENT CABINET
- INSTALL (1) PROPOSED POWER CONDUIT
- INSTALL (1) PROPOSED TELCO CONDUIT
- INSTALL (1) PROPOSED TELCO-FIBER BOX
- INSTALL (1) PROPOSED GPS UNIT
- INSTALL (1) PROPOSED FIBER NID (IF REQUIRED)
- REMOVE EXISTING ABANDONED EQUIPMENT
- REMOVE EXISTING ABANDONED COAX

SITE PHOTO

UNDERGROUND SERVICE ALERT CBYD 811
UTILITY NOTIFICATION CENTER OF CONNECTICUT
(800) 922-4455
WWW.CBYD.COM

CALL 2 WORKING DAYS UTILITY NOTIFICATION PRIOR TO CONSTRUCTION

GENERAL NOTES

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

11"x17" PLOT WILL BE HALF SCALE UNLESS OTHERWISE NOTED

CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON THE JOB SITE, AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK.

SITE INFORMATION

PROPERTY OWNER:	GLOBAL SIGNAL ACQUISITION
ADDRESS:	PO BOX 277445 ATLANTA, GA 30384-7455
TOWER TYPE:	SELF-SUPPORT
TOWER CO SITE ID:	876345
TOWER APP NUMBER:	572903
COUNTY:	WINDHAM
LATITUDE (NAD 83):	41° 57' 7.70" N 41.952139 N
LONGITUDE (NAD 83):	-72° 11' 43.90" W -72.195528 W
ZONING JURISDICTION:	CT SITING COUNCIL
ZONING DISTRICT:	RA
PARCEL NUMBER:	ASHF-007410-000000
OCCUPANCY GROUP:	U
CONSTRUCTION TYPE:	II-B
POWER COMPANY:	EVERSOURCE
TELEPHONE COMPANY:	T.B.D.

PROJECT DIRECTORY

APPLICANT:	DISH Wireless L.L.C. 5701 SOUTH SANTA FE DRIVE LITTLETON, CO 80120
TOWER OWNER:	CROWN CASTLE USA INC. 2000 CORPORATE DR. CANONSBURG, PA 15317 (877) 486-9377
SITE DESIGNER:	NB+C ENGINEERING SERVICES, LLC 6095 MARSHALEE DRIVE, SUITE 300 ELKRIDGE, MD 21075 (410) 712-7092
SITE ACQUISITION:	VICTOR NUNEZ VICTOR.NUNEZ@CROWNCASTLE.COM
CONSTRUCTION MANAGER:	AARON CHANDLER AARON.CHANDLER@DISH.COM
RF ENGINEER:	ARVIN SEBASTIAN ARVIN.SEBASTIAN@DISH.COM

DIRECTIONS

DIRECTIONS FROM SOUTHBRIDGE MUNICIPAL AIRPORT:
START OUT GOING SOUTHEAST ON CLEMENCE HILL RD. TAKE THE 1ST RIGHT ONTO AIRPORT ACCESS RD. TURN LEFT ONTO PLEASANT ST. TURN LEFT ONTO MAIN ST. TAKE THE 1ST RIGHT ONTO WEST ST. TURN RIGHT ONTO SOUTH ST. SOUTH ST BECOMES MASHAPAUG RD. TURN RIGHT TO STAY ON MASHAPAUG RD. MERGE ONTO I-84 W TOWARD HARTFORD CT. TAKE THE CT-89 EXIT, EXIT 72. TURN LEFT ONTO FISH POINT RD. TURN RIGHT ONTO FRONTAGE RD. TAKE THE 1ST LEFT ONTO JANOSKI RD. DRIVE TO END OF ROAD TO REACH SITE.

VICINITY MAP

NO SCALE

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

NB+C ENGINEERING SERVICES, LLC.
6095 MARSHALEE DRIVE, SUITE 300
ELKRIDGE, MD 21075
(410) 712-7092

06/08/2022

KRUPAKARAN KOLANDAIVELU, P.E.
STATE OF CONNECTICUT
PROFESSIONAL ENGINEER
LICENSE #PEN.0028997

DRAWN BY:	CHECKED BY:	APPROVED BY:
BPC	BRN	TA

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	11/09/2021	ISSUED FOR CONSTRUCTION
1	03/09/2022	ISSUED FOR CONSTRUCTION
2	06/08/2022	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

876345

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00874A
33 JANOWSKI ROAD
ASHFORD, CT 06278

SHEET TITLE

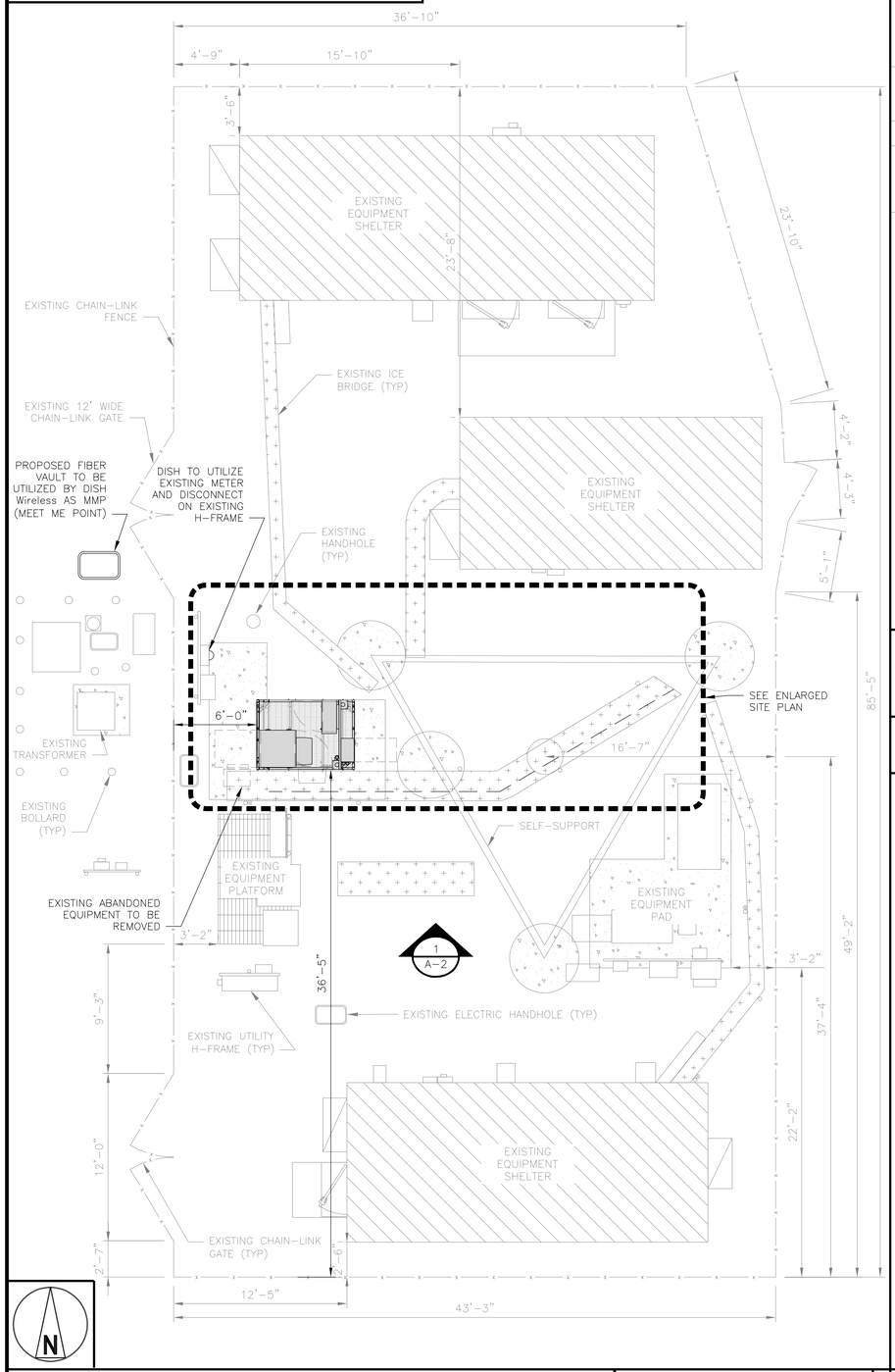
TITLE SHEET

SHEET NUMBER

T-1

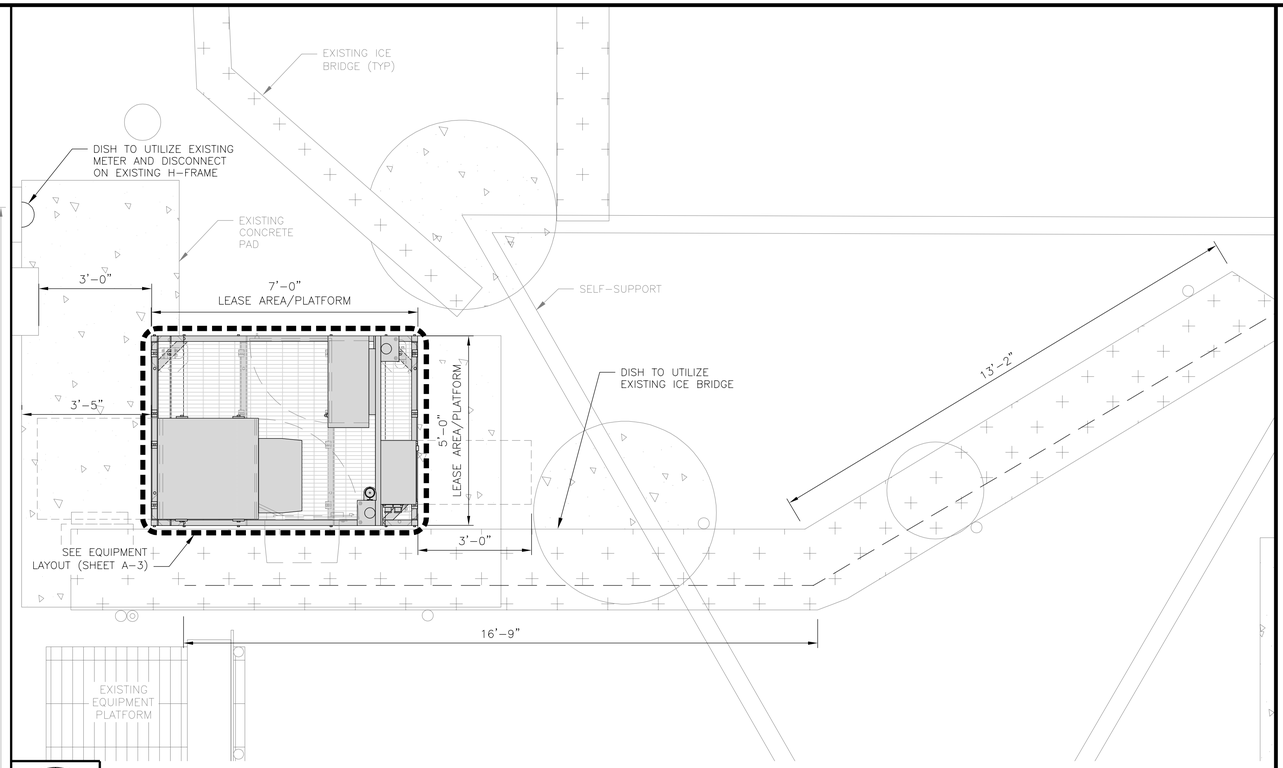
NOTES

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. CONTRACTOR SHALL MAINTAIN A 10'-0" MINIMUM SEPARATION BETWEEN THE PROPOSED GPS UNIT, TRANSMITTING ANTENNAS AND EXISTING GPS UNITS.
3. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.



OVERALL SITE PLAN

6' 4' 2' 0 5' 10'
3/16"=1'-0"



ENLARGED SITE PLAN

12" 6" 0 1' 2' 3' 4' 5' 6' 7'
3/8"=1'-0"

2

1 AERIAL VIEW 3

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

NB+C TOTALLY COMMITTED.
NB+C ENGINEERING SERVICES, LLC.
6095 MARSHALEE DRIVE, SUITE 300
ELKRIDGE, MD 21075
(410) 712-7092

STATE OF CONNECTICUT · KRUPAKARAN KOLANDAIVELU · PEN.0028997 · LICENSED PROFESSIONAL ENGINEER

06/08/2022

KRUPAKARAN KOLANDAIVELU, P.E.
STATE OF CONNECTICUT
PROFESSIONAL ENGINEER
LICENSE #PEN.0028997

DRAWN BY:	CHECKED BY:	APPROVED BY:
BPC	BRN	TA

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	11/09/2021	ISSUED FOR CONSTRUCTION
1	03/09/2022	ISSUED FOR CONSTRUCTION
2	06/08/2022	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

876345

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00874A
33 JANOWSKI ROAD
ASHFORD, CT 06278

SHEET TITLE

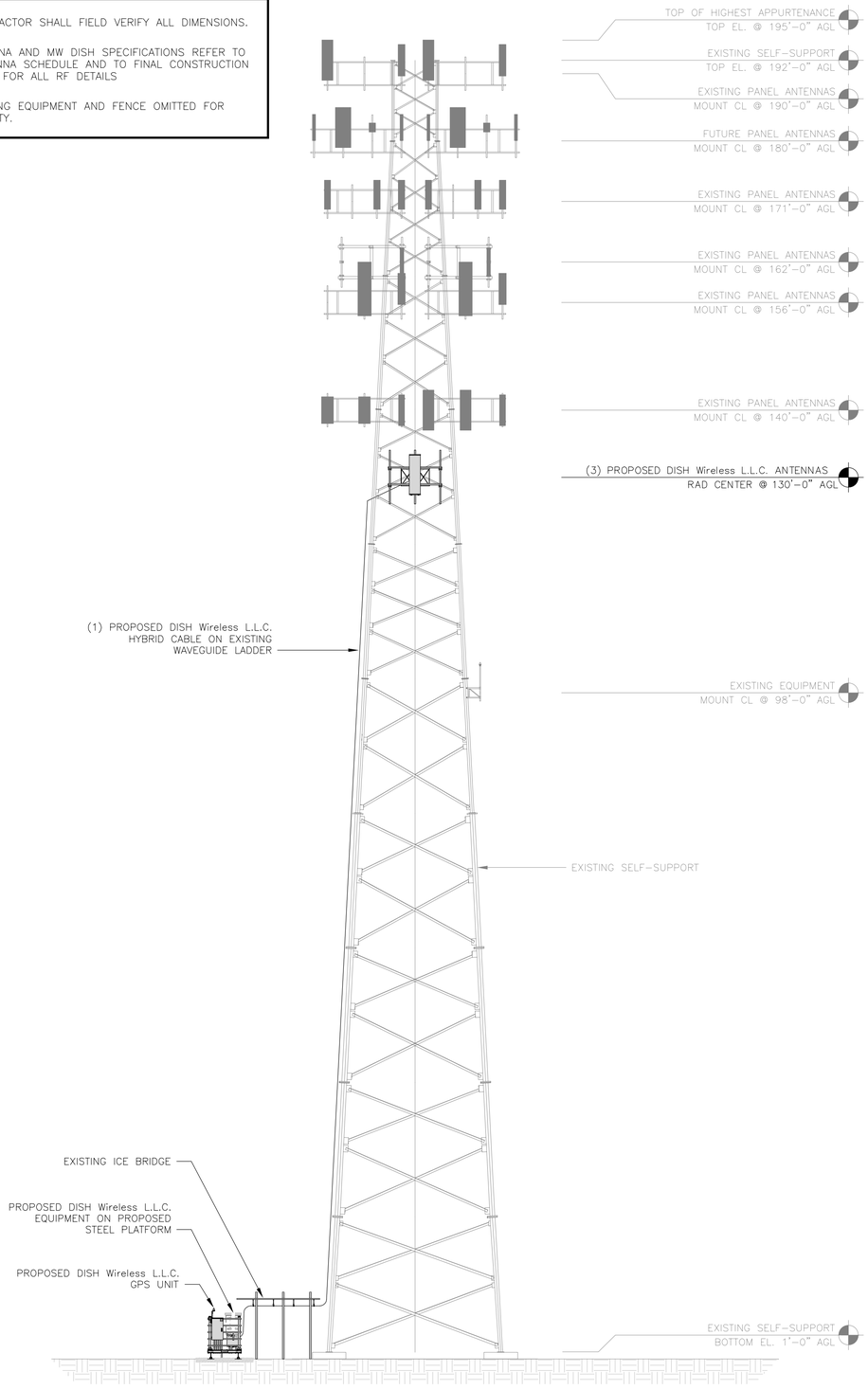
OVERALL AND ENLARGED SITE PLAN

SHEET NUMBER

A-1

NOTES

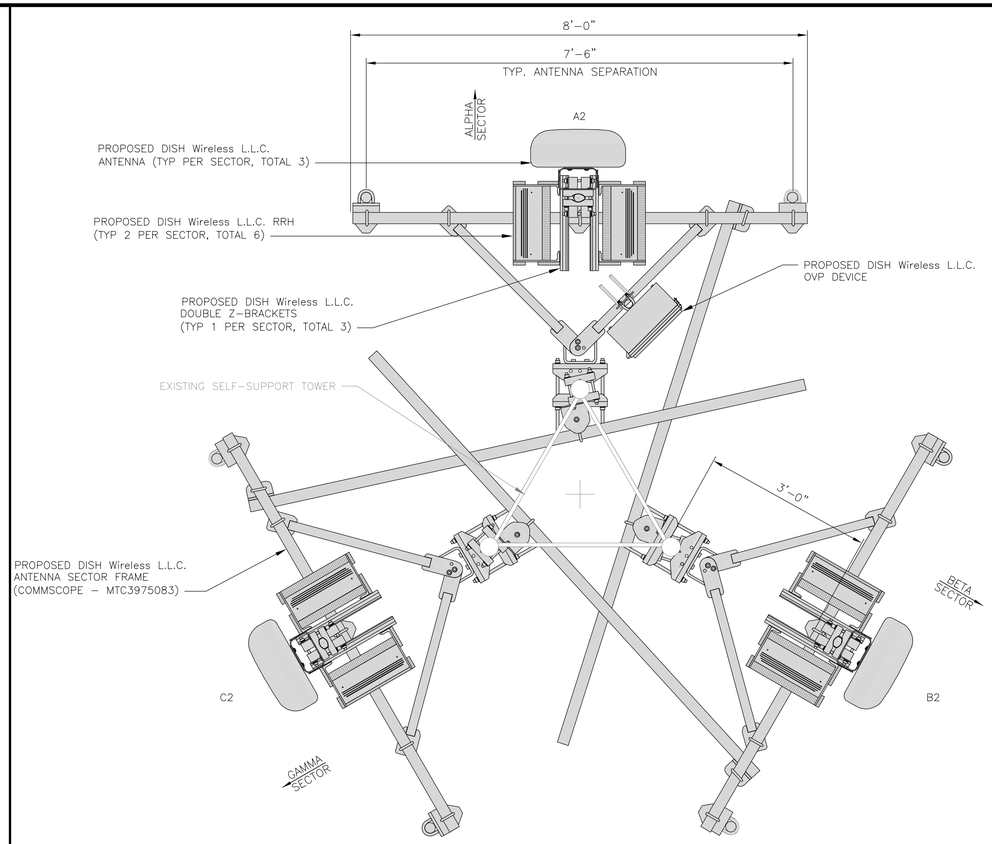
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. ANTENNA AND MW DISH SPECIFICATIONS REFER TO ANTENNA SCHEDULE AND TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS
3. EXISTING EQUIPMENT AND FENCE OMITTED FOR CLARITY.



PROPOSED NORTH ELEVATION

12' 8' 4' 0 10' 20'
3/32"=1'-0"

1



ANTENNA LAYOUT

12" 6" 0 1' 2' 3'
3/4"=1'-0"

2

SECTOR POS.	ANTENNA					TRANSMISSION CABLE	RRH			OVP
	EXISTING OR PROPOSED	MANUFACTURER - MODEL NUMBER	TECH	AZIMUTH	RAD CENTER	FEED LINE TYPE AND LENGTH	MANUFACTURER - MODEL NUMBER	TECH	POS.	MANUFACTURER MODEL
A1	--	--	--	--	--	(1) HIGH-CAPACITY 1.5" DIA. HYBRID CABLE (191' LONG)	FUJITSU - TA08025-B604	5G	A2	RAYCAP - RDIDC-9181-PF-48
A2	PROPOSED	JMA - MX08FRO665-21	5G	0°	130'-0"		FUJITSU - TA08025-B605	5G	A2	
A3	--	--	--	--	--		--	--	--	
B1	--	--	--	--	--	SHARED W/ALPHA	FUJITSU - TA08025-B604	5G	B2	SHARED W/ALPHA
B2	PROPOSED	JMA - MX08FRO665-21	5G	120°	130'-0"		FUJITSU - TA08025-B605	5G	B2	
B3	--	--	--	--	--		--	--	--	
C1	--	--	--	--	--	SHARED W/ALPHA	FUJITSU - TA08025-B604	5G	C2	SHARED W/ALPHA
C2	PROPOSED	JMA - MX08FRO665-21	5G	240°	130'-0"		FUJITSU - TA08025-B605	5G	C2	
C3	--	--	--	--	--		--	--	--	

NOTES

1. CONTRACTOR TO REFER TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS.
2. ANTENNA AND RRH MODELS MAY CHANGE DUE TO EQUIPMENT AVAILABILITY. ALL EQUIPMENT CHANGES MUST BE APPROVED AND REMAIN IN COMPLIANCE WITH THE PROPOSED DESIGN AND STRUCTURAL ANALYSES.

ANTENNA SCHEDULE

NO SCALE

3

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

NB+C TOTALLY COMMITTED.
NB+C ENGINEERING SERVICES, LLC.
6095 MARSHALEE DRIVE, SUITE 300
ELKRIDGE, MD 21075
(410) 712-7092

06/08/2022

KRUPAKARAN KOLANDAIVELU, P.E.
STATE OF CONNECTICUT
PROFESSIONAL ENGINEER
LICENSE #PEN.0028997

DRAWN BY:	CHECKED BY:	APPROVED BY:
BPC	BRN	TA

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	11/09/2021	ISSUED FOR CONSTRUCTION
1	03/09/2022	ISSUED FOR CONSTRUCTION
2	06/08/2022	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

876345

DISH Wireless L.L.C.
PROJECT INFORMATION

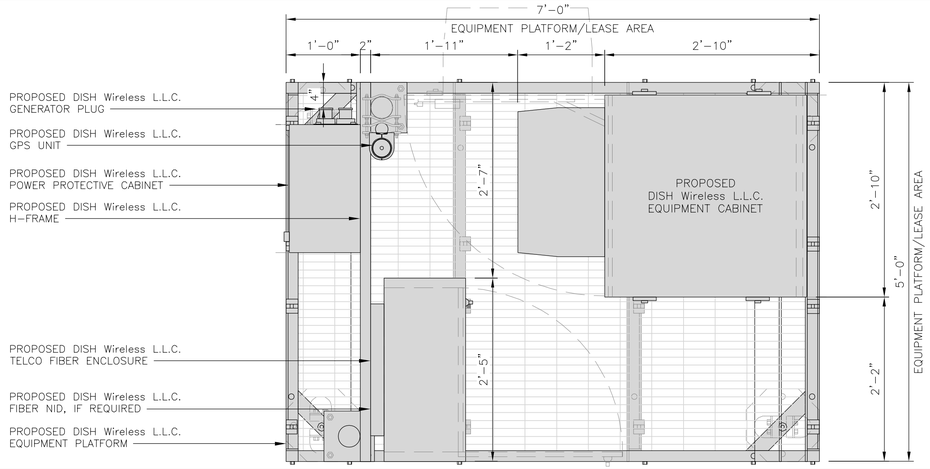
BOBOS00874A
33 JANOWSKI ROAD
ASHFORD, CT 06278

SHEET TITLE

ELEVATION, ANTENNA LAYOUT AND SCHEDULE

SHEET NUMBER

A-2



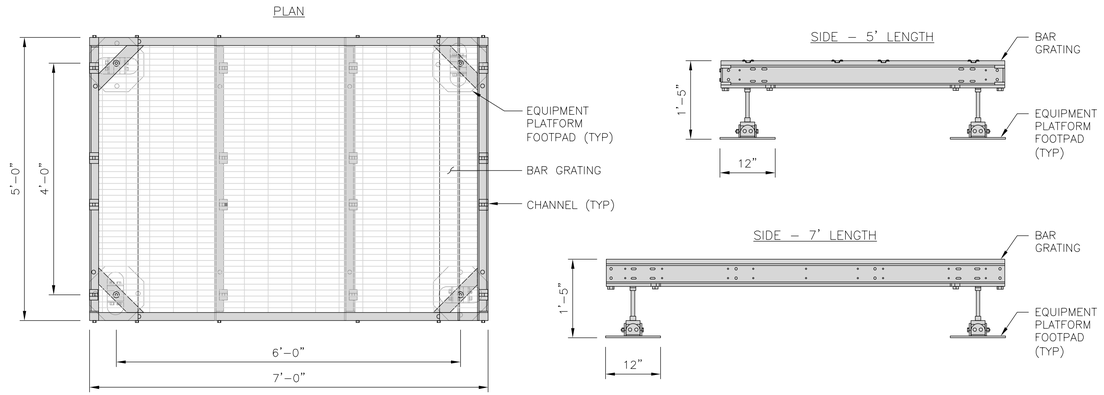
PLATFORM EQUIPMENT PLAN

12" 9" 6" 3" 0 1' 2"
1"=1'-0"

1

COMMSCOPE MTC4045LP 5X7 PLATFORM	
DIMENSIONS (HxWxD)	16"x84"x60"
TOTAL WEIGHT	423 LBS

NOTE:
GC TO PROVIDE EXTENDED THREAD FOR PLATFORM IF REQUIRED HEIGHT EXCEEDS 17"

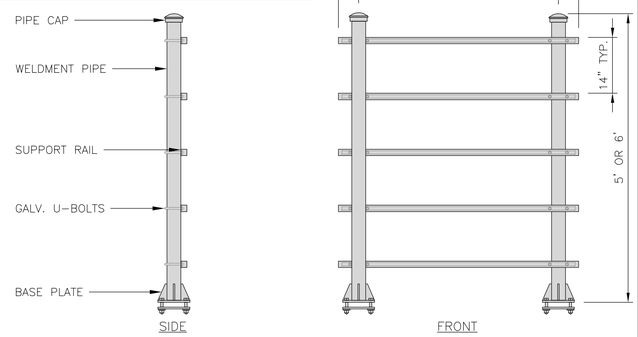


PLATFORM DETAIL

NO SCALE

2

COMMSCOPE MTC4045HFLD H-FRAME	
UNISTRUT/SUPPORT RAILS QTY	5
WEIGHT	59.74 lbs



H-FRAME DETAIL

NO SCALE

3

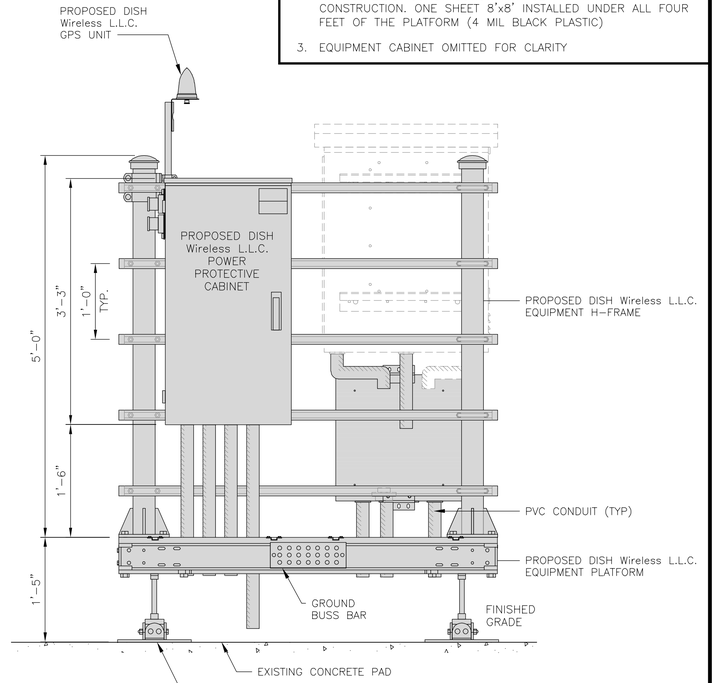
NOT USED

NO SCALE

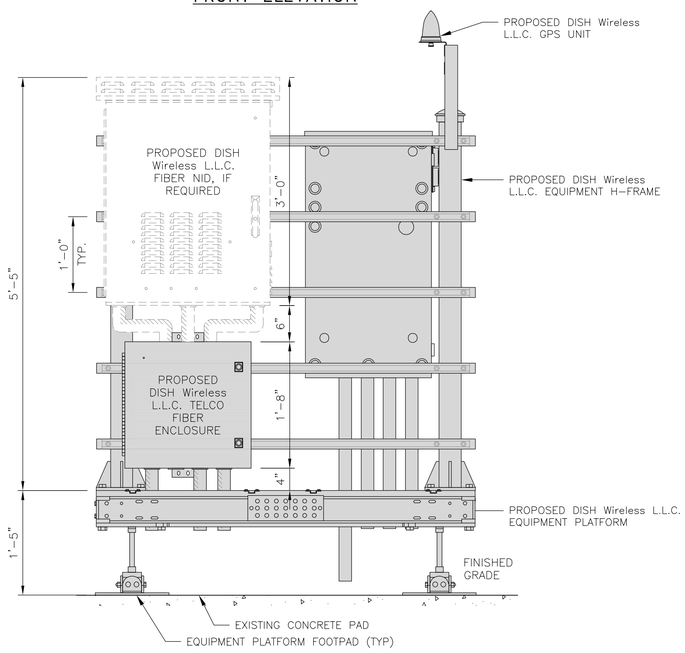
4

NOTES

1. CONTRACTOR TO BURY PLATFORM FEET WITH A MINIMUM OF 2" OF FILL PER EXISTING SITE SURFACE
2. WEED BARRIER FABRIC TO BE ADDED AT DISCRETION OF DISH Wireless L.L.C. CONSTRUCTION MANAGER AT TIME OF CONSTRUCTION. ONE SHEET 8'x8' INSTALLED UNDER ALL FOUR FEET OF THE PLATFORM (4 MIL BLACK PLASTIC)
3. EQUIPMENT CABINET OMITTED FOR CLARITY



FRONT ELEVATION



BACK ELEVATION

H-FRAME EQUIPMENT ELEVATION

12" 9" 6" 3" 0 1' 2"
1"=1'-0"

5

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

NB+C TOTALLY COMMITTED.
NB+C ENGINEERING SERVICES, LLC.
6095 MARSHALEE DRIVE, SUITE 300
ELKRIDGE, MD 21075
(410) 712-7092

STATE OF CONNECTICUT — KRUPAKARAN KOLANDAIVELU — PEN.0028997 — LICENSED PROFESSIONAL ENGINEER

06/08/2022

KRUPAKARAN KOLANDAIVELU, P.E.
STATE OF CONNECTICUT
PROFESSIONAL ENGINEER
LICENSE #PEN.0028997

DRAWN BY:	CHECKED BY:	APPROVED BY:
BPC	BRN	TA

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	11/09/2021	ISSUED FOR CONSTRUCTION
1	03/09/2022	ISSUED FOR CONSTRUCTION
2	06/08/2022	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

876345

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00874A
33 JANOWSKI ROAD
ASHFORD, CT 06278

SHEET TITLE

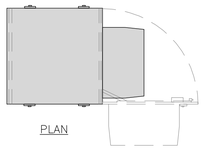
EQUIPMENT PLATFORM AND H-FRAME DETAILS

SHEET NUMBER

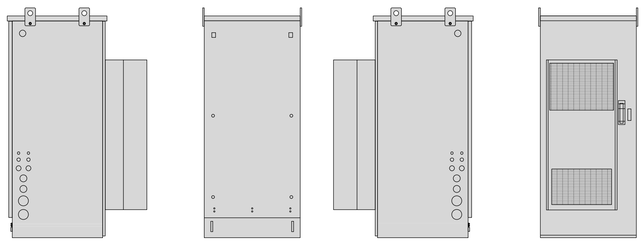
A-3

CHARLES INDUSTRY HEX CUBE–PM639155N4

DIMENSIONS (HxWxD):	74"x32"x32"
POWER PLANT:	–48VDC ABB/600W
TOTAL WEIGHT (EMPTY)	408 LBS



PLAN



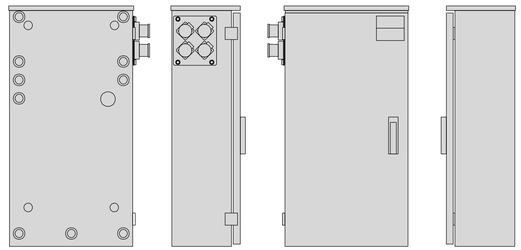
SIDE BACK SIDE FRONT

CABINET DETAIL | NO SCALE | 1

RAYCAP PPC RDIAC–2465–P–240–MTS

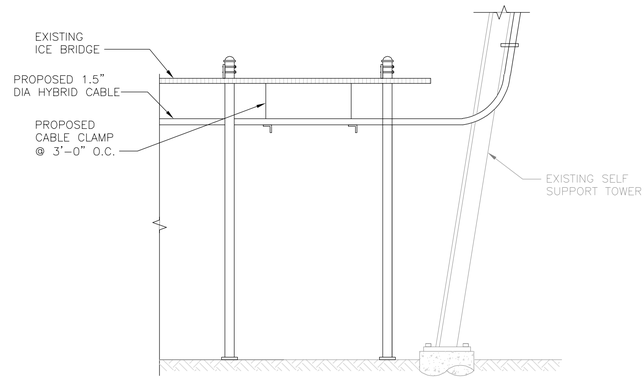
ENCLOSURE DIMENSIONS (HxWxD):	39"x22.855"x12.593
WEIGHT:	80 lbs
OPERATING AC VOLTAGE	240/120 1 PHASE 3W+G

TOP



BACK SIDE FRONT SIDE

POWER PROTECTION CABINET (PPC) DETAIL | NO SCALE | 2

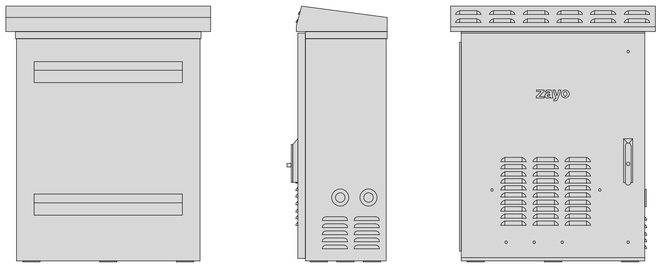


HYBRID CABLE RUN | NO SCALE | 3

ZAYO 5RU (LEFT SWING DOOR) FIBER NID ENCLOSURE

DIMENSIONS (HxWxD)	36.1"x29"x12.9"
WEIGHT	85 lbs

BOTTOM

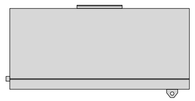


BACK SIDE FRONT

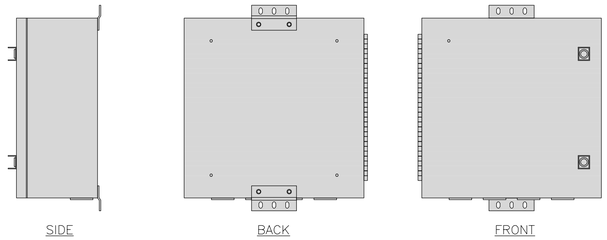
FIBER NID ENCLOSURE DETAIL | NO SCALE | 4

CHARLES CFIT–PF2020DSH1 FIBER TELCO ENCLOSURE

ENCLOSURE DIMS (HxWxD)	20"x20"x9"
ENCLOSURE WEIGHT	20 lbs
MOUNTING	WALL
COMPLIANCE	TYPE 4



FRONT



SIDE BACK FRONT

FIBER TELCO ENCLOSURE DETAIL | NO SCALE | 5

NOT USED | NO SCALE | 6

NOT USED | NO SCALE | 7

NOT USED | NO SCALE | 8

NOT USED | NO SCALE | 9

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

NB+C TOTALLY COMMITTED.
NB+C ENGINEERING SERVICES, LLC.
6095 MARSHALEE DRIVE, SUITE 300
ELKRIDGE, MD 21075
(410) 712-7092

STATE OF CONNECTICUT · KRUPAKARAN KOLANDAIVELU · PEN.0028997 · LICENSED PROFESSIONAL ENGINEER

06/08/2022

KRUPAKARAN KOLANDAIVELU, P.E.
STATE OF CONNECTICUT
PROFESSIONAL ENGINEER
LICENSE #PEN.0028997

DRAWN BY:	CHECKED BY:	APPROVED BY:
BPC	BRN	TA

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	11/09/2021	ISSUED FOR CONSTRUCTION
1	03/09/2022	ISSUED FOR CONSTRUCTION
2	06/08/2022	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

876345

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00874A
33 JANOWSKI ROAD
ASHFORD, CT 06278

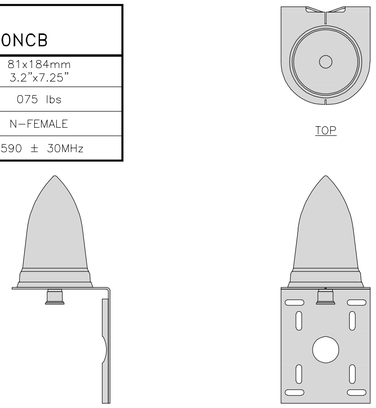
SHEET TITLE

EQUIPMENT DETAILS

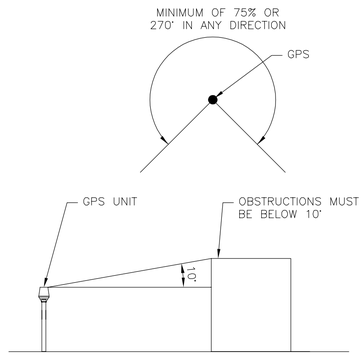
SHEET NUMBER

A-4

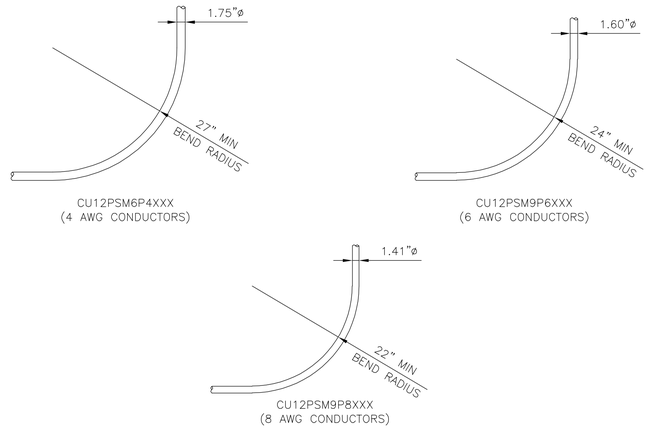
PCTEL GPSGL-TMG-SPI-40NCB	
DIMENSIONS (DIAxH) MM/INCH	81x184mm 3.2"x7.25"
WEIGHT W/ACCESSORIES	075 lbs
CONNECTOR	N-FEMALE
FREQUENCY RANGE	1590 ± 30MHz



GPS DETAIL | NO SCALE | 1



GPS MINIMUM SKY VIEW REQUIREMENTS | NO SCALE | 2



CABLES UNLIMITED HYBRID CABLE MINIMUM BEND RADIUSES | NO SCALE | 3

DESC	QTY	
SITE ID #:	BOBOS00874A	
TWR TYPE:	SELF-SUPPORT	
HYBRID BEND RADIUS	30"	The preparer must determine the lengths below.
RAD CENTER (ft)	130.0	This is the RAD center for the antennas on towers. For a rooftop, this is the total length of all vertical sections of the hybrid.
ICE BRIDGE HEIGHT (ft)	10.0	This is the height of the bridge coverings.
ICE BRIDGE LENGTH (ft)	30.0	This is the length of the total ice bridge coverings, if more than one ice bridge is used or total horizontal lengths of hybrid if this is inside a building.
LENGTH ACROSS PLATFORM (ft)	6.0	This is the length from the cabinet to the first bend up the ice bridge or inside a radio room.
LENGTH FROM TOWER TOP TO OVP (ft)	6.0	This is the horizontal length from the tower to the OVP at the antenna level or the total horizontal lengths of hybrid on a building or large self supporting tower.
VERTICAL LENGTH OF HYBRID INTO TOWER TOP OVP (ft)	3.0	This is the vertical length of hybrid that comes out to the tower top OVP to the beginning of the first bend that is going into the monopole port.
	LENGTH (ft)	
Additional Excess Hybrid to be added (To be determined by preparer)	0	
Total Hybrid Length to Order (Rounded up to nearest whole number)	191	

HYBRID CABLE CALCULATOR | NO SCALE | 4

NOT USED | NO SCALE | 5

NOT USED | NO SCALE | 6

NOT USED | NO SCALE | 7

NOT USED | NO SCALE | 8

NOT USED | NO SCALE | 9

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

NB+C TOTALLY COMMITTED.
NB+C ENGINEERING SERVICES, LLC.
6095 MARSHALEE DRIVE, SUITE 300
ELKRIDGE, MD 21075
(410) 712-7092

STATE OF CONNECTICUT · KOLANDAIVELU · PEN.0028997 · LICENSED PROFESSIONAL ENGINEER

06/08/2022

KRUPAKARAN KOLANDAIVELU, P.E.
STATE OF CONNECTICUT
PROFESSIONAL ENGINEER
LICENSE #PEN.0028997

DRAWN BY:	CHECKED BY:	APPROVED BY:
BPC	BRN	TA

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	11/09/2021	ISSUED FOR CONSTRUCTION
1	03/09/2022	ISSUED FOR CONSTRUCTION
2	06/08/2022	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

876345

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00874A
33 JANOWSKI ROAD
ASHFORD, CT 06278

SHEET TITLE

EQUIPMENT DETAILS

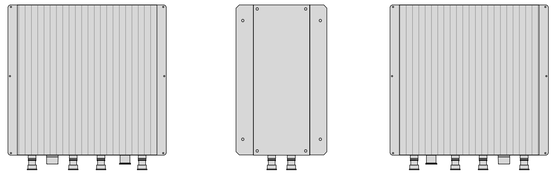
SHEET NUMBER

A-5

FUJITSU TRIPLE BAND TA08025-B605

DIMENSIONS (HxWxD)	14.9"x15.7"x9"
WEIGHT	74.95 lbs
CONNECTOR TYPE	4.3-10 RF CONNECTOR
POWER SUPPLY	DC -58~-36V

PLAN

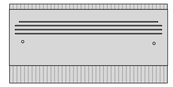


BACK SIDE FRONT

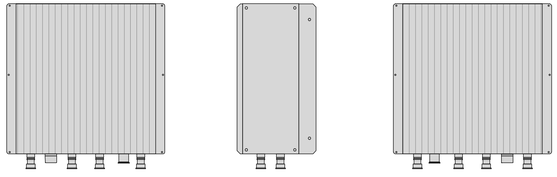
RRH DETAIL | NO SCALE | 1

FUJITSU DUAL BAND TA08025-B604

DIMENSIONS (HxWxD)	14.9"x15.7"x7.8"
WEIGHT	63.9 lbs
CONNECTOR TYPE	4.3-10 RF CONNECTOR
POWER SUPPLY	DC -58~-36V



PLAN



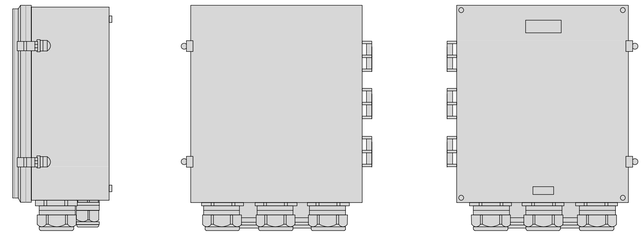
BACK SIDE FRONT

RRH DETAIL | NO SCALE | 2

RAYCAP RDIDC-9181-PF-48 DC SURGE PROTECTION (OVP)

DIMENSIONS (HxWxD)	18.98"x14.39"x8.15"
WEIGHT	21.82 LBS

PLAN

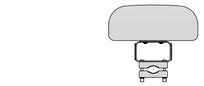


SIDE BACK FRONT

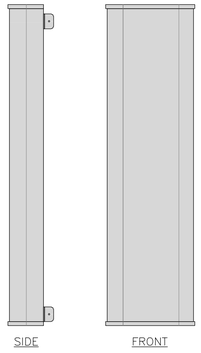
SURGE SUPPRESSION DETAIL (OVP) | NO SCALE | 3

JMA MX08FRO665-21

DIMENSIONS (HxWxD)	72"x20.0"x8.0"
RF PORTS, CONNECTOR TYPE	8 x 4.3-10 FEMALE
WEIGHT	64.5 lbs
WEIGHT WITH BRACKETS	82.5 lbs



PLAN



SIDE FRONT

ANTENNA DETAIL | NO SCALE | 4

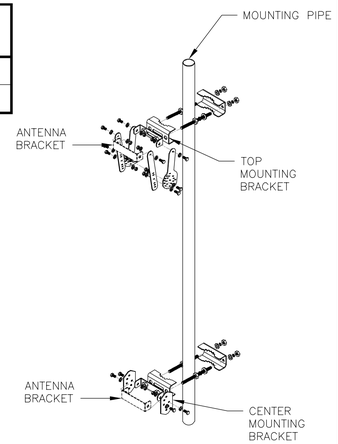
JMA ANTENNA MOUNT BRACKET #91900318

TOTAL WEIGHT (WITH BRACKETS)	18 lbs (8.18 Kg)
POLE DIAMETER RANGE	2.5" TO 4.5"

NOTE:
KIT #91900318: TOP AND BOTTOM BRACKETS FOR 4-,6-, AND 8-FOOT ANTENNAS

ANTENNA BRACKET NOT PART OF KIT

NOTE:
OR DISH Wireless L.L.C. APPROVED EQUIVALENT

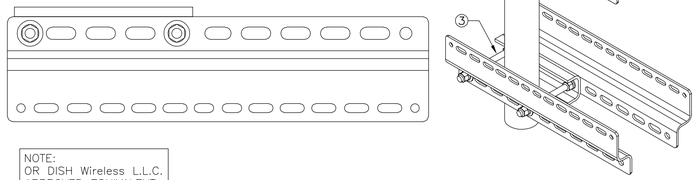


ANTENNA BRACKET DETAIL | NO SCALE | 5

SABRE DOUBLE Z-BRACKET C10123155

DIMENSIONS (HxWxD) (1 BRACKET)	5"x20"x1-13/16"
WEIGHT (FULL ASSEMBLY)	35.79 lbs
PACKAGE QUANTITY	4

#	DESCRIPTION
1	PLATE, CHANNEL BRACKET
2	RRH Z BRACKET, 3/16"
3	THREADED ROD ASSEMBLY 1/2"x12"



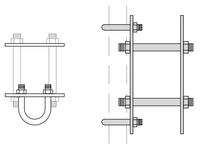
NOTE:
OR DISH Wireless L.L.C. APPROVED EQUIVALENT

RRH MOUNT DETAIL | NO SCALE | 6

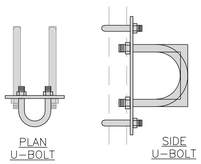
COMMSCOPE XP-2040 CROSSOVER PLATE

DIMENSIONS (HxW)	10"x12"
WEIGHT	11 lbs

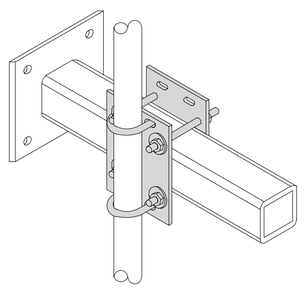
NOTE:
OR DISH Wireless L.L.C. APPROVED EQUIVALENT



PLAN PLATE SIDE PLATE



PLAN U-BOLT SIDE U-BOLT

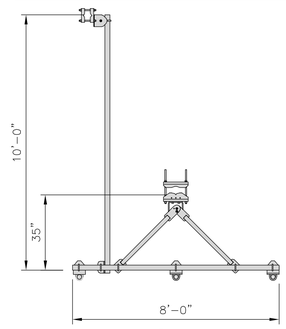


RRH/OVP MOUNT DETAIL | NO SCALE | 7

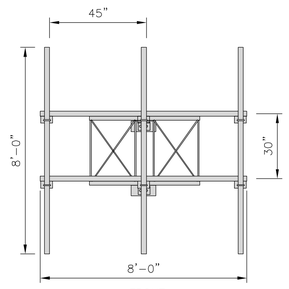
COMMSCOPE V-FRAME MTC3975083

FACE SIZE	8'-0"
WEIGHT	352.136 lbs

NOTE:
OR DISH Wireless L.L.C. APPROVED EQUIVALENT



PLAN



FRONT

ANTENNA FRAME DETAIL | NO SCALE | 8

NOT USED | NO SCALE | 9

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

NB+C TOTALLY COMMITTED.
NB+C ENGINEERING SERVICES, LLC.
6095 MARSHALEE DRIVE, SUITE 300
ELKRIDGE, MD 21075
(410) 712-7092

STATE OF CONNECTICUT KRUPAKARAN KOLANDAIVELU PEN.0028997 LICENSED PROFESSIONAL ENGINEER

06/08/2022

KRUPAKARAN KOLANDAIVELU, P.E.
STATE OF CONNECTICUT
PROFESSIONAL ENGINEER
LICENSE #PEN.0028997

DRAWN BY:	CHECKED BY:	APPROVED BY:
BPC	BRN	TA

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	11/09/2021	ISSUED FOR CONSTRUCTION
1	03/09/2022	ISSUED FOR CONSTRUCTION
2	06/08/2022	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

876345

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00874A
33 JANOWSKI ROAD
ASHFORD, CT 06278

SHEET TITLE

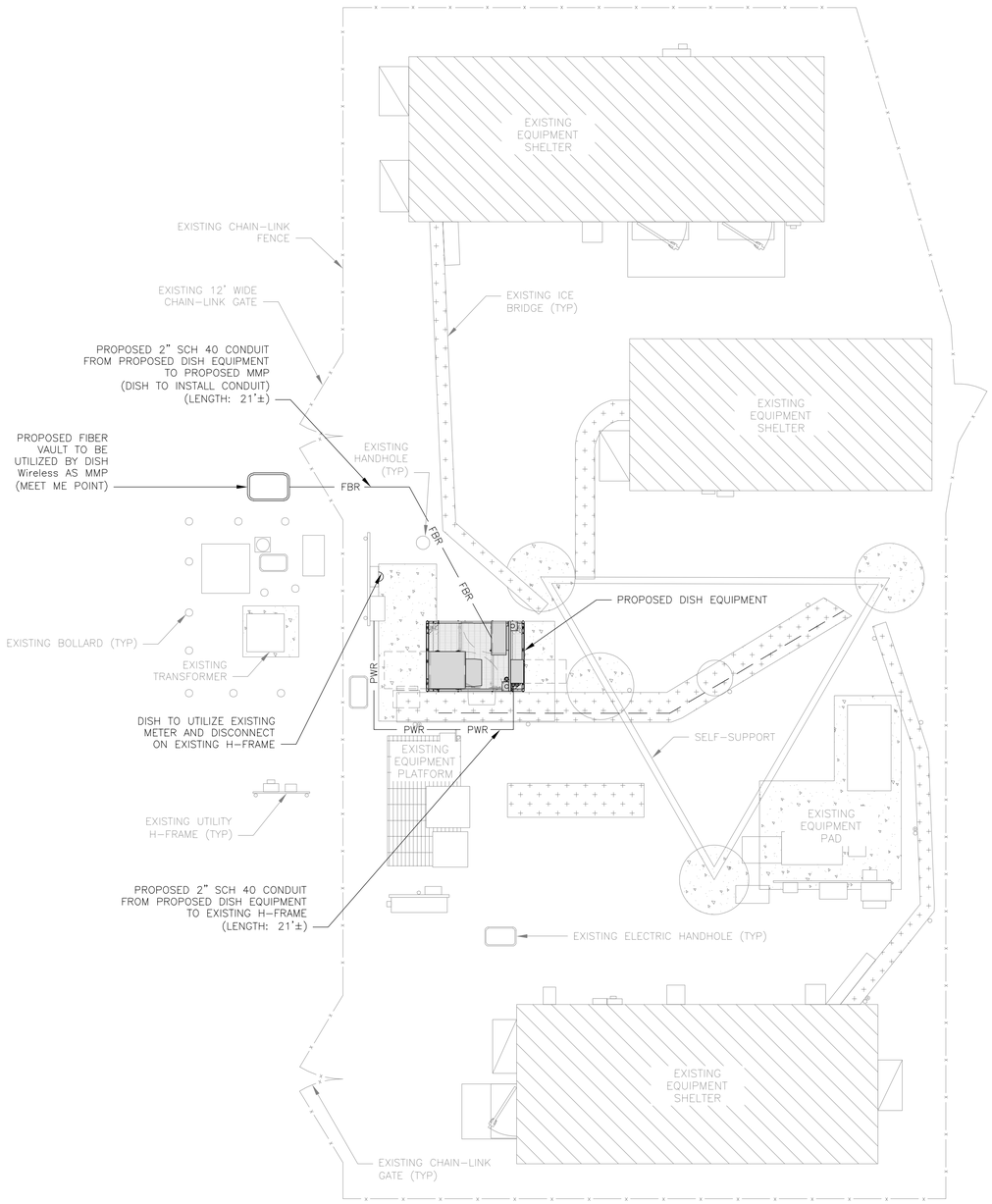
EQUIPMENT DETAILS

SHEET NUMBER

A-6

EASEMENT RIGHTS

1. CONTRACTOR SHALL FIELD VERIFY ALL PROPOSED UNDERGROUND UTILITY CONDUIT ROUTE.
2. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.
3. DUE TO UTILITY EASEMENT RIGHTS SPECIFIED IN THE GROUND LEASE, CUSTOMER MAY INSTALL EQUIPMENT WITHIN SPECIFIED UTILITY EASEMENT AREA. "PWR" AND "FBR" PATH DEPICTED ON A-1 AND E-1 REPRESENT PLANNED ROUTING BASED ON BEST AVAILABLE INFORMATION INCLUDING BUT NOT LIMITED TO A SURVEY, EXHIBITS, METES AND BOUNDS OF THE UTILITY EASEMENT, FIELD VERIFICATION, PRIOR PROJECT DOCUMENTATION AND OTHER REAL PROPERTY RIGHTS DOCUMENTS. WHEN INSTALLING THE UTILITIES PLEASE LOCATE AND FOLLOW EXISTING PATH. IF EXISTING PATH IS MATERIALLY INCONSISTENT WITH THE "PWR" AND "FBR" PATH DEPICTED ON A-1 AND E-1 AND SAID VARIANCE IS NOT NOTED ON CDS, PLEASE NOTIFY CROWN CASTLE REAL ESTATE AS FURTHER COORDINATION MAY BE NEEDED.



N

UTILITY ROUTE PLAN

6' 4' 2' 0 5' 10'
3/16"=1'-0"

1

DC POWER WIRING SHALL BE COLOR CODED AT EACH END FOR IDENTIFYING +24V AND -48V CONDUCTORS. RED MARKINGS SHALL IDENTIFY +24V AND BLUE MARKINGS SHALL IDENTIFY -48V.

1. CONTRACTOR SHALL INSPECT THE EXISTING CONDITIONS PRIOR TO SUBMITTING A BID. ANY QUESTIONS ARISING DURING THE BID PERIOD IN REGARDS TO THE CONTRACTOR'S FUNCTIONS, THE SCOPE OF WORK, OR ANY OTHER ISSUE RELATED TO THIS PROJECT SHALL BE BROUGHT UP DURING THE BID PERIOD WITH THE PROJECT MANAGER FOR CLARIFICATION, NOT AFTER THE CONTRACT HAS BEEN AWARDED.
2. ALL ELECTRICAL WORK SHALL BE DONE IN ACCORDANCE WITH CURRENT NATIONAL ELECTRICAL CODES AND ALL STATE AND LOCAL CODES, LAWS, AND ORDINANCES. PROVIDE ALL COMPONENTS AND WIRING SIZES AS REQUIRED TO MEET NEC STANDARDS.
3. LOCATION OF EQUIPMENT, CONDUIT AND DEVICES SHOWN ON THE DRAWINGS ARE APPROXIMATE AND SHALL BE COORDINATED WITH FIELD CONDITIONS PRIOR TO CONSTRUCTION.
4. CONDUIT ROUGH-IN SHALL BE COORDINATED WITH THE MECHANICAL EQUIPMENT TO AVOID LOCATION CONFLICTS. VERIFY WITH THE MECHANICAL EQUIPMENT CONTRACTOR AND COMPLY AS REQUIRED.
5. CONTRACTOR SHALL PROVIDE ALL BREAKERS, CONDUITS AND CIRCUITS AS REQUIRED FOR A COMPLETE SYSTEM.
6. CONTRACTOR SHALL PROVIDE PULL BOXES AND JUNCTION BOXES AS REQUIRED BY THE NEC ARTICLE 314.
7. CONTRACTOR SHALL PROVIDE ALL STRAIN RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
8. ALL DISCONNECTS AND CONTROLLING DEVICES SHALL BE PROVIDED WITH ENGRAVED PHENOLIC NAMEPLATES INDICATING EQUIPMENT CONTROLLED, BRANCH CIRCUITS INSTALLED ON, AND PANEL FIELD LOCATIONS FED FROM.
9. INSTALL AN EQUIPMENT GROUNDING CONDUCTOR IN ALL CONDUITS PER THE SPECIFICATIONS AND NEC 250. THE EQUIPMENT GROUNDING CONDUCTORS SHALL BE BONDED AT ALL JUNCTION BOXES, PULL BOXES, AND ALL DISCONNECT SWITCHES, AND EQUIPMENT CABINETS.
10. ALL NEW MATERIAL SHALL HAVE A U.L. LABEL.
11. PANEL SCHEDULE LOADING AND CIRCUIT ARRANGEMENTS REFLECT POST-CONSTRUCTION EQUIPMENT.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR AS-BUILT PANEL SCHEDULE AND SITE DRAWINGS.
13. ALL TRENCHES IN COMPOUND TO BE HAND DUG

ELECTRICAL NOTES

NO SCALE

2

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

NB+C TOTALLY COMMITTED.
NB+C ENGINEERING SERVICES, LLC.
6095 MARSHALEE DRIVE, SUITE 300
ELKRIDGE, MD 21075
(410) 712-7092

STATE OF CONNECTICUT · KRUPAKARAN KOLANDAIVELU · PEN.0028997 · LICENSED PROFESSIONAL ENGINEER

06/08/2022

KRUPAKARAN KOLANDAIVELU, P.E.
STATE OF CONNECTICUT
PROFESSIONAL ENGINEER
LICENSE #PEN.0028997

DRAWN BY:	CHECKED BY:	APPROVED BY:
BPC	BRN	TA

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	11/09/2021	ISSUED FOR CONSTRUCTION
1	03/09/2022	ISSUED FOR CONSTRUCTION
2	06/08/2022	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

876345

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00874A
33 JANOWSKI ROAD
ASHFORD, CT 06278

SHEET TITLE

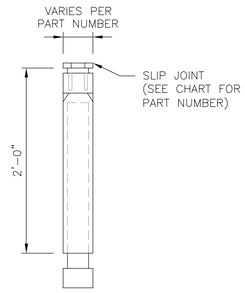
ELECTRICAL/FIBER ROUTE PLAN AND NOTES

SHEET NUMBER

E-1

CARLON EXPANSION FITTINGS

COUPLING END PART#	MALE TERMINAL ADAPTER END PART#	SIZE	STD CTN QTY.	TRAVEL LENGTH
E945D	E945DX	1/2"	20	4"
E945E	E945EX	3/4"	15	4"
E945F	E945FX	1"	10	4"
E945G	E945GX	1 1/4"	5	4"
E945H	E945HX	1 1/2"	5	4"
E945J	E945JX	2"	15	8"
E945K	E945KX	2 1/2"	10	8"
E945L	E945LX	3"	10	8"
E945M	E945MX	3 1/2"	5	8"
E945N	E945NX	4"	5	8"
E945P	E945PX	5"	1	8"
E945R	E945RX	6"	1	8"

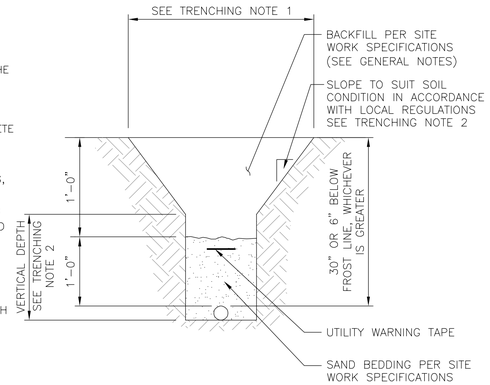


NOTE:
CONTRACTOR TO INSTALL EXPANSION FITTING SLIP JOINT AT METER CENTER CONDUIT TERMINATION, AS PER LOCAL UTILITY POLICY, ORDINANCE AND/OR SPECIFIED REQUIREMENT.

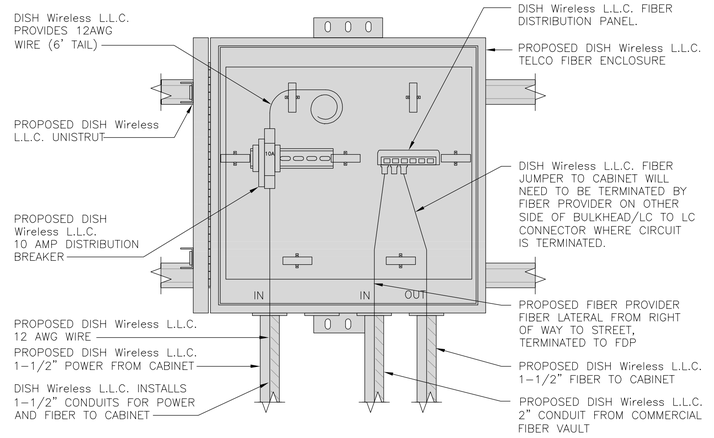
EXPANSION JOINT DETAIL | NO SCALE | 1

TRENCHING NOTES

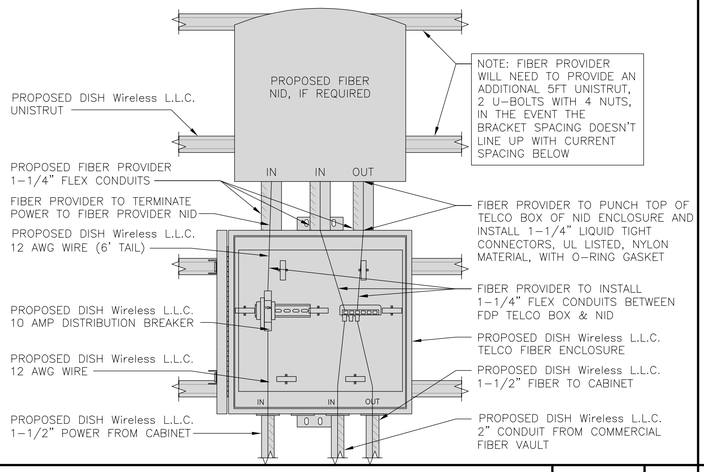
1. CONTRACTOR SHALL RESTORE THE TRENCH TO ITS ORIGINAL CONDITIONS BY EITHER SEEDING OR SODDING GRASS AREAS, OR REPLACING ASPHALT OR CONCRETE AREAS TO ITS ORIGINAL CROSS SECTION.
2. TRENCHING SAFETY; INCLUDING, BUT NOT LIMITED TO SOIL CLASSIFICATION, SLOPING, AND SHORING, SHALL BE GOVERNED BY THE CURRENT OSHA TRENCHING AND EXCAVATION SAFETY STANDARDS.
3. ALL CONDUITS SHALL BE INSTALLED IN COMPLIANCE WITH THE CURRENT NATIONAL ELECTRIC CODE (NEC) OR AS REQUIRED BY THE LOCAL JURISDICTION, WHICHEVER IS THE MOST STRINGENT.



TYPICAL UNDERGROUND TRENCH DETAIL | NO SCALE | 2



DARK TELCO BOX – INTERIOR WIRING LAYOUT | NO SCALE | 3



LIT TELCO BOX – INTERIOR WIRING LAYOUT (OPTIONAL) | NO SCALE | 4

NOT USED | NO SCALE | 5

NOT USED | NO SCALE | 6

NOT USED | NO SCALE | 7

NOT USED | NO SCALE | 8

NOT USED | NO SCALE | 9

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

NB+C TOTALLY COMMITTED.
NB+C ENGINEERING SERVICES, LLC.
6095 MARSHALEE DRIVE, SUITE 300
ELKRIDGE, MD 21075
(410) 712-7092

STATE OF CONNECTICUT
KRUPAKARAN KOLANDAIVELU
PEN.0028997
LICENSED
PROFESSIONAL ENGINEER

06/08/2022

KRUPAKARAN KOLANDAIVELU, P.E.
STATE OF CONNECTICUT
PROFESSIONAL ENGINEER
LICENSE #PEN.0028997

DRAWN BY:	CHECKED BY:	APPROVED BY:
BPC	BRN	TA

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	11/09/2021	ISSUED FOR CONSTRUCTION
1	03/09/2022	ISSUED FOR CONSTRUCTION
2	06/08/2022	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

876345

DISH Wireless L.L.C.
PROJECT INFORMATION

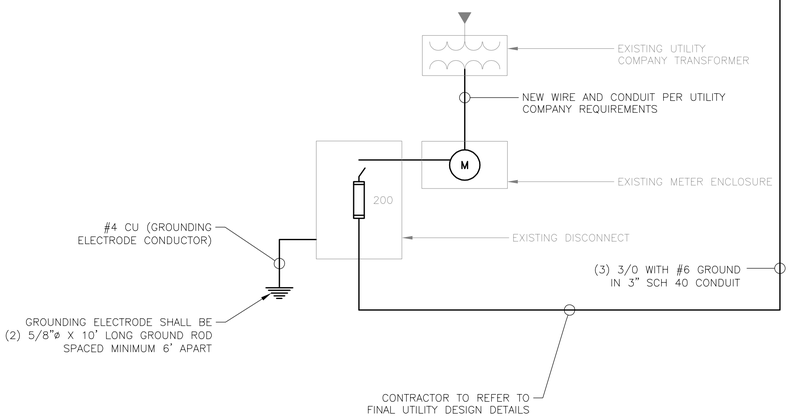
BOBOS00874A
33 JANOWSKI ROAD
ASHFORD, CT 06278

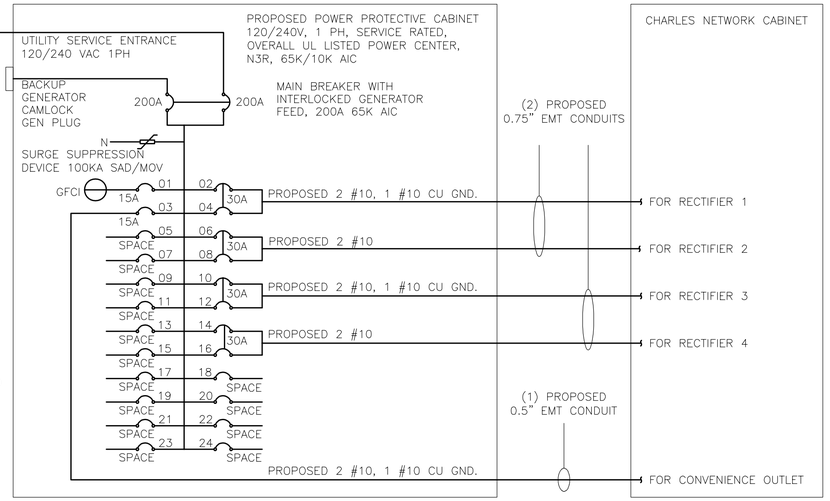
SHEET TITLE

ELECTRICAL DETAILS

SHEET NUMBER

E-2





NOTE:
BRANCH CIRCUIT WIRING SUPPLYING RECTIFIERS ARE TO BE RATED UL1015, 105°C, 600V, AND PVC INSULATED, IN THE SIZES SHOWN IN THE ONE-LINE DIAGRAM. CONTRACTOR MAY SUBSTITUTE UL1015 WIRE FOR THWN-2 FOR CONVENIENCE OUTLET BRANCH CIRCUIT.

BREAKERS REQUIRED:
(4) 30A, 2P BREAKER – SQUARE D P/N:QO230
(1) 15A, 1P BREAKER – SQUARE D P/N:QO115

NOTES

THE ENGINEER OF RECORD HAS PERFORMED ALL REQUIRED SHORT CIRCUIT CALCULATIONS AND THE AIC RATINGS FOR EACH DEVICE IS ADEQUATE TO PROTECT THE EQUIPMENT AND THE ELECTRICAL SYSTEM.

THE ENGINEER OF RECORD HAS PERFORMED ALL REQUIRED VOLTAGE DROP CALCULATIONS AND ALL BRANCH CIRCUIT AND FEEDERS COMPLY WITH THE NEC (LISTED ON T-1) ARTICLE 210.19(A)(1) FPN NO. 4.

THE (2) CONDUITS WITH (4) CURRENT CARRYING CONDUCTORS EACH, SHALL APPLY THE ADJUSTMENT FACTOR OF 80% PER 2014/17 NEC TABLE 310.15(B)(3)(a) OR 2020 NEC TABLE 310.15(C)(1) FOR UL1015 WIRE.

#12 FOR 15A-20A/1P BREAKER: 0.8 x 30A = 24.0A
#10 FOR 25A-30A/2P BREAKER: 0.8 x 40A = 32.0A
#8 FOR 35A-40A/2P BREAKER: 0.8 x 55A = 44.0A
#6 FOR 45A-60A/2P BREAKER: 0.8 x 75A = 60.0A

CONDUIT SIZING: AT 40% FILL PER NEC CHAPTER 9, TABLE 4, ARTICLE 358.
0.5" CONDUIT – 0.122 SQ. IN AREA
0.75" CONDUIT – 0.213 SQ. IN AREA
2.0" CONDUIT – 1.316 SQ. IN AREA
3.0" CONDUIT – 2.907 SQ. IN AREA

CABINET CONVENIENCE OUTLET CONDUCTORS (1 CONDUIT): USING THWN-2, CU.

#10 – 0.0211 SQ. IN X 2 = 0.0422 SQ. IN
#10 – 0.0211 SQ. IN X 1 = 0.0211 SQ. IN <GROUND
TOTAL = 0.0633 SQ. IN

0.5" EMT CONDUIT IS ADEQUATE TO HANDLE THE TOTAL OF (3) WIRES, INCLUDING GROUND WIRE, AS INDICATED ABOVE.

RECTIFIER CONDUCTORS (2 CONDUITS): USING UL1015, CU.

#10 – 0.0266 SQ. IN X 4 = 0.1064 SQ. IN
#10 – 0.0082 SQ. IN X 1 = 0.0082 SQ. IN <BARE GROUND
TOTAL = 0.1146 SQ. IN

0.75" EMT CONDUIT IS ADEQUATE TO HANDLE THE TOTAL OF (5) WIRES, INCLUDING GROUND WIRE, AS INDICATED ABOVE.

PPC FEED CONDUCTORS (1 CONDUIT): USING THWN, CU.

3/0 – 0.2679 SQ. IN X 3 = 0.8037 SQ. IN
#6 – 0.0507 SQ. IN X 1 = 0.0507 SQ. IN <GROUND
TOTAL = 0.8544 SQ. IN

3.0" SCH 40 PVC CONDUIT IS ADEQUATE TO HANDLE THE TOTAL OF (4) WIRES, INCLUDING GROUND WIRE, AS INDICATED ABOVE.

PPC ONE-LINE DIAGRAM — NO SCALE — 1

PROPOSED CHARLES PANEL SCHEDULE

LOAD SERVED	VOLT AMPS (WATTS) L1	VOLT AMPS (WATTS) L2	TRIP	CKT #	PHASE	CKT #	TRIP	VOLT AMPS (WATTS) L1	VOLT AMPS (WATTS) L2	LOAD SERVED
PPC GFCI OUTLET	180		15A	1	A	2	30A	2880		ABB/GE INFINITY RECTIFIER 1
CHARLES GFCI OUTLET		180	15A	3	B	4			2880	
-SPACE-				5	A	6	30A	2880		ABB/GE INFINITY RECTIFIER 2
-SPACE-				7	B	8			2880	
-SPACE-				9	A	10	30A	2880		ABB/GE INFINITY RECTIFIER 3
-SPACE-				11	B	12			2880	
-SPACE-				13	A	14	30A	2880		ABB/GE INFINITY RECTIFIER 4
-SPACE-				15	B	16			2880	
-SPACE-				17	A	18				-SPACE-
-SPACE-				19	B	20				-SPACE-
-SPACE-				21	A	22				-SPACE-
-SPACE-				23	B	24				-SPACE-
VOLTAGE AMPS	180	180						11520	11520	

200A MCB, 1ϕ, 24 SPACE, 120/240V	L1	L2	
MB RATING: 65,000 AIC	11700	11700	VOLTAGE AMPS
	98	98	AMPS
	98		MAX AMPS
	123		MAX 125%

PANEL SCHEDULE — NO SCALE — 2

NOT USED — NO SCALE — 3

dish wireless.
5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

NB+C TOTALLY COMMITTED.
NB+C ENGINEERING SERVICES, LLC.
6095 MARSHALEE DRIVE, SUITE 300
ELKRIDGE, MD 21075
(410) 712-7092

STATE OF CONNECTICUT — KRUPAKARAN KOLANDAIVELU — REG. NO. PEN.0028997 — LICENSED PROFESSIONAL ENGINEER

06/08/2022

KRUPAKARAN KOLANDAIVELU, P.E.
STATE OF CONNECTICUT
PROFESSIONAL ENGINEER
LICENSE #PEN.0028997

DRAWN BY:	CHECKED BY:	APPROVED BY:
BPC	BRN	TA

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

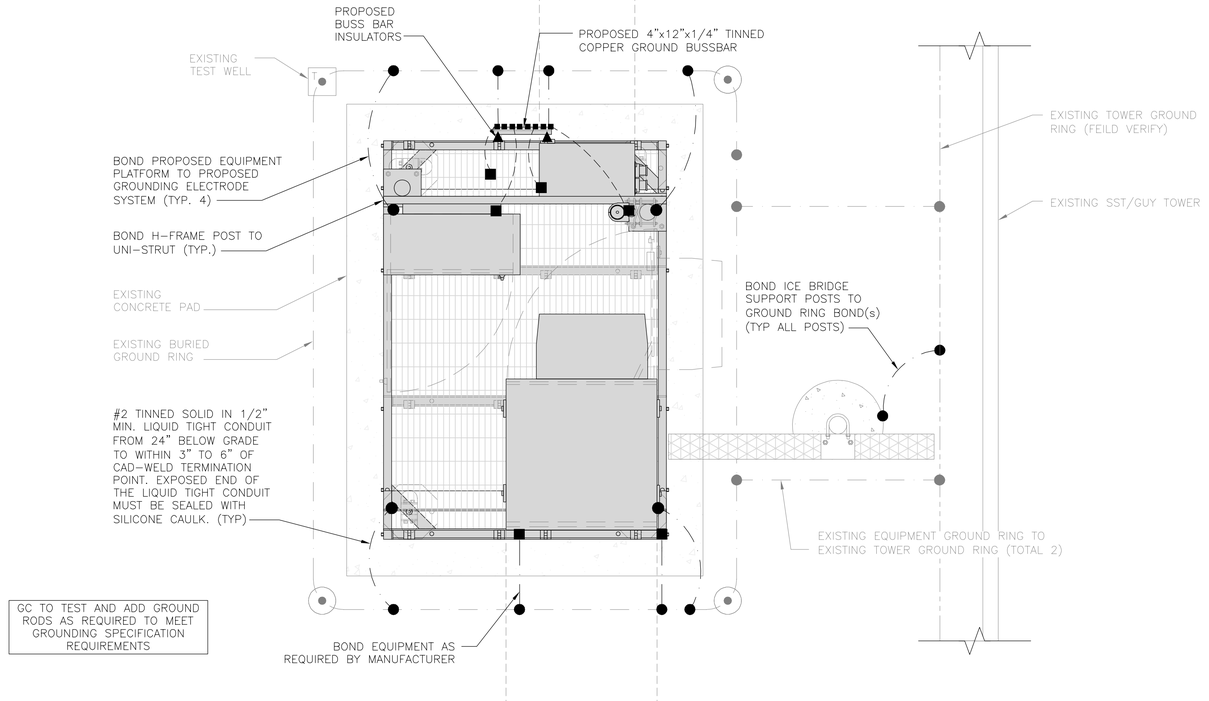
REV	DATE	DESCRIPTION
0	11/09/2021	ISSUED FOR CONSTRUCTION
1	03/09/2022	ISSUED FOR CONSTRUCTION
2	06/08/2022	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
876345

DISH Wireless L.L.C.
PROJECT INFORMATION
BOBOS00874A
33 JANOWSKI ROAD
ASHFORD, CT 06278

SHEET TITLE
ELECTRICAL ONE-LINE, FAULT CALCS & PANEL SCHEDULE

SHEET NUMBER
E-3

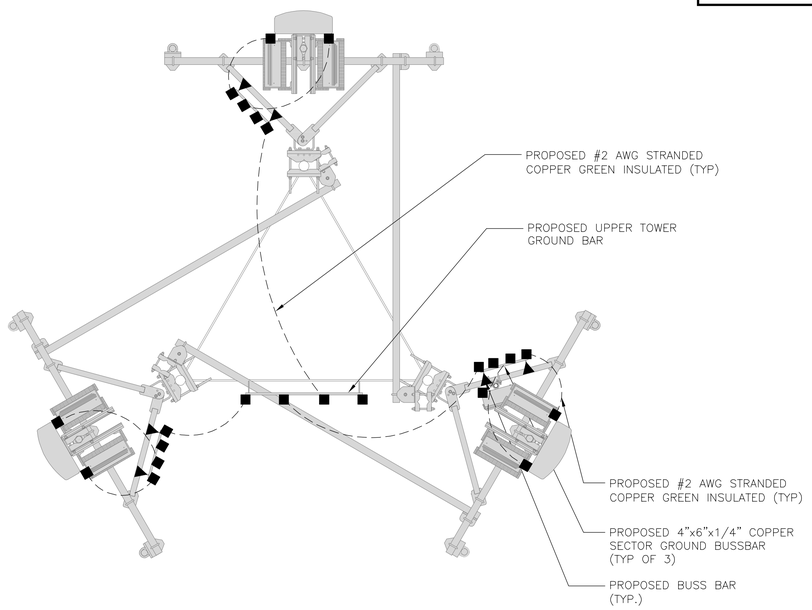


TYPICAL EQUIPMENT GROUNDING PLAN

NO SCALE | 1

NOTES

ANTENNAS AND OVP SHOWN ARE GENERIC AND NOT REFERENCING TO A SPECIFIC MANUFACTURER. THIS LAYOUT IS FOR REFERENCE PURPOSES ONLY



TYPICAL ANTENNA GROUNDING PLAN

NO SCALE | 2

EXOTHERMIC CONNECTION
MECHANICAL CONNECTION
GROUND BUS BAR
GROUND ROD
TEST GROUND ROD WITH INSPECTION SLEEVE
#6 AWG STRANDED & INSULATED
#2 AWG SOLID COPPER TINNED
BUSS BAR INSULATOR

GROUNDING LEGEND

1. GROUNDING IS SHOWN DIAGRAMMATICALLY ONLY.
2. CONTRACTOR SHALL GROUND ALL EQUIPMENT AS A COMPLETE SYSTEM. GROUNDING SHALL BE IN COMPLIANCE WITH NEC SECTION 250 AND DISH Wireless L.L.C. GROUNDING AND BONDING REQUIREMENTS AND MANUFACTURER'S SPECIFICATIONS.
3. ALL GROUND CONDUCTORS SHALL BE COPPER; NO ALUMINUM CONDUCTORS SHALL BE USED.

GROUNDING KEY NOTES

(A) EXTERIOR GROUND RING: #2 AWG SOLID COPPER, BURIED AT A DEPTH OF AT LEAST 30 INCHES BELOW GRADE, OR 6 INCHES BELOW THE FROST LINE AND APPROXIMATELY 24 INCHES FROM THE EXTERIOR WALL OR FOOTING.

(B) TOWER GROUND RING: THE GROUND RING SYSTEM SHALL BE INSTALLED AROUND AN ANTENNA TOWER'S LEGS, AND/OR GUY ANCHORS. WHERE SEPARATE SYSTEMS HAVE BEEN PROVIDED FOR THE TOWER AND THE BUILDING, AT LEAST TWO BONDS SHALL BE MADE BETWEEN THE TOWER RING GROUND SYSTEM AND THE BUILDING RING GROUND SYSTEM USING MINIMUM #2 AWG SOLID COPPER CONDUCTORS.

(C) INTERIOR GROUND RING: #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTOR EXTENDED AROUND THE PERIMETER OF THE EQUIPMENT AREA. ALL NON-TELECOMMUNICATIONS RELATED METALLIC OBJECTS FOUND WITHIN A SITE SHALL BE GROUNDED TO THE INTERIOR GROUND RING WITH #6 AWG STRANDED GREEN INSULATED CONDUCTOR.

(D) BOND TO INTERIOR GROUND RING: #2 AWG SOLID TINNED COPPER WIRE PRIMARY BONDS SHALL BE PROVIDED AT LEAST AT FOUR POINTS ON THE INTERIOR GROUND RING, LOCATED AT THE CORNERS OF THE BUILDING.

(E) GROUND ROD: UL LISTED COPPER CLAD STEEL. MINIMUM 1/2" DIAMETER BY EIGHT FEET LONG. GROUND RODS SHALL BE INSTALLED WITH INSPECTION SLEEVES. GROUND RODS SHALL BE DRIVEN TO THE DEPTH OF GROUND RING CONDUCTOR.

(F) CELL REFERENCE GROUND BAR: POINT OF GROUND REFERENCE FOR ALL COMMUNICATIONS EQUIPMENT FRAMES. ALL BONDS ARE MADE WITH #2 AWG UNLESS NOTED OTHERWISE STRANDED GREEN INSULATED COPPER CONDUCTORS. BOND TO GROUND RING WITH (2) #2 SOLID TINNED COPPER CONDUCTORS.

(G) HATCH PLATE GROUND BAR: BOND TO THE INTERIOR GROUND RING WITH TWO #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTORS. WHEN A HATCH-PLATE AND A CELL REFERENCE GROUND BAR ARE BOTH PRESENT, THE CRGB MUST BE CONNECTED TO THE HATCH-PLATE AND TO THE INTERIOR GROUND RING USING (2) TWO #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTORS EACH.

(H) EXTERIOR CABLE ENTRY PORT GROUND BARS: LOCATED AT THE ENTRANCE TO THE CELL SITE BUILDING. BOND TO GROUND RING WITH A #2 AWG SOLID TINNED COPPER CONDUCTORS WITH AN EXOTHERMIC WELD AND INSPECTION SLEEVE.

(I) TELCO GROUND BAR: BOND TO BOTH CELL REFERENCE GROUND BAR OR EXTERIOR GROUND RING.

(J) FRAME BONDING: THE BONDING POINT FOR TELECOM EQUIPMENT FRAMES SHALL BE THE GROUND BUS THAT IS NOT ISOLATED FROM THE EQUIPMENTS METAL FRAMEWORK.

(K) INTERIOR UNIT BONDS: METAL FRAMES, CABINETS AND INDIVIDUAL METALLIC UNITS LOCATED WITH THE AREA OF THE INTERIOR GROUND RING REQUIRE A #6 AWG STRANDED GREEN INSULATED COPPER BOND TO THE INTERIOR GROUND RING.

(L) FENCE AND GATE GROUNDING: METAL FENCES WITHIN 7 FEET OF THE EXTERIOR GROUND RING OR OBJECTS BONDED TO THE EXTERIOR GROUND RING SHALL BE BONDED TO THE GROUND RING WITH A #2 AWG SOLID TINNED COPPER CONDUCTOR AT AN INTERVAL NOT EXCEEDING 25 FEET. BONDS SHALL BE MADE AT EACH GATE POST AND ACROSS GATE OPENINGS.

(M) EXTERIOR UNIT BONDS: METALLIC OBJECTS, EXTERNAL TO OR MOUNTED TO THE BUILDING, SHALL BE BONDED TO THE EXTERIOR GROUND RING. USING #2 TINNED SOLID COPPER WIRE

(N) ICE BRIDGE SUPPORTS: EACH ICE BRIDGE LEG SHALL BE BONDED TO THE GROUND RING WITH #2 AWG BARE TINNED COPPER CONDUCTOR. PROVIDE EXOTHERMIC WELDS AT BOTH THE ICE BRIDGE LEG AND BURIED GROUND RING.

(O) DURING ALL DC POWER SYSTEM CHANGES INCLUDING DC SYSTEM CHANGE OUTS, RECTIFIER REPLACEMENTS OR ADDITIONS, BREAKER DISTRIBUTION CHANGES, BATTERY ADDITIONS, BATTERY REPLACEMENTS AND INSTALLATIONS OR CHANGES TO DC CONVERTER SYSTEMS IT SHALL BE REQUIRED THAT SERVICE CONTRACTORS VERIFY ALL DC POWER SYSTEMS ARE EQUIPPED WITH A MASTER DC SYSTEM RETURN GROUND CONDUCTOR FROM THE DC POWER SYSTEM COMMON RETURN BUS DIRECTLY CONNECTED TO THE CELL SITE REFERENCE GROUND BAR

(P) TOWER TOP COLLECTOR BUSS BAR IS TO BE MECHANICALLY BONDED TO PROPOSED ANTENNA MOUNT COLLAR.

REFER TO DISH Wireless L.L.C. GROUNDING NOTES.

GROUNDING KEY NOTES

NO SCALE | 3

dish wireless.
5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

NB+C TOTALLY COMMITTED.
NB+C ENGINEERING SERVICES, LLC.
6095 MARSHALEE DRIVE, SUITE 300
ELKRIDGE, MD 21075
(410) 712-7092

STATE OF CONNECTICUT · KRUPAKARAN KOLANDAIVELU · PEN.0028997 · LICENSED PROFESSIONAL ENGINEER

06/08/2022

KRUPAKARAN KOLANDAIVELU, P.E.
STATE OF CONNECTICUT
PROFESSIONAL ENGINEER
LICENSE #PEN.0028997

DRAWN BY:	CHECKED BY:	APPROVED BY:
BPC	BRN	TA

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	11/09/2021	ISSUED FOR CONSTRUCTION
1	03/09/2022	ISSUED FOR CONSTRUCTION
2	06/08/2022	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

876345

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00874A
33 JANOWSKI ROAD
ASHFORD, CT 06278

SHEET TITLE

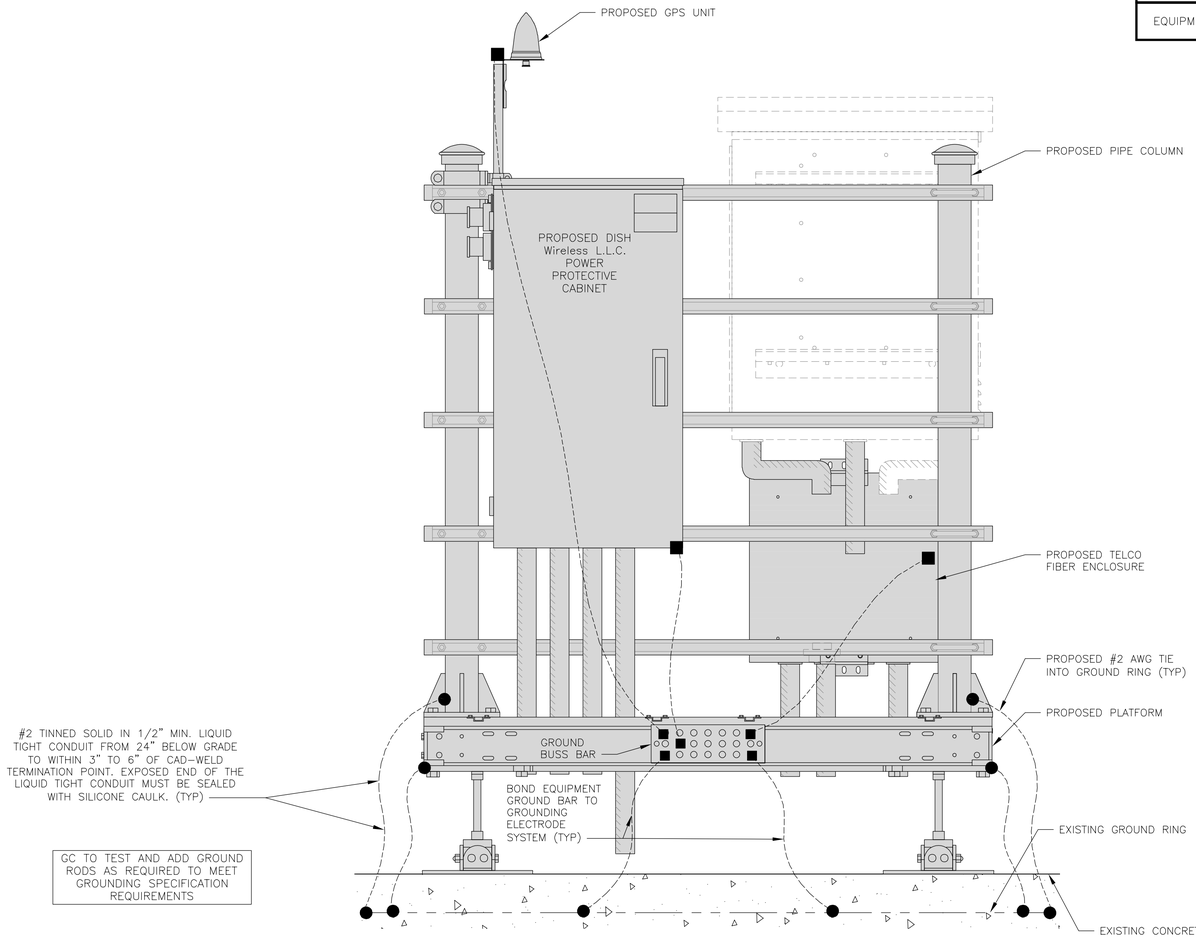
GROUNDING PLANS AND NOTES

SHEET NUMBER

G-1

NOTES

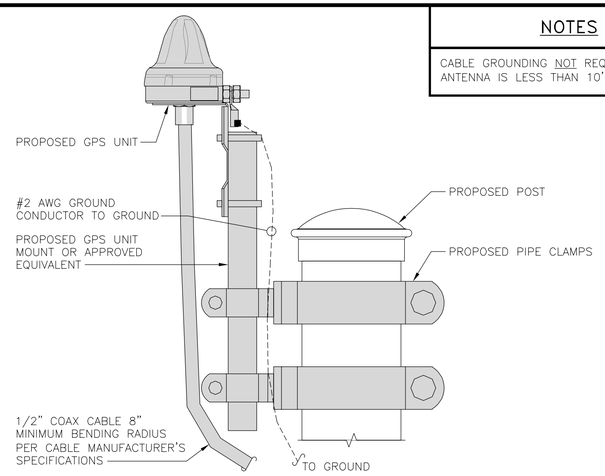
EQUIPMENT CABINET OMITTED FOR CLARITY



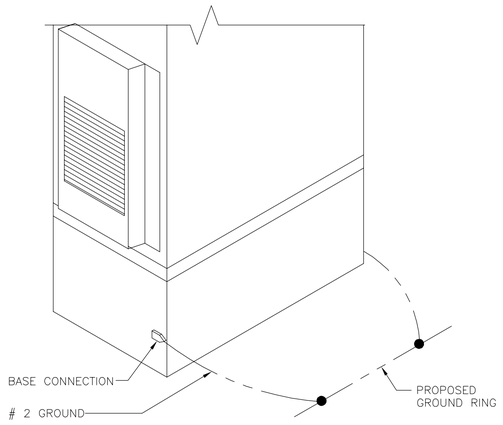
H-FRAME GROUNDING DETAIL | NO SCALE | 1

NOTES

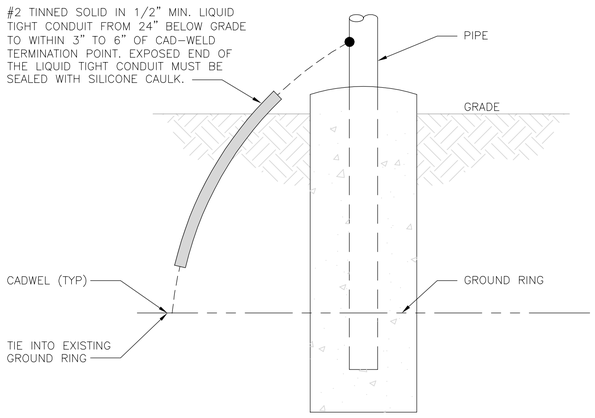
CABLE GROUNDING NOT REQUIRED WHEN ANTENNA IS LESS THAN 10' FROM CABINET



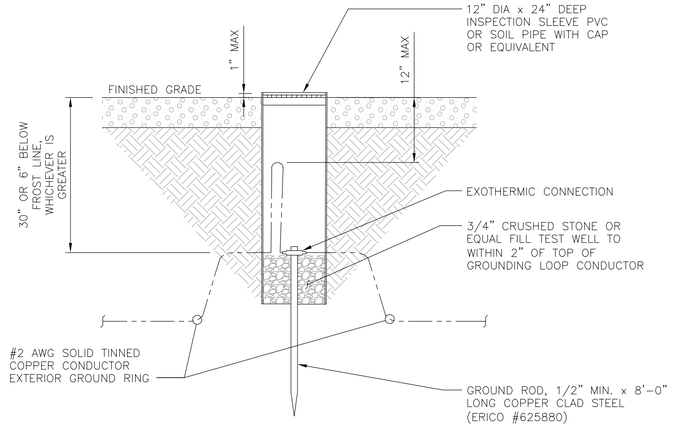
TYPICAL GPS UNIT GROUNDING | NO SCALE | 2



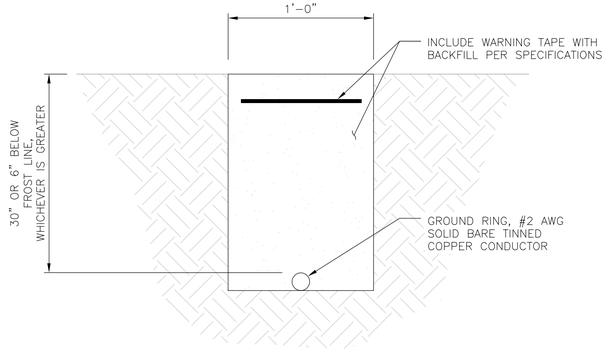
OUTDOOR CABINET GROUNDING | NO SCALE | 3



TRANSITIONING GROUND DETAIL | NO SCALE | 4



TYPICAL TEST GROUND ROD WITH INSPECTION SLEEVE | NO SCALE | 5



TYPICAL GROUND RING TRENCH | NO SCALE | 6

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

NB+C TOTALLY COMMITTED.
NB+C ENGINEERING SERVICES, LLC.
6095 MARSHALEE DRIVE, SUITE 300
ELKRIDGE, MD 21075
(410) 712-7092

STATE OF CONNECTICUT — KRUPAKARAN KOLANDAIVELU — PEN.0028997 — LICENSED PROFESSIONAL ENGINEER

06/08/2022

KRUPAKARAN KOLANDAIVELU, P.E.
STATE OF CONNECTICUT
PROFESSIONAL ENGINEER
LICENSE #PEN.0028997

DRAWN BY:	CHECKED BY:	APPROVED BY:
BPC	BRN	TA

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	11/09/2021	ISSUED FOR CONSTRUCTION
1	03/09/2022	ISSUED FOR CONSTRUCTION
2	06/08/2022	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

876345

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00874A
33 JANOWSKI ROAD
ASHFORD, CT 06278

SHEET TITLE

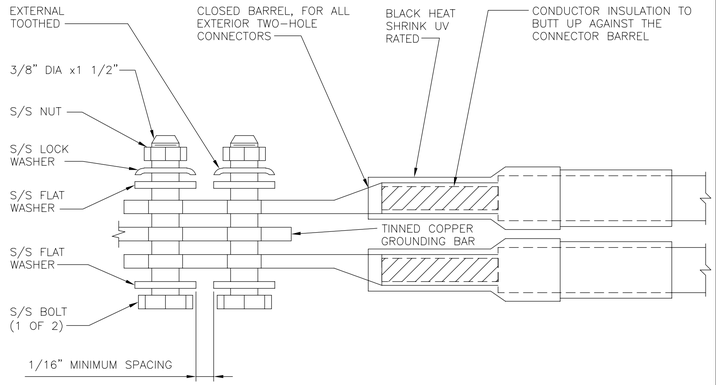
GROUNDING DETAILS

SHEET NUMBER

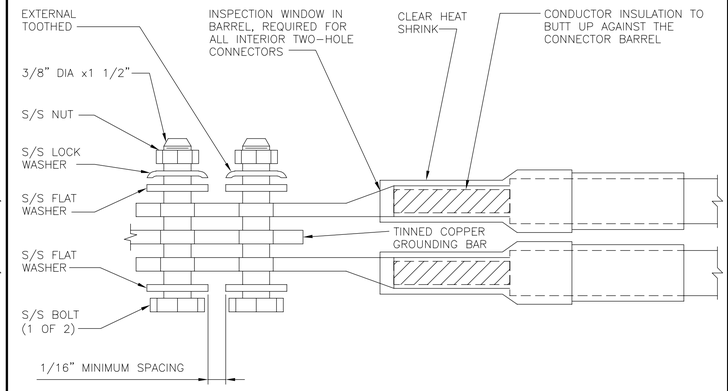
G-2

1. EXOTHERMIC WELD (2) TWO, #2 AWG BARE TINNED SOLID COPPER CONDUCTORS TO GROUND BAR, ROUTE CONDUCTORS TO BURIED GROUND RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
2. ALL EXTERIOR GROUNDING HARDWARE SHALL BE STAINLESS STEEL 3/8" DIAMETER OR LARGER. ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING LOCK WASHERS, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
3. FOR GROUND BOND TO STEEL ONLY: COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
4. DO NOT INSTALL CABLE GROUNDING KIT AT A BEND AND ALWAYS DIRECT GROUND CONDUCTOR DOWN TO GROUNDING BUS.
5. NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUND BAR AND BOLTED ON THE BACK SIDE.
6. ALL GROUNDING PARTS AND EQUIPMENT TO BE SUPPLIED AND INSTALLED BY CONTRACTOR.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUND BAR AS REQUIRED.
8. ENSURE THE WIRE INSULATION TERMINATION IS WITHIN 1/8" OF THE BARREL (NO SHINERS).

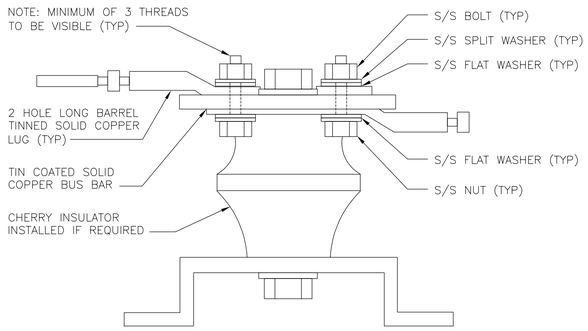
TYPICAL GROUNDING NOTES | NO SCALE | 1



TYPICAL EXTERIOR TWO HOLE LUG | NO SCALE | 2



TYPICAL INTERIOR TWO HOLE LUG | NO SCALE | 3



LUG DETAIL | NO SCALE | 4

NOT USED | NO SCALE | 5

NOT USED | NO SCALE | 6

NOT USED | NO SCALE | 7

NOT USED | NO SCALE | 8

NOT USED | NO SCALE | 9

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

NB+C TOTALLY COMMITTED.
NB+C ENGINEERING SERVICES, LLC.
6095 MARSHALEE DRIVE, SUITE 300
ELKRIDGE, MD 21075
(410) 712-7092

STATE OF CONNECTICUT · KRUPAKARAN KOLANDAIVELU · PEN.0028997 · LICENSED PROFESSIONAL ENGINEER

06/08/2022

KRUPAKARAN KOLANDAIVELU, P.E.
STATE OF CONNECTICUT
PROFESSIONAL ENGINEER
LICENSE #PEN.0028997

DRAWN BY:	CHECKED BY:	APPROVED BY:
BPC	BRN	TA

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	11/09/2021	ISSUED FOR CONSTRUCTION
1	03/09/2022	ISSUED FOR CONSTRUCTION
2	06/08/2022	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

876345

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00874A
33 JANOWSKI ROAD
ASHFORD, CT 06278

SHEET TITLE

GROUNDING DETAILS

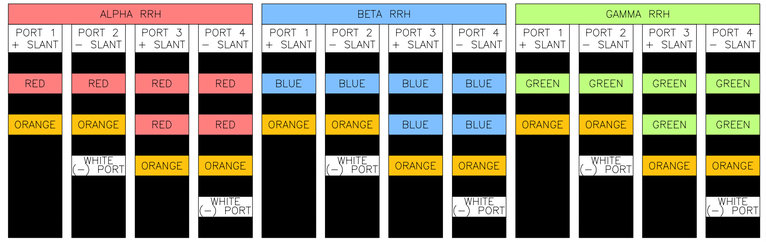
SHEET NUMBER

G-3

HYBRID/DISCREET CABLES — 3/4" TAPE WIDTHS WITH 3/4" SPACING

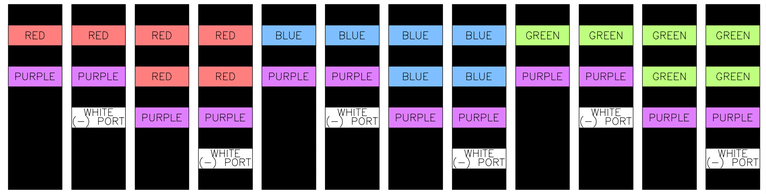
LOW–BAND RRH
(600 MHz N71 BASEBAND) +
(850 MHz N26 BAND) +
(700 MHz N29 BAND) – OPTIONAL PER MARKET

ADD FREQUENCY COLOR TO SECTOR BAND
(CBRS WILL USE YELLOW BAND)



MID–BAND RRH
(AWS BANDS N66+N70)

ADD FREQUENCY COLOR TO SECTOR BAND
(CBRS WILL USE YELLOW BANDS)



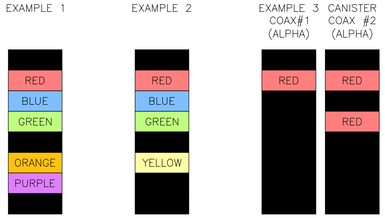
HYBRID/DISCREET CABLES

INCLUDE SECTOR BANDS BEING SUPPORTED ALONG WITH FREQUENCY BANDS.

EXAMPLE 1 – HYBRID, OR DISCREET, SUPPORTS ALL SECTORS, BOTH LOW–BANDS AND MID–BANDS.

EXAMPLE 2 – HYBRID, OR DISCREET, SUPPORTS CBRS ONLY, ALL SECTORS.

EXAMPLE 3 – MAIN COAX WITH GROUND MOUNTED RRHs.

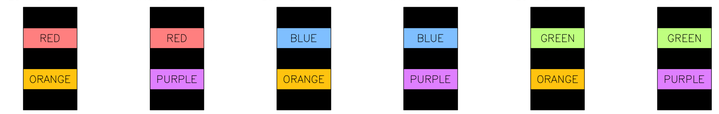


FIBER JUMPERS TO RRHs

LOW–BAND HHR FIBER CABLES HAVE SECTOR STRIPE ONLY.

POWER CABLES TO RRHs

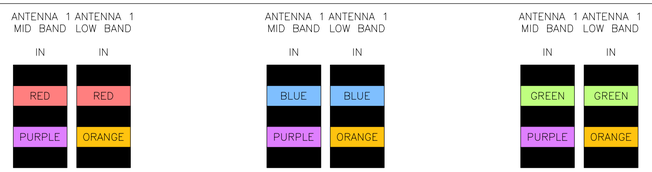
LOW–BAND RRH POWER CABLES HAVE SECTOR STRIPE ONLY



RET MOTORS AT ANTENNAS

RET CONTROL IS HANDLED BY THE MID–BAND RRH WHEN ONE SET OF RET PORTS EXIST ON ANTENNA.

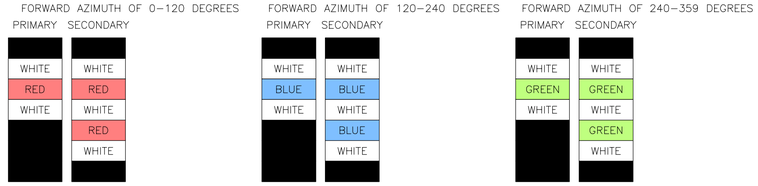
SEPARATE RET CABLES ARE USED WHEN ANTENNA PORTS PROVIDE INPUTS FOR BOTH LOW AND MID BANDS.



MICROWAVE RADIO LINKS

LINKS WILL HAVE A 1.5–2 INCH WHITE WRAP WITH THE AZIMUTH COLOR OVERLAPPING IN THE MIDDLE.
ADD ADDITIONAL SECTOR COLOR BANDS FOR EACH ADDITIONAL MW RADIO.

MICROWAVE CABLES WILL REQUIRE P–TOUCH LABELS INSIDE THE CABINET TO IDENTIFY THE LOCAL AND REMOTE SITE ID's.



LOW BANDS (N71+N26) OPTIONAL – (N29): ORANGE

AWS (N66+N70+H–BLOCK): PURPLE

CBRS TECH (3 GHz): YELLOW

NEGATIVE SLANT PORT ON ANT/RRH: WHITE

ALPHA SECTOR: RED

BETA SECTOR: BLUE

GAMMA SECTOR: GREEN

COLOR IDENTIFIER		2
NOT USED		3
RF CABLE COLOR CODES		1
NOT USED		4

dish wireless.
5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

NB+C TOTALLY COMMITTED.
NB+C ENGINEERING SERVICES, LLC.
6095 MARSHALEE DRIVE, SUITE 300
ELKRIDGE, MD 21075
(410) 712-7092

06/08/2022

KRUPAKARAN KOLANDAIVELU, P.E.
STATE OF CONNECTICUT
PROFESSIONAL ENGINEER
LICENSE #PEN.0028997

DRAWN BY:	CHECKED BY:	APPROVED BY:
BPC	BRN	TA

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	11/09/2021	ISSUED FOR CONSTRUCTION
1	03/09/2022	ISSUED FOR CONSTRUCTION
2	06/08/2022	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
876345

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00874A
33 JANOWSKI ROAD
ASHFORD, CT 06278

SHEET TITLE
RF
CABLE COLOR CODES

SHEET NUMBER
RF-1

LEGEND

EXOTHERMIC CONNECTION

MECHANICAL CONNECTION

BUSS BAR INSULATOR

CHEMICAL ELECTROLYTIC GROUNDING SYSTEM

TEST CHEMICAL ELECTROLYTIC GROUNDING SYSTEM — T

EXOTHERMIC WITH INSPECTION SLEEVE

GROUNDING BAR

GROUND ROD

TEST GROUND ROD WITH INSPECTION SLEEVE — T

SINGLE POLE SWITCH

DUPLEX RECEPTACLE

DUPLEX GFCI RECEPTACLE — GFCI

FLUORESCENT LIGHTING FIXTURE
(2) TWO LAMPS 48–T8 — F

SMOKE DETECTION (DC) — SD

EMERGENCY LIGHTING (DC)

SECURITY LIGHT W/PHOTOCELL LITHONIA ALXW
LED–1–25A400/51K–SR4–120–PE–DDBTXD

CHAIN LINK FENCE — X — X — X — X

WOOD/WROUGHT IRON FENCE

WALL STRUCTURE

LEASE AREA

PROPERTY LINE (PL)

SETBACKS

ICE BRIDGE

CABLE TRAY

WATER LINE — W — W — W — W — W

UNDERGROUND POWER — UGP — UGP — UGP — UGP — UGP

UNDERGROUND TELCO — UGT — UGT — UGT — UGT — UGT

OVERHEAD POWER — OHP — OHP — OHP — OHP

OVERHEAD TELCO — OHT — OHT — OHT — OHT

UNDERGROUND TELCO/POWER — UGT/P — UGT/P — UGT/P — UGT/P

ABOVE GROUND POWER — AGP — AGP — AGP — AGP — AGP

ABOVE GROUND TELCO — AGT — AGT — AGT — AGT — AGT

ABOVE GROUND TELCO/POWER — AGT/P — AGT/P — AGT/P — AGT/P

WORKPOINT — W.P.

SECTION REFERENCE — XX / X–X

DETAIL REFERENCE — XX / X–X

ABBREVIATIONS

AB	ANCHOR BOLT
ABV	ABOVE
AC	ALTERNATING CURRENT
ADDL	ADDITIONAL
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AGL	ABOVE GROUND LEVEL
AIC	AMPERAGE INTERRUPTION CAPACITY
ALUM	ALUMINUM
ALT	ALTERNATE
ANT	ANTENNA
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BATT	BATTERY
BLDG	BUILDING
BLK	BLOCK
BLKG	BLOCKING
BM	BEAM
BTC	BARE TINNED COPPER CONDUCTOR
BOF	BOTTOM OF FOOTING
CAB	CABINET
CANT	CANTILEVERED
CHG	CHARGING
CLG	CEILING
CLR	CLEAR
COL	COLUMN
COMM	COMMON
CONC	CONCRETE
CONSTR	CONSTRUCTION
DBL	DOUBLE
DC	DIRECT CURRENT
DEPT	DEPARTMENT
DF	DOUGLAS FIR
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DWG	DRAWING
DWL	DOWEL
EA	EACH
EC	ELECTRICAL CONDUCTOR
EL.	ELEVATION
ELEC	ELECTRICAL
EMT	ELECTRICAL METALLIC TUBING
ENG	ENGINEER
EQ	EQUAL
EXP	EXPANSION
EXT	EXTERIOR
EW	EACH WAY
FAB	FABRICATION
FF	FINISH FLOOR
FG	FINISH GRADE
FIF	FACILITY INTERFACE FRAME
FIN	FINISH(ED)
FLR	FLOOR
FDN	FOUNDATION
FOC	FACE OF CONCRETE
FOM	FACE OF MASONRY
FOS	FACE OF STUD
FOW	FACE OF WALL
FS	FINISH SURFACE
FT	FOOT
FTG	FOOTING
GA	GAUGE
GEN	GENERATOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GLB	GLUE LAMINATED BEAM
GLV	GALVANIZED
GPS	GLOBAL POSITIONING SYSTEM
GND	GROUND
GSM	GLOBAL SYSTEM FOR MOBILE
HDG	HOT DIPPED GALVANIZED
HDR	HEADER
HGR	HANGER
HVAC	HEAT/VENTILATION/AIR CONDITIONING
HT	HEIGHT
IGR	INTERIOR GROUND RING
IN	INCH
INT	INTERIOR
LB(S)	POUND(S)
LF	LINEAR FEET
LTE	LONG TERM EVOLUTION
MAS	MASONRY
MAX	MAXIMUM
MB	MACHINE BOLT
MECH	MECHANICAL
MFR	MANUFACTURER
MGB	MASTER GROUND BAR
MIN	MINIMUM
MISC	MISCELLANEOUS
MTL	METAL
MTS	MANUAL TRANSFER SWITCH
MW	MICROWAVE
NEC	NATIONAL ELECTRIC CODE
NM	NEWTON METERS
NO.	NUMBER
#	NUMBER
NTS	NOT TO SCALE
OC	ON–CENTER
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
OPNG	OPENING
P/C	PRECAST CONCRETE
PCS	PERSONAL COMMUNICATION SERVICES
PCU	PRIMARY CONTROL UNIT
PRC	PRIMARY RADIO CABINET
PP	POLARIZING PRESERVING
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	PRESSURE TREATED
PWR	POWER CABINET
QTY	QUANTITY
RAD	RADIUS
RECT	RECTIFIER
REF	REFERENCE
REINF	REINFORCEMENT
REQ'D	REQUIRED
RET	REMOTE ELECTRIC TILT
RF	RADIO FREQUENCY
RMC	RIGID METALLIC CONDUIT
RRH	REMOTE RADIO HEAD
RRU	REMOTE RADIO UNIT
RWY	RACEWAY
SCH	SCHEDULE
SHT	SHEET
SIAD	SMART INTEGRATED ACCESS DEVICE
SIM	SIMILAR
SPEC	SPECIFICATION
SQ	SQUARE
SS	STAINLESS STEEL
STD	STANDARD
STL	STEEL
TEMP	TEMPORARY
THK	THICKNESS
TMA	TOWER MOUNTED AMPLIFIER
TN	TOE NAIL
TOA	TOP OF ANTENNA
TOC	TOP OF CURB
TOF	TOP OF FOUNDATION
TOP	TOP OF PLATE (PARAPET)
TOS	TOP OF STEEL
TOW	TOP OF WALL
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION
TYP	TYPICAL
UG	UNDERGROUND
UL	UNDERWRITERS LABORATORY
UNO	UNLESS NOTED OTHERWISE
UMTS	UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
UPS	UNITERRUPTIBLE POWER SYSTEM (DC POWER PLANT)
VIF	VERIFIED IN FIELD
W	WIDE
W/	WITH
WD	WOOD
WP	WEATHERPROOF
WT	WEIGHT

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

NB+C TOTALLY COMMITTED.
NB+C ENGINEERING SERVICES, LLC.
6095 MARSHALEE DRIVE, SUITE 300
ELKRIDGE, MD 21075
(410) 712-7092

STATE OF CONNECTICUT — KRUPAKARAN KOLANDAIVELU — PEN.0028997 — LICENSED PROFESSIONAL ENGINEER

06/08/2022

KRUPAKARAN KOLANDAIVELU, P.E.
STATE OF CONNECTICUT
PROFESSIONAL ENGINEER
LICENSE #PEN.0028997

DRAWN BY:	CHECKED BY:	APPROVED BY:
BPC	BRN	TA

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	11/09/2021	ISSUED FOR CONSTRUCTION
1	03/09/2022	ISSUED FOR CONSTRUCTION
2	06/08/2022	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

876345

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00874A
33 JANOWSKI ROAD
ASHFORD, CT 06278

SHEET TITLE

LEGEND AND ABBREVIATIONS

SHEET NUMBER

GN-1

SITE ACTIVITY REQUIREMENTS:

1. NOTICE TO PROCEED – NO WORK SHALL COMMENCE PRIOR TO CONTRACTOR RECEIVING A WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE DISH Wireless L.L.C. AND TOWER OWNER NOC & THE DISH Wireless L.L.C. AND TOWER OWNER CONSTRUCTION MANAGER.

2. "LOOK UP" – DISH Wireless L.L.C. AND TOWER OWNER SAFETY CLIMB REQUIREMENT:

THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR DISH Wireless L.L.C. AND DISH Wireless L.L.C. AND TOWER OWNER POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.

3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.

4. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN, AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND DISH Wireless L.L.C. AND TOWER OWNER STANDARDS, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION, TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA–322 (LATEST EDITION).

5. ALL SITE WORK TO COMPLY WITH DISH Wireless L.L.C. AND TOWER OWNER INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON DISH Wireless L.L.C. AND TOWER OWNER TOWER SITE AND LATEST VERSION OF ANSI/TIA–1019–A–2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."

6. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY DISH Wireless L.L.C. AND TOWER OWNER PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.

7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

9. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES INCLUDING PRIVATE LOCATES SERVICES PRIOR TO THE START OF CONSTRUCTION.

10. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION E) CONSTRUCTION SAFETY PROCEDURES.

11. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND DISH PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.

12. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.

13. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF DISH Wireless L.L.C. AND TOWER OWNER, AND/OR LOCAL UTILITIES.

14. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.

15. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.

16. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.

17. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.

18. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.

19. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.

20. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS AND RADIOS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.

21. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

22. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

GENERAL NOTES:

1.FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:

CONTRACTOR:GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION

CARRIER:DISH Wireless L.L.C.

TOWER OWNER:TOWER OWNER

2. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE ENGINEERS IN THIS OR SIMILAR LOCALITIES. IT IS ASSUMED THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND/OR WORKPEOPLE WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.

3. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY FOR PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, FORMWORK, SHORING, ETC. SITE VISITS BY THE ENGINEER OR HIS REPRESENTATIVE WILL NOT INCLUDE INSPECTION OF THESE ITEMS AND IS FOR STRUCTURAL OBSERVATION OF THE FINISHED STRUCTURE ONLY.

4. NOTES AND DETAILS IN THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT, AND/OR AS PROVIDED FOR IN THE CONTRACT DOCUMENTS. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL NOTES, AND SPECIFICATIONS, THE GREATER, MORE STRICT REQUIREMENTS, SHALL GOVERN. IF FURTHER CLARIFICATION IS REQUIRED CONTACT THE ENGINEER OF RECORD.

5. SUBSTANTIAL EFFORT HAS BEEN MADE TO PROVIDE ACCURATE DIMENSIONS AND MEASUREMENTS ON THE DRAWINGS TO ASSIST IN THE FABRICATION AND/OR PLACEMENT OF CONSTRUCTION ELEMENTS BUT IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE DIMENSIONS, MEASUREMENTS, AND/OR CLEARANCES SHOWN IN THE CONSTRUCTION DRAWINGS PRIOR TO FABRICATION OR CUTTING OF ANY NEW OR EXISTING CONSTRUCTION ELEMENTS. IF IT IS DETERMINED THAT THERE ARE DISCREPANCIES AND/OR CONFLICTS WITH THE CONSTRUCTION DRAWINGS THE ENGINEER OF RECORD IS TO BE NOTIFIED AS SOON AS POSSIBLE.

6. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CARRIER POC AND TOWER OWNER.

7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

8. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

9. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

10. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CARRIER AND TOWER OWNER PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.

11. CONTRACTOR IS TO PERFORM A SITE INVESTIGATION, BEFORE SUBMITTING BIDS, TO DETERMINE THE BEST ROUTING OF ALL CONDUITS FOR POWER, AND TELCO AND FOR GROUNDING CABLES AS SHOWN IN THE POWER, TELCO, AND GROUNDING PLAN DRAWINGS.

12. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF DISH Wireless L.L.C. AND TOWER OWNER

13. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.

14. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

NB+C TOTALLY COMMITTED.
NB+C ENGINEERING SERVICES, LLC.
6095 MARSHALEE DRIVE, SUITE 300
ELKRIDGE, MD 21075
(410) 712-7092

STATE OF CONNECTICUT
KRUPAKARAN KOLANDAIVELU
PEN.0028997
LICENSED
PROFESSIONAL ENGINEER

06/08/2022

KRUPAKARAN KOLANDAIVELU, P.E.
STATE OF CONNECTICUT
PROFESSIONAL ENGINEER
LICENSE #PEN.0028997

DRAWN BY:	CHECKED BY:	APPROVED BY:
BPC	BRN	TA

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	11/09/2021	ISSUED FOR CONSTRUCTION
1	03/09/2022	ISSUED FOR CONSTRUCTION
2	06/08/2022	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

876345

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00874A
33 JANOWSKI ROAD
ASHFORD, CT 06278

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-2

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST-IN-PLACE CONCRETE.

2. UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.

3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (f'c) OF 3000 psi AT 28 DAYS, UNLESS NOTED OTHERWISE. NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME TO TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF CONCRETE SHALL NOT EXCEED 90°f AT TIME OF PLACEMENT.

4. CONCRETE EXPOSED TO FREEZE-THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A MAXIMUM WATER-TO-CEMENT RATIO (W/C) OF 0.45.

5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES, UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH (Fy) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:

#4 BARS AND SMALLER 40 ksi

#5 BARS AND LARGER 60 ksi

6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:

- CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH 3"
- CONCRETE EXPOSED TO EARTH OR WEATHER:
- #6 BARS AND LARGER 2"
- #5 BARS AND SMALLER 1-1/2"
- CONCRETE NOT EXPOSED TO EARTH OR WEATHER:
- SLAB AND WALLS 3/4"
- BEAMS AND COLUMNS 1-1/2"

7. A TOOLED EDGE OR A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.

2. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.

3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC.

4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.

4.1. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.

4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PRE THE GOVERNING JURISDICTION.

5. EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR CABLE SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.

6. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (i.e. PANEL BOARD AND CIRCUIT ID'S).

7. PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.

8. TIE WRAPS ARE NOT ALLOWED.

9. ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER) WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.

10. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.

11. POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI-CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.

12. POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI-CONDUCTOR, TYPE TC CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.

13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION NOT LESS THAN 75° C (90° C IF AVAILABLE).

14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.

15. ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.

16. ELECTRICAL METALLIC TUBING (EMT) OR METAL-CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.

17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.

18. LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.

19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.

20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND THE NEC.

21. WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREMOLD SPECMATE WIREWAY).

22. SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).

23. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e. POWDER-ACTUATED) FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.

24. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY-COATED SHEET STEEL. SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3 (OR BETTER) FOR EXTERIOR LOCATIONS.

25. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY-COATED OR NON-CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.

26. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.

27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR DISH Wireless L.L.C. AND TOWER OWNER BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.

28. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.

29. INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "DISH Wireless L.L.C.".

30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

NB+C TOTALLY COMMITTED.
NB+C ENGINEERING SERVICES, LLC.
6095 MARSHALEE DRIVE, SUITE 300
ELKRIDGE, MD 21075
(410) 712-7092

STATE OF CONNECTICUT
KRUPAKARAN KOLANDAIVELU
PEN.0028997
LICENSED
PROFESSIONAL ENGINEER

06/08/2022

KRUPAKARAN KOLANDAIVELU, P.E.
STATE OF CONNECTICUT
PROFESSIONAL ENGINEER
LICENSE #PEN.0028997

DRAWN BY:	CHECKED BY:	APPROVED BY:
BPC	BRN	TA

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	11/09/2021	ISSUED FOR CONSTRUCTION
1	03/09/2022	ISSUED FOR CONSTRUCTION
2	06/08/2022	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

876345

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00874A
33 JANOWSKI ROAD
ASHFORD, CT 06278

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-3

GROUNDING NOTES:

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.

2. THE CONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.

3. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.

4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.

6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE SOLID TINNED COPPER FOR OUTDOOR BTS.

7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.

8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.

9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.

10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.

11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.

12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.

13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.

14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.

15. APPROVED ANTIOXIDANT COATINGS (i.e. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.

16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.

17. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.

18. BOND ALL METALLIC OBJECTS WITHIN 6 ft OF MAIN GROUND RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.

19. GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.

20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 BARE SOLID TINNED COPPER IN 3/4" NON-METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD-WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).

21. BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY). DO NOT ATTACH GROUNDING TO FIRE SPRINKLER SYSTEM PIPES.

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

NB+C TOTALLY COMMITTED.

NB+C ENGINEERING SERVICES, LLC.
6095 MARSHALEE DRIVE, SUITE 300
ELKRIDGE, MD 21075
(410) 712-7092

06/08/2022

KRUPAKARAN KOLANDAIVELU, P.E.
STATE OF CONNECTICUT
PROFESSIONAL ENGINEER
LICENSE #PEN.0028997

DRAWN BY:	CHECKED BY:	APPROVED BY:
BPC	BRN	TA

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	11/09/2021	ISSUED FOR CONSTRUCTION
1	03/09/2022	ISSUED FOR CONSTRUCTION
2	06/08/2022	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

876345

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00874A
33 JANOWSKI ROAD
ASHFORD, CT 06278

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-4

Exhibit D

Structural Analysis Report

Date: **September 10, 2021**

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

Subject:	**Structural Analysis Report**	
Carrier Designation:	***DISH Network* Co-Locate**	
	Site Number:	BOBOS00874A
Crown Castle Designation:	**BU Number:**	876345
	Site Name:	SKY HILL
	JDE Job Number:	671530
	Work Order Number:	2013123
	Order Number:	572903 Rev. 0
Engineering Firm Designation:	**Crown Castle Project Number:**	2013123
Site Data:	**33 Janowski Road, Ashford, WINDHAM County, CT** **Latitude *41° 57' 7.7"*, Longitude *-72° 11' 43.9"*** **192 Foot - Self Support Tower**	

Crown Castle is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above-mentioned tower.

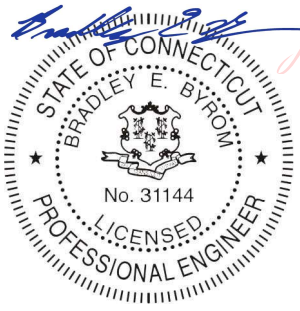
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC5: Proposed Equipment Configuration **Sufficient Capacity-85.3%**

This analysis utilizes an ultimate 3-second gust wind speed of 130 mph as required by the 2015 International Building Code. Applicable Standard references and design criteria are listed in Section 2 - "Analysis Criteria".

Structural analysis prepared by: Melanie Atiles

Respectfully submitted by:



Digitally signed by Bradley E Byrom
Date: 2021.09.12 09:51:45 -04'00'

Bradley E. Byrom, P.E., S.E.
Senior Project Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 192 ft Self Support tower designed by ROHN.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	130 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	2 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
130.0	130.0	3	fujitsu	TA08025-B604	1	1-1/2
		3	fujitsu	TA08025-B605		
		3	jma wireless	MX08FRO665-21 w/ Mount Pipe		
		1	raycap	RDIDC-9181-PF-48		
		1	tower mounts	Commscope MTC3975083 (3)		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
190.0	192.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz	4 1	1-1/4 1/2
		6	alcatel lucent	RRH2X50-800		
		3	commscope	NNVV-65B-R4 w/ Mount Pipe		
		3	nokia	FZHN		
		3	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe		
	190.0	1	tower mounts	Sector Mount [SM 506-3]		
180.0	184.0	2	antel	LPA-80080/4CF	8 1	1-5/8 1/2
		1	symmetricom	58532A		
	181.0	3		FDJ85020Q7-S1		
		4	antel	LPA-80080/4CF		
		6	commscope	JAHH-65B-R3B		
		2	raycap	RC3DC-3315-PF-48		
		3	samsung telecommunications	20W CBRS		
		3	samsung telecommunications	CBRS w/ Mount Pipe		
		3	samsung telecommunications	RFV01U-D1A		
		3	samsung telecommunications	RFV01U-D2A		
	180.0	1	tower mounts	Sector Mount [SM 304-3]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
171.0	172.0	9	allgon	7130.16.33.00 w/ Mount Pipe	9	1-5/8
	171.0	1	tower mounts	Sector Mount [SM 502-3]		
162.0	162.0	3	andrew	HBX-6516DS-VTM w/ Mount Pipe	6	1-5/8
		1	tower mounts	Sector Mount [SM 104-3]		
156.0	159.0	3	ericsson	RADIO 4449 B12/B71	3	1-5/8
		3	ericsson	RRUS 4415 B25		
	158.0	3	rfs celwave	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe		
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
	156.0	3	ericsson	RADIO 4415 B66A		
		1	tower mounts	Sector Mount [SM 502-3]		
140.0	140.0	4	cci antennas	TPA65R-BU4D w/ Mount Pipe	14 2 2 1	7/8 3/8 3/4 Conduit
		2	commscope	NNHH-65B-R4 w/ Mount Pipe		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 4478 B14		
		3	ericsson	RRUS 8843 B2/B66A		
		3	powerwave technologies	7770.00 w/ Mount Pipe		
		3	powerwave technologies	TT19-08BP111-001		
		1	raycap	DC6-48-60-0-8C-EV		
		1	raycap	DC6-48-60-18-8F		
		1	tower mounts	Sector Mount [SM 504-3]		
98.0	102.0	1	symmetricom	58532A	1	1/2
	98.0	1	tower mounts	Side Arm Mount [SO 301-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	2189896	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	1631622	CCISITES
4-TOWER MANUFACTURER DRAWINGS	1631630	CCISITES

3.1) Analysis Method

tnxTower (version 8.1.1.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

3.2) Assumptions

1) Tower and structures were maintained in accordance with the TIA-222 Standard.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	192 - 180	Leg	ROHN 2.5 STD	1	-6.556	66.738	9.8	Pass
T2	180 - 160	Leg	ROHN 2.5 STD	27	-34.204	59.996	57.0	Pass
T3	160 - 140	Leg	ROHN 3 EH	56	-67.809	99.054	68.5	Pass
T4	140 - 120	Leg	ROHN 4 EH	77	-108.692	167.894	64.7	Pass
T5	120 - 100	Leg	ROHN 5 EH	98	-148.307	251.347	59.0	Pass
T6	100 - 80	Leg	ROHN 6 EHS	119	-182.558	256.249	71.2	Pass
T7	80 - 60	Leg	ROHN 6 EH	134	-219.771	318.945	68.9	Pass
T8	60 - 40	Leg	ROHN 8 EHS	148	-254.910	405.672	62.8	Pass
T9	40 - 20	Leg	ROHN 8 EHS	163	-290.165	405.729	71.5	Pass
T10	20 - 0	Leg	ROHN 8 EHS	178	-325.361	405.717	80.2	Pass
T1	192 - 180	Diagonal	L1 3/4x1 3/4x3/16	7	-1.441	11.895	12.1	Pass
T2	180 - 160	Diagonal	L2x2x3/16	36	-3.906	10.392	37.6	Pass
T3	160 - 140	Diagonal	L2 1/2x2 1/2x1/4	63	-5.885	16.480	35.7	Pass
T4	140 - 120	Diagonal	L2 1/2x2 1/2x1/4	81	-7.768	12.587	61.7	Pass
T5	120 - 100	Diagonal	L3x3x1/4	102	-8.182	17.432	46.9	Pass
T6	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	123	-9.566	19.016	50.3	Pass
T7	80 - 60	Diagonal	L4x4x1/4	138	-10.499	24.136	43.5	Pass
T8	60 - 40	Diagonal	L4x4x5/16	153	-10.093	24.922	40.5	Pass
T9	40 - 20	Diagonal	L4x4x5/16	168	-11.952	21.484	55.6	Pass
T10	20 - 0	Diagonal	L4x4x3/8	183	-12.588	21.926	57.4	Pass
T1	192 - 180	Top Girt	L1 3/4x1 3/4x3/16	4	-0.080	4.122	1.9	Pass
T2	180 - 160	Top Girt	L2x2x3/16	28	-0.719	6.245	11.5	Pass
							Summary	
						Leg (T10)	80.2	Pass
						Diagonal (T4)	61.7	Pass
						Top Girt (T2)	11.5	Pass
						Bolt Checks	85.3	Pass
						Rating =	85.3	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	46.7	Pass
1	Base Foundation (Structure)	0	14.9	Pass
1	Base Foundation (Soil Interaction)	0	45.5	Pass

Structure Rating (max from all components) =	85.3%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.

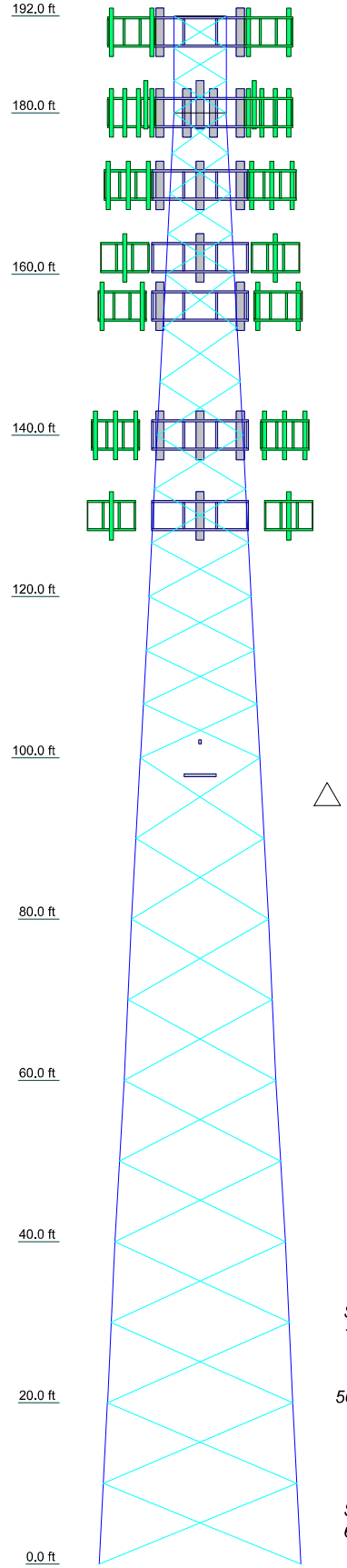
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section		T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Legs		ROHN 2.5 STD	ROHN 2.5 STD	ROHN 3 EH	ROHN 4 EH	ROHN 5 EH	ROHN 6 EHS	ROHN 6 EH	ROHN 8 EHS	ROHN 8 EHS	ROHN 8 EHS
Leg Grade		A572-50	A572-50	A572-50	A572-50	A572-50	A572-50	A572-50	A572-50	A572-50	A572-50
Diagonals	A	L2x2x3/16	L2x2x3/16	L2 1/2x2 1/2x1/4	L2 1/2x2 1/2x1/4	L3x3x1/4	L3 1/2x3 1/2x1/4	L4x4x1/4	L4x4x5/16	L4x4x5/16	L4x4x3/8
Diagonal Grade	A36	A572-50	A572-50	A572-50	A572-50	A572-50	A572-50	A572-50	A572-50	A572-50	A572-50
Top Girts	A	L2x2x3/16	L2x2x3/16	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Face Width (ft)	6.58	6.58	8.54	10.61	12.74	14.83	16.92	18.88	21.13	23.05	25.05
# Panels @ (ft)	3 @ 4	4 @ 5	9 @ 6.66667				10 @ 10				
Weight (K)	0.6	1.0	1.5	2.0	2.7	2.8	3.5	4.4	4.6	5.3	28.4



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L1 3/4x1 3/4x3/16		

MATERIAL STRENGTH

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

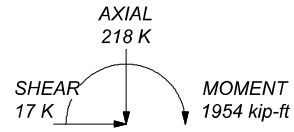
TOWER DESIGN NOTES

1. Tower is located in Windham County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 130 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 2.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TOWER RATING: 85.3%

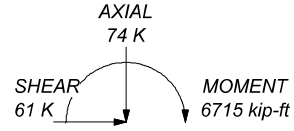
ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 334 K
SHEAR: 38 K

UPLIFT: -278 K
SHEAR: 33 K



TORQUE 12 kip-ft
50 mph WIND - 2.000 in ICE



TORQUE 54 kip-ft
REACTIONS - 130 mph WIND

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
The Pathway to Possible
Phone: (724) 416-2000
FAX:

Job: *BU 876345*			
Project:			
Client: Crown Castle	Drawn by: MAtiles	App'd:	
Code: TIA-222-H	Date: 09/10/21	Scale: NTS	
Path: C:\Users\matiles\Desktop\Working from Home\876345\WO 2013123 - SA\Prod\876345.er		Dwg No. E-1	

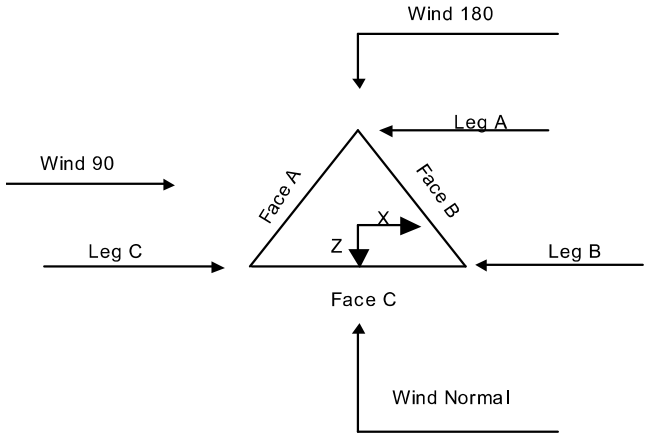
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 192.000 ft above the ground line.
The base of the tower is set at an elevation of 0.000 ft above the ground line.
The face width of the tower is 6.580 ft at the top and 25.050 ft at the base.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

- Tower is located in Windham County, Connecticut.
- Tower base elevation above sea level: 1068.000 ft.
- Basic wind speed of 130 mph.
- Risk Category II.
- Exposure Category B.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.000 ft.
- Nominal ice thickness of 2.000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56.000 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50.000 °F.
- Deflections calculated using a wind speed of 60 mph.
- Pressures are calculated at each section.
- Stress ratio used in tower member design is 1.
- Tower analysis based on target reliabilities in accordance with Annex S.
- Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
- Maximum demand-capacity ratio is: 1.05.
- 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-H Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-H 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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	192.000-180.000			6.580	1	12.000
T2	180.000-160.000			6.580	1	20.000
T3	160.000-140.000			8.540	1	20.000
T4	140.000-120.000			10.610	1	20.000
T5	120.000-100.000			12.740	1	20.000
T6	100.000-80.000			14.830	1	20.000
T7	80.000-60.000			16.920	1	20.000
T8	60.000-40.000			18.880	1	20.000
T9	40.000-20.000			21.130	1	20.000
T10	20.000-0.000			23.050	1	20.000

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	192.000-180.000	4.000	X Brace	No	No	0.000	0.000
T2	180.000-160.000	5.000	X Brace	No	No	0.000	0.000
T3	160.000-140.000	6.667	X Brace	No	No	0.000	0.000
T4	140.000-120.000	6.667	X Brace	No	No	0.000	0.000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T5	120.000-100.000	6.667	X Brace	No	No	0.000	0.000
T6	100.000-80.000	10.000	X Brace	No	No	0.000	0.000
T7	80.000-60.000	10.000	X Brace	No	No	0.000	0.000
T8	60.000-40.000	10.000	X Brace	No	No	0.000	0.000
T9	40.000-20.000	10.000	X Brace	No	No	0.000	0.000
T10	20.000-0.000	10.000	X Brace	No	No	0.000	0.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 192.000-180.000	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T2 180.000-160.000	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T3 160.000-140.000	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T4 140.000-120.000	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T5 120.000-100.000	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Equal Angle	L3x3x1/4	A572-50 (50 ksi)
T6 100.000-80.000	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T7 80.000-60.000	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Equal Angle	L4x4x1/4	A572-50 (50 ksi)
T8 60.000-40.000	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Equal Angle	L4x4x5/16	A572-50 (50 ksi)
T9 40.000-20.000	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Equal Angle	L4x4x5/16	A572-50 (50 ksi)
T10 20.000-0.000	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Equal Angle	L4x4x3/8	A572-50 (50 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 192.000-180.000	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T2 180.000-160.000	Equal Angle	L2x2x3/16	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 192.000-180.000	0.000	0.250	A36 (36 ksi)	1.05	1	1.05	0.000	0.000	36.000
T2 180.000-160.000	0.000	0.250	A36 (36 ksi)	1.05	1	1.05	0.000	0.000	36.000
T3 160.000-	0.000	0.250	A36	1.05	1	1.05	0.000	0.000	36.000

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
140.000			(36 ksi)						
T4 140.000-120.000	0.000	0.250	A36 (36 ksi)	1.05	1	1.05	0.000	0.000	36.000
T5 120.000-100.000	0.000	0.250	A36 (36 ksi)	1.05	1	1.05	0.000	0.000	36.000
T6 100.000-80.000	0.000	0.250	A36 (36 ksi)	1.05	1	1.05	0.000	0.000	36.000
T7 80.000-60.000	0.000	0.250	A36 (36 ksi)	1.05	1	1.05	0.000	0.000	36.000
T8 60.000-40.000	0.000	0.250	A36 (36 ksi)	1.05	1	1.05	0.000	0.000	36.000
T9 40.000-20.000	0.000	0.250	A36 (36 ksi)	1.05	1	1.05	0.000	0.000	36.000
T10 20.000-0.000	0.000	0.250	A36 (36 ksi)	1.05	1	1.05	0.000	0.000	36.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 192.000-180.000	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T2 180.000-160.000	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T3 160.000-140.000	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T4 140.000-120.000	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T5 120.000-100.000	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T6 100.000-80.000	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T7 80.000-60.000	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T8 60.000-40.000	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T9 40.000-20.000	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1
T10 20.000-0.000	Yes	No	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

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
T1 192.000-180.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 180.000-160.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

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
T3 160.000-140.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 140.000-120.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5 120.000-100.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 100.000-80.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 80.000-60.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T8 60.000-40.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T9 40.000-20.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T10 20.000-0.000	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub-Diagonal		Redundant Sub-Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	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
T1 192.000-180.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 180.000-160.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 160.000-140.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 140.000-120.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5 120.000-100.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 100.000-80.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 80.000-60.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T8 60.000-40.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T9 40.000-20.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T10 20.000-0.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 192.000-180.000	Flange	0.625 A325N	4	0.625 A325N	1	0.625 A325N	1	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T2 180.000-160.000	Flange	0.625 A325N	4	0.625 A325N	1	0.625 A325N	1	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T3 160.000-140.000	Flange	0.875 A325N	4	0.625 A325N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T4 140.000-120.000	Flange	1.000 A325N	4	0.625 A325N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T5 120.000-100.000	Flange	1.000 A325N	6	0.750 A325N	1	0.625 A325N	0	0.000 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T6 100.000-80.000	Flange	1.000 A325N	6	0.750 A325N	1	0.625 A325N	0	0.000 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T7 80.000-60.000	Flange	1.000 A325N	8	0.750 A325N	1	0.625 A325N	0	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T8 60.000-40.000	Flange	1.000 A325N	8	0.750 A325X	1	0.625 A325N	0	0.000 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T9 40.000-20.000	Flange	1.000 A325N	8	0.750 A325X	1	0.625 A325N	0	0.625 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0
T10 20.000-0.000	Flange	1.000 A354-BC	10	0.750 A325X	1	0.625 A325N	0	0.000 A325N	0	0.625 A325X	0	0.625 A325N	0	0.625 A325X	0

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 klf
Thin Flat Bar Climbing Ladder	A	No	No	Af (CaAa)	192.000 - 0.000	-6.000	0.45	1	1	2.000	2.000		0.004
Safety Line 3/8 ***	A	No	No	Ar (CaAa)	192.000 - 0.000	-6.000	0.45	1	1	0.375	0.375		0.000
LDF4-50A(1/2)	A	No	No	Ar (CaAa)	190.000 - 0.000	0.000	-0.4	1	1	0.630	0.630		0.000
HB114-1-0813U4-M5J(1-1/4)	A	No	No	Ar (CaAa)	190.000 - 0.000	0.000	-0.45	4	4	0.850	1.540		0.001
Feedline Ladder (Af) ***	A	No	No	Af (CaAa)	190.000 - 0.000	0.000	-0.45	1	1	3.000	3.000		0.008
LDF4-50A(1/2)	A	No	No	Ar (CaAa)	180.000 - 98.000	0.000	0.48	1	1	0.630	0.630		0.000
LDF7-50A(1-5/8)	A	No	No	Ar (CaAa)	180.000 - 0.000	0.000	0.4	8	8	0.850	1.980		0.001
LDF4-50A(1/2)	A	No	No	Ar (CaAa)	98.000 - 0.000	0.000	0.48	2	2	0.630	0.630		0.000
Feedline Ladder (Af) ***	A	No	No	Af (CaAa)	180.000 - 0.000	0.000	0.4	1	1	3.000	3.000		0.008
LDF7-50A(1-5/8)	B	No	No	Ar (CaAa)	171.000 - 0.000	0.000	-0.4	9	9	0.850	1.980		0.001
Feedline Ladder (Af) ***	B	No	No	Af (CaAa)	170.000 - 0.000	0.000	-0.4	1	1	3.000	3.000		0.008
FXL 1873 PE(1-5/8)	B	No	No	Ar (CaAa)	162.000 - 0.000	-2.000	0.45	6	3	0.850 0.750	1.980		0.001
Feedline Ladder (Af) ***	B	No	No	Af (CaAa)	160.000 - 0.000	-0.500	0.45	1	1	3.000	3.000		0.008
FLC 78-50J(7/8)	C	No	No	Ar (CaAa)	140.000 - 0.000	0.000	-0.4	14	12	0.850 0.750	1.112		0.000
FB-L98B-002-75000(3/8)	C	No	No	Ar (CaAa)	140.000 - 0.000	1.500	-0.42	1	1	0.394	0.394		0.000
FB-L98B-034-XXX(3/8)	C	No	No	Ar (CaAa)	140.000 - 0.000	0.000	-0.32	1	1	0.394	0.000		0.000
WR-	C	No	No	Ar (CaAa)	140.000 -	0.000	-0.32	2	2	0.795	0.000		0.001

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 klf
VG86ST-BRD(3/4) 2" Flex Conduit	C	No	No	Ar (CaAa)	0.000 140.000 - 0.000	0.000	-0.32	1	1	2.000	2.000		0.000
Feedline Ladder (Af) ***	C	No	No	Af (CaAa)	140.000 - 0.000	0.000	-0.4	1	1	3.000	3.000		0.008
HCS 6X12 4AWG(1-5/8)	C	No	No	Ar (CaAa)	156.000 - 0.000	0.000	0.4	3	3	0.850	1.660		0.002
Feedline Ladder (Af) ******	C	No	No	Af (CaAa)	150.000 - 0.000	0.000	0.4	1	1	3.000	3.000		0.008
CU12PSM9P6XXX(1-1/2) ***	C	No	No	Ar (CaAa)	130.000 - 0.000	0.000	0.48	1	1	1.600	1.600		0.002

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	C_AA_A ft^2/ft	Weight klf
***								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	192.000-180.000	A	0.000	0.000	16.240	0.000	0.184
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.000
T2	180.000-160.000	A	0.000	0.000	73.937	0.000	0.654
		B	0.000	0.000	26.978	0.000	0.173
		C	0.000	0.000	0.000	0.000	0.000
T3	160.000-140.000	A	0.000	0.000	73.937	0.000	0.654
		B	0.000	0.000	79.400	0.000	0.564
		C	0.000	0.000	12.968	0.000	0.199
T4	140.000-120.000	A	0.000	0.000	73.937	0.000	0.654
		B	0.000	0.000	79.400	0.000	0.564
		C	0.000	0.000	67.484	0.000	0.648
T5	120.000-100.000	A	0.000	0.000	73.937	0.000	0.654
		B	0.000	0.000	79.400	0.000	0.564
		C	0.000	0.000	69.084	0.000	0.672
T6	100.000-80.000	A	0.000	0.000	75.071	0.000	0.656
		B	0.000	0.000	79.400	0.000	0.564
		C	0.000	0.000	69.084	0.000	0.672
T7	80.000-60.000	A	0.000	0.000	75.197	0.000	0.657
		B	0.000	0.000	79.400	0.000	0.564
		C	0.000	0.000	69.084	0.000	0.672
T8	60.000-40.000	A	0.000	0.000	75.197	0.000	0.657
		B	0.000	0.000	79.400	0.000	0.564
		C	0.000	0.000	69.084	0.000	0.672
T9	40.000-20.000	A	0.000	0.000	75.197	0.000	0.657
		B	0.000	0.000	79.400	0.000	0.564
		C	0.000	0.000	69.084	0.000	0.672
T10	20.000-0.000	A	0.000	0.000	75.197	0.000	0.657
		B	0.000	0.000	79.400	0.000	0.564

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	69.084	0.000	0.672

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	192.000-180.000	A	2.021	0.000	0.000	45.264	0.000	0.844
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.000
T2	180.000-160.000	A	2.003	0.000	0.000	178.888	0.000	3.269
		B		0.000	0.000	52.854	0.000	0.966
		C		0.000	0.000	0.000	0.000	0.000
T3	160.000-140.000	A	1.978	0.000	0.000	177.977	0.000	3.228
		B		0.000	0.000	144.978	0.000	2.788
		C		0.000	0.000	33.011	0.000	0.638
T4	140.000-120.000	A	1.950	0.000	0.000	176.949	0.000	3.183
		B		0.000	0.000	144.391	0.000	2.754
		C		0.000	0.000	183.089	0.000	3.164
T5	120.000-100.000	A	1.918	0.000	0.000	175.768	0.000	3.131
		B		0.000	0.000	143.716	0.000	2.716
		C		0.000	0.000	187.171	0.000	3.218
T6	100.000-80.000	A	1.879	0.000	0.000	182.571	0.000	3.109
		B		0.000	0.000	142.920	0.000	2.671
		C		0.000	0.000	185.500	0.000	3.154
T7	80.000-60.000	A	1.833	0.000	0.000	181.638	0.000	3.039
		B		0.000	0.000	141.946	0.000	2.617
		C		0.000	0.000	183.455	0.000	3.077
T8	60.000-40.000	A	1.772	0.000	0.000	179.242	0.000	2.944
		B		0.000	0.000	140.680	0.000	2.547
		C		0.000	0.000	180.797	0.000	2.978
T9	40.000-20.000	A	1.684	0.000	0.000	175.758	0.000	2.808
		B		0.000	0.000	138.840	0.000	2.446
		C		0.000	0.000	176.932	0.000	2.837
T10	20.000-0.000	A	1.509	0.000	0.000	168.855	0.000	2.548
		B		0.000	0.000	135.193	0.000	2.252
		C		0.000	0.000	169.268	0.000	2.568

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	192.000-180.000	-5.049	1.075	-5.835	-0.371
T2	180.000-160.000	-4.744	-15.872	-6.205	-15.537
T3	160.000-140.000	-1.685	-15.245	-4.063	-14.853
T4	140.000-120.000	5.593	-11.877	6.132	-7.909
T5	120.000-100.000	5.503	-12.425	6.044	-8.381
T6	100.000-80.000	6.295	-14.596	6.929	-10.430
T7	80.000-60.000	6.527	-15.335	7.480	-11.499
T8	60.000-40.000	6.933	-16.332	8.026	-12.476
T9	40.000-20.000	7.359	-17.415	8.689	-13.710
T10	20.000-0.000	7.740	-18.389	9.398	-15.168

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	Thin Flat Bar Climbing Ladder	180.00 - 192.00	0.6000	0.5487
T1	2	Safety Line 3/8	180.00 - 192.00	0.6000	0.5487
T1	4	LDF4-50A(1/2)	180.00 - 190.00	0.6000	0.5487
T1	5	HB114-1-0813U4-M5J(1-1/4)	180.00 - 190.00	0.6000	0.5487
T1	7	Feedline Ladder (Af)	180.00 - 190.00	0.6000	0.5487
T2	1	Thin Flat Bar Climbing Ladder	160.00 - 180.00	0.6000	0.6000
T2	2	Safety Line 3/8	160.00 - 180.00	0.6000	0.6000
T2	4	LDF4-50A(1/2)	160.00 - 180.00	0.6000	0.6000
T2	5	HB114-1-0813U4-M5J(1-1/4)	160.00 - 180.00	0.6000	0.6000
T2	7	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T2	9	LDF4-50A(1/2)	160.00 - 180.00	0.6000	0.6000
T2	10	LDF7-50A(1-5/8)	160.00 - 180.00	0.6000	0.6000
T2	13	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T2	15	LDF7-50A(1-5/8)	160.00 - 171.00	0.6000	0.6000
T2	16	Feedline Ladder (Af)	160.00 - 170.00	0.6000	0.6000
T2	18	FXL 1873 PE(1-5/8)	160.00 - 162.00	0.6000	0.6000
T3	1	Thin Flat Bar Climbing Ladder	140.00 - 160.00	0.6000	0.6000
T3	2	Safety Line 3/8	140.00 - 160.00	0.6000	0.6000
T3	4	LDF4-50A(1/2)	140.00 - 160.00	0.6000	0.6000
T3	5	HB114-1-0813U4-M5J(1-1/4)	140.00 - 160.00	0.6000	0.6000
T3	7	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T3	9	LDF4-50A(1/2)	140.00 - 160.00	0.6000	0.6000
T3	10	LDF7-50A(1-5/8)	140.00 - 160.00	0.6000	0.6000
T3	13	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T3	15	LDF7-50A(1-5/8)	140.00 - 160.00	0.6000	0.6000
T3	16	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T3	18	FXL 1873 PE(1-5/8)	140.00 - 160.00	0.6000	0.6000
T3	19	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T3	29	HCS 6X12 4AWG(1-5/8)	140.00 - 156.00	0.6000	0.6000
T3	30	Feedline Ladder (Af)	140.00 - 150.00	0.6000	0.6000
T4	1	Thin Flat Bar Climbing Ladder	120.00 - 140.00	0.6000	0.6000
T4	2	Safety Line 3/8	120.00 - 140.00	0.6000	0.6000
T4	4	LDF4-50A(1/2)	120.00 - 140.00	0.6000	0.6000
T4	5	HB114-1-0813U4-M5J(1-1/4)	120.00 - 140.00	0.6000	0.6000
T4	7	Feedline Ladder (Af)	120.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T4	9	LDF4-50A(1/2)	140.00 120.00 - 140.00	0.6000	0.6000
T4	10	LDF7-50A(1-5/8)	140.00 120.00 - 140.00	0.6000	0.6000
T4	13	Feedline Ladder (Af)	140.00 120.00 - 140.00	0.6000	0.6000
T4	15	LDF7-50A(1-5/8)	140.00 120.00 - 140.00	0.6000	0.6000
T4	16	Feedline Ladder (Af)	140.00 120.00 - 140.00	0.6000	0.6000
T4	18	FXL 1873 PE(1-5/8)	140.00 120.00 - 140.00	0.6000	0.6000
T4	19	Feedline Ladder (Af)	140.00 120.00 - 140.00	0.6000	0.6000
T4	21	FLC 78-50J(7/8)	140.00 120.00 - 140.00	0.6000	0.6000
T4	22	FB-L98B-002-75000(3/8)	140.00 120.00 - 140.00	0.6000	0.6000
T4	23	FB-L98B-034-XXX(3/8)	140.00 120.00 - 140.00	0.6000	0.6000
T4	25	WR-VG86ST-BRD(3/4)	140.00 120.00 - 140.00	0.6000	0.6000
T4	26	2" Flex Conduit	140.00 120.00 - 140.00	0.6000	0.6000
T4	27	Feedline Ladder (Af)	140.00 120.00 - 140.00	0.6000	0.6000
T4	29	HCS 6X12 4AWG(1-5/8)	140.00 120.00 - 140.00	0.6000	0.6000
T4	30	Feedline Ladder (Af)	140.00 120.00 - 140.00	0.6000	0.6000
T4	32	CU12PSM9P6XXX(1-1/2)	140.00 120.00 - 130.00	0.6000	0.6000
T5	1	Thin Flat Bar Climbing Ladder	100.00 - 120.00	0.6000	0.6000
T5	2	Safety Line 3/8	100.00 - 120.00	0.6000	0.6000
T5	4	LDF4-50A(1/2)	100.00 - 120.00	0.6000	0.6000
T5	5	HB114-1-0813U4-M5J(1-1/4)	100.00 - 120.00	0.6000	0.6000
T5	7	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T5	9	LDF4-50A(1/2)	100.00 - 120.00	0.6000	0.6000
T5	10	LDF7-50A(1-5/8)	100.00 - 120.00	0.6000	0.6000
T5	13	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T5	15	LDF7-50A(1-5/8)	100.00 - 120.00	0.6000	0.6000
T5	16	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T5	18	FXL 1873 PE(1-5/8)	100.00 - 120.00	0.6000	0.6000
T5	19	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T5	21	FLC 78-50J(7/8)	100.00 - 120.00	0.6000	0.6000
T5	22	FB-L98B-002-75000(3/8)	100.00 - 120.00	0.6000	0.6000
T5	23	FB-L98B-034-XXX(3/8)	100.00 - 120.00	0.6000	0.6000
T5	25	WR-VG86ST-BRD(3/4)	100.00 - 120.00	0.6000	0.6000
T5	26	2" Flex Conduit	100.00 - 120.00	0.6000	0.6000
T5	27	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T5	29	HCS 6X12 4AWG(1-5/8)	100.00 - 120.00	0.6000	0.6000
T5	30	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T5	32	CU12PSM9P6XXX(1-1/2)	100.00 - 120.00	0.6000	0.6000
T6	1	Thin Flat Bar Climbing Ladder	80.00 - 100.00	0.6000	0.6000
T6	2	Safety Line 3/8	80.00 - 100.00	0.6000	0.6000
T6	4	LDF4-50A(1/2)	80.00 - 100.00	0.6000	0.6000
T6	5	HB114-1-0813U4-M5J(1-1/4)	80.00 - 100.00	0.6000	0.6000
T6	7	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T6	9	LDF4-50A(1/2)	98.00 - 100.00	0.6000	0.6000
T6	10	LDF7-50A(1-5/8)	80.00 - 100.00	0.6000	0.6000
T6	12	LDF4-50A(1/2)	80.00 - 98.00	0.6000	0.6000
T6	13	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T6	15	LDF7-50A(1-5/8)	80.00 - 100.00	0.6000	0.6000
T6	16	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T6	18	FXL 1873 PE(1-5/8)	80.00 - 100.00	0.6000	0.6000
T6	19	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T6	21	FLC 78-50J(7/8)	80.00 - 100.00	0.6000	0.6000
T6	22	FB-L98B-002-75000(3/8)	80.00 - 100.00	0.6000	0.6000
T6	23	FB-L98B-034-XXX(3/8)	80.00 - 100.00	0.6000	0.6000
T6	25	WR-VG86ST-BRD(3/4)	80.00 - 100.00	0.6000	0.6000
T6	26	2" Flex Conduit	80.00 - 100.00	0.6000	0.6000
T6	27	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T6	29	HCS 6X12 4AWG(1-5/8)	80.00 - 100.00	0.6000	0.6000
T6	30	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T6	32	CU12PSM9P6XXX(1-1/2)	80.00 - 100.00	0.6000	0.6000
T7	1	Thin Flat Bar Climbing Ladder	60.00 - 80.00	0.6000	0.6000
T7	2	Safety Line 3/8	60.00 - 80.00	0.6000	0.6000
T7	4	LDF4-50A(1/2)	60.00 - 80.00	0.6000	0.6000
T7	5	HB114-1-0813U4-M5J(1-1/4)	60.00 - 80.00	0.6000	0.6000
T7	7	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T7	10	LDF7-50A(1-5/8)	60.00 - 80.00	0.6000	0.6000
T7	12	LDF4-50A(1/2)	60.00 - 80.00	0.6000	0.6000
T7	13	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T7	15	LDF7-50A(1-5/8)	60.00 - 80.00	0.6000	0.6000
T7	16	Feedline Ladder (Af)	60.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T7	18	FXL 1873 PE(1-5/8)	80.00 60.00 - 80.00	0.6000	0.6000
T7	19	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T7	21	FLC 78-50J(7/8)	60.00 - 80.00	0.6000	0.6000
T7	22	FB-L98B-002-75000(3/8)	60.00 - 80.00	0.6000	0.6000
T7	23	FB-L98B-034-XXX(3/8)	60.00 - 80.00	0.6000	0.6000
T7	25	WR-VG86ST-BRD(3/4)	60.00 - 80.00	0.6000	0.6000
T7	26	2" Flex Conduit	60.00 - 80.00	0.6000	0.6000
T7	27	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T7	29	HCS 6X12 4AWG(1-5/8)	60.00 - 80.00	0.6000	0.6000
T7	30	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T7	32	CU12PSM9P6XXX(1-1/2)	60.00 - 80.00	0.6000	0.6000
T8	1	Thin Flat Bar Climbing Ladder	40.00 - 60.00	0.6000	0.6000
T8	2	Safety Line 3/8	40.00 - 60.00	0.6000	0.6000
T8	4	LDF4-50A(1/2)	40.00 - 60.00	0.6000	0.6000
T8	5	HB114-1-0813U4-M5J(1-1/4)	40.00 - 60.00	0.6000	0.6000
T8	7	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T8	10	LDF7-50A(1-5/8)	40.00 - 60.00	0.6000	0.6000
T8	12	LDF4-50A(1/2)	40.00 - 60.00	0.6000	0.6000
T8	13	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T8	15	LDF7-50A(1-5/8)	40.00 - 60.00	0.6000	0.6000
T8	16	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T8	18	FXL 1873 PE(1-5/8)	40.00 - 60.00	0.6000	0.6000
T8	19	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T8	21	FLC 78-50J(7/8)	40.00 - 60.00	0.6000	0.6000
T8	22	FB-L98B-002-75000(3/8)	40.00 - 60.00	0.6000	0.6000
T8	23	FB-L98B-034-XXX(3/8)	40.00 - 60.00	0.6000	0.6000
T8	25	WR-VG86ST-BRD(3/4)	40.00 - 60.00	0.6000	0.6000
T8	26	2" Flex Conduit	40.00 - 60.00	0.6000	0.6000
T8	27	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T8	29	HCS 6X12 4AWG(1-5/8)	40.00 - 60.00	0.6000	0.6000
T8	30	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T8	32	CU12PSM9P6XXX(1-1/2)	40.00 - 60.00	0.6000	0.6000
T9	1	Thin Flat Bar Climbing Ladder	20.00 - 40.00	0.6000	0.6000
T9	2	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T9	4	LDF4-50A(1/2)	20.00 - 40.00	0.6000	0.6000
T9	5	HB114-1-0813U4-M5J(1-1/4)	20.00 - 40.00	0.6000	0.6000
T9	7	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T9	10	LDF7-50A(1-5/8)	20.00 - 40.00	0.6000	0.6000
T9	12	LDF4-50A(1/2)	20.00 - 40.00	0.6000	0.6000
T9	13	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T9	15	LDF7-50A(1-5/8)	20.00 - 40.00	0.6000	0.6000
T9	16	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T9	18	FXL 1873 PE(1-5/8)	20.00 - 40.00	0.6000	0.6000
T9	19	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T9	21	FLC 78-50J(7/8)	20.00 - 40.00	0.6000	0.6000
T9	22	FB-L98B-002-75000(3/8)	20.00 - 40.00	0.6000	0.6000
T9	23	FB-L98B-034-XXX(3/8)	20.00 - 40.00	0.6000	0.6000
T9	25	WR-VG86ST-BRD(3/4)	20.00 - 40.00	0.6000	0.6000
T9	26	2" Flex Conduit	20.00 - 40.00	0.6000	0.6000
T9	27	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T9	29	HCS 6X12 4AWG(1-5/8)	20.00 - 40.00	0.6000	0.6000
T9	30	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T9	32	CU12PSM9P6XXX(1-1/2)	20.00 - 40.00	0.6000	0.6000
T10	1	Thin Flat Bar Climbing Ladder	0.00 - 20.00	0.6000	0.6000
T10	2	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000
T10	4	LDF4-50A(1/2)	0.00 - 20.00	0.6000	0.6000
T10	5	HB114-1-0813U4-M5J(1-1/4)	0.00 - 20.00	0.6000	0.6000
T10	7	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T10	10	LDF7-50A(1-5/8)	0.00 - 20.00	0.6000	0.6000
T10	12	LDF4-50A(1/2)	0.00 - 20.00	0.6000	0.6000
T10	13	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T10	15	LDF7-50A(1-5/8)	0.00 - 20.00	0.6000	0.6000
T10	16	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T10	18	FXL 1873 PE(1-5/8)	0.00 - 20.00	0.6000	0.6000
T10	19	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T10	21	FLC 78-50J(7/8)	0.00 - 20.00	0.6000	0.6000
T10	22	FB-L98B-002-75000(3/8)	0.00 - 20.00	0.6000	0.6000
T10	23	FB-L98B-034-XXX(3/8)	0.00 - 20.00	0.6000	0.6000
T10	25	WR-VG86ST-BRD(3/4)	0.00 - 20.00	0.6000	0.6000
T10	26	2" Flex Conduit	0.00 - 20.00	0.6000	0.6000
T10	27	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T10	29	HCS 6X12 4AWG(1-5/8)	0.00 - 20.00	0.6000	0.6000
T10	30	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T10	32	CU12PSM9P6XXX(1-1/2)	0.00 - 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
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	190.000
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	190.000
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	190.000
NNVV-65B-R4 w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	190.000
NNVV-65B-R4 w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	190.000
NNVV-65B-R4 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	190.000
FZHN	A	From Leg	4.000 0.000 2.000	0.000	190.000
FZHN	B	From Leg	4.000 0.000 2.000	0.000	190.000
FZHN	C	From Leg	4.000 0.000 2.000	0.000	190.000
PCS 1900MHz 4x45W-65MHz	A	From Leg	4.000 0.000 2.000	0.000	190.000
PCS 1900MHz 4x45W-65MHz	B	From Leg	4.000 0.000 2.000	0.000	190.000
PCS 1900MHz 4x45W-65MHz	C	From Leg	4.000 0.000 2.000	0.000	190.000
(2) RRH2X50-800	A	From Leg	4.000 0.000 2.000	0.000	190.000
(2) RRH2X50-800	B	From Leg	4.000 0.000 2.000	0.000	190.000
(2) RRH2X50-800	C	From Leg	4.000 0.000 2.000	0.000	190.000
Sector Mount [SM 506-3] ***	C	None		0.000	190.000
(2) LPA-80080/4CF	A	From Leg	4.000 0.000 1.000	0.000	180.000
(2) LPA-80080/4CF	B	From Leg	4.000 0.000 1.000	0.000	180.000
(2) LPA-80080/4CF	C	From Leg	4.000 0.000 4.000	0.000	180.000
(2) JAHH-65B-R3B	A	From Leg	4.000 0.000 1.000	0.000	180.000
(2) JAHH-65B-R3B	B	From Leg	4.000 0.000 1.000	0.000	180.000
(2) JAHH-65B-R3B	C	From Leg	4.000 0.000	0.000	180.000

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
CBRS w/ Mount Pipe	A	From Leg	1.000 4.000 0.000	0.000	180.000
CBRS w/ Mount Pipe	B	From Leg	1.000 4.000 0.000	0.000	180.000
CBRS w/ Mount Pipe	C	From Leg	1.000 4.000 0.000	0.000	180.000
58532A	C	From Leg	1.000 4.000 0.000	0.000	180.000
20W CBRS	A	From Leg	4.000 4.000 0.000	0.000	180.000
20W CBRS	B	From Leg	1.000 4.000 0.000	0.000	180.000
20W CBRS	C	From Leg	1.000 4.000 0.000	0.000	180.000
FDJ85020Q7-S1	A	From Leg	1.000 4.000 0.000	0.000	180.000
FDJ85020Q7-S1	B	From Leg	1.000 4.000 0.000	0.000	180.000
FDJ85020Q7-S1	C	From Leg	1.000 4.000 0.000	0.000	180.000
RFV01U-D1A	A	From Leg	1.000 4.000 0.000	0.000	180.000
RFV01U-D1A	B	From Leg	1.000 4.000 0.000	0.000	180.000
RFV01U-D1A	C	From Leg	1.000 4.000 0.000	0.000	180.000
RFV01U-D2A	A	From Leg	1.000 4.000 0.000	0.000	180.000
RFV01U-D2A	B	From Leg	1.000 4.000 0.000	0.000	180.000
RFV01U-D2A	C	From Leg	1.000 4.000 0.000	0.000	180.000
(2) RC3DC-3315-PF-48	A	From Leg	1.000 4.000 0.000	0.000	180.000
Sector Mount [SM 304-3]	C	None	1.000	0.000	180.000
***					
(3) 7130.16.33.00 w/ Mount Pipe	A	From Leg	4.000 0.000	0.000	171.000
(3) 7130.16.33.00 w/ Mount Pipe	B	From Leg	1.000 4.000 0.000	0.000	171.000
(3) 7130.16.33.00 w/ Mount Pipe	C	From Leg	1.000 4.000 0.000	0.000	171.000
Sector Mount [SM 502-3]	C	None	1.000	0.000	171.000
***					

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
HBX-6516DS-VTM w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	162.000
HBX-6516DS-VTM w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	162.000
HBX-6516DS-VTM w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	162.000
6' x 2" Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	162.000
6' x 2" Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	162.000
6' x 2" Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	162.000
Sector Mount [SM 104-3] ***	C	None		0.000	162.000
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	156.000
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	156.000
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	156.000
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	156.000
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	156.000
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	156.000
RADIO 4415 B66A	A	From Leg	4.000 0.000 0.000	0.000	156.000
RADIO 4415 B66A	B	From Leg	4.000 0.000 0.000	0.000	156.000
RADIO 4415 B66A	C	From Leg	4.000 0.000 0.000	0.000	156.000
RRUS 4415 B25	A	From Leg	4.000 0.000 3.000	0.000	156.000
RRUS 4415 B25	B	From Leg	4.000 0.000 3.000	0.000	156.000
RRUS 4415 B25	C	From Leg	4.000 0.000 3.000	0.000	156.000
RADIO 4449 B12/B71	B	From Leg	4.000 0.000 3.000	0.000	156.000
RADIO 4449 B12/B71	C	From Leg	4.000 0.000 3.000	0.000	156.000
RADIO 4449 B12/B71	A	From Leg	4.000 0.000 3.000	0.000	156.000

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
8' x 2" Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	156.000
8' x 2" Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	156.000
8' x 2" Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	156.000
Sector Mount [SM 502-3] ***	C	None		0.000	156.000
7770.00 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	140.000
7770.00 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	140.000
7770.00 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	140.000
(2) NNHH-65B-R4 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	140.000
(2) TPA65R-BU4D w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	140.000
(2) TPA65R-BU4D w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	140.000
TT19-08BP111-001	A	From Leg	4.000 0.000 0.000	0.000	140.000
TT19-08BP111-001	B	From Leg	4.000 0.000 0.000	0.000	140.000
TT19-08BP111-001	C	From Leg	4.000 0.000 0.000	0.000	140.000
RRUS 4478 B14	A	From Leg	4.000 0.000 0.000	0.000	140.000
RRUS 4478 B14	B	From Leg	4.000 0.000 0.000	0.000	140.000
RRUS 4478 B14	C	From Leg	4.000 0.000 0.000	0.000	140.000
RRUS 4449 B5/B12	A	From Leg	4.000 0.000 0.000	0.000	140.000
RRUS 4449 B5/B12	B	From Leg	4.000 0.000 0.000	0.000	140.000
RRUS 4449 B5/B12	C	From Leg	4.000 0.000 0.000	0.000	140.000
RRUS 8843 B2/B66A	A	From Leg	4.000 0.000 0.000	0.000	140.000
RRUS 8843 B2/B66A	B	From Leg	4.000 0.000 0.000	0.000	140.000
RRUS 8843 B2/B66A	C	From Leg	4.000 0.000 0.000	0.000	140.000

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft
DC6-48-60-18-8F	A	From Leg	4.000 0.000 0.000	0.000	140.000
DC6-48-60-0-8C-EV	B	From Leg	4.000 0.000 0.000	0.000	140.000
Sector Mount [SM 504-3]	C	None		0.000	140.000
***					
58532A	A	From Leg	3.000 0.000 4.000	0.000	98.000
Side Arm Mount [SO 301-1]	A	From Leg	1.500 0.000 0.000	0.000	98.000
******					
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	130.000
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	130.000
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	130.000
TA08025-B604	A	From Leg	4.000 0.000 0.000	0.000	130.000
TA08025-B604	B	From Leg	4.000 0.000 0.000	0.000	130.000
TA08025-B604	C	From Leg	4.000 0.000 0.000	0.000	130.000
TA08025-B605	A	From Leg	4.000 0.000 0.000	0.000	130.000
TA08025-B605	B	From Leg	4.000 0.000 0.000	0.000	130.000
TA08025-B605	C	From Leg	4.000 0.000 0.000	0.000	130.000
RDIDC-9181-PF-48	B	From Leg	4.000 0.000 0.000	0.000	130.000
(2) 8' x 2" Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	130.000
(2) 8' x 2" Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	130.000
(2) 8' x 2" Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	130.000
Commscope MTC3975083 (3)	C	None		0.000	130.000
***					

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	192 - 180	Leg	Max Tension	23	3.985	-0.060	-0.044
			Max. Compression	18	-6.556	0.025	-0.037
			Max. Mx	20	-1.229	-0.723	0.002
			Max. My	2	-0.886	-0.023	-0.723
			Max. Vy	20	-0.536	0.349	-0.030
			Max. Vx	2	-0.542	-0.006	0.368
		Diagonal	Max Tension	21	1.389	0.000	0.000
			Max. Compression	20	-1.441	0.000	0.000
			Max. Mx	36	0.149	0.026	0.000
			Max. My	16	1.370	0.005	-0.002
			Max. Vy	36	-0.029	0.026	0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	16	-0.000	0.004	-0.002
		Top Girt	Max Tension	14	0.091	0.000	0.000
			Max. Compression	3	-0.080	0.000	0.000
			Max. Mx	26	0.000	-0.074	0.000
			Max. Vy	26	0.045	0.000	0.000
T2	180 - 160	Leg	Max Tension	23	25.922	-0.016	-0.017
			Max. Compression	2	-34.204	0.589	0.010
			Max. Mx	14	23.471	-0.647	-0.010
			Max. My	20	-5.032	-0.032	-0.644
			Max. Vy	14	-1.156	-0.010	-0.007
			Max. Vx	8	1.187	0.013	-0.033
		Diagonal	Max Tension	16	3.970	0.000	0.000
			Max. Compression	16	-3.977	0.000	0.000
			Max. Mx	27	1.166	0.048	-0.005
			Max. My	28	-1.373	0.024	0.006
			Max. Vy	27	-0.040	0.048	-0.005
			Max. Vx	28	-0.002	0.000	0.000
		Top Girt	Max Tension	3	0.691	0.000	0.000
			Max. Compression	14	-0.719	0.000	0.000
			Max. Mx	26	-0.053	-0.081	0.000
			Max. My	26	-0.050	0.000	0.002
			Max. Vy	26	0.049	0.000	0.000
			Max. Vx	26	-0.001	0.000	0.000
T3	160 - 140	Leg	Max Tension	23	55.045	0.013	-0.035
			Max. Compression	10	-67.809	0.176	0.031
			Max. Mx	14	31.265	0.907	-0.010
			Max. My	8	-5.026	-0.032	-0.934
			Max. Vy	14	0.583	-0.603	-0.005
			Max. Vx	20	0.607	-0.048	-0.584
		Diagonal	Max Tension	16	5.929	0.000	0.000
			Max. Compression	18	-5.885	0.000	0.000
			Max. Mx	27	1.303	0.093	-0.011
			Max. My	36	1.258	0.076	-0.012
			Max. Vy	27	-0.061	0.093	-0.011
			Max. Vx	36	0.004	0.000	0.000
T4	140 - 120	Leg	Max Tension	23	88.420	-0.561	-0.022
			Max. Compression	10	-108.692	0.244	0.026
			Max. Mx	22	74.016	0.591	-0.023
			Max. My	20	-9.575	-0.022	-0.622
			Max. Vy	14	-0.967	-0.166	-0.001
			Max. Vx	20	-0.924	-0.002	-0.093
		Diagonal	Max Tension	12	7.677	0.000	0.000
			Max. Compression	12	-7.768	0.000	0.000
			Max. Mx	27	1.790	0.111	-0.014
			Max. My	30	-1.813	0.092	0.015
			Max. Vy	37	0.072	0.105	0.013
			Max. Vx	30	-0.004	0.000	0.000
T5	120 - 100	Leg	Max Tension	23	123.440	-0.326	-0.010
			Max. Compression	10	-148.307	0.779	0.052
			Max. Mx	10	-148.307	0.779	0.052
			Max. My	20	-12.903	0.006	-0.683
			Max. Vy	11	-0.125	0.777	0.052
			Max. Vx	20	0.152	0.006	-0.683
		Diagonal	Max Tension	12	8.219	0.000	0.000
			Max. Compression	12	-8.182	0.000	0.000
			Max. Mx	27	2.275	0.156	-0.019
			Max. My	30	-1.440	0.142	0.021
			Max. Vy	37	0.095	0.152	-0.020
			Max. Vx	30	-0.005	0.000	0.000
T6	100 - 80	Leg	Max Tension	23	153.372	-0.632	-0.046
			Max. Compression	10	-182.558	0.941	0.050
			Max. Mx	10	-182.558	0.941	0.050
			Max. My	20	-14.357	-0.065	-1.119
			Max. Vy	10	-0.134	0.941	0.050
			Max. Vx	20	-0.197	-0.065	-1.119
		Diagonal	Max Tension	12	9.524	0.000	0.000
			Max. Compression	12	-9.566	0.000	0.000
			Max. Mx	27	2.443	0.253	-0.033
			Max. My	36	2.770	0.248	-0.034

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	37	0.121	0.243	0.032
			Max. Vx	36	0.007	0.000	0.000
T7	80 - 60	Leg	Max Tension	23	185.383	-0.600	-0.035
			Max. Compression	10	-219.771	1.262	0.060
			Max. Mx	10	-219.771	1.262	0.060
			Max. My	20	-16.734	0.039	-1.111
			Max. Vy	10	-0.166	1.262	0.060
			Max. Vx	20	0.168	-0.068	-0.888
		Diagonal	Max Tension	12	10.355	0.000	0.000
			Max. Compression	12	-10.499	0.000	0.000
			Max. Mx	27	2.597	0.326	-0.040
			Max. My	36	2.491	0.313	-0.041
			Max. Vy	29	0.148	0.316	-0.038
			Max. Vx	36	0.008	0.000	0.000
T8	60 - 40	Leg	Max Tension	23	214.332	-1.361	-0.029
			Max. Compression	18	-254.910	1.172	-0.011
			Max. Mx	37	9.122	-2.012	-0.023
			Max. My	20	-17.914	-0.072	-1.332
			Max. Vy	33	0.304	-1.996	0.013
			Max. Vx	20	0.169	-0.072	-1.332
		Diagonal	Max Tension	12	10.101	0.000	0.000
			Max. Compression	12	-10.093	0.000	0.000
			Max. Mx	29	2.504	0.390	0.056
			Max. My	30	-1.330	0.367	0.058
			Max. Vy	29	0.172	0.390	0.056
			Max. Vx	30	-0.010	0.000	0.000
T9	40 - 20	Leg	Max Tension	23	243.302	-1.221	-0.024
			Max. Compression	18	-290.165	1.988	-0.027
			Max. Mx	37	11.015	-4.017	-0.015
			Max. My	20	-21.274	-0.124	-1.644
			Max. Vy	33	0.656	-3.993	0.012
			Max. Vx	20	-0.232	-0.124	-1.644
		Diagonal	Max Tension	12	11.659	0.000	0.000
			Max. Compression	12	-11.952	0.000	0.000
			Max. Mx	27	2.229	0.461	-0.050
			Max. My	30	3.873	0.412	0.055
			Max. Vy	29	0.179	0.414	-0.053
			Max. Vx	30	-0.009	0.000	0.000
T10	20 - 0	Leg	Max Tension	23	271.480	-1.281	-0.033
			Max. Compression	18	-325.361	0.000	0.000
			Max. Mx	35	-156.226	4.055	0.017
			Max. My	20	-23.231	-0.211	-2.983
			Max. Vy	33	-0.780	-3.993	0.012
			Max. Vx	20	-0.428	-0.211	-2.983
		Diagonal	Max Tension	12	12.082	0.000	0.000
			Max. Compression	10	-12.588	0.000	0.000
			Max. Mx	29	-0.280	0.589	0.059
			Max. My	30	5.329	0.418	0.069
			Max. Vy	29	0.198	0.589	0.059
			Max. Vx	30	-0.010	0.000	0.000

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	334.122	32.913	-19.496
	Max. H_x	18	334.122	32.913	-19.496
	Max. H_z	7	-277.935	-28.177	16.742
	Min. Vert	7	-277.935	-28.177	16.742
	Min. H_x	7	-277.935	-28.177	16.742
	Min. H_z	18	334.122	32.913	-19.496
Leg B	Max. Vert	10	333.522	-32.689	-19.644
	Max. H_x	23	-278.375	27.964	16.909
	Max. H_z	23	-278.375	27.964	16.909

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg A	Min. Vert	23	-278.375	27.964	16.909
	Min. H_x	10	333.522	-32.689	-19.644
	Min. H_z	10	333.522	-32.689	-19.644
	Max. Vert	2	327.635	0.391	37.436
	Max. H_x	21	18.850	5.595	1.565
	Max. H_z	2	327.635	0.391	37.436
	Min. Vert	15	-270.847	-0.402	-31.946
	Min. H_x	8	24.956	-5.606	2.071
	Min. H_z	15	-270.847	-0.402	-31.946

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	61.513	0.000	0.000	-7.718	6.204	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	73.816	-0.011	-59.699	-6573.896	9.089	17.214
0.9 Dead+1.0 Wind 0 deg - No Ice	55.362	-0.011	-59.699	-6571.581	7.228	17.214
1.2 Dead+1.0 Wind 30 deg - No Ice	73.816	28.708	-49.741	-5510.883	-3165.657	18.230
0.9 Dead+1.0 Wind 30 deg - No Ice	55.362	28.708	-49.741	-5508.567	-3167.519	18.230
1.2 Dead+1.0 Wind 60 deg - No Ice	73.816	50.107	-28.926	-3225.887	-5561.557	-18.192
0.9 Dead+1.0 Wind 60 deg - No Ice	55.362	50.107	-28.926	-3223.572	-5563.418	-18.192
1.2 Dead+1.0 Wind 90 deg - No Ice	73.816	59.459	0.011	-7.616	-6611.639	-54.029
0.9 Dead+1.0 Wind 90 deg - No Ice	55.362	59.459	0.011	-5.301	-6613.500	-54.029
1.2 Dead+1.0 Wind 120 deg - No Ice	73.816	52.716	30.445	3349.534	-5804.513	-28.868
0.9 Dead+1.0 Wind 120 deg - No Ice	55.362	52.716	30.445	3351.850	-5806.374	-28.868
1.2 Dead+1.0 Wind 150 deg - No Ice	73.816	28.916	50.079	5553.048	-3202.595	-11.407
0.9 Dead+1.0 Wind 150 deg - No Ice	55.362	28.916	50.079	5555.363	-3204.456	-11.407
1.2 Dead+1.0 Wind 180 deg - No Ice	73.816	0.011	56.462	6273.757	5.800	-17.214
0.9 Dead+1.0 Wind 180 deg - No Ice	55.362	0.011	56.462	6276.072	3.938	-17.214
1.2 Dead+1.0 Wind 210 deg - No Ice	73.816	-28.708	49.741	5492.360	3180.547	-18.230
0.9 Dead+1.0 Wind 210 deg - No Ice	55.362	-28.708	49.741	5494.675	3178.685	-18.230
1.2 Dead+1.0 Wind 240 deg - No Ice	73.816	-52.910	30.545	3348.173	5820.333	18.192
0.9 Dead+1.0 Wind 240 deg - No Ice	55.362	-52.910	30.545	3350.488	5818.472	18.192
1.2 Dead+1.0 Wind 270 deg - No Ice	73.816	-59.459	-0.011	-10.906	6626.528	54.029
0.9 Dead+1.0 Wind 270 deg - No Ice	55.362	-59.459	-0.011	-8.591	6624.667	54.029
1.2 Dead+1.0 Wind 300 deg - No Ice	73.816	-49.913	-28.827	-3227.249	5575.515	28.868
0.9 Dead+1.0 Wind 300 deg - No Ice	55.362	-49.913	-28.827	-3224.934	5573.654	28.868
1.2 Dead+1.0 Wind 330 deg - No Ice	73.816	-28.916	-50.079	-5571.571	3217.484	11.407
0.9 Dead+1.0 Wind 330 deg - No Ice	55.362	-28.916	-50.079	-5569.255	3215.623	11.407
1.2 Dead+1.0 Ice+1.0 Temp	218.451	0.000	0.000	-71.508	-28.929	0.000

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	218.451	-0.002	-16.832	-1953.500	-28.655	5.112
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	218.451	8.264	-14.314	-1680.859	-957.718	3.627
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	218.451	14.383	-8.302	-1009.564	-1653.595	-6.382
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	218.451	16.885	0.002	-71.235	-1938.115	-12.055
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	218.451	14.886	8.594	895.291	-1702.834	-6.945
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	218.451	8.352	14.462	1557.301	-969.268	-2.600
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	218.451	0.002	16.422	1776.094	-29.202	-5.112
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	218.451	-8.264	14.315	1537.842	899.861	-3.627
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	218.451	-14.738	8.507	883.741	1625.519	6.382
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	218.451	-16.885	-0.002	-71.782	1880.258	12.055
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	218.451	-14.531	-8.389	-1021.113	1615.196	6.945
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	218.451	-8.352	-14.462	-1700.317	911.411	2.600
Dead+Wind 0 deg - Service	61.513	-0.002	-13.686	-1496.792	6.573	3.872
Dead+Wind 30 deg - Service	61.513	6.587	-11.413	-1256.143	-713.844	4.095
Dead+Wind 60 deg - Service	61.513	11.496	-6.636	-737.525	-1257.331	-4.078
Dead+Wind 90 deg - Service	61.513	13.633	0.002	-7.349	-1495.079	-12.120
Dead+Wind 120 deg - Service	61.513	12.080	6.977	753.968	-1311.808	-6.483
Dead+Wind 150 deg - Service	61.513	6.634	11.489	1254.316	-722.126	-2.570
Dead+Wind 180 deg - Service	61.513	0.002	12.961	1418.210	5.835	-3.872
Dead+Wind 210 deg - Service	61.513	-6.587	11.413	1240.708	726.252	-4.095
Dead+Wind 240 deg - Service	61.513	-12.124	6.999	753.663	1324.425	4.078
Dead+Wind 270 deg - Service	61.513	-13.633	-0.002	-8.087	1507.487	12.120
Dead+Wind 300 deg - Service	61.513	-11.452	-6.614	-737.830	1269.529	6.483
Dead+Wind 330 deg - Service	61.513	-6.634	-11.489	-1269.751	734.534	2.570

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.000	-61.513	0.000	0.000	61.513	-0.000	0.000%
2	-0.011	-73.816	-59.699	0.011	73.816	59.699	0.000%
3	-0.011	-55.362	-59.699	0.011	55.362	59.699	0.000%
4	28.708	-73.816	-49.741	-28.708	73.816	49.741	0.000%
5	28.708	-55.362	-49.741	-28.708	55.362	49.741	0.000%
6	50.107	-73.816	-28.926	-50.107	73.816	28.926	0.000%
7	50.107	-55.362	-28.926	-50.107	55.362	28.926	0.000%
8	59.459	-73.816	0.011	-59.459	73.816	-0.011	0.000%
9	59.459	-55.362	0.011	-59.459	55.362	-0.011	0.000%
10	52.716	-73.816	30.445	-52.716	73.816	-30.445	0.000%
11	52.716	-55.362	30.445	-52.716	55.362	-30.445	0.000%
12	28.916	-73.816	50.079	-28.916	73.816	-50.079	0.000%
13	28.916	-55.362	50.079	-28.916	55.362	-50.079	0.000%
14	0.011	-73.816	56.462	-0.011	73.816	-56.462	0.000%
15	0.011	-55.362	56.462	-0.011	55.362	-56.462	0.000%
16	-28.708	-73.816	49.741	28.708	73.816	-49.741	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
17	-28.708	-55.362	49.741	28.708	55.362	-49.741	0.000%
18	-52.910	-73.816	30.545	52.910	73.816	-30.545	0.000%
19	-52.910	-55.362	30.545	52.910	55.362	-30.545	0.000%
20	-59.459	-73.816	-0.011	59.459	73.816	0.011	0.000%
21	-59.459	-55.362	-0.011	59.459	55.362	0.011	0.000%
22	-49.913	-73.816	-28.827	49.913	73.816	28.827	0.000%
23	-49.913	-55.362	-28.827	49.913	55.362	28.827	0.000%
24	-28.916	-73.816	-50.079	28.916	73.816	50.079	0.000%
25	-28.916	-55.362	-50.079	28.916	55.362	50.079	0.000%
26	0.000	-218.451	0.000	-0.000	218.451	-0.000	0.000%
27	-0.002	-218.451	-16.832	0.002	218.451	16.832	0.000%
28	8.264	-218.451	-14.315	-8.264	218.451	14.314	0.000%
29	14.383	-218.451	-8.302	-14.383	218.451	8.302	0.000%
30	16.885	-218.451	0.002	-16.885	218.451	-0.002	0.000%
31	14.886	-218.451	8.594	-14.886	218.451	-8.594	0.000%
32	8.352	-218.451	14.462	-8.352	218.451	-14.462	0.000%
33	0.002	-218.451	16.422	-0.002	218.451	-16.422	0.000%
34	-8.264	-218.451	14.315	8.264	218.451	-14.315	0.000%
35	-14.738	-218.451	8.507	14.738	218.451	-8.507	0.000%
36	-16.885	-218.451	-0.002	16.885	218.451	0.002	0.000%
37	-14.531	-218.451	-8.389	14.531	218.451	8.389	0.000%
38	-8.352	-218.451	-14.462	8.352	218.451	14.462	0.000%
39	-0.002	-61.513	-13.686	0.002	61.513	13.686	0.000%
40	6.587	-61.513	-11.413	-6.587	61.513	11.413	0.000%
41	11.496	-61.513	-6.636	-11.496	61.513	6.636	0.000%
42	13.633	-61.513	0.002	-13.633	61.513	-0.002	0.000%
43	12.080	-61.513	6.977	-12.080	61.513	-6.977	0.000%
44	6.634	-61.513	11.489	-6.634	61.513	-11.489	0.000%
45	0.002	-61.513	12.961	-0.002	61.513	-12.961	0.000%
46	-6.587	-61.513	11.413	6.587	61.513	-11.413	0.000%
47	-12.124	-61.513	6.999	12.124	61.513	-6.999	0.000%
48	-13.633	-61.513	-0.002	13.633	61.513	0.002	0.000%
49	-11.452	-61.513	-6.614	11.452	61.513	6.614	0.000%
50	-6.634	-61.513	-11.489	6.634	61.513	11.489	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	192 - 180	4.085	48	0.193	0.025
T2	180 - 160	3.598	48	0.190	0.025
T3	160 - 140	2.822	47	0.169	0.021
T4	140 - 120	2.150	47	0.143	0.018
T5	120 - 100	1.575	47	0.118	0.014
T6	100 - 80	1.096	47	0.097	0.011
T7	80 - 60	0.713	47	0.074	0.008
T8	60 - 40	0.418	47	0.055	0.006
T9	40 - 20	0.204	47	0.037	0.004
T10	20 - 0	0.061	47	0.019	0.002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
190.000	APXVTM14-ALU-I20 w/ Mount Pipe	48	4.003	0.193	0.025	618588
180.000	(2) LPA-80080/4CF	48	3.598	0.190	0.025	217578
171.000	(3) 7130.16.33.00 w/ Mount Pipe	47	3.240	0.183	0.024	68845
162.000	HBX-6516DS-VTM w/ Mount	47	2.896	0.171	0.022	40191

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
	Pipe					
156.000	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	47	2.679	0.164	0.021	38723
140.000	7770.00 w/ Mount Pipe	47	2.150	0.143	0.018	51489
130.000	MX08FRO665-21 w/ Mount Pipe	47	1.851	0.130	0.016	50269
98.000	58532A	47	1.053	0.095	0.010	49204

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	192 - 180	18.120	11	0.851	0.110
T2	180 - 160	15.970	11	0.841	0.110
T3	160 - 140	12.518	11	0.747	0.095
T4	140 - 120	9.524	11	0.634	0.080
T5	120 - 100	6.965	18	0.526	0.063
T6	100 - 80	4.842	18	0.429	0.047
T7	80 - 60	3.147	18	0.330	0.035
T8	60 - 40	1.841	18	0.244	0.025
T9	40 - 20	0.897	18	0.165	0.016
T10	20 - 0	0.269	18	0.084	0.007

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
190.000	APXVTM14-ALU-I20 w/ Mount Pipe	11	17.761	0.851	0.110	156116
180.000	(2) LPA-80080/4CF	11	15.970	0.841	0.110	53635
171.000	(3) 7130.16.33.00 w/ Mount Pipe	11	14.379	0.808	0.105	16068
162.000	HBX-6516DS-VTM w/ Mount Pipe	11	12.846	0.759	0.097	9274
156.000	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	11	11.879	0.724	0.092	8920
140.000	7770.00 w/ Mount Pipe	11	9.524	0.634	0.080	11697
130.000	MX08FRO665-21 w/ Mount Pipe	11	8.192	0.579	0.072	11375
98.000	58532A	18	4.653	0.420	0.046	11087

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	192	Leg	A325N	0.625	4	0.996	20.340	0.049	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	1.389	7.116	0.195	1.05	Member Block Shear
		Top Girt	A325N	0.625	1	0.091	7.116	0.013	1.05	Member Block Shear
T2	180	Leg	A325N	0.625	4	6.481	20.340	0.319	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	3.970	8.135	0.488	1.05	Member Block Shear
		Top Girt	A325N	0.625	1	0.691	8.135	0.085	1.05	Member Block Shear

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T3	160	Leg	A325N	0.875	4	13.761	41.556	0.331	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	5.929	11.310	0.524	1.05	Member Bearing
T4	140	Leg	A325N	1.000	4	22.105	54.517	0.405	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	7.677	11.310	0.679	1.05	Member Bearing
T5	120	Leg	A325N	1.000	6	20.573	54.517	0.377	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	8.219	13.485	0.610	1.05	Gusset Bearing
T6	100	Leg	A325N	1.000	6	25.562	54.517	0.469	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	9.524	13.485	0.706	1.05	Gusset Bearing
T7	80	Leg	A325N	1.000	8	23.173	54.517	0.425	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	10.355	13.485	0.768	1.05	Gusset Bearing
T8	60	Leg	A325N	1.000	8	26.791	54.517	0.491	1.05	Bolt Tension
		Diagonal	A325X	0.750	1	10.101	13.485	0.749	1.05	Gusset Bearing
T9	40	Leg	A325N	1.000	8	30.413	54.517	0.558	1.05	Bolt Tension
		Diagonal	A325X	0.750	1	11.659	13.485	0.865	1.05	Gusset Bearing
T10	20	Leg	A354-BC	1.000	10	27.148	56.788	0.478	1.05	Bolt Tension
		Diagonal	A325X	0.750	1	12.082	13.485	0.896	1.05	Gusset Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	192 - 180	ROHN 2.5 STD	12.000	4.000	50.7 K=1.00	1.704	-6.556	63.560	0.103 [1]
T2	180 - 160	ROHN 2.5 STD	20.032	5.008	63.4 K=1.00	1.704	-34.204	57.139	0.599 [1]
T3	160 - 140	ROHN 3 EH	20.036	6.679	70.5 K=1.00	3.016	-67.809	94.337	0.719 [1]
T4	140 - 120	ROHN 4 EH	20.038	6.679	54.3 K=1.00	4.407	-108.692	159.899	0.680 [1]
T5	120 - 100	ROHN 5 EH	20.036	6.679	43.6 K=1.00	6.112	-148.307	239.378	0.620 [1]
T6	100 - 80	ROHN 6 EHS	20.036	10.018	54.0 K=1.00	6.713	-182.558	244.047	0.748 [1]
T7	80 - 60	ROHN 6 EH	20.032	10.016	54.8 K=1.00	8.405	-219.771	303.757	0.724 [1]
T8	60 - 40	ROHN 8 EHS	20.042	10.021	41.2 K=1.00	9.719	-254.910	386.354	0.660 [1]
T9	40 - 20	ROHN 8 EHS	20.031	10.015	41.2 K=1.00	9.719	-290.165	386.409	0.751 [1]
T10	20 - 0	ROHN 8 EHS	20.033	10.017	41.2 K=1.00	9.719	-325.361	386.397	0.842 [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 K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	192 - 180	L1 3/4x1 3/4x3/16	7.700	3.585	125.3 K=1.00	0.621	-1.441	11.328	0.127 [1]
T2	180 - 160	L2x2x3/16	9.686	4.721	143.8	0.715	-3.906	9.897	0.395 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T3	160 - 140	L2 1/2x2 1/2x1/4	12.241	6.028	K=1.00 147.3	1.190	-5.885	15.695	0.375 [1]
T4	140 - 120	L2 1/2x2 1/2x1/4	14.067	6.897	K=1.00 168.6	1.190	-7.768	11.987	0.648 [1]
T5	120 - 100	L3x3x1/4	15.944	7.773	K=1.00 157.6	1.440	-8.182	16.602	0.493 [1]
T6	100 - 80	L3 1/2x3 1/2x1/4	19.209	9.452	K=1.00 163.4	1.690	-9.566	18.110	0.528 [1]
T7	80 - 60	L4x4x1/4	20.935	10.297	K=1.00 155.4	1.940	-10.499	22.986	0.457 [1]
T8	60 - 40	L4x4x5/16	22.872	11.214	K=1.00 170.1	2.400	-10.093	23.735	0.425 [1]
T9	40 - 20	L4x4x5/16	24.688	12.078	K=1.00 183.2	2.400	-11.952	20.461	0.584 [1]
T10	20 - 0	L4x4x3/8	26.510	13.002	K=1.00 198.0 K=1.00	2.860	-12.588	20.882	0.603 [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 K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	192 - 180	L1 3/4x1 3/4x3/16	6.580	6.090	212.8 K=1.00	0.621	-0.080	3.926	0.020 [1]
T2	180 - 160	KL/R > 200 (C) - 4 L2x2x3/16	6.580	6.090	185.5 K=1.00	0.715	-0.719	5.948	0.121 [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 K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	192 - 180	ROHN 2.5 STD	12.000	4.000	50.7	1.704	3.985	76.682	0.052 [1]
T2	180 - 160	ROHN 2.5 STD	20.032	5.008	63.4	1.704	25.922	76.682	0.338 [1]
T3	160 - 140	ROHN 3 EH	20.036	6.679	70.5	3.016	55.045	135.717	0.406 [1]
T4	140 - 120	ROHN 4 EH	20.038	6.679	54.3	4.407	88.420	198.335	0.446 [1]
T5	120 - 100	ROHN 5 EH	20.036	6.679	43.6	6.112	123.440	275.039	0.449 [1]
T6	100 - 80	ROHN 6 EHS	20.036	10.018	54.0	6.713	153.372	302.097	0.508 [1]
T7	80 - 60	ROHN 6 EH	20.032	10.016	54.8	8.405	185.383	378.222	0.490 [1]
T8	60 - 40	ROHN 8 EHS	20.042	10.021	41.2	9.719	214.332	437.369	0.490 [1]
T9	40 - 20	ROHN 8 EHS	20.031	10.015	41.2	9.719	243.302	437.369	0.556 [1]
T10	20 - 0	ROHN 8 EHS	20.033	10.017	41.2	9.719	271.480	437.369	0.621 [1]

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	192 - 180	L1 3/4x1 3/4x3/16	7.700	3.585	82.9	0.360	1.389	15.675	0.089 [1]
T2	180 - 160	L2x2x3/16	9.686	4.721	94.3	0.431	3.970	18.739	0.212 [1]
T3	160 - 140	L2 1/2x2 1/2x1/4	11.669	5.746	91.6	0.752	5.929	32.707	0.181 [1]
T4	140 - 120	L2 1/2x2 1/2x1/4	14.067	6.897	109.6	0.752	7.677	32.707	0.235 [1]
T5	120 - 100	L3x3x1/4	15.944	7.773	102.0	0.916	8.219	44.652	0.184 [1]
T6	100 - 80	L3 1/2x3 1/2x1/4	19.209	9.452	105.5	1.103	9.524	53.793	0.177 [1]
T7	80 - 60	L4x4x1/4	20.935	10.297	100.1	1.291	10.355	62.933	0.165 [1]
T8	60 - 40	L4x4x5/16	22.872	11.214	109.8	1.595	10.101	77.752	0.130 [1]
T9	40 - 20	L4x4x5/16	24.688	12.078	118.2	1.595	11.659	77.752	0.150 [1]
T10	20 - 0	L4x4x3/8	26.510	13.002	128.2	1.899	12.082	92.572	0.131 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	192 - 180	L1 3/4x1 3/4x3/16	6.580	6.090	141.7	0.360	0.091	15.675	0.006 [1]
T2	180 - 160	L2x2x3/16	6.580	6.090	123.3	0.431	0.691	18.739	0.037 [1]

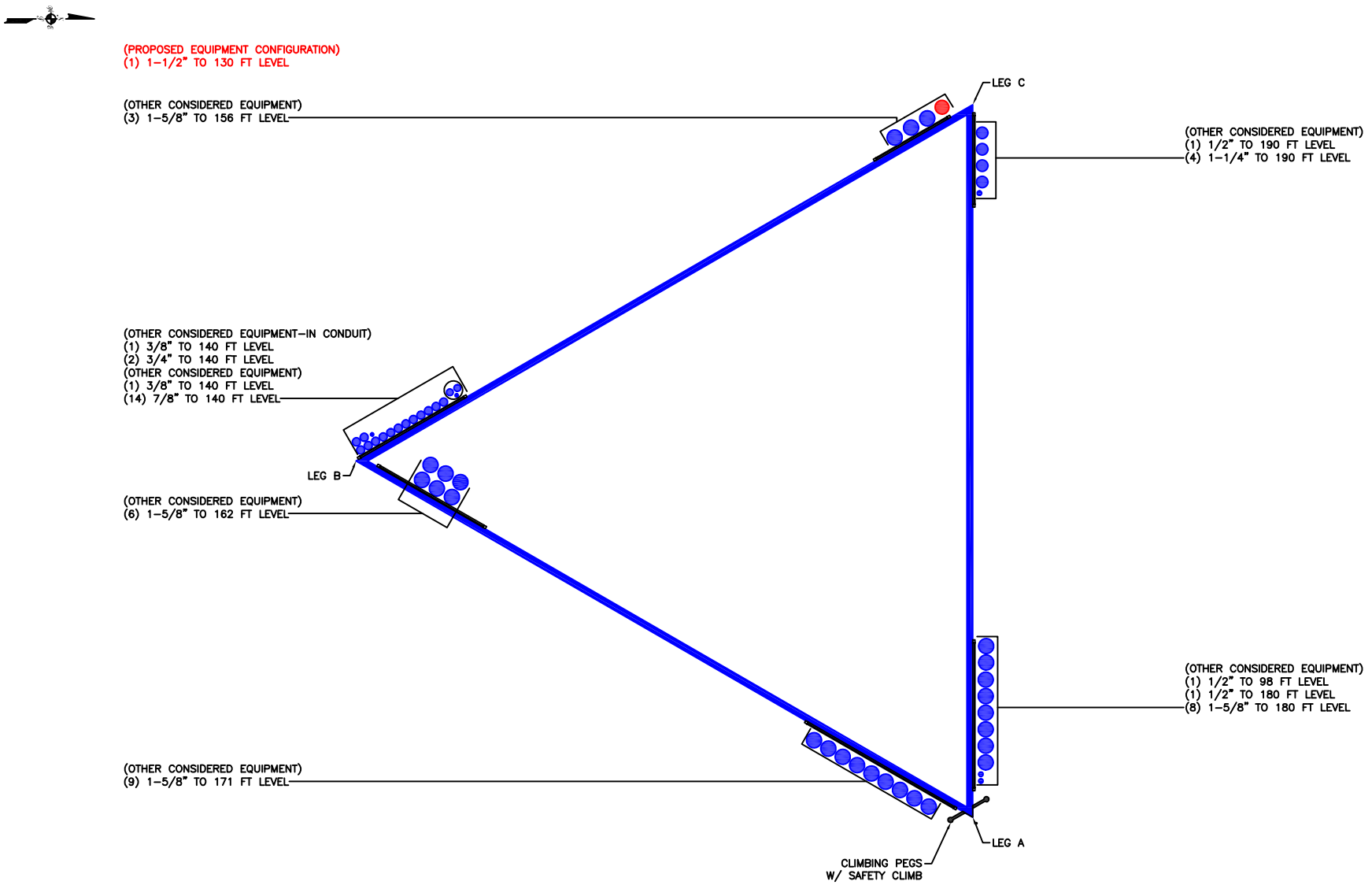
[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	192 - 180	Leg	ROHN 2.5 STD	1	-6.556	66.738	9.8	Pass
T2	180 - 160	Leg	ROHN 2.5 STD	27	-34.204	59.996	57.0	Pass
T3	160 - 140	Leg	ROHN 3 EH	56	-67.809	99.054	68.5	Pass
T4	140 - 120	Leg	ROHN 4 EH	77	-108.692	167.894	64.7	Pass
T5	120 - 100	Leg	ROHN 5 EH	98	-148.307	251.347	59.0	Pass
T6	100 - 80	Leg	ROHN 6 EHS	119	-182.558	256.249	71.2	Pass
T7	80 - 60	Leg	ROHN 6 EH	134	-219.771	318.945	68.9	Pass
T8	60 - 40	Leg	ROHN 8 EHS	148	-254.910	405.672	62.8	Pass
T9	40 - 20	Leg	ROHN 8 EHS	163	-290.165	405.729	71.5	Pass
T10	20 - 0	Leg	ROHN 8 EHS	178	-325.361	405.717	80.2	Pass
T1	192 - 180	Diagonal	L1 3/4x1 3/4x3/16	7	-1.441	11.895	12.1	Pass
T2	180 - 160	Diagonal	L2x2x3/16	36	-3.906	10.392	37.6	Pass
T3	160 - 140	Diagonal	L2 1/2x2 1/2x1/4	63	-5.885	16.480	35.7	Pass
T4	140 - 120	Diagonal	L2 1/2x2 1/2x1/4	81	-7.768	12.587	61.7	Pass
T5	120 - 100	Diagonal	L3x3x1/4	102	-8.182	17.432	46.9	Pass
T6	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	123	-9.566	19.016	50.3	Pass
T7	80 - 60	Diagonal	L4x4x1/4	138	-10.499	24.136	43.5	Pass
T8	60 - 40	Diagonal	L4x4x5/16	153	-10.093	24.922	40.5	Pass
T9	40 - 20	Diagonal	L4x4x5/16	168	-11.952	21.484	55.6	Pass
T10	20 - 0	Diagonal	L4x4x3/8	183	-12.588	21.926	57.4	Pass
T1	192 - 180	Top Girt	L1 3/4x1 3/4x3/16	4	-0.080	4.122	1.9	Pass
T2	180 - 160	Top Girt	L2x2x3/16	28	-0.719	6.245	11.5	Pass
						Summary		
						Leg (T10)	80.2	Pass
						Diagonal (T4)	61.7	Pass
						Top Girt (T2)	11.5	Pass
						Bolt Checks	85.3	Pass
						RATING =	**85.3**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


(PROPOSED EQUIPMENT CONFIGURATION)
(1) 1-1/2" TO 130 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(3) 1-5/8" TO 156 FT LEVEL
LEG C
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 190 FT LEVEL
(4) 1-1/4" TO 190 FT LEVEL
(OTHER CONSIDERED EQUIPMENT-IN CONDUIT)
(1) 3/8" TO 140 FT LEVEL
(2) 3/4" TO 140 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 3/8" TO 140 FT LEVEL
(14) 7/8" TO 140 FT LEVEL
LEG B
(OTHER CONSIDERED EQUIPMENT)
(6) 1-5/8" TO 162 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 98 FT LEVEL
(1) 1/2" TO 180 FT LEVEL
(8) 1-5/8" TO 180 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(9) 1-5/8" TO 171 FT LEVEL
LEG A
CLIMBING PEGS
W/ SAFETY CLIMB

APPENDIX C

ADDITIONAL CALCULATIONS

Self Support Anchor Rod Capacity

Site Info	
BU #	876345
Site Name	SKY HILL
Order #	572903, Rev. 0

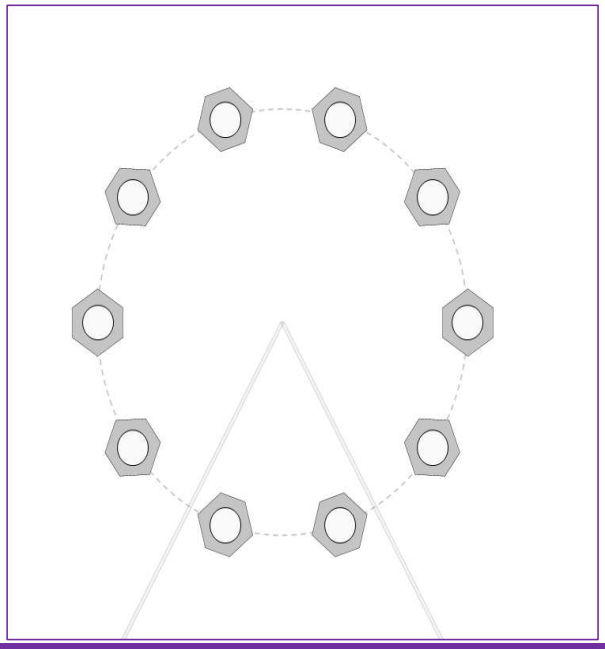
Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	Yes
l_{ar} (in)	1.5

Applied Loads		
	Comp.	Uplift
Axial Force (kips)	334.12	278.38
Shear Force (kips)	38.25	32.68

**TIA-222-H Section 15.5 Applied*

Considered Eccentricity	
Leg Mod Eccentricity (in)	0.000
Anchor Rod N.A Shift (in)	0.000
Total Eccentricity (in)	0.000

**Anchor Rod Eccentricity Applied*



Connection Properties

Anchor Rod Data

(10) 1" ø bolts (A354-BC N; Fy=109 ksi, Fu=125 ksi)

l_{ar} (in): 1.5

Analysis Results

Anchor Rod Summary		*(units of kips, kip-in)*
Pu_t = 27.84	ϕPn_t = 56.81	**Stress Rating**
Vu = 3.27	ϕVn = 36.82	**46.7%**
Mu = n/a	ϕMn = n/a	**Pass**

Drilled Pier Foundation

BU # :	876345
Site Name:	SKY HILL
Order Number:	572903, Rev. 0
TIA-222 Revison:	H
Tower Type:	Self Support

Check Limitation	
Apply TIA-222-H Section 15.5:	☑
N/A	☐
Additional Longitudinal Rebar	
Input Effective Depths (else Actual):	☐
Shear Design Options	
Check Shear along Depth of Pier:	☑
Utilize Shear-Friction Methodology:	☐
Override Critical Depth:	☐

Go to Soil Calculations

Applied Loads	Comp.	Uplift
Moment (kip-ft)	0	0
Axial Force (kips)	334.12	278.38
Shear Force (kips)	38.25	32.68

Material Properties		
Concrete Strength, f'c:	3	ksi
Rebar Strength, Fy:	60	ksi
Tie Yield Strength, Fyt:	40	ksi

Pier Design Data		
Depth	26	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
From 0.5' above grade to 26' below grade		
Pier Diameter	5	ft
Rebar Quantity	18	
Rebar Size	9	
Rebar Cage Diameter	54	in
Tie Size	5	
Tie Spacing		in

Rebar & Pier Options

Embedded Pole Inputs

Belled Pier Inputs

Analysis Results		
Soil Lateral Check	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	11.53	11.53
Soil Safety Factor	36.76	43.03
Max Moment (kip-ft)	304.91	260.51
Rating*	*3.4%*	*2.9%*
Soil Vertical Check	*Compression*	*Uplift*
Skin Friction (kips)	519.54	519.54
End Bearing (kips)	375.00	-
Weight of Concrete (kips)	93.66	70.24
Total Capacity (kips)	894.54	589.78
Axial (kips)	427.78	278.38
Rating*	*45.5%*	*45.0%*
Reinforced Concrete Flexure	*Compression*	*Uplift*
Critical Depth (ft from TOC)	11.83	10.75
Critical Moment (kip-ft)	304.66	259.09
Critical Moment Capacity	2427.04	1681.47
Rating*	*12.0%*	*14.7%*
Reinforced Concrete Shear	*Compression*	*Uplift*
Critical Depth (ft from TOC)	19.01	0.00
Critical Shear (kip)	40.73	32.68
Critical Shear Capacity	424.80	209.46
Rating*	*9.1%*	*14.9%*

Structural Foundation Rating*	**14.9%**
Soil Interaction Rating*	**45.5%**

*Rating per TIA-222-H Section 15.5

Soil Profile

Groundwater Depth	N/A

# of Layers	4

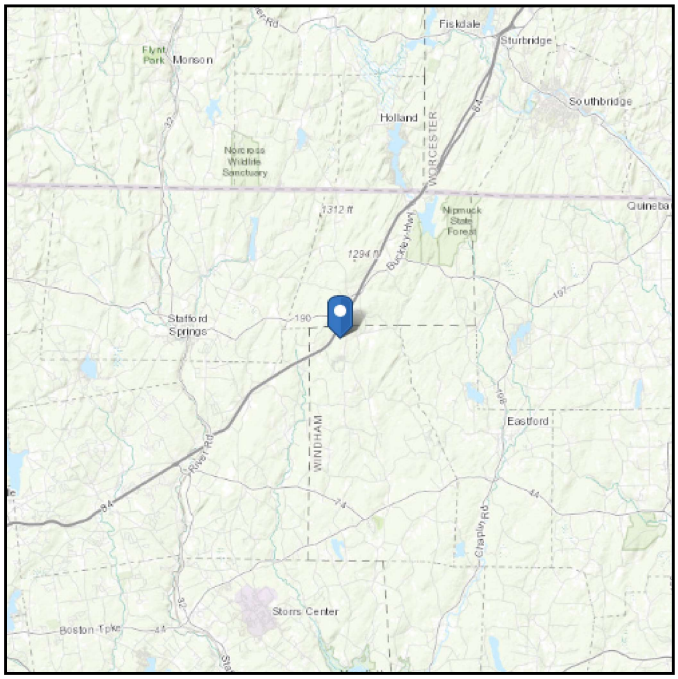
Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	2	2	120	150			0.000	0.000					Cohesionless
2	2	3.33	1.33	130	150			0.000	0.000					Cohesionless
3	3.33	5	1.67	130	150	3		1.650	1.650	0.00	0.00			Cohesive
4	5	26	21	135	150	5		2.321	2.321	2.10	2.10	25.46479		Cohesive

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 1068.03 ft (NAVD 88)
Latitude: 41.952139
Longitude: -72.195528



Wind

Results:

Wind Speed:	125 Vmph	130 mph per jurisdiction
10-year MRI	77 Vmph	
25-year MRI	87 Vmph	
50-year MRI	94 Vmph	
100-year MRI	101 Vmph	

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

Date Accessed: Mon Aug 31 2020

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

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

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

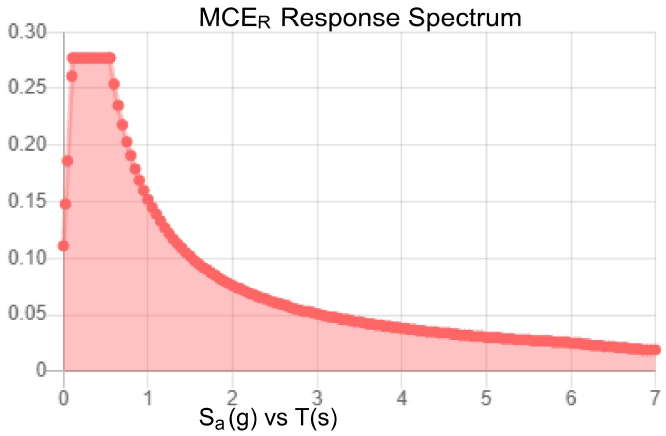
Seismic

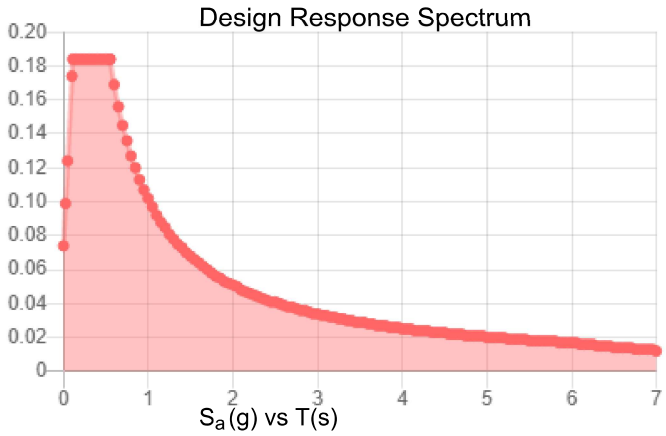
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.173	S_{DS} :	0.184
S_1 :	0.064	S_{D1} :	0.102
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.085
S_{MS} :	0.277	PGA_M :	0.136
S_{M1} :	0.152	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Mon Aug 31 2020

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

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Mon Aug 31 2020

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

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

Exhibit E

Mount Analysis

Date: **November 4, 2021**

Michael McWilliams
Crown Castle
8000 Avalon Blvd, Suite 700
Alpharetta, GA 30009
(770) 375-4936

Trylon
1825 W. Walnut Hill Lane,
Suite 302
Irving, TX 75038
214-930-1730

Subject:	**Mount Replacement Analysis Report**	
Carrier Designation:	**Dish Network Dish 5G**	
	Carrier Site Number:	BOBOS00874A
	Carrier Site Name:	-
Crown Castle Designation:	**Crown Castle BU Number:**	876345
	Crown Castle Site Name:	Sky Hill
	Crown Castle JDE Job Number:	671530
	Crown Castle Order Number:	572903 Rev. 2
Engineering Firm Designation:	**Trylon Report Designation:**	195636
Site Data:	**33 Janowski Road, Ashford, Windham County, CT, 06278** **Latitude 41°57'7.70" Longitude -72°11'43.90"**	
Structure Information:	**Tower Height & Type:**	**192.0 ft Self Support**
	Mount Elevation:	**130.0 ft**
	Mount Type:	**8.0 ft Sector Frame**

Dear Michael McWilliams,

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

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

Sector Frame **Sufficient***
***Sufficient upon completion of the changes listed in the 'Recommendations' section of this report.**

This analysis utilizes an ultimate 3-second gust wind speed of 130 mph as required by the 2018 Connecticut State Building Code.Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount analysis prepared by: Aura Baltoiu

Respectfully Submitted by:
Cliff Abernathy, P.E.

11/04/2021

TABLE OF CONTENTS

1) INTRODUCTION

This is a proposed 3 sector 8.0 ft Sector Frame, designed by Commscope.

2) ANALYSIS CRITERIA

Building Code:	2015 IBC
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	130 mph
Exposure Category:	B
Topographic Factor at Base:	1.00
Topographic Factor at Mount:	1.00
Ice Thickness:	2.0 in
Wind Speed with Ice:	50 mph
Seismic S_s:	0.173
Seismic S_1:	0.063
Live Loading Wind Speed:	30 mph
Man Live Load at Mid/End-Points:	250 lb
Man Live Load at Mount Pipes:	500 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
130.0	130.0	3	JMA Wireless	MX08FRO665-21	8.0 ft Sector Frame **[Commscope, MTC3975083]**
		3	Fujitsu	TA08025-B604	
		3	Fujitsu	TA08025-B605	
		1	Raycap	RDIDC-9181-PF-48	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Crown Application	Dish Network Application	572903, Rev.2	CCI Sites
Mount Manufacturer Drawings	Commscope	MTC3975083	Trylon
Exposure Category Determination	Crown Castle	5969262	CCI Sites

3.1) Analysis Method

RISA-3D (Version 17.0.4), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

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

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

3.2) Assumptions

1) The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
2) The configuration of antennas, mounts, and other appurtenances are as specified in Table 1 and the referenced drawings.
3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
4) The analysis will be required to be revised if the existing conditions in the field differ from those shown in the above-referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.
5) Prior structural modifications to the tower mounting system are assumed to be installed as shown per available data.
6) Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM A500 (GR B-46)
Pipe	ASTM A53 (GR 35)
Connection Bolts	ASTM A325

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

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Sector Frame, Worst Case Sector)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1,2	Mount Pipe(s)	MP1	130.0	23.4	Pass
	Horizontal(s)	H1		38.2	Pass
	Standoff(s)	M4		23.2	Pass
	Bracing(s)	M29		25.1	Pass
	Tieback(s)	M31A		18.2	Pass
	Mount Connection(s)	-		37.7	Pass

Structure Rating (max from all components) =	38.2%

Notes:
1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
2) Rating per TIA-222-H, Section 15.5

Table 4 - Tieback Connection Data Table

Tower Connection Node No.	Existing / Proposed	Resultant End Reaction (lb)	Connected Member Type	Connected Member Size	Member Compressive Capacity (lb)[3]	Notes
N47B	Proposed	616.79	Leg	ROHN 4 EH	7,994.95	1

Notes:
1) Tieback connection point is within 25% of either end of the connected tower member
2) Tieback connection point is NOT within 25% of either end of the connected tower member
3) Reduced member compressive capacity according to CED-STD-10294 *Standard for Installation of Mounts and Appurtenances*

4.1) Recommendations

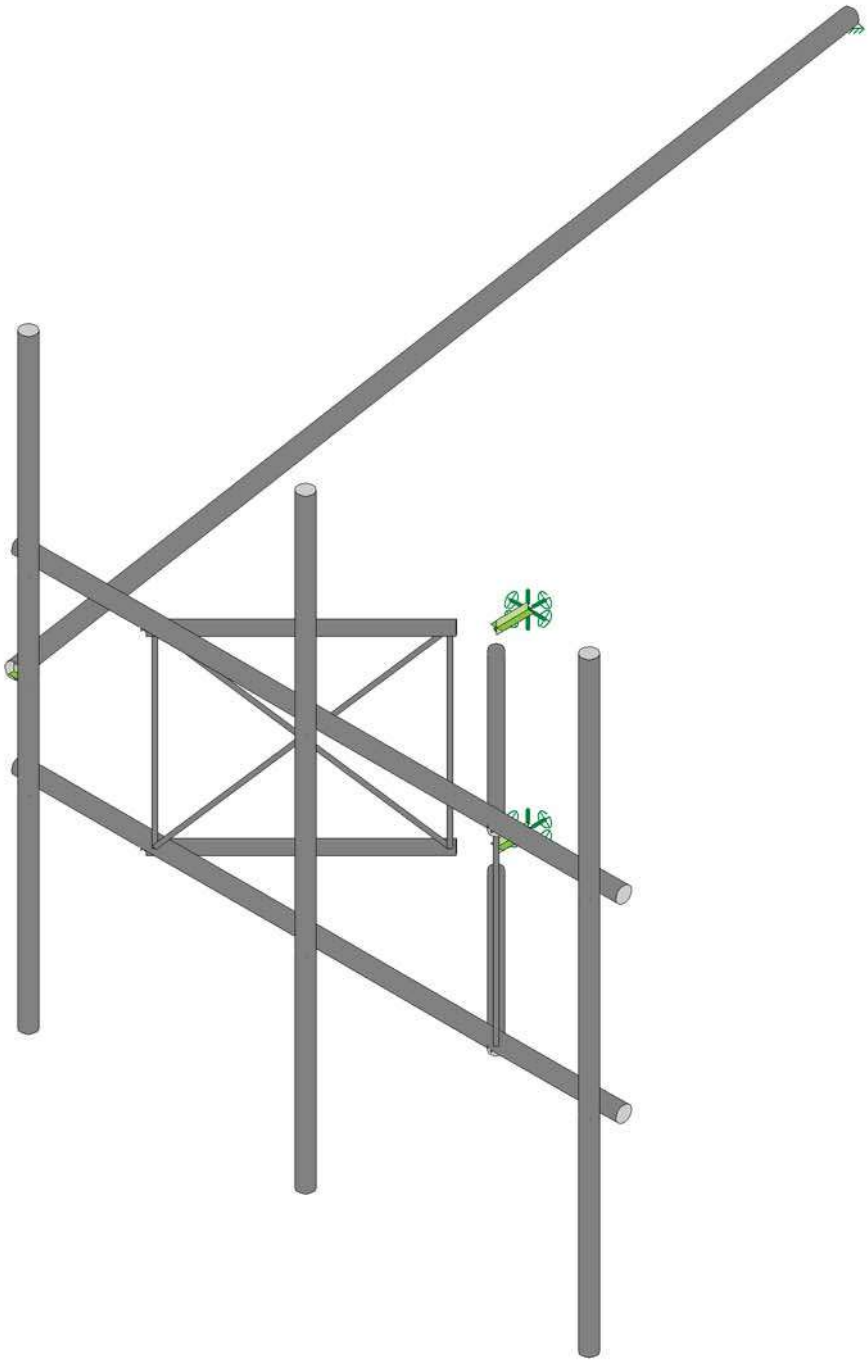
The mount has sufficient capacity to carry the proposed loading configuration. In order for the results of the analysis to be considered valid, the proposed mount listed below must be installed.

1. Commscope, MTC3975083.
2. Replace the proposed MT-654-96 pipe tieback in the manufacturer's drawings with new Commscope MT-537-160 pipe an install it as recommended. Tieback connection point needs to be within 25% ends of tower leg.

No structural modifications are required at this time, provided that the above-listed changes are implemented.

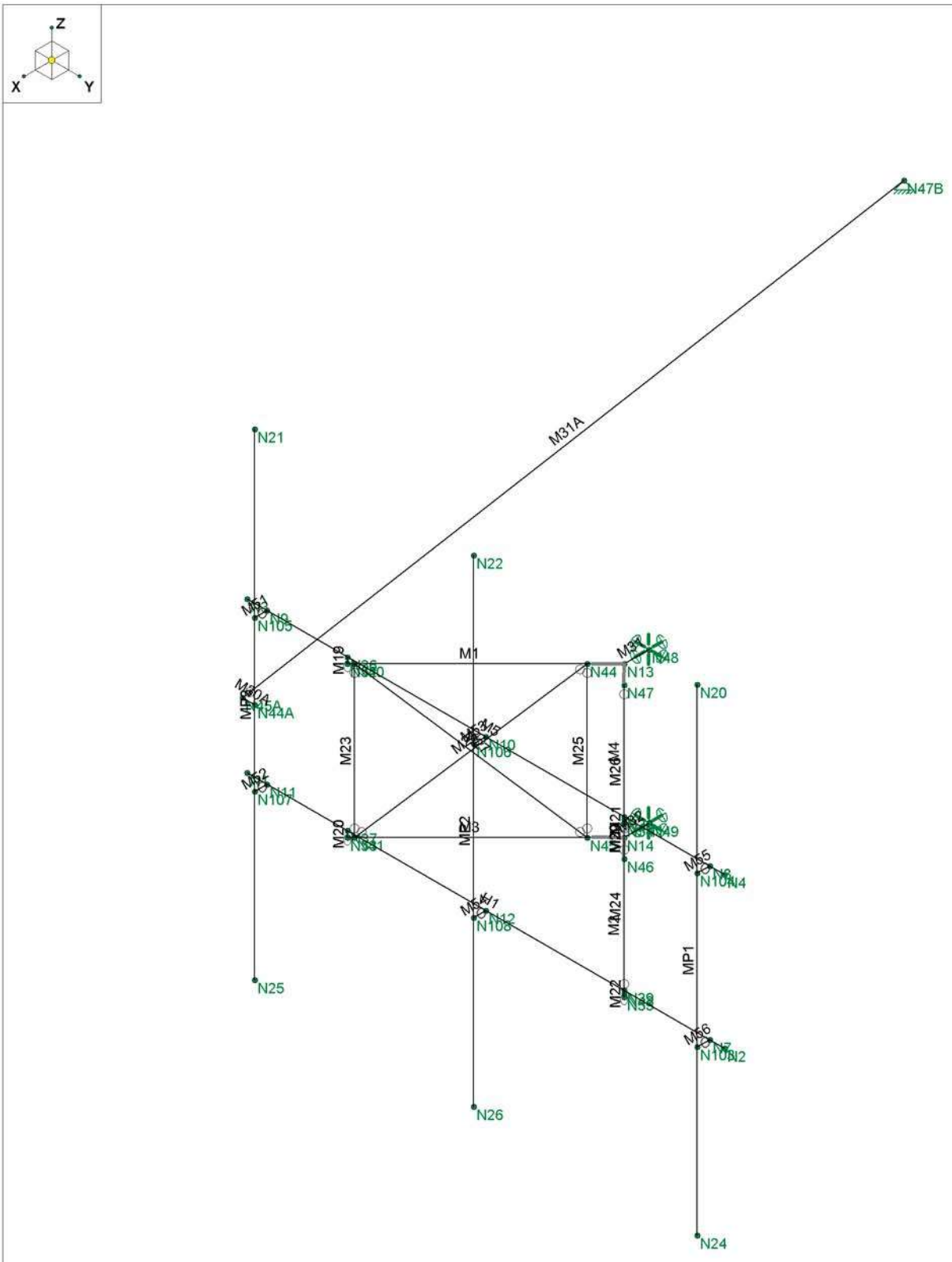
APPENDIX A

WIRE FRAME AND RENDERED MODELS



Envelope Only Solution

Trylon	876345	SK - 1
AB		Nov 4, 2021 at 12:34 PM
195636		MTC3975083_ 876345 _loaded.r3d



Envelope Only Solution

Trylon	876345	SK - 2
AB		Nov 4, 2021 at 12:34 PM
195636		MTC3975083_ 876345 _loaded.r3d

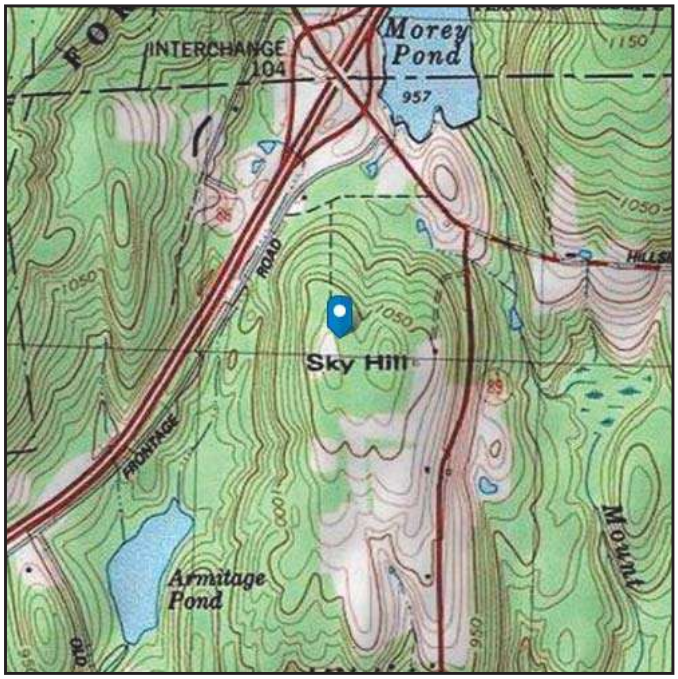
APPENDIX B

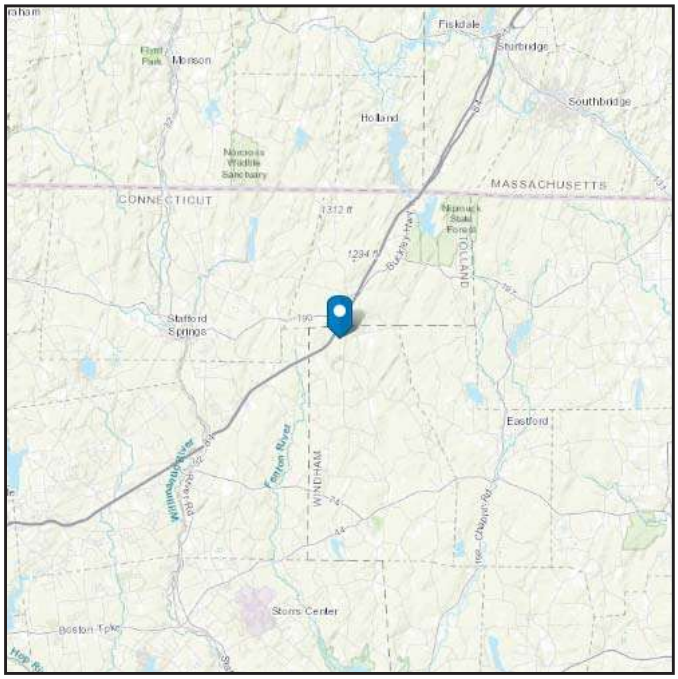
SOFTWARE INPUT CALCULATIONS

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-10	**Elevation:**	1068.03 ft (NAVD 88)
Risk Category:	II	**Latitude:**	41.952139
Soil Class:	D - Stiff Soil	**Longitude:**	-72.195528





Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph

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

Date Accessed: Thu Nov 04 2021

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

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

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

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

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

Trylon
1825 W. Walnut Hill Lane Suite 120
Irving, TX 75038

TIA LOAD CALCULATOR 2.1

PROJECT DATA	
Job Code:	195636
Carrier Site ID:	BOBOS00874A
Carrier Site Name:	-

CODES AND STANDARDS	
Building Code:	2015 IBC
Local Building Code:	-
Design Standard:	TIA-222-H

STRUCTURE DETAILS		
Mount Type:	Sector Frame	--
Mount Elevation:	130.0	ft.
Number of Sectors:	3	--
Structure Type:	Self Support Tower	--
Structure Height:	192.0	ft.

ANALYSIS CRITERIA		
Structure Risk Category:	II	--
Exposure Category:	B	--
Site Class:	D - Stiff Soil	--
Ground Elevation:	1068.03	ft.

TOPOGRAPHIC DATA		
Topographic Category:	1.00	--
Topographic Feature:	N/A	--
Crest Point Elevation:	0.00	ft.
Base Point Elevation:	0.00	ft.
Crest to Mid-Height (L/2):	0.00	ft.
Distance from Crest (x):	0.00	ft.
Base Topo Factor (K_{zt}):	1.00	--
Mount Topo Factor (K_{zt}):	1.00	--

WIND PARAMETERS		
Design Wind Speed:	130	mph
Wind Escalation Factor (K_s):	1.00	--
Velocity Coefficient (K_z):	1.07	--
Directionality Factor (K_d):	0.95	--
Gust Effect Factor (Gh):	1.00	--
Shielding Factor (K_a):	0.90	--
Velocity Pressure (q_z):	42.12	psf
Ground Elevation Factor (K_e):	0.96	--

ICE PARAMETERS		
Design Ice Wind Speed:	50	mph
Design Ice Thickness (t_i):	2.00	in
Importance Factor (I_i):	1.00	--
Ice Velocity Pressure (q_{zi}):	42.12	psf
Mount Ice Thickness (t_{iz}):	2.29	in

WIND STRUCTURE CALCULATIONS		
Flat Member Pressure:	75.81	psf
Round Member Pressure:	45.49	psf
Ice Wind Pressure:	7.25	psf

SEISMIC PARAMETERS		
Importance Factor (I_e):	1.00	--
Short Period Accel .(S_s):	0.173	g
1 Second Accel (S_1):	0.063	g
Short Period Des. (S_{DS}):	0.18	g
1 Second Des. (S_{D1}):	0.10	g
Short Period Coeff. (F_a):	1.60	--
1 Second Coeff. (F_v):	2.40	--
Response Coefficient (Cs):	0.09	--
Amplification Factor (A_S):	1.20	--

LOAD COMBINATIONS [LRFD]

#	Description
1	1.4DL
2	1.2DL + 1WL 0 AZI
3	1.2DL + 1WL 30 AZI
4	1.2DL + 1WL 45 AZI
5	1.2DL + 1WL 60 AZI
6	1.2DL + 1WL 90 AZI
7	1.2DL + 1WL 120 AZI
8	1.2DL + 1WL 135 AZI
9	1.2DL + 1WL 150 AZI
10	1.2DL + 1WL 180 AZI
11	1.2DL + 1WL 210 AZI
12	1.2DL + 1WL 225 AZI
13	1.2DL + 1WL 240 AZI
14	1.2DL + 1WL 270 AZI
15	1.2DL + 1WL 300 AZI
16	1.2DL + 1WL 315 AZI
17	1.2DL + 1WL 330 AZI
18	0.9DL + 1WL 0 AZI
19	0.9DL + 1WL 30 AZI
20	0.9DL + 1WL 45 AZI
21	0.9DL + 1WL 60 AZI
22	0.9DL + 1WL 90 AZI
23	0.9DL + 1WL 120 AZI
24	0.9DL + 1WL 135 AZI
25	0.9DL + 1WL 150 AZI
26	0.9DL + 1WL 180 AZI
27	0.9DL + 1WL 210 AZI
28	0.9DL + 1WL 225 AZI
29	0.9DL + 1WL 240 AZI
30	0.9DL + 1WL 270 AZI
31	0.9DL + 1WL 300 AZI
32	0.9DL + 1WL 315 AZI
33	0.9DL + 1WL 330 AZI
34	1.2DL + 1DLi + 1WLi 0 AZI
35	1.2DL + 1DLi + 1WLi 30 AZI
36	1.2DL + 1DLi + 1WLi 45 AZI
37	1.2DL + 1DLi + 1WLi 60 AZI
38	1.2DL + 1DLi + 1WLi 90 AZI
39	1.2DL + 1DLi + 1WLi 120 AZI
40	1.2DL + 1DLi + 1WLi 135 AZI
41	1.2DL + 1DLi + 1WLi 150 AZI

#	Description
42	1.2DL + 1DLi + 1WLi 180 AZI
43	1.2DL + 1DLi + 1WLi 210 AZI
44	1.2DL + 1DLi + 1WLi 225 AZI
45	1.2DL + 1DLi + 1WLi 240 AZI
46	1.2DL + 1DLi + 1WLi 270 AZI
47	1.2DL + 1DLi + 1WLi 300 AZI
48	1.2DL + 1DLi + 1WLi 315 AZI
49	1.2DL + 1DLi + 1WLi 330 AZI
50	(1.2+0.2Sds) + 1.0E 0 AZI
51	(1.2+0.2Sds) + 1.0E 30 AZI
52	(1.2+0.2Sds) + 1.0E 45 AZI
53	(1.2+0.2Sds) + 1.0E 60 AZI
54	(1.2+0.2Sds) + 1.0E 90 AZI
55	(1.2+0.2Sds) + 1.0E 120 AZI
56	(1.2+0.2Sds) + 1.0E 135 AZI
57	(1.2+0.2Sds) + 1.0E 150 AZI
58	(1.2+0.2Sds) + 1.0E 180 AZI
59	(1.2+0.2Sds) + 1.0E 210 AZI
60	(1.2+0.2Sds) + 1.0E 225 AZI
61	(1.2+0.2Sds) + 1.0E 240 AZI
62	(1.2+0.2Sds) + 1.0E 270 AZI
63	(1.2+0.2Sds) + 1.0E 300 AZI
64	(1.2+0.2Sds) + 1.0E 315 AZI
65	(1.2+0.2Sds) + 1.0E 330 AZI
66	(0.9-0.2Sds) + 1.0E 0 AZI
67	(0.9-0.2Sds) + 1.0E 30 AZI
68	(0.9-0.2Sds) + 1.0E 45 AZI
69	(0.9-0.2Sds) + 1.0E 60 AZI
70	(0.9-0.2Sds) + 1.0E 90 AZI
71	(0.9-0.2Sds) + 1.0E 120 AZI
72	(0.9-0.2Sds) + 1.0E 135 AZI
73	(0.9-0.2Sds) + 1.0E 150 AZI
74	(0.9-0.2Sds) + 1.0E 180 AZI
75	(0.9-0.2Sds) + 1.0E 210 AZI
76	(0.9-0.2Sds) + 1.0E 225 AZI
77	(0.9-0.2Sds) + 1.0E 240 AZI
78	(0.9-0.2Sds) + 1.0E 270 AZI
79	(0.9-0.2Sds) + 1.0E 300 AZI
80	(0.9-0.2Sds) + 1.0E 315 AZI
81	(0.9-0.2Sds) + 1.0E 330 AZI
82-88	1.2D + 1.5 Lv1

#	Description
89	1.2D + 1.5Lm + 1.0Wm 0 AZI - MP1
90	1.2D + 1.5Lm + 1.0Wm 30 AZI - MP1
91	1.2D + 1.5Lm + 1.0Wm 45 AZI - MP1
92	1.2D + 1.5Lm + 1.0Wm 60 AZI - MP1
93	1.2D + 1.5Lm + 1.0Wm 90 AZI - MP1
94	1.2D + 1.5Lm + 1.0Wm 120 AZI - MP1
95	1.2D + 1.5Lm + 1.0Wm 135 AZI - MP1
96	1.2D + 1.5Lm + 1.0Wm 150 AZI - MP1
97	1.2D + 1.5Lm + 1.0Wm 180 AZI - MP1
98	1.2D + 1.5Lm + 1.0Wm 210 AZI - MP1
99	1.2D + 1.5Lm + 1.0Wm 225 AZI - MP1
100	1.2D + 1.5Lm + 1.0Wm 240 AZI - MP1
101	1.2D + 1.5Lm + 1.0Wm 270 AZI - MP1
102	1.2D + 1.5Lm + 1.0Wm 300 AZI - MP1
103	1.2D + 1.5Lm + 1.0Wm 315 AZI - MP1
104	1.2D + 1.5Lm + 1.0Wm 330 AZI - MP1
105	1.2D + 1.5Lm + 1.0Wm 0 AZI - MP2
106	1.2D + 1.5Lm + 1.0Wm 30 AZI - MP2
107	1.2D + 1.5Lm + 1.0Wm 45 AZI - MP2
108	1.2D + 1.5Lm + 1.0Wm 60 AZI - MP2
109	1.2D + 1.5Lm + 1.0Wm 90 AZI - MP2
110	1.2D + 1.5Lm + 1.0Wm 120 AZI - MP2
111	1.2D + 1.5Lm + 1.0Wm 135 AZI - MP2
112	1.2D + 1.5Lm + 1.0Wm 150 AZI - MP2
113	1.2D + 1.5Lm + 1.0Wm 180 AZI - MP2
114	1.2D + 1.5Lm + 1.0Wm 210 AZI - MP2
115	1.2D + 1.5Lm + 1.0Wm 225 AZI - MP2
116	1.2D + 1.5Lm + 1.0Wm 240 AZI - MP2
117	1.2D + 1.5Lm + 1.0Wm 270 AZI - MP2
118	1.2D + 1.5Lm + 1.0Wm 300 AZI - MP2
119	1.2D + 1.5Lm + 1.0Wm 315 AZI - MP2
120	1.2D + 1.5Lm + 1.0Wm 330 AZI - MP2

#	Description
121	1.2D + 1.5Lm + 1.0Wm 0 AZI - MP3
122	1.2D + 1.5Lm + 1.0Wm 30 AZI - MP3
123	1.2D + 1.5Lm + 1.0Wm 45 AZI - MP3
124	1.2D + 1.5Lm + 1.0Wm 60 AZI - MP3
125	1.2D + 1.5Lm + 1.0Wm 90 AZI - MP3
126	1.2D + 1.5Lm + 1.0Wm 120 AZI - MP3
127	1.2D + 1.5Lm + 1.0Wm 135 AZI - MP3
128	1.2D + 1.5Lm + 1.0Wm 150 AZI - MP3
129	1.2D + 1.5Lm + 1.0Wm 180 AZI - MP3
130	1.2D + 1.5Lm + 1.0Wm 210 AZI - MP3
131	1.2D + 1.5Lm + 1.0Wm 225 AZI - MP3
132	1.2D + 1.5Lm + 1.0Wm 240 AZI - MP3
133	1.2D + 1.5Lm + 1.0Wm 270 AZI - MP3
134	1.2D + 1.5Lm + 1.0Wm 300 AZI - MP3
135	1.2D + 1.5Lm + 1.0Wm 315 AZI - MP3
136	1.2D + 1.5Lm + 1.0Wm 330 AZI - MP3
137	1.2D + 1.5Lm + 1.0Wm 0 AZI - MP4
138	1.2D + 1.5Lm + 1.0Wm 30 AZI - MP4
139	1.2D + 1.5Lm + 1.0Wm 45 AZI - MP4
140	1.2D + 1.5Lm + 1.0Wm 60 AZI - MP4
141	1.2D + 1.5Lm + 1.0Wm 90 AZI - MP4
142	1.2D + 1.5Lm + 1.0Wm 120 AZI - MP4
143	1.2D + 1.5Lm + 1.0Wm 135 AZI - MP4
144	1.2D + 1.5Lm + 1.0Wm 150 AZI - MP4
145	1.2D + 1.5Lm + 1.0Wm 180 AZI - MP4
146	1.2D + 1.5Lm + 1.0Wm 210 AZI - MP4
147	1.2D + 1.5Lm + 1.0Wm 225 AZI - MP4
148	1.2D + 1.5Lm + 1.0Wm 240 AZI - MP4
149	1.2D + 1.5Lm + 1.0Wm 270 AZI - MP4
150	1.2D + 1.5Lm + 1.0Wm 300 AZI - MP4
151	1.2D + 1.5Lm + 1.0Wm 315 AZI - MP4
152	1.2D + 1.5Lm + 1.0Wm 330 AZI - MP4

*This page shows an example of maintenance loads for (4) pipes, the number of mount pipe LCs may vary per site

EQUIPMENT LOADING

Appurtenance Name	Qty.	Elevation [ft]	--	EPA $_N$ (ft2)	EPA $_T$ (ft2)	Weight (lbs)
MX08FRO665-21	1	130	No Ice	8.01	3.21	82.50
--	--	--	w/ Ice	10.18	5.12	394.86
TA08025-B604	1	130	No Ice	1.96	0.98	63.90
--	--	--	w/ Ice	2.54	1.44	100.41
TA08025-B605	1	130	No Ice	1.92	1.10	75.00
--	--	--	w/ Ice	2.49	1.57	105.08
RDIDC-9181-PF-48	1	130	No Ice	2.01	1.17	21.85
--	--	--	w/ Ice	2.60	1.66	105.20
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			

EQUIPMENT LOADING [CONT.]

Appurtenance Name	Qty.	Elevation [ft]	--	EPA_N (ft2)	EPA_T (ft2)	Weight (lbs)
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			

EQUIPMENT WIND CALCULATIONS

Appurtenance Name	Qty.	Elevation [ft]	K_{zt}	K_z	K_d	t_d	q_z [psf]	q_{zi} [psf]
MX08FRO665-21	1	130	1.00	1.07	0.95	2.29	42.12	6.23
TA08025-B604	1	130	1.00	1.07	0.95	2.29	42.12	6.23
TA08025-B605	1	130	1.00	1.07	0.95	2.29	42.12	6.23
RDIDC-9181-PF-48	1	130	1.00	1.07	0.95	2.29	42.12	6.23

EQUIPMENT LATERAL WIND FORCE CALCULATIONS

Appurtenance Name	Qty.	--	0° 180°	30° 210°	60° 240°	90° 270°	120° 300°	150° 330°
MX08FRO665-21	1	No Ice	303.63	167.17	258.14	121.68	258.14	167.17
--	--	w/ Ice	57.10	35.80	50.00	28.70	50.00	35.80
TA08025-B604	1	No Ice	74.43	46.50	65.12	37.19	65.12	46.50
--	--	w/ Ice	14.27	9.61	12.71	8.05	12.71	9.61
TA08025-B605	1	No Ice	72.64	49.50	64.93	41.78	64.93	49.50
--	--	w/ Ice	13.97	10.10	12.68	8.80	12.68	10.10
RDIDC-9181-PF-48	1	No Ice	76.26	52.28	68.27	44.28	68.27	52.28
--	--	w/ Ice	14.58	10.63	13.27	9.31	13.27	10.63
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						

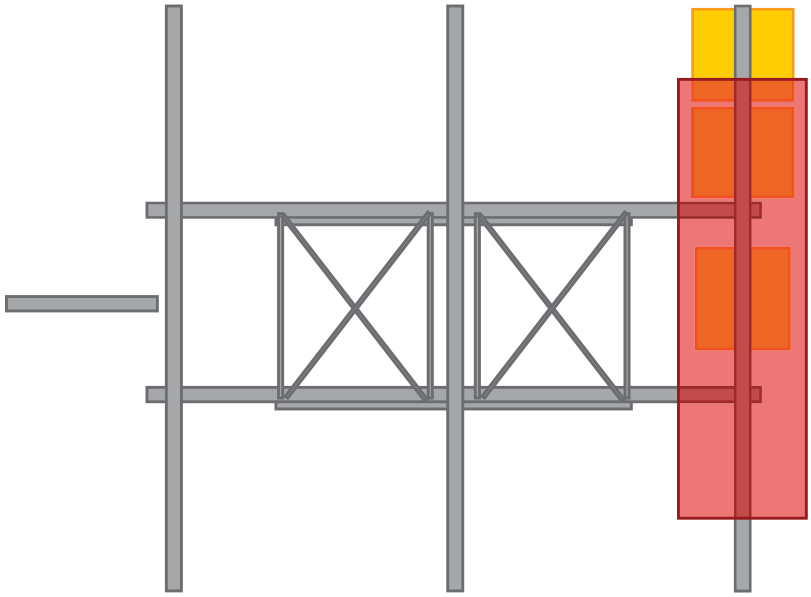
EQUIPMENT LATERAL WIND FORCE CALCULATIONS [CONT.]

Appurtenance Name	Qty.	--	0° 180°	30° 210°	60° 240°	90° 270°	120° 300°	150° 330°
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						

EQUIPMENT SEISMIC FORCE CALCULATIONS

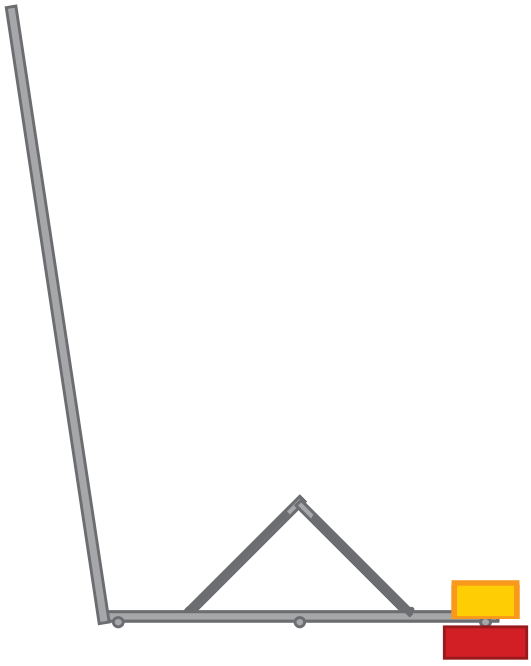
Appurtenance Name	Qty.	Elevation [ft]	Weight [lbs]	F_p [lbs]
MX08FRO665-21	1	130	82.5	9.13
TA08025-B604	1	130	63.9	7.08
TA08025-B605	1	130	75	8.30
RDIDC-9181-PF-48	1	130	21.85	2.42

ELEVATION VIEW



*Elevation View Shows Alpha Sector Only

PLAN VIEW



1825 W. Walnut Hill Lane, Suite 120
Irving, Texas 75038

Equipment Name	Total Quantity	Antenna Centerline	Mount Pipe Positions	Equipment Azimuths
MX08FRO665-21	1	130	MP1	0
TA08025-B604	1	130	MP1	0
TA08025-B605	1	130	MP1	0
RDIDC-9181-PF-48	1	130	MP1	0

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

(Global) Model Settings

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

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): LRFD
Cold Formed Steel Code	AISI S100-07: LRFD
Wood Code	AWC NDS-15: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-14
Masonry Code	ACI 530-13: Strength
Aluminum Code	AA ADM1-10: LRFD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

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

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (in)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	1
Cd X	1
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E5 F)	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3
8	A500 Gr. C - 46	29000	11154	.3	.65	.49	46	1.3	62	1.4
9	A529 Gr. 50	29000	11154	.3	.65	.49	50	1.3	65	1.4

Cold Formed Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Standoffs	PIPE 1.5	Beam	None	A500 Gr. C - ...	Typical	.749	.293	.293	.586
2	Tie Backs	Pipe 2.375x0.120	Beam	None	A500 Gr. C - ...	Typical	.85	.542	.542	1.084
3	Pipe 2.375x0.120	Pipe 2.375x0.120	Beam	None	A500 Gr. C - ...	Typical	.85	.542	.542	1.084
4	Standoff Bracing (Vert)	SR 5/8	Beam	None	A529 Gr. 50	Typical	.307	.007	.007	.015
5	Vertical pipes	PIPE_3.0	Beam	None	A500 Gr. C - ...	Typical	2.07	2.85	2.85	5.69

Hot Rolled Steel Section Sets (Continued)

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
6	Standoff Bracing (Diag)	SR 1/2"	Beam	None	A529 Gr. 50	Typical	.196	.003	.003	.006

Cold Formed Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	CF1A	8CU1.25X057	Beam	None	A653 SS Gr33	Typical	.581	.057	4.41	.00063

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	N13						
2	N14						
3	N48	Reaction	Reaction	Reaction	Reaction	Reaction	
4	N49	Reaction	Reaction	Reaction	Reaction	Reaction	
5	N47B	Reaction	Reaction	Reaction			

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu..	Area(M...	Surface...
1	Self Weight	DL			-1		5			
2	Structure Wind X	WLX						31		
3	Structure Wind Y	WLY						31		
4	Wind Load 0 AZI	WLX					10			
5	Wind Load 30 AZI	None					10			
6	Wind Load 45 AZI	None					10			
7	Wind Load 60 AZI	None					10			
8	Wind Load 90 AZI	WLY					10			
9	Wind Load 120 AZI	None					10			
10	Wind Load 135 AZI	None					10			
11	Wind Load 150 AZI	None					10			
12	Ice Weight	OL1					5	31		
13	Ice Structure Wind X	OL2						31		
14	Ice Structure Wind Y	OL3						31		
15	Ice Wind Load 0 AZI	OL2					10			
16	Ice Wind Load 30 AZI	None					10			
17	Ice Wind Load 45 AZI	None					10			
18	Ice Wind Load 60 AZI	None					10			
19	Ice Wind Load 90 AZI	OL3					10			
20	Ice Wind Load 120 AZI	None					10			
21	Ice Wind Load 135 AZI	None					10			
22	Ice Wind Load 150 AZI	None					10			
23	Seismic Load X	ELX	-.111				5			
24	Seismic Load Y	ELY		-.111			5			
25	Live Load 1 (Lv)	None					1			
26	Live Load 2 (Lv)	None					1			
27	Live Load 3 (Lv)	None					1			
28	Maintenance Load 1 (Lm)	None					1			
29	Maintenance Load 2 (Lm)	None					1			
30	Maintenance Load 3 (Lm)	None					1			

Load Combinations

	Description	Solve	PD...	SR...	B...	Factor	BLC	Factor	B...	Fa...	B...	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4DL	Yes	Y		DL	1.4																		
2	1.2DL + 1WL 0 AZI	Yes	Y		DL	1.2	2	1	3		4	1												
3	1.2DL + 1WL 30 AZI	Yes	Y		DL	1.2	2	.866	3	.5	5	1												
4	1.2DL + 1WL 45 AZI	Yes	Y		DL	1.2	2	.707	3	.707	6	1												
5	1.2DL + 1WL 60 AZI	Yes	Y		DL	1.2	2	.5	3	.866	7	1												
6	1.2DL + 1WL 90 AZI	Yes	Y		DL	1.2	2		3	1	8	1												
7	1.2DL + 1WL 120 AZI	Yes	Y		DL	1.2	2	-.5	3	.866	9	1												
8	1.2DL + 1WL 135 AZI	Yes	Y		DL	1.2	2	-.707	3	.707	10	1												
9	1.2DL + 1WL 150 AZI	Yes	Y		DL	1.2	2	-.866	3	.5	11	1												
10	1.2DL + 1WL 180 AZI	Yes	Y		DL	1.2	2	-1	3		4	-1												
11	1.2DL + 1WL 210 AZI	Yes	Y		DL	1.2	2	-.866	3	-.5	5	-1												
12	1.2DL + 1WL 225 AZI	Yes	Y		DL	1.2	2	-.707	3	-.7...	6	-1												
13	1.2DL + 1WL 240 AZI	Yes	Y		DL	1.2	2	-.5	3	-.8...	7	-1												
14	1.2DL + 1WL 270 AZI	Yes	Y		DL	1.2	2		3	-1	8	-1												
15	1.2DL + 1WL 300 AZI	Yes	Y		DL	1.2	2	.5	3	-.8...	9	-1												
16	1.2DL + 1WL 315 AZI	Yes	Y		DL	1.2	2	.707	3	-.7...	10	-1												
17	1.2DL + 1WL 330 AZI	Yes	Y		DL	1.2	2	.866	3	-.5	11	-1												
18	0.9DL + 1WL 0 AZI	Yes	Y		DL	.9	2	1	3		4	1												
19	0.9DL + 1WL 30 AZI	Yes	Y		DL	.9	2	.866	3	.5	5	1												
20	0.9DL + 1WL 45 AZI	Yes	Y		DL	.9	2	.707	3	.707	6	1												
21	0.9DL + 1WL 60 AZI	Yes	Y		DL	.9	2	.5	3	.866	7	1												
22	0.9DL + 1WL 90 AZI	Yes	Y		DL	.9	2		3	1	8	1												
23	0.9DL + 1WL 120 AZI	Yes	Y		DL	.9	2	-.5	3	.866	9	1												
24	0.9DL + 1WL 135 AZI	Yes	Y		DL	.9	2	-.707	3	.707	10	1												
25	0.9DL + 1WL 150 AZI	Yes	Y		DL	.9	2	-.866	3	.5	11	1												
26	0.9DL + 1WL 180 AZI	Yes	Y		DL	.9	2	-1	3		4	-1												
27	0.9DL + 1WL 210 AZI	Yes	Y		DL	.9	2	-.866	3	-.5	5	-1												
28	0.9DL + 1WL 225 AZI	Yes	Y		DL	.9	2	-.707	3	-.7...	6	-1												
29	0.9DL + 1WL 240 AZI	Yes	Y		DL	.9	2	-.5	3	-.8...	7	-1												
30	0.9DL + 1WL 270 AZI	Yes	Y		DL	.9	2		3	-1	8	-1												
31	0.9DL + 1WL 300 AZI	Yes	Y		DL	.9	2	.5	3	-.8...	9	-1												
32	0.9DL + 1WL 315 AZI	Yes	Y		DL	.9	2	.707	3	-.7...	10	-1												
33	0.9DL + 1WL 330 AZI	Yes	Y		DL	.9	2	.866	3	-.5	11	-1												
34	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	1	14		15	1										
35	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	.866	14	.5	16	1										
36	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	.707	14	.707	17	1										
37	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	.5	14	.866	18	1										
38	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13		14	1	19	1										
39	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	-.5	14	.866	20	1										
40	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	-.7...	14	.707	21	1										
41	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	-.8...	14	.5	22	1										
42	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	-1	14		15	-1										
43	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	-.8...	14	-.5	16	-1										
44	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	-.7...	14	-.7...	17	-1										
45	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	-.5	14	-.8...	18	-1										
46	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13		14	-1	19	-1										
47	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	.5	14	-.8...	20	-1										
48	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	.707	14	-.7...	21	-1										
49	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	.866	14	-.5	22	-1										
50	(1.2+0.2Sds)DL + 1...	Yes	Y		DL	1.237	23	1	24															
51	(1.2+0.2Sds)DL + 1...	Yes	Y		DL	1.237	23	.866	24	.5														

Load Combinations (Continued)

	Description	Solve	PD...	SR...	B...	Factor	BLC	Factor	B...	Fa...	B...	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
52	(1.2+0.2Sds)DL + 1...	Yes	Y		DL	1.237	23	.707	24	.707														
53	(1.2+0.2Sds)DL + 1...	Yes	Y		DL	1.237	23	.5	24	.866														
54	(1.2+0.2Sds)DL + 1...	Yes	Y		DL	1.237	23		24	1														
55	(1.2+0.2Sds)DL + 1...	Yes	Y		DL	1.237	23	-.5	24	.866														
56	(1.2+0.2Sds)DL + 1...	Yes	Y		DL	1.237	23	-.707	24	.707														
57	(1.2+0.2Sds)DL + 1...	Yes	Y		DL	1.237	23	-.866	24	.5														
58	(1.2+0.2Sds)DL + 1...	Yes	Y		DL	1.237	23	-1	24															
59	(1.2+0.2Sds)DL + 1...	Yes	Y		DL	1.237	23	-.866	24	-.5														
60	(1.2+0.2Sds)DL + 1...	Yes	Y		DL	1.237	23	-.707	24	-.7...														
61	(1.2+0.2Sds)DL + 1...	Yes	Y		DL	1.237	23	-.5	24	-.8...														
62	(1.2+0.2Sds)DL + 1...	Yes	Y		DL	1.237	23		24	-1														
63	(1.2+0.2Sds)DL + 1...	Yes	Y		DL	1.237	23	.5	24	-.8...														
64	(1.2+0.2Sds)DL + 1...	Yes	Y		DL	1.237	23	.707	24	-.7...														
65	(1.2+0.2Sds)DL + 1...	Yes	Y		DL	1.237	23	.866	24	-.5														
66	(0.9-0.2Sds)DL + 1...	Yes	Y		DL	.863	23	1	24															
67	(0.9-0.2Sds)DL + 1...	Yes	Y		DL	.863	23	.866	24	.5														
68	(0.9-0.2Sds)DL + 1...	Yes	Y		DL	.863	23	.707	24	.707														
69	(0.9-0.2Sds)DL + 1...	Yes	Y		DL	.863	23	.5	24	.866														
70	(0.9-0.2Sds)DL + 1...	Yes	Y		DL	.863	23		24	1														
71	(0.9-0.2Sds)DL + 1...	Yes	Y		DL	.863	23	-.5	24	.866														
72	(0.9-0.2Sds)DL + 1...	Yes	Y		DL	.863	23	-.707	24	.707														
73	(0.9-0.2Sds)DL + 1...	Yes	Y		DL	.863	23	-.866	24	.5														
74	(0.9-0.2Sds)DL + 1...	Yes	Y		DL	.863	23	-1	24															
75	(0.9-0.2Sds)DL + 1...	Yes	Y		DL	.863	23	-.866	24	-.5														
76	(0.9-0.2Sds)DL + 1...	Yes	Y		DL	.863	23	-.707	24	-.7...														
77	(0.9-0.2Sds)DL + 1...	Yes	Y		DL	.863	23	-.5	24	-.8...														
78	(0.9-0.2Sds)DL + 1...	Yes	Y		DL	.863	23		24	-1														
79	(0.9-0.2Sds)DL + 1...	Yes	Y		DL	.863	23	.5	24	-.8...														
80	(0.9-0.2Sds)DL + 1...	Yes	Y		DL	.863	23	.707	24	-.7...														
81	(0.9-0.2Sds)DL + 1...	Yes	Y		DL	.863	23	.866	24	-.5														
82	1.2DL + 1Lv1	Yes	Y		DL	1.2	25	1.5																
83	1.2DL + 1Lv2	Yes	Y		DL	1.2	26	1.5																
84	1.2DL + 1Lv3	Yes	Y		DL	1.2	27	1.5																
85	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	28	1.5	2	.053	3		4	.053										
86	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	28	1.5	2	.046	3	.027	5	.053										
87	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	28	1.5	2	.038	3	.038	6	.053										
88	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	28	1.5	2	.027	3	.046	7	.053										
89	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	28	1.5	2		3	.053	8	.053										
90	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	28	1.5	2	-.0...	3	.046	9	.053										
91	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	28	1.5	2	-.0...	3	.038	10	.053										
92	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	28	1.5	2	-.0...	3	.027	11	.053										
93	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	28	1.5	2	-.0...	3		4	-.0...										
94	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	28	1.5	2	-.0...	3	-.0...	5	-.0...										
95	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	28	1.5	2	-.0...	3	-.0...	6	-.0...										
96	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	28	1.5	2	-.0...	3	-.0...	7	-.0...										
97	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	28	1.5	2		3	-.0...	8	-.0...										
98	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	28	1.5	2	.027	3	-.0...	9	-.0...										
99	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	28	1.5	2	.038	3	-.0...	10	-.0...										
100	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	28	1.5	2	.046	3	-.0...	11	-.0...										
101	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	29	1.5	2	.053	3		4	.053										
102	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	29	1.5	2	.046	3	.027	5	.053										
103	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	29	1.5	2	.038	3	.038	6	.053										

Load Combinations (Continued)

	Description	Solve	PD...	SR...	B...	Factor	BLC	Factor	B...	Fa...	B...	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
104	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	29	1.5	2	.027	3	.046	7	.053												
105	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	29	1.5	2		3	.053	8	.053												
106	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	29	1.5	2	-.0...	3	.046	9	.053												
107	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	29	1.5	2	-.0...	3	.038	10	.053												
108	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	29	1.5	2	-.0...	3	.027	11	.053												
109	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	29	1.5	2	-.0...	3		4	-.0...												
110	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	29	1.5	2	-.0...	3	-.0...	5	-.0...												
111	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	29	1.5	2	-.0...	3	-.0...	6	-.0...												
112	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	29	1.5	2	-.0...	3	-.0...	7	-.0...												
113	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	29	1.5	2		3	-.0...	8	-.0...												
114	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	29	1.5	2	.027	3	-.0...	9	-.0...												
115	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	29	1.5	2	.038	3	-.0...	10	-.0...												
116	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	29	1.5	2	.046	3	-.0...	11	-.0...												
117	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	30	1.5	2	.053	3		4	.053												
118	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	30	1.5	2	.046	3	.027	5	.053												
119	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	30	1.5	2	.038	3	.038	6	.053												
120	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	30	1.5	2	.027	3	.046	7	.053												
121	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	30	1.5	2		3	.053	8	.053												
122	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	30	1.5	2	-.0...	3	.046	9	.053												
123	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	30	1.5	2	-.0...	3	.038	10	.053												
124	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	30	1.5	2	-.0...	3	.027	11	.053												
125	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	30	1.5	2	-.0...	3		4	-.0...												
126	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	30	1.5	2	-.0...	3	-.0...	5	-.0...												
127	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	30	1.5	2	-.0...	3	-.0...	6	-.0...												
128	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	30	1.5	2	-.0...	3	-.0...	7	-.0...												
129	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	30	1.5	2		3	-.0...	8	-.0...												
130	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	30	1.5	2	.027	3	-.0...	9	-.0...												
131	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	30	1.5	2	.038	3	-.0...	10	-.0...												
132	1.2DL + 1.5Lm + 1...	Yes	Y		DL	1.2	30	1.5	2	.046	3	-.0...	11	-.0...												

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	N48	max	605.01	18	569.61	88	1105.87	41	390.63	132	-63.35	18	0	132
2		min	-2133.06	42	-1226.84	128	124.68	18	-181.54	92	-578.88	41	0	1
3	N49	max	2039.97	49	1217.96	121	1100.41	49	402.28	132	-29.37	25	0	132
4		min	-163.82	25	-560.45	97	125.51	26	-186.65	92	-586.24	49	0	1
5	N47B	max	593.04	9	127.37	8	109.22	38	0	132	0	132	0	132
6		min	-598.93	17	-128.92	16	16.46	80	0	1	0	1	0	1
7	Totals:	max	1007.74	18	657.58	22	2274.18	49						
8		min	-1007.75	10	-657.59	14	385.99	72						

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

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Lo...	...	...	phi*P...	phi*P...	phi*...	phi*...	...	Eqn
1	H1	PIpe 2.375x0.120	.402	76	34	.119	76		...	2539...	3519...	2107...	2107...	....	H1-...
2	M5	PIpe 2.375x0.120	.402	76	42	.120	76		...	2539...	3519...	2107...	2107...	....	H1-...
3	M29	SR 1/2"	.264	22.43	36	.016	0		...	3389.4	8835...	73.63	73.63	1	H1-...
4	MP1	PIpe 2.375x0.120	.246	33	2	.155	33		2	1328...	3519...	2107...	2107...	....	H1-...
5	M4	PIPE_1.5	.244	1.09	42	.190	34...		...	2377...	3100...	1452...	1452...	....	H1-...
6	M2	PIPE_1.5	.237	1.09	41	.193	34...		...	2377...	3100...	1452...	1452...	....	H1-...

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

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Lo...	...	...	phi*P...	phi*P...	phi*...	phi*...	...	Eqn
7	M28	SR 1/2"	.206	22.43	48	.023	0		...	3389.4	8835...	73.63	73.63	1	H1-...
8	M3	PIPE_1.5	.195	34.81	121	.125	34....		...	2377...	3100...	1452...	1452...	1	H1-...
9	M31A	PIpe 2.375x0.120	.192	79.15	39	.011	15...		...	4884...	3519...	2107...	2107...	...	H1-...
10	MP3	PIpe 2.375x0.120	.175	48	17	.144	63		...	1328...	3519...	2107...	2107...	...	H1-...
11	M1	PIPE_1.5	.173	34.81	130	.124	34....		...	2377...	3100...	1452...	1452...	1	H1-...
12	MP2	PIpe 2.375x0.120	.029	33	109	.178	63		...	1328...	3519...	2107...	2107...	...	H1-...
13	M24	SR 5/8	.020	15.76	42	.045	0		...	4090...	13815	134.4	134.4	1	H1-...
14	M23	SR 5/8	.020	15.76	42	.045	0		...	4090...	13815	134.4	134.4	1	H1-...
15	M25	SR 5/8	.019	15.76	42	.071	0		...	4090...	13815	134.4	134.4	1	H1-...
16	M26	SR 5/8	.019	15.76	42	.071	0		...	4090...	13815	134.4	134.4	1	H1-...
17	M27	SR 1/2"	.002	44.85	25	.024	44....		...	3389.4	8835...	73.63	73.63	1	H1-...
18	M30	SR 1/2"	.000	0	132	.014	44....		...	3389.4	8835...	73.63	73.63	1	H1-...

Envelope AISI S100-07: LRFD Cold Formed Steel Code Checks

Member	Shape	Code Check	Loc[in]	LC	Shea...	Loc[i...	Dir	LC	phi*Pn[...	phi*Tn[...	phi*Mn...	phi*Mn...	Cb	Cmyy	Cmzz	Eqn
No Data to Print ...																

APPENDIX D

ADDITIONAL CALCUATIONS

Trylon

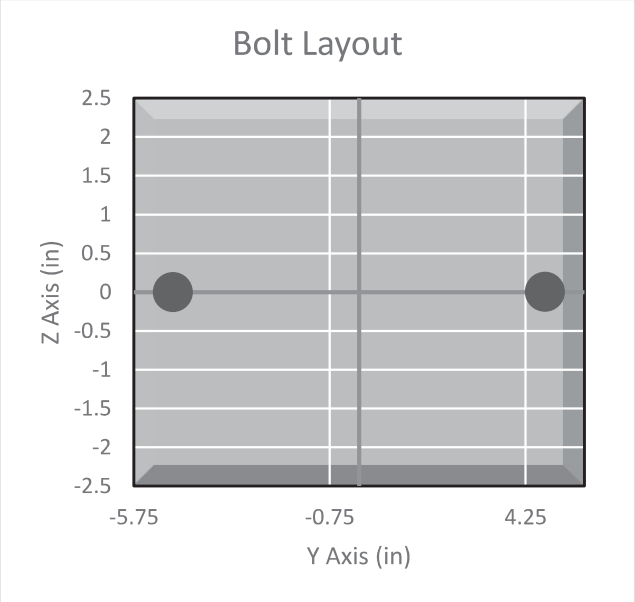
Analysis date: 11/04/21

BOLT TOOL 1.5.2

Project Data	
Job Code:	195636
Carrier Site ID:	BOBOS00874A
Carrier Site Name:	-

Code	
Design Standard:	TIA-222-H
Slip Check:	Yes
Pretension Standard:	TIA-222-H

Bolt Properties		
Connection Type:	Threaded Rod	
Diameter:	0.75	in
Grade:	A307	--
Yield Strength (Fy):	36	ksi
Ultimate Strength (Fu):	60	ksi
Number of Bolts:	2	--
Threads Included:	Yes	--
Double Shear:	No	--
Connection Pipe Size:	9.5	in



Connection Description
Standoff to Tower

Bolt Check*		
Tensile Capacity (ϕT_n):	15050.7	lbs
Shear Capacity (ϕV_n):	9940.2	lbs
Tension Force (T_u):	0.0	lbs
Shear Force (V_u):	1140.4	lbs
Tension Usage:	0.0%	--
Shear Usage:	10.9%	--
Interaction:	10.9%	Pass
Controlling Member:	M32	--
Controlling LC:	34	--

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

Slip Check*		
Sliding Capacity (ϕR_{ns}):	9323.6	lbs
Torsion Capacity (ϕR_{nr}):	3690.6	lb-ft
Sliding Force (V_{us}):	1105.9	lbs
Torsional Force (T_{ur}):	0.0	lb-ft
Sliding Usage:	11.3%	--
Torsion Usage:	0.0%	--
Interaction:	11.3%	Pass
Controlling Member:	M31	--
Controlling LC:	41	--

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

Trylon

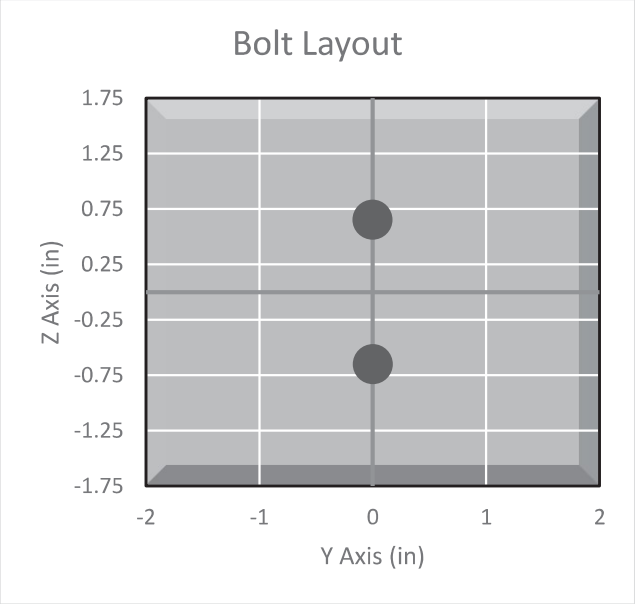
Analysis date: 11/04/21

BOLT TOOL 1.5.2

Project Data	
Job Code:	195636
Carrier Site ID:	BOBOS00874A
Carrier Site Name:	-

Code	
Design Standard:	TIA-222-H
Slip Check:	No
Pretension Standard:	AISC

Bolt Properties		
Connection Type:	Bolt	
Diameter:	0.625	in
Grade:	A325	--
Yield Strength (Fy):	92	ksi
Ultimate Strength (Fu):	120	ksi
Number of Bolts:	2	--
Threads Included:	Yes	--
Double Shear:	No	--
Connection Pipe Size:	9.5	in



Connection Description
Standoff arm to Tower connection kit

Bolt Check*		
Tensile Capacity (ϕT_n):	20340.1	lbs
Shear Capacity (ϕV_n):	13805.8	lbs
Tension Force (T_u):	0.0	lbs
Shear Force (V_u):	5460.6	lbs
Tension Usage:	0.0%	--
Shear Usage:	37.7%	--
Interaction:	37.7%	Pass
Controlling Member:	M31	--
Controlling LC:	45	--

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

APPENDIX E

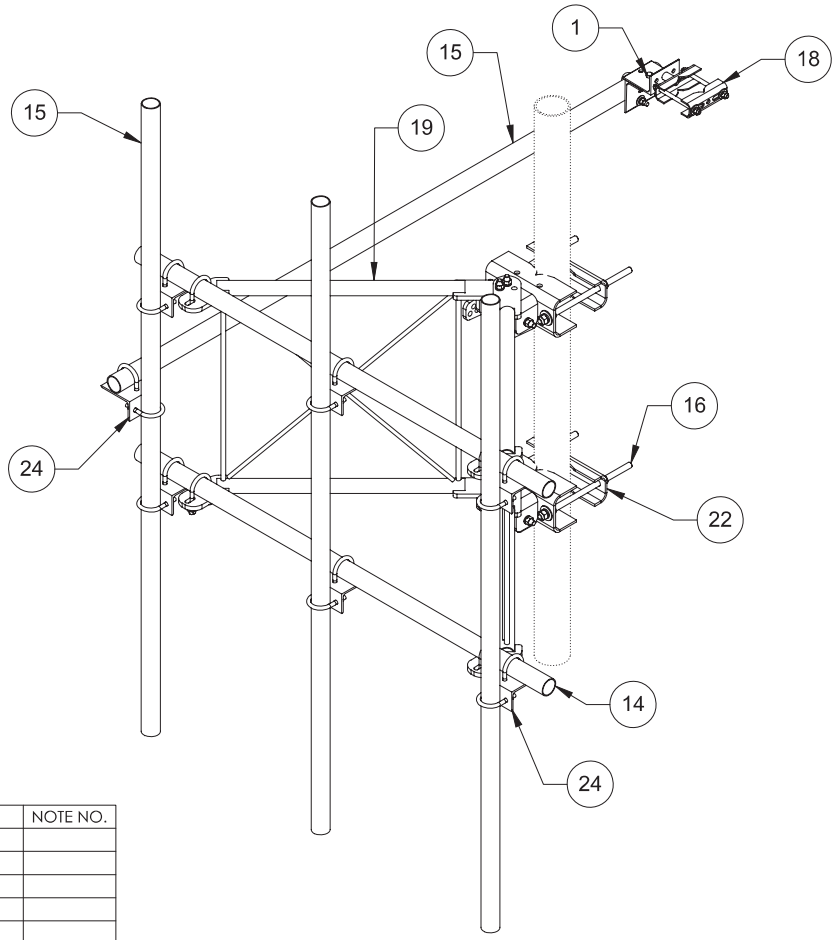
SUPPLEMENTAL DRAWINGS

NOTES:
1.0 ALL METRIC DIMENSIONS ARE IN BRACKETS.

REVISIONS				
REV.	ECN	DESCRIPTION	BY	DATE
PRE		REVIEW	DRH	01/28/21

www.Talleycom.com | Sales@Talleycom.com | 800.949.7079

TALLEY®



ITEM	PART NO.	DESCRIPTION	QTY.	WEIGHT	NOTE NO.
1	GB-04125	1/2" X 1-1/4" GALV BOLT KIT	1	0.12 LBS	
2	GB-04265	1/2" X 2-3/4" GALV BOLT KIT	1	0.20 LBS	
3	GB-05225	5/8" X 2-1/4" GALV BOLT KIT	8	0.28 LBS	
4	GB-05305	5/8" X 3" GALV BOLT KIT	4	0.35 LBS	
5	GN-04	1/2" GALV HEX NUT	4	0.04 LBS	
6	GN-06	3/4" GALV HEX NUT	12	0.15 LBS	
7	GUB-4240	1/2" X 2-1/2" X 4" GALV U-BOLT	19	0.56 LBS	
8	GWF-04	1/2" GALV FLAT WASHER	4	0.03 LBS	
9	GWF-05	5/8" GALV FLAT WASHER	4	0.06 LBS	
10	GWF-06	3/4" GALV FLAT WASHER	8	0.10 LBS	
11	GWL-04	1/2" GALV LOCK WASHER	4	0.01 LBS	
12	GWL-06	3/4" GALV LOCK WASHER	8	0.04 LBS	
13	MT-379-8	1/2" X 8" GALV THREADED ROD	2	0.44 LBS	
14	MT-651-96	2.375" OD x 96" PIPE	2	17.29 LBS	
15	MT-651-96	Ø2.375" OD X 96" PIPE	4	23.05 LBS	
16	MT38416	Threaded Rod Galv 3/4" x 16"	4	1.99 LBS	
17	OS15034	3/4" X 1-1/2" OFFSET COLLAR	1	0.14 LBS	
18	SAB01	FORMED CLAMP	2	1.35 LBS	
19	SFV01	WELDMENT, SF-V STANDOFF ARM	2	36.81 LBS	
20	SFV02	SFV AZIMUTH BRACKET	3	6.70 LBS	
21	SFV03	SFV TAPER BRACKET	1	7.49 LBS	
22	SMU2080.06	CLAMP PLATE	2	6.96 LBS	
23	SMU208004	MOUNT	2	12.15 LBS	
24	XA2020.01	ANTENNA MOUNT ANGLE	9	2.65 LBS	

DENSITY	0.28	lbs/in³
MASS	400.61	lbs
VOLUME	1421.66	in³
SURFACE AREA		in²
HEIGHT		
LENGTH		
WIDTH		

COMMSCOPE, INC. OF NORTH CAROLINA

TOLERANCES
0 PLACE X ± .25 | 2 PLACE .XX ± .06
1 PLACE .X ± .12 | ANGLES ± 2°

SAP MATERIAL MASTER: MTC3975083

FINISH: GALV A123

MATERIAL: A1011/A1018, A500, A529

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS INTERPRET GEOMETRIC TOLERANCING PER ASME Y14.5M-1994, HANDBOOK TECHNICAL DRAWINGS, VOLUMES 1 & 2, THIRD EDITION (2002)

	NAME	DATE
CE	RDLS	7/14/17
RW		
RV		
AD		
RE	TP	7/14/17
ECN		

TITLE: SECTOR FRAME, 8' FACE, (3) 96" PIPES

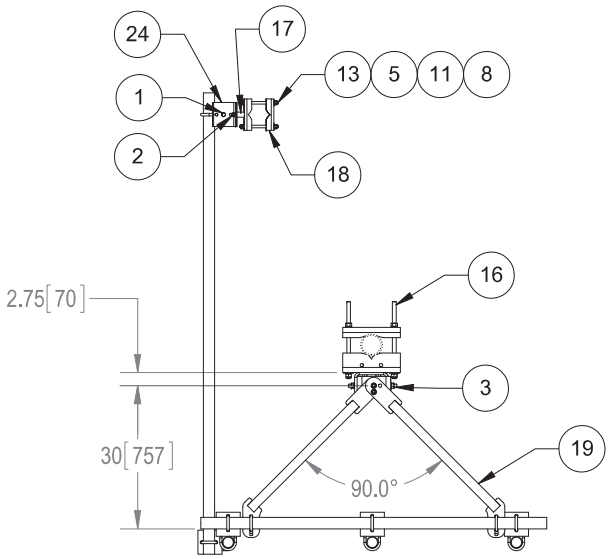
SCALE: 1:12

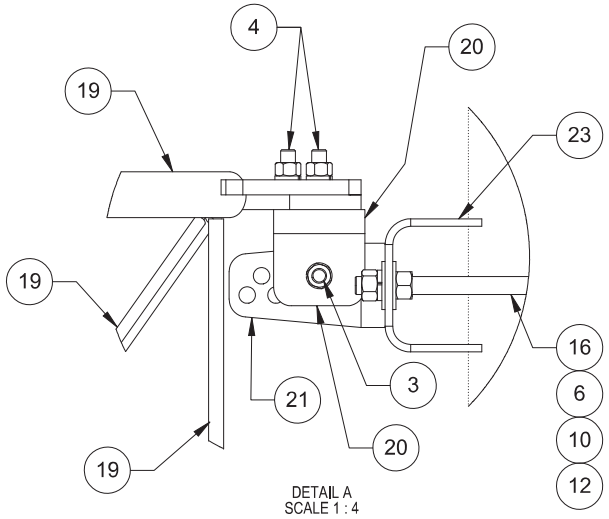
DOCUMENT NO.: MTC3975083

SIZE	WORK AREA	MODEL			DRAWING			SHEET
		VERSION	STATUS	REVISION	VERSION	STATUS	REVISION	
C							PRE	1 OF 2

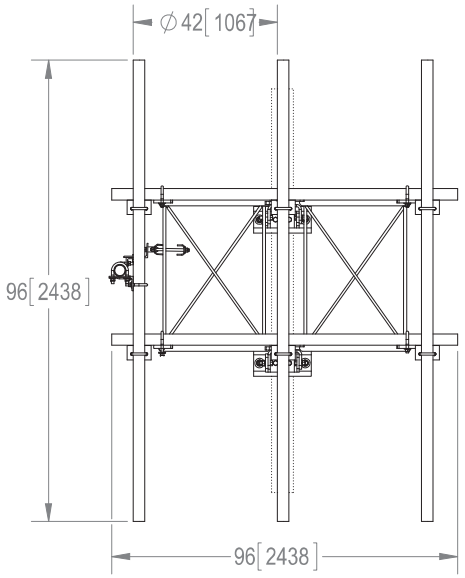
NOTES:

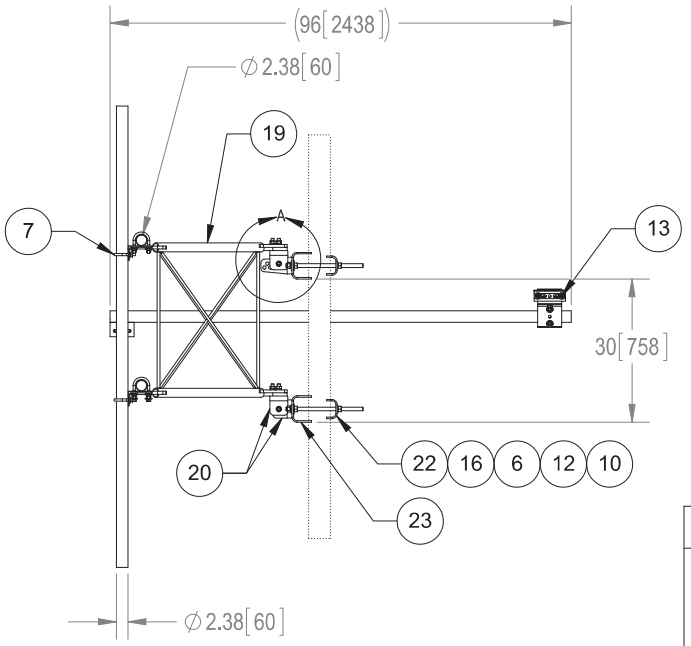
1.0 ALL METRIC DIMENSIONS ARE IN BRACKETS.





DETAIL A
SCALE 1 : 4





COMMSCOPE, INC. OF NORTH CAROLINA			
TITLE: **SECTOR FRAME, 8' FACE, (3) 96" PIPES**			
SIZE: C	SCALE: 1:20	DOCUMENT NO.: **MTC3975083**	
		DRAWING VERSION / STATUS / REVISION: PRE	SHEET: 2 OF 2

Exhibit F

Power Density/RF Emissions Report

EBI Consulting

environmental | engineering | due diligence

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

Dish Wireless Existing Facility

Site ID: 876345

BOBOS00874A
33 Janowski Road
Ashford, Connecticut 06278

May 22, 2022

EBI Project Number: 6222003235

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**15.83%**

May 22, 2022

Attn: Dish Wireless

Emissions Analysis for Site: 876345 - BOBOS00874A

EBI Consulting was directed to analyze the proposed Dish Wireless facility located at **33 Janowski Road** in **Ashford, Connecticut** for the purpose of determining whether the emissions from the Proposed Dish Wireless Antenna Installation located on this property are within specified federal limits.

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

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$, respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz frequency bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed Dish Wireless Wireless antenna facility located at 33 Janowski Road in Ashford, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since Dish Wireless is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 20 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 4 n71 channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 4 n70 channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

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

4) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 20 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

5) The antennas used in this modeling are the JMA MX08FRO665-21 for the 600 MHz / 1900 MHz channel(s) in Sector A, the JMA MX08FRO665-21 for the 600 MHz / 1900 MHz channel(s) in Sector B, the JMA MX08FRO665-21 for the 600 MHz / 1900 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 20 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

6) The antenna mounting height centerline of the proposed antennas is 130 feet above ground level (AGL).

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

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

Dish Wireless Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	JMA MX08FRO665-21	Make / Model:	JMA MX08FRO665-21	Make / Model:	JMA MX08FRO665-21
Frequency Bands:	600 MHz / 1900 MHz	Frequency Bands:	600 MHz / 1900 MHz	Frequency Bands:	600 MHz / 1900 MHz
Gain:	11.35 dBd / 15.75 dBd	Gain:	11.35 dBd / 15.75 dBd	Gain:	11.35 dBd / 15.75 dBd
Height (AGL):	130 feet	Height (AGL):	130 feet	Height (AGL):	130 feet
Channel Count:	8	Channel Count:	8	Channel Count:	8
Total TX Power (W):	280.00 Watts	Total TX Power (W):	280.00 Watts	Total TX Power (W):	280.00 Watts
ERP (W):	1,424.17	ERP (W):	1,424.17	ERP (W):	1,424.17
Antenna A1 MPE %:	**0.49%**	Antenna B1 MPE %:	**0.49%**	Antenna C1 MPE %:	**0.49%**

Site Composite MPE %	
Carrier	**MPE %**
Dish Wireless (Max at Sector A):	0.49%
AT&T	5.19%
Verizon	5.58%
T-Mobile	2.77%
Nextel	0.21%
Sprint	1.59%
Site Total MPE % :	15.83%

Dish Wireless MPE % Per Sector	
Dish Wireless Sector A Total:	0.49%
Dish Wireless Sector B Total:	0.49%
Dish Wireless Sector C Total:	0.49%
Site Total MPE % :	15.83%

Dish Wireless Maximum MPE Power Values (Sector A)

Dish Wireless Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
Dish Wireless 600 MHz n71	4	110.82	130.0	1.04	600 MHz n71	400	0.26%
Dish Wireless 1900 MHz n70	4	245.22	130.0	2.29	1900 MHz n70	1000	0.23%
						Total:	**0.49%**

• NOTE: Totals may vary by approximately 0.01% due to summation of remainders in calculations.

Summary

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

The anticipated maximum composite contributions from the Dish Wireless facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

Dish Wireless Sector	Power Density Value (%)
Sector A:	0.49%
Sector B:	0.49%
Sector C:	0.49%
Dish Wireless Maximum MPE % (Sector A):	0.49%
Site Total:	15.83%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **15.83%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Exhibit G

Letter of Authorization

4545 E River Rd, Suite 320
West Henrietta, NY 14586

Phone: (585) 445-5896
Fax: (724) 416-4461
www.crowncastle.com

Crown Castle Letter of Authorization

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

Re: Tower Share Application
Crown Castle telecommunications site at:
33 JANOWSKI ROAD, ASHFORD, CT 06278

GLOBAL SIGNAL ACQUISITIONS II LLC ("Crown Castle") hereby authorizes DISH Wireless LLC, including their Agent, to act as our Agent in the processing of all zoning applications, building permits and approvals through the CT - CONNECTICUT SITING COUNCIL for the existing wireless communications site described below:

Crown Site ID/Name: **876345/SKY HILL**
Customer Site ID: **BOBOS00874A/**
Site Address: **33 Janowski Road, Ashford, CT 06278**

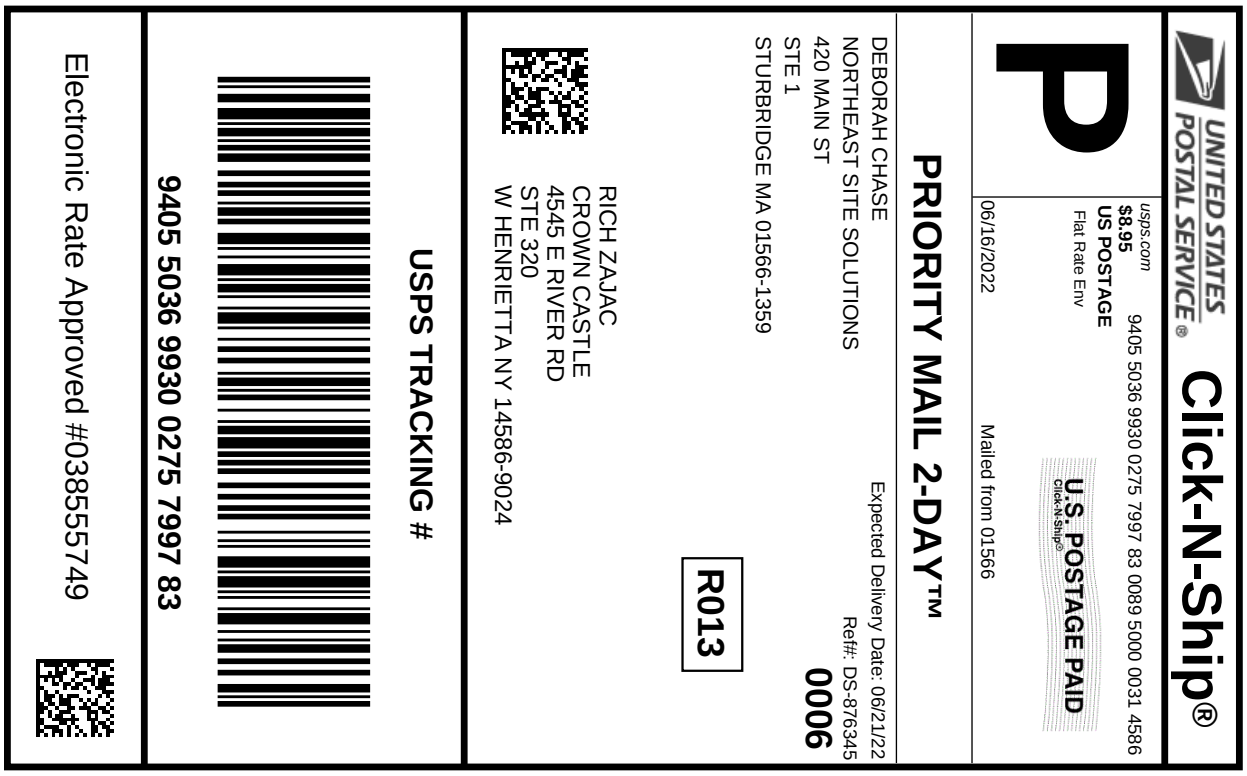
Crown Castle

By: _____ Date: 6/6/2022

Richard Zajac
Site Acquisition Specialist

Exhibit H

Recipient Mailings



Cut on dotted line.

Instructions

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

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0275 7997 83

Trans. #:	565814562
Print Date:	06/16/2022
Ship Date:	06/16/2022
Expected Delivery Date:	06/21/2022

Priority Mail® Postage:	**$8.95**
Total:	**$8.95**

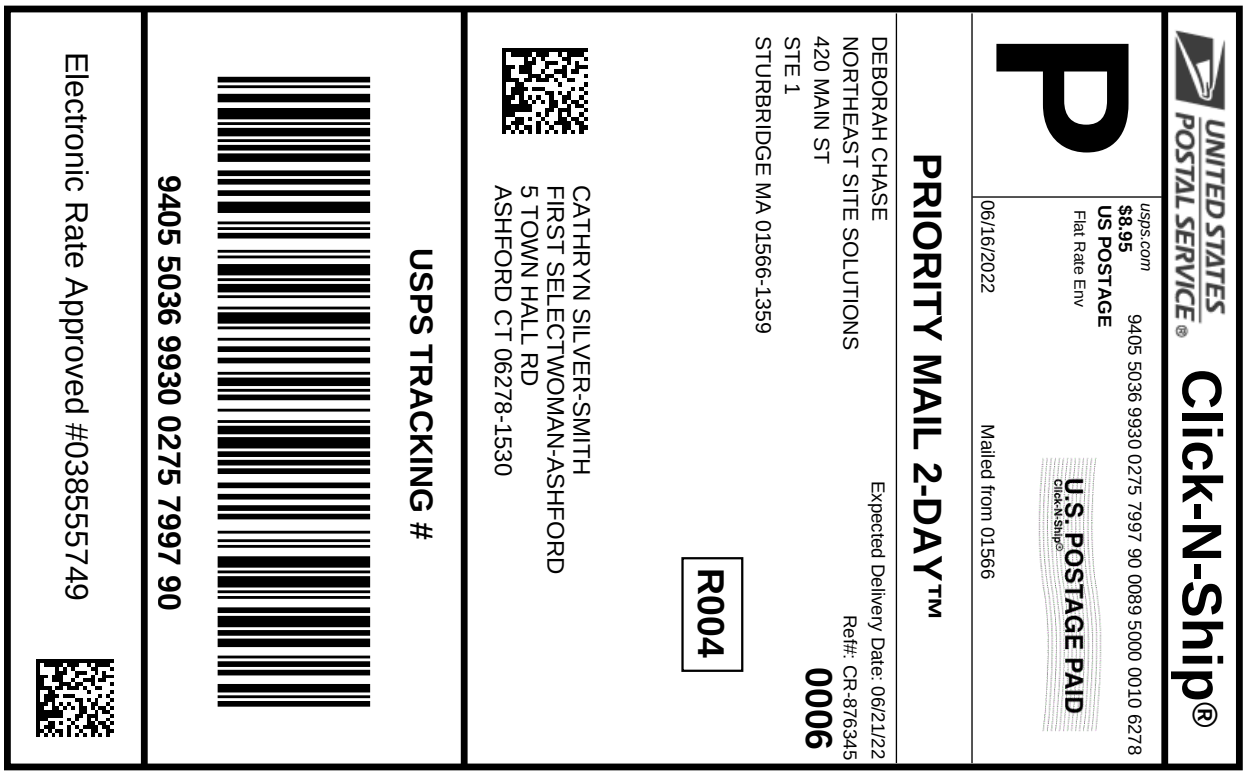
From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Ref#: DS-876345

To: RICH ZAJAC
CROWN CASTLE
4545 E RIVER RD
STE 320
W HENRIETTA NY 14586-9024

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

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



Cut on dotted line.

Instructions

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

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0275 7997 90

Trans. #:	565814562
Print Date:	06/16/2022
Ship Date:	06/16/2022
Expected Delivery Date:	06/21/2022

Priority Mail® Postage:	**$8.95**
Total:	**$8.95**

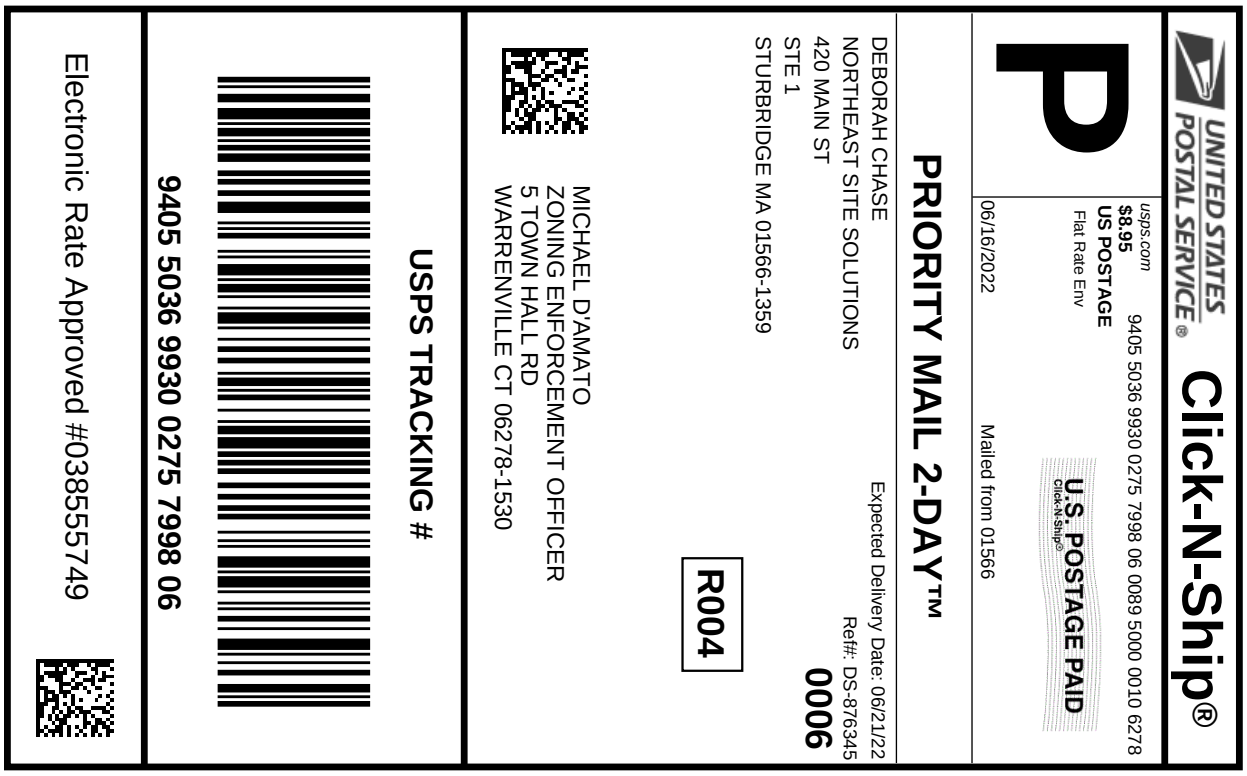
From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Ref#: CR-876345

To: CATHRYN SILVER-SMITH
FIRST SELECTWOMAN-ASHFORD
5 TOWN HALL RD
ASHFORD CT 06278-1530

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

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



Cut on dotted line.

Instructions

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

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0275 7998 06

Trans. #:	565814562
Print Date:	06/16/2022
Ship Date:	06/16/2022
Expected Delivery Date:	06/21/2022

Priority Mail® Postage:	**$8.95**
Total:	**$8.95**

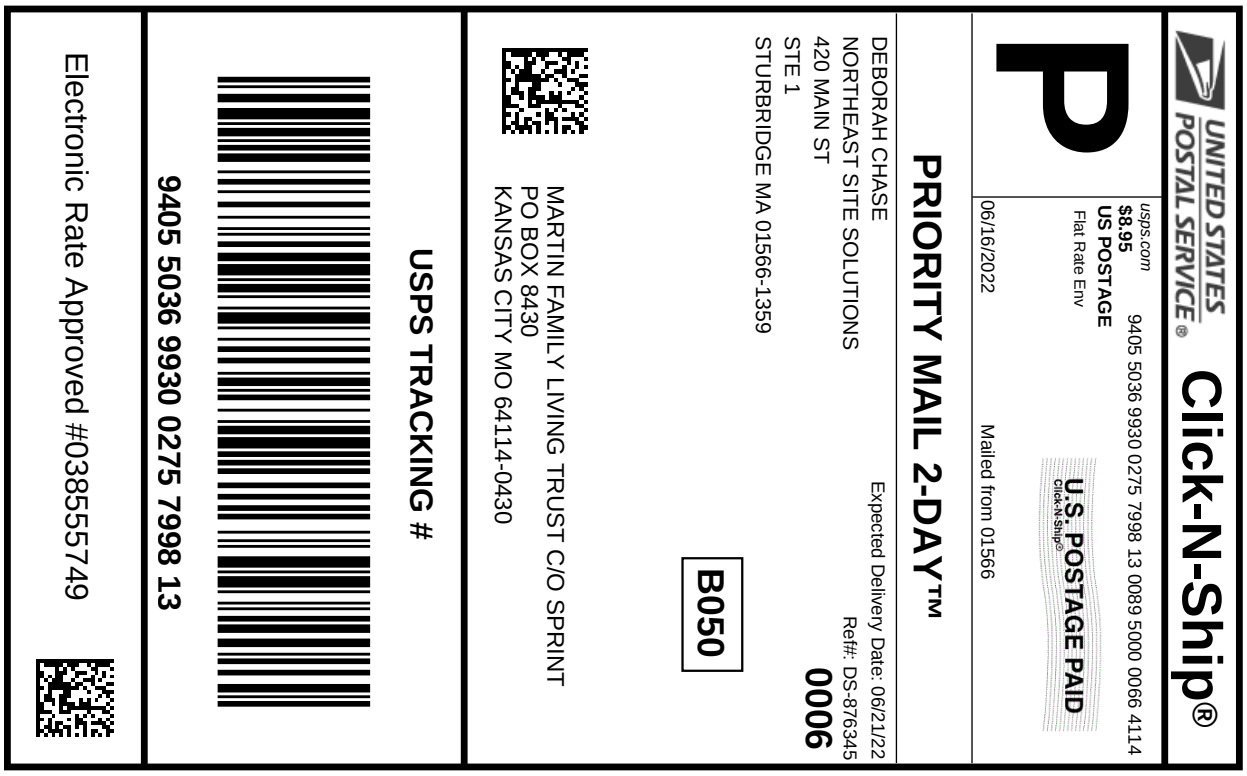
From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Ref#: DS-876345

To: MICHAEL D'AMATO
ZONING ENFORCEMENT OFFICER
5 TOWN HALL RD
WARRENVILLE CT 06278-1530

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

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



Cut on dotted line.

Instructions

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

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0275 7998 13

Trans. #:	565814562
Print Date:	06/16/2022
Ship Date:	06/16/2022
Expected Delivery Date:	06/21/2022

Priority Mail® Postage:	**$8.95**
Total:	**$8.95**

From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Ref#: DS-876345

To: MARTIN FAMILY LIVING TRUST C/O SPRINT SPECTRUM
PO BOX 8430
KANSAS CITY MO 64114-0430

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

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

UNITED STATES POSTAL SERVICE.

FARMINGTON
210 MAIN ST
FARMINGTON, CT 06032-9998
(800)275-8777

06/21/2022 09:30 AM

Product	Qty	Unit Price	Price
Prepaid Mail West Henrietta, NY 14586 Weight: 0 lb 1.90 oz Acceptance Date: Tue 06/21/2022 Tracking #: 9405 5036 9930 0275 7997 83	1		$0.00
Prepaid Mail Ashford, CT 06278 Weight: 0 lb 8.40 oz Acceptance Date: Tue 06/21/2022 Tracking #: 9405 5036 9930 0275 7998 06	1		$0.00
Prepaid Mail Kansas City, MO 64114 Weight: 1 lb 0.70 oz Acceptance Date: Tue 06/21/2022 Tracking #: 9405 5036 9930 0275 7998 13	1		$0.00
Prepaid Mail Ashford, CT 06278 Weight: 0 lb 8.30 oz Acceptance Date: Tue 06/21/2022 Tracking #: 9405 5036 9930 0275 7997 90	1		$0.00
Grand Total:			$0.00

****
Every household in the U.S. is now
eligible to receive a third set
of 8 free test kits.
Go to www.covidtests.gov
****

Preview your Mail
Track your Packages
Sign up for FREE @
https://informeddelivery.usps.com

All sales final on stamps and postage.
Refunds for guaranteed services only.
Thank you for your business.

Tell us about your experience.
Go to: https://postalexperience.com/Pos
or scan this code with your mobile device,

or call 1-800-410-7420.