NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

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

November 5, 2021

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

RE: Tower Share Application
73 North Main Street, Marlborough CT 06447
Latitude: 41.629806
Longitude: -72.4665
Site# 806366_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 73 North Main Street in Marlborough, Connecticut.

Dish Wireless LLC proposes to install three (3) 600/1900/2100 MHz antenna and six (6) RRUs, at the 116-foot level of the existing 155.6-foot monopole tower, one (1) Fiber cables will also be installed. Dish Wireless LLC equipment cabinets will be placed within 7x5 lease area. Included are plans by Infinigy, dated July 21, 2021 Exhibit C. Also included is a structural analysis prepared by Crown Castle, dated May 26, 2021, confirming that the existing tower is structurally capable of supporting the proposed equipment. Attached as Exhibit D. This facility was approved by the CT Sitting Council – Docket No. 169 on October 25, 1995. 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 Greg Lowrey, First Selectman for the Town of Marlborough, Peter Hughes, Director of Planning & Development, as well as the tower owner (Crown Castle) and property owner (Advantage Properties LLC).

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 tower is 155.6-feet; Dish Wireless LLC proposed antennas will be located at a center line height of 116-feet.

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

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.

NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

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. As indicated in the attached power density calculations, the combined site operations will result in a total power density of 31.56% 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 indicates that the shared use of this facility satisfies these criteria.

A. Technical Feasibility. The existing monopole 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 Marlborough. 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 116-foot level of the existing 155.6-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 guyed 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 Marlborough.

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:

Greg Lowrey, First Selectman (also as property owner)
Town of Marlborough
26 North Main Street Marlborough, CT 06447

Peter Hughes, Director of Planning & Development
Town of Marlborough
26 North Main Street Marlborough, CT 06447

Advantage Properties LLC
C/O Kevin MacGranor
219 South Road Marlborough, CT 06447

Crown Castle, Tower Owner

Exhibit A

Original Facility Approval

Filing Guides
Meetings & Minutes
Public Participation
Audio Link to New Britain Hearing Rooms
Programs & Services
Telecommunications Database
Publications
Other Resources
Statutes & Regulations
Electric Transmission Upgrade Projects
Frequently Asked Questions

Melanie Bachman,
Executive Director

DOCKET NO. 169 - An application of Bell Atlantic NYNEX Mobile, for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a telecommunications tower and associated equipment located within a 56+/- acre parcel at 56 East Hampton Road, in Marlborough, Connecticut. The proposed alternatives are located within a 21.7+/- acre parcel at North Main Street and within a 2.5+/- acre parcel at 9-11 South Main Street, in Marlborough, Connecticut.

Connecticut Siting Council

October 25, 1995

DECISION AND ORDER

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, operation, and maintenance of a cellular telecommunications tower and equipment building at the proposed first alternate site in Marlborough, Connecticut, including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate either alone or cumulatively with other effects when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application and therefore directs that a Certificate of Environmental Compatibility and Public Need, as provided by General Statutes § 16-50k, be issued to Bell Atlantic NYNEX Mobile, Inc. (BANM) for the construction, operation, and maintenance of a cellular telecommunications tower, associated equipment, and building at the proposed first alternate site, located within a 21.7+/- acre parcel at North Main Street, Marlborough, Connecticut. We find the effects on scenic resources and adjacent land uses of the prime site and second alternate site to be significant, and therefore deny certification of these sites.

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

1. The tower shall be constructed as a monopole, no taller than necessary to provide the proposed communications service, sufficient to accommodate the antennas of Springwich Cellular Limited Partnership and the Town of Marlborough, and not to exceed a total height of 160 feet above ground level (AGL).

2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be submitted to and approved by the Council prior to the commencement of facility construction and shall include placement of utilities underground, relocation of the tower within the leased parcel to provide the maximum practicable buffer of the tower from adjacent land owners; plans for the tower foundation; specifications for the placement of all antennas to be attached to this tower; plans for the equipment building and security fence; plans for the access road and utility line installation from North Main Street; plans for site clearing and tree trimming; and plans for water drainage and erosion and sedimentation controls consistent with the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended.

3. Upon the establishment of any new State or federal radio frequency standards applicable to frequencies of this facility, the facility granted herein shall be brought into compliance with such standards.

4. The Certificate Holder shall provide the Council a recalculated report of electromagnetic radio frequency power density if and when circumstances in operation cause a change in power density above the levels originally calculated and provided in the application.

5. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.

6. If the facility does not initially provide, or permanently ceases to provide cellular services following completion of construction, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapplication for any continued or new use shall be made to the Council before any such use is made.

7. Unless otherwise approved by the Council, this Decision and Order shall be void if all construction authorized herein is not completed within three years of the effective date of this Decision and Order or within three years after all appeals to this Decision and Order have been resolved.

8. The Certificate Holder shall notify the Council upon completion of construction and provide the final cost to construct the facility.

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

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

The parties and intervenors to this proceeding are:

APPLICANT	**ITS REPRESENTATIVE**
Bell Atlantic NYNEX Mobile, Inc.	Brian C. S. Freeman, Esq. Kenneth C. Baldwin, Esq. Robinson & Cole One Commercial Plaza Hartford, CT 06103-3597 David S. Malko General Manager - Engineering Sandy M. Ranciato Regulatory Services Bell Atlantic NYNEX Mobile, Inc. 20 Alexander Drive Wallingford, CT 06492
INTERVENOR	**ITS REPRESENTATIVE**
Springwich Cellular Limited Partnership	Peter J. Tyrrell, Esq. Springwich Cellular Limited Partnership 227 Church Street New Haven, CT 06510
PARTY	**ITS REPRESENTATIVE**
Town of Marlborough	William S. Fish, Jr. Tyler, Cooper & Alcorn CityPlace, 35th Floor Hartford, CT 06103-3488
PARTY	**ITS REPRESENTATIVE**
Neighbors Endorsing an Appropriate Tower (NEAT)	Barry S. Zitser Perakos, Kindl & Zitser 207 Main Street Hartford, CT 06106

Content Last Modified on 8/9/2002 11:28:31 AM

Exhibit B

Property Card

Property Location: 73 NO MAIN ST | **MAP ID:** 6/ 26/ 65T/ / | **Bldg Name:** | **State Use:** 200

Vision ID: 100287 | **Account #** 2014T | **Bldg #:** 1 of 1 | **Sec #:** 1 of 1 | **Card** 1 of 1 | **Print Date:** 05/07/2019 10:27

CURRENT OWNER	TOPO.	UTILITIES	STRT./ROAD	LOCATION
ADVANTAGE PROPERTIES LLC	2 Above Street		1 Paved	
C/O CROWN ATLANTIC CO				
PMB 353				
4017 WASHINGTON RD				
MCMURRAY, PA 15317				
Additional Owners:				

SUPPLEMENTAL DATA

Other ID: 2014T	EXEMPT CO
Census	Lake Area
Dev. Lot	Photo Retake
Dev. Map	CB Letter
GIS ID: 6/26/65T	ASSOC PID#

CURRENT ASSESSMENT

Description	Code	Appraised Value	Assessed Value
Comm Land	2-1	121,900	85,330
Comm Bldg	2-2	80,600	56,420
Comm OB	2-5	663,000	464,100
	Total	865,500	605,850

6079
MARLBOROUGH, CT

VISION

RECORD OF OWNERSHIP

	BK-VOL/PAGE	SALE DATE	q/u	v/i	SALE PRICE	V.C.
ADVANTAGE PROPERTIES LLC	252/ 911	05/06/2019	U	I		29
VILLAGE PROPERTIES LLC	127/ 9	02/03/1999	U	I		29

PREVIOUS ASSESSMENTS (HISTORY)

Yr.	Code	Assessed Value	Yr.	Code	Assessed Value	Yr.	Code	Assessed Value
2015	2-1	85,330	2014	2-1	90,300	2014	2-1	90,300
2015	2-2	56,420	2014	2-2	25,270	2014	2-2	25,270
2015	2-5	578,620	2014	2-5	463,260	2014	2-5	463,260
	Total:	720,370		Total:	578,830		Total:	578,830

EXEMPTIONS

Year	Type	Description	Amount
		Total:	

OTHER ASSESSMENTS

Code	Description	Number	Amount	Comm. Int.

This signature acknowledges a visit by a Data Collector or Assessor

APPRAISED VALUE SUMMARY

Appraised Bldg. Value (Card)	80,600
Appraised XF (B) Value (Bldg)	0
Appraised OB (L) Value (Bldg)	663,000
Appraised Land Value (Bldg)	121,900
Special Land Value	0
Total Appraised Parcel Value	865,500
Valuation Method:	C
Adjustment:	0
Net Total Appraised Parcel Value	865,500

ASSESSING NEIGHBORHOOD

NBHD/ SUB	NBHD Name	Street Index Name	Tracing	Batch
0001/A				

NOTES

CELL TOWER LOCATED BEHIND MARLBORO BARN
CELLULAR TOWER; GATED
500 FT LF FALL DOWN ZONE = 5.74 AC
1.84 COMMERCIAL SITE
3.9 COMMERCIAL EXCESS

CELL TOWER VALUE = $2083/MONTH-5% VAC-
15% EXPENSES = $20,184 CAPPED AT 10% =
$201,880 PER SITE X 5 SITES = $1,009,400
2017 UPDATE-TERMINATION/EXPIRATION OFONE
CARRIER/SPRINT/NEXTEL

BUILDING PERMIT RECORD

Permit ID	Issue Date	Type	Description	Amount	Insp. Date	% Comp.	Date Comp.	Comments
18-318	10/16/2018	BP		20,000		0		REMOVE AND REPLAC
17-035	03/09/2017	BP		7,500		0		REPLACE 3 RRUS TO E
15-101	05/12/2015	CM	Commercial	0	07/27/2015	100		ANTENNA UPGRADE
1128	12/27/2012	CM	Commercial	0	07/27/2015	100		GROUND MOUNTED C
500	12/13/2011	CM	Commercial	0	07/27/2015	100		CHANGE SEVEN (7) AN

VISIT/ CHANGE HISTORY

Date	Type	IS	ID	Cd.	Purpose/Result
07/27/2015			LM	99	Vacant Land

LAND LINE VALUATION SECTION

B #	Use Code	Use Description	Zone	D	Front	Depth	Units	Unit Price	I. Factor	S.A.	Acre Disc	C. Factor	ST. Idx	Adj.	Notes- Adj	Special Pricing	S Adj Fact	Adj. Unit Price	Land Value
1	200	Commercial	R	A	181		1.84 AC	76,000.00	0.6150	C	1.0000	1.00	D	1.10			1.00		94,600
1	200	Commercial	R				3.90 AC	7,000.00	1.0000	0	1.0000	1.00		0.00			1.00		27,300

Total Card Land Units: 5.74 AC | Parcel Total Land Area: 5.74 AC | Total Land Value: 121,900

Property Location: 73 NO MAIN ST | **MAP ID:** 6/ 26/ 65T/ / | **Bldg Name:** | **State Use:** 200

Vision ID: 100287 | **Account #** 2014T | **Bldg #:** 1 of 1 | **Sec #:** 1 of 1 | **Card** 1 of 1 | **Print Date:** 05/07/2019 10:27

CONSTRUCTION DETAIL

Element	Cd.	Ch.	Description
Style	91		Support Shed
Model	94		Commercial
Grade	03		Average
Stories	1		
Occupancy	1		
Exterior Wall A	24		Reinforc Concr
Exterior Wall B			
Roof Structure	01		Flat
Roof Cover	04		T&G/Rubber
Interior Wall A	01		Minimum
Interior Wall B			
Interior Floor A	03		Concrete
Interior Floor B			
Heating Fuel	01		Coal or Wood
Heating Type	01		None
AC Type	03		Central
Bldg Use	200		Commercial
Heat/AC	02		HEAT/AC SPLIT
Frame Type	04		Reinforced Cnc
Baths/Plumbing	00		None
Ceiling/Walls	00		None
Rooms/Prtns	01		Light
Wall Height	8		
% Comn Wall			

CONSTRUCTION DETAIL (CONTINUED)

Element	Cd.	Ch.	Description

MIXED USE

Code	Description	Percentage
200	Commercial	100

COST/MARKET VALUATION

Adj. Base Rate:	110.32
Replace Cost	92,669
AYB	2000
Dep Code	A
Remodel Rating	
Year Remodeled	
Dep %	13
Functional Obslnc	
External Obslnc	
Cost Trend Factor	1
Condition	
% Complete	
Overall % Cond	87
Apprais Val	80,600
Dep % Ovr	0
Dep Ovr Comment	
Misc Imp Ovr	0
Misc Imp Ovr Comment	
Cost to Cure Ovr	0
Cost to Cure Ovr Comment	

OB-OUTBUILDING & YARD ITEMS(L) / XF-BUILDING EXTRA FEATURES(B)

Code	Description	Sub	Sub Descript	L/B	Units	Unit Price	Yr	Gde	Dp Rt	Cnd	%Cnd	Apr Value
SHD1	Shed	FR	Frame	L	360	20.00	1999			5	60	4,300
FN4	Fence 8'			L	322	20.00	2000			5	60	3,900
PAT1	Patio	CR	Concrete	L	192	3.50	2000				60	400
CELL	Cell Tower			L	4	163,600.00	2011		0		100	654,400

BUILDING SUB-AREA SUMMARY SECTION

Code	Description	Living Area	Gross Area	Eff. Area	Unit Cost	Undeprec. Value
BAS	First Floor	840	840	840		92,669
	Ttl. Gross Liv/Lease Area:	840	840	840		92,669

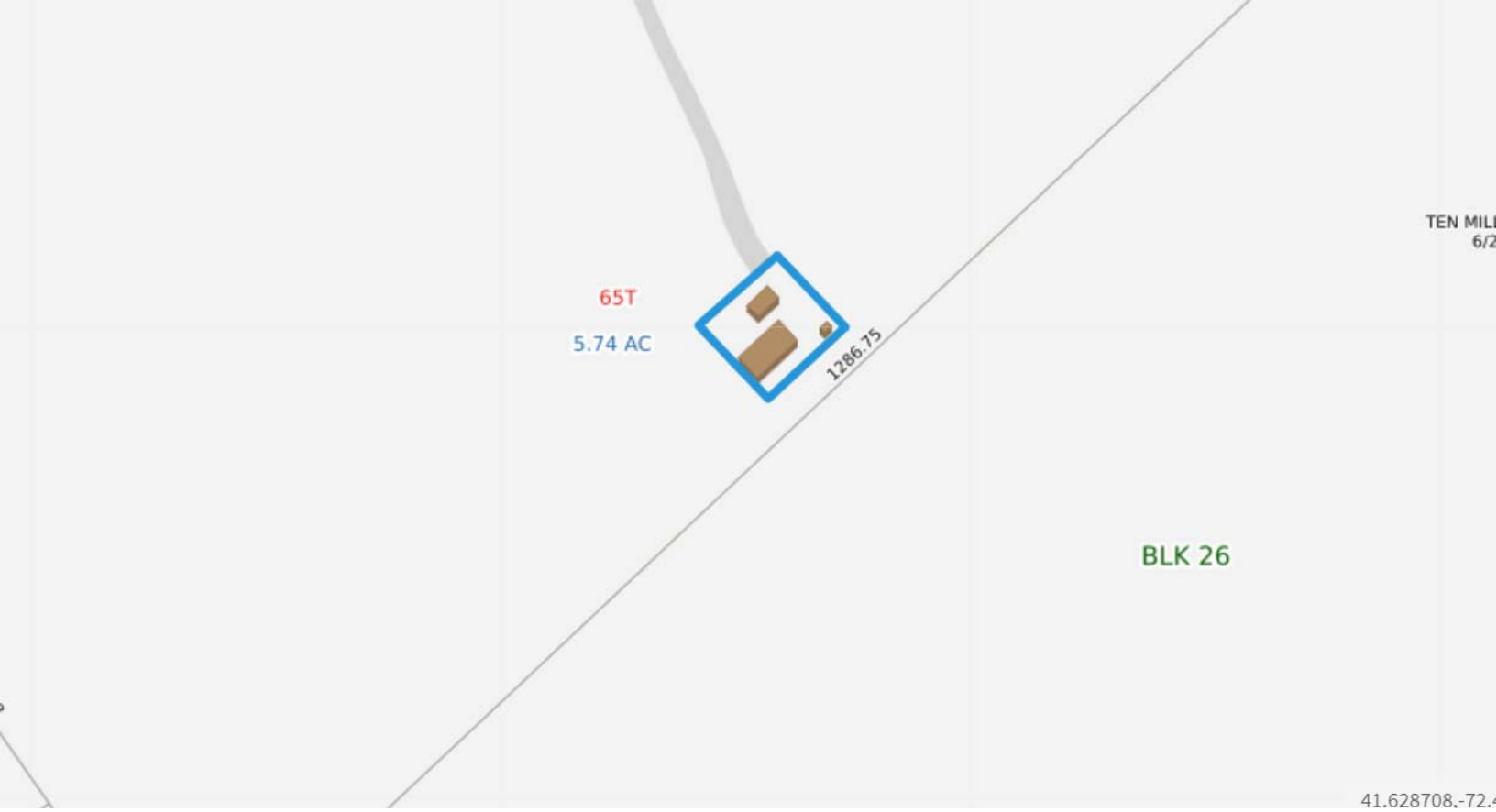

65T
5.74 AC
1286.75
BLK 26
TEN MILE
6/2
41.628708,-72.4

Exhibit C

Construction Drawings

dish wireless™

DISH Wireless L.L.C. SITE ID:

BOBDL00042A

DISH Wireless L.L.C. SITE ADDRESS:

73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

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 (1) PROPOSED TOWER PLATFORM MOUNT
- INSTALL PROPOSED JUMPERS
- INSTALL (6) PROPOSED RRUs (2 PER SECTOR)
- INSTALL (1) PROPOSED OVER VOLTAGE PROTECTION DEVICE (OVP)
- INSTALL (1) PROPOSED HYBRID CABLE

GROUND SCOPE OF WORK:
- INSTALL (1) PROPOSED METAL PLATFORM
- INSTALL (1) PROPOSED ICE BRIDGE
- 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)
- INSTALL (1) PROPOSED METER SOCKET

SITE INFORMATION

PROPERTY OWNER:	GLOBAL SIGNAL ACQUISITION
ADDRESS:	P.O. BOX 277455 ATLANTA, GA 30384–7455
TOWER TYPE:	MONOPOLE
TOWER CO SITE ID:	806366
TOWER APP NUMBER:	556642
COUNTY:	HARTFORD
LATITUDE (NAD 83):	41° 37' 47.3" N 41.629806 N
LONGITUDE (NAD 83):	72° 27' 59.4" W 72.4665 W
ZONING JURISDICTION:	CONNECTICUT SITING COUNCIL
ZONING DISTRICT:	R
PARCEL NUMBER:	000008–000026–000056CD
OCCUPANCY GROUP:	U
CONSTRUCTION TYPE:	II–B
POWER COMPANY:	CONNECTICUT LIGHT & POWER
TELEPHONE COMPANY:	LIGHTOWER

PROJECT DIRECTORY

APPLICANT:	DISH Wireless L.L.C. 5701 SOUTH SANTA FE DRIVE LITTLETON, CO 80120
TOWER OWNER:	CROWN CASTLE 2000 CORPORATE DRIVE CANONSBURG, PA 15317 (877) 486–9377
SITE DESIGNER:	B+T GROUP 1717 S. BOULDER AVE, SUITE 300 TULSA, OK 74119 (918) 587–4630
SITE ACQUISITION:	SARAH PARSONS SARAH.PARSONS@CROWNCASTLE.COM
CONSTRUCTION MANAGER:	JAVIER SOTO JAVIER.SOTO@DISH.COM
RF ENGINEER:	BOSSENER CHARLES BOSSENER.CHARLES@DISH.COM

CONNECTICUT CODE COMPLIANCE

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

CODE TYPE	CODE
BUILDING	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

SITE PHOTO

DIRECTIONS

DIRECTIONS FROM SOUTHBRIDGE MUNICIPAL AIRPORT:

GET ON I–84 IN STURBRIDGE FROM PLEASANT ST, SOUTH ST, MASHAPAUG RD AND HAYNES ST/RTE 15, HEAD SOUTH ON CLEMENCE HILL RD TOWARD AIRPORT ACCESS RD, TURN RIGHT ONTO AIRPORT ACCESS RD, TURN LEFT ONTO PLEASANT ST, TURN LEFT ONTO MAIN ST, TURN RIGHT ONTO WEST ST, TURN RIGHT ONTO SOUTH ST, CONTINUE ONTO MASHAPAUG RD, SLIGHT RIGHT TO STAY ON MASHAPAUG RD, TURN LEFT ONTO HAYNES ST/RTE 15, TAKE THE RAMP ONTO I–84, FOLLOW I–84 AND CT–2 E TO N MAIN ST IN MARLBOROUGH. TAKE EXIT 12 FROM CT–2 E, MERGE WITH I–84, ENTERING CONNECTICUT ,KEEP LEFT TO STAY ON I–84, KEEP LEFT TO STAY ON I–84, KEEP RIGHT TO STAY ON I–84, FOLLOW SIGNS FOR I–91 N/HARTFORD, USE THE LEFT LANE TO TAKE EXIT 55 FOR CT–2 E TOWARD NORWICH, CONTINUE ONTO CT–2 E, TAKE EXIT 12 FOR WEST ROAD TOWARD BUSINESS ROUTE/MARLBOROUGH, CONTINUE ON N MAIN ST. DRIVE TO KEIRSTEAD CIR, CONTINUE ONTO N MAIN ST, TURN RIGHT ONTO HILLSIDE AVE, TURN LEFT ONTO KEIRSTEAD CIR.

SHEET INDEX

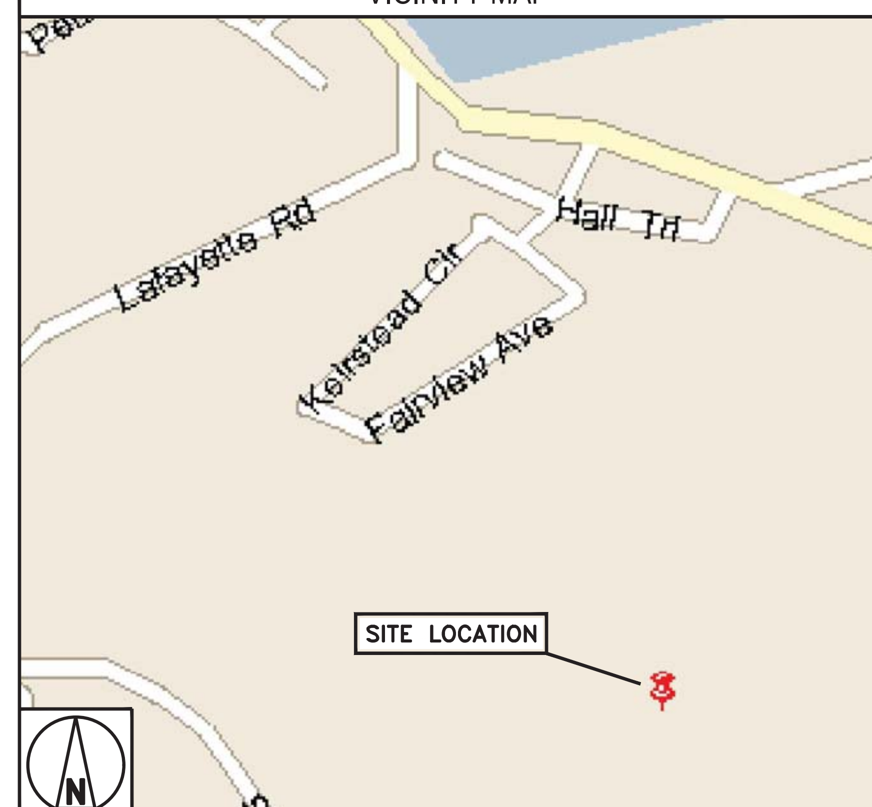
SHEET NO.	SHEET TITLE
T–1	TITLE SHEET
A–1	OVERALL AND ENLARGED SITE PLAN
A–2	ELEVATION, ANTENNA LAYOUT AND SCHEDULE
A–3	EQUIPMENT PLATFORM AND H–FRAME DETAILS
A–4	EQUIPMENT DETAILS
A–5	EQUIPMENT DETAILS
A–6	EQUIPMENT DETAILS
E–1	ELECTRICAL/FIBER ROUTE PLAN AND NOTES
E–2	ELECTRICAL DETAILS
E–3	ELECTRICAL ONE–LINE, FAULT CALCS & PANEL SCHEDULE
G–1	GROUNDING PLANS AND NOTES
G–2	GROUNDING DETAILS
G–3	GROUNDING DETAILS
RF–1	RF CABLE COLOR CODE
GN–1	LEGEND AND ABBREVIATIONS
GN–2	GENERAL NOTES
GN–3	GENERAL NOTES
GN–4	GENERAL NOTES

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

811

VICINITY MAP



NO SCALE

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.

---

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

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

7/21/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

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

DRAWN BY:	CHECKED BY:	APPROVED BY:
JJR	MTJ	MDW

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	6/4/21	ISSUED FOR REVIEW
B	7/1/21	ISSUED FOR REVIEW
0	7/21/21	ISSUED FOR CONSTRUCTION

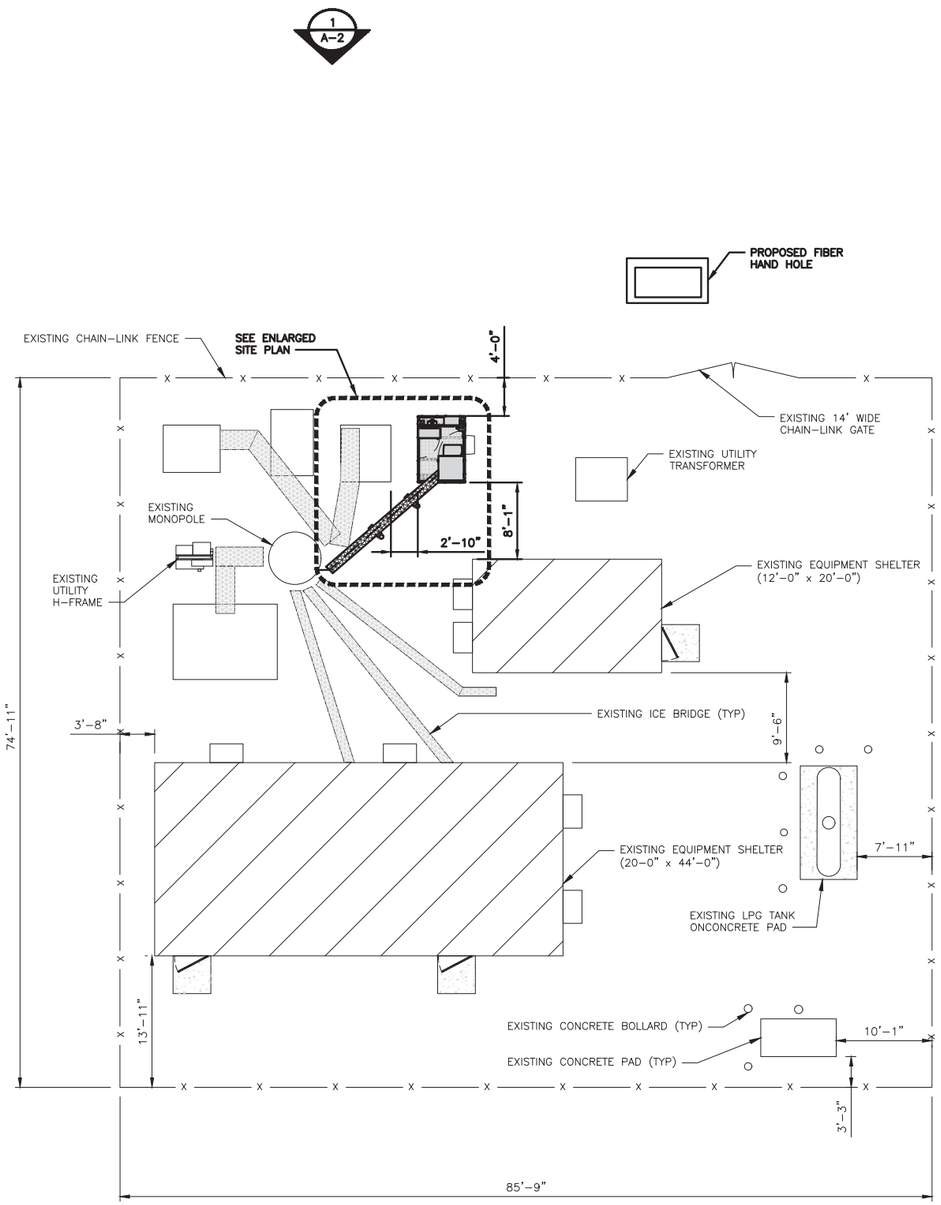
A&E PROJECT NUMBER
151421.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBDL00042A
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

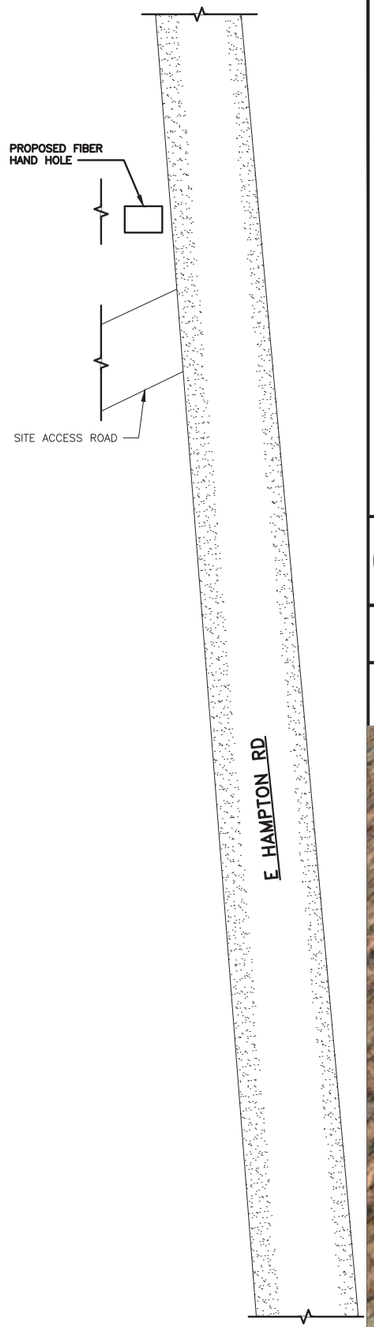
SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1



NOTES

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.



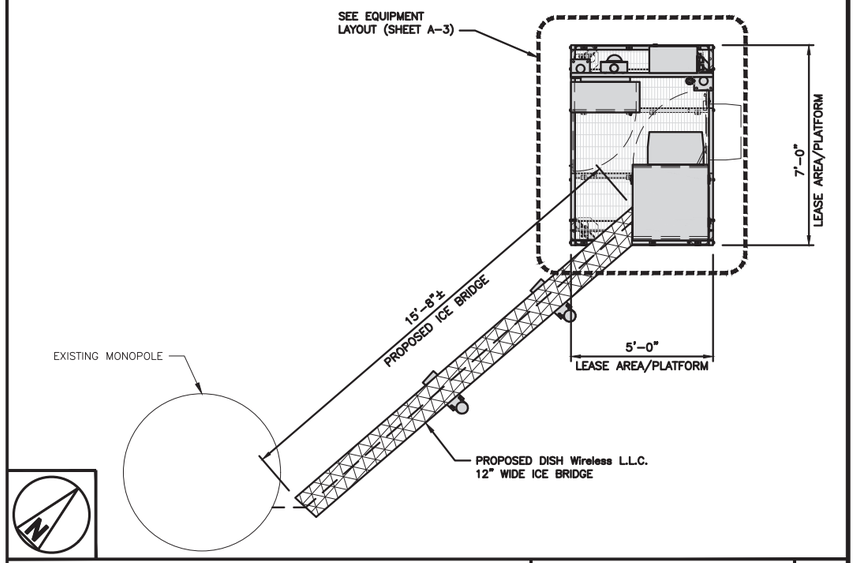
OVERALL SITE PLAN

8' 4' 0 8' 16'
1/8"=1'-0"

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.



ENLARGED SITE PLAN

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

2

UTILITY PLAN

3

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

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

STATE OF CONNECTICUT
No. 23924
LICENSED
PROFESSIONAL ENGINEER
7/21/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

DRAWN BY:	CHECKED BY:	APPROVED BY:
JJR	MTJ	MDW

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	6/4/21	ISSUED FOR REVIEW
B	7/1/21	ISSUED FOR REVIEW
0	7/21/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
151421.001.01

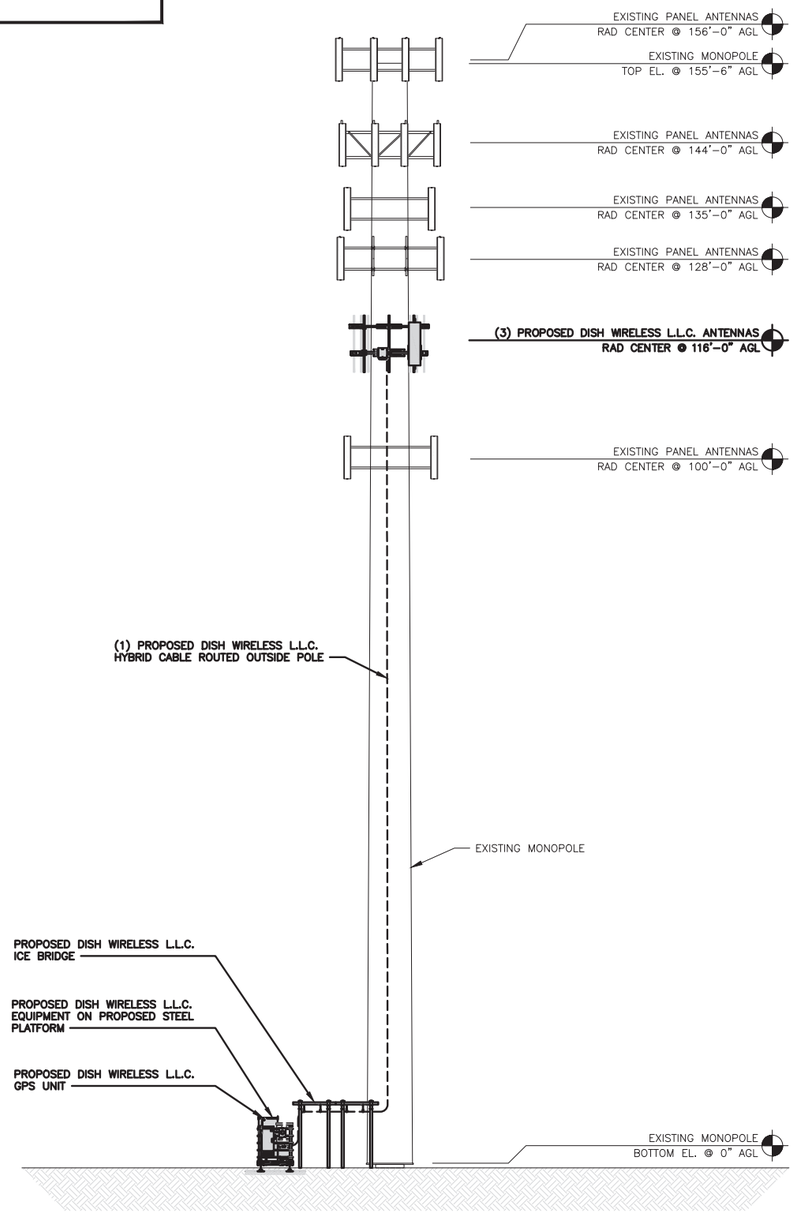
DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00042A
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

SHEET TITLE
OVERALL AND ENLARGED SITE PLAN

SHEET NUMBER
A-1

NOTES

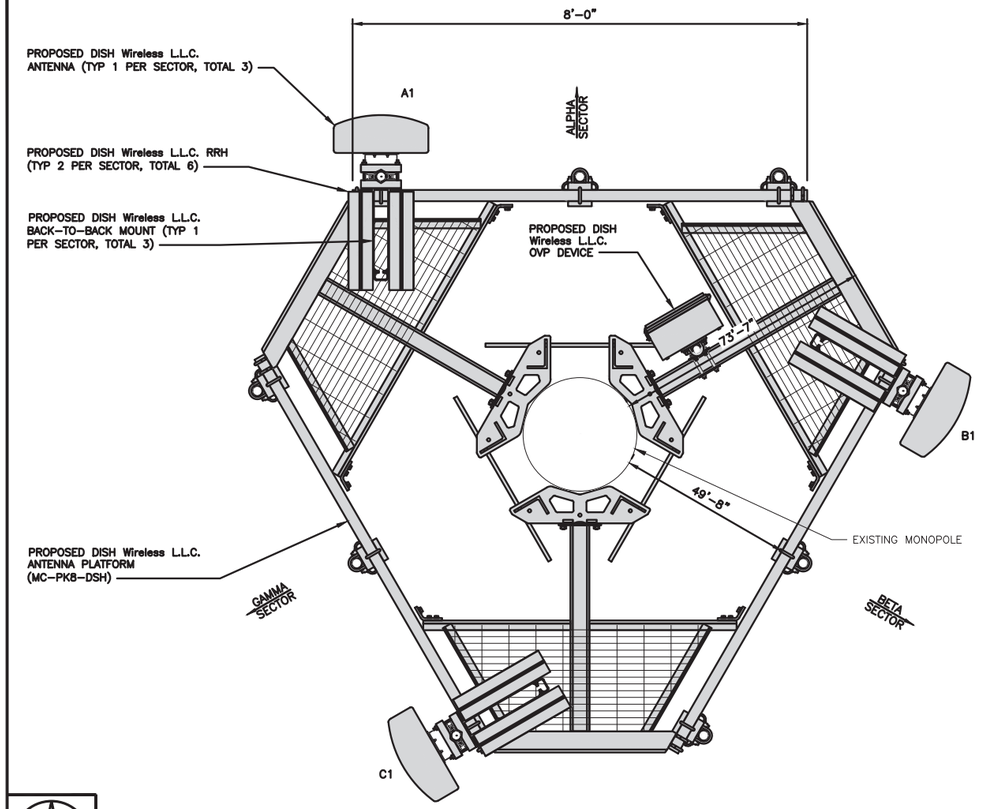
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. ANTENNA AND MW DISH SPECIFICATIONS REFER TO ANTENNA SCHEDULE AND TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS
3. EXISTING EQUIPMENT AND FENCE OMITTED FOR CLARITY.



PROPOSED NORTH-WEST 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	POSITION	ANTENNA						TRANSMISSION CABLE
		EXISTING OR PROPOSED	MANUFACTURER – MODEL NUMBER	TECHNOLOGY	SIZE (HxW)	AZIMUTH	RAD CENTER	FEED LINE TYPE AND LENGTH
ALPHA	A1	PROPOSED	JMA – MX08FRO665-21	5G	72.0" x 20.0"	0°	116'-0"	(1) HIGH-CAPACITY HYBRID CABLE (155' LONG)
BETA	B1	PROPOSED	JMA – MX08FRO665-21	5G	72.0" x 20.0"	120°	116'-0"	
GAMMA	C1	PROPOSED	JMA – MX08FRO665-21	5G	72.0" x 20.0"	240°	116'-0"	

SECTOR	POSITION	RRH	
		MANUFACTURER – MODEL NUMBER	TECHNOLOGY
ALPHA	A1	FUJITSU – TA08025-B604	5G
	A1	FUJITSU – TA08025-B605	5G
BETA	B1	FUJITSU – TA08025-B604	5G
	B1	FUJITSU – TA08025-B605	5G
GAMMA	C1	FUJITSU – TA08025-B604	5G
	C1	FUJITSU – TA08025-B605	5G

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

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

STATE OF CONNECTICUT — No. 23924 — LICENSED PROFESSIONAL ENGINEER

7/21/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

DRAWN BY:	CHECKED BY:	APPROVED BY:
JJR	MTJ	MDW

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	6/4/21	ISSUED FOR REVIEW
B	7/1/21	ISSUED FOR REVIEW
0	7/21/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

151421.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

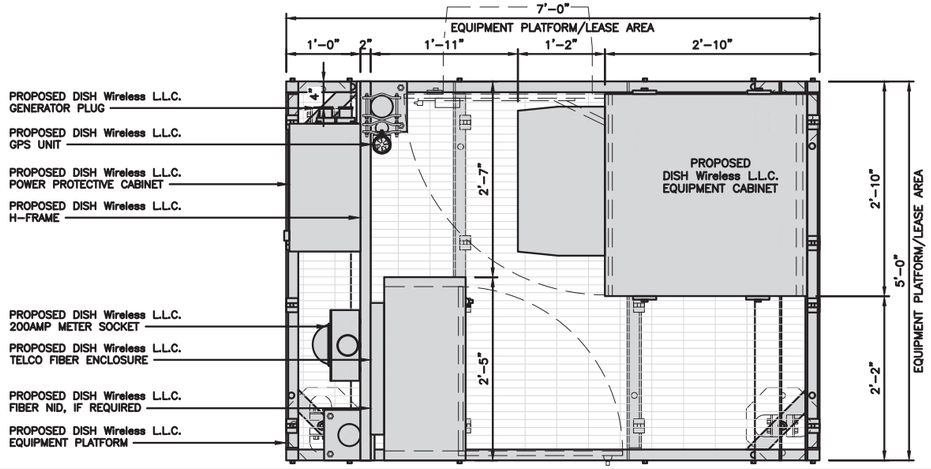
BOBDL00042A
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

SHEET TITLE

ELEVATION, ANTENNA LAYOUT AND SCHEDULE

SHEET NUMBER

A-2



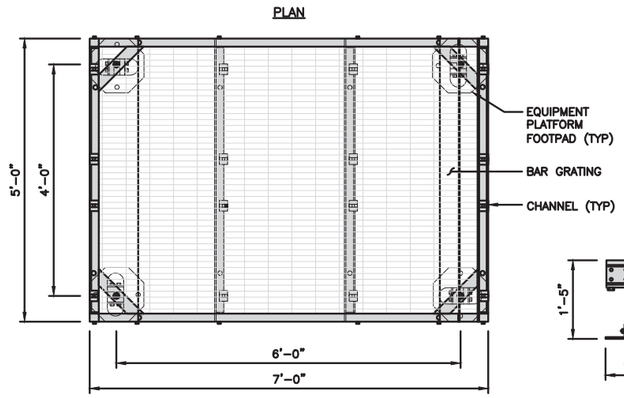
PLATFORM EQUIPMENT PLAN

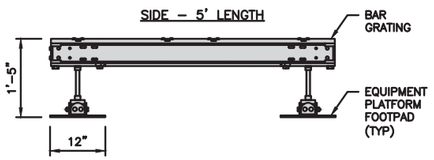
12" 9" 6" 3" 0 1' 2"
1"=1'-0"

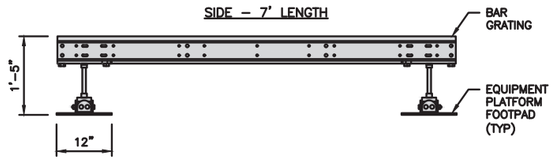
1

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"

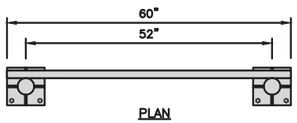


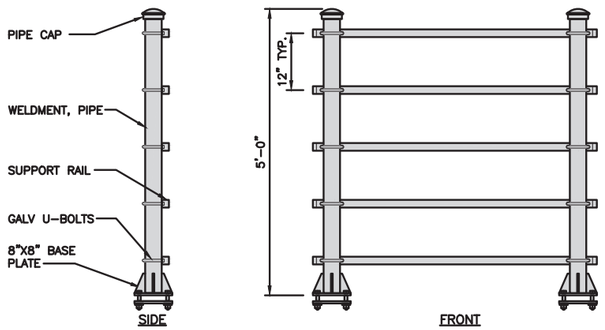




PLATFORM DETAIL | NO SCALE | 2

KENWOOD T1701KT5-5S H-FRAME	
UNISTRUT/SUPPORT RAIL	5
WEIGHT/ VOLUME	173.6 LBS



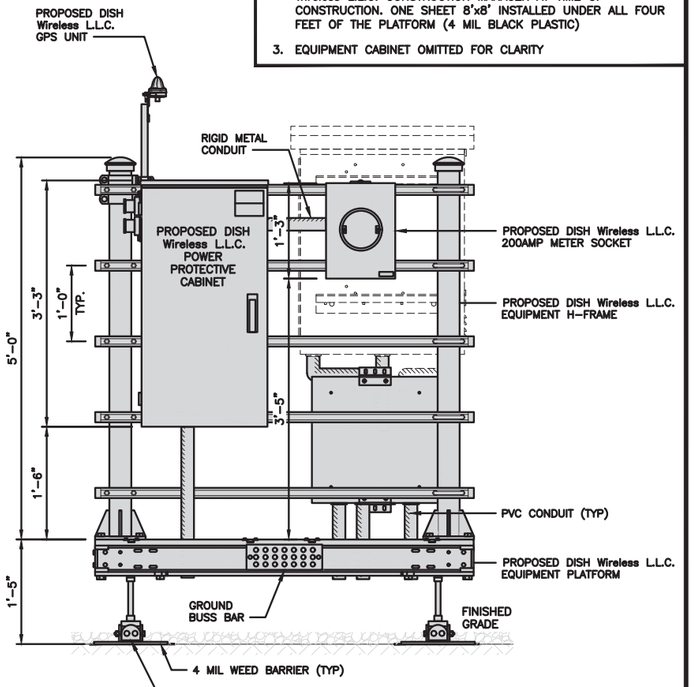


H-FRAME DETAIL | NO SCALE | 3

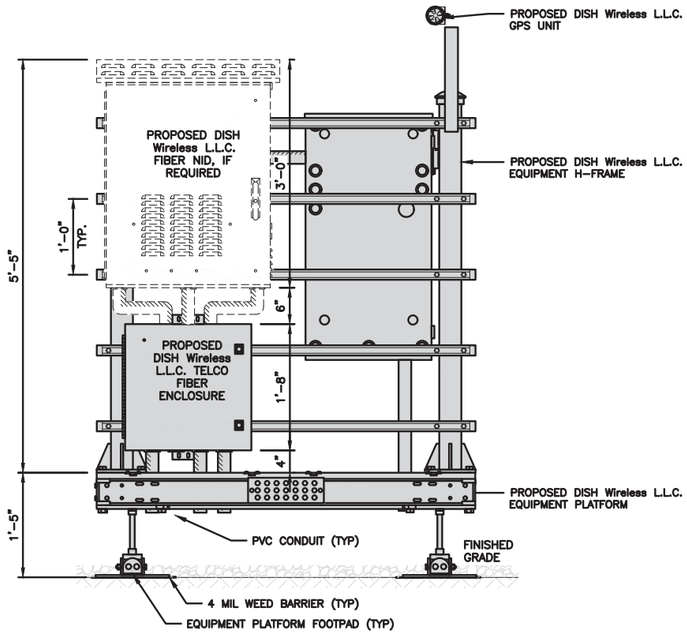
NOT USED | NO SCALE | 4

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

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

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

DRAWN BY:	CHECKED BY:	APPROVED BY:
JJR	MTJ	MDW

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	6/4/21	ISSUED FOR REVIEW
B	7/1/21	ISSUED FOR REVIEW
0	7/21/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
151421.001.01

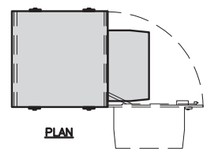
DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00042A
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

SHEET TITLE
EQUIPMENT PLATFORM AND H-FRAME DETAILS

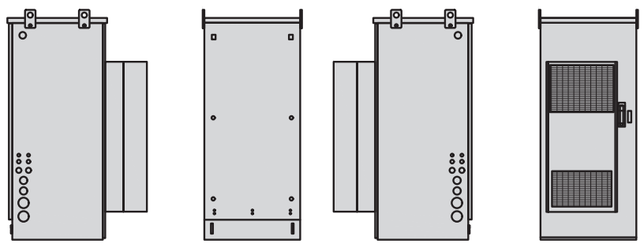
SHEET NUMBER
A-3

CHARLES INDUSTRY HEX CUBE–PM639155N4

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



PLAN



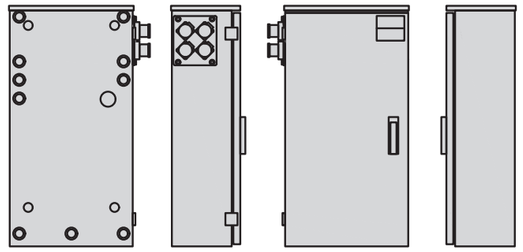
SIDE BACK SIDE FRONT

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



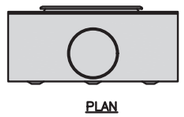
BACK SIDE FRONT SIDE

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

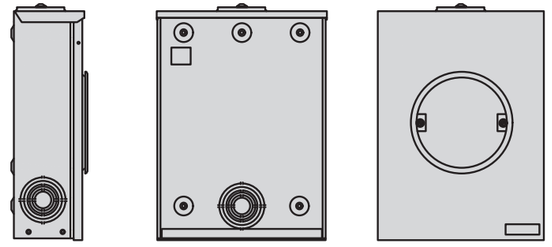
NOT USED | NO SCALE | 3

EATON METER SOCKET UNRRS213BEUSE

METER SOCKET TYPE	RING
ENCLOSURE DIM (HxWxD)	16"x12"x6"
MAIN AMPERE RATING	200A
WEIGHT	18 LBS



PLAN



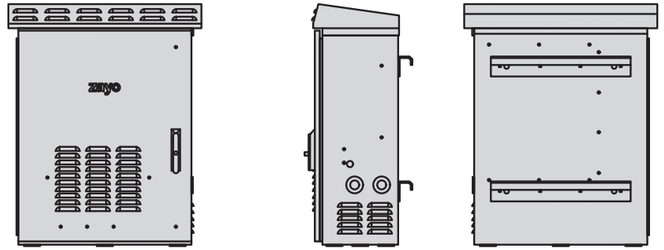
SIDE BACK FRONT

METER SOCKET DETAIL | NO SCALE | 4

ZAYO 5RU CABINET LEFT SWING DOOR ("LIT" SITES)

DIMENSIONS (HxWxD)	36.115"x29"x12.9"
WEIGHT	85 LBS
POWER INPUT	20A, –48VDC

PLAN

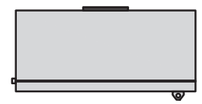


FRONT SIDE BACK

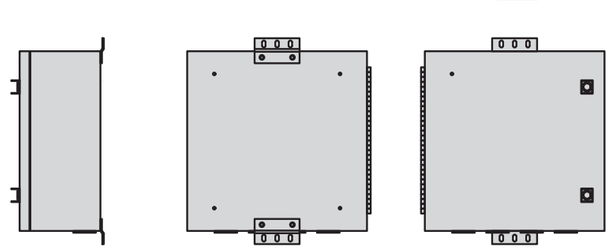
NETWORK INTERFACE UNIT DETAIL | NO SCALE | 5

CHARLES CFIT–PF2020DSH1 FIBER TELCO ENCLOSURE

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



FRONT



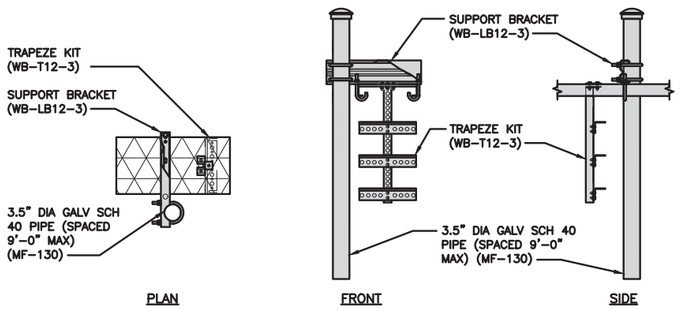
SIDE BACK FRONT

FIBER TELCO ENCLOSURE DETAIL | NO SCALE | 6

COMMSCOPE WB–K110–B WAVEGUIDE BRIDGE KIT

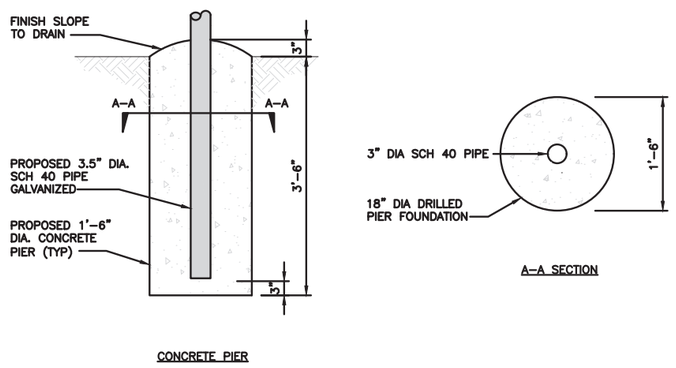
DIMENSIONS (HxL)	160"x10'
WEIGHT/ VOLUME	325.0 LBS
CABLE RUN (QTY)	12

INCLUDED PRODUCTS:
- WB–T12–3 TRAPEZE KIT, 3 RUNGS
- WB–LB12–3 SUPPORT BRACKET
- MF–130 DIRECT BURIAL PIPE COLUMN, 13'–4"



PLAN FRONT SIDE

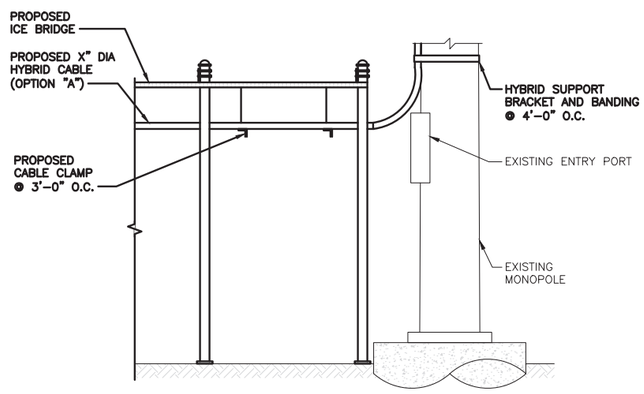
ICE BRIDGE DETAIL | NO SCALE | 7



CONCRETE PIER

A–A SECTION

TYPICAL ICE BRIDGE CONCRETE PIER DETAIL | NO SCALE | 8



HYBRID CABLE RUN | NO SCALE | 9

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

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

STATE OF CONNECTICUT — No. 23924 — LICENSED PROFESSIONAL ENGINEER — 7/21/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

DRAWN BY:	CHECKED BY:	APPROVED BY:
JJR	MTJ	MDW

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	6/4/21	ISSUED FOR REVIEW
B	7/1/21	ISSUED FOR REVIEW
0	7/21/21	ISSUED FOR CONSTRUCTION

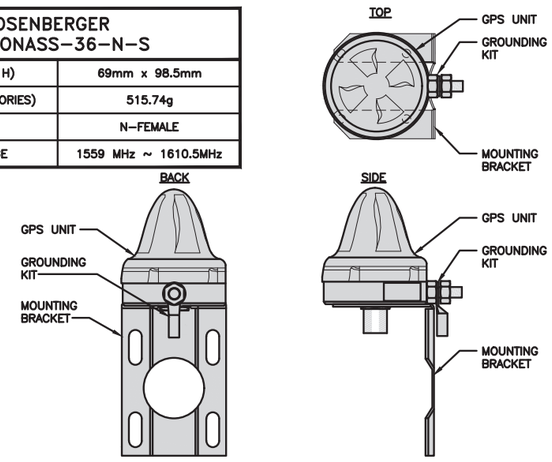
A&E PROJECT NUMBER
151421.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00042A
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

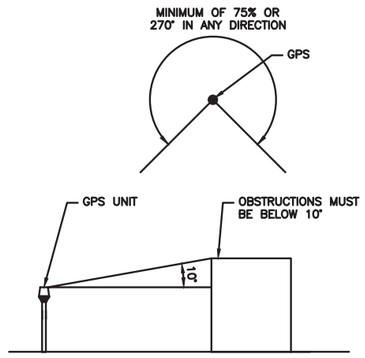
SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER
A-4

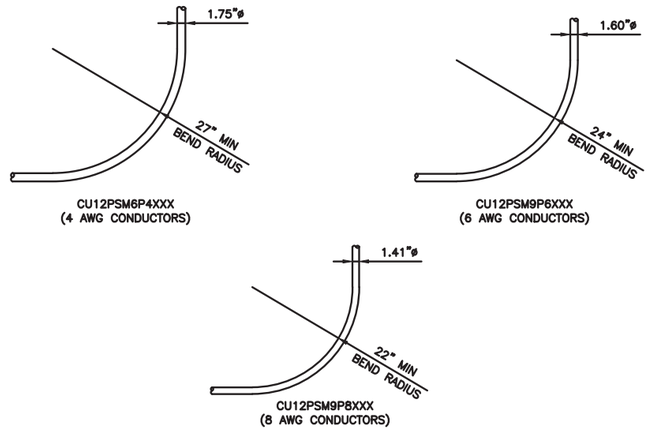
ROSENBERGER GPSGLONASS-36-N-S	
DIMENSION (DIA x H)	69mm x 98.5mm
WEIGHT (WITH ACCESSORIES)	515.74g
CONNECTOR	N-FEMALE
FREQUENCY RANGE	1559 MHz ~ 1610.5MHz



GPS ANTENNA DETAIL | NO SCALE | 1



GPS MINIMUM SKY VIEW REQUIREMENTS | NO SCALE | 2



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

NOT USED | 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

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

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

DRAWN BY:	CHECKED BY:	APPROVED BY:
JJR	MTJ	MDW

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	6/4/21	ISSUED FOR REVIEW
B	7/1/21	ISSUED FOR REVIEW
0	7/21/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
151421.001.01

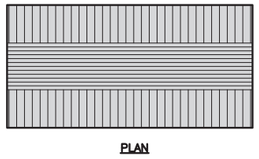
DISH Wireless L.L.C.
PROJECT INFORMATION

BOBDL00042A
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

SHEET TITLE
EQUIPMENT DETAILS

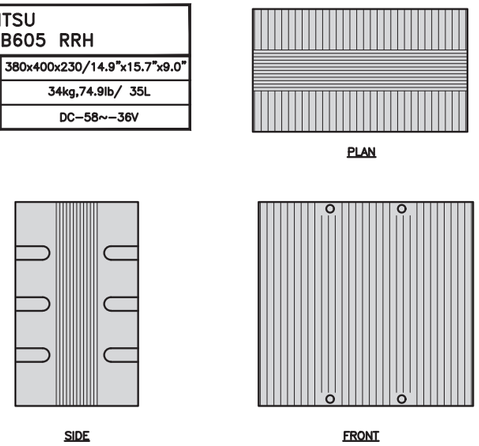
SHEET NUMBER
A-5

FUJITSU TA08025-B604 RRH	
DIMENSIONS (HxWxD) (KG/IN)	380x400x200/14.9"x15.7"x7.8"
WEIGHT(KG,LB)/ VOLUME	29kg,63.9lb/ 30L
POWER SUPPLY	DC-58~-36V



REMOTE RADIO HEAD DETAIL | NO SCALE | 1

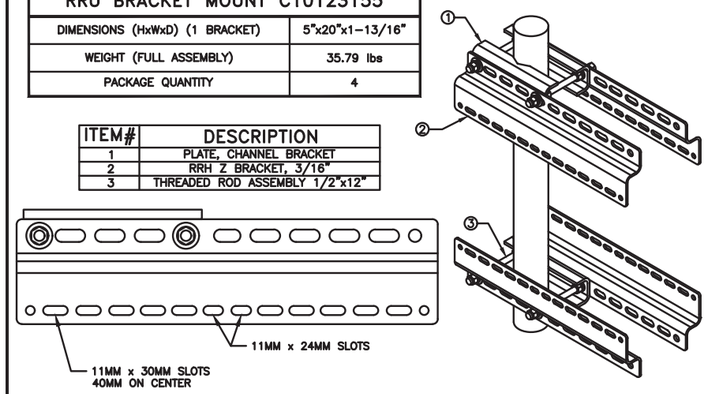
FUJITSU TA08025-B605 RRH	
DIMENSIONS (HxWxD) (KG/IN)	380x400x230/14.9"x15.7"x9.0"
WEIGHT(KG,LB)/ VOLUME	34kg,74.9lb/ 35L
POWER SUPPLY	DC-58~-36V



REMOTE RADIO HEAD DETAIL | NO SCALE | 2

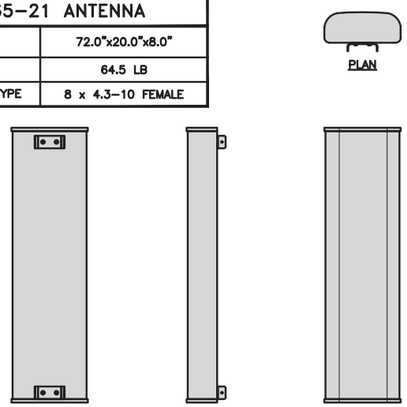
SABRE INDUSTRIES RRU BRACKET MOUNT C10123155	
DIMENSIONS (HxWxD) (1 BRACKET)	5"x20"x1-13/16"
WEIGHT (FULL ASSEMBLY)	35.79 lbs
PACKAGE QUANTITY	4

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



REMOTE RADIO MOUNT DETAIL | NO SCALE | 3

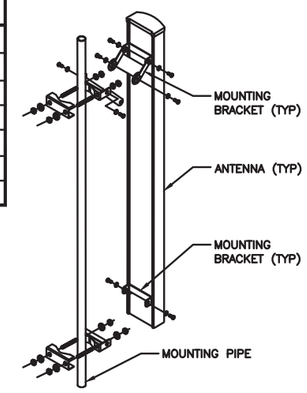
JMA WIRELESS MX08FRO665-21 ANTENNA	
DIMENSIONS (HxWxD)	72.0"x20.0"x8.0"
TOTAL WEIGHT	64.5 LB
RF PORTS, CONNECTOR TYPE	8 x 4.3-10 FEMALE



ANTENNA DETAIL | NO SCALE | 4

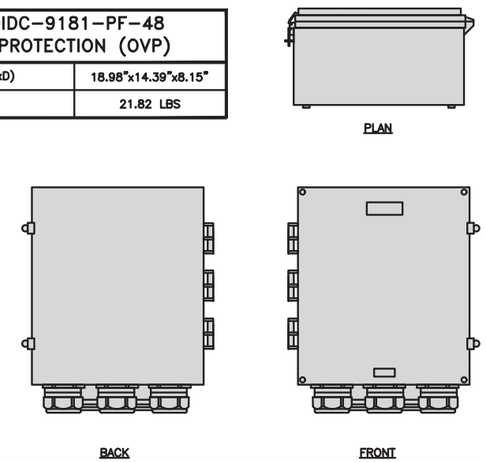
NOT USED | NO SCALE | 5

M04 MOUNTING BRACKET HPA-33R-BUU-H4-K	
WIDTH	5" (135mm)
DEPTH	2" (51mm)
HEIGHT	8" (213mm)
TOTAL WEIGHT (WITH BRACKETS)	1.5 LBS (15.50 Kg)
HOUSING MATERIAL	ASA/ABS/ALUMINUM
RADOME COLOR	LIGHT GRAY
CONNECTOR	1X8-PIN DAISY CHAIN



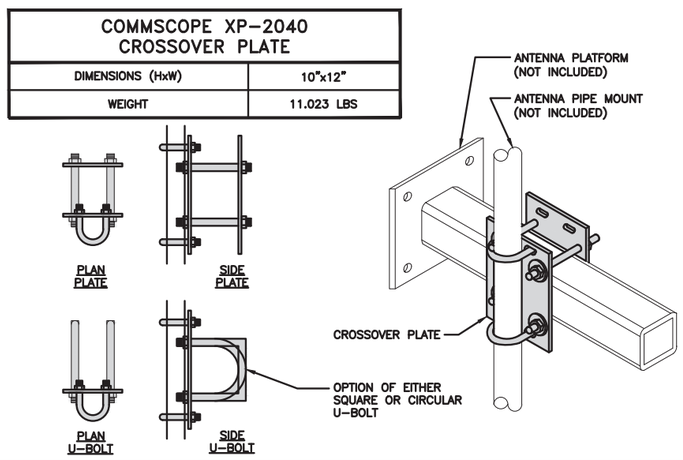
ANTENNA MOUNTING DETAIL | NO SCALE | 6

RAYCAP RDIDC-9181-PF-48 DC SURGE PROTECTION (OVP)	
DIMENSIONS (HxWxD)	18.98"x14.39"x8.15"
WEIGHT	21.82 LBS



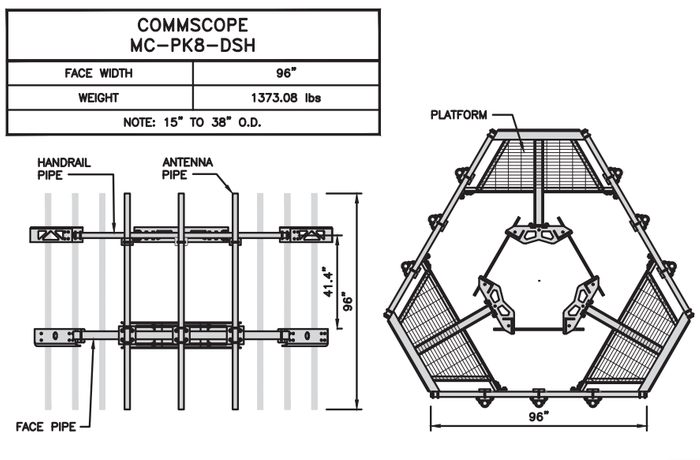
SURGE SUPPRESSION DETAIL (OVP) | NO SCALE | 7

COMMSCOPE XP-2040 CROSSOVER PLATE	
DIMENSIONS (HxW)	10"x12"
WEIGHT	11.023 LBS



RRH/OVP MOUNT DETAIL | NO SCALE | 8

COMMSCOPE MC-PK8-DSH	
FACE WIDTH	96"
WEIGHT	1373.08 lbs
NOTE: 15" TO 38" O.D.	



ANTENNA PLATFORM DETAIL | NO SCALE | 9

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

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

STATE OF CONNECTICUT — No. 23924 — LICENSED PROFESSIONAL ENGINEER
7/21/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

DRAWN BY:	CHECKED BY:	APPROVED BY:
JJR	MTJ	MDW

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	6/4/21	ISSUED FOR REVIEW
B	7/1/21	ISSUED FOR REVIEW
0	7/21/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
151421.001.01

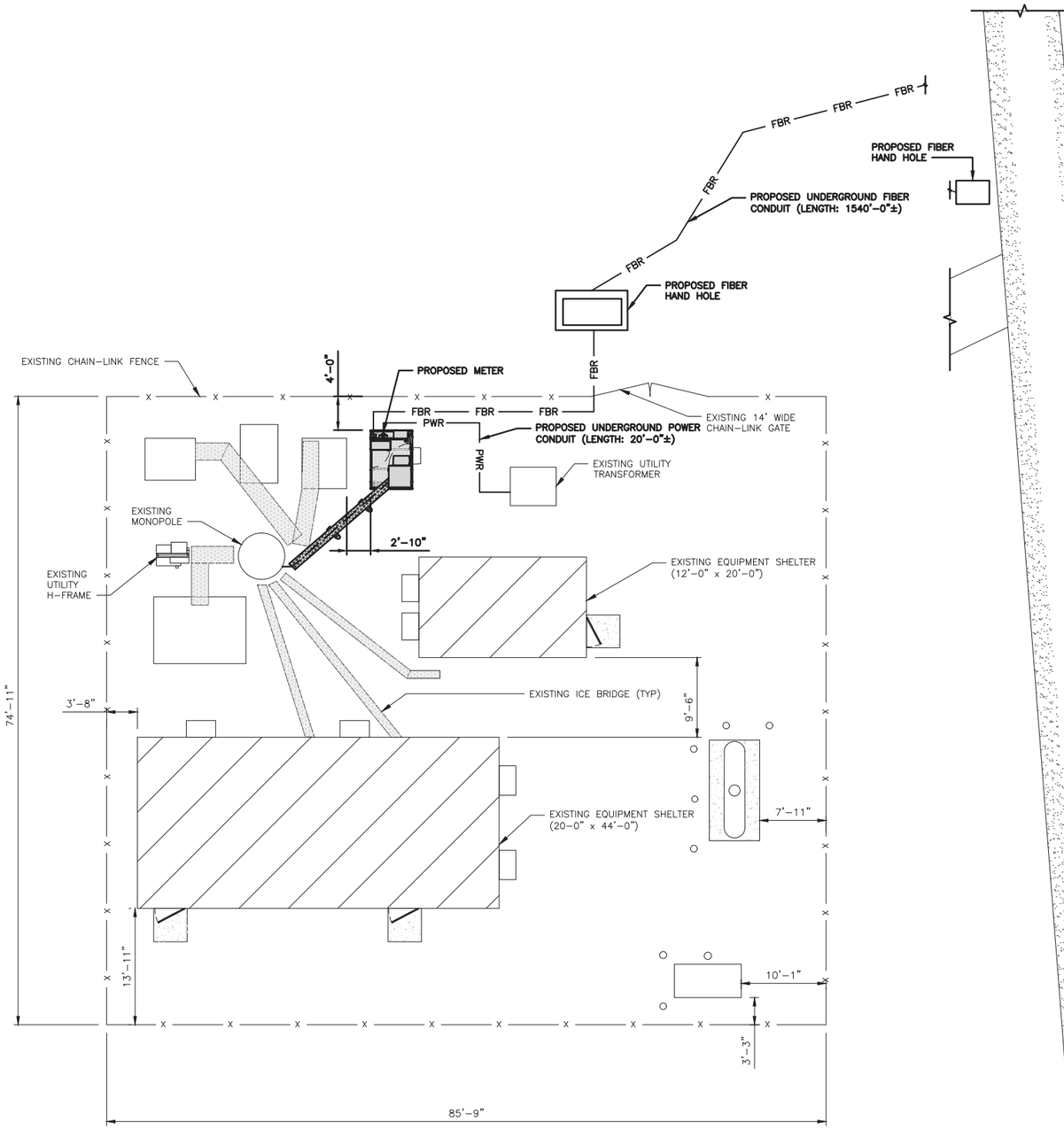
DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00042A
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER
A-6

NOTES

1. CONTRACTOR SHALL FIELD VERIFY ALL PROPOSED UNDERGROUND UTILITY CONDUIT ROUTE.
2. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.



UTILITY ROUTE PLAN

8' 4' 0 8' 16'
1/8"=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

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

STATE OF CONNECTICUT
No. 23924
LICENSED
PROFESSIONAL ENGINEER
7/21/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

DRAWN BY:	CHECKED BY:	APPROVED BY:
JJR	MTJ	MDW

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	6/4/21	ISSUED FOR REVIEW
B	7/1/21	ISSUED FOR REVIEW
0	7/21/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

151421.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBDL00042A
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

SHEET TITLE

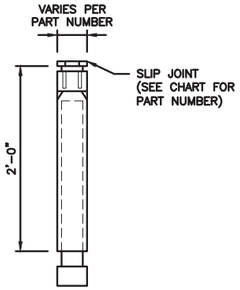
ELECTRICAL/FIBER ROUTE PLAN AND NOTES

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"

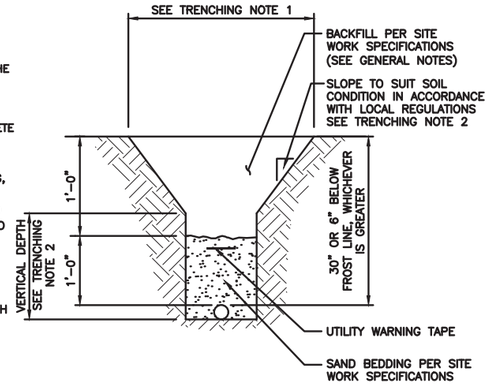


NOTE:
CONTRACTOR TO INSTALL EXPANSION FITTING SLIP JOINT AT METER CENTER CONDUIT TERMINATION, AS PER LOCAL UTILITY POLICY, ORDINANCE AND/OR SPECIFIED REQUIREMENT.

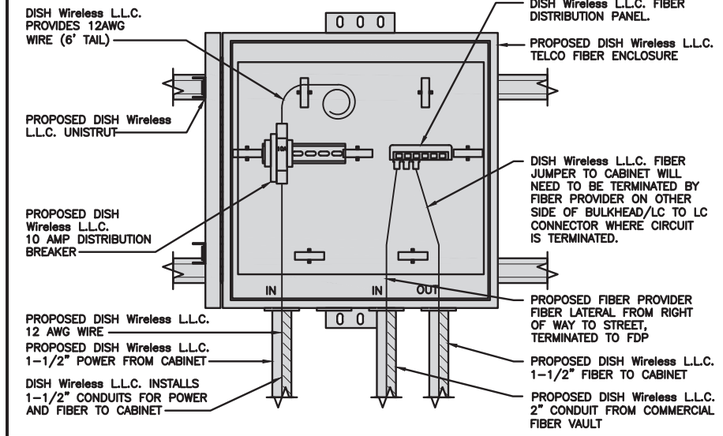
EXPANSION JOINT DETAIL | NO SCALE | 1

TRENCHING NOTES

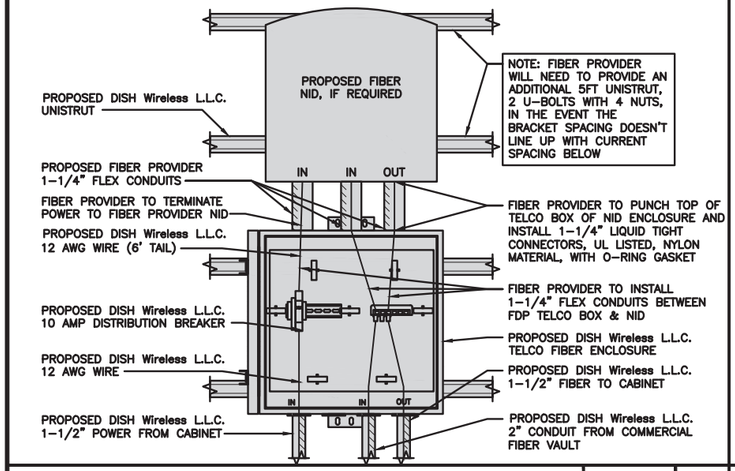
1. CONTRACTOR SHALL RESTORE THE TRENCH TO ITS ORIGINAL CONDITIONS BY EITHER SEEDING OR SODDING GRASS AREAS, OR REPLACING ASPHALT OR CONCRETE AREAS TO ITS ORIGINAL CROSS SECTION.
2. TRENCHING SAFETY; INCLUDING, BUT NOT LIMITED TO SOIL CLASSIFICATION, SLOPING, AND SHORING, SHALL BE GOVERNED BY THE CURRENT 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

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

STATE OF CONNECTICUT
No. 23924
LICENSED
PROFESSIONAL ENGINEER
7/21/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

DRAWN BY:	CHECKED BY:	APPROVED BY:
JJR	MTJ	MDW

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	6/4/21	ISSUED FOR REVIEW
B	7/1/21	ISSUED FOR REVIEW
0	7/21/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

151421.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

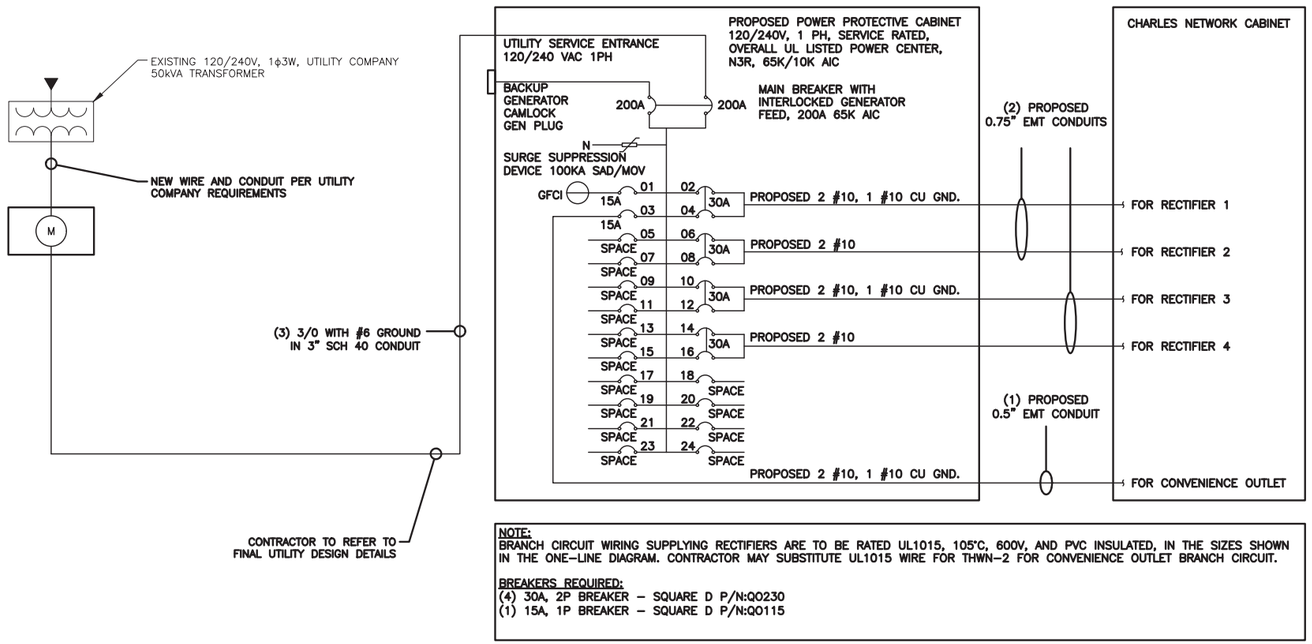
BOBDL00042A
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

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

PPC ONE-LINE DIAGRAM

NO SCALE | 1

NOTES

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.

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

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

STATE OF CONNECTICUT
No. 23924
LICENSED
PROFESSIONAL ENGINEER
7/21/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

DRAWN BY:	CHECKED BY:	APPROVED BY:
JJR	MTJ	MDW

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

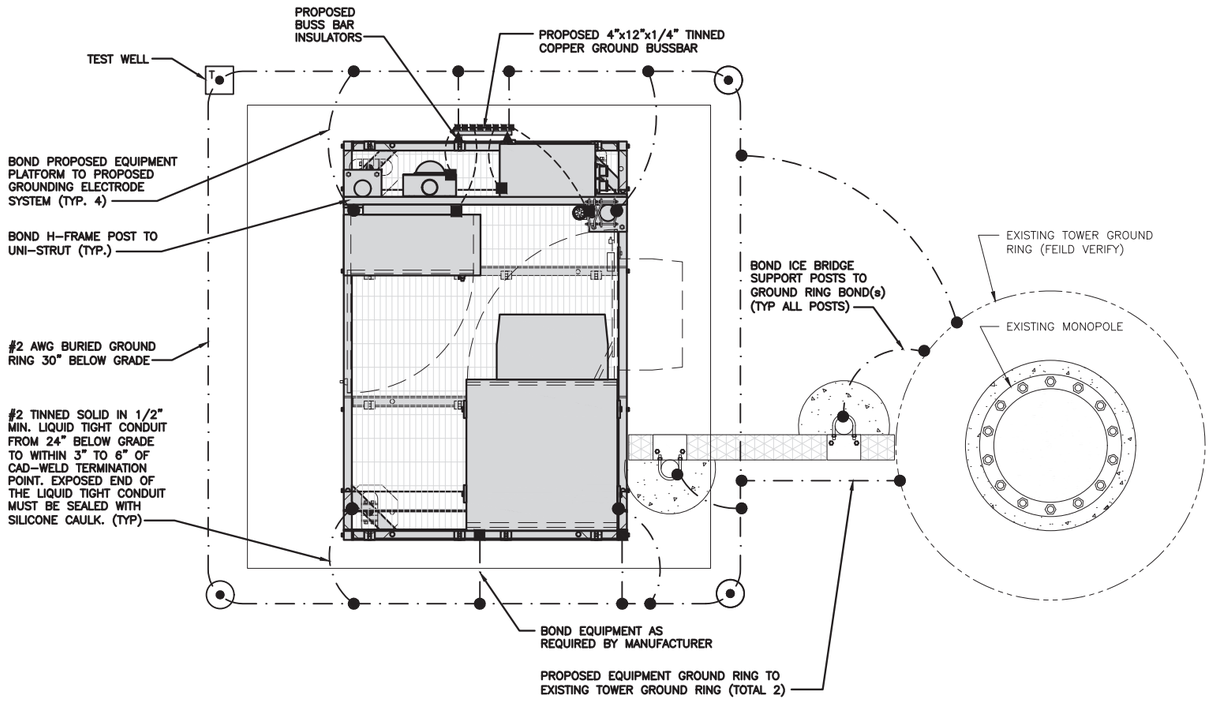
REV	DATE	DESCRIPTION
A	6/4/21	ISSUED FOR REVIEW
B	7/1/21	ISSUED FOR REVIEW
0	7/21/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
151421.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00042A
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

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

SHEET NUMBER
E-3

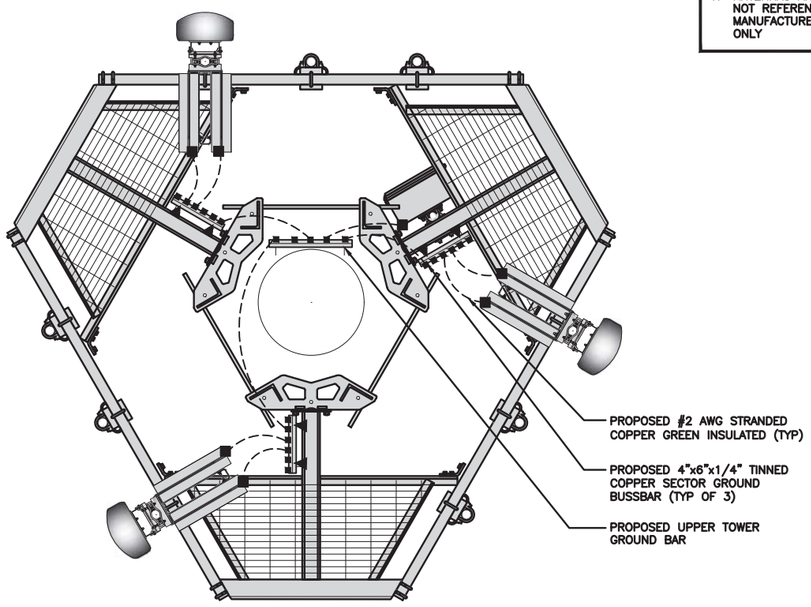


TYPICAL EQUIPMENT GROUNDING PLAN

NO SCALE | 1

NOTES

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

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

STATE OF CONNECTICUT
No. 23924
LICENSED PROFESSIONAL ENGINEER
7/21/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

DRAWN BY:	CHECKED BY:	APPROVED BY:
JJR	MTJ	MDW

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	6/4/21	ISSUED FOR REVIEW
B	7/1/21	ISSUED FOR REVIEW
0	7/21/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
151421.001.01

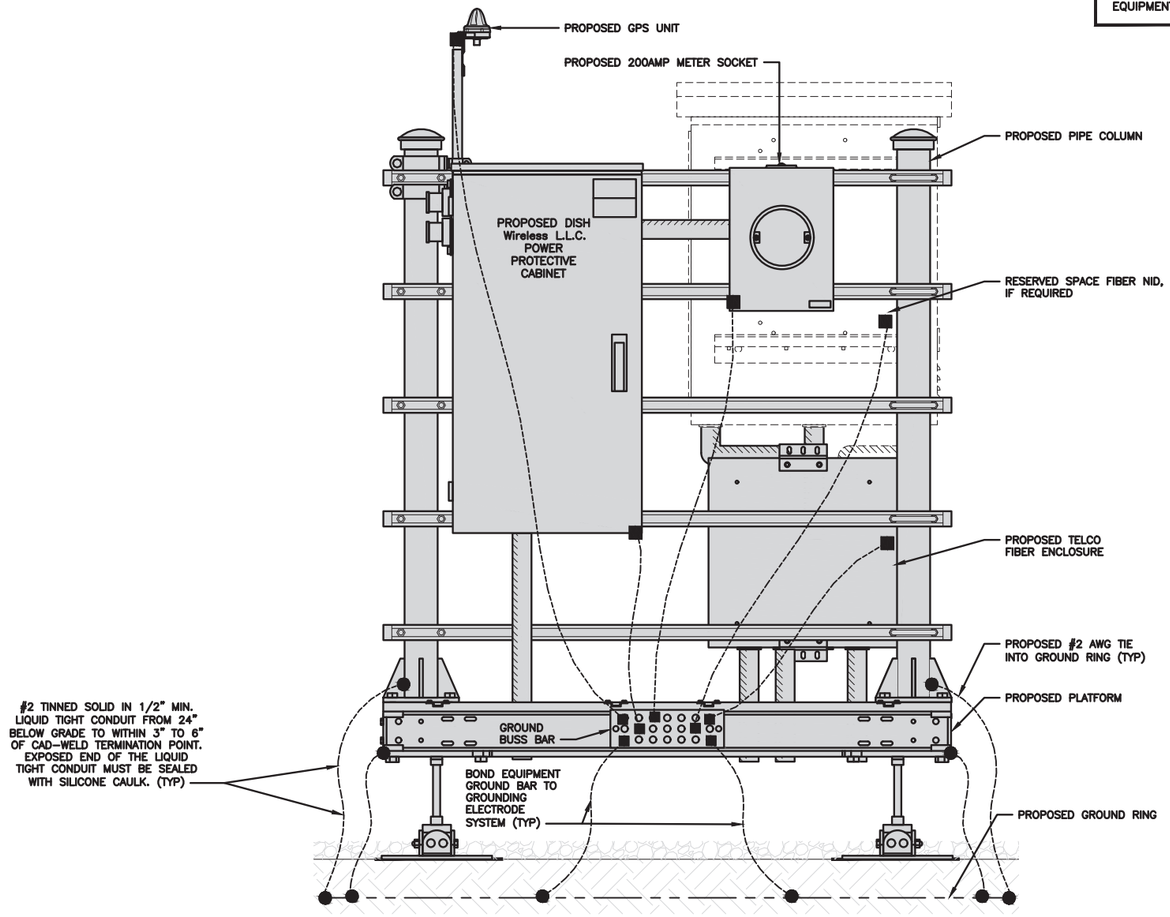
DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00042A
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

SHEET TITLE
GROUNDING PLANS AND NOTES

SHEET NUMBER
G-1

NOTES

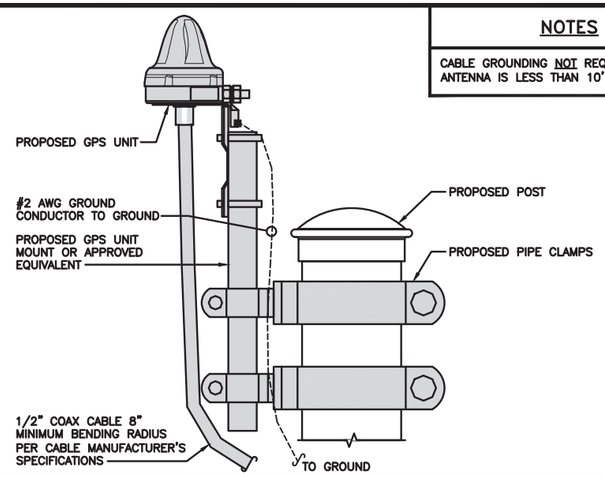
EQUIPMENT CABINET OMITTED FOR CLARITY



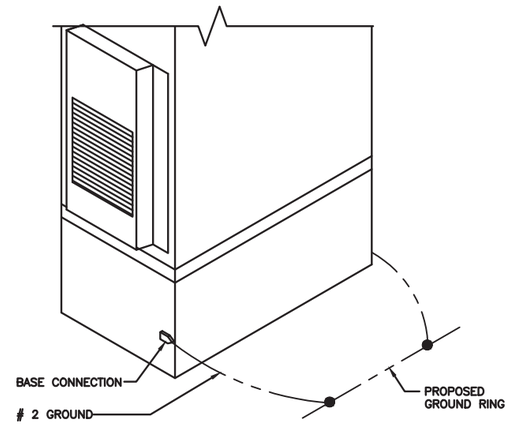
H-FRAME GROUNDING DETAIL | NO SCALE | 1

NOTES

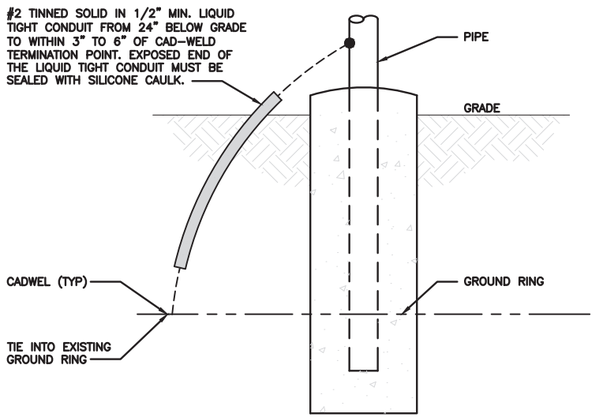
CABLE GROUNDING NOT REQUIRED WHEN ANTENNA IS LESS THAN 10' FROM CABINET



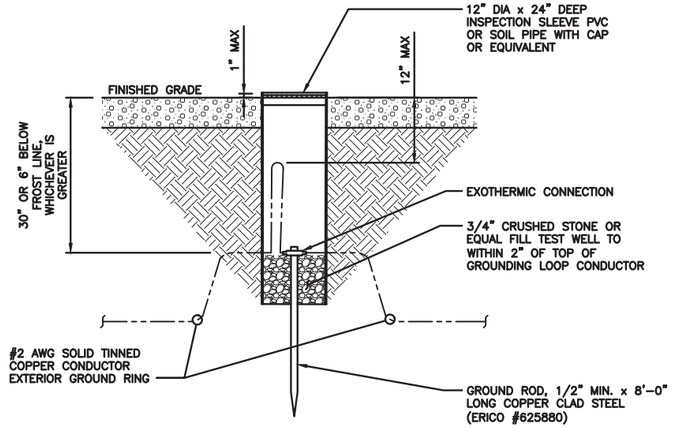
TYPICAL GPS UNIT GROUNDING | NO SCALE | 2



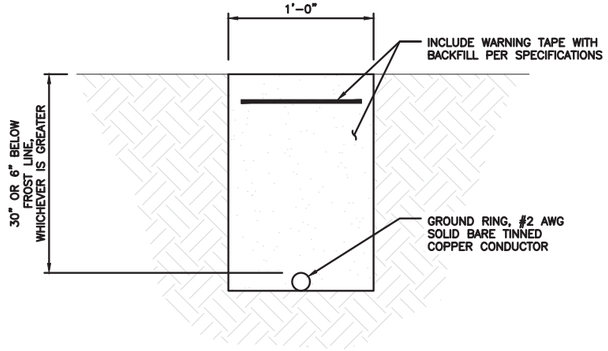
OUTDOOR CABINET GROUNDING | NO SCALE | 3



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

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

STATE OF CONNECTICUT — No. 23924 — LICENSED PROFESSIONAL ENGINEER
7/21/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

DRAWN BY:	CHECKED BY:	APPROVED BY:
JJR	MTJ	MDW

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	6/4/21	ISSUED FOR REVIEW
B	7/1/21	ISSUED FOR REVIEW
0	7/21/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
151421.001.01

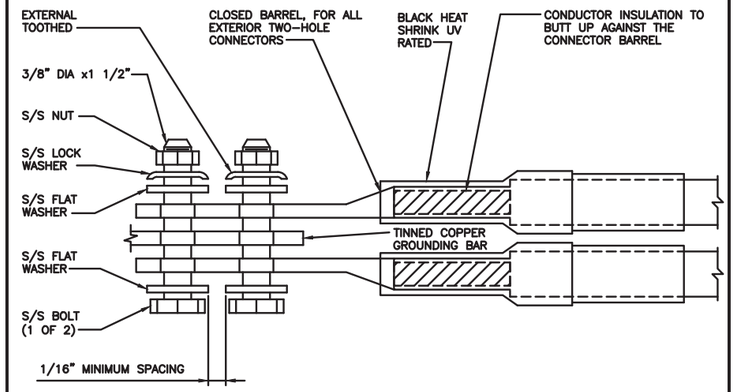
DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00042A
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

SHEET TITLE
GROUNDING DETAILS

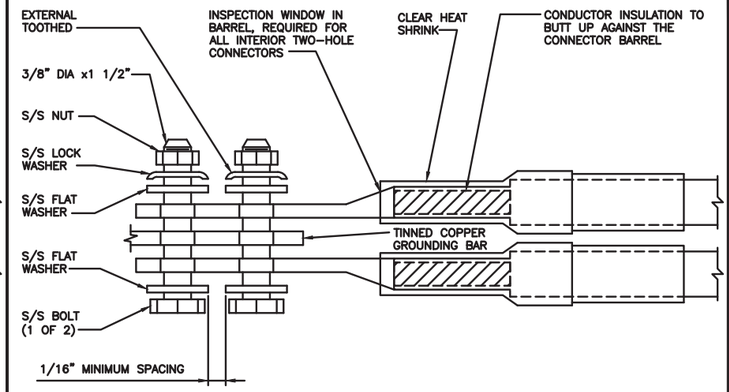
SHEET NUMBER
G-2

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).

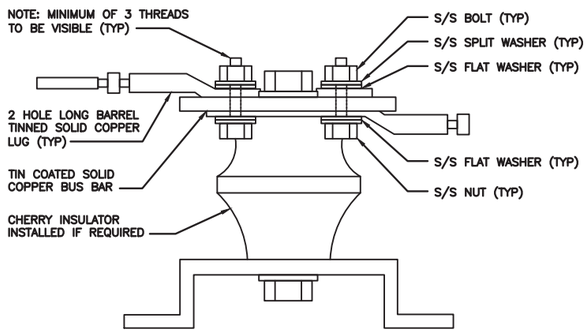
TYPICAL GROUNDING NOTES | NO SCALE | 1



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

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

7/21/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

DRAWN BY:	CHECKED BY:	APPROVED BY:
JJR	MTJ	MDW

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	6/4/21	ISSUED FOR REVIEW
B	7/1/21	ISSUED FOR REVIEW
0	7/21/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

151421.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBDL00042A
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

SHEET TITLE

GROUNDING DETAILS

SHEET NUMBER

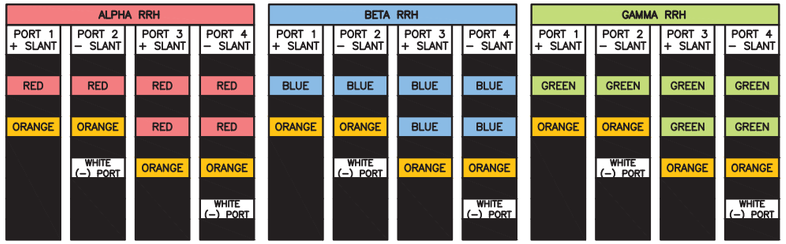
G-3

RF JUMPER COLOR CODING

3/4" TAPE WIDTHS WITH 3/4" SPACING

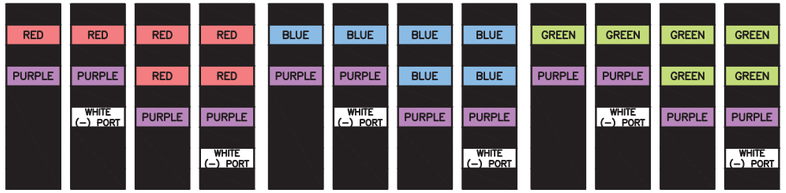
LOW–BAND RRH –
(600MHz N71 BASEBAND) +
(850MHz N26 BAND) +
(700MHz N29 BAND) – OPTIONAL PER MARKET

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



MID–BAND RRH –
(AWS BANDS N66+N70)

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

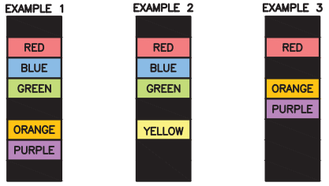


HYBRID/DISCREET CABLES

INCLUDE SECTOR BANDS BEING SUPPORTED
ALONG WITH FREQUENCY BANDS

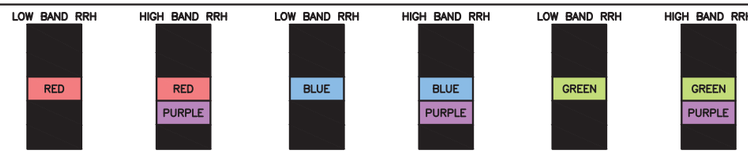
EXAMPLE 1 – HYBRID, OR DISCREET, SUPPORTS
ALL SECTORS, BOTH LOW–BANDS AND MID–BANDS

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



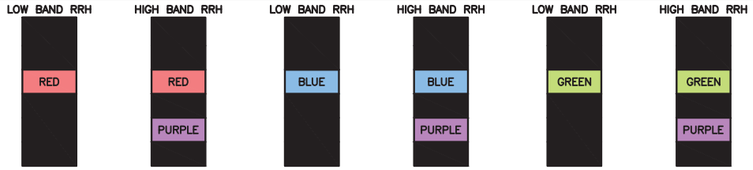
FIBER JUMPERS TO RRHs

LOW–BAND RRH FIBER CABLES HAVE SECTOR
STRIPE ONLY

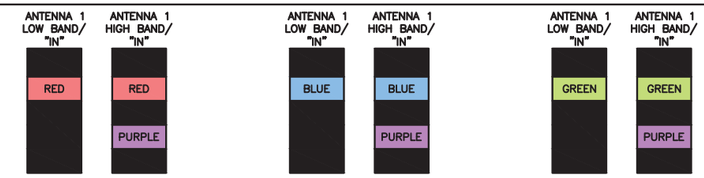


POWER CABLES TO RRHs

LOW–BAND RRH POWER CABLES HAVE SECTOR
STRIPE ONLY



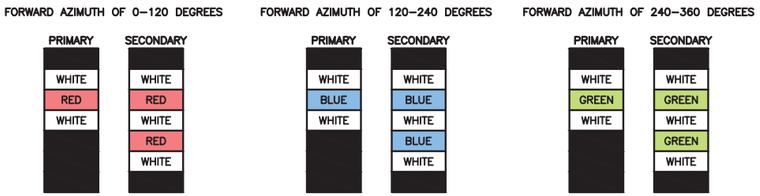
RET MOTORS AT ANTENNAS



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



RF CABLE COLOR CODES	NO SCALE	1

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	NO SCALE	2

NOT USED	NO SCALE	3

NOT USED	NO SCALE	4

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

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

STATE OF CONNECTICUT
No. 23924
LICENSED
PROFESSIONAL ENGINEER
7/21/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

DRAWN BY:	CHECKED BY:	APPROVED BY:
JJR	MTJ	MDW

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	6/4/21	ISSUED FOR REVIEW
B	7/1/21	ISSUED FOR REVIEW
0	7/21/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

151421.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBDL00042A
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

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

EXOTHERMIC WITH INSPECTION SLEEVE

GROUNDING BAR

GROUND ROD

TEST GROUND ROD WITH INSPECTION SLEEVE

SINGLE POLE SWITCH

DUPLEX RECEPTACLE

DUPLEX GFCI RECEPTACLE

FLUORESCENT LIGHTING FIXTURE
(2) TWO LAMPS 48–T8

SMOKE DETECTION (DC)

EMERGENCY LIGHTING (DC)

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

CHAIN LINK FENCE

WOOD/WROUGHT IRON FENCE

WALL STRUCTURE

LEASE AREA

PROPERTY LINE (PL)

SETBACKS

ICE BRIDGE

CABLE TRAY

WATER LINE

UNDERGROUND POWER

UNDERGROUND TELCO

OVERHEAD POWER

OVERHEAD TELCO

UNDERGROUND TELCO/POWER

ABOVE GROUND POWER

ABOVE GROUND TELCO

ABOVE GROUND TELCO/POWER

WORKPOINT

SECTION REFERENCE

DETAIL REFERENCE

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

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

STATE OF CONNECTICUT — No. 23924 — LICENSED PROFESSIONAL ENGINEER

7/21/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

DRAWN BY:	CHECKED BY:	APPROVED BY:
JJR	MTJ	MDW

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	6/4/21	ISSUED FOR REVIEW
B	7/1/21	ISSUED FOR REVIEW
0	7/21/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

151421.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBDL00042A
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

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

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

STATE OF CONNECTICUT
No. 23924
LICENSED
PROFESSIONAL ENGINEER
7/21/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

DRAWN BY:	CHECKED BY:	APPROVED BY:
JJR	MTJ	MDW

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	6/4/21	ISSUED FOR REVIEW
B	7/1/21	ISSUED FOR REVIEW
0	7/21/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

151421.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBDL00042A
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

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

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

7/21/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

DRAWN BY:	CHECKED BY:	APPROVED BY:
JJR	MTJ	MDW

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	6/4/21	ISSUED FOR REVIEW
B	7/1/21	ISSUED FOR REVIEW
0	7/21/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

151421.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBDL00042A
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

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

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

7/21/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

DRAWN BY:	CHECKED BY:	APPROVED BY:
JJR	MTJ	MDW

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	6/4/21	ISSUED FOR REVIEW
B	7/1/21	ISSUED FOR REVIEW
0	7/21/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

151421.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBDL00042A
73 NORTH MAIN STREET
MARLBOROUGH, CT 06447

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-4

Exhibit D

Structural Analysis Report

Date: **May 26, 2021**

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

Subject:	**Structural Analysis Report**	
Carrier Designation:	***DISH Network* Co-Locate**	
	Site Number:	BOBDL00042A
	Site Name:	CT-CCI-T-806366
Crown Castle Designation:	**BU Number:**	806366
	Site Name:	HRT 107(C) 943204
	JDE Job Number:	650038
	Work Order Number:	1962718
	Order Number:	556642 Rev. 2
Engineering Firm Designation:	**Crown Castle Project Number:**	1962718
Site Data:	**73 North Main Street, MARLBOROUGH, Hartford County, CT** **Latitude *41° 37' 47.3"*, Longitude *-72° 27' 59.4"*** **155.5 Foot - Monopole 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:

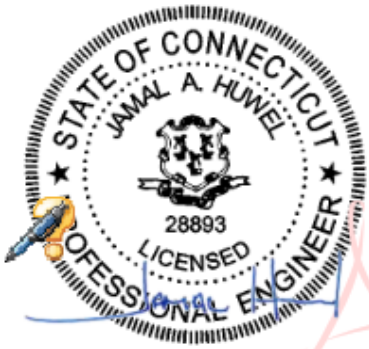
LC5: Proposed Equipment Configuration **Sufficient Capacity**

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".

Structural analysis prepared by: Tyler Ho

Respectfully submitted by:

Jamal A. Huwel, P.E.
Director Engineering



Digitally signed by
Jamal A Huwel
Date: 2021.05.27
08:15:55 -04'00'

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 155.5 ft Monopole tower designed by Forth Worth Tower, Inc.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	130 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
116.0	116.0	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 MC-PK8-DSH		

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)
156.0	159.0	3	alcatel lucent	B13 RRH 4x30	17	1-5/8
		6	andrew	SBNHH-1D65B w/ Mount Pipe		
		3	commscope	LNX-6514DS-A1M w/ Mount Pipe		
		2	commscope	LNX-6514DS-AIM w/ Mount Pipe		
		1	commscope	LNX-8513DS-VTM w/ Mount Pipe		
		3	decibel	DB809K-Y		
		2	raycap	RRFDC-3315-PF-48		
	156.0	1		Platform Mount [16' LP 603-1]		
144.0	144.0	3	cci antennas	HPA65R-BU6A w/ Mount Pipe	2 6 12 1	3/8 3/4 1-1/4 Conduit
		3	cci antennas	OPA65R-BU6D w/ Mount Pipe		
		3	ericsson	RRUS 32 B30		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 4478 B14		
		3	ericsson	RRUS 8843 B2/B66A		
		3	kathrein	80010965 w/ Mount Pipe		
		3	powerwave technologies	1001940		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		3	powerwave technologies	7770.00 w/ Mount Pipe		
		6	powerwave technologies	LGP 17201		
		3	raycap	DC6-48-60-18-8F		
		1	tower mounts	Platform Mount [LP 1002-1]		
135.0	135.0	3	kathrein	742 213 w/ Mount Pipe	6	1-1/4
128.0	130.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz	1 3	7/8 1-1/4
		6	alcatel lucent	RRH2X50-800		
		3	alcatel lucent	TD-RRH8x20-25		
		3	commscope	NNVV-65B-R4 w/ Mount Pipe		
		3	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe		
	128.0	2	tower mounts	T-Arm Mount [TA 602-3]		
100.0	102.0	3	ems wireless	RV90-17-00DP w/ Mount Pipe	12 1	1-1/4 1-5/8
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
	100.0	3	ericsson	KRY 112 144/1		
		3	ericsson	RADIO 4415 B66A		
		3	ericsson	RADIO 4449 B71/B85A		
		1	tower mounts	Side Arm Mount [SO 901-3]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	2208816	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	823125	CCISITES
4-TOWER MANUFACTURER DRAWINGS	823125	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.9.0), 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
L1	155.5 - 110	Pole	TP64.606x58.6x0.375	1	-27.65	4083.22	13.1	Pass
L2	110 - 72.5	Pole	TP68.805x62.8x0.4375	2	-50.72	5456.99	26.9	Pass
L3	72.5 - 36	Pole	TP72.748x66.8082x0.5	3	-72.63	6956.40	35.9	Pass
L4	36 - 0	Pole	TP76.5x70.56x0.5	4	-101.71	7106.06	54.2	Pass
							Summary	
						Pole (L4)	54.2	Pass
						Rating =	54.2	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	51.9	Pass
1	Base Plate	0	24.1	Pass
1	Base Foundation (Structure)	0	30.8	Pass
1	Base Foundation (Soil Interaction)	0	35.2	Pass

Structure Rating (max from all components) =	**54.2%**

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

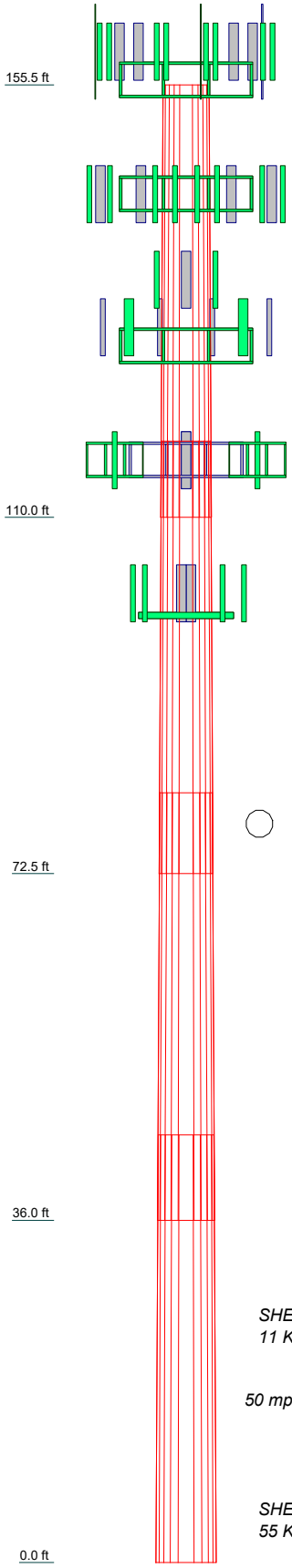
4.1) Recommendations

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	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	45.50	12	0.3750	8.00	58.6000	64.6060	A572-65	11.4
2	45.50	12	0.4375	8.50	62.8000	68.8050		14.3
3	45.00	12	0.5000	9.00	66.8082	72.7480		17.1
4	45.00	12	0.5000		70.5600	76.5000		18.0
								60.8



ALL REACTIONS ARE FACTORED

AXIAL 151 K

SHEAR 11 K *MOMENT 1257 kip-ft*

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

AXIAL 102 K

SHEAR 55 K *MOMENT 5808 kip-ft*

TORQUE 1 kip-ft
REACTIONS - 130 mph WIND

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure 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 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 54.2%

CROWN CASTLE
The Pathway To Possible

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

Job: *806366*			
Project:			
Client: Crown Castle	Drawn by: THo		App'd:
Code: TIA-222-H	Date: 05/26/21		Scale: NTS
Path: C:\Users\THo\OneDrive - Crown Castle USA Inc\Desktop\WORK SPACE\806366\WO 1962718 - SA\Prod\806366_RPA.eri			Dwg No. E-1

Tower Input Data

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

- Tower is located in Hartford County, Connecticut.
- Tower base elevation above sea level: 578.00 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: 0.00 ft.
- Nominal ice thickness of 1.5000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.05.
- Tower analysis based on target reliabilities in accordance with Annex S.
- Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
- Maximum demand-capacity ratio is: 1.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	155.50-110.00	45.50	8.00	12	58.6000	64.6060	0.3750	1.5000	A572-65 (65 ksi)
L2	110.00-72.50	45.50	8.50	12	62.8000	68.8050	0.4375	1.7500	A572-65 (65 ksi)
L3	72.50-36.00	45.00	9.00	12	66.8082	72.7480	0.5000	2.0000	A572-65 (65 ksi)
L4	36.00-0.00	45.00		12	70.5600	76.5000	0.5000	2.0000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	60.5349	70.3067	30422.9680	20.8446	30.3548	1002.2457	61645.1813	34.6028	14.6998	39.199
	66.7528	77.5589	40842.0131	22.9947	33.4659	1220.4065	82756.9913	38.1721	16.3094	43.492
L2	65.9541	87.8532	43610.4361	22.3258	32.5304	1340.6056	88366.5670	43.2387	15.6579	35.789
	71.0778	96.3127	57460.4440	24.4756	35.6410	1612.2011	116430.4378	47.4022	17.2672	39.468
L3	70.1501	106.7562	59911.9263	23.7383	34.6066	1731.2263	121397.8056	52.5421	16.5646	33.129
	75.1379	116.3193	77497.7893	25.8648	37.6835	2056.5463	157031.5318	57.2488	18.1565	36.313
L4	74.1026	112.7967	70668.0195	25.0815	36.5501	1933.4563	143192.5665	55.5151	17.5701	35.14
	79.0222	122.3600	90209.5680	27.2080	39.6270	2276.4673	182789.0418	60.2219	19.1620	38.324

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 155.50-110.00				1	1	1			
L2 110.00-72.50				1	1	1			
L3 72.50-36.00				1	1	1			
L4 36.00-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
***										
(3) HB114-1-08U4-M5F(1-1/4) + (1) HB114-08U3M12-xxxF(7/8)	C	No	Surface Ar (CaAa)	128.00 - 8.00	4	4	0.400 0.486	1.5400		1.30
***										
CU12PSM9P6XXX(1-1/2)	C	No	Surface Ar (CaAa)	116.00 - 0.00	1	1	0.150 0.250	1.6000		2.35
**										

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 plf
***									
HB158-1-08U8-S8J18(1-5/8)	C	No	No	Inside Pole	155.50 - 0.00	2	No Ice	0.00	1.30
							1/2" Ice	0.00	1.30
							1" Ice	0.00	1.30
							2" Ice	0.00	1.30
561(1-5/8)	C	No	No	Inside Pole	155.50 - 0.00	12	No Ice	0.00	1.35
							1/2" Ice	0.00	1.35
							1" Ice	0.00	1.35
							2" Ice	0.00	1.35
LDF7-50A(1-5/8)	C	No	No	Inside Pole	155.50 - 0.00	3	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
***									
UCF114-50JA(1-1/4)	C	No	No	Inside Pole	144.00 - 0.00	12	No Ice	0.00	0.55
							1/2" Ice	0.00	0.55
							1" Ice	0.00	0.55
							2" Ice	0.00	0.55
FB-L98B-002-75000(3/8)	C	No	No	Inside Pole	144.00 - 0.00	1	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	144.00 - 0.00	4	No Ice	0.00	0.59
							1/2" Ice	0.00	0.59
							1" Ice	0.00	0.59
							2" Ice	0.00	0.59
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	144.00 - 0.00	2	No Ice	0.00	0.59
							1/2" Ice	0.00	0.59
							1" Ice	0.00	0.59
							2" Ice	0.00	0.59
2" innerduct conduit	C	No	No	Inside Pole	144.00 - 0.00	1	No Ice	0.00	0.20
							1/2" Ice	0.00	0.20
							1" Ice	0.00	0.20
							2" Ice	0.00	0.20
FB-L98B-034-XXX(3/8)	C	No	No	Inside Pole	144.00 - 0.00	1	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
***									
AVA6-50(1-1/4)	C	No	No	Inside Pole	135.00 - 0.00	6	No Ice	0.00	0.46
							1/2" Ice	0.00	0.46
							1" Ice	0.00	0.46
							2" Ice	0.00	0.46
***									
LDF6-50A(1-1/4)	C	No	No	Inside Pole	100.00 - 0.00	6	No Ice	0.00	0.60
							1/2" Ice	0.00	0.60
							1" Ice	0.00	0.60
							2" Ice	0.00	0.60
AVA6-50(1-1/4)	C	No	No	Inside Pole	100.00 - 0.00	6	No Ice	0.00	0.46
							1/2" Ice	0.00	0.46
							1" Ice	0.00	0.46
							2" Ice	0.00	0.46
HCS 6X12 4AWG(1-5/8)	C	No	No	Inside Pole	100.00 - 0.00	1	No Ice	0.00	2.40
							1/2" Ice	0.00	2.40
							1" Ice	0.00	2.40
							2" Ice	0.00	2.40
**									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	155.50-110.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	12.048	0.000	1.50
L2	110.00-72.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	29.100	0.000	1.82
L3	72.50-36.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	28.324	0.000	1.85
L4	36.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	23.008	0.000	1.79

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	155.50-110.00	A	1.465	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	23.172	0.000	1.73
L2	110.00-72.50	A	1.412	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	59.602	0.000	2.44
L3	72.50-36.00	A	1.341	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	57.130	0.000	2.44
L4	36.00-0.00	A	1.199	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	46.356	0.000	2.24

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	155.50-110.00	-1.2477	1.0144	-1.6899	1.4280
L2	110.00-72.50	-3.0548	2.8222	-3.9991	4.0054
L3	72.50-36.00	-3.0732	2.8392	-4.0204	4.0165
L4	36.00-0.00	-2.5176	2.4366	-3.3809	3.5615

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	16	(3) HB114-1-08U4-M5F(1-1/4) + (1) HB114-08U3M12-xxxF(7/8)	110.00 - 128.00	1.0000	1.0000
L1	22	CU12PSM9P6XXX(1-1/2)	110.00 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			116.00		
L2	16	(3) HB114-1-08U4-M5F(1-1/4) + (1) HB114-08U3M12-xxxF(7/8)	72.50 - 110.00	1.0000	1.0000
L2	22	CU12PSM9P6XXX(1-1/2)	72.50 - 110.00	1.0000	1.0000
L3	16	(3) HB114-1-08U4-M5F(1-1/4) + (1) HB114-08U3M12-xxxF(7/8)	36.00 - 72.50	1.0000	1.0000
L3	22	CU12PSM9P6XXX(1-1/2)	36.00 - 72.50	1.0000	1.0000
L4	16	(3) HB114-1-08U4-M5F(1-1/4) + (1) HB114-08U3M12-xxxF(7/8)	8.00 - 36.00	1.0000	1.0000
L4	22	CU12PSM9P6XXX(1-1/2)	0.00 - 36.00	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Platform Mount [16' LP 603-1]	C	None		0.0000	156.00	No Ice	46.42	46.42	2.35
						1/2" Ice	54.03	54.03	3.19
						1" Ice	62.40	62.40	4.17
						2" Ice	82.16	82.16	6.59
6'x2" Mount Pipe	A	From Leg	4.00 8.00 0.00	0.0000	156.00	No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						1" Ice	2.29	2.29	0.05
						2" Ice	3.06	3.06	0.09
6'x2" Mount Pipe	B	From Leg	4.00 8.00 0.00	0.0000	156.00	No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						1" Ice	2.29	2.29	0.05
						2" Ice	3.06	3.06	0.09
6'x2" Mount Pipe	C	From Leg	4.00 8.00 0.00	0.0000	156.00	No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						1" Ice	2.29	2.29	0.05
						2" Ice	3.06	3.06	0.09
6'x2" Mount Pipe	A	From Leg	4.00 8.00 2.00	0.0000	156.00	No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						1" Ice	2.29	2.29	0.05
						2" Ice	3.06	3.06	0.09
6'x2" Mount Pipe	B	From Leg	4.00 8.00 2.00	0.0000	156.00	No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						1" Ice	2.29	2.29	0.05
						2" Ice	3.06	3.06	0.09
6'x2" Mount Pipe	C	From Leg	4.00 8.00 2.00	0.0000	156.00	No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						1" Ice	2.29	2.29	0.05
						2" Ice	3.06	3.06	0.09
DB809K-Y	A	From Leg	4.00 8.00	0.0000	156.00	No Ice	2.85	2.85	0.03
						1/2"	4.03	4.03	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			3.00			Ice	5.21	5.21	0.08
						1" Ice	7.17	7.17	0.16
						2" Ice			
DB809K-Y	B	From Leg	4.00	0.0000	156.00	No Ice	2.85	2.85	0.03
			8.00			1/2"	4.03	4.03	0.05
			3.00			Ice	5.21	5.21	0.08
						1" Ice	7.17	7.17	0.16
						2" Ice			
DB809K-Y	C	From Leg	4.00	0.0000	156.00	No Ice	2.85	2.85	0.03
			8.00			1/2"	4.03	4.03	0.05
			3.00			Ice	5.21	5.21	0.08
						1" Ice	7.17	7.17	0.16
						2" Ice			
SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00	0.0000	156.00	No Ice	4.09	3.30	0.07
			-7.00			1/2"	4.49	3.68	0.13
			3.00			Ice	4.89	4.07	0.20
						1" Ice	5.72	4.87	0.39
						2" Ice			
SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00	0.0000	156.00	No Ice	4.09	3.30	0.07
			-7.00			1/2"	4.49	3.68	0.13
			3.00			Ice	4.89	4.07	0.20
						1" Ice	5.72	4.87	0.39
						2" Ice			
SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00	0.0000	156.00	No Ice	4.09	3.30	0.07
			-7.00			1/2"	4.49	3.68	0.13
			3.00			Ice	4.89	4.07	0.20
						1" Ice	5.72	4.87	0.39
						2" Ice			
SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00	0.0000	156.00	No Ice	4.09	3.30	0.07
			7.00			1/2"	4.49	3.68	0.13
			3.00			Ice	4.89	4.07	0.20
						1" Ice	5.72	4.87	0.39
						2" Ice			
SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00	0.0000	156.00	No Ice	4.09	3.30	0.07
			7.00			1/2"	4.49	3.68	0.13
			3.00			Ice	4.89	4.07	0.20
						1" Ice	5.72	4.87	0.39
						2" Ice			
SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00	0.0000	156.00	No Ice	4.09	3.30	0.07
			7.00			1/2"	4.49	3.68	0.13
			3.00			Ice	4.89	4.07	0.20
						1" Ice	5.72	4.87	0.39
						2" Ice			
LNX-6514DS-A1M w/ Mount Pipe	A	From Leg	4.00	0.0000	156.00	No Ice	4.09	3.30	0.06
			-5.00			1/2"	4.49	3.68	0.13
			3.00			Ice	4.89	4.06	0.20
						1" Ice	5.71	4.87	0.38
						2" Ice			
LNX-6514DS-A1M w/ Mount Pipe	B	From Leg	4.00	0.0000	156.00	No Ice	4.09	3.30	0.06
			-5.00			1/2"	4.49	3.68	0.13
			3.00			Ice	4.89	4.06	0.20
						1" Ice	5.71	4.87	0.38
						2" Ice			
LNX-6514DS-A1M w/ Mount Pipe	C	From Leg	4.00	0.0000	156.00	No Ice	4.09	3.30	0.06
			-5.00			1/2"	4.49	3.68	0.13
			3.00			Ice	4.89	4.06	0.20
						1" Ice	5.71	4.87	0.38
						2" Ice			
LNX-8513DS-VTM w/ Mount Pipe	A	From Leg	4.00	0.0000	156.00	No Ice	4.09	3.30	0.07
			5.00			1/2"	4.49	3.68	0.13
			3.00			Ice	4.89	4.06	0.20
						1" Ice	5.71	4.87	0.38
						2" Ice			
LNX-6514DS-AIM w/ Mount Pipe	B	From Leg	4.00	0.0000	156.00	No Ice	4.09	3.30	0.06
			5.00			1/2"	4.49	3.68	0.13

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			3.00			Ice	4.89	4.06	0.20
						1" Ice	5.71	4.87	0.38
						2" Ice			
LNX-6514DS-AIM w/ Mount Pipe	C	From Leg	4.00 5.00 3.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.09 4.49 4.89 5.71	3.30 3.68 4.06 4.87	0.06 0.13 0.20 0.38
RRFDC-3315-PF-48	A	From Leg	4.00 0.00 3.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.36 3.60 3.84 4.34	2.19 2.39 2.61 3.05	0.03 0.06 0.09 0.17
RRFDC-3315-PF-48	B	From Leg	4.00 0.00 3.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.36 3.60 3.84 4.34	2.19 2.39 2.61 3.05	0.03 0.06 0.09 0.17
B13 RRH 4x30	A	From Leg	4.00 0.00 3.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.06 2.24 2.43 2.84	1.32 1.48 1.64 2.00	0.06 0.07 0.09 0.14
B13 RRH 4x30	B	From Leg	4.00 0.00 3.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.06 2.24 2.43 2.84	1.32 1.48 1.64 2.00	0.06 0.07 0.09 0.14
B13 RRH 4x30	C	From Leg	4.00 0.00 3.00	0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.06 2.24 2.43 2.84	1.32 1.48 1.64 2.00	0.06 0.07 0.09 0.14
***									
Platform Mount [LP 1002-1]	C	None		0.0000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	77.24 85.74 94.79 115.77	77.24 85.74 94.79 115.77	4.05 5.65 7.48 11.81
6'x2" Mount Pipe	A	From Leg	4.00 9.50 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	B	From Leg	4.00 9.50 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	C	From Leg	4.00 9.50 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
7770.00 w/ Mount Pipe	A	From Leg	4.00 -9.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
7770.00 w/ Mount Pipe	B	From Leg	4.00 -9.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
7770.00 w/ Mount Pipe	C	From Leg	4.00	0.0000	144.00	No Ice	5.75	4.25	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			-9.00 0.00			1/2" Ice 1" Ice 2" Ice	6.18 6.61 7.49	5.01 5.71 7.16	0.10 0.16 0.29
80010965 w/ Mount Pipe	A	From Leg	4.00 9.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.26 13.03 13.80 15.41	5.79 6.47 7.17 8.60	0.14 0.23 0.33 0.57
80010965 w/ Mount Pipe	B	From Leg	4.00 9.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.26 13.03 13.80 15.41	5.79 6.47 7.17 8.60	0.14 0.23 0.33 0.57
80010965 w/ Mount Pipe	C	From Leg	4.00 9.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.26 13.03 13.80 15.41	5.79 6.47 7.17 8.60	0.14 0.23 0.33 0.57
HPA65R-BU6A w/ Mount Pipe	A	From Leg	4.00 -4.75 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.83 6.40 6.99 8.19	5.00 5.56 6.13 7.32	0.08 0.14 0.22 0.40
HPA65R-BU6A w/ Mount Pipe	B	From Leg	4.00 -4.75 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.83 6.40 6.99 8.19	5.00 5.56 6.13 7.32	0.08 0.14 0.22 0.40
HPA65R-BU6A w/ Mount Pipe	C	From Leg	4.00 -4.75 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.83 6.40 6.99 8.19	5.00 5.56 6.13 7.32	0.08 0.14 0.22 0.40
OPA65R-BU6D w/ Mount Pipe	A	From Leg	4.00 4.75 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.25 13.00 13.76 15.34	6.05 6.71 7.39 8.79	0.09 0.18 0.27 0.51
OPA65R-BU6D w/ Mount Pipe	B	From Leg	4.00 4.75 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.25 13.00 13.76 15.34	6.05 6.71 7.39 8.79	0.09 0.18 0.27 0.51
OPA65R-BU6D w/ Mount Pipe	C	From Leg	4.00 4.75 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.25 13.00 13.76 15.34	6.05 6.71 7.39 8.79	0.09 0.18 0.27 0.51
RRUS 4478 B14	A	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.84 2.01 2.19 2.57	1.06 1.20 1.34 1.66	0.06 0.08 0.09 0.14
RRUS 4478 B14	B	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.84 2.01 2.19 2.57	1.06 1.20 1.34 1.66	0.06 0.08 0.09 0.14
RRUS 4478 B14	C	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.84 2.01 2.19 2.57	1.06 1.20 1.34 1.66	0.06 0.08 0.09 0.14
RRUS 8843 B2/B66A	A	From Leg	4.00	0.0000	144.00	No Ice	1.64	1.35	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2"	1.80	1.50	0.09
			0.00			Ice	1.97	1.65	0.11
						1" Ice	2.32	1.99	0.16
						2" Ice			
RRUS 8843 B2/B66A	B	From Leg	4.00	0.0000	144.00	No Ice	1.64	1.35	0.07
			0.00			1/2"	1.80	1.50	0.09
			0.00			Ice	1.97	1.65	0.11
						1" Ice	2.32	1.99	0.16
						2" Ice			
RRUS 8843 B2/B66A	C	From Leg	4.00	0.0000	144.00	No Ice	1.64	1.35	0.07
			0.00			1/2"	1.80	1.50	0.09
			0.00			Ice	1.97	1.65	0.11
						1" Ice	2.32	1.99	0.16
						2" Ice			
RRUS 32 B30	A	From Leg	4.00	0.0000	144.00	No Ice	2.69	1.57	0.06
			0.00			1/2"	2.91	1.76	0.08
			0.00			Ice	3.14	1.95	0.10
						1" Ice	3.61	2.35	0.16
						2" Ice			
RRUS 32 B30	B	From Leg	4.00	0.0000	144.00	No Ice	2.69	1.57	0.06
			0.00			1/2"	2.91	1.76	0.08
			0.00			Ice	3.14	1.95	0.10
						1" Ice	3.61	2.35	0.16
						2" Ice			
RRUS 32 B30	C	From Leg	4.00	0.0000	144.00	No Ice	2.69	1.57	0.06
			0.00			1/2"	2.91	1.76	0.08
			0.00			Ice	3.14	1.95	0.10
						1" Ice	3.61	2.35	0.16
						2" Ice			
DC6-48-60-18-8F	C	From Leg	4.00	0.0000	144.00	No Ice	1.21	1.21	0.02
			0.00			1/2"	1.89	1.89	0.04
			0.00			Ice	2.11	2.11	0.07
						1" Ice	2.57	2.57	0.13
						2" Ice			
(2) LGP 17201	A	From Leg	4.00	0.0000	144.00	No Ice	1.67	0.47	0.03
			0.00			1/2"	1.83	0.57	0.04
			0.00			Ice	2.00	0.68	0.06
						1" Ice	2.36	0.91	0.09
						2" Ice			
(2) LGP 17201	B	From Leg	4.00	0.0000	144.00	No Ice	1.67	0.47	0.03
			0.00			1/2"	1.83	0.57	0.04
			0.00			Ice	2.00	0.68	0.06
						1" Ice	2.36	0.91	0.09
						2" Ice			
(2) LGP 17201	C	From Leg	4.00	0.0000	144.00	No Ice	1.67	0.47	0.03
			0.00			1/2"	1.83	0.57	0.04
			0.00			Ice	2.00	0.68	0.06
						1" Ice	2.36	0.91	0.09
						2" Ice			
1001940	A	From Leg	4.00	0.0000	144.00	No Ice	0.18	0.08	0.00
			0.00			1/2"	0.23	0.13	0.00
			0.00			Ice	0.30	0.18	0.01
						1" Ice	0.44	0.30	0.01
						2" Ice			
1001940	B	From Leg	4.00	0.0000	144.00	No Ice	0.18	0.08	0.00
			0.00			1/2"	0.23	0.13	0.00
			0.00			Ice	0.30	0.18	0.01
						1" Ice	0.44	0.30	0.01
						2" Ice			
1001940	C	From Leg	4.00	0.0000	144.00	No Ice	0.18	0.08	0.00
			0.00			1/2"	0.23	0.13	0.00
			0.00			Ice	0.30	0.18	0.01
						1" Ice	0.44	0.30	0.01
						2" Ice			
RRUS 4449 B5/B12	A	From Leg	4.00	0.0000	144.00	No Ice	1.97	1.41	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00 0.00			1/2" Ice 1" Ice 2" Ice	2.14 2.33 2.72	1.56 1.73 2.07	0.09 0.11 0.16
RRUS 4449 B5/B12	B	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16
RRUS 4449 B5/B12	C	From Leg	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16
DC6-48-60-18-8F	A	From Leg	1.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.21 1.89 2.11 2.57	1.21 1.89 2.11 2.57	0.02 0.04 0.07 0.13
DC6-48-60-18-8F	B	From Leg	1.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.21 1.89 2.11 2.57	1.21 1.89 2.11 2.57	0.02 0.04 0.07 0.13
***									
742 213 w/ Mount Pipe	A	From Leg	1.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.54 4.13 4.74 6.01	2.98 3.57 4.17 5.42	0.05 0.09 0.14 0.27
742 213 w/ Mount Pipe	B	From Leg	1.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.54 4.13 4.74 6.01	2.98 3.57 4.17 5.42	0.05 0.09 0.14 0.27
742 213 w/ Mount Pipe	C	From Leg	1.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.54 4.13 4.74 6.01	2.98 3.57 4.17 5.42	0.05 0.09 0.14 0.27
***									
(2) T-Arm Mount [TA 602-3]	C	None		0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	13.40 16.44 19.70 25.86	13.40 16.44 19.70 25.86	0.77 1.00 1.29 2.05
6'x2" Mount Pipe	A	From Face	4.00 -6.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	B	From Face	4.00 -6.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	C	From Face	4.00 -6.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	A	From Face	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
6'x2" Mount Pipe	B	From Face	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	C	From Face	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	A	From Face	4.00 6.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	B	From Face	4.00 6.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
6'x2" Mount Pipe	C	From Face	4.00 6.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.92 2.29 3.06	1.43 1.92 2.29 3.06	0.02 0.03 0.05 0.09
NNVV-65B-R4 w/ Mount Pipe	A	From Face	4.00 -6.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.55 8.04 8.53 9.56	4.23 4.67 5.12 6.05	0.11 0.20 0.30 0.53
NNVV-65B-R4 w/ Mount Pipe	B	From Face	4.00 -6.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.55 8.04 8.53 9.56	4.23 4.67 5.12 6.05	0.11 0.20 0.30 0.53
NNVV-65B-R4 w/ Mount Pipe	C	From Face	4.00 -6.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.55 8.04 8.53 9.56	4.23 4.67 5.12 6.05	0.11 0.20 0.30 0.53
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Face	4.00 6.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.09 4.48 4.88 5.71	2.86 3.23 3.61 4.40	0.08 0.13 0.19 0.33
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Face	4.00 6.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.09 4.48 4.88 5.71	2.86 3.23 3.61 4.40	0.08 0.13 0.19 0.33
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Face	4.00 6.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.09 4.48 4.88 5.71	2.86 3.23 3.61 4.40	0.08 0.13 0.19 0.33
(2) RRH2X50-800	A	From Face	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.70 1.86 2.03 2.40	1.28 1.43 1.58 1.91	0.05 0.07 0.09 0.14
(2) RRH2X50-800	B	From Face	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice	1.70 1.86 2.03 2.40	1.28 1.43 1.58 1.91	0.05 0.07 0.09 0.14

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
(2) RRH2X50-800	C	From Face	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.70 1.86 2.03 2.40	1.28 1.43 1.58 1.91	0.05 0.07 0.09 0.14
TD-RRH8x20-25	A	From Face	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.05 4.30 4.56 5.10	1.53 1.71 1.90 2.30	0.07 0.10 0.13 0.20
TD-RRH8x20-25	B	From Face	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.05 4.30 4.56 5.10	1.53 1.71 1.90 2.30	0.07 0.10 0.13 0.20
TD-RRH8x20-25	C	From Face	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.05 4.30 4.56 5.10	1.53 1.71 1.90 2.30	0.07 0.10 0.13 0.20
PCS 1900MHz 4x45W-65MHz	A	From Face	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.32 2.53 2.74 3.19	2.24 2.44 2.65 3.09	0.06 0.08 0.11 0.17
PCS 1900MHz 4x45W-65MHz	B	From Face	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.32 2.53 2.74 3.19	2.24 2.44 2.65 3.09	0.06 0.08 0.11 0.17
PCS 1900MHz 4x45W-65MHz	C	From Face	4.00 0.00 2.00	0.0000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.32 2.53 2.74 3.19	2.24 2.44 2.65 3.09	0.06 0.08 0.11 0.17
***									
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.01 8.52 9.04 10.11	4.23 4.69 5.16 6.12	0.11 0.19 0.29 0.52
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.01 8.52 9.04 10.11	4.23 4.69 5.16 6.12	0.11 0.19 0.29 0.52
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.01 8.52 9.04 10.11	4.23 4.69 5.16 6.12	0.11 0.19 0.29 0.52
TA08025-B604	A	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.96 2.14 2.32 2.71	0.98 1.11 1.25 1.55	0.06 0.08 0.10 0.15
TA08025-B604	B	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.96 2.14 2.32 2.71	0.98 1.11 1.25 1.55	0.06 0.08 0.10 0.15
TA08025-B604	C	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice	1.96 2.14 2.32	0.98 1.11 1.25	0.06 0.08 0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice 2" Ice	2.71	1.55	0.15
TA08025-B605	A	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.96 2.14 2.32 2.71	1.13 1.27 1.41 1.72	0.08 0.09 0.11 0.16
TA08025-B605	B	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.96 2.14 2.32 2.71	1.13 1.27 1.41 1.72	0.08 0.09 0.11 0.16
TA08025-B605	C	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.96 2.14 2.32 2.71	1.13 1.27 1.41 1.72	0.08 0.09 0.11 0.16
RDIDC-9181-PF-48	A	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.31 2.50 2.70 3.12	1.29 1.45 1.61 1.96	0.02 0.04 0.06 0.12
(2) 8' x 2'' Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0.03 0.04 0.06 0.12
(2) 8' x 2'' Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0.03 0.04 0.06 0.12
(2) 8' x 2'' Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0.03 0.04 0.06 0.12
Commscope MC-PK8-DSH	C	None		0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice	34.24 62.95 91.66 149.08	34.24 62.95 91.66 149.08	1.75 2.10 2.45 3.15
**									
RV90-17-00DP w/ Mount Pipe	A	From Leg	2.00 0.50 2.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.47 5.08 5.70 7.01	2.92 3.50 4.10 5.35	0.04 0.07 0.11 0.22
RV90-17-00DP w/ Mount Pipe	B	From Leg	2.00 0.50 2.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.47 5.08 5.70 7.01	2.92 3.50 4.10 5.35	0.04 0.07 0.11 0.22
RV90-17-00DP w/ Mount Pipe	C	From Leg	2.00 0.50 2.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.47 5.08 5.70 7.01	2.92 3.50 4.10 5.35	0.04 0.07 0.11 0.22
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.00 -0.50 2.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.69 15.46 16.23 17.82	6.87 7.55 8.25 9.67	0.19 0.31 0.46 0.79
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.00 -0.50	0.0000	100.00	No Ice 1/2"	14.69 15.46	6.87 7.55	0.19 0.31

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			2.00			Ice	16.23	8.25	0.46
						1" Ice	17.82	9.67	0.79
						2" Ice			
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.00 -0.50 2.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.69 15.46 16.23 17.82	6.87 7.55 8.25 9.67	0.19 0.31 0.46 0.79
RADIO 4449 B71/B85A	A	From Leg	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.33	1.31 1.46 1.61 1.94	0.07 0.09 0.11 0.16
RADIO 4449 B71/B85A	B	From Leg	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.33	1.31 1.46 1.61 1.94	0.07 0.09 0.11 0.16
RADIO 4449 B71/B85A	C	From Leg	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.33	1.31 1.46 1.61 1.94	0.07 0.09 0.11 0.16
RADIO 4415 B66A	A	From Leg	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.86 2.03 2.20 2.58	0.87 1.00 1.13 1.43	0.05 0.06 0.08 0.12
RADIO 4415 B66A	B	From Leg	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.86 2.03 2.20 2.58	0.87 1.00 1.13 1.43	0.05 0.06 0.08 0.12
RADIO 4415 B66A	C	From Leg	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.86 2.03 2.20 2.58	0.87 1.00 1.13 1.43	0.05 0.06 0.08 0.12
KRY 112 144/1	A	From Leg	2.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.35 0.43 0.51 0.70	0.17 0.23 0.30 0.46	0.01 0.01 0.02 0.03
KRY 112 144/1	B	From Leg	2.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.35 0.43 0.51 0.70	0.17 0.23 0.30 0.46	0.01 0.01 0.02 0.03
KRY 112 144/1	C	From Leg	2.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.35 0.43 0.51 0.70	0.17 0.23 0.30 0.46	0.01 0.01 0.02 0.03
Side Arm Mount [SO 901-3]	C	None		0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.14 1.49 1.91 2.93	1.14 1.49 1.91 2.93	0.32 0.34 0.37 0.46
***									

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
L1	155.5 - 110	Pole	Max Tension	26	0.00	0.00	0.00
			Max. Compression	26	-54.19	-0.50	-0.52
			Max. Mx	8	-27.65	-649.70	-1.21
			Max. My	14	-27.65	-1.13	-650.93
			Max. Vy	8	26.61	-649.70	-1.21
			Max. Vx	14	26.64	-1.13	-650.93
			Max. Torque	12			0.68
L2	110 - 72.5	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-87.98	-0.50	-2.20
			Max. Mx	8	-50.72	-1933.75	-2.79
			Max. My	14	-50.72	-2.06	-1937.96
			Max. Vy	8	39.80	-1933.75	-2.79
			Max. Vx	14	39.87	-2.06	-1937.96
			Max. Torque	22			-0.73
L3	72.5 - 36	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-115.65	-0.50	-4.88
			Max. Mx	8	-72.63	-3503.46	-4.67
			Max. My	14	-72.63	-2.95	-3510.97
			Max. Vy	8	47.13	-3503.46	-4.67
			Max. Vx	14	47.20	-2.95	-3510.97
			Max. Torque	22			-0.73
L4	36 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-150.96	-0.50	-7.86
			Max. Mx	8	-101.71	-5795.89	-6.89
			Max. My	14	-101.71	-4.05	-5807.41
			Max. Vy	8	54.47	-5795.89	-6.89
			Max. Vx	14	54.54	-4.05	-5807.41
			Max. Torque	22			-0.73

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	150.96	0.00	0.00
	Max. H_x	20	101.72	54.44	0.02
	Max. H_z	2	101.72	0.02	54.51
	Max. M_x	2	5801.45	0.02	54.51
	Max. M_z	8	5795.89	-54.44	-0.02
	Max. Torsion	10	0.73	-47.16	-27.27
	Min. Vert	7	76.29	-47.14	27.23
	Min. H_x	8	101.72	-54.44	-0.02
	Min. H_z	14	101.72	-0.02	-54.51
	Min. M_x	14	-5807.41	-0.02	-54.51
	Min. M_z	20	-5795.60	54.44	0.02
	Min. Torsion	22	-0.73	47.16	27.27

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	84.77	0.00	0.00	2.44	-0.12	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	101.72	-0.02	-54.51	-5801.45	3.77	0.47
0.9 Dead+1.0 Wind 0 deg - No Ice	76.29	-0.02	-54.51	-5775.10	3.78	0.47
1.2 Dead+1.0 Wind 30 deg - No Ice	101.72	27.20	-47.19	-5021.85	-2894.63	0.12
0.9 Dead+1.0 Wind 30 deg - No Ice	76.29	27.20	-47.19	-4999.14	-2881.08	0.12
1.2 Dead+1.0 Wind 60 deg - No Ice	101.72	47.14	-27.23	-2895.85	-5017.45	-0.26
0.9 Dead+1.0 Wind 60 deg - No Ice	76.29	47.14	-27.23	-2883.07	-4993.99	-0.26
1.2 Dead+1.0 Wind 90 deg - No Ice	101.72	54.44	0.02	6.89	-5795.89	-0.57
0.9 Dead+1.0 Wind 90 deg - No Ice	76.29	54.44	0.02	6.11	-5768.79	-0.57

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 120 deg - No Ice	101.72	47.16	27.27	2908.58	-5021.36	-0.73
0.9 Dead+1.0 Wind 120 deg - No Ice	76.29	47.16	27.27	2894.25	-4997.87	-0.72
1.2 Dead+1.0 Wind 150 deg - No Ice	101.72	27.24	47.22	5031.72	-2901.40	-0.69
0.9 Dead+1.0 Wind 150 deg - No Ice	76.29	27.24	47.22	5007.48	-2887.81	-0.69
1.2 Dead+1.0 Wind 180 deg - No Ice	101.72	0.02	54.51	5807.41	-4.05	-0.47
0.9 Dead+1.0 Wind 180 deg - No Ice	76.29	0.02	54.51	5779.55	-4.00	-0.47
1.2 Dead+1.0 Wind 210 deg - No Ice	101.72	-27.20	47.19	5027.81	2894.34	-0.12
0.9 Dead+1.0 Wind 210 deg - No Ice	76.29	-27.20	47.19	5003.59	2880.86	-0.12
1.2 Dead+1.0 Wind 240 deg - No Ice	101.72	-47.14	27.23	2901.81	5017.16	0.26
0.9 Dead+1.0 Wind 240 deg - No Ice	76.29	-47.14	27.23	2887.52	4993.77	0.26
1.2 Dead+1.0 Wind 270 deg - No Ice	101.72	-54.44	-0.02	-0.93	5795.60	0.57
0.9 Dead+1.0 Wind 270 deg - No Ice	76.29	-54.44	-0.02	-1.66	5768.57	0.57
1.2 Dead+1.0 Wind 300 deg - No Ice	101.72	-47.16	-27.27	-2902.62	5021.07	0.73
0.9 Dead+1.0 Wind 300 deg - No Ice	76.29	-47.16	-27.27	-2889.80	4997.66	0.73
1.2 Dead+1.0 Wind 330 deg - No Ice	101.72	-27.24	-47.22	-5025.76	2901.11	0.69
0.9 Dead+1.0 Wind 330 deg - No Ice	76.29	-27.24	-47.22	-5003.03	2887.60	0.69
1.2 Dead+1.0 Ice+1.0 Temp	150.96	0.00	0.00	7.86	-0.50	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	150.96	-0.00	-11.38	-1240.58	0.10	0.08
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	150.96	5.68	-9.85	-1072.97	-623.62	0.02
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	150.96	9.85	-5.69	-615.68	-1080.38	-0.05
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	150.96	11.37	0.00	8.75	-1247.80	-0.11
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	150.96	9.85	5.69	633.01	-1081.01	-0.13
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	150.96	5.69	9.86	1089.83	-624.71	-0.12
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	150.96	0.00	11.38	1256.80	-1.16	-0.08
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	150.96	-5.68	9.85	1089.19	622.55	-0.02
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	150.96	-9.85	5.69	631.91	1079.32	0.05
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	150.96	-11.37	-0.00	7.48	1246.74	0.11
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	150.96	-9.85	-5.69	-616.78	1079.95	0.13
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	150.96	-5.69	-9.86	-1073.60	623.65	0.12
Dead+Wind 0 deg - Service	84.77	-0.00	-10.94	-1159.18	0.66	0.09
Dead+Wind 30 deg - Service	84.77	5.46	-9.47	-1003.16	-579.40	0.02
Dead+Wind 60 deg - Service	84.77	9.46	-5.47	-577.67	-1004.25	-0.05
Dead+Wind 90 deg - Service	84.77	10.93	0.00	3.26	-1160.04	-0.11
Dead+Wind 120 deg - Service	84.77	9.47	5.47	583.98	-1005.03	-0.14
Dead+Wind 150 deg - Service	84.77	5.47	9.48	1008.89	-580.76	-0.13
Dead+Wind 180 deg - Service	84.77	0.00	10.94	1164.13	-0.90	-0.09
Dead+Wind 210 deg - Service	84.77	-5.46	9.47	1008.11	579.16	-0.02

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 240 deg - Service	84.77	-9.46	5.47	582.63	1004.01	0.05
Dead+Wind 270 deg - Service	84.77	-10.93	-0.00	1.69	1159.80	0.11
Dead+Wind 300 deg - Service	84.77	-9.47	-5.47	-579.03	1004.79	0.14
Dead+Wind 330 deg - Service	84.77	-5.47	-9.48	-1003.94	580.52	0.13

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-84.77	0.00	0.00	84.77	0.00	0.000%
2	-0.02	-101.72	-54.51	0.02	101.72	54.51	0.000%
3	-0.02	-76.29	-54.51	0.02	76.29	54.51	0.000%
4	27.20	-101.72	-47.19	-27.20	101.72	47.19	0.000%
5	27.20	-76.29	-47.19	-27.20	76.29	47.19	0.000%
6	47.14	-101.72	-27.23	-47.14	101.72	27.23	0.000%
7	47.14	-76.29	-27.23	-47.14	76.29	27.23	0.000%
8	54.44	-101.72	0.02	-54.44	101.72	-0.02	0.000%
9	54.44	-76.29	0.02	-54.44	76.29	-0.02	0.000%
10	47.16	-101.72	27.27	-47.16	101.72	-27.27	0.000%
11	47.16	-76.29	27.27	-47.16	76.29	-27.27	0.000%
12	27.24	-101.72	47.22	-27.24	101.72	-47.22	0.000%
13	27.24	-76.29	47.22	-27.24	76.29	-47.22	0.000%
14	0.02	-101.72	54.51	-0.02	101.72	-54.51	0.000%
15	0.02	-76.29	54.51	-0.02	76.29	-54.51	0.000%
16	-27.20	-101.72	47.19	27.20	101.72	-47.19	0.000%
17	-27.20	-76.29	47.19	27.20	76.29	-47.19	0.000%
18	-47.14	-101.72	27.23	47.14	101.72	-27.23	0.000%
19	-47.14	-76.29	27.23	47.14	76.29	-27.23	0.000%
20	-54.44	-101.72	-0.02	54.44	101.72	0.02	0.000%
21	-54.44	-76.29	-0.02	54.44	76.29	0.02	0.000%
22	-47.16	-101.72	-27.27	47.16	101.72	27.27	0.000%
23	-47.16	-76.29	-27.27	47.16	76.29	27.27	0.000%
24	-27.24	-101.72	-47.22	27.24	101.72	47.22	0.000%
25	-27.24	-76.29	-47.22	27.24	76.29	47.22	0.000%
26	0.00	-150.96	0.00	0.00	150.96	0.00	0.000%
27	-0.00	-150.96	-11.38	0.00	150.96	11.38	0.000%
28	5.68	-150.96	-9.85	-5.68	150.96	9.85	0.000%
29	9.85	-150.96	-5.69	-9.85	150.96	5.69	0.000%
30	11.37	-150.96	0.00	-11.37	150.96	-0.00	0.000%
31	9.85	-150.96	5.69	-9.85	150.96	-5.69	0.000%
32	5.69	-150.96	9.86	-5.69	150.96	-9.86	0.000%
33	0.00	-150.96	11.38	-0.00	150.96	-11.38	0.000%
34	-5.68	-150.96	9.85	5.68	150.96	-9.85	0.000%
35	-9.85	-150.96	5.69	9.85	150.96	-5.69	0.000%
36	-11.37	-150.96	-0.00	11.37	150.96	0.00	0.000%
37	-9.85	-150.96	-5.69	9.85	150.96	5.69	0.000%
38	-5.69	-150.96	-9.86	5.69	150.96	9.86	0.000%
39	-0.00	-84.77	-10.94	0.00	84.77	10.94	0.000%
40	5.46	-84.77	-9.47	-5.46	84.77	9.47	0.000%
41	9.46	-84.77	-5.47	-9.46	84.77	5.47	0.000%
42	10.93	-84.77	0.00	-10.93	84.77	-0.00	0.000%
43	9.47	-84.77	5.47	-9.47	84.77	-5.47	0.000%
44	5.47	-84.77	9.48	-5.47	84.77	-9.48	0.000%
45	0.00	-84.77	10.94	-0.00	84.77	-10.94	0.000%
46	-5.46	-84.77	9.47	5.46	84.77	-9.47	0.000%
47	-9.46	-84.77	5.47	9.46	84.77	-5.47	0.000%
48	-10.93	-84.77	-0.00	10.93	84.77	0.00	0.000%
49	-9.47	-84.77	-5.47	9.47	84.77	5.47	0.000%
50	-5.47	-84.77	-9.48	5.47	84.77	9.48	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00007961
3	Yes	4	0.00000001	0.00004096
4	Yes	4	0.00000001	0.00076557
5	Yes	4	0.00000001	0.00050270
6	Yes	4	0.00000001	0.00076666
7	Yes	4	0.00000001	0.00050356
8	Yes	4	0.00000001	0.00007989
9	Yes	4	0.00000001	0.00004128
10	Yes	4	0.00000001	0.00075701
11	Yes	4	0.00000001	0.00049633
12	Yes	4	0.00000001	0.00077960
13	Yes	4	0.00000001	0.00051195
14	Yes	4	0.00000001	0.00008022
15	Yes	4	0.00000001	0.00004146
16	Yes	4	0.00000001	0.00076248
17	Yes	4	0.00000001	0.00050033
18	Yes	4	0.00000001	0.00076067
19	Yes	4	0.00000001	0.00049907
20	Yes	4	0.00000001	0.00008046
21	Yes	4	0.00000001	0.00004179
22	Yes	4	0.00000001	0.00077783
23	Yes	4	0.00000001	0.00051114
24	Yes	4	0.00000001	0.00075599
25	Yes	4	0.00000001	0.00049593
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00077959
28	Yes	4	0.00000001	0.00079282
29	Yes	4	0.00000001	0.00079420
30	Yes	4	0.00000001	0.00078418
31	Yes	4	0.00000001	0.00080056
32	Yes	4	0.00000001	0.00080250
33	Yes	4	0.00000001	0.00078946
34	Yes	4	0.00000001	0.00080095
35	Yes	4	0.00000001	0.00079864
36	Yes	4	0.00000001	0.00078299
37	Yes	4	0.00000001	0.00079403
38	Yes	4	0.00000001	0.00079301
39	Yes	4	0.00000001	0.00001314
40	Yes	4	0.00000001	0.00001761
41	Yes	4	0.00000001	0.00001762
42	Yes	4	0.00000001	0.00001315
43	Yes	4	0.00000001	0.00001757
44	Yes	4	0.00000001	0.00001788
45	Yes	4	0.00000001	0.00001319
46	Yes	4	0.00000001	0.00001762
47	Yes	4	0.00000001	0.00001760
48	Yes	4	0.00000001	0.00001315
49	Yes	4	0.00000001	0.00001778
50	Yes	4	0.00000001	0.00001749

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	155.5 - 110	6.007	44	0.2734	0.0001
L2	118 - 72.5	3.895	44	0.2583	0.0001
L3	81 - 36	2.046	44	0.2087	0.0001
L4	45 - 0	0.712	45	0.1340	0.0000

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

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
156.00	Platform Mount [16' LP 603-1]	44	6.007	0.2734	0.0001	501661
144.00	Platform Mount [LP 1002-1]	44	5.348	0.2710	0.0001	218113
135.00	742 213 w/ Mount Pipe	44	4.837	0.2683	0.0001	122356
128.00	(2) T-Arm Mount [TA 602-3]	44	4.444	0.2651	0.0001	91211
116.00	MX08FRO665-21 w/ Mount Pipe	44	3.787	0.2566	0.0001	64486
100.00	RV90-17-00DP w/ Mount Pipe	44	2.954	0.2383	0.0001	49648

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	155.5 - 110	29.984	12	1.3651	0.0006
L2	118 - 72.5	19.442	12	1.2897	0.0004
L3	81 - 36	10.214	12	1.0419	0.0003
L4	45 - 0	3.553	12	0.6689	0.0001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
156.00	Platform Mount [16' LP 603-1]	12	29.984	1.3651	0.0006	100612
144.00	Platform Mount [LP 1002-1]	12	26.693	1.3531	0.0006	43744
135.00	742 213 w/ Mount Pipe	12	24.141	1.3393	0.0005	24539
128.00	(2) T-Arm Mount [TA 602-3]	12	22.182	1.3234	0.0005	18292
116.00	MX08FRO665-21 w/ Mount Pipe	12	18.904	1.2810	0.0004	12931
100.00	RV90-17-00DP w/ Mount Pipe	12	14.745	1.1899	0.0003	9952

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	155.5 - 110 (1)	TP64.606x58.6x0.375	45.50	0.00	0.0	76.2838	-27.65	3888.78	0.007
L2	110 - 72.5 (2)	TP68.805x62.8x0.4375	45.50	0.00	0.0	94.7324	-50.72	5197.13	0.010
L3	72.5 - 36 (3)	TP72.748x66.8082x0.5	45.00	0.00	0.0	114.4070	-72.63	6625.14	0.011
L4	36 - 0 (4)	TP76.5x70.56x0.5	45.00	0.00	0.0	122.3600	-101.71	6767.68	0.015

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	155.5 - 110 (1)	TP64.606x58.6x0.375	651.55	5014.91	0.130	0.00	5014.91	0.000
L2	110 - 72.5 (2)	TP68.805x62.8x0.4375	1938.70	7129.95	0.272	0.00	7129.95	0.000
L3	72.5 - 36 (3)	TP72.748x66.8082x0.5	3511.78	9599.50	0.366	0.00	9599.50	0.000
L4	36 - 0 (4)	TP76.5x70.56x0.5	5808.30	10492.50	0.554	0.00	10492.50	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	155.5 - 110 (1)	TP64.606x58.6x0.375	26.66	1338.78	0.020	0.54	7439.68	0.000
L2	110 - 72.5 (2)	TP68.805x62.8x0.4375	39.87	1662.55	0.024	0.69	9834.25	0.000
L3	72.5 - 36 (3)	TP72.748x66.8082x0.5	47.20	2007.84	0.024	0.69	12550.25	0.000
L4	36 - 0 (4)	TP76.5x70.56x0.5	54.54	2147.42	0.025	0.69	14355.92	0.000

Pole Interaction Design Data

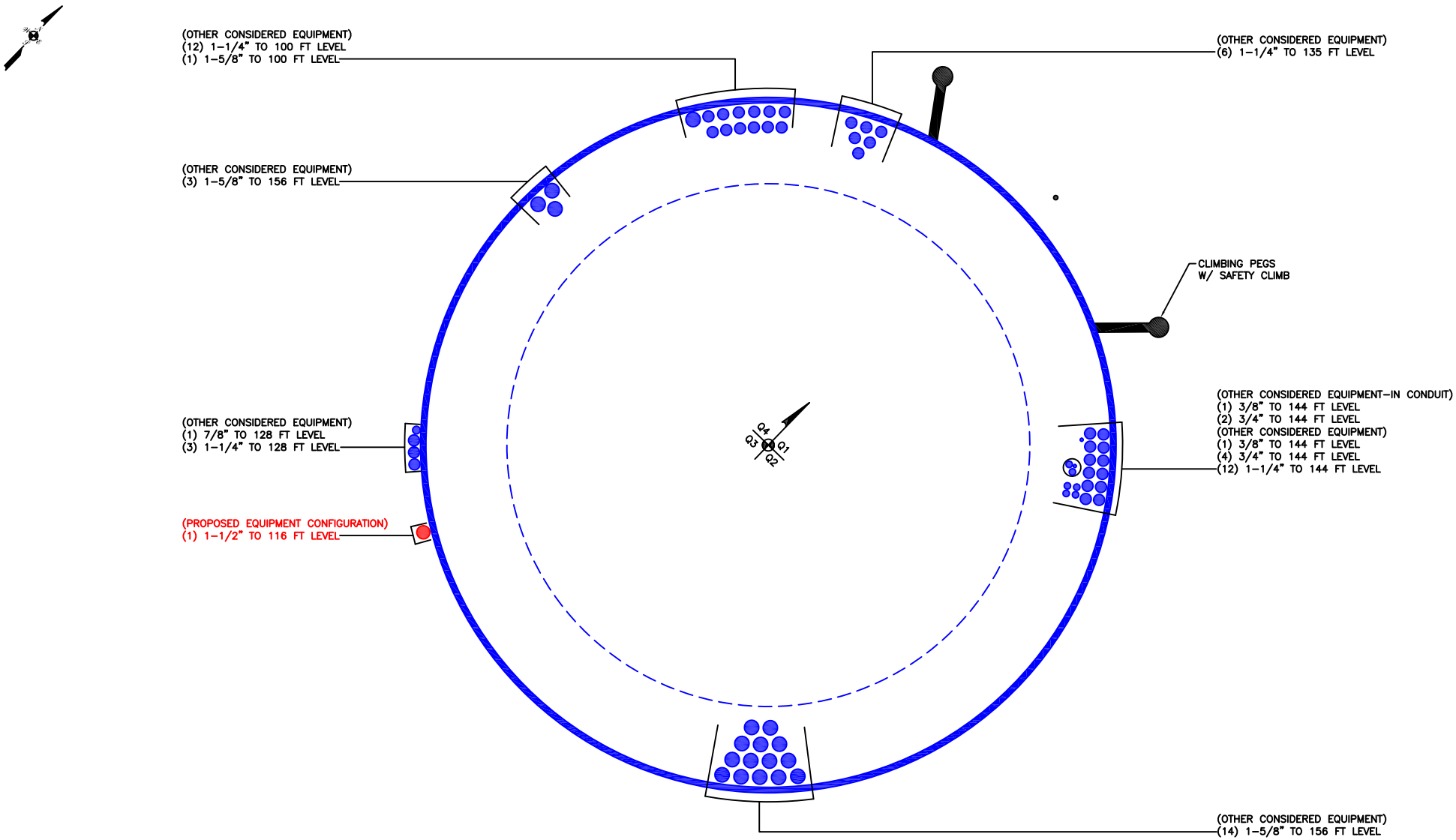
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	155.5 - 110 (1)	0.007	0.130	0.000	0.020	0.000	0.137	1.050	4.8.2
L2	110 - 72.5 (2)	0.010	0.272	0.000	0.024	0.000	0.282	1.050	4.8.2
L3	72.5 - 36 (3)	0.011	0.366	0.000	0.024	0.000	0.377	1.050	4.8.2
L4	36 - 0 (4)	0.015	0.554	0.000	0.025	0.000	0.569	1.050	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	155.5 - 110	Pole	TP64.606x58.6x0.375	1	-27.65	4083.22	13.1	Pass
L2	110 - 72.5	Pole	TP68.805x62.8x0.4375	2	-50.72	5456.99	26.9	Pass
L3	72.5 - 36	Pole	TP72.748x66.8082x0.5	3	-72.63	6956.40	35.9	Pass
L4	36 - 0	Pole	TP76.5x70.56x0.5	4	-101.71	7106.06	54.2	Pass
						Summary		
						Pole (L4)	54.2	Pass
						RATING =	**54.2**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


(OTHER CONSIDERED EQUIPMENT)
(12) 1-1/4" TO 100 FT LEVEL
(1) 1-5/8" TO 100 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(6) 1-1/4" TO 135 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(3) 1-5/8" TO 156 FT LEVEL
CLIMBING PEGS
W/ SAFETY CLIMB
(OTHER CONSIDERED EQUIPMENT-IN CONDUIT)
(1) 3/8" TO 144 FT LEVEL
(2) 3/4" TO 144 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 3/8" TO 144 FT LEVEL
(4) 3/4" TO 144 FT LEVEL
(12) 1-1/4" TO 144 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 7/8" TO 128 FT LEVEL
(3) 1-1/4" TO 128 FT LEVEL
(PROPOSED EQUIPMENT CONFIGURATION)
(1) 1-1/2" TO 116 FT LEVEL
Q1
Q2
Q3
Q4
(OTHER CONSIDERED EQUIPMENT)
(14) 1-5/8" TO 156 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

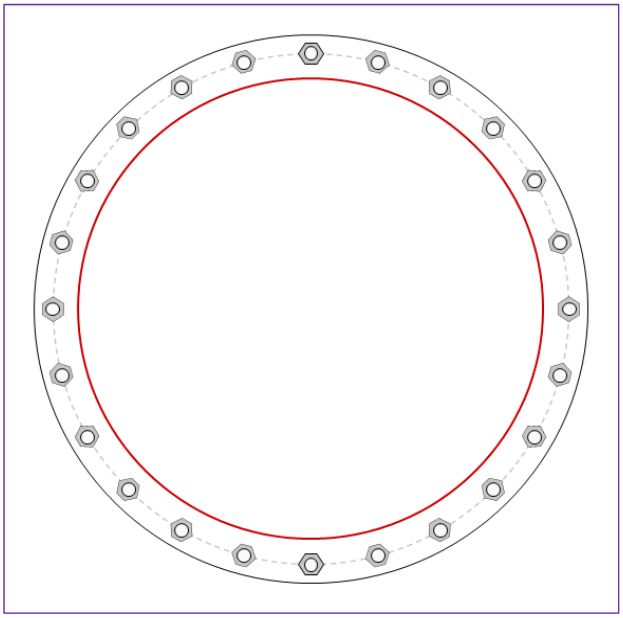
Monopole Base Plate Connection

Site Info	
BU #	806366
Site Name	HRT 107(C) 943204
Order #	556642 Rev. 2

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	1.875

Applied Loads	
Moment (kip-ft)	5808.30
Axial Force (kips)	101.71
Shear Force (kips)	54.54

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(24) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 84.75" BC

Base Plate Data

91" OD x 3.25" Plate (A633 Gr. E; Fy=60 ksi, Fu=70 ksi)

Stiffener Data

N/A

Pole Data

76.5" x 0.5" 12-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

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

Pu_t = 132.79	ϕPn_t = 243.75	**Stress Rating**
Vu = 2.27	ϕVn = 149.1	**51.9%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	13.66	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**24.1%**	**Pass**

Pier and Pad Foundation

BU # :	806366
Site Name:	HRT 107(C) 94320
App. Number:	556642 Rev. 2

TIA-222 Revision:	H
Tower Type:	Monopole

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

Superstructure Analysis Reactions

Compression, P_{comp}:	102	kips
Base Shear, Vu_comp:	55	kips
Moment, M_u:	5808	ft-kips
Tower Height, **H**:	155.5	ft
BP Dist. Above Fdn, bp_{dist}:	7.375	in

Pier Properties

Pier Shape:	Square	
Pier Diameter, **dpier**:	9	ft
Ext. Above Grade, **E**:	0.5	ft
Pier Rebar Size, **Sc**:	11	
Pier Rebar Quantity, **mc**:	59	
Pier Tie/Spiral Size, **St**:	5	
Pier Tie/Spiral Quantity, **mt**:	7	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties

Depth, **D**:	7.5	ft
Pad Width, W_1:	33.25	ft
Pad Thickness, **T**:	4.5	ft
Pad Rebar Size (Bottom dir. 2), Sp_2:	11	
Pad Rebar Quantity (Bottom dir. 2), mp_2:	25	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties

Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	4	ksi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties

Total Soil Unit Weight, γ:	130	pcf
Ultimate Gross Bearing, Qult:	21.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	40	degrees
SPT Blow Count, N_{blows}:		
Base Friction, μ:	0.4	
Neglected Depth, **N**:	4.50	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	14.5	ft

<--Toggle between Gross and Net

Foundation Analysis Checks

	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	612.17	55.00	**8.6%**	**Pass**
Bearing Pressure (ksf)	15.75	2.10	**12.7%**	**Pass**
*Overturning (kip*ft)*	17855.39	6281.80	**35.2%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	18544.57	6000.50	**30.8%**	**Pass**
Pier Compression (kip)	51554.88	153.03	**0.3%**	**Pass**
*Pad Flexure (kip*ft)*	8427.96	2151.30	**24.3%**	**Pass**
Pad Shear - 1-way (kips)	1850.42	235.89	**12.1%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.190	0.022	**11.0%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	11161.59	3600.30	**30.7%**	**Pass**

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

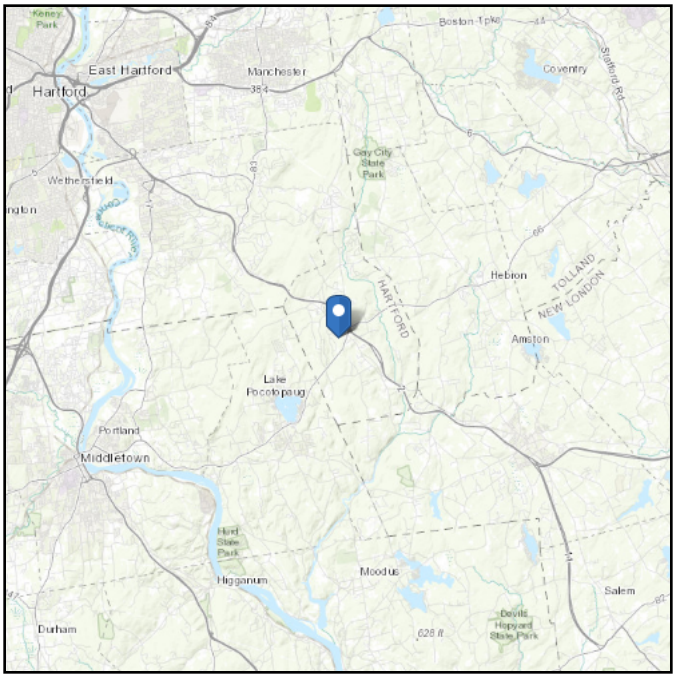
Structural Rating*:	**30.8%**
Soil Rating*:	**35.2%**

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 577.55 ft (NAVD 88)
Latitude: 41.629806
Longitude: -72.4665



Wind

Results:

Wind Speed:	~~126 Vmph~~	130 Vmph
10-year MRI	78 Vmph	
25-year MRI	87 Vmph	
50-year MRI	95 Vmph	
100-year MRI	103 Vmph	

Data Source: ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, and Section 26.5.2, incorporating errata of March 12, 2014

Date Accessed: Mon May 17 2021

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.

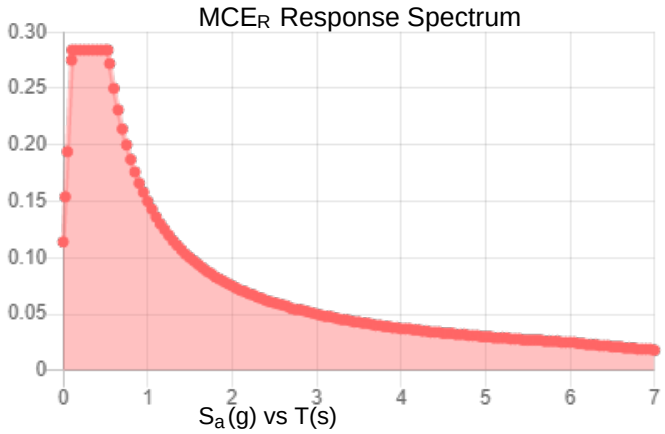
Seismic

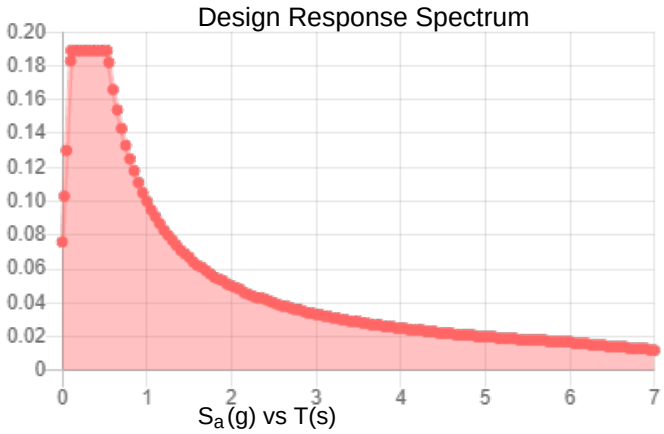
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.177	S_{DS} :	0.189
S_1 :	0.062	S_{D1} :	0.1
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.09
S_{MS} :	0.284	PGA_M :	0.143
S_{M1} :	0.15	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Mon May 17 2021

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

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Mon May 17 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.

Date: **October 15, 2021**

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

Subject:	**Structural Opinion Letter**	
Carrier Designation:	**DISH Network Co-Locate**	
	Carrier Site Number:	**BOBDL00042A**
	Carrier Site Name:	**CT-CCI-T-806366**
Crown Castle Designation:	**Crown Castle BU Number:**	**806366**
	Crown Castle Site Name:	**HRT 107(C) 943204**
	Crown Castle Work Order Number:	**1962718**
	Crown Castle Order Number:	**556642 Rev. 2**
Site Data:	**73 North Main Street, MARLBOROUGH, Hartford County, CT**	
	Latitude 41° 37' 47.3", Longitude -72° 27' 59.4"	
	155.5 Foot - Monopole Tower	

Crown Castle is pleased to submit this **"Structural Opinion Letter"** to determine the structural integrity of the above mentioned tower.

The purpose of the opinion letter is to determine the suitability of the tower. This opinion is consistent with the 2018 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 130 mph.

Based on a comparison of the previous analysis loads (Crown Castle Work Order Number: 1962718/Previous Structural Analysis dated May 26, 2021) with the loads listed in Tables 1 & 2, we have determined the tower structure and foundation ***ARE*** sufficient.

Respectfully submitted by:

Jamal A. Huwel, P.E.
Director Engineering

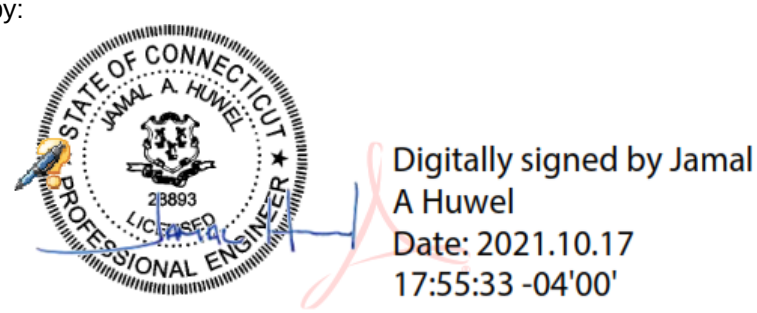


Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
116.0	116.0	3	fujitsu	TA08025-B604	1	1-1/2
		3	fujitsu	TA08025-B605		
		3	jma wireless	MX08FRO665-21 w/ Mount Pip		
		1	raycap	RDIDC-9181-PF-48		
		1	tower mounts	Commscope MC-PK8-DSH		
		1	-	MTC 3924		
		1	-	MT547120		
		3	-	MT-651-120		

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)
156.0	159.0	3	alcatel lucent	B13 RRH 4x30	17	1-5/8
		6	andrew	SBNHH-1D65B w/ Mount Pipe		
		3	commscope	LNX-6514DS-A1M w/ Mount Pipe		
		2	commscope	LNX-6514DS-AIM w/ Mount Pipe		
		1	commscope	LNX-8513DS-VTM w/ Mount Pipe		
		3	decibel	DB809K-Y		
		2	raycap	RRFDC-3315-PF-48		
	156.0	1		Platform Mount [16' LP 603-1]		
144.0	144.0	3	cci antennas	HPA65R-BU6A w/ Mount Pipe	2 6 12 1	3/8 3/4 1-1/4 Conduit
		3	cci antennas	OPA65R-BU6D w/ Mount Pipe		
		3	ericsson	RRUS 32 B30		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 4478 B14		
		3	ericsson	RRUS 8843 B2/B66A		
		3	kathrein	80010965 w/ Mount Pipe		
		3	powerwave technologies	1001940		
		3	powerwave technologies	7770.00 w/ Mount Pipe		
		6	powerwave technologies	LGP 17201		
		3	raycap	DC6-48-60-18-8F		
		1	tower mounts	Platform Mount [LP 1002-1]		
135.0	135.0	3	kathrein	742 213 w/ Mount Pipe	6	1-1/4
128.0	130.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz	1 3	7/8 1-1/4
		6	alcatel lucent	RRH2X50-800		
		3	alcatel lucent	TD-RRH8x20-25		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		3	commscope	NNVV-65B-R4 w/ Mount Pipe		
		3	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe		
	128.0	2	tower mounts	T-Arm Mount [TA 602-3]		
100.0	102.0	3	ems wireless	RV90-17-00DP w/ Mount Pipe	12 1	1-1/4 1-5/8
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
	100.0	3	ericsson	KRY 112 144/1		
		3	ericsson	RADIO 4415 B66A		
		3	ericsson	RADIO 4449 B71/B85A		
		1	tower mounts	Side Arm Mount [SO 901-3]		

Previous Analysis
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)
116.0	116.0	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 MC-PK8-DSH		

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)
156.0	159.0	3	alcatel lucent	B13 RRH 4x30	17	1-5/8
		6	andrew	SBNHH-1D65B w/ Mount Pipe		
		3	commscope	LNX-6514DS-A1M w/ Mount Pipe		
		2	commscope	LNX-6514DS-AIM w/ Mount Pipe		
		1	commscope	LNX-8513DS-VTM w/ Mount Pipe		
		3	decibel	DB809K-Y		
		2	raycap	RRFDC-3315-PF-48		
	156.0	1		Platform Mount [16' LP 603-1]		
144.0	144.0	3	cci antennas	HPA65R-BU6A w/ Mount Pipe	2 6 12 1	3/8 3/4 1-1/4 Conduit
		3	cci antennas	OPA65R-BU6D w/ Mount Pipe		
		3	ericsson	RRUS 32 B30		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 4478 B14		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		3	ericsson	RRUS 8843 B2/B66A		
		3	kathrein	80010965 w/ Mount Pipe		
		3	powerwave technologies	1001940		
		3	powerwave technologies	7770.00 w/ Mount Pipe		
		6	powerwave technologies	LGP 17201		
		3	raycap	DC6-48-60-18-8F		
		1	tower mounts	Platform Mount [LP 1002-1]		
135.0	135.0	3	kathrein	742 213 w/ Mount Pipe	6	1-1/4
128.0	130.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz	1 3	7/8 1-1/4
		6	alcatel lucent	RRH2X50-800		
		3	alcatel lucent	TD-RRH8x20-25		
		3	commscope	NNVV-65B-R4 w/ Mount Pipe		
		3	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe		
	128.0	2	tower mounts	T-Arm Mount [TA 602-3]		
100.0	102.0	3	ems wireless	RV90-17-00DP w/ Mount Pipe	12 1	1-1/4 1-5/8
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
	100.0	3	ericsson	KRY 112 144/1		
		3	ericsson	RADIO 4415 B66A		
		3	ericsson	RADIO 4449 B71/B85A		
		1	tower mounts	Side Arm Mount [SO 901-3]		

Exhibit E

Mount Analysis

Date: **September 15, 2021**

Darcy Tarr
Crown Castle
3530 Toringdon Way,
Suite 300, Charlotte, NC 28277
704-405-6589

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

Subject:	**Mount Replacement Analysis Report**	
Carrier Designation:	**DISH Network 5G**	
	Carrier Site Number:	BOBDL00042A
	Carrier Site Name:	CT-CCI-T-806366
Crown Castle Designation:	**Crown Castle BU Number:**	806366
	Crown Castle Site Name:	HRT 107(C) 943204
	Crown Castle JDE Job Number:	650038
	Crown Castle Order Number:	556642 Rev.2
Engineering Firm Designation:	**Trylon Report Designation:**	190772
Site Data:	**73 North Main Street, Marlborough, Hartford, CT, 06447**	
	Latitude 41°37'47.30" Longitude -72°27'59.40"	
Structure Information:	**Tower Height & Type:**	**155.5 ft Monopole**
	Mount Elevation:	**116.0 ft**
	Mount Type:	**10.0 ft Platform**

Dear Darcy Tarr,

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:

Platform **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: Alexandru Ciuca

Respectfully Submitted by:
Cliff Abernathy, P.E.

09/15/2021

TABLE OF CONTENTS

1) INTRODUCTION

This is an proposed (3) sector 10.0 ft Platform, designed by Commscope.

2) ANALYSIS CRITERIA

Building Code:	2015 IBC / 2018 Connecticut State Building Code
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	130 mph
Exposure Category:	B
Topographic Factor at Base:	1.0
Topographic Factor at Mount:	1.0
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Seismic S_s:	0.177
Seismic S_1:	0.062
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
116.0	116.0	3	JMA WIRELESS	MX08FRO665-21	10.0 ft Platform **[Commscope, MC−PK8−C with MTC3924 Ringmount extension kit, MT547120 face horizontals and (3) MT-651-120 antenna mounting pipes]**
		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	556642, Rev.2	CCI Sites
Structural Analysis	Tower Engineering Professionals	9934438	CCI Sites
Mount Manufacturer Drawings	Commscope	MC−PK8−C	Trylon

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 (Platform, All sectors)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1,2	Mount Pipe(s)	MP3	116.0	45.2	Pass
	Horizontal(s)	H1		9.6	Pass
	Standoff(s)	M2		53.8	Pass
	Bracing(s)	M1		43.2	Pass
	Handrail(s)	M17		33.2	Pass
	Mount Connection(s)	-		21.7	Pass

Structure Rating (max from all components) =	53.8%

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

4.1) Recommendations

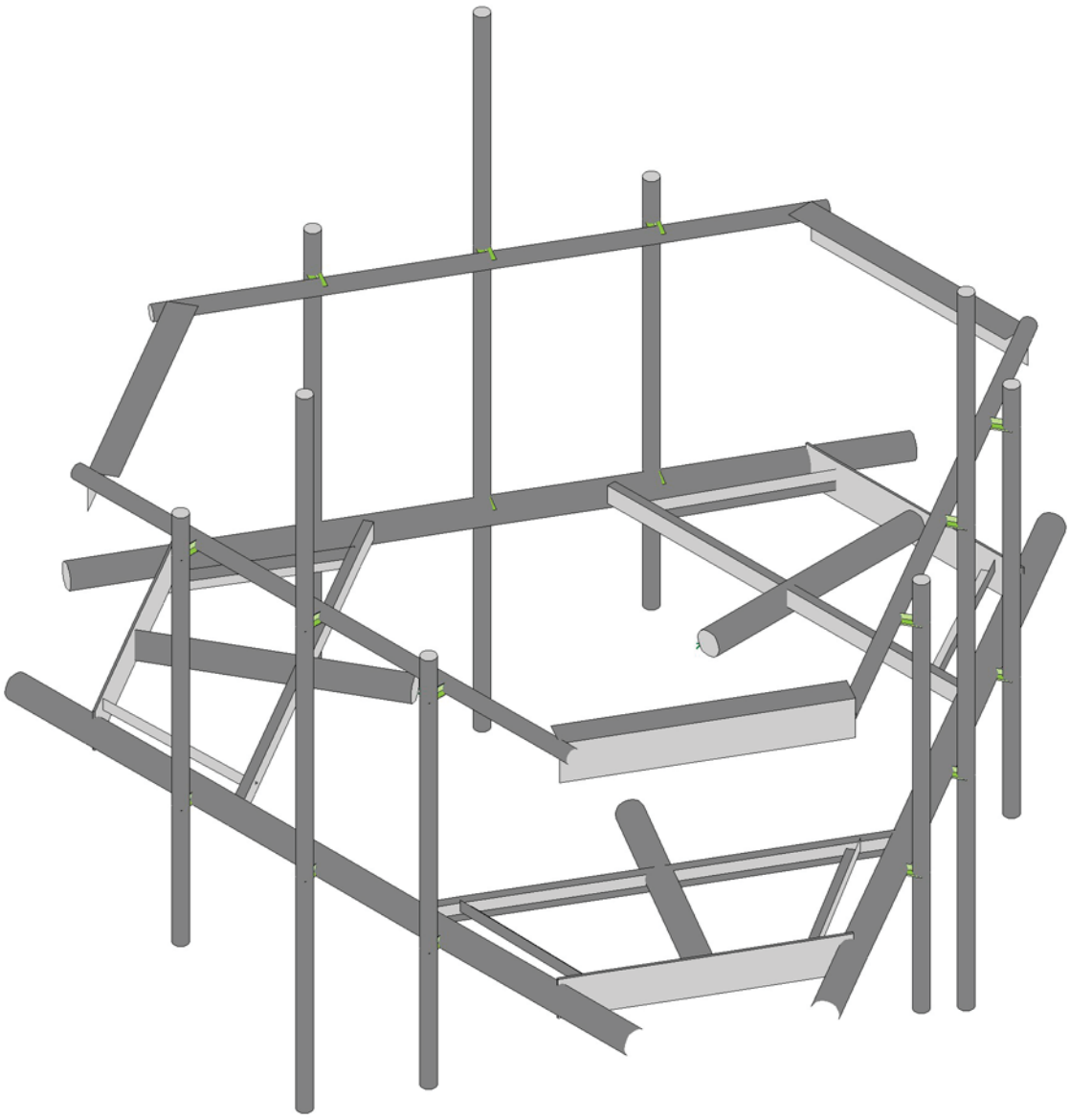
The mount has sufficient capacity to carry the proposed loading configuration. In order for the results of the analysis to be considered valid, the proposed mount listed below must be installed.

1. Commscope, MC-PK8-C platform;
2. Commscope, MTC3924 ringmount extension;
3. Commscope, MT547120 face horizontals;
4. Commscope, (3) MT-651-120 antenna mounting pipes.

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

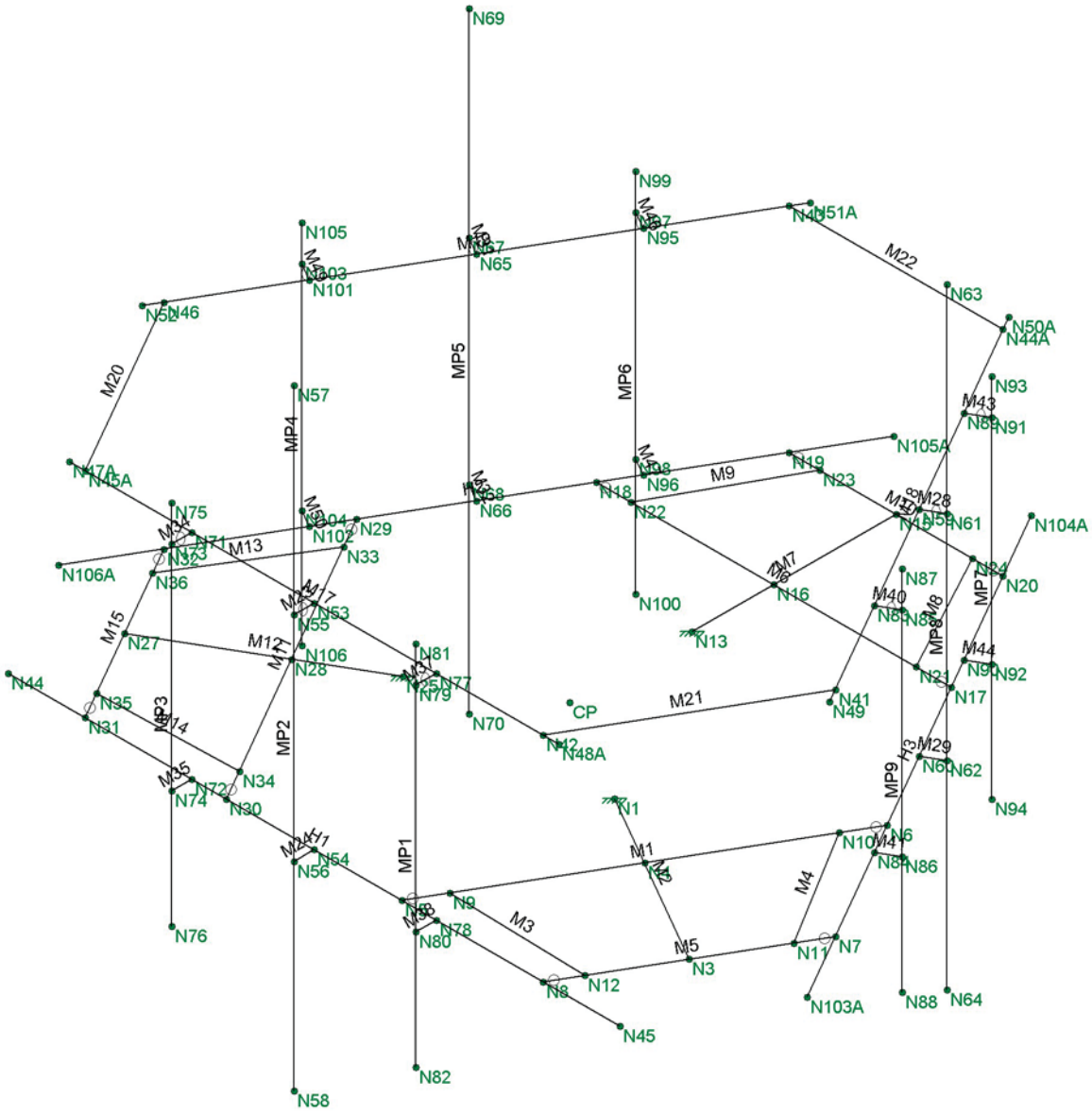
APPENDIX A

WIRE FRAME AND RENDERED MODELS



Envelope Only Solution

Trylon	806366	SK - 1
AC		Sept 15, 2021 at 2:12 PM
190772		190772 - 806366_loaded.r3d



Envelope Only Solution

Trylon	806366	SK - 2
AC		Sept 15, 2021 at 2:12 PM
190772		190772 - 806366_loaded.r3d

APPENDIX B

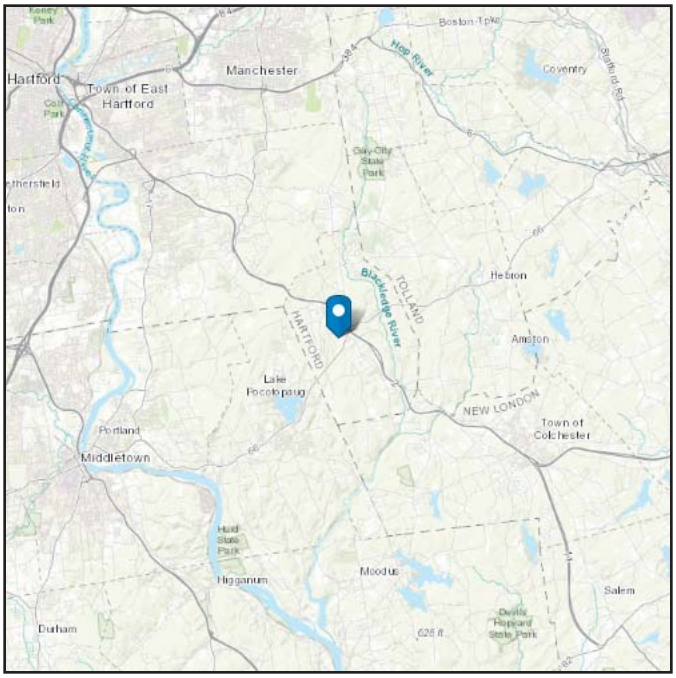
SOFTWARE INPUT CALCULATIONS

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 577.55 ft (NAVD 88)
Latitude: 41.629806
Longitude: -72.4665



Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph

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

Date Accessed: Wed Sep 15 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:	190772
Carrier Site ID:	806366
Carrier Site Name:	HRT 107(C) 943204

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

STRUCTURE DETAILS		
Mount Type:	Platform	--
Mount Elevation:	116.0	ft.
Number of Sectors:	3	--
Structure Type:	Monopole	--
Structure Height:	155.5	ft.

ANALYSIS CRITERIA		
Structure Risk Category:	II	--
Exposure Category:	B	--
Site Class:	D - Default	--
Ground Elevation:	577.55	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):	1.03	--
Directionality Factor (K_d):	0.95	--
Gust Effect Factor (Gh):	1.00	--
Shielding Factor (K_a):	0.90	--
Velocity Pressure (q_z):	41.50	psf
Ground Elevation Factor (K_e):	0.98	--

ICE PARAMETERS		
Design Ice Wind Speed:	50	mph
Design Ice Thickness (t_i):	1.50	in
Importance Factor (I_i):	1.00	--
Ice Velocity Pressure (q_{zi}):	41.50	psf
Mount Ice Thickness (t_{iz}):	1.70	in

WIND STRUCTURE CALCULATIONS		
Flat Member Pressure:	74.70	psf
Round Member Pressure:	44.82	psf
Ice Wind Pressure:	7.29	psf

SEISMIC PARAMETERS		
Importance Factor (I_e):	1.00	--
Short Period Accel .(S_s):	0.18	g
1 Second Accel (S_1):	0.06	g
Short Period Des. (S_{DS}):	0.19	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	3	116	No Ice	8.01	3.21	82.50
--	--	--	w/ Ice	9.62	4.62	278.67
TA08025-B604	3	116	No Ice	1.96	0.98	63.90
--	--	--	w/ Ice	2.38	1.30	68.37
TA08025-B605	3	116	No Ice	2.23	1.28	75.00
--	--	--	w/ Ice	2.67	1.64	79.06
RDIDC-9181-PF-48	1	116	No Ice	2.01	1.17	21.85
--	--	--	w/ Ice	2.43	1.52	71.79
			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	3	116	1.00	1.03	0.95	1.70	41.50	6.14
TA08025-B604	3	116	1.00	1.03	0.95	1.70	41.50	6.14
TA08025-B605	3	116	1.00	1.03	0.95	1.70	41.50	6.14
RDIDC-9181-PF-48	1	116	1.00	1.03	0.95	1.70	41.50	6.14

EQUIPMENT LATERAL WIND FORCE CALCULATIONS

Appurtenance Name	Qty.	--	0° 180°	30° 210°	60° 240°	90° 270°	120° 300°	150° 330°
MX08FRO665-21	3	No Ice	299.17	164.71	254.35	119.89	254.35	164.71
--	--	w/ Ice	53.16	32.45	46.25	25.54	46.25	32.45
TA08025-B604	3	No Ice	73.34	45.82	64.16	36.64	64.16	45.82
--	--	w/ Ice	13.15	8.69	11.66	7.21	11.66	8.69
TA08025-B605	3	No Ice	83.14	56.65	74.31	47.83	74.31	56.65
--	--	w/ Ice	14.74	10.49	13.32	9.08	13.32	10.49
RDIDC-9181-PF-48	1	No Ice	75.14	51.51	67.27	43.63	67.27	51.51
--	--	w/ Ice	13.45	9.66	12.18	8.39	12.18	9.66
		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						

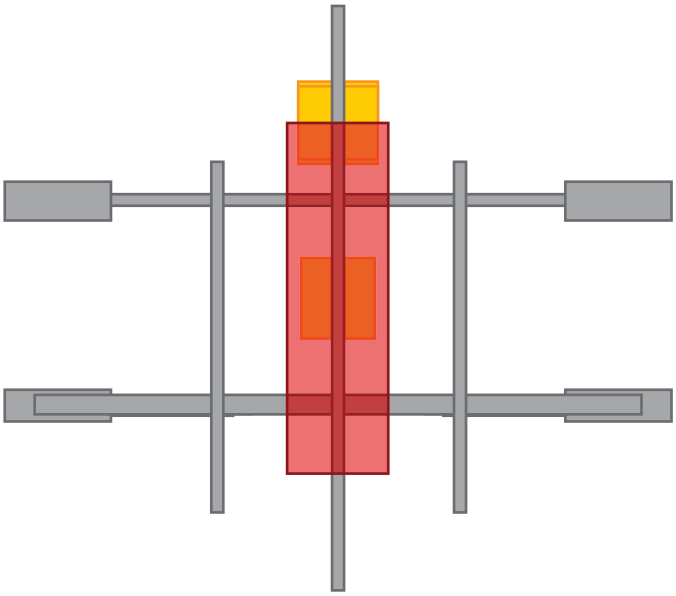
EQUIPMENT LATERAL WIND FORCE CALCULATIONS [CONT.]

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	3	116	82.5	9.35
TA08025-B604	3	116	63.9	7.24
TA08025-B605	3	116	75	8.50
RDIDC-9181-PF-48	1	116	21.85	2.48

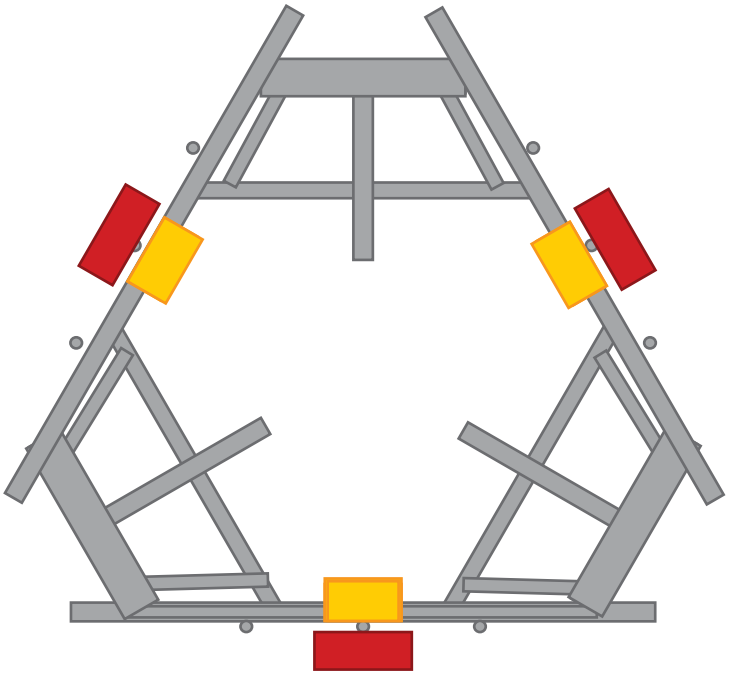
ELEVATION VIEW



MP3 MP2 MP1

*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	3	116	MP2/MP5/MP8	0/120/240
TA08025-B604	3	116	MP2/MP5/MP8	0/120/240
TA08025-B605	3	116	MP2/MP5/MP8	0/120/240
RDIDC-9181-PF-48	1	116	MP2	0

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

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 15th(360-16): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 15th(360-16): LRFD
Cold Formed Steel Code	AISI S100-16: LRFD
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building
Stainless Steel Code	AISC 14th(360-10): LRFD
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?	No
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
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 (/1...	Density[k/ft^3]	Yield[psi]	Ry	Fu[psi]	Rt
1	A992	29000	11154	.3	.65	.49	50000	1.1	65000	1.1
2	A36 Gr.36	29000	11154	.3	.65	.49	36000	1.5	58000	1.2
3	A572 Gr.50	29000	11154	.3	.65	.49	50000	1.1	65000	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42000	1.4	58000	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46000	1.4	58000	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35000	1.6	60000	1.2
7	A1085	29000	11154	.3	.65	.49	50000	1.4	65000	1.3
8	A500 GR C	29000	11154	.3	.65	.527	46000	1.4	58000	1.3

Cold Formed Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E5 F)	Density[k/ft^3]	Yield[psi]	Fu[psi]
1	A653 SS Gr33	29500	11346	.3	.65	.49	33000	45000
2	A653 SS Gr50/1	29500	11346	.3	.65	.49	50000	65000

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Plates	6.5"x0.37" Plate	Beam	RECT	A53 Gr.B	Typical	2.405	.027	8.468	.106
2	Grating Bracing	L2x2x3	Beam	Single An...	A36 Gr.36	Typical	.722	.271	.271	.009
3	Standoffs	PIPE_3.5	Beam	Pipe	A53 Gr.B	Typical	2.5	4.52	4.52	9.04
4	Standoff Bracing	C3X5	Beam	Channel	A36 Gr.36	Typical	1.47	.241	1.85	.043
5	Handrails	PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
6	Handrail Corners	L6.6"X4.46"X0.25"	Beam	Single An...	A36 Gr.36	Typical	2.702	4.759	12.473	.055
7	MT547120	PIPE_3.5	Beam	Pipe	A500 GR C	Typical	2.5	4.52	4.52	9.04
8	MT-651-120	PIPE 2.375X0.120	Beam	Pipe	A500 GR C	Typical	.85	.542	.542	1.084
9	MT-651	PIPE 2.375X0.120	Beam	Pipe	A500 GR C	Typical	.85	.542	.542	1.084

Cold Formed Steel Section Sets

	Label	Shape	Type	Design L...	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	CF1A	8CU1.25...	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	N25	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N13	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(...
1	Self Weight	DL			-1		13		3	
2	Structure Wind X	WLX						51		
3	Structure Wind Y	WLY						51		
4	Wind Load 0 AZI	WLX					26			
5	Wind Load 30 AZI	None					26			
6	Wind Load 45 AZI	None					26			
7	Wind Load 60 AZI	None					26			
8	Wind Load 90 AZI	WLY					26			
9	Wind Load 120 AZI	None					26			
10	Wind Load 135 AZI	None					26			
11	Wind Load 150 AZI	None					26			
12	Ice Weight	OL1					13	51	3	
13	Ice Structure Wind X	OL2						51		
14	Ice Structure Wind Y	OL3						51		
15	Ice Wind Load 0 AZI	OL2					26			
16	Ice Wind Load 30 AZI	None					26			
17	Ice Wind Load 45 AZI	None					26			
18	Ice Wind Load 60 AZI	None					26			
19	Ice Wind Load 90 AZI	OL3					26			
20	Ice Wind Load 120 AZI	None					26			
21	Ice Wind Load 135 AZI	None					26			
22	Ice Wind Load 150 AZI	None					26			
23	Seismic Load X	ELX	-.113				13			
24	Seismic Load Y	ELY		-.113			13			
25	Live Load 1 (Lv)	None					1			
26	Live Load 2 (Lv)	None					1			
27	Live Load 3 (Lv)	None					1			
28	Live Load 4 (Lv)	None					1			
29	Live Load 5 (Lv)	None					1			
30	Live Load 6 (Lv)	None					1			
31	Live Load 7 (Lv)	None					1			
32	Live Load 8 (Lv)	None					1			
33	Live Load 9 (Lv)	None					1			
34	Maintenance Load 1 (Lm)	None					1			
35	Maintenance Load 2 (Lm)	None					1			
36	Maintenance Load 3 (Lm)	None					1			
37	Maintenance Load 4 (Lm)	None					1			
38	Maintenance Load 5 (Lm)	None					1			
39	Maintenance Load 6 (Lm)	None					1			
40	Maintenance Load 7 (Lm)	None					1			
41	Maintenance Load 8 (Lm)	None					1			
42	Maintenance Load 9 (Lm)	None					1			
43	BLC 1 Transient Area Loads	None						9		

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(...
44	BLC 12 Transient Area Loads	None						9		

Load Combinations

	Description	So...	PDelta	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
1	1.4DL	Yes	Y		DL	1.4																		
2	1.2DL + 1WL 0 ...	Yes	Y		DL	1.2	2	1	3		4	1												
3	1.2DL + 1WL 30...	Yes	Y		DL	1.2	2	.866	3	.5	5	1												
4	1.2DL + 1WL 45...	Yes	Y		DL	1.2	2	.707	3	.707	6	1												
5	1.2DL + 1WL 60...	Yes	Y		DL	1.2	2	.5	3	.866	7	1												
6	1.2DL + 1WL 90...	Yes	Y		DL	1.2	2		3	1	8	1												
7	1.2DL + 1WL 12...	Yes	Y		DL	1.2	2	-.5	3	.866	9	1												
8	1.2DL + 1WL 13...	Yes	Y		DL	1.2	2	-.707	3	.707	10	1												
9	1.2DL + 1WL 15...	Yes	Y		DL	1.2	2	-.866	3	.5	11	1												
10	1.2DL + 1WL 18...	Yes	Y		DL	1.2	2	-1	3		4	-1												
11	1.2DL + 1WL 21...	Yes	Y		DL	1.2	2	-.866	3	-.5	5	-1												
12	1.2DL + 1WL 22...	Yes	Y		DL	1.2	2	-.707	3	-.707	6	-1												
13	1.2DL + 1WL 24...	Yes	Y		DL	1.2	2	-.5	3	-.866	7	-1												
14	1.2DL + 1WL 27...	Yes	Y		DL	1.2	2		3	-1	8	-1												
15	1.2DL + 1WL 30...	Yes	Y		DL	1.2	2	.5	3	-.866	9	-1												
16	1.2DL + 1WL 31...	Yes	Y		DL	1.2	2	.707	3	-.707	10	-1												
17	1.2DL + 1WL 33...	Yes	Y		DL	1.2	2	.866	3	-.5	11	-1												
18	0.9DL + 1WL 0 ...	Yes	Y		DL	.9	2	1	3		4	1												
19	0.9DL + 1WL 30...	Yes	Y		DL	.9	2	.866	3	.5	5	1												
20	0.9DL + 1WL 45...	Yes	Y		DL	.9	2	.707	3	.707	6	1												
21	0.9DL + 1WL 60...	Yes	Y		DL	.9	2	.5	3	.866	7	1												
22	0.9DL + 1WL 90...	Yes	Y		DL	.9	2		3	1	8	1												
23	0.9DL + 1WL 12...	Yes	Y		DL	.9	2	-.5	3	.866	9	1												
24	0.9DL + 1WL 13...	Yes	Y		DL	.9	2	-.707	3	.707	10	1												
25	0.9DL + 1WL 15...	Yes	Y		DL	.9	2	-.866	3	.5	11	1												
26	0.9DL + 1WL 18...	Yes	Y		DL	.9	2	-1	3		4	-1												
27	0.9DL + 1WL 21...	Yes	Y		DL	.9	2	-.866	3	-.5	5	-1												
28	0.9DL + 1WL 22...	Yes	Y		DL	.9	2	-.707	3	-.707	6	-1												
29	0.9DL + 1WL 24...	Yes	Y		DL	.9	2	-.5	3	-.866	7	-1												
30	0.9DL + 1WL 27...	Yes	Y		DL	.9	2		3	-1	8	-1												
31	0.9DL + 1WL 30...	Yes	Y		DL	.9	2	.5	3	-.866	9	-1												
32	0.9DL + 1WL 31...	Yes	Y		DL	.9	2	.707	3	-.707	10	-1												
33	0.9DL + 1WL 33...	Yes	Y		DL	.9	2	.866	3	-.5	11	-1												
34	1.2DL + 1DLi + ...	Yes	Y		DL	1.2	OL1	1	13	1	14		15	1										
35	1.2DL + 1DLi + ...	Yes	Y		DL	1.2	OL1	1	13	.866	14	.5	16	1										
36	1.2DL + 1DLi + ...	Yes	Y		DL	1.2	OL1	1	13	.707	14	.707	17	1										
37	1.2DL + 1DLi + ...	Yes	Y		DL	1.2	OL1	1	13	.5	14	.866	18	1										
38	1.2DL + 1DLi + ...	Yes	Y		DL	1.2	OL1	1	13		14	1	19	1										
39	1.2DL + 1DLi + ...	Yes	Y		DL	1.2	OL1	1	13	-.5	14	.866	20	1										
40	1.2DL + 1DLi + ...	Yes	Y		DL	1.2	OL1	1	13	-.707	14	.707	21	1										
41	1.2DL + 1DLi + ...	Yes	Y		DL	1.2	OL1	1	13	-.866	14	.5	22	1										
42	1.2DL + 1DLi + ...	Yes	Y		DL	1.2	OL1	1	13	-1	14		15	-1										
43	1.2DL + 1DLi + ...	Yes	Y		DL	1.2	OL1	1	13	-.866	14	-.5	16	-1										
44	1.2DL + 1DLi + ...	Yes	Y		DL	1.2	OL1	1	13	-.707	14	-.707	17	-1										
45	1.2DL + 1DLi + ...	Yes	Y		DL	1.2	OL1	1	13	-.5	14	-.866	18	-1										
46	1.2DL + 1DLi + ...	Yes	Y		DL	1.2	OL1	1	13		14	-1	19	-1										
47	1.2DL + 1DLi + ...	Yes	Y		DL	1.2	OL1	1	13	.5	14	-.866	20	-1										
48	1.2DL + 1DLi + ...	Yes	Y		DL	1.2	OL1	1	13	.707	14	-.707	21	-1										
49	1.2DL + 1DLi + ...	Yes	Y		DL	1.2	OL1	1	13	.866	14	-.5	22	-1										
50	(1.2+0.2Sds)DL ...	Yes	Y		DL	1.238	23	1	24															
51	(1.2+0.2Sds)DL ...	Yes	Y		DL	1.238	23	.866	24	.5														

Load Combinations (Continued)

	Description	So...	PDelta	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
52	(1.2+0.2Sds)DL ...	Yes	Y		DL	1.238	23	.707	24	.707														
53	(1.2+0.2Sds)DL ...	Yes	Y		DL	1.238	23	.5	24	.866														
54	(1.2+0.2Sds)DL ...	Yes	Y		DL	1.238	23		24	1														
55	(1.2+0.2Sds)DL ...	Yes	Y		DL	1.238	23	-.5	24	.866														
56	(1.2+0.2Sds)DL ...	Yes	Y		DL	1.238	23	-.707	24	.707														
57	(1.2+0.2Sds)DL ...	Yes	Y		DL	1.238	23	-.866	24	.5														
58	(1.2+0.2Sds)DL ...	Yes	Y		DL	1.238	23	-1	24															
59	(1.2+0.2Sds)DL ...	Yes	Y		DL	1.238	23	-.866	24	-.5														
60	(1.2+0.2Sds)DL ...	Yes	Y		DL	1.238	23	-.707	24	-.707														
61	(1.2+0.2Sds)DL ...	Yes	Y		DL	1.238	23	-.5	24	-.866														
62	(1.2+0.2Sds)DL ...	Yes	Y		DL	1.238	23		24	-1														
63	(1.2+0.2Sds)DL ...	Yes	Y		DL	1.238	23	.5	24	-.866														
64	(1.2+0.2Sds)DL ...	Yes	Y		DL	1.238	23	.707	24	-.707														
65	(1.2+0.2Sds)DL ...	Yes	Y		DL	1.238	23	.866	24	-.5														
66	(0.9-0.2Sds)DL ...	Yes	Y		DL	.862	23	1	24															
67	(0.9-0.2Sds)DL ...	Yes	Y		DL	.862	23	.866	24	.5														
68	(0.9-0.2Sds)DL ...	Yes	Y		DL	.862	23	.707	24	.707														
69	(0.9-0.2Sds)DL ...	Yes	Y		DL	.862	23	.5	24	.866														
70	(0.9-0.2Sds)DL ...	Yes	Y		DL	.862	23		24	1														
71	(0.9-0.2Sds)DL ...	Yes	Y		DL	.862	23	-.5	24	.866														
72	(0.9-0.2Sds)DL ...	Yes	Y		DL	.862	23	-.707	24	.707														
73	(0.9-0.2Sds)DL ...	Yes	Y		DL	.862	23	-.866	24	.5														
74	(0.9-0.2Sds)DL ...	Yes	Y		DL	.862	23	-1	24															
75	(0.9-0.2Sds)DL ...	Yes	Y		DL	.862	23	-.866	24	-.5														
76	(0.9-0.2Sds)DL ...	Yes	Y		DL	.862	23	-.707	24	-.707														
77	(0.9-0.2Sds)DL ...	Yes	Y		DL	.862	23	-.5	24	-.866														
78	(0.9-0.2Sds)DL ...	Yes	Y		DL	.862	23		24	-1														
79	(0.9-0.2Sds)DL ...	Yes	Y		DL	.862	23	.5	24	-.866														
80	(0.9-0.2Sds)DL ...	Yes	Y		DL	.862	23	.707	24	-.707														
81	(0.9-0.2Sds)DL ...	Yes	Y		DL	.862	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 + 1Lv4	Yes	Y		DL	1.2	28	1.5																
86	1.2DL + 1Lv5	Yes	Y		DL	1.2	29	1.5																
87	1.2DL + 1Lv6	Yes	Y		DL	1.2	30	1.5																
88	1.2DL + 1Lv7	Yes	Y		DL	1.2	31	1.5																
89	1.2DL + 1Lv8	Yes	Y		DL	1.2	32	1.5																
90	1.2DL + 1Lv9	Yes	Y		DL	1.2	33	1.5																
91	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	34	1.5	2	.053	3		4	.053										
92	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	34	1.5	2	.046	3	.027	5	.053										
93	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	34	1.5	2	.038	3	.038	6	.053										
94	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	34	1.5	2	.027	3	.046	7	.053										
95	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	34	1.5	2		3	.053	8	.053										
96	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	34	1.5	2	-.027	3	.046	9	.053										
97	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	34	1.5	2	-.038	3	.038	10	.053										
98	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	34	1.5	2	-.046	3	.027	11	.053										
99	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	34	1.5	2	-.053	3		4	-.053										
100	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	34	1.5	2	-.046	3	-.027	5	-.053										
101	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	34	1.5	2	-.038	3	-.038	6	-.053										
102	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	34	1.5	2	-.027	3	-.046	7	-.053										
103	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	34	1.5	2		3	-.053	8	-.053										
104	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	34	1.5	2	.027	3	-.046	9	-.053										
105	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	34	1.5	2	.038	3	-.038	10	-.053										
106	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	34	1.5	2	.046	3	-.027	11	-.053										
107	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	35	1.5	2	.053	3		4	.053										
108	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	35	1.5	2	.046	3	.027	5	.053										

Load Combinations (Continued)

	Description	So...	PDelta	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
109	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	35	1.5	2	.038	3	.038	6	.053										
110	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	35	1.5	2	.027	3	.046	7	.053										
111	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	35	1.5	2		3	.053	8	.053										
112	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	35	1.5	2	-.027	3	.046	9	.053										
113	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	35	1.5	2	-.038	3	.038	10	.053										
114	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	35	1.5	2	-.046	3	.027	11	.053										
115	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	35	1.5	2	-.053	3		4	-.053										
116	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	35	1.5	2	-.046	3	-.027	5	-.053										
117	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	35	1.5	2	-.038	3	-.038	6	-.053										
118	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	35	1.5	2	-.027	3	-.046	7	-.053										
119	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	35	1.5	2		3	-.053	8	-.053										
120	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	35	1.5	2	.027	3	-.046	9	-.053										
121	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	35	1.5	2	.038	3	-.038	10	-.053										
122	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	35	1.5	2	.046	3	-.027	11	-.053										
123	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	36	1.5	2	.053	3		4	.053										
124	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	36	1.5	2	.046	3	.027	5	.053										
125	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	36	1.5	2	.038	3	.038	6	.053										
126	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	36	1.5	2	.027	3	.046	7	.053										
127	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	36	1.5	2		3	.053	8	.053										
128	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	36	1.5	2	-.027	3	.046	9	.053										
129	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	36	1.5	2	-.038	3	.038	10	.053										
130	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	36	1.5	2	-.046	3	.027	11	.053										
131	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	36	1.5	2	-.053	3		4	-.053										
132	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	36	1.5	2	-.046	3	-.027	5	-.053										
133	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	36	1.5	2	-.038	3	-.038	6	-.053										
134	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	36	1.5	2	-.027	3	-.046	7	-.053										
135	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	36	1.5	2		3	-.053	8	-.053										
136	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	36	1.5	2	.027	3	-.046	9	-.053										
137	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	36	1.5	2	.038	3	-.038	10	-.053										
138	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	36	1.5	2	.046	3	-.027	11	-.053										
139	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	37	1.5	2	.053	3		4	.053										
140	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	37	1.5	2	.046	3	.027	5	.053										
141	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	37	1.5	2	.038	3	.038	6	.053										
142	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	37	1.5	2	.027	3	.046	7	.053										
143	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	37	1.5	2		3	.053	8	.053										
144	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	37	1.5	2	-.027	3	.046	9	.053										
145	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	37	1.5	2	-.038	3	.038	10	.053										
146	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	37	1.5	2	-.046	3	.027	11	.053										
147	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	37	1.5	2	-.053	3		4	-.053										
148	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	37	1.5	2	-.046	3	-.027	5	-.053										
149	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	37	1.5	2	-.038	3	-.038	6	-.053										
150	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	37	1.5	2	-.027	3	-.046	7	-.053										
151	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	37	1.5	2		3	-.053	8	-.053										
152	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	37	1.5	2	.027	3	-.046	9	-.053										
153	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	37	1.5	2	.038	3	-.038	10	-.053										
154	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	37	1.5	2	.046	3	-.027	11	-.053										
155	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	38	1.5	2	.053	3		4	.053										
156	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	38	1.5	2	.046	3	.027	5	.053										
157	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	38	1.5	2	.038	3	.038	6	.053										
158	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	38	1.5	2	.027	3	.046	7	.053										
159	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	38	1.5	2		3	.053	8	.053										
160	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	38	1.5	2	-.027	3	.046	9	.053										
161	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	38	1.5	2	-.038	3	.038	10	.053										
162	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	38	1.5	2	-.046	3	.027	11	.053										
163	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	38	1.5	2	-.053	3		4	-.053										
164	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	38	1.5	2	-.046	3	-.027	5	-.053										
165	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	38	1.5	2	-.038	3	-.038	6	-.053										

Load Combinations (Continued)

	Description	So...	PDelta	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
166	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	38	1.5	2	-.027	3	-.046	7	-.053										
167	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	38	1.5	2		3	-.053	8	-.053										
168	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	38	1.5	2	.027	3	-.046	9	-.053										
169	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	38	1.5	2	.038	3	-.038	10	-.053										
170	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	38	1.5	2	.046	3	-.027	11	-.053										
171	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	39	1.5	2	.053	3		4	.053										
172	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	39	1.5	2	.046	3	.027	5	.053										
173	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	39	1.5	2	.038	3	.038	6	.053										
174	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	39	1.5	2	.027	3	.046	7	.053										
175	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	39	1.5	2		3	.053	8	.053										
176	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	39	1.5	2	-.027	3	.046	9	.053										
177	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	39	1.5	2	-.038	3	.038	10	.053										
178	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	39	1.5	2	-.046	3	.027	11	.053										
179	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	39	1.5	2	-.053	3		4	-.053										
180	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	39	1.5	2	-.046	3	-.027	5	-.053										
181	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	39	1.5	2	-.038	3	-.038	6	-.053										
182	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	39	1.5	2	-.027	3	-.046	7	-.053										
183	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	39	1.5	2		3	-.053	8	-.053										
184	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	39	1.5	2	.027	3	-.046	9	-.053										
185	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	39	1.5	2	.038	3	-.038	10	-.053										
186	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	39	1.5	2	.046	3	-.027	11	-.053										
187	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	40	1.5	2	.053	3		4	.053										
188	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	40	1.5	2	.046	3	.027	5	.053										
189	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	40	1.5	2	.038	3	.038	6	.053										
190	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	40	1.5	2	.027	3	.046	7	.053										
191	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	40	1.5	2		3	.053	8	.053										
192	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	40	1.5	2	-.027	3	.046	9	.053										
193	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	40	1.5	2	-.038	3	.038	10	.053										
194	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	40	1.5	2	-.046	3	.027	11	.053										
195	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	40	1.5	2	-.053	3		4	-.053										
196	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	40	1.5	2	-.046	3	-.027	5	-.053										
197	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	40	1.5	2	-.038	3	-.038	6	-.053										
198	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	40	1.5	2	-.027	3	-.046	7	-.053										
199	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	40	1.5	2		3	-.053	8	-.053										
200	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	40	1.5	2	.027	3	-.046	9	-.053										
201	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	40	1.5	2	.038	3	-.038	10	-.053										
202	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	40	1.5	2	.046	3	-.027	11	-.053										
203	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	41	1.5	2	.053	3		4	.053										
204	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	41	1.5	2	.046	3	.027	5	.053										
205	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	41	1.5	2	.038	3	.038	6	.053										
206	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	41	1.5	2	.027	3	.046	7	.053										
207	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	41	1.5	2		3	.053	8	.053										
208	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	41	1.5	2	-.027	3	.046	9	.053										
209	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	41	1.5	2	-.038	3	.038	10	.053										
210	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	41	1.5	2	-.046	3	.027	11	.053										
211	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	41	1.5	2	-.053	3		4	-.053										
212	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	41	1.5	2	-.046	3	-.027	5	-.053										
213	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	41	1.5	2	-.038	3	-.038	6	-.053										
214	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	41	1.5	2	-.027	3	-.046	7	-.053										
215	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	41	1.5	2		3	-.053	8	-.053										
216	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	41	1.5	2	.027	3	-.046	9	-.053										
217	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	41	1.5	2	.038	3	-.038	10	-.053										
218	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	41	1.5	2	.046	3	-.027	11	-.053										
219	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	42	1.5	2	.053	3		4	.053										
220	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	42	1.5	2	.046	3	.027	5	.053										
221	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	42	1.5	2	.038	3	.038	6	.053										
222	1.2DL + 1.5Lm +...	Yes	Y		DL	1.2	42	1.5	2	.027	3	.046	7	.053										

Load Combinations (Continued)

	Description	So...	PDelta	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
223	1.2DL + 1.5Lm +..	Yes	Y		DL	1.2	42	1.5	2		3	.053	8	.053										
224	1.2DL + 1.5Lm +..	Yes	Y		DL	1.2	42	1.5	2	-.027	3	.046	9	.053										
225	1.2DL + 1.5Lm +..	Yes	Y		DL	1.2	42	1.5	2	-.038	3	.038	10	.053										
226	1.2DL + 1.5Lm +..	Yes	Y		DL	1.2	42	1.5	2	-.046	3	.027	11	.053										
227	1.2DL + 1.5Lm +..	Yes	Y		DL	1.2	42	1.5	2	-.053	3		4	-.053										
228	1.2DL + 1.5Lm +..	Yes	Y		DL	1.2	42	1.5	2	-.046	3	-.027	5	-.053										
229	1.2DL + 1.5Lm +..	Yes	Y		DL	1.2	42	1.5	2	-.038	3	-.038	6	-.053										
230	1.2DL + 1.5Lm +..	Yes	Y		DL	1.2	42	1.5	2	-.027	3	-.046	7	-.053										
231	1.2DL + 1.5Lm +..	Yes	Y		DL	1.2	42	1.5	2		3	-.053	8	-.053										
232	1.2DL + 1.5Lm +..	Yes	Y		DL	1.2	42	1.5	2	.027	3	-.046	9	-.053										
233	1.2DL + 1.5Lm +..	Yes	Y		DL	1.2	42	1.5	2	.038	3	-.038	10	-.053										
234	1.2DL + 1.5Lm +..	Yes	Y		DL	1.2	42	1.5	2	.046	3	-.027	11	-.053										

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	N25	max	1492.546	3	919.001	20	2063.383	39	798.411	31	482.99	32	1679.096	19
2		min	-1489.959	27	-923.024	12	-174.914	31	-3655.049	39	-2256.385	145	-1678.373	27
3	N1	max	1492.581	17	923.033	8	2063.386	45	3655.054	45	483	20	1678.407	25
4		min	-1489.994	25	-919.01	32	-174.915	21	-798.408	21	-2256.39	165	-1679.131	33
5	N13	max	432.89	18	1511.728	22	1996.924	34	870.517	198	4140.007	34	1421.089	30
6		min	-439.85	10	-1511.728	30	-213.739	26	-870.508	208	-1023.998	26	-1421.089	22
7	Totals:	max	3078.53	18	2882.173	22	5639.352	34						
8		min	-3078.529	26	-2882.173	30	1444.28	74						

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

	Member	Shape	Code Check	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*Pnc ...	phi*Pnt [...	phi*Mn y...	phi*Mn z...	Cb	Eqn
1	M2	PIPE_3.5	.538	40	45	.183	40		1...	64491.4...	78750	7953.75	7953.75	2....	H1-1b
2	M12	PIPE_3.5	.538	40	39	.183	40		1...	64491.4...	78750	7953.75	7953.75	2....	H1-1b
3	M7	PIPE_3.5	.521	40	34	.178	40		2...	64491.4...	78750	7953.75	7953.75	2....	H1-1b
4	MP1	PIPE 2.375...	.452	48.75	14	.082	48.75		11	20365.2...	35194.76	2107.188	2107.188	2....	H1-1b
5	MP3	PIPE 2.375...	.452	48.75	6	.082	48.75		9	20365.2...	35194.76	2107.188	2107.188	1	H1-1b
6	MP9	PIPE 2.375...	.447	48.75	11	.071	48.75		14	20365.2...	35194.76	2107.188	2107.188	1....	H1-1b
7	MP4	PIPE 2.375...	.447	48.75	9	.071	48.75		6	20365.2...	35194.76	2107.188	2107.188	1	H1-1b
8	MP7	PIPE 2.375...	.444	48.75	3	.080	48.75		17	20365.2...	35194.76	2107.188	2107.188	1	H1-1b
9	MP6	PIPE 2.375...	.444	48.75	17	.080	48.75		3	20365.2...	35194.76	2107.188	2107.188	2....	H1-1b
10	M1	C3X5	.432	34.856	45	.266	6.536	y	2	32242.4...	47628	981.263	4104	1....	H1-1b
11	M11	C3X5	.432	34.856	39	.266	63.177	y	2	32242.7...	47628	981.263	4104	1....	H1-1b
12	M6	C3X5	.409	34.856	34	.247	6.536	y	7	32242.7...	47628	981.263	4104	1....	H1-1b
13	MP2	PIPE 2.375...	.400	80	6	.073	80		14	20365.2...	35194.76	2107.188	2107.188	1	H1-1b
14	MP8	PIPE 2.375...	.386	80	11	.069	80		11	20365.2...	35194.76	2107.188	2107.188	2....	H1-1b
15	MP5	PIPE 2.375...	.386	80	9	.069	80		9	20365.2...	35194.76	2107.188	2107.188	1	H1-1b
16	M17	PIPE_2.0	.332	24	10	.263	72		2	14916.0...	32130	1871.625	1871.625	1....	H3-6
17	M19	PIPE_2.0	.321	72	5	.252	72		13	14916.0...	32130	1871.625	1871.625	1....	H3-6
18	M18	PIPE_2.0	.321	24	15	.252	24		7	14916.0...	32130	1871.625	1871.625	1....	H3-6
19	M3	L2x2x3	.236	27.295	10	.032	27.295	z	42	18051.6...	23392.8	557.717	1182.442	1	H2-1
20	M13	L2x2x3	.234	27.295	4	.032	27.295	z	37	18051.6...	23392.8	557.717	1182.442	1	H2-1
21	M14	L2x2x3	.231	27.295	11	.032	27.295	y	42	18051.6...	23392.8	557.717	1239.29	2....	H2-1
22	M4	L2x2x3	.229	27.295	16	.032	27.295	y	47	18051.6...	23392.8	557.717	1239.29	2....	H2-1
23	M8	L2x2x3	.224	27.295	14	.031	27.295	z	47	18051.6...	23392.8	557.717	1182.442	1	H2-1
24	M9	L2x2x3	.221	27.295	6	.031	27.295	y	37	18051.6...	23392.8	557.717	1239.29	1....	H2-1
25	M5	6.5"x0.37" P..	.206	21	13	.310	5.687	y	2	14055.2...	75757.5	583.963	7152.879	1....	H1-1b
26	M15	6.5"x0.37" P..	.206	21	7	.310	36.312	y	2	14055.2...	75757.5	583.963	7152.867	1....	H1-1b
27	M10	6.5"x0.37" P..	.203	21	2	.286	36.313	y	13	14055.2...	75757.5	583.963	7092.818	1....	H1-1b
28	M20	L6.6"X4.46"...	.123	0	19	.080	0	y	3	51154.4...	87544.8	2462.134	7127.017	1	H2-1

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

	Member	Shape	Code Check	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*Pnc ...	phi*Pnt [...	phi*Mn y...	phi*Mn z...	Cb	Eqn
29	M21	L6.6"X4.46"...	.123	42	33	.080	42	y	17	51154.4...	87544.8	2462.134	7127.017	1	H2-1
30	M22	L6.6"X4.46"...	.104	42	17	.076	0	y	14	51154.4...	87544.8	4500.461	7127.017	1	H2-1
31	H1	PIPE_3.5	.096	60	1...	.055	76.25		15	73455.8...	103500	10453.5	10453.5	1	H1-1b
32	H3	PIPE_3.5	.094	60	1...	.056	43.75		10	73455.8...	103500	10453.5	10453.5	1	H1-1b
33	H2	PIPE_3.5	.094	60	1...	.056	76.25		10	73455.8...	103500	10453.5	10453.5	1	H1-1b

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

Member	Shape	Code Check	Loc[in]	LC	Shear...	Loc[in]	Dir	LC	phi*Pn[lb]	phi*Tn[lb]	phi*Mn...	phi*Mn...	phi*V...	phi*V...	Cb	Eqn
No Data to Print ...																

APPENDIX D

ADDITIONAL CALCUATIONS

Trylon

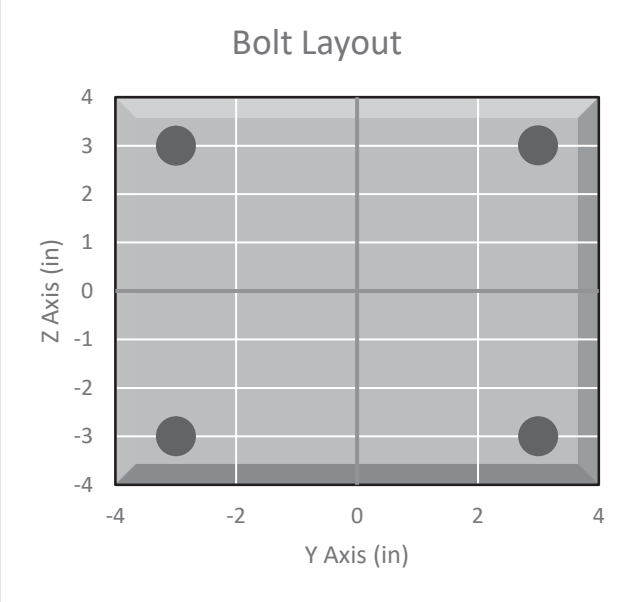
Analysis date: 09/15/21

BOLT TOOL 1.5.2

Project Data	
Job Code:	190775
Carrier Site ID:	806366
Carrier Site Name:	HRT 107(C) 943204

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:	4	--
Threads Included:	Yes	--
Double Shear:	No	--
Connection Pipe Size:	-	in



Connection Description
Standoff to Monopole Collar

Bolt Check		
Tensile Capacity (ϕT_n):	20340.1	lbs
Shear Capacity (ϕV_n):	13805.8	lbs
Tension Force (T_u):	4418.0	lbs
Shear Force (V_u):	573.3	lbs
Tension Usage:	21.7%	--
Shear Usage:	4.2%	--
Interaction:	21.7%	Pass
Controlling Member:	M2	--
Controlling LC:	43	--

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

APPENDIX E

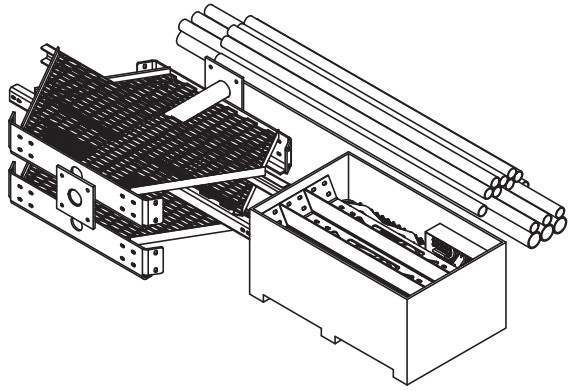
SUPPLEMENTAL DRAWINGS

ITEM	PART NO.	DESCRIPTION	QTY.	WEIGHT	NOTE NO.
1	MTC3006SB	STEEL BUNDLE FOR SNUB NOSE PLATFORM	1	402.64 LBS	
2	MCPK8CSB	PIPE STEEL BUNDLE FOR MC-PK8-C	1	464.27 LBS	
3	MCPK8CHWK	HARDWARE KIT FOR MC-PK8-C	1	543.22 LBS	

C

REVISIONS				
REV.	ECN	DESCRIPTION	BY	DATE
A		INITIAL RELEASE	DRR	12/27/11
B	8000005979	CHANGE NOSE CORNER BRKT, ADD GUB-4240	MSM	11/25/14
C	8000007579	NEW RINGMOUNT WELDMENT DESIGN	RJC	04/07/15

FOR BOM ENTRY ONLY



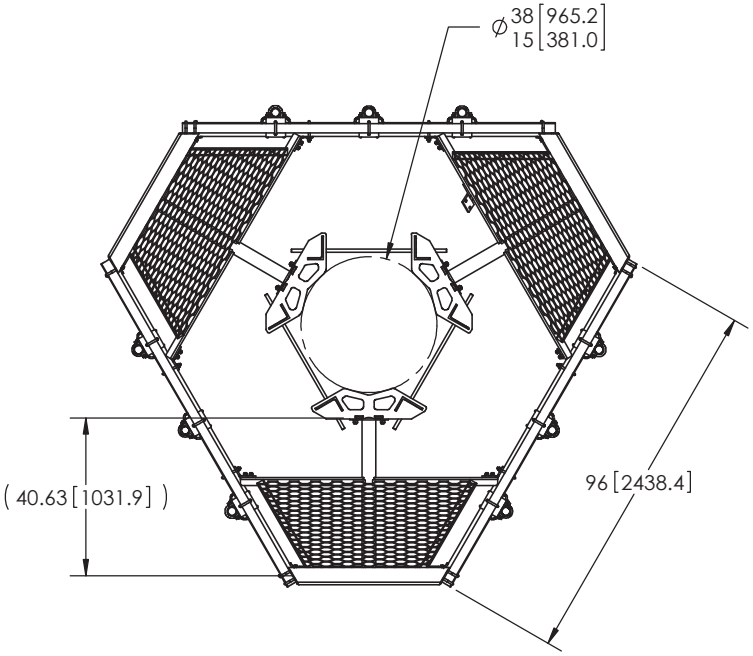
NOTES:
1. CUSTOMER ASSEMBLY SHEETS 2–3.

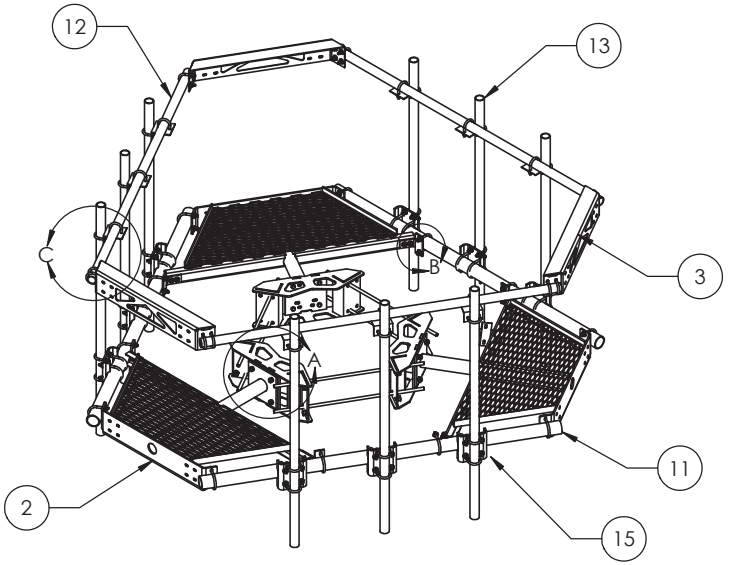
ALL DIMENSIONS ARE IN INCHES U.O.S.
TOLERANCES UNLESS OTHERWISE SPECIFIED:
.X = ± .12 ANGLES ±2°
.XX = ± .06 FRACTIONS ±1/32
.XXX= ± .03

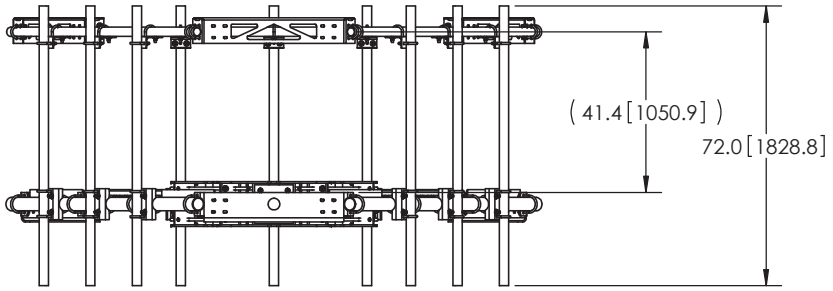
REMOVE BURRS AND BREAK EDGES .005

DO NOT SCALE THIS PRINT

DRAWN BY: MSM	SHEET: 1 of 3	PART NUMBER: MC-PK8-C	
CHECKED BY: TP	SCALE: NTS	DESCRIPTION: LOW PROFILE PLATFORM KIT 8' FACE	
DATE: 10/18/11	MATERIAL: A36, A500	DRAWING TYPE: ASSEMBLY DRAWING	
REVISION: C	FINISH: GALV A123	WEIGHT: 1410.14 LBS	ANDREW® WESTCHESTER, IL. 60154 U.S.A.





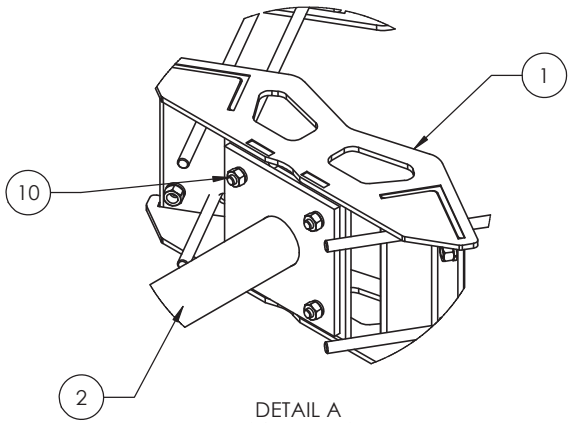


ITEM	PART NO.	DESCRIPTION	QTY.	WEIGHT
C 1	MC-RM1550-3	12" - 50" OD RINGMOUNT	1	230.42 LBS
2	MTC300601	Low Profile Co-Location Platform Snub Nose	3	134.21 LBS
3	MT195801	Corner Weldment Snub Nose Handrail	3	27.10 LBS
4	XA2020.01	CROSS OVER ANGLE	9	2.65 LBS
5	GUB-4356	1/2" X 3-5/8" X 6" GALV U-BOLT	18	0.82 LBS
6	GUB-4355	1/2" X 3-5/8" X 5" GALV U-BOLT	12	0.71 LBS
7	GUB-4240	1/2" X 2-1/2" X 4" GALV U-BOLT	48	0.56 LBS
8	GB-04145	1/2" X 1-1/2" GALV BOLT KIT	12	0.13 LBS
9	GWF-04	1/2" GALV FLAT WASHER	24	0.03 LBS
10	GB-0520A	5/8" X 2" GALV BOLT KIT (A325)	12	0.27 LBS
11	MT54796	3.50" OD X 96" GALV PIPE	3	60.28 LBS
12	MT-651-96	Ø2.375" OD X 96" PIPE	3	29.07 LBS
13	MT-651	2.375" OD x 72" PIPE	9	21.80 LBS
14	MT19617	MT196 Pipe Mount Plate	6	2.49 LBS
15	MT21701	PIPE MOUNT PLATE	9	7.93 LBS

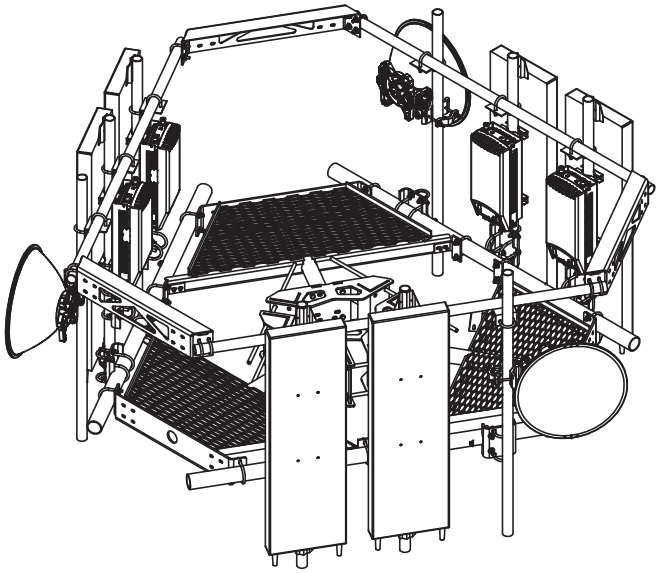
NOTES:
1. ALL METRIC DIMENSIONS ARE IN BRACKETS.
2. WILL FIT MONOPOLES 15"–38" OD.

ALL DIMENSIONS ARE IN INCHES U.O.S.
TOLERANCES UNLESS OTHERWISE SPECIFIED:
.X = ± .12 ANGLES ±2°
.XX = ± .06 FRACTIONS ±1/32
.XXX= ± .03
REMOVE BURRS AND BREAK EDGES .005
DO NOT SCALE THIS PRINT

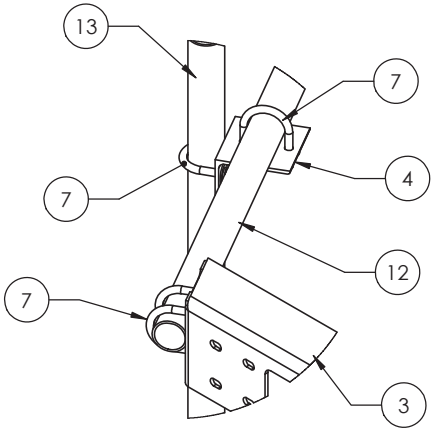
DRAWN BY: MSM	SHEET: 2 of 3	PART NUMBER: MC-PK8-C	
CHECKED BY: TP	SCALE: NTS	DESCRIPTION: 25" OD Snub Nose MT-196	
DATE: 10/18/11	MATERIAL: A36, A53	DRAWING TYPE: ASSEMBLY DRAWING	
REVISION: C	FINISH: GALV A123	ANDREW® WESTCHESTER, IL. 60154 U.S.A.	
	WEIGHT: 1361.27 LBS		



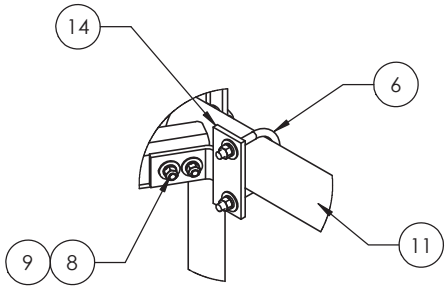
DETAIL A
SCALE 1 : 8



WITH ANTENNAS



DETAIL C
SCALE 1 : 8



DETAIL B
SCALE 1 : 8

NOTES:
1. ALL METRIC DIMENSIONS ARE IN BRACKETS.

ALL DIMENSIONS ARE IN INCHES U.O.S.
TOLERANCES UNLESS OTHERWISE SPECIFIED:
.X = ± .12 ANGLES ±2°
.XX = ± .06 FRACTIONS ±1/32
.XXX= ± .03
REMOVE BURRS AND BREAK EDGES .005
DO NOT SCALE THIS PRINT

DRAWN BY: MSM	SHEET: 3 of 3	PART NUMBER: MC-PK8-C	
CHECKED BY: TP	SCALE: NTS	DESCRIPTION: 25" OD Snub Nose MT-196	
DATE: 10/18/11	MATERIAL: A36, A53	DRAWING TYPE: ASSEMBLY DRAWING	
REVISION: C	FINISH: GALV A123	ANDREW®	WESTCHESTER, IL. 60154 U.S.A.
	WEIGHT: 1361.27 LBS		

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: 806366

BOBDL00042A
73 North Main Street
Marlborough, Connecticut 06447

June 24, 2021

EBI Project Number: 6221003214

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**37.56%**

June 24, 2021

Dish Wireless

Emissions Analysis for Site: 806366 - BOBDL00042A

EBI Consulting was directed to analyze the proposed Dish Wireless facility located at **73 North Main Street** in **Marlborough, 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 73 North Main Street in Marlborough, 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 10 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 5G 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 5G 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 10 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 10 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 116 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:	17.45 dBd / 22.65 dBd	Gain:	17.45 dBd / 22.65 dBd	Gain:	17.45 dBd / 22.65 dBd
Height (AGL):	116 feet	Height (AGL):	116 feet	Height (AGL):	116 feet
Channel Count:	8	Channel Count:	8	Channel Count:	8
Total TX Power (W):	280 Watts	Total TX Power (W):	280 Watts	Total TX Power (W):	280 Watts
ERP (W):	36,123.20	ERP (W):	36,123.20	ERP (W):	36,123.20
Antenna A1 MPE %:	**13.71%**	Antenna B1 MPE %:	**13.71%**	Antenna C1 MPE %:	**13.71%**

Site Composite MPE %	
Carrier	**MPE %**
Dish Wireless (Max at Sector A):	13.71%
AT&T	4.67%
Metro PCS	0.41%
Verizon	3.59%
T-Mobile	5.56%
Town	6.03%
Sprint	3.59%
Site Total MPE % :	37.56%

Dish Wireless MPE % Per Sector	
Dish Wireless Sector A Total:	13.71%
Dish Wireless Sector B Total:	13.71%
Dish Wireless Sector C Total:	13.71%
Site Total MPE % :	37.56%

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 5G	4	1667.71	116.0	19.82	600 MHz 5G	400	4.96%
Dish Wireless 1900 MHz 5G	4	7363.09	116.0	87.51	1900 MHz 5G	1000	8.75%
						Total:	**13.71%**

• 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:	13.71%
Sector B:	13.71%
Sector C:	13.71%
Dish Wireless Maximum MPE % (Sector A):	13.71%
Site Total:	37.56%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **37.56%** 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:
73 NORTH MAIN STREET, MARLBOROUGH, CT 06447

CROWN ATLANTIC COMPANY 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: 806366/HRT 107(C) 943204
Customer Site ID: BOBDL00042A/CT-CCI-T-806366
Site Address: 73 North Main Street, MARLBOROUGH, CT 06447

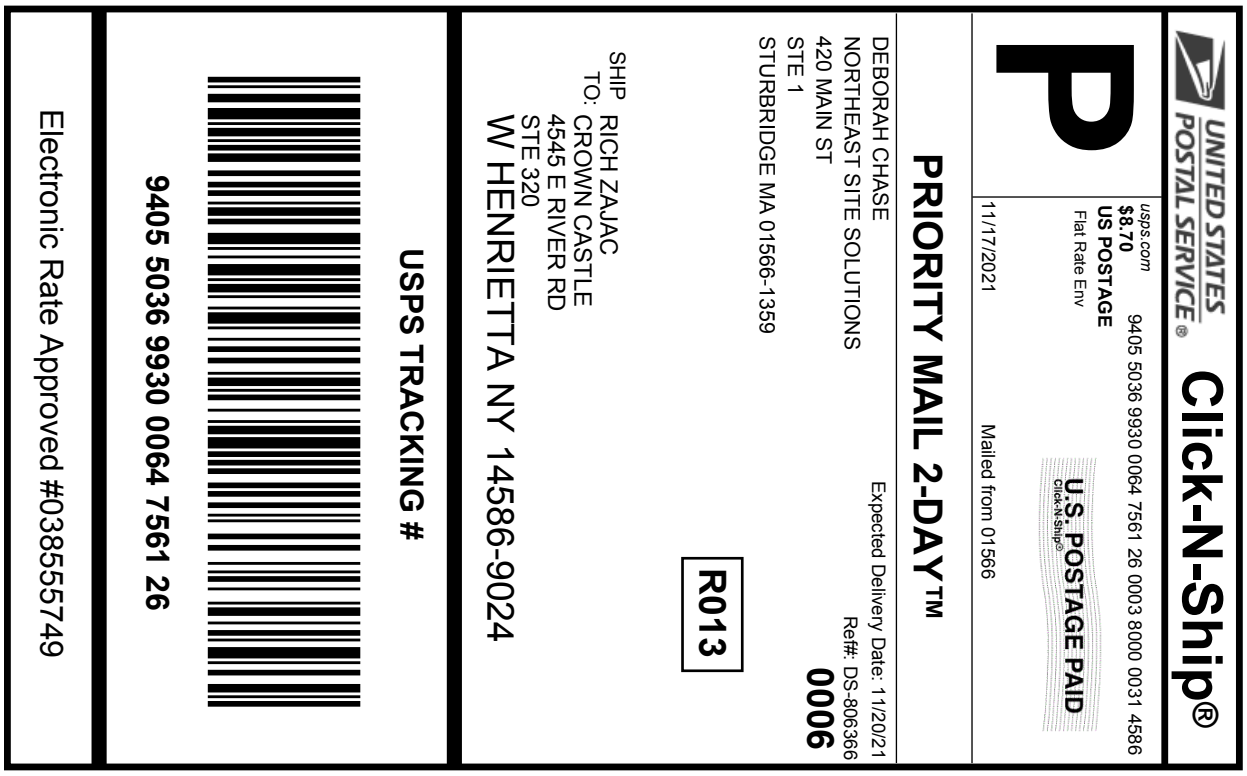
Crown Castle

By: _____ Date: 7/29/2021

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 0064 7561 26

Trans. #:	548567772
Print Date:	11/17/2021
Ship Date:	11/17/2021
Expected Delivery Date:	11/20/2021

Priority Mail® Postage:	**$8.70**
Total:	**$8.70**

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

Ref#: DS-806366

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

UNITED STATES POSTAL SERVICE®

Click-N-Ship®

9405 5036 9930 0064 7561 33 0003 9000 0010 6447

usps.com
$8.70
US POSTAGE
Flat Rate Env

U.S. POSTAGE PAID
Click-N-Ship®

11/17/2021 Mailed from 01566

P

PRIORITY MAIL 2-DAY™

Expected Delivery Date: 11/20/21

Ref#: DS-806366

0006

R008

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

SHIP TO: GREG LOWREY
FIRST SELECTMAN
26 N MAIN ST
MARLBOROUGH CT 06447-1308

USPS TRACKING #

9405 5036 9930 0064 7561 33

Electronic Rate Approved #038555749

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 0064 7561 33

Trans. #:	548567772
Print Date:	11/17/2021
Ship Date:	11/17/2021
Expected Delivery Date:	11/20/2021

Priority Mail® Postage:	**$8.70**
Total:	**$8.70**

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

Ref#: DS-806366

To: GREG LOWREY
FIRST SELECTMAN
26 N MAIN ST
MARLBOROUGH CT 06447-1308

* 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.

UNITED STATES POSTAL SERVICE®

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®

Click-N-Ship®

9405 5036 9930 0064 7561 40 0003 9000 0010 6447

usps.com
$8.70
US POSTAGE
Flat Rate Env

11/17/2021 Mailed from 01566

U.S. POSTAGE PAID
Click-N-Ship®

P

PRIORITY MAIL 2-DAY™

Expected Delivery Date: 11/20/21

Ref#: DS-806366

0006

R008

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

SHIP TO: PETER HUGHES
DIRECTOR OF PLANNINH & DEVELOPMENT
26 N MAIN ST
MARLBOROUGH CT 06447-1308

USPS TRACKING #

9405 5036 9930 0064 7561 40

Electronic Rate Approved #038555749

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 0064 7561 40

Trans. #:	548567772
Print Date:	11/17/2021
Ship Date:	11/17/2021
Expected Delivery Date:	11/20/2021

Priority Mail® Postage:	**$8.70**
Total:	**$8.70**

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

Ref#: DS-806366

To: PETER HUGHES
DIRECTOR OF PLANNINH & DEVELOPMENT
26 N MAIN ST
MARLBOROUGH CT 06447-1308

* 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.

UNITED STATES POSTAL SERVICE®

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

8063366

UNITED STATES POSTAL SERVICE.

UNIONVILLE
24 MILL ST
UNIONVILLE, CT 06085-9998
(800)275-8777

12/01/2021 12:39 PM

Product	Qty	Unit Price	Price
Prepaid Mail West Henrietta, NY 14586 Weight: 0 lb 1.90 oz Acceptance Date: Wed 12/01/2021 Tracking #: 9405 5036 9930 0064 7561 26	1		$0.00
Prepaid Mail Marlborough, CT 06447 Weight: 0 lb 8.20 oz Acceptance Date: Wed 12/01/2021 Tracking #: 9405 5036 9930 0064 7561 33	1		$0.00
Prepaid Mail Marlborough, CT 06447 Weight: 0 lb 8.10 oz Acceptance Date: Wed 12/01/2021 Tracking #: 9405 5036 9930 0064 7561 40	1		$0.00
Grand Total:			$0.00