NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

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

August 11, 2021

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

RE: Tower Share Application
1102 Horse Hill Road, Westbrook CT 06498
Latitude: 41.323808
Longitude: -72.491139
Site# 857011_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 1102 Horse Hill Road in Westbrook, Connecticut.

Dish Wireless LLC proposes to install three (3) 600/1900/2100 MHz antenna and six (6) RRUs, at the 135-foot level of the existing 159-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 June 23, 2021 Exhibit C. Also included is a structural analysis prepared by Crown Castle, dated May 25, 2021, confirming that the existing tower is structurally capable of supporting the proposed equipment. Attached as Exhibit D. The facility was approved by the Connecticut Siting Council Docket No.289 on August 26, 2004. 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 Noel Bishop, First Selectman for the Town of Westbrook, David Maiden-Building Official, as well as the tower owner (Crown Castle) and property owner (Norwich RC Diocesan Corp).

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 159-feet; Dish Wireless LLC proposed antennas will be located at a center line height of 135-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.

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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 4.333% 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 support tower in Westbrook. 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 135-foot level of the existing 159-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 Westbrook.

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:

Town of Westbrook
Attn: Noel Bishop – First Selectman (nbishop@westbrookct.us)
866 Boston Post Road Westbrook, CT 06498

Town of Westbrook
Attn: David Maiden – Building Official (dmaiden@westbrookct.us)
866 Boston Post Road Westbrook, CT 06498

Norwich RC Diocesan Corp
815 Boswell Ave, Norwich CT 06360

Crown Castle, Tower Owner

Exhibit A

Original Facility Approval

Connecticut Siting Council

Decisions

DOCKET NO. 289 – AT&T Wireless PCS, LLC d/b/a AT&T Wireless application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of a telecommunications facility in the Town of Westbrook, Connecticut.	} } }	Connecticut Siting Council August 26, 2004

Decision and Order

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, operation, and maintenance of a telecommunications facility including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate either alone or cumulatively with other effects when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application and therefore directs that a Certificate of Environmental Compatibility and Public Need, as provided by General Statutes § 16-50k, be issued to AT&T Wireless PCS, LLC d/b/a AT&T Wireless for the construction, maintenance and operation of a wireless telecommunications facility at Horse Hill Road (State Route 145), Westbrook, Connecticut.

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

1. The tower shall be designed as a monopole and shall be constructed no taller than 160 feet above ground level to provide telecommunications services to both public and private entities. The overall height of such tower shall not exceed 163 feet with all appurtenances attached thereto.

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 served on all parties and intervenors, as listed in the service list, and submitted to and approved by the Council prior to the commencement of facility construction and shall include:

    a. a final site plan(s) of site development to include specifications for the tower, tower foundation, antennas, equipment building, access road, utility line, and landscaping; and

    b) construction plans for site clearing, water drainage, and erosion and sedimentation control consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended.

3. The Certificate Holder shall, prior to the commencement of operation, provide the Council worst-case modeling of electromagnetic radio frequency power density of all proposed entities' antennas at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin No. 65, August 1997. The Certificate Holder shall ensure a recalculated report of electromagnetic radio frequency power density is submitted to the Council in the event other carriers locate at this facility or if circumstances in operation cause a change in power density above the levels calculated and provided pursuant to this Decision and Order.

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

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

6. The Certificate Holder shall provide reasonable space on the tower for no compensation for any municipal antennas, provided such antennas are compatible with the structural integrity of the tower.

7. If the facility does not initially provide wireless services within one year of completion of construction or ceases to provide wireless services for a period of one year, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made.

8. Any antenna that becomes obsolete and ceases to function shall be removed within 60 days after such antennas become obsolete and cease to function.

9. Unless otherwise approved by the Council, this Decision and Order shall be void if the facility authorized herein is not operational within one year of the effective date of this Decision and Order or within one year after all appeals to this Decision and Order have been resolved. Any request for extensions of the period shall be filed with the Council not later than sixty days prior to expiration date of the Certificate and shall be served on all parties and intervenors, as listed in the service list. Any proposed modifications to this Decision and Order shall likewise be so served.

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:

Exhibit B

Property Card

1102 HORSE HILL RD

Location	1102 HORSE HILL RD	**Mblu**	126/ / 013/ /
Acct#	N0513301	**Owner**	NORWICH RC DIOCESAN CORP
Assessment	$250,800	**Appraisal**	$732,900
PID	2749	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$189,700	$543,200	$732,900
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$132,790	$118,010	$250,800

Owner of Record

Owner	NORWICH RC DIOCESAN CORP	**Sale Price**	$0
Co-Owner	RESURRECTION CEMETARY	**Certificate**	
Address	815 BOSWELL AVE NORWICH, CT 06360	**Book & Page**	52/301
		Sale Date	01/01/1901
		Instrument	25

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
NORWICH RC DIOCESAN CORP	$0		52/301	25	01/01/1901

Building Information

Building 1 : Section 1

Year Built:	
Living Area:	0
Replacement Cost:	$0
Building Percent Good:	
Replacement Cost Less Depreciation:	$0

Building Attributes	
Field	**Description**
Style	Outbuildings
Model	
Grade:	
Stories	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Full Bthrms:	
Half Baths:	
Extra Fixtures	
Total Rooms:	
Bath Style:	
Kitchen Style:	
Extra Kitchens	
Fireplace(s)	
Gas Fireplace(s)	
Stacks	
Bsmt Garage(s)	
Callback	
Fireplaces	
Fin Bsmnt	
Fin Bsmnt Qual	
Bsmt Heat	
Int Vs Ext	
Fndtn Cndtn	
Basement	

Building Photo

(http://images.vgsi.com/photos2/WestbrookCTPhotos//default.jpg)

Building Layout

Building Layout

(http://images.vgsi.com/photos2/WestbrookCTPhotos//Sketches/2749_274

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	610
Description	Forest
Zone	RR
Neighborhood	0040
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	58
Depth	
Assessed Value	$118,010
Appraised Value	$543,200

Special Land			
Land Use Code	**Land Use Description**	**Units**	**Unit Type**
610	Forest	30	AC

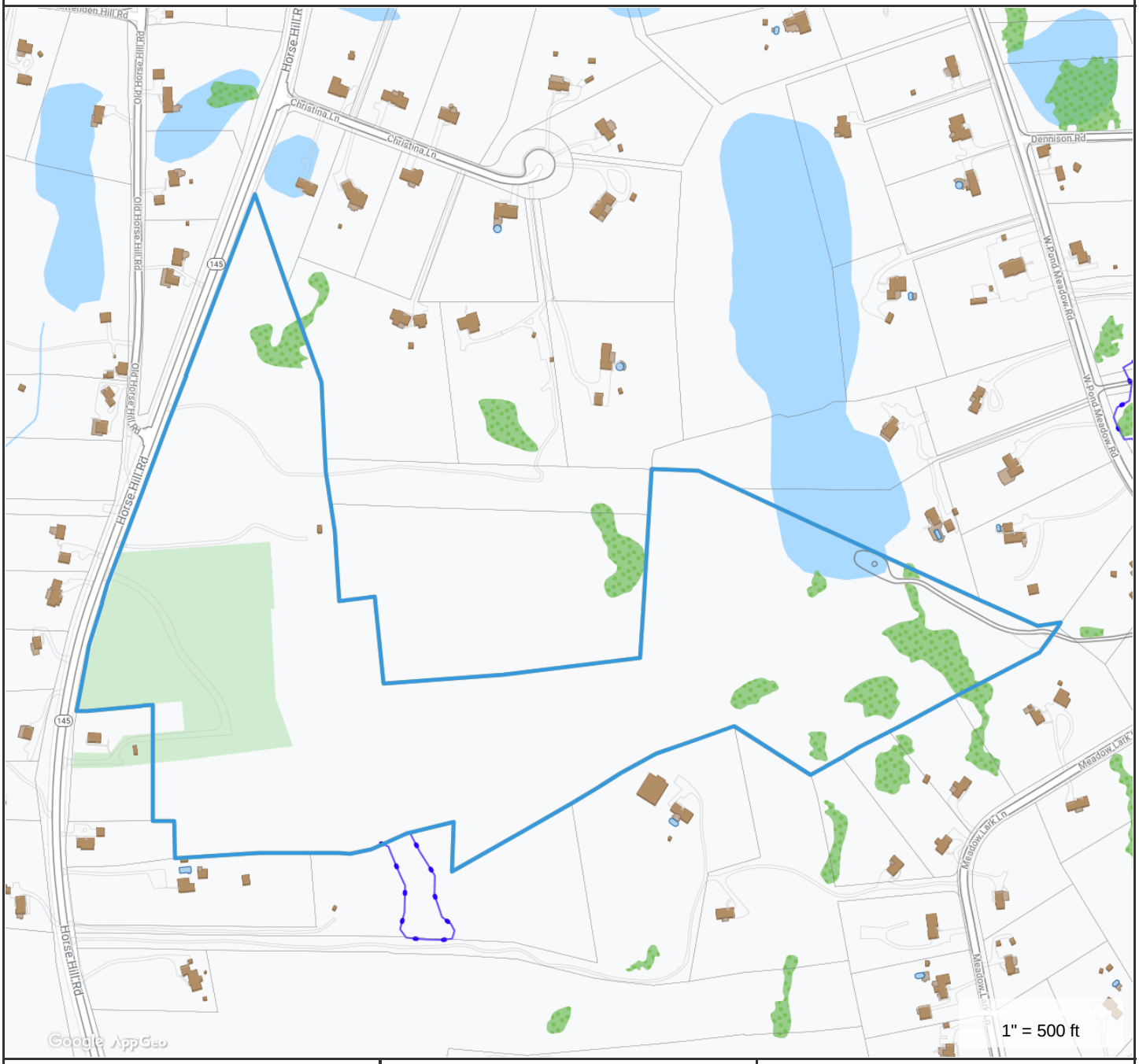
Outbuildings

Outbuildings							Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**	**Comment**
TCS	Telecomm Site			209.00 UNITS	$80,470	1	
TCM	Telecomm			0.00 S.F.&HGT	$25,000	1	
TCM	Telecomm			1.00 S.F.&HGT	$5,000	1	
TCS	Telecomm Site			147.00 UNITS	$79,230	1	

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$189,700	$543,200	$732,900
2018	$185,450	$543,200	$728,650
2017	$105,470	$543,200	$648,670

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$132,790	$118,010	$250,800
2018	$129,820	$118,010	$247,830
2017	$73,830	$118,010	$191,840



Property Information

Property ID	126/013
Location	1102 HORSE HILL RD
Owner	NORWICH RC DIOCESAN CORP

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town of Westbrook, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Geometry updated October 2018
Data updated 11/19/2018

Print map scale is approximate. Critical layout or measurement activities should not be done using this resource.

Exhibit C

Construction Drawings

DISH WIRELESS, LLC. SITE ID:

BOBDL00074A

DISH WIRELESS, LLC. SITE ADDRESS:

1102 HORSE HILL ROAD
WESTBROOK, CT 06498

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

SHEET INDEX

SCOPE OF WORK

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

TOWER SCOPE OF WORK:
- INSTALL (3) PROPOSED PANEL ANTENNAS (1 PER SECTOR)
- INSTALL (1) PROPOSED PLATFORM
- 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 SAFETY SWITCH (IF REQUIRED)
- INSTALL (1) PROPOSED CIENA BOX (IF REQUIRED)
- EXISTING METER SOCKET ON EXISTING H-FRAME TO BE UTILIZED

SITE PHOTO

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

CALL 2 WORKING DAYS UTILITY NOTIFICATION PRIOR TO CONSTRUCTION

811

GENERAL NOTES

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

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

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

SITE INFORMATION

PROPERTY OWNER:	NORWICH RC DIOCESAN CORP, RESURRECTION CEMETARY
ADDRESS:	815 BOSWELL AVENUE NORWICH, CT 06360
TOWER TYPE:	MONOPOLE
TOWER CO SITE ID:	857011
TOWER APP NUMBER:	553288
COUNTY:	MIDDLESEX
LATITUDE (NAD 83):	41° 19' 25.71" N 41.323808 N
LONGITUDE (NAD 83):	-72° 29' 28.10" W -72.491139 W
ZONING JURISDICTION:	CITY OF WESTBROOK
ZONING DISTRICT:	RR
PARCEL NUMBER:	52/301
OCCUPANCY GROUP:	U
CONSTRUCTION TYPE:	V-B
POWER COMPANY:	CONNECTICUT LIGHT & POWER
TELEPHONE COMPANY:	AT&T

PROJECT DIRECTORY

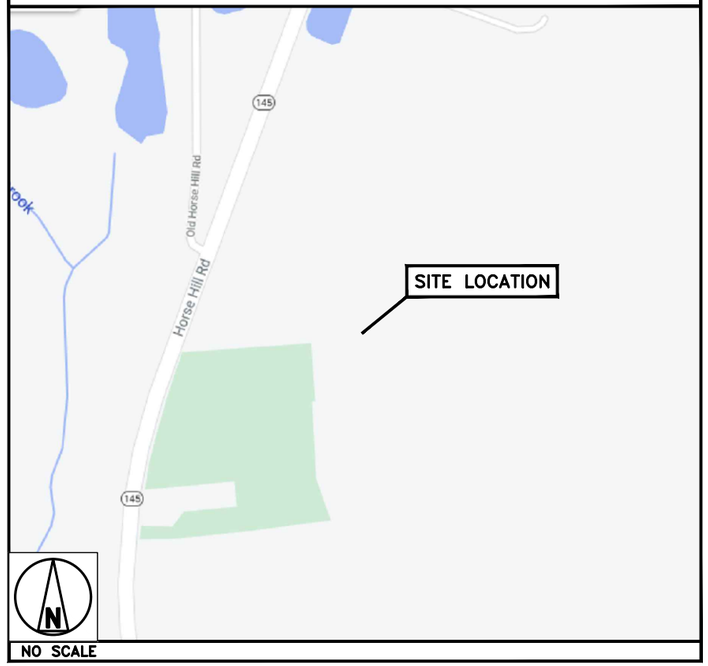
APPLICANT:	DISH WIRELESS, LLC. 5701 SOUTH SANTA FE DRIVE LITTLETON, CO 80120
TOWER OWNER:	CROWN CASTLE 2000 CORPORATE DRIVE CANONSBURG, PA 15317 (877) 486-9377
SITE DESIGNER:	INFINIGY 2500 W. HIGGINS RD. STE. 500 HOFFMAN ESTATES, IL 60169 (847) 648-4068
SITE ACQUISITION:	NICHOLAS CURRY TBD
CONSTRUCTION MANAGER:	JAVIER SOTO TBD
RF ENGINEER:	CHARLES BOSSENER TBD

DIRECTIONS

DIRECTIONS FROM TWEED NEW HAVEN AIRPORT:

DEPART AND HEAD (NORTHEAST), TURN LEFT, AVIS RENT A CAR ON THE CORNER, TURN RIGHT, TURN RIGHT TOWARDS BURR ST, BUDGET CAR RENTAL ON THE CORNER, TURN RIGHT ONTO BURR ST, KEEP STRAIGHT TO GET ONTO DODGE AVE, TURN LEFT ONTO THOMPSON AVE, KEEP STRAIGHT TO GET ONTO CT-100 / HIGH ST, TAKE THE RAMP ON THE RIGHT FOR I-95 NORTH AND HEAD TOWARDS NEW LONDON, AT JUNCTION 64, HEAD RIGHT ON THE RAMP FOR CT-145 TOWARDS WINTHROP, TURN LEFT ONTO CT-145 / HORSE HILL RD TOWARDS WINTHROP, ARRIVE AT 1102 HORSE HILL ROAD, WESTBROOK, CT 06498

VICINITY MAP



NO SCALE

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

CROWN CASTLE
2000 CORPORATE DRIVE
CANONSBURG, PA 15317

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
2500 W. HIGGINS RD. SUITE 500 |
HOFFMAN ESTATES, IL 60169
PHONE: 847-648-4068 | FAX: 518-690-0793
WWW.INFINIGY.COM

STATE OF CONNECTICUT
MATTHEI SAKANOUE
34916
LICENSED PROFESSIONAL ENGINEER
6/23/21

DRAWN BY:	CHECKED BY:	APPROVED BY:
DB	SS	CJW

RFDS REV #: N/A

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	04/16/2021	ISSUED FOR REVIEW
0	05/17/2021	ISSUED FOR CONSTRUCTION
1	06/23/2021	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

2039-Z5555C

DISH WIRELESS, LLC.
PROJECT INFORMATION
BOBDL00074A
1102 HORSE HILL ROAD
WESTBROOK, CT 06498

SHEET TITLE

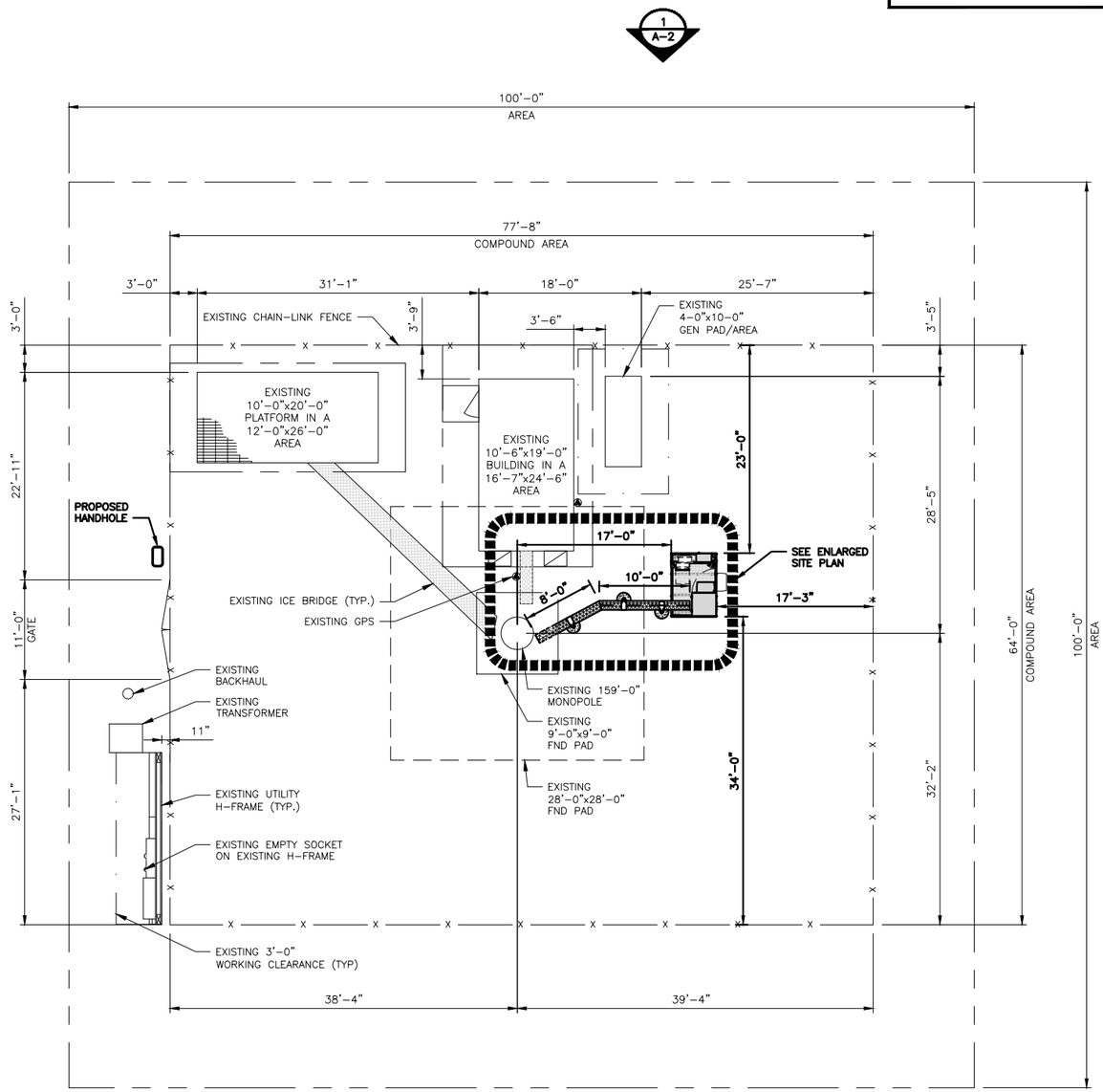
TITLE SHEET

SHEET NUMBER

T-1

NOTES

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



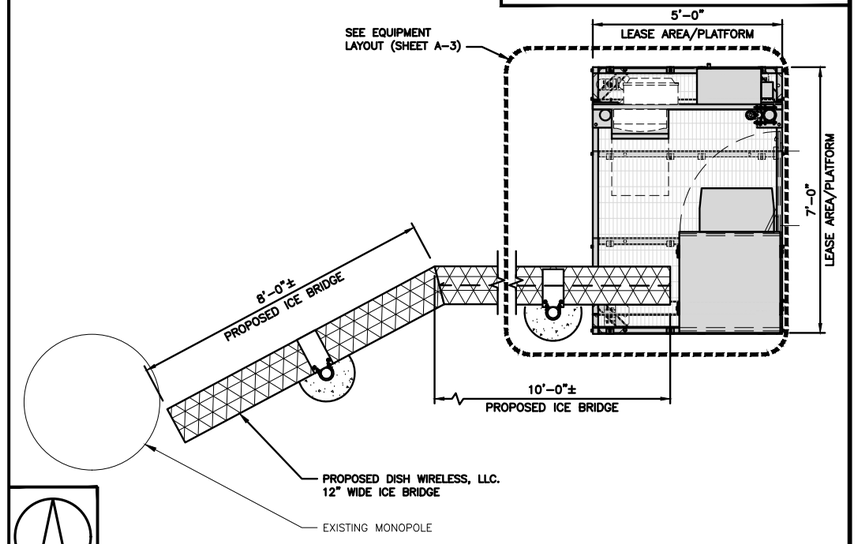
COMPOUND PLAN

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

1

NOTES

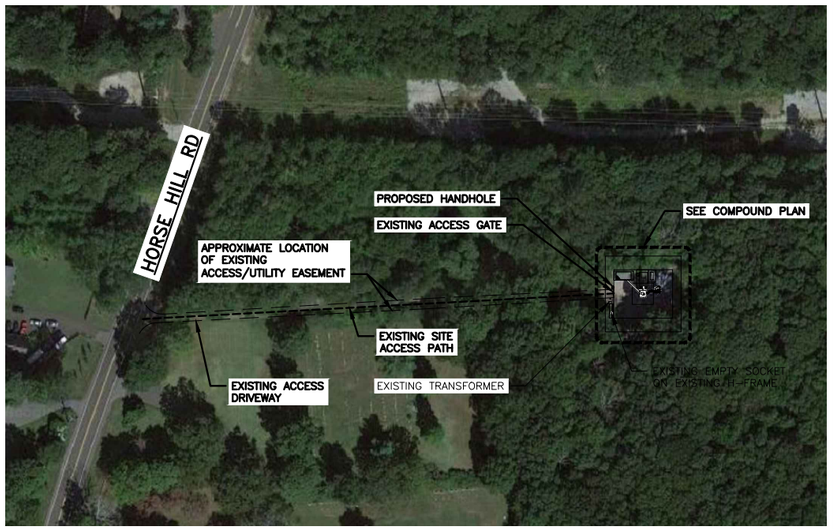
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. CONTRACTOR SHALL MAINTAIN A 10'-0" MINIMUM SEPARATION BETWEEN THE PROPOSED GPS UNIT, TRANSMITTING ANTENNAS AND EXISTING GPS UNITS.
3. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.



ENLARGED SITE PLAN

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

2



SITE PLAN

100' 50' 0 100' 200'
1"=100'

3

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

CROWN CASTLE
2000 CORPORATE DRIVE
CANONSBURG, PA 15317

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PHONE: 847-648-4068 | FAX: 518-690-0793
WWW.INFINIGY.COM

STATE OF CONNECTICUT
CHUHEY SAKANOUE
34916
LICENSED
PROFESSIONAL ENGINEER
6/23/21

DRAWN BY:	CHECKED BY:	APPROVED BY:
DB	SS	CJW

RFDS REV #: N/A

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	04/16/2021	ISSUED FOR REVIEW
0	05/17/2021	ISSUED FOR CONSTRUCTION
1	06/23/2021	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
2039-Z5555C

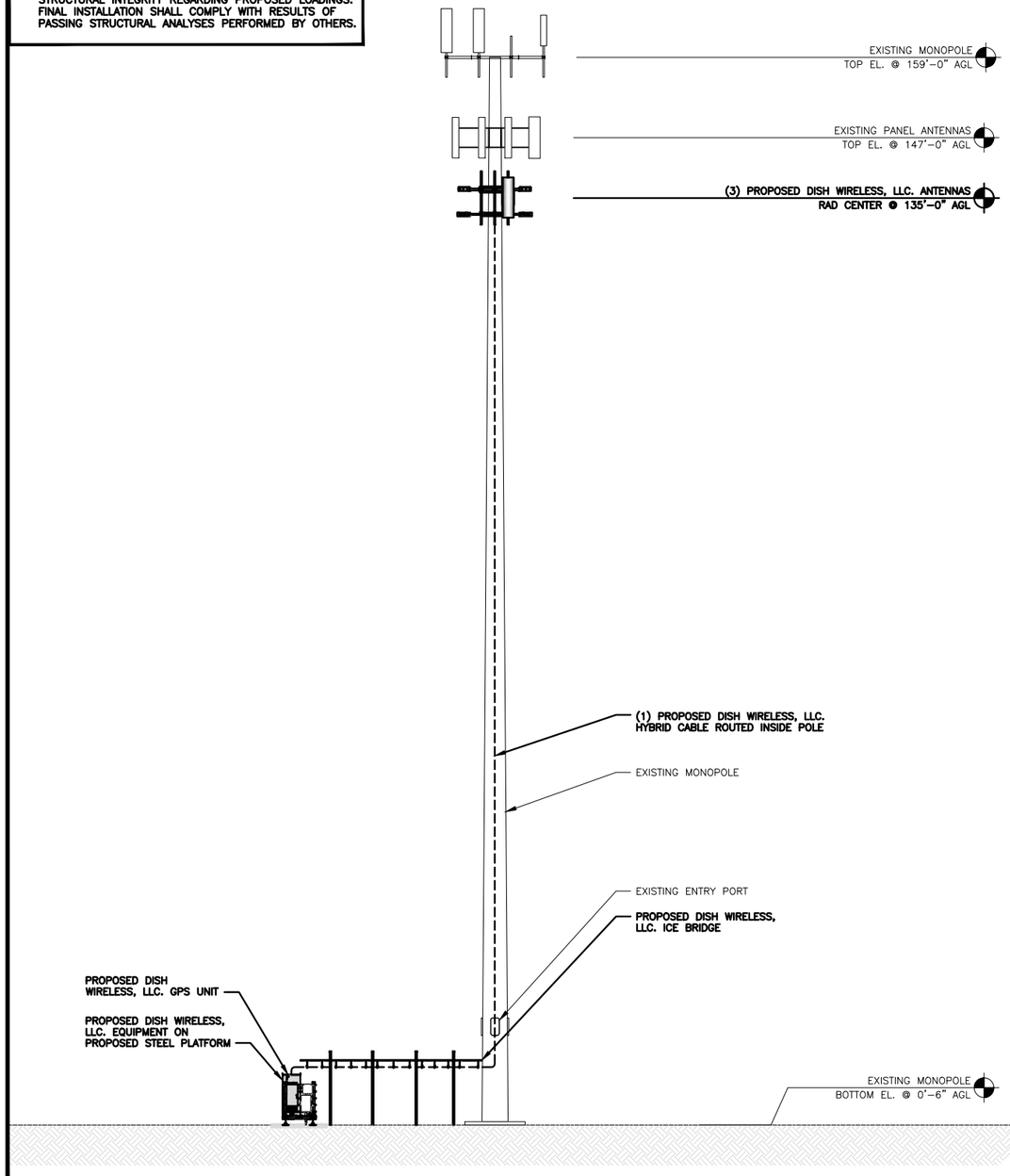
DISH WIRELESS, LLC.
PROJECT INFORMATION
BOBDL00074A
1102 HORSE HILL ROAD
WESTBROOK, CT 06498

SHEET TITLE
OVERALL AND ENLARGED SITE PLAN

SHEET NUMBER
A-1

NOTES

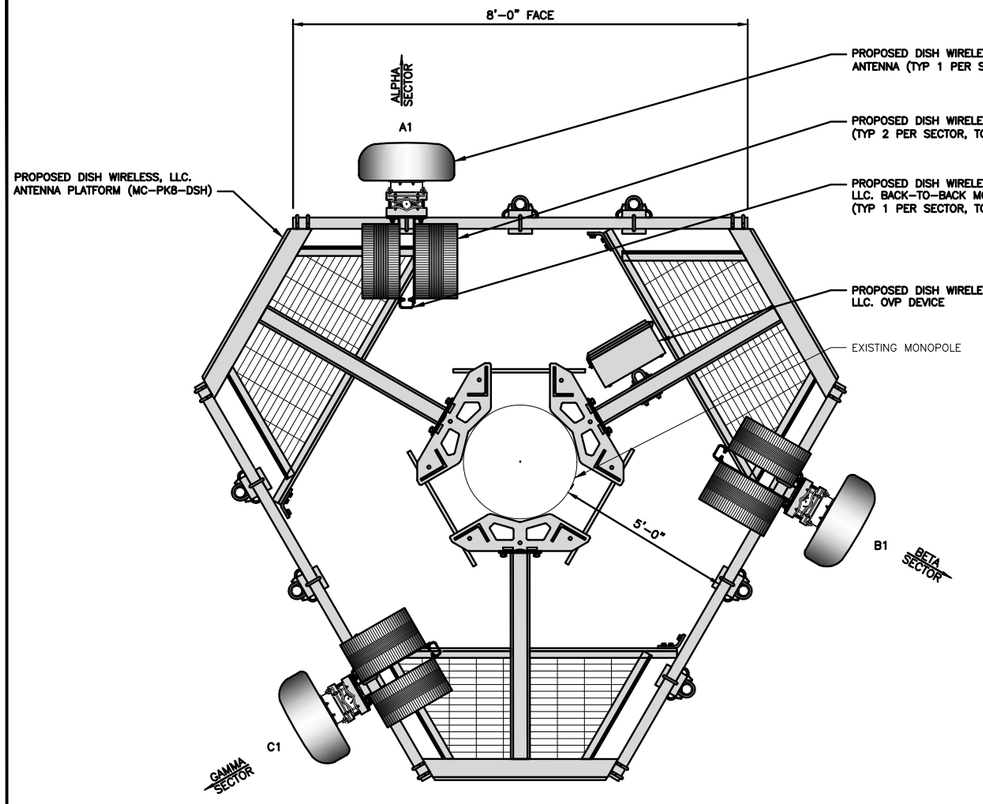
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. ANTENNA AND MW DISH SPECIFICATIONS REFER TO ANTENNA SCHEDULE AND TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS
3. EXISTING EQUIPMENT AND FENCE OMITTED FOR CLARITY.
4. INFINIGY HAS NOT EVALUATED THE TOWER OR MOUNT STRUCTURE AND ASSUMES NO RESPONSIBILITY FOR THEIR STRUCTURAL INTEGRITY REGARDING PROPOSED LOADINGS. FINAL INSTALLATION SHALL COMPLY WITH RESULTS OF PASSING STRUCTURAL ANALYSES PERFORMED BY OTHERS.



PROPOSED SOUTH 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)	AZMUITH	RAD CENTER	FEED LINE TYPE AND LENGTH
ALPHA	A1	PROPOSED	JMA WIRELESS – MX08FRO665-20	5G	72.0" x 20.0"	0°	135'-0"	(1) HIGH-CAPACITY HYBRID CABLE (177' LONG)
BETA	B1	PROPOSED	JMA WIRELESS – MX08FRO665-20	5G	72.0" x 20.0"	120°	135'-0"	
GAMMA	C1	PROPOSED	JMA WIRELESS – MX08FRO665-20	5G	72.0" x 20.0"	240°	135'-0"	

NOTES

1. CONTRACTOR TO REFER TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS.
2. ANTENNA OR 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.

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

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STATE OF CONNECTICUT
TSUHEI SAKANO
34916
LICENSED PROFESSIONAL ENGINEER
6/23/21

DRAWN BY:	CHECKED BY:	APPROVED BY:
DB	SS	CJW

RFDS REV #: N/A

CONSTRUCTION DOCUMENTS

SUBMITTALS

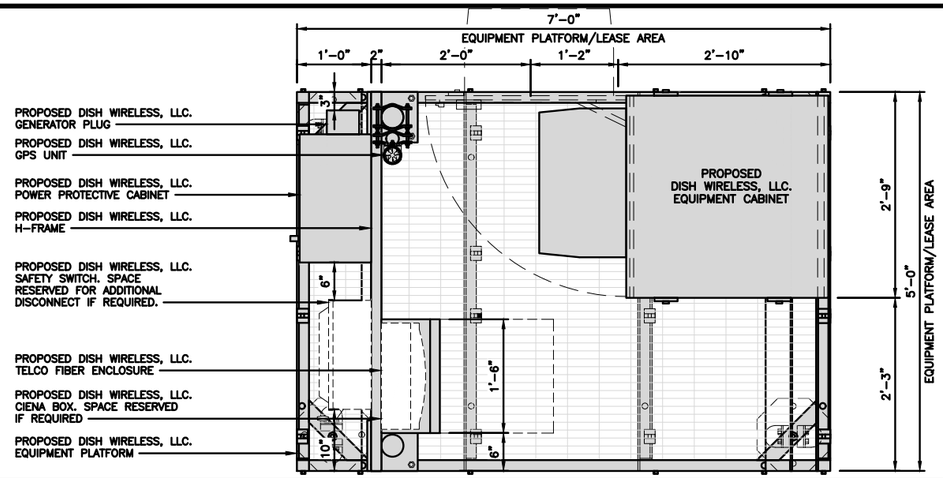
REV	DATE	DESCRIPTION
A	04/16/2021	ISSUED FOR REVIEW
0	05/17/2021	ISSUED FOR CONSTRUCTION
1	06/23/2021	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
2039-Z5555C

DISH WIRELESS, LLC.
PROJECT INFORMATION
BOBDL00074A
1102 HORSE HILL ROAD
WESTBROOK, CT 06498

SHEET TITLE
ELEVATION, ANTENNA LAYOUT AND SCHEDULE

SHEET NUMBER
A-2



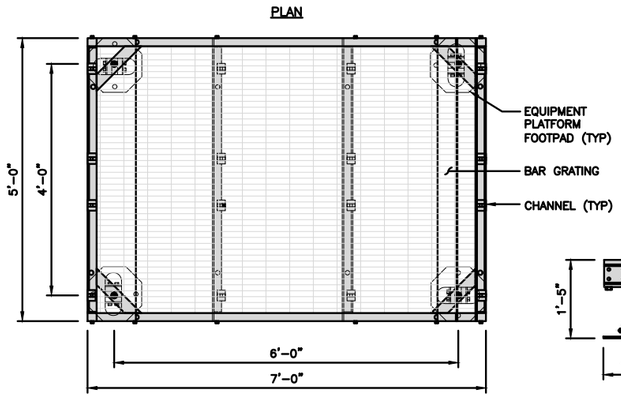
PLATFORM EQUIPMENT PLAN

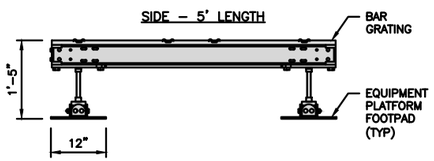
12" 9" 6" 3" 0 1' 2"
1"=1'-0"

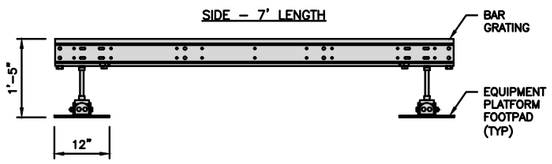
1

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"

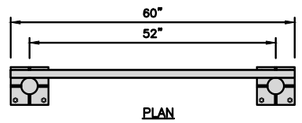


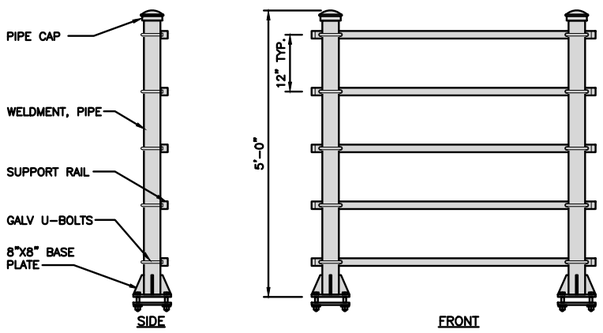




PLATFORM DETAIL | NO SCALE | 2

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



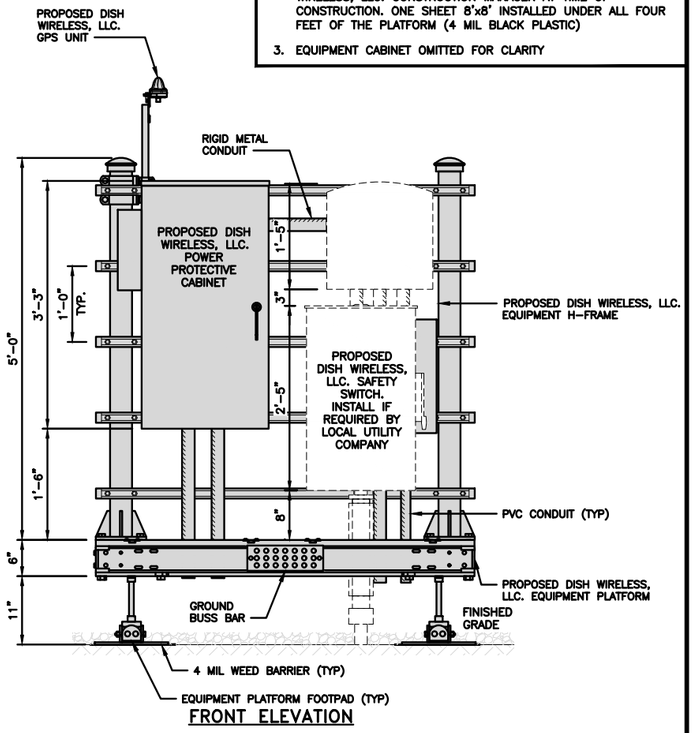


H-FRAME DETAIL | NO SCALE | 3

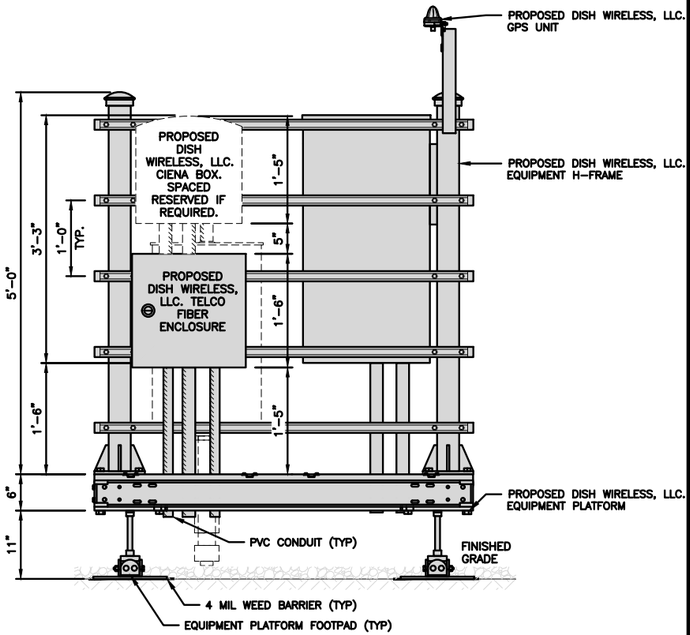
NOT USED | NO SCALE | 4

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, LLC. 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

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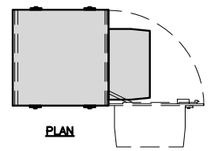
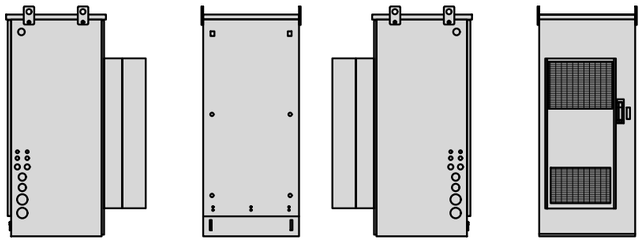
WESTBROOK, CT 06498

SHEET TITLE
EQUIPMENT PLATFORM AND H-FRAME DETAILS

SHEET NUMBER
A-3

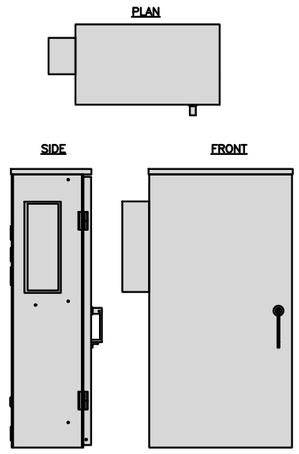
CHARLES INDUSTRY HEX CUBE–PM369155N4	
DIMENSIONS (HxWxD):	74"x32"x32"
POWER PLANT:	–48VDC ABB
TOTAL WEIGHT (EMPTY)	394 LBS





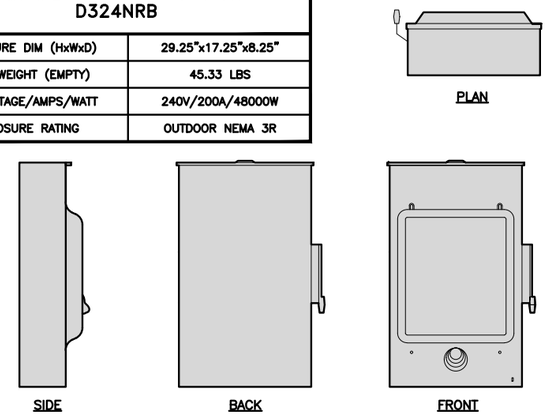
CABINET DETAIL | NO SCALE | 1

RAYCAP RDIAC–6512–P–240–MTS POWER & TELCO PROTECTION CABINET	
DIMENSIONS (HxWxD)	40"x20"x10"
WEIGHT/ VOLUME	124 LBS
MANUAL TRANSFER SWITCH	200A
LOAD CENTER	30 POSITION
MAIN BREAKER	200A, 65kA AIC
GENERATOR RECEPTACLE	CAMLOCK
NEMA RATING	3R POWDER COATED ALUMINUM
SURGE PROTECTION DEVICE	UL 1449 4TH EDITION LISTED



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

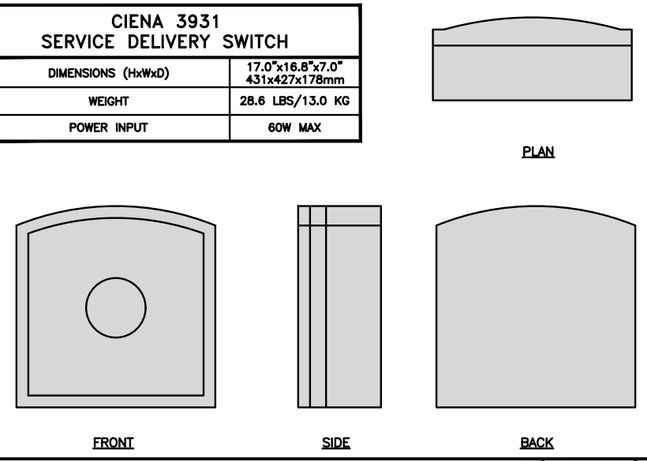
SQUARE D SAFETY SWITCH D324NRB	
ENCLOSURE DIM (HxWxD)	29.25"x17.25"x8.25"
TOTAL WEIGHT (EMPTY)	45.33 LBS
MAX VOLTAGE/AMPS/WATT	240V/200A/48000W
ENCLOSURE RATING	OUTDOOR NEMA 3R



SAFETY SWITCH | NO SCALE | 3

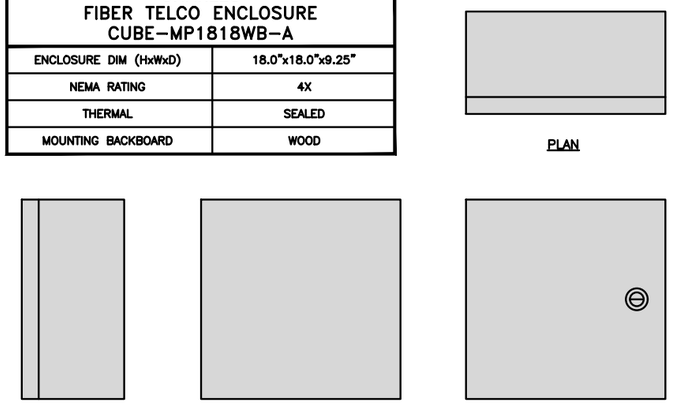
NOT USED | NO SCALE | 4

CIENA 3931 SERVICE DELIVERY SWITCH	
DIMENSIONS (HxWxD)	17.0"x16.8"x7.0" 431x427x178mm
WEIGHT	28.6 LBS/13.0 KG
POWER INPUT	60W MAX



CIENA DETAIL | NO SCALE | 5

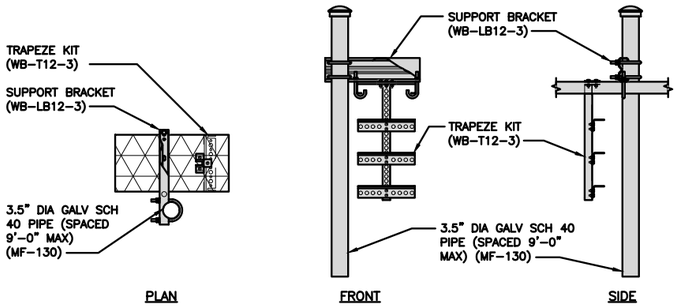
CHARLES FIBER TELCO ENCLOSURE CUBE–MP1818WB–A	
ENCLOSURE DIM (HxWxD)	18.0"x18.0"x9.25"
NEMA RATING	4X
THERMAL	SEALED
MOUNTING BACKBOARD	WOOD



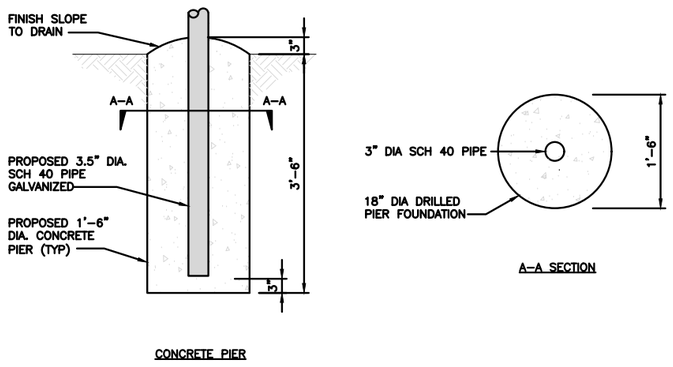
FIBER TELCO ENCLOSURE DETAIL | NO SCALE | 6

COMMSCOPE WB–K110–B WAVEGUIDE BRIDGE KIT	
DIMENSIONS (HxL)	160"x10'
WEIGHT/ VOLUME	325.0 LBS
CABLE RUN (QTY)	12

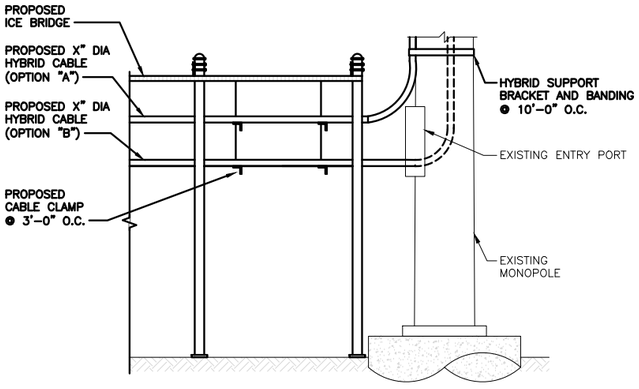
INCLUDED PRODUCTS:	WB–T12–3 TRAPEZE KIT, 3 RUNGS
	WB–LB12–3 SUPPORT BRACKET
	MF–130 DIRECT BURIAL PIPE COLUMN, 13'–4"



ICE BRIDGE DETAIL | NO SCALE | 7



TYPICAL ICE BRIDGE CONCRETE PIER DETAIL | NO SCALE | 8



HYBRID CABLE RUN | NO SCALE | 9

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PROJECT INFORMATION
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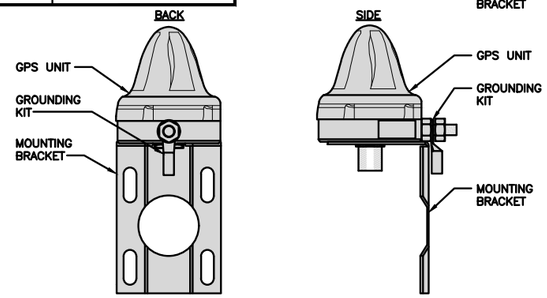
1102 HORSE HILL ROAD
WESTBROOK, CT 06498

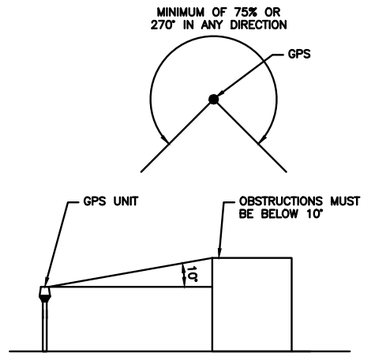
SHEET TITLE
EQUIPMENT DETAILS

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

NOT USED | 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

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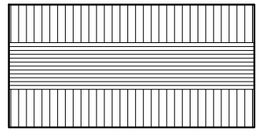
WESTBROOK, CT 06498

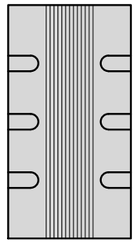
SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER
A-5

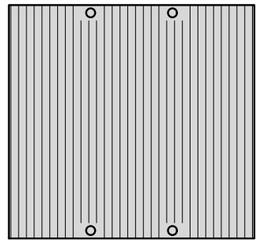
FUJITSU TA08025-B604 RRH	
DIMENSIONS (HxWxD) (KG/IN)	380x400x200/14.9"x15.7"x7.8"
WEIGHT(KG,LB)/ VOLUME	29kg,63.9lb/ 30L
POWER SUPPLY	DC-58~-36V



PLAN



SIDE



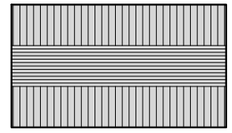
FRONT

NOTES

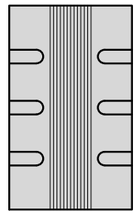
FINAL RRH SPECIFICATIONS TO BE CONFIRMED BY GC

REMOTE RADIO HEAD DETAIL | NO SCALE | 1

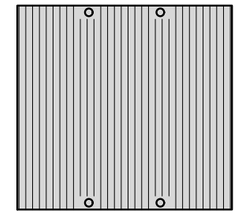
FUJITSU TA08025-B605 RRH	
DIMENSIONS (HxWxD) (KG/IN)	380x400x230/14.9"x15.7"x9.0"
WEIGHT(KG,LB)/ VOLUME	34kg,74.9lb/ 35L
POWER SUPPLY	DC-58~-36V



PLAN



SIDE



FRONT

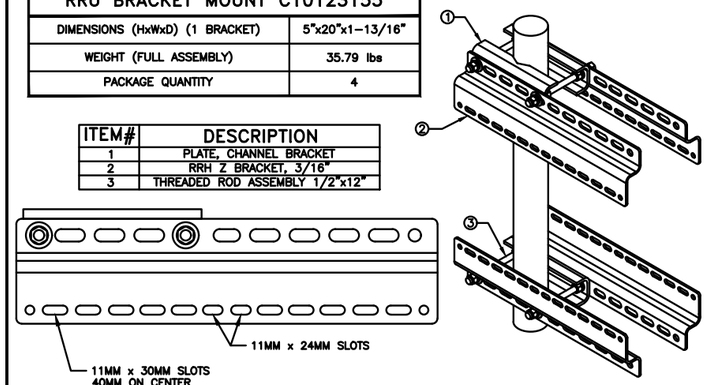
NOTES

FINAL RRH SPECIFICATIONS TO BE CONFIRMED BY GC

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

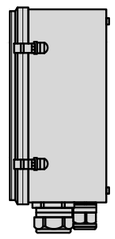
ITEM#	DESCRIPTION
1	PLATE, CHANNEL BRACKET
2	RRH Z BRACKET, 3/16"
3	THREADED ROD ASSEMBLY 1/2"x12"



REMOTE RADIO MOUNT DETAIL | NO SCALE | 3

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

PLAN



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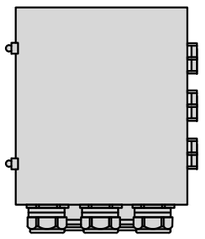
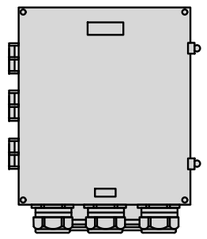


BACK

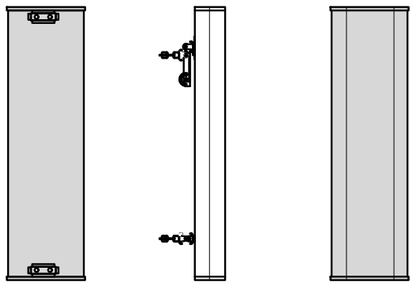


FRONT

SURGE SUPPRESSION DETAIL | NO SCALE | 4

JMA WIRELESS MX08FRO665-20 ANTENNA	
DIMENSIONS (HxWxD)	72.0"x20.0"x8.0"
TOTAL WEIGHT	54 LB
RF PORTS, CONNECTOR TYPE	8 x 4.3-10 FEMALE

PLAN

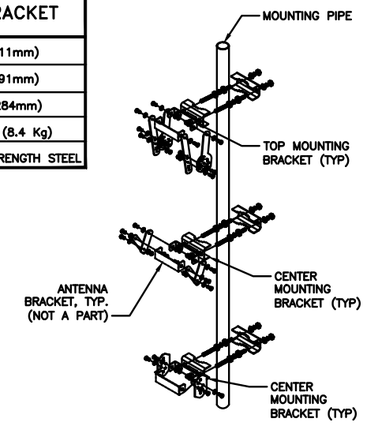


NOTES

FINAL ANTENNA SPECIFICATIONS TO BE CONFIRMED BY GC

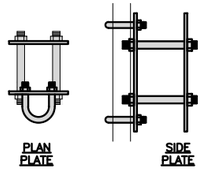
ANTENNA DETAIL | NO SCALE | 5

JMA 91900318 MOUNTING BRACKET	
WIDTH	8.3" (211mm)
DEPTH	7.5" (191mm)
HEIGHT	11.2" (284mm)
TOTAL WEIGHT (WITH BRACKETS)	18.5 LBS (8.4 Kg)
HOUSING MATERIAL	GALV. HIGH STRENGTH STEEL



ANTENNA MOUNTING DETAIL | NO SCALE | 6

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

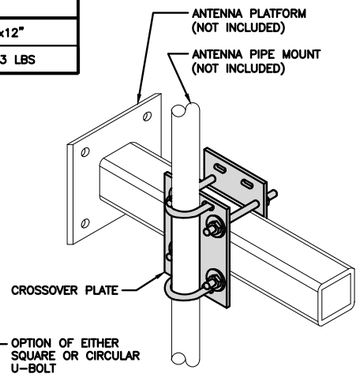


PLAN PLATE

SIDE PLATE

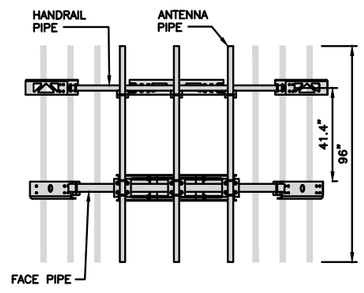
PLAN U-BOLT

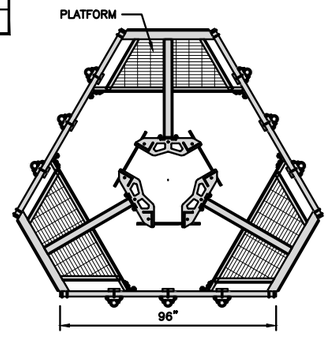
SIDE U-BOLT



RRH/OVP MOUNT DETAIL | NO SCALE | 7

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





ANTENNA PLATFORM DETAIL | NO SCALE | 8

NOT USED | NO SCALE | 9

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34916
LICENSED PROFESSIONAL ENGINEER
6/23/21

DRAWN BY:	CHECKED BY:	APPROVED BY:
DB	SS	CJW

RFDS REV #: N/A

CONSTRUCTION DOCUMENTS

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0	05/17/2021	ISSUED FOR CONSTRUCTION
1	06/23/2021	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

2039-Z5555C

DISH WIRELESS, LLC.
PROJECT INFORMATION

BOBDL00074A
1102 HORSE HILL ROAD
WESTBROOK, CT 06498

SHEET TITLE

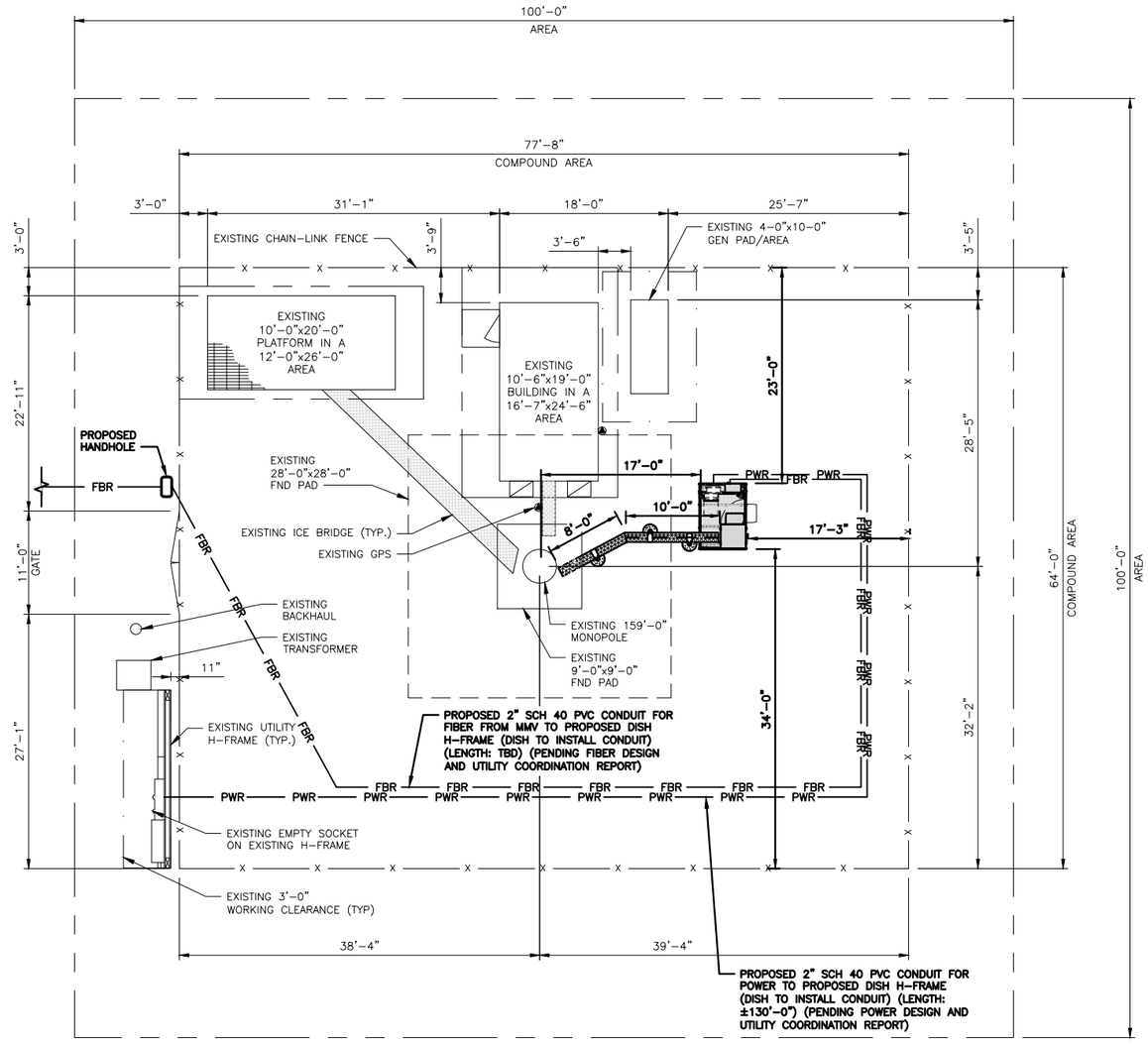
EQUIPMENT DETAILS

SHEET NUMBER

A-6

NOTES

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



N

UTILITY ROUTE PLAN

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

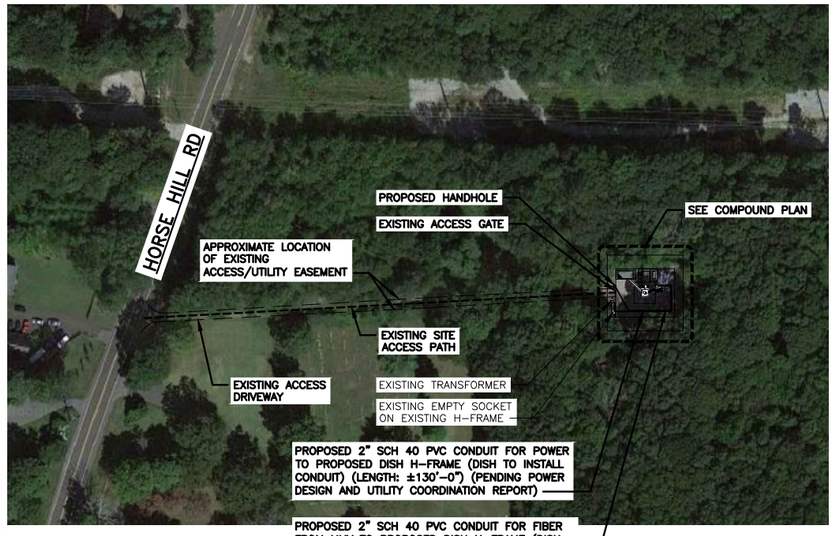
1

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. FIBER ROUTE IS PRELIMINARY, FINAL FIBER ROUTE TO BE DETERMINED ONCE UCR (UTILITY COORDINATION REPORT) HAS BEEN FINALIZED.

ELECTRICAL NOTES

2



N

OVERALL UTILITY ROUTE PLAN

100' 50' 0 100' 200'
1"=100'

3

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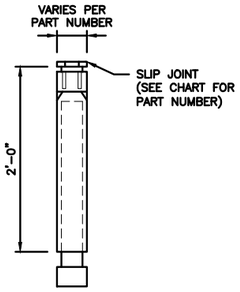
DISH WIRELESS, LLC.
PROJECT INFORMATION
BOBDL00074A
1102 HORSE HILL ROAD
WESTBROOK, CT 06498

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"

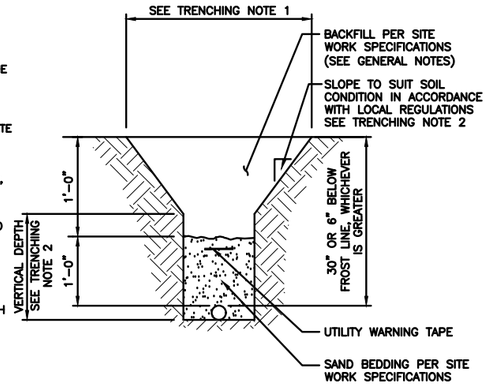


NOTE:
CONTRACTOR TO INSTALL EXPANSION FITTING SLIP JOINT AT METER CENTER CONDUIT TERMINATION, AS PER LOCAL UTILITY POLICY, ORDINANCE AND/OR SPECIFIED REQUIREMENT.

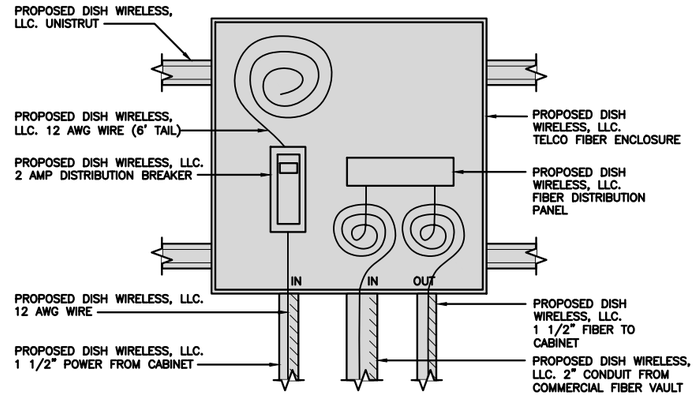
EXPANSION JOINT DETAIL | NO SCALE | 1

TRENCHING NOTES

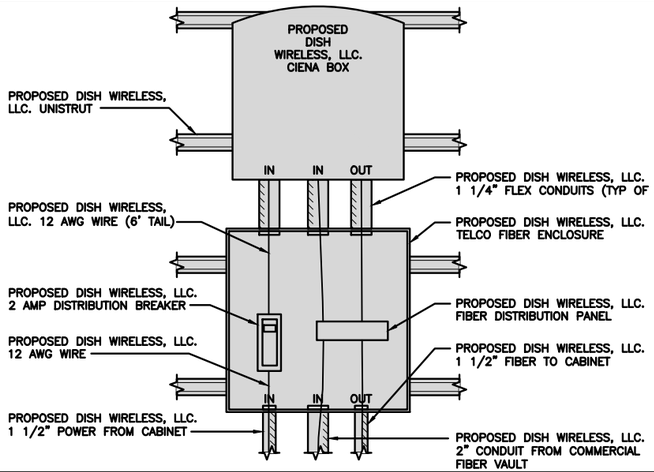
1. CONTRACTOR SHALL RESTORE THE TRENCH TO ITS ORIGINAL CONDITIONS BY EITHER SEEDING OR SODDING GRASS AREAS, OR REPLACING ASPHALT OR CONCRETE AREAS TO ITS ORIGINAL CROSS SECTION.
2. TRENCHING SAFETY; INCLUDING, BUT NOT LIMITED TO SOIL CLASSIFICATION, SLOPING, AND SHORING, SHALL BE GOVERNED BY THE CURRENT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

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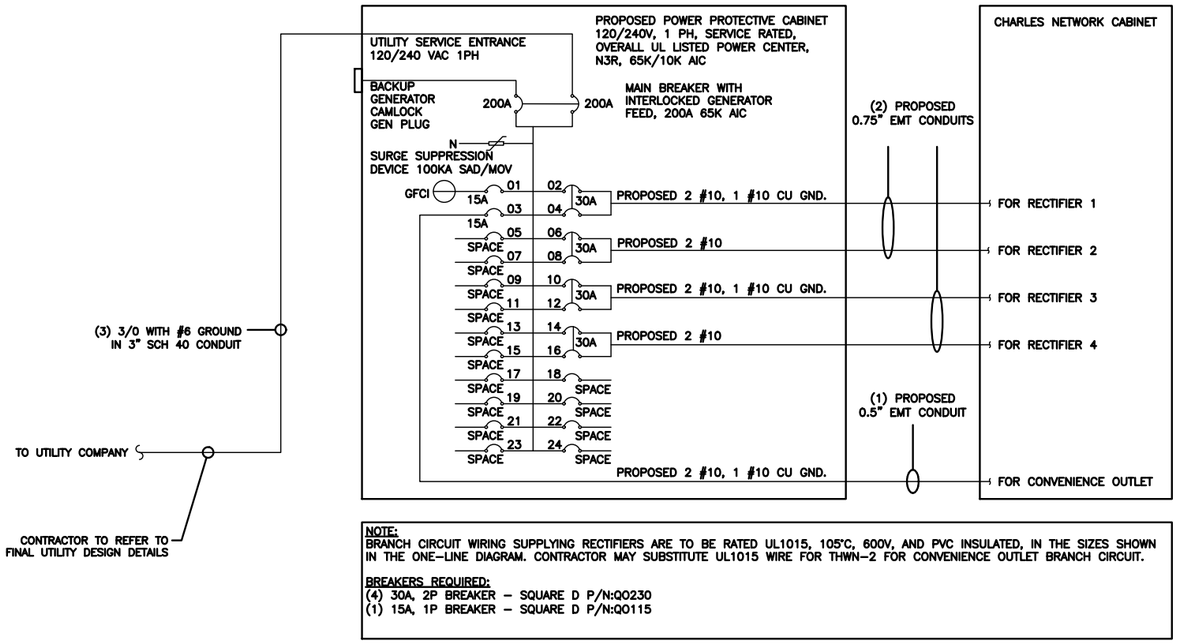
DISH WIRELESS, LLC.
PROJECT INFORMATION
BOBDL00074A
1102 HORSE HILL ROAD
WESTBROOK, CT 06498

SHEET TITLE
ELECTRICAL DETAILS

SHEET NUMBER
E-2



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

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

NOTES

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

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

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

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

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

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

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

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

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

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

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

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

PPC ONE–LINE DIAGRAM

NO SCALE | 1

PROPOSED CHARLES PANEL SCHEDULE

LOAD SERVED	VOLT AMPS (WATTS) L1	VOLT AMPS (WATTS) L2	TRIP	CKT #	PHASE	CKT #	TRIP	VOLT AMPS (WATTS) L1	VOLT AMPS (WATTS) L2	LOAD SERVED
PPC GFCI OUTLET	180		15A	1	A	2	30A	2880		ABB/GE INFINITY RECTIFIER 1
CHARLES GFCI OUTLET		180	15A	3	B	4			2880	
–SPACE–				5	A	6	30A	2880		ABB/GE INFINITY RECTIFIER 2
–SPACE–				7	B	8			2880	
–SPACE–				9	A	10	30A	2880		ABB/GE INFINITY RECTIFIER 3
–SPACE–				11	B	12			2880	
–SPACE–				13	A	14	30A	2880		ABB/GE INFINITY RECTIFIER 4
–SPACE–				15	B	16			2880	
–SPACE–				17	A	18				–SPACE–
–SPACE–				19	B	20				–SPACE–
–SPACE–				21	A	22				–SPACE–
–SPACE–				23	B	24				–SPACE–
VOLTAGE AMPS	180	180						11520	11520	
200A MCB, 1φ, 24 SPACE, 120/240V			L1		L2		VOLTAGE AMPS			
MB RATING: 65,000 AIC			11700		11700					
			98		98		AMPS			
			98				MAX AMPS			
			123				MAX 125%			

PANEL SCHEDULE

NO SCALE | 2

NOT USED

NO SCALE | 3

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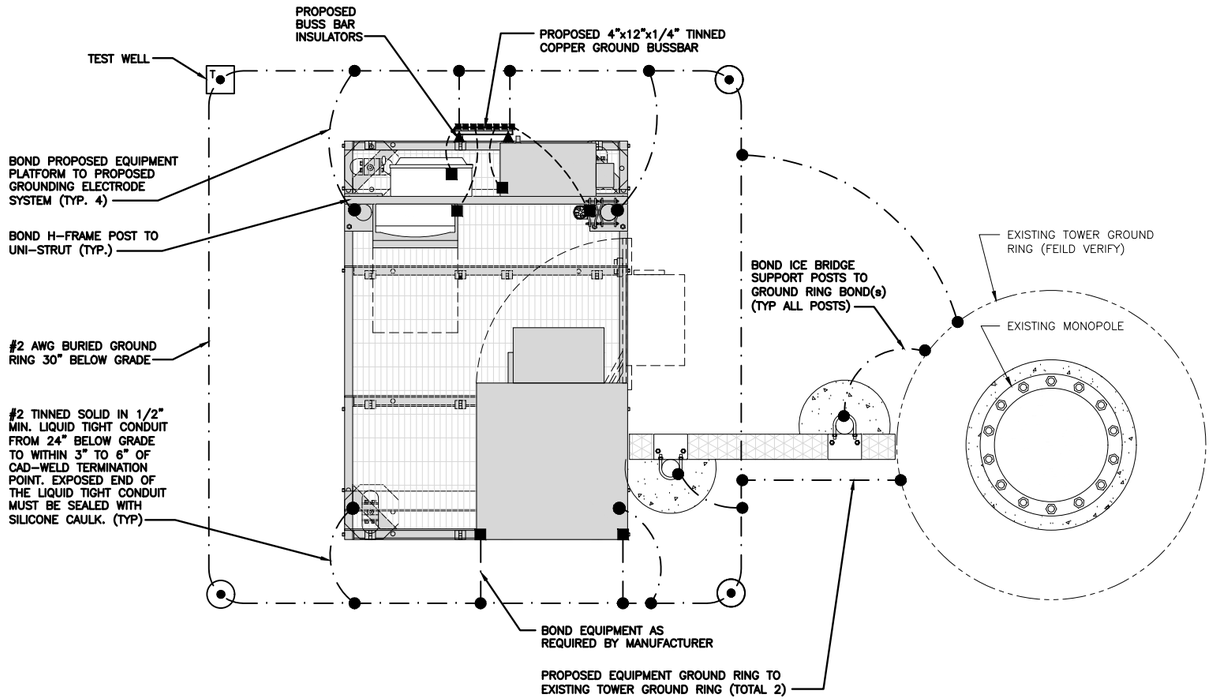
2039–Z5555C

DISH WIRELESS, LLC.
PROJECT INFORMATION
BOBDL00074A
1102 HORSE HILL ROAD
WESTBROOK, CT 06498

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

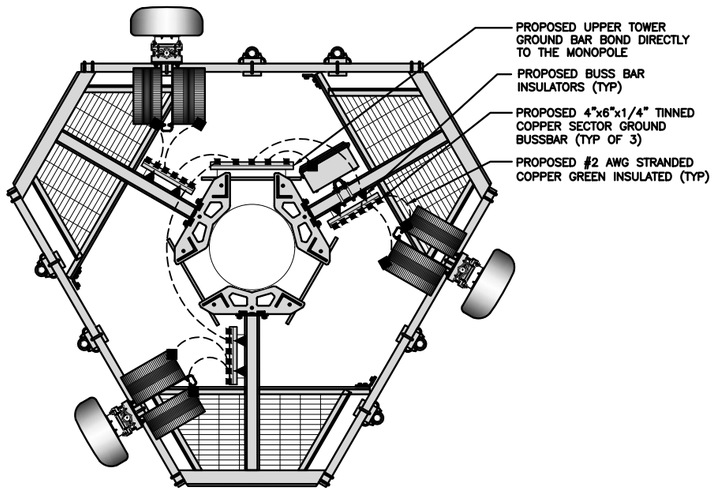
SHEET NUMBER
E-3



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
- #2 AWG STRANDED & INSULATED
- #2 AWG SOLID COPPER TINNED

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, LLC. 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.

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

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

(L) 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.

(M) 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.

(N) 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

(P) 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.

(Q) 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

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

REFER TO DISH WIRELESS, LLC. GROUNDING NOTES.

GROUNDING KEY NOTES | NO SCALE | 3

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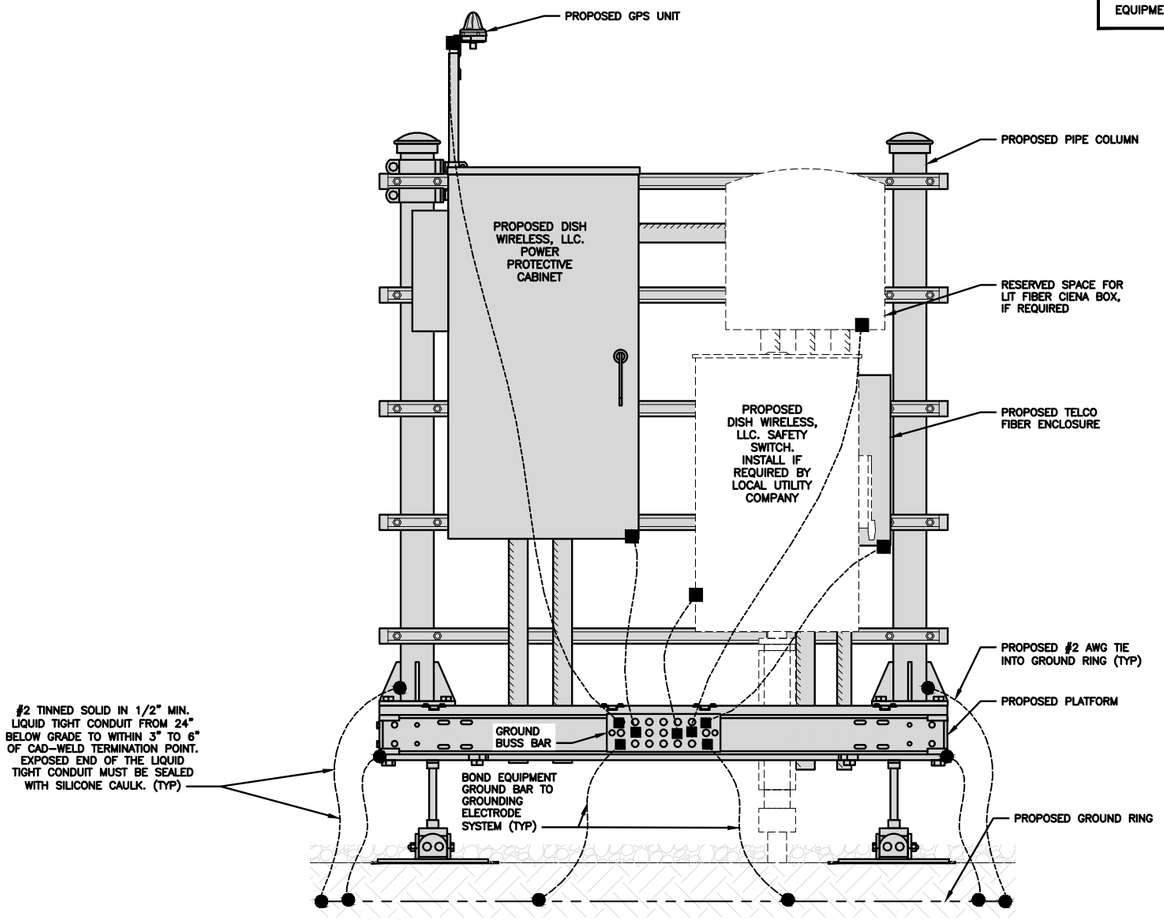
GROUNDING PLANS AND NOTES

SHEET NUMBER
G-1

NOTES

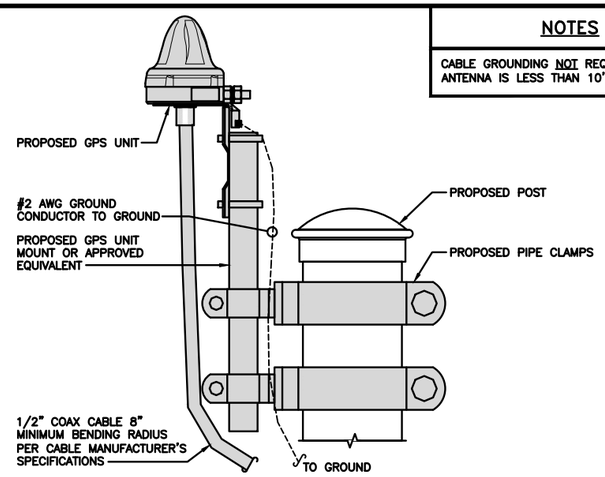
EQUIPMENT CABINET OMITTED FOR CLARITY



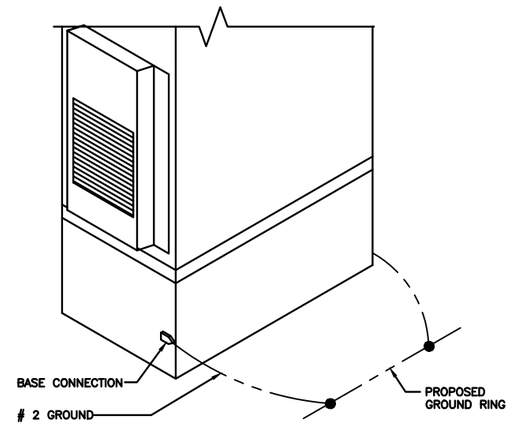
H-FRAME GROUNDING DETAIL | NO SCALE | 1

NOTES

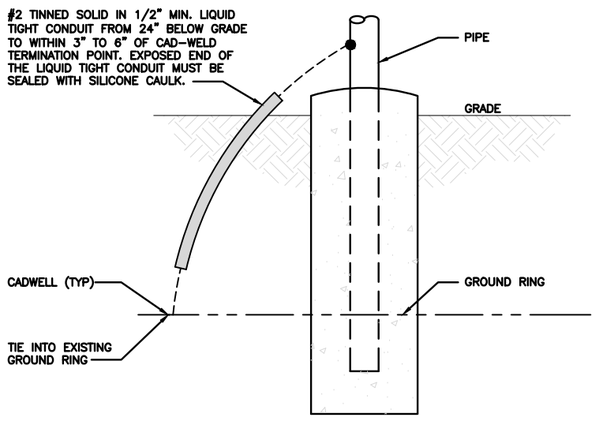
CABLE GROUNDING NOT REQUIRED WHEN ANTENNA IS LESS THAN 10' FROM CABINET



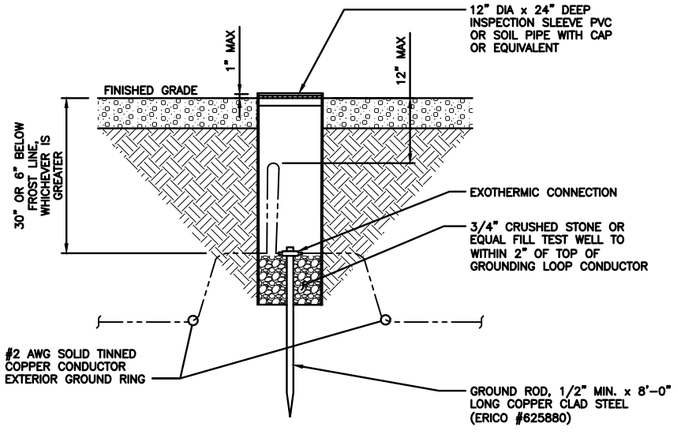
TYPICAL GPS UNIT GROUNDING | NO SCALE | 2



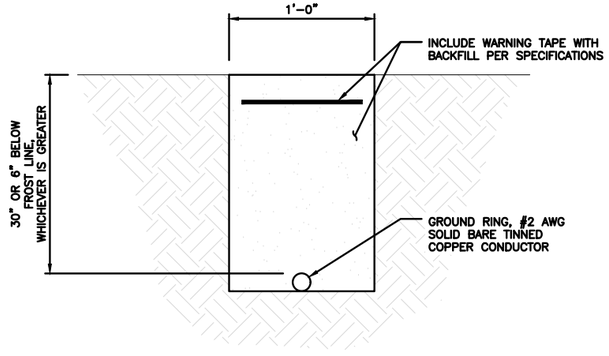
OUTDOOR CABINET GROUNDING | NO SCALE | 3



TRANSITIONING GROUND DETAIL | NO SCALE | 4



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



TYPICAL GROUND RING TRENCH | NO SCALE | 6

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6/23/21

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DB	SS	CJW

RFDS REV #: N/A

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	04/16/2021	ISSUED FOR REVIEW
0	05/17/2021	ISSUED FOR CONSTRUCTION
1	06/23/2021	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
2039-Z5555C

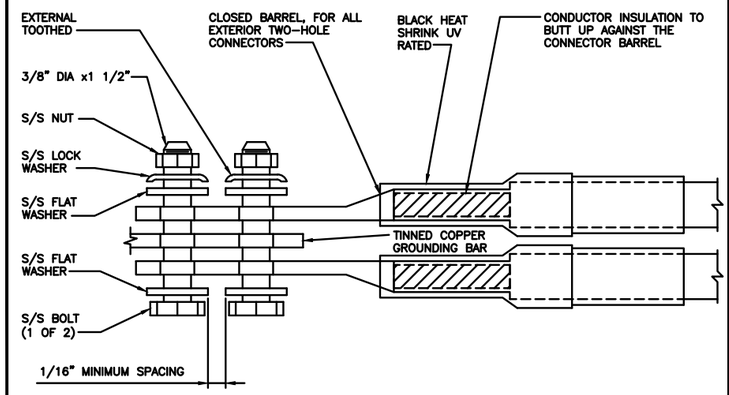
DISH WIRELESS, LLC.
PROJECT INFORMATION
BOBDL00074A
1102 HORSE HILL ROAD
WESTBROOK, CT 06498

SHEET TITLE
GROUNDING DETAILS

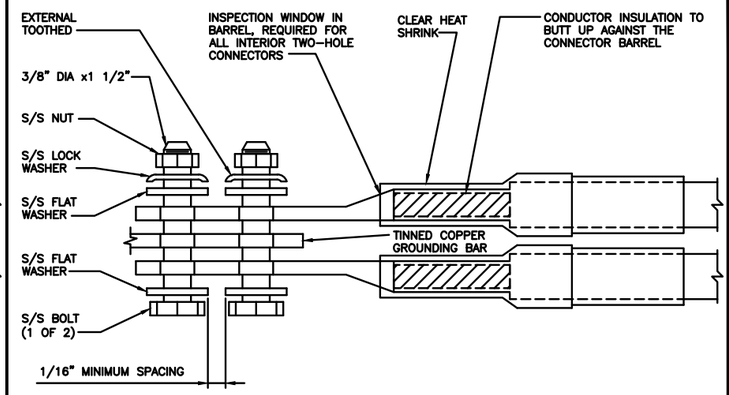
SHEET NUMBER
G-2

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.
9. ENSURE THE WIRE INSULATION TERMINATION IS WITHIN 1/8" OF THE BARREL (NO SHINERS).

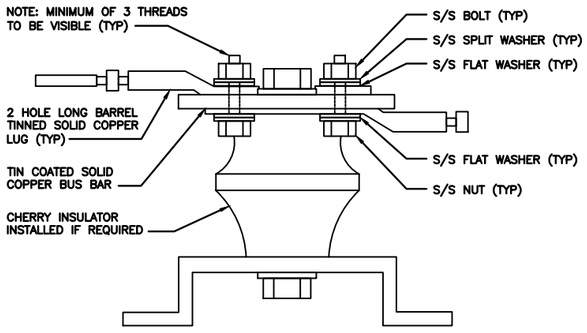
TYPICAL GROUNDING NOTES | NO SCALE | 1



TYPICAL EXTERIOR TWO HOLE LUG | NO SCALE | 2



TYPICAL INTERIOR TWO HOLE LUG | NO SCALE | 3



LUG DETAIL | NO SCALE | 4

NO SCALE | 5

NOT USED | NO SCALE | 6

NOT USED | NO SCALE | 7

NOT USED | NO SCALE | 8

NOT USED | NO SCALE | 9

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1102 HORSE HILL ROAD
WESTBROOK, CT 06498

SHEET TITLE
GROUNDING DETAILS

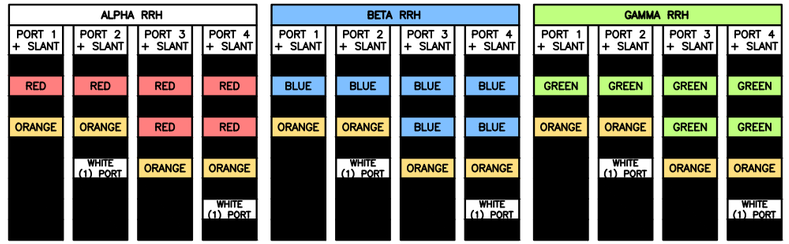
SHEET NUMBER
G-3

RF JUMPER COLOR CODING

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

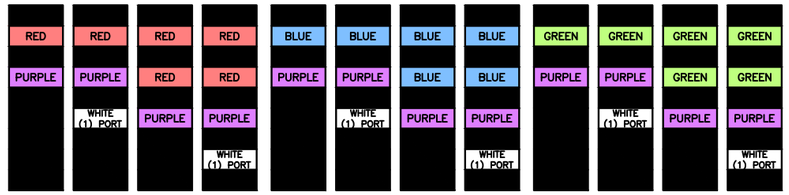
LOW-BAND RRH –
(600MHz N71 BASEBAND) +
(850MHz N26 BAND) +
(700MHz N29 BAND) – OPTIONAL PER MARKET

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)

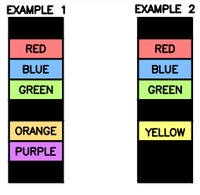


HYBRID/DISCREET CABLES

INCLUDE SECTOR BANDS BEING SUPPORTED AM LONG WITH FREQUENCY BANDS

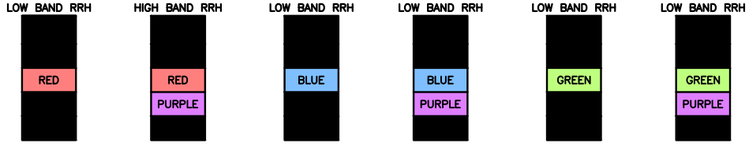
EXAMPLE 1 – HYBRID, OR DISCREET, SUPPORTS ALL SECTORS, BOTH LOW-BANDS AND MID-BANDS

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



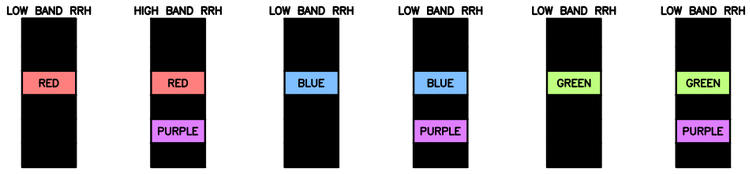
HYBRID/DISCREET CABLES

LOW-BAND RRH FIBER CABLES HAVE SECTOR STRIPE ONLY

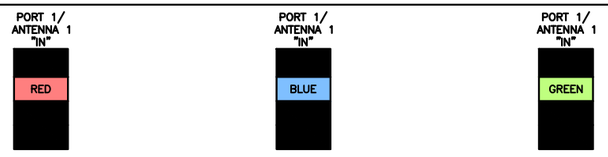


POWER CABLES TO RRHs

LOW-BAND RRH POWER CABLES HAVE SECTOR STRIPE ONLY



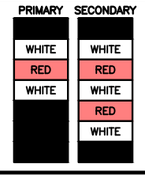
RET MOTORS AT ANTENNAS



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 CABINETS 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–N28)
OPTIONAL – (N29)
ORANGE

AWS
(N65+N70+H-BLOCK)
PURPLE

CBRS TECH
(3 GHz)
YELLOW

NEGATIVE SLANT PORT
ON ANTRRH
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

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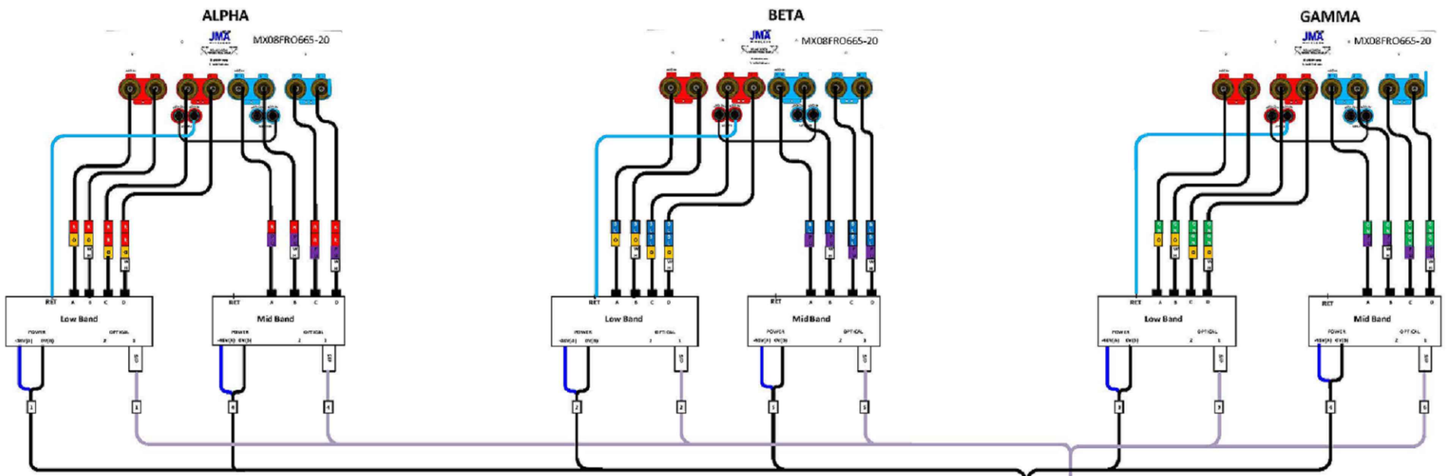
2039-Z5555C

DISH WIRELESS, LLC.
PROJECT INFORMATION
BOBDL00074A
1102 HORSE HILL ROAD
WESTBROOK, CT 06498

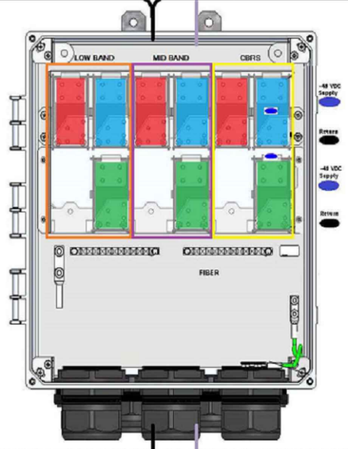
SHEET TITLE
RF
CABLE COLOR CODES

SHEET NUMBER
RF-1



Fiber Patch Panel

Bottom Row	Pair 1	Pair 2	Pair 3	Pair 10	Open	Open
Middle Row	Pair 4	Pair 5	Pair 6	Pair 11	Open	Open
Top Row	Pair 7	Pair 8	Pair 9	Pair 12	Open	Open



CSR NCS540

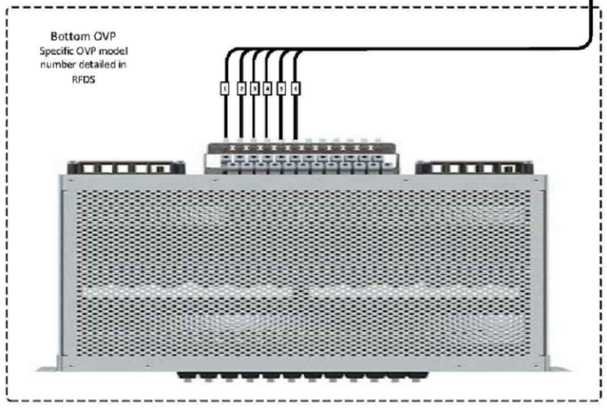
Port	Interface	Description
0	Gi0/0/0/0	SiteBoss
1	Gi0/0/0/1	CBRS - Alpha
2	Gi0/0/0/2	CBRS - Beta
3	Gi0/0/0/3	CBRS - Gamma
4	Te0/0/0/4	Fujitsu Low-Band RU - Alpha
5	Te0/0/0/5	Fujitsu Mid-Band RU - Alpha
6	Te0/0/0/6	Fujitsu Low-Band RU - Beta
7	Te0/0/0/7	Fujitsu Mid-Band RU - Beta
8	Te0/0/0/8	Fujitsu Low-Band RU - Gamma
9	Te0/0/0/9	Fujitsu Mid-Band RU - Gamma
10	Te0/0/0/10	Fixed WI6
11	Te0/0/0/11	Fixed WI6
12	Te0/0/0/12	Fixed WI6
13	Te0/0/0/13	Fixed WI6
14	Te0/0/0/14	CBRS1
15	Te0/0/0/15	CBRS2
16	Te0/0/0/16	CBRS3
17	Gi0/0/0/17	SM1 - BMC
18	Gi0/0/0/18	SM2 - BMC
19	Te0/0/0/19	SM1 - Data 1
20	Te0/0/0/20	SM1 - Data 2
21	Te0/0/0/21	SM2 - Data 1
22	Te0/0/0/22	SM2 - Data 2
23	Te0/0/0/23	Reserved Uplink (EDC, LDC)
24	Te0/0/0/24	Blank/Future
25	Te0/0/0/25	Blank/Future
26	Te0/0/0/26	Fiber NIU
27	Te0/0/0/27	Fiber NIU
28	Te0/0/0/28	Blank/Future
29	Te0/0/0/29	Blank/Future

top

bottom

Bottom OVP Layout

Circuit 1	Alpha Low Band
Circuit 2	Beta Low Band
Circuit 3	Gamma Low Band
Circuit 4	Alpha Mid Band
Circuit 5	Beta Mid Band
Circuit 6	Gamma Mid Band
Circuit 7	Alpha CBRS
Circuit 8	Beta CBRS
Circuit 9	Gamma CBRS
Circuit 10	Open
Circuit 11	Open
Circuit 12	Open



	5G plumbing diagram JMA MX08FRO665-20 2-2-2(LB+MB)		
Quantity	Job	RDIV NO	DWG NO	REV
5- Jan- 2021	DRWN	Rong	CHKD	SHEET

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DISH WIRELESS, LLC.
PROJECT INFORMATION
BOBDL00074A
1102 HORSE HILL ROAD
WESTBROOK, CT 06498

SHEET TITLE
RF
PLUMBING DIAGRAM

SHEET NUMBER
RF-2

EXOTHERMIC CONNECTION

MECHANICAL CONNECTION

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

LEGEND

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

ABBREVIATIONS

dish wireless.

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A&E PROJECT NUMBER

2039–Z5555C

DISH WIRELESS, LLC.
PROJECT INFORMATION

BOBDL00074A
1102 HORSE HILL ROAD
WESTBROOK, CT 06498

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, LLC. AND TOWER OWNER NOC & THE DISH WIRELESS, LLC. AND TOWER OWNER CONSTRUCTION MANAGER.

2. "LOOK UP" – DISH WIRELESS, LLC. 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, LLC. AND DISH WIRELESS, LLC. 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, LLC. 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, LLC. AND TOWER OWNER INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON DISH WIRELESS, LLC. 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, LLC. 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, LLC. 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, LLC.

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, LLC. 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.

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STATE OF CONNECTICUT
SHUHEI SAKAMOTO
34916
LICENSED PROFESSIONAL ENGINEER
6/23/21

DRAWN BY:	CHECKED BY:	APPROVED BY:
DB	SS	CJW

RFDS REV #: N/A

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	04/16/2021	ISSUED FOR REVIEW
0	05/17/2021	ISSUED FOR CONSTRUCTION
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BOBDL00074A
1102 HORSE HILL ROAD
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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, LLC. 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, LLC.".

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
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STATE OF CONNECTICUT
SHUHTI SAKANCHI
34916
LICENSED PROFESSIONAL ENGINEER
6/23/21

DRAWN BY:	CHECKED BY:	APPROVED BY:
DB	SS	CJW

RFDS REV #: N/A

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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

CROWN CASTLE
2000 CORPORATE DRIVE
CANONSBURG, PA 15317

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STATE OF CONNECTICUT
YUHEI SAKAMOTO
34916
LICENSED PROFESSIONAL ENGINEER
6/23/21

DRAWN BY:	CHECKED BY:	APPROVED BY:
DB	SS	CJW

RFDS REV #: N/A

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	04/16/2021	ISSUED FOR REVIEW
0	05/17/2021	ISSUED FOR CONSTRUCTION
1	06/23/2021	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

2039-Z5555C

DISH WIRELESS, LLC.
PROJECT INFORMATION

BOBDL00074A
1102 HORSE HILL ROAD
WESTBROOK, CT 06498

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-4

Exhibit D

Structural Analysis Report

Date: **May 25, 2021**

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

Subject:	**Structural Analysis Report**	
Carrier Designation:	***DISH Network* Co-Locate**	
	Site Number:	BOBDL00074A
	Site Name:	CT-CCI-T-857011
Crown Castle Designation:	**BU Number:**	857011
	Site Name:	WESTBROOK NORTH HORSE HILL ROA
	JDE Job Number:	645153
	Work Order Number:	1973897
	Order Number:	553288 Rev. 2
Engineering Firm Designation:	**Crown Castle Project Number:**	1973897
Site Data:	**1102 HORSE HILL ROAD, WESTBROOK, Middlesex County, CT** **Latitude *41° 19' 25.71"*, Longitude *-72° 29' 28.1"*** **159.08 Foot - Monopole Tower**	

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

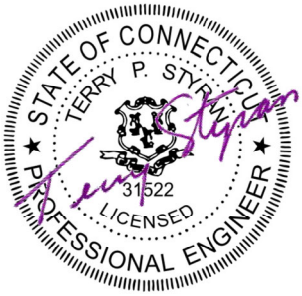
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC5: Proposed Equipment Configuration **Sufficient Capacity - 55.8%**

This analysis has been performed in accordance with the 2018 Connecticut Building Code based upon an ultimate 3-second gust wind speed of 135 mph. Applicable Standard references and design criteria are listed in Section 2 - "Analysis Criteria".

Structural analysis prepared by: Tyler Ho

Respectfully submitted by:



Terry P. Styran, P.E.
Senior Project Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 159.08 ft Monopole tower designed by Elevated Services.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	135 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Seismic Ss:	0.167
Seismic S1:	0.059
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)
135.0	135.0	3	fujitsu	TA08025-B604	1	1-1/2
		3	fujitsu	TA08025-B605		
		3	jma wireless	MX08FRO665-20 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)
159.0	163.0	3	ericsson	RRUS 4415 B25	2 4 2 12 3	3/8 3/4 7/8 1-5/8 2-1/2” Conduit
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 8843 B2/B66A		
		3	kathrein	80010965 w/ Mount Pipe		
		3	kathrein	80010991 w/ Mount Pipe		
		3	powerwave technologies	7770.00 w/ Mount Pipe		
		6	powerwave technologies	LGP21402		
		3	raycap	DC6-48-60-18-8C-EV		
	159.0	1	tower mounts	Platform Mount [LP 714-1]		
147.0	147.0	3	alcatel lucent	B13 RRH 4X30	2	1-5/8
		3	alcatel lucent	B66A RRH4X45		
		3	amphenol	QUAD656C0000X w/ Mount Pipe		
		9	commscope	SBNHH-1D65B w/ Mount Pipe		
		1	raycap	RCMDC-6627-PF-48		
		1	tower mounts	Platform Mount [LP 303-1_KCKR-HR-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	4306672	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	4723512	CCISITES
4-TOWER MANUFACTURER DRAWINGS	5177796	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	159.08 - 139.33	Pole	TP24.1x18.43x0.188	1	-8.05	842.55	37.6	Pass
L2	139.33 - 91.24	Pole	TP40.49x22.861x0.313	2	-18.69	2341.50	47.0	Pass
L3	91.24 - 44.66	Pole	TP54.61x38.119x0.375	3	-31.13	3805.71	45.4	Pass
L4	44.66 - 0	Pole	TP69.47x51.679x0.375	4	-50.17	4980.67	50.8	Pass
							Summary	
						Pole (L4)	50.8	Pass
						Rating =	50.8	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	40.9	Pass
1	Base Plate	0	37.1	Pass
1	Base Foundation (Structure)	0	55.8	Pass
1	Base Foundation (Soil Interaction)	0	37.2	Pass

Structure Rating (max from all components) =	55.8%

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

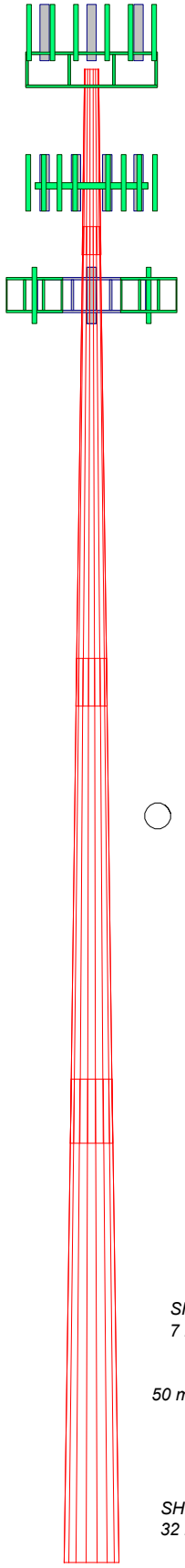
4.1) Recommendations

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	19.75	18	0.188	3.01	18.430	24.100	A572-65	0.8
2	51.10	18	0.313	5.06	22.861	40.490		5.4
3	51.64	18	0.375	6.83	38.119	54.610		9.6
4	51.49	18	0.375		51.679	69.470		12.6
								28.4



MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 135 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: 50.8%

ALL REACTIONS ARE FACTORED

AXIAL 78 K
SHEAR 7 K
MOMENT 828 kip-ft
TORQUE 0 kip-ft
50 mph WIND - 1.500 in ICE

AXIAL 50 K
SHEAR 32 K
MOMENT 3530 kip-ft
TORQUE 1 kip-ft
REACTIONS - 135 mph WIND

CROWN CASTLE
The Pathway To Possible

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

Job: *BU# 857011*			
Project:			
Client: Crown Castle	Drawn by: THo	App'd:	
Code: TIA-222-H	Date: 05/25/21	Scale: NTS	
Path: C:\Users\THo\OneDrive - Crown Castle USA Inc\Desktop\WORK SPACE\857011\WO 1973897 - SA\Prod\857011_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 Middlesex County, Connecticut.
- Tower base elevation above sea level: 236.00 ft.
- Basic wind speed of 135 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 1.500 in.
- Ice thickness is considered to increase with height.
- Ice density of 56.00 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.
- Tower analysis based on target reliabilities in accordance with Annex S.
- Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
- Maximum demand-capacity ratio is: 1.05.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

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	159.08-139.33	19.75	3.01	18	18.430	24.100	0.188	0.750	A572-65 (65 ksi)
L2	139.33-91.24	51.10	5.06	18	22.861	40.490	0.313	1.250	A572-65 (65 ksi)
L3	91.24-44.66	51.64	6.83	18	38.119	54.610	0.375	1.500	A572-65 (65 ksi)
L4	44.66-0.00	51.49		18	51.679	69.470	0.375	1.500	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	18.685	10.857	456.456	6.476	9.362	48.754	913.512	5.429	2.914	15.54
	24.443	14.231	1028.065	8.489	12.243	83.973	2057.483	7.117	3.912	20.862
L2	24.220	22.365	1436.612	8.005	11.613	123.704	2875.114	11.185	3.474	11.115
	41.066	39.851	8127.241	14.263	20.569	395.122	16265.175	19.929	6.576	21.044
L3	40.290	44.925	8085.949	13.399	19.365	417.563	16182.538	22.467	6.049	16.131
	55.395	64.553	23989.134	19.253	27.742	864.726	48009.834	32.283	8.951	23.87
L4	54.815	61.064	20306.130	18.213	26.253	773.482	40638.979	30.538	8.435	22.495
	70.484	82.240	49603.864	24.529	35.291	1405.577	99272.997	41.128	11.567	30.845

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 159.08-139.33				1	1	1			
L2 139.33-91.24				1	1	1			
L3 91.24-44.66				1	1	1			
L4 44.66-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
*											

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
Level 159									
LDF7-50A(1-5/8)	A	No	No	Inside Pole	159.00 - 0.00	12	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
FB-L98B-034-XXX(3/8)	A	No	No	Inside Pole	159.00 - 0.00	2	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
							2" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	A	No	No	Inside Pole	159.00 - 0.00	4	No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
							2" Ice	0.00	0.58
WR-VG86ST-BRDA(7/8)	A	No	No	Inside Pole	159.00 - 0.00	2	No Ice	0.00	0.68
							1/2" Ice	0.00	0.68
							1" Ice	0.00	0.68
							2" Ice	0.00	0.68
2-1/2" Rigid Conduit	A	No	No	Inside Pole	159.00 - 0.00	3	No Ice	0.00	3.00
							1/2" Ice	0.00	3.00
							1" Ice	0.00	3.00
							2" Ice	0.00	3.00
Level 147									
HB158-1-08U8-S8J18(1-5/8)	B	No	No	Inside Pole	147.00 - 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
****									
CU12PSM9P6XXX (1-1/2)	C	No	No	Inside Pole	135.00 - 0.00	1	No Ice	0.00	2.35
							1/2" Ice	0.00	2.35
							1" Ice	0.00	2.35
							2" Ice	0.00	2.35
*									

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	159.08-139.33	A	0.000	0.000	0.000	0.000	0.45
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
L2	139.33-91.24	A	0.000	0.000	0.000	0.000	1.09
		B	0.000	0.000	0.000	0.000	0.13
		C	0.000	0.000	0.000	0.000	0.10
L3	91.24-44.66	A	0.000	0.000	0.000	0.000	1.06
		B	0.000	0.000	0.000	0.000	0.12
		C	0.000	0.000	0.000	0.000	0.11
L4	44.66-0.00	A	0.000	0.000	0.000	0.000	1.01
		B	0.000	0.000	0.000	0.000	0.12
		C	0.000	0.000	0.000	0.000	0.10

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	159.08-139.33	A	1.482	0.000	0.000	0.000	0.000	0.45
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L2	139.33-91.24	A	1.443	0.000	0.000	0.000	0.000	1.09
		B		0.000	0.000	0.000	0.000	0.13
		C		0.000	0.000	0.000	0.000	0.10
L3	91.24-44.66	A	1.369	0.000	0.000	0.000	0.000	1.06
		B		0.000	0.000	0.000	0.000	0.12
		C		0.000	0.000	0.000	0.000	0.11
L4	44.66-0.00	A	1.222	0.000	0.000	0.000	0.000	1.01
		B		0.000	0.000	0.000	0.000	0.12

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
		C		0.000	0.000	0.000	0.000	0.10

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	159.08-139.33	0.000	0.000	0.000	0.000
L2	139.33-91.24	0.000	0.000	0.000	0.000
L3	91.24-44.66	0.000	0.000	0.000	0.000
L4	44.66-0.00	0.000	0.000	0.000	0.000

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

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
Level 159									
Platform Mount [LP 714-1]	C	None		0.000	159.00	No Ice	37.51	37.51	1.60
						1/2" Ice	41.70	41.70	2.50
						1" Ice	45.89	45.89	3.46
						2" Ice	54.29	54.29	5.58
6' x 2" Mount Pipe	A	From Leg	4.00 0.00 4.00	0.000	159.00	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' x 2" Mount Pipe	B	From Leg	4.00 0.00 4.00	0.000	159.00	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' x 2" Mount Pipe	C	From Leg	4.00 0.00 4.00	0.000	159.00	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
7770.00 w/ Mount Pipe	A	From Leg	4.00 0.00 4.00	0.000	159.00	No Ice	5.75	4.25	0.06
						1/2" Ice	6.18	5.01	0.10
						1" Ice	6.61	5.71	0.16
						2" Ice	7.49	7.16	0.29
7770.00 w/ Mount Pipe	B	From Leg	4.00 0.00 4.00	0.000	159.00	No Ice	5.75	4.25	0.06
						1/2" Ice	6.18	5.01	0.10
						1" Ice	6.61	5.71	0.16
						2" Ice	7.49	7.16	0.29
7770.00 w/ Mount Pipe	C	From Leg	4.00 0.00 4.00	0.000	159.00	No Ice	5.75	4.25	0.06
						1/2" Ice	6.18	5.01	0.10
						1" Ice	6.61	5.71	0.16
						2" Ice	7.49	7.16	0.29

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
80010991 w/ Mount Pipe	A	From Leg	4.00 0.00 4.00	0.000	159.00	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
80010991 w/ Mount Pipe	B	From Leg	4.00 0.00 4.00	0.000	159.00	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
80010991 w/ Mount Pipe	C	From Leg	4.00 0.00 4.00	0.000	159.00	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	A	From Leg	4.00 0.00 4.00	0.000	159.00	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 0.00 4.00	0.000	159.00	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 0.00 4.00	0.000	159.00	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
(2) LGP21402	A	From Leg	4.00 0.00 4.00	0.000	159.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.05 1.18 1.32 1.62	0.23 0.30 0.37 0.55	0.01 0.02 0.03 0.05
(2) LGP21402	B	From Leg	4.00 0.00 4.00	0.000	159.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.05 1.18 1.32 1.62	0.23 0.30 0.37 0.55	0.01 0.02 0.03 0.05
(2) LGP21402	C	From Leg	4.00 0.00 4.00	0.000	159.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.05 1.18 1.32 1.62	0.23 0.30 0.37 0.55	0.01 0.02 0.03 0.05
RRUS 4415 B25	A	From Leg	4.00 0.00 4.00	0.000	159.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.33	0.68 0.79 0.91 1.18	0.04 0.06 0.07 0.11
RRUS 4415 B25	B	From Leg	4.00 0.00 4.00	0.000	159.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.33	0.68 0.79 0.91 1.18	0.04 0.06 0.07 0.11
RRUS 4415 B25	C	From Leg	4.00 0.00 4.00	0.000	159.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.33	0.68 0.79 0.91 1.18	0.04 0.06 0.07 0.11
RRUS 4449 B5/B12	A	From Leg	4.00 0.00 4.00	0.000	159.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
RRUS 4449 B5/B12	B	From Leg	4.00 0.00 4.00	0.000	159.00	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 4.00	0.000	159.00	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 8843 B2/B66A	A	From Leg	4.00 0.00 4.00	0.000	159.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.32	1.35 1.50 1.65 1.99	0.07 0.09 0.11 0.16
RRUS 8843 B2/B66A	B	From Leg	4.00 0.00 4.00	0.000	159.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.32	1.35 1.50 1.65 1.99	0.07 0.09 0.11 0.16
RRUS 8843 B2/B66A	C	From Leg	4.00 0.00 4.00	0.000	159.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.32	1.35 1.50 1.65 1.99	0.07 0.09 0.11 0.16
DC6-48-60-18-8C-EV	A	From Leg	4.00 0.00 4.00	0.000	159.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.14 1.79 2.00 2.45	1.14 1.79 2.00 2.45	0.03 0.05 0.07 0.13
DC6-48-60-18-8C-EV	A	From Leg	4.00 0.00 4.00	0.000	159.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.14 1.79 2.00 2.45	1.14 1.79 2.00 2.45	0.03 0.05 0.07 0.13
DC6-48-60-18-8C-EV	B	From Leg	4.00 0.00 4.00	0.000	159.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.14 1.79 2.00 2.45	1.14 1.79 2.00 2.45	0.03 0.05 0.07 0.13
**									
MX08FRO665-20 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	135.00	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	0.10 0.18 0.28 0.51
MX08FRO665-20 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	135.00	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	0.10 0.18 0.28 0.51
MX08FRO665-20 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	135.00	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	0.10 0.18 0.28 0.51
TA08025-B604	A	From Leg	4.00 0.00 0.00	0.000	135.00	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	0.000	135.00	No Ice 1/2" Ice 1" 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

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			
TA08025-B604	C	From Leg	4.00 0.00 0.00	0.000	135.00	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-B605	A	From Leg	4.00 0.00 0.00	0.000	135.00	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	0.000	135.00	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	0.000	135.00	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	0.000	135.00	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	0.000	135.00	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	0.000	135.00	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	0.000	135.00	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		0.000	135.00	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
Level 147 Platform Mount [LP 303-1_KCKR-HR-1]	C	None		0.000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice	28.31 35.69 43.11 58.21	28.31 35.69 43.11 58.21	1.77 2.30 2.94 4.60
QUAD656C0000X w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice	13.90 14.77 15.64 17.46	6.62 7.39 8.17 9.78	0.10 0.18 0.28 0.52
QUAD656C0000X w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice	13.90 14.77 15.64 17.46	6.62 7.39 8.17 9.78	0.10 0.18 0.28 0.52
QUAD656C0000X w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	147.00	No Ice 1/2" Ice	13.90 14.77 15.64	6.62 7.39 8.17	0.10 0.18 0.28

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	17.46	9.78	0.52
						2" Ice			
(3) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00	0.000	147.00	No Ice	4.09	3.30	0.07
			0.00			1/2"	4.49	3.68	0.13
			0.00			Ice	4.89	4.07	0.20
						1" Ice	5.72	4.87	0.39
						2" Ice			
(3) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00	0.000	147.00	No Ice	4.09	3.30	0.07
			0.00			1/2"	4.49	3.68	0.13
			0.00			Ice	4.89	4.07	0.20
						1" Ice	5.72	4.87	0.39
						2" Ice			
(3) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00	0.000	147.00	No Ice	4.09	3.30	0.07
			0.00			1/2"	4.49	3.68	0.13
			0.00			Ice	4.89	4.07	0.20
						1" Ice	5.72	4.87	0.39
						2" Ice			
B66A RRH4X45	A	From Leg	4.00	0.000	147.00	No Ice	2.58	1.63	0.07
			0.00			1/2"	2.79	1.81	0.09
			0.00			Ice	3.01	2.00	0.11
						1" Ice	3.48	2.40	0.17
						2" Ice			
B66A RRH4X45	B	From Leg	4.00	0.000	147.00	No Ice	2.58	1.63	0.07
			0.00			1/2"	2.79	1.81	0.09
			0.00			Ice	3.01	2.00	0.11
						1" Ice	3.48	2.40	0.17
						2" Ice			
B66A RRH4X45	C	From Leg	4.00	0.000	147.00	No Ice	2.58	1.63	0.07
			0.00			1/2"	2.79	1.81	0.09
			0.00			Ice	3.01	2.00	0.11
						1" Ice	3.48	2.40	0.17
						2" Ice			
B13 RRH 4X30	A	From Leg	4.00	0.000	147.00	No Ice	2.06	1.32	0.06
			0.00			1/2"	2.24	1.48	0.07
			0.00			Ice	2.43	1.64	0.09
						1" Ice	2.84	2.00	0.14
						2" Ice			
B13 RRH 4X30	B	From Leg	4.00	0.000	147.00	No Ice	2.06	1.32	0.06
			0.00			1/2"	2.24	1.48	0.07
			0.00			Ice	2.43	1.64	0.09
						1" Ice	2.84	2.00	0.14
						2" Ice			
B13 RRH 4X30	C	From Leg	4.00	0.000	147.00	No Ice	2.06	1.32	0.06
			0.00			1/2"	2.24	1.48	0.07
			0.00			Ice	2.43	1.64	0.09
						1" Ice	2.84	2.00	0.14
						2" Ice			
RCMDC-6627-PF-48	B	From Leg	4.00	0.000	147.00	No Ice	4.06	3.10	0.03
			0.00			1/2"	4.32	3.34	0.07
			0.00			Ice	4.58	3.58	0.11
						1" Ice	5.14	4.09	0.20
						2" Ice			
****									

Load Combinations

Comb. No.	*Description*
1	Dead Only

Comb. No.	Description
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	159.08 - 139.33	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-21.47	-1.14	0.37
			Max. Mx	8	-8.05	-171.35	0.09
			Max. My	2	-8.05	-0.18	171.13
			Max. Vy	8	13.23	-171.35	0.09
			Max. Vx	2	-13.21	-0.18	171.13
			Max. Torque	2			-0.78
L2	139.33 - 91.24	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-37.59	-1.16	0.85
			Max. Mx	8	-18.69	-1005.40	-0.59

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	2	-18.69	0.59	1005.98
			Max. Vy	8	20.84	-1005.40	-0.59
			Max. Vx	2	-20.86	0.59	1005.98
			Max. Torque	24			-0.87
L3	91.24 - 44.66	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-53.63	-1.16	0.85
			Max. Mx	8	-31.13	-2049.55	-1.37
			Max. My	2	-31.13	1.36	2051.09
			Max. Vy	8	25.81	-2049.55	-1.37
			Max. Vx	2	-25.83	1.36	2051.09
			Max. Torque	24			-0.87
L4	44.66 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-77.62	-1.16	0.85
			Max. Mx	8	-50.17	-3526.18	-2.25
			Max. My	2	-50.17	2.24	3528.82
			Max. Vy	8	31.60	-3526.18	-2.25
			Max. Vx	2	-31.62	2.24	3528.82
			Max. Torque	24			-0.87

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	77.62	-0.00	0.00
	Max. H_x	20	50.19	31.58	0.02
	Max. H_z	2	50.19	0.02	31.60
	Max. M_x	2	3528.82	0.02	31.60
	Max. M_z	8	3526.18	-31.58	-0.02
	Max. Torsion	12	0.87	-15.80	-27.37
	Min. Vert	19	37.64	27.34	-15.78
	Min. H_x	8	50.19	-31.58	-0.02
	Min. H_z	14	50.19	-0.02	-31.60
	Min. M_x	14	-3528.20	-0.02	-31.60
	Min. M_z	20	-3525.54	31.58	0.02
	Min. Torsion	24	-0.87	15.80	27.37

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	41.82	0.00	0.00	-0.24	-0.25	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	50.19	-0.02	-31.60	-3528.82	2.24	0.78
0.9 Dead+1.0 Wind 0 deg - No Ice	37.64	-0.02	-31.60	-3502.06	2.30	0.78
1.2 Dead+1.0 Wind 30 deg - No Ice	50.19	15.77	-27.36	-3054.82	-1761.04	0.48
0.9 Dead+1.0 Wind 30 deg - No Ice	37.64	15.77	-27.36	-3031.65	-1747.65	0.48
1.2 Dead+1.0 Wind 60 deg - No Ice	50.19	27.34	-15.78	-1762.36	-3052.54	0.05
0.9 Dead+1.0 Wind 60 deg - No Ice	37.64	27.34	-15.78	-1748.96	-3029.37	0.05
1.2 Dead+1.0 Wind 90 deg - No Ice	50.19	31.58	0.02	2.25	-3526.18	-0.39
0.9 Dead+1.0 Wind 90 deg - No Ice	37.64	31.58	0.02	2.31	-3499.44	-0.39
1.2 Dead+1.0 Wind 120 deg	50.19	27.35	15.81	1766.16	-3055.08	-0.73

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
0.9 Dead+1.0 Wind 120 deg - No Ice	37.64	27.35	15.81	1752.89	-3031.90	-0.72
1.2 Dead+1.0 Wind 150 deg - No Ice	50.19	15.80	27.37	3056.75	-1765.46	-0.87
0.9 Dead+1.0 Wind 150 deg - No Ice	37.64	15.80	27.37	3033.72	-1752.03	-0.86
1.2 Dead+1.0 Wind 180 deg - No Ice	50.19	0.02	31.60	3528.20	-2.87	-0.77
0.9 Dead+1.0 Wind 180 deg - No Ice	37.64	0.02	31.60	3501.61	-2.77	-0.77
1.2 Dead+1.0 Wind 210 deg - No Ice	50.19	-15.77	27.36	3054.20	1760.40	-0.48
0.9 Dead+1.0 Wind 210 deg - No Ice	37.64	-15.77	27.36	3031.19	1747.18	-0.48
1.2 Dead+1.0 Wind 240 deg - No Ice	50.19	-27.34	15.78	1761.74	3051.90	-0.05
0.9 Dead+1.0 Wind 240 deg - No Ice	37.64	-27.34	15.78	1748.50	3028.90	-0.05
1.2 Dead+1.0 Wind 270 deg - No Ice	50.19	-31.58	-0.02	-2.86	3525.54	0.39
0.9 Dead+1.0 Wind 270 deg - No Ice	37.64	-31.58	-0.02	-2.76	3498.97	0.39
1.2 Dead+1.0 Wind 300 deg - No Ice	50.19	-27.35	-15.81	-1766.78	3054.44	0.73
0.9 Dead+1.0 Wind 300 deg - No Ice	37.64	-27.35	-15.81	-1753.34	3031.43	0.72
1.2 Dead+1.0 Wind 330 deg - No Ice	50.19	-15.80	-27.37	-3057.37	1764.83	0.87
0.9 Dead+1.0 Wind 330 deg - No Ice	37.64	-15.80	-27.37	-3034.17	1751.56	0.87
1.2 Dead+1.0 Ice+1.0 Temp	77.62	0.00	-0.00	-0.85	-1.16	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	77.62	-0.00	-7.34	-828.32	-0.89	0.15
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	77.62	3.67	-6.36	-717.28	-414.42	0.07
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	77.62	6.35	-3.67	-414.29	-717.25	-0.03
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	77.62	7.34	0.00	-0.55	-828.24	-0.12
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	77.62	6.36	3.67	413.10	-717.64	-0.18
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	77.62	3.67	6.36	715.80	-415.09	-0.20
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	77.62	0.00	7.34	826.45	-1.66	-0.15
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	77.62	-3.67	6.36	715.41	411.87	-0.07
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	77.62	-6.35	3.67	412.43	714.70	0.03
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	77.62	-7.34	-0.00	-1.32	825.69	0.12
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	77.62	-6.36	-3.67	-414.96	715.09	0.18
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	77.62	-3.67	-6.36	-717.67	412.54	0.19
Dead+Wind 0 deg - Service	41.82	-0.00	-5.88	-654.91	0.21	0.15
Dead+Wind 30 deg - Service	41.82	2.94	-5.09	-566.97	-326.94	0.09
Dead+Wind 60 deg - Service	41.82	5.09	-2.94	-327.17	-566.55	0.00
Dead+Wind 90 deg - Service	41.82	5.88	0.00	0.22	-654.43	-0.09
Dead+Wind 120 deg - Service	41.82	5.09	2.95	327.48	-567.03	-0.15
Dead+Wind 150 deg - Service	41.82	2.94	5.10	566.93	-327.76	-0.18
Dead+Wind 180 deg - Service	41.82	0.00	5.88	654.40	-0.74	-0.15
Dead+Wind 210 deg - Service	41.82	-2.94	5.09	566.46	326.41	-0.09
Dead+Wind 240 deg -	41.82	-5.09	2.94	326.66	566.02	-0.00

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
Service						
Dead+Wind 270 deg - Service	41.82	-5.88	-0.00	-0.73	653.90	0.09
Dead+Wind 300 deg - Service	41.82	-5.09	-2.95	-327.99	566.49	0.15
Dead+Wind 330 deg - Service	41.82	-2.94	-5.10	-567.44	327.23	0.18

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-41.82	0.00	0.00	41.82	0.00	0.000%
2	-0.02	-50.19	-31.60	0.02	50.19	31.60	0.000%
3	-0.02	-37.64	-31.60	0.02	37.64	31.60	0.000%
4	15.77	-50.19	-27.36	-15.77	50.19	27.36	0.000%
5	15.77	-37.64	-27.36	-15.77	37.64	27.36	0.000%
6	27.34	-50.19	-15.78	-27.34	50.19	15.78	0.000%
7	27.34	-37.64	-15.78	-27.34	37.64	15.78	0.000%
8	31.58	-50.19	0.02	-31.58	50.19	-0.02	0.000%
9	31.58	-37.64	0.02	-31.58	37.64	-0.02	0.000%
10	27.35	-50.19	15.81	-27.35	50.19	-15.81	0.000%
11	27.35	-37.64	15.81	-27.35	37.64	-15.81	0.000%
12	15.80	-50.19	27.37	-15.80	50.19	-27.37	0.000%
13	15.80	-37.64	27.37	-15.80	37.64	-27.37	0.000%
14	0.02	-50.19	31.60	-0.02	50.19	-31.60	0.000%
15	0.02	-37.64	31.60	-0.02	37.64	-31.60	0.000%
16	-15.77	-50.19	27.36	15.77	50.19	-27.36	0.000%
17	-15.77	-37.64	27.36	15.77	37.64	-27.36	0.000%
18	-27.34	-50.19	15.78	27.34	50.19	-15.78	0.000%
19	-27.34	-37.64	15.78	27.34	37.64	-15.78	0.000%
20	-31.58	-50.19	-0.02	31.58	50.19	0.02	0.000%
21	-31.58	-37.64	-0.02	31.58	37.64	0.02	0.000%
22	-27.35	-50.19	-15.81	27.35	50.19	15.81	0.000%
23	-27.35	-37.64	-15.81	27.35	37.64	15.81	0.000%
24	-15.80	-50.19	-27.37	15.80	50.19	27.37	0.000%
25	-15.80	-37.64	-27.37	15.80	37.64	27.37	0.000%
26	0.00	-77.62	0.00	-0.00	77.62	0.00	0.000%
27	-0.00	-77.62	-7.34	0.00	77.62	7.34	0.000%
28	3.67	-77.62	-6.36	-3.67	77.62	6.36	0.000%
29	6.35	-77.62	-3.67	-6.35	77.62	3.67	0.000%
30	7.34	-77.62	0.00	-7.34	77.62	-0.00	0.000%
31	6.36	-77.62	3.67	-6.36	77.62	-3.67	0.000%
32	3.67	-77.62	6.36	-3.67	77.62	-6.36	0.000%
33	0.00	-77.62	7.34	-0.00	77.62	-7.34	0.000%
34	-3.67	-77.62	6.36	3.67	77.62	-6.36	0.000%
35	-6.35	-77.62	3.67	6.35	77.62	-3.67	0.000%
36	-7.34	-77.62	-0.00	7.34	77.62	0.00	0.000%
37	-6.36	-77.62	-3.67	6.36	77.62	3.67	0.000%
38	-3.67	-77.62	-6.36	3.67	77.62	6.36	0.000%
39	-0.00	-41.82	-5.88	0.00	41.82	5.88	0.000%
40	2.94	-41.82	-5.09	-2.94	41.82	5.09	0.000%
41	5.09	-41.82	-2.94	-5.09	41.82	2.94	0.000%
42	5.88	-41.82	0.00	-5.88	41.82	-0.00	0.000%
43	5.09	-41.82	2.95	-5.09	41.82	-2.95	0.000%
44	2.94	-41.82	5.10	-2.94	41.82	-5.10	0.000%
45	0.00	-41.82	5.88	-0.00	41.82	-5.88	0.000%
46	-2.94	-41.82	5.09	2.94	41.82	-5.09	0.000%
47	-5.09	-41.82	2.94	5.09	41.82	-2.94	0.000%
48	-5.88	-41.82	-0.00	5.88	41.82	0.00	0.000%
49	-5.09	-41.82	-2.95	5.09	41.82	2.95	0.000%
50	-2.94	-41.82	-5.10	2.94	41.82	5.10	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	0.00034346
3	Yes	4	0.00000001	0.00021704
4	Yes	5	0.00000001	0.00029358
5	Yes	5	0.00000001	0.00013115
6	Yes	5	0.00000001	0.00028832
7	Yes	5	0.00000001	0.00012855
8	Yes	4	0.00000001	0.00017913
9	Yes	4	0.00000001	0.00010611
10	Yes	5	0.00000001	0.00028321
11	Yes	5	0.00000001	0.00012602
12	Yes	5	0.00000001	0.00029792
13	Yes	5	0.00000001	0.00013322
14	Yes	4	0.00000001	0.00037219
15	Yes	4	0.00000001	0.00023552
16	Yes	5	0.00000001	0.00028373
17	Yes	5	0.00000001	0.00012643
18	Yes	5	0.00000001	0.00028882
19	Yes	5	0.00000001	0.00012896
20	Yes	4	0.00000001	0.00020520
21	Yes	4	0.00000001	0.00012360
22	Yes	5	0.00000001	0.00029647
23	Yes	5	0.00000001	0.00013251
24	Yes	5	0.00000001	0.00028190
25	Yes	5	0.00000001	0.00012538
26	Yes	4	0.00000001	0.00000592
27	Yes	5	0.00000001	0.00012113
28	Yes	5	0.00000001	0.00014160
29	Yes	5	0.00000001	0.00014143
30	Yes	5	0.00000001	0.00012119
31	Yes	5	0.00000001	0.00014015
32	Yes	5	0.00000001	0.00014126
33	Yes	5	0.00000001	0.00012034
34	Yes	5	0.00000001	0.00013888
35	Yes	5	0.00000001	0.00013897
36	Yes	5	0.00000001	0.00012009
37	Yes	5	0.00000001	0.00014079
38	Yes	5	0.00000001	0.00013976
39	Yes	4	0.00000001	0.00001963
40	Yes	4	0.00000001	0.00007215
41	Yes	4	0.00000001	0.00006784
42	Yes	4	0.00000001	0.00001545
43	Yes	4	0.00000001	0.00006284
44	Yes	4	0.00000001	0.00007664
45	Yes	4	0.00000001	0.00001975
46	Yes	4	0.00000001	0.00006377
47	Yes	4	0.00000001	0.00006719
48	Yes	4	0.00000001	0.00001553
49	Yes	4	0.00000001	0.00007519
50	Yes	4	0.00000001	0.00006225

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	159.08 - 139.33	13.52	39	0.914	0.002
L2	142.34 - 91.24	10.47	39	0.807	0.001
L3	96.3 - 44.66	4.31	50	0.457	0.000
L4	51.49 - 0	1.16	50	0.212	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
159.00	Platform Mount [LP 714-1]	39	13.50	0.914	0.002	21976
147.00	Platform Mount [LP 303-1_KCKR-HR-1]	39	11.29	0.838	0.001	9096
135.00	MX08FRO665-20 w/ Mount Pipe	39	9.25	0.754	0.001	6857

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	159.08 - 139.33	72.81	2	4.916	0.010
L2	142.34 - 91.24	56.41	24	4.348	0.006
L3	96.3 - 44.66	23.23	24	2.467	0.001
L4	51.49 - 0	6.23	24	1.143	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
159.00	Platform Mount [LP 714-1]	2	72.73	4.914	0.010	4164
147.00	Platform Mount [LP 303-1_KCKR-HR-1]	24	60.82	4.515	0.007	1723
135.00	MX08FRO665-20 w/ Mount Pipe	24	49.88	4.066	0.004	1294

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	159.08 - 139.33 (1)	TP24.1x18.43x0.188	19.75	0.00	0.0	13.717	-8.05	802.42	0.010
L2	139.33 - 91.24 (2)	TP40.49x22.861x0.313	51.10	0.00	0.0	38.120	-18.69	2230.00	0.008
L3	91.24 - 44.66 (3)	TP54.61x38.119x0.375	51.64	0.00	0.0	61.957	-31.13	3624.49	0.009
L4	44.66 - 0 (4)	TP69.47x51.679x0.375	51.49	0.00	0.0	82.240	-50.17	4743.50	0.011

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	159.08 - 139.33 (1)	TP24.1x18.43x0.188	171.35	449.12	0.382	0.00	449.12	0.000
L2	139.33 - 91.24 (2)	TP40.49x22.861x0.313	1006.41	2080.90	0.484	0.00	2080.90	0.000
L3	91.24 - 44.66 (3)	TP54.61x38.119x0.375	2051.95	4389.49	0.467	0.00	4389.49	0.000
L4	44.66 - 0 (4)	TP69.47x51.679x0.375	3530.17	6755.96	0.523	0.00	6755.96	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	159.08 - 139.33 (1)	TP24.1x18.43x0.188	13.23	240.73	0.055	0.13	485.90	0.000
L2	139.33 - 91.24 (2)	TP40.49x22.861x0.313	20.87	669.00	0.031	0.87	2251.63	0.000
L3	91.24 - 44.66 (3)	TP54.61x38.119x0.375	25.84	1087.35	0.024	0.87	4956.81	0.000
L4	44.66 - 0 (4)	TP69.47x51.679x0.375	31.63	1443.32	0.022	0.87	8733.50	0.000

Pole Interaction Design Data

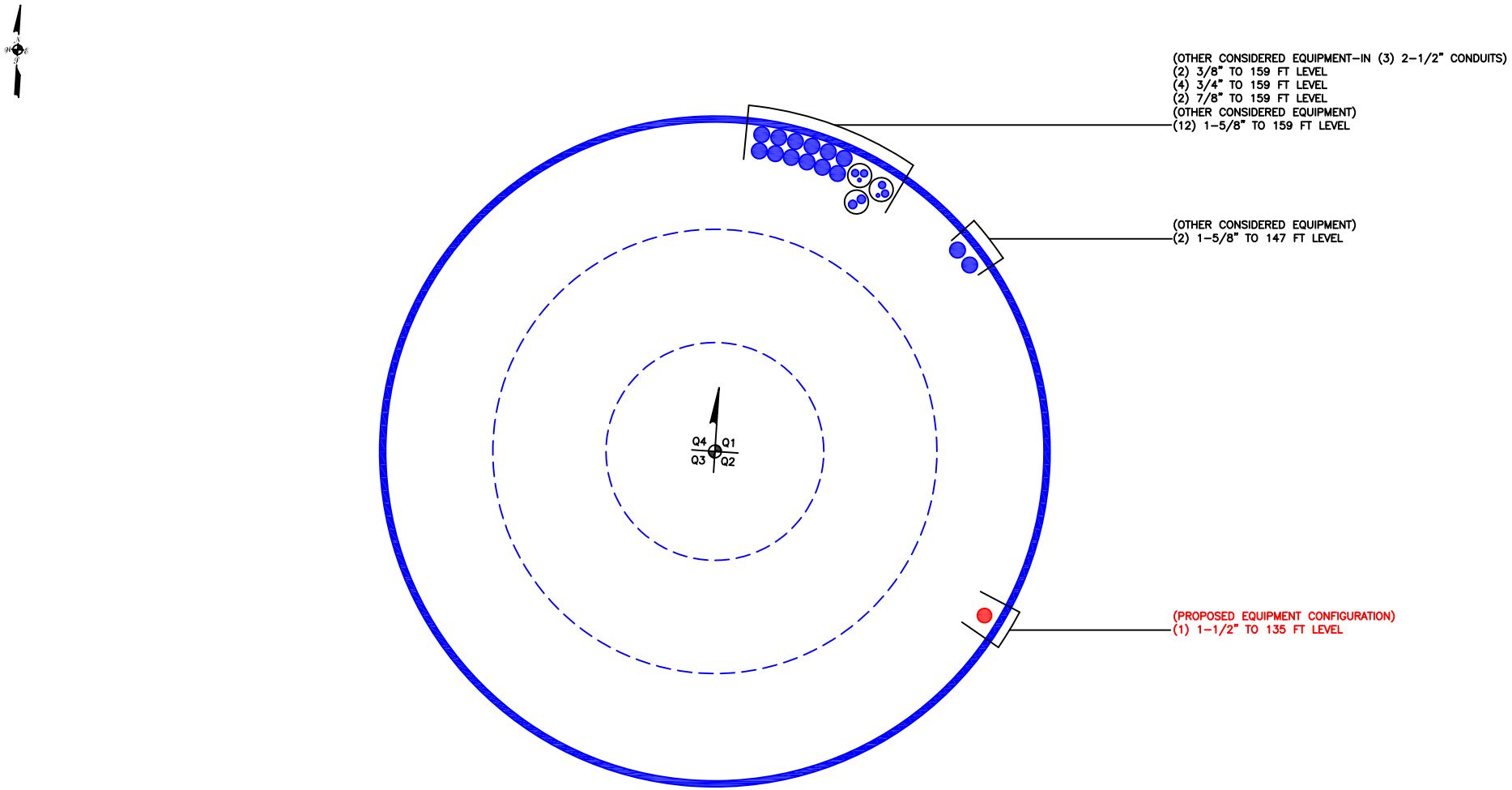
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	159.08 - 139.33 (1)	0.010	0.382	0.000	0.055	0.000	0.395	1.050	4.8.2
L2	139.33 - 91.24 (2)	0.008	0.484	0.000	0.031	0.000	0.493	1.050	4.8.2
L3	91.24 - 44.66 (3)	0.009	0.467	0.000	0.024	0.000	0.477	1.050	4.8.2
L4	44.66 - 0 (4)	0.011	0.523	0.000	0.022	0.000	0.534	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	159.08 - 139.33	Pole	TP24.1x18.43x0.188	1	-8.05	842.55	37.6	Pass
L2	139.33 - 91.24	Pole	TP40.49x22.861x0.313	2	-18.69	2341.50	47.0	Pass
L3	91.24 - 44.66	Pole	TP54.61x38.119x0.375	3	-31.13	3805.71	45.4	Pass
L4	44.66 - 0	Pole	TP69.47x51.679x0.375	4	-50.17	4980.67	50.8	Pass
							Summary	
						Pole (L4)	50.8	Pass
						RATING =	**50.8**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


(OTHER CONSIDERED EQUIPMENT-IN (3) 2-1/2" CONDUITS)
(2) 3/8" TO 159 FT LEVEL
(4) 3/4" TO 159 FT LEVEL
(2) 7/8" TO 159 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(12) 1-5/8" TO 159 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(2) 1-5/8" TO 147 FT LEVEL
(PROPOSED EQUIPMENT CONFIGURATION)
(1) 1-1/2" TO 135 FT LEVEL
Q4
Q1
Q3
Q2

APPENDIX C

ADDITIONAL CALCULATIONS

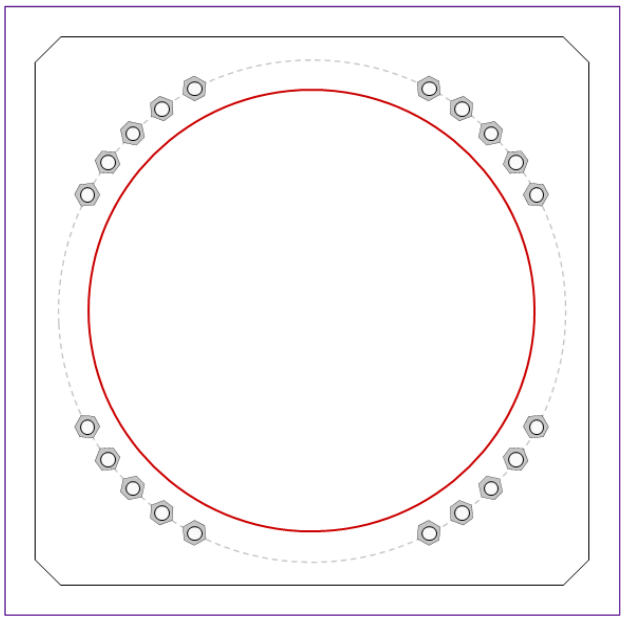
Monopole Base Plate Connection

Site Info	
BU #	857011
Site Name	brook North Horse Hill
Order #	553288 Rev. 2

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	2.5

Applied Loads	
Moment (kip-ft)	3530.17
Axial Force (kips)	50.17
Shear Force (kips)	31.63

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(20) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 78.97" BC

Anchor Spacing: 6 in

Base Plate Data

86.21" W x 3" Plate (A572-50; Fy=50 ksi, Fu=65 ksi); Clip: 4 in

Stiffener Data

N/A

Pole Data

69.47" x 0.375" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

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

Pu_t = 104.74	ϕPn_t = 243.75	**Stress Rating**
Vu = 1.58	ϕVn = 149.1	**40.9%**
Mu = 2.57	ϕMn = 128.14	**Pass**

Base Plate Summary

Max Stress (ksi):	17.53	(Flexural)
Allowable Stress (ksi):	45	
Stress Rating:	**37.1%**	**Pass**

Pier and Pad Foundation

BU # :	857011
Site Name:	Westbrook North H
	553288 Rev.2

TIA-222 Revision:	H
Tower Type:	Monopole

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

Superstructure Analysis Reactions		
Compression, P_{comp}:	50	kips
Base Shear, Vu_comp:	32	kips
Moment, M_u:	3530	ft-kips
Tower Height, **H**:	159	ft
BP Dist. Above Fdn, bp_{dist}:	4.75	in

Pier Properties		
Pier Shape:	Square	
Pier Diameter, **dpier**:	9	ft
Ext. Above Grade, **E**:	0.5	ft
Pier Rebar Size, **Sc**:	8	
Pier Rebar Quantity, **mc**:	74	
Pier Tie/Spiral Size, **St**:	3	
Pier Tie/Spiral Quantity, **mt**:	6	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties		
Depth, **D**:	8	ft
Pad Width, W_1:	28	ft
Pad Thickness, **T**:	3	ft
Pad Rebar Size (Bottom dir. 2), Sp_2:	9	
Pad Rebar Quantity (Bottom dir. 2), mp_2:	22	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties		
Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	3	ksi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties		
Total Soil Unit Weight, γ:	130	pcf
Ultimate Gross Bearing, Qult:	12.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	38	degrees
SPT Blow Count, N_{blows}:	35	
Base Friction, μ:	0.35	
Neglected Depth, **N**:	5.00	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	N/A	ft

<--Toggle between Gross and Net

Foundation Analysis Checks				
	Capacity	**Demand**	**Rating***	**Check**
Lateral (Sliding) (kips)	440.72	32.00	**6.9%**	**Pass**
Bearing Pressure (ksf)	9.00	2.14	**22.6%**	**Pass**
*Overturning (kip*ft)*	10247.98	3814.67	**37.2%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	11981.77	3706.00	**29.5%**	**Pass**
Pier Compression (kip)	38666.16	130.19	**0.3%**	**Pass**
*Pad Flexure (kip*ft)*	3023.23	1127.39	**35.5%**	**Pass**
Pad Shear - 1-way (kips)	864.26	168.16	**18.5%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.164	0.028	**16.5%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	3793.12	2223.60	**55.8%**	**Pass**

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

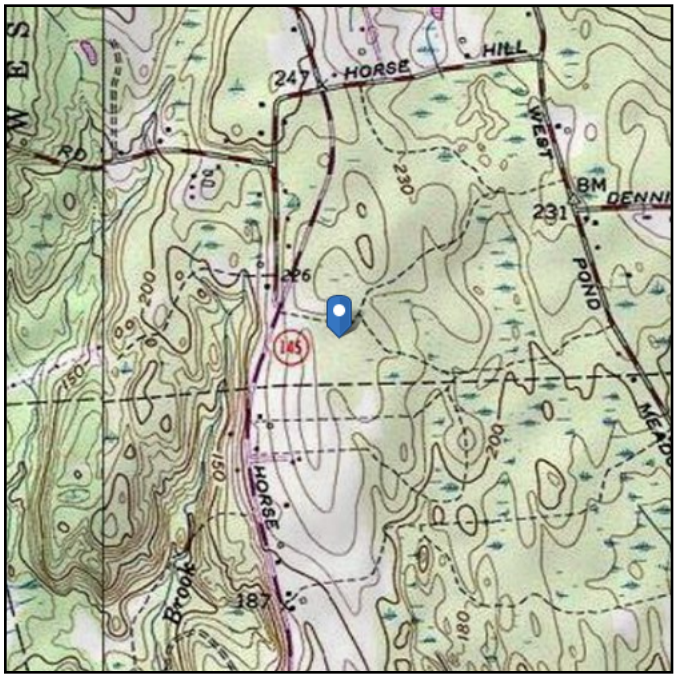
Structural Rating*:	**55.8%**
Soil Rating*:	**37.2%**

Version 4.1.0

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-10	**Elevation:**	235.72 ft (NAVD 88)
Risk Category:	II	**Latitude:**	41.323808
Soil Class:	D - Stiff Soil	**Longitude:**	-72.491139



Wind

Results:

Wind Speed:	130 Vmph
10-year MRI	79 Vmph
25-year MRI	88 Vmph
50-year MRI	97 Vmph
100-year MRI	106 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: Sun Mar 28 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.

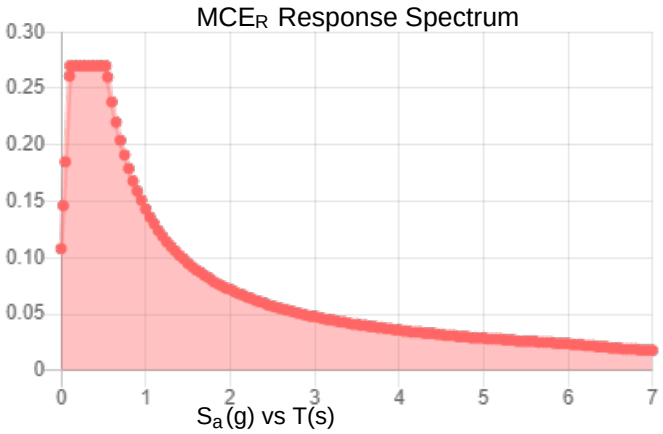
Seismic

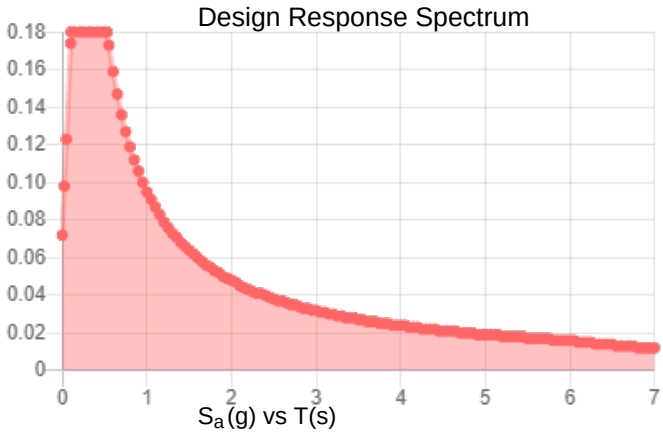
Site Soil Class: D - Stiff Soil

Results:

S_S :	~~0.169~~ 0.167	S_{DS} :	0.18
S_1 :	~~0.06~~ 0.059	S_{D1} :	0.095
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.085
S_{MS} :	0.27	PGA_M :	0.136
S_{M1} :	0.143	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Sun Mar 28 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:	Sun Mar 28 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.

Exhibit E

Mount Analysis

Date: **July 29, 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 Dish 5G**	
	Carrier Site Number:	BOBDL00074A
	Carrier Site Name:	CT-CCI-T-857011
Crown Castle Designation:	**Crown Castle BU Number:**	857011
	Crown Castle Site Name:	Westbrook North Horse Hill Roa
	Crown Castle JDE Job Number:	645153
	Crown Castle Order Number:	553288 Rev. 0
Engineering Firm Designation:	**Trylon Report Designation:**	188626
Site Data:	**1102 Horse Hill Road, Westbrook, Middlesex County, CT, 06498 Latitude 41°19'25.71" Longitude -72°29'28.10"**	
Structure Information:	**Tower Height & Type:**	**159.1 ft Monopole**
	Mount Elevation:	**135.0 ft**
	Mount Type:	**8.0 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 135 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: Teodor Nitescu

Respectfully Submitted by:
Cliff Abernathy, P.E.

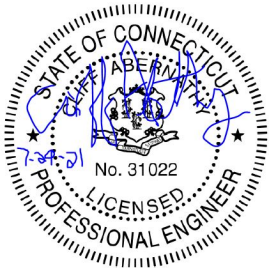


TABLE OF CONTENTS

1) INTRODUCTION

This is an proposed 3 sector 8.0 ft Platform, designed by Commscope.

2) ANALYSIS CRITERIA

Building Code:	2015 IBC
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	135 mph
Exposure Category:	B
Topographic Factor at Base:	1.00
Topographic Factor at Mount:	1.00
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Seismic S_s:	0.167
Seismic S_1:	0.059
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
135.0	135.0	3	JMA WIRELESS	MX08FRO665-20	8.0 ft Platform **[COMMSCOPE, MC-PK8-C]**
		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	553288 Rev. 0	CCI Sites
Mount Manufacturer Drawings	COMMSCOPE	MC-PK8-C	Trylon
Exposure Category Determination	Crown Castle	5961182	CCI Sites

3.1) Analysis Method

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

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

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

3.2) Assumptions

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

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

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

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Platform, All Sectors)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1, 2,	Mount Pipe(s)	M30	135.0	36.4	Pass
	Horizontal(s)	M4		15.0	Pass
	Standoff(s)	M12		45.6	Pass
	Bracing(s)	M11		36.2	Pass
	Handrail(s)	M19		14.0	Pass
	Plate(s)	M5		25.7	Pass
	Mount Connection(s)	-		18.3	Pass

Structure Rating (max from all components) =	**45.6%**

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

4.1) Recommendations

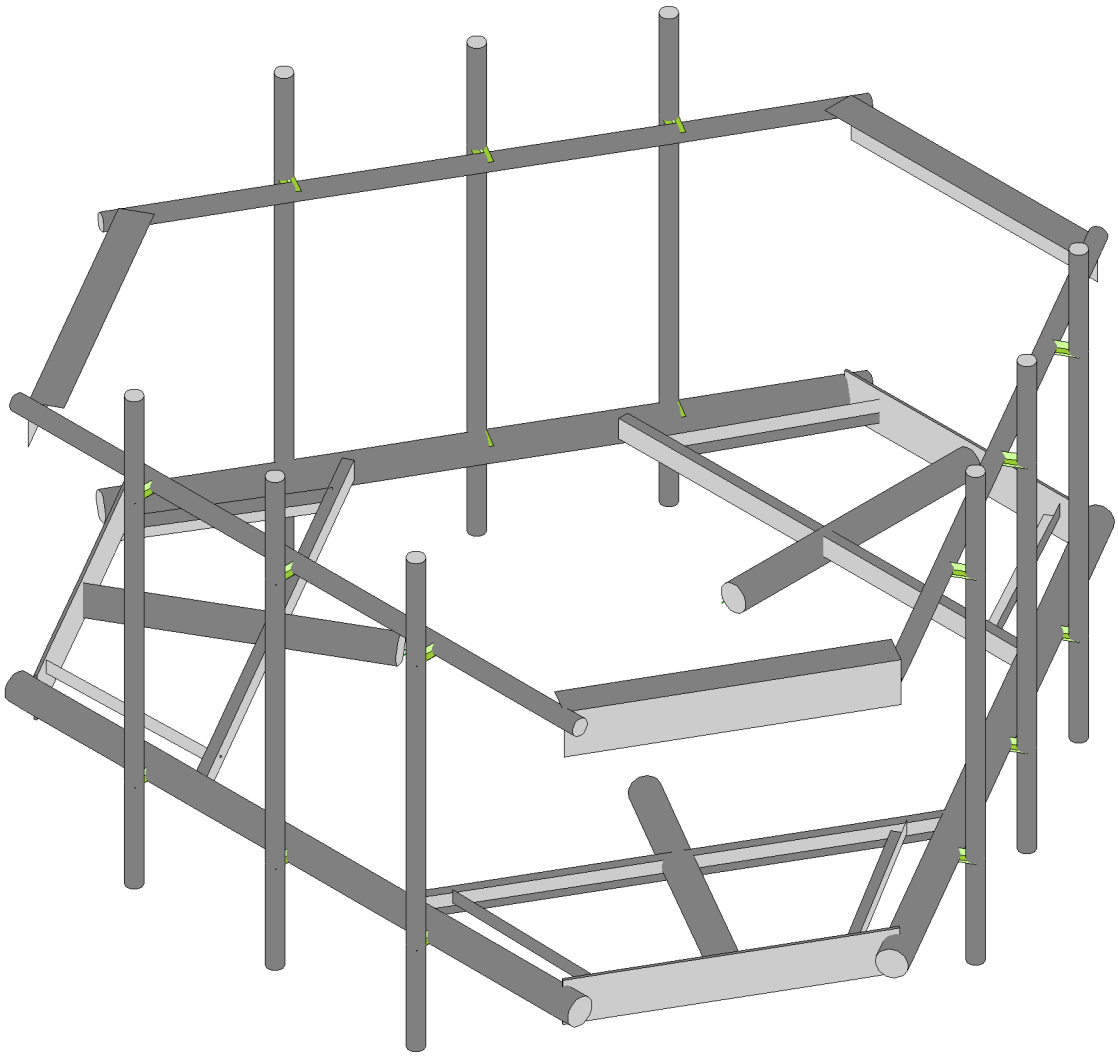
The mount has sufficient capacity to carry the proposed loading configuration. In order for the results of the analysis to be considered valid, the proposed mount listed below must be installed.

1. COMMSCOPE, MC-PK8-C.

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

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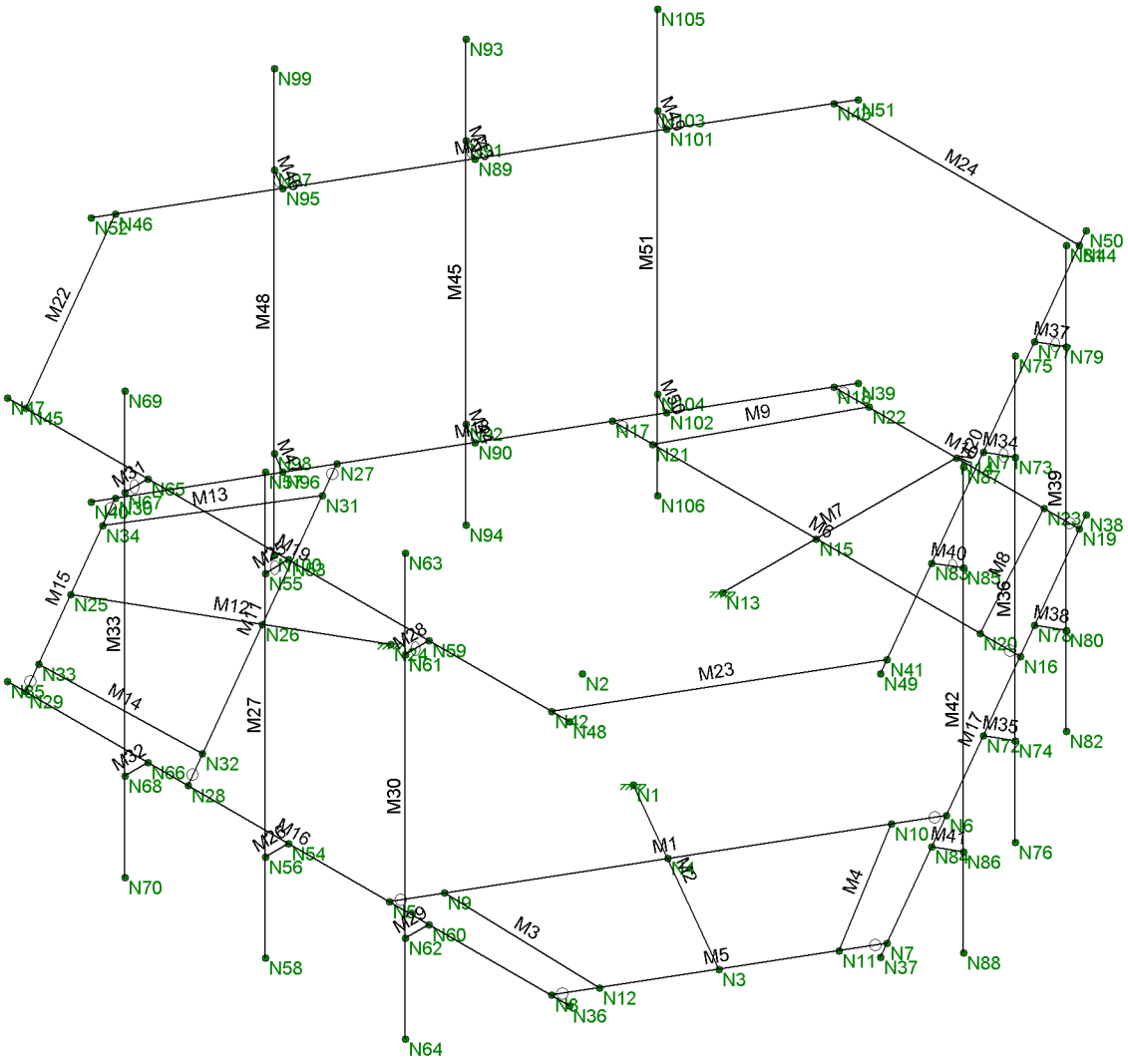
188626		857011.r3d



Envelope Only Solution

Trylon	857011	SK - 2
TN		July 29, 2021 at 2:33 PM
188626		857011.r3d

APPENDIX B

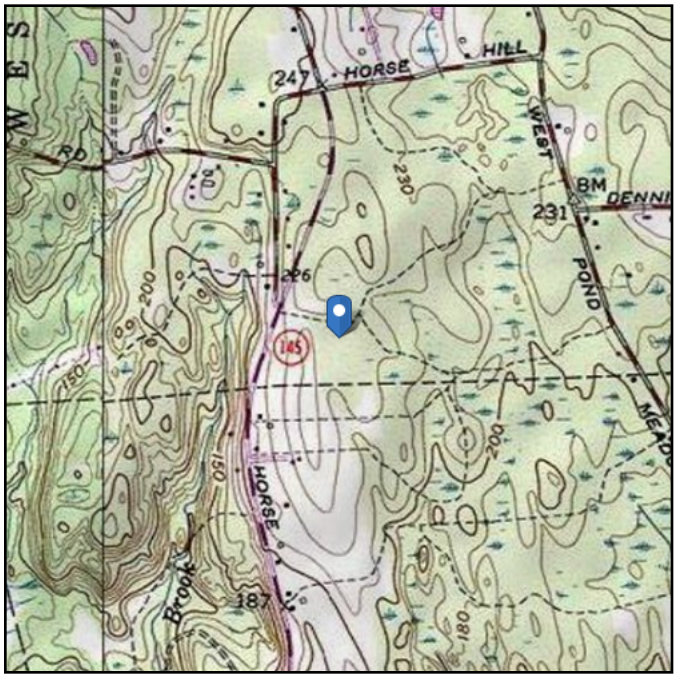
SOFTWARE INPUT CALCULATIONS

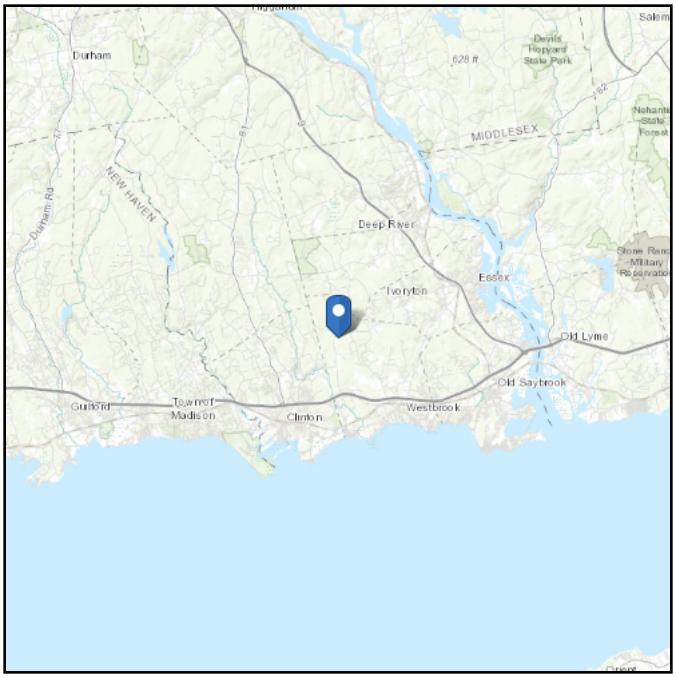
ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 235.72 ft (NAVD 88)
Latitude: 41.323808
Longitude: -72.491139





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: Thu Jul 29 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.

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

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

TIA LOAD CALCULATOR 2.0

PROJECT DATA	
Job Code:	188626
Carrier Site ID:	BOBBL00074A
Carrier Site Name:	CT-CCI-T-857011

CODES AND STANDARDS	
Building Code:	2015 IBC
Local Building Code:	2018 CSBS
Design Standard:	TIA-222-H

STRUCTURE DETAILS		
Mount Type:	Platform	--
Mount Elevation:	135.0	ft.
Number of Sectors:	3	--
Structure Type:	Monopole	--
Structure Height:	159.1	ft.

ANALYSIS CRITERIA		
Structure Risk Category:	II	--
Exposure Category:	B	--
Site Class:	D - Default	--
Ground Elevation:	235.72	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:	135	mph
Wind Escalation Factor (K_s):	1.00	--
Velocity Coefficient (K_z):	1.08	--
Directionality Factor (K_d):	0.95	--
Gust Effect Factor (Gh):	1.00	--
Shielding Factor (K_a):	0.90	--
Velocity Pressure (q_z):	47.32	psf

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}):	47.32	psf
Mount Ice Thickness (t_{iz}):	1.73	in

WIND STRUCTURE CALCULATIONS		
Flat Member Pressure:	85.17	psf
Round Member Pressure:	51.10	psf
Ice Wind Pressure:	7.50	psf

SEISMIC PARAMETERS		
Importance Factor (I_e):	1.00	--
Short Period Accel .(S_s):	0.167	g
1 Second Accel (S_1):	0.059	g
Short Period Des. (S_{DS}):	0.18	g
1 Second Des. (S_{D1}):	0.09	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/Location	Qty.	Elevation [ft]	--	EPA $_N$ (ft2)	EPA $_T$ (ft2)	Weight (lbs)
MX08FRO665-20	3	135	No Ice	8.01	3.21	54.00
M27/M45/M36, 0/120/240	--	--	w/ Ice	9.63	4.63	283.55
TA08025-B604	3	135	No Ice	1.96	0.98	63.90
M27/M45/M36, 0/120/240	--	--	w/ Ice	2.39	1.31	69.68
TA08025-B605	3	135	No Ice	1.96	1.13	75.00
M27/M45/M36, 0/120/240	--	--	w/ Ice	2.39	1.47	74.23
RDIDC-9181-PF-48	1	135	No Ice	2.01	1.17	21.85
M27, 0	--	--	w/ Ice	2.44	1.52	73.15
			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			
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			No Ice			
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			No Ice			
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			No Ice			
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			No Ice			
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			No Ice			
--	--	--	w/ Ice			
			No Ice			
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			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/Location	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			
			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]
MX08FRO665-20	3	135	1.00	1.08	0.95	1.73	47.32	6.49
TA08025-B604	3	135	1.00	1.08	0.95	1.73	47.32	6.49
TA08025-B605	3	135	1.00	1.08	0.95	1.73	47.32	6.49
RDIDC-9181-PF-48	1	135	1.00	1.08	0.95	1.73	47.32	6.49

EQUIPMENT LATERAL WIND FORCE CALCULATIONS

Appurtenance Name	*Qty.*	*--*	*0° 180°*	*30° 210°*	*60° 240°*	*90° 270°*	*120° 300°*	*150° 330°*
MX08FRO665-20	3	No Ice	341.11	187.80	290.01	136.70	290.01	187.80
M27/M45/M36, 0/120/240	--	w/ Ice	56.27	34.37	48.97	27.06	48.97	34.37
TA08025-B604	3	No Ice	83.62	52.24	73.16	41.78	73.16	52.24
M27/M45/M36, 0/120/240	--	w/ Ice	13.94	9.22	12.37	7.65	12.37	9.22
TA08025-B605	3	No Ice	83.62	56.98	74.74	48.10	74.74	56.98
M27/M45/M36, 0/120/240	--	w/ Ice	13.94	9.94	12.61	8.60	12.61	9.94
RDIDC-9181-PF-48	1	No Ice	85.68	58.73	76.69	49.75	76.69	58.73
M27, 0	--	w/ Ice	14.26	10.25	12.92	8.91	12.92	10.25
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
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		No Ice						
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		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						
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		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]
MX08FRO665-20	3	135	54	5.77
TA08025-B604	3	135	63.9	6.83
TA08025-B605	3	135	75	8.02
RDIDC-9181-PF-48	1	135	21.85	2.34

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 S100-12: LRFD
Wood Code	AWC NDS-15: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-14
Masonry Code	ACI 530-13: Strength
Aluminum Code	AA ADM1-10: LRFD - Building
Stainless Steel Code	AISC 14th(360-10): 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 7-16
Seismic Base Elevation (in)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	1
Cd X	1
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1...	Density[k/f...	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

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	A36 Gr.36	Typical	2.405	.027	8.468	.106
2	Grating Bracing	L2x2x3	Beam	Single Angle	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 Angle	A36 Gr.36	Typical	2.703	4.759	12.473	.055
7	Horizontals	PIPE_3.5	Beam	Pipe	A53 Gr.B	Typical	2.5	4.52	4.52	9.04

Hot Rolled Steel Section Sets (Continued)

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
8	Mount Pipes	PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25

Cold Formed Steel Section Sets

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

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N24	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	Distribut...	Area(Member)	Surface(...
1	Self Weight	DL			-1		13		3	
2	Structure Wind X	WLX						33		
3	Structure Wind Y	WLY						33		
4	Wind Load 0 AZI	WLX					13			
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					13			
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	33	3	
13	Structure Ice Wind X	OL2						33		
14	Structure Ice Wind Y	OL3						33		
15	Ice Wind Load 0 AZI	OL2					13			
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					13			
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	-.107				13			
24	Seismic Load Y	ELY		-.107			13			
25	Live Load 1 (Lv)	LL				1				
26	Live Load 2 (Lv)	LL				1				
27	Live Load 3 (Lv)	LL				1				
28	Live Load 4 (Lv)	LL				1				
29	Live Load 5 (Lv)	LL				1				
30	Live Load 6 (Lv)	LL				1				
31	Maintenance Load 1 (Lm)	None				1				
32	Maintenance Load 2 (Lm)	None				1				
33	Maintenance Load 3 (Lm)	None				1				

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Member)	Surface(...
34	Maintenance Load 4 (Lm)	None				1				
35	Maintenance Load 5 (Lm)	None				1				
36	Maintenance Load 6 (Lm)	None				1				
37	Maintenance Load 7 (Lm)	None				1				
38	Maintenance Load 8 (Lm)	None				1				
39	Maintenance Load 9 (Lm)	None				1				
40	BLC 1 Transient Area Loads	None						9		
41	BLC 12 Transient Area Lo...	None						9		

Load Combinations

	Description	S...	P...	S...	B...	Factor	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...
1	1.4DL	Yes	Y		DL	1.4																				
2	1.2DL + 1WL 0 AZI	Yes	Y		DL	1.2	2	1	3		4	1														
3	1.2DL + 1WL 30 AZI	Yes	Y		DL	1.2	2	.866	3	.5	5	1														
4	1.2DL + 1WL 45 AZI	Yes	Y		DL	1.2	2	.707	3	.707	6	1														
5	1.2DL + 1WL 60 AZI	Yes	Y		DL	1.2	2	.5	3	.866	7	1														
6	1.2DL + 1WL 90 AZI	Yes	Y		DL	1.2	2		3	1	8	1														
7	1.2DL + 1WL 120 AZI	Yes	Y		DL	1.2	2	-.5	3	.866	9	1														
8	1.2DL + 1WL 135 AZI	Yes	Y		DL	1.2	2	-.707	3	.707	10	1														
9	1.2DL + 1WL 150 AZI	Yes	Y		DL	1.2	2	-.866	3	.5	11	1														
10	1.2DL + 1WL 180 AZI	Yes	Y		DL	1.2	2	-1	3		4	-1														
11	1.2DL + 1WL 210 AZI	Yes	Y		DL	1.2	2	-.866	3	-.5	5	-1														
12	1.2DL + 1WL 225 AZI	Yes	Y		DL	1.2	2	-.707	3	-.707	6	-1														
13	1.2DL + 1WL 240 AZI	Yes	Y		DL	1.2	2	-.5	3	-.866	7	-1														
14	1.2DL + 1WL 270 AZI	Yes	Y		DL	1.2	2		3	-1	8	-1														
15	1.2DL + 1WL 300 AZI	Yes	Y		DL	1.2	2	.5	3	-.866	9	-1														
16	1.2DL + 1WL 315 AZI	Yes	Y		DL	1.2	2	.707	3	-.707	10	-1														
17	1.2DL + 1WL 330 AZI	Yes	Y		DL	1.2	2	.866	3	-.5	11	-1														
18	0.9DL + 1WL 0 AZI	Yes	Y		DL	.9	2	1	3		4	1														
19	0.9DL + 1WL 30 AZI	Yes	Y		DL	.9	2	.866	3	.5	5	1														
20	0.9DL + 1WL 45 AZI	Yes	Y		DL	.9	2	.707	3	.707	6	1														
21	0.9DL + 1WL 60 AZI	Yes	Y		DL	.9	2	.5	3	.866	7	1														
22	0.9DL + 1WL 90 AZI	Yes	Y		DL	.9	2		3	1	8	1														
23	0.9DL + 1WL 120 AZI	Yes	Y		DL	.9	2	-.5	3	.866	9	1														
24	0.9DL + 1WL 135 AZI	Yes	Y		DL	.9	2	-.707	3	.707	10	1														
25	0.9DL + 1WL 150 AZI	Yes	Y		DL	.9	2	-.866	3	.5	11	1														
26	0.9DL + 1WL 180 AZI	Yes	Y		DL	.9	2	-1	3		4	-1														
27	0.9DL + 1WL 210 AZI	Yes	Y		DL	.9	2	-.866	3	-.5	5	-1														
28	0.9DL + 1WL 225 AZI	Yes	Y		DL	.9	2	-.707	3	-.707	6	-1														
29	0.9DL + 1WL 240 AZI	Yes	Y		DL	.9	2	-.5	3	-.866	7	-1														
30	0.9DL + 1WL 270 AZI	Yes	Y		DL	.9	2		3	-1	8	-1														
31	0.9DL + 1WL 300 AZI	Yes	Y		DL	.9	2	.5	3	-.866	9	-1														
32	0.9DL + 1WL 315 AZI	Yes	Y		DL	.9	2	.707	3	-.707	10	-1														
33	0.9DL + 1WL 330 AZI	Yes	Y		DL	.9	2	.866	3	-.5	11	-1														
34	1.2DL + 1DLi + 1WLi 0 A...	Yes	Y		DL	1.2	O...	1	13	1	14		15	1												
35	1.2DL + 1DLi + 1WLi 30 ...	Yes	Y		DL	1.2	O...	1	13	.866	14	.5	16	1												
36	1.2DL + 1DLi + 1WLi 45 ...	Yes	Y		DL	1.2	O...	1	13	.707	14	.707	17	1												
37	1.2DL + 1DLi + 1WLi 60 ...	Yes	Y		DL	1.2	O...	1	13	.5	14	.866	18	1												
38	1.2DL + 1DLi + 1WLi 90 ...	Yes	Y		DL	1.2	O...	1	13		14	1	19	1												
39	1.2DL + 1DLi + 1WLi 12...	Yes	Y		DL	1.2	O...	1	13	-.5	14	.866	20	1												

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Factor	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...
40	1.2DL + 1DLi + 1WLi 13...	Yes	Y		DL	1.2	O...	1	13	-.707	14	.707	21	1										
41	1.2DL + 1DLi + 1WLi 15...	Yes	Y		DL	1.2	O...	1	13	-.866	14	.5	22	1										
42	1.2DL + 1DLi + 1WLi 18...	Yes	Y		DL	1.2	O...	1	13	-1	14		15	-1										
43	1.2DL + 1DLi + 1WLi 21...	Yes	Y		DL	1.2	O...	1	13	-.866	14	-.5	16	-1										
44	1.2DL + 1DLi + 1WLi 22...	Yes	Y		DL	1.2	O...	1	13	-.707	14	-.707	17	-1										
45	1.2DL + 1DLi + 1WLi 24...	Yes	Y		DL	1.2	O...	1	13	-.5	14	-.866	18	-1										
46	1.2DL + 1DLi + 1WLi 27...	Yes	Y		DL	1.2	O...	1	13		14	-1	19	-1										
47	1.2DL + 1DLi + 1WLi 30...	Yes	Y		DL	1.2	O...	1	13	.5	14	-.866	20	-1										
48	1.2DL + 1DLi + 1WLi 31...	Yes	Y		DL	1.2	O...	1	13	.707	14	-.707	21	-1										
49	1.2DL + 1DLi + 1WLi 33...	Yes	Y		DL	1.2	O...	1	13	.866	14	-.5	22	-1										
50	(1.2+0.2Sds) + 1.0E 0 AZI	Yes	Y		DL	1.236	E...	1	E...															
51	(1.2+0.2Sds) + 1.0E 30 ...	Yes	Y		DL	1.236	E...	.866	E...	.5														
52	(1.2+0.2Sds) + 1.0E 45 ...	Yes	Y		DL	1.236	E...	.707	E...	.707														
53	(1.2+0.2Sds) + 1.0E 60 ...	Yes	Y		DL	1.236	E...	.5	E...	.866														
54	(1.2+0.2Sds) + 1.0E 90 ...	Yes	Y		DL	1.236	E...		E...	1														
55	(1.2+0.2Sds) + 1.0E 120 ...	Yes	Y		DL	1.236	E...	-.5	E...	.866														
56	(1.2+0.2Sds) + 1.0E 135 ...	Yes	Y		DL	1.236	E...	-.707	E...	.707														
57	(1.2+0.2Sds) + 1.0E 150 ...	Yes	Y		DL	1.236	E...	-.866	E...	.5														
58	(1.2+0.2Sds) + 1.0E 180 ...	Yes	Y		DL	1.236	E...	-1	E...															
59	(1.2+0.2Sds) + 1.0E 210 ...	Yes	Y		DL	1.236	E...	-.866	E...	-.5														
60	(1.2+0.2Sds) + 1.0E 225 ...	Yes	Y		DL	1.236	E...	-.707	E...	-.707														
61	(1.2+0.2Sds) + 1.0E 240 ...	Yes	Y		DL	1.236	E...	-.5	E...	-.866														
62	(1.2+0.2Sds) + 1.0E 270 ...	Yes	Y		DL	1.236	E...		E...	-1														
63	(1.2+0.2Sds) + 1.0E 300 ...	Yes	Y		DL	1.236	E...	.5	E...	-.866														
64	(1.2+0.2Sds) + 1.0E 315 ...	Yes	Y		DL	1.236	E...	.707	E...	-.707														
65	(1.2+0.2Sds) + 1.0E 330 ...	Yes	Y		DL	1.236	E...	.866	E...	-.5														
66	(0.9-0.2Sds) + 1.0E 0 AZI	Yes	Y		DL	.864	E...	1	E...															
67	(0.9-0.2Sds) + 1.0E 30 A...	Yes	Y		DL	.864	E...	.866	E...	.5														
68	(0.9-0.2Sds) + 1.0E 45 A...	Yes	Y		DL	.864	E...	.707	E...	.707														
69	(0.9-0.2Sds) + 1.0E 60 A...	Yes	Y		DL	.864	E...	.5	E...	.866														
70	(0.9-0.2Sds) + 1.0E 90 A...	Yes	Y		DL	.864	E...		E...	1														
71	(0.9-0.2Sds) + 1.0E 120 ...	Yes	Y		DL	.864	E...	-.5	E...	.866														
72	(0.9-0.2Sds) + 1.0E 135 ...	Yes	Y		DL	.864	E...	-.707	E...	.707														
73	(0.9-0.2Sds) + 1.0E 150 ...	Yes	Y		DL	.864	E...	-.866	E...	.5														
74	(0.9-0.2Sds) + 1.0E 180 ...	Yes	Y		DL	.864	E...	-1	E...															
75	(0.9-0.2Sds) + 1.0E 210 ...	Yes	Y		DL	.864	E...	-.866	E...	-.5														
76	(0.9-0.2Sds) + 1.0E 225 ...	Yes	Y		DL	.864	E...	-.707	E...	-.707														
77	(0.9-0.2Sds) + 1.0E 240 ...	Yes	Y		DL	.864	E...	-.5	E...	-.866														
78	(0.9-0.2Sds) + 1.0E 270 ...	Yes	Y		DL	.864	E...		E...	-1														
79	(0.9-0.2Sds) + 1.0E 300 ...	Yes	Y		DL	.864	E...	.5	E...	-.866														
80	(0.9-0.2Sds) + 1.0E 315 ...	Yes	Y		DL	.864	E...	.707	E...	-.707														
81	(0.9-0.2Sds) + 1.0E 330 ...	Yes	Y		DL	.864	E...	.866	E...	-.5														
82	1.2D + 1.5 Lv1	Yes	Y		DL	1.2	25	1.5																
83	1.2D + 1.5 Lv2	Yes	Y		DL	1.2	26	1.5																
84	1.2D + 1.5 Lv3	Yes	Y		DL	1.2	27	1.5																
85	1.2D + 1.5 Lv4	Yes	Y		DL	1.2	28	1.5																
86	1.2D + 1.5 Lv5	Yes	Y		DL	1.2	29	1.5																
87	1.2D + 1.5 Lv6	Yes	Y		DL	1.2	30	1.5																
88	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	4	.049	2	.049	3											
89	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	5	.049	2	.043	3	.025										
90	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	6	.049	2	.035	3	.035										
91	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	7	.049	2	.025	3	.043										

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Factor	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...
92	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	8	.049	2	3.0...	3	.049										
93	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	9	.049	2	-.025	3	.043										
94	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	10	.049	2	-.035	3	.035										
95	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	11	.049	2	-.043	3	.025										
96	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	4	.049	2	-.049	3	6.0...										
97	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	5	.049	2	-.043	3	-.025										
98	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	6	.049	2	-.035	3	-.035										
99	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	7	.049	2	-.025	3	-.043										
100	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	8	.049	2	-9....	3	-.049										
101	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	9	.049	2	.025	3	-.043										
102	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	10	.049	2	.035	3	-.035										
103	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	31	1.5	11	.049	2	.043	3	-.025										
104	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	4	.049	2	.049	3											
105	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	5	.049	2	.043	3	.025										
106	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	6	.049	2	.035	3	.035										
107	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	7	.049	2	.025	3	.043										
108	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	8	.049	2	3.0...	3	.049										
109	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	9	.049	2	-.025	3	.043										
110	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	10	.049	2	-.035	3	.035										
111	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	11	.049	2	-.043	3	.025										
112	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	4	.049	2	-.049	3	6.0...										
113	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	5	.049	2	-.043	3	-.025										
114	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	6	.049	2	-.035	3	-.035										
115	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	7	.049	2	-.025	3	-.043										
116	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	8	.049	2	-9....	3	-.049										
117	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	9	.049	2	.025	3	-.043										
118	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	10	.049	2	.035	3	-.035										
119	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	32	1.5	11	.049	2	.043	3	-.025										
120	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	4	.049	2	.049	3											
121	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	5	.049	2	.043	3	.025										
122	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	6	.049	2	.035	3	.035										
123	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	7	.049	2	.025	3	.043										
124	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	8	.049	2	3.0...	3	.049										
125	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	9	.049	2	-.025	3	.043										
126	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	10	.049	2	-.035	3	.035										
127	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	11	.049	2	-.043	3	.025										
128	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	4	.049	2	-.049	3	6.0...										
129	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	5	.049	2	-.043	3	-.025										
130	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	6	.049	2	-.035	3	-.035										
131	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	7	.049	2	-.025	3	-.043										
132	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	8	.049	2	-9....	3	-.049										
133	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	9	.049	2	.025	3	-.043										
134	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	10	.049	2	.035	3	-.035										
135	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	33	1.5	11	.049	2	.043	3	-.025										
136	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	4	.049	2	.049	3											
137	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	5	.049	2	.043	3	.025										
138	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	6	.049	2	.035	3	.035										
139	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	7	.049	2	.025	3	.043										
140	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	8	.049	2	3.0...	3	.049										
141	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	9	.049	2	-.025	3	.043										
142	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	10	.049	2	-.035	3	.035										
143	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	11	.049	2	-.043	3	.025										

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Factor	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...
144	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	4	.049	2	-.049	3	6.0...										
145	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	5	.049	2	-.043	3	-.025										
146	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	6	.049	2	-.035	3	-.035										
147	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	7	.049	2	-.025	3	-.043										
148	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	8	.049	2	-9....	3	-.049										
149	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	9	.049	2	.025	3	-.043										
150	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	10	.049	2	.035	3	-.035										
151	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	34	1.5	11	.049	2	.043	3	-.025										
152	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	4	.049	2	.049	3											
153	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	5	.049	2	.043	3	.025										
154	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	6	.049	2	.035	3	.035										
155	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	7	.049	2	.025	3	.043										
156	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	8	.049	2	3.0...	3	.049										
157	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	9	.049	2	-.025	3	.043										
158	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	10	.049	2	-.035	3	.035										
159	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	11	.049	2	-.043	3	.025										
160	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	4	.049	2	-.049	3	6.0...										
161	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	5	.049	2	-.043	3	-.025										
162	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	6	.049	2	-.035	3	-.035										
163	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	7	.049	2	-.025	3	-.043										
164	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	8	.049	2	-9....	3	-.049										
165	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	9	.049	2	.025	3	-.043										
166	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	10	.049	2	.035	3	-.035										
167	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	35	1.5	11	.049	2	.043	3	-.025										
168	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	4	.049	2	.049	3											
169	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	5	.049	2	.043	3	.025										
170	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	6	.049	2	.035	3	.035										
171	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	7	.049	2	.025	3	.043										
172	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	8	.049	2	3.0...	3	.049										
173	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	9	.049	2	-.025	3	.043										
174	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	10	.049	2	-.035	3	.035										
175	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	11	.049	2	-.043	3	.025										
176	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	4	.049	2	-.049	3	6.0...										
177	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	5	.049	2	-.043	3	-.025										
178	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	6	.049	2	-.035	3	-.035										
179	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	7	.049	2	-.025	3	-.043										
180	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	8	.049	2	-9....	3	-.049										
181	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	9	.049	2	.025	3	-.043										
182	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	10	.049	2	.035	3	-.035										
183	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	36	1.5	11	.049	2	.043	3	-.025										
184	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	4	.049	2	.049	3											
185	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	5	.049	2	.043	3	.025										
186	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	6	.049	2	.035	3	.035										
187	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	7	.049	2	.025	3	.043										
188	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	8	.049	2	3.0...	3	.049										
189	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	9	.049	2	-.025	3	.043										
190	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	10	.049	2	-.035	3	.035										
191	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	11	.049	2	-.043	3	.025										
192	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	4	.049	2	-.049	3	6.0...										
193	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	5	.049	2	-.043	3	-.025										
194	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	6	.049	2	-.035	3	-.035										
195	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	7	.049	2	-.025	3	-.043										

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Factor	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...
196	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	8	.049	2	-9....	3	-.049												
197	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	9	.049	2	.025	3	-.043												
198	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	10	.049	2	.035	3	-.035												
199	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	37	1.5	11	.049	2	.043	3	-.025												
200	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	4	.049	2	.049	3													
201	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	5	.049	2	.043	3	.025												
202	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	6	.049	2	.035	3	.035												
203	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	7	.049	2	.025	3	.043												
204	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	8	.049	2	3.0...	3	.049												
205	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	9	.049	2	-.025	3	.043												
206	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	10	.049	2	-.035	3	.035												
207	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	11	.049	2	-.043	3	.025												
208	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	4	.049	2	-.049	3	6.0...												
209	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	5	.049	2	-.043	3	-.025												
210	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	6	.049	2	-.035	3	-.035												
211	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	7	.049	2	-.025	3	-.043												
212	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	8	.049	2	-9....	3	-.049												
213	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	9	.049	2	.025	3	-.043												
214	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	10	.049	2	.035	3	-.035												
215	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	38	1.5	11	.049	2	.043	3	-.025												
216	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	4	.049	2	.049	3													
217	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	5	.049	2	.043	3	.025												
218	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	6	.049	2	.035	3	.035												
219	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	7	.049	2	.025	3	.043												
220	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	8	.049	2	3.0...	3	.049												
221	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	9	.049	2	-.025	3	.043												
222	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	10	.049	2	-.035	3	.035												
223	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	11	.049	2	-.043	3	.025												
224	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	4	.049	2	-.049	3	6.0...												
225	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	5	.049	2	-.043	3	-.025												
226	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	6	.049	2	-.035	3	-.035												
227	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	7	.049	2	-.025	3	-.043												
228	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	8	.049	2	-9....	3	-.049												
229	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	9	.049	2	.025	3	-.043												
230	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	10	.049	2	.035	3	-.035												
231	1.2D + 1.5Lm + 1.0Wm ...	Yes	Y		DL	1.2	39	1.5	11	.049	2	.043	3	-.025												

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb...	LC	MZ [lb...	LC
1	N24	max	1642.799	3	1003.704	20	1869.604	39	511.117	30	542.59	33	1878....	3
2		min	-1638.875	27	-1009.904	12	-111.36	31	-3255.231	38	-2010....	41	-1877...	27
3	N1	max	1642.779	17	1009.894	8	1869.604	45	3255.23	46	542.599	19	1877....	25
4		min	-1638.855	25	-1003.695	32	-111.374	21	-511.139	22	-2010....	43	-1878...	17
5	N13	max	423.361	18	1635.066	22	1796.217	34	730.061	14	3648....	34	1561.74	30
6		min	-431.423	10	-1635.066	30	-146.556	26	-730.06	6	-670.0...	26	-1561...	22
7	Totals:	max	3294.413	18	3079.459	22	5282.702	42						
8		min	-3294.414	10	-3079.459	30	1297.145	66						

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

	Member	Shape	Code C...	Loc[in]	LC	Shea...	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pn...	phi*M...	phi*M...	Cb	Eqn
1	M2	PIPE_3.5	.479	40	45	.194	40		9	64491.424	78750	7953.75	7953.75	2.154	H1-1b
2	M12	PIPE_3.5	.479	40	39	.194	40		11	75262.68	78750	7953.75	7953.75	2.154	H1-1b
3	M7	PIPE_3.5	.459	40	34	.176	40		6	64491.424	78750	7953.75	7953.75	2.157	H1-1b
4	M33	PIPE_2.0	.383	57	5	.051	57		9	20866.733	32130	1871.6..	1871.6..	1	H1-1b
5	M30	PIPE_2.0	.383	57	15	.051	57		11	20866.733	32130	1871.6..	1871.6..	1.68	H1-1b
6	M1	C3X5	.381	34.856	45	.135	6.536	y	49	37099.724	47628	981.263	4104	1.343	H1-1b
7	M11	C3X5	.381	34.856	39	.135	63.177	y	35	37104.508	47628	981.263	4104	1.343	H1-1b
8	M48	PIPE_2.0	.380	57	10	.044	57		5	20866.733	32130	1871.6..	1871.6..	1	H1-1b
9	M42	PIPE_2.0	.380	57	10	.044	57		15	20866.733	32130	1871.6..	1871.6..	1.194	H1-1b
10	M6	C3X5	.359	34.856	34	.129	63.177	y	46	37104.508	47628	981.263	4104	1.337	H1-1b
11	M27	PIPE_2.0	.359	57	14	.055	57		5	20866.733	32130	1871.6..	1871.6..	1.592	H1-1b
12	M39	PIPE_2.0	.352	57	5	.051	57		16	20866.733	32130	1871.6..	1871.6..	1	H1-1b
13	M51	PIPE_2.0	.352	57	15	.051	57		4	20866.733	32130	1871.6..	1871.6..	1.782	H1-1b
14	M45	PIPE_2.0	.339	57	10	.050	15		11	20866.733	32130	1871.6..	1871.6..	1	H1-1b
15	M36	PIPE_2.0	.339	57	10	.050	15		9	20866.733	32130	1871.6..	1871.6..	1.271	H1-1b
16	M5	6.5"x0.37" Plate	.270	21	12	.084	21	y	47	3513.807	77922	600.647	6369.2...	1.18	H1-1b
17	M15	6.5"x0.37" Plate	.270	21	8	.084	21	y	37	3513.807	77922	600.647	6369.25	1.18	H1-1b
18	M10	6.5"x0.37" Plate	.266	21	2	.080	21	y	37	3513.807	77922	600.647	6132.3...	1.136	H1-1b
19	M4	L2x2x3	.158	0	13	.029	0	y	41	20966.38	23392.8	557.717	1182.4...	1	H2-1
20	M13	L2x2x3	.157	0	31	.029	0	z	43	20966.38	23392.8	557.717	1182.4...	1	H2-1
21	M19	PIPE_2.0	.148	72	10	.147	72		2	14916.096	32130	1871.6..	1871.6..	1.455	H1-1b
22	M21	PIPE_2.0	.147	72	4	.143	24		12	14916.096	32130	1871.6..	1871.6..	1.526	H1-1b
23	M20	PIPE_2.0	.147	24	16	.143	72		8	14916.096	32130	1871.6..	1871.6..	1.526	H1-1b
24	M9	L2x2x3	.142	0	2	.028	0	y	46	20966.38	23392.8	557.717	1182.4...	1	H2-1
25	M8	L2x2x3	.141	0	26	.028	0	z	38	20966.38	23392.8	557.717	1182.4...	1	H2-1
26	M14	L2x2x3	.139	0	8	.029	0	y	35	20966.38	23392.8	557.717	1182.4...	1	H2-1
27	M3	L2x2x3	.138	0	20	.029	0	z	49	20966.38	23392.8	557.717	1182.4...	1	H2-1
28	M16	PIPE_3.5	.116	48	105	.107	72		10	60666.127	78750	7953.75	7953.75	1	H1-1b
29	M17	PIPE_3.5	.113	48	207	.102	24		15	60666.127	78750	7953.75	7953.75	1	H1-1b
30	M18	PIPE_3.5	.112	48	159	.102	72		5	60666.127	78750	7953.75	7953.75	1	H1-1b
31	M23	L6.6"X4.46"X0...	.053	42	31	.048	42	y	17	51170.949	87561	2464.8..	7125.3...	1	H2-1
32	M22	L6.6"X4.46"X0...	.053	0	21	.048	0	y	3	51170.949	87561	2464.8..	7125.3...	1	H2-1
33	M24	L6.6"X4.46"X0...	.051	21	18	.045	0	y	14	51170.949	87561	2464.8..	7125.3...	1	H2-1

Envelope AISI S100-12: LRFD Cold Formed Steel Code Checks

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

APPENDIX D

ADDITIONAL CALCUATIONS

Trylon

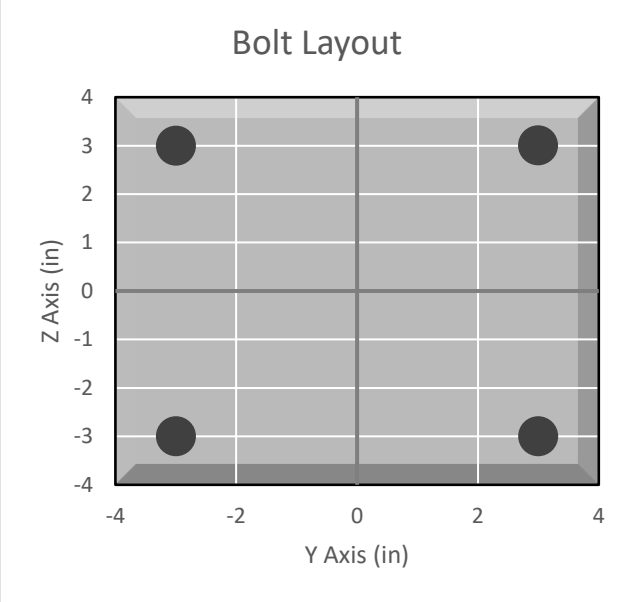
Analysis date: 7/29/2021

BOLT TOOL 1.5.2

Project Data	
Job Code:	188626
Carrier Site ID:	BOBDL00074A
Carrier Site Name:	CT-CCI-T-857011

Code	
Design Standard:	TIA-222-H
Slip Check:	-
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
Mount to Collar

Bolt Check*		
Tensile Capacity (ϕT_n):	20340.1	lbs
Shear Capacity (ϕV_n):	13805.8	lbs
Tension Force (T_u):	3909.6	lbs
Shear Force (V_u):	567.6	lbs
Tension Usage:	18.3%	--
Shear Usage:	3.9%	--
Interaction:	18.3%	Pass
Controlling Member:	M12	--
Controlling LC:	42	--

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

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

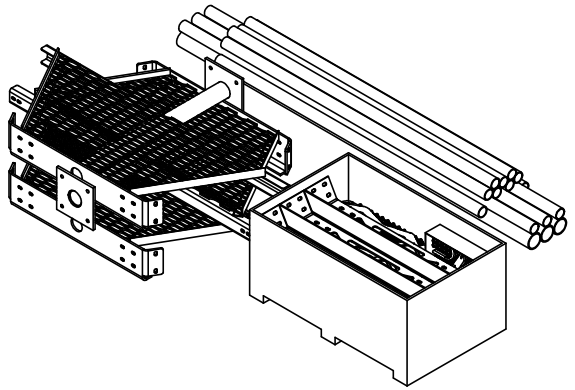
APPENDIX E

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	

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



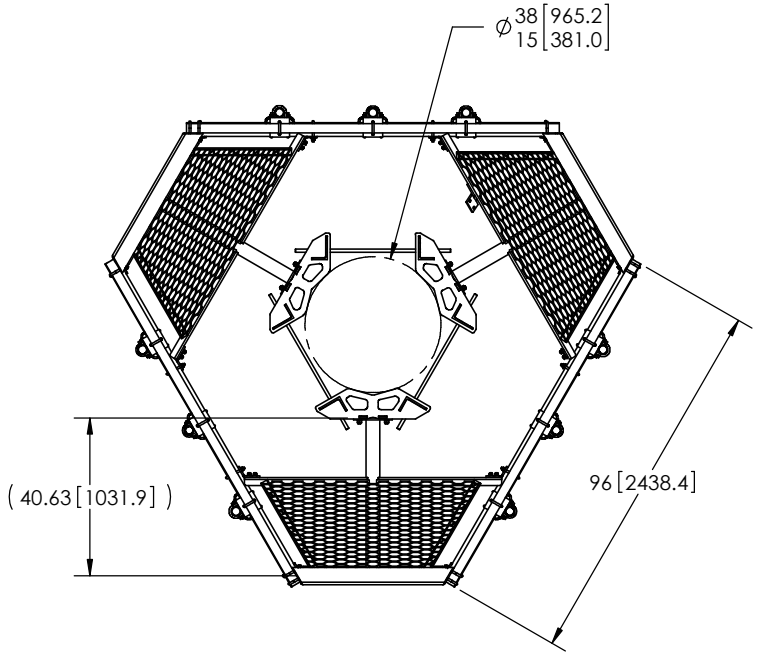
NOTES:
1. CUSTOMER ASSEMBLY SHEETS 2–3.

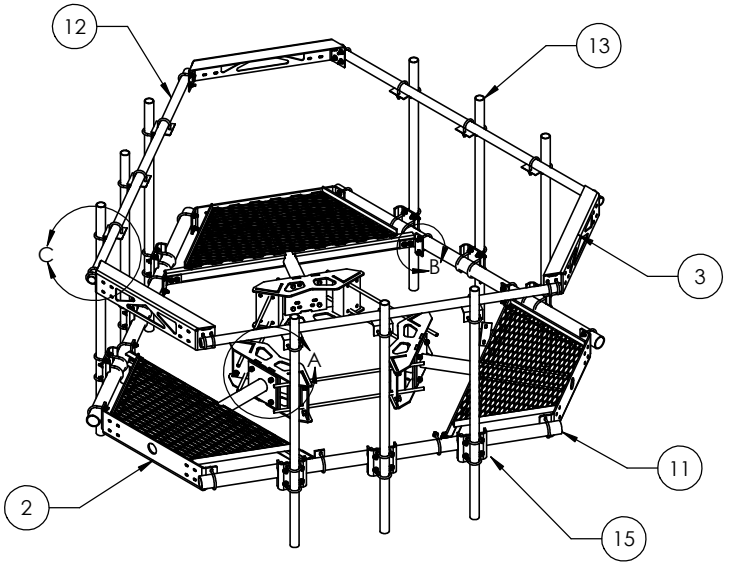
ALL DIMENSIONS ARE IN INCHES U.O.S.
TOLERANCES UNLESS OTHERWISE SPECIFIED:
.X = ± .12 ANGLES ±2°
.XX = ± .06 FRACTIONS ±1/32
.XXX= ± .03

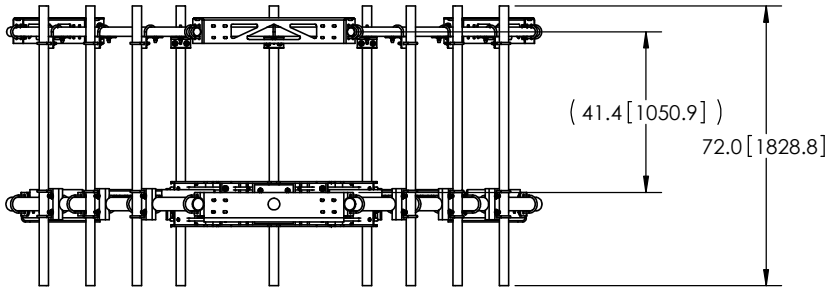
REMOVE BURRS AND BREAK EDGES .005

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.





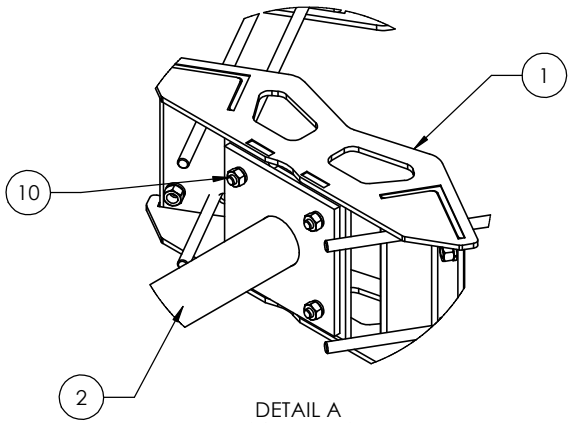


ITEM	PART NO.	DESCRIPTION	QTY.	WEIGHT
C 1	MC-RM1550-3	12" - 50" OD RINGMOUNT	1	230.42 LBS
2	MTC300601	Low Profile Co-Location Platform Snub Nose	3	134.21 LBS
3	MT195801	Corner Weldment Snub Nose Handrail	3	27.10 LBS
4	XA2020.01	CROSS OVER ANGLE	9	2.65 LBS
5	GUB-4356	1/2" X 3-5/8" X 6" GALV U-BOLT	18	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

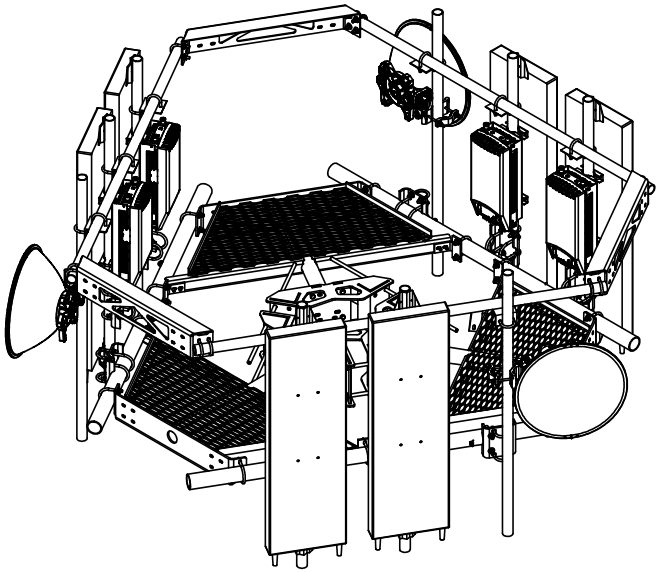
NOTES:
1. ALL METRIC DIMENSIONS ARE IN BRACKETS.
2. WILL FIT MONOPOLES 15"–38" OD.

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

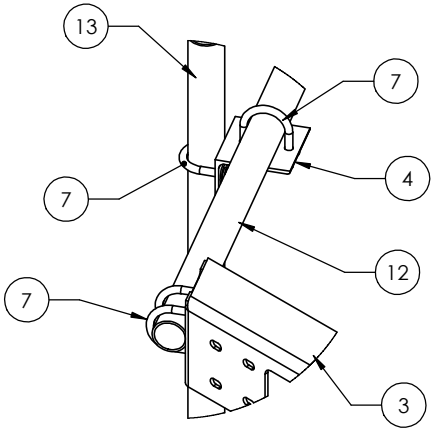
DRAWN BY: MSM	SHEET: 2 of 3	PART NUMBER: MC-PK8-C	
CHECKED BY: TP	SCALE: NTS	DESCRIPTION: 25" OD Snub Nose MT-196	
DATE: 10/18/11	MATERIAL: A36, A53	DRAWING TYPE: ASSEMBLY DRAWING	
REVISION: C	FINISH: GALV A123	ANDREW® WESTCHESTER, IL. 60154 U.S.A.	
	WEIGHT: 1361.27 LBS		



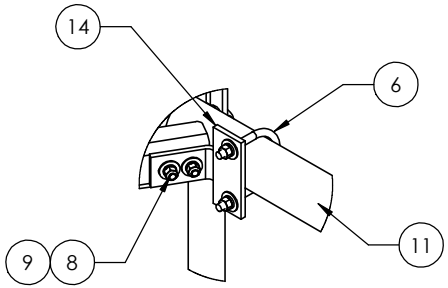
DETAIL A
SCALE 1 : 8



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

RF EMISSIONS COMPLIANCE REPORT

Crown Castle on behalf of Dish Wireless

Crown Castle Site Name: WESTBROOK NORTH HORSE HILL ROA
Crown Castle Site BU Number: 857011
Dish Wireless Site Name: CT-CCI-T-857011
Dish Wireless Site ID: BOBDL00074A
Application ID: 553288
1102 Horse Hill Road
Westbrook, CT
6/10/2021

Report Status:

Dish Wireless is Compliant

Signed 10 June 2021

Prepared By:

Site Safe, LLC

8618 Westwood Center Drive
Suite 315

Vienna, VA 22182

Voice: 703-276-1100
Fax: 703-276-1169

Engineering Statement in Re:
Electromagnetic Energy Analysis
Crown Castle
Westbrook, CT

My signature on the cover of this document indicates:

That I am registered as a Professional Engineer in the jurisdiction indicated; and

That I have extensive professional experience in the wireless communications engineering industry; and

That I am an employee of Site Safe, LLC in Vienna, Virginia; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission ("the FCC" and "the FCC Rules") both in general and specifically as they apply to the FCC's Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields; and

That the technical information serving as the basis for this report was supplied by Crown Castle on behalf of Dish Wireless (see attached Site Summary and Carrier documents) and that Dish Wireless' installation involves communications equipment, antennas and associated technical equipment at a location referred to as "WESTBROOK NORTH HORSE HILL ROA" ("the site"); and

That Dish Wireless proposes to operate at the site with transmit antennas listed in the carrier summary and with a maximum effective radiated power as specified by Dish Wireless and shown on the worksheet and that worst-case 100% duty cycle has been assumed; and

That this analysis has been performed with the assumption that the ground immediately surrounding the tower is primarily flat or falling; and

That at this time, the FCC requires that certain licensees address specific levels of radio frequency energy to which workers or members of the public might possibly be exposed (at §1.1307(b) of the FCC Rules); and

That such consideration of possible exposure of humans to radio frequency energy must utilize the standards set by the FCC, which is the federal agency having jurisdiction over communications facilities; and

That the FCC rules define two tiers of permissible exposure guidelines: 1) "uncontrolled environments," which defines situations in which persons may not be aware of (the "general public"), or may not be able to control their exposure to a transmission facility; and 2) "controlled environments," which defines situations in which persons are aware of their potential for exposure (industry personnel); and

That this statement specifically addresses the uncontrolled environment (which is more conservative than the controlled environment) and the limit set forth in the FCC rules for licensees of Dish Wireless' operating frequencies as shown on the attached antenna worksheet; and

That when applying the uncontrolled environment standards, the predicted Maximum Power Density at two meters above ground level from the proposed T-Mobile operation is no more than 1.752% of the maximum permissible exposure limits in any accessible area on the ground; and

That it is understood per FCC Guidelines and OET 65 Appendix A, that regardless of the existent radio frequency environment, only those licensees whose contributions exceed 5% of the exposure limit pertinent to their operation(s) bear any responsibility for bringing any non-compliant area(s) into compliance; and

That when applying the uncontrolled environment standards, the cumulative predicted energy density from the proposed operation is no more than 4.333% of the maximum in any accessible area up to two meters above the ground per OET 65; and

That the calculations provided in this report are based on data provided by the client and antenna pattern data supplied by the antenna manufacturer, in accordance with FCC guidelines listed in OET 65. Horizontal and vertical antenna patterns are combined for modeling purposes to accurately reflect the energy two meters above ground level where on-axis energy refers to maximum energy two meters above the ground along the azimuth of the antenna and where area energy refers to the maximum energy anywhere two meters above the ground regardless of the antenna azimuth, accounting for cumulative energy from multiple antennas for the carrier(s) and frequency range(s) indicated; and

That the Occupational Safety and Health Administration has policies in place which address worker safety in and around communications sites, thus individual companies will be responsible for their employees' training regarding radio frequency safety; and

In summary, it is stated here that the proposed operation at the site will not result in exposure of the public to excessive levels of radio frequency energy as defined in the FCC Rules and Regulations, specifically 47 CFR 1.1307(b), and that Dish Wireless' proposed operation is completely compliant.

Finally, it is stated that access to the tower should be restricted to communication industry professionals and approved contractor personnel trained in radio frequency safety and that this instant analysis addresses exposure levels at two meters above ground level and does not address exposure levels on the tower or in the immediate proximity of the antennas.

Crown Castle
WESTBROOK NORTH HORSE HILL ROA
Site Summary

Carrier	Area Maximum Percentage MPE
AT&T Mobility, LLC	0.300 %
AT&T Mobility, LLC	0.259 %
AT&T Mobility, LLC	0.274 %
AT&T Mobility, LLC	0.299 %
Dish Wireless (Proposed)	0.804 %
Dish Wireless (Proposed)	0.731 %
Dish Wireless (Proposed)	0.217 %
Verizon Wireless	0.494 %
Verizon Wireless	0.477 %
Verizon Wireless	0.262 %
Verizon Wireless	0.216 %

Composite Site MPE: 4.333 %

AT&T Mobility, LLC
WESTBROOK NORTH HORSE HILL ROA
Carrier Summary

Frequency:	2100	MHz
Maximum Permissible Exposure (MPE):	1000	$\mu W/cm^2$
Maximum power density at ground level:	3.00358	$\mu W/cm^2$
Highest percentage of Maximum Permissible Exposure:	0.30036	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density ($\mu W/cm^2$)**	**Percent of MPE**	**Max Power Density ($\mu W/cm^2$)**	**Percent of MPE**
Kathrein-Scala	800-10965	163	30	7114	1.127131	0.112713	2.735982	0.273598
Kathrein-Scala	800-10965	163	150	7114	1.127131	0.112713	2.735982	0.273598
Kathrein-Scala	800-10965	163	280	7114	1.127131	0.112713	2.735982	0.273598

AT&T Mobility, LLC
WESTBROOK NORTH HORSE HILL ROA
Carrier Summary

Frequency:	737	MHz
Maximum Permissible Exposure (MPE):	491.33	$\mu W/cm^2$
Maximum power density at ground level:	1.27437	$\mu W/cm^2$
Highest percentage of Maximum Permissible Exposure:	0.25937	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density ($\mu W/cm^2$)**	**Percent of MPE**	**Max Power Density ($\mu W/cm^2$)**	**Percent of MPE**
Kathrein-Scala	800-10965	163	30	2959	0.870043	0.177078	1.105438	0.224987
Kathrein-Scala	800-10965	163	150	2959	0.870043	0.177078	1.105438	0.224987
Kathrein-Scala	800-10965	163	280	2959	0.870043	0.177078	1.105438	0.224987

AT&T Mobility, LLC
WESTBROOK NORTH HORSE HILL ROA
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	$\mu W/cm^2$
Maximum power density at ground level:	2.74214	$\mu W/cm^2$
Highest percentage of Maximum Permissible Exposure:	0.27421	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density ($\mu W/cm^2$)**	**Percent of MPE**	**Max Power Density ($\mu W/cm^2$)**	**Percent of MPE**
Kathrein-Scala	800-10991	163	30	4151	0.947923	0.094792	0.965828	0.096583
Kathrein-Scala	800-10991	163	30	4151	0.947923	0.094792	0.965828	0.096583
Kathrein-Scala	800-10991	163	150	4151	0.947923	0.094792	0.965828	0.096583
Kathrein-Scala	800-10991	163	150	4151	0.947923	0.094792	0.965828	0.096583
Kathrein-Scala	800-10991	163	280	4151	0.947923	0.094792	0.965828	0.096583
Kathrein-Scala	800-10991	163	280	4151	0.947923	0.094792	0.965828	0.096583

AT&T Mobility, LLC
WESTBROOK NORTH HORSE HILL ROA
Carrier Summary

Frequency:	850	MHz
Maximum Permissible Exposure (MPE):	566.67	$\mu W/cm^2$
Maximum power density at ground level:	1.69312	$\mu W/cm^2$
Highest percentage of Maximum Permissible Exposure:	0.29879	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density ($\mu W/cm^2$)**	**Percent of MPE**	**Max Power Density ($\mu W/cm^2$)**	**Percent of MPE**
Powerwave	7770	163	30	547	0.197202	0.034800	0.303280	0.053520
Kathrein-Scala	800-10965	163	30	3607	0.841105	0.148430	0.857713	0.151361
Powerwave	7770	163	150	547	0.197202	0.034800	0.303280	0.053520
Kathrein-Scala	800-10965	163	150	3607	0.841105	0.148430	0.857713	0.151361
Powerwave	7770	163	280	547	0.197202	0.034800	0.303280	0.053520
Kathrein-Scala	800-10965	163	280	3607	0.841105	0.148430	0.857713	0.151361

Dish Wireless (Proposed)
WESTBROOK NORTH HORSE HILL ROA
Carrier Summary

Frequency:	2100	MHz
Maximum Permissible Exposure (MPE):	1000	$\mu W/cm^2$
Maximum power density at ground level:	8.04152	$\mu W/cm^2$
Highest percentage of Maximum Permissible Exposure:	0.80415	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density ($\mu W/cm^2$)**	**Percent of MPE**	**Max Power Density ($\mu W/cm^2$)**	**Percent of MPE**
JMA Wireless	MX08FRO665-20	135	0	11861	3.932449	0.393245	7.962152	0.796215
JMA Wireless	MX08FRO665-20	135	120	11861	3.932449	0.393245	7.962152	0.796215
JMA Wireless	MX08FRO665-20	135	240	11861	3.932449	0.393245	7.962152	0.796215

Dish Wireless (Proposed)
WESTBROOK NORTH HORSE HILL ROA
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	$\mu W/cm^2$
Maximum power density at ground level:	7.30636	$\mu W/cm^2$
Highest percentage of Maximum Permissible Exposure:	0.73064	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density ($\mu W/cm^2$)**	**Percent of MPE**	**Max Power Density ($\mu W/cm^2$)**	**Percent of MPE**
JMA Wireless	MX08FRO665-20	135	0	9866	3.561107	0.356111	7.189264	0.718926
JMA Wireless	MX08FRO665-20	135	120	9866	3.561107	0.356111	7.189264	0.718926
JMA Wireless	MX08FRO665-20	135	240	9866	3.561107	0.356111	7.189264	0.718926

Dish Wireless (Proposed)
WESTBROOK NORTH HORSE HILL ROA
Carrier Summary

Frequency:	600	MHz
Maximum Permissible Exposure (MPE):	400	$\mu W/cm^2$
Maximum power density at ground level:	0.86925	$\mu W/cm^2$
Highest percentage of Maximum Permissible Exposure:	0.21731	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density ($\mu W/cm^2$)**	**Percent of MPE**	**Max Power Density ($\mu W/cm^2$)**	**Percent of MPE**
JMA Wireless	MX08FRO665-20	135	0	1304	0.655727	0.163932	0.822318	0.205580
JMA Wireless	MX08FRO665-20	135	120	1304	0.655727	0.163932	0.822318	0.205580
JMA Wireless	MX08FRO665-20	135	240	1304	0.655727	0.163932	0.822318	0.205580

Verizon Wireless
WESTBROOK NORTH HORSE HILL ROA
Carrier Summary

Frequency:	2100	MHz
Maximum Permissible Exposure (MPE):	1000	$\mu W/cm^2$
Maximum power density at ground level:	4.94326	$\mu W/cm^2$
Highest percentage of Maximum Permissible Exposure:	0.49433	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density ($\mu W/cm^2$)**	**Percent of MPE**	**Max Power Density ($\mu W/cm^2$)**	**Percent of MPE**
ANDREW	SBNHH-1D65B	147	0	7732	3.148934	0.314893	4.719460	0.471946
ANDREW	SBNHH-1D65B	147	120	7732	3.148934	0.314893	4.719460	0.471946
ANDREW	SBNHH-1D65B	147	240	7732	3.148934	0.314893	4.719460	0.471946

Verizon Wireless
WESTBROOK NORTH HORSE HILL ROA
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	$\mu W/cm^2$
Maximum power density at ground level:	4.77317	$\mu W/cm^2$
Highest percentage of Maximum Permissible Exposure:	0.47732	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density ($\mu W/cm^2$)**	**Percent of MPE**	**Max Power Density ($\mu W/cm^2$)**	**Percent of MPE**
ANDREW	SBNHH-1D65B	147	0	4583	3.721555	0.372156	4.713563	0.471356
ANDREW	SBNHH-1D65B	147	120	4583	3.721555	0.372156	4.713563	0.471356
ANDREW	SBNHH-1D65B	147	240	4583	3.721555	0.372156	4.713563	0.471356

Verizon Wireless
WESTBROOK NORTH HORSE HILL ROA
Carrier Summary

Frequency:	751	MHz
Maximum Permissible Exposure (MPE):	500.67	$\mu W/cm^2$
Maximum power density at ground level:	1.31114	$\mu W/cm^2$
Highest percentage of Maximum Permissible Exposure:	0.26188	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density ($\mu W/cm^2$)**	**Percent of MPE**	**Max Power Density ($\mu W/cm^2$)**	**Percent of MPE**
ANDREW	SBNHH-1D65B	147	0	2043	0.671044	0.134030	1.107548	0.221215
ANDREW	SBNHH-1D65B	147	120	2043	0.671044	0.134030	1.107548	0.221215
ANDREW	SBNHH-1D65B	147	240	2043	0.671044	0.134030	1.107548	0.221215

Verizon Wireless
WESTBROOK NORTH HORSE HILL ROA
Carrier Summary

Frequency:	850	MHz
Maximum Permissible Exposure (MPE):	566.67	$\mu W/cm^2$
Maximum power density at ground level:	1.2217	$\mu W/cm^2$
Highest percentage of Maximum Permissible Exposure:	0.21559	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density ($\mu W/cm^2$)**	**Percent of MPE**	**Max Power Density ($\mu W/cm^2$)**	**Percent of MPE**
Amphenol	QUAD656C0000x	147	0	3120	1.129918	0.199397	1.173954	0.207168
Amphenol	QUAD656C0000x	147	120	3120	1.129918	0.199397	1.173954	0.207168
Amphenol	QUAD656C0000x	147	240	3120	1.129918	0.199397	1.173954	0.207168

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:
1102 HORSE HILL ROAD, WESTBROOK, CT 06498

CCATT 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: 857011/WESTBROOK NORTH HORSE HILL ROA
Customer Site ID: BOBDL00074A/CT-CCI-T-857011
Site Address: 1102 HORSE HILL ROAD, WESTBROOK, CT 06498

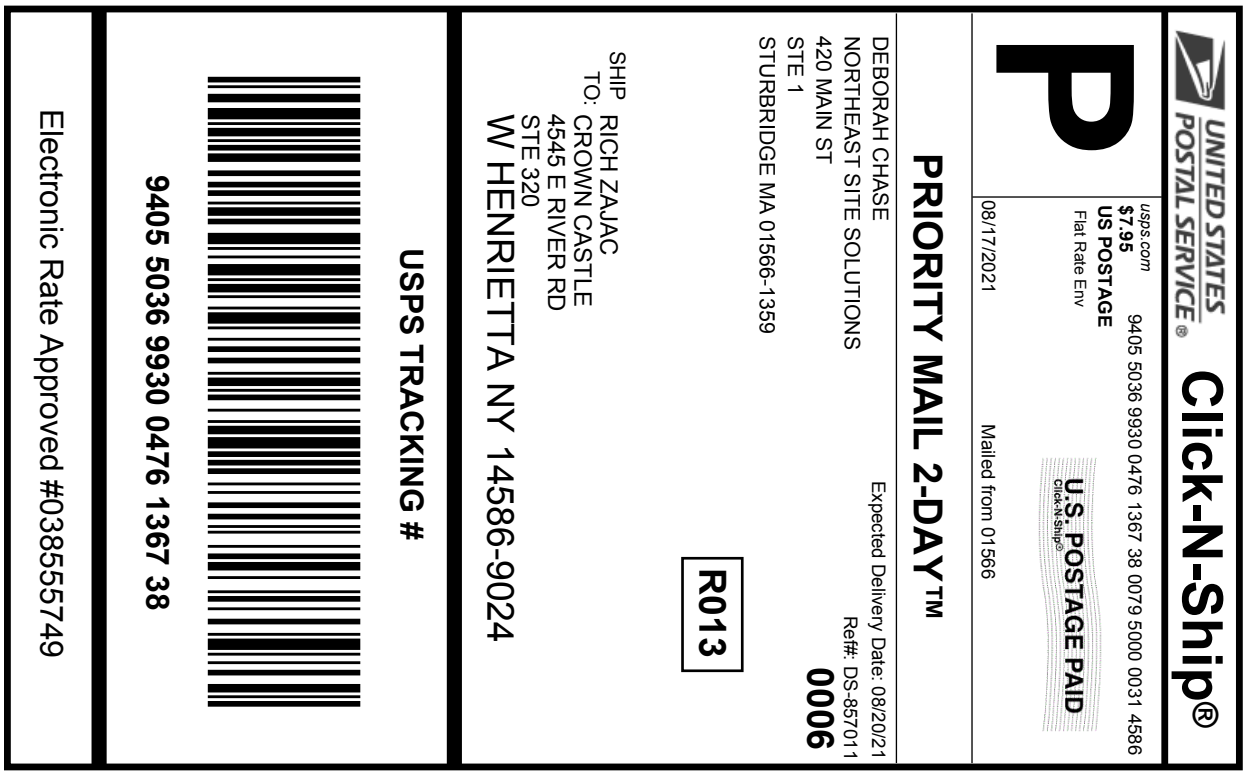
Crown Castle

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 0476 1367 38

Trans. #:	540986614
Print Date:	08/17/2021
Ship Date:	08/17/2021
Expected Delivery Date:	08/20/2021

Priority Mail® Postage:	**$7.95**
Total:	**$7.95**

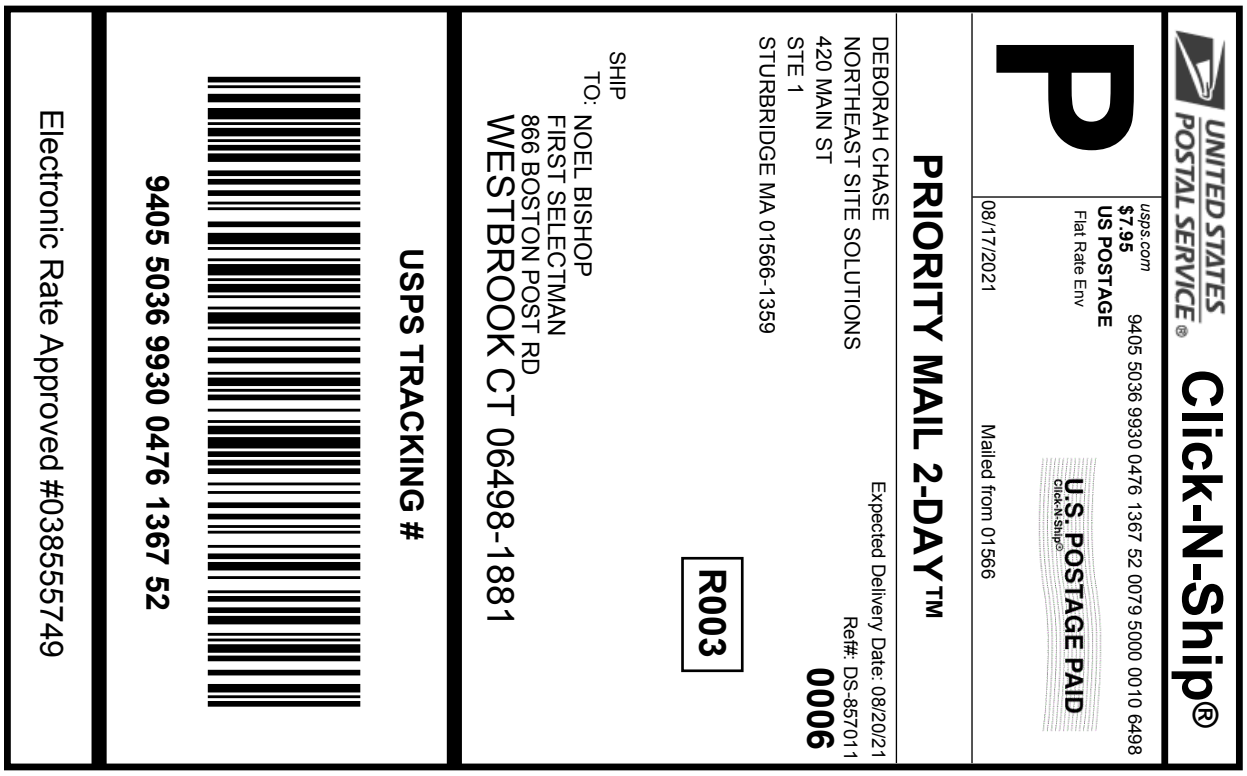
From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Ref#: DS-857011

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



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Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0476 1367 52

Trans. #:	540986614
Print Date:	08/17/2021
Ship Date:	08/17/2021
Expected Delivery Date:	08/20/2021

Priority Mail® Postage:	**$7.95**
Total:	**$7.95**

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

Ref#: DS-857011

To: NOEL BISHOP
FIRST SELECTMAN
866 BOSTON POST RD
WESTBROOK CT 06498-1881

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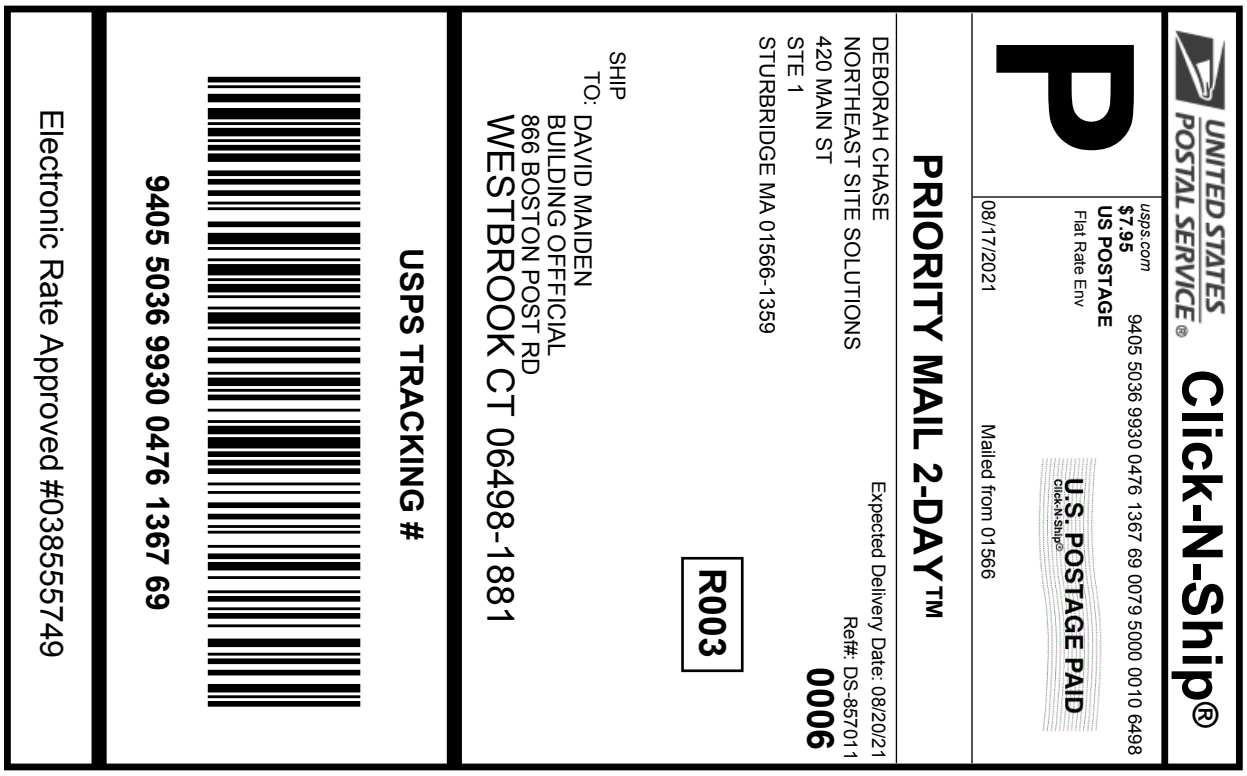

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5. **Mail your package on the "Ship Date" you selected when creating this label.**

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0476 1367 69

Trans. #:	540986614
Print Date:	08/17/2021
Ship Date:	08/17/2021
Expected Delivery Date:	08/20/2021

Priority Mail® Postage:	**$7.95**
Total:	**$7.95**

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

Ref#: DS-857011

To: DAVID MAIDEN
BUILDING OFFFICIAL
866 BOSTON POST RD
WESTBROOK CT 06498-1881

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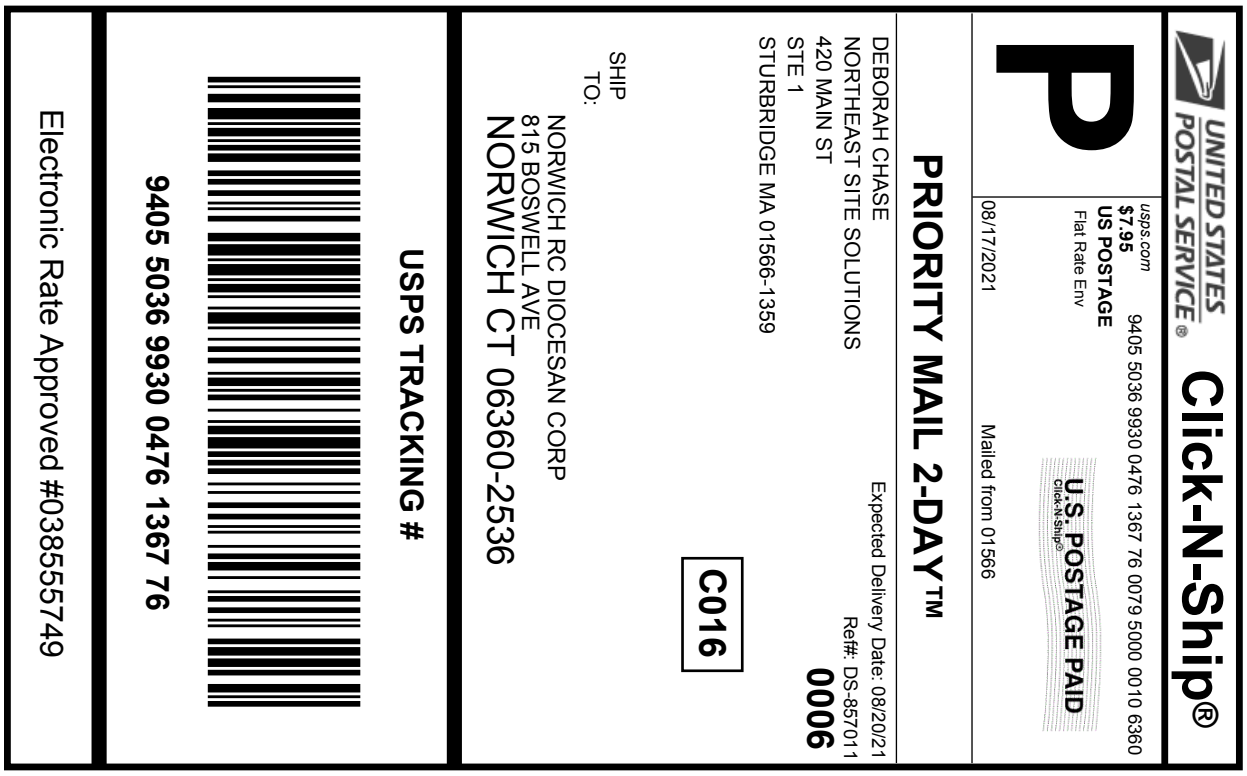

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Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0476 1367 76

Trans. #:	540986614
Print Date:	08/17/2021
Ship Date:	08/17/2021
Expected Delivery Date:	08/20/2021

Priority Mail® Postage:	**$7.95**
Total:	**$7.95**

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

Ref#: DS-857011

To: NORWICH RC DIOCESAN CORP
815 BOSWELL AVE
NORWICH CT 06360-2536

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85701

FISKDALE
458 MAIN ST
FISKDALE, MA 01518-9998
(800)275-8777

08/18/2021 12:46 PM

Product	Qty	Unit Price	Price
Prepaid Mail Norwich, CT 06360 Weight: 1 lb 8.20 oz Acceptance Date: Wed 08/18/2021 Tracking #: 9405 5036 9930 0476 1367 76	1		$0.00
Prepaid Mail Westbrook, CT 06498 Weight: 1 lb 8.10 oz Acceptance Date: Wed 08/18/2021 Tracking #: 9405 5036 9930 0476 1367 52	1		$0.00
Prepaid Mail Westbrook, CT 06498 Weight: 1 lb 8.20 oz Acceptance Date: Wed 08/18/2021 Tracking #: 9405 5036 9930 0476 1367 69	1		$0.00
Prepaid Mail West Henrietta, NY 14586 Weight: 0 lb 2.00 oz Acceptance Date: Wed 08/18/2021 Tracking #: 9405 5036 9930 0476 1367 38	1		$0.00
Grand Total:			$0.00

****
USPS is experiencing unprecedented volume