



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

September 21, 2021

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

RE: Tower Share Application
85 Paper Mill Road, Woodbury, CT 06798
Latitude: 41.853475
Longitude: 72.452089
Site# 857528_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 85 Paper Mill Road, Woodbury, Connecticut.

Dish Wireless LLC proposes to install three (3) 600/1900 5G MHz antenna and six (6) RRUs, at the 138-foot level of the existing 150-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 August 31, 2021 Exhibit C. Also included is a structural analysis prepared by Crown Castle, dated May 28, 2021, confirming that the existing tower is structurally capable of supporting the proposed equipment. Attached as Exhibit D. This facility was approved by Connecticut Siting Council, Docket No. 375 on August 27, 2009. 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 Barbara Perkinson, First Selectwoman, for the Town of Woodbury, William Agresta, Town Planner, as well as the tower owner (Crown Castle) and property owner (Jodie Bryan)

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 150-feet; Dish Wireless LLC proposed antennas will be located at a center line height of 138-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.

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 5.61% 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 Woodbury. 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 138-foot level of the existing 150-foot tower would have an insignificant visual impact on the area around the tower. Dish Wireless LLC ground equipment would be installed within the existing facility compound. Dish Wireless LLC shared use would therefore not cause any significant alteration in the physical or environmental characteristics of the existing site. Additionally, as evidenced by Exhibit F, the proposed antennas would not increase radio frequency emissions to a level at or above the Federal Communications Commission safety standard.

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

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

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



NSS **NORTHEAST**
SITE SOLUTIONS
Turnkey Wireless Development

Attachments

cc: Barbara Perkinson, First Selectwoman
Town of Woodbury
281 Main Street South Woodbury, CT 06798

William Agresta, Town Planner
Town of Woodbury
281 Main Street South Woodbury, CT 06798

Jodie Bryan, Property Owner
85 Paper Mill Road Woodbury, CT 06798

Crown Castle, Tower Owner

Exhibit A

Original Facility Approval

DOCKET NO. 375 – New Cingular Wireless PCS, LLC } application for a Certificate of Environmental Compatibility and } Public Need for the construction, maintenance and operation of a } telecommunications facility located at 85 Paper Mill Road, } Woodbury, Connecticut. }	Connecticut Siting Council August 27, 2009
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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 New Cingular Wireless PCS, LLC, hereinafter referred to as the Certificate Holder, for a telecommunications facility located at 85 Paper Mill Road, Woodbury, 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 constructed as a monopole, no taller than necessary to provide the proposed telecommunications services, sufficient to accommodate the antennas of the Certificate Holder and other entities, both public and private, but such tower shall not exceed a height of 150 feet above ground level.

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. Prior to the submission of the D&M Plan to the Council, the Certificate Holder shall discuss and resolve issues pertaining to the existing driveway that serves the site property with the Town of Woodbury. Once the driveway issues are resolved, the D&M Plan shall be served on the Town of Woodbury for comment, and 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 compound, radio equipment, access road, utility line, and landscaping; and
 - b) construction plans for site clearing, grading, landscaping, water drainage, and erosion and sedimentation controls 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 the 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 the electromagnetic radio frequency power density be submitted to the Council if and when 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 Town of Woodbury public safety services (police, fire and medical services), provided such use can be accommodated and is compatible with the structural integrity of the tower.
7. Unless otherwise approved by the Council, if the facility authorized herein is not fully constructed and providing wireless services within eighteen months from the date of the mailing of the Council's Findings of Fact, Opinion, and Decision and Order (collectively called "Final Decision"), 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. The time between the filing and resolution of any appeals of the Council's Final Decision shall not be counted in calculating this deadline.
8. Any request for extension of the time period referred to in Condition 7 shall be filed with the Council not later than 60 days prior to the expiration date of this Certificate and shall be served on all parties and intervenors, as listed in the service list, and the Town of Woodbury. Any proposed modifications to this Decision and Order shall likewise be so served.
9. If the facility 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.
10. The Certificate Holder shall remove any nonfunctioning antenna, and associated antenna mounting equipment, within 60 days of the date the antenna ceased to function.
11. In accordance with Section 16-50j-77 of the Regulations of Connecticut State Agencies, the Certificate Holder shall provide the Council with written notice two weeks prior to the commencement of site construction activities. In addition, the Certificate Holder shall provide the Council with written notice of the completion of site construction and the commencement of site operation.

Pursuant to General Statutes § 16-50p, the Council hereby directs 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 Republican-American and Voices.

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

The parties and intervenors to this proceeding are:

Applicant

New Cingular Wireless PCS, LLC

Its Representative

Christopher B. Fisher, Esq.
Cuddy & Feder LLP
445 Hamilton Avenue, 14th Floor
White Plains, New York 10601

Exhibit B

Property Card



Town of Woodbury, CT

Property Listing Report

Map Block Lot

040-032A

Building # **1**

Unique Identifier

240100

Property Information

Property Location	85 PAPER MILL RD
Mailing Address	85 PAPER MILL RD WOODBURY CT 067982006
Land Use	Residential
Zoning Code	OS100
Neighborhood	20

Owner	BRYAN JODIE A
Co-Owner	
Book / Page	0251/0215
Land Class	Residential
Census Tract	3621
Acreage	31.88

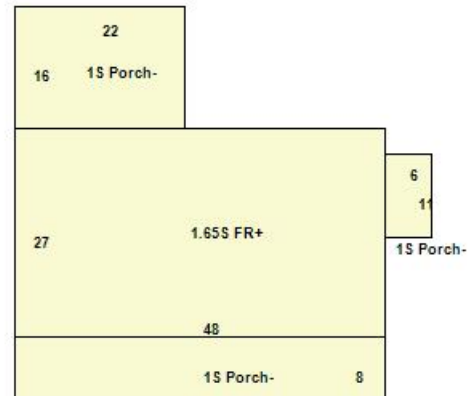
Valuation Summary

(Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings	214102	149870
Outbuildings	53768	37640
Land	335358	113870
Total	603228	0

Utility Information

Electric	No
Gas	No
Sewer	No
Public Water	No
Well	Yes



Primary Construction Details

Year Built	1992
Building Desc.	Residential
Building Style	Cape
Stories	1.65
Exterior Walls	Vinyl
Exterior Walls 2	
Interior Walls	Drywall
Interior Walls 2	
Interior Floors 1	Hardwood
Interior Floors 2	Carpet

Heating Fuel	Oil
Heating Type	HWBB
AC Type	Central
Bedrooms	2
Full Bathrooms	2
Half Bathrooms	1
Extra Fixtures	0
Total Rooms	5
Bath Style	NA
Kitchen Style	Typical
Occupancy	1

Building Use	Single Family
Building Condition	Average
Frame Type	Wood Frame
Fireplaces	0
Bsmt Gar	0
Fin Bsmt Area	
Fin Bsmt Quality	
Building Grade	0
Roof Style	Gable
Roof Cover	Asphalt

Report Created On

9/24/2021



Town of Woodbury, CT

Property Listing Report

Map Block Lot

040-032A

Building # 1

Unique Identifier

240100

Detached Outbuildings

Type	Description	Area (sq ft)	Condition	Year Built
Barn	Frame	2560	Average	1994
Barn	Frame	1200	Average	1994
Generator	Generator	10	Average	2012

Attached Extra Features

Type	Description	Area (sq ft)	Condition	Year Built
Porch	Open	384	Average	2009
Porch	Open	66	Average	1992
Porch	Open	352	Average	1992

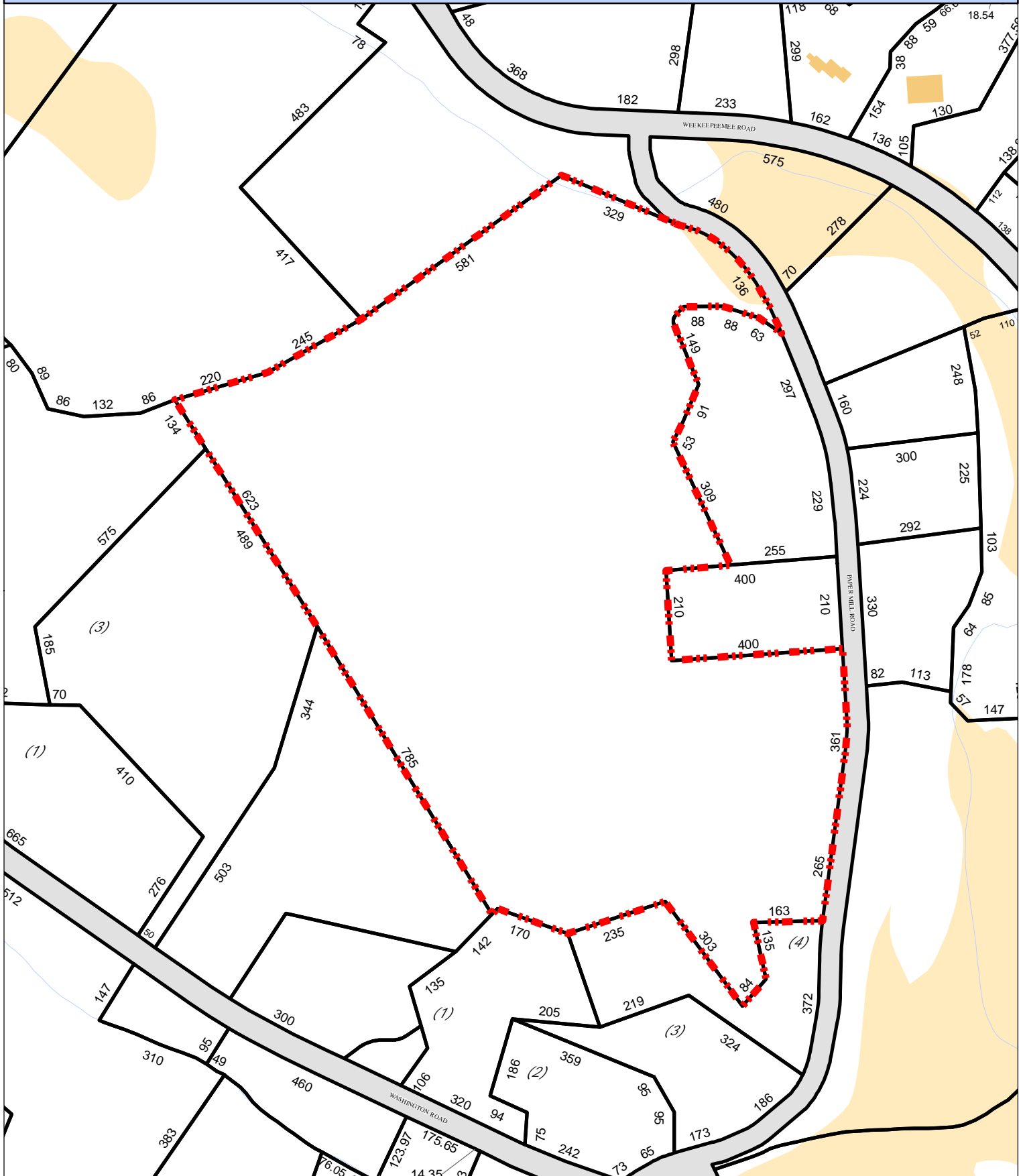
Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
BRYAN JODIE A	0251_0215	6/30/2000	260000
BRYAN RALPH D & JODIE A	0222_0581	6/30/1997	260000

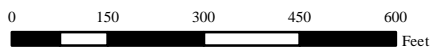
Town of Woodbury, Connecticut - Assessment Parcel Map

Parcel: 040-032A

Address: 85 PAPER MILL RD



Approximate Scale: 1 inch = 300 feet



Disclaimer: This map is for informational purposes only.
All information is subject to verification by any user.
The Town of Woodbury and its mapping contractors assume no legal responsibility for the information contained herein.

Map Produced:

5/19/2020

Exhibit C

Construction Drawings



DISH Wireless L.L.C. SITE ID:

BOHVN00018A

DISH Wireless L.L.C. SITE ADDRESS:

**85 PAPER MILL ROAD
WOODBURY, CT 06798**

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:	
<ul style="list-style-type: none"> • INSTALL (3) PROPOSED PANEL ANTENNAS (1 PER SECTOR) • INSTALL (1) PROPOSED PLATFORM MOUNT • INSTALL PROPOSED JUMPERS • INSTALL (6) PROPOSED RRUs (2 PER SECTOR) • INSTALL (1) PROPOSED OVER VOLTAGE PROTECTION DEVICE (OVP) • INSTALL (1) PROPOSED HYBRID CABLE 	
GROUND SCOPE OF WORK:	
<ul style="list-style-type: none"> • 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 FIBER NID (IF REQUIRED) • EXISTING METER SOCKET IS AVAILABLE AT SOCKET 	

SITE INFORMATION	PROJECT DIRECTORY
PROPERTY OWNER: BRYAN JODIE A ADDRESS: 85 PAPER MILL RD WOODBURY, CT 06798	APPLICANT: DISH Wireless L.L.C. 5701 SOUTH SANTA FE DRIVE LITTLETON, CO 80120
TOWER TYPE: MONOPOLE	TOWER OWNER: CROWN CASTLE 2000 CORPORATE DRIVE CANONSBURG, PA 15317 (877) 486-9377
TOWER CO SITE ID: 857528	SITE DESIGNER: INFINIGY 2500 W. HIGGINS RD. SUITE 500 HOFFMAN ESTATES, IL 60169 (847) 648-4068
TOWER APP NUMBER: 553361	SITE ACQUISITION: NICHOLAS CURRY NICHOLAS.CURRY@crowncastle.com
COUNTY: LITCHFIELD	CONSTRUCTION MANAGER: JAVIER SOTO JAVIER.SOTTO@dish.com
LATITUDE (NAD 83): 41° 34' 23.07" N 41.573083 N	RF ENGINEER: SYED ZAIDI SYED.ZAIDI@dish.com
LONGITUDE (NAD 83): 73° 13' 39.51" W 73.227639 W	
ZONING JURISDICTION: TOWN OF WOODBURY	
ZONING DISTRICT: OS100	
PARCEL NUMBER: 040-032A	
OCCUPANCY GROUP: U	
CONSTRUCTION TYPE: V-B	
POWER COMPANY: EVERSOURCE	
TELEPHONE COMPANY: TBD	



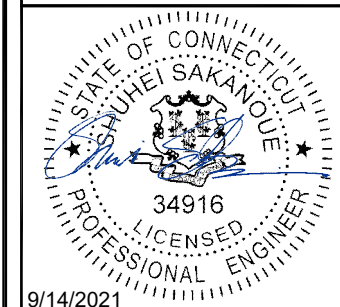
5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120



2000 CORPORATE DRIVE
CANONSBURG, PA 15317



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9/14/2021

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DRAWN BY: RCD
CHECKED BY: SS
APPROVED BY: CJW

RFDS REV #: N/A

CONSTRUCTION DOCUMENTS

SUBMITTALS		
REV	DATE	DESCRIPTION
A	07/01/2021	ISSUED FOR REVIEW
O	08/31/2021	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
6039-Z0001-C

DISH Wireless L.L.C.
PROJECT INFORMATION
BOHVN00018A
85 PAPER MILL ROAD
WOODBURY, CT 06798

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

SITE PHOTO



UNDERGROUND SERVICE ALERT CBYD 811
UTILITY NOTIFICATION CENTER OF CONNECTICUT
(800) 922-4455
WWW.CBYD.COM
CALL 2 WORKING DAYS UTILITY NOTIFICATION PRIOR TO CONSTRUCTION

GENERAL NOTES

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

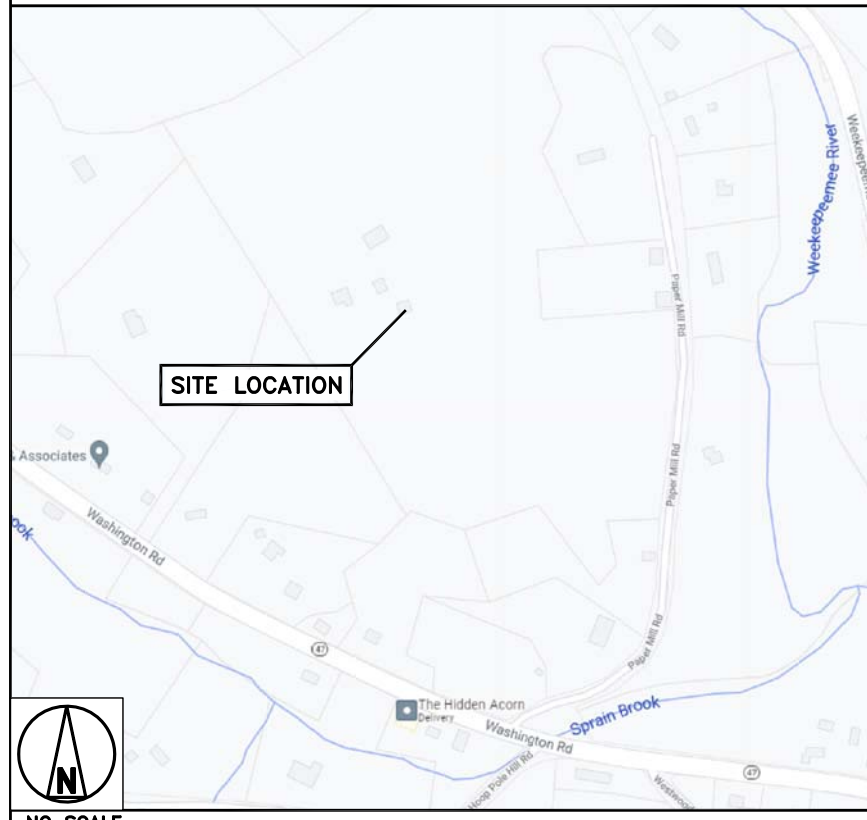
11"x17" PLOT WILL BE HALF SCALE UNLESS OTHERWISE NOTED

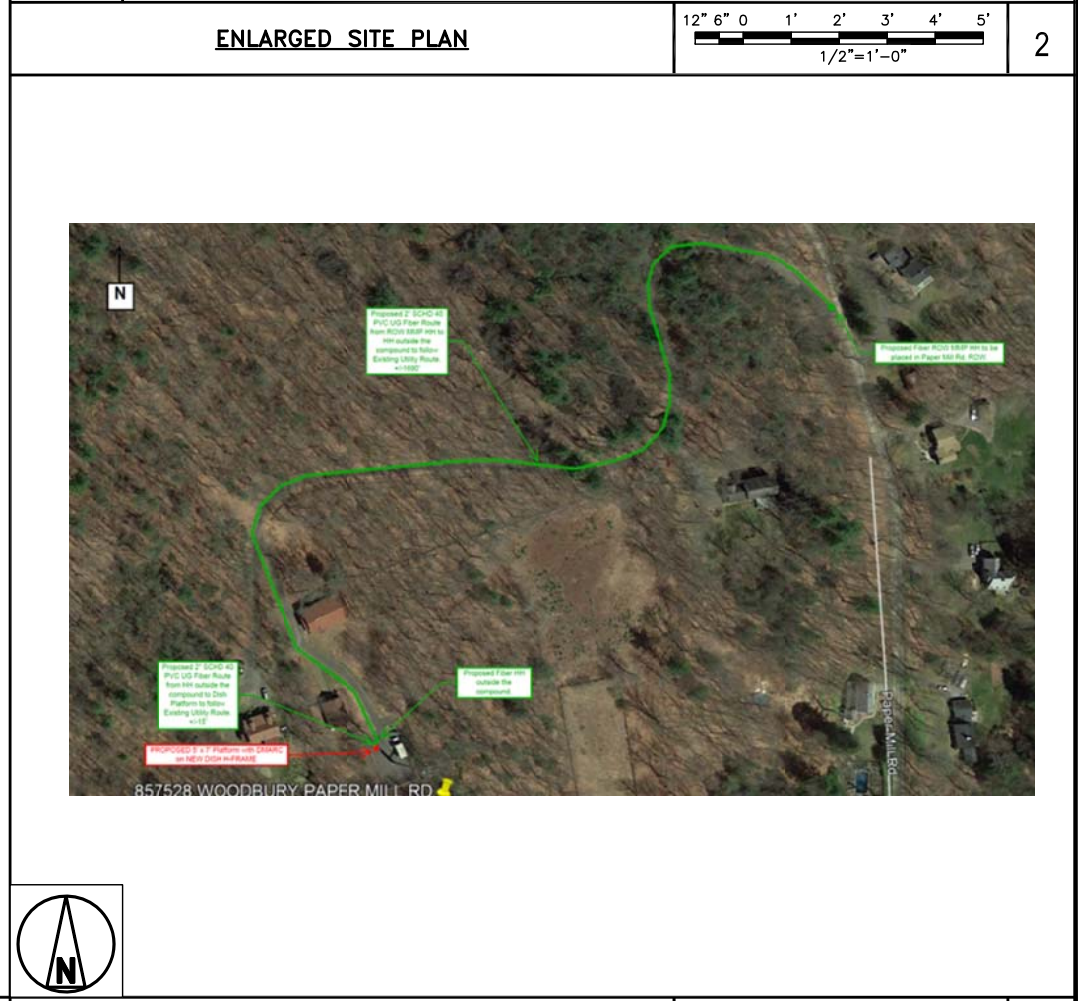
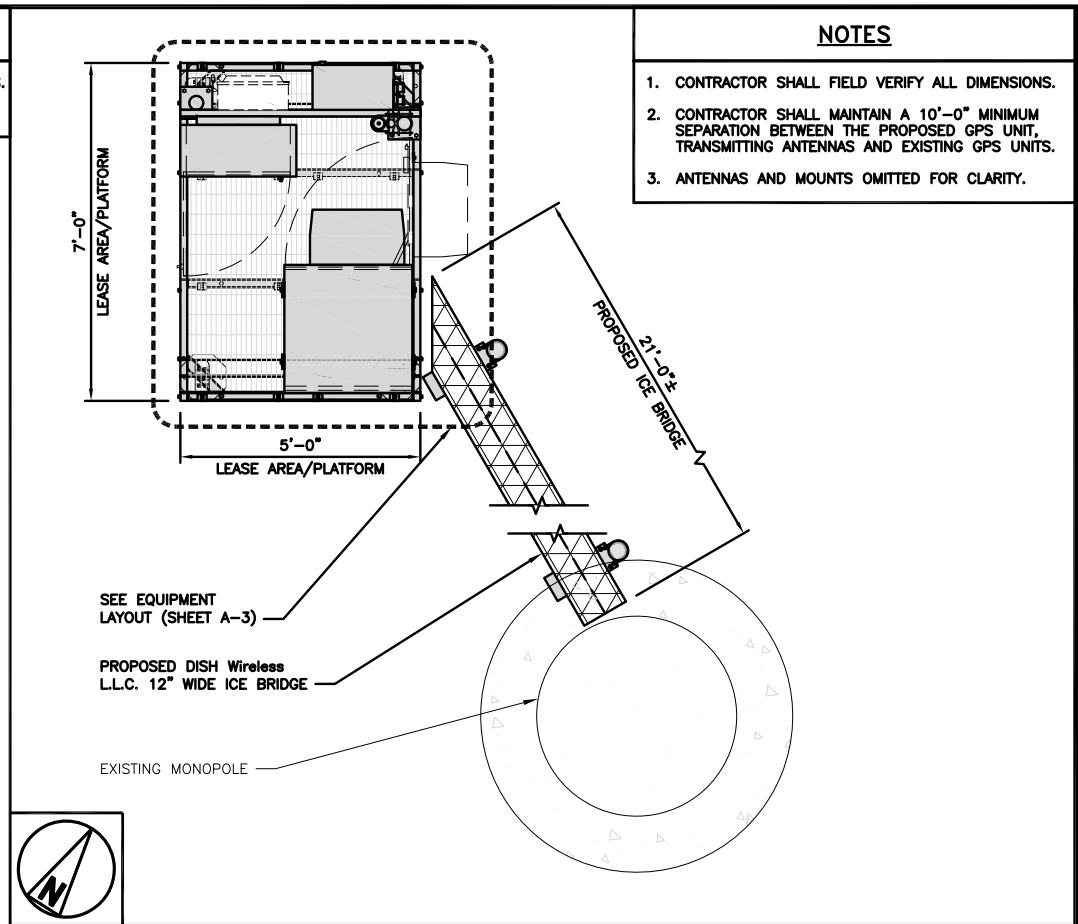
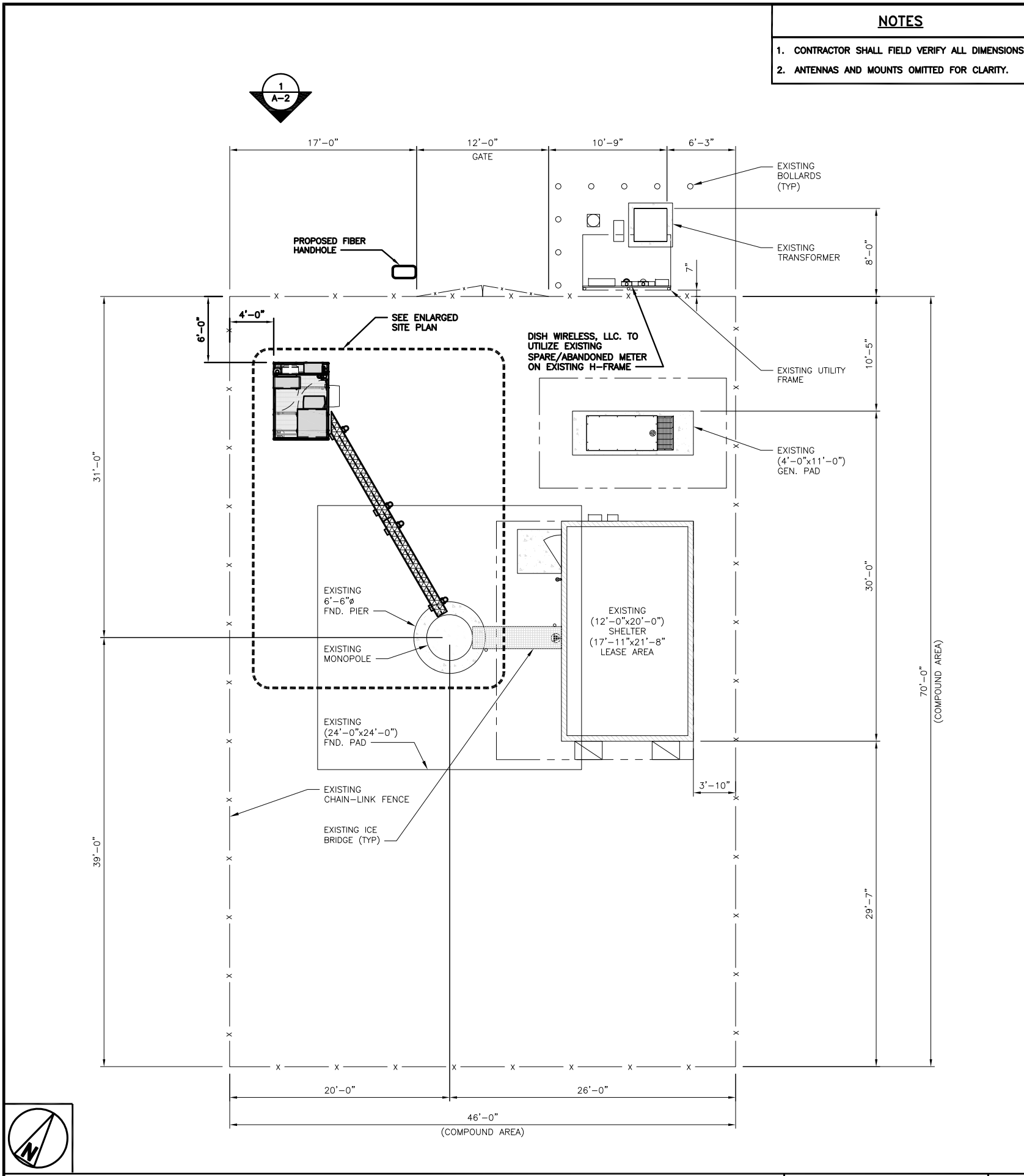
CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON THE JOB SITE, AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK.

DIRECTIONS

DIRECTIONS FROM DANBURY MUNICIPAL AIRPORT:
HEAD EAST ON WIBLING RD TOWARD SUGAR HOLLOW RD, TURN RIGHT ONTO SUGAR HOLLOW RD
TURN LEFT ONTO WOOSTER HEIGHTS, TAKE THE RAMP FOR US-7 NORTH AND HEAD TOWARD NEW MILFORD
TAKE THE RAMP ON THE RIGHT FOR US-7 NORTH / I-84 EAST AND HEAD TOWARD NEW MILFORD /
WATERBURY, TAKE THE RAMP ON THE RIGHT FOR I-84 EAST AND HEAD TOWARD WATERBURY, AT EXIT 15,
HEAD RIGHT ON THE RAMP FOR CT-67 / US-6 EAST TOWARD SOUTHURBY, TURN LEFT ONTO US-6 E /
CT-67 / CHURCH HILL RD, MODERATE CONGESTION, TURN LEFT ONTO CT-47 / WASHINGTON RD, TURN
RIGHT ONTO PAPER MILL RDARRIVE AT, 85 PAPER MILL ROAD, WOODBURY, CT 06798.

VICINITY MAP





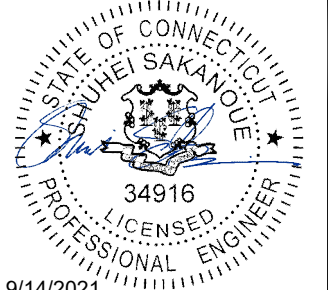
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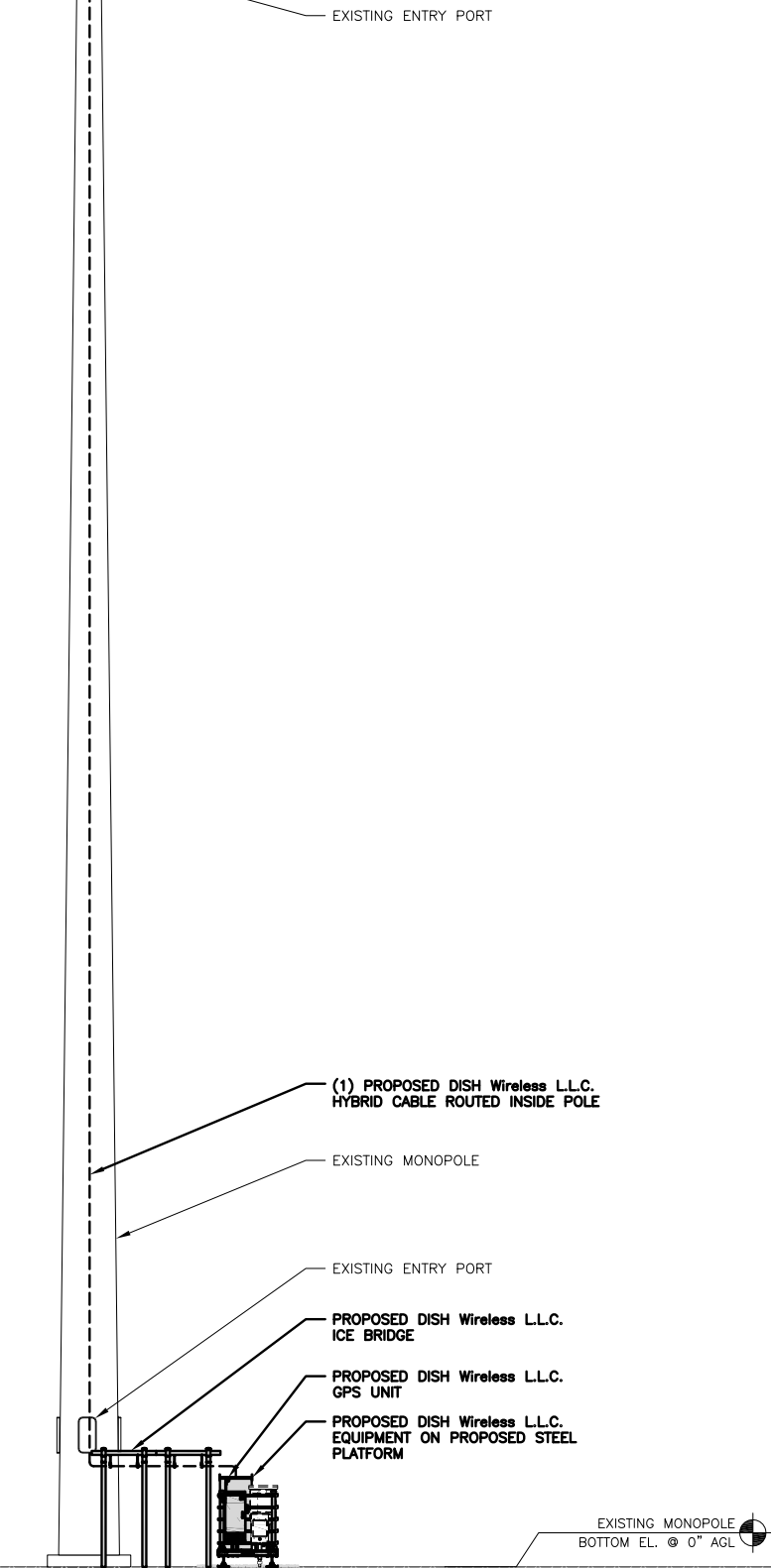
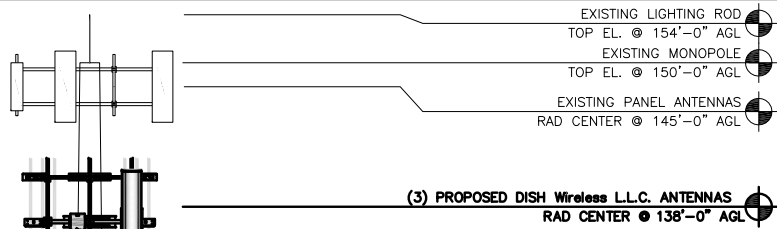
DISH Wireless L.L.C.
PROJECT INFORMATION
BOHVN00018A
85 PAPER MILL ROAD
WOODBURY, CT 06798

SHEET TITLE
OVERALL AND ENLARGED
SITE PLAN

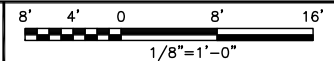
SHEET NUMBER
A-1

NOTES

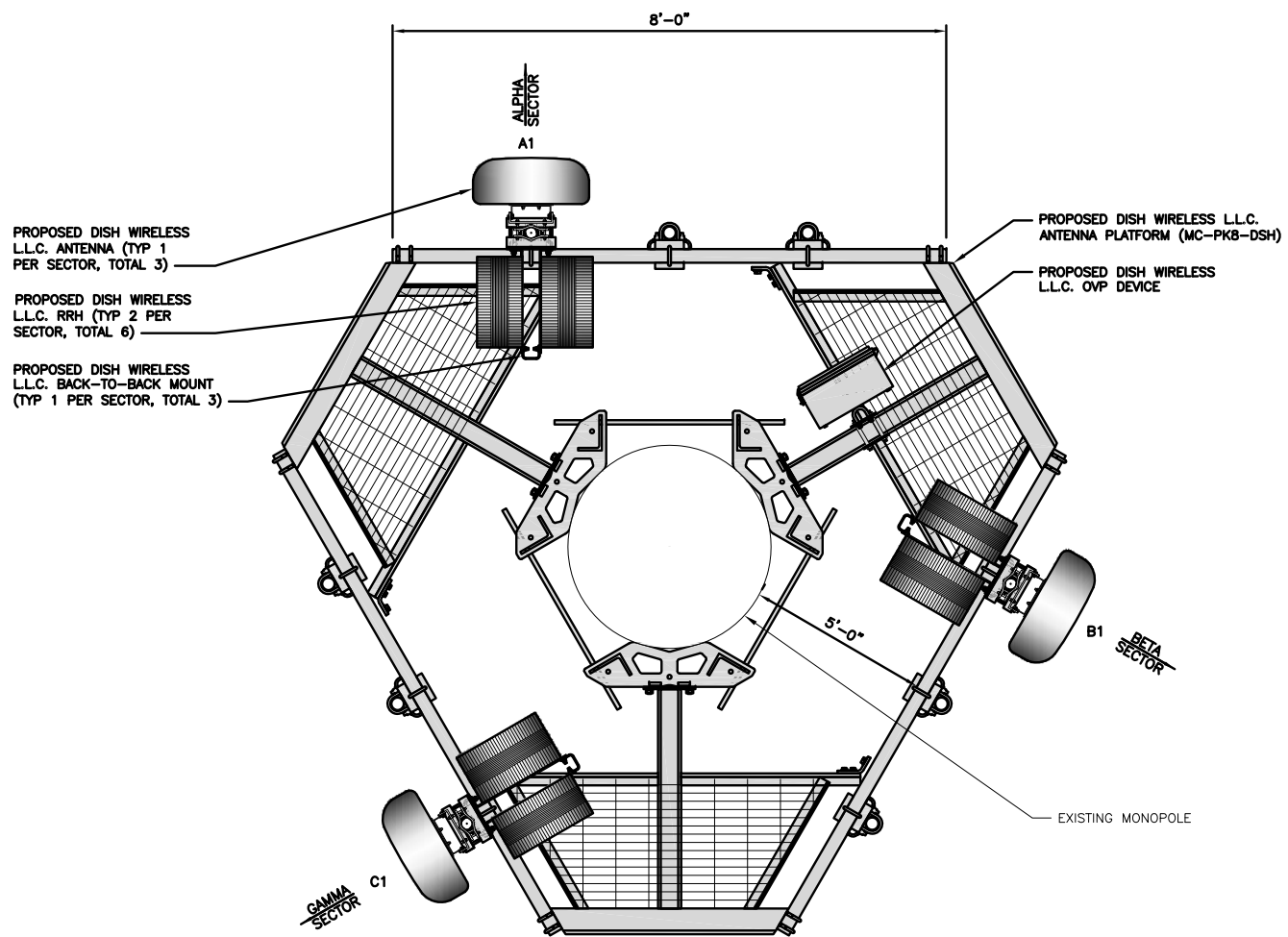
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. ANTENNA SPECIFICATIONS REFER TO ANTENNA SCHEDULE AND TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS
3. EXISTING EQUIPMENT AND FENCE OMITTED FOR CLARITY.
4. INFINIGY HAS NOT EVALUATED THE TOWER OR MOUNT STRUCTURE AND ASSUMES NO RESPONSIBILITY FOR THEIR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



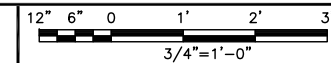
PROPOSED NORTHWEST ELEVATION



1



ANTENNA LAYOUT



2

SECTOR	POSITION	ANTENNA							TRANSMISSION CABLE
		EXISTING OR PROPOSED	MANUFACTURER - MODEL NUMBER	TECHNOLOGY	SIZE (HxW)	AZMUTH	RAD CENTER	FEED LINE TYPE AND LENGTH	
ALPHA	A1	PROPOSED	JMA WIRELESS - MX08FRO665-21	5G	72.0" x 20.0"	0°	138'-0"	(1) HIGH-CAPACITY HYBRID CABLE (182' LONG)	
BETA	B1	PROPOSED	JMA WIRELESS - MX08FRO665-21	5G	72.0" x 20.0"	120°	138'-0"		
GAMMA	C1	PROPOSED	JMA WIRELESS - MX08FRO665-21	5G	72.0" x 20.0"	240°	138'-0"		

SECTOR	POSITION	RRH		NOTES
		MANUFACTURER - MODEL NUMBER	TECHNOLOGY	
ALPHA	A1	FUJITSU - TA08025-B604	5G	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.
	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	

ANTENNA SCHEDULE

NO SCALE

3



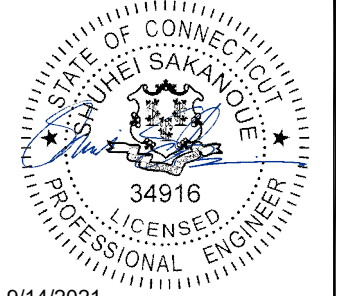
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9/14/2021

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DRAWN BY: CHECKED BY: APPROVED BY:

RCD SS CJW

RFDS REV #: N/A

CONSTRUCTION DOCUMENTS

SUBMITTALS		
REV	DATE	DESCRIPTION
A	07/01/2021	ISSUED FOR REVIEW
0	08/31/2021	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
6039-Z0001-C

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00018A
85 PAPER MILL ROAD
WOODBURY, CT 06798

SHEET TITLE
ELEVATION, ANTENNA
LAYOUT AND SCHEDULE

SHEET NUMBER

A-2



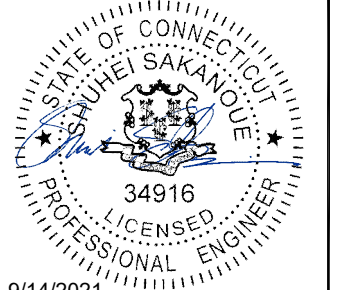
5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120



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DRAWN BY: CHECKED BY: APPROVED BY:
RCD SS CJW

RFDS REV #: N/A

CONSTRUCTION DOCUMENTS

SUBMITTALS		
REV	DATE	DESCRIPTION
A	07/01/2021	ISSUED FOR REVIEW
0	08/31/2021	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
6039-Z0001-C

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00018A
85 PAPER MILL ROAD
WOODBURY, CT 06798

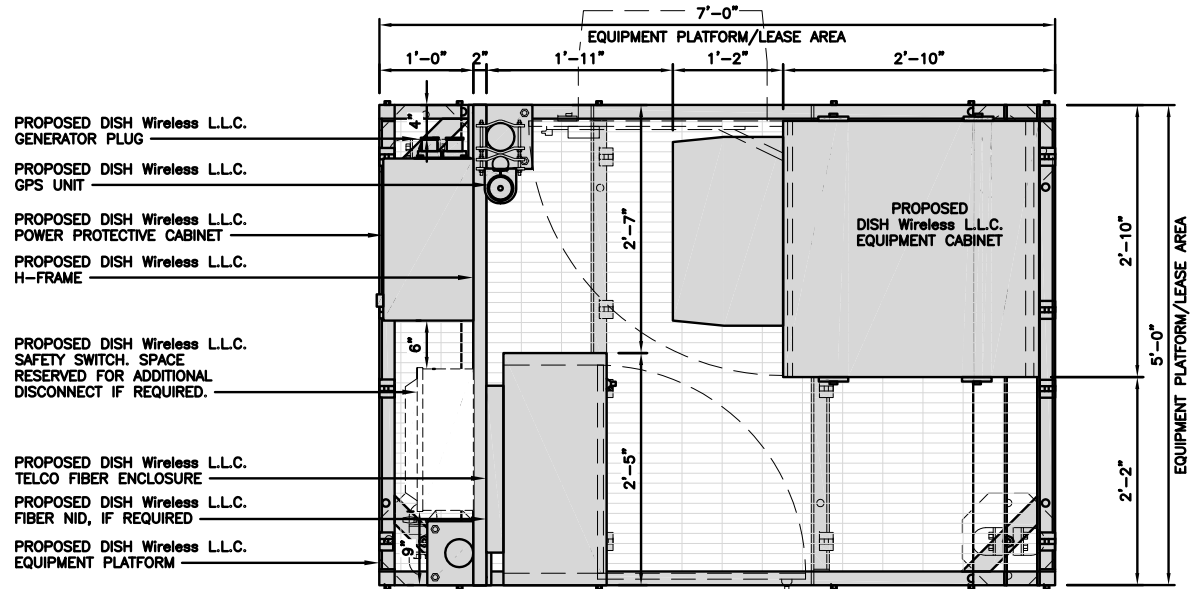
SHEET TITLE
EQUIPMENT PLATFORM AND
H-FRAME DETAILS

SHEET NUMBER

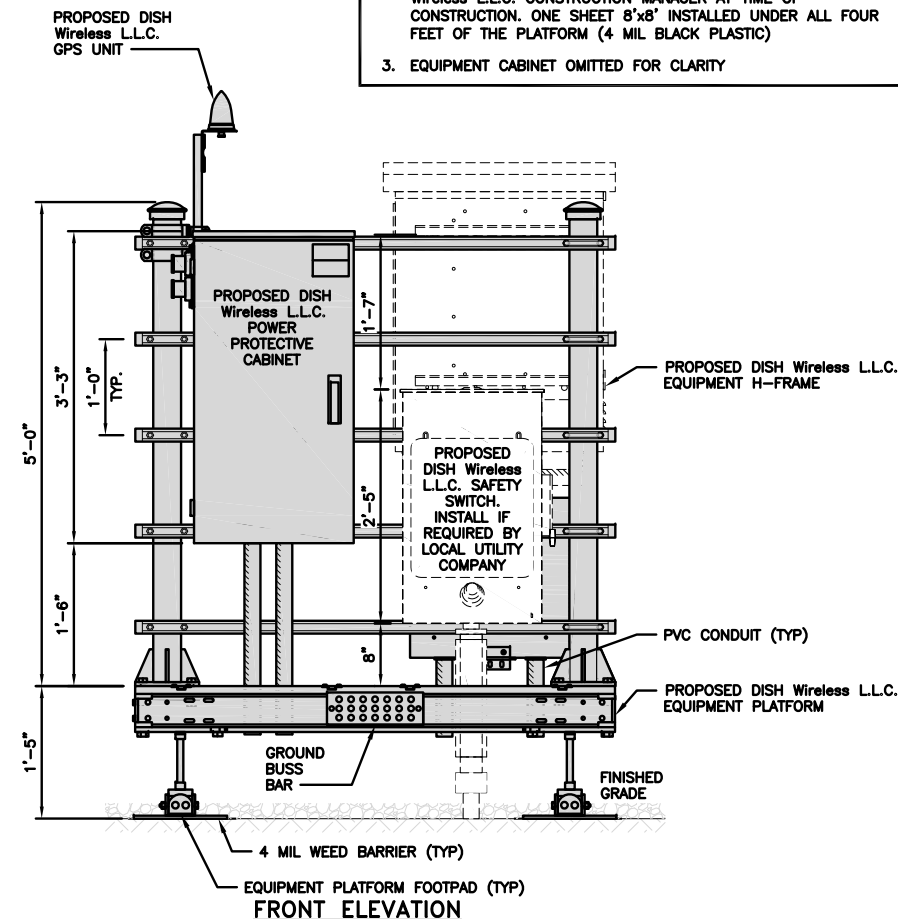
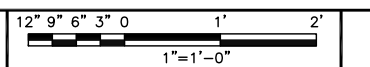
A-3

NOTES

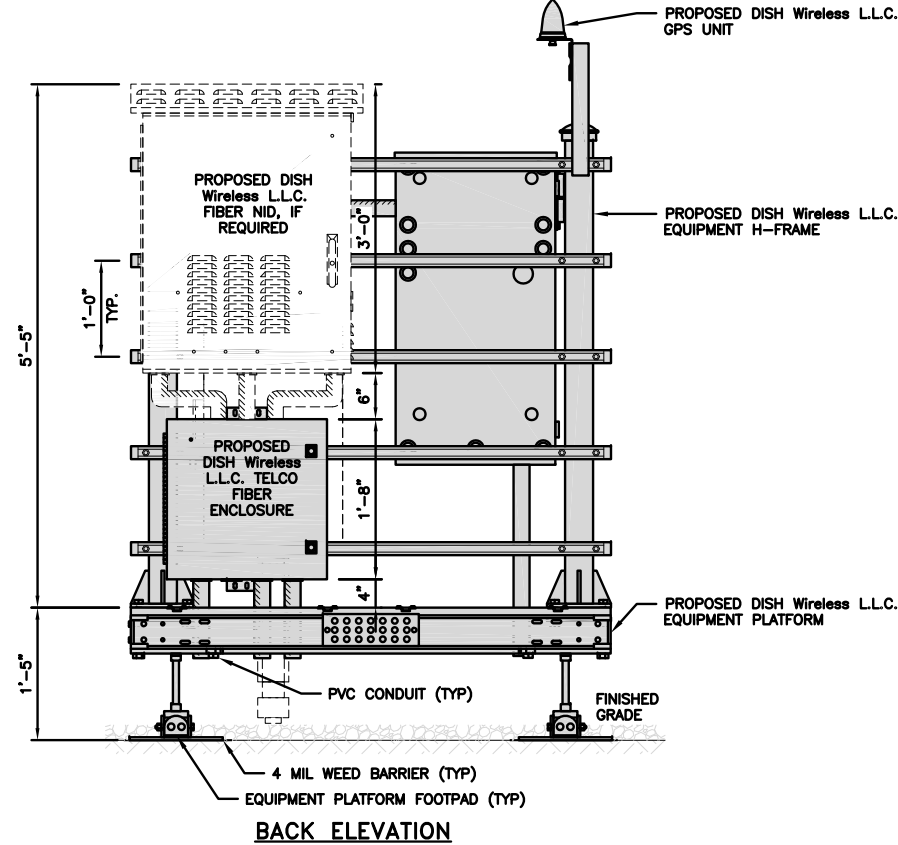
1. CONTRACTOR TO BURY PLATFORM FEET WITH A MINIMUM OF 2" OF FILL PER EXISTING SITE SURFACE
2. WEED BARRIER FABRIC TO BE ADDED AT DISCRETION OF DISH Wireless L.L.C. CONSTRUCTION MANAGER AT TIME OF CONSTRUCTION. ONE SHEET 8'x8' INSTALLED UNDER ALL FOUR FEET OF THE PLATFORM (4 MIL BLACK PLASTIC)
3. EQUIPMENT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



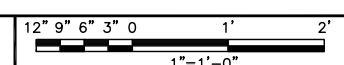
PLATFORM EQUIPMENT PLAN



FRONT ELEVATION

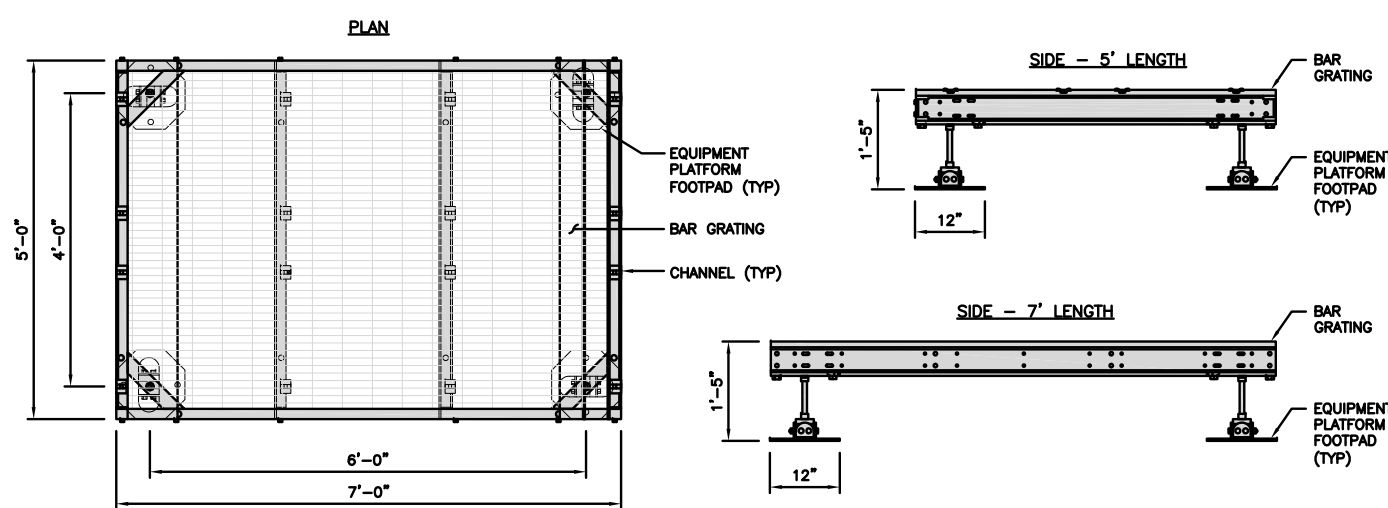


BACK ELEVATION



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

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

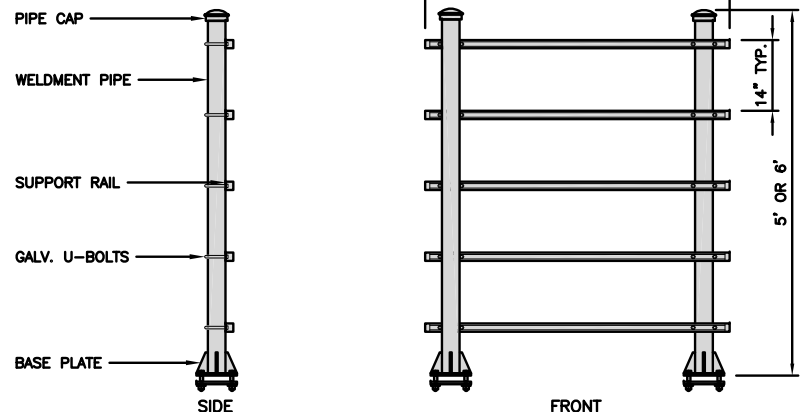


PLATFORM DETAIL

NO SCALE 2

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

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

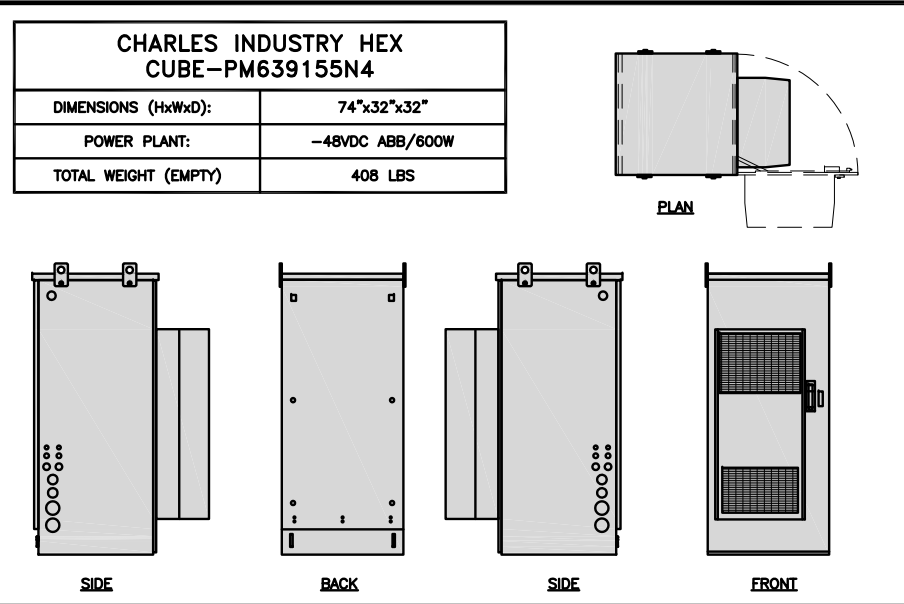


H-FRAME DETAIL

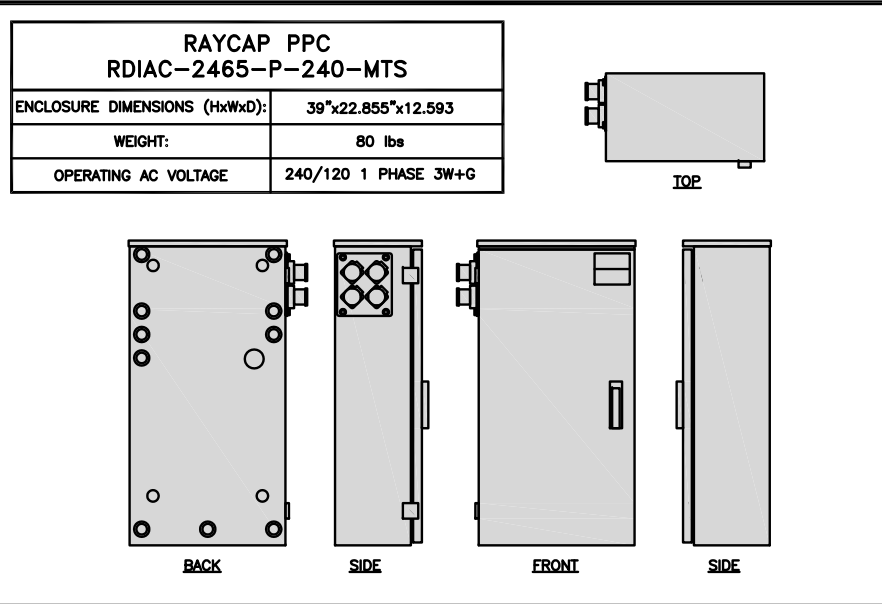
NO SCALE 3

NOT USED

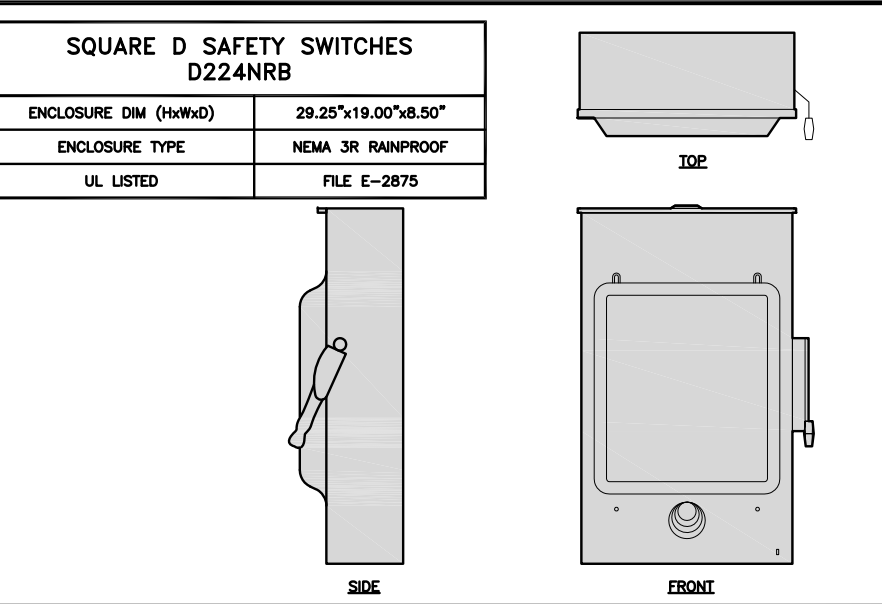
NO SCALE 4



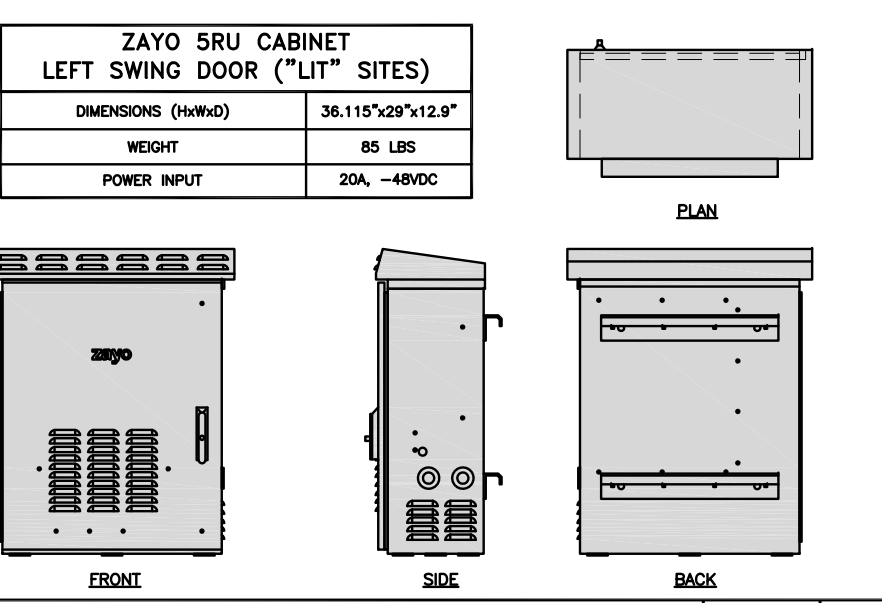
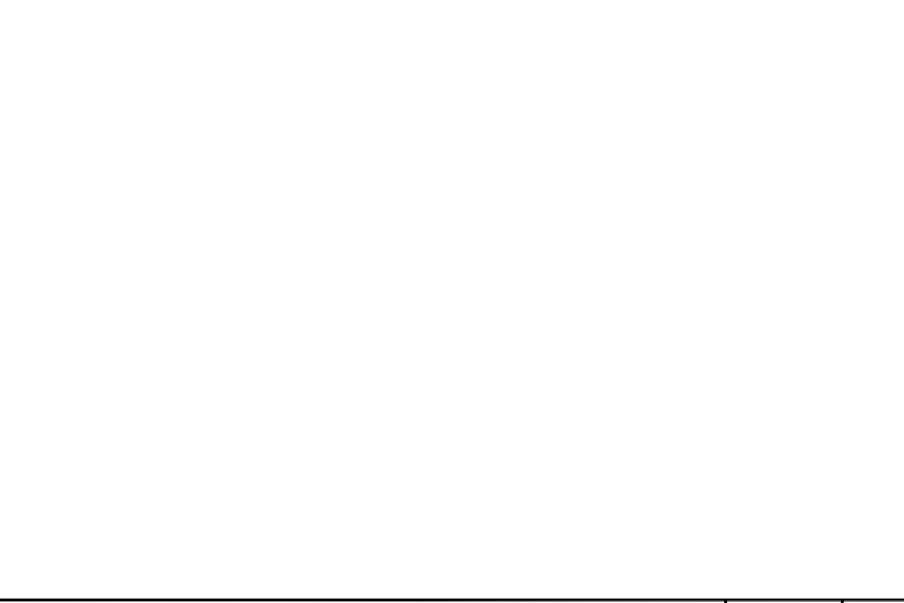
CABINET DETAIL NO SCALE 1



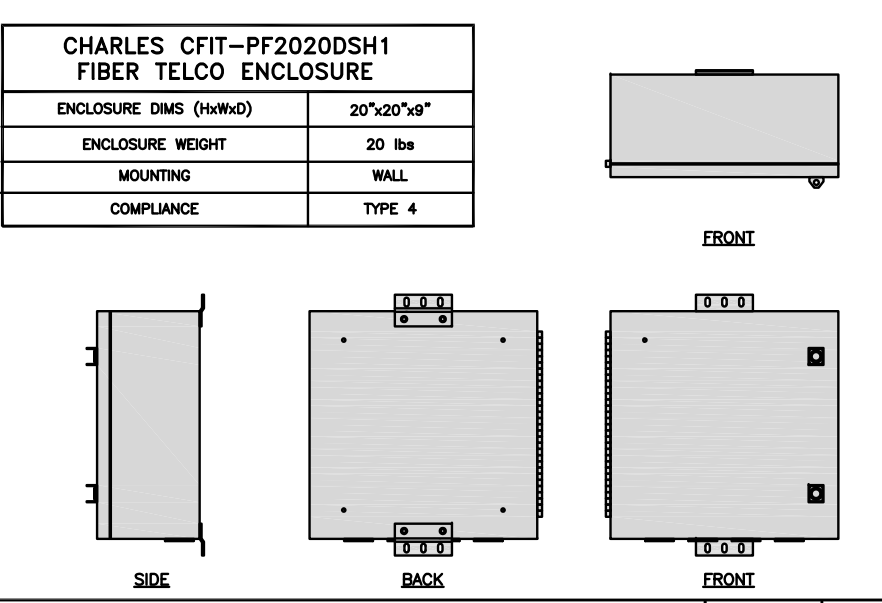
POWER PROTECTION CABINET (PPC) DETAIL NO SCALE 2



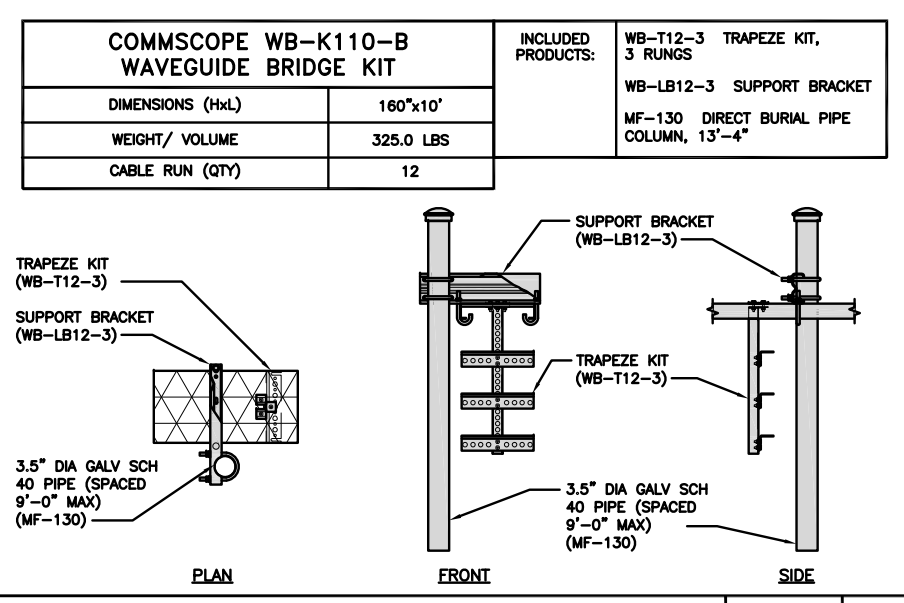
SAFETY SWITCH DETAIL NO SCALE 3



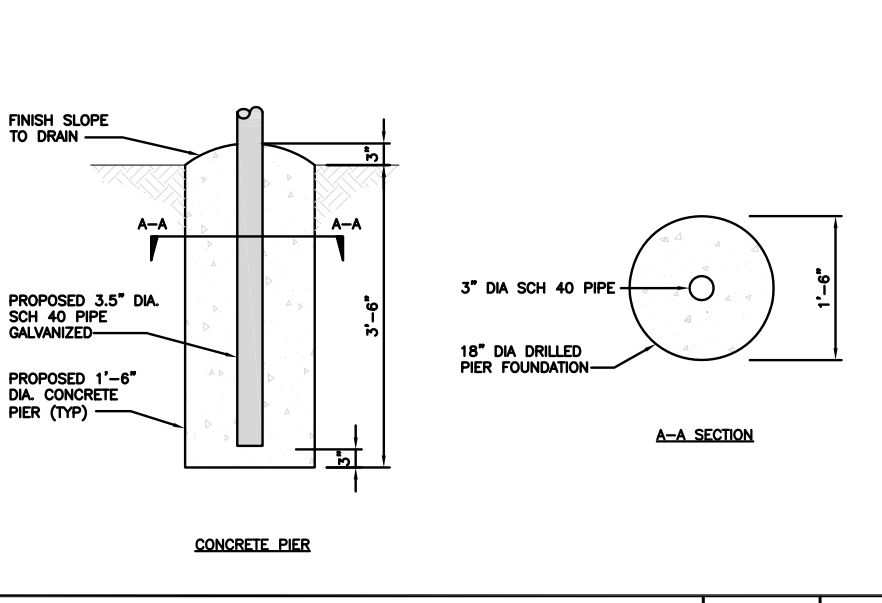
NETWORK INTERFACE UNIT DETAIL NO SCALE 5



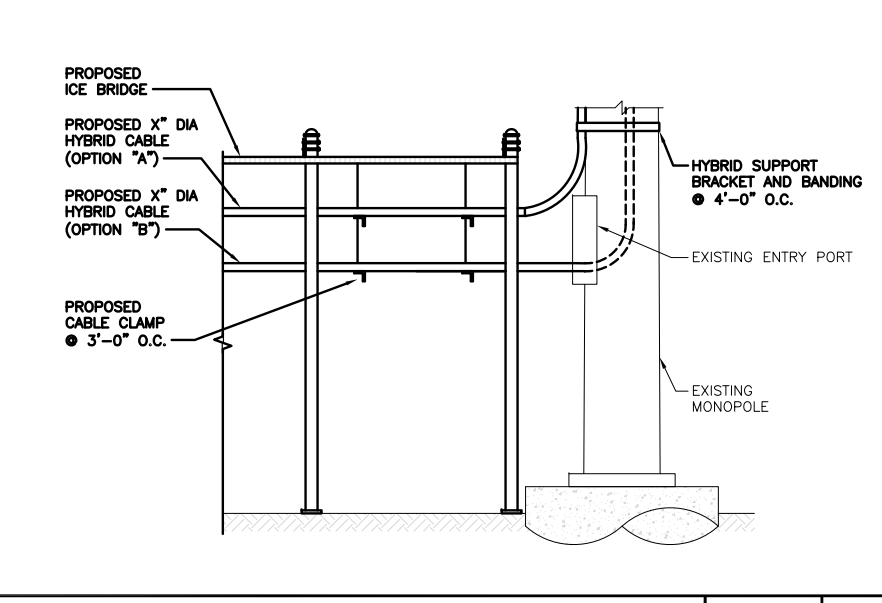
FIBER TELCO ENCLOSURE DETAIL NO SCALE 6



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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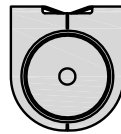
DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00018A
85 PAPER MILL ROAD
WOODBURY, CT 06798

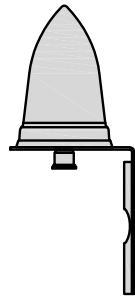
SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER
A-4

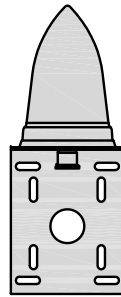
PCTEL GPSGL-TMG-SPI-40NCB	
DIMENSIONS (DIAxH) MM/INCH	81x184mm 3.2"x7.25"
WEIGHT W/ACCESSORIES	075 lbs
CONNECTOR	N-FEMALE
FREQUENCY RANGE	1590 ± 30MHz



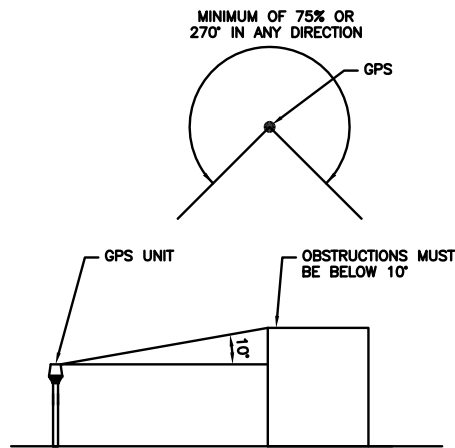
TOP



BACK



SIDE



GPS DETAIL

NO SCALE

1

GPS MINIMUM SKY VIEW REQUIREMENTS

NO SCALE

2

CABLES UNLIMITED HYBRID CABLE
MINIMUM BEND RADIUSES

NO SCALE

3

NOT USED

NO SCALE

4

NOT USED

NO SCALE

5

NOT USED

NO SCALE

6

NOT USED

NO SCALE

7

NOT USED

NO SCALE

8

NOT USED

NO SCALE

9

dish
wireless.

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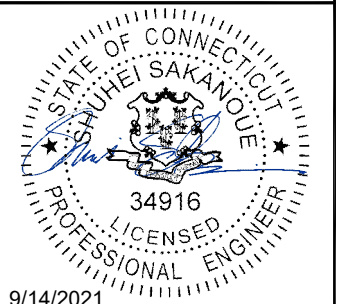
CROWN
CASTLE

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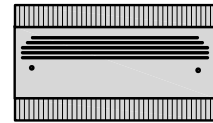
BOHVN00018A
85 PAPER MILL ROAD
WOODBURY, CT 06798

SHEET TITLE
EQUIPMENT DETAILS

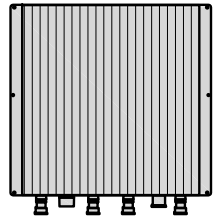
SHEET NUMBER

A-5

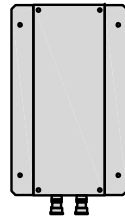
FUJITSU TRIPLE BAND TA08025-B605	
DIMENSIONS (HxWxD)	14.9"x15.7"x9"
WEIGHT	74.95 lbs
CONNECTOR TYPE	4.3-10 RF CONNECTOR
POWER SUPPLY	DC -58~-36V



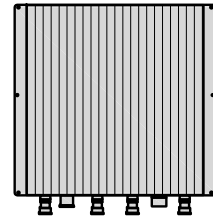
PLAN



BACK



SIDE



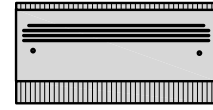
FRONT

RRH DETAIL

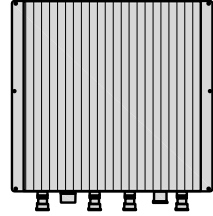
NO SCALE

1

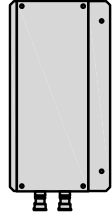
FUJITSU DUAL BAND TA08025-B604	
DIMENSIONS (HxWxD)	14.9"x15.7"x7.8"
WEIGHT	63.9 lbs
CONNECTOR TYPE	4.3-10 RF CONNECTOR
POWER SUPPLY	DC -58~-36V



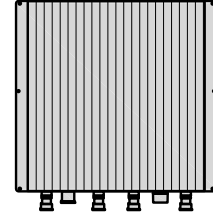
PLAN



BACK



SIDE



FRONT

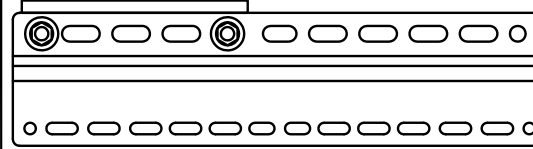
RRH DETAIL

NO SCALE

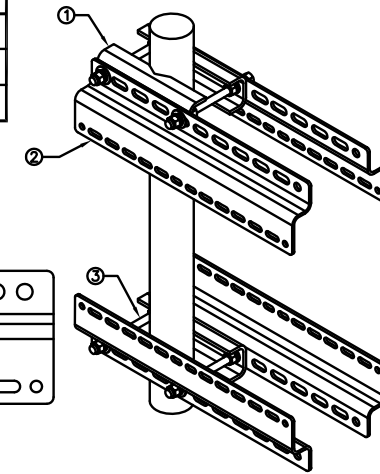
2

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

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



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

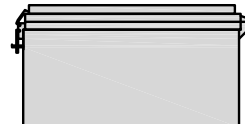


RRH MOUNT DETAIL

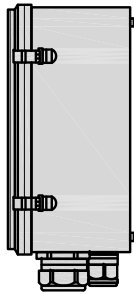
NO SCALE

3

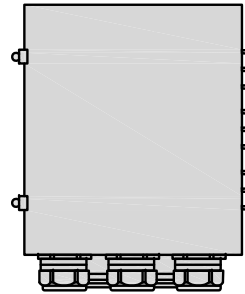
RAYCAP RDIDC-9181-PF-48 DC SURGE PROTECTION (OVP)	
DIMENSIONS (HxWxD)	18.98"x14.39"x8.15"
WEIGHT	21.82 LBS



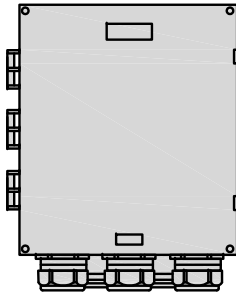
PLAN



SIDE



BACK



FRONT

SURGE SUPPRESSION DETAIL (OVP)

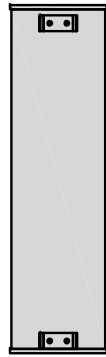
NO SCALE

4

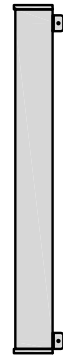
JMA WIRELESS MX08FR0665-21 ANTENNA	
DIMENSIONS (HxWxD)	72.0"x20.0"x8.0"
TOTAL WEIGHT	64.5 LB
RF PORTS, CONNECTOR TYPE	8 x 4.3-10 FEMALE



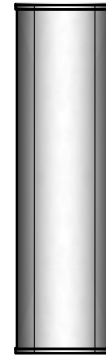
PLAN



BACK



SIDE



FRONT

ANTENNA DETAIL

NO SCALE

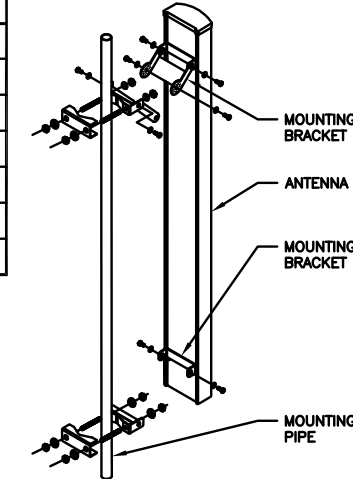
5

NOTES

FINAL ANTENNA SPECIFICATIONS
TO BE CONFIRMED BY GC

M04 MOUNTING BRACKET HPA-33R-BUU-H4-K	
WIDTH	5"
DEPTH	2"
HEIGHT	8"
TOTAL WEIGHT	1.5 lbs
HOUSING MATERIAL	ASA/ABS/ALUMINUM
RADOME COLOR	LIGHT GRAY
CONNECTOR	1x8-PIN DAISY CHAIN

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



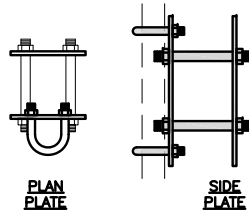
ANTENNA MOUNTING DETAIL

NO SCALE

6

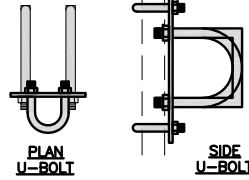
COMMSCOPE XP-2040 CROSSOVER PLATE	
DIMENSIONS (HxW)	10"x12"
WEIGHT	11 lbs

NOTE:
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APPROVED EQUIVALENT



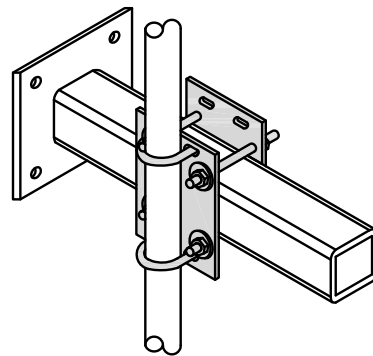
PLAN PLATE

SIDE PLATE



PLAN U-BOLT

SIDE U-BOLT



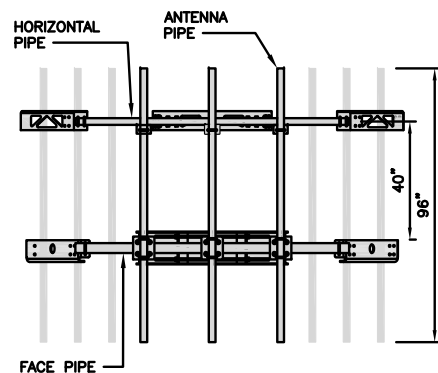
RRH/OVP MOUNT DETAIL

NO SCALE

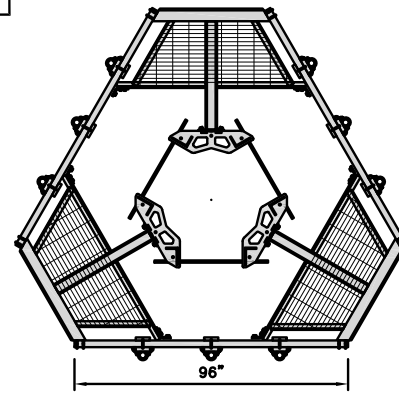
7

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

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



FACE PIPE



96"

ANTENNA PLATFORM DETAIL

NO SCALE

8

NOT USED

NO SCALE

9



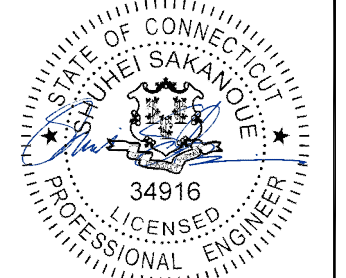
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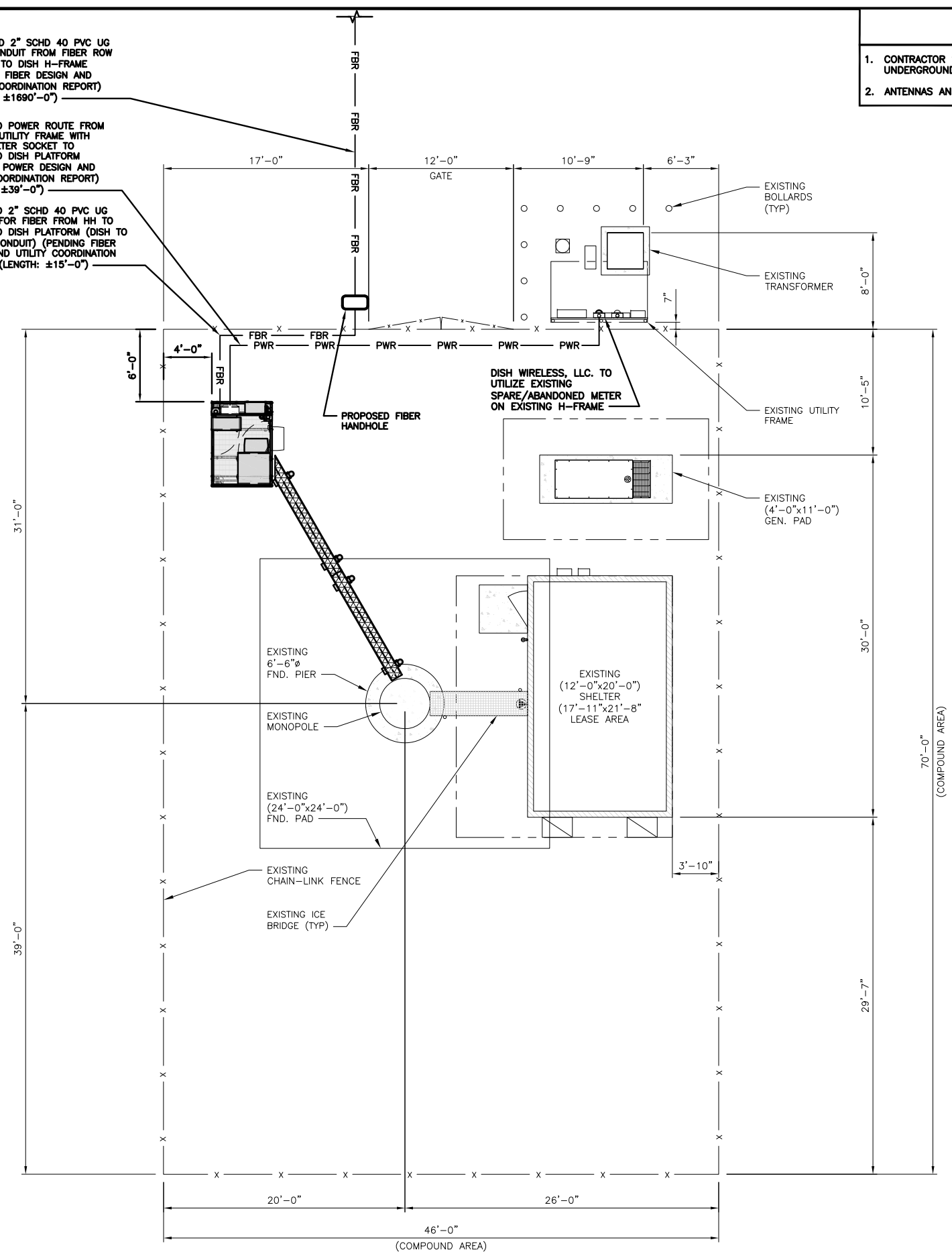
SHEET NUMBER

A-6

PROPOSED 2" SCHD 40 PVC UG FIBER CONDUIT FROM FIBER ROW MMP/HH TO DISH H-FRAME (PENDING FIBER DESIGN AND UTILITY COORDINATION REPORT) (LENGTH: ±1690'-0")

PROPOSED POWER ROUTE FROM EXISTING UTILITY FRAME WITH EMPTY METER SOCKET TO PROPOSED DISH PLATFORM (PENDING POWER DESIGN AND UTILITY COORDINATION REPORT) (LENGTH: ±39'-0")

PROPOSED 2" SCHD 40 PVC UG CONDUIT FOR FIBER FROM HH TO PROPOSED DISH PLATFORM (DISH TO INSTALL CONDUIT) (PENDING FIBER DESIGN AND UTILITY COORDINATION REPORT) (LENGTH: ±15'-0")



NOTES

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

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

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

ELECTRICAL NOTES

2



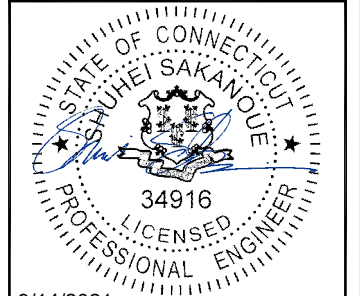
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SUBMITTALS		
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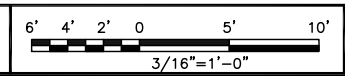
A&E PROJECT NUMBER
6039-Z0001-C

DISH Wireless L.L.C.
PROJECT INFORMATION
BOHVN00018A
85 PAPER MILL ROAD
WOODBURY, CT 06798

SHEET TITLE
ELECTRICAL/FIBER ROUTE
PLAN AND NOTES

SHEET NUMBER
E-1

UTILITY ROUTE PLAN



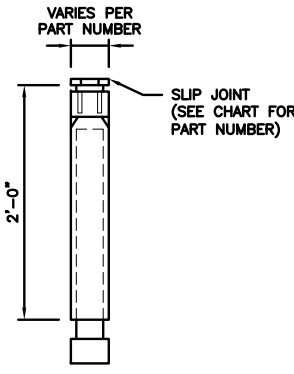
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OVERALL UTILITY ROUTE PLAN

NO SCALE

3

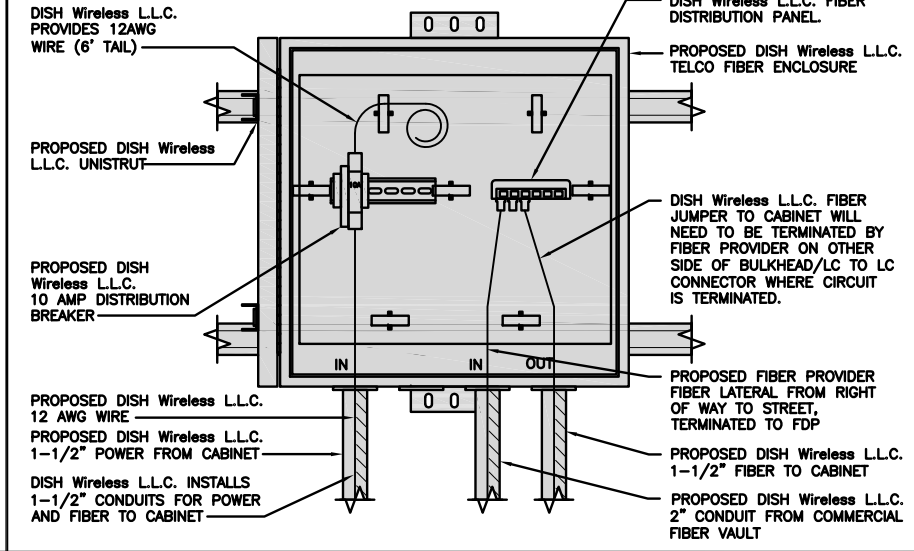
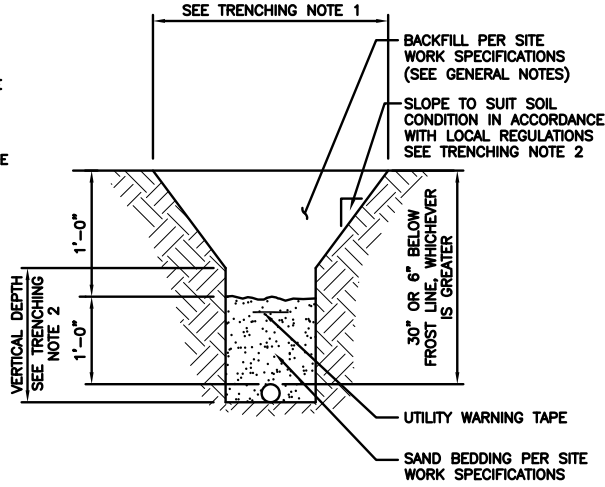
CARLON EXPANSION FITTINGS				
COUPLING END PART#	MALE TERMINAL ADAPTER END PART#	SIZE	STD CTN QTY.	TRAVEL LENGTH
E945D	E945DX	1/2"	20	4"
E945E	E945EX	3/4"	15	4"
E945F	E945FX	1"	10	4"
E945G	E945GX	1 1/4"	5	4"
E945H	E945HX	1 1/2"	5	4"
E945J	E945JX	2"	15	8"
E945K	E945KX	2 1/2"	10	8"
E945L	E945LX	3"	10	8"
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.

TRENCHING NOTES

- 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.
- TRENCHING SAFETY; INCLUDING, BUT NOT LIMITED TO SOIL CLASSIFICATION, SLOPING, AND SHORING, SHALL BE GOVERNED BY THE CURRENT OSHA TRENCHING AND EXCAVATION SAFETY STANDARDS.
- 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.



EXPANSION JOINT DETAIL

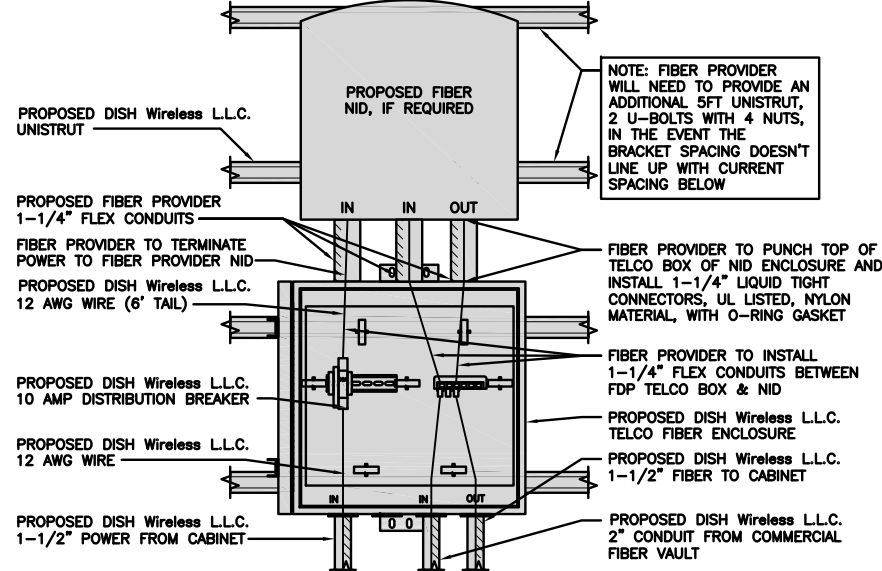
NO SCALE 1

TYPICAL UNDERGROUND TRENCH DETAIL

NO SCALE 2

DARK TELCO BOX – INTERIOR WIRING LAYOUT

NO SCALE 3



LIT TELCO BOX – INTERIOR WIRING LAYOUT (OPTIONAL)

NO SCALE 4

NOT USED

NO SCALE 5

NOT USED

NO SCALE 6

NOT USED

NO SCALE 7

NOT USED

NO SCALE 8

NOT USED

NO SCALE 9



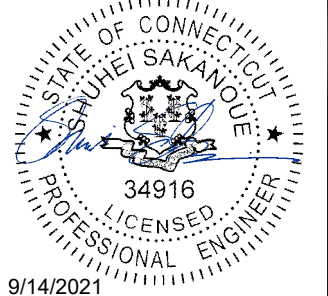
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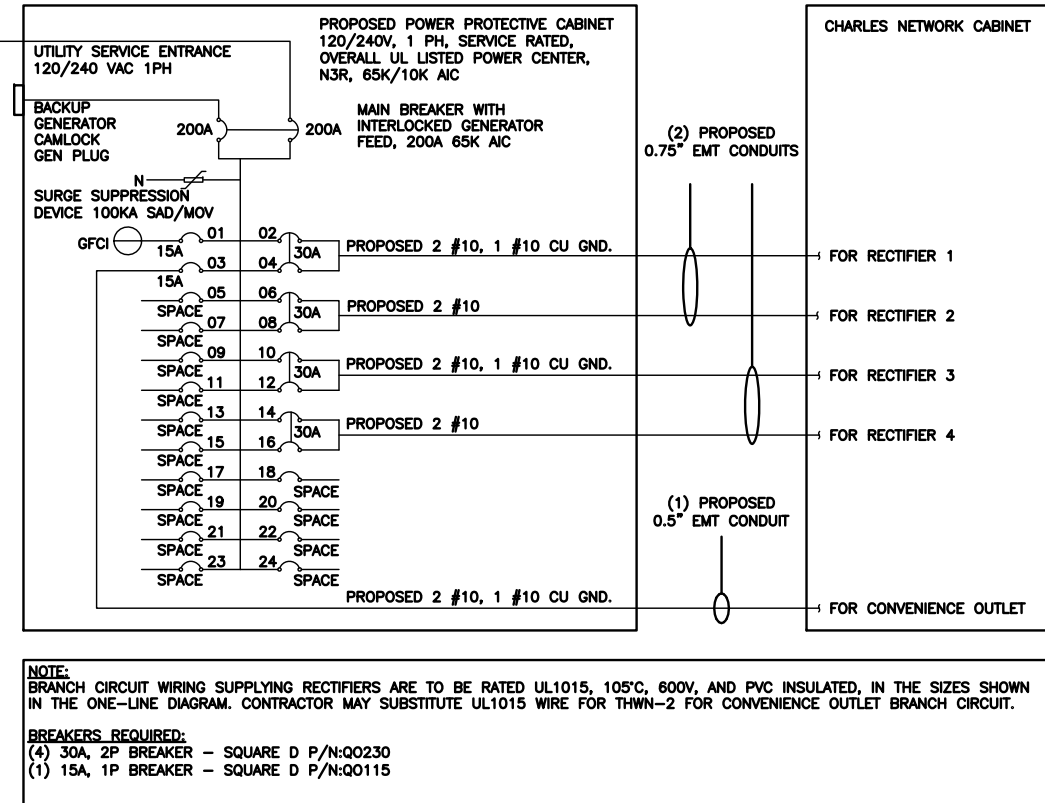
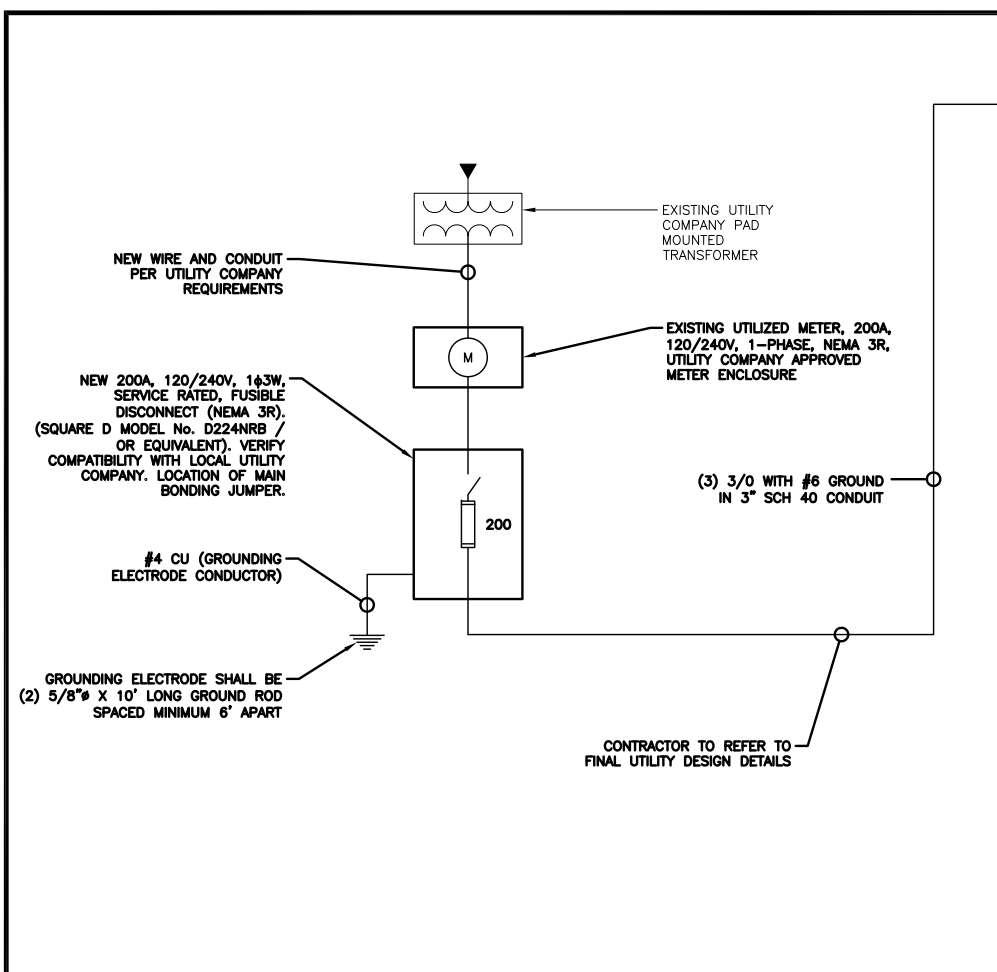
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DISH Wireless L.L.C.
PROJECT INFORMATION
BOHVN00018A
85 PAPER MILL ROAD
WOODBURY, CT 06798

SHEET TITLE
ELECTRICAL
DETAILS

SHEET NUMBER

E-2



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

PANEL SCHEDULE

NO SCALE 2

NOT USED

NO SCALE 3



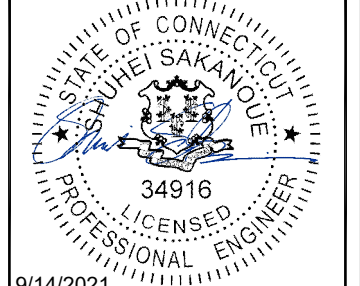
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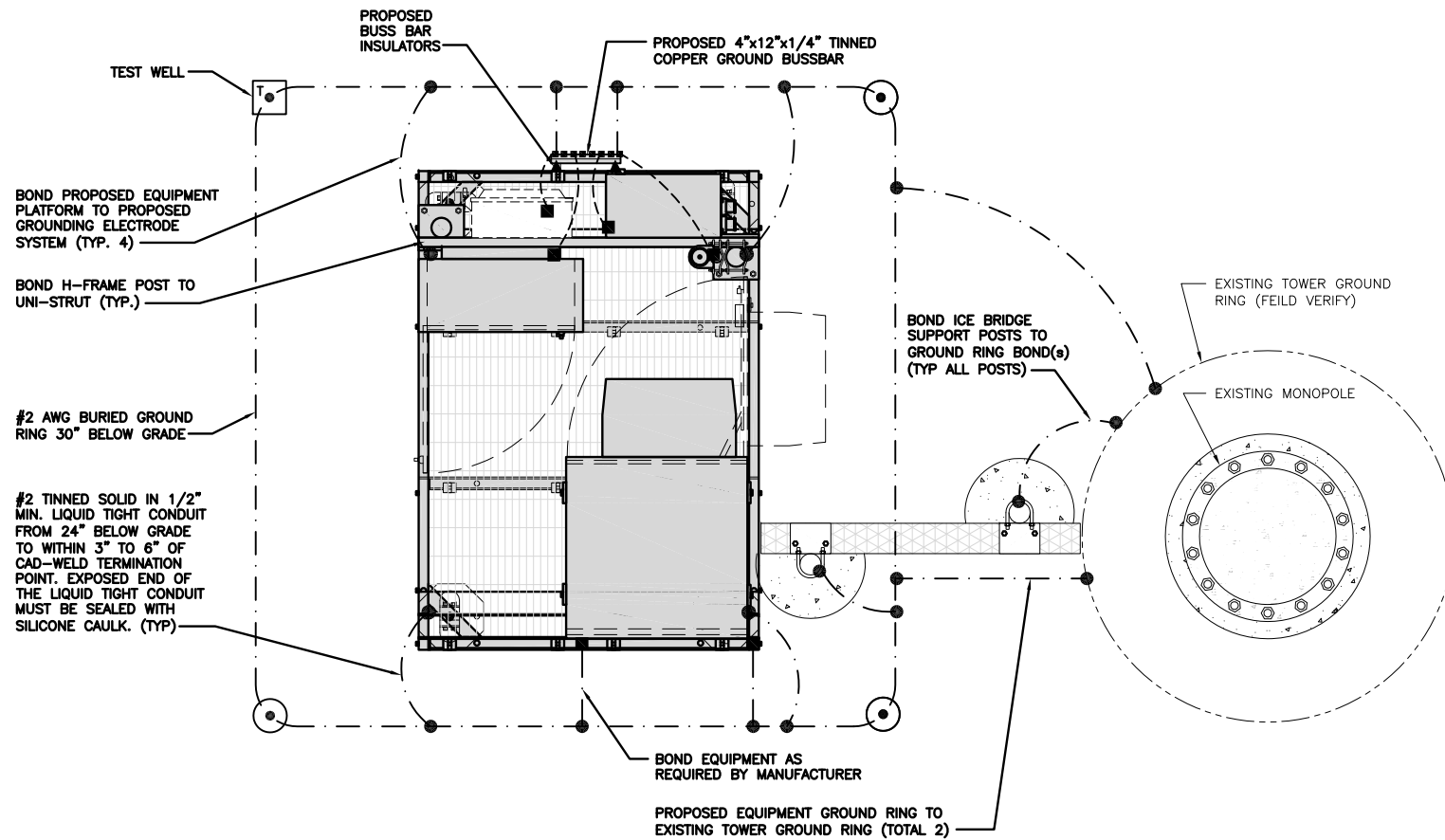
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DISH Wireless L.L.C.
PROJECT INFORMATION
BOHVN00018A
85 PAPER MILL ROAD
WOODBURY, CT 06798

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

SHEET NUMBER
E-3

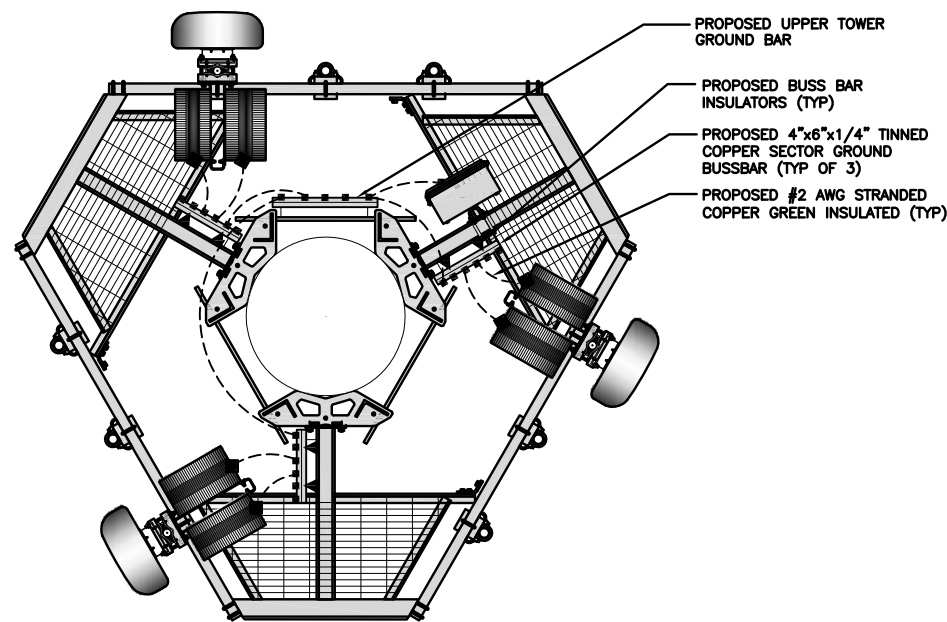


TYPICAL EQUIPMENT GROUNDING PLAN

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
- T TEST GROUND ROD WITH INSPECTION SLEEVE
- #6 AWG STRANDED & INSULATED
- - - #2 AWG SOLID COPPER TINNED
- ▲ BUSS BAR INSULATOR

GROUNDING LEGEND

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

GROUNDING KEY NOTES

- 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.
- 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.
- 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 GROUND TO THE INTERIOR GROUND RING WITH #6 AWG STRANDED GREEN INSULATED CONDUCTOR.
- 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.
- 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.
- 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.
- 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.
- 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.
- TELCO GROUND BAR:** BOND TO BOTH CELL REFERENCE GROUND BAR OR EXTERIOR GROUND RING.
- FRAME BONDING:** THE BONDING POINT FOR TELECOM EQUIPMENT FRAMES SHALL BE THE GROUND BUS THAT IS NOT ISOLATED FROM THE EQUIPMENTS METAL FRAMEWORK.
- 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.
- 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.
- 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
- 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.
- 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**
- TOWER TOP COLLECTOR BUSS BAR IS TO BE MECHANICALLY BONDED TO PROPOSED ANTENNA MOUNT COLLAR. REFER TO DISH Wireless L.L.C. GROUNDING NOTES.**

GROUNDING KEY NOTES

NO SCALE 3



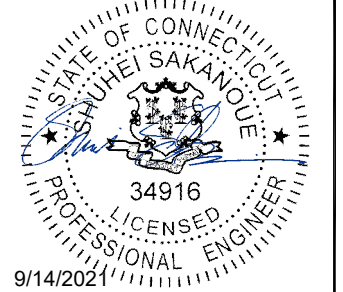
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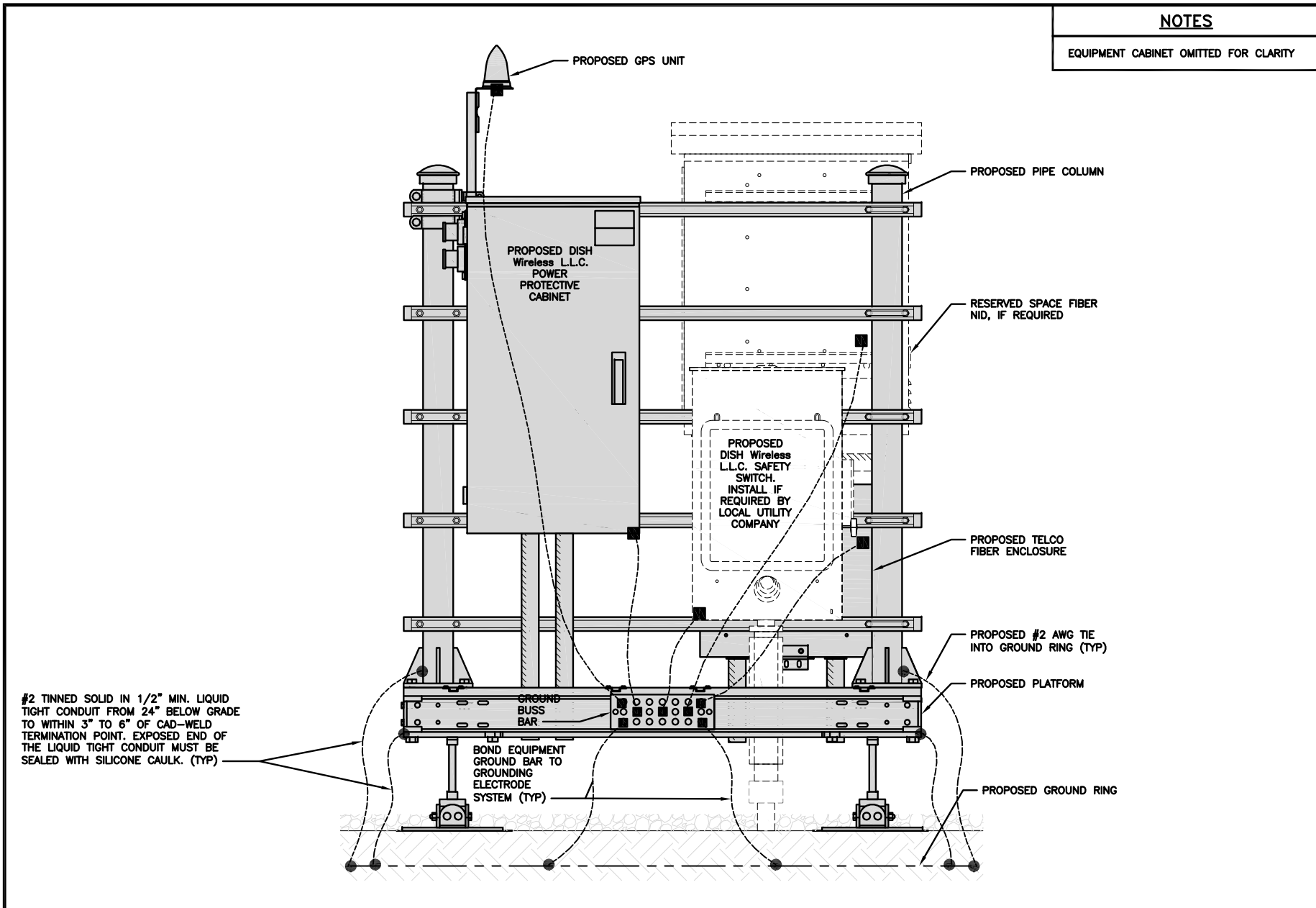
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85 PAPER MILL ROAD
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SHEET TITLE
GROUNDING PLANS
AND NOTES

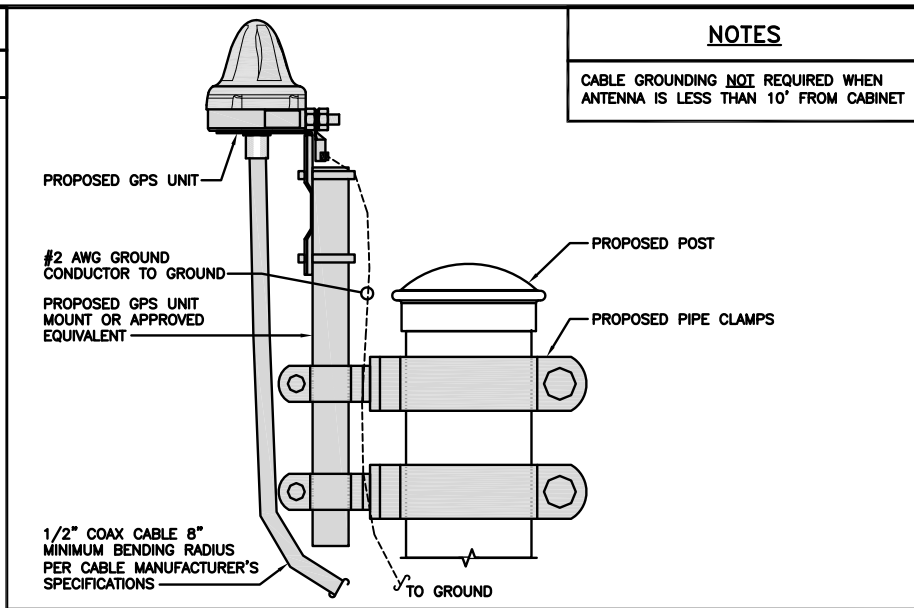
SHEET NUMBER

G-1



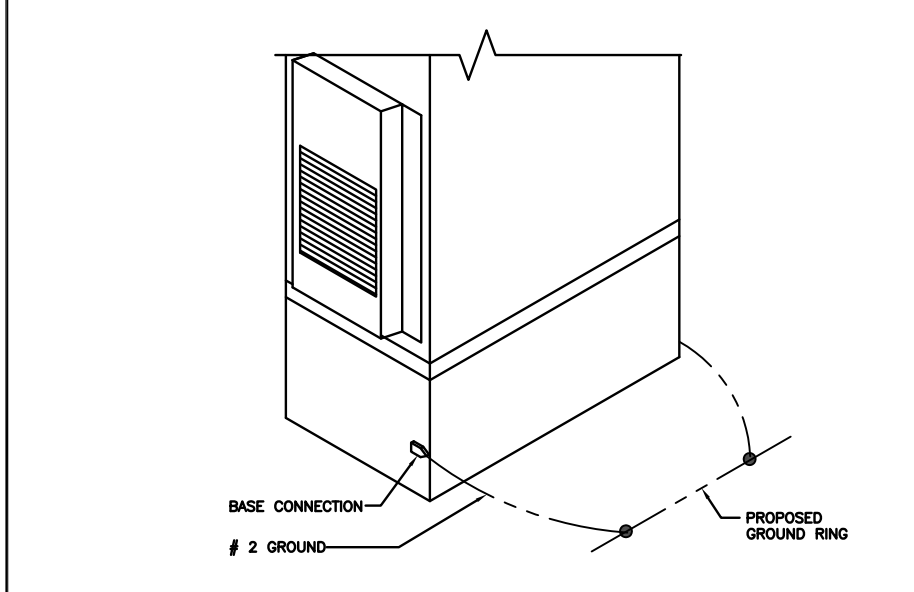
H-FRAME GROUNDING DETAIL

NO SCALE 1



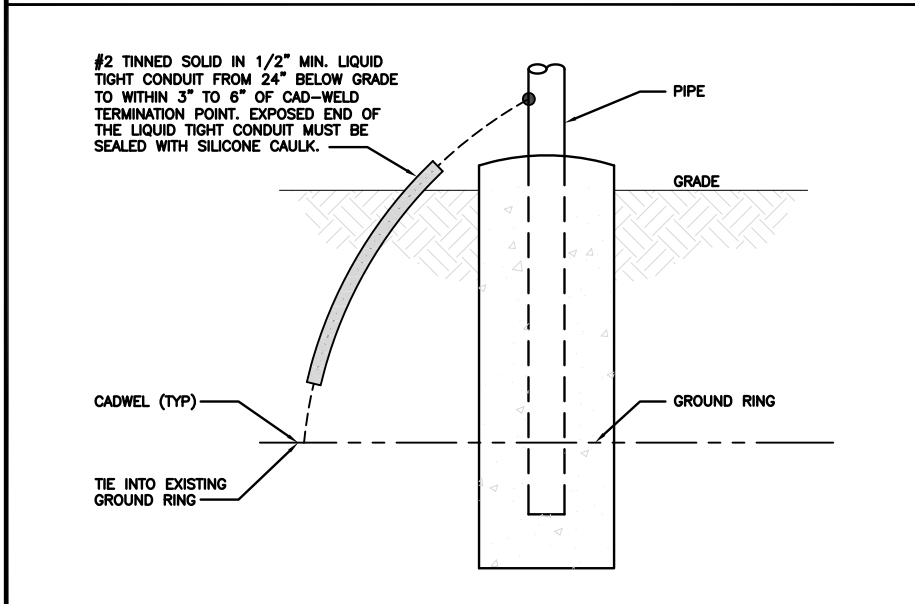
TYPICAL GPS UNIT GROUNDING

NO SCALE 2



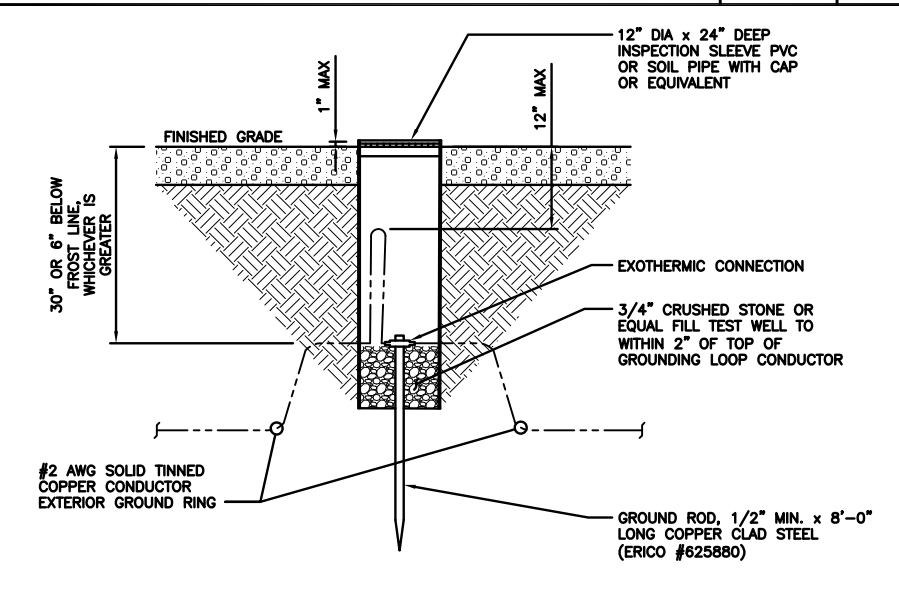
OUTDOOR CABINET GROUNDING

NO SCALE 3



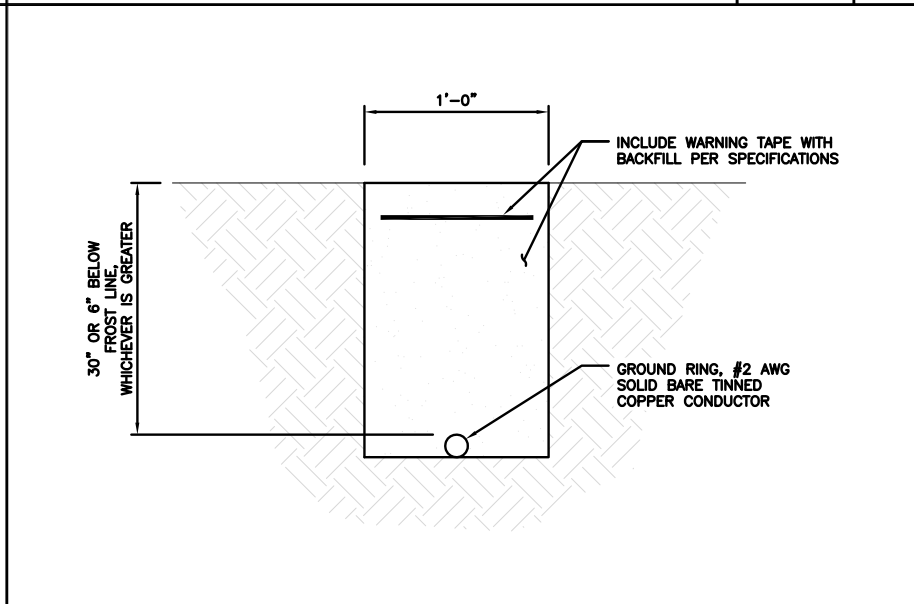
TRANSITIONING GROUND DETAIL

NO SCALE 4



TYPICAL TEST GROUND ROD WITH INSPECTION SLEEVE

NO SCALE 5



TYPICAL GROUND RING TRENCH

NO SCALE 6



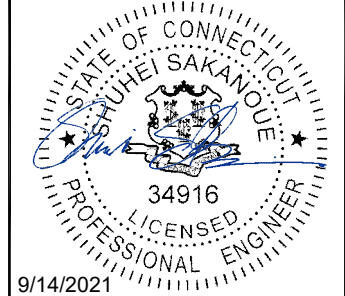
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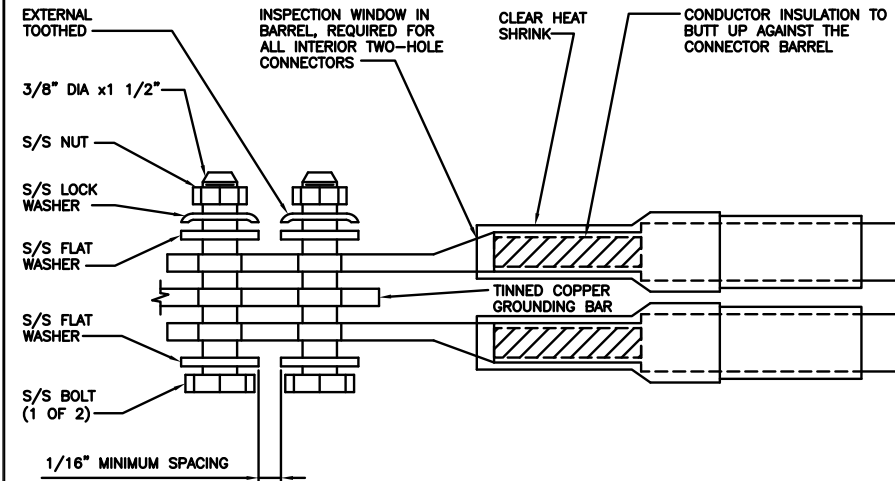
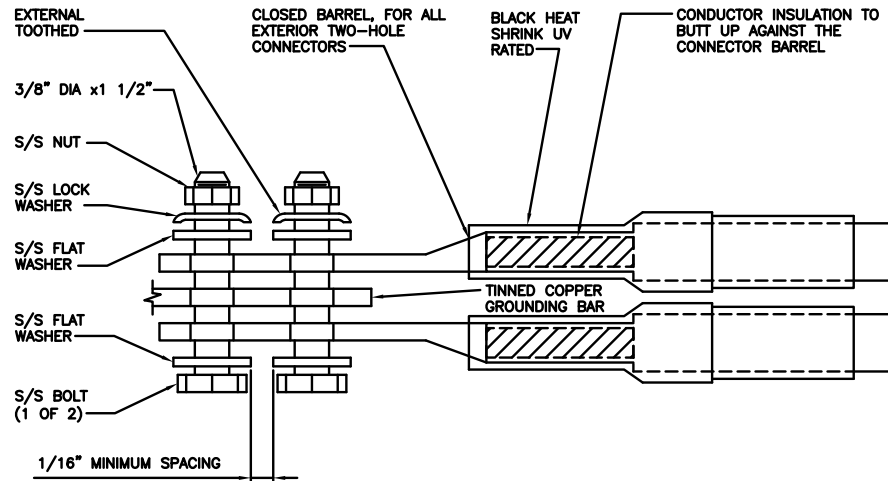
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85 PAPER MILL ROAD
WOODBURY, CT 06798

SHEET TITLE
GROUNDING DETAILS

SHEET NUMBER
G-2

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



TYPICAL GROUNDING NOTES

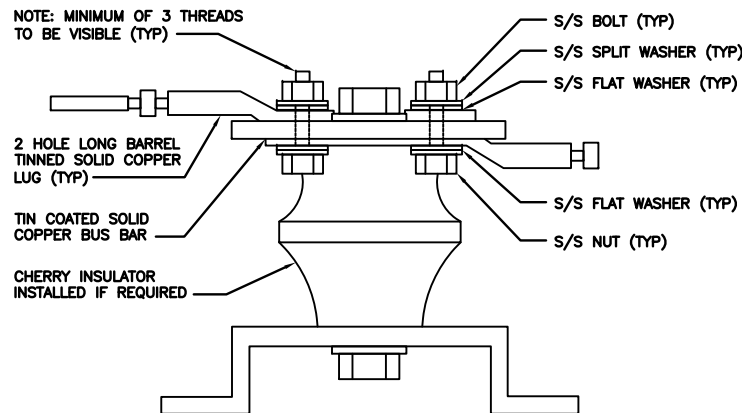
NO SCALE 1

TYPICAL EXTERIOR TWO HOLE LUG

NO SCALE 2

TYPICAL INTERIOR TWO HOLE LUG

NO SCALE 3



LUG DETAIL

NO SCALE 4

NOT USED

NO SCALE 5

NOT USED

NO SCALE 6

NOT USED

NO SCALE 7

NOT USED

NO SCALE 8

NOT USED

NO SCALE 9



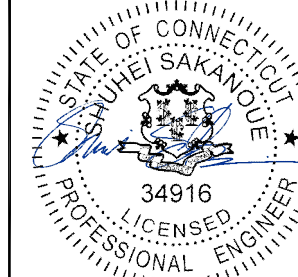
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DRAWN BY: CHECKED BY: APPROVED BY:

RCD SS CJW

RFDS REV #: N/A

CONSTRUCTION DOCUMENTS

SUBMITTALS		
REV	DATE	DESCRIPTION
A	07/01/2021	ISSUED FOR REVIEW
0	08/31/2021	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
6039-Z0001-C

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00018A
85 PAPER MILL ROAD
WOODBURY, CT 06798

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)

ALPHA RRH				BETA RRH				GAMMA RRH			
PORT 1 + SLANT	PORT 2 - SLANT	PORT 3 + SLANT	PORT 4 - SLANT	PORT 1 + SLANT	PORT 2 - SLANT	PORT 3 + SLANT	PORT 4 - SLANT	PORT 1 + SLANT	PORT 2 - SLANT	PORT 3 + SLANT	PORT 4 - SLANT
RED	RED	RED	RED	BLUE	BLUE	BLUE	BLUE	GREEN	GREEN	GREEN	GREEN
ORANGE	ORANGE	RED	RED	ORANGE	ORANGE	BLUE	BLUE	ORANGE	ORANGE	GREEN	GREEN
	WHITE (-) PORT	ORANGE	ORANGE		WHITE (-) PORT	ORANGE	ORANGE		WHITE (-) PORT	ORANGE	ORANGE
			WHITE (-) PORT				WHITE (-) PORT				WHITE (-) PORT

MID-BAND RRH -
(AWS BANDS N66+N70)

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

RED	RED	RED	RED	BLUE	BLUE	BLUE	BLUE	GREEN	GREEN	GREEN	GREEN
PURPLE	PURPLE	RED	RED	PURPLE	PURPLE	BLUE	BLUE	PURPLE	PURPLE	GREEN	GREEN
	WHITE (-) PORT	PURPLE	PURPLE		WHITE (-) PORT	PURPLE	PURPLE		WHITE (-) PORT	PURPLE	PURPLE
			WHITE (-) PORT				WHITE (-) PORT				WHITE (-) PORT

HYBRID/DISCREET CABLES

INCLUDE SECTOR BANDS BEING SUPPORTED
ALONG WITH FREQUENCY BANDS

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

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

EXAMPLE 1	EXAMPLE 2	EXAMPLE 3
RED	RED	RED
BLUE	BLUE	
GREEN	GREEN	ORANGE
ORANGE	YELLOW	PURPLE
PURPLE		

FIBER JUMPERS TO RRHs

LOW-BAND RRH FIBER CABLES HAVE SECTOR
STRIPE ONLY

LOW BAND RRH	HIGH BAND RRH	LOW BAND RRH	HIGH BAND RRH	LOW BAND RRH	HIGH BAND RRH
RED	RED	BLUE	BLUE	GREEN	GREEN
	PURPLE		PURPLE		PURPLE

POWER CABLES TO RRHs

LOW-BAND RRH POWER CABLES HAVE SECTOR
STRIPE ONLY

LOW BAND RRH	HIGH BAND RRH	LOW BAND RRH	HIGH BAND RRH	LOW BAND RRH	HIGH BAND RRH
RED	RED	BLUE	BLUE	GREEN	GREEN
	PURPLE		PURPLE		PURPLE

RET MOTORS AT ANTENNAS

ANTENNA 1 LOW BAND/ "IN"	ANTENNA 1 HIGH BAND/ "IN"	ANTENNA 1 LOW BAND/ "IN"	ANTENNA 1 HIGH BAND/ "IN"	ANTENNA 1 LOW BAND/ "IN"	ANTENNA 1 HIGH BAND/ "IN"
RED	RED	BLUE	BLUE	GREEN	GREEN
	PURPLE		PURPLE		PURPLE

MICROWAVE RADIO LINKS

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

MICROWAVE CABLES WILL REQUIRE P-TOUCH
LABELS INSIDE THE CABINET TO IDENTIFY THE
LOCAL AND REMOTE SITE ID'S

FORWARD AZIMUTH OF 0-120 DEGREES		FORWARD AZIMUTH OF 120-240 DEGREES		FORWARD AZIMUTH OF 240-360 DEGREES	
PRIMARY	SECONDARY	PRIMARY	SECONDARY	PRIMARY	SECONDARY
WHITE	WHITE	WHITE	WHITE	WHITE	WHITE
RED	RED	BLUE	BLUE	GREEN	GREEN
WHITE	WHITE	WHITE	WHITE	WHITE	WHITE
	RED		BLUE		GREEN
	WHITE		WHITE		WHITE
	WHITE		WHITE		WHITE

RF CABLE COLOR CODES

NO SCALE

1

LOW BANDS (N71+N26)
OPTIONAL - (N29)



AWS
(N66+N70+H-BLOCK)



CBRS TECH
(3 GHz)



NEGATIVE SLANT PORT
ON ANT/RRH



ALPHA SECTOR



BETA SECTOR



GAMMA SECTOR



COLOR IDENTIFIER

NO SCALE

2

NOT USED

NO SCALE

3

NOT USED

NO SCALE

4



5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

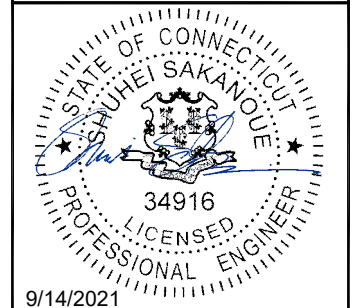


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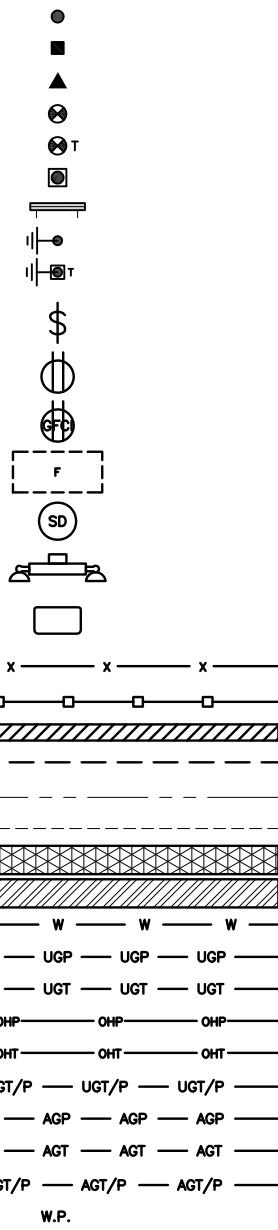
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PROJECT INFORMATION

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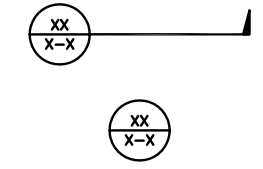
SHEET TITLE
RF
CABLE COLOR CODES

SHEET NUMBER
RF-1

EXOTHERMIC CONNECTION
 MECHANICAL CONNECTION
 BUSS BAR INSULATOR
 CHEMICAL ELECTROLYTIC GROUNDING SYSTEM
 TEST CHEMICAL ELECTROLYTIC GROUNDING SYSTEM
 EXOTHERMIC WITH INSPECTION SLEEVE
 GROUNDING BAR
 GROUND ROD
 TEST GROUND ROD WITH INSPECTION SLEEVE
 SINGLE POLE SWITCH
 DUPLEX RECEPTACLE
 DUPLEX GFCI RECEPTACLE
 FLUORESCENT LIGHTING FIXTURE (2) TWO LAMPS 48-T8
 SMOKE DETECTION (DC)
 EMERGENCY LIGHTING (DC)
 SECURITY LIGHT W/PHOTOCELL LITHONIA ALXW
 LED-1-25A400/51K-SR4-120-PE-DOBTD
 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	IN INCH
ABV ABOVE	INT INTERIOR
AC ALTERNATING CURRENT	LB(S) POUND(S)
ADDL ADDITIONAL	LF LINEAR FEET
AFF ABOVE FINISHED FLOOR	LTE LONG TERM EVOLUTION
AFG ABOVE FINISHED GRADE	MAS MASONRY
AGL ABOVE GROUND LEVEL	MAX MAXIMUM
AIC AMPERAGE INTERRUPTION CAPACITY	MB MACHINE BOLT
ALUM ALUMINUM	MECH MECHANICAL
ALT ALTERNATE	MFR MANUFACTURER
ANT ANTENNA	MGB MASTER GROUND BAR
APPROX APPROXIMATE	MIN MINIMUM
ARCH ARCHITECTURAL	MISC MISCELLANEOUS
ATS AUTOMATIC TRANSFER SWITCH	MTL METAL
AWG AMERICAN WIRE GAUGE	MTS MANUAL TRANSFER SWITCH
BATT BATTERY	MW MICROWAVE
BLDG BUILDING	NEC NATIONAL ELECTRIC CODE
BLK BLOCK	NM NEWTON METERS
BLKG BLOCKING	NO. NUMBER
BM BEAM	# NUMBER
BTC BARE TINNED COPPER CONDUCTOR	NTS NOT TO SCALE
BOF BOTTOM OF FOOTING	OC ON-CENTER
CAB CABINET	OSHA OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
CANT CANTILEVERED	OPNG OPENING
CHG CHARGING	P/C PRECAST CONCRETE
CLG CEILING	PCS PERSONAL COMMUNICATION SERVICES
CLR CLEAR	PCU PRIMARY CONTROL UNIT
COL COLUMN	PRC PRIMARY RADIO CABINET
COMM COMMON	PP POLARIZING PRESERVING
CONC CONCRETE	PSF POUNDS PER SQUARE FOOT
CONSTR CONSTRUCTION	PSI POUNDS PER SQUARE INCH
DBL DOUBLE	PT PRESSURE TREATED
DC DIRECT CURRENT	PWR POWER CABINET
DEPT DEPARTMENT	QTY QUANTITY
DF DOUGLAS FIR	RAD RADIUS
DIA DIAMETER	RECT RECTIFIER
DIAG DIAGONAL	REF REFERENCE
DIM DIMENSION	REINF REINFORCEMENT
DWG DRAWING	REQ'D REQUIRED
DWL DOWEL	RET REMOTE ELECTRIC TILT
EA EACH	RF RADIO FREQUENCY
EC ELECTRICAL CONDUCTOR	RMC RIGID METALLIC CONDUIT
EL ELEVATION	RRH REMOTE RADIO HEAD
ELEC ELECTRICAL	RRU REMOTE RADIO UNIT
EMT ELECTRICAL METALLIC TUBING	RWY RACEWAY
ENG ENGINEER	SCH SCHEDULE
EQ EQUAL	SHT SHEET
EXP EXPANSION	SIAD SMART INTEGRATED ACCESS DEVICE
EXT EXTERIOR	SIM SIMILAR
EW EACH WAY	SPEC SPECIFICATION
FAB FABRICATION	SQ SQUARE
FF FINISH FLOOR	SS STAINLESS STEEL
FG FINISH GRADE	STD STANDARD
FIF FACILITY INTERFACE FRAME	STL STEEL
FIN FINISH(ED)	TEMP TEMPORARY
FLR FLOOR	THK THICKNESS
FDN FOUNDATION	TMA TOWER MOUNTED AMPLIFIER
FOC FACE OF CONCRETE	TN TOE NAIL
FOM FACE OF MASONRY	TOA TOP OF ANTENNA
FOS FACE OF STUD	TOC TOP OF CURB
FOW FACE OF WALL	TOF TOP OF FOUNDATION
FS FINISH SURFACE	TOP TOP OF PLATE (PARAPET)
FT FOOT	TOS TOP OF STEEL
FTG FOOTING	TOW TOP OF WALL
GA GAUGE	TVSS TRANSIENT VOLTAGE SURGE SUPPRESSION
GEN GENERATOR	TYP TYPICAL
GFCI GROUND FAULT CIRCUIT INTERRUPTER	UG UNDERGROUND
GLB GLUE LAMINATED BEAM	UL UNDERWRITERS LABORATORY
GLV GALVANIZED	UNO UNLESS NOTED OTHERWISE
GPS GLOBAL POSITIONING SYSTEM	UMTS UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
GND GROUND	UPS UNINTERRUPTIBLE POWER SYSTEM (DC POWER PLANT)
GSM GLOBAL SYSTEM FOR MOBILE	VIF VERIFIED IN FIELD
HDG HOT DIPPED GALVANIZED	W WIDE
HDR HEADER	W/ WITH
HGR HANGER	WD WOOD
HVAC HEAT/VENTILATION/AIR CONDITIONING	WP WEATHERPROOF
HT HEIGHT	WT WEIGHT
IGR INTERIOR GROUND RING	

ABBREVIATIONS



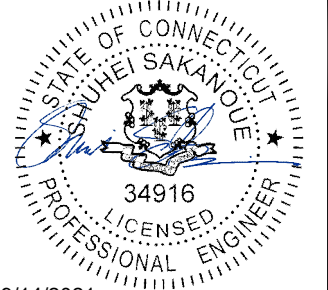
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DISH Wireless L.L.C.
 PROJECT INFORMATION
 BOHVN00018A
 85 PAPER MILL ROAD
 WOODBURY, CT 06798

SHEET TITLE
 LEGEND AND ABBREVIATIONS

SHEET NUMBER
GN-1

SITE ACTIVITY REQUIREMENTS:

1. NOTICE TO PROCEED – NO WORK SHALL COMMENCE PRIOR TO CONTRACTOR RECEIVING A WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE DISH Wireless L.L.C. AND TOWER OWNER NOC & THE DISH Wireless L.L.C. AND TOWER OWNER CONSTRUCTION MANAGER.
2. "LOOK UP" – DISH Wireless L.L.C. AND TOWER OWNER SAFETY CLIMB REQUIREMENT:
THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR DISH Wireless L.L.C. AND DISH Wireless L.L.C. AND TOWER OWNER POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.
3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.
4. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN, AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND DISH Wireless L.L.C. AND TOWER OWNER STANDARDS, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION, TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA-322 (LATEST EDITION).
5. ALL SITE WORK TO COMPLY WITH DISH Wireless L.L.C. AND TOWER OWNER INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON DISH Wireless L.L.C. AND TOWER OWNER TOWER SITE AND LATEST VERSION OF ANSI/TIA-1019-A-2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
6. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY DISH Wireless L.L.C. AND TOWER OWNER PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES INCLUDING PRIVATE LOCATES SERVICES PRIOR TO THE START OF CONSTRUCTION.
10. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION E) CONSTRUCTION SAFETY PROCEDURES.
11. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND DISH PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.
12. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
13. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF DISH Wireless L.L.C. AND TOWER OWNER, AND/OR LOCAL UTILITIES.
14. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.
15. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.
16. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
17. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.
18. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
19. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
20. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS AND RADIOS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
21. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.
22. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

GENERAL NOTES:

- 1.FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
CONTRACTOR:GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION
CARRIER:DISH Wireless L.L.C.
TOWER OWNER:TOWER OWNER
2. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE ENGINEERS IN THIS OR SIMILAR LOCALITIES. IT IS ASSUMED THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND/OR WORKPEOPLE WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.
3. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY FOR PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, FORMWORK, SHORING, ETC. SITE VISITS BY THE ENGINEER OR HIS REPRESENTATIVE WILL NOT INCLUDE INSPECTION OF THESE ITEMS AND IS FOR STRUCTURAL OBSERVATION OF THE FINISHED STRUCTURE ONLY.
4. NOTES AND DETAILS IN THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT, AND/OR AS PROVIDED FOR IN THE CONTRACT DOCUMENTS. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL NOTES, AND SPECIFICATIONS, THE GREATER, MORE STRICT REQUIREMENTS, SHALL GOVERN. IF FURTHER CLARIFICATION IS REQUIRED CONTACT THE ENGINEER OF RECORD.
5. SUBSTANTIAL EFFORT HAS BEEN MADE TO PROVIDE ACCURATE DIMENSIONS AND MEASUREMENTS ON THE DRAWINGS TO ASSIST IN THE FABRICATION AND/OR PLACEMENT OF CONSTRUCTION ELEMENTS BUT IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE DIMENSIONS, MEASUREMENTS, AND/OR CLEARANCES SHOWN IN THE CONSTRUCTION DRAWINGS PRIOR TO FABRICATION OR CUTTING OF ANY NEW OR EXISTING CONSTRUCTION ELEMENTS. IF IT IS DETERMINED THAT THERE ARE DISCREPANCIES AND/OR CONFLICTS WITH THE CONSTRUCTION DRAWINGS THE ENGINEER OF RECORD IS TO BE NOTIFIED AS SOON AS POSSIBLE.
6. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CARRIER POC AND TOWER OWNER.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
9. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
10. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CARRIER AND TOWER OWNER PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
11. CONTRACTOR IS TO PERFORM A SITE INVESTIGATION, BEFORE SUBMITTING BIDS, TO DETERMINE THE BEST ROUTING OF ALL CONDUITS FOR POWER, AND TELCO AND FOR GROUNDING CABLES AS SHOWN IN THE POWER, TELCO, AND GROUNDING PLAN DRAWINGS.
12. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF DISH Wireless L.L.C. AND TOWER OWNER
13. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
14. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.



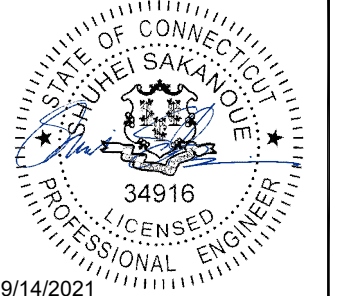
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RCD	SS	CJW

RFDS REV #: N/A

CONSTRUCTION DOCUMENTS

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REV	DATE	DESCRIPTION
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A&E PROJECT NUMBER
6039-Z0001-C

DISH Wireless L.L.C.
PROJECT INFORMATION
BOHVN00018A
85 PAPER MILL ROAD
WOODBURY, CT 06798

SHEET TITLE
GENERAL NOTES

SHEET NUMBER
GN-2

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST-IN-PLACE CONCRETE.
2. UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.
3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (f'c) OF 3000 psi AT 28 DAYS, UNLESS NOTED OTHERWISE. NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME TO TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF CONCRETE SHALL NOT EXCEED 90°F AT TIME OF PLACEMENT.
4. CONCRETE EXPOSED TO FREEZE-THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A MAXIMUM WATER-TO-CEMENT RATIO (W/C) OF 0.45.
5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES, UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH (Fy) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:
 #4 BARS AND SMALLER 40 ksi
 #5 BARS AND LARGER 60 ksi
6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
 - CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH 3"
 - CONCRETE EXPOSED TO EARTH OR WEATHER:
 - #6 BARS AND LARGER 2"
 - #5 BARS AND SMALLER 1-1/2"
 - CONCRETE NOT EXPOSED TO EARTH OR WEATHER:
 - SLAB AND WALLS 3/4"
 - BEAMS AND COLUMNS 1-1/2"
7. A TOOLED EDGE OR A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
- 4.1. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.
- 4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PRE THE GOVERNING JURISDICTION.
5. EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR CABLE SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
6. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (i.e. PANEL BOARD AND CIRCUIT ID'S).
7. PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
8. TIE WRAPS ARE NOT ALLOWED.
9. ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER) WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.
10. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.
11. POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI-CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI-CONDUCTOR, TYPE TC CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION NOT LESS THAN 75° C (90° C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.

16. ELECTRICAL METALLIC TUBING (EMT) OR METAL-CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND THE NEC.
21. WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREMOLD SPECMATE WIREWAY).
22. SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).
23. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e. POWDER-ACTUATED) FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
24. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY-COATED SHEET STEEL SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3 (OR BETTER) FOR EXTERIOR LOCATIONS.
25. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY-COATED OR NON-CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
26. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR DISH Wireless L.L.C. AND TOWER OWNER BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
28. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
29. INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "DISH Wireless L.L.C.".
30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.



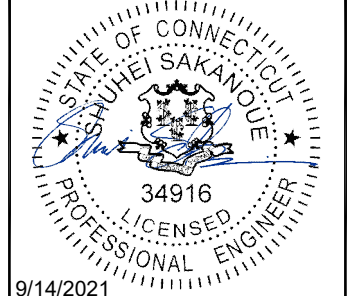
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A&E PROJECT NUMBER
6039-Z0001-C

DISH Wireless L.L.C.
PROJECT INFORMATION
BOHVN00018A
85 PAPER MILL ROAD
WOODBURY, CT 06798

SHEET TITLE
GENERAL NOTES

SHEET NUMBER
GN-3

GROUNDING NOTES:

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE CONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE SOLID TINNED COPPER FOR OUTDOOR BTS.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
15. APPROVED ANTIOXIDANT COATINGS (i.e. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 ft OF MAIN GROUND RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 BARE SOLID TINNED COPPER IN 3/4" NON-METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD-WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).
21. BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY). DO NOT ATTACH GROUNDING TO FIRE SPRINKLER SYSTEM PIPES.



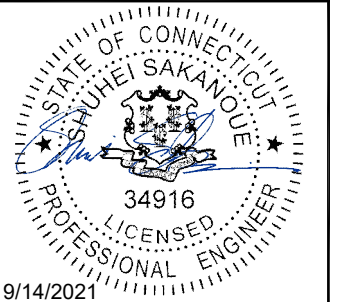
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85 PAPER MILL ROAD
WOODBURY, CT 06798

SHEET TITLE
GENERAL NOTES

SHEET NUMBER
GN-4

Exhibit D

Structural Analysis Report

Date: **May 28, 2021**



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

Subject: **Structural Analysis Report**

Carrier Designation: **DISH Network Co-Locate**
Site Number: BOHVN00018A
Site Name: CT-CCI-T-857528

Crown Castle Designation: **BU Number:** 857528
Site Name: WOODBURY PAPER MILL RD
JDE Job Number: 645155
Work Order Number: 1966221
Order Number: 553361 Rev. 1

Engineering Firm Designation: **Crown Castle Project Number:** 1966221

Site Data: **85 PAPER MILL ROAD, WOODBURY, LITCHFIELD County, CT**
Latitude 41° 34' 23.07", Longitude -73° 13' 39.51"
150 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 – 52.6%

This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - "Analysis Criteria".

Structural analysis prepared by: Michael Lopienski

Respectfully submitted by:

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

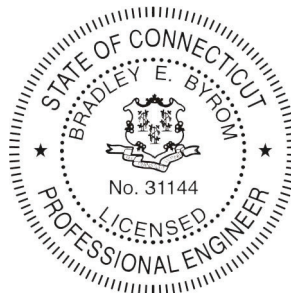


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1) INTRODUCTION

This tower is a 150 ft Monopole tower designed by Ehresmann Engineering 1995.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	120 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
138.0	138.0	3	fujitsu	TA08025-B604	1	1-1/2
		3	fujitsu	TA08025-B605		
		3	jma wireless	MX08FRO665-21 w/ Mount Pipe		
		1	raycap	RDIDC-9181-PF-48		
		1	tower mounts	Commscope MC-PK8-DSH		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
147.0	148.0	1	cci antennas	DMP65R-BU4D w/ Mount Pipe	6 2 2 3	1-5/8 3/8 5/8 3/4
		2	cci antennas	DMP65R-BU6D w/ Mount Pipe		
		1	cci antennas	OPA65R-BU4D w/ Mount Pipe		
		2	cci antennas	OPA65R-BU6D w/ Mount Pipe		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 4478 B14		
		3	ericsson	RRUS 8843 B2/B66A		
		3	powerwave technologies	P90-14-XLH-RR w/ Mount Pipe		
		3	powerwave technologies	TT19-08BP111-001		
	2	raycap	DC6-48-60-18-8F			
	147.0	1	tower mounts	Miscellaneous [NA 507-1]		
147.0	1	tower mounts	Platform Mount [LP 601-1]			

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	4570959	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	4724414	CCISITES
4-TOWER MANUFACTURER DRAWINGS	4724415	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	150 - 104.5	Pole	TP28.1875x18x0.1875	1	-8.95	988.77	48.5	Pass
L2	104.5 - 68.75	Pole	TP35.75x26.8609x0.25	2	-13.42	1673.43	48.8	Pass
L3	68.75 - 34	Pole	TP43x34.0833x0.3125	3	-19.95	2519.29	43.7	Pass
L4	34 - 0	Pole	TP50x41.0375x0.3125	4	-29.27	3027.25	50.2	Pass
							Summary	
						Pole (L4)	50.2	Pass
						Rating =	50.2	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	21.8	Pass
1	Base Plate	0	31.7	Pass
1	Base Foundation (Structure)	0	25.4	Pass
1	Base Foundation (Soil Interaction)	0	52.6	Pass

Structure Rating (max from all components) =	52.6%
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Notes:

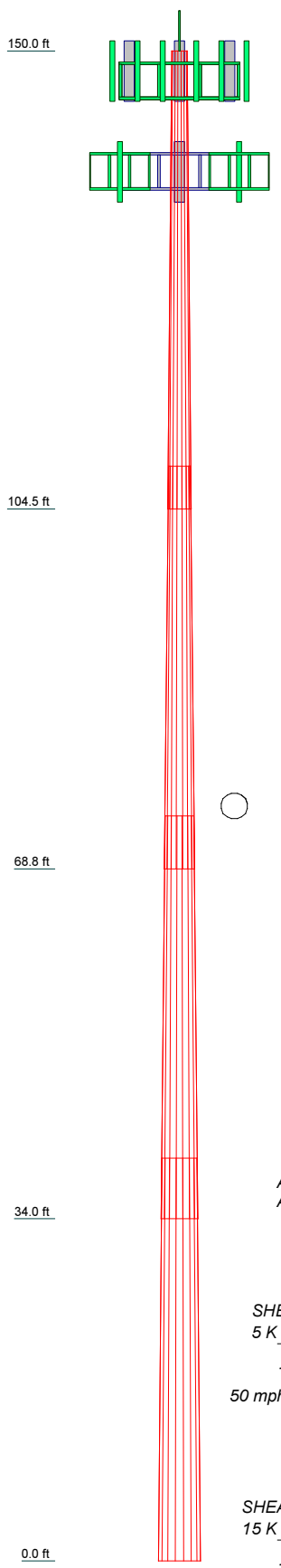
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

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	1	2	3	4	
Length (ft)	45.50	40.00	40.00	40.00	
Number of Sides	18	18	18	18	
Thickness (in)	0.1875	0.2500	0.3125	0.3125	
Socket Length (ft)	4.25	5.25	6.00	41.0375	
Top Dia (in)	18.0000	26.8609	34.0833	50.0000	
Bot Dia (in)	28.1875	35.7500	43.0000		
Grade	A572-65				
Weight (K)	2.1	3.4	5.2	6.1	16.7



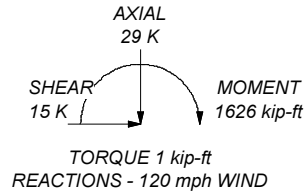
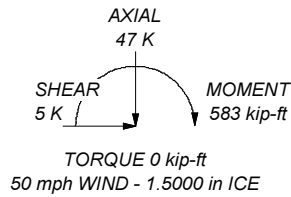
MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for Exposure B to the TIA-222-H Standard.
2. Tower designed for a 120 mph basic wind in accordance with the TIA-222-H Standard.
3. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 50.2%

ALL REACTIONS
ARE FACTORED



Crown Castle

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

Job: BU 857528		
Project:	Client: Crown Castle	App'd:
Code: TIA-222-H	Drawn by: MLopienski	Scale: NTS
Path: C:\Work Area\857528\WO 1986221 - SAIProd\857528_RPA.en	Date: 05/28/21	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 base elevation above sea level: 528.00 ft.
- Basic wind speed of 120 mph.
- Risk Category II.
- Exposure Category B.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.00 ft.
- Nominal ice thickness of 1.5000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.
- 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 Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification ✓ Use Code Stress Ratios ✓ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt. Autocalc Torque Arm Areas Add IBC .6D+W Combination ✓ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder Ignore KL/ry For 60 Deg. Angle Legs	Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption <div style="text-align: center; background-color: #e0e0e0; padding: 2px;">Poles</div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets ✓ Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known
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Tapered Pole Section Geometry

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	

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	150.00-104.50	45.50	4.25	18	18.0000	28.1875	0.1875	0.7500	A572-65 (65 ksi)
L2	104.50-68.75	40.00	5.25	18	26.8609	35.7500	0.2500	1.0000	A572-65 (65 ksi)
L3	68.75-34.00	40.00	6.00	18	34.0833	43.0000	0.3125	1.2500	A572-65 (65 ksi)
L4	34.00-0.00	40.00		18	41.0375	50.0000	0.3125	1.2500	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	18.2488	10.6007	424.9328	6.3234	9.1440	46.4712	850.4248	5.3013	2.8380	15.136
	28.5934	16.6635	1650.5160	9.9400	14.3193	115.2655	3303.2038	8.3333	4.6310	24.699
L2	28.1958	21.1158	1889.1397	9.4469	13.6453	138.4457	3780.7651	10.5599	4.2875	17.15
	36.2629	28.1692	4485.0722	12.6025	18.1610	246.9617	8976.0460	14.0873	5.8520	23.408
L3	35.7493	33.4964	4826.3494	11.9886	17.3143	278.7490	9659.0495	16.7514	5.4487	17.436
	43.6151	42.3407	9747.5744	15.1541	21.8440	446.2358	19507.974 9	21.1744	7.0180	22.458
L4	42.9875	40.3941	8464.0370	14.4574	20.8470	406.0065	16939.211 2	20.2009	6.6726	21.352
	50.7231	49.2838	15372.193 1	17.6391	25.4000	605.2045	30764.613 4	24.6466	8.2500	26.4

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _r	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 150.00- 104.50				1	1	1			
L2 104.50- 68.75				1	1	1			
L3 68.75- 34.00				1	1	1			
L4 34.00-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Componen t Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diamete r in	Perimete r in	Weight plf
*											
*											

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Componen t Type	Placement ft	Total Number	C _A A _A ft ² /ft	Weight plf
*** 147 *** LDF7-50A(1-5/8)	B	No	No	Inside Pole	147.00 - 0.00	12		
						No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C _A A _A ft ² /ft	Weight plf
FB-L98B-034-XXX(3/8)	B	No	No	Inside Pole	147.00 - 0.00	1	2" Ice	0.00	0.82
							No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
WR-VG82ST-BRDA(5/8)	B	No	No	Inside Pole	147.00 - 0.00	2	2" Ice	0.00	0.06
							No Ice	0.00	0.31
							1/2" Ice	0.00	0.31
							1" Ice	0.00	0.31
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	147.00 - 0.00	2	2" Ice	0.00	0.31
							No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
FB-L98B-034-XXX(3/8)	C	No	No	Inside Pole	147.00 - 0.00	1	2" Ice	0.00	0.58
							No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06

Safety Line 3/8	C	No	No	CaAa (Out Of Face)	150.00 - 0.00	1	No Ice	0.04	0.22
							1/2" Ice	0.14	0.75
							1" Ice	0.24	1.28
							2" Ice	0.44	2.34
5/8 rod/step	C	No	No	CaAa (Out Of Face)	150.00 - 0.00	1	No Ice	0.02	0.27
							1/2" Ice	0.12	0.70
							1" Ice	0.22	1.74
							2" Ice	0.42	5.65

CU12PSM9P6XXX (1-1/2)	C	No	No	Inside Pole	138.00 - 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 _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	150.00-104.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.45
		C	0.000	0.000	0.000	2.616	0.15
L2	104.50-68.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.38
		C	0.000	0.000	0.000	2.056	0.15
L3	68.75-34.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.37
		C	0.000	0.000	0.000	1.998	0.14
L4	34.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.36
		C	0.000	0.000	0.000	1.955	0.14

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	150.00-104.50	A	1.458	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.45

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L2	104.50-68.75	C	1.403	0.000	0.000	0.000	29.145	0.37
		A		0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.38
L3	68.75-34.00	C	1.332	0.000	0.000	0.000	22.900	0.32
		A		0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.37
L4	34.00-0.00	C	1.190	0.000	0.000	0.000	21.505	0.30
		A		0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.36
		C		0.000	0.000	0.000	20.074	0.28

Feed Line Center of Pressure

Section	Elevation ft	CP _X in	CP _Z in	CP _X Ice in	CP _Z Ice in
L1	150.00-104.50	-0.4467	0.2579	-2.0969	1.2106
L2	104.50-68.75	-0.4522	0.2611	-2.2881	1.3210
L3	68.75-34.00	-0.4551	0.2627	-2.3296	1.3450
L4	34.00-0.00	-0.4568	0.2638	-2.3139	1.3359

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 Adjustmen t °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K	
Lighting Rod 5/8" x 5'	C	None		0.0000	152.00	No Ice	0.31	0.31	0.03
						1/2" Ice	0.83	0.83	0.03
						Ice	1.32	1.32	0.04
						1" Ice	1.96	1.96	0.07
						2" Ice			
*** 147 *** P90-14-XLH-RR w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	147.00	No Ice	5.30	4.05	0.05
						1/2" Ice	5.69	4.67	0.09
						Ice	6.09	5.29	0.15
						1" Ice	6.90	6.57	0.27
						2" Ice			
P90-14-XLH-RR w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	147.00	No Ice	5.30	4.05	0.05
						1/2" Ice	5.69	4.67	0.09
						Ice	6.09	5.29	0.15
						1" Ice	6.90	6.57	0.27
						2" Ice			
P90-14-XLH-RR w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	147.00	No Ice	5.30	4.05	0.05
						1/2" Ice	5.69	4.67	0.09
						Ice	6.09	5.29	0.15
						1" Ice	6.90	6.57	0.27
						2" Ice			
TT19-08BP111-001	A	From Leg	4.00 0.00 1.00	0.0000	147.00	No Ice	0.55	0.44	0.02
						1/2" Ice	0.64	0.53	0.02
						Ice	0.74	0.63	0.03
						1" Ice	0.97	0.84	0.05
						2" Ice			
TT19-08BP111-001	A	From Leg	4.00	0.0000	147.00	No Ice	0.55	0.44	0.02

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment °	Placement ft	C _{AA} Front	C _{AA} Side	Weight K	
			Horz Lateral ft	Vert ft			ft ²	ft ²		
				0.00			1/2"	0.64	0.53	0.02
				1.00			Ice	0.74	0.63	0.03
							1" Ice	0.97	0.84	0.05
							2" Ice			
TT19-08BP111-001	C	From Leg	4.00	0.0000	147.00	No Ice	0.55	0.44	0.02	
			0.00			1/2"	0.64	0.53	0.02	
			1.00			Ice	0.74	0.63	0.03	
						1" Ice	0.97	0.84	0.05	
						2" Ice				
DC6-48-60-18-8F	B	From Leg	4.00	0.0000	147.00	No Ice	1.21	1.21	0.02	
			0.00			1/2"	1.89	1.89	0.04	
			1.00			Ice	2.11	2.11	0.07	
						1" Ice	2.57	2.57	0.13	
						2" Ice				
6' x 2" Mount Pipe	B	From Leg	4.00	0.0000	147.00	No Ice	1.43	1.43	0.02	
			0.00			1/2"	1.92	1.92	0.03	
			0.00			Ice	2.29	2.29	0.05	
						1" Ice	3.06	3.06	0.09	
						2" Ice				
Platform Mount [LP 601-1]	C	None		0.0000	147.00	No Ice	28.50	28.50	1.12	
						1/2"	31.69	31.69	1.68	
						Ice	34.87	34.87	2.28	
						1" Ice	41.23	41.23	3.65	
						2" Ice				
Miscellaneous [NA 507-1]	C	None		0.0000	147.00	No Ice	4.56	4.56	0.25	
						1/2"	6.39	6.39	0.31	
						Ice	8.18	8.18	0.40	
						1" Ice	11.66	11.66	0.66	
						2" Ice				
DMP65R-BU6D w/ Mount Pipe	A	From Leg	4.00	0.0000	147.00	No Ice	11.96	5.97	0.11	
			0.00			1/2"	12.70	6.63	0.20	
			1.00			Ice	13.46	7.30	0.30	
						1" Ice	15.02	8.69	0.53	
						2" Ice				
DMP65R-BU6D w/ Mount Pipe	B	From Leg	4.00	0.0000	147.00	No Ice	11.96	5.97	0.11	
			0.00			1/2"	12.70	6.63	0.20	
			1.00			Ice	13.46	7.30	0.30	
						1" Ice	15.02	8.69	0.53	
						2" Ice				
DMP65R-BU4D w/ Mount Pipe	C	From Leg	4.00	0.0000	147.00	No Ice	7.53	3.79	0.09	
			0.00			1/2"	8.04	4.23	0.16	
			1.00			Ice	8.57	4.68	0.22	
						1" Ice	9.68	5.63	0.39	
						2" Ice				
OPA65R-BU6D w/ Mount Pipe	A	From Leg	4.00	0.0000	147.00	No Ice	12.25	6.05	0.09	
			0.00			1/2"	13.00	6.71	0.18	
			1.00			Ice	13.76	7.39	0.27	
						1" Ice	15.34	8.79	0.51	
						2" Ice				
OPA65R-BU6D w/ Mount Pipe	B	From Leg	4.00	0.0000	147.00	No Ice	12.25	6.05	0.09	
			0.00			1/2"	13.00	6.71	0.18	
			1.00			Ice	13.76	7.39	0.27	
						1" Ice	15.34	8.79	0.51	
						2" Ice				
OPA65R-BU4D w/ Mount Pipe	C	From Leg	4.00	0.0000	147.00	No Ice	8.10	4.03	0.08	
			0.00			1/2"	8.65	4.50	0.14	
			1.00			Ice	9.21	4.98	0.21	
						1" Ice	10.39	5.98	0.38	
						2" Ice				
RRUS 4449 B5/B12	A	From Leg	4.00	0.0000	147.00	No Ice	1.97	1.41	0.07	
			0.00			1/2"	2.14	1.56	0.09	
			1.00			Ice	2.33	1.73	0.11	
						1" Ice	2.72	2.07	0.16	
						2" Ice				
RRUS 4449 B5/B12	B	From Leg	4.00	0.0000	147.00	No Ice	1.97	1.41	0.07	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Lateral					
			ft	ft	°	ft	ft ²	ft ²	K
			0.00			1/2"	2.14	1.56	0.09
			1.00			Ice	2.33	1.73	0.11
						1" Ice	2.72	2.07	0.16
						2" Ice			
RRUS 4449 B5/B12	C	From Leg	4.00	0.0000	147.00	No Ice	1.97	1.41	0.07
			0.00			1/2"	2.14	1.56	0.09
			1.00			Ice	2.33	1.73	0.11
						1" Ice	2.72	2.07	0.16
						2" Ice			
RRUS 4478 B14	A	From Leg	4.00	0.0000	147.00	No Ice	1.84	1.06	0.06
			0.00			1/2"	2.01	1.20	0.08
			1.00			Ice	2.19	1.34	0.09
						1" Ice	2.57	1.66	0.14
						2" Ice			
RRUS 4478 B14	B	From Leg	4.00	0.0000	147.00	No Ice	1.84	1.06	0.06
			0.00			1/2"	2.01	1.20	0.08
			1.00			Ice	2.19	1.34	0.09
						1" Ice	2.57	1.66	0.14
						2" Ice			
RRUS 4478 B14	C	From Leg	4.00	0.0000	147.00	No Ice	1.84	1.06	0.06
			0.00			1/2"	2.01	1.20	0.08
			1.00			Ice	2.19	1.34	0.09
						1" Ice	2.57	1.66	0.14
						2" Ice			
RRUS 8843 B2/B66A	A	From Leg	4.00	0.0000	147.00	No Ice	1.64	1.35	0.07
			0.00			1/2"	1.80	1.50	0.09
			1.00			Ice	1.97	1.65	0.11
						1" Ice	2.32	1.99	0.16
						2" Ice			
RRUS 8843 B2/B66A	B	From Leg	4.00	0.0000	147.00	No Ice	1.64	1.35	0.07
			0.00			1/2"	1.80	1.50	0.09
			1.00			Ice	1.97	1.65	0.11
						1" Ice	2.32	1.99	0.16
						2" Ice			
RRUS 8843 B2/B66A	C	From Leg	4.00	0.0000	147.00	No Ice	1.64	1.35	0.07
			0.00			1/2"	1.80	1.50	0.09
			1.00			Ice	1.97	1.65	0.11
						1" Ice	2.32	1.99	0.16
						2" Ice			
DC6-48-60-18-8F	A	From Leg	4.00	0.0000	147.00	No Ice	1.21	1.21	0.02
			0.00			1/2"	1.89	1.89	0.04
			1.00			Ice	2.11	2.11	0.07
						1" Ice	2.57	2.57	0.13
						2" Ice			

MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.00	0.0000	138.00	No Ice	8.01	4.23	0.11
			0.00			1/2"	8.52	4.69	0.19
			0.00			Ice	9.04	5.16	0.29
						1" Ice	10.11	6.12	0.52
						2" Ice			
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.00	0.0000	138.00	No Ice	8.01	4.23	0.11
			0.00			1/2"	8.52	4.69	0.19
			0.00			Ice	9.04	5.16	0.29
						1" Ice	10.11	6.12	0.52
						2" Ice			
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.00	0.0000	138.00	No Ice	8.01	4.23	0.11
			0.00			1/2"	8.52	4.69	0.19
			0.00			Ice	9.04	5.16	0.29
						1" Ice	10.11	6.12	0.52
						2" Ice			
RDIDC-9181-PF-48	A	From Leg	4.00	0.0000	138.00	No Ice	2.31	1.29	0.02
			0.00			1/2"	2.50	1.45	0.04
			0.00			Ice	2.70	1.61	0.06
						1" Ice	3.12	1.96	0.12

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz	Lateral						Vert
			ft	ft	°	ft	ft ²	ft ²	K	
TA08025-B604	A	From Leg	4.00	0.00	0.0000	138.00	2" Ice			
							No Ice	1.96	0.98	0.06
							1/2"	2.14	1.11	0.08
							Ice	2.32	1.25	0.10
							1" Ice	2.71	1.55	0.15
TA08025-B604	B	From Leg	4.00	0.00	0.0000	138.00	2" Ice			
							No Ice	1.96	0.98	0.06
							1/2"	2.14	1.11	0.08
							Ice	2.32	1.25	0.10
							1" Ice	2.71	1.55	0.15
TA08025-B604	C	From Leg	4.00	0.00	0.0000	138.00	2" Ice			
							No Ice	1.96	0.98	0.06
							1/2"	2.14	1.11	0.08
							Ice	2.32	1.25	0.10
							1" Ice	2.71	1.55	0.15
TA08025-B605	A	From Leg	4.00	0.00	0.0000	138.00	2" Ice			
							No Ice	1.96	1.13	0.08
							1/2"	2.14	1.27	0.09
							Ice	2.32	1.41	0.11
							1" Ice	2.71	1.72	0.16
TA08025-B605	B	From Leg	4.00	0.00	0.0000	138.00	2" Ice			
							No Ice	1.96	1.13	0.08
							1/2"	2.14	1.27	0.09
							Ice	2.32	1.41	0.11
							1" Ice	2.71	1.72	0.16
TA08025-B605	C	From Leg	4.00	0.00	0.0000	138.00	2" Ice			
							No Ice	1.96	1.13	0.08
							1/2"	2.14	1.27	0.09
							Ice	2.32	1.41	0.11
							1" Ice	2.71	1.72	0.16
(2) 8' x 2" Mount Pipe	A	From Leg	4.00	0.00	0.0000	138.00	2" Ice			
							No Ice	1.90	1.90	0.03
							1/2"	2.73	2.73	0.04
							Ice	3.40	3.40	0.06
							1" Ice	4.40	4.40	0.12
(2) 8' x 2" Mount Pipe	B	From Leg	4.00	0.00	0.0000	138.00	2" Ice			
							No Ice	1.90	1.90	0.03
							1/2"	2.73	2.73	0.04
							Ice	3.40	3.40	0.06
							1" Ice	4.40	4.40	0.12
(2) 8' x 2" Mount Pipe	C	From Leg	4.00	0.00	0.0000	138.00	2" Ice			
							No Ice	1.90	1.90	0.03
							1/2"	2.73	2.73	0.04
							Ice	3.40	3.40	0.06
							1" Ice	4.40	4.40	0.12
Commscope MC-PK8-DSH	C	None			0.0000	138.00	2" Ice			
							No Ice	34.24	34.24	1.75
							1/2"	62.95	62.95	2.10
							Ice	91.66	91.66	2.45
							1" Ice	149.08	149.08	3.15
							2" Ice			

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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	150 - 104.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-19.28	-1.32	1.34
			Max. Mx	8	-8.97	-285.90	-2.11
			Max. My	2	-8.95	2.27	290.14
			Max. Vy	8	9.04	-285.90	-2.11
			Max. Vx	2	-9.15	2.27	290.14
			Max. Torque	25			-0.99
L2	104.5 - 68.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-25.94	-1.14	1.25
			Max. Mx	8	-13.43	-634.11	-4.29
			Max. My	2	-13.42	4.46	642.29

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L3	68.75 - 34	Pole	Max. Vy	8	11.01	-634.11	-4.29
			Max. Vx	2	-11.12	4.46	642.29
			Max. Torque	25			-0.91
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.02	-0.90	1.11
			Max. Mx	8	-19.96	-1042.85	-6.41
			Max. My	2	-19.95	6.58	1054.84
			Max. Vy	8	12.99	-1042.85	-6.41
L4	34 - 0	Pole	Max. Vx	2	-13.10	6.58	1054.84
			Max. Torque	25			-0.82
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-47.42	-0.59	0.93
			Max. Mx	8	-29.27	-1605.47	-8.84
			Max. My	2	-29.27	9.03	1621.83
			Max. Vy	8	15.12	-1605.47	-8.84
			Max. Vx	2	-15.22	9.03	1621.83
			Max. Torque	25			-0.72

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	47.42	0.01	5.33
	Max. H _x	20	29.27	15.10	0.06
	Max. H _z	2	29.27	0.06	15.21
	Max. M _x	2	1621.83	0.06	15.21
	Max. M _z	8	1605.47	-15.10	-0.06
	Max. Torsion	13	0.63	-7.60	-13.20
	Min. Vert	7	21.96	-13.05	7.55
	Min. H _x	8	29.27	-15.10	-0.06
	Min. H _z	15	21.96	-0.06	-15.21
	Min. M _x	14	-1621.17	-0.06	-15.21
	Min. M _z	20	-1605.17	15.10	0.06
	Min. Torsion	25	-0.63	7.60	13.20

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overtuning Moment, M _x kip-ft	Overtuning Moment, M _z kip-ft	Torque kip-ft
Dead Only	24.40	0.00	0.00	-0.26	-0.11	-0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	29.27	-0.06	-15.21	-1621.83	9.03	0.50
0.9 Dead+1.0 Wind 0 deg - No Ice	21.96	-0.06	-15.21	-1602.75	8.95	0.50
1.2 Dead+1.0 Wind 30 deg - No Ice	29.27	7.50	-13.14	-1400.04	-794.86	0.24
0.9 Dead+1.0 Wind 30 deg - No Ice	21.96	7.50	-13.14	-1383.56	-785.54	0.24
1.2 Dead+1.0 Wind 60 deg - No Ice	29.27	13.05	-7.55	-803.17	-1385.83	-0.09
0.9 Dead+1.0 Wind 60 deg - No Ice	21.96	13.05	-7.55	-793.69	-1369.59	-0.09
1.2 Dead+1.0 Wind 90 deg - No Ice	29.27	15.10	0.06	8.84	-1605.47	-0.39
0.9 Dead+1.0 Wind 90 deg - No Ice	21.96	15.10	0.06	8.80	-1586.66	-0.40
1.2 Dead+1.0 Wind 120 deg - No Ice	29.27	13.11	7.65	818.37	-1394.96	-0.59
0.9 Dead+1.0 Wind 120 deg	21.96	13.11	7.65	808.85	-1378.60	-0.59

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
- No Ice						
1.2 Dead+1.0 Wind 150 deg	29.27	7.60	13.20	1408.51	-810.72	-0.63
- No Ice						
0.9 Dead+1.0 Wind 150 deg	21.96	7.60	13.20	1392.09	-801.19	-0.63
- No Ice						
1.2 Dead+1.0 Wind 180 deg	29.27	0.06	15.21	1621.17	-9.31	-0.50
- No Ice						
0.9 Dead+1.0 Wind 180 deg	21.96	0.06	15.21	1602.26	-9.15	-0.50
- No Ice						
1.2 Dead+1.0 Wind 210 deg	29.27	-7.50	13.14	1399.36	794.57	-0.23
- No Ice						
0.9 Dead+1.0 Wind 210 deg	21.96	-7.50	13.14	1383.07	785.33	-0.23
- No Ice						
1.2 Dead+1.0 Wind 240 deg	29.27	-13.05	7.55	802.50	1385.53	0.09
- No Ice						
0.9 Dead+1.0 Wind 240 deg	21.96	-13.05	7.55	793.20	1369.38	0.09
- No Ice						
1.2 Dead+1.0 Wind 270 deg	29.27	-15.10	-0.06	-9.51	1605.17	0.39
- No Ice						
0.9 Dead+1.0 Wind 270 deg	21.96	-15.10	-0.06	-9.29	1586.45	0.39
- No Ice						
1.2 Dead+1.0 Wind 300 deg	29.27	-13.11	-7.65	-819.03	1394.67	0.59
- No Ice						
0.9 Dead+1.0 Wind 300 deg	21.96	-13.11	-7.65	-809.34	1378.39	0.59
- No Ice						
1.2 Dead+1.0 Wind 330 deg	29.27	-7.60	-13.20	-1409.17	810.44	0.63
- No Ice						
0.9 Dead+1.0 Wind 330 deg	21.96	-7.60	-13.20	-1392.57	800.99	0.63
- No Ice						
1.2 Dead+1.0 Ice+1.0 Temp	47.42	0.00	-0.00	-0.93	-0.59	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	47.42	-0.01	-5.33	-582.44	1.04	-0.41
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	47.42	2.65	-4.61	-503.69	-288.35	-0.24
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	47.42	4.60	-2.66	-290.26	-500.65	-0.01
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	47.42	5.32	0.01	0.69	-578.97	0.23
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	47.42	4.61	2.68	291.18	-502.34	0.40
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	47.42	2.67	4.63	503.38	-291.27	0.47
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	47.42	0.01	5.33	580.43	-2.34	0.41
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	47.42	-2.65	4.61	501.69	287.05	0.24
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	47.42	-4.60	2.66	288.25	499.36	0.01
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	47.42	-5.32	-0.01	-2.70	577.68	-0.23
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	47.42	-4.61	-2.68	-293.19	501.05	-0.40
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	47.42	-2.67	-4.63	-505.39	289.98	-0.47
Dead+Wind 0 deg - Service	24.40	-0.01	-3.58	-379.91	2.02	0.13
Dead+Wind 30 deg - Service	24.40	1.77	-3.10	-327.98	-186.19	0.06
Dead+Wind 60 deg - Service	24.40	3.08	-1.78	-188.24	-324.54	-0.02
Dead+Wind 90 deg - Service	24.40	3.56	0.01	1.86	-375.96	-0.10
Dead+Wind 120 deg - Service	24.40	3.09	1.80	191.39	-326.68	-0.15
Dead+Wind 150 deg - Service	24.40	1.79	3.11	329.56	-189.90	-0.16
Dead+Wind 180 deg - Service	24.40	0.01	3.58	379.35	-2.26	-0.12
Dead+Wind 210 deg - Service	24.40	-1.77	3.10	327.42	185.94	-0.06
Dead+Wind 240 deg - Service	24.40	-3.08	1.78	187.68	324.29	0.02
Dead+Wind 270 deg - Service	24.40	-3.56	-0.01	-2.42	375.72	0.10

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
Service Dead+Wind 300 deg - Service	24.40	-3.09	-1.80	-191.95	326.44	0.15
Service Dead+Wind 330 deg - Service	24.40	-1.79	-3.11	-330.12	189.65	0.16

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-24.40	0.00	0.00	24.40	0.00	0.000%
2	-0.06	-29.27	-15.21	0.06	29.27	15.21	0.000%
3	-0.06	-21.96	-15.21	0.06	21.96	15.21	0.000%
4	7.50	-29.27	-13.14	-7.50	29.27	13.14	0.000%
5	7.50	-21.96	-13.14	-7.50	21.96	13.14	0.000%
6	13.05	-29.27	-7.55	-13.05	29.27	7.55	0.000%
7	13.05	-21.96	-7.55	-13.05	21.96	7.55	0.000%
8	15.10	-29.27	0.06	-15.10	29.27	-0.06	0.000%
9	15.10	-21.96	0.06	-15.10	21.96	-0.06	0.000%
10	13.11	-29.27	7.65	-13.11	29.27	-7.65	0.000%
11	13.11	-21.96	7.65	-13.11	21.96	-7.65	0.000%
12	7.60	-29.27	13.20	-7.60	29.27	-13.20	0.000%
13	7.60	-21.96	13.20	-7.60	21.96	-13.20	0.000%
14	0.06	-29.27	15.21	-0.06	29.27	-15.21	0.000%
15	0.06	-21.96	15.21	-0.06	21.96	-15.21	0.000%
16	-7.50	-29.27	13.14	7.50	29.27	-13.14	0.000%
17	-7.50	-21.96	13.14	7.50	21.96	-13.14	0.000%
18	-13.05	-29.27	7.55	13.05	29.27	-7.55	0.000%
19	-13.05	-21.96	7.55	13.05	21.96	-7.55	0.000%
20	-15.10	-29.27	-0.06	15.10	29.27	0.06	0.000%
21	-15.10	-21.96	-0.06	15.10	21.96	0.06	0.000%
22	-13.11	-29.27	-7.65	13.11	29.27	7.65	0.000%
23	-13.11	-21.96	-7.65	13.11	21.96	7.65	0.000%
24	-7.60	-29.27	-13.20	7.60	29.27	13.20	0.000%
25	-7.60	-21.96	-13.20	7.60	21.96	13.20	0.000%
26	0.00	-47.42	0.00	-0.00	47.42	0.00	0.000%
27	-0.01	-47.42	-5.33	0.01	47.42	5.33	0.000%
28	2.65	-47.42	-4.61	-2.65	47.42	4.61	0.000%
29	4.60	-47.42	-2.66	-4.60	47.42	2.66	0.000%
30	5.32	-47.42	0.01	-5.32	47.42	-0.01	0.000%
31	4.61	-47.42	2.68	-4.61	47.42	-2.68	0.000%
32	2.67	-47.42	4.62	-2.67	47.42	-4.63	0.000%
33	0.01	-47.42	5.33	-0.01	47.42	-5.33	0.000%
34	-2.65	-47.42	4.61	2.65	47.42	-4.61	0.000%
35	-4.60	-47.42	2.66	4.60	47.42	-2.66	0.000%
36	-5.32	-47.42	-0.01	5.32	47.42	0.01	0.000%
37	-4.61	-47.42	-2.68	4.61	47.42	2.68	0.000%
38	-2.67	-47.42	-4.62	2.67	47.42	4.63	0.000%
39	-0.01	-24.40	-3.58	0.01	24.40	3.58	0.000%
40	1.77	-24.40	-3.10	-1.77	24.40	3.10	0.000%
41	3.08	-24.40	-1.78	-3.08	24.40	1.78	0.000%
42	3.56	-24.40	0.01	-3.56	24.40	-0.01	0.000%
43	3.09	-24.40	1.80	-3.09	24.40	-1.80	0.000%
44	1.79	-24.40	3.11	-1.79	24.40	-3.11	0.000%
45	0.01	-24.40	3.58	-0.01	24.40	-3.58	0.000%
46	-1.77	-24.40	3.10	1.77	24.40	-3.10	0.000%
47	-3.08	-24.40	1.78	3.08	24.40	-1.78	0.000%
48	-3.56	-24.40	-0.01	3.56	24.40	0.01	0.000%
49	-3.09	-24.40	-1.80	3.09	24.40	1.80	0.000%
50	-1.79	-24.40	-3.11	1.79	24.40	3.11	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	0.00077993
3	Yes	4	0.00000001	0.00043461
4	Yes	5	0.00000001	0.00090305
5	Yes	5	0.00000001	0.00042554
6	Yes	5	0.00000001	0.00088979
7	Yes	5	0.00000001	0.00041933
8	Yes	4	0.00000001	0.00063493
9	Yes	4	0.00000001	0.00031224
10	Yes	5	0.00000001	0.00089108
11	Yes	5	0.00000001	0.00041773
12	Yes	5	0.00000001	0.00095135
13	Yes	5	0.00000001	0.00044795
14	Yes	5	0.00000001	0.0006259
15	Yes	4	0.00000001	0.00071759
16	Yes	5	0.00000001	0.00087578
17	Yes	5	0.00000001	0.00041219
18	Yes	5	0.00000001	0.00088091
19	Yes	5	0.00000001	0.00041526
20	Yes	4	0.00000001	0.00096805
21	Yes	4	0.00000001	0.00057753
22	Yes	5	0.00000001	0.00094446
23	Yes	5	0.00000001	0.00044484
24	Yes	5	0.00000001	0.00089245
25	Yes	5	0.00000001	0.00041779
26	Yes	4	0.00000001	0.00004036
27	Yes	5	0.00000001	0.00066783
28	Yes	5	0.00000001	0.00083857
29	Yes	5	0.00000001	0.00083799
30	Yes	5	0.00000001	0.00066312
31	Yes	5	0.00000001	0.00083904
32	Yes	5	0.00000001	0.00083662
33	Yes	5	0.00000001	0.00065991
34	Yes	5	0.00000001	0.00082235
35	Yes	5	0.00000001	0.00081901
36	Yes	5	0.00000001	0.00065577
37	Yes	5	0.00000001	0.00083582
38	Yes	5	0.00000001	0.00084222
39	Yes	4	0.00000001	0.00006757
40	Yes	4	0.00000001	0.00025103
41	Yes	4	0.00000001	0.00024080
42	Yes	4	0.00000001	0.00005868
43	Yes	4	0.00000001	0.00022808
44	Yes	4	0.00000001	0.00027788
45	Yes	4	0.00000001	0.00007163
46	Yes	4	0.00000001	0.00022678
47	Yes	4	0.00000001	0.00023253
48	Yes	4	0.00000001	0.00006210
49	Yes	4	0.00000001	0.00027353
50	Yes	4	0.00000001	0.00022806

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 104.5	19.108	50	1.2173	0.0053
L2	108.75 - 68.75	9.547	50	0.8971	0.0015
L3	74 - 34	4.226	50	0.5467	0.0005
L4	40 - 0	1.233	50	0.2813	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
152.00	Lighting Rod 5/8" x 5'	50	19.108	1.2173	0.0053	36383
147.00	P90-14-XLH-RR w/ Mount Pipe	50	18.357	1.1965	0.0050	36383
138.00	MX08FRO665-21 w/ Mount Pipe	50	16.121	1.1333	0.0040	15159

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 104.5	81.603	24	5.2027	0.0218
L2	108.75 - 68.75	40.798	24	3.8375	0.0059
L3	74 - 34	18.060	24	2.3377	0.0022
L4	40 - 0	5.268	24	1.2022	0.0008

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
152.00	Lighting Rod 5/8" x 5'	24	81.603	5.2027	0.0218	8649
147.00	P90-14-XLH-RR w/ Mount Pipe	24	78.398	5.1142	0.0204	8649
138.00	MX08FRO665-21 w/ Mount Pipe	24	68.858	4.8451	0.0164	3602

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	KI/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	150 - 104.5 (1)	TP28.1875x18x0.1875	45.50	0.00	0.0	16.097 2	-8.95	941.69	0.010
L2	104.5 - 68.75 (2)	TP35.75x26.8609x0.25	40.00	0.00	0.0	27.243 5	-13.42	1593.74	0.008
L3	68.75 - 34 (3)	TP43x34.0833x0.3125	40.00	0.00	0.0	41.014 0	-19.95	2399.32	0.008
L4	34 - 0 (4)	TP50x41.0375x0.3125	40.00	0.00	0.0	49.283 8	-29.27	2883.10	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{rx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{rx}}$	M_{uy} kip-ft	ϕM_{ry} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ry}}$
L1	150 - 104.5 (1)	TP28.1875x18x0.1875	291.09	583.66	0.499	0.00	583.66	0.000

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 $\frac{M_{uy}}{\phi M_{ny}}$
L2	104.5 - 68.75 (2)	TP35.75x26.8609x0.25	644.15	1278.26	0.504	0.00	1278.26	0.000
L3	68.75 - 34 (3)	TP43x34.0833x0.3125	1057.59	2349.59	0.450	0.00	2349.59	0.000
L4	34 - 0 (4)	TP50x41.0375x0.3125	1625.61	3146.22	0.517	0.00	3146.22	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	150 - 104.5 (1)	TP28.1875x18x0.1875	9.18	282.51	0.032	0.93	669.19	0.001
L2	104.5 - 68.75 (2)	TP35.75x26.8609x0.25	11.15	478.12	0.023	0.84	1437.59	0.001
L3	68.75 - 34 (3)	TP43x34.0833x0.3125	13.13	719.80	0.018	0.74	2606.54	0.000
L4	34 - 0 (4)	TP50x41.0375x0.3125	15.25	864.93	0.018	0.63	3763.64	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio P_u ϕP_n	Ratio M_{ux} ϕM_{nx}	Ratio M_{uy} ϕM_{ny}	Ratio V_u ϕV_n	Ratio T_u ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	150 - 104.5 (1)	0.010	0.499	0.000	0.032	0.001	0.509	1.050	4.8.2
L2	104.5 - 68.75 (2)	0.008	0.504	0.000	0.023	0.001	0.513	1.050	4.8.2
L3	68.75 - 34 (3)	0.008	0.450	0.000	0.018	0.000	0.459	1.050	4.8.2
L4	34 - 0 (4)	0.010	0.517	0.000	0.018	0.000	0.527	1.050	4.8.2

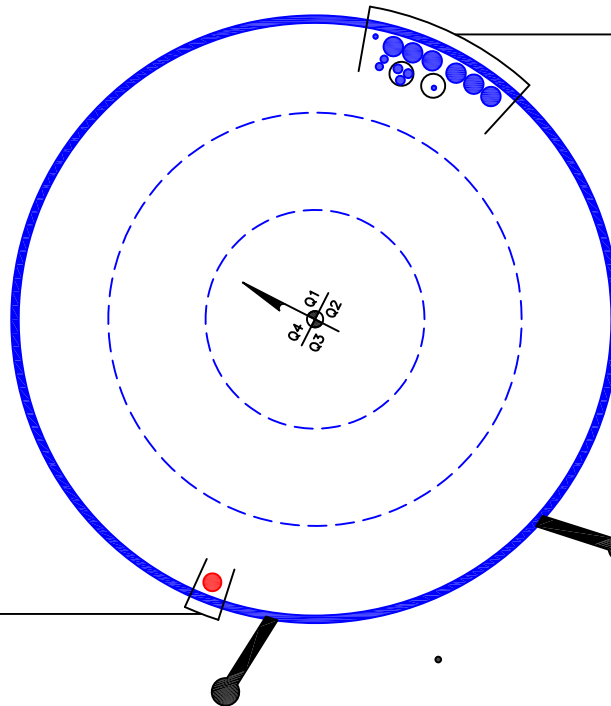
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	150 - 104.5	Pole	TP28.1875x18x0.1875	1	-8.95	988.77	48.5	Pass
L2	104.5 - 68.75	Pole	TP35.75x26.8609x0.25	2	-13.42	1673.43	48.8	Pass
L3	68.75 - 34	Pole	TP43x34.0833x0.3125	3	-19.95	2519.29	43.7	Pass
L4	34 - 0	Pole	TP50x41.0375x0.3125	4	-29.27	3027.25	50.2	Pass
Summary								
Pole (L4)							50.2	Pass
RATING =							50.2	Pass

APPENDIX B
BASE LEVEL DRAWING



- (OTHER CONSIDERED EQUIPMENT-IN (2) CONDUITS)
- (1) 3/8" TO 148 FT LEVEL
- (3) 3/4" TO 148 FT LEVEL
- (OTHER CONSIDERED EQUIPMENT)
- (1) 3/8" TO 148 FT LEVEL
- (2) 5/8" TO 148 FT LEVEL
- (6) 1-5/8" TO 148 FT LEVEL



(PROPOSED EQUIPMENT CONFIGURATION)
(1) 1-1/2" TO 138 FT LEVEL

CLIMBING PEGS
W/ SAFETY CLIMB

APPENDIX C
ADDITIONAL CALCULATIONS

Monopole Base Plate Connection

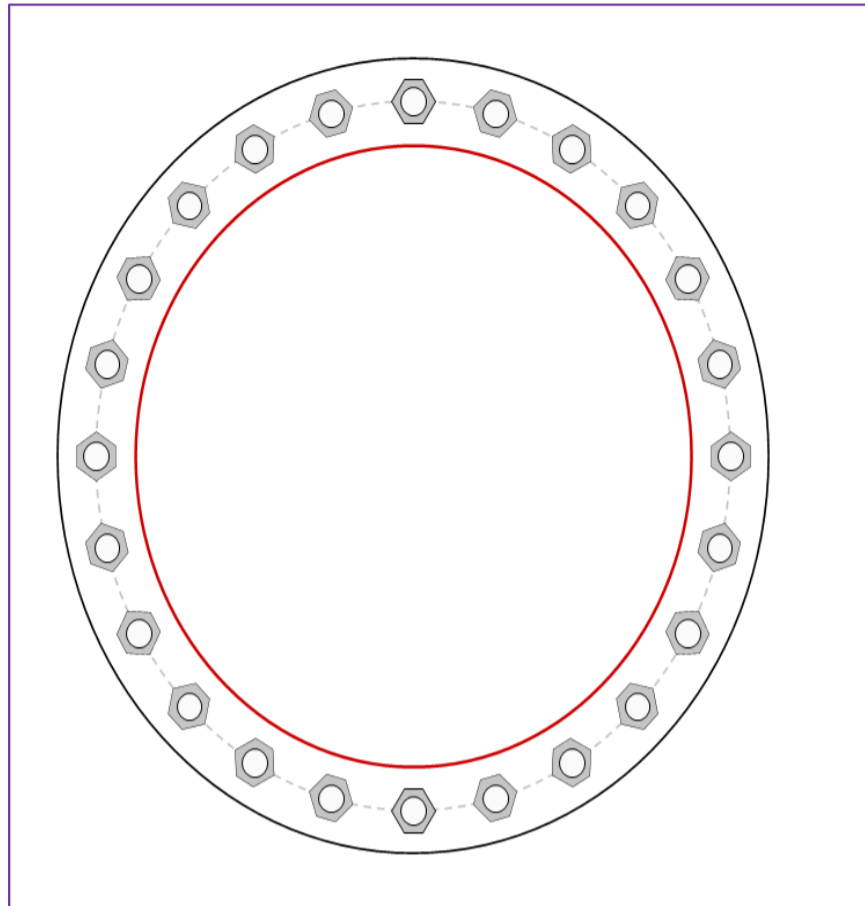


Site Info	
BU #	857528
Site Name	DODBURY PAPER MILL
Order #	553361 Rev. 1

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	2.25

Applied Loads	
Moment (kip-ft)	1625.60
Axial Force (kips)	29.27
Shear Force (kips)	15.25

*TIA-222-H Section 15.5 Applied



Connection Properties	Analysis Results
-----------------------	------------------

Anchor Rod Data
(24) 2-1/4" ϕ bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 57" BC
Base Plate Data
64" OD x 2.25" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)
Stiffener Data
N/A
Pole Data
50" x 0.3125" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Anchor Rod Summary			<i>(units of kips, kip-in)</i>
$P_{u,t}$ = 55.78	$\phi P_{n,t}$ = 243.75	Stress Rating	
V_u = 0.64	ϕV_n = 149.1	21.8%	
M_u = n/a	ϕM_n = n/a	Pass	
Base Plate Summary			
Max Stress (ksi):	14.99	(Flexural)	
Allowable Stress (ksi):	45		
Stress Rating:	31.7%	Pass	

Pier and Pad Foundation



BU #: 857528
 Site Name: WOODBURY PAPER
 App. Number: 553361 Rev. 1

TIA-222 Revision: H
 Tower Type: Monopole

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

Superstructure Analysis Reactions		
Compression, P_{comp} :	29.27	kips
Base Shear, V_{u_comp} :	15.23	kips
Moment, M_u :	1625.6	ft-kips
Tower Height, H :	150	ft
BP Dist. Above Fdn, bp_{dist} :	4.25	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
<i>Lateral (Sliding) (kips)</i>	65.53	15.23	22.1%	Pass
<i>Bearing Pressure (ksf)</i>	9.00	1.76	19.6%	Pass
<i>Overturning (kip*ft)</i>	3233.33	1699.53	52.6%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	6219.92	1656.06	25.4%	Pass
<i>Pier Compression (kip)</i>	21120.36	41.22	0.2%	Pass
<i>Pad Flexure (kip*ft)</i>	4232.26	593.88	13.4%	Pass
<i>Pad Shear - 1-way (kips)</i>	685.65	98.62	13.7%	Pass
<i>Pad Shear - 2-way (Comp) (ksi)</i>	0.190	0.026	13.1%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	4903.88	993.64	19.3%	Pass

Pier Properties		
Pier Shape:	Circular	
Pier Diameter, $dpier$:	6.5	ft
Ext. Above Grade, E :	0.5	ft
Pier Rebar Size, Sc :	10	
Pier Rebar Quantity, mc :	34	
Pier Tie/Spiral Size, St :	4	
Pier Tie/Spiral Quantity, mt :	5	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier} :	3	in

*Rating per TIA-222-H Section 15.5

Structural Rating*:	25.4%
Soil Rating*:	52.6%

Pad Properties		
Depth, D :	4	ft
Pad Width, W_1 :	24	ft
Pad Thickness, T :	2.5	ft
Pad Rebar Size (Bottom dir. 2), Sp_2 :	10	
Pad Rebar Quantity (Bottom dir. 2), mp_2 :	31	
Pad Clear Cover, cc_{pad} :	3	in

Material Properties		
Rebar Grade, F_y :	60	ksi
Concrete Compressive Strength, F'_c :	4	ksi
Dry Concrete Density, δ_c :	150	pcf

Soil Properties		
Total Soil Unit Weight, γ :	90	pcf
Ultimate Gross Bearing, Q_{ult} :	12.000	ksf
Cohesion, C_u :	0.000	ksf
Friction Angle, ϕ :	0	degrees
SPT Blow Count, N_{blows} :	79	
Base Friction, μ :	0.3	
Neglected Depth, N :	4.17	ft
Foundation Bearing on Rock?	Yes	
Groundwater Depth, gw :	n/a	ft

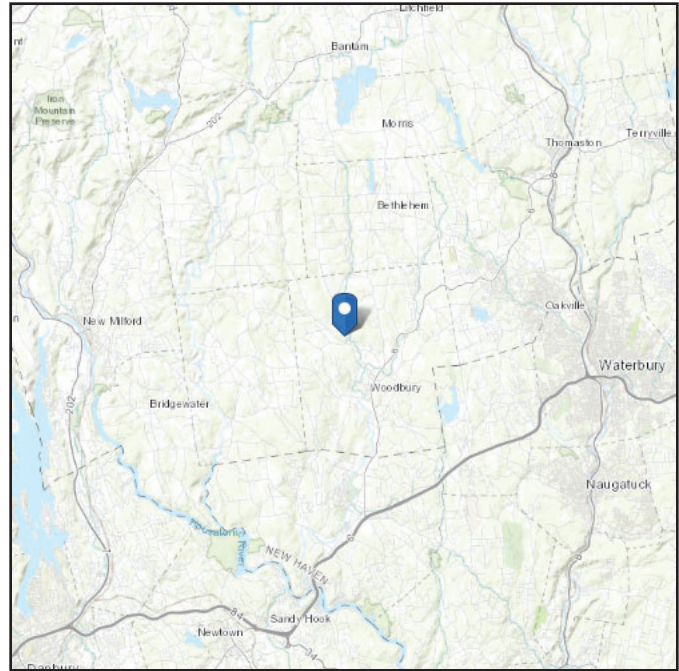
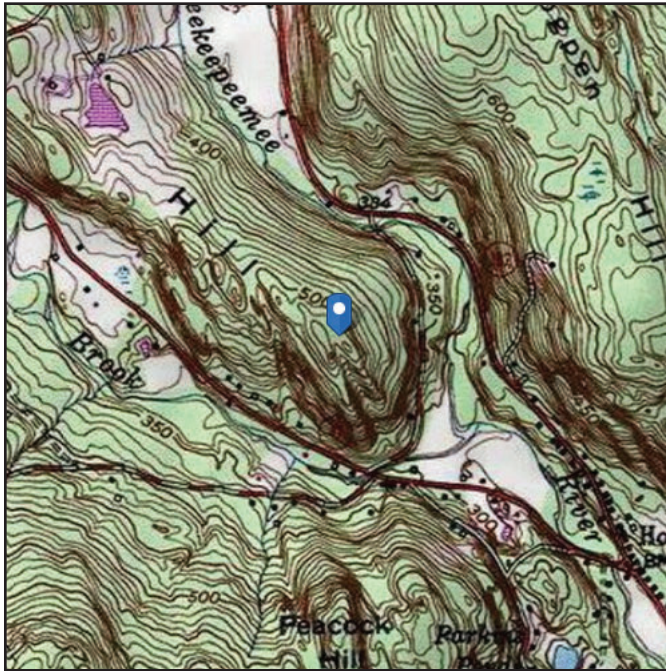
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ASCE 7 Hazards Report

Address:
No Address at This
Location

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

Elevation: 528.06 ft (NAVD 88)
Latitude: 41.573075
Longitude: -73.227642



Wind

Results:

Wind Speed:	117 Vmph
10-year MRI	76 Vmph
25-year MRI	85 Vmph
50-year MRI	90 Vmph
100-year MRI	96 Vmph

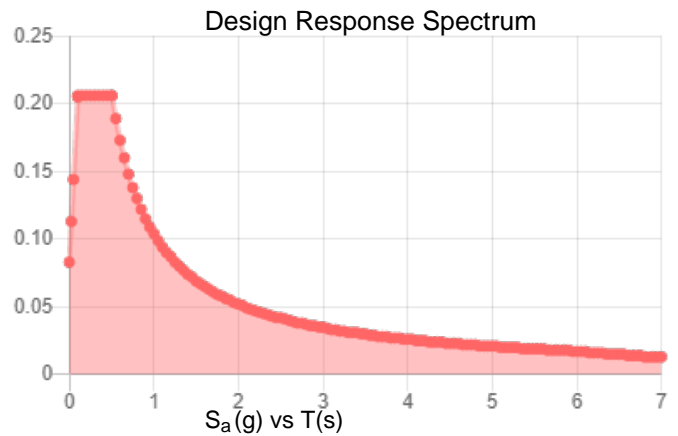
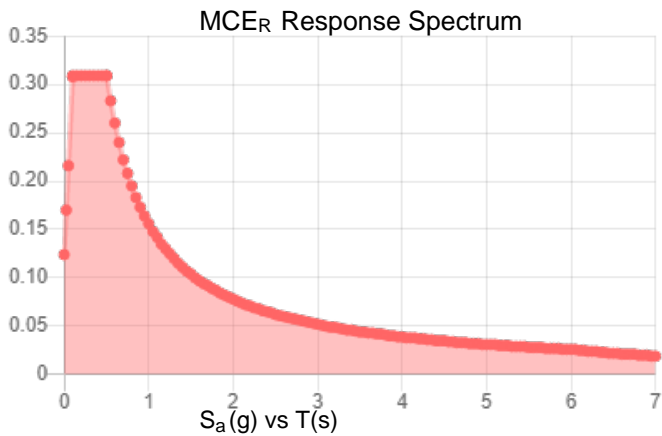
← 120 mph Required by Jurisdiction

Site Soil Class: D - Stiff Soil

Results:

S_S :	0.194	S_{DS} :	0.206
S_1 :	0.065	S_{D1} :	0.104
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.101
S_{MS} :	0.309	PGA _M :	0.161
S_{M1} :	0.156	F _{PGA} :	1.598
		I_e :	1

Seismic Design Category B



Data Accessed:

Wed May 26 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: Wed May 26 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.

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Exhibit E

Mount Analysis

Date: **July 30, 2021**

Darcy Tarr
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC, 28277
704-405-6619



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

Subject: **Mount Replacement Analysis Report**

Carrier Designation: **Dish Wireless Dish 5G**
Carrier Site Number: BOHVN00018A
Carrier Site Name: CT-CCI-T-857528

Crown Castle Designation: **Crown Castle BU Number:** 857528
Crown Castle Site Name: Woodbury Paper Mill RD
Crown Castle JDE Job Number: 645155
Crown Castle Order Number: 553361 Rev. 1

Engineering Firm Designation: **Trylon Report Designation:** 189034

Site Data: **85 Paper Mill Road, Woodbury, Litchfield County, CT, 06798**
Latitude 41°34'23.07" Longitude -73°13'39.51"

Structure Information: **Tower Height & Type:** **150.0 ft Monopole**
Mount Elevation: **138.0 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 Wireless'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 120 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.

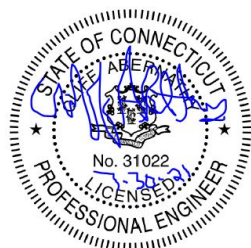


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Supplemental Drawings

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:	120 mph
Exposure Category:	B
Topographic Factor at Base:	1.00
Topographic Factor at Mount:	1.00
Ice Thickness:	1.50 in
Wind Speed with Ice:	50 mph
Seismic S_s:	0.194
Seismic S₁:	0.065
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
138.0	138.0	3	JMA WIRELESS	MX08FRO665-21	8.0 ft Platform [COMMSCOPE and 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	553361 Rev. 1	CCI Sites
Mount Manufacturer Drawings	COMMSCOPE	MC-PK8-C	Trylon
Exposure Category Determination	Crown Castle	5963760	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. Tylon should be notified to determine the effect on the structural integrity of the antenna mounting system.

4) ANALYSIS RESULTS

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

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1, 2	Mount Pipe(s)	M48	138.0	26.8	Pass
	Horizontal(s)	M18		10.0	Pass
	Standoff(s)	M7		47.2	Pass
	Bracing(s)	M6		36.0	Pass
	Handrail(s)	M21		11.0	Pass
	Plates(s)	M10		18.9	Pass
	Mount Connection(s)	-		19.0	Pass

Structure Rating (max from all components) =	47.2%
---	--------------

Notes:

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

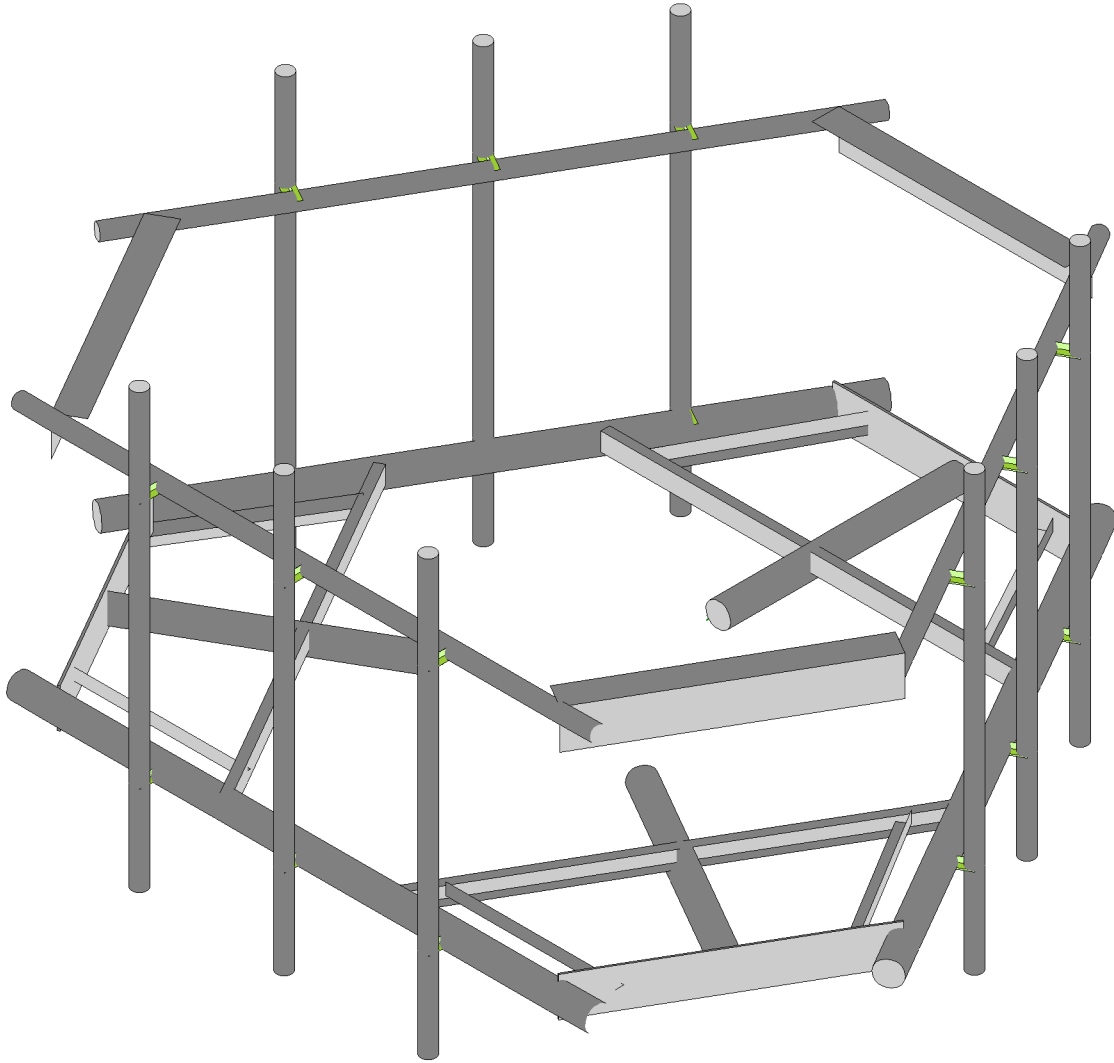
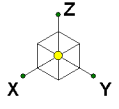
4.1) Recommendations

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

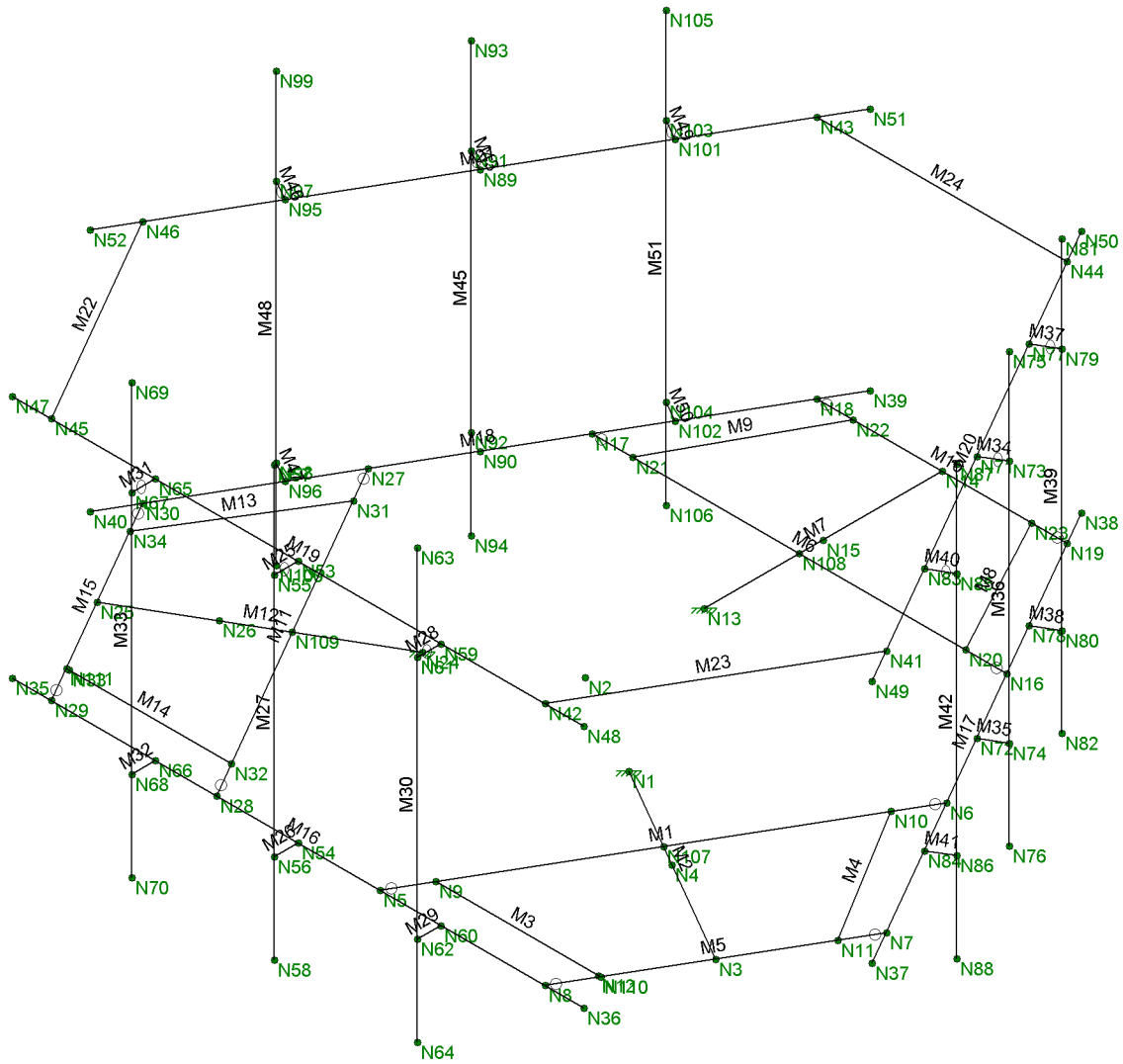
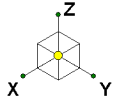


Envelope Only Solution

Trylon
TN
189034

857528

SK - 1
July 30, 2021 at 7:02 PM
857528.r3d



Envelope Only Solution

Trylon
TN
189034

857528

SK - 2
July 30, 2021 at 7:03 PM
857528.r3d

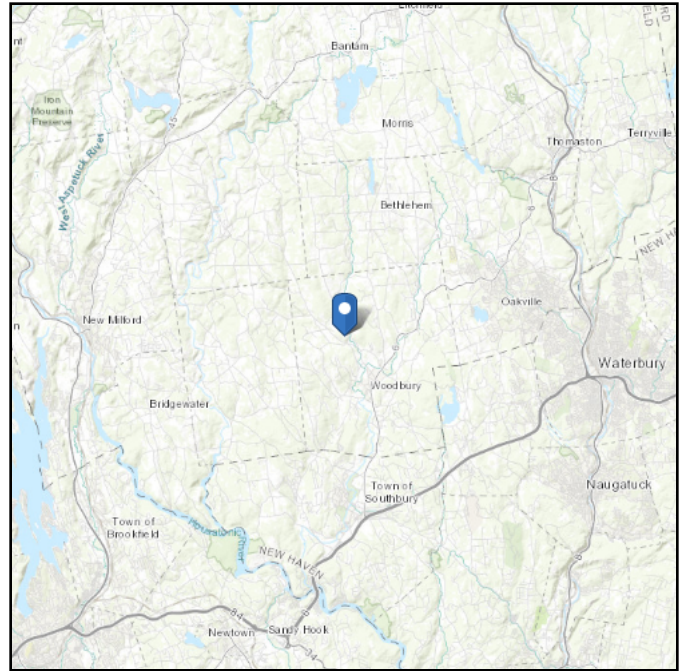
APPENDIX B
SOFTWARE INPUT CALCULATIONS

ASCE 7 Hazards Report

Address:
No Address at This
Location

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

Elevation: 528.06 ft (NAVD 88)
Latitude: 41.573075
Longitude: -73.227642



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: Fri Jul 30 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.

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Trylon

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

TIA LOAD CALCULATOR 2.0

PROJECT DATA	
Job Code:	189034
Carrier Site ID:	BOHVN00018A
Carrier Site Name:	CT-CCI-T-857528

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

STRUCTURE DETAILS		
Mount Type:	Platform	--
Mount Elevation:	138.0	ft.
Number of Sectors:	3	--
Structure Type:	Monopole	--
Structure Height:	150.0	ft.

ANALYSIS CRITERIA		
Structure Risk Category:	II	--
Exposure Category:	B	--
Site Class:	D - Default	--
Ground Elevation:	528.06	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:	120	mph
Wind Escalation Factor (K_s):	1.00	--
Velocity Coefficient (K_z):	1.08	--
Directionality Factor (K_d):	0.95	--
Gust Effect Factor (G _h):	1.00	--
Shielding Factor (K_a):	0.90	--
Velocity Pressure (q_z):	37.23	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_{iz}):	37.23	psf
Mount Ice Thickness (t_{iz}):	1.73	in

WIND STRUCTURE CALCULATIONS		
Flat Member Pressure:	67.01	psf
Round Member Pressure:	40.20	psf
Ice Wind Pressure:	7.43	psf

SEISMIC PARAMETERS		
Importance Factor (I_e):	1.00	--
Short Period Accel. (S_s):	0.194	g
1 Second Accel. (S_1):	0.065	g
Short Period Des. (S_{DS}):	0.21	g
1 Second Des. (S_{D1}):	0.10	g
Short Period Coeff. (F_a):	1.60	--
1 Second Coeff. (F_v):	2.40	--
Response Coefficient (C_s):	0.10	--
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 [CONT.]

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

EQUIPMENT WIND CALCULATIONS

<i>Appurtenance Name</i>	<i>Qty.</i>	<i>Elevation [ft]</i>	K_{zt}	K_z	K_d	t_d	q_z [psf]	q_{zi} [psf]
MX08FRO665-21	3	138	1.00	1.08	0.95	1.73	37.23	6.46
TA08025-B604	3	138	1.00	1.08	0.95	1.73	37.23	6.46
TA08025-B605	3	138	1.00	1.08	0.95	1.73	37.23	6.46
RDIDC-9181-PF-48	1	138	1.00	1.08	0.95	1.73	37.23	6.46

EQUIPMENT LATERAL WIND FORCE CALCULATIONS [CONT.]

<i>Appurtenance Name</i>	<i>Qty.</i>	--	0° 180°	30° 210°	60° 240°	90° 270°	120° 300°	150° 330°
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
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		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 SEISMIC FORCE CALCULATIONS

<i>Appurtenance Name</i>	<i>Qty.</i>	<i>Elevation [ft]</i>	<i>Weight [lbs]</i>	<i>F_p [lbs]</i>
MX08FRO665-21	3	138	82.5	10.24
TA08025-B604	3	138	63.9	7.93
TA08025-B605	3	138	75	9.31
RDIDC-9181-PF-48	1	138	21.85	2.71

APPENDIX C
SOFTWARE ANALYSIS OUTPUT

APPENDIX D
ADDITIONAL CALCUATIONS

BOLT TOOL 1.5.2

Project Data	
Job Code:	189034
Carrier Site ID:	BOHVN00018A
Carrier Site Name:	CT-CCI-T-857528

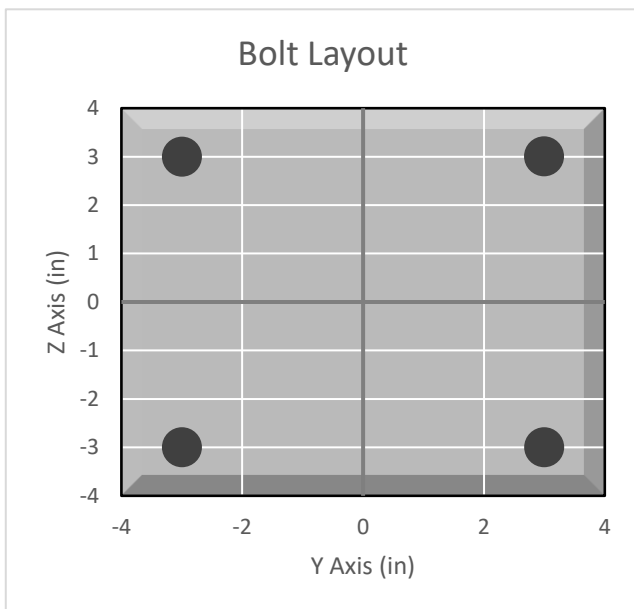
Code	
Design Standard:	TIA-222-H
Slip Check:	No
Pretension Standard:	AISC

Bolt Properties		
Connection Type:	Bolt	
Diameter:	0.625	in
Grade:	A325	--
Yield Strength (Fy):	92	ksi
Ultimate Strength (Fu):	120	ksi
Number of Bolts:	4	--
Threads Included:	Yes	--
Double Shear:	No	--
Connection Pipe Size:	-	in

Connection Description
Mount to Collar

Bolt Check*		
Tensile Capacity (ϕT_n):	20340.1	lbs
Shear Capacity (ϕV_n):	13805.8	lbs
Tension Force (T_u):	4054.1	lbs
Shear Force (V_u):	478.7	lbs
Tension Usage:	19.0%	--
Shear Usage:	3.3%	--
Interaction:	19.0%	Pass
Controlling Member:	M12	--
Controlling LC:	42	--

*Rating per TIA-222-H Section 15.5



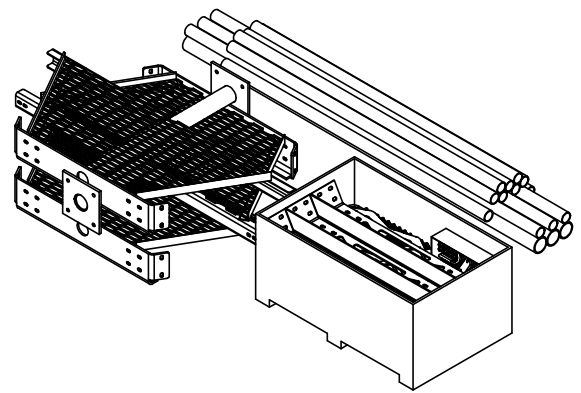
APPENDIX E
SUPPLEMENTAL DRAWINGS

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	




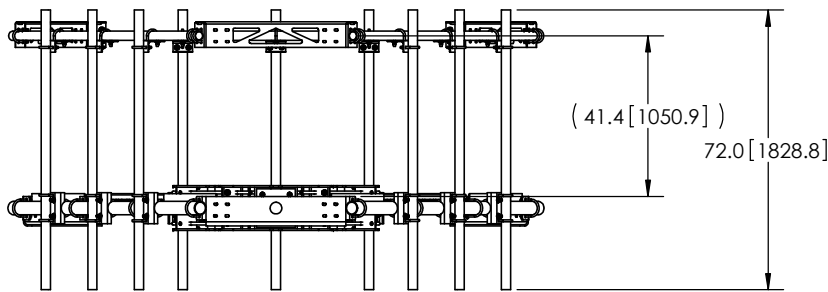
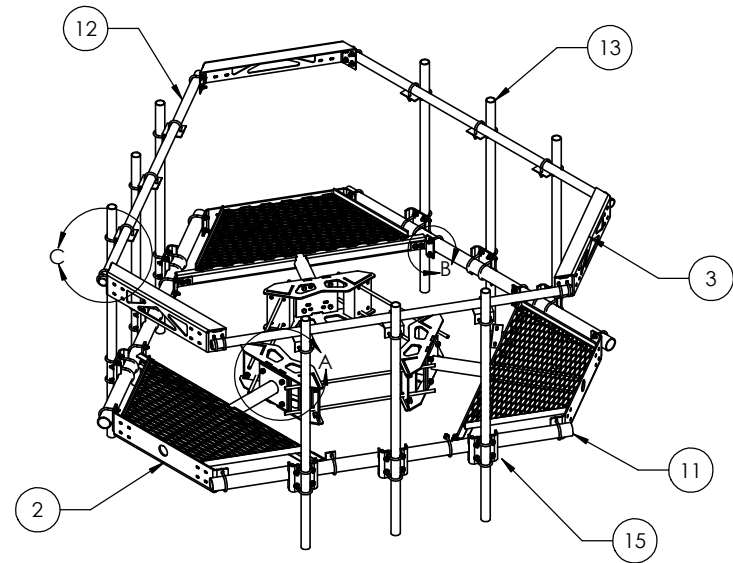
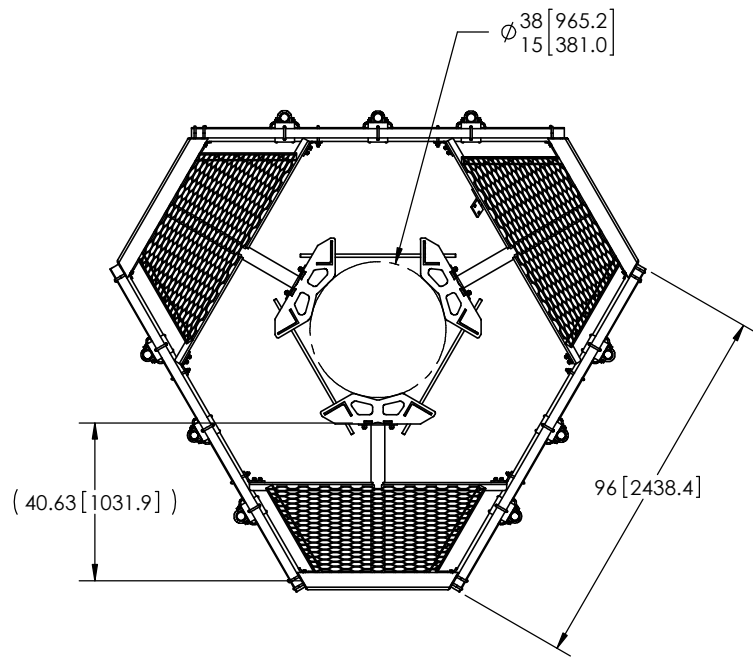
REVISIONS				
REV.	ECN	DESCRIPTION	BY	DATE
A		INITIAL RELEASE	DRR	12/27/11
B	8000005979	CHANGE NOSE CORNER BRKT, ADD GUB-4240	MSM	11/25/14
C	8000007579	NEW RINGMOUNT WELDMENT DESIGN	RJC	04/07/15

FOR BOM ENTRY ONLY



NOTES:
1. CUSTOMER ASSEMBLY SHEETS 2-3.

<small>These drawings and specifications are the proprietary property of ANDREW CORPORATION and may be used only for the specific purpose authorized in writing by Andrew Corporation.</small>			<small>DRAWN BY:</small> MSM	<small>SHEET:</small> 1 of 3	<small>PART NUMBER:</small> MC-PK8-C
<small>ALL DIMENSIONS ARE IN INCHES U.O.S. TOLERANCES UNLESS OTHERWISE SPECIFIED:</small>			<small>CHECKED BY:</small> TP	<small>SCALE:</small> NTS	<small>DESCRIPTION:</small> LOW PROFILE PLATFORM KIT 8' FACE
<small>.X = ± .12 ANGLES ±2° .XX = ± .06 FRACTIONS ±1/32 .XXX = ± .03</small>			<small>DATE:</small> 10/18/11	<small>MATERIAL:</small> A36, A500	<small>DRAWING TYPE:</small> ASSEMBLY DRAWING
<small>REMOVE BURRS AND BREAK EDGES .005</small>			<small>REVISION:</small> C	<small>FINISH:</small> GALV A123	 WESTCHESTER, IL. 60154 U.S.A.
<small>DO NOT SCALE THIS PRINT</small>				<small>WEIGHT:</small> 1410.14 LBS	



ITEM	PART NO.	DESCRIPTION	QTY.	WEIGHT
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

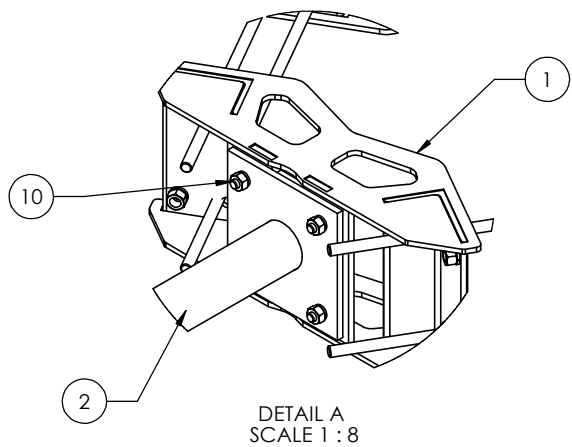
<small>These drawings and specifications are the proprietary property of ANDREW CORPORATION and may be used only for the specific purpose authorized in writing by Andrew Corporation.</small>			
DESIGNED BY: MSM	DATE: 10/18/11	SHEET: 2 of 3	REV# NUMBER: MC-PK8-C
CHECKED BY: TP	DATE: 10/18/11	SCALE: NTS	DESCRIPTION: 25" OD Snub Nose MT-196
REVISION: C	DATE: 10/18/11	MATERIAL: A36, A53	DRAWING TYPE: ASSEMBLY DRAWING
REVISION: C	DATE: 10/18/11	FINISH: GALV A123	WEIGHT: 1361.27 LBS

NOTES:

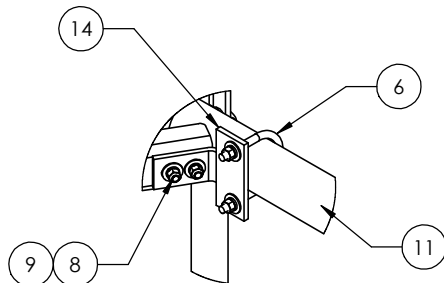
1. ALL METRIC DIMENSIONS ARE IN BRACKETS.
2. WILL FIT MONOPOLES 15"-38" OD.



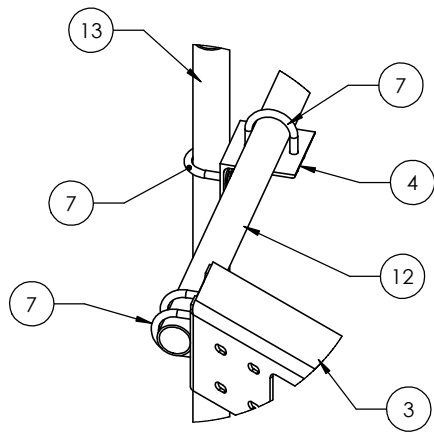
8 7 6 5 4 3 2 1



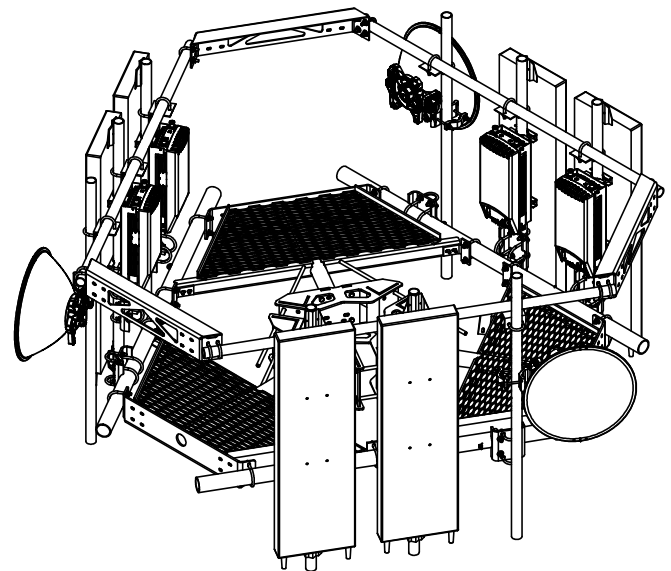
DETAIL A
SCALE 1 : 8



DETAIL B
SCALE 1 : 8




DETAIL C
SCALE 1 : 8



WITH ANTENNAS

NOTES:
1. ALL METRIC DIMENSIONS ARE IN BRACKETS.

<small>These drawings and specifications are the proprietary property of ANDREW CORPORATION and may be used only for the specific purpose authorized in writing by Andrew Corporation.</small>			<small>DRAWN BY:</small> MSM	<small>SHEET:</small> 3 of 3	<small>PART NUMBER:</small> MC-PK8-C
<small>ALL DIMENSIONS ARE IN INCHES U.O.S. TOLERANCES UNLESS OTHERWISE SPECIFIED:</small> .X = ± .12 ANGLES ±2° .XX = ± .06 FRACTIONS ±1/32 .XXX = ± .03 REMOVE BURRS AND BREAK EDGES .005 DO NOT SCALE THIS PRINT			<small>CHECKED BY:</small> TP	<small>SCALE:</small> NTS	<small>DESCRIPTION:</small> 25" OD Snub Nose MT-196
			<small>DATE:</small> 10/18/11	<small>MATERIAL:</small> A36, A53	<small>DRAWING TYPE:</small> ASSEMBLY DRAWING
			<small>REVISION:</small> C	<small>FINISH:</small> GALV A123	 WESTCHESTER, IL. 60154 U.S.A.
				<small>WEIGHT:</small> 1361.27 LBS	

8 7 6 5 4 3 2 1

Exhibit F

Power Density/RF Emissions Report

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

Dish Wireless Existing Facility

Site ID: BOHVN00018A

857528

**85 Paper Mill Road
Woodbury, Connecticut 06798**

August 31, 2021

EBI Project Number: 6221004794

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	5.61%

August 31, 2021

Dish Wireless

Emissions Analysis for Site: BOHVN00018A - 857528

EBI Consulting was directed to analyze the proposed Dish Wireless facility located at **85 Paper Mill Road in Woodbury, Connecticut** for the purpose of determining whether the emissions from the Proposed Dish Wireless Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed Dish Wireless Wireless antenna facility located at 85 Paper Mill Road in Woodbury, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since Dish Wireless is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 20 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

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

- 1) 4 n71 channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 2) 4 n70 channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.
- 3) 4 n66 channels (AWS Band - 2190 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.
- 4) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 5) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 20 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative

estimate as gain reductions for these particular antennas are typically much higher in this direction.

- 6) The antennas used in this modeling are the JMA MX08FRO665-20 for the 600 MHz / 1900 MHz / 2190 MHz channel(s) in Sector A, the JMA MX08FRO665-20 for the 600 MHz / 1900 MHz / 2190 MHz channel(s) in Sector B, the JMA MX08FRO665-20 for the 600 MHz / 1900 MHz / 2190 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 20 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 7) The antenna mounting height centerline of the proposed antennas is 138 feet above ground level (AGL).
- 8) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.
- 9) All calculations were done with respect to uncontrolled / general population threshold limits.

Dish Wireless Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	JMA MX08FRO665-20	Make / Model:	JMA MX08FRO665-20	Make / Model:	JMA MX08FRO665-20
Frequency Bands:	600 MHz / 1900 MHz / 2190 MHz	Frequency Bands:	600 MHz / 1900 MHz / 2190 MHz	Frequency Bands:	600 MHz / 1900 MHz / 2190 MHz
Gain:	17.45 dBd / 22.65 dBd / 22.65 dBd	Gain:	17.45 dBd / 22.65 dBd / 22.65 dBd	Gain:	17.45 dBd / 22.65 dBd / 22.65 dBd
Height (AGL):	138 feet	Height (AGL):	138 feet	Height (AGL):	138 feet
Channel Count:	12	Channel Count:	12	Channel Count:	12
Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts
ERP (W):	5,236.31	ERP (W):	5,236.31	ERP (W):	5,236.31
Antenna AI MPE %:	1.36%	Antenna BI MPE %:	1.36%	Antenna CI MPE %:	1.36%

Site Composite MPE %	
Carrier	MPE %
Dish Wireless (Max at Sector A):	1.36%
AT&T	4.25%
Site Total MPE % :	5.61%

Dish Wireless MPE % Per Sector	
Dish Wireless Sector A Total:	1.36%
Dish Wireless Sector B Total:	1.36%
Dish Wireless Sector C Total:	1.36%
Site Total MPE % :	5.61%

Dish Wireless Maximum MPE Power Values (Sector A)							
Dish Wireless Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
Dish Wireless 600 MHz n71	4	223.68	138.0	1.85	600 MHz n71	400	0.46%
Dish Wireless 1900 MHz n70	4	542.70	138.0	4.48	1900 MHz n70	1000	0.45%
Dish Wireless 2190 MHz n66	4	542.70	138.0	4.48	2190 MHz n66	1000	0.45%
						Total:	1.36%

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

Summary

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

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

Dish Wireless Sector	Power Density Value (%)
Sector A:	1.36%
Sector B:	1.36%
Sector C:	1.36%
Dish Wireless Maximum MPE % (Sector A):	1.36%
Site Total:	5.61%
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **5.61%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Exhibit G

Letter of Authorization



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

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

Crown Castle Letter of Authorization

CT - CONNECTICUT SITING COUNCIL

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

Re: Tower Share Application
Crown Castle telecommunications site at:
85 PAPER MILL ROAD, WOODBURY, CT 06798

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: 857528/WOODBURY PAPER MILL RD
Customer Site ID: BOHVN00018A/CT-CCI-T-857528
Site Address: 85 PAPER MILL ROAD, WOODBURY, CT 06798

Crown Castle

By:  _____ Date: 9/7/2021
Richard Zajac
Site Acquisition Specialist

Exhibit H

Recipient Mailings



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 9405 5036 9930 0013 4886 42 0079 5000 0031 4586

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PRIORITY MAIL 2-DAY™


Expected Delivery Date: 09/27/21
 Re#: DS-857528
0006

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

R013

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

USPS TRACKING #



9405 5036 9930 0013 4885 42

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Print Date: 09/24/2021	Total: \$7.95
Ship Date: 09/24/2021	
Expected Delivery Date: 09/27/2021	

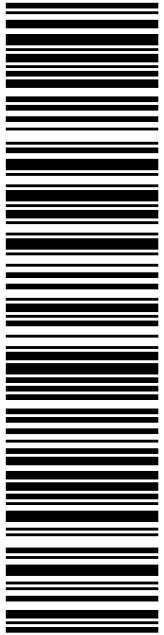
From: DEBORAH CHASE Re#: DS-857528
 NORTHEAST SITE SOLUTIONS
 420 MAIN ST
 STE 1
 STURBRIDGE MA 01566-1359

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

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9405 5036 9930 0013 4885 73

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SHIP TO: BARBARA PERKINSON
FIRST SELECTWOMAN- WOODBURY
281 MAIN ST S
WOODBURY CT 06798-3449


P

09/24/2021

PRIORITY MAIL 2-DAY™

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0006

R007



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USPS TRACKING # :
9405 5036 9930 0013 4885 73

Trans. #: 544385820	Priority Mail® Postage: \$7.95
Print Date: 09/24/2021	Total: \$7.95
Ship Date: 09/24/2021	
Expected Delivery Date: 09/27/2021	

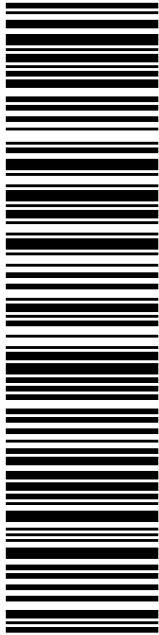
From: DEBORAH CHASE Ref#: DS-857528
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

To: BARBARA PERKINSON
FIRST SELECTWOMAN- WOODBURY
281 MAIN ST S
WOODBURY CT 06798-3449

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09/24/2021

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U.S. POSTAGE
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\$7.95

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PRIORITY MAIL 2-DAY™

Expected Delivery Date: 09/27/21
Re#: DS-857528
0006

SHIP TO: WILLIAM AGRESTA
TOWN PLANNER
281 MAIN ST S
WOODBURY CT 06798-3449

R007

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

PRIORITY MAIL 2-DAY™

Expected Delivery Date: 09/27/21
Re#: DS-857528
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9405 5036 9930 0013 4885 80	
Trans. #:	544385820
Print Date:	09/24/2021
Ship Date:	09/24/2021
Expected Delivery Date:	09/27/2021
Priority Mail® Postage:	\$7.95
Total:	\$7.95
From:	DEBORAH CHASE NORTHEAST SITE SOLUTIONS 420 MAIN ST STE 1 STURBRIDGE MA 01566-1359
To:	WILLIAM AGRESTA TOWN PLANNER 281 MAIN ST S WOODBURY CT 06798-3449
	Re#: DS-857528
* 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.	



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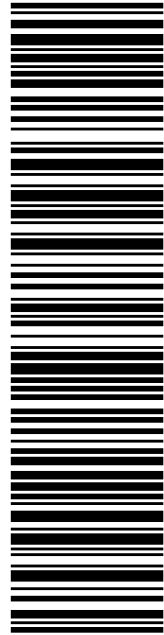
PRIORITY MAIL 2-DAY™

Expected Delivery Date: 09/27/21
 Re#: DS-857528
0006

R008

SHIP TO:
 JODIE BRYAN
 85 PAPER MILL RD
 WOODBURY CT 06798-2006

USPS TRACKING #



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Trans. #:	544385820	Priority Mail® Postage:	\$7.95
Print Date:	09/24/2021	Total:	\$7.95
Ship Date:	09/24/2021		
Expected			
Delivery Date:	09/27/2021		

From:	DEBORAH CHASE NORTHEAST SITE SOLUTIONS 420 MAIN ST STE 1 STURBRIDGE MA 01566-1359	Re#: DS-857528
To:	JODIE BRYAN 85 PAPER MILL RD WOODBURY CT 06798-2006	

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857528 - Woodbury



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

09/24/2021 11:17 AM

Product	Qty	Unit Price	Price
Prepaid Mail Woodbury, CT 06798 Weight: 1 lb 3.30 oz Acceptance Date: Fri 09/24/2021 Tracking #: 9405 5036 9930 0013 4885 73	1		\$0.00
Prepaid Mail Woodbury, CT 06798 Weight: 1 lb 3.30 oz Acceptance Date: Fri 09/24/2021 Tracking #: 9405 5036 9930 0013 4885 97	1		\$0.00
Prepaid Mail Woodbury, CT 06798 Weight: 1 lb 3.30 oz Acceptance Date: Fri 09/24/2021 Tracking #: 9405 5036 9930 0013 4885 80	1		\$0.00
Prepaid Mail West Henrietta, NY 14586 Weight: 0 lb 2.00 oz Acceptance Date: Fri 09/24/2021 Tracking #: 9405 5036 9930 0013 4885 42	1		\$0.00
Grand Total:			\$0.00

Date: **May 28, 2021**



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

Subject: **Structural Analysis Report**

Carrier Designation: **DISH Network Co-Locate**
Site Number: BOHVN00018A
Site Name: CT-CCI-T-857528

Crown Castle Designation: **BU Number:** 857528
Site Name: WOODBURY PAPER MILL RD
JDE Job Number: 645155
Work Order Number: 1966221
Order Number: 553361 Rev. 1

Engineering Firm Designation: **Crown Castle Project Number:** 1966221

Site Data: **85 PAPER MILL ROAD, WOODBURY, LITCHFIELD County, CT**
Latitude 41° 34' 23.07", Longitude -73° 13' 39.51"
150 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 – 52.6%

This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - "Analysis Criteria".

Structural analysis prepared by: Michael Lopienski

Respectfully submitted by:

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

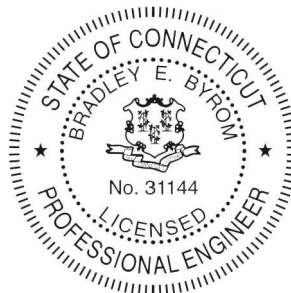


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Additional Calculations

1) INTRODUCTION

This tower is a 150 ft Monopole tower designed by Ehresmann Engineering 1995.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	120 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
138.0	138.0	3	fujitsu	TA08025-B604	1	1-1/2
		3	fujitsu	TA08025-B605		
		3	jma wireless	MX08FRO665-21 w/ Mount Pipe		
		1	raycap	RDIDC-9181-PF-48		
		1	tower mounts	Commscope MC-PK8-DSH		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
147.0	148.0	1	cci antennas	DMP65R-BU4D w/ Mount Pipe	6 2 2 3	1-5/8 3/8 5/8 3/4
		2	cci antennas	DMP65R-BU6D w/ Mount Pipe		
		1	cci antennas	OPA65R-BU4D w/ Mount Pipe		
		2	cci antennas	OPA65R-BU6D w/ Mount Pipe		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 4478 B14		
		3	ericsson	RRUS 8843 B2/B66A		
		3	powerwave technologies	P90-14-XLH-RR w/ Mount Pipe		
		3	powerwave technologies	TT19-08BP111-001		
	2	raycap	DC6-48-60-18-8F			
	147.0	1	tower mounts	Miscellaneous [NA 507-1]		
		1	tower mounts	Platform Mount [LP 601-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	4570959	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	4724414	CCISITES
4-TOWER MANUFACTURER DRAWINGS	4724415	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	150 - 104.5	Pole	TP28.1875x18x0.1875	1	-8.95	988.77	48.5	Pass
L2	104.5 - 68.75	Pole	TP35.75x26.8609x0.25	2	-13.42	1673.43	48.8	Pass
L3	68.75 - 34	Pole	TP43x34.0833x0.3125	3	-19.95	2519.29	43.7	Pass
L4	34 - 0	Pole	TP50x41.0375x0.3125	4	-29.27	3027.25	50.2	Pass
							Summary	
						Pole (L4)	50.2	Pass
						Rating =	50.2	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	21.8	Pass
1	Base Plate	0	31.7	Pass
1	Base Foundation (Structure)	0	25.4	Pass
1	Base Foundation (Soil Interaction)	0	52.6	Pass

Structure Rating (max from all components) =	52.6%
---	--------------

Notes:

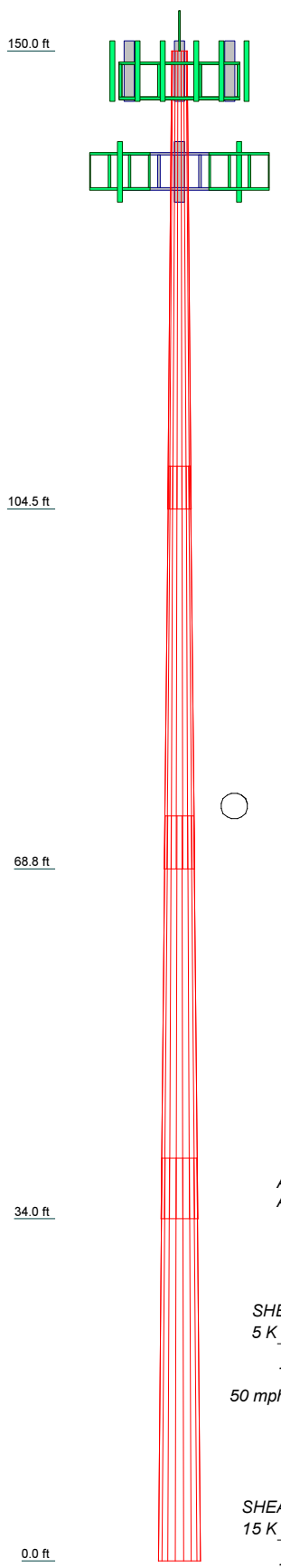
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

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	1	2	3	4	
Length (ft)	45.50	40.00	40.00	40.00	
Number of Sides	18	18	18	18	
Thickness (in)	0.1875	0.2500	0.3125	0.3125	
Socket Length (ft)	4.25	5.25	6.00	41.0375	
Top Dia (in)	18.0000	26.8609	34.0833	50.0000	
Bot Dia (in)	28.1875	35.7500	43.0000		
Grade	A572-65				
Weight (K)	2.1	3.4	5.2	6.1	16.7



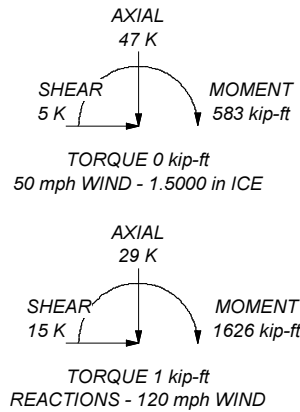
MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for Exposure B to the TIA-222-H Standard.
2. Tower designed for a 120 mph basic wind in accordance with the TIA-222-H Standard.
3. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 50.2%

ALL REACTIONS
ARE FACTORED



Crown Castle

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

Job: BU 857528		
Project:	Client: Crown Castle	Drawn by: MLopienski
Code: TIA-222-H	Date: 05/28/21	App'd: NTS
Path: C:\Work Area\857528\WO 1986221 - SAIProd\857528_RPA.en	Scale: NTS	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 base elevation above sea level: 528.00 ft.
- Basic wind speed of 120 mph.
- Risk Category II.
- Exposure Category B.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.00 ft.
- Nominal ice thickness of 1.5000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.
- 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 Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification ✓ Use Code Stress Ratios ✓ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt. Autocalc Torque Arm Areas Add IBC .6D+W Combination ✓ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder Ignore KL/ry For 60 Deg. Angle Legs	Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption <div style="text-align: center; background-color: #e0e0e0; padding: 2px;">Poles</div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets ✓ Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known
--	---	---

Tapered Pole Section Geometry

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	

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	150.00-104.50	45.50	4.25	18	18.0000	28.1875	0.1875	0.7500	A572-65 (65 ksi)
L2	104.50-68.75	40.00	5.25	18	26.8609	35.7500	0.2500	1.0000	A572-65 (65 ksi)
L3	68.75-34.00	40.00	6.00	18	34.0833	43.0000	0.3125	1.2500	A572-65 (65 ksi)
L4	34.00-0.00	40.00		18	41.0375	50.0000	0.3125	1.2500	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	18.2488	10.6007	424.9328	6.3234	9.1440	46.4712	850.4248	5.3013	2.8380	15.136
	28.5934	16.6635	1650.5160	9.9400	14.3193	115.2655	3303.2038	8.3333	4.6310	24.699
L2	28.1958	21.1158	1889.1397	9.4469	13.6453	138.4457	3780.7651	10.5599	4.2875	17.15
	36.2629	28.1692	4485.0722	12.6025	18.1610	246.9617	8976.0460	14.0873	5.8520	23.408
L3	35.7493	33.4964	4826.3494	11.9886	17.3143	278.7490	9659.0495	16.7514	5.4487	17.436
	43.6151	42.3407	9747.5744	15.1541	21.8440	446.2358	19507.974 9	21.1744	7.0180	22.458
L4	42.9875	40.3941	8464.0370	14.4574	20.8470	406.0065	16939.211 2	20.2009	6.6726	21.352
	50.7231	49.2838	15372.193 1	17.6391	25.4000	605.2045	30764.613 4	24.6466	8.2500	26.4

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _r	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 150.00- 104.50				1	1	1			
L2 104.50- 68.75				1	1	1			
L3 68.75- 34.00				1	1	1			
L4 34.00-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Componen t Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diamete r in	Perimete r in	Weight plf
*											
*											

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Componen t Type	Placement ft	Total Number	C _A A _A ft ² /ft	Weight plf
*** 147 *** LDF7-50A(1-5/8)	B	No	No	Inside Pole	147.00 - 0.00	12		
						No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C _A A _A ft ² /ft	Weight plf
FB-L98B-034-XXX(3/8)	B	No	No	Inside Pole	147.00 - 0.00	1	2" Ice	0.00	0.82
							No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
WR-VG82ST-BRDA(5/8)	B	No	No	Inside Pole	147.00 - 0.00	2	2" Ice	0.00	0.06
							No Ice	0.00	0.31
							1/2" Ice	0.00	0.31
							1" Ice	0.00	0.31
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	147.00 - 0.00	2	2" Ice	0.00	0.31
							No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
FB-L98B-034-XXX(3/8)	C	No	No	Inside Pole	147.00 - 0.00	1	2" Ice	0.00	0.58
							No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06

Safety Line 3/8	C	No	No	CaAa (Out Of Face)	150.00 - 0.00	1	No Ice	0.04	0.22
							1/2" Ice	0.14	0.75
							1" Ice	0.24	1.28
							2" Ice	0.44	2.34
5/8 rod/step	C	No	No	CaAa (Out Of Face)	150.00 - 0.00	1	No Ice	0.02	0.27
							1/2" Ice	0.12	0.70
							1" Ice	0.22	1.74
							2" Ice	0.42	5.65

CU12PSM9P6XXX (1-1/2)	C	No	No	Inside Pole	138.00 - 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 _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	150.00-104.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.45
		C	0.000	0.000	0.000	2.616	0.15
L2	104.50-68.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.38
		C	0.000	0.000	0.000	2.056	0.15
L3	68.75-34.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.37
		C	0.000	0.000	0.000	1.998	0.14
L4	34.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.36
		C	0.000	0.000	0.000	1.955	0.14

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L1	150.00-104.50	A	1.458	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.45

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
L2	104.50-68.75	C	1.403	0.000	0.000	0.000	29.145	0.37
		A		0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.38
L3	68.75-34.00	C	1.332	0.000	0.000	0.000	22.900	0.32
		A		0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.37
L4	34.00-0.00	C	1.190	0.000	0.000	0.000	21.505	0.30
		A		0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.36
		C		0.000	0.000	0.000	20.074	0.28

Feed Line Center of Pressure

Section	Elevation ft	CP _X in	CP _Z in	CP _X Ice in	CP _Z Ice in
L1	150.00-104.50	-0.4467	0.2579	-2.0969	1.2106
L2	104.50-68.75	-0.4522	0.2611	-2.2881	1.3210
L3	68.75-34.00	-0.4551	0.2627	-2.3296	1.3450
L4	34.00-0.00	-0.4568	0.2638	-2.3139	1.3359

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 Adjustmen t °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K	
Lighting Rod 5/8" x 5'	C	None		0.0000	152.00	No Ice	0.31	0.31	0.03
						1/2" Ice	0.83	0.83	0.03
						Ice	1.32	1.32	0.04
						1" Ice	1.96	1.96	0.07
						2" Ice			
*** 147 *** P90-14-XLH-RR w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	147.00	No Ice	5.30	4.05	0.05
						1/2" Ice	5.69	4.67	0.09
						Ice	6.09	5.29	0.15
						1" Ice	6.90	6.57	0.27
						2" Ice			
P90-14-XLH-RR w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	147.00	No Ice	5.30	4.05	0.05
						1/2" Ice	5.69	4.67	0.09
						Ice	6.09	5.29	0.15
						1" Ice	6.90	6.57	0.27
						2" Ice			
P90-14-XLH-RR w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	147.00	No Ice	5.30	4.05	0.05
						1/2" Ice	5.69	4.67	0.09
						Ice	6.09	5.29	0.15
						1" Ice	6.90	6.57	0.27
						2" Ice			
TT19-08BP111-001	A	From Leg	4.00 0.00 1.00	0.0000	147.00	No Ice	0.55	0.44	0.02
						1/2" Ice	0.64	0.53	0.02
						Ice	0.74	0.63	0.03
						1" Ice	0.97	0.84	0.05
						2" Ice			
TT19-08BP111-001	A	From Leg	4.00	0.0000	147.00	No Ice	0.55	0.44	0.02

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment °	Placement ft	C _{AA} Front	C _{AA} Side	Weight K	
			Horz Lateral ft	Vert ft			ft ²	ft ²		
				0.00			1/2"	0.64	0.53	0.02
				1.00			Ice	0.74	0.63	0.03
							1" Ice	0.97	0.84	0.05
							2" Ice			
TT19-08BP111-001	C	From Leg	4.00	0.0000	147.00	No Ice	0.55	0.44	0.02	
			0.00			1/2"	0.64	0.53	0.02	
			1.00			Ice	0.74	0.63	0.03	
						1" Ice	0.97	0.84	0.05	
						2" Ice				
DC6-48-60-18-8F	B	From Leg	4.00	0.0000	147.00	No Ice	1.21	1.21	0.02	
			0.00			1/2"	1.89	1.89	0.04	
			1.00			Ice	2.11	2.11	0.07	
						1" Ice	2.57	2.57	0.13	
						2" Ice				
6' x 2" Mount Pipe	B	From Leg	4.00	0.0000	147.00	No Ice	1.43	1.43	0.02	
			0.00			1/2"	1.92	1.92	0.03	
			0.00			Ice	2.29	2.29	0.05	
						1" Ice	3.06	3.06	0.09	
						2" Ice				
Platform Mount [LP 601-1]	C	None		0.0000	147.00	No Ice	28.50	28.50	1.12	
						1/2"	31.69	31.69	1.68	
						Ice	34.87	34.87	2.28	
						1" Ice	41.23	41.23	3.65	
						2" Ice				
Miscellaneous [NA 507-1]	C	None		0.0000	147.00	No Ice	4.56	4.56	0.25	
						1/2"	6.39	6.39	0.31	
						Ice	8.18	8.18	0.40	
						1" Ice	11.66	11.66	0.66	
						2" Ice				
DMP65R-BU6D w/ Mount Pipe	A	From Leg	4.00	0.0000	147.00	No Ice	11.96	5.97	0.11	
			0.00			1/2"	12.70	6.63	0.20	
			1.00			Ice	13.46	7.30	0.30	
						1" Ice	15.02	8.69	0.53	
						2" Ice				
DMP65R-BU6D w/ Mount Pipe	B	From Leg	4.00	0.0000	147.00	No Ice	11.96	5.97	0.11	
			0.00			1/2"	12.70	6.63	0.20	
			1.00			Ice	13.46	7.30	0.30	
						1" Ice	15.02	8.69	0.53	
						2" Ice				
DMP65R-BU4D w/ Mount Pipe	C	From Leg	4.00	0.0000	147.00	No Ice	7.53	3.79	0.09	
			0.00			1/2"	8.04	4.23	0.16	
			1.00			Ice	8.57	4.68	0.22	
						1" Ice	9.68	5.63	0.39	
						2" Ice				
OPA65R-BU6D w/ Mount Pipe	A	From Leg	4.00	0.0000	147.00	No Ice	12.25	6.05	0.09	
			0.00			1/2"	13.00	6.71	0.18	
			1.00			Ice	13.76	7.39	0.27	
						1" Ice	15.34	8.79	0.51	
						2" Ice				
OPA65R-BU6D w/ Mount Pipe	B	From Leg	4.00	0.0000	147.00	No Ice	12.25	6.05	0.09	
			0.00			1/2"	13.00	6.71	0.18	
			1.00			Ice	13.76	7.39	0.27	
						1" Ice	15.34	8.79	0.51	
						2" Ice				
OPA65R-BU4D w/ Mount Pipe	C	From Leg	4.00	0.0000	147.00	No Ice	8.10	4.03	0.08	
			0.00			1/2"	8.65	4.50	0.14	
			1.00			Ice	9.21	4.98	0.21	
						1" Ice	10.39	5.98	0.38	
						2" Ice				
RRUS 4449 B5/B12	A	From Leg	4.00	0.0000	147.00	No Ice	1.97	1.41	0.07	
			0.00			1/2"	2.14	1.56	0.09	
			1.00			Ice	2.33	1.73	0.11	
						1" Ice	2.72	2.07	0.16	
						2" Ice				
RRUS 4449 B5/B12	B	From Leg	4.00	0.0000	147.00	No Ice	1.97	1.41	0.07	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz	Lateral						ft
			0.00				1/2"	2.14	1.56	0.09
			1.00				Ice	2.33	1.73	0.11
							1" Ice	2.72	2.07	0.16
							2" Ice			
RRUS 4449 B5/B12	C	From Leg	4.00	0.0000	147.00	No Ice	1.97	1.41	0.07	
			0.00			1/2"	2.14	1.56	0.09	
			1.00			Ice	2.33	1.73	0.11	
						1" Ice	2.72	2.07	0.16	
						2" Ice				
RRUS 4478 B14	A	From Leg	4.00	0.0000	147.00	No Ice	1.84	1.06	0.06	
			0.00			1/2"	2.01	1.20	0.08	
			1.00			Ice	2.19	1.34	0.09	
						1" Ice	2.57	1.66	0.14	
						2" Ice				
RRUS 4478 B14	B	From Leg	4.00	0.0000	147.00	No Ice	1.84	1.06	0.06	
			0.00			1/2"	2.01	1.20	0.08	
			1.00			Ice	2.19	1.34	0.09	
						1" Ice	2.57	1.66	0.14	
						2" Ice				
RRUS 4478 B14	C	From Leg	4.00	0.0000	147.00	No Ice	1.84	1.06	0.06	
			0.00			1/2"	2.01	1.20	0.08	
			1.00			Ice	2.19	1.34	0.09	
						1" Ice	2.57	1.66	0.14	
						2" Ice				
RRUS 8843 B2/B66A	A	From Leg	4.00	0.0000	147.00	No Ice	1.64	1.35	0.07	
			0.00			1/2"	1.80	1.50	0.09	
			1.00			Ice	1.97	1.65	0.11	
						1" Ice	2.32	1.99	0.16	
						2" Ice				
RRUS 8843 B2/B66A	B	From Leg	4.00	0.0000	147.00	No Ice	1.64	1.35	0.07	
			0.00			1/2"	1.80	1.50	0.09	
			1.00			Ice	1.97	1.65	0.11	
						1" Ice	2.32	1.99	0.16	
						2" Ice				
RRUS 8843 B2/B66A	C	From Leg	4.00	0.0000	147.00	No Ice	1.64	1.35	0.07	
			0.00			1/2"	1.80	1.50	0.09	
			1.00			Ice	1.97	1.65	0.11	
						1" Ice	2.32	1.99	0.16	
						2" Ice				
DC6-48-60-18-8F	A	From Leg	4.00	0.0000	147.00	No Ice	1.21	1.21	0.02	
			0.00			1/2"	1.89	1.89	0.04	
			1.00			Ice	2.11	2.11	0.07	
						1" Ice	2.57	2.57	0.13	
						2" Ice				

MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.00	0.0000	138.00	No Ice	8.01	4.23	0.11	
			0.00			1/2"	8.52	4.69	0.19	
			0.00			Ice	9.04	5.16	0.29	
						1" Ice	10.11	6.12	0.52	
						2" Ice				
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.00	0.0000	138.00	No Ice	8.01	4.23	0.11	
			0.00			1/2"	8.52	4.69	0.19	
			0.00			Ice	9.04	5.16	0.29	
						1" Ice	10.11	6.12	0.52	
						2" Ice				
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.00	0.0000	138.00	No Ice	8.01	4.23	0.11	
			0.00			1/2"	8.52	4.69	0.19	
			0.00			Ice	9.04	5.16	0.29	
						1" Ice	10.11	6.12	0.52	
						2" Ice				
RDIDC-9181-PF-48	A	From Leg	4.00	0.0000	138.00	No Ice	2.31	1.29	0.02	
			0.00			1/2"	2.50	1.45	0.04	
			0.00			Ice	2.70	1.61	0.06	
						1" Ice	3.12	1.96	0.12	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} _{Front}	C _{AA} _{Side}	Weight	
			Horz	Lateral						Vert
			ft	ft	°	ft	ft ²	ft ²	K	
TA08025-B604	A	From Leg	4.00	0.00	0.0000	138.00	2" Ice			
							No Ice	1.96	0.98	0.06
							1/2"	2.14	1.11	0.08
							Ice	2.32	1.25	0.10
							1" Ice	2.71	1.55	0.15
TA08025-B604	B	From Leg	4.00	0.00	0.0000	138.00	2" Ice			
							No Ice	1.96	0.98	0.06
							1/2"	2.14	1.11	0.08
							Ice	2.32	1.25	0.10
							1" Ice	2.71	1.55	0.15
TA08025-B604	C	From Leg	4.00	0.00	0.0000	138.00	2" Ice			
							No Ice	1.96	0.98	0.06
							1/2"	2.14	1.11	0.08
							Ice	2.32	1.25	0.10
							1" Ice	2.71	1.55	0.15
TA08025-B605	A	From Leg	4.00	0.00	0.0000	138.00	2" Ice			
							No Ice	1.96	1.13	0.08
							1/2"	2.14	1.27	0.09
							Ice	2.32	1.41	0.11
							1" Ice	2.71	1.72	0.16
TA08025-B605	B	From Leg	4.00	0.00	0.0000	138.00	2" Ice			
							No Ice	1.96	1.13	0.08
							1/2"	2.14	1.27	0.09
							Ice	2.32	1.41	0.11
							1" Ice	2.71	1.72	0.16
TA08025-B605	C	From Leg	4.00	0.00	0.0000	138.00	2" Ice			
							No Ice	1.96	1.13	0.08
							1/2"	2.14	1.27	0.09
							Ice	2.32	1.41	0.11
							1" Ice	2.71	1.72	0.16
(2) 8' x 2" Mount Pipe	A	From Leg	4.00	0.00	0.0000	138.00	2" Ice			
							No Ice	1.90	1.90	0.03
							1/2"	2.73	2.73	0.04
							Ice	3.40	3.40	0.06
							1" Ice	4.40	4.40	0.12
(2) 8' x 2" Mount Pipe	B	From Leg	4.00	0.00	0.0000	138.00	2" Ice			
							No Ice	1.90	1.90	0.03
							1/2"	2.73	2.73	0.04
							Ice	3.40	3.40	0.06
							1" Ice	4.40	4.40	0.12
(2) 8' x 2" Mount Pipe	C	From Leg	4.00	0.00	0.0000	138.00	2" Ice			
							No Ice	1.90	1.90	0.03
							1/2"	2.73	2.73	0.04
							Ice	3.40	3.40	0.06
							1" Ice	4.40	4.40	0.12
Commscope MC-PK8-DSH	C	None			0.0000	138.00	2" Ice			
							No Ice	34.24	34.24	1.75
							1/2"	62.95	62.95	2.10
							Ice	91.66	91.66	2.45
							1" Ice	149.08	149.08	3.15
							2" Ice			

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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	150 - 104.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-19.28	-1.32	1.34
			Max. Mx	8	-8.97	-285.90	-2.11
			Max. My	2	-8.95	2.27	290.14
			Max. Vy	8	9.04	-285.90	-2.11
			Max. Vx	2	-9.15	2.27	290.14
			Max. Torque	25			-0.99
L2	104.5 - 68.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-25.94	-1.14	1.25
			Max. Mx	8	-13.43	-634.11	-4.29
			Max. My	2	-13.42	4.46	642.29

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L3	68.75 - 34	Pole	Max. Vy	8	11.01	-634.11	-4.29
			Max. Vx	2	-11.12	4.46	642.29
			Max. Torque	25			-0.91
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.02	-0.90	1.11
			Max. Mx	8	-19.96	-1042.85	-6.41
			Max. My	2	-19.95	6.58	1054.84
			Max. Vy	8	12.99	-1042.85	-6.41
L4	34 - 0	Pole	Max. Vx	2	-13.10	6.58	1054.84
			Max. Torque	25			-0.82
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-47.42	-0.59	0.93
			Max. Mx	8	-29.27	-1605.47	-8.84
			Max. My	2	-29.27	9.03	1621.83
			Max. Vy	8	15.12	-1605.47	-8.84
			Max. Vx	2	-15.22	9.03	1621.83
			Max. Torque	25			-0.72

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	47.42	0.01	5.33
	Max. H _x	20	29.27	15.10	0.06
	Max. H _z	2	29.27	0.06	15.21
	Max. M _x	2	1621.83	0.06	15.21
	Max. M _z	8	1605.47	-15.10	-0.06
	Max. Torsion	13	0.63	-7.60	-13.20
	Min. Vert	7	21.96	-13.05	7.55
	Min. H _x	8	29.27	-15.10	-0.06
	Min. H _z	15	21.96	-0.06	-15.21
	Min. M _x	14	-1621.17	-0.06	-15.21
	Min. M _z	20	-1605.17	15.10	0.06
	Min. Torsion	25	-0.63	7.60	13.20

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturing Moment, M _x kip-ft	Overturing Moment, M _z kip-ft	Torque kip-ft
Dead Only	24.40	0.00	0.00	-0.26	-0.11	-0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	29.27	-0.06	-15.21	-1621.83	9.03	0.50
0.9 Dead+1.0 Wind 0 deg - No Ice	21.96	-0.06	-15.21	-1602.75	8.95	0.50
1.2 Dead+1.0 Wind 30 deg - No Ice	29.27	7.50	-13.14	-1400.04	-794.86	0.24
0.9 Dead+1.0 Wind 30 deg - No Ice	21.96	7.50	-13.14	-1383.56	-785.54	0.24
1.2 Dead+1.0 Wind 60 deg - No Ice	29.27	13.05	-7.55	-803.17	-1385.83	-0.09
0.9 Dead+1.0 Wind 60 deg - No Ice	21.96	13.05	-7.55	-793.69	-1369.59	-0.09
1.2 Dead+1.0 Wind 90 deg - No Ice	29.27	15.10	0.06	8.84	-1605.47	-0.39
0.9 Dead+1.0 Wind 90 deg - No Ice	21.96	15.10	0.06	8.80	-1586.66	-0.40
1.2 Dead+1.0 Wind 120 deg - No Ice	29.27	13.11	7.65	818.37	-1394.96	-0.59
0.9 Dead+1.0 Wind 120 deg	21.96	13.11	7.65	808.85	-1378.60	-0.59

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
- No Ice						
1.2 Dead+1.0 Wind 150 deg	29.27	7.60	13.20	1408.51	-810.72	-0.63
- No Ice						
0.9 Dead+1.0 Wind 150 deg	21.96	7.60	13.20	1392.09	-801.19	-0.63
- No Ice						
1.2 Dead+1.0 Wind 180 deg	29.27	0.06	15.21	1621.17	-9.31	-0.50
- No Ice						
0.9 Dead+1.0 Wind 180 deg	21.96	0.06	15.21	1602.26	-9.15	-0.50
- No Ice						
1.2 Dead+1.0 Wind 210 deg	29.27	-7.50	13.14	1399.36	794.57	-0.23
- No Ice						
0.9 Dead+1.0 Wind 210 deg	21.96	-7.50	13.14	1383.07	785.33	-0.23
- No Ice						
1.2 Dead+1.0 Wind 240 deg	29.27	-13.05	7.55	802.50	1385.53	0.09
- No Ice						
0.9 Dead+1.0 Wind 240 deg	21.96	-13.05	7.55	793.20	1369.38	0.09
- No Ice						
1.2 Dead+1.0 Wind 270 deg	29.27	-15.10	-0.06	-9.51	1605.17	0.39
- No Ice						
0.9 Dead+1.0 Wind 270 deg	21.96	-15.10	-0.06	-9.29	1586.45	0.39
- No Ice						
1.2 Dead+1.0 Wind 300 deg	29.27	-13.11	-7.65	-819.03	1394.67	0.59
- No Ice						
0.9 Dead+1.0 Wind 300 deg	21.96	-13.11	-7.65	-809.34	1378.39	0.59
- No Ice						
1.2 Dead+1.0 Wind 330 deg	29.27	-7.60	-13.20	-1409.17	810.44	0.63
- No Ice						
0.9 Dead+1.0 Wind 330 deg	21.96	-7.60	-13.20	-1392.57	800.99	0.63
- No Ice						
1.2 Dead+1.0 Ice+1.0 Temp	47.42	0.00	-0.00	-0.93	-0.59	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	47.42	-0.01	-5.33	-582.44	1.04	-0.41
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	47.42	2.65	-4.61	-503.69	-288.35	-0.24
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	47.42	4.60	-2.66	-290.26	-500.65	-0.01
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	47.42	5.32	0.01	0.69	-578.97	0.23
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	47.42	4.61	2.68	291.18	-502.34	0.40
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	47.42	2.67	4.63	503.38	-291.27	0.47
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	47.42	0.01	5.33	580.43	-2.34	0.41
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	47.42	-2.65	4.61	501.69	287.05	0.24
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	47.42	-4.60	2.66	288.25	499.36	0.01
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	47.42	-5.32	-0.01	-2.70	577.68	-0.23
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	47.42	-4.61	-2.68	-293.19	501.05	-0.40
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	47.42	-2.67	-4.63	-505.39	289.98	-0.47
Dead+Wind 0 deg - Service	24.40	-0.01	-3.58	-379.91	2.02	0.13
Dead+Wind 30 deg - Service	24.40	1.77	-3.10	-327.98	-186.19	0.06
Dead+Wind 60 deg - Service	24.40	3.08	-1.78	-188.24	-324.54	-0.02
Dead+Wind 90 deg - Service	24.40	3.56	0.01	1.86	-375.96	-0.10
Dead+Wind 120 deg - Service	24.40	3.09	1.80	191.39	-326.68	-0.15
Dead+Wind 150 deg - Service	24.40	1.79	3.11	329.56	-189.90	-0.16
Dead+Wind 180 deg - Service	24.40	0.01	3.58	379.35	-2.26	-0.12
Dead+Wind 210 deg - Service	24.40	-1.77	3.10	327.42	185.94	-0.06
Dead+Wind 240 deg - Service	24.40	-3.08	1.78	187.68	324.29	0.02
Dead+Wind 270 deg - Service	24.40	-3.56	-0.01	-2.42	375.72	0.10

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 300 deg -	24.40	-3.09	-1.80	-191.95	326.44	0.15
Service Dead+Wind 330 deg -	24.40	-1.79	-3.11	-330.12	189.65	0.16

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-24.40	0.00	0.00	24.40	0.00	0.000%
2	-0.06	-29.27	-15.21	0.06	29.27	15.21	0.000%
3	-0.06	-21.96	-15.21	0.06	21.96	15.21	0.000%
4	7.50	-29.27	-13.14	-7.50	29.27	13.14	0.000%
5	7.50	-21.96	-13.14	-7.50	21.96	13.14	0.000%
6	13.05	-29.27	-7.55	-13.05	29.27	7.55	0.000%
7	13.05	-21.96	-7.55	-13.05	21.96	7.55	0.000%
8	15.10	-29.27	0.06	-15.10	29.27	-0.06	0.000%
9	15.10	-21.96	0.06	-15.10	21.96	-0.06	0.000%
10	13.11	-29.27	7.65	-13.11	29.27	-7.65	0.000%
11	13.11	-21.96	7.65	-13.11	21.96	-7.65	0.000%
12	7.60	-29.27	13.20	-7.60	29.27	-13.20	0.000%
13	7.60	-21.96	13.20	-7.60	21.96	-13.20	0.000%
14	0.06	-29.27	15.21	-0.06	29.27	-15.21	0.000%
15	0.06	-21.96	15.21	-0.06	21.96	-15.21	0.000%
16	-7.50	-29.27	13.14	7.50	29.27	-13.14	0.000%
17	-7.50	-21.96	13.14	7.50	21.96	-13.14	0.000%
18	-13.05	-29.27	7.55	13.05	29.27	-7.55	0.000%
19	-13.05	-21.96	7.55	13.05	21.96	-7.55	0.000%
20	-15.10	-29.27	-0.06	15.10	29.27	0.06	0.000%
21	-15.10	-21.96	-0.06	15.10	21.96	0.06	0.000%
22	-13.11	-29.27	-7.65	13.11	29.27	7.65	0.000%
23	-13.11	-21.96	-7.65	13.11	21.96	7.65	0.000%
24	-7.60	-29.27	-13.20	7.60	29.27	13.20	0.000%
25	-7.60	-21.96	-13.20	7.60	21.96	13.20	0.000%
26	0.00	-47.42	0.00	-0.00	47.42	0.00	0.000%
27	-0.01	-47.42	-5.33	0.01	47.42	5.33	0.000%
28	2.65	-47.42	-4.61	-2.65	47.42	4.61	0.000%
29	4.60	-47.42	-2.66	-4.60	47.42	2.66	0.000%
30	5.32	-47.42	0.01	-5.32	47.42	-0.01	0.000%
31	4.61	-47.42	2.68	-4.61	47.42	-2.68	0.000%
32	2.67	-47.42	4.62	-2.67	47.42	-4.63	0.000%
33	0.01	-47.42	5.33	-0.01	47.42	-5.33	0.000%
34	-2.65	-47.42	4.61	2.65	47.42	-4.61	0.000%
35	-4.60	-47.42	2.66	4.60	47.42	-2.66	0.000%
36	-5.32	-47.42	-0.01	5.32	47.42	0.01	0.000%
37	-4.61	-47.42	-2.68	4.61	47.42	2.68	0.000%
38	-2.67	-47.42	-4.62	2.67	47.42	4.63	0.000%
39	-0.01	-24.40	-3.58	0.01	24.40	3.58	0.000%
40	1.77	-24.40	-3.10	-1.77	24.40	3.10	0.000%
41	3.08	-24.40	-1.78	-3.08	24.40	1.78	0.000%
42	3.56	-24.40	0.01	-3.56	24.40	-0.01	0.000%
43	3.09	-24.40	1.80	-3.09	24.40	-1.80	0.000%
44	1.79	-24.40	3.11	-1.79	24.40	-3.11	0.000%
45	0.01	-24.40	3.58	-0.01	24.40	-3.58	0.000%
46	-1.77	-24.40	3.10	1.77	24.40	-3.10	0.000%
47	-3.08	-24.40	1.78	3.08	24.40	-1.78	0.000%
48	-3.56	-24.40	-0.01	3.56	24.40	0.01	0.000%
49	-3.09	-24.40	-1.80	3.09	24.40	1.80	0.000%
50	-1.79	-24.40	-3.11	1.79	24.40	3.11	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	0.00077993
3	Yes	4	0.00000001	0.00043461
4	Yes	5	0.00000001	0.00090305
5	Yes	5	0.00000001	0.00042554
6	Yes	5	0.00000001	0.00088979
7	Yes	5	0.00000001	0.00041933
8	Yes	4	0.00000001	0.00063493
9	Yes	4	0.00000001	0.00031224
10	Yes	5	0.00000001	0.00089108
11	Yes	5	0.00000001	0.00041773
12	Yes	5	0.00000001	0.00095135
13	Yes	5	0.00000001	0.00044795
14	Yes	5	0.00000001	0.0006259
15	Yes	4	0.00000001	0.00071759
16	Yes	5	0.00000001	0.00087578
17	Yes	5	0.00000001	0.00041219
18	Yes	5	0.00000001	0.00088091
19	Yes	5	0.00000001	0.00041526
20	Yes	4	0.00000001	0.00096805
21	Yes	4	0.00000001	0.00057753
22	Yes	5	0.00000001	0.00094446
23	Yes	5	0.00000001	0.00044484
24	Yes	5	0.00000001	0.00089245
25	Yes	5	0.00000001	0.00041779
26	Yes	4	0.00000001	0.00004036
27	Yes	5	0.00000001	0.00066783
28	Yes	5	0.00000001	0.00083857
29	Yes	5	0.00000001	0.00083799
30	Yes	5	0.00000001	0.00066312
31	Yes	5	0.00000001	0.00083904
32	Yes	5	0.00000001	0.00083662
33	Yes	5	0.00000001	0.00065991
34	Yes	5	0.00000001	0.00082235
35	Yes	5	0.00000001	0.00081901
36	Yes	5	0.00000001	0.00065577
37	Yes	5	0.00000001	0.00083582
38	Yes	5	0.00000001	0.00084222
39	Yes	4	0.00000001	0.00006757
40	Yes	4	0.00000001	0.00025103
41	Yes	4	0.00000001	0.00024080
42	Yes	4	0.00000001	0.00005868
43	Yes	4	0.00000001	0.00022808
44	Yes	4	0.00000001	0.00027788
45	Yes	4	0.00000001	0.00007163
46	Yes	4	0.00000001	0.00022678
47	Yes	4	0.00000001	0.00023253
48	Yes	4	0.00000001	0.00006210
49	Yes	4	0.00000001	0.00027353
50	Yes	4	0.00000001	0.00022806

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 104.5	19.108	50	1.2173	0.0053
L2	108.75 - 68.75	9.547	50	0.8971	0.0015
L3	74 - 34	4.226	50	0.5467	0.0005
L4	40 - 0	1.233	50	0.2813	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
152.00	Lighting Rod 5/8" x 5'	50	19.108	1.2173	0.0053	36383
147.00	P90-14-XLH-RR w/ Mount Pipe	50	18.357	1.1965	0.0050	36383
138.00	MX08FRO665-21 w/ Mount Pipe	50	16.121	1.1333	0.0040	15159

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 104.5	81.603	24	5.2027	0.0218
L2	108.75 - 68.75	40.798	24	3.8375	0.0059
L3	74 - 34	18.060	24	2.3377	0.0022
L4	40 - 0	5.268	24	1.2022	0.0008

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
152.00	Lighting Rod 5/8" x 5'	24	81.603	5.2027	0.0218	8649
147.00	P90-14-XLH-RR w/ Mount Pipe	24	78.398	5.1142	0.0204	8649
138.00	MX08FRO665-21 w/ Mount Pipe	24	68.858	4.8451	0.0164	3602

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	KI/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	150 - 104.5 (1)	TP28.1875x18x0.1875	45.50	0.00	0.0	16.097 2	-8.95	941.69	0.010
L2	104.5 - 68.75 (2)	TP35.75x26.8609x0.25	40.00	0.00	0.0	27.243 5	-13.42	1593.74	0.008
L3	68.75 - 34 (3)	TP43x34.0833x0.3125	40.00	0.00	0.0	41.014 0	-19.95	2399.32	0.008
L4	34 - 0 (4)	TP50x41.0375x0.3125	40.00	0.00	0.0	49.283 8	-29.27	2883.10	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{rx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{rx}}$	M_{uy} kip-ft	ϕM_{ry} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ry}}$
L1	150 - 104.5 (1)	TP28.1875x18x0.1875	291.09	583.66	0.499	0.00	583.66	0.000

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 $\frac{M_{uy}}{\phi M_{ny}}$
L2	104.5 - 68.75 (2)	TP35.75x26.8609x0.25	644.15	1278.26	0.504	0.00	1278.26	0.000
L3	68.75 - 34 (3)	TP43x34.0833x0.3125	1057.59	2349.59	0.450	0.00	2349.59	0.000
L4	34 - 0 (4)	TP50x41.0375x0.3125	1625.61	3146.22	0.517	0.00	3146.22	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	150 - 104.5 (1)	TP28.1875x18x0.1875	9.18	282.51	0.032	0.93	669.19	0.001
L2	104.5 - 68.75 (2)	TP35.75x26.8609x0.25	11.15	478.12	0.023	0.84	1437.59	0.001
L3	68.75 - 34 (3)	TP43x34.0833x0.3125	13.13	719.80	0.018	0.74	2606.54	0.000
L4	34 - 0 (4)	TP50x41.0375x0.3125	15.25	864.93	0.018	0.63	3763.64	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio P_u ϕP_n	Ratio M_{ux} ϕM_{nx}	Ratio M_{uy} ϕM_{ny}	Ratio V_u ϕV_n	Ratio T_u ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	150 - 104.5 (1)	0.010	0.499	0.000	0.032	0.001	0.509	1.050	4.8.2
L2	104.5 - 68.75 (2)	0.008	0.504	0.000	0.023	0.001	0.513	1.050	4.8.2
L3	68.75 - 34 (3)	0.008	0.450	0.000	0.018	0.000	0.459	1.050	4.8.2
L4	34 - 0 (4)	0.010	0.517	0.000	0.018	0.000	0.527	1.050	4.8.2

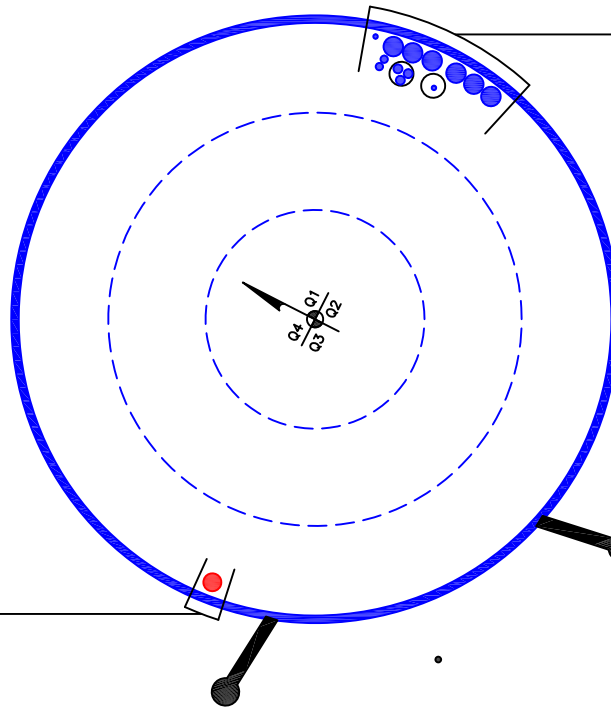
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	150 - 104.5	Pole	TP28.1875x18x0.1875	1	-8.95	988.77	48.5	Pass
L2	104.5 - 68.75	Pole	TP35.75x26.8609x0.25	2	-13.42	1673.43	48.8	Pass
L3	68.75 - 34	Pole	TP43x34.0833x0.3125	3	-19.95	2519.29	43.7	Pass
L4	34 - 0	Pole	TP50x41.0375x0.3125	4	-29.27	3027.25	50.2	Pass
Summary								
Pole (L4)							50.2	Pass
RATING =							50.2	Pass

APPENDIX B
BASE LEVEL DRAWING



- (OTHER CONSIDERED EQUIPMENT-IN (2) CONDUITS)
- (1) 3/8" TO 148 FT LEVEL
- (3) 3/4" TO 148 FT LEVEL
- (OTHER CONSIDERED EQUIPMENT)
- (1) 3/8" TO 148 FT LEVEL
- (2) 5/8" TO 148 FT LEVEL
- (6) 1-5/8" TO 148 FT LEVEL



(PROPOSED EQUIPMENT CONFIGURATION)
(1) 1-1/2" TO 138 FT LEVEL

CLIMBING PEGS
W/ SAFETY CLIMB

APPENDIX C
ADDITIONAL CALCULATIONS

Monopole Base Plate Connection

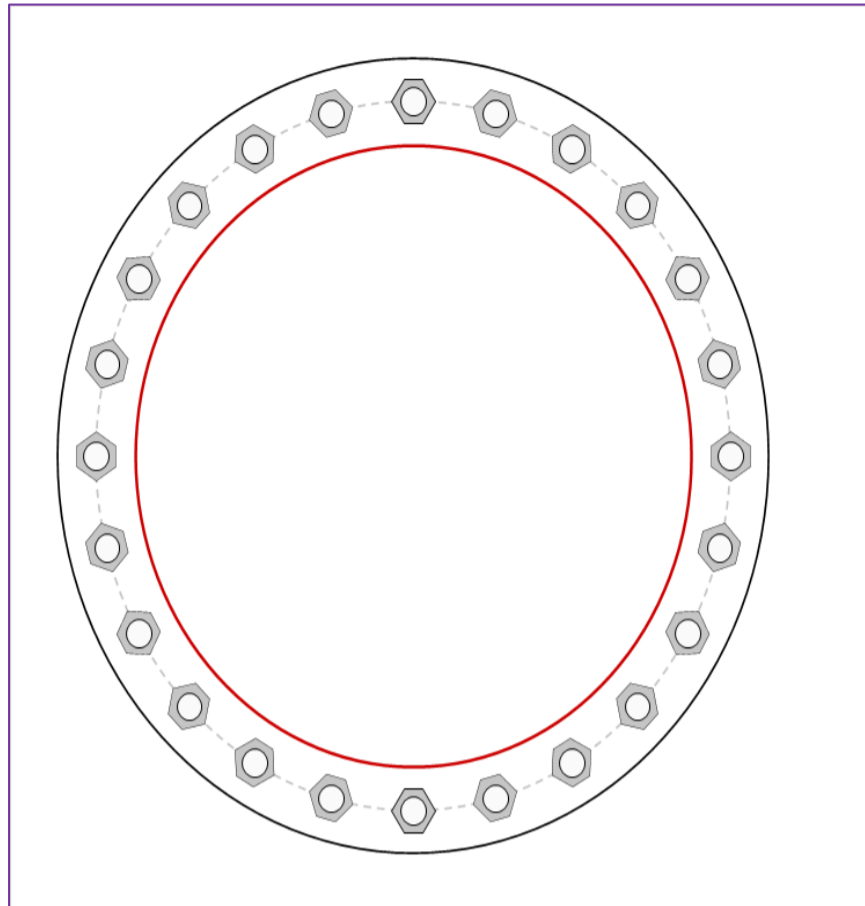


Site Info	
BU #	857528
Site Name	DODBURY PAPER MILL
Order #	553361 Rev. 1

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	2.25

Applied Loads	
Moment (kip-ft)	1625.60
Axial Force (kips)	29.27
Shear Force (kips)	15.25

*TIA-222-H Section 15.5 Applied



Connection Properties	Analysis Results
-----------------------	------------------

Anchor Rod Data
(24) 2-1/4" ϕ bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 57" BC
Base Plate Data
64" OD x 2.25" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)
Stiffener Data
N/A
Pole Data
50" x 0.3125" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Anchor Rod Summary			<i>(units of kips, kip-in)</i>
$P_{u,t} = 55.78$	$\phi P_{n,t} = 243.75$	Stress Rating	
$V_u = 0.64$	$\phi V_n = 149.1$	21.8%	
$M_u = n/a$	$\phi M_n = n/a$	Pass	
Base Plate Summary			
Max Stress (ksi):	14.99	(Flexural)	
Allowable Stress (ksi):	45		
Stress Rating:	31.7%	Pass	

Pier and Pad Foundation



BU #: 857528
 Site Name: WOODBURY PAPER MILL
 App. Number: 553361 Rev. 1

TIA-222 Revision: H
 Tower Type: Monopole

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

Superstructure Analysis Reactions		
Compression, P_{comp} :	29.27	kips
Base Shear, V_{u_comp} :	15.23	kips
Moment, M_u :	1625.6	ft-kips
Tower Height, H :	150	ft
BP Dist. Above Fdn, bp_{dist} :	4.25	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
<i>Lateral (Sliding) (kips)</i>	65.53	15.23	22.1%	Pass
<i>Bearing Pressure (ksf)</i>	9.00	1.76	19.6%	Pass
<i>Overturning (kip*ft)</i>	3233.33	1699.53	52.6%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	6219.92	1656.06	25.4%	Pass
<i>Pier Compression (kip)</i>	21120.36	41.22	0.2%	Pass
<i>Pad Flexure (kip*ft)</i>	4232.26	593.88	13.4%	Pass
<i>Pad Shear - 1-way (kips)</i>	685.65	98.62	13.7%	Pass
<i>Pad Shear - 2-way (Comp) (ksi)</i>	0.190	0.026	13.1%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	4903.88	993.64	19.3%	Pass

Pier Properties		
Pier Shape:	Circular	
Pier Diameter, $dpier$:	6.5	ft
Ext. Above Grade, E :	0.5	ft
Pier Rebar Size, Sc :	10	
Pier Rebar Quantity, mc :	34	
Pier Tie/Spiral Size, St :	4	
Pier Tie/Spiral Quantity, mt :	5	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier} :	3	in

*Rating per TIA-222-H Section 15.5

Structural Rating*:	25.4%
Soil Rating*:	52.6%

Pad Properties		
Depth, D :	4	ft
Pad Width, W_1 :	24	ft
Pad Thickness, T :	2.5	ft
Pad Rebar Size (Bottom dir. 2), Sp_2 :	10	
Pad Rebar Quantity (Bottom dir. 2), mp_2 :	31	
Pad Clear Cover, cc_{pad} :	3	in

Material Properties		
Rebar Grade, F_y :	60	ksi
Concrete Compressive Strength, F'_c :	4	ksi
Dry Concrete Density, δ_c :	150	pcf

Soil Properties		
Total Soil Unit Weight, γ :	90	pcf
Ultimate Gross Bearing, Q_{ult} :	12.000	ksf
Cohesion, C_u :	0.000	ksf
Friction Angle, ϕ :	0	degrees
SPT Blow Count, N_{blows} :	79	
Base Friction, μ :	0.3	
Neglected Depth, N :	4.17	ft
Foundation Bearing on Rock?	Yes	
Groundwater Depth, gw :	n/a	ft

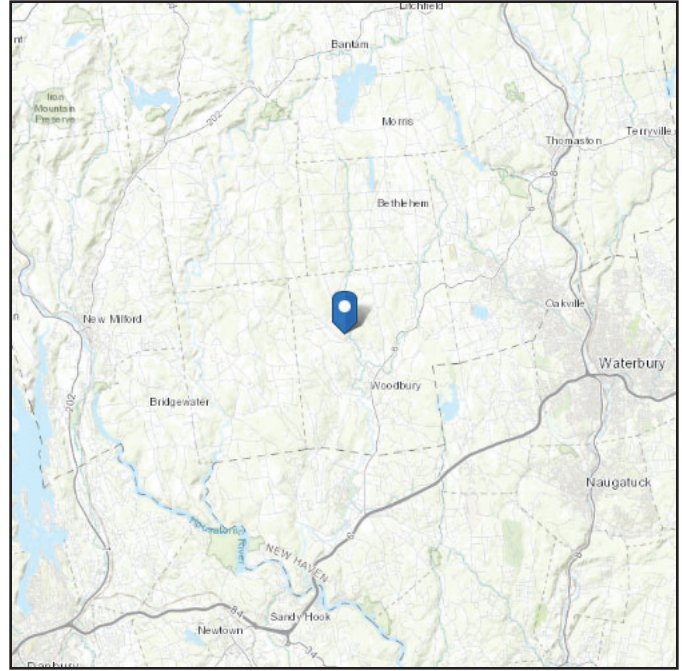
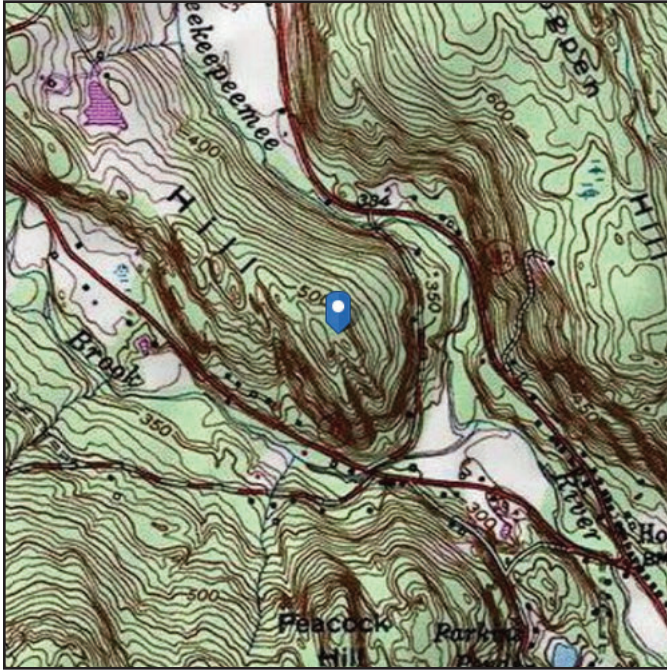
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ASCE 7 Hazards Report

Address:
No Address at This
Location

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

Elevation: 528.06 ft (NAVD 88)
Latitude: 41.573075
Longitude: -73.227642



Wind

Results:

Wind Speed:	117 Vmph
10-year MRI	76 Vmph
25-year MRI	85 Vmph
50-year MRI	90 Vmph
100-year MRI	96 Vmph

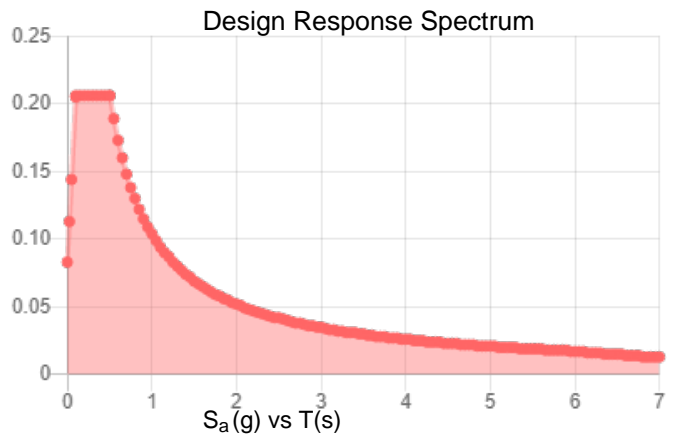
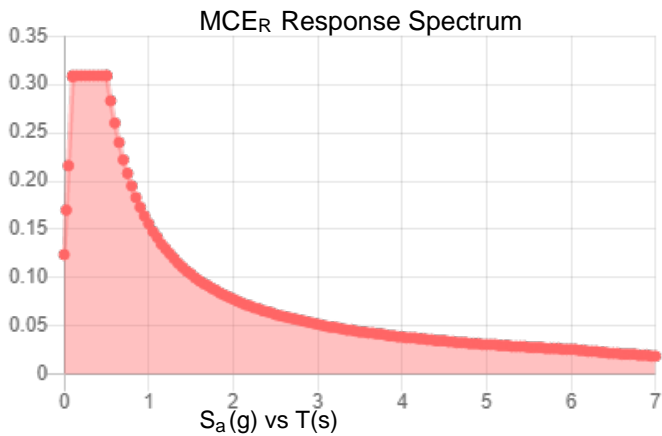
← 120 mph Required by Jurisdiction

Site Soil Class: D - Stiff Soil

Results:

S_S :	0.194	S_{DS} :	0.206
S_1 :	0.065	S_{D1} :	0.104
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.101
S_{MS} :	0.309	PGA _M :	0.161
S_{M1} :	0.156	F _{PGA} :	1.598
		I_e :	1

Seismic Design Category B



Data Accessed:

Wed May 26 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: Wed May 26 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.

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