NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

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

October 12, 2021

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

RE: Tower Share Application
49 South Road, Bolton CT 06043
Latitude: 41.789008
Longitude: -72.429142
Site# 842858_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 49 South Road in Bolton, Connecticut.

Dish Wireless LLC proposes to install three (3) 600/1900 5G MHz antenna and six (6) RRUs, at the 89-foot level of the existing 120-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 B+T Group, dated July 8, 2021 Exhibit C. Also included is a structural analysis prepared by Crown Castle, dated June 14, 2021, confirming that the existing tower is structurally capable of supporting the proposed equipment. Attached as Exhibit D. The facility was approved by the CT Siting Council, Docket No. 240 on July 7, 2003. 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 Sandra Pierog, First Selectwoman and Jim Rupert, Zoning Enforcement Officer for the Town of Bolton, as well as the tower owner (Crown Castle) and property owner (Leonard & Cheryl Giglio)

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 120-feet; Dish Wireless LLC proposed antennas will be located at a center line height of 89-feet.

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

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

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4. The operation of the proposed antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard. As indicated in the attached power density calculations, the combined site operations will result in a total power density of 22.84% 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 monopole in Bolton. 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 89-foot level of the existing 120-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 Bolton.

Sincerely,

Denise Sabo

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

NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

Attachments cc:

Sandra Pierog, First Selectwoman
Bolton Town Hall
222 Bolton Center Road Bolton, CT 06043

Jim Rupert, ZEO
Bolton Town Hall
Zoning Department
222 Bolton Center Road Bolton, CT 06043

Leonard & Cheryl Giglio, Property Owner
49 South Road Bolton, CT 06043

Crown Castle, Tower Owner

Exhibit A

Original Facility Approval

DOCKET NO. 240 – AT&T Wireless PCS, LLC d/b/a AT&T Wireless application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of a telecommunications facility in Bolton, Connecticut.	}	Connecticut Siting Council

July 7, 2003

Decision and Order

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, operation, and maintenance of a telecommunications facility including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate either alone or cumulatively with other effects when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application and therefore directs that a Certificate of Environmental Compatibility and Public Need, as provided by General Statutes § 16-50k, be issued to AT&T Wireless PCS, LLC (AT&T) for the construction, maintenance and operation of a wireless telecommunications facility at proposed Candidate A site (Giglio property) located at 49 South Road, Bolton, Connecticut. We deny certification of the proposed Candidate B site located at 299 Hop River Road (Route 6), Bolton, 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 AT&T and other entities, both public and private, but such tower shall not exceed a height of 120 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. The D&M Plan shall be submitted to and approved by the Council prior to the commencement of facility construction and shall include:

    a) a detailed site development plan that depicts the location of the access road, compound, tower, and utility line;
    b) specifications for the tower, tower foundation, antennas, equipment building, and security fence;
    c) construction plans for site clearing, water drainage, and erosion and sedimentation control consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended.

3. The Certificate Holder shall, prior to the commencement of operation, provide the Council worst-case modeling of electromagnetic radio frequency power densities 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 provide a recalculated report of electromagnetic radio frequency power density 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. If the facility does not initially provide wireless services within one year of completion of construction or ceases to provide wireless services for a period of one year, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made.

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

8. Unless otherwise approved by the Council, this Decision and Order shall be void if the facility authorized herein is not operational within one year of the effective date of this Decision and Order or within one year after all appeals to this Decision and Order have been resolved.

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

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
AT&T Wireless PCS, LLC
d/b/a AT&T Wireless

Its Representative
Christopher B. Fisher, Esq.
Cuddy & Feder & Worby LLP
90 Maple Avenue
White Plains, NY 10601
(914) 761-1300
(914) 761-6405 - fax

CERTIFICATION

The undersigned members of the Connecticut Siting Council (Council) hereby certify that they have heard this case, or read the record thereof, in **DOCKET NO. 240** – AT&T Wireless PCS, LLC d/b/a AT&T Wireless application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of a telecommunications facility in Bolton, Connecticut, and voted as follows to approve the proposed Candidate A site located at 49 South Road (Giglio property), Bolton, Connecticut, and deny certification of the proposed Candidate B site located at 299 Hop River Road (Route 6), Bolton, Connecticut:

Council Members	Vote Cast
Pamela B. Katz, P.E., Chairman	Yes
Commissioner Donald W. Downes Designee: Gerald J. Heffernan	Yes
Commissioner Arthur J. Rocque, Jr. Designee: Brian J. Emerick	Yes
Philip Ashton	Yes
Daniel P. Lynch, Jr.	No
James J. Murphy, Jr.	Abstain
Brian O'Neill	No
Colin C. Tait	No
Edward S. Wilensky	Abstain

Dated at New Britain, Connecticut July 8, 2003.

STATE OF CONNECTICUT)

ss. New Britain, Connecticut :

COUNTY OF HARTFORD)

I hereby certify that the foregoing is a true and correct copy of the Findings of Fact, Opinion, and Decision and Order issued by the Connecticut Siting Council, State of Connecticut.

ATTEST:

S. Derek Phelps
Executive Director
Connecticut Siting Council

I certify that a copy of the Findings of Fact, Opinion, and Decision and Order in Docket No. 240 has been forwarded by Certified First Class Return Receipt Requested mail on July 11, 2003, to all parties and intervenors of record as listed on the attached service list, dated January 21, 2003.

ATTEST:

Lisa Fontaine
Administrative Assistant
Connecticut Siting Council

Exhibit B

Property Card

49 SOUTH RD

Location	49 SOUTH RD	**Mblu**	05/ / 107/ /
Owner	GIGLIO LEONARD W &	**Assessment**	$394,650
Appraisal	$743,600	**PID**	1348
Building Count	1		

Current Value

Appraisal	
Valuation Year	**Total**
2018	$743,600

Assessment	
Valuation Year	**Total**
2018	$394,650

Owner of Record

Owner	GIGLIO LEONARD W &	**Sale Price**	$0
Co-Owner	GIGLIO CHERYL P	**Certificate**	SURV
Address	49 SOUTH RD	**Book & Page**	165/120
	BOLTON, CT 06043	**Sale Date**	04/15/2014
		Instrument	24

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
GIGLIO LEONARD W &	$0	SURV	165/120	24	04/15/2014
GIGLIO LEONARD W &	$0	salemaster	0087/0548		05/01/1996

Building Information

Building 1 : Section 1

Year Built: 1996
Living Area: 2,044
Building Percent Good: 89

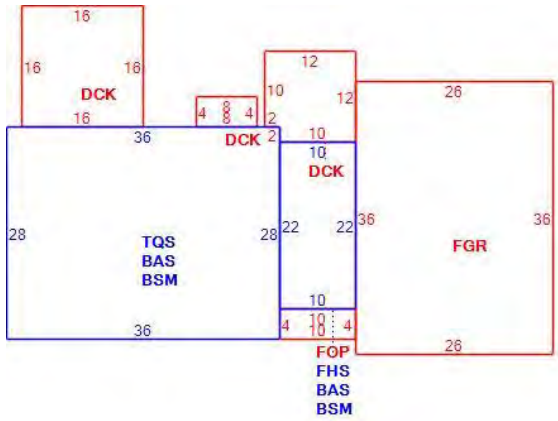
Building Attributes	
Field	**Description**

Style	Cape
Model	Residential
Grade:	B-
Stories	1.75
Occupancy	1
Exterior Wall 1	Vinyl Siding
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Arch Shingles
Interior Wall 1	Drywall
Interior Wall 2	
Interior Flr 1	Hardwood
Bath Floors	Ceramic Tile
Heat Fuel	Oil
Heat Type:	Hot Water
AC Percent	0
Total Bedrooms:	3 Bedrooms
Full Bthrms:	2
Half Baths:	0
Extra Fixtures	0
Total Rooms:	6
Num Kitchens	1
Fireplace(s)	1
Wood Stoves	
Foundation	Concrete
Bsmt Gar(s)	
SF Fin. Bsmt.	
Fin Bsmt Qual	
Usrfld 300	
Usrfld 301	

Building Photo

(http://images.vgsi.com/photos/BoltonCTPhotos//default.jpg)

Building Layout



(ParcelSketch.ashx?pid=1348&bid=1348)

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	1,228	1,228
TQS	Three Quarter Story	1,008	706
FHS	Finished Half Story	220	110
BSM	Basement	1,228	0
DCK	Deck	428	0
FGR	Garage	936	0
FOP	Open Porch	40	0
		5,088	2,044

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land

Land Use

Zone R-1

Land Line Valuation

Size (Acres)	29.00
Depth	
Assessed Value	$199,550
Appraised Value	$464,900

Outbuildings

Outbuildings					Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Bldg #**
FGR2	Garage W/ Loft	FR	Frame	1320.00 S.F.	1
FGR2	Garage W/ Loft	FR	Frame	2400.00 S.F.	1
FOP	Porch			960.00 S.F.	1
CELL	Cell Tower			120.00 FEET	1

Valuation History

Appraisal	
Valuation Year	**Total**
2019	$743,600
2018	$743,600

Assessment	
Valuation Year	**Total**
2019	$394,650
2018	$394,650


Stonehedge Ln
S Rd
49 S Rd, Bolton,
CT 06043
S Rd
Stony Rd
S Rd

Exhibit C

Construction Drawings

DISH Wireless L.L.C. SITE ID:

BOBDL00064A

DISH Wireless L.L.C. SITE ADDRESS:

49 SOUTH ROAD
BOLTON, CT 06043

CONNECTICUT CODE COMPLIANCE

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

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

SHEET INDEX

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

SCOPE OF WORK

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

TOWER SCOPE OF WORK:
- INSTALL (3) PROPOSED PANEL ANTENNAS (1 PER SECTOR)
- INSTALL (3) PROPOSED TOWER T-ARM MOUNT (1 PER SECTOR)
- INSTALL PROPOSED JUMPERS
- INSTALL (6) PROPOSED RRUs (2 PER SECTOR)
- INSTALL (1) PROPOSED OVER VOLTAGE PROTECTION DEVICE (OVP)
- INSTALL (1) PROPOSED HYBRID CABLE

GROUND SCOPE OF WORK:
- INSTALL (1) PROPOSED METAL PLATFORM
- INSTALL (1) PROPOSED ICE BRIDGE
- INSTALL (1) PROPOSED PPC CABINET
- INSTALL (1) PROPOSED EQUIPMENT CABINET
- INSTALL (1) PROPOSED POWER CONDUIT
- INSTALL (1) PROPOSED TELCO CONDUIT
- INSTALL (1) PROPOSED TELCO-FIBER BOX
- INSTALL (1) PROPOSED GPS UNIT
- INSTALL (1) PROPOSED SAFETY SWITCH (IF REQUIRED)
- INSTALL (1) PROPOSED FIBER NID (IF REQUIRED)
- INSTALL (1) PROPOSED METER SOCKET

SITE PHOTO

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

811

GENERAL NOTES

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

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

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

SITE INFORMATION

PROPERTY OWNER:	GIGLIO LEONARD & CHERYL LEONARD 49 SOUTH ROAD
ADDRESS:	BOLTON, CT 06043
TOWER TYPE:	MONOPOLE
TOWER CO SITE ID:	842858
TOWER APP NUMBER:	556628
COUNTY:	TOLLAND
LATITUDE (NAD 83):	41° 47' 20.43" N 41.789008 N
LONGITUDE (NAD 83):	72° 25' 44.91" W 72.429142 W
ZONING JURISDICTION:	CONNECTICUT SITING COUNCIL
ZONING DISTRICT:	R-1
PARCEL NUMBER:	1348
OCCUPANCY GROUP:	U
CONSTRUCTION TYPE:	V-B
POWER COMPANY:	EVERSOURCE
TELEPHONE COMPANY:	XFINITY

PROJECT DIRECTORY

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

DIRECTIONS

DIRECTIONS FROM HARTFORD-BRAINARD AIRPORT:

GET ON US-5 N FROM MAXIM RD AND BRAINARD RD, HEAD NORTH ON LINDBERGH DR TOWARD MAXIM RD, TURN LEFT ONTO MAXIM RD, CONTINUE ONTO BRAINARD RD, TURN RIGHT ONTO THE RAMP TO I-91 N/I-84/SPRINGFIELD/BOSTON, TAKE I-384 TO US-6 E IN BOLTON, MERGE WITH US-5 N, CONTINUE ONTO CT-15 N, USE THE LEFT 2 LANES TO MERGE WITH I-84 E TOWARD BOSTON, USE THE RIGHT 2 LANES TO TAKE EXIT 59 FOR I-384 E TOWARD PROVIDENCE, CONTINUE ONTO I-384, CONTINUE ONTO US-44 E/US-6 E, CONTINUE ON US-6 E. DRIVE TO S RD, KEEP RIGHT AT THE Y JUNCTION TO CONTINUE ON US-6 E, FOLLOW SIGNS FOR WILLIMANTIC/PROVIDENCE, TURN LEFT ONTO STONY RD, TURN LEFT AT THE 1ST CROSS STREET ONTO S RD.

VICINITY MAP

NO SCALE

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

CROWN CASTLE
2000 CORPORATE DRIVE
CANONSBURG, PA 15317

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

STATE OF CONNECTICUT — No. 23924 — LICENSED PROFESSIONAL ENGINEER
7/8/21

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

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

RFDS REV #: 0

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	6/17/21	ISSUED FOR REVIEW
0	7/8/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
137088.003.01

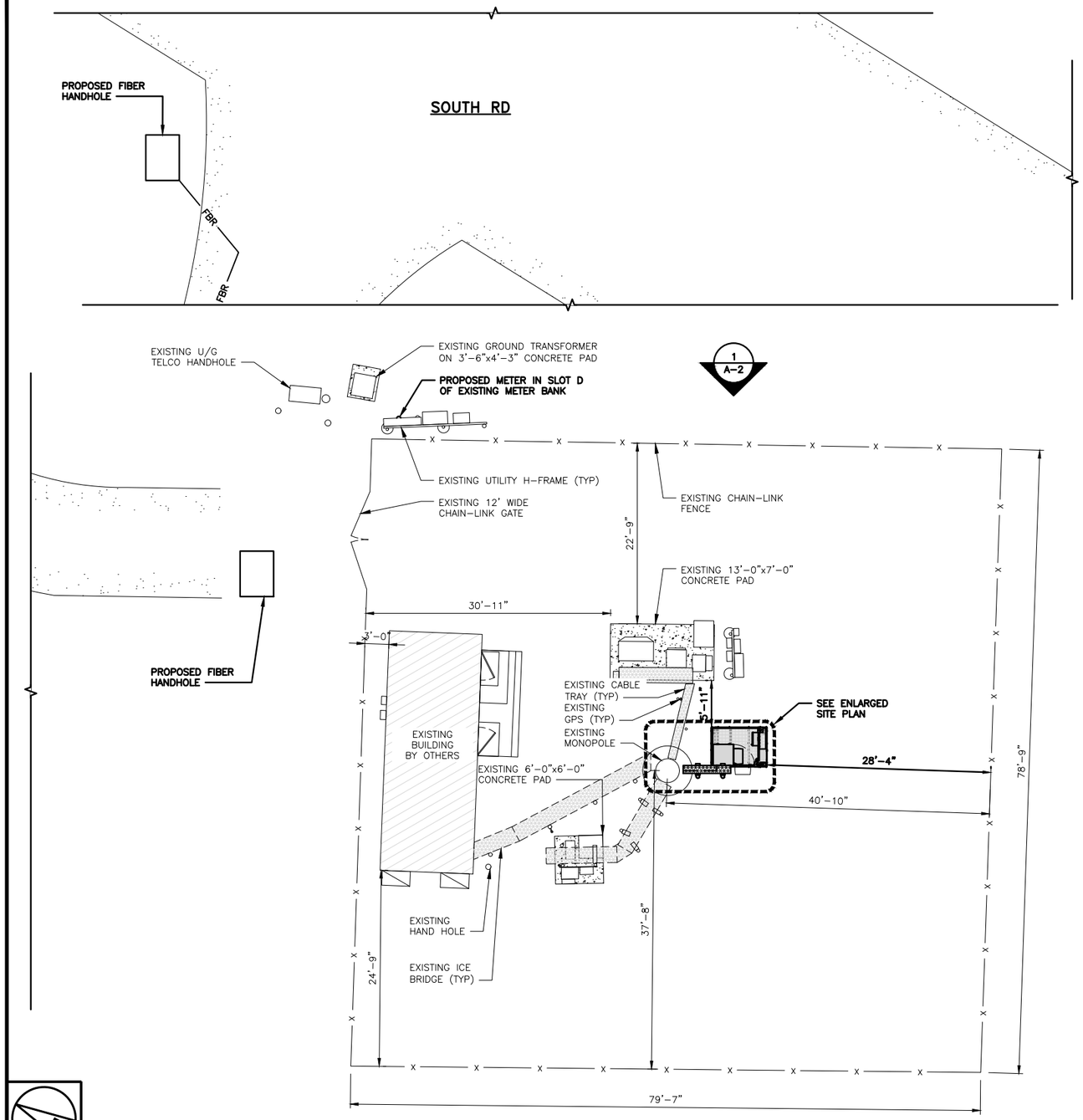
DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00064A
49 SOUTH ROAD
BOLTON, CT 06043

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

NOTES

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



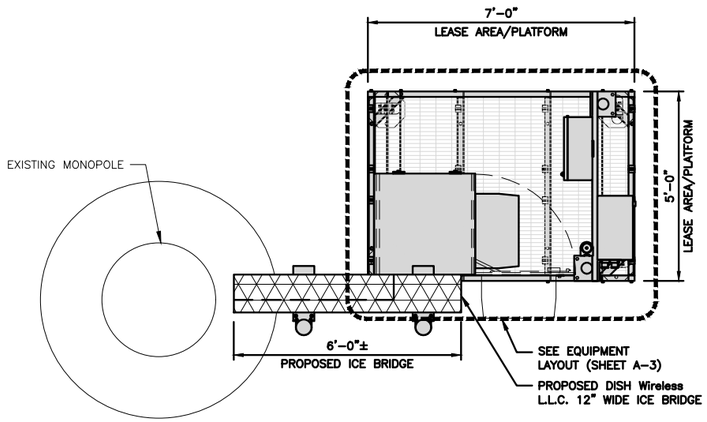
OVERALL SITE PLAN

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

1

NOTES

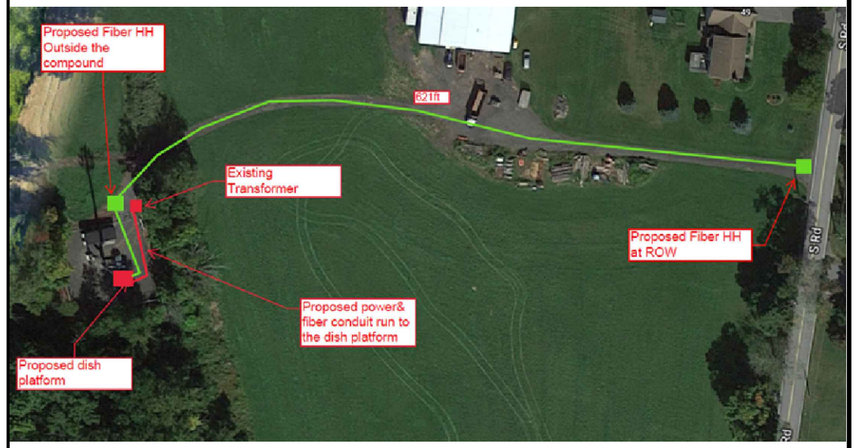
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. CONTRACTOR SHALL MAINTAIN A 10'-0" MINIMUM SEPARATION BETWEEN THE PROPOSED GPS UNIT, TRANSMITTING ANTENNAS AND EXISTING GPS UNITS.
3. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.



ENLARGED SITE PLAN

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

2



UTILITY PLAN

NO SCALE

3

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

CROWN CASTLE
2000 CORPORATE DRIVE
CANONSBURG, PA 15317

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

STATE OF CONNECTICUT — No. 23924 — LICENSED PROFESSIONAL ENGINEER — 7/8/21

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

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

RFDS REV #: 0

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	6/17/21	ISSUED FOR REVIEW
0	7/8/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
137088.003.01

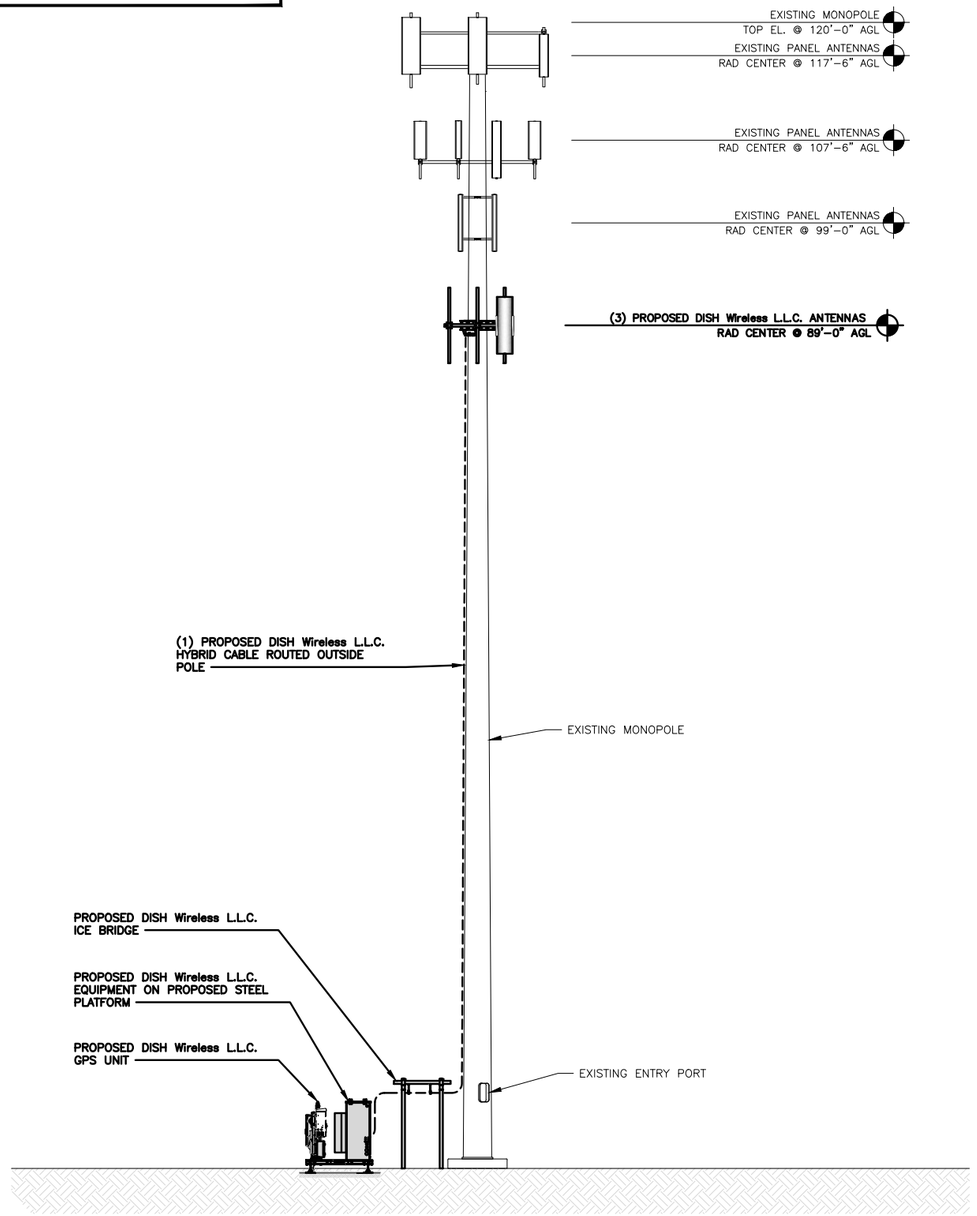
DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00064A
49 SOUTH ROAD
BOLTON, CT 06043

SHEET TITLE
OVERALL AND ENLARGED SITE PLAN

SHEET NUMBER
A-1

NOTES

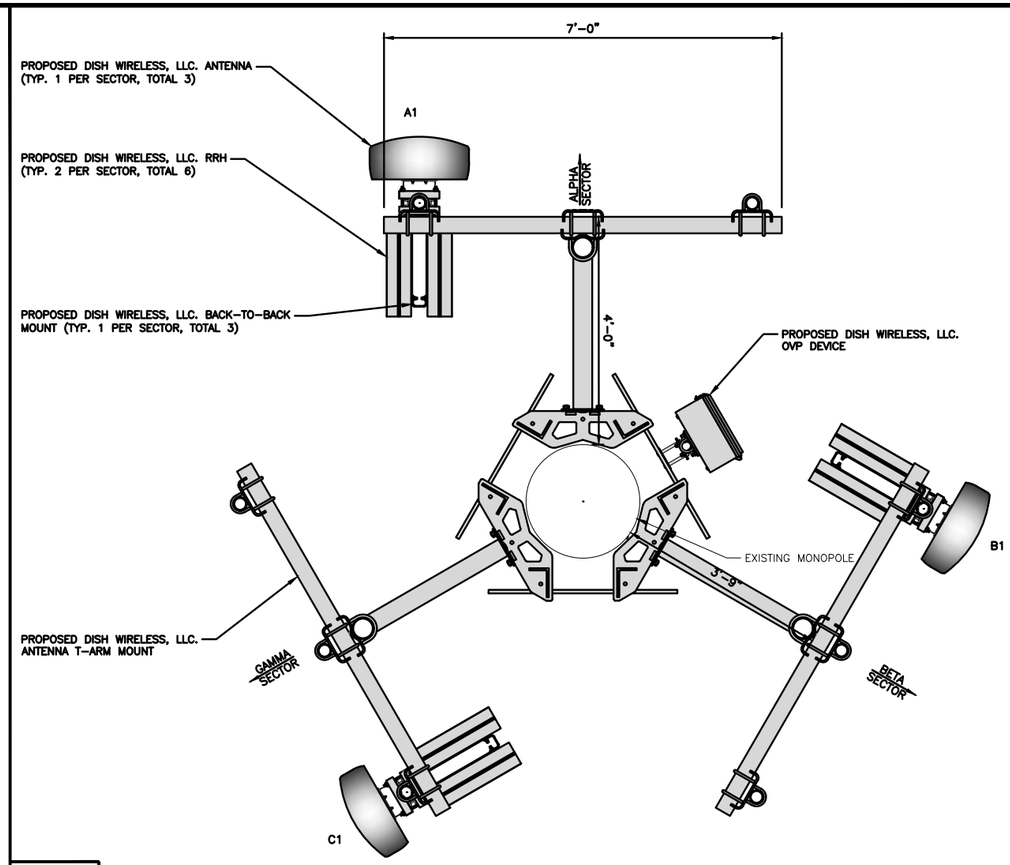
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. ANTENNA AND MW DISH SPECIFICATIONS REFER TO ANTENNA SCHEDULE AND TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS
3. EXISTING EQUIPMENT AND FENCE OMITTED FOR CLARITY.



PROPOSED NORTHEAST ELEVATION

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

1



N

ANTENNA LAYOUT

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

2

SECTOR	POSITION	ANTENNA						TRANSMISSION CABLE
		EXISTING OR PROPOSED	MANUFACTURER – MODEL NUMBER	TECHNOLOGY	SIZE (HxW)	AZIMUTH	RAD CENTER	FEED LINE TYPE AND LENGTH
ALPHA	A1	PROPOSED	JMA WIRELESS–MX08FRO665–21	5G	72.0" x 20.0"	0°	89'–0"	(1) HIGH–CAPACITY HYBRID CABLE (120' LONG)
BETA	B1	PROPOSED	JMA WIRELESS–MX08FRO665–21	5G	72.0" x 20.0"	120°	89'–0"	
GAMMA	C1	PROPOSED	JMA WIRELESS–MX08FRO665–21	5G	72.0" x 20.0"	240°	89'–0"	

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

NOTES

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

ANTENNA SCHEDULE

NO SCALE

3

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CROWN CASTLE
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Expires 2/10/22

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

RFDS REV #: 0

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
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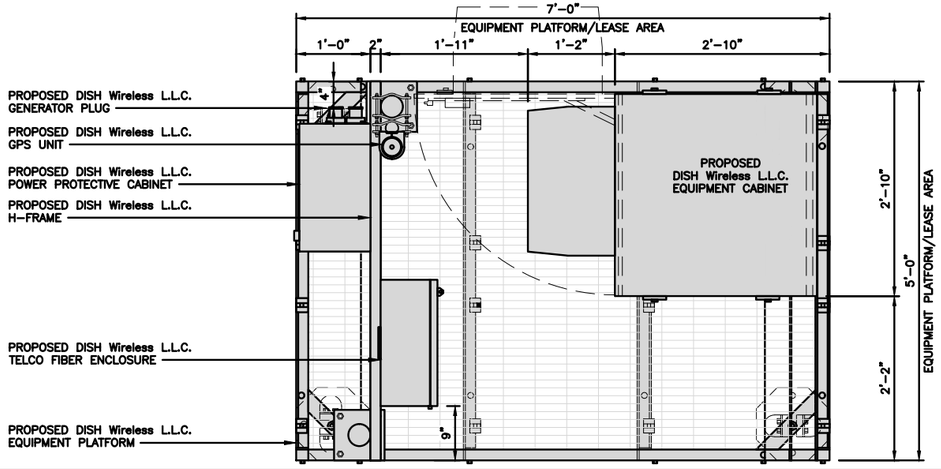
0	7/8/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
137088.003.01

DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00064A
49 SOUTH ROAD
BOLTON, CT 06043

SHEET TITLE
ELEVATION, ANTENNA LAYOUT AND SCHEDULE

SHEET NUMBER
A-2



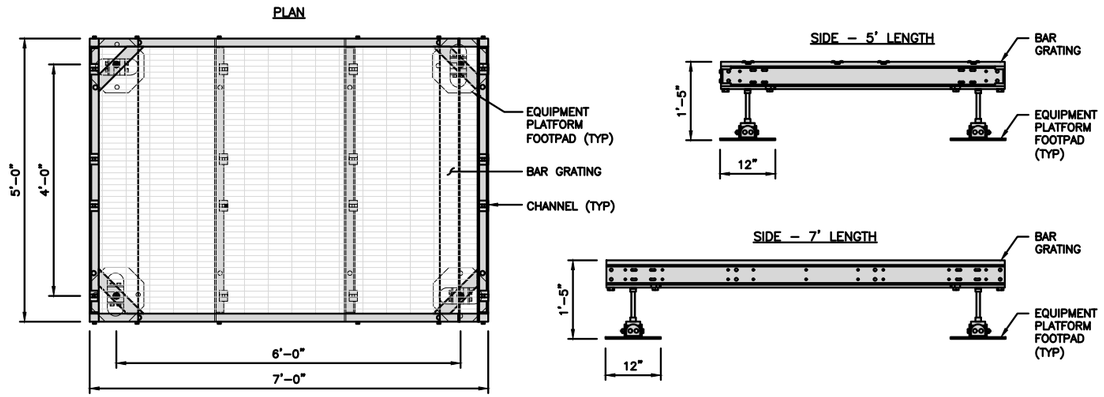
PLATFORM EQUIPMENT PLAN

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

1

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

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

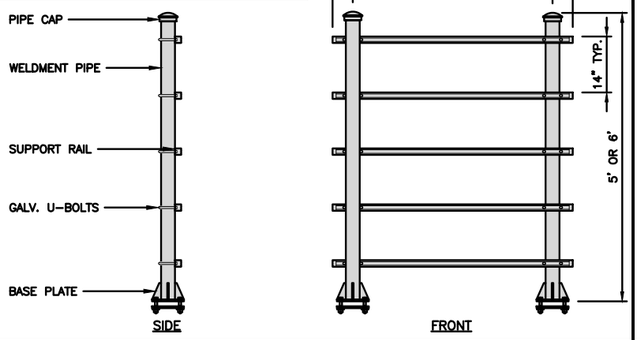


PLATFORM DETAIL

NO SCALE

2

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



H-FRAME DETAIL

NO SCALE

3

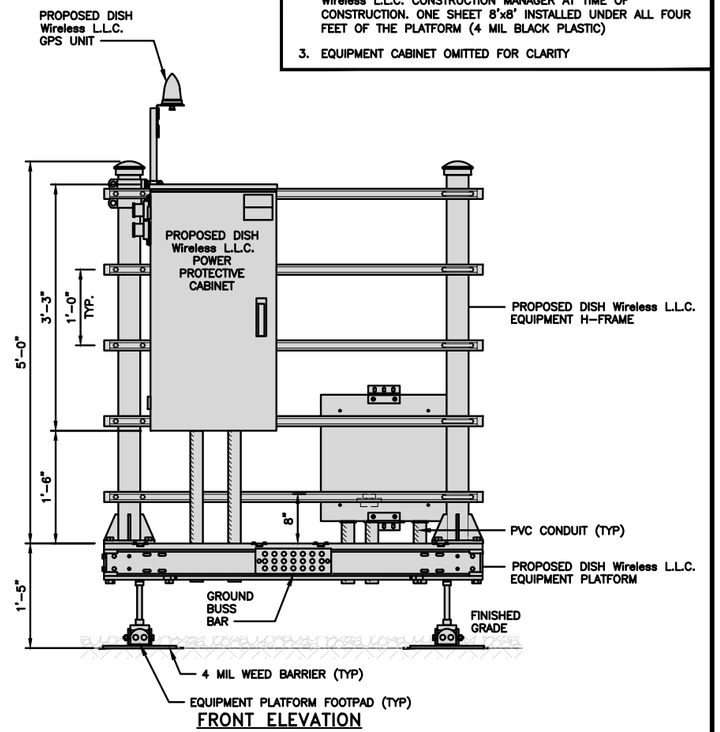
NOT USED

NO SCALE

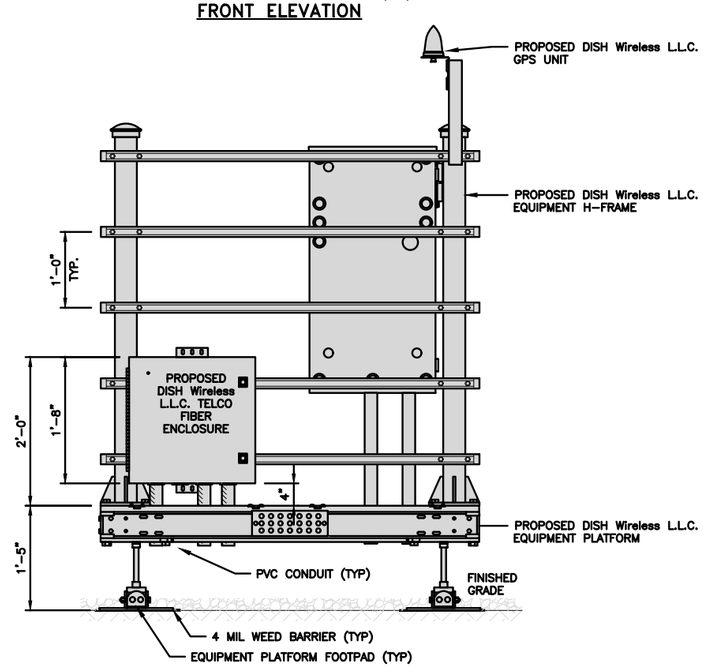
4

NOTES

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



FRONT ELEVATION



BACK ELEVATION

H-FRAME EQUIPMENT ELEVATION

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

5

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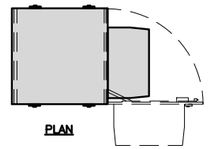
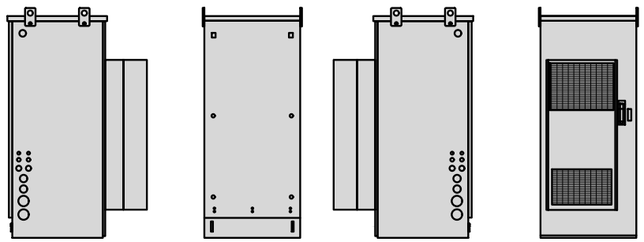
DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00064A
49 SOUTH ROAD
BOLTON, CT 06043

SHEET TITLE
EQUIPMENT PLATFORM AND H-FRAME DETAILS

SHEET NUMBER
A-3

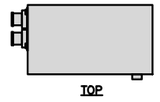
CHARLES INDUSTRY HEX CUBE–PM639155N4	
DIMENSIONS (HxWxD):	74"x32"x32"
POWER PLANT:	–48VDC ABB/600W
TOTAL WEIGHT (EMPTY)	408 LBS

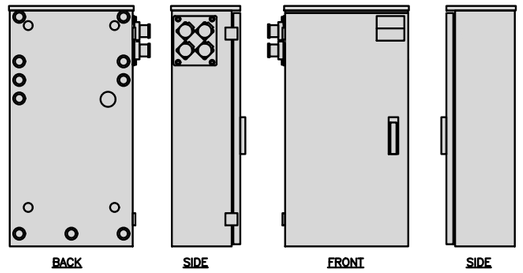




CABINET DETAIL | NO SCALE | 1

RAYCAP PPC RDIAC–2465–P–240–MTS	
ENCLOSURE DIMENSIONS (HxWxD):	39"x22.855"x12.593
WEIGHT:	80 lbs
OPERATING AC VOLTAGE	240/120 1 PHASE 3W+G

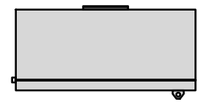




POWER PROTECTION CABINET (PPC) DETAIL | NO SCALE | 2

NOT USED | NO SCALE | 3

CHARLES CFIT–PF2020DSH1 FIBER TELCO ENCLOSURE	
ENCLOSURE DIMS (HxWxD)	20"x20"x9"
ENCLOSURE WEIGHT	20 lbs
MOUNTING	WALL
COMPLIANCE	TYPE 4



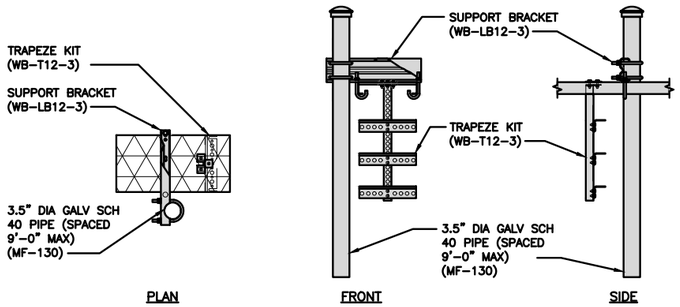
NOT USED | NO SCALE | 4

NOT USED | NO SCALE | 5

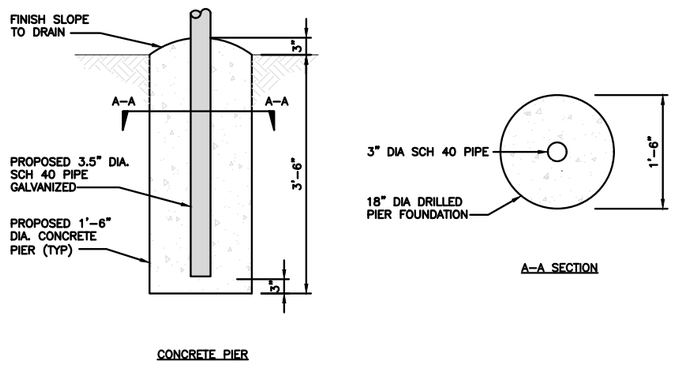
FIBER TELCO ENCLOSURE DETAIL | NO SCALE | 6

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

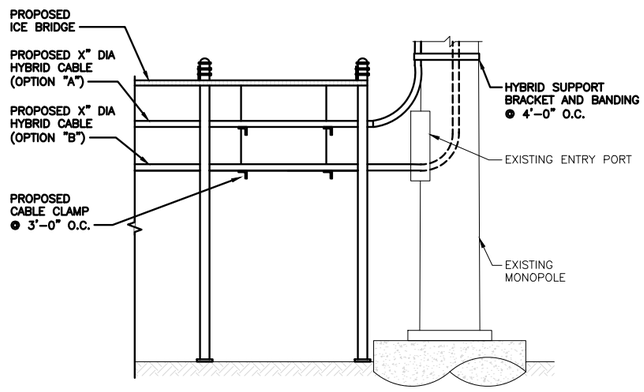
INCLUDED PRODUCTS:	
	WB–T12–3 TRAPEZE KIT, 3 RUNGS
	WB–LB12–3 SUPPORT BRACKET
	MF–130 DIRECT BURIAL PIPE COLUMN, 13'–4"



ICE BRIDGE DETAIL | NO SCALE | 7



TYPICAL ICE BRIDGE CONCRETE PIER DETAIL | NO SCALE | 8



HYBRID CABLE RUN | NO SCALE | 9

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RFDS REV #: 0

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137088.003.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBDL00064A
49 SOUTH ROAD
BOLTON, CT 06043

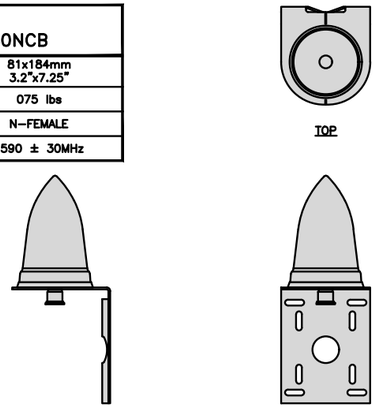
SHEET TITLE

EQUIPMENT DETAILS

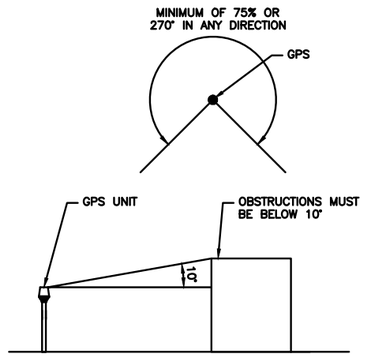
SHEET NUMBER

A-4

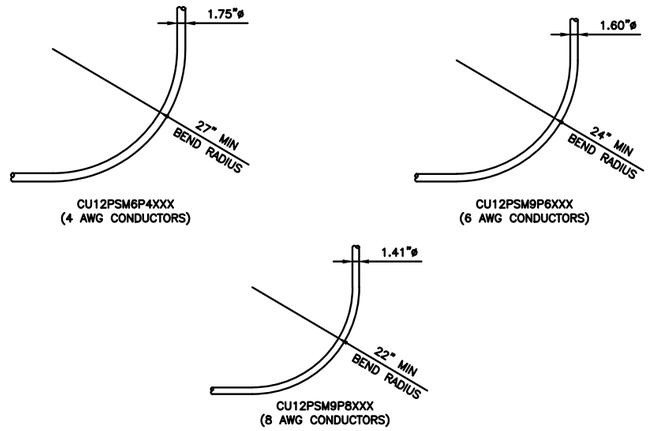
PCTEL GPSGL-TMG-SPI-40NCB	
DIMENSIONS (DIAxH) MM/INCH	81x184mm 3.2"x7.25"
WEIGHT W/ACCESSORIES	075 lbs
CONNECTOR	N-FEMALE
FREQUENCY RANGE	1590 ± 30MHz



GPS DETAIL | NO SCALE | 1



GPS MINIMUM SKY VIEW REQUIREMENTS | NO SCALE | 2



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

NOT USED | NO SCALE | 4

NOT USED | NO SCALE | 5

NOT USED | NO SCALE | 6

NOT USED | NO SCALE | 7

NOT USED | NO SCALE | 8

NOT USED | NO SCALE | 9

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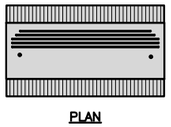
BOBDL00064A
49 SOUTH ROAD
BOLTON, CT 06043

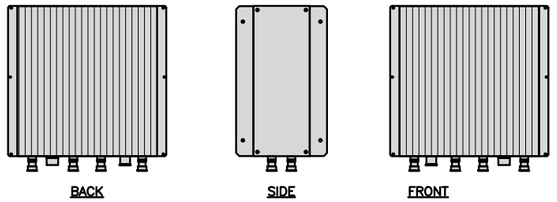
SHEET TITLE
EQUIPMENT DETAILS

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



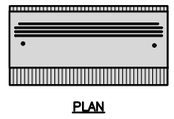
PLAN



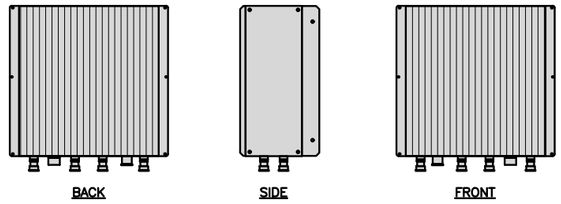
BACK SIDE FRONT

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

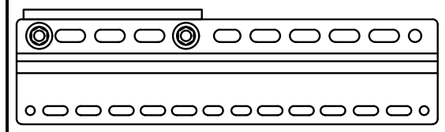


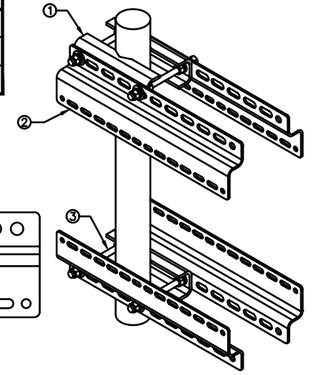
BACK SIDE FRONT

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"



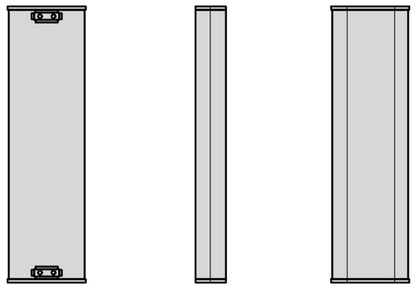


NOTE:
OR DISH Wireless L.L.C.
APPROVED EQUIVALENT

RRH MOUNT DETAIL | NO SCALE | 3

JMA WIRELESS MX08FRO665-21 ANTENNA	
DIMENSIONS (HxWxD)	72.8"x20.0"x8.0"
TOTAL WEIGHT	64.5 LB
RF PORTS, CONNECTOR TYPE	8 x 4.3-10 FEMALE

PLAN

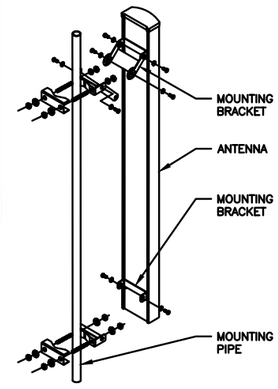


BACK SIDE FRONT

ANTENNA DETAIL | NO SCALE | 4

NOT USED | NO SCALE | 5

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

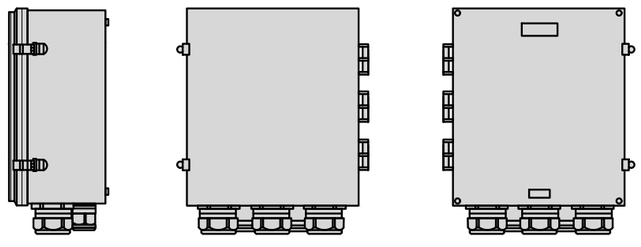


NOTE:
OR DISH Wireless L.L.C.
APPROVED EQUIVALENT

ANTENNA MOUNTING DETAIL | NO SCALE | 6

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

PLAN

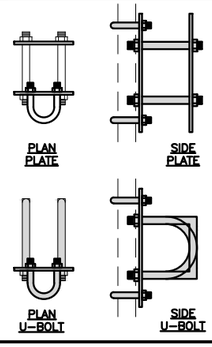


SIDE BACK FRONT

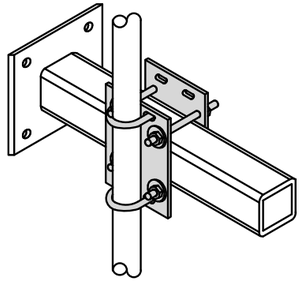
SURGE SUPPRESSION DETAIL (OVP) | NO SCALE | 7

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

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

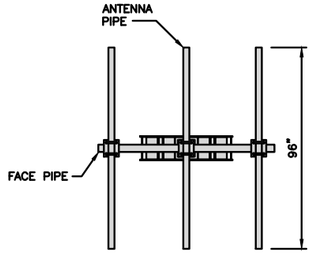


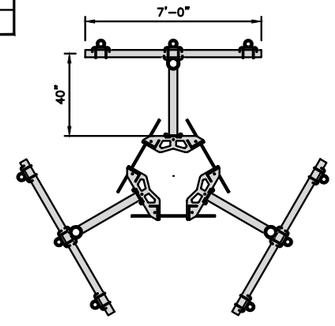
PLAN PLATE SIDE PLATE PLAN U-BOLT SIDE U-BOLT



RRH/OVP MOUNT DETAIL | NO SCALE | 8

COMMSCOPE MC-K6MHDX-9-96	
FACE WIDTH	7'-0"
WEIGHT	1203.31 lbs
NOTE: 15" TO 50" O.D.	





ANTENNA PLATFORM DETAIL | NO SCALE | 9

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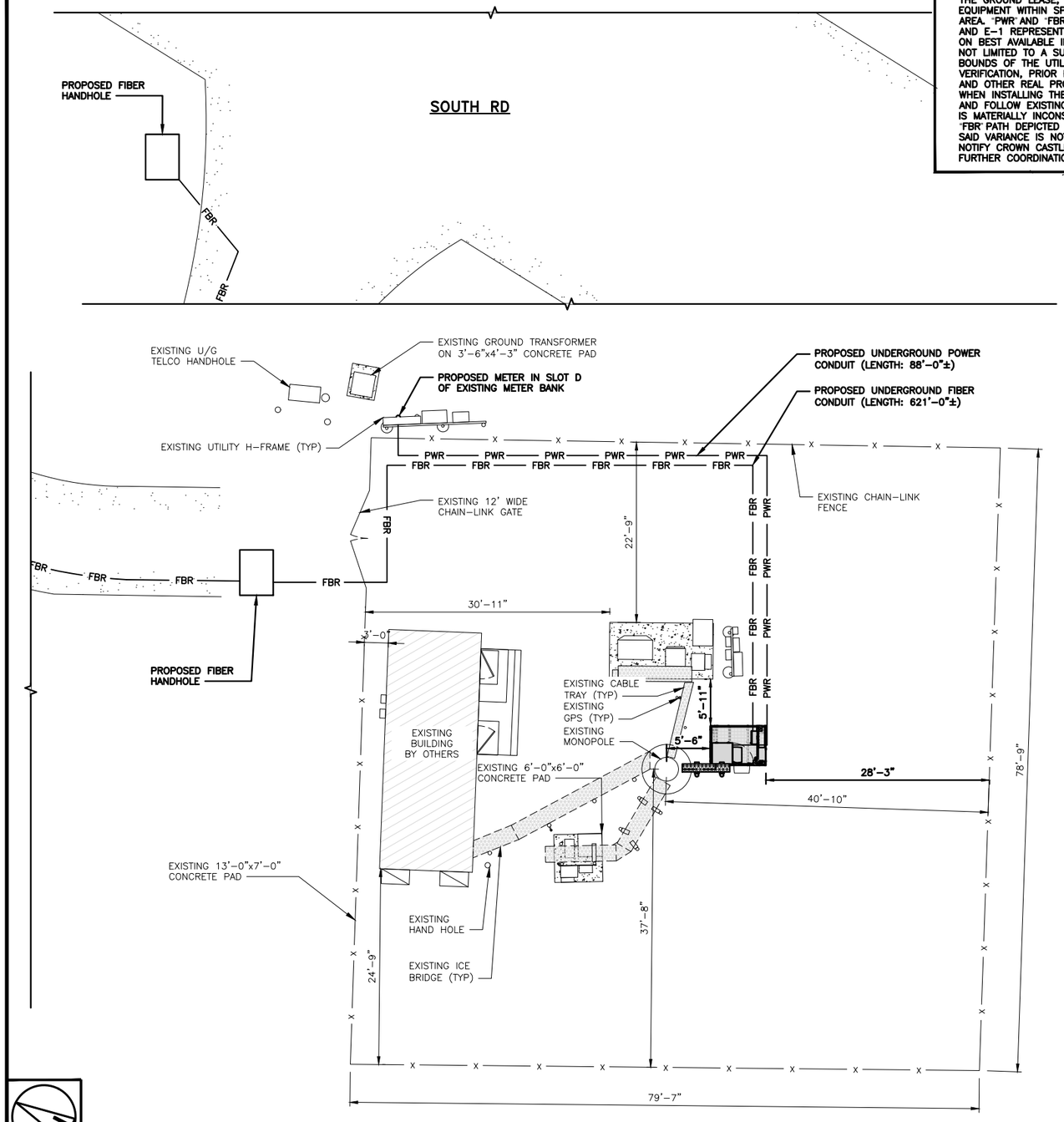
49 SOUTH ROAD
BOLTON, CT 06043

SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER
A-6

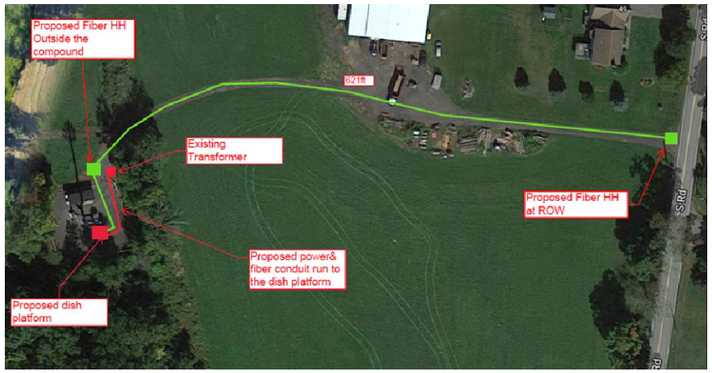


NOTES

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

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



UTILITY ROUTE PLAN

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

1

ELECTRICAL NOTES

NO SCALE

2

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SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
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STATE OF CONNECTICUT — No. 23924 — LICENSED PROFESSIONAL ENGINEER — 7/8/21

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

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

RFDS REV #: 0

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	6/17/21	ISSUED FOR REVIEW
0	7/8/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
137088.003.01

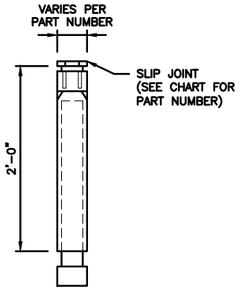
DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00064A
49 SOUTH ROAD
BOLTON, CT 06043

SHEET TITLE
ELECTRICAL/FIBER ROUTE PLAN AND NOTES

SHEET NUMBER
E-1

CARLON EXPANSION FITTINGS

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

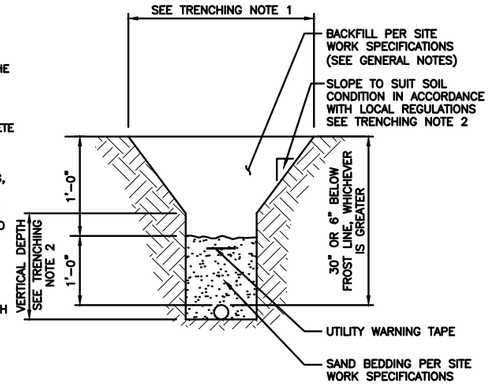


NOTE:
CONTRACTOR TO INSTALL EXPANSION FITTING SLIP JOINT AT METER CENTER CONDUIT TERMINATION, AS PER LOCAL UTILITY POLICY, ORDINANCE AND/OR SPECIFIED REQUIREMENT.

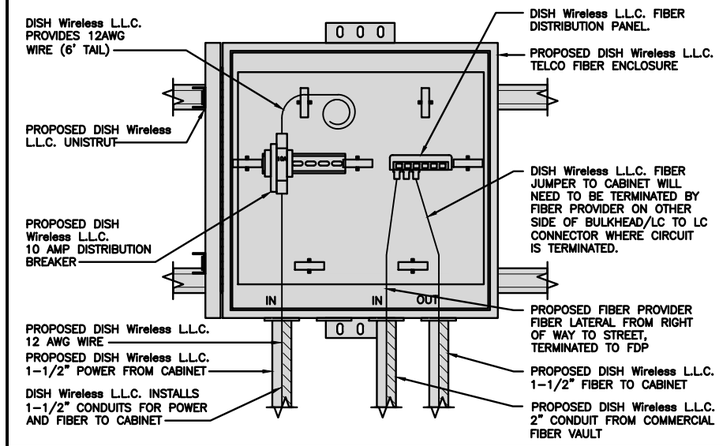
EXPANSION JOINT DETAIL | NO SCALE | 1

TRENCHING NOTES

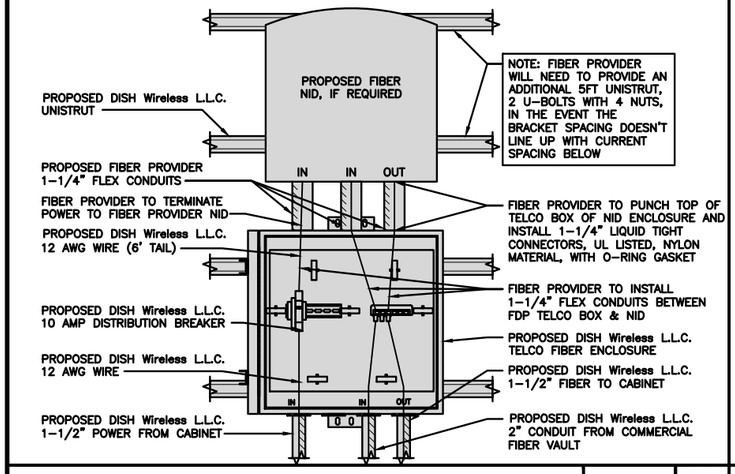
1. CONTRACTOR SHALL RESTORE THE TRENCH TO ITS ORIGINAL CONDITIONS BY EITHER SEEDING OR SODDING GRASS AREAS, OR REPLACING ASPHALT OR CONCRETE AREAS TO ITS ORIGINAL CROSS SECTION.
2. TRENCHING SAFETY; INCLUDING, BUT NOT LIMITED TO SOIL CLASSIFICATION, SLOPING, AND SHORING, SHALL BE GOVERNED BY THE CURRENT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



TYPICAL UNDERGROUND TRENCH DETAIL | NO SCALE | 2



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



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

NOT USED | NO SCALE | 5

NOT USED | NO SCALE | 6

NOT USED | NO SCALE | 7

NOT USED | NO SCALE | 8

NOT USED | NO SCALE | 9

DISH Wireless L.L.C. TEMPLATE VERSION 34 – 06/11/2021

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1717 S. BOULDER
SUITE 300
TULSA, OK 74119
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www.btgrp.com

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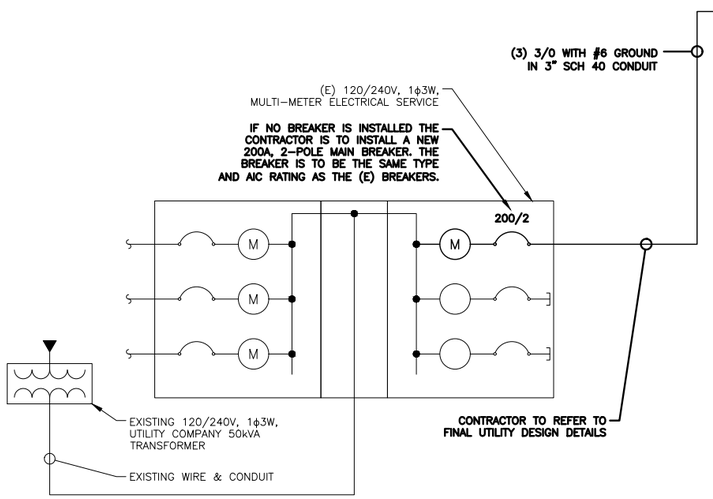
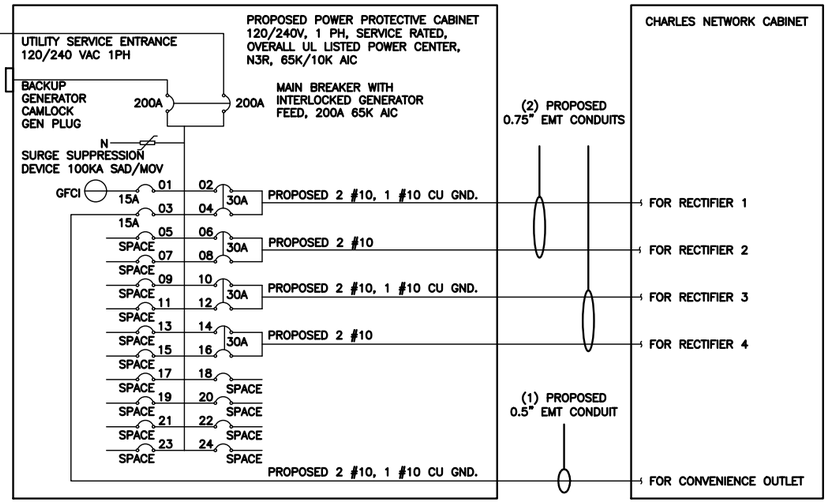
DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00064A
49 SOUTH ROAD
BOLTON, CT 06043

SHEET TITLE
ELECTRICAL DETAILS

SHEET NUMBER
E-2





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

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

NOTES

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

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

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

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

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

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

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

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

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

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

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

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

PPC ONE-LINE DIAGRAM

NO SCALE | 1

PROPOSED CHARLES PANEL SCHEDULE

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

PANEL SCHEDULE

NO SCALE | 2

NOT USED

NO SCALE | 3

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2000 CORPORATE DRIVE
CANONSBURG, PA 15317

B+T GRP
1717 S. BOULDER
SUITE 300
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JJR	JJR	MDW

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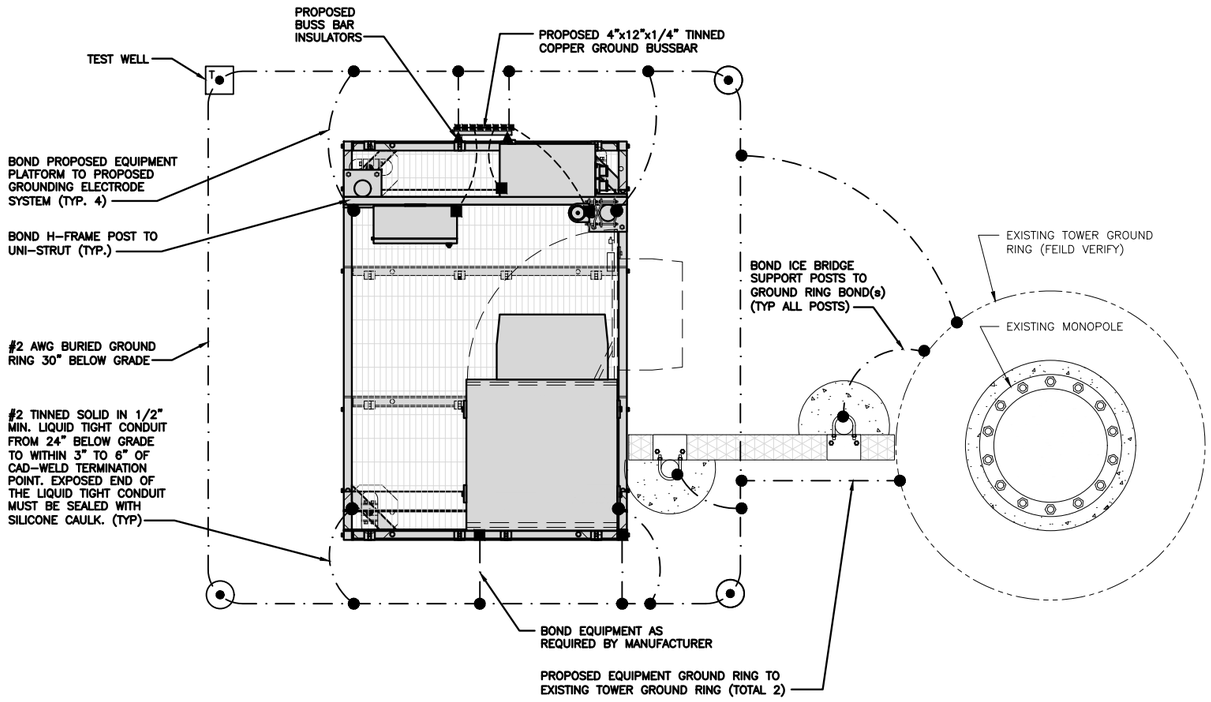
A&E PROJECT NUMBER
137088.003.01

DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00064A
49 SOUTH ROAD
BOLTON, CT 06043

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

SHEET NUMBER
E-3

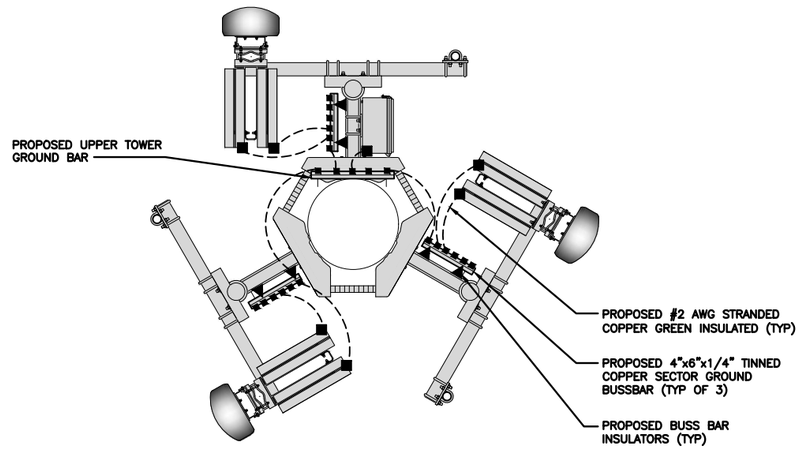


TYPICAL EQUIPMENT GROUNDING PLAN

NO SCALE | 1

NOTES

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



TYPICAL ANTENNA GROUNDING PLAN

NO SCALE | 2

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

GROUNDING LEGEND

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

GROUNDING KEY NOTES

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

GROUNDING KEY NOTES

NO SCALE | 3

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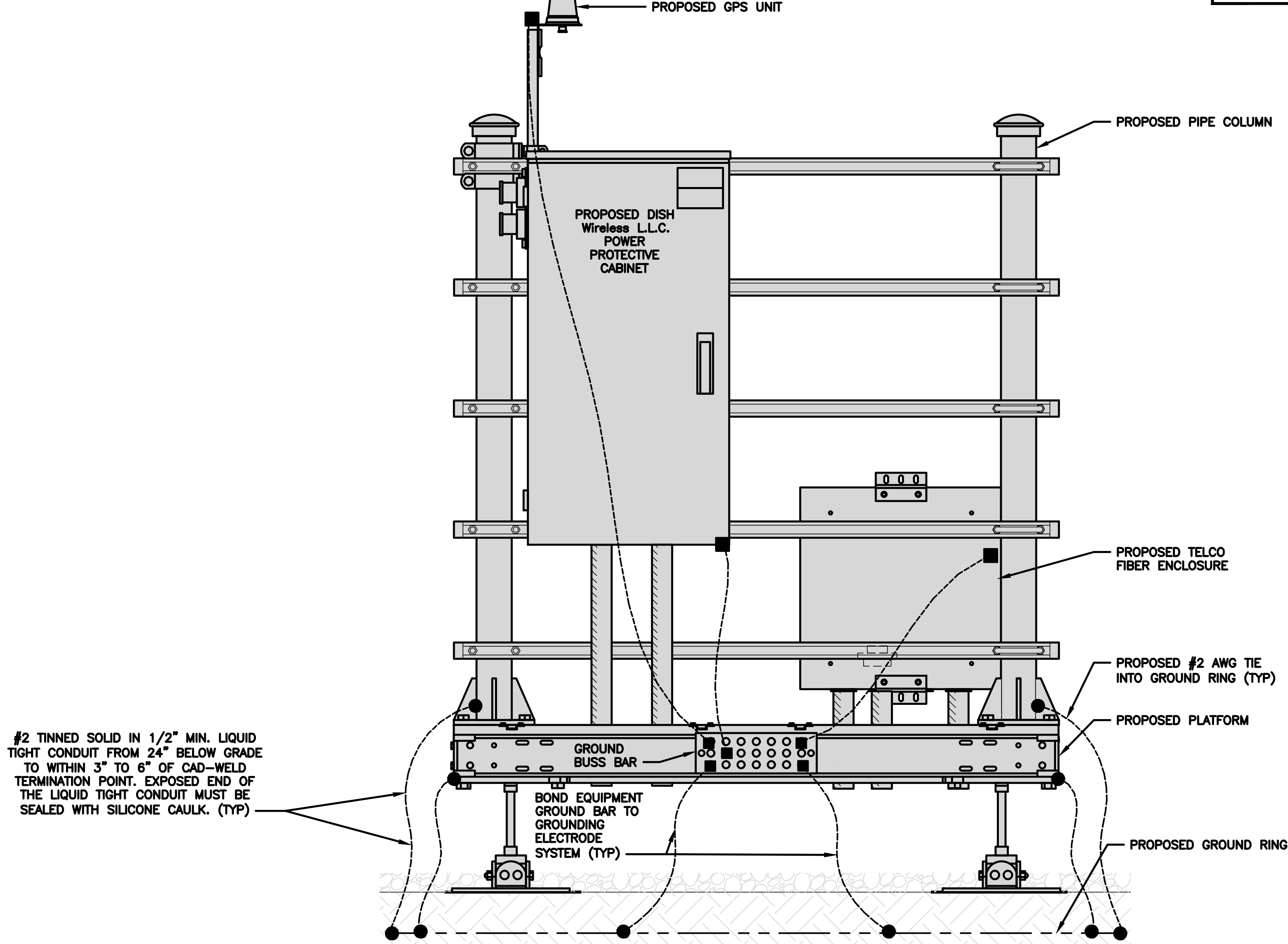
DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00064A
49 SOUTH ROAD
BOLTON, CT 06043

SHEET TITLE
GROUNDING PLANS AND NOTES

SHEET NUMBER
G-1

NOTES

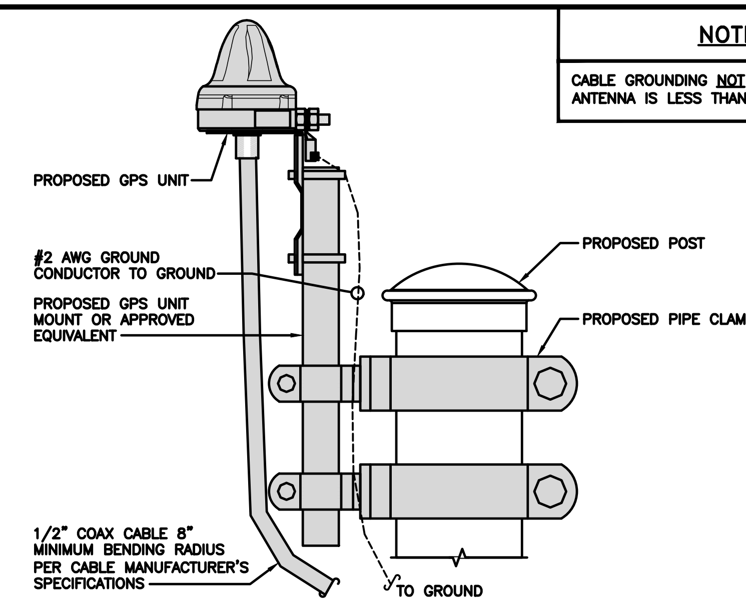
EQUIPMENT CABINET OMITTED FOR CLARITY



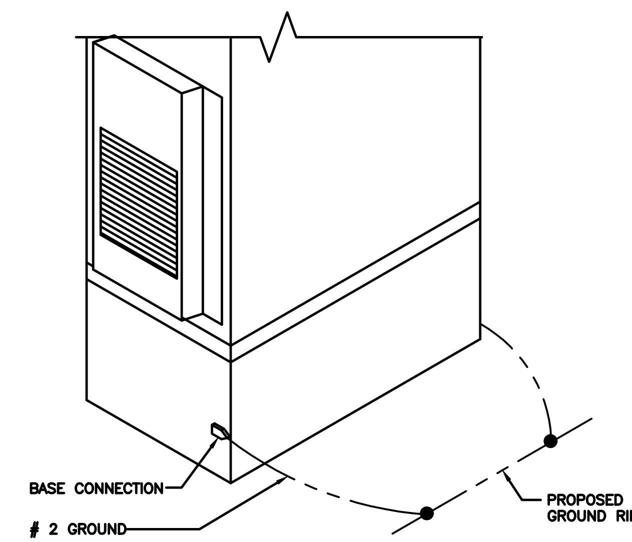
H–FRAME GROUNDING DETAIL | NO SCALE | 1

NOTES

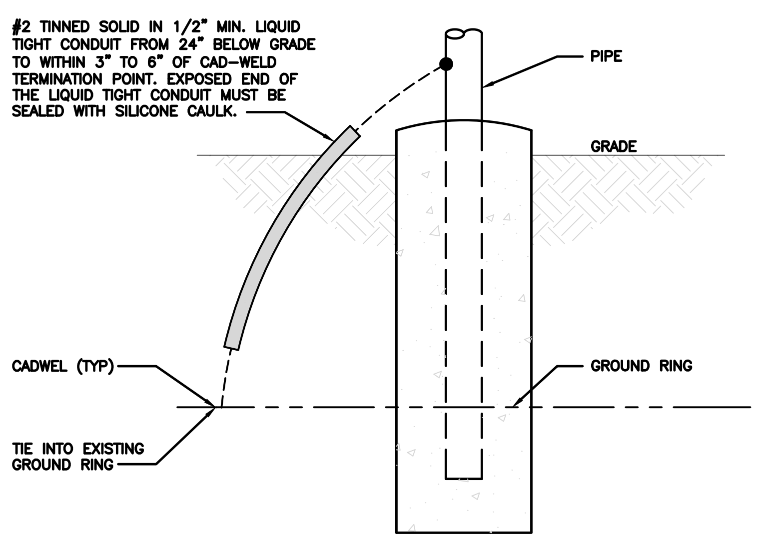
CABLE GROUNDING NOT REQUIRED WHEN ANTENNA IS LESS THAN 10' FROM CABINET



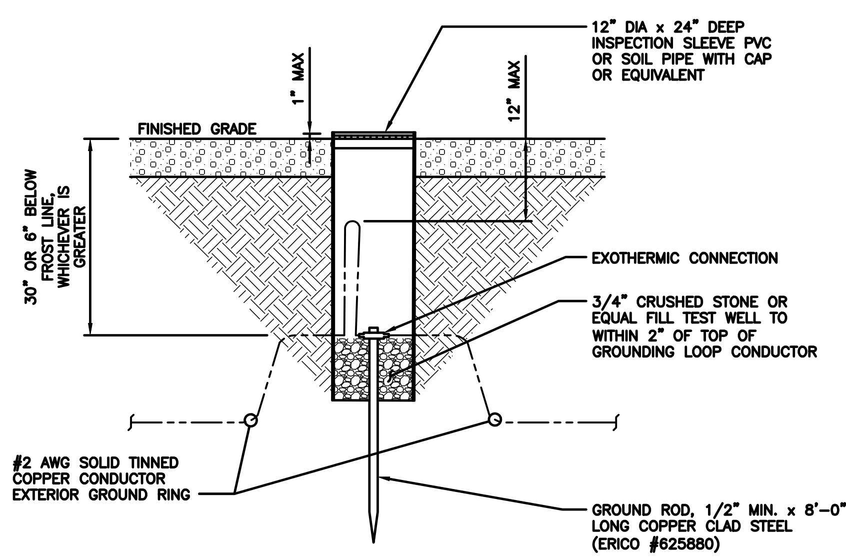
TYPICAL GPS UNIT GROUNDING | NO SCALE | 2



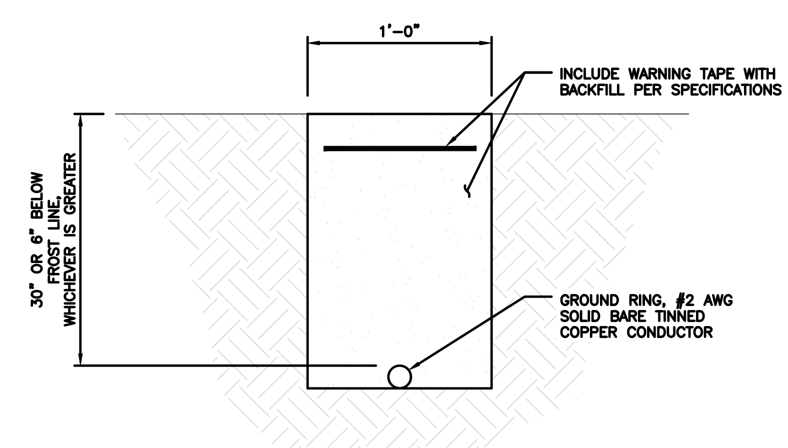
OUTDOOR CABINET GROUNDING | NO SCALE | 3



TRANSITIONING GROUND DETAIL | NO SCALE | 4



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



TYPICAL GROUND RING TRENCH | NO SCALE | 6

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PH: (918) 587-4630
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B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

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

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

RFDS REV #: 0

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0	7/8/21	ISSUED FOR CONSTRUCTION

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137088.003.01

DISH Wireless L.L.C.
PROJECT INFORMATION

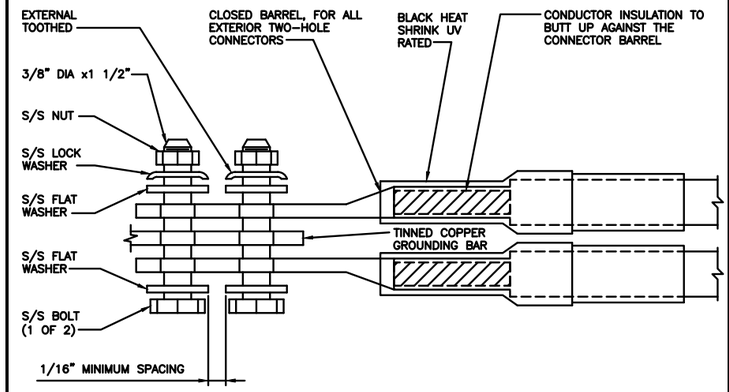
BOBDL00064A
49 SOUTH ROAD
BOLTON, CT 06043

SHEET TITLE
GROUNDING DETAILS

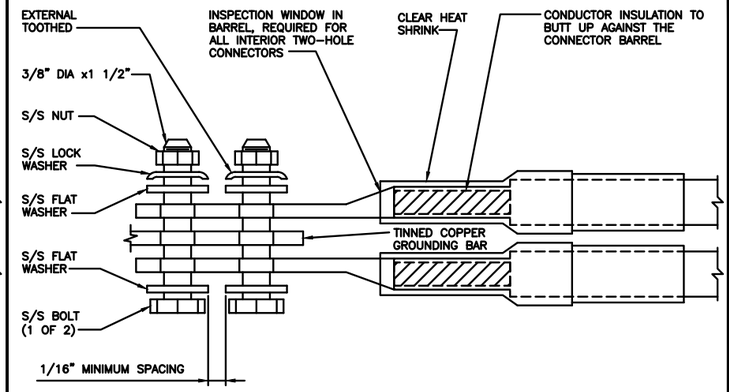
SHEET NUMBER
G-2

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).

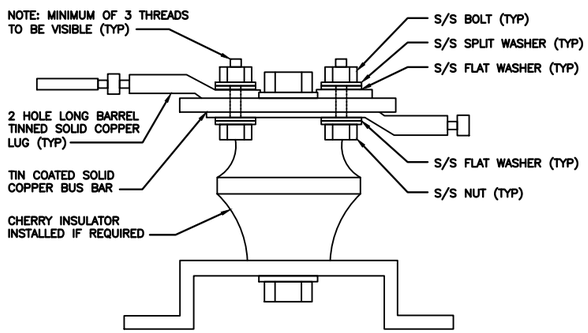
TYPICAL GROUNDING NOTES | NO SCALE | 1



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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SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

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

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

RFDS REV #: 0

CONSTRUCTION DOCUMENTS

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SHEET TITLE
GROUNDING DETAILS

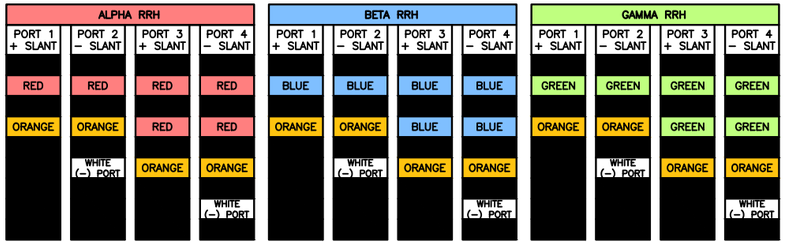
SHEET NUMBER
G-3

RF JUMPER COLOR CODING

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

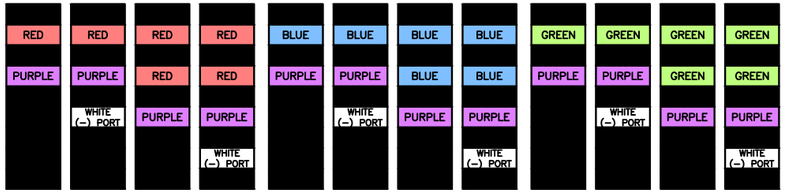
LOW-BAND RRH –
(600MHz N71 BASEBAND) +
(850MHz N26 BAND) +
(700MHz N29 BAND) – OPTIONAL PER MARKET

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



MID-BAND RRH –
(AWS BANDS N66+N70)

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

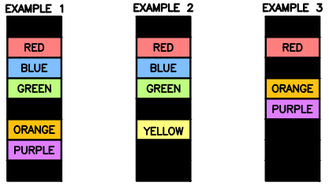


HYBRID/DISCREET CABLES

INCLUDE SECTOR BANDS BEING SUPPORTED
ALONG WITH FREQUENCY BANDS

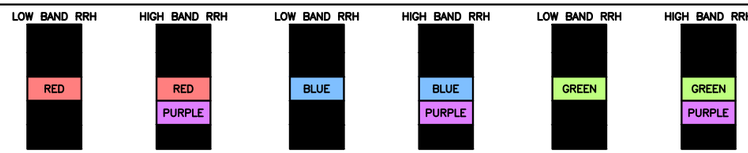
EXAMPLE 1 – HYBRID, OR DISCREET, SUPPORTS
ALL SECTORS, BOTH LOW-BANDS AND MID-BANDS

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



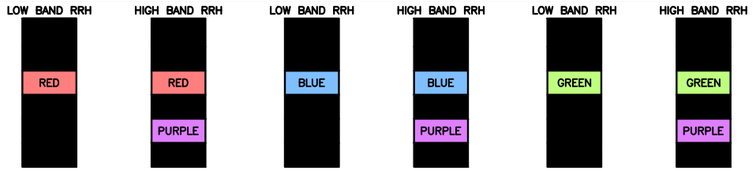
FIBER JUMPERS TO RRHs

LOW-BAND RRH FIBER CABLES HAVE SECTOR
STRIPE ONLY

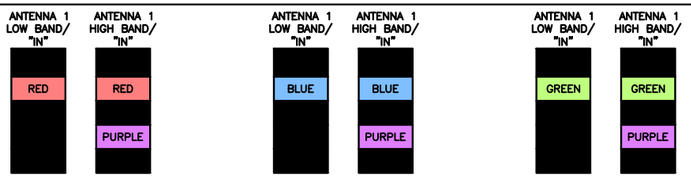


POWER CABLES TO RRHs

LOW-BAND RRH POWER CABLES HAVE SECTOR
STRIPE ONLY



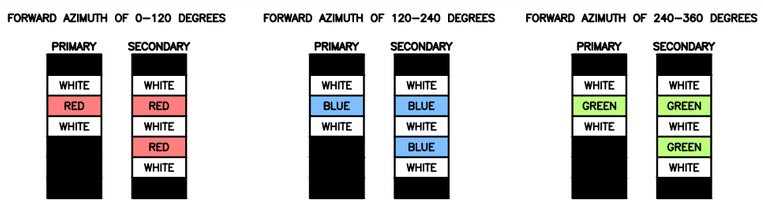
RET MOTORS AT ANTENNAS



MICROWAVE RADIO LINKS

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

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



RF CABLE COLOR CODES	NO SCALE	1

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

AWS
(N66+N70+H-BLOCK)
PURPLE

CBRS TECH
(3 GHz)
YELLOW

NEGATIVE SLANT PORT
ON ANT/RRH
WHITE

ALPHA SECTOR
RED

BETA SECTOR
BLUE

GAMMA SECTOR
GREEN

COLOR IDENTIFIER	NO SCALE	2

NOT USED	NO SCALE	3

NOT USED	NO SCALE	4

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www.btgrp.com

STATE OF CONNECTICUT
No. 23924
LICENSED PROFESSIONAL ENGINEER
7/8/21

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

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

RFDS REV #: 0

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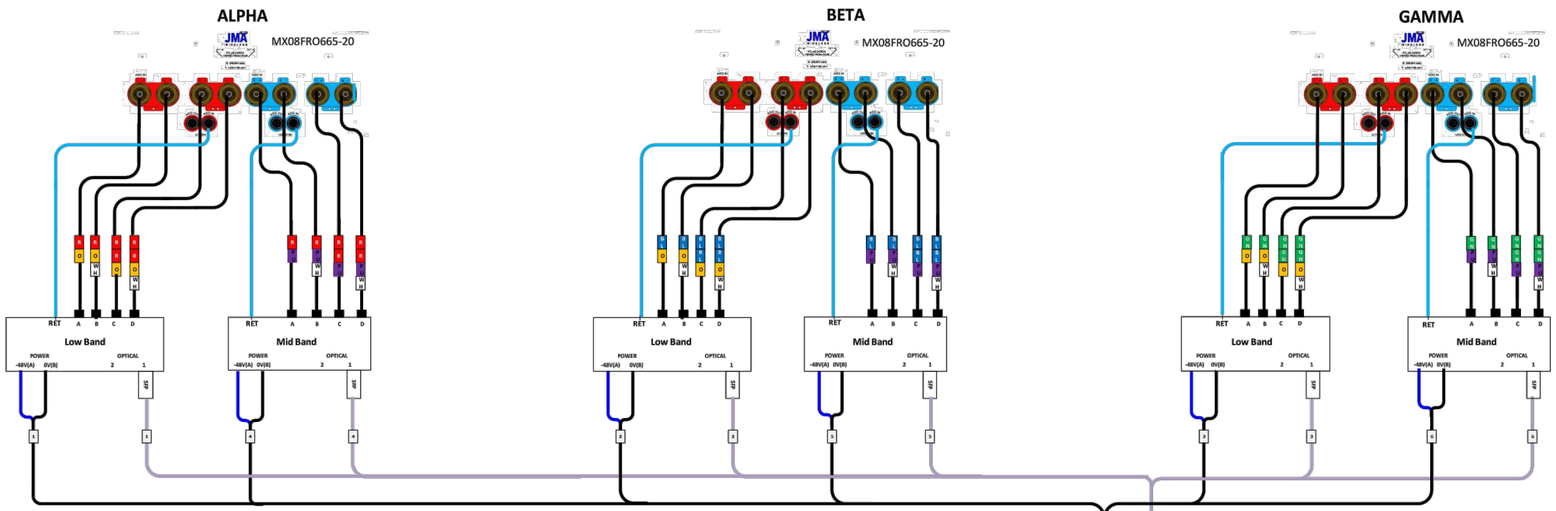
DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00064A
49 SOUTH ROAD
BOLTON, CT 06043

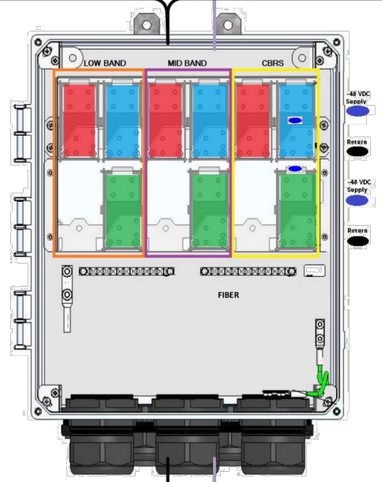
SHEET TITLE
RF
CABLE COLOR CODES

SHEET NUMBER
RF-1



Fiber Patch Panel

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



CSR NCS540		
Port	Interface	Description
0	Gi0/0/0/0	SiteBoss
1	Gi0/0/0/1	CBRS - Alpha
2	Gi0/0/0/2	CBRS - Beta
3	Gi0/0/0/3	CBRS - Gamma
4	Te0/0/0/4	Fujitsu Low-Band RU - Alpha
5	Te0/0/0/5	Fujitsu Mid-Band RU - Alpha
6	Te0/0/0/6	Fujitsu Low-Band RU - Beta
7	Te0/0/0/7	Fujitsu Mid-Band RU - Beta
8	Te0/0/0/8	Fujitsu Low-Band RU - Gamma
9	Te0/0/0/9	Fujitsu Mid-Band RU - Gamma
10	Te0/0/0/10	Fixed Wifi
11	Te0/0/0/11	Fixed Wifi
12	Te0/0/0/12	Fixed Wifi
13	Te0/0/0/13	Fixed Wifi
14	Te0/0/0/14	CBRS1
15	Te0/0/0/15	CBRS2
16	Te0/0/0/16	CBRS3
17	Gi0/0/0/17	SM1 - BMC
18	Gi0/0/0/18	SM2 - BMC
19	Te0/0/019	SM1 - Data 1
20	Te0/0/020	SM1 - Data 2
21	Te0/0/021	SM2 - Data 1
22	Te0/0/022	SM2 - Data 2
23	Te0/0/023	Reserved Uplink (EDC, LDC)
24	Te0/0/024	Blank/Future
25	Te0/0/025	Blank/Future
26	Te0/0/026	Fiber NIU
27	Te0/0/027	Fiber NIU
28	Te0/0/028	Blank/Future
29	Te0/0/029	Blank/Future

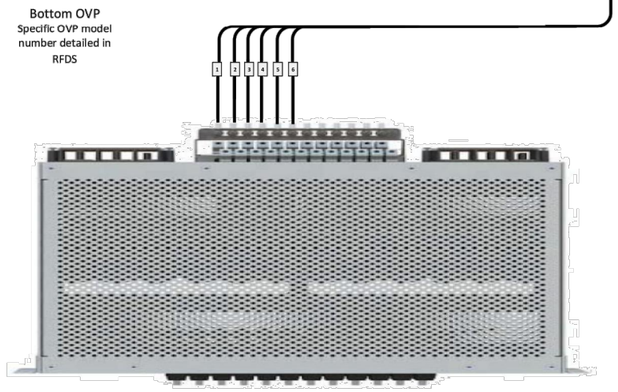
top

bottom

Bottom OVP Layout

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

Bottom OVP
Specific OVP model number detailed in RFDS



Quan Liu	5G plumbing diagram JMA MX08FRO665-20 2-2-2(LB+MB)
5-Jan-2021	SIZE / FSCM NO / DWG NO / REV 3 / SCALE None / SHEET

PLUMBING DIAGRAM

NO SCALE

1

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PROJECT INFORMATION

BOBDL00064A
49 SOUTH ROAD
BOLTON, CT 06043

SHEET TITLE

RF
PLUMBING DIAGRAM

SHEET NUMBER

RF-2

LEGEND	SYMBOL
EXOTHERMIC CONNECTION	●
MECHANICAL CONNECTION	■
BUSS BAR INSULATOR	▲
CHEMICAL ELECTROLYTIC GROUNDING SYSTEM	
TEST CHEMICAL ELECTROLYTIC GROUNDING SYSTEM	T
EXOTHERMIC WITH INSPECTION SLEEVE	
GROUNDING BAR	
GROUND ROD	
TEST GROUND ROD WITH INSPECTION SLEEVE	T
SINGLE POLE SWITCH	$
DUPLEX RECEPTACLE	
DUPLEX GFCI RECEPTACLE	GFCI
FLUORESCENT LIGHTING FIXTURE (2) TWO LAMPS 48-T8	F
SMOKE DETECTION (DC)	SD
EMERGENCY LIGHTING (DC)	
SECURITY LIGHT W/PHOTOCELL LITHONIA ALXW LED-1-25A400/51K-SR4-120-PE-DDBTXD	
CHAIN LINK FENCE	— x — x — x — x —
WOOD/WROUGHT IRON FENCE	
WALL STRUCTURE	
LEASE AREA	
PROPERTY LINE (PL)	
SETBACKS	
ICE BRIDGE	
CABLE TRAY	
WATER LINE	— W — W — W — W — W —
UNDERGROUND POWER	— UGP — UGP — UGP — UGP — UGP —
UNDERGROUND TELCO	— UGT — UGT — UGT — UGT — UGT —
OVERHEAD POWER	— OHP — OHP — OHP — OHP —
OVERHEAD TELCO	— OHT — OHT — OHT — OHT —
UNDERGROUND TELCO/POWER	— UGT/P — UGT/P — UGT/P — UGT/P —
ABOVE GROUND POWER	— AGP — AGP — AGP — AGP — AGP —
ABOVE GROUND TELCO	— AGT — AGT — AGT — AGT — AGT —
ABOVE GROUND TELCO/POWER	— AGT/P — AGT/P — AGT/P — AGT/P —
WORKPOINT	W.P.
SECTION REFERENCE	XX / X-X
DETAIL REFERENCE	XX / X-X

LEGEND

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

ABBREVIATIONS

dish wireless.

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49 SOUTH ROAD
BOLTON, CT 06043

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.

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dish wireless.

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LITTLETON, CO 80120

CROWN CASTLE

2000 CORPORATE DRIVE
CANONSBURG, PA 15317

B+T GRP

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

7/8/21

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

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

RFDS REV #: 0

CONSTRUCTION DOCUMENTS

SUBMITTALS

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0	7/8/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

137088.003.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBDL00064A
49 SOUTH ROAD
BOLTON, CT 06043

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-2

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

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

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

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

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

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

#4 BARS AND SMALLER 40 ksi

#5 BARS AND LARGER 60 ksi

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

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

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

ELECTRICAL INSTALLATION NOTES:

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

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

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

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

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

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

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

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

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

8. TIE WRAPS ARE NOT ALLOWED.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

CROWN CASTLE

2000 CORPORATE DRIVE
CANONSBURG, PA 15317

B+T GRP

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

7/8/21

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PEC.0001564
Expires 2/10/22

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

RFDS REV #: 0

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A&E PROJECT NUMBER

137088.003.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBDL00064A
49 SOUTH ROAD
BOLTON, CT 06043

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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REV	DATE	DESCRIPTION
A	6/17/21	ISSUED FOR REVIEW
0	7/8/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

137088.003.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBDL00064A
49 SOUTH ROAD
BOLTON, CT 06043

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-4

Exhibit D

Structural Analysis Report

Date: **June 14, 2021**

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

Subject:	**Structural Analysis Report**	
Carrier Designation:	***DISH Network* Co-Locate**	
	Site Number:	BOBDL00064A
	Site Name:	CT-CCI-T-842858
Crown Castle Designation:	**BU Number:**	842858
	Site Name:	BOLTON
	JDE Job Number:	650053
	Work Order Number:	1963265
	Order Number:	556628 Rev. 1
Engineering Firm Designation:	**Crown Castle Project Number:**	1963265
Site Data:	**49 SOUTH ROAD, BOLTON, TOLLAND County, CT** **Latitude *41° 47' 20.43"*, Longitude *-72° 25' 44.91"*** **120 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:

LC7: Proposed Equipment Configuration **Sufficient Capacity-99.9%**

This analysis utilizes an ultimate 3-second gust wind speed of 125 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: Subhash Mandal

Respectfully submitted by:

STATE OF CONNECTICUT
TERRY P. STYRAN
31522
LICENSED
PROFESSIONAL ENGINEER

Terry P Styran
2021.06.14
17:08:41 -04'00'

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

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1) INTRODUCTION

This tower is a 120 ft Monopole tower designed by PENNSUMMIT TUBULAR, LLC.

The tower has been modified multiple times to accommodate additional loading.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	125 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	2 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
89.0	89.0	3	fujitsu	TA08025-B604	1	1-3/8
		3	fujitsu	TA08025-B605		
		3	jma wireless	MX08FRO665-21 w/ Mount Pipe		
		1	raycap	RDIDC-9181-PF-48		
		1	tower mounts	Commscope MC-K6MHDX-9-96 (3)		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
118.0	118.0	6	cci antennas	DMP65R-BU4D w/ Mount Pipe	2 4 12 2	3/8 1 1-1/4 2" RC
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 4478 B14		
		3	ericsson	RRUS 8843 B2/B66A		
		3	powerwave technologies	1001940		
		3	powerwave technologies	7770.00 w/ Mount Pipe		
		6	powerwave technologies	LGP21401		
		1	raycap	DC6-48-60-18-8C		
		1	raycap	DC6-48-60-18-8F		
		1	tower mounts	Platform Mount [LP 303-1_HR-1]		
108.0	110.0	6	antel	LPA-185063/8CFX2 w/ Mount Pipe	18	1-5/8
		6	antel	LPD-6513 w/ Mount Pipe		
	108.0	1	tower mounts	Platform Mount [LP 303-1]		
99.0	99.0	3	ericsson	AIR 32 B2A/B66AA	9	1-5/8

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		3	ericsson	KRY 112 144/1		
		3	ericsson	RADIO 4449 B12/B71		
		3	rfs celwave	APXVAARR24_43-U-NA20		
		1	sitepro 1	12.5' Platform Mount [#RMQP-496-HK]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	5337356	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	4291646	CCISITES
4-TOWER MANUFACTURER DRAWINGS	4291644	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	4492167	CCISITES
4-POST-MODIFICATION INSPECTION	4497609	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	5096968	CCISITES
4-POST-MODIFICATION INSPECTION	5652677	CCISITES

3.1) Analysis Method

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

tnxTower was used to determine the loads on the modified structure. Additional calculations were performed to determine the stresses in the pole and in the reinforcing elements. These calculations are included in Appendix C.

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)

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
120 - 116	Pole	TP19.6x19x0.1875	Pole	3.2%	Pass
116 - 112	Pole	TP20.2x19.6x0.1875	Pole	8.3%	Pass
112 - 108	Pole	TP20.801x20.2x0.1875	Pole	13.3%	Pass
108 - 104	Pole	TP21.401x20.801x0.1875	Pole	22.6%	Pass
104 - 100	Pole	TP22.001x21.401x0.1875	Pole	30.1%	Pass
100 - 96	Pole	TP22.601x22.001x0.1875	Pole	39.8%	Pass
96 - 92	Pole	TP23.202x22.601x0.1875	Pole	49.2%	Pass
92 - 88	Pole	TP23.802x23.202x0.1875	Pole	58.9%	Pass
88 - 86.25	Pole	TP24.552x23.802x0.1875	Pole	63.4%	Pass
86.25 - 82.25	Pole	TP24.289x23.689x0.25	Pole	52.2%	Pass
82.25 - 78.25	Pole	TP24.89x24.289x0.25	Pole	58.7%	Pass
78.25 - 74.25	Pole	TP25.49x24.89x0.25	Pole	64.6%	Pass
74.25 - 70.25	Pole	TP26.09x25.49x0.25	Pole	70.3%	Pass
70.25 - 66.25	Pole	TP26.69x26.09x0.25	Pole	75.5%	Pass
66.25 - 62.25	Pole	TP27.29x26.69x0.25	Pole	80.5%	Pass
62.25 - 61	Pole	TP27.478x27.29x0.25	Pole	81.9%	Pass
61 - 60.75	Pole	TP27.515x27.478x0.25	Pole	82.2%	Pass
60.75 - 59	Pole	TP27.778x27.515x0.25	Pole	84.2%	Pass
59 - 58.75	Pole	TP27.815x27.778x0.25	Pole	84.5%	Pass
58.75 - 54.75	Pole	TP28.415x27.815x0.25	Pole	88.9%	Pass
54.75 - 50.75	Pole	TP29.016x28.415x0.25	Pole	93.1%	Pass
50.75 - 46.75	Pole	TP29.616x29.016x0.25	Pole	97.0%	Pass
46.75 - 45	Pole	TP30.441x29.616x0.25	Pole	98.7%	Pass
45 - 40.25	Pole + Reinf.	TP30.091x29.378x0.55	Reinf. 3 Tension Rupture	79.2%	Pass
40.25 - 36.25	Pole + Reinf.	TP30.691x30.091x0.5375	Reinf. 3 Tension Rupture	82.0%	Pass
36.25 - 33	Pole + Reinf.	TP31.179x30.691x0.5375	Reinf. 3 Tension Rupture	84.2%	Pass
33 - 32.75	Pole	TP31.216x31.179x0.3125	Pole	84.8%	Pass
32.75 - 28.75	Pole	TP31.816x31.216x0.3125	Pole	87.1%	Pass
28.75 - 24.75	Pole	TP32.417x31.816x0.3125	Pole	89.3%	Pass
24.75 - 20.75	Pole	TP33.017x32.417x0.3125	Pole	91.3%	Pass
20.75 - 18.5	Pole	TP33.354x33.017x0.3125	Pole	92.3%	Pass
18.5 - 18.25	Pole	TP33.392x33.354x0.3125	Pole	92.5%	Pass
18.25 - 14.25	Pole	TP33.992x33.392x0.3125	Pole	94.3%	Pass
14.25 - 10.25	Pole	TP34.592x33.992x0.3125	Pole	96.0%	Pass
10.25 - 6.25	Pole	TP35.192x34.592x0.3125	Pole	97.6%	Pass
6.25 - 2.25	Pole	TP35.792x35.192x0.3125	Pole	99.1%	Pass
2.25 - 0	Pole	TP36.13x35.792x0.3125	Pole	99.9%	Pass
				Summary	
			Pole	99.9%	Pass
			Reinforcement	84.2%	Pass
			Overall	99.9%	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	79.6	Pass
1	Base Plate	0	64.2	Pass
1	Base Foundation (Structure)	0	58.3	Pass
1	Base Foundation (Soil Interaction)	0	55.8	Pass

Structure Rating (max from all components) =	99.9%

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

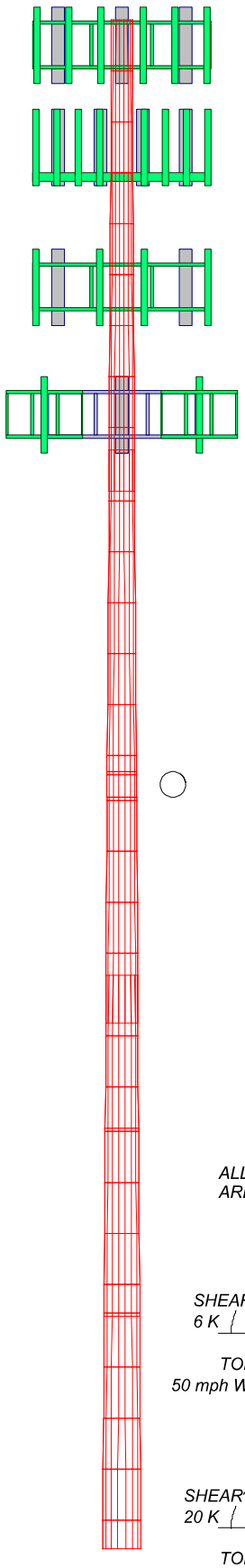
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	4.00	18	0.1875		19.0000	19.6002		0.2
2	4.00	18	0.1875		19.6002	20.2004		0.2
3	4.00	18	0.1875		20.2004	20.8006		0.2
4	4.00	18	0.1875		20.8006	21.4009		0.2
5	4.00	18	0.1875		21.4009	22.0011		0.2
6	4.00	18	0.1875		22.0011	22.6013		0.2
7	4.00	18	0.1875		22.6013	23.2015		0.2
8	4.00	18	0.1875		23.2015	23.8017		0.2
9	4.00	18	0.1875	3.25	23.8017	24.4020		0.2
10	4.00	18	0.2500		24.4020	25.0022		0.3
11	4.00	18	0.2500		25.0022	25.6024		0.3
12	4.00	18	0.2500		24.8896	25.4898		0.3
13	4.00	18	0.2500		25.4898	26.0899		0.3
14	4.00	18	0.2500		26.0899	26.6901		0.3
15	4.00	18	0.2500		26.6901	27.2902		0.3
16	4.00	18	0.2500		27.2902	27.8904		0.3
17	4.00	18	0.2500		27.8904	28.4906		0.3
18	4.00	18	0.2500		28.4906	29.0907		0.3
19	4.00	18	0.2500		29.0907	29.6909		0.3
20	4.00	18	0.2500		29.6909	30.2911		0.3
21	4.00	18	0.2500		28.4155	29.0156		0.3
22	4.00	18	0.2500		29.0156	29.6158		0.3
23	4.50	18	0.2500	3.75	29.6158	30.4410		0.4
24	5.50	18	0.5000		30.3789	31.2041		0.8
25	4.00	18	0.5376		30.0929	30.6931		0.7
26	3.25	18	0.5375		30.6891	31.2783		0.5
27	3.25	18	0.5375		31.2783	31.8675		0.5
28	4.00	18	0.3125		31.2812	31.8165		0.4
29	4.00	18	0.3125		31.8165	32.4166		0.4
30	4.00	18	0.3125		32.4166	33.0167		0.4
31	3.25	18	0.3125		33.0167	33.4343		0.2
32	3.25	18	0.3125		33.4343	33.8519		0.2
33	4.00	18	0.3125		33.8519	33.9920		0.5
34	4.00	18	0.3125		33.9920	34.5921		0.5
35	4.00	18	0.3125		34.5921	35.1923		0.5
36	4.00	18	0.3125		35.1923	35.7924		0.5
37	2.25	18	0.3125		35.7924	36.1300		0.3
							A607-65	10.6



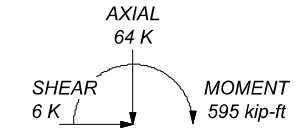
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi			

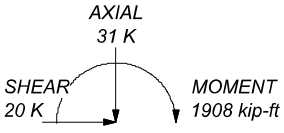
TOWER DESIGN NOTES

1. Tower is located in Tolland County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 125 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 2.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 99.9%

ALL REACTIONS ARE FACTORED



TORQUE 0 kip-ft
50 mph WIND - 2.0000 in ICE



TORQUE 0 kip-ft
REACTIONS - 125 mph WIND

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

Job: **BU#842858**			
Project:			
Client: Crown Castle USA	Drawn by: SMandal	App'd:	
Code: TIA-222-H	Date: 06/14/21	Scale: NTS	
Path: C:\Users\smandal\Desktop\WIP\842858\WO 1963265 - SA\Prod\842858_R.er		Dwg No. E-1	

Tower Input Data

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

- Tower is located in Tolland County, Connecticut.
- Tower base elevation above sea level: 621.50 ft.
- Basic wind speed of 125 mph.
- Risk Category II.
- Exposure Category C.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.00 ft.
- Nominal ice thickness of 2.0000 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		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-H Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-H Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component	√	Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric		Ignore KL/ry For 60 Deg. Angle Legs		Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	120.00-116.00	4.00	0.00	18	19.0000	19.6002	0.1875	0.7500	A607-65 (65 ksi)
L2	116.00-112.00	4.00	0.00	18	19.6002	20.2004	0.1875	0.7500	A607-65 (65 ksi)
L3	112.00-108.00	4.00	0.00	18	20.2004	20.8006	0.1875	0.7500	A607-65 (65 ksi)
L4	108.00-104.00	4.00	0.00	18	20.8006	21.4009	0.1875	0.7500	A607-65 (65 ksi)
L5	104.00-100.00	4.00	0.00	18	21.4009	22.0011	0.1875	0.7500	A607-65 (65 ksi)
L6	100.00-96.00	4.00	0.00	18	22.0011	22.6013	0.1875	0.7500	A607-65 (65 ksi)
L7	96.00-92.00	4.00	0.00	18	22.6013	23.2015	0.1875	0.7500	A607-65 (65 ksi)
L8	92.00-88.00	4.00	0.00	18	23.2015	23.8017	0.1875	0.7500	A607-65 (65 ksi)
L9	88.00-83.00	5.00	3.25	18	23.8017	24.5520	0.1875	0.7500	A607-65 (65 ksi)
L10	83.00-82.25	4.00	0.00	18	23.6893	24.2895	0.2500	1.0000	A607-65 (65 ksi)
L11	82.25-78.25	4.00	0.00	18	24.2895	24.8896	0.2500	1.0000	A607-65 (65 ksi)
L12	78.25-74.25	4.00	0.00	18	24.8896	25.4898	0.2500	1.0000	A607-65 (65 ksi)
L13	74.25-70.25	4.00	0.00	18	25.4898	26.0899	0.2500	1.0000	A607-65 (65 ksi)
L14	70.25-66.25	4.00	0.00	18	26.0899	26.6901	0.2500	1.0000	A607-65 (65 ksi)
L15	66.25-62.25	4.00	0.00	18	26.6901	27.2902	0.2500	1.0000	A607-65 (65 ksi)
L16	62.25-61.00	1.25	0.00	18	27.2902	27.4778	0.2500	1.0000	A607-65 (65 ksi)
L17	61.00-60.75	0.25	0.00	18	27.4778	27.5153	0.2500	1.0000	A607-65 (65 ksi)
L18	60.75-59.00	1.75	0.00	18	27.5153	27.7778	0.2500	1.0000	A607-65 (65 ksi)
L19	59.00-58.75	0.25	0.00	18	27.7778	27.8153	0.2500	1.0000	A607-65 (65 ksi)
L20	58.75-54.75	4.00	0.00	18	27.8153	28.4155	0.2500	1.0000	A607-65 (65 ksi)
L21	54.75-50.75	4.00	0.00	18	28.4155	29.0156	0.2500	1.0000	A607-65 (65 ksi)
L22	50.75-46.75	4.00	0.00	18	29.0156	29.6158	0.2500	1.0000	A607-65 (65 ksi)
L23	46.75-41.25	5.50	3.75	18	29.6158	30.4410	0.2500	1.0000	A607-65 (65 ksi)
L24	41.25-40.25	4.75	0.00	18	29.3784	30.0910	0.5500	2.2000	A607-65 (65 ksi)
L25	40.25-36.25	4.00	0.00	18	30.0910	30.6912	0.5375	2.1500	A607-65 (65 ksi)
L26	36.25-33.00	3.25	0.00	18	30.6912	31.1788	0.5375	2.1500	A607-65 (65 ksi)
L27	33.00-32.75	0.25	0.00	18	31.1788	31.2163	0.3125	1.2500	A607-65 (65 ksi)
L28	32.75-28.75	4.00	0.00	18	31.2163	31.8165	0.3125	1.2500	A607-65 (65 ksi)
L29	28.75-24.75	4.00	0.00	18	31.8165	32.4166	0.3125	1.2500	A607-65 (65 ksi)
L30	24.75-20.75	4.00	0.00	18	32.4166	33.0167	0.3125	1.2500	A607-65 (65 ksi)
L31	20.75-18.50	2.25	0.00	18	33.0167	33.3543	0.3125	1.2500	A607-65 (65 ksi)
L32	18.50-18.25	0.25	0.00	18	33.3543	33.3918	0.3125	1.2500	A607-65 (65 ksi)
L33	18.25-14.25	4.00	0.00	18	33.3918	33.9920	0.3125	1.2500	A607-65 (65 ksi)
L34	14.25-10.25	4.00	0.00	18	33.9920	34.5921	0.3125	1.2500	A607-65 (65 ksi)
L35	10.25-6.25	4.00	0.00	18	34.5921	35.1923	0.3125	1.2500	A607-65

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
L36	6.25-2.25	4.00	0.00	18	35.1923	35.7924	0.3125	1.2500	(65 ksi) A607-65 (65 ksi)
L37	2.25-0.00	2.25		18	35.7924	36.1300	0.3125	1.2500	A607-65 (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	19.2642	11.1958	500.5935	6.6784	9.6520	51.8642	1001.8456	5.5990	3.0140	16.075
	19.8737	11.5530	550.0530	6.8915	9.9569	55.2433	1100.8298	5.7776	3.1196	16.638
L2	19.8737	11.5530	550.0530	6.8915	9.9569	55.2433	1100.8298	5.7776	3.1196	16.638
	20.4831	11.9102	602.6676	7.1046	10.2618	58.7291	1206.1282	5.9562	3.2253	17.201
L3	20.4831	11.9102	602.6676	7.1046	10.2618	58.7291	1206.1282	5.9562	3.2253	17.201
	21.0926	12.2674	658.5347	7.3177	10.5667	62.3215	1317.9359	6.1349	3.3309	17.765
L4	21.0926	12.2674	658.5347	7.3177	10.5667	62.3215	1317.9359	6.1349	3.3309	17.765
	21.7021	12.6246	717.7519	7.5307	10.8716	66.0206	1436.4482	6.3135	3.4366	18.328
L5	21.7021	12.6246	717.7519	7.5307	10.8716	66.0206	1436.4482	6.3135	3.4366	18.328
	22.3116	12.9818	780.4167	7.7438	11.1765	69.8263	1561.8603	6.4921	3.5422	18.892
L6	22.3116	12.9818	780.4167	7.7438	11.1765	69.8263	1561.8603	6.4921	3.5422	18.892
	22.9210	13.3390	846.6267	7.9569	11.4815	73.7386	1694.3674	6.6708	3.6478	19.455
L7	22.9210	13.3390	846.6267	7.9569	11.4815	73.7386	1694.3674	6.6708	3.6478	19.455
	23.5305	13.6962	916.4795	8.1700	11.7864	77.7576	1834.1648	6.8494	3.7535	20.018
L8	23.5305	13.6962	916.4795	8.1700	11.7864	77.7576	1834.1648	6.8494	3.7535	20.018
	24.1400	14.0534	990.0725	8.3831	12.0913	81.8832	1981.4478	7.0280	3.8591	20.582
L9	24.1400	14.0534	990.0725	8.3831	12.0913	81.8832	1981.4478	7.0280	3.8591	20.582
	24.9018	14.4999	1087.4722	8.6494	12.4724	87.1902	2176.3753	7.2513	3.9912	21.286
L10	24.5113	18.5991	1290.9804	8.3210	12.0342	107.2762	2583.6595	9.3013	3.7293	14.917
	24.6256	19.0753	1392.7053	8.5340	12.3391	112.8697	2787.2431	9.5395	3.8349	15.34
L11	24.6256	19.0753	1392.7053	8.5340	12.3391	112.8697	2787.2431	9.5395	3.8349	15.34
	25.2350	19.5515	1499.6383	8.7471	12.6439	118.6054	3001.2498	9.7776	3.9406	15.762
L12	25.2350	19.5515	1499.6383	8.7471	12.6439	118.6054	3001.2498	9.7776	3.9406	15.762
	25.8444	20.0278	1611.9094	8.9601	12.9488	124.4833	3225.9397	10.0158	4.0462	16.185
L13	25.8444	20.0278	1611.9094	8.9601	12.9488	124.4833	3225.9397	10.0158	4.0462	16.185
	26.4538	20.5040	1729.6486	9.1732	13.2537	130.5033	3461.5731	10.2539	4.1518	16.607
L14	26.4538	20.5040	1729.6486	9.1732	13.2537	130.5033	3461.5731	10.2539	4.1518	16.607
	27.0632	20.9802	1852.9860	9.3862	13.5586	136.6654	3708.4102	10.4921	4.2575	17.03
L15	27.0632	20.9802	1852.9860	9.3862	13.5586	136.6654	3708.4102	10.4921	4.2575	17.03
	27.6726	21.4564	1982.0516	9.5993	13.8634	142.9698	3966.7112	10.7302	4.3631	17.452
L16	27.6726	21.4564	1982.0516	9.5993	13.8634	142.9698	3966.7112	10.7302	4.3631	17.452
	27.8631	21.6052	2023.5798	9.6659	13.9587	144.9690	4049.8223	10.8047	4.3961	17.584
L17	27.8631	21.6052	2023.5798	9.6659	13.9587	144.9690	4049.8223	10.8047	4.3961	17.584
	27.9012	21.6350	2031.9545	9.6792	13.9778	145.3705	4066.5827	10.8196	4.4027	17.611
L18	27.9012	21.6350	2031.9545	9.6792	13.9778	145.3705	4066.5827	10.8196	4.4027	17.611
	28.1678	21.8433	2091.2249	9.7724	14.1111	148.1967	4185.2015	10.9237	4.4489	17.796
L19	28.1678	21.8433	2091.2249	9.7724	14.1111	148.1967	4185.2015	10.9237	4.4489	17.796
	28.2059	21.8731	2099.7850	9.7857	14.1302	148.6027	4202.3330	10.9386	4.4555	17.822
L20	28.2059	21.8731	2099.7850	9.7857	14.1302	148.6027	4202.3330	10.9386	4.4555	17.822
	28.8153	22.3493	2239.9414	9.9988	14.4351	155.1735	4482.8301	11.1768	4.5611	18.245
L21	28.8153	22.3493	2239.9414	9.9988	14.4351	155.1735	4482.8301	11.1768	4.5611	18.245
	29.4247	22.8255	2386.1997	10.2118	14.7399	161.8866	4775.5392	11.4149	4.6668	18.667
L22	29.4247	22.8255	2386.1997	10.2118	14.7399	161.8866	4775.5392	11.4149	4.6668	18.667
	30.0341	23.3018	2538.6900	10.4249	15.0448	168.7418	5080.7205	11.6531	4.7724	19.09
L23	30.0341	23.3018	2538.6900	10.4249	15.0448	168.7418	5080.7205	11.6531	4.7724	19.09
	30.8720	23.9566	2758.7788	10.7178	15.4640	178.3998	5521.1876	11.9806	4.9176	19.67
L24	30.3180	50.3257	5284.0496	10.2341	14.9242	354.0590	10575.052 2	25.1676	4.2026	7.641
	30.4704	51.5698	5685.7023	10.4871	15.2862	371.9489	11378.885 9	25.7898	4.3280	7.869
L25	30.4723	50.4191	5563.5383	10.4915	15.2862	363.9572	11134.397 2	25.2143	4.3500	8.093
	31.0817	51.4429	5909.4052	10.7046	15.5911	379.0238	11826.586 2	25.7264	4.4556	8.29
L26	31.0817	51.4429	5909.4052	10.7046	15.5911	379.0238	11826.586	25.7264	4.4556	8.29

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
	31.5769	52.2748	6200.7511	10.8777	15.8388	391.4905	12409.6612	26.1424	4.5415	8.449
L27	31.6116	30.6155	3685.0893	10.9575	15.8388	232.6617	7375.0275	15.3107	4.9375	15.8
	31.6497	30.6527	3698.5401	10.9709	15.8579	233.2304	7401.9468	15.3293	4.9441	15.821
L28	31.6497	30.6527	3698.5401	10.9709	15.8579	233.2304	7401.9468	15.3293	4.9441	15.821
	32.2591	31.2480	3918.2264	11.1839	16.1628	242.4231	7841.6085	15.6270	5.0497	16.159
L29	32.2591	31.2480	3918.2264	11.1839	16.1628	242.4231	7841.6085	15.6270	5.0497	16.159
	32.8685	31.8433	4146.4441	11.3970	16.4676	251.7936	8298.3443	15.9247	5.1553	16.497
L30	32.8685	31.8433	4146.4441	11.3970	16.4676	251.7936	8298.3443	15.9247	5.1553	16.497
	33.4779	32.4385	4383.3559	11.6100	16.7725	261.3417	8772.4796	16.2223	5.2609	16.835
L31	33.4779	32.4385	4383.3559	11.6100	16.7725	261.3417	8772.4796	16.2223	5.2609	16.835
	33.8207	32.7734	4520.5004	11.7298	16.9440	266.7907	9046.9490	16.3898	5.3204	17.025
L32	33.8207	32.7734	4520.5004	11.7298	16.9440	266.7907	9046.9490	16.3898	5.3204	17.025
	33.8587	32.8106	4535.9129	11.7432	16.9631	267.3996	9077.7943	16.4084	5.3270	17.046
L33	33.8587	32.8106	4535.9129	11.7432	16.9631	267.3996	9077.7943	16.4084	5.3270	17.046
	34.4682	33.4058	4787.2990	11.9562	17.2679	277.2365	9580.8973	16.7061	5.4326	17.384
L34	34.4682	33.4058	4787.2990	11.9562	17.2679	277.2365	9580.8973	16.7061	5.4326	17.384
	35.0776	34.0011	5047.8058	12.1693	17.5728	287.2511	10102.2537	17.0038	5.5382	17.722
L35	35.0776	34.0011	5047.8058	12.1693	17.5728	287.2511	10102.2537	17.0038	5.5382	17.722
	35.6870	34.5964	5317.5957	12.3823	17.8777	297.4434	10642.1885	17.3015	5.6438	18.06
L36	35.6870	34.5964	5317.5957	12.3823	17.8777	297.4434	10642.1885	17.3015	5.6438	18.06
	36.2964	35.1916	5596.8313	12.5954	18.1825	307.8134	11201.0271	17.5992	5.7495	18.398
L37	36.2964	35.1916	5596.8313	12.5954	18.1825	307.8134	11201.0271	17.5992	5.7495	18.398
	36.6392	35.5265	5758.1133	12.7152	18.3540	313.7246	11523.8032	17.7666	5.8089	18.588

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 120.00-116.00				1	1	1			
L2 116.00-112.00				1	1	1			
L3 112.00-108.00				1	1	1			
L4 108.00-104.00				1	1	1			
L5 104.00-100.00				1	1	1			
L6 100.00-96.00				1	1	1			
L7 96.00-92.00				1	1	1			
L8 92.00-88.00				1	1	1			
L9 88.00-83.00				1	1	1			
L10 83.00-82.25				1	1	1			
L11 82.25-78.25				1	1	1			
L12 78.25-74.25				1	1	1			
L13 74.25-70.25				1	1	1			
L14 70.25-66.25				1	1	1			
L15 66.25-62.25				1	1	1			
L16 62.25-				1	1	1			

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
61.00									
L17 61.00-60.75				1	1	1			
L18 60.75-59.00				1	1	1			
L19 59.00-58.75				1	1	1			
L20 58.75-54.75				1	1	1			
L21 54.75-50.75				1	1	1			
L22 50.75-46.75				1	1	1			
L23 46.75-41.25				1	1	1			
L24 41.25-40.25				1	1	0.936348			
L25 40.25-36.25				1	1	0.950228			
L26 36.25-33.00				1	1	0.944359			
L27 33.00-32.75				1	1	1			
L28 32.75-28.75				1	1	1			
L29 28.75-24.75				1	1	1			
L30 24.75-20.75				1	1	1			
L31 20.75-18.50				1	1	1			
L32 18.50-18.25				1	1	1			
L33 18.25-14.25				1	1	1			
L34 14.25-10.25				1	1	1			
L35 10.25-6.25				1	1	1			
L36 6.25-2.25				1	1	1			
L37 2.25-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
***										
Safety Line 3/8"	A	No	Surface Ar (CaAa)	120.00 - 11.00	1	1	0.450 0.450	0.3750		0.22
HJ7-50A(1-5/8)	B	No	Surface Ar (CaAa)	108.00 - 8.00	6	6	0.300 0.500	1.9800		1.04
******										
PL4x1.25 (MOD)	A	No	Surface Af (CaAa)	62.50 - 57.25	1	1	0.000 0.000	4.0000	10.5000	0.00
PL4x1.25 (MOD)	B	No	Surface Af (CaAa)	62.50 - 57.25	1	1	0.000 0.000	4.0000	10.5000	0.00
PL4x1.25 (MOD)	C	No	Surface Af (CaAa)	62.50 - 57.25	1	1	0.000 0.000	4.0000	10.5000	0.00
*										
PL5x1.25 (MOD)	A	No	Surface Af (CaAa)	43.75 - 38.75	1	1	-0.167 -0.167	5.0000	12.5000	21.27

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
PL5x1.25 (MOD)	A	No	Surface Af (CaAa)	43.75 - 38.75	1	1	0.330 0.330	5.0000	12.5000	21.27
PL5x1.25 (MOD)	B	No	Surface Af (CaAa)	43.75 - 38.75	1	1	-0.167 -0.167	5.0000	12.5000	21.27
PL5x1.25 (MOD)	B	No	Surface Af (CaAa)	43.75 - 38.75	1	1	0.330 0.330	5.0000	12.5000	21.27
PL5x1.25 (MOD)	C	No	Surface Af (CaAa)	43.75 - 38.75	1	1	-0.167 -0.167	5.0000	12.5000	21.27
PL5x1.25 (MOD)	C	No	Surface Af (CaAa)	43.75 - 38.75	1	1	0.330 0.330	5.0000	12.5000	21.27
*										
PL5x1.25 (MOD)	A	No	Surface Af (CaAa)	41.25 - 30.50	1	1	-0.500 -0.500	5.0000	12.5000	0.00
PL5x1.25 (MOD)	B	No	Surface Af (CaAa)	41.25 - 30.50	1	1	-0.500 -0.500	5.0000	12.5000	0.00
PL5x1.25 (MOD)	C	No	Surface Af (CaAa)	41.25 - 30.50	1	1	-0.500 -0.500	5.0000	12.5000	0.00
***										
PL4.5x1 (MOD)	A	No	Surface Af (CaAa)	59.00 - 41.33	1	1	-0.500 -0.500	4.5000	11.0000	0.00
PL4.5x1 (MOD)	B	No	Surface Af (CaAa)	59.00 - 41.33	1	1	-0.500 -0.500	4.5000	11.0000	0.00
PL4.5x1 (MOD)	C	No	Surface Af (CaAa)	59.00 - 41.33	1	1	-0.500 -0.500	4.5000	11.0000	0.00
*										
PL5x1 (MOD)	A	No	Surface Af (CaAa)	33.00 - 18.00	1	1	0.500 0.500	5.0000	12.0000	0.00
PL5x1 (MOD)	B	No	Surface Af (CaAa)	33.00 - 18.00	1	1	0.500 0.500	5.0000	12.0000	0.00
PL5x1 (MOD)	C	No	Surface Af (CaAa)	33.00 - 18.00	1	1	0.500 0.500	5.0000	12.0000	0.00
*										
PL5x1 (MOD)	A	No	Surface Af (CaAa)	20.50 - 0.50	1	1	-0.167 -0.167	5.0000	12.0000	0.00
PL5x1 (MOD)	B	No	Surface Af (CaAa)	20.50 - 0.50	1	1	-0.500 -0.500	5.0000	12.0000	0.00
PL5x1 (MOD)	C	No	Surface Af (CaAa)	20.50 - 0.50	1	1	-0.500 -0.500	5.0000	12.0000	0.00
PL5x1 (MOD)	C	No	Surface Af (CaAa)	20.50 - 0.50	1	1	0.000 0.000	5.0000	12.0000	0.00
***										
CU12PSM9P8XXX(1-3/8)	C	No	Surface Ar (CaAa)	89.00 - 0.00	1	1	-0.100 -0.100	1.4110		1.66

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
******									
LDF6-50A(1-1/4)	B	No	No	Inside Pole	118.00 - 8.00	12	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.60 0.60 0.60 0.60
FB-L98B-034-XXX(3/8)	B	No	No	Inside Pole	118.00 - 8.00	2	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.06 0.06 0.06 0.06
WR-CAT5E10P(1)	B	No	No	Inside Pole	118.00 - 8.00	4	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.41 0.41 0.41 0.41
CONDUIT(2)	B	No	No	Inside Pole	118.00 - 8.00	2	No Ice 1/2" Ice	0.00 0.00	2.80 2.80

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
							1" Ice	0.00	2.80
							2" Ice	0.00	2.80
******									
HJ7-50A(1-5/8)	A	No	No	Inside Pole	108.00 - 8.00	12	No Ice	0.00	1.04
							1/2" Ice	0.00	1.04
							1" Ice	0.00	1.04
							2" Ice	0.00	1.04
******									
LDF7-50A(1-5/8)	C	No	No	Inside Pole	99.00 - 8.00	6	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
*									
HCS 6X12 4AWG(1-5/8)	C	No	No	Inside Pole	99.00 - 8.00	3	No Ice	0.00	2.40
							1/2" Ice	0.00	2.40
							1" Ice	0.00	2.40
							2" Ice	0.00	2.40

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	120.00-116.00	A	0.000	0.000	0.150	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.03
		C	0.000	0.000	0.000	0.000	0.00
L2	116.00-112.00	A	0.000	0.000	0.150	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.06
		C	0.000	0.000	0.000	0.000	0.00
L3	112.00-108.00	A	0.000	0.000	0.150	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.06
		C	0.000	0.000	0.000	0.000	0.00
L4	108.00-104.00	A	0.000	0.000	0.150	0.000	0.05
		B	0.000	0.000	4.752	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.00
L5	104.00-100.00	A	0.000	0.000	0.150	0.000	0.05
		B	0.000	0.000	4.752	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.00
L6	100.00-96.00	A	0.000	0.000	0.150	0.000	0.05
		B	0.000	0.000	4.752	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.04
L7	96.00-92.00	A	0.000	0.000	0.150	0.000	0.05
		B	0.000	0.000	4.752	0.000	0.08
		C	0.000	0.000	0.000	0.000	0.05
L8	92.00-88.00	A	0.000	0.000	0.150	0.000	0.05
		B	0.000	0.000	4.752	0.000	0.08
		C	0.000	0.000	0.141	0.000	0.05
L9	88.00-83.00	A	0.000	0.000	0.188	0.000	0.06
		B	0.000	0.000	5.940	0.000	0.10
		C	0.000	0.000	0.706	0.000	0.07
L10	83.00-82.25	A	0.000	0.000	0.028	0.000	0.01
		B	0.000	0.000	0.891	0.000	0.02
		C	0.000	0.000	0.106	0.000	0.01
L11	82.25-78.25	A	0.000	0.000	0.150	0.000	0.05
		B	0.000	0.000	4.752	0.000	0.08
		C	0.000	0.000	0.564	0.000	0.06
L12	78.25-74.25	A	0.000	0.000	0.150	0.000	0.05
		B	0.000	0.000	4.752	0.000	0.08
		C	0.000	0.000	0.564	0.000	0.06
L13	74.25-70.25	A	0.000	0.000	0.150	0.000	0.05
		B	0.000	0.000	4.752	0.000	0.08
		C	0.000	0.000	0.564	0.000	0.06

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L14	70.25-66.25	A	0.000	0.000	0.150	0.000	0.05
		B	0.000	0.000	4.752	0.000	0.08
		C	0.000	0.000	0.564	0.000	0.06
L15	66.25-62.25	A	0.000	0.000	0.289	0.000	0.05
		B	0.000	0.000	4.891	0.000	0.08
		C	0.000	0.000	0.703	0.000	0.06
L16	62.25-61.00	A	0.000	0.000	0.742	0.000	0.02
		B	0.000	0.000	2.180	0.000	0.03
		C	0.000	0.000	0.871	0.000	0.02
L17	61.00-60.75	A	0.000	0.000	0.148	0.000	0.00
		B	0.000	0.000	0.436	0.000	0.01
		C	0.000	0.000	0.174	0.000	0.00
L18	60.75-59.00	A	0.000	0.000	1.038	0.000	0.02
		B	0.000	0.000	3.052	0.000	0.04
		C	0.000	0.000	1.220	0.000	0.02
L19	59.00-58.75	A	0.000	0.000	0.336	0.000	0.00
		B	0.000	0.000	0.623	0.000	0.01
		C	0.000	0.000	0.362	0.000	0.00
L20	58.75-54.75	A	0.000	0.000	3.984	0.000	0.05
		B	0.000	0.000	8.586	0.000	0.08
		C	0.000	0.000	4.398	0.000	0.06
L21	54.75-50.75	A	0.000	0.000	3.150	0.000	0.05
		B	0.000	0.000	7.752	0.000	0.08
		C	0.000	0.000	3.564	0.000	0.06
L22	50.75-46.75	A	0.000	0.000	3.150	0.000	0.05
		B	0.000	0.000	7.752	0.000	0.08
		C	0.000	0.000	3.564	0.000	0.06
L23	46.75-41.25	A	0.000	0.000	7.510	0.000	0.18
		B	0.000	0.000	13.838	0.000	0.22
		C	0.000	0.000	8.080	0.000	0.18
L24	41.25-40.25	A	0.000	0.000	2.166	0.000	0.06
		B	0.000	0.000	3.317	0.000	0.06
		C	0.000	0.000	2.270	0.000	0.06
L25	40.25-36.25	A	0.000	0.000	5.427	0.000	0.11
		B	0.000	0.000	10.029	0.000	0.15
		C	0.000	0.000	5.841	0.000	0.12
L26	36.25-33.00	A	0.000	0.000	2.830	0.000	0.04
		B	0.000	0.000	6.569	0.000	0.07
		C	0.000	0.000	3.167	0.000	0.04
L27	33.00-32.75	A	0.000	0.000	0.426	0.000	0.00
		B	0.000	0.000	0.714	0.000	0.01
		C	0.000	0.000	0.452	0.000	0.00
L28	32.75-28.75	A	0.000	0.000	5.358	0.000	0.05
		B	0.000	0.000	9.960	0.000	0.08
		C	0.000	0.000	5.773	0.000	0.06
L29	28.75-24.75	A	0.000	0.000	3.483	0.000	0.05
		B	0.000	0.000	8.085	0.000	0.08
		C	0.000	0.000	3.898	0.000	0.06
L30	24.75-20.75	A	0.000	0.000	3.483	0.000	0.05
		B	0.000	0.000	8.085	0.000	0.08
		C	0.000	0.000	3.898	0.000	0.06
L31	20.75-18.50	A	0.000	0.000	3.626	0.000	0.03
		B	0.000	0.000	6.215	0.000	0.05
		C	0.000	0.000	5.526	0.000	0.03
L32	18.50-18.25	A	0.000	0.000	0.426	0.000	0.00
		B	0.000	0.000	0.714	0.000	0.01
		C	0.000	0.000	0.660	0.000	0.00
L33	18.25-14.25	A	0.000	0.000	3.692	0.000	0.05
		B	0.000	0.000	8.294	0.000	0.08
		C	0.000	0.000	7.439	0.000	0.06
L34	14.25-10.25	A	0.000	0.000	3.455	0.000	0.05
		B	0.000	0.000	8.085	0.000	0.08
		C	0.000	0.000	7.231	0.000	0.06
L35	10.25-6.25	A	0.000	0.000	3.333	0.000	0.03
		B	0.000	0.000	6.006	0.000	0.05
		C	0.000	0.000	7.231	0.000	0.03
L36	6.25-2.25	A	0.000	0.000	3.333	0.000	0.00
		B	0.000	0.000	3.333	0.000	0.00
		C	0.000	0.000	7.231	0.000	0.01

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L37	2.25-0.00	A	0.000	0.000	1.458	0.000	0.00
		B	0.000	0.000	1.458	0.000	0.00
		C	0.000	0.000	3.234	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	120.00-116.00	A	1.931	0.000	0.000	1.695	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.03
		C		0.000	0.000	0.000	0.000	0.00
L2	116.00-112.00	A	1.924	0.000	0.000	1.689	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.06
		C		0.000	0.000	0.000	0.000	0.00
L3	112.00-108.00	A	1.917	0.000	0.000	1.684	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.06
		C		0.000	0.000	0.000	0.000	0.00
L4	108.00-104.00	A	1.910	0.000	0.000	1.678	0.000	0.07
		B		0.000	0.000	7.850	0.000	0.18
		C		0.000	0.000	0.000	0.000	0.00
L5	104.00-100.00	A	1.903	0.000	0.000	1.672	0.000	0.07
		B		0.000	0.000	7.843	0.000	0.18
		C		0.000	0.000	0.000	0.000	0.00
L6	100.00-96.00	A	1.895	0.000	0.000	1.666	0.000	0.07
		B		0.000	0.000	7.835	0.000	0.18
		C		0.000	0.000	0.000	0.000	0.04
L7	96.00-92.00	A	1.888	0.000	0.000	1.660	0.000	0.07
		B		0.000	0.000	7.828	0.000	0.18
		C		0.000	0.000	0.000	0.000	0.05
L8	92.00-88.00	A	1.879	0.000	0.000	1.654	0.000	0.07
		B		0.000	0.000	7.819	0.000	0.18
		C		0.000	0.000	0.517	0.000	0.06
L9	88.00-83.00	A	1.870	0.000	0.000	2.057	0.000	0.09
		B		0.000	0.000	9.762	0.000	0.23
		C		0.000	0.000	2.575	0.000	0.11
L10	83.00-82.25	A	1.863	0.000	0.000	0.309	0.000	0.01
		B		0.000	0.000	1.464	0.000	0.03
		C		0.000	0.000	0.386	0.000	0.02
L11	82.25-78.25	A	1.858	0.000	0.000	1.636	0.000	0.07
		B		0.000	0.000	7.798	0.000	0.18
		C		0.000	0.000	2.051	0.000	0.08
L12	78.25-74.25	A	1.848	0.000	0.000	1.629	0.000	0.07
		B		0.000	0.000	7.788	0.000	0.18
		C		0.000	0.000	2.043	0.000	0.08
L13	74.25-70.25	A	1.839	0.000	0.000	1.621	0.000	0.07
		B		0.000	0.000	7.779	0.000	0.18
		C		0.000	0.000	2.035	0.000	0.08
L14	70.25-66.25	A	1.828	0.000	0.000	1.612	0.000	0.07
		B		0.000	0.000	7.768	0.000	0.18
		C		0.000	0.000	2.027	0.000	0.08
L15	66.25-62.25	A	1.817	0.000	0.000	1.792	0.000	0.07
		B		0.000	0.000	7.945	0.000	0.18
		C		0.000	0.000	2.206	0.000	0.09
L16	62.25-61.00	A	1.810	0.000	0.000	1.437	0.000	0.04
		B		0.000	0.000	3.360	0.000	0.07
		C		0.000	0.000	1.567	0.000	0.04
L17	61.00-60.75	A	1.807	0.000	0.000	0.287	0.000	0.01
		B		0.000	0.000	0.672	0.000	0.01
		C		0.000	0.000	0.313	0.000	0.01
L18	60.75-59.00	A	1.804	0.000	0.000	2.010	0.000	0.05
		B		0.000	0.000	4.701	0.000	0.10
		C		0.000	0.000	2.191	0.000	0.06
L19	59.00-58.75	A	1.801	0.000	0.000	0.564	0.000	0.01
		B		0.000	0.000	0.949	0.000	0.02
		C		0.000	0.000	0.590	0.000	0.01

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
L20	58.75-54.75	A	1.795	0.000	0.000	7.145	0.000	0.14
		B		0.000	0.000	13.294	0.000	0.25
		C		0.000	0.000	7.559	0.000	0.15
L21	54.75-50.75	A	1.782	0.000	0.000	6.001	0.000	0.12
		B		0.000	0.000	12.147	0.000	0.23
		C		0.000	0.000	6.415	0.000	0.13
L22	50.75-46.75	A	1.768	0.000	0.000	5.978	0.000	0.12
		B		0.000	0.000	12.122	0.000	0.23
		C		0.000	0.000	6.393	0.000	0.13
L23	46.75-41.25	A	1.750	0.000	0.000	12.278	0.000	0.33
		B		0.000	0.000	20.721	0.000	0.48
		C		0.000	0.000	12.848	0.000	0.35
L24	41.25-40.25	A	1.736	0.000	0.000	3.080	0.000	0.10
		B		0.000	0.000	4.615	0.000	0.13
		C		0.000	0.000	3.184	0.000	0.10
L25	40.25-36.25	A	1.725	0.000	0.000	8.092	0.000	0.22
		B		0.000	0.000	14.227	0.000	0.33
		C		0.000	0.000	8.506	0.000	0.23
L26	36.25-33.00	A	1.708	0.000	0.000	4.523	0.000	0.10
		B		0.000	0.000	9.505	0.000	0.18
		C		0.000	0.000	4.860	0.000	0.11
L27	33.00-32.75	A	1.699	0.000	0.000	0.634	0.000	0.01
		B		0.000	0.000	1.017	0.000	0.02
		C		0.000	0.000	0.660	0.000	0.01
L28	32.75-28.75	A	1.688	0.000	0.000	8.363	0.000	0.14
		B		0.000	0.000	14.490	0.000	0.25
		C		0.000	0.000	8.777	0.000	0.16
L29	28.75-24.75	A	1.665	0.000	0.000	6.061	0.000	0.11
		B		0.000	0.000	12.184	0.000	0.22
		C		0.000	0.000	6.475	0.000	0.13
L30	24.75-20.75	A	1.638	0.000	0.000	6.028	0.000	0.11
		B		0.000	0.000	12.146	0.000	0.22
		C		0.000	0.000	6.443	0.000	0.13
L31	20.75-18.50	A	1.614	0.000	0.000	5.684	0.000	0.09
		B		0.000	0.000	9.122	0.000	0.14
		C		0.000	0.000	8.229	0.000	0.12
L32	18.50-18.25	A	1.603	0.000	0.000	0.662	0.000	0.01
		B		0.000	0.000	1.044	0.000	0.02
		C		0.000	0.000	0.977	0.000	0.01
L33	18.25-14.25	A	1.584	0.000	0.000	6.301	0.000	0.11
		B		0.000	0.000	12.407	0.000	0.21
		C		0.000	0.000	11.315	0.000	0.17
L34	14.25-10.25	A	1.540	0.000	0.000	5.688	0.000	0.11
		B		0.000	0.000	12.045	0.000	0.21
		C		0.000	0.000	10.926	0.000	0.16
L35	10.25-6.25	A	1.480	0.000	0.000	4.517	0.000	0.07
		B		0.000	0.000	8.691	0.000	0.13
		C		0.000	0.000	10.783	0.000	0.14
L36	6.25-2.25	A	1.385	0.000	0.000	4.441	0.000	0.04
		B		0.000	0.000	4.441	0.000	0.04
		C		0.000	0.000	10.555	0.000	0.10
L37	2.25-0.00	A	1.212	0.000	0.000	1.883	0.000	0.01
		B		0.000	0.000	1.883	0.000	0.01
		C		0.000	0.000	4.628	0.000	0.04

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	120.00-116.00	-0.0314	-0.2988	-0.1575	-1.4982
L2	116.00-112.00	-0.0314	-0.2989	-0.1584	-1.5074
L3	112.00-108.00	-0.0314	-0.2990	-0.1593	-1.5157
L4	108.00-104.00	5.1429	1.5180	3.7430	0.4474
L5	104.00-100.00	5.2003	1.5346	3.8001	0.4547

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L6	100.00-96.00	5.2560	1.5508	3.8560	0.4621
L7	96.00-92.00	5.3103	1.5665	3.9108	0.4696
L8	92.00-88.00	5.3272	1.7212	3.9351	0.7327
L9	88.00-83.00	5.2843	2.1374	3.9139	1.4506
L10	83.00-82.25	5.2903	2.1398	3.9202	1.4529
L11	82.25-78.25	5.3213	2.1524	3.9521	1.4647
L12	78.25-74.25	5.3725	2.1731	4.0049	1.4839
L13	74.25-70.25	5.4223	2.1934	4.0566	1.5027
L14	70.25-66.25	5.4710	2.2131	4.1074	1.5213
L15	66.25-62.25	5.3350	2.1581	4.0710	1.5076
L16	62.25-61.00	3.5898	1.4522	3.1332	1.1602
L17	61.00-60.75	3.5982	1.4556	3.1413	1.1632
L18	60.75-59.00	3.6095	1.4602	3.1522	1.1672
L19	59.00-58.75	2.4567	0.9938	2.3058	0.8538
L20	58.75-54.75	2.9079	1.1764	2.6241	0.9716
L21	54.75-50.75	3.2898	1.3309	2.8843	1.0679
L22	50.75-46.75	3.3312	1.3477	2.9243	1.0827
L23	46.75-41.25	2.5661	1.0382	2.4364	0.9021
L24	41.25-40.25	1.8925	0.7656	2.0225	0.7488
L25	40.25-36.25	2.5976	1.0509	2.5823	0.9564
L26	36.25-33.00	3.2928	1.3322	3.1051	1.1503
L27	33.00-32.75	2.3109	0.9349	2.3198	0.8594
L28	32.75-28.75	2.6804	1.0844	2.5920	0.9604
L29	28.75-24.75	3.3672	1.3623	3.0526	1.1314
L30	24.75-20.75	3.4049	1.3776	3.0880	1.1449
L31	20.75-18.50	1.3453	0.6483	1.4413	0.5956
L32	18.50-18.25	1.1835	0.5915	1.3022	0.5496
L33	18.25-14.25	1.5937	0.7964	1.6636	0.7023
L34	14.25-10.25	1.6512	0.8420	1.7357	0.8260
L35	10.25-6.25	0.3686	0.5372	0.6366	0.9559
L36	6.25-2.25	-1.6800	-0.0747	-1.3503	0.4108
L37	2.25-0.00	-1.4879	0.0485	-1.1456	0.5238

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	2	Safety Line 3/8"	116.00 - 120.00	1.0000	1.0000
L2	2	Safety Line 3/8"	112.00 - 116.00	1.0000	1.0000
L3	2	Safety Line 3/8"	108.00 - 112.00	1.0000	1.0000
L4	2	Safety Line 3/8"	104.00 - 108.00	1.0000	1.0000
L4	11	HJ7-50A(1-5/8)	104.00 - 108.00	1.0000	1.0000
L5	2	Safety Line 3/8"	100.00 - 104.00	1.0000	1.0000
L5	11	HJ7-50A(1-5/8)	100.00 - 104.00	1.0000	1.0000
L6	2	Safety Line 3/8"	96.00 - 100.00	1.0000	1.0000
L6	11	HJ7-50A(1-5/8)	96.00 - 100.00	1.0000	1.0000
L7	2	Safety Line 3/8"	92.00 - 96.00	1.0000	1.0000
L7	11	HJ7-50A(1-5/8)	92.00 - 96.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L8	2	Safety Line 3/8"	88.00 - 92.00	1.0000	1.0000
L8	11	HJ7-50A(1-5/8)	88.00 - 92.00	1.0000	1.0000
L8	45	CU12PSM9P8XXX(1-3/8)	88.00 - 89.00	1.0000	1.0000
L9	2	Safety Line 3/8"	83.00 - 88.00	1.0000	1.0000
L9	11	HJ7-50A(1-5/8)	83.00 - 88.00	1.0000	1.0000
L9	45	CU12PSM9P8XXX(1-3/8)	83.00 - 88.00	1.0000	1.0000
L10	2	Safety Line 3/8"	82.25 - 83.00	1.0000	1.0000
L10	11	HJ7-50A(1-5/8)	82.25 - 83.00	1.0000	1.0000
L10	45	CU12PSM9P8XXX(1-3/8)	82.25 - 83.00	1.0000	1.0000
L11	2	Safety Line 3/8"	78.25 - 82.25	1.0000	1.0000
L11	11	HJ7-50A(1-5/8)	78.25 - 82.25	1.0000	1.0000
L11	45	CU12PSM9P8XXX(1-3/8)	78.25 - 82.25	1.0000	1.0000
L12	2	Safety Line 3/8"	74.25 - 78.25	1.0000	1.0000
L12	11	HJ7-50A(1-5/8)	74.25 - 78.25	1.0000	1.0000
L12	45	CU12PSM9P8XXX(1-3/8)	74.25 - 78.25	1.0000	1.0000
L13	2	Safety Line 3/8"	70.25 - 74.25	1.0000	1.0000
L13	11	HJ7-50A(1-5/8)	70.25 - 74.25	1.0000	1.0000
L13	45	CU12PSM9P8XXX(1-3/8)	70.25 - 74.25	1.0000	1.0000
L14	2	Safety Line 3/8"	66.25 - 70.25	1.0000	1.0000
L14	11	HJ7-50A(1-5/8)	66.25 - 70.25	1.0000	1.0000
L14	45	CU12PSM9P8XXX(1-3/8)	66.25 - 70.25	1.0000	1.0000
L15	2	Safety Line 3/8"	62.25 - 66.25	1.0000	1.0000
L15	11	HJ7-50A(1-5/8)	62.25 - 66.25	1.0000	1.0000
L15	17	PL4x1.25 (MOD)	62.25 - 62.50	1.0000	1.0000
L15	18	PL4x1.25 (MOD)	62.25 - 62.50	1.0000	1.0000
L15	19	PL4x1.25 (MOD)	62.25 - 62.50	1.0000	1.0000
L15	45	CU12PSM9P8XXX(1-3/8)	62.25 - 66.25	1.0000	1.0000
L16	2	Safety Line 3/8"	61.00 - 62.25	1.0000	1.0000
L16	11	HJ7-50A(1-5/8)	61.00 - 62.25	1.0000	1.0000
L16	17	PL4x1.25 (MOD)	61.00 - 62.25	1.0000	1.0000
L16	18	PL4x1.25 (MOD)	61.00 - 62.25	1.0000	1.0000
L16	19	PL4x1.25 (MOD)	61.00 - 62.25	1.0000	1.0000
L16	45	CU12PSM9P8XXX(1-3/8)	61.00 - 62.25	1.0000	1.0000
L17	2	Safety Line 3/8"	60.75 - 61.00	1.0000	1.0000
L17	11	HJ7-50A(1-5/8)	60.75 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			61.00		
L17	17	PL4x1.25 (MOD)	60.75 - 61.00	1.0000	1.0000
L17	18	PL4x1.25 (MOD)	60.75 - 61.00	1.0000	1.0000
L17	19	PL4x1.25 (MOD)	60.75 - 61.00	1.0000	1.0000
L17	45	CU12PSM9P8XXX(1-3/8)	60.75 - 61.00	1.0000	1.0000
L18	2	Safety Line 3/8"	59.00 - 60.75	1.0000	1.0000
L18	11	HJ7-50A(1-5/8)	59.00 - 60.75	1.0000	1.0000
L18	17	PL4x1.25 (MOD)	59.00 - 60.75	1.0000	1.0000
L18	18	PL4x1.25 (MOD)	59.00 - 60.75	1.0000	1.0000
L18	19	PL4x1.25 (MOD)	59.00 - 60.75	1.0000	1.0000
L18	45	CU12PSM9P8XXX(1-3/8)	59.00 - 60.75	1.0000	1.0000
L19	2	Safety Line 3/8"	58.75 - 59.00	1.0000	1.0000
L19	11	HJ7-50A(1-5/8)	58.75 - 59.00	1.0000	1.0000
L19	17	PL4x1.25 (MOD)	58.75 - 59.00	1.0000	1.0000
L19	18	PL4x1.25 (MOD)	58.75 - 59.00	1.0000	1.0000
L19	19	PL4x1.25 (MOD)	58.75 - 59.00	1.0000	1.0000
L19	32	PL4.5x1 (MOD)	58.75 - 59.00	1.0000	1.0000
L19	33	PL4.5x1 (MOD)	58.75 - 59.00	1.0000	1.0000
L19	34	PL4.5x1 (MOD)	58.75 - 59.00	1.0000	1.0000
L19	45	CU12PSM9P8XXX(1-3/8)	58.75 - 59.00	1.0000	1.0000
L20	2	Safety Line 3/8"	54.75 - 58.75	1.0000	1.0000
L20	11	HJ7-50A(1-5/8)	54.75 - 58.75	1.0000	1.0000
L20	17	PL4x1.25 (MOD)	57.25 - 58.75	1.0000	1.0000
L20	18	PL4x1.25 (MOD)	57.25 - 58.75	1.0000	1.0000
L20	19	PL4x1.25 (MOD)	57.25 - 58.75	1.0000	1.0000
L20	32	PL4.5x1 (MOD)	54.75 - 58.75	1.0000	1.0000
L20	33	PL4.5x1 (MOD)	54.75 - 58.75	1.0000	1.0000
L20	34	PL4.5x1 (MOD)	54.75 - 58.75	1.0000	1.0000
L20	45	CU12PSM9P8XXX(1-3/8)	54.75 - 58.75	1.0000	1.0000
L21	2	Safety Line 3/8"	50.75 - 54.75	1.0000	1.0000
L21	11	HJ7-50A(1-5/8)	50.75 - 54.75	1.0000	1.0000
L21	32	PL4.5x1 (MOD)	50.75 - 54.75	1.0000	1.0000
L21	33	PL4.5x1 (MOD)	50.75 - 54.75	1.0000	1.0000
L21	34	PL4.5x1 (MOD)	50.75 - 54.75	1.0000	1.0000
L21	45	CU12PSM9P8XXX(1-3/8)	50.75 - 54.75	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L22	2	Safety Line 3/8"	46.75 - 50.75	1.0000	1.0000
L22	11	HJ7-50A(1-5/8)	46.75 - 50.75	1.0000	1.0000
L22	32	PL4.5x1 (MOD)	46.75 - 50.75	1.0000	1.0000
L22	33	PL4.5x1 (MOD)	46.75 - 50.75	1.0000	1.0000
L22	34	PL4.5x1 (MOD)	46.75 - 50.75	1.0000	1.0000
L22	45	CU12PSM9P8XXX(1-3/8)	46.75 - 50.75	1.0000	1.0000
L23	2	Safety Line 3/8"	41.25 - 46.75	1.0000	1.0000
L23	11	HJ7-50A(1-5/8)	41.25 - 46.75	1.0000	1.0000
L23	21	PL5x1.25 (MOD)	41.25 - 43.75	1.0000	1.0000
L23	22	PL5x1.25 (MOD)	41.25 - 43.75	1.0000	1.0000
L23	23	PL5x1.25 (MOD)	41.25 - 43.75	1.0000	1.0000
L23	24	PL5x1.25 (MOD)	41.25 - 43.75	1.0000	1.0000
L23	25	PL5x1.25 (MOD)	41.25 - 43.75	1.0000	1.0000
L23	26	PL5x1.25 (MOD)	41.25 - 43.75	1.0000	1.0000
L23	32	PL4.5x1 (MOD)	41.33 - 46.75	1.0000	1.0000
L23	33	PL4.5x1 (MOD)	41.33 - 46.75	1.0000	1.0000
L23	34	PL4.5x1 (MOD)	41.33 - 46.75	1.0000	1.0000
L23	45	CU12PSM9P8XXX(1-3/8)	41.25 - 46.75	1.0000	1.0000
L24	2	Safety Line 3/8"	40.25 - 41.25	1.0000	1.0000
L24	11	HJ7-50A(1-5/8)	40.25 - 41.25	1.0000	1.0000
L24	21	PL5x1.25 (MOD)	40.25 - 41.25	1.0000	1.0000
L24	22	PL5x1.25 (MOD)	40.25 - 41.25	1.0000	1.0000
L24	23	PL5x1.25 (MOD)	40.25 - 41.25	1.0000	1.0000
L24	24	PL5x1.25 (MOD)	40.25 - 41.25	1.0000	1.0000
L24	25	PL5x1.25 (MOD)	40.25 - 41.25	1.0000	1.0000
L24	26	PL5x1.25 (MOD)	40.25 - 41.25	1.0000	1.0000
L24	28	PL5x1.25 (MOD)	40.25 - 41.25	1.0000	1.0000
L24	29	PL5x1.25 (MOD)	40.25 - 41.25	1.0000	1.0000
L24	30	PL5x1.25 (MOD)	40.25 - 41.25	1.0000	1.0000
L24	45	CU12PSM9P8XXX(1-3/8)	40.25 - 41.25	1.0000	1.0000
L25	2	Safety Line 3/8"	36.25 - 40.25	1.0000	1.0000
L25	11	HJ7-50A(1-5/8)	36.25 - 40.25	1.0000	1.0000
L25	21	PL5x1.25 (MOD)	38.75 - 40.25	1.0000	1.0000
L25	22	PL5x1.25 (MOD)	38.75 - 40.25	1.0000	1.0000
L25	23	PL5x1.25 (MOD)	38.75 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L25	24	PL5x1.25 (MOD)	40.25 38.75 - 40.25	1.0000	1.0000
L25	25	PL5x1.25 (MOD)	38.75 - 40.25	1.0000	1.0000
L25	26	PL5x1.25 (MOD)	38.75 - 40.25	1.0000	1.0000
L25	28	PL5x1.25 (MOD)	36.25 - 40.25	1.0000	1.0000
L25	29	PL5x1.25 (MOD)	36.25 - 40.25	1.0000	1.0000
L25	30	PL5x1.25 (MOD)	36.25 - 40.25	1.0000	1.0000
L25	45	CU12PSM9P8XXX(1-3/8)	36.25 - 40.25	1.0000	1.0000
L26	2	Safety Line 3/8"	33.00 - 36.25	1.0000	1.0000
L26	11	HJ7-50A(1-5/8)	33.00 - 36.25	1.0000	1.0000
L26	28	PL5x1.25 (MOD)	33.00 - 36.25	1.0000	1.0000
L26	29	PL5x1.25 (MOD)	33.00 - 36.25	1.0000	1.0000
L26	30	PL5x1.25 (MOD)	33.00 - 36.25	1.0000	1.0000
L26	45	CU12PSM9P8XXX(1-3/8)	33.00 - 36.25	1.0000	1.0000
L27	2	Safety Line 3/8"	32.75 - 33.00	1.0000	1.0000
L27	11	HJ7-50A(1-5/8)	32.75 - 33.00	1.0000	1.0000
L27	28	PL5x1.25 (MOD)	32.75 - 33.00	1.0000	1.0000
L27	29	PL5x1.25 (MOD)	32.75 - 33.00	1.0000	1.0000
L27	30	PL5x1.25 (MOD)	32.75 - 33.00	1.0000	1.0000
L27	36	PL5x1 (MOD)	32.75 - 33.00	1.0000	1.0000
L27	37	PL5x1 (MOD)	32.75 - 33.00	1.0000	1.0000
L27	38	PL5x1 (MOD)	32.75 - 33.00	1.0000	1.0000
L27	45	CU12PSM9P8XXX(1-3/8)	32.75 - 33.00	1.0000	1.0000
L28	2	Safety Line 3/8"	28.75 - 32.75	1.0000	1.0000
L28	11	HJ7-50A(1-5/8)	28.75 - 32.75	1.0000	1.0000
L28	28	PL5x1.25 (MOD)	30.50 - 32.75	1.0000	1.0000
L28	29	PL5x1.25 (MOD)	30.50 - 32.75	1.0000	1.0000
L28	30	PL5x1.25 (MOD)	30.50 - 32.75	1.0000	1.0000
L28	36	PL5x1 (MOD)	28.75 - 32.75	1.0000	1.0000
L28	37	PL5x1 (MOD)	28.75 - 32.75	1.0000	1.0000
L28	38	PL5x1 (MOD)	28.75 - 32.75	1.0000	1.0000
L28	45	CU12PSM9P8XXX(1-3/8)	28.75 - 32.75	1.0000	1.0000
L29	2	Safety Line 3/8"	24.75 - 28.75	1.0000	1.0000
L29	11	HJ7-50A(1-5/8)	24.75 - 28.75	1.0000	1.0000
L29	36	PL5x1 (MOD)	24.75 - 28.75	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L29	37	PL5x1 (MOD)	24.75 - 28.75	1.0000	1.0000
L29	38	PL5x1 (MOD)	24.75 - 28.75	1.0000	1.0000
L29	45	CU12PSM9P8XXX(1-3/8)	24.75 - 28.75	1.0000	1.0000
L30	2	Safety Line 3/8"	20.75 - 24.75	1.0000	1.0000
L30	11	HJ7-50A(1-5/8)	20.75 - 24.75	1.0000	1.0000
L30	36	PL5x1 (MOD)	20.75 - 24.75	1.0000	1.0000
L30	37	PL5x1 (MOD)	20.75 - 24.75	1.0000	1.0000
L30	38	PL5x1 (MOD)	20.75 - 24.75	1.0000	1.0000
L30	45	CU12PSM9P8XXX(1-3/8)	20.75 - 24.75	1.0000	1.0000
L31	2	Safety Line 3/8"	18.50 - 20.75	1.0000	1.0000
L31	11	HJ7-50A(1-5/8)	18.50 - 20.75	1.0000	1.0000
L31	36	PL5x1 (MOD)	18.50 - 20.75	1.0000	1.0000
L31	37	PL5x1 (MOD)	18.50 - 20.75	1.0000	1.0000
L31	38	PL5x1 (MOD)	18.50 - 20.75	1.0000	1.0000
L31	40	PL5x1 (MOD)	18.50 - 20.50	1.0000	1.0000
L31	41	PL5x1 (MOD)	18.50 - 20.50	1.0000	1.0000
L31	42	PL5x1 (MOD)	18.50 - 20.50	1.0000	1.0000
L31	43	PL5x1 (MOD)	18.50 - 20.50	1.0000	1.0000
L31	45	CU12PSM9P8XXX(1-3/8)	18.50 - 20.75	1.0000	1.0000
L32	2	Safety Line 3/8"	18.25 - 18.50	1.0000	1.0000
L32	11	HJ7-50A(1-5/8)	18.25 - 18.50	1.0000	1.0000
L32	36	PL5x1 (MOD)	18.25 - 18.50	1.0000	1.0000
L32	37	PL5x1 (MOD)	18.25 - 18.50	1.0000	1.0000
L32	38	PL5x1 (MOD)	18.25 - 18.50	1.0000	1.0000
L32	40	PL5x1 (MOD)	18.25 - 18.50	1.0000	1.0000
L32	41	PL5x1 (MOD)	18.25 - 18.50	1.0000	1.0000
L32	42	PL5x1 (MOD)	18.25 - 18.50	1.0000	1.0000
L32	43	PL5x1 (MOD)	18.25 - 18.50	1.0000	1.0000
L32	45	CU12PSM9P8XXX(1-3/8)	18.25 - 18.50	1.0000	1.0000
L33	2	Safety Line 3/8"	14.25 - 18.25	1.0000	1.0000
L33	11	HJ7-50A(1-5/8)	14.25 - 18.25	1.0000	1.0000
L33	36	PL5x1 (MOD)	18.00 - 18.25	1.0000	1.0000
L33	37	PL5x1 (MOD)	18.00 - 18.25	1.0000	1.0000
L33	38	PL5x1 (MOD)	18.00 - 18.25	1.0000	1.0000
L33	40	PL5x1 (MOD)	14.25 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L33	41	PL5x1 (MOD)	18.25 14.25 - 18.25	1.0000	1.0000
L33	42	PL5x1 (MOD)	14.25 - 18.25	1.0000	1.0000
L33	43	PL5x1 (MOD)	14.25 - 18.25	1.0000	1.0000
L33	45	CU12PSM9P8XXX(1-3/8)	14.25 - 18.25	1.0000	1.0000
L34	2	Safety Line 3/8"	11.00 - 14.25	1.0000	1.0000
L34	11	HJ7-50A(1-5/8)	10.25 - 14.25	1.0000	1.0000
L34	40	PL5x1 (MOD)	10.25 - 14.25	1.0000	1.0000
L34	41	PL5x1 (MOD)	10.25 - 14.25	1.0000	1.0000
L34	42	PL5x1 (MOD)	10.25 - 14.25	1.0000	1.0000
L34	43	PL5x1 (MOD)	10.25 - 14.25	1.0000	1.0000
L34	45	CU12PSM9P8XXX(1-3/8)	10.25 - 14.25	1.0000	1.0000
L35	11	HJ7-50A(1-5/8)	8.00 - 10.25	1.0000	1.0000
L35	40	PL5x1 (MOD)	6.25 - 10.25	1.0000	1.0000
L35	41	PL5x1 (MOD)	6.25 - 10.25	1.0000	1.0000
L35	42	PL5x1 (MOD)	6.25 - 10.25	1.0000	1.0000
L35	43	PL5x1 (MOD)	6.25 - 10.25	1.0000	1.0000
L35	45	CU12PSM9P8XXX(1-3/8)	6.25 - 10.25	1.0000	1.0000
L36	40	PL5x1 (MOD)	2.25 - 6.25	1.0000	1.0000
L36	41	PL5x1 (MOD)	2.25 - 6.25	1.0000	1.0000
L36	42	PL5x1 (MOD)	2.25 - 6.25	1.0000	1.0000
L36	43	PL5x1 (MOD)	2.25 - 6.25	1.0000	1.0000
L36	45	CU12PSM9P8XXX(1-3/8)	2.25 - 6.25	1.0000	1.0000
L37	40	PL5x1 (MOD)	0.50 - 2.25	1.0000	1.0000
L37	41	PL5x1 (MOD)	0.50 - 2.25	1.0000	1.0000
L37	42	PL5x1 (MOD)	0.50 - 2.25	1.0000	1.0000
L37	43	PL5x1 (MOD)	0.50 - 2.25	1.0000	1.0000
L37	45	CU12PSM9P8XXX(1-3/8)	0.00 - 2.25	1.0000	1.0000

Effective Width of Flat Linear Attachments / Feed Lines

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L15	17	PL4x1.25 (MOD)	62.25 - 62.50	Auto	0.0000
L15	18	PL4x1.25 (MOD)	62.25 - 62.50	Auto	0.0000
L15	19	PL4x1.25 (MOD)	62.25 - 62.50	Auto	0.0000
L16	17	PL4x1.25 (MOD)	61.00 - 62.25	Auto	0.0000
L16	18	PL4x1.25 (MOD)	61.00 - 62.25	Auto	0.0000
L16	19	PL4x1.25 (MOD)	61.00 - 62.25	Auto	0.0000
L17	17	PL4x1.25 (MOD)	60.75 - 61.00	Auto	0.0000
L17	18	PL4x1.25 (MOD)	60.75 -	Auto	0.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L17	19	PL4x1.25 (MOD)	61.00 60.75 -	Auto	0.0000
L18	17	PL4x1.25 (MOD)	61.00 59.00 -	Auto	0.0000
L18	18	PL4x1.25 (MOD)	60.75 59.00 -	Auto	0.0000
L18	19	PL4x1.25 (MOD)	60.75 59.00 -	Auto	0.0000
L19	17	PL4x1.25 (MOD)	60.75 58.75 -	Auto	0.0000
L19	18	PL4x1.25 (MOD)	59.00 58.75 -	Auto	0.0000
L19	19	PL4x1.25 (MOD)	59.00 58.75 -	Auto	0.0000
L19	32	PL4.5x1 (MOD)	59.00 58.75 -	Auto	0.0106
L19	33	PL4.5x1 (MOD)	59.00 58.75 -	Auto	0.0106
L19	34	PL4.5x1 (MOD)	59.00 58.75 -	Auto	0.0106
L20	17	PL4x1.25 (MOD)	59.00 57.25 -	Auto	0.0000
L20	18	PL4x1.25 (MOD)	58.75 57.25 -	Auto	0.0000
L20	19	PL4x1.25 (MOD)	58.75 57.25 -	Auto	0.0000
L20	32	PL4.5x1 (MOD)	58.75 54.75 -	Auto	0.0021
L20	33	PL4.5x1 (MOD)	58.75 54.75 -	Auto	0.0021
L20	34	PL4.5x1 (MOD)	58.75 54.75 -	Auto	0.0021
L21	32	PL4.5x1 (MOD)	58.75 50.75 -	Auto	0.0000
L21	33	PL4.5x1 (MOD)	54.75 50.75 -	Auto	0.0000
L21	34	PL4.5x1 (MOD)	54.75 50.75 -	Auto	0.0000
L22	32	PL4.5x1 (MOD)	54.75 46.75 -	Auto	0.0000
L22	33	PL4.5x1 (MOD)	50.75 46.75 -	Auto	0.0000
L22	34	PL4.5x1 (MOD)	50.75 46.75 -	Auto	0.0000
L23	21	PL5x1.25 (MOD)	50.75 41.25 -	Auto	0.0231
L23	22	PL5x1.25 (MOD)	43.75 41.25 -	Auto	0.0231
L23	23	PL5x1.25 (MOD)	43.75 41.25 -	Auto	0.0231
L23	24	PL5x1.25 (MOD)	43.75 41.25 -	Auto	0.0231
L23	25	PL5x1.25 (MOD)	43.75 41.25 -	Auto	0.0231
L23	26	PL5x1.25 (MOD)	43.75 41.25 -	Auto	0.0231
L23	32	PL4.5x1 (MOD)	43.75 41.33 -	Auto	0.0000
L23	33	PL4.5x1 (MOD)	46.75 41.33 -	Auto	0.0000
L23	34	PL4.5x1 (MOD)	46.75 41.33 -	Auto	0.0000
L24	21	PL5x1.25 (MOD)	46.75 40.25 -	Auto	0.1370
L24	22	PL5x1.25 (MOD)	41.25 40.25 -	Auto	0.1370
L24	23	PL5x1.25 (MOD)	41.25 40.25 -	Auto	0.1370

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L24	24	PL5x1.25 (MOD)	41.25 40.25 -	Auto	0.1370
L24	25	PL5x1.25 (MOD)	41.25 40.25 -	Auto	0.1370
L24	26	PL5x1.25 (MOD)	41.25 40.25 -	Auto	0.1370
L24	28	PL5x1.25 (MOD)	41.25 40.25 -	Auto	0.1370
L24	29	PL5x1.25 (MOD)	41.25 40.25 -	Auto	0.1370
L24	30	PL5x1.25 (MOD)	41.25 40.25 -	Auto	0.1370
L25	21	PL5x1.25 (MOD)	41.25 38.75 -	Auto	0.1260
L25	22	PL5x1.25 (MOD)	40.25 38.75 -	Auto	0.1260
L25	23	PL5x1.25 (MOD)	40.25 38.75 -	Auto	0.1260
L25	24	PL5x1.25 (MOD)	40.25 38.75 -	Auto	0.1260
L25	25	PL5x1.25 (MOD)	40.25 38.75 -	Auto	0.1260
L25	26	PL5x1.25 (MOD)	40.25 38.75 -	Auto	0.1260
L25	28	PL5x1.25 (MOD)	40.25 36.25 -	Auto	0.1194
L25	29	PL5x1.25 (MOD)	40.25 36.25 -	Auto	0.1194
L25	30	PL5x1.25 (MOD)	40.25 36.25 -	Auto	0.1194
L26	28	PL5x1.25 (MOD)	40.25 33.00 -	Auto	0.1003
L26	29	PL5x1.25 (MOD)	36.25 33.00 -	Auto	0.1003
L26	30	PL5x1.25 (MOD)	36.25 33.00 -	Auto	0.1003
L27	28	PL5x1.25 (MOD)	36.25 32.75 -	Auto	0.0118
L27	29	PL5x1.25 (MOD)	33.00 32.75 -	Auto	0.0118
L27	30	PL5x1.25 (MOD)	33.00 32.75 -	Auto	0.0118
L27	36	PL5x1 (MOD)	33.00 32.75 -	Auto	0.0118
L27	37	PL5x1 (MOD)	33.00 32.75 -	Auto	0.0118
L27	38	PL5x1 (MOD)	33.00 32.75 -	Auto	0.0118
L28	28	PL5x1.25 (MOD)	33.00 30.50 -	Auto	0.0053
L28	29	PL5x1.25 (MOD)	32.75 30.50 -	Auto	0.0053
L28	30	PL5x1.25 (MOD)	32.75 30.50 -	Auto	0.0053
L28	36	PL5x1 (MOD)	32.75 28.75 -	Auto	0.0030
L28	37	PL5x1 (MOD)	32.75 28.75 -	Auto	0.0030
L28	38	PL5x1 (MOD)	32.75 28.75 -	Auto	0.0030
L29	36	PL5x1 (MOD)	32.75 24.75 -	Auto	0.0000
L29	37	PL5x1 (MOD)	28.75 24.75 -	Auto	0.0000
L29	38	PL5x1 (MOD)	28.75 24.75 -	Auto	0.0000
L30	36	PL5x1 (MOD)	28.75 20.75 -	Auto	0.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L30	37	PL5x1 (MOD)	24.75 20.75 - 24.75	Auto	0.0000
L30	38	PL5x1 (MOD)	20.75 - 24.75	Auto	0.0000
L31	36	PL5x1 (MOD)	18.50 - 20.75	Auto	0.0000
L31	37	PL5x1 (MOD)	18.50 - 20.75	Auto	0.0000
L31	38	PL5x1 (MOD)	18.50 - 20.75	Auto	0.0000
L31	40	PL5x1 (MOD)	18.50 - 20.50	Auto	0.0000
L31	41	PL5x1 (MOD)	18.50 - 20.50	Auto	0.0000
L31	42	PL5x1 (MOD)	18.50 - 20.50	Auto	0.0000
L31	43	PL5x1 (MOD)	18.50 - 20.50	Auto	0.0000
L32	36	PL5x1 (MOD)	18.25 - 18.50	Auto	0.0000
L32	37	PL5x1 (MOD)	18.25 - 18.50	Auto	0.0000
L32	38	PL5x1 (MOD)	18.25 - 18.50	Auto	0.0000
L32	40	PL5x1 (MOD)	18.25 - 18.50	Auto	0.0000
L32	41	PL5x1 (MOD)	18.25 - 18.50	Auto	0.0000
L32	42	PL5x1 (MOD)	18.25 - 18.50	Auto	0.0000
L32	43	PL5x1 (MOD)	18.25 - 18.50	Auto	0.0000
L33	36	PL5x1 (MOD)	18.00 - 18.25	Auto	0.0000
L33	37	PL5x1 (MOD)	18.00 - 18.25	Auto	0.0000
L33	38	PL5x1 (MOD)	18.00 - 18.25	Auto	0.0000
L33	40	PL5x1 (MOD)	14.25 - 18.25	Auto	0.0000
L33	41	PL5x1 (MOD)	14.25 - 18.25	Auto	0.0000
L33	42	PL5x1 (MOD)	14.25 - 18.25	Auto	0.0000
L33	43	PL5x1 (MOD)	14.25 - 18.25	Auto	0.0000
L34	40	PL5x1 (MOD)	10.25 - 14.25	Auto	0.0000
L34	41	PL5x1 (MOD)	10.25 - 14.25	Auto	0.0000
L34	42	PL5x1 (MOD)	10.25 - 14.25	Auto	0.0000
L34	43	PL5x1 (MOD)	10.25 - 14.25	Auto	0.0000
L35	40	PL5x1 (MOD)	6.25 - 10.25	Auto	0.0000
L35	41	PL5x1 (MOD)	6.25 - 10.25	Auto	0.0000
L35	42	PL5x1 (MOD)	6.25 - 10.25	Auto	0.0000
L35	43	PL5x1 (MOD)	6.25 - 10.25	Auto	0.0000
L36	40	PL5x1 (MOD)	2.25 - 6.25	Auto	0.0000
L36	41	PL5x1 (MOD)	2.25 - 6.25	Auto	0.0000
L36	42	PL5x1 (MOD)	2.25 - 6.25	Auto	0.0000
L36	43	PL5x1 (MOD)	2.25 - 6.25	Auto	0.0000
L37	40	PL5x1 (MOD)	0.50 - 2.25	Auto	0.0000
L37	41	PL5x1 (MOD)	0.50 - 2.25	Auto	0.0000
L37	42	PL5x1 (MOD)	0.50 - 2.25	Auto	0.0000
L37	43	PL5x1 (MOD)	0.50 - 2.25	Auto	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft
***					
(2) DMP65R-BU4D w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	118.00
(2) DMP65R-BU4D w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	118.00
(2) DMP65R-BU4D w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	118.00
7770.00 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	118.00
7770.00 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	118.00
7770.00 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	118.00
(3) RRUS 4449 B5/B12	C	From Leg	4.00 0.00 0.00	0.0000	118.00
(3) RRUS 4478 B14	A	From Leg	4.00 0.00 0.00	0.0000	118.00
(3) RRUS 8843 B2/B66A	B	From Leg	4.00 0.00 0.00	0.0000	118.00
(2) 1001940	A	From Leg	4.00 0.00 0.00	0.0000	118.00
1001940	B	From Leg	4.00 0.00 0.00	0.0000	118.00
(2) LGP21401	A	From Leg	4.00 0.00 0.00	0.0000	118.00
(2) LGP21401	B	From Leg	4.00 0.00 0.00	0.0000	118.00
(2) LGP21401	C	From Leg	4.00 0.00 0.00	0.0000	118.00
DC6-48-60-18-8C	A	From Leg	1.00 0.00 0.00	0.0000	118.00
DC6-48-60-18-8F	A	From Leg	1.00 0.00 0.00	0.0000	118.00
4' x 2" Pipe Mount	A	From Leg	1.00 0.00 0.00	0.0000	118.00
4' x 2" Pipe Mount	A	From Leg	4.00 0.00 0.00	0.0000	118.00
4' x 2" Pipe Mount	B	From Leg	4.00 0.00	0.0000	118.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft
4' x 2" Pipe Mount	C	From Leg	0.00 4.00 0.00	0.0000	118.00
Platform Mount [LP 303-1_HR-1]	A	None	0.00	0.0000	118.00
******					
(2) LPA-185063/8CFX2 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	108.00
(2) LPA-185063/8CFX2 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	108.00
(2) LPA-185063/8CFX2 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	108.00
(2) LPD-6513 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	108.00
(2) LPD-6513 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	108.00
(2) LPD-6513 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	108.00
Platform Mount [LP 303-1]	A	None		0.0000	108.00
****** ***					
APXVAARR24_43-U-NA20	A	From Leg	4.00 0.00 0.00	0.0000	99.00
APXVAARR24_43-U-NA20	B	From Leg	4.00 0.00 0.00	0.0000	99.00
APXVAARR24_43-U-NA20	C	From Leg	4.00 0.00 0.00	0.0000	99.00
AIR 32 B2A/B66AA	A	From Leg	4.00 0.00 0.00	0.0000	99.00
AIR 32 B2A/B66AA	B	From Leg	4.00 0.00 0.00	0.0000	99.00
AIR 32 B2A/B66AA	C	From Leg	4.00 0.00 0.00	0.0000	99.00
RADIO 4449 B12/B71	A	From Leg	4.00 0.00 0.00	0.0000	99.00
RADIO 4449 B12/B71	B	From Leg	4.00 0.00 0.00	0.0000	99.00
RADIO 4449 B12/B71	C	From Leg	4.00 0.00 0.00	0.0000	99.00
KRY 112 144/1	A	From Leg	4.00 0.00 0.00	0.0000	99.00
KRY 112 144/1	B	From Leg	4.00 0.00 0.00	0.0000	99.00
KRY 112 144/1	C	From Leg	4.00 0.00 0.00	0.0000	99.00
12.5' Platform Mount [#RMQP-496-HK]	A	None		0.0000	99.00
***					

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	89.00
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	89.00
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	89.00
TA08025-B604	A	From Leg	4.00 0.00 0.00	0.0000	89.00
TA08025-B604	B	From Leg	4.00 0.00 0.00	0.0000	89.00
TA08025-B604	C	From Leg	4.00 0.00 0.00	0.0000	89.00
TA08025-B605	A	From Leg	4.00 0.00 0.00	0.0000	89.00
TA08025-B605	B	From Leg	4.00 0.00 0.00	0.0000	89.00
TA08025-B605	C	From Leg	4.00 0.00 0.00	0.0000	89.00
RDIDC-9181-PF-48	A	From Leg	4.00 0.00 0.00	0.0000	89.00
(2) 8' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	89.00
(2) 8' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	89.00
(2) 8' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	89.00
Commscope MC-K6MHDX-9-96 (3)	C	None		0.0000	89.00

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice

Comb. No.	Description
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	120 - 116	Pole	Max Tension	15	0.00	-0.00	0.00
			Max. Compression	26	-9.85	-0.01	0.39
			Max. Mx	8	-3.24	-9.36	0.04
			Max. My	2	-3.22	-0.04	9.47
			Max. Vy	8	4.68	-9.36	0.04
			Max. Vx	2	-4.73	-0.04	9.47
			Max. Torque	30			0.08
L2	116 - 112	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-10.34	-0.01	0.42
			Max. Mx	8	-3.46	-28.63	0.09
			Max. My	2	-3.45	-0.09	28.95
			Max. Vy	8	4.96	-28.63	0.09
			Max. Vx	2	-5.01	-0.09	28.95
			Max. Torque	30			0.08
L3	112 - 108	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-10.84	-0.01	0.44
			Max. Mx	8	-3.69	-49.04	0.15
			Max. My	2	-3.68	-0.15	49.57
			Max. Vy	8	5.25	-49.04	0.15
			Max. Vx	2	-5.30	-0.15	49.57
			Max. Torque	30			0.08
L4	108 - 104	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-17.70	-0.12	0.55
			Max. Mx	8	-5.62	-88.36	0.22
			Max. My	2	-5.61	-0.23	89.10

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	8	8.84	-88.36	0.22
			Max. Vx	2	-8.89	-0.23	89.10
			Max. Torque	30			0.08
L5	104 - 100	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-18.41	-0.24	0.65
			Max. Mx	8	-5.97	-124.33	0.30
			Max. My	2	-5.96	-0.31	125.27
			Max. Vy	8	9.14	-124.33	0.30
			Max. Vx	2	-9.19	-0.31	125.27
			Max. Torque	30			0.08
L6	100 - 96	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-27.15	-0.37	0.77
			Max. Mx	8	-9.73	-171.43	0.38
			Max. My	2	-9.71	-0.40	172.59
			Max. Vy	8	12.75	-171.43	0.38
			Max. Vx	2	-12.81	-0.40	172.59
			Max. Torque	30			0.08
L7	96 - 92	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-27.94	-0.50	0.89
			Max. Mx	8	-10.18	-223.01	0.46
			Max. My	2	-10.17	-0.48	224.39
			Max. Vy	8	13.04	-223.01	0.46
			Max. Vx	2	-13.10	-0.48	224.39
			Max. Torque	30			0.08
L8	92 - 88	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.47	-0.63	1.58
			Max. Mx	8	-12.92	-278.11	0.62
			Max. My	2	-12.90	-0.57	279.87
			Max. Vy	8	15.70	-278.11	0.62
			Max. Vx	2	-15.80	-0.57	279.87
			Max. Torque	20			-0.33
L9	88 - 83	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.84	-0.70	1.61
			Max. Mx	8	-13.13	-305.68	0.65
			Max. My	2	-13.11	-0.61	307.60
			Max. Vy	8	15.82	-305.68	0.65
			Max. Vx	2	-15.92	-0.61	307.60
			Max. Torque	20			-0.33
L10	83 - 82.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-37.15	-0.84	1.71
			Max. Mx	8	-13.88	-369.61	0.72
			Max. My	2	-13.85	-0.70	371.90
			Max. Vy	8	16.14	-369.61	0.72
			Max. Vx	2	-16.24	-0.70	371.90
			Max. Torque	20			-0.33
L11	82.25 - 78.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-38.08	-0.99	1.79
			Max. Mx	8	-14.47	-434.73	0.80
			Max. My	2	-14.44	-0.79	437.40
			Max. Vy	8	16.42	-434.73	0.80
			Max. Vx	2	-16.52	-0.79	437.40
			Max. Torque	20			-0.33
L12	78.25 - 74.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-39.03	-1.13	1.88
			Max. Mx	8	-15.07	-500.93	0.87
			Max. My	2	-15.05	-0.88	503.97
			Max. Vy	8	16.69	-500.93	0.87
			Max. Vx	2	-16.78	-0.88	503.97
			Max. Torque	20			-0.33
L13	74.25 - 70.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-39.98	-1.28	1.97
			Max. Mx	8	-15.70	-568.16	0.94
			Max. My	2	-15.68	-0.98	571.58
			Max. Vy	8	16.94	-568.16	0.94
			Max. Vx	2	-17.04	-0.98	571.58
			Max. Torque	20			-0.33

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L14	70.25 - 66.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-40.95	-1.42	2.05
			Max. Mx	8	-16.34	-636.41	1.01
			Max. My	2	-16.33	-1.07	640.19
			Max. Vy	8	17.19	-636.41	1.01
			Max. Vx	2	-17.29	-1.07	640.19
			Max. Torque	20			-0.33
L15	66.25 - 62.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.93	-1.57	2.13
			Max. Mx	8	-17.00	-705.62	1.09
			Max. My	2	-16.99	-1.16	709.78
			Max. Vy	8	17.43	-705.62	1.09
			Max. Vx	2	-17.53	-1.16	709.78
			Max. Torque	20			-0.33
L16	62.25 - 61	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42.28	-1.62	2.15
			Max. Mx	8	-17.21	-727.45	1.11
			Max. My	2	-17.19	-1.19	731.72
			Max. Vy	8	17.51	-727.45	1.11
			Max. Vx	2	-17.60	-1.19	731.72
			Max. Torque	20			-0.33
L17	61 - 60.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42.36	-1.63	2.16
			Max. Mx	8	-17.27	-731.82	1.11
			Max. My	2	-17.25	-1.19	736.12
			Max. Vy	8	17.51	-731.82	1.11
			Max. Vx	2	-17.61	-1.19	736.12
			Max. Torque	20			-0.33
L18	60.75 - 59	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42.85	-1.69	2.19
			Max. Mx	8	-17.54	-762.56	1.14
			Max. My	2	-17.52	-1.23	767.01
			Max. Vy	8	17.63	-762.56	1.14
			Max. Vx	2	-17.73	-1.23	767.01
			Max. Torque	20			-0.33
L19	59 - 58.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42.93	-1.70	2.20
			Max. Mx	8	-17.61	-766.96	1.15
			Max. My	2	-17.59	-1.24	771.44
			Max. Vy	8	17.62	-766.96	1.15
			Max. Vx	2	-17.72	-1.24	771.44
			Max. Torque	20			-0.33
L20	58.75 - 54.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-44.13	-1.85	2.28
			Max. Mx	8	-18.28	-837.91	1.22
			Max. My	2	-18.27	-1.33	842.75
			Max. Vy	8	17.86	-837.91	1.22
			Max. Vx	2	-17.95	-1.33	842.75
			Max. Torque	20			-0.33
L21	54.75 - 50.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-45.28	-1.99	2.35
			Max. Mx	8	-18.99	-909.73	1.29
			Max. My	2	-18.97	-1.43	914.93
			Max. Vy	8	18.07	-909.73	1.29
			Max. Vx	2	-18.16	-1.43	914.93
			Max. Torque	20			-0.33
L22	50.75 - 46.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-46.44	-2.14	2.42
			Max. Mx	8	-19.70	-982.37	1.36
			Max. My	2	-19.69	-1.52	987.92
			Max. Vy	8	18.27	-982.37	1.36
			Max. Vx	2	-18.37	-1.52	987.92
			Max. Torque	20			-0.33
L23	46.75 -	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
	41.25						
			Max. Compression	26	-47.14	-2.20	2.46
			Max. Mx	8	-20.13	-1014.41	1.39
			Max. My	2	-20.12	-1.56	1020.11
			Max. Vy	8	18.38	-1014.41	1.39
			Max. Vx	2	-18.47	-1.56	1020.11
			Max. Torque	20			-0.33
L24	41.25 - 40.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-50.23	-2.38	2.54
			Max. Mx	8	-22.16	-1102.59	1.47
			Max. My	2	-22.15	-1.67	1108.72
			Max. Vy	8	18.77	-1102.59	1.47
			Max. Vx	2	-18.87	-1.67	1108.72
			Max. Torque	20			-0.33
L25	40.25 - 36.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-52.16	-2.52	2.61
			Max. Mx	8	-23.46	-1178.25	1.54
			Max. My	2	-23.45	-1.76	1184.75
			Max. Vy	8	19.06	-1178.25	1.54
			Max. Vx	2	-19.16	-1.76	1184.75
			Max. Torque	20			-0.33
L26	36.25 - 33	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-53.45	-2.64	2.67
			Max. Mx	8	-24.34	-1240.52	1.60
			Max. My	2	-24.33	-1.84	1247.34
			Max. Vy	8	19.27	-1240.52	1.60
			Max. Vx	2	-19.37	-1.84	1247.34
			Max. Torque	20			-0.33
L27	33 - 32.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-53.54	-2.65	2.68
			Max. Mx	8	-24.40	-1245.34	1.60
			Max. My	2	-24.39	-1.84	1252.18
			Max. Vy	8	19.28	-1245.34	1.60
			Max. Vx	2	-19.38	-1.84	1252.18
			Max. Torque	20			-0.33
L28	32.75 - 28.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-54.91	-2.79	2.74
			Max. Mx	8	-25.23	-1322.80	1.67
			Max. My	2	-25.22	-1.94	1330.01
			Max. Vy	8	19.46	-1322.80	1.67
			Max. Vx	2	-19.56	-1.94	1330.01
			Max. Torque	20			-0.33
L29	28.75 - 24.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-56.20	-2.94	2.81
			Max. Mx	8	-26.09	-1400.91	1.74
			Max. My	2	-26.08	-2.03	1408.49
			Max. Vy	8	19.62	-1400.91	1.74
			Max. Vx	2	-19.72	-2.03	1408.49
			Max. Torque	20			-0.32
L30	24.75 - 20.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-57.49	-3.07	2.87
			Max. Mx	8	-26.96	-1479.61	1.80
			Max. My	2	-26.96	-2.12	1487.55
			Max. Vy	8	19.76	-1479.61	1.80
			Max. Vx	2	-19.86	-2.12	1487.55
			Max. Torque	20			-0.32
L31	20.75 - 18.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-58.31	-3.15	2.88
			Max. Mx	8	-27.46	-1524.13	1.84
			Max. My	2	-27.45	-2.18	1532.27
			Max. Vy	8	19.84	-1524.13	1.84
			Max. Vx	2	-19.93	-2.18	1532.27
			Max. Torque	20			-0.32
L32	18.5 - 18.25	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-58.41	-3.16	2.88
			Max. Mx	8	-27.53	-1529.09	1.85
			Max. My	2	-27.52	-2.18	1537.24
			Max. Vy	8	19.83	-1529.09	1.85
			Max. Vx	2	-19.92	-2.18	1537.24
			Max. Torque	20			-0.32
L33	18.25 - 14.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-59.76	-3.31	2.90
			Max. Mx	8	-28.41	-1608.66	1.91
			Max. My	2	-28.40	-2.28	1617.13
			Max. Vy	8	19.96	-1608.66	1.91
			Max. Vx	2	-20.05	-2.28	1617.13
			Max. Torque	20			-0.32
L34	14.25 - 10.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-61.09	-3.46	2.92
			Max. Mx	8	-29.31	-1688.67	1.98
			Max. My	2	-29.31	-2.37	1697.44
			Max. Vy	8	20.07	-1688.67	1.98
			Max. Vx	2	-20.15	-2.37	1697.44
			Max. Torque	20			-0.32
L35	10.25 - 6.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-62.27	-3.56	2.90
			Max. Mx	8	-30.13	-1769.06	2.03
			Max. My	2	-30.13	-2.44	1778.14
			Max. Vy	8	20.16	-1769.06	2.03
			Max. Vx	2	-20.25	-2.44	1778.14
			Max. Torque	20			-0.32
L36	6.25 - 2.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-63.27	-3.57	2.83
			Max. Mx	8	-30.84	-1849.80	2.07
			Max. My	2	-30.84	-2.50	1859.19
			Max. Vy	8	20.26	-1849.80	2.07
			Max. Vx	2	-20.34	-2.50	1859.19
			Max. Torque	20			-0.32
L37	2.25 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-63.79	-3.58	2.80
			Max. Mx	8	-31.24	-1895.38	2.09
			Max. My	2	-31.24	-2.53	1904.94
			Max. Vy	8	20.31	-1895.38	2.09
			Max. Vx	2	-20.39	-2.53	1904.94
			Max. Torque	20			-0.32

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	63.79	-0.00	5.64
	Max. H_x	21	23.45	20.28	-0.01
	Max. H_z	3	23.45	-0.01	20.36
	Max. M_x	2	1904.94	-0.01	20.36
	Max. M_z	8	1895.38	-20.28	0.01
	Max. Torsion	8	0.32	-20.28	0.01
	Min. Vert	7	23.45	-17.56	10.19
	Min. H_x	9	23.45	-20.28	0.01
	Min. H_z	15	23.45	0.01	-20.36
	Min. M_x	14	-1904.08	0.01	-20.36
	Min. M_z	20	-1893.67	20.28	-0.01
	Min. Torsion	20	-0.32	20.28	-0.01

Tower Mast Reaction Summary

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
Dead Only	26.05	0.00	0.00	-0.32	-0.66	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	31.26	0.01	-20.36	-1904.94	-2.53	-0.01
0.9 Dead+1.0 Wind 0 deg - No Ice	23.45	0.01	-20.36	-1863.17	-2.25	-0.01
1.2 Dead+1.0 Wind 30 deg - No Ice	31.26	10.19	-17.71	-1653.67	-951.23	-0.17
0.9 Dead+1.0 Wind 30 deg - No Ice	23.45	10.19	-17.71	-1617.42	-930.23	-0.17
1.2 Dead+1.0 Wind 60 deg - No Ice	31.26	17.56	-10.19	-954.01	-1642.03	-0.28
0.9 Dead+1.0 Wind 60 deg - No Ice	23.45	17.56	-10.19	-933.03	-1605.91	-0.28
1.2 Dead+1.0 Wind 90 deg - No Ice	31.26	20.28	-0.01	-2.09	-1895.38	-0.32
0.9 Dead+1.0 Wind 90 deg - No Ice	23.45	20.28	-0.01	-1.93	-1853.72	-0.32
1.2 Dead+1.0 Wind 120 deg - No Ice	31.26	17.55	10.17	950.29	-1640.38	-0.28
0.9 Dead+1.0 Wind 120 deg - No Ice	23.45	17.55	10.17	929.61	-1604.30	-0.27
1.2 Dead+1.0 Wind 150 deg - No Ice	31.26	10.12	17.62	1647.88	-946.46	-0.15
0.9 Dead+1.0 Wind 150 deg - No Ice	23.45	10.12	17.62	1611.95	-925.55	-0.15
1.2 Dead+1.0 Wind 180 deg - No Ice	31.26	-0.01	20.36	1904.08	0.80	0.01
0.9 Dead+1.0 Wind 180 deg - No Ice	23.45	-0.01	20.36	1862.54	0.99	0.01
1.2 Dead+1.0 Wind 210 deg - No Ice	31.26	-10.19	17.71	1652.82	949.50	0.17
0.9 Dead+1.0 Wind 210 deg - No Ice	23.45	-10.19	17.71	1616.80	928.97	0.17
1.2 Dead+1.0 Wind 240 deg - No Ice	31.26	-17.56	10.19	953.16	1640.31	0.29
0.9 Dead+1.0 Wind 240 deg - No Ice	23.45	-17.56	10.19	932.41	1604.65	0.28
1.2 Dead+1.0 Wind 270 deg - No Ice	31.26	-20.28	0.01	1.24	1893.67	0.32
0.9 Dead+1.0 Wind 270 deg - No Ice	23.45	-20.28	0.01	1.31	1852.47	0.32
1.2 Dead+1.0 Wind 300 deg - No Ice	31.26	-17.55	-10.17	-951.15	1638.68	0.27
0.9 Dead+1.0 Wind 300 deg - No Ice	23.45	-17.55	-10.17	-930.24	1603.05	0.27
1.2 Dead+1.0 Wind 330 deg - No Ice	31.26	-10.12	-17.62	-1648.75	944.74	0.15
0.9 Dead+1.0 Wind 330 deg - No Ice	23.45	-10.12	-17.62	-1612.58	924.30	0.15
1.2 Dead+1.0 Ice+1.0 Temp	63.79	0.00	-0.00	-2.80	-3.58	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	63.79	0.00	-5.64	-593.70	-3.97	0.00
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	63.79	2.81	-4.89	-514.71	-298.25	-0.08
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	63.79	4.87	-2.82	-298.56	-513.59	-0.14
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	63.79	5.62	-0.00	-3.18	-592.29	-0.16
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	63.79	4.87	2.82	292.30	-513.26	-0.14
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	63.79	2.81	4.88	508.69	-297.68	-0.08
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	63.79	-0.00	5.64	588.01	-3.31	-0.00
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	63.79	-2.81	4.89	509.02	290.98	0.08

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	63.79	-4.87	2.82	292.87	506.32	0.14
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	63.79	-5.62	0.00	-2.52	585.02	0.16
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	63.79	-4.87	-2.82	-297.99	505.99	0.14
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	63.79	-2.81	-4.88	-514.38	290.41	0.08
Dead+Wind 0 deg - Service	26.05	0.00	-4.42	-409.50	-1.07	-0.00
Dead+Wind 30 deg - Service	26.05	2.21	-3.84	-355.52	-204.88	-0.04
Dead+Wind 60 deg - Service	26.05	3.81	-2.21	-205.21	-353.27	-0.07
Dead+Wind 90 deg - Service	26.05	4.40	-0.00	-0.71	-407.69	-0.08
Dead+Wind 120 deg - Service	26.05	3.81	2.21	203.87	-352.91	-0.06
Dead+Wind 150 deg - Service	26.05	2.20	3.83	353.74	-203.85	-0.04
Dead+Wind 180 deg - Service	26.05	-0.00	4.42	408.78	-0.35	0.00
Dead+Wind 210 deg - Service	26.05	-2.21	3.84	354.81	203.46	0.04
Dead+Wind 240 deg - Service	26.05	-3.81	2.21	204.49	351.85	0.07
Dead+Wind 270 deg - Service	26.05	-4.40	0.00	-0.00	406.27	0.08
Dead+Wind 300 deg - Service	26.05	-3.81	-2.21	-204.59	351.50	0.06
Dead+Wind 330 deg - Service	26.05	-2.20	-3.83	-354.46	202.43	0.04

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-26.05	0.00	0.00	26.05	0.00	0.000%
2	0.01	-31.26	-20.36	-0.01	31.26	20.36	0.000%
3	0.01	-23.45	-20.36	-0.01	23.45	20.36	0.000%
4	10.19	-31.26	-17.71	-10.19	31.26	17.71	0.000%
5	10.19	-23.45	-17.71	-10.19	23.45	17.71	0.000%
6	17.56	-31.26	-10.19	-17.56	31.26	10.19	0.000%
7	17.56	-23.45	-10.19	-17.56	23.45	10.19	0.000%
8	20.28	-31.26	-0.01	-20.28	31.26	0.01	0.000%
9	20.28	-23.45	-0.01	-20.28	23.45	0.01	0.000%
10	17.55	-31.26	10.17	-17.55	31.26	-10.17	0.000%
11	17.55	-23.45	10.17	-17.55	23.45	-10.17	0.000%
12	10.12	-31.26	17.62	-10.12	31.26	-17.62	0.000%
13	10.12	-23.45	17.62	-10.12	23.45	-17.62	0.000%
14	-0.01	-31.26	20.36	0.01	31.26	-20.36	0.000%
15	-0.01	-23.45	20.36	0.01	23.45	-20.36	0.000%
16	-10.19	-31.26	17.71	10.19	31.26	-17.71	0.000%
17	-10.19	-23.45	17.71	10.19	23.45	-17.71	0.000%
18	-17.56	-31.26	10.19	17.56	31.26	-10.19	0.000%
19	-17.56	-23.45	10.19	17.56	23.45	-10.19	0.000%
20	-20.28	-31.26	0.01	20.28	31.26	-0.01	0.000%
21	-20.28	-23.45	0.01	20.28	23.45	-0.01	0.000%
22	-17.55	-31.26	-10.17	17.55	31.26	10.17	0.000%
23	-17.55	-23.45	-10.17	17.55	23.45	10.17	0.000%
24	-10.12	-31.26	-17.62	10.12	31.26	17.62	0.000%
25	-10.12	-23.45	-17.62	10.12	23.45	17.62	0.000%
26	0.00	-63.79	0.00	-0.00	63.79	0.00	0.000%
27	0.00	-63.79	-5.64	-0.00	63.79	5.64	0.000%
28	2.81	-63.79	-4.89	-2.81	63.79	4.89	0.000%
29	4.87	-63.79	-2.82	-4.87	63.79	2.82	0.000%
30	5.62	-63.79	-0.00	-5.62	63.79	0.00	0.000%
31	4.87	-63.79	2.82	-4.87	63.79	-2.82	0.000%
32	2.81	-63.79	4.88	-2.81	63.79	-4.88	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
33	-0.00	-63.79	5.64	0.00	63.79	-5.64	0.000%
34	-2.81	-63.79	4.89	2.81	63.79	-4.89	0.000%
35	-4.87	-63.79	2.82	4.87	63.79	-2.82	0.000%
36	-5.62	-63.79	0.00	5.62	63.79	-0.00	0.000%
37	-4.87	-63.79	-2.82	4.87	63.79	2.82	0.000%
38	-2.81	-63.79	-4.88	2.81	63.79	4.88	0.000%
39	0.00	-26.05	-4.42	-0.00	26.05	4.42	0.000%
40	2.21	-26.05	-3.84	-2.21	26.05	3.84	0.000%
41	3.81	-26.05	-2.21	-3.81	26.05	2.21	0.000%
42	4.40	-26.05	-0.00	-4.40	26.05	0.00	0.000%
43	3.81	-26.05	2.21	-3.81	26.05	-2.21	0.000%
44	2.20	-26.05	3.83	-2.20	26.05	-3.83	0.000%
45	-0.00	-26.05	4.42	0.00	26.05	-4.42	0.000%
46	-2.21	-26.05	3.84	2.21	26.05	-3.84	0.000%
47	-3.81	-26.05	2.21	3.81	26.05	-2.21	0.000%
48	-4.40	-26.05	0.00	4.40	26.05	-0.00	0.000%
49	-3.81	-26.05	-2.21	3.81	26.05	2.21	0.000%
50	-2.20	-26.05	-3.83	2.20	26.05	3.83	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	6	0.00000001	0.00009907
3	Yes	5	0.00000001	0.00037846
4	Yes	7	0.00000001	0.00087620
5	Yes	7	0.00000001	0.00019252
6	Yes	7	0.00000001	0.00088242
7	Yes	7	0.00000001	0.00019447
8	Yes	6	0.00000001	0.00015845
9	Yes	5	0.00000001	0.00071923
10	Yes	7	0.00000001	0.00087007
11	Yes	7	0.00000001	0.00019165
12	Yes	7	0.00000001	0.00087784
13	Yes	7	0.00000001	0.00019355
14	Yes	6	0.00000001	0.00009441
15	Yes	5	0.00000001	0.00036125
16	Yes	7	0.00000001	0.00088030
17	Yes	7	0.00000001	0.00019387
18	Yes	7	0.00000001	0.00087112
19	Yes	7	0.00000001	0.00019171
20	Yes	6	0.00000001	0.00012282
21	Yes	5	0.00000001	0.00052913
22	Yes	7	0.00000001	0.00087916
23	Yes	7	0.00000001	0.00019408
24	Yes	7	0.00000001	0.00087217
25	Yes	7	0.00000001	0.00019214
26	Yes	5	0.00000001	0.00031961
27	Yes	8	0.00000001	0.00043497
28	Yes	8	0.00000001	0.00076327
29	Yes	8	0.00000001	0.00076754
30	Yes	8	0.00000001	0.00043338
31	Yes	8	0.00000001	0.00074192
32	Yes	8	0.00000001	0.00075139
33	Yes	8	0.00000001	0.00042859
34	Yes	8	0.00000001	0.00073757
35	Yes	8	0.00000001	0.00073195
36	Yes	8	0.00000001	0.00042783
37	Yes	8	0.00000001	0.00075319
38	Yes	8	0.00000001	0.00074530
39	Yes	5	0.00000001	0.00021049
40	Yes	6	0.00000001	0.00012878
41	Yes	6	0.00000001	0.00013131
42	Yes	5	0.00000001	0.00021903

43	Yes	6	0.00000001	0.00012595
44	Yes	6	0.00000001	0.00012936
45	Yes	5	0.00000001	0.00020981
46	Yes	6	0.00000001	0.00012947
47	Yes	6	0.00000001	0.00012575
48	Yes	5	0.00000001	0.00021661
49	Yes	6	0.00000001	0.00012958
50	Yes	6	0.00000001	0.00012669

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 116	28.102	40	1.9167	0.0012
L2	116 - 112	26.497	40	1.9156	0.0012
L3	112 - 108	24.895	40	1.9075	0.0012
L4	108 - 104	23.303	40	1.8923	0.0011
L5	104 - 100	21.729	40	1.8669	0.0011
L6	100 - 96	20.179	40	1.8319	0.0010
L7	96 - 92	18.663	40	1.7875	0.0010
L8	92 - 88	17.188	40	1.7325	0.0010
L9	88 - 83	15.763	40	1.6680	0.0009
L10	86.25 - 82.25	15.158	40	1.6368	0.0009
L11	82.25 - 78.25	13.801	40	1.5968	0.0008
L12	78.25 - 74.25	12.492	40	1.5285	0.0007
L13	74.25 - 70.25	11.243	40	1.4545	0.0007
L14	70.25 - 66.25	10.057	40	1.3759	0.0006
L15	66.25 - 62.25	8.939	40	1.2933	0.0005
L16	62.25 - 61	7.891	40	1.2074	0.0005
L17	61 - 60.75	7.579	40	1.1802	0.0004
L18	60.75 - 59	7.517	40	1.1747	0.0004
L19	59 - 58.75	7.093	40	1.1363	0.0004
L20	58.75 - 54.75	7.034	40	1.1307	0.0004
L21	54.75 - 50.75	6.125	40	1.0399	0.0004
L22	50.75 - 46.75	5.292	40	0.9472	0.0003
L23	46.75 - 41.25	4.538	40	0.8528	0.0003
L24	45 - 40.25	4.233	40	0.8111	0.0003
L25	40.25 - 36.25	3.445	40	0.7695	0.0002
L26	36.25 - 33	2.821	40	0.7206	0.0002
L27	33 - 32.75	2.344	40	0.6808	0.0002
L28	32.75 - 28.75	2.309	40	0.6756	0.0002
L29	28.75 - 24.75	1.778	40	0.5927	0.0002
L30	24.75 - 20.75	1.316	40	0.5097	0.0001
L31	20.75 - 18.5	0.924	40	0.4267	0.0001
L32	18.5 - 18.25	0.733	40	0.3800	0.0001
L33	18.25 - 14.25	0.714	40	0.3748	0.0001
L34	14.25 - 10.25	0.434	40	0.2920	0.0001
L35	10.25 - 6.25	0.224	40	0.2095	0.0001
L36	6.25 - 2.25	0.083	40	0.1274	0.0000
L37	2.25 - 0	0.011	40	0.0457	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
118.00	(2) DMP65R-BU4D w/ Mount Pipe	40	27.299	1.9167	0.0012	37580
108.00	(2) LPA-185063/8CFX2 w/ Mount Pipe	40	23.303	1.8923	0.0011	11394
99.00	APXVAARR24_43-U-NA20	40	19.797	1.8218	0.0010	5451
89.00	MX08FRO665-21 w/ Mount Pipe	40	16.114	1.6858	0.0009	3697

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 116	130.473	2	8.9233	0.0052
L2	116 - 112	123.031	2	8.9182	0.0051
L3	112 - 108	115.605	2	8.8807	0.0049
L4	108 - 104	108.225	2	8.8102	0.0047
L5	104 - 100	100.921	2	8.6922	0.0045
L6	100 - 96	93.734	2	8.5297	0.0044
L7	96 - 92	86.699	2	8.3235	0.0042
L8	92 - 88	79.856	2	8.0676	0.0041
L9	88 - 83	73.244	2	7.7680	0.0039
L10	86.25 - 82.25	70.432	2	7.6227	0.0037
L11	82.25 - 78.25	64.135	2	7.4371	0.0035
L12	78.25 - 74.25	58.054	2	7.1188	0.0031
L13	74.25 - 70.25	52.250	2	6.7747	0.0028
L14	70.25 - 66.25	46.746	4	6.4086	0.0025
L15	66.25 - 62.25	41.555	4	6.0238	0.0022
L16	62.25 - 61	36.690	4	5.6233	0.0020
L17	61 - 60.75	35.238	4	5.4967	0.0019
L18	60.75 - 59	34.952	4	5.4710	0.0019
L19	59 - 58.75	32.984	4	5.2921	0.0018
L20	58.75 - 54.75	32.708	4	5.2661	0.0018
L21	54.75 - 50.75	28.483	4	4.8429	0.0016
L22	50.75 - 46.75	24.614	4	4.4105	0.0014
L23	46.75 - 41.25	21.108	4	3.9707	0.0012
L24	45 - 40.25	19.690	4	3.7764	0.0011
L25	40.25 - 36.25	16.026	4	3.5824	0.0010
L26	36.25 - 33	13.123	4	3.3549	0.0009
L27	33 - 32.75	10.905	4	3.1691	0.0009
L28	32.75 - 28.75	10.740	4	3.1450	0.0008
L29	28.75 - 24.75	8.268	4	2.7589	0.0007
L30	24.75 - 20.75	6.120	4	2.3722	0.0006
L31	20.75 - 18.5	4.296	4	1.9854	0.0005
L32	18.5 - 18.25	3.412	4	1.7681	0.0004
L33	18.25 - 14.25	3.320	4	1.7440	0.0004
L34	14.25 - 10.25	2.020	4	1.3585	0.0003
L35	10.25 - 6.25	1.043	4	0.9745	0.0002
L36	6.25 - 2.25	0.387	4	0.5923	0.0001
L37	2.25 - 0	0.050	4	0.2125	0.0000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
118.00	(2) DMP65R-BU4D w/ Mount Pipe	2	126.751	8.9234	0.0051	8482
108.00	(2) LPA-185063/8CFX2 w/ Mount Pipe	2	108.225	8.8102	0.0047	2564
99.00	APXVAARR24_43-U-NA20	2	91.960	8.4827	0.0043	1223
89.00	MX08FRO665-21 w/ Mount Pipe	2	74.872	7.8506	0.0040	824

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	120 - 116 (1)	TP19.6002x19x0.1875	4.00	0.00	0.0	11.5530	-3.22	675.85	0.005
L2	116 - 112 (2)	TP20.2004x19.6002x0.1875	4.00	0.00	0.0	11.9102	-3.45	696.75	0.005
L3	112 - 108 (3)	TP20.8006x20.2004x0.1875	4.00	0.00	0.0	12.2674	-3.68	717.64	0.005
L4	108 - 104 (4)	TP21.4009x20.8006x0.1875	4.00	0.00	0.0	12.6246	-5.61	738.54	0.008
L5	104 - 100 (5)	TP22.0011x21.4009x0.1875	4.00	0.00	0.0	12.9818	-5.96	759.44	0.008
L6	100 - 96 (6)	TP22.6013x22.0011x0.1875	4.00	0.00	0.0	13.3390	-9.71	780.33	0.012
L7	96 - 92 (7)	TP23.2015x22.6013x0.1875	4.00	0.00	0.0	13.6962	-10.17	801.23	0.013
L8	92 - 88 (8)	TP23.8017x23.2015x0.1875	4.00	0.00	0.0	14.0534	-12.90	822.13	0.016
L9	88 - 83 (9)	TP24.552x23.8017x0.1875	5.00	0.00	0.0	14.2097	-13.11	831.27	0.016
L10	83 - 82.25 (10)	TP24.2895x23.6893x0.25	4.00	0.00	0.0	19.0753	-13.85	1115.91	0.012
L11	82.25 - 78.25 (11)	TP24.8896x24.2895x0.25	4.00	0.00	0.0	19.5515	-14.44	1143.77	0.013
L12	78.25 - 74.25 (12)	TP25.4898x24.8896x0.25	4.00	0.00	0.0	20.0278	-15.05	1171.62	0.013
L13	74.25 - 70.25 (13)	TP26.0899x25.4898x0.25	4.00	0.00	0.0	20.5040	-15.68	1199.48	0.013
L14	70.25 - 66.25 (14)	TP26.6901x26.0899x0.25	4.00	0.00	0.0	20.9802	-16.33	1227.34	0.013
L15	66.25 - 62.25 (15)	TP27.2902x26.6901x0.25	4.00	0.00	0.0	21.4564	-16.99	1255.20	0.014
L16	62.25 - 61 (16)	TP27.4778x27.2902x0.25	1.25	0.00	0.0	21.6052	-17.19	1263.91	0.014
L17	61 - 60.75 (17)	TP27.5153x27.4778x0.25	0.25	0.00	0.0	21.6350	-17.25	1265.65	0.014
L18	60.75 - 59 (18)	TP27.7778x27.5153x0.25	1.75	0.00	0.0	21.8433	-17.52	1277.84	0.014
L19	59 - 58.75 (19)	TP27.8153x27.7778x0.25	0.25	0.00	0.0	21.8731	-17.59	1279.58	0.014
L20	58.75 - 54.75 (20)	TP28.4155x27.8153x0.25	4.00	0.00	0.0	22.3493	-18.27	1307.44	0.014
L21	54.75 - 50.75 (21)	TP29.0156x28.4155x0.25	4.00	0.00	0.0	22.8255	-18.97	1335.29	0.014
L22	50.75 - 46.75 (22)	TP29.6158x29.0156x0.25	4.00	0.00	0.0	23.3018	-19.69	1363.15	0.014
L23	46.75 - 41.25 (23)	TP30.441x29.6158x0.25	5.50	0.00	0.0	23.5101	-20.12	1375.34	0.015
L24	41.25 - 40.25 (24)	TP30.091x29.3784x0.55	4.75	0.00	0.0	51.5698	-22.15	3016.83	0.007
L25	40.25 - 36.25 (25)	TP30.6912x30.091x0.5375	4.00	0.00	0.0	51.4429	-23.45	3009.41	0.008
L26	36.25 - 33 (26)	TP31.1788x30.6912x0.5375	3.25	0.00	0.0	52.2748	-24.33	3058.08	0.008
L27	33 - 32.75 (27)	TP31.2163x31.1788x0.3125	0.25	0.00	0.0	30.6527	-24.39	1793.18	0.014
L28	32.75 - 28.75 (28)	TP31.8165x31.2163x0.3125	4.00	0.00	0.0	31.2480	-25.22	1828.01	0.014
L29	28.75 - 24.75 (29)	TP32.4166x31.8165x0.3125	4.00	0.00	0.0	31.8433	-26.08	1862.83	0.014
L30	24.75 - 20.75 (30)	TP33.0167x32.4166x0.3125	4.00	0.00	0.0	32.4385	-26.95	1897.65	0.014
L31	20.75 - 18.5 (31)	TP33.3543x33.0167x0.3125	2.25	0.00	0.0	32.7734	-27.45	1917.24	0.014
L32	18.5 - 18.25 (32)	TP33.3918x33.3543x0.3125	0.25	0.00	0.0	32.8106	-27.52	1919.42	0.014
L33	18.25 - 14.25 (33)	TP33.992x33.3918x0.3125	4.00	0.00	0.0	33.4058	-28.40	1954.24	0.015
L34	14.25 - 10.25 (34)	TP34.5921x33.992x0.3125	4.00	0.00	0.0	34.0011	-29.31	1989.06	0.015

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L35	10.25 - 6.25 (35)	TP35.1923x34.5921x0.3125	4.00	0.00	0.0	34.5964	-30.13	2023.89	0.015
L36	6.25 - 2.25 (36)	TP35.7924x35.1923x0.3125	4.00	0.00	0.0	35.1916	-30.84	2058.71	0.015
L37	2.25 - 0 (37)	TP36.13x35.7924x0.3125	2.25	0.00	0.0	35.5265	-31.24	2078.30	0.015

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	120 - 116 (1)	TP19.6002x19x0.1875	9.47	334.76	0.028	0.00	334.76	0.000
L2	116 - 112 (2)	TP20.2004x19.6002x0.1875	28.95	352.96	0.082	0.00	352.96	0.000
L3	112 - 108 (3)	TP20.8006x20.2004x0.1875	49.57	371.46	0.133	0.00	371.46	0.000
L4	108 - 104 (4)	TP21.4009x20.8006x0.1875	89.10	390.22	0.228	0.00	390.22	0.000
L5	104 - 100 (5)	TP22.0011x21.4009x0.1875	125.28	409.25	0.306	0.00	409.25	0.000
L6	100 - 96 (6)	TP22.6013x22.0011x0.1875	172.60	428.51	0.403	0.00	428.51	0.000
L7	96 - 92 (7)	TP23.2015x22.6013x0.1875	224.41	448.00	0.501	0.00	448.00	0.000
L8	92 - 88 (8)	TP23.8017x23.2015x0.1875	279.87	467.70	0.598	0.00	467.70	0.000
L9	88 - 83 (9)	TP24.552x23.8017x0.1875	307.59	476.38	0.646	0.00	476.38	0.000
L10	83 - 82.25 (10)	TP24.2895x23.6893x0.25	371.90	696.88	0.534	0.00	696.88	0.000
L11	82.25 - 78.25 (11)	TP24.8896x24.2895x0.25	437.40	727.88	0.601	0.00	727.88	0.000
L12	78.25 - 74.25 (12)	TP25.4898x24.8896x0.25	503.97	759.31	0.664	0.00	759.31	0.000
L13	74.25 - 70.25 (13)	TP26.0899x25.4898x0.25	571.58	791.17	0.722	0.00	791.17	0.000
L14	70.25 - 66.25 (14)	TP26.6901x26.0899x0.25	640.19	823.43	0.777	0.00	823.43	0.000
L15	66.25 - 62.25 (15)	TP27.2902x26.6901x0.25	709.78	856.08	0.829	0.00	856.08	0.000
L16	62.25 - 61 (16)	TP27.4778x27.2902x0.25	731.72	866.37	0.845	0.00	866.37	0.000
L17	61 - 60.75 (17)	TP27.5153x27.4778x0.25	736.12	868.43	0.848	0.00	868.43	0.000
L18	60.75 - 59 (18)	TP27.7778x27.5153x0.25	767.01	882.90	0.869	0.00	882.90	0.000
L19	59 - 58.75 (19)	TP27.8153x27.7778x0.25	771.44	884.97	0.872	0.00	884.97	0.000
L20	58.75 - 54.75 (20)	TP28.4155x27.8153x0.25	842.75	918.32	0.918	0.00	918.32	0.000
L21	54.75 - 50.75 (21)	TP29.0156x28.4155x0.25	914.93	952.01	0.961	0.00	952.01	0.000
L22	50.75 - 46.75 (22)	TP29.6158x29.0156x0.25	988.04	986.03	1.002	0.00	986.03	0.000
L23	46.75 - 41.25 (23)	TP30.441x29.6158x0.25	1020.29	1001.03	1.019	0.00	1001.03	0.000
L24	41.25 - 40.25 (24)	TP30.091x29.3784x0.55	1109.06	2302.82	0.482	0.00	2302.82	0.000
L25	40.25 - 36.25 (25)	TP30.6912x30.091x0.5375	1185.25	2346.63	0.505	0.00	2346.63	0.000
L26	36.25 - 33 (26)	TP31.1788x30.6912x0.5375	1247.97	2423.82	0.515	0.00	2423.82	0.000
L27	33 - 32.75 (27)	TP31.2163x31.1788x0.3125	1252.83	1430.12	0.876	0.00	1430.12	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 $\frac{M_{uy}}{\phi M_{ny}}$
L28	32.75 - 28.75 (28)	TP31.8165x31.2163x0.3125	1330.88	1479.26	0.900	0.00	1479.26	0.000
L29	28.75 - 24.75 (29)	TP32.4166x31.8165x0.3125	1409.62	1528.93	0.922	0.00	1528.93	0.000
L30	24.75 - 20.75 (30)	TP33.0167x32.4166x0.3125	1488.93	1579.12	0.943	0.00	1579.12	0.000
L31	20.75 - 18.5 (31)	TP33.3543x33.0167x0.3125	1533.79	1607.57	0.954	0.00	1607.57	0.000
L32	18.5 - 18.25 (32)	TP33.3918x33.3543x0.3125	1538.79	1610.73	0.955	0.00	1610.73	0.000
L33	18.25 - 14.25 (33)	TP33.992x33.3918x0.3125	1618.96	1661.72	0.974	0.00	1661.72	0.000
L34	14.25 - 10.25 (34)	TP34.5921x33.992x0.3125	1699.55	1713.18	0.992	0.00	1713.18	0.000
L35	10.25 - 6.25 (35)	TP35.1923x34.5921x0.3125	1780.52	1765.11	1.009	0.00	1765.11	0.000
L36	6.25 - 2.25 (36)	TP35.7924x35.1923x0.3125	1861.83	1817.47	1.024	0.00	1817.47	0.000
L37	2.25 - 0 (37)	TP36.13x35.7924x0.3125	1907.73	1847.11	1.033	0.00	1847.11	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	120 - 116 (1)	TP19.6002x19x0.1875	4.73	202.76	0.023	0.04	344.70	0.000
L2	116 - 112 (2)	TP20.2004x19.6002x0.1875	5.01	209.02	0.024	0.01	366.34	0.000
L3	112 - 108 (3)	TP20.8006x20.2004x0.1875	5.30	215.29	0.025	0.01	388.65	0.000
L4	108 - 104 (4)	TP21.4009x20.8006x0.1875	8.89	221.56	0.040	0.01	411.61	0.000
L5	104 - 100 (5)	TP22.0011x21.4009x0.1875	9.19	227.83	0.040	0.04	435.23	0.000
L6	100 - 96 (6)	TP22.6013x22.0011x0.1875	12.81	234.10	0.055	0.04	459.51	0.000
L7	96 - 92 (7)	TP23.2015x22.6013x0.1875	13.10	240.37	0.054	0.04	484.45	0.000
L8	92 - 88 (8)	TP23.8017x23.2015x0.1875	15.79	246.64	0.064	0.17	510.05	0.000
L9	88 - 83 (9)	TP24.552x23.8017x0.1875	15.91	249.38	0.064	0.17	521.46	0.000
L10	83 - 82.25 (10)	TP24.2895x23.6893x0.25	16.24	334.77	0.049	0.01	704.78	0.000
L11	82.25 - 78.25 (11)	TP24.8896x24.2895x0.25	16.52	343.13	0.048	0.01	740.41	0.000
L12	78.25 - 74.25 (12)	TP25.4898x24.8896x0.25	16.78	351.49	0.048	0.01	776.92	0.000
L13	74.25 - 70.25 (13)	TP26.0899x25.4898x0.25	17.04	359.85	0.047	0.01	814.30	0.000
L14	70.25 - 66.25 (14)	TP26.6901x26.0899x0.25	17.29	368.20	0.047	0.01	852.57	0.000
L15	66.25 - 62.25 (15)	TP27.2902x26.6901x0.25	17.53	376.56	0.047	0.01	891.71	0.000
L16	62.25 - 61 (16)	TP27.4778x27.2902x0.25	17.60	379.17	0.046	0.01	904.13	0.000
L17	61 - 60.75 (17)	TP27.5153x27.4778x0.25	17.61	379.69	0.046	0.01	906.62	0.000
L18	60.75 - 59 (18)	TP27.7778x27.5153x0.25	17.73	383.35	0.046	0.01	924.16	0.000
L19	59 - 58.75 (19)	TP27.8153x27.7778x0.25	17.72	383.87	0.046	0.01	926.68	0.000
L20	58.75 - 54.75 (20)	TP28.4155x27.8153x0.25	17.95	392.23	0.046	0.01	967.48	0.000
L21	54.75 - 50.75	TP29.0156x28.4155x0.25	18.19	400.59	0.045	0.17	1009.14	0.000

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 $\frac{T_u}{\phi T_n}$
L22	50.75 - 46.75 (21)	TP29.6158x29.0156x0.25	18.39	408.95	0.045	0.17	1051.69	0.000
L23	46.75 - 41.25 (22)	TP30.441x29.6158x0.25	18.50	412.60	0.045	0.17	1070.58	0.000
L24	41.25 - 40.25 (23)	TP30.091x29.3784x0.55	18.90	905.05	0.021	0.17	2341.42	0.000
L25	40.25 - 36.25 (24)	TP30.6912x30.091x0.537 5	19.20	902.82	0.021	0.17	2384.09	0.000
L26	36.25 - 33 (25)	TP31.1788x30.6912x0.53 75	19.42	917.42	0.021	0.17	2461.82	0.000
L27	33 - 32.75 (26)	TP31.2163x31.1788x0.31 25	19.42	537.96	0.036	0.17	1455.93	0.000
L28	32.75 - 28.75 (27)	TP31.8165x31.2163x0.31 25	19.62	548.40	0.036	0.17	1513.02	0.000
L29	28.75 - 24.75 (28)	TP32.4166x31.8165x0.31 25	19.77	558.85	0.035	0.17	1571.22	0.000
L30	24.75 - 20.75 (29)	TP33.0167x32.4166x0.31 25	19.91	569.30	0.035	0.17	1630.51	0.000
L31	20.75 - 18.5 (30)	TP33.3543x33.0167x0.31 25	20.00	575.17	0.035	0.17	1664.34	0.000
L32	18.5 - 18.25 (31)	TP33.3918x33.3543x0.31 25	19.99	575.83	0.035	0.17	1668.13	0.000
L33	18.25 - 14.25 (32)	TP33.992x33.3918x0.312 5	20.11	586.27	0.034	0.17	1729.20	0.000
L34	14.25 - 10.25 (33)	TP34.5921x33.992x0.312 5	20.22	596.72	0.034	0.17	1791.38	0.000
L35	10.25 - 6.25 (34)	TP35.1923x34.5921x0.31 25	20.31	607.17	0.033	0.17	1854.65	0.000
L36	6.25 - 2.25 (35)	TP35.7924x35.1923x0.31 25	20.40	617.61	0.033	0.17	1919.02	0.000
L37	2.25 - 0 (36)	TP36.13x35.7924x0.3125	20.46	623.49	0.033	0.17	1955.71	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	120 - 116 (1)	0.005	0.028	0.000	0.023	0.000	0.034	1.050	4.8.2
L2	116 - 112 (2)	0.005	0.082	0.000	0.024	0.000	0.088	1.050	4.8.2
L3	112 - 108 (3)	0.005	0.133	0.000	0.025	0.000	0.139	1.050	4.8.2
L4	108 - 104 (4)	0.008	0.228	0.000	0.040	0.000	0.238	1.050	4.8.2
L5	104 - 100 (5)	0.008	0.306	0.000	0.040	0.000	0.316	1.050	4.8.2
L6	100 - 96 (6)	0.012	0.403	0.000	0.055	0.000	0.418	1.050	4.8.2
L7	96 - 92 (7)	0.013	0.501	0.000	0.054	0.000	0.517	1.050	4.8.2
L8	92 - 88 (8)	0.016	0.598	0.000	0.064	0.000	0.618	1.050	4.8.2
L9	88 - 83 (9)	0.016	0.646	0.000	0.064	0.000	0.666	1.050	4.8.2
L10	83 - 82.25 (10)	0.012	0.534	0.000	0.049	0.000	0.548	1.050	4.8.2
L11	82.25 - 78.25 (11)	0.013	0.601	0.000	0.048	0.000	0.616	1.050	4.8.2
L12	78.25 - 74.25 (12)	0.013	0.664	0.000	0.048	0.000	0.679	1.050	4.8.2
L13	74.25 - 70.25 (13)	0.013	0.722	0.000	0.047	0.000	0.738	1.050	4.8.2
L14	70.25 - 66.25 (14)	0.013	0.777	0.000	0.047	0.000	0.793	1.050	4.8.2
L15	66.25 - 62.25 (15)	0.014	0.829	0.000	0.047	0.000	0.845	1.050	4.8.2
L16	62.25 - 61 (16)	0.014	0.845	0.000	0.046	0.000	0.860	1.050	4.8.2
L17	61 - 60.75 (17)	0.014	0.848	0.000	0.046	0.000	0.863	1.050	4.8.2

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
L18	60.75 - 59 (18)	0.014	0.869	0.000	0.046	0.000	0.885	1.050	4.8.2
L19	59 - 58.75 (19)	0.014	0.872	0.000	0.046	0.000	0.888	1.050	4.8.2
L20	58.75 - 54.75 (20)	0.014	0.918	0.000	0.046	0.000	0.934	1.050	4.8.2
L21	54.75 - 50.75 (21)	0.014	0.961	0.000	0.045	0.000	0.977	1.050	4.8.2
L22	50.75 - 46.75 (22)	0.014	1.002	0.000	0.045	0.000	1.019	1.050	4.8.2
L23	46.75 - 41.25 (23)	0.015	1.019	0.000	0.045	0.000	1.036	1.050	4.8.2
L24	41.25 - 40.25 (24)	0.007	0.482	0.000	0.021	0.000	0.489	1.050	4.8.2
L25	40.25 - 36.25 (25)	0.008	0.505	0.000	0.021	0.000	0.513	1.050	4.8.2
L26	36.25 - 33 (26)	0.008	0.515	0.000	0.021	0.000	0.523	1.050	4.8.2
L27	33 - 32.75 (27)	0.014	0.876	0.000	0.036	0.000	0.891	1.050	4.8.2
L28	32.75 - 28.75 (28)	0.014	0.900	0.000	0.036	0.000	0.915	1.050	4.8.2
L29	28.75 - 24.75 (29)	0.014	0.922	0.000	0.035	0.000	0.937	1.050	4.8.2
L30	24.75 - 20.75 (30)	0.014	0.943	0.000	0.035	0.000	0.958	1.050	4.8.2
L31	20.75 - 18.5 (31)	0.014	0.954	0.000	0.035	0.000	0.970	1.050	4.8.2
L32	18.5 - 18.25 (32)	0.014	0.955	0.000	0.035	0.000	0.971	1.050	4.8.2
L33	18.25 - 14.25 (33)	0.015	0.974	0.000	0.034	0.000	0.990	1.050	4.8.2
L34	14.25 - 10.25 (34)	0.015	0.992	0.000	0.034	0.000	1.008	1.050	4.8.2
L35	10.25 - 6.25 (35)	0.015	1.009	0.000	0.033	0.000	1.025	1.050	4.8.2
L36	6.25 - 2.25 (36)	0.015	1.024	0.000	0.033	0.000	1.040	1.050	4.8.2
L37	2.25 - 0 (37)	0.015	1.033	0.000	0.033	0.000	1.049	1.050	4.8.2

Section Capacity Table

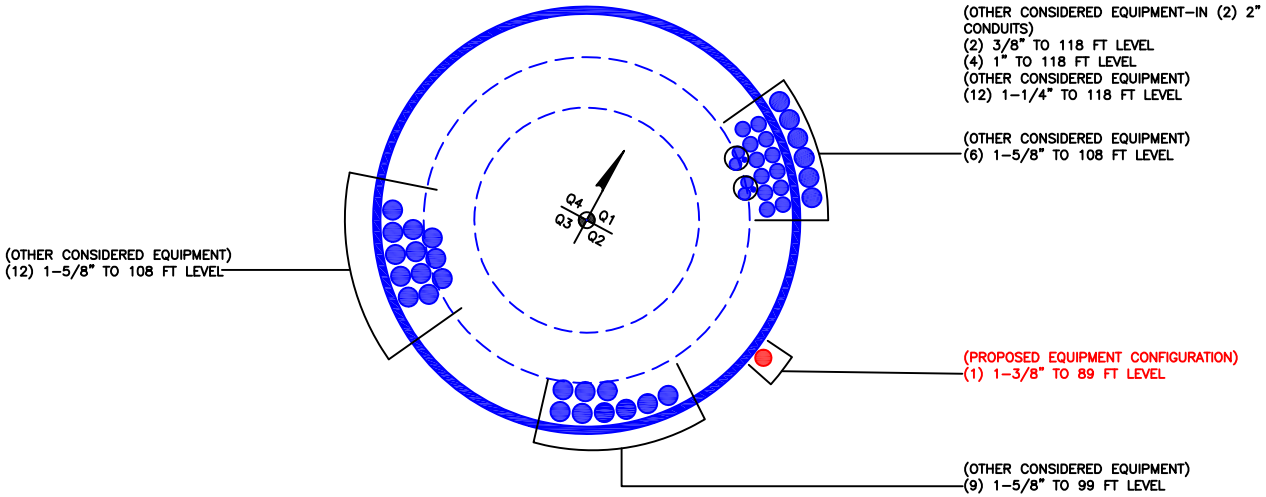
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	120 - 116	Pole	TP19.6002x19x0.1875	1	-3.22	709.64	3.2	Pass
L2	116 - 112	Pole	TP20.2004x19.6002x0.1875	2	-3.45	731.58	8.3	Pass
L3	112 - 108	Pole	TP20.8006x20.2004x0.1875	3	-3.68	753.53	13.3	Pass
L4	108 - 104	Pole	TP21.4009x20.8006x0.1875	4	-5.61	775.47	22.6	Pass
L5	104 - 100	Pole	TP22.0011x21.4009x0.1875	5	-5.96	797.41	30.1	Pass
L6	100 - 96	Pole	TP22.6013x22.0011x0.1875	6	-9.71	819.35	39.8	Pass
L7	96 - 92	Pole	TP23.2015x22.6013x0.1875	7	-10.17	841.29	49.2	Pass
L8	92 - 88	Pole	TP23.8017x23.2015x0.1875	8	-12.90	863.23	58.9	Pass
L9	88 - 83	Pole	TP24.552x23.8017x0.1875	9	-13.11	872.83	63.4	Pass
L10	83 - 82.25	Pole	TP24.2895x23.6893x0.25	10	-13.85	1171.71	52.2	Pass
L11	82.25 - 78.25	Pole	TP24.8896x24.2895x0.25	11	-14.44	1200.96	58.7	Pass
L12	78.25 - 74.25	Pole	TP25.4898x24.8896x0.25	12	-15.05	1230.20	64.7	Pass
L13	74.25 - 70.25	Pole	TP26.0899x25.4898x0.25	13	-15.68	1259.45	70.3	Pass
L14	70.25 - 66.25	Pole	TP26.6901x26.0899x0.25	14	-16.33	1288.71	75.5	Pass
L15	66.25 - 62.25	Pole	TP27.2902x26.6901x0.25	15	-16.99	1317.96	80.5	Pass
L16	62.25 - 61	Pole	TP27.4778x27.2902x0.25	16	-17.19	1327.11	81.9	Pass
L17	61 - 60.75	Pole	TP27.5153x27.4778x0.25	17	-17.25	1328.93	82.2	Pass
L18	60.75 - 59	Pole	TP27.7778x27.5153x0.25	18	-17.52	1341.73	84.2	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L19	59 - 58.75	Pole	TP27.8153x27.7778x0.25	19	-17.59	1343.56	84.5	Pass
L20	58.75 - 54.75	Pole	TP28.4155x27.8153x0.25	20	-18.27	1372.81	88.9	Pass
L21	54.75 - 50.75	Pole	TP29.0156x28.4155x0.25	21	-18.97	1402.05	93.1	Pass
L22	50.75 - 46.75	Pole	TP29.6158x29.0156x0.25	22	-19.69	1431.31	97.0	Pass
L23	46.75 - 41.25	Pole	TP30.441x29.6158x0.25	23	-20.12	1444.11	98.7	Pass
L24	41.25 - 40.25	Pole	TP30.091x29.3784x0.55	24	-22.15	3167.67	46.6	Pass
L25	40.25 - 36.25	Pole	TP30.6912x30.091x0.5375	25	-23.45	3159.88	48.9	Pass
L26	36.25 - 33	Pole	TP31.1788x30.6912x0.5375	26	-24.33	3210.98	49.8	Pass
L27	33 - 32.75	Pole	TP31.2163x31.1788x0.3125	27	-24.39	1882.84	84.9	Pass
L28	32.75 - 28.75	Pole	TP31.8165x31.2163x0.3125	28	-25.22	1919.41	87.1	Pass
L29	28.75 - 24.75	Pole	TP32.4166x31.8165x0.3125	29	-26.08	1955.97	89.3	Pass
L30	24.75 - 20.75	Pole	TP33.0167x32.4166x0.3125	30	-26.95	1992.53	91.3	Pass
L31	20.75 - 18.5	Pole	TP33.3543x33.0167x0.3125	31	-27.45	2013.10	92.3	Pass
L32	18.5 - 18.25	Pole	TP33.3918x33.3543x0.3125	32	-27.52	2015.39	92.5	Pass
L33	18.25 - 14.25	Pole	TP33.992x33.3918x0.3125	33	-28.40	2051.95	94.3	Pass
L34	14.25 - 10.25	Pole	TP34.5921x33.992x0.3125	34	-29.31	2088.51	96.0	Pass
L35	10.25 - 6.25	Pole	TP35.1923x34.5921x0.3125	35	-30.13	2125.08	97.6	Pass
L36	6.25 - 2.25	Pole	TP35.7924x35.1923x0.3125	36	-30.84	2161.65	99.1	Pass
L37	2.25 - 0	Pole	TP36.13x35.7924x0.3125	37	-31.24	2182.21	99.9	Pass
							Summary	
						Pole (L37)	99.9	Pass
						RATING =	**99.9**	**Pass**

***NOTE: Above stress ratios for reinforced sections are approximate. More exact calculations are presented in Appendix C.**

APPENDIX B

BASE LEVEL DRAWING


(OTHER CONSIDERED EQUIPMENT–IN (2) 2" CONDUITS)
(2) 3/8" TO 118 FT LEVEL
(4) 1" TO 118 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(12) 1–1/4" TO 118 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(6) 1–5/8" TO 108 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(12) 1–5/8" TO 108 FT LEVEL
(PROPOSED EQUIPMENT CONFIGURATION)
(1) 1–3/8" TO 89 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(9) 1–5/8" TO 99 FT LEVEL
Q4
Q1
Q3
Q2

APPENDIX C

ADDITIONAL CALCULATIONS

CCIpole

per TIA-222- H

Site BU: 842858

Work Order: 1963265

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	120	37	3.25	18	19	24.552	0.1875	Auto	A607-65
2	86.25	45	3.75	18	23.69	30.441	0.25	Auto	A607-65
3	45	45	0	18	29.38	36.13	0.3125	Auto	A607-65

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	0	18.5	plate	5" x 1" (Bottom Welde	4				x					x			x						x
2	18.5	33	plate	PL 5" x 1"	3	x						x						x					
3	33	41.33	plate	PL 5" x 1.25"	3						x						x						x
4	41.33	59	plate	PL 4.5" x 1"	3						x						x						x
5	59	61	plate	PL 4" x 1.25"	3				x						x						x		
6																							
7																							
8																							
9																							
10																							

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Type	Bottom Termination Length (in)	Top Termination Type	Top Termination Length (in)	Lu (in)	Net Area (in2)	Bolt Hole Size (in)	Reinforcement Material
1	5	1	5	0.5	Welded	n/a	PC 8.8 - M20 (100)	24.000	18.000	3.750	1.1875	A572-65
2	5	1	5	0.5	PC 8.8 - M20 (100)	21	PC 8.8 - M20 (100)	21.000	18.000	3.750	1.1875	A572-65
3	5	1.25	6.25	0.625	PC 8.8 - M20 (100)	27	PC 8.8 - M20 (100)	27.000	15.000	4.688	1.1875	A572-65
4	4.5	1	4.5	0.5	PC 8.8 - M20 (100)	18	PC 8.8 - M20 (100)	18.000	18.000	3.250	1.1875	A572-65
5	4	1.25	5	0.625	PC 8.8 - M20 (100)	18	PC 8.8 - M20 (100)	18.000	13.500	3.438	1.1875	A572-65

Connection Details for Custom Reinforcements

Reinforcement	End	# Bolts	N or X	Bolt Spacing (in)	Edge Dist (in)	Weld Grade (ksi)	Transverse (Horiz.) Weld Type	Horiz. Weld Length (in)	Horiz. Groove Depth (in)	Horiz. Groove Angle (deg)	Horiz. Fillet Size (in)	Vertical Weld Length (in)	Vertical Fillet Size (in)	Rev H Connection Capacity (kip)
PL 5" x 1" (Bottom Welded)	Top	8	N	3	3	-	-	-	-	-	-	-	-	-
	Bottom	-	-	-	-	70	Fillet	5	-	-	0.3125	18	0.313	-
PL 5" x 1"	Top	7	N	3	3	-	-	-	-	-	-	-	-	-
	Bottom	7	N	3	3	-	-	-	-	-	-	-	-	-
PL 5" x 1.25"	Top	9	N	3	3	-	-	-	-	-	-	-	-	-
	Bottom	9	N	3	3	-	-	-	-	-	-	-	-	-
PL 4.5" x 1"	Top	6	N	3	3	-	-	-	-	-	-	-	-	-
	Bottom	6	N	3	3	-	-	-	-	-	-	-	-	-
PL 4" x 1.25"	Top	6	N	3	3	-	-	-	-	-	-	-	-	-
	Bottom	6	N	3	3	-	-	-	-	-	-	-	-	-

TNX Geometry Input

Increment (ft): 4 Export to TNX

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	120 - 116	4		18	19.000	19.600	0.1875	A607-65	1.000
2	116 - 112	4		18	19.600	20.200	0.1875	A607-65	1.000
3	112 - 108	4		18	20.200	20.801	0.1875	A607-65	1.000
4	108 - 104	4		18	20.801	21.401	0.1875	A607-65	1.000
5	104 - 100	4		18	21.401	22.001	0.1875	A607-65	1.000
6	100 - 96	4		18	22.001	22.601	0.1875	A607-65	1.000
7	96 - 92	4		18	22.601	23.202	0.1875	A607-65	1.000
8	92 - 88	4		18	23.202	23.802	0.1875	A607-65	1.000
9	88 - 86.25	5	3.25	18	23.802	24.552	0.1875	A607-65	1.000
10	86.25 - 82.25	4		18	23.689	24.289	0.25	A607-65	1.000
11	82.25 - 78.25	4		18	24.289	24.890	0.25	A607-65	1.000
12	78.25 - 74.25	4		18	24.890	25.490	0.25	A607-65	1.000
13	74.25 - 70.25	4		18	25.490	26.090	0.25	A607-65	1.000
14	70.25 - 66.25	4		18	26.090	26.690	0.25	A607-65	1.000
15	66.25 - 62.25	4		18	26.690	27.290	0.25	A607-65	1.000
16	62.25 - 61	1.25		18	27.290	27.478	0.25	A607-65	1.000
17	61 - 60.75	0.25		18	27.478	27.515	0.25	A607-65	1.000
18	60.75 - 59	1.75		18	27.515	27.778	0.25	A607-65	1.000
19	59 - 58.75	0.25		18	27.778	27.815	0.25	A607-65	1.000
20	58.75 - 54.75	4		18	27.815	28.415	0.25	A607-65	1.000
21	54.75 - 50.75	4		18	28.415	29.016	0.25	A607-65	1.000
22	50.75 - 46.75	4		18	29.016	29.616	0.25	A607-65	1.000
23	46.75 - 45	5.5	3.75	18	29.616	30.441	0.25	A607-65	1.000
24	45 - 40.25	4.75		18	29.378	30.091	0.55	A607-65	0.936
25	40.25 - 36.25	4		18	30.091	30.691	0.5375	A607-65	0.950
26	36.25 - 33	3.25		18	30.691	31.179	0.5375	A607-65	0.944
27	33 - 32.75	0.25		18	31.179	31.216	0.3125	A607-65	1.000
28	32.75 - 28.75	4		18	31.216	31.816	0.3125	A607-65	1.000
29	28.75 - 24.75	4		18	31.816	32.417	0.3125	A607-65	1.000
30	24.75 - 20.75	4		18	32.417	33.017	0.3125	A607-65	1.000
31	20.75 - 18.5	2.25		18	33.017	33.354	0.3125	A607-65	1.000
32	18.5 - 18.25	0.25		18	33.354	33.392	0.3125	A607-65	1.000
33	18.25 - 14.25	4		18	33.392	33.992	0.3125	A607-65	1.000
34	14.25 - 10.25	4		18	33.992	34.592	0.3125	A607-65	1.000
35	10.25 - 6.25	4		18	34.592	35.192	0.3125	A607-65	1.000
36	6.25 - 2.25	4		18	35.192	35.792	0.3125	A607-65	1.000
37	2.25 - 0	2.25		18	35.792	36.130	0.3125	A607-65	1.000

TNX Section Forces

Increment (ft):	4	TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	120 - 116	3.22	9.47	4.73
2	116 - 112	3.45	28.95	5.01
3	112 - 108	3.68	49.57	5.30
4	108 - 104	5.61	89.10	8.89
5	104 - 100	5.96	125.28	9.19
6	100 - 96	9.71	172.60	12.81
7	96 - 92	10.17	224.41	13.10
8	92 - 88	12.90	279.87	15.79
9	88 - 86.25	13.11	307.60	15.92
10	86.25 - 82.25	13.85	371.90	16.24
11	82.25 - 78.25	14.44	437.40	16.52
12	78.25 - 74.25	15.05	503.97	16.78
13	74.25 - 70.25	15.68	571.58	17.04
14	70.25 - 66.25	16.33	640.19	17.29
15	66.25 - 62.25	16.99	709.78	17.53
16	62.25 - 61	17.19	731.72	17.60
17	61 - 60.75	17.25	736.12	17.61
18	60.75 - 59	17.52	767.01	17.73
19	59 - 58.75	17.59	771.44	17.72
20	58.75 - 54.75	18.27	842.75	17.95
21	54.75 - 50.75	18.97	914.93	18.19
22	50.75 - 46.75	19.69	988.05	18.39
23	46.75 - 45	20.12	1020.29	18.50
24	45 - 40.25	22.15	1109.06	18.90
25	40.25 - 36.25	23.45	1185.25	19.20
26	36.25 - 33	24.33	1247.98	19.42
27	33 - 32.75	24.39	1252.83	19.42
28	32.75 - 28.75	25.22	1330.89	19.62
29	28.75 - 24.75	26.08	1409.61	19.77
30	24.75 - 20.75	26.95	1488.93	19.91
31	20.75 - 18.5	27.45	1533.79	20.00
32	18.5 - 18.25	27.52	1538.79	19.99
33	18.25 - 14.25	28.40	1618.96	20.11
34	14.25 - 10.25	29.31	1699.55	20.22
35	10.25 - 6.25	30.13	1780.52	20.31
36	6.25 - 2.25	30.84	1861.84	20.40
37	2.25 - 0	31.24	1907.74	20.46

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
120 - 116	Pole	TP19.6x19x0.1875	Pole	3.2%	Pass
116 - 112	Pole	TP20.2x19.6x0.1875	Pole	8.3%	Pass
112 - 108	Pole	TP20.801x20.2x0.1875	Pole	13.3%	Pass
108 - 104	Pole	TP21.401x20.801x0.1875	Pole	22.6%	Pass
104 - 100	Pole	TP22.001x21.401x0.1875	Pole	30.1%	Pass
100 - 96	Pole	TP22.601x22.001x0.1875	Pole	39.8%	Pass
96 - 92	Pole	TP23.202x22.601x0.1875	Pole	49.2%	Pass
92 - 88	Pole	TP23.802x23.202x0.1875	Pole	58.9%	Pass
88 - 86.25	Pole	TP24.552x23.802x0.1875	Pole	63.4%	Pass
86.25 - 82.25	Pole	TP24.289x23.689x0.25	Pole	52.2%	Pass
82.25 - 78.25	Pole	TP24.89x24.289x0.25	Pole	58.7%	Pass
78.25 - 74.25	Pole	TP25.49x24.89x0.25	Pole	64.6%	Pass
74.25 - 70.25	Pole	TP26.09x25.49x0.25	Pole	70.3%	Pass
70.25 - 66.25	Pole	TP26.69x26.09x0.25	Pole	75.5%	Pass
66.25 - 62.25	Pole	TP27.29x26.69x0.25	Pole	80.5%	Pass
62.25 - 61	Pole	TP27.478x27.29x0.25	Pole	81.9%	Pass
61 - 60.75	Pole	TP27.515x27.478x0.25	Pole	82.2%	Pass
60.75 - 59	Pole	TP27.778x27.515x0.25	Pole	84.2%	Pass
59 - 58.75	Pole	TP27.815x27.778x0.25	Pole	84.5%	Pass
58.75 - 54.75	Pole	TP28.415x27.815x0.25	Pole	88.9%	Pass
54.75 - 50.75	Pole	TP29.016x28.415x0.25	Pole	93.1%	Pass
50.75 - 46.75	Pole	TP29.616x29.016x0.25	Pole	97.0%	Pass
46.75 - 45	Pole	TP30.441x29.616x0.25	Pole	98.7%	Pass
45 - 40.25	Pole + Reinf.	TP30.091x29.378x0.55	Reinf. 3 Tension Rupture	79.2%	Pass
40.25 - 36.25	Pole + Reinf.	TP30.691x30.091x0.5375	Reinf. 3 Tension Rupture	82.0%	Pass
36.25 - 33	Pole + Reinf.	TP31.179x30.691x0.5375	Reinf. 3 Tension Rupture	84.2%	Pass
33 - 32.75	Pole	TP31.216x31.179x0.3125	Pole	84.8%	Pass
32.75 - 28.75	Pole	TP31.816x31.216x0.3125	Pole	87.1%	Pass
28.75 - 24.75	Pole	TP32.417x31.816x0.3125	Pole	89.3%	Pass
24.75 - 20.75	Pole	TP33.017x32.417x0.3125	Pole	91.3%	Pass
20.75 - 18.5	Pole	TP33.354x33.017x0.3125	Pole	92.3%	Pass
18.5 - 18.25	Pole	TP33.392x33.354x0.3125	Pole	92.5%	Pass
18.25 - 14.25	Pole	TP33.992x33.392x0.3125	Pole	94.3%	Pass
14.25 - 10.25	Pole	TP34.592x33.992x0.3125	Pole	96.0%	Pass
10.25 - 6.25	Pole	TP35.192x34.592x0.3125	Pole	97.6%	Pass
6.25 - 2.25	Pole	TP35.792x35.192x0.3125	Pole	99.1%	Pass
2.25 - 0	Pole	TP36.13x35.792x0.3125	Pole	99.9%	Pass
				Summary	
			Pole	99.9%	Pass
			Reinforcement	84.2%	Pass
			Overall	99.9%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity*					
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4	R5
120 - 116	550	n/a	550	11.55	n/a	11.55	3.2%					
116 - 112	602	n/a	602	11.91	n/a	11.91	8.3%					
112 - 108	658	n/a	658	12.27	n/a	12.27	13.3%					
108 - 104	717	n/a	717	12.62	n/a	12.62	22.6%					
104 - 100	780	n/a	780	12.98	n/a	12.98	30.1%					
100 - 96	846	n/a	846	13.34	n/a	13.34	39.8%					
96 - 92	916	n/a	916	13.70	n/a	13.70	49.2%					
92 - 88	990	n/a	990	14.05	n/a	14.05	58.9%					
88 - 86.25	1023	n/a	1023	14.21	n/a	14.21	63.4%					
86.25 - 82.25	1392	n/a	1392	19.07	n/a	19.07	52.2%					
82.25 - 78.25	1499	n/a	1499	19.55	n/a	19.55	58.7%					
78.25 - 74.25	1611	n/a	1611	20.03	n/a	20.03	64.6%					
74.25 - 70.25	1729	n/a	1729	20.50	n/a	20.50	70.3%					
70.25 - 66.25	1852	n/a	1852	20.98	n/a	20.98	75.5%					
66.25 - 62.25	1981	n/a	1981	21.46	n/a	21.46	80.5%					
62.25 - 61	2023	n/a	2023	21.60	n/a	21.60	81.9%					
61 - 60.75	2031	n/a	2031	21.63	n/a	21.63	82.2%					
60.75 - 59	2090	n/a	2090	21.84	n/a	21.84	84.2%					
59 - 58.75	2099	n/a	2099	21.87	n/a	21.87	84.5%					
58.75 - 54.75	2239	n/a	2239	22.35	n/a	22.35	88.9%					
54.75 - 50.75	2385	n/a	2385	22.82	n/a	22.82	93.1%					
50.75 - 46.75	2538	n/a	2538	23.30	n/a	23.30	97.0%					
46.75 - 45	2606	n/a	2606	23.51	n/a	23.51	98.7%					
45 - 40.25	3308	2323	5631	29.54	18.75	48.29	46.4%			79.2%		
40.25 - 36.25	3512	2412	5924	30.13	18.75	48.88	48.3%			82.0%		
36.25 - 33	3684	2486	6169	30.61	18.75	49.36	49.9%			84.2%		
33 - 32.75	3697	n/a	3697	30.65	n/a	30.65	84.8%					
32.75 - 28.75	3917	n/a	3917	31.25	n/a	31.25	87.1%					
28.75 - 24.75	4145	n/a	4145	31.84	n/a	31.84	89.3%					
24.75 - 20.75	4382	n/a	4382	32.44	n/a	32.44	91.3%					
20.75 - 18.5	4519	n/a	4519	32.77	n/a	32.77	92.3%					
18.5 - 18.25	4534	n/a	4534	32.81	n/a	32.81	92.5%					
18.25 - 14.25	4786	n/a	4786	33.40	n/a	33.40	94.3%					
14.25 - 10.25	5046	n/a	5046	34.00	n/a	34.00	96.0%					
10.25 - 6.25	5316	n/a	5316	34.60	n/a	34.60	97.6%					
6.25 - 2.25	5595	n/a	5595	35.19	n/a	35.19	99.1%					
2.25 - 0	5756	n/a	5756	35.53	n/a	35.53	99.9%					

Note: Section capacity checked using 5 degree increments.
Rating per TIA-222-H Section 15.5.

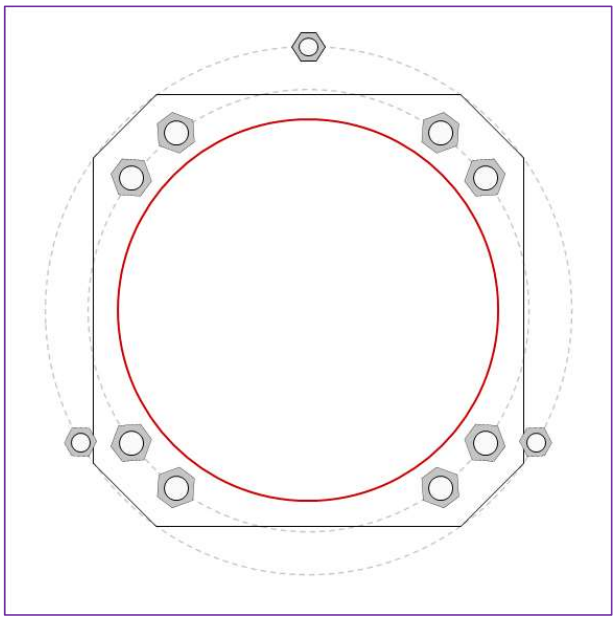
Monopole Base Plate Connection

Site Info	
BU #	842858
Site Name	BOLTON
Order #	556628 Rev.1

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	See Custom Sheet
l_{ar} (in)	See Custom Sheet

Applied Loads	
Moment (kip-ft)	1907.74
Axial Force (kips)	31.24
Shear Force (kips)	20.46

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

GROUP 1: (8) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 42" BC

Anchor Spacing: 6 in

GROUP 2: (3) 1-3/4" ø bolts (A193 Gr. B7 N; Fy=105 ksi, Fu=125 ksi) on 50" BC

Base Plate Data

41" W x 2.5" Plate (A572-55; Fy=55 ksi, Fu=70 ksi); Clip: 6 in

Stiffener Data

N/A

Pole Data

36.13" x 0.3125" 18-sided pole (A607-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

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

GROUP 1:		
Pu_t = 203.71	ϕPn_t = 243.75	**Stress Rating**
Vu = 2.56	ϕVn = 149.1	**79.6%**
Mu = n/a	ϕMn = n/a	Pass
GROUP 2:		
Pu_t = 144.57	ϕPn_t = 178.13	**Stress Rating**
Vu = 0	ϕVn = 112.75	**77.3%**
Mu = 0	ϕMn = 84.41	Pass

Base Plate Summary

Max Stress (ksi):	33.37	(Flexural)
Allowable Stress (ksi):	49.5	
Stress Rating:	**64.2%**	Pass

CCIplate

Elevation (ft)	0	*(Base)*

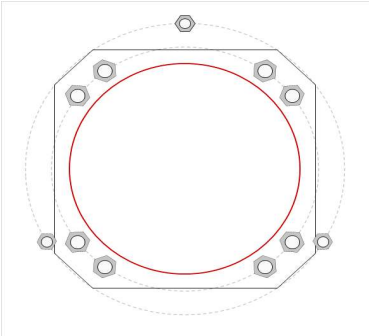
note: Bending interaction not considered when Grout Considered = "Yes"

Bolt Group	Resist Axial	Resist Shear	Induce Plate Bending	Grout Considered	Apply at BARB Elevation	BARB CL Elevation (ft)
1	Yes	Yes	Yes	No	No	
2	No	No	No	No	No	

Custom Bolt Connection

Bolt	Bolt Group ID	Location (deg.)	Diameter (in)	Material	Bolt Circle (in)	Eta Factor, η:	l_{er} (in):	Thread Type	Area Override, in^2	Tension Only
1	1	36.786789	2.25	A615-75	42	0.5	1.125	N-Included		No
2	1	53.213211	2.25	A615-75	42	0.5	1.125	N-Included		No
3	1	126.78679	2.25	A615-75	42	0.5	1.125	N-Included		No
4	1	143.21321	2.25	A615-75	42	0.5	1.125	N-Included		No
5	1	216.78679	2.25	A615-75	42	0.5	1.125	N-Included		No
6	1	233.21321	2.25	A615-75	42	0.5	1.125	N-Included		No
7	1	306.78679	2.25	A615-75	42	0.5	1.125	N-Included		No
8	1	323.21321	2.25	A615-75	42	0.5	1.125	N-Included		No
9	2	90	1.75	A193 Gr. B7	50	0.5	3.375	N-Included		No
10	2	210	1.75	A193 Gr. B7	50	0.5	3.375	N-Included		No
11	2	330	1.75	A193 Gr. B7	50	0.5	3.375	N-Included		No

Plot Graphic



Drilled Pier Foundation

BU # :	842858
Site Name:	BOLTON
Order Number:	556628 Rev.1
TIA-222 Revison:	H
Tower Type:	Monopole

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

Go to Soil Calculations

Applied Loads	Comp.	Uplift
Moment (kip-ft)	1907.74	
Axial Force (kips)	31.26	
Shear Force (kips)	20.43	

Material Properties			Rebar 2, Fy Override (ksi)
Concrete Strength, f'c:	3	ksi	
Rebar Strength, Fy:	60	ksi	
Tie Yield Strength, Fyt:	40	ksi	

Pier Design Data		
Depth	19.5	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
From 0.5' above grade to 19.5' below grade		
Pier Diameter	6	ft
Rebar Quantity	16	
Rebar Size	11	
Clear Cover to Ties	4	in
Tie Size	5	
Tie Spacing		in

Rebar & Pier Options

Embedded Pole Inputs

Belled Pier Inputs

Analysis Results		
Soil Lateral Check	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	5.22	-
Soil Safety Factor	2.27	-
Max Moment (kip-ft)	2046.16	-
Rating*	*55.8%*	-
Soil Vertical Check	*Compression*	*Uplift*
Skin Friction (kips)	98.82	-
End Bearing (kips)	1121.55	-
Weight of Concrete (kips)	72.15	-
Total Capacity (kips)	1220.38	-
Axial (kips)	103.41	-
Rating*	*8.1%*	-
Reinforced Concrete Flexure	*Compression*	*Uplift*
Critical Depth (ft from TOC)	4.97	-
Critical Moment (kip-ft)	2045.68	-
Critical Moment Capacity	3339.78	-
Rating*	*58.3%*	-
Reinforced Concrete Shear	*Compression*	*Uplift*
Critical Depth (ft from TOC)	15.89	-
Critical Shear (kip)	241.12	-
Critical Shear Capacity	478.95	-
Rating*	*47.9%*	-

Shear-Friction Methodology is Applied

Structural Foundation Rating*	**58.3%**
Soil Interaction Rating*	**55.8%**

*Rating per TIA-222-H Section 15.5

Soil Profile

Groundwater Depth	5.5

# of Layers	12

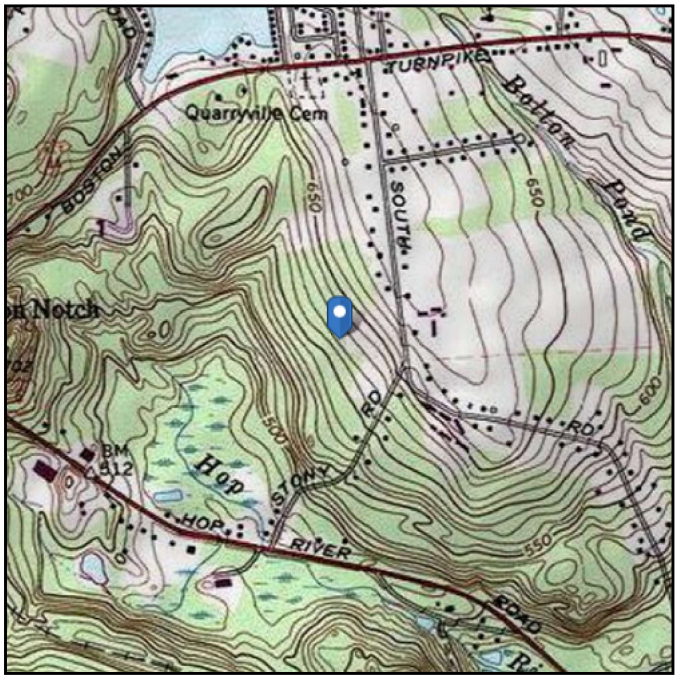
Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	0.5	0.5	100	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	0.5	2	1.5	102	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
3	2	3	1	115	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
4	3	3.33	0.33	115	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
5	3.33	4	0.67	115	150	0	40	0.000	0.000	0.12	0.12			Cohesionless
6	4	5.5	1.5	115	150	0	37	0.000	0.000	0.20	0.20			Cohesionless
7	5.5	6	0.5	53	87.6	0	37	0.00	0.00	0.24	0.24			Cohesionless
8	6	8	2	53	87.6	0	37	0.00	0.00	0.26	0.26			Cohesionless
9	8	10	2	53	87.6	0	41	0.00	0.00	0.34	0.34			Cohesionless
10	10	12	2	55	87.6	0	45	0.00	0.00	0.44	0.44			Cohesionless
11	12	14	2	58	87.6	0	45	0.00	0.00	0.50	0.50			Cohesionless
12	14	19.5	5.5	58	87.6	0	45	0.00	0.00	0.62	0.62	52.889		Cohesionless

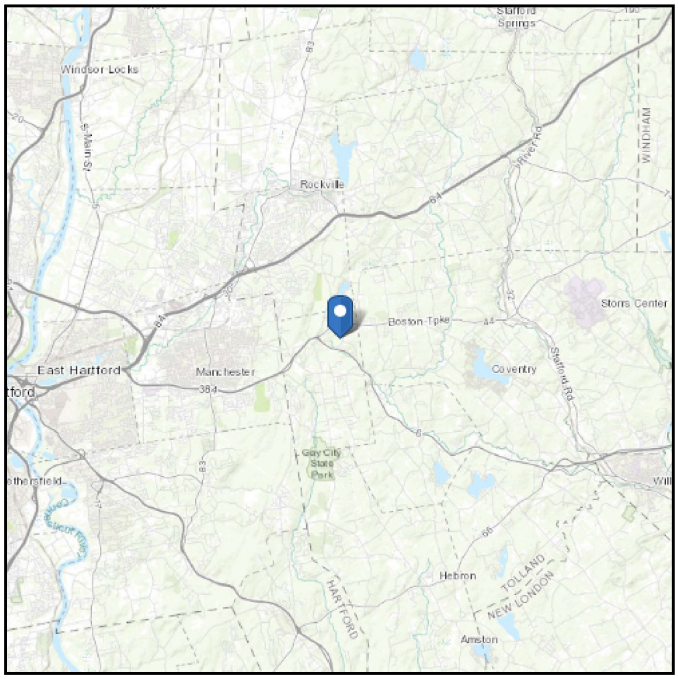
ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 621.52 ft (NAVD 88)
Latitude: 41.789008
Longitude: -72.429142





Wind

Results:

Wind Speed:	125 Vmph
10-year MRI	77 Vmph
25-year MRI	87 Vmph
50-year MRI	94 Vmph
100-year MRI	102 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Wed Nov 18 2020

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

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

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

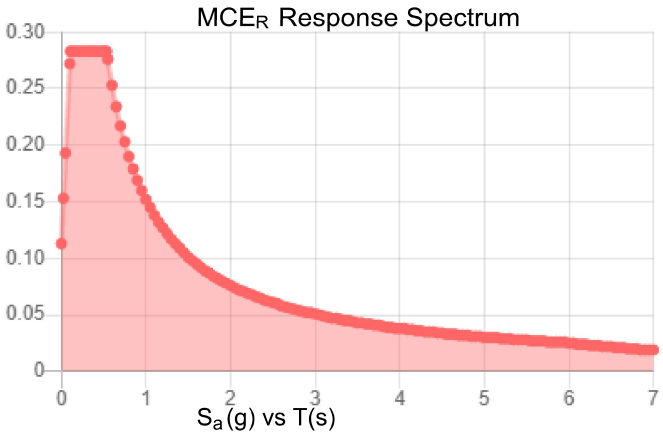
Seismic

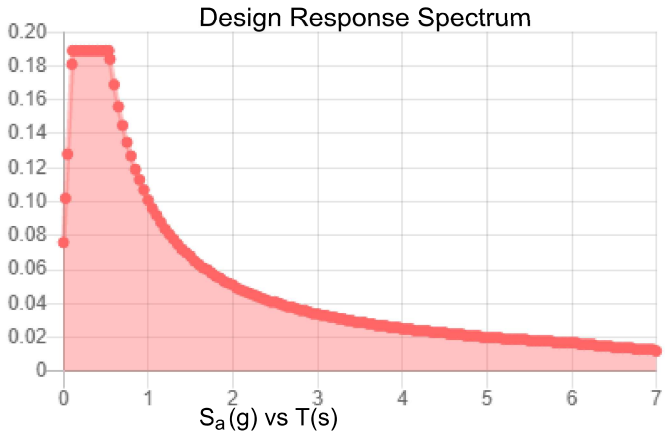
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.177	S_{DS} :	0.189
S_1 :	0.063	S_{D1} :	0.101
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.089
S_{MS} :	0.283	PGA_M :	0.142
S_{M1} :	0.152	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Wed Nov 18 2020

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

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Wed Nov 18 2020

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

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

Exhibit E

Mount Analysis

Date: **August 10, 2021**

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

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

Subject:	**Mount Replacement Analysis Report**	
Carrier Designation:	**Dish Network Equipment Change-Out**	
	Carrier Site Number:	BOBDL00064A
	Carrier Site Name:	CT-CCI-T-842858
Crown Castle Designation:	**Crown Castle BU Number:**	842858
	Crown Castle Site Name:	BOLTON
	Crown Castle JDE Job Number:	650053
	Crown Castle Order Number:	556628 Rev. 1
Engineering Firm Designation:	**Trylon Report Designation:**	189622
Site Data:	**49 South Road, Bolton, Tolland County, CT, 06043** **Latitude 41°47'20.43" Longitude -72°25'44.91"**	
Structure Information:	**Tower Height & Type:**	**120.0 ft Monopole**
	Mount Elevation:	**89.0 ft**
	Mount Type:	**7.0 ft T-Arms**

Dear Darcy Tarr,

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

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

T-Arms **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 125 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: Mostafa Faghihnia, P.E.

Respectfully Submitted by:
Cliff Abernathy, P.E.

08/10/2021

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1) INTRODUCTION

This is a proposed 3 sector 7.0 ft T-Arms Mount, designed by Commscope.

2) ANALYSIS CRITERIA

Building Code:	2015 IBC / 2018 CTSBC
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	125 mph
Exposure Category:	C
Topographic Factor at Base:	1.0
Topographic Factor at Mount:	1.0
Ice Thickness:	2.0 in
Wind Speed with Ice:	50 mph
Seismic S_s:	0.177
Seismic S_1:	0.063
Live Loading Wind Speed:	60 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
89.0	89.0	3	JMA WIRELESS	MX08FRO665-21	7.0 ft T-Arms [Commscope MC-K6MHDX-9-96]
		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	556628 Rev. 1	CCI Sites
Mount Manufacturer Drawings	Commscope	MC-K6MHDX-9-96	Trylon

3.1) Analysis Method

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

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

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

3.2) Assumptions

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

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

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

4) ANALYSIS RESULTS

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

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1, 2	Mount Pipe(s)	MP1	89.0	21.6	Pass
	Horizontal(s)	H1		59.3	Pass
	Standoff(s)	M2		45.7	Pass
	Mount Connection(s)	---		64.8	Pass

Structure Rating (max from all components) =	64.8%

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

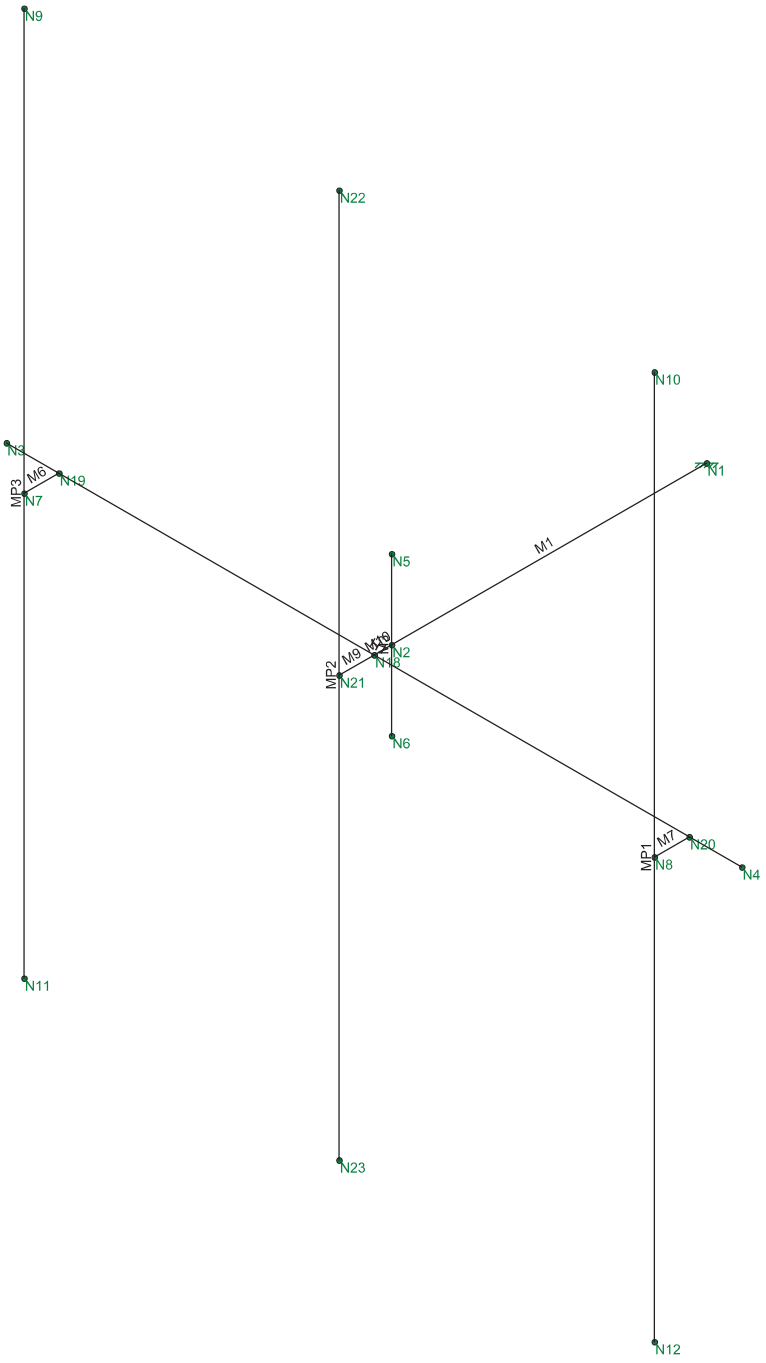
The mount has sufficient capacity to carry the proposed loading configuration. In order for the results of the analysis to be considered valid, the proposed mount listed below must be installed.

1. Commscope MC-K6MHDX-9-96.

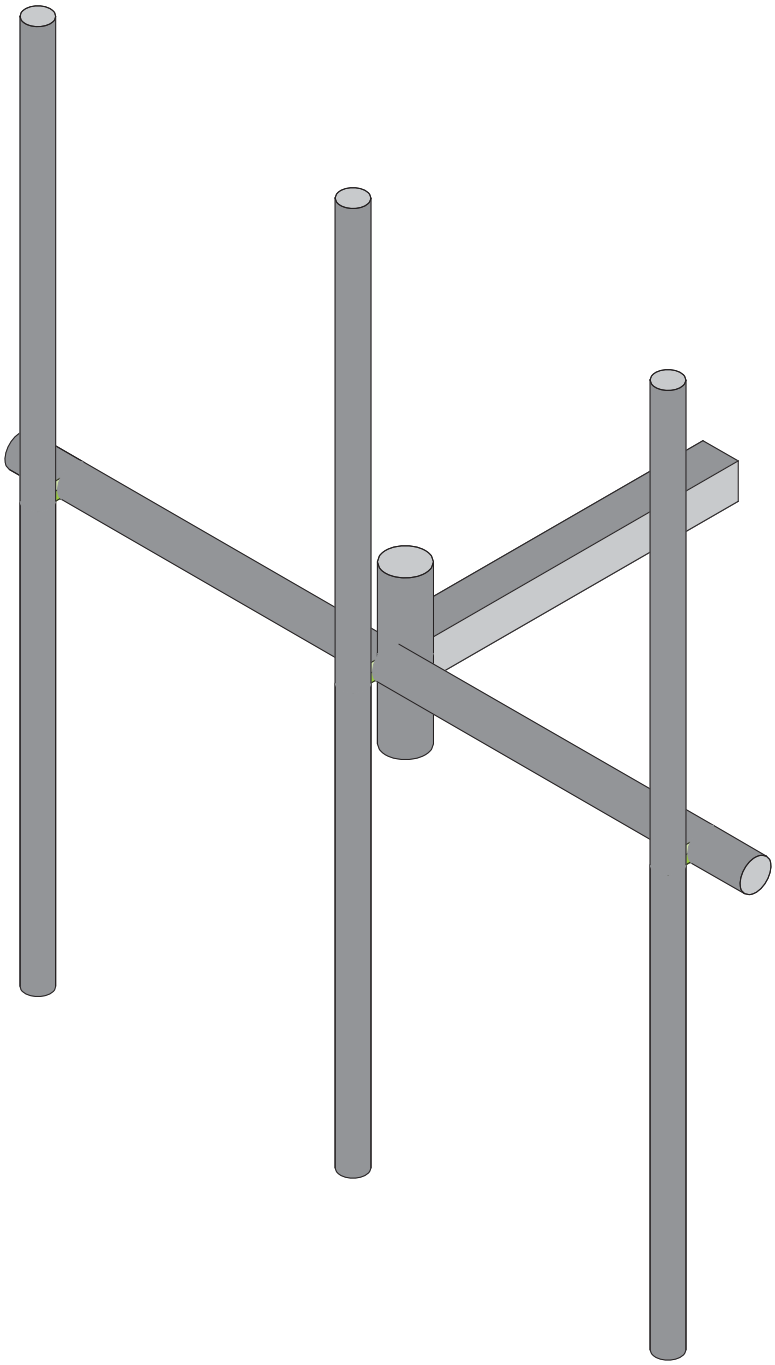
No structural modifications are required at this time, provided that the above-listed changes are implemented.

APPENDIX A

WIRE FRAME AND RENDERED MODELS



Trylon	842858	Wireframe
MFT		Aug 10, 2021 at 1:33 PM
189207		MC-K6MHDX-9-96_loaded.r3d



Trylon	842858	Render
MFT		Aug 10, 2021 at 1:34 PM
189207		MC-K6MHDX-9-96_loaded.r3d

APPENDIX B

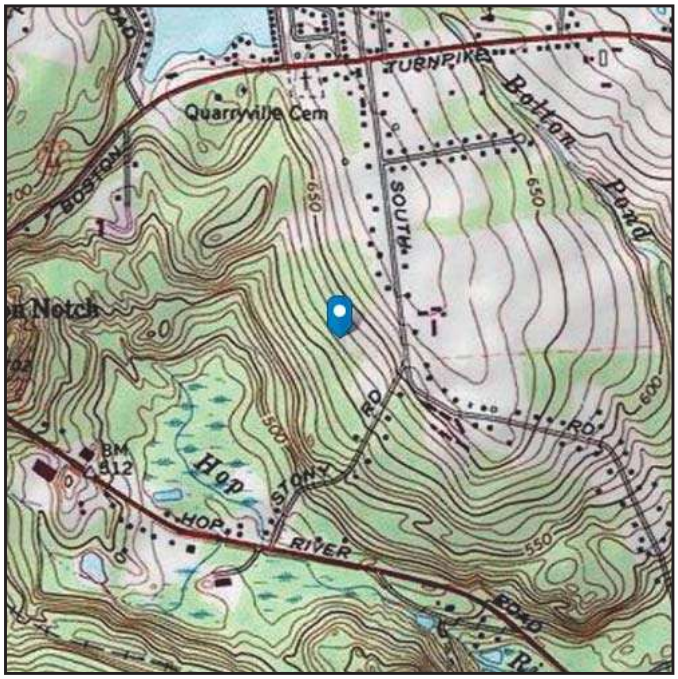
SOFTWARE INPUT CALCULATIONS

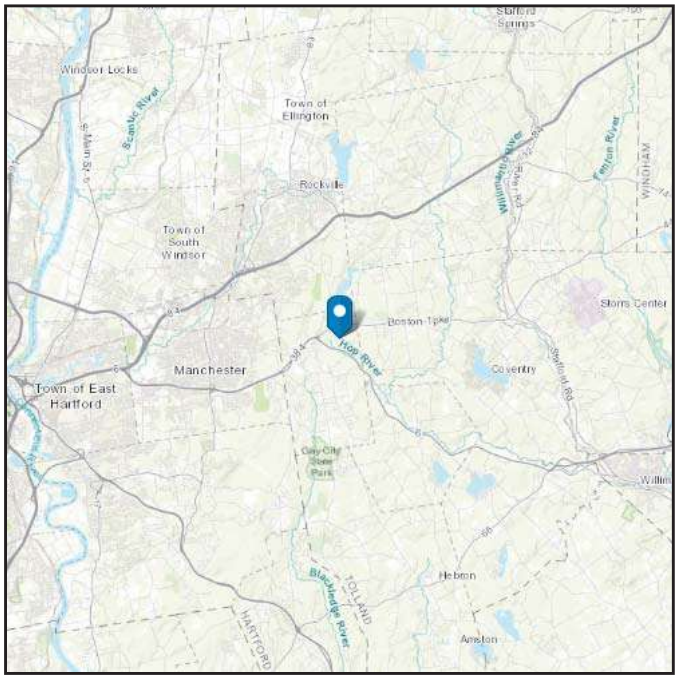
ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 621.52 ft (NAVD 88)
Latitude: 41.789008
Longitude: -72.429142





Ice

Results:

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

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

Date Accessed: Thu Jul 29 2021

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

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

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

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

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

TIA LOAD CALCULATOR 2.0

PROJECT DATA	
Job Code:	189207
Carrier Site ID:	842858
Carrier Site Name:	BOLTON

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

STRUCTURE DETAILS		
Mount Type:	Sector Frame	--
Mount Elevation:	89.0	ft.
Number of Sectors:	3	--
Structure Type:	Monopole	--
Structure Height:	120.0	ft.

ANALYSIS CRITERIA		
Structure Risk Category:	II	--
Exposure Category:	C	--
Site Class:	D - Stiff Soil	--
Ground Elevation:	621.52	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:	125	mph
Wind Escalation Factor (K_s):	1.00	--
Velocity Coefficient (K_z):	1.23	--
Directionality Factor (K_d):	0.95	--
Gust Effect Factor (Gh):	1.00	--
Shielding Factor (K_a):	0.90	--
Velocity Pressure (q_z):	45.88	psf

ICE PARAMETERS		
Design Ice Wind Speed:	50	mph
Design Ice Thickness (t_i):	2.00	in
Importance Factor (I_i):	1.00	--
Ice Velocity Pressure (q_{zi}):	45.88	psf
Mount Ice Thickness (t_{iz}):	2.21	in

WIND STRUCTURE CALCULATIONS		
Flat Member Pressure:	82.59	psf
Round Member Pressure:	49.55	psf
Ice Wind Pressure:	7.09	psf

SEISMIC PARAMETERS		
Importance Factor (I_e):	1.00	--
Short Period Accel .(S_s):	0.18	g
1 Second Accel (S_1):	0.06	g
Short Period Des. (S_{DS}):	0.19	g
1 Second Des. (S_{D1}):	0.10	g
Short Period Coeff. (F_a):	1.60	--
1 Second Coeff. (F_v):	2.40	--
Response Coefficient (Cs):	0.09	--
Amplification Factor (A_S):	1.20	--

LOAD COMBINATIONS [LRFD]

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

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

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

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

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

EQUIPMENT LOADING

Appurtenance Name/Location	*Qty.*	*Elevation [ft]*	--	*EPA $_N$ (ft2)*	*EPA $_T$ (ft2)*	*Weight (lbs)*
MX08FRO665-21	1	89	No Ice	8.01	3.21	82.50
MP1, 0	--	--	w/ Ice	10.18	5.12	377.52
TA08025-B604	1	89	No Ice	1.96	0.98	63.90
MP1, 0	--	--	w/ Ice	2.52	1.42	95.51
TA08025-B605	1	89	No Ice	1.96	1.13	75.00
MP1, 0	--	--	w/ Ice	2.52	1.58	101.50
RDIDC-9181-PF-48	1	89	No Ice	2.01	1.17	21.85
MP1, 0/0/0	--	--	w/ Ice	2.58	1.64	100.11
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
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			No Ice			
--	--	--	w/ Ice			

EQUIPMENT WIND CALCULATIONS

Appurtenance Name	Qty.	Elevation [ft]	K_{zt}	K_z	K_d	t_d	q_z [psf]	q_{zi} [psf]
MX08FRO665-21	1	89	1.00	1.23	0.95	2.21	45.88	7.34
TA08025-B604	1	89	1.00	1.23	0.95	2.21	45.88	7.34
TA08025-B605	1	89	1.00	1.23	0.95	2.21	45.88	7.34
RDIDC-9181-PF-48	1	89	1.00	1.23	0.95	2.21	45.88	7.34

EQUIPMENT LATERAL WIND FORCE CALCULATIONS

Appurtenance Name	Qty.	--	0° 180°	30° 210°	60° 240°	90° 270°	120° 300°	150° 330°
MX08FRO665-21	1	No Ice	330.78	182.11	281.22	132.56	281.22	182.11
MP1, 0	--	w/ Ice	67.28	42.19	58.92	33.82	58.92	42.19
TA08025-B604	1	No Ice	81.08	50.66	70.94	40.52	70.94	50.66
MP1, 0	--	w/ Ice	16.65	11.18	14.83	9.36	14.83	11.18
TA08025-B605	1	No Ice	81.08	55.25	72.47	46.64	72.47	55.25
MP1, 0	--	w/ Ice	16.65	12.01	15.10	10.46	15.10	12.01
RDIDC-9181-PF-48	1	No Ice	83.08	56.95	74.37	48.24	74.37	56.95
MP1, 0/0/0	--	w/ Ice	17.02	12.38	15.47	10.83	15.47	12.38
		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						

EQUIPMENT SEISMIC FORCE CALCULATIONS

Appurtenance Name	Qty.	Elevation [ft]	Weight [lbs]	F_p [lbs]
MX08FRO665-21	1	89	82.5	9.35
TA08025-B604	1	89	63.9	7.24
TA08025-B605	1	89	75	8.50
RDIDC-9181-PF-48	1	89	21.85	2.48

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

(Global) Model Settings

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

Hot Rolled Steel Code	AISC 15th(360-16): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): LRFD
Cold Formed Steel Code	AISI S100-12: LRFD
Wood Code	AWC NDS-15: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-14
Masonry Code	ACI 530-13: Strength
Aluminum Code	AA ADM1-10: LRFD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

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

(Global) Model Settings, Continued

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

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E...	Density[k/ft...	Yield[psi]	Ry	Fu[psi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36000	1.5	58000	1.2
2	A500 Gr.B RND	29000	11154	.3	.65	.527	42000	1.4	58000	1.3
3	A500 Gr.B Rect	29000	11154	.3	.65	.527	46000	1.4	58000	1.3
4	A53 Gr.B	29000	11154	.3	.65	.49	35000	1.6	60000	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Standoffs	HSS4X4X4	Beam	Tube	A500 Gr.B R...	Typical	3.37	7.8	7.8	12.8
2	Horizontals	PIPE_3.0	Beam	Pipe	A53 Gr.B	Typical	2.07	2.85	2.85	5.69
3	Vertical Stan...	PIPE_4.0	Beam	Pipe	A53 Gr.B	Typical	2.96	6.82	6.82	13.6
4	Pipe Mounts	PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical	1.61	1.45	1.45	2.89

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Self Weight	DL		-1			5			
2	Structure Wind Z	WLZ						9		
3	Structure Wind X	WLX						9		

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
4	Wind Load 0 AZI	WLZ					10			
5	Wind Load 30 AZI	None					10			
6	Wind Load 45 AZI	None					10			
7	Wind Load 60 AZI	None					10			
8	Wind Load 90 AZI	WLX					10			
9	Wind Load 120 AZI	None					10			
10	Wind Load 135 AZI	None					10			
11	Wind Load 150 AZI	None					10			
12	Ice Weight	OL1					5	9		
13	Ice Structure Wind Z	OL2						9		
14	Ice Structure Wind X	OL3						9		
15	Ice Wind Load 0 AZI	OL2					10			
16	Ice Wind Load 30 AZI	None					10			
17	Ice Wind Load 45 AZI	None					10			
18	Ice Wind Load 60 AZI	None					10			
19	Ice Wind Load 90 AZI	OL3					10			
20	Ice Wind Load 120 AZI	None					10			
21	Ice Wind Load 135 AZI	None					10			
22	Ice Wind Load 150 AZI	None					10			
23	Seismic Load Z	ELZ			-.113		5			
24	Seismic Load X	ELX	-.113				5			
25	Live Load 1 (Lv)	None					1			
26	Live Load 2 (Lv)	None					1			
27	Live Load 3 (Lv)	None					1			
28	Maintenance Load 1 (...	None					1			
29	Maintenance Load 2 (...	None					1			
30	Maintenance Load 3 (...	None					1			

Load Combinations

	Description	Sol..	PD..	SR..	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...
1	1.4DL	Yes	Y		DL	1.4																				
2	1.2DL + 1...	Yes	Y		DL	1.2	2	1	3		4	1														
3	1.2DL + 1...	Yes	Y		DL	1.2	2	.866	3	.5	5	1														
4	1.2DL + 1...	Yes	Y		DL	1.2	2	.707	3	.707	6	1														
5	1.2DL + 1...	Yes	Y		DL	1.2	2	.5	3	.866	7	1														
6	1.2DL + 1...	Yes	Y		DL	1.2	2		3	1	8	1														
7	1.2DL + 1...	Yes	Y		DL	1.2	2	-.5	3	.866	9	1														
8	1.2DL + 1...	Yes	Y		DL	1.2	2	-.707	3	.707	10	1														
9	1.2DL + 1...	Yes	Y		DL	1.2	2	-.866	3	.5	11	1														
10	1.2DL + 1...	Yes	Y		DL	1.2	2	-1	3		4	-1														
11	1.2DL + 1...	Yes	Y		DL	1.2	2	-.866	3	-.5	5	-1														
12	1.2DL + 1...	Yes	Y		DL	1.2	2	-.707	3	-.707	6	-1														
13	1.2DL + 1...	Yes	Y		DL	1.2	2	-.5	3	-.866	7	-1														
14	1.2DL + 1...	Yes	Y		DL	1.2	2		3	-1	8	-1														
15	1.2DL + 1...	Yes	Y		DL	1.2	2	.5	3	-.866	9	-1														
16	1.2DL + 1...	Yes	Y		DL	1.2	2	.707	3	-.707	10	-1														
17	1.2DL + 1...	Yes	Y		DL	1.2	2	.866	3	-.5	11	-1														
18	0.9DL + 1...	Yes	Y		DL	.9	2	1	3		4	1														
19	0.9DL + 1...	Yes	Y		DL	.9	2	.866	3	.5	5	1														
20	0.9DL + 1...	Yes	Y		DL	.9	2	.707	3	.707	6	1														

Load Combinations (Continued)

	Description	Sol..	PD..	SR..	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...
21	0.9DL + 1...	Yes	Y		DL	.9	2	.5	3	.866	7	1														
22	0.9DL + 1...	Yes	Y		DL	.9	2		3	1	8	1														
23	0.9DL + 1...	Yes	Y		DL	.9	2	-.5	3	.866	9	1														
24	0.9DL + 1...	Yes	Y		DL	.9	2	-.707	3	.707	10	1														
25	0.9DL + 1...	Yes	Y		DL	.9	2	-.866	3	.5	11	1														
26	0.9DL + 1...	Yes	Y		DL	.9	2	-1	3		4	-1														
27	0.9DL + 1...	Yes	Y		DL	.9	2	-.866	3	-.5	5	-1														
28	0.9DL + 1...	Yes	Y		DL	.9	2	-.707	3	-.707	6	-1														
29	0.9DL + 1...	Yes	Y		DL	.9	2	-.5	3	-.866	7	-1														
30	0.9DL + 1...	Yes	Y		DL	.9	2		3	-1	8	-1														
31	0.9DL + 1...	Yes	Y		DL	.9	2	.5	3	-.866	9	-1														
32	0.9DL + 1...	Yes	Y		DL	.9	2	.707	3	-.707	10	-1														
33	0.9DL + 1...	Yes	Y		DL	.9	2	.866	3	-.5	11	-1														
34	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	1	14		15	1												
35	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	.866	14	.5	16	1												
36	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	.707	14	.707	17	1												
37	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	.5	14	.866	18	1												
38	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13		14	1	19	1												
39	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	-.5	14	.866	20	1												
40	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	-.707	14	.707	21	1												
41	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	-.866	14	.5	22	1												
42	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	-1	14		15	-1												
43	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	-.866	14	-.5	16	-1												
44	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	-.707	14	-.707	17	-1												
45	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	-.5	14	-.866	18	-1												
46	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13		14	-1	19	-1												
47	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	.5	14	-.866	20	-1												
48	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	.707	14	-.707	21	-1												
49	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	.866	14	-.5	22	-1												
50	(1.2+0.2S...	Yes	Y		DL	1.238	23	1	24																	
51	(1.2+0.2S...	Yes	Y		DL	1.238	23	.866	24	.5																
52	(1.2+0.2S...	Yes	Y		DL	1.238	23	.707	24	.707																
53	(1.2+0.2S...	Yes	Y		DL	1.238	23	.5	24	.866																
54	(1.2+0.2S...	Yes	Y		DL	1.238	23		24	1																
55	(1.2+0.2S...	Yes	Y		DL	1.238	23	-.5	24	.866																
56	(1.2+0.2S...	Yes	Y		DL	1.238	23	-.707	24	.707																
57	(1.2+0.2S...	Yes	Y		DL	1.238	23	-.866	24	.5																
58	(1.2+0.2S...	Yes	Y		DL	1.238	23	-1	24																	
59	(1.2+0.2S...	Yes	Y		DL	1.238	23	-.866	24	-.5																
60	(1.2+0.2S...	Yes	Y		DL	1.238	23	-.707	24	-.707																
61	(1.2+0.2S...	Yes	Y		DL	1.238	23	-.5	24	-.866																
62	(1.2+0.2S...	Yes	Y		DL	1.238	23		24	-1																
63	(1.2+0.2S...	Yes	Y		DL	1.238	23	.5	24	-.866																
64	(1.2+0.2S...	Yes	Y		DL	1.238	23	.707	24	-.707																
65	(1.2+0.2S...	Yes	Y		DL	1.238	23	.866	24	-.5																
66	(0.9-0.2Sd...	Yes	Y		DL	.862	23	1	24																	
67	(0.9-0.2Sd...	Yes	Y		DL	.862	23	.866	24	.5																
68	(0.9-0.2Sd...	Yes	Y		DL	.862	23	.707	24	.707																
69	(0.9-0.2Sd...	Yes	Y		DL	.862	23	.5	24	.866																
70	(0.9-0.2Sd...	Yes	Y		DL	.862	23		24	1																
71	(0.9-0.2Sd...	Yes	Y		DL	.862	23	-.5	24	.866																
72	(0.9-0.2Sd...	Yes	Y		DL	.862	23	-.707	24	.707																

Load Combinations (Continued)

	Description	Sol..	PD..	SR..	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...
73	(0.9-0.2Sd..	Yes	Y		DL	.862	23	-.866	24	.5																
74	(0.9-0.2Sd..	Yes	Y		DL	.862	23	-1	24																	
75	(0.9-0.2Sd..	Yes	Y		DL	.862	23	-.866	24	-.5																
76	(0.9-0.2Sd..	Yes	Y		DL	.862	23	-.707	24	-.707																
77	(0.9-0.2Sd..	Yes	Y		DL	.862	23	-.5	24	-.866																
78	(0.9-0.2Sd..	Yes	Y		DL	.862	23		24	-1																
79	(0.9-0.2Sd..	Yes	Y		DL	.862	23	.5	24	-.866																
80	(0.9-0.2Sd..	Yes	Y		DL	.862	23	.707	24	-.707																
81	(0.9-0.2Sd..	Yes	Y		DL	.862	23	.866	24	-.5																
82	1.2DL + 1...	Yes	Y		DL	1.2	25	1.5																		
83	1.2DL + 1...	Yes	Y		DL	1.2	26	1.5																		
84	1.2DL + 1...	Yes	Y		DL	1.2	27	1.5																		
85	1.2DL + 1...	Yes	Y		DL	1.2	28	1.5	2	.058	3		4	.058												
86	1.2DL + 1...	Yes	Y		DL	1.2	28	1.5	2	.05	3	.029	5	.058												
87	1.2DL + 1...	Yes	Y		DL	1.2	28	1.5	2	.041	3	.041	6	.058												
88	1.2DL + 1...	Yes	Y		DL	1.2	28	1.5	2	.029	3	.05	7	.058												
89	1.2DL + 1...	Yes	Y		DL	1.2	28	1.5	2		3	.058	8	.058												
90	1.2DL + 1...	Yes	Y		DL	1.2	28	1.5	2	-.029	3	.05	9	.058												
91	1.2DL + 1...	Yes	Y		DL	1.2	28	1.5	2	-.041	3	.041	10	.058												
92	1.2DL + 1...	Yes	Y		DL	1.2	28	1.5	2	-.05	3	.029	11	.058												
93	1.2DL + 1...	Yes	Y		DL	1.2	28	1.5	2	-.058	3		4	-.058												
94	1.2DL + 1...	Yes	Y		DL	1.2	28	1.5	2	-.05	3	-.029	5	-.058												
95	1.2DL + 1...	Yes	Y		DL	1.2	28	1.5	2	-.041	3	-.041	6	-.058												
96	1.2DL + 1...	Yes	Y		DL	1.2	28	1.5	2	-.029	3	-.05	7	-.058												
97	1.2DL + 1...	Yes	Y		DL	1.2	28	1.5	2		3	-.058	8	-.058												
98	1.2DL + 1...	Yes	Y		DL	1.2	28	1.5	2	.029	3	-.05	9	-.058												
99	1.2DL + 1...	Yes	Y		DL	1.2	28	1.5	2	.041	3	-.041	10	-.058												
100	1.2DL + 1...	Yes	Y		DL	1.2	28	1.5	2	.05	3	-.029	11	-.058												
101	1.2DL + 1...	Yes	Y		DL	1.2	29	1.5	2	.058	3		4	.058												
102	1.2DL + 1...	Yes	Y		DL	1.2	29	1.5	2	.05	3	.029	5	.058												
103	1.2DL + 1...	Yes	Y		DL	1.2	29	1.5	2	.041	3	.041	6	.058												
104	1.2DL + 1...	Yes	Y		DL	1.2	29	1.5	2	.029	3	.05	7	.058												
105	1.2DL + 1...	Yes	Y		DL	1.2	29	1.5	2		3	.058	8	.058												
106	1.2DL + 1...	Yes	Y		DL	1.2	29	1.5	2	-.029	3	.05	9	.058												
107	1.2DL + 1...	Yes	Y		DL	1.2	29	1.5	2	-.041	3	.041	10	.058												
108	1.2DL + 1...	Yes	Y		DL	1.2	29	1.5	2	-.05	3	.029	11	.058												
109	1.2DL + 1...	Yes	Y		DL	1.2	29	1.5	2	-.058	3		4	-.058												
110	1.2DL + 1...	Yes	Y		DL	1.2	29	1.5	2	-.05	3	-.029	5	-.058												
111	1.2DL + 1...	Yes	Y		DL	1.2	29	1.5	2	-.041	3	-.041	6	-.058												
112	1.2DL + 1...	Yes	Y		DL	1.2	29	1.5	2	-.029	3	-.05	7	-.058												
113	1.2DL + 1...	Yes	Y		DL	1.2	29	1.5	2		3	-.058	8	-.058												
114	1.2DL + 1...	Yes	Y		DL	1.2	29	1.5	2	.029	3	-.05	9	-.058												
115	1.2DL + 1...	Yes	Y		DL	1.2	29	1.5	2	.041	3	-.041	10	-.058												
116	1.2DL + 1...	Yes	Y		DL	1.2	29	1.5	2	.05	3	-.029	11	-.058												
117	1.2DL + 1...	Yes	Y		DL	1.2	30	1.5	2	.058	3		4	.058												
118	1.2DL + 1...	Yes	Y		DL	1.2	30	1.5	2	.05	3	.029	5	.058												
119	1.2DL + 1...	Yes	Y		DL	1.2	30	1.5	2	.041	3	.041	6	.058												
120	1.2DL + 1...	Yes	Y		DL	1.2	30	1.5	2	.029	3	.05	7	.058												
121	1.2DL + 1...	Yes	Y		DL	1.2	30	1.5	2		3	.058	8	.058												
122	1.2DL + 1...	Yes	Y		DL	1.2	30	1.5	2	-.029	3	.05	9	.058												
123	1.2DL + 1...	Yes	Y		DL	1.2	30	1.5	2	-.041	3	.041	10	.058												
124	1.2DL + 1...	Yes	Y		DL	1.2	30	1.5	2	-.05	3	.029	11	.058												

Load Combinations (Continued)

	Description	Sol..	PD..	SR..	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...
125	1.2DL + 1...	Yes	Y		DL	1.2	30	1.5	2	-.058	3		4	-.058												
126	1.2DL + 1...	Yes	Y		DL	1.2	30	1.5	2	-.05	3	-.029	5	-.058												
127	1.2DL + 1...	Yes	Y		DL	1.2	30	1.5	2	-.041	3	-.041	6	-.058												
128	1.2DL + 1...	Yes	Y		DL	1.2	30	1.5	2	-.029	3	-.05	7	-.058												
129	1.2DL + 1...	Yes	Y		DL	1.2	30	1.5	2		3	-.058	8	-.058												
130	1.2DL + 1...	Yes	Y		DL	1.2	30	1.5	2	.029	3	-.05	9	-.058												
131	1.2DL + 1...	Yes	Y		DL	1.2	30	1.5	2	.041	3	-.041	10	-.058												
132	1.2DL + 1...	Yes	Y		DL	1.2	30	1.5	2	.05	3	-.029	11	-.058												

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N1	max	663.365	22	1773.865	42	990.011	18	-1187.873	26	2792.431	24	3133.128	90
2		min	-663.365	14	410.551	66	-990.011	10	-5960.662	34	-2790.519	32	-1381.804	114
3	Totals:	max	663.365	22	1773.865	42	990.011	18						
4		min	-663.365	14	410.551	66	-990.011	10						

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

	Member	Shape	Code ...	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*Pnc ...	phi*Pnt ...	phi*Mn ...	phi*Mn ...	Cb	Eqn
1	H1	PIPE_3.0	.623	42	41	.144	42		34	21765.9...	65205	5748.75	5748.75	1	H1-1b
2	M1	HSS4X4X4	.480	0	48	.263	0	y	88	134360....	139518	16180.5	16180.5	1...	H3-6
3	MP1	PIPE_2.5	.227	48	10	.019	48		26	7310.519	50715	3596.25	3596.25	1	H1-1b
4	MP2	PIPE_2.5	.027	49	12	.003	48		12	7310.519	50715	3596.25	3596.25	1	H1-1b
5	MP3	PIPE_2.5	.027	49	12	.003	48		12	7310.519	50715	3596.25	3596.25	1	H1-1b
6	M3	PIPE_4.0	.001	9	12	.000	9		12	90033.6...	93240	10631.25	10631.25	1	H1-1b

APPENDIX D

ADDITIONAL CALCUATIONS

Trylon

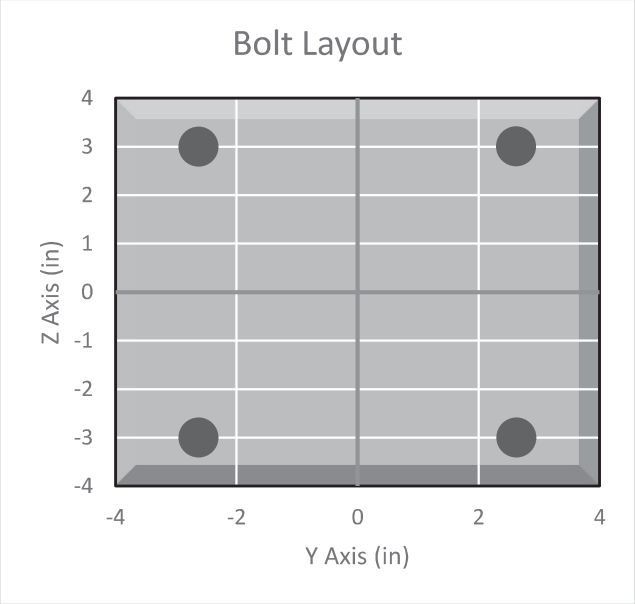
Analysis date: 8/10/2021

BOLT TOOL 1.5.2

Project Data	
Job Code:	189207
Carrier Site ID:	842858
Carrier Site Name:	BOLTON

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

Bolt Properties		
Connection Type:	U-Bolt	
Diameter:	0.625	in
Grade:	A307	--
Yield Strength (Fy):	36	ksi
Ultimate Strength (Fu):	60	ksi
Number of Bolts:	2	--
Threads Included:	Yes	--
Double Shear:	Yes	--
Connection Pipe Size:	4.5	in



Connection Description
Mount Horizontal Standoff

Bolt Check*		
Tensile Capacity (ϕT_n):	10170.1	lbs
Shear Capacity (ϕV_n):	6902.9	lbs
Tension Force (T_u):	2263.6	lbs
Shear Force (V_u):	217.6	lbs
Tension Usage:	21.2%	--
Shear Usage:	3.0%	--
Interaction:	21.2%	Pass
Controlling Member:	M1	--
Controlling LC:	26	--

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

Slip Check*		
Sliding Capacity (ϕR_{ns}):	14132.2	lbs
Torsion Capacity (ϕR_{nr}):	2649.8	lb-ft
Sliding Force (V_{us}):	525.6	lbs
Torsional Force (T_{ur}):	1724.7	lb-ft
Sliding Usage:	3.5%	--
Torsion Usage:	64.7%	--
Interaction:	64.8%	Pass
Controlling Member:	M1	--
Controlling LC:	10	--

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

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

Trylon

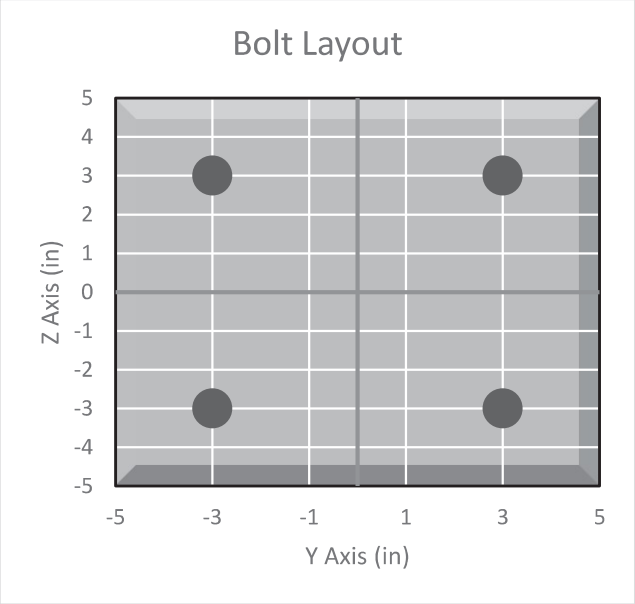
Analysis date: 8/10/2021

BOLT TOOL 1.5.2

Project Data	
Job Code:	189207
Carrier Site ID:	842858
Carrier Site Name:	BOLTON

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

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 Standoff to Collar

Bolt Check*		
Tensile Capacity (ϕT_n):	20340.1	lbs
Shear Capacity (ϕV_n):	13805.8	lbs
Tension Force (T_u):	6628.9	lbs
Shear Force (V_u):	2424.9	lbs
Tension Usage:	31.0%	--
Shear Usage:	16.7%	--
Interaction:	31.0%	Pass
Controlling Member:	M1	--
Controlling LC:	40	--

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

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

Trylon

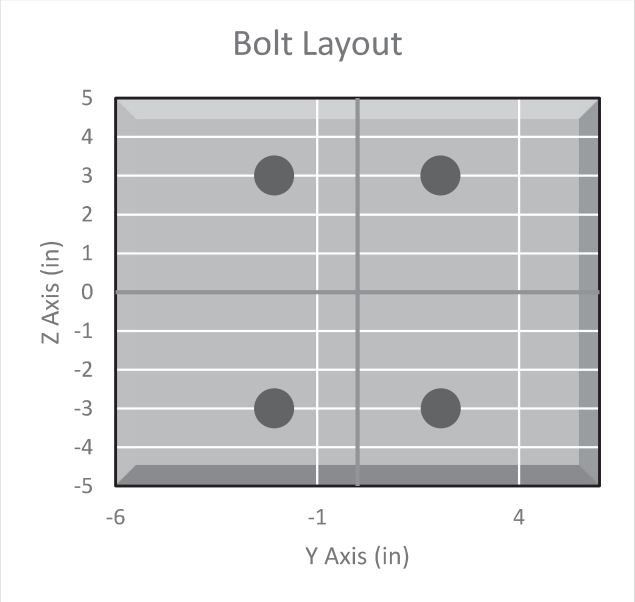
Analysis date: 8/10/2021

BOLT TOOL 1.5.2

Project Data	
Job Code:	189207
Carrier Site ID:	842858
Carrier Site Name:	BOLTON

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

Bolt Properties		
Connection Type:	U-Bolt	
Diameter:	0.5	in
Grade:	A307	--
Yield Strength (Fy):	36	ksi
Ultimate Strength (Fu):	60	ksi
Number of Bolts:	2	--
Threads Included:	Yes	--
Double Shear:	No	--
Connection Pipe Size:	3.5	in



Connection Description
Pipe Mount Rolling Connection

Bolt Check*		
Tensile Capacity (ϕT_n):	6385.4	lbs
Shear Capacity (ϕV_n):	4417.9	lbs
Tension Force (T_u):	588.7	lbs
Shear Force (V_u):	305.3	lbs
Tension Usage:	8.8%	--
Shear Usage:	6.6%	--
Interaction:	8.8%	Pass
Controlling Member:	M7	--
Controlling LC:	48	--

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

Slip Check*		
Sliding Capacity (ϕR_{ns}):	9424.8	lbs
Torsion Capacity (ϕR_{nr}):	1374.4	lb-ft
Sliding Force (V_{us}):	0.4	lbs
Torsional Force (T_{ur}):	418.4	lb-ft
Sliding Usage:	0.0%	--
Torsion Usage:	29.0%	--
Interaction:	29.0%	Pass
Controlling Member:	M7	--
Controlling LC:	34	--

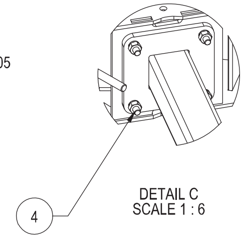
**Rating per TIA-222-H Section 15.5*

APPENDIX E

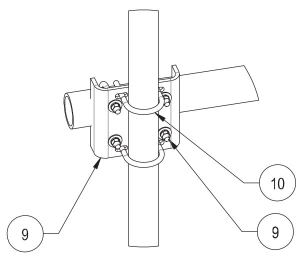
SUPPLEMENTAL DRAWINGS

NOTES:

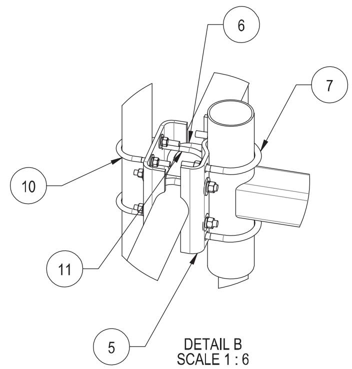
1.0 GENERAL NOTES
  1.1 ALL METRIC DIMENSIONS ARE IN BRACKETS.
2.0 DESIGN NOTES
  2.1 FOR PATENT INFORMATION: HTTPS://WWW.CS-PAT.COM
  2.2 USE STANDARD TORQUE VALUES FOR 5/8" BOLTS
  2.3 TORQUE U-BOLTS TO 44 FT-LBS
3.0 MANUFACTURING/SPECIAL REQUIREMENTS
4.0 TEST
5.0 PACKAGING
  5.1 PACKAGING SHALL MEET COMMSCOPE REQUIREMENTS PER DOCUMENT IS-PL-3005



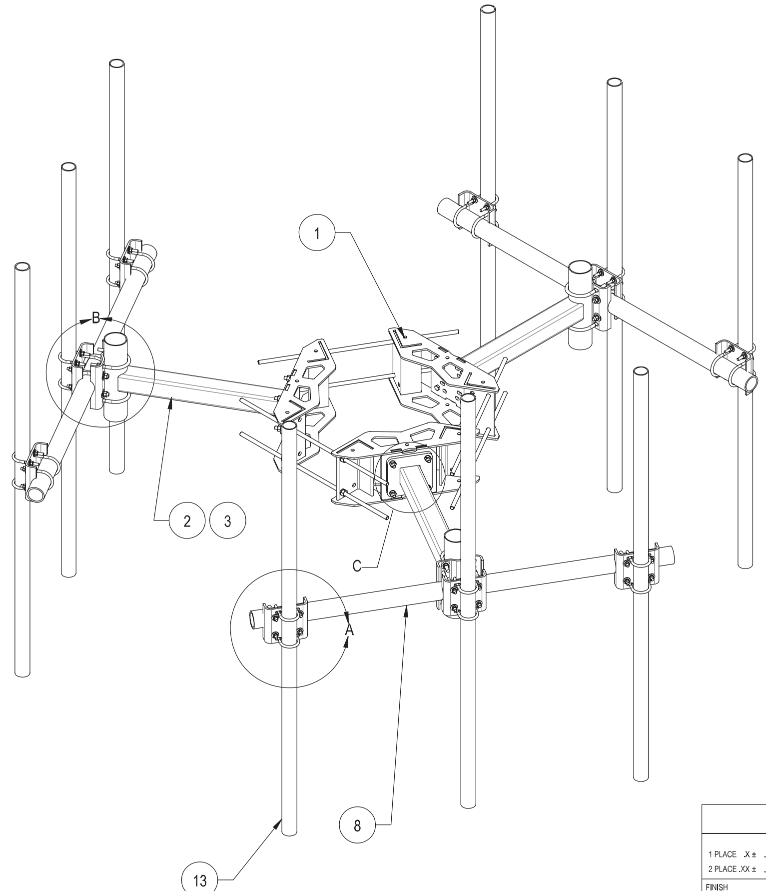
DETAIL C
SCALE 1 : 6



DETAIL A
SCALE 1 : 6



DETAIL B
SCALE 1 : 6



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	MC-RM1550-3	12" - 50" OD RINGMOUNT	1
2	MT197.01	36" SINGLE SUPPORT ARM	3
3	MT197H	HARDWARE KIT (NEXT ITEM)	3
4	GB-0524A	5/8" X 2-1/2" GALV BOLT KIT (A325)	12
5	MT216.13	CENTER BRACKET	3
6	GUB-53560	5/8" X 3-5/8" X 6" GALV U-BOLT	6
7	GUB-5456	5/8" X 4-5/8" X 6½" GALV U-BOLT	6
8	MTC333912	84" X 3-1/2" OD PIPE	3
9	MT219H3501	3.5"OD Clamp Bracket	9
10	GUB-4352	1/2" X 3" X 5-1/4" GALV U-BOLT	18
11	GUB-4356	1/2" X 3-5/8" X 6" GALV U-BOLT	18
13	MT54696	∅2.875" O.D. X 96 PIPE	9

REVISIONS

REV.	IPS	DESCRIPTION	BY	DATE
A	10539PC	NEW RELEASED.	XZ1054	3/11/2021

DENSITY	0.28	lbs/in³
MASS	1203.02	lbs
VOLUME	4265.23	in³
SURFACE AREA	35860.22	in²
HEIGHT	96"	
LENGTH	131.5"	
WIDTH	151.9"	

COMMSCOPE, INC. OF NORTH CAROLINA

TOLERANCES
1 PLACE .X ± .12 3 PLACE .XXX ± .03
2 PLACE .XX ± .06 ANGLES ± 2° FRACTIONS ± 1/32

SAP MATERIAL MASTER: MC-K6MHDX-9-96

FINISH: N/A

MATERIAL: A36, A53

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
INTERPRET PER ANSI Y 14.5M-1994

	NAME	DATE
CE	XZ1054	03/08/2021
RW	ROGHANSON	03/16/2021
AD	BCAMPBELLCON	03/19/2021
RE		

ECN 10539PC

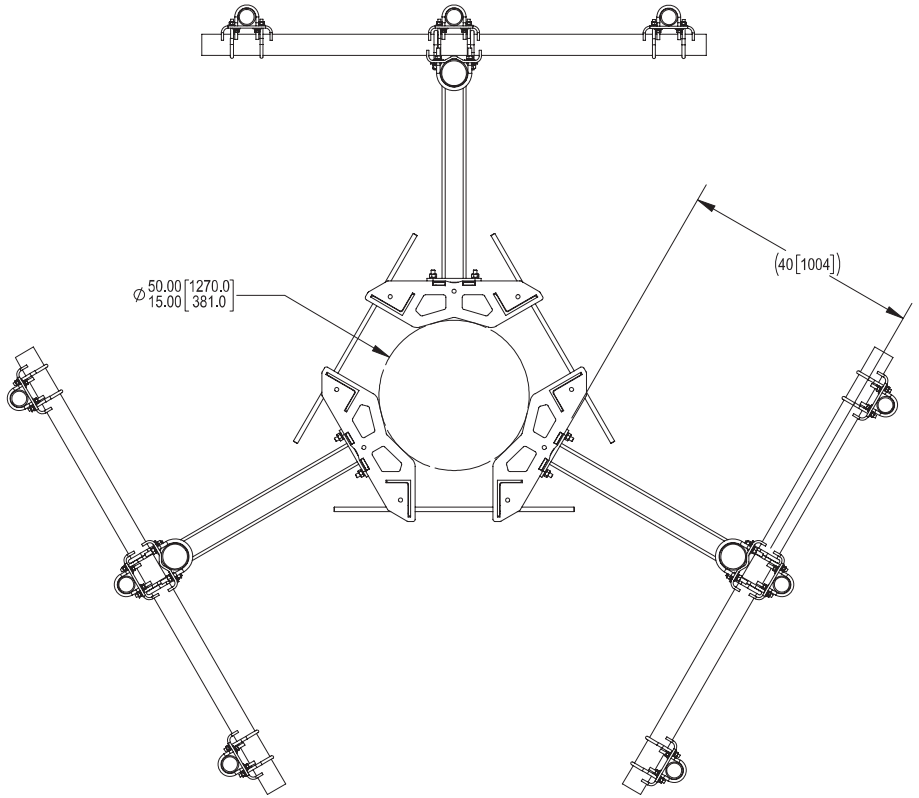
TITLE: T-ARM, MCK6, 3, 4” x 84” , 9, 2-7/8"x96

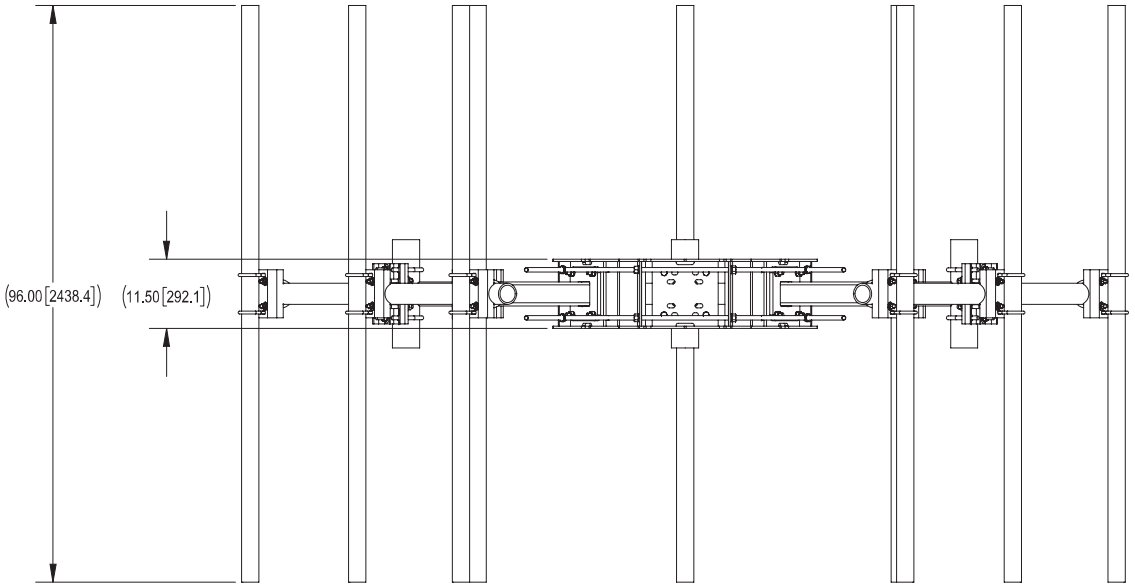
SCALE: 1:32

DOCUMENT NO.: MC-K6MHDX-9-96

SIZE	Auth Group INSL	MODEL VERSION	MODEL STATUS	MODEL REVISION	DRAWING VERSION	DRAWING STATUS	DRAWING REVISION	SHEET
D		00	AD	A	00	AD	A	1 OF 2

NOTES:





COMMSCOPE, INC. OF NORTH CAROLINA			
TITLE: T-ARM, MCK6, 3, 4" x 84" , 9, 2-7/8"x96			
SIZE: C	SCALE: 1:32	DOCUMENT NO.: MC-K6MHDX-9-96	
		DRAWING: VERSION 00 / STATUS AD / REVISION A	SHEET: 2 OF 2

Exhibit F

Power Density/RF Emissions Report

EBI Consulting

environmental | engineering | due diligence

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

Dish Wireless Existing Facility

Site ID: BOBDL00064A

842858
49 South Road
Bolton, Connecticut 06043

October 5, 2021

EBI Project Number: 6221005698

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**22.84%**

21 B Street, Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

October 5, 2021

Dish Wireless

Emissions Analysis for Site: BOBDL00064A - 842858

EBI Consulting was directed to analyze the proposed Dish Wireless facility located at **49 South Road** in **Bolton, Connecticut** for the purpose of determining whether the emissions from the Proposed Dish Wireless Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed Dish Wireless Wireless antenna facility located at 49 South Road in Bolton, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since Dish Wireless is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 20 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

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

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

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

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

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

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

6) The antenna mounting height centerline of the proposed antennas is 89 feet above ground level (AGL).

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

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

Dish Wireless Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	JMA MX08FRO665-21	Make / Model:	JMA MX08FRO665-21	Make / Model:	JMA MX08FRO665-21
Frequency Bands:	600 MHz / 1900 MHz	Frequency Bands:	600 MHz / 1900 MHz	Frequency Bands:	600 MHz / 1900 MHz
Gain:	17.45 dBd / 22.65 dBd	Gain:	17.45 dBd / 22.65 dBd	Gain:	17.45 dBd / 22.65 dBd
Height (AGL):	89 feet	Height (AGL):	89 feet	Height (AGL):	89 feet
Channel Count:	8	Channel Count:	8	Channel Count:	8
Total TX Power (W):	280 Watts	Total TX Power (W):	280 Watts	Total TX Power (W):	280 Watts
ERP (W):	3,065.51	ERP (W):	3,065.51	ERP (W):	3,065.51
Antenna A1 MPE %:	**2.30%**	Antenna B1 MPE %:	**2.30%**	Antenna C1 MPE %:	**2.30%**

Site Composite MPE %	
Carrier	**MPE %**
Dish Wireless (Max at Sector A):	2.30%
AT&T	5.97%
T-Mobile	9.15%
Verizon	5.42%
Site Total MPE % :	22.84%

Dish Wireless MPE % Per Sector	
Dish Wireless Sector A Total:	2.30%
Dish Wireless Sector B Total:	2.30%
Dish Wireless Sector C Total:	2.30%
Site Total MPE % :	22.84%

Dish Wireless Maximum MPE Power Values (Sector A)

Dish Wireless Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
Dish Wireless 600 MHz n71	4	223.68	89.0	4.67	600 MHz n71	400	1.17%
Dish Wireless 1900 MHz n70	4	542.70	89.0	11.33	1900 MHz n70	1000	1.13%
						Total:	**2.30%**

• 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:	2.30%
Sector B:	2.30%
Sector C:	2.30%
Dish Wireless Maximum MPE % (Sector A):	2.30%
Site Total:	22.84%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **22.84%** 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:
49 SOUTH ROAD, BOLTON, CT 06043

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: 842858/BOLTON
Customer Site ID: BOBDL00064A/CT-CCI-T-842858
Site Address: 49 SOUTH ROAD, BOLTON, CT 06043

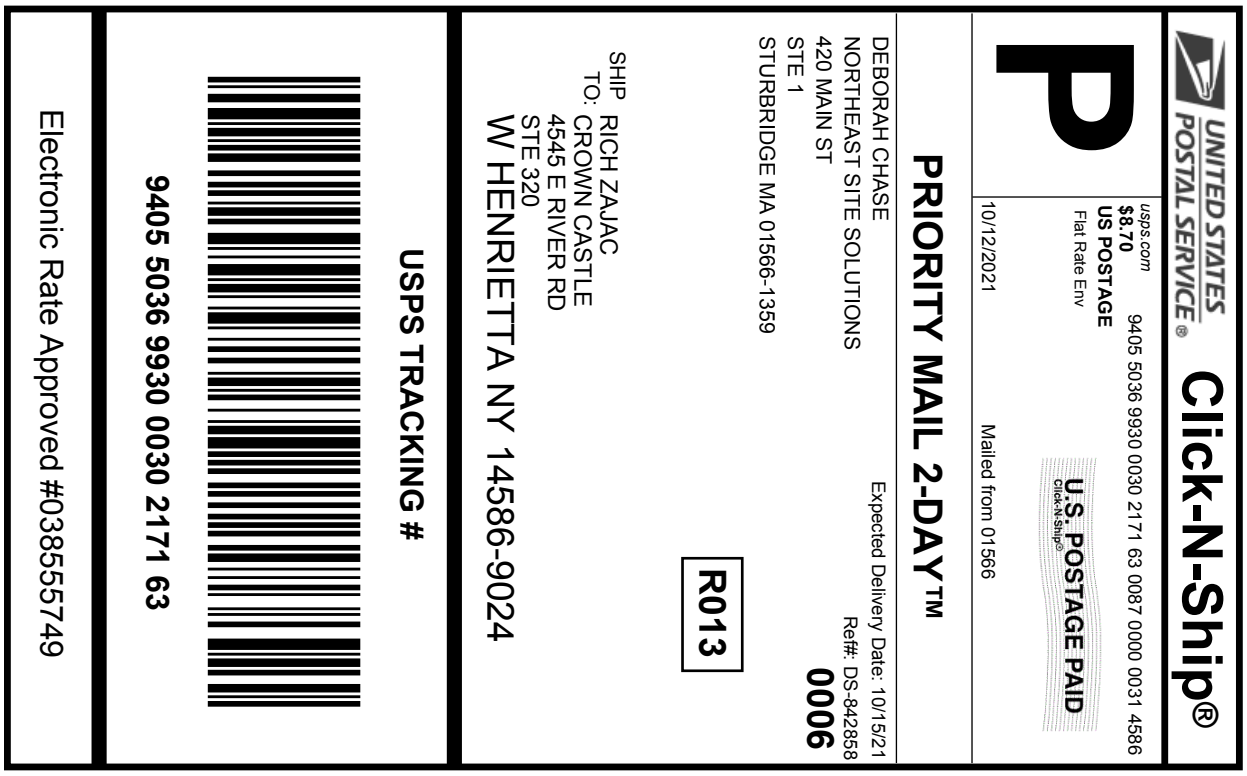
Crown Castle

By: _____ Date: 10/11/2021

Richard Zajac
Site Acquisition Specialist

Exhibit H

Recipient Mailings



Cut on dotted line.

Instructions

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

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0030 2171 63

Trans. #:	545757007
Print Date:	10/12/2021
Ship Date:	10/12/2021
Expected Delivery Date:	10/15/2021

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

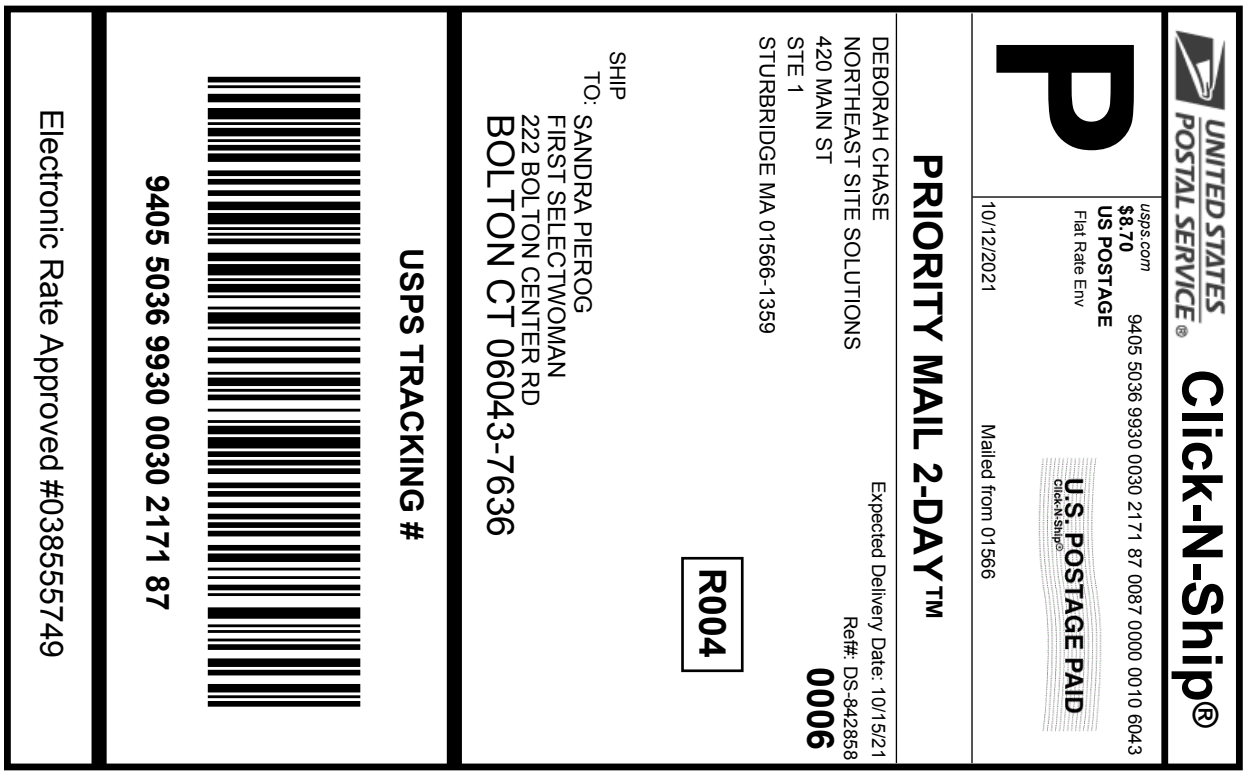
From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Ref#: DS-842858

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

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

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



Cut on dotted line.

Instructions

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

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0030 2171 87

Trans. #:	545757007
Print Date:	10/12/2021
Ship Date:	10/12/2021
Expected Delivery Date:	10/15/2021

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

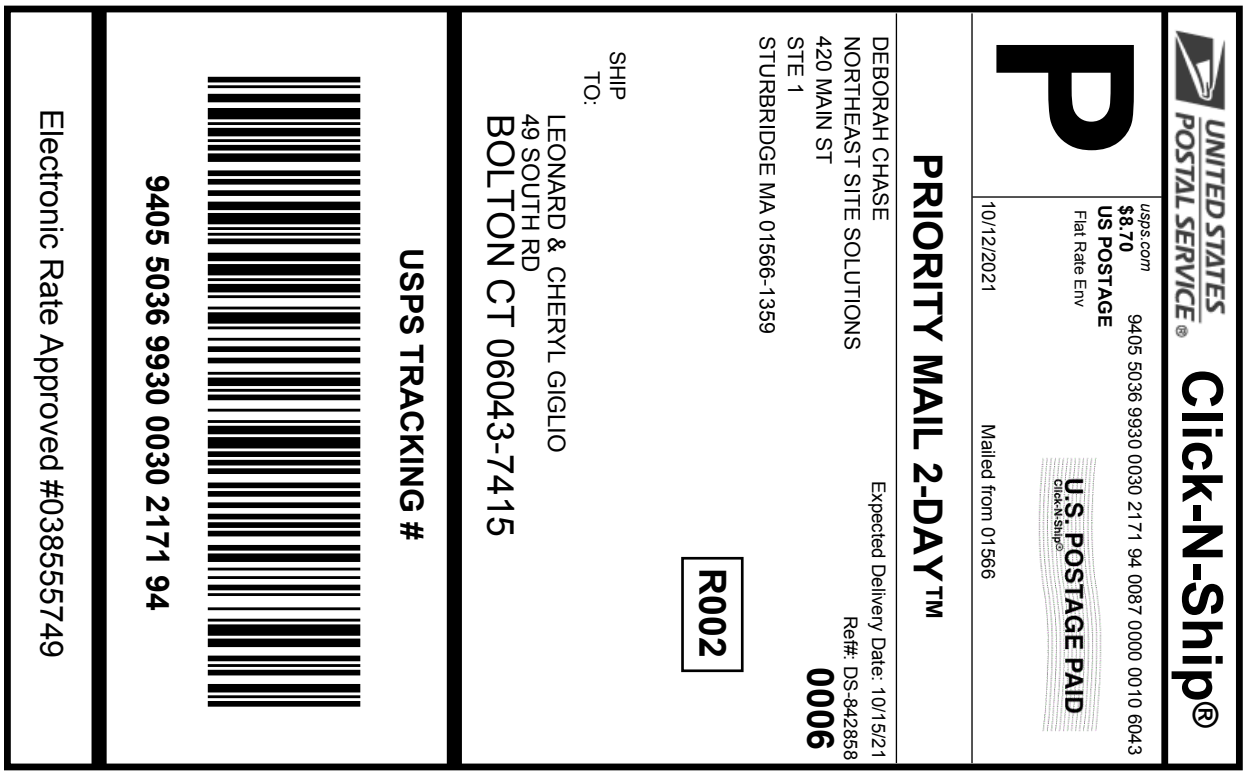
From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Ref#: DS-842858

To: SANDRA PIEROG
FIRST SELECTWOMAN
222 BOLTON CENTER RD
BOLTON CT 06043-7636

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

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



Cut on dotted line.

Instructions

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

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0030 2171 94

Trans. #:	545757007
Print Date:	10/12/2021
Ship Date:	10/12/2021
Expected Delivery Date:	10/15/2021

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

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

Ref#: DS-842858

To: LEONARD & CHERYL GIGLIO
49 SOUTH RD
BOLTON CT 06043-7415

* 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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UNITED STATES POSTAL SERVICE®

Click-N-Ship®

9405 5036 9930 0030 3909 96 0087 0000 0010 6043

usps.com
$8.70
US POSTAGE
Flat Rate Env

U.S. POSTAGE PAID
Click-N-Ship®

10/12/2021 Mailed from 01566

P

PRIORITY MAIL 2-DAY™

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

Expected Delivery Date: 10/15/21
Ref#: DS-842858

0006

R004

SHIP TO: JIM RUPERT
ZONING ENFORCEMENT OFFICER-BOLTON
222 BOLTON CENTER RD
BOLTON CT 06043-7636

USPS TRACKING #

9405 5036 9930 0030 3909 96

Electronic Rate Approved #038555749

Cut on dotted line.

Instructions

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

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0030 3909 96

Trans. #:	545770746
Print Date:	10/12/2021
Ship Date:	10/12/2021
Expected Delivery Date:	10/15/2021

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

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

Ref#: DS-842858

To: JIM RUPERT
ZONING ENFORCEMENT OFFICER-BOLTON
222 BOLTON CENTER RD
BOLTON CT 06043-7636

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

UNITED STATES POSTAL SERVICE®

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842858

UNITED STATES POSTAL SERVICE.

NEW BRITAIN
135 CHESTNUT ST
NEW BRITAIN, CT 06050-9998
(800)275-8777

10/14/2021 12:53 PM

Product	Qty	Unit Price	Price
Prepaid Mail West Henrietta, NY 14586 Weight: 0 lb 2.00 oz Acceptance Date: Thu 10/14/2021 Tracking #: 9405 5036 9930 0030 2171 63	1		$0.00
Prepaid Mail Bolton, CT 06043 Weight: 0 lb 13.40 oz Acceptance Date: Thu 10/14/2021 Tracking #: 9405 5036 9930 0030 3909 96	1		$0.00
Prepaid Mail Bolton, CT 06043 Weight: 0 lb 13.40 oz Acceptance Date: Thu 10/14/2021 Tracking #: 9405 5036 9930 0030 2171 94	1		$0.00
Prepaid Mail Bolton, CT 06043 Weight: 0 lb 13.30 oz Acceptance Date: Thu 10/14/2021 Tracking #: 9405 5036 9930 0030 2171 87	1		$0.00
Grand Total:			$0.00