NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

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

September 21, 2021

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

RE: Tower Share Application
50 Rockland Road, Norwalk CT 06854
Latitude: 41.0817889
Longitude: 73.43042222
Site# 807133_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 50 Rockland Road, Norwalk, Connecticut.

Dish Wireless LLC proposes to install three (3) 600/1900 5G MHz antenna and six (6) RRUs, at the 181-foot level of the existing 182-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 September 1, 2021 Exhibit C. Also included is a structural analysis prepared by Crown Castle, dated June 7, 2021, confirming that the existing tower is structurally capable of supporting the proposed equipment. Attached as Exhibit D. This facility was approved by Connecticut Siting Council, Docket No. 73 on April 1, 1997. Please see attached Exhibit A.
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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 Harry Rilling, Mayor, for the City of Norwalk, Steven Kleppin, Director of Planning, as well as the tower owner and property owner (Crown Castle)

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 182-feet; Dish Wireless LLC proposed antennas will be located at a center line height of 181-feet.

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

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

4. The operation of the proposed antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard. As indicated in the attached power density calculations, the combined site operations will result in a total power density of 24.00% as evidenced by Exhibit F.

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

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

B. Legal Feasibility. As referenced above, C.G.S. 16-50aa has been authorized to issue orders approving the shared use of an existing tower such as this support tower in Norwalk. 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 181-foot level of the existing 182-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 Norwalk.

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: Harry Rilling, Mayor
City of Norwalk 125 East Avenue Norwalk, CT 06851

Steven Kleppin, Director of Planning
City of Norwalk Planning & Zoning
125 East Avenue Norwalk, CT 06851

Crown Castle, Property and Tower Owner

Exhibit A

Original Facility Approval

DOCKET NO. 73

AN APPLICATION OF METRO MOBILE CTS OF FAIRFIELD COUNTY, INC., FOR CERTIFICATES OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE, AND OPERATION OF THREE FACILITIES CONSISTING OF TELECOMMUNICATIONS TOWERS AND ASSOCIATED EQUIPMENT FOR THE PURPOSE OF PROVIDING DOMESTIC PUBLIC CELLULAR RADIO TELECOMMUNICATIONS SERVICE IN THE TOWN OF GREENWICH AND IN THE CITIES OF NORWALK AND STAMFORD, CONNECTICUT.	:	CONNECTICUT SITING COUNCIL
	:	April 1, 1987

D E C I S I O N A N D O R D E R

Pursuant to the foregoing opinion, the Connecticut Siting Council (Council) hereby directs that a Certificate of Environmental Compatibility and Public Need, as provided by Section 16-50k of the General Statutes of Connecticut (CGS), be issued to Metro Mobile CTS of Fairfield County, Inc., for the construction, operation, and maintenance of cellular mobile telecommunications equipment in the Town of Greenwich, and the Cities of Norwalk and Stamford, Connecticut.

The facilities shall be constructed, operated, and maintained as specified in the Council's record on this matter, and subject to the following conditions.

1. The Norwalk tower, including antennas, shall be no taller than necessary to provide the proposed service, and in no event shall exceed 193 feet.
2. A fence not lower than eight feet shall surround the Norwalk tower.
3. Unless necessary to comply with condition number four, below, no lights shall be installed on the Norwalk tower.
4. The facilities shall be constructed in accordance with all applicable federal, state, and municipal laws and regulations.

5. The certificate holder shall prepare a development and management (D&M) plan for the Norwalk site in compliance with sections 16-50j-75 through 16-50j-77 of the Regulations of State Agencies. The D&M plan shall provide for evergreen screening around the perimeter of the fence at this site, and for other landscaping to improve the appearance of the facility.
6. The receive antennas at the Greenwich and Stamford sites shall be mounted below the high points of the facades of their respective buildings to minimize their visibility.
7. No construction activities shall take place outside the hours of 7:00 A.M. to 7:00 P.M., Monday through Saturday.
8. The certificate holder or its successor shall notify the Council if and when directional antennas or any equipment other than that listed in this application is added to these facilities.
9. The certificate holder or its successor shall permit public or private entities to share space on the Norwalk tower, for due consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.
10. If these facilities do not provide or permanently cease to provide cellular service following completion of construction, this Decision and Order shall be void, and the tower and all associated equipment in this application shall be dismantled and removed or reapplication for any new use shall be made to the Council before any such new use is made.

11. Unless otherwise approved by the Council, this Decision and Order shall be void if all construction authorized herein is not completed within three years of the issuance of this Decision and Order, or within three years of the completion of any appeal taken in this Decision.

12. The certificate holder shall comply with any future radio frequency (RF) standards promulgated by state or federal regulatory agencies. Upon the establishment of any new governmental RF standards, the facilities granted in this Decision shall continue to be in compliance with such standards.

Pursuant to CGS section 16-50p, we hereby direct that a copy of the Decision and Order be served on each person listed below. A notice of the issuance shall be published in the Stamford Advocate, the Greenwich Times, the Norwalk Hour, and the Bridgeport Post.

The parties to the proceeding are:

Mr. Armand Mascioli (Applicant)
General Manager
Metro Mobile CTS of Fairfield
County, Inc.
5 Eversley Avenue
Norwalk, Connecticut 06855

Howard L. Slater, Esquire (its attorney)
Byrne, Slater, Sandler,
Shulman & Rouse, P.C.
330 Main Street
P.O. Box 3216
Hartford, Connecticut 06103

Richard Rubin, Esquire (its attorney)
Fleischman and Walsh, P.C.
1725 N Street, N.W.
Washington, D.C. 20036

Southern New England
Telephone Company

(its attorney)

Mr. Peter J. Tyrrell
Senior Attorney
Southern New England
Telephone Company
227 Church Street
New Haven, Connecticut 06506

C E R T I F I C A T I O N

The undersigned members of the Connecticut Siting Council hereby certify that they have heard this case or read the record thereof, and that we voted as follows:

Dated at New Britain, Connecticut, this 1st day of April, 1987.

Council Members	Vote Cast
Gloria Dibble Pond Gloria Dibble Pond Chairperson	Yes
_____ Commissioner John Downey Designee: Commissioner Peter G. Boucher	Yes
Brian J. Emerick Acting Commissioner John Anderson Designee: Brian Emerick	Yes
Owen L. Clark Owen L. Clark	Yes
Fred J. Doocy Fred J. Doocy	Yes
Mortimer A. Gelston Mortimer A. Gelston	Yes
_____ James G. Horsfall	Absent
_____ William H. Smith	Absent
Colin C. Tait Colin C. Tait	Yes

STATE OF CONNECTICUT)
: ss. New Britain, April 1, 1987
COUNTY OF HARTFORD)

I hereby certify that the foregoing is a true and correct copy of the decision and order issued by the Connecticut Siting Council, State of Connecticut.

ATTEST:

John C. Kelly
Executive Director
Connecticut Siting Council

I certify that a copy of the opinion and decision and order have been forwarded by mail to all parties of record on April 3, 1987.

ATTEST:

Robert K. Erling
Siting Analyst
Connecticut Siting Council

Exhibit B

Property Card

50 ROCKLAND RD

Location	50 ROCKLAND RD	**Mblu**	5/ 82/ 58/ 0/
Acct#	25665	**Owner**	CROWN ATLANTIC COMPANY LLC
Assessment	$3,369,900	**Appraisal**	$4,814,150
PID	25665	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$4,161,500	$652,650	$4,814,150
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$2,913,040	$456,860	$3,369,900

Owner of Record

Owner	CROWN ATLANTIC COMPANY LLC	**Sale Price**	$1,600,000
Co-Owner		**Certificate**	
Address	PMB 353 4017 WASHINGTON RD McMURRAY, PA 15317-0000	**Book & Page**	3701/331
		Sale Date	04/16/1999

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
CROWN ATLANTIC COMPANY LLC	$1,600,000		3701/331	04/16/1999
CELLCO PARTNERSHIP,	$1,020,000		3489/348	04/03/1998
DEVIVO MARIO + WENCHE	$0		0/0	

Building Information

Building 1 : Section 1

Year Built:	1987
Living Area:	21,115
Replacement Cost:	$1,257,359

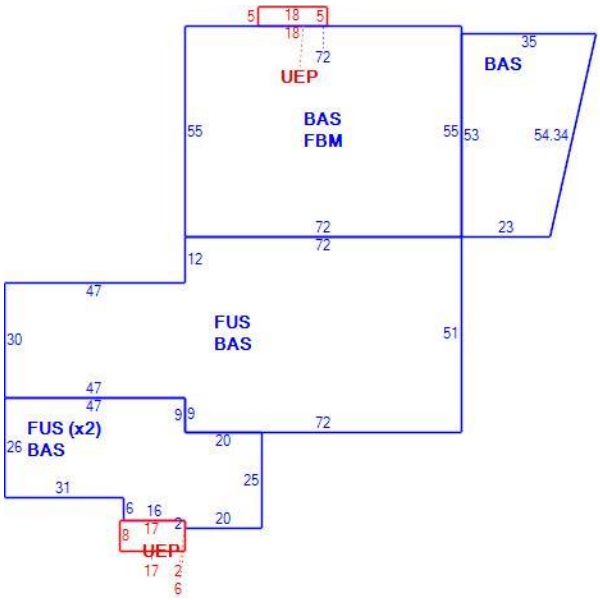
Building Percent Good: 66
Replacement Cost
Less Depreciation: $829,860

Building Attributes	
Field	**Description**
STYLE	Light Indust
MODEL	Industrial
Grade	C+
Stories:	3.00
Occupancy	1.00
Exterior Wall 1	Concrete
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Rolled Compos
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	Concrete
Heating Fuel	Gas
Heating Type	Forced Air
AC Percent	60
Heat Percent	100
Bldg Use	Industrial
Total Rooms	0
Bedrooms	0
Full Baths	0
Half Baths	6
Extra Fixtures	0
FBM Area	
Heat/AC	Heat/AC Pkg
Frame	Masonry
Plumbing	Average
Foundation	Slab
Partitions	Average
Wall Height	13.00
% Sprinkler	40.00

Building Photo

(http://images.vgsi.com/photos/NorwalkCTPhotos//00\00\72/74.jpg)

Building Layout



(ParcelSketch.ashx?pid=25665&bid=25665)

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	12,397	12,397
FUS	Finished Upper Story	8,718	8,718
FBM	Finished Basement	3,960	0
UEP	Utility Enclosed Porch	226	0
		25,301	21,115

Extra Features

Extra Features				Legend
Code	**Description**	**Size**	**Value**	**Bldg #**
ELV1	Commercial	3.00 STOP	$56,250	1

A/C	Air Conditioning	12669.00 S.F.	$38,010	1
SPR	Sprinklers	8446.00 S.F.	$31,670	1

Land

Land Use

Use Code	301
Description	Industrial
Zone	RI
Neighborhood	C530

Land Line Valuation

Size (Acres)	0.82
Frontage	
Depth	
Assessed Value	$456,860
Appraised Value	$652,650

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
PAV1	Paving Asph.			16900.00 S.F.	$21,970	1
FN6	Fence 6'			450.00 L.F.	$4,090	1
SHD4	Cell Equip	FR	Frame	128.00 S.F.	$12,800	1
CEL1	Cell Tower		Steel	5.00 UNITS	$750,000	1
SHD4	Cell Equip	FR	Frame	128.00 S.F.	$12,800	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$4,161,500	$652,650	$4,814,150
2017	$991,370	$447,530	$1,438,900
2016	$991,370	$447,530	$1,438,900

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$2,913,040	$456,860	$3,369,900
2017	$693,970	$313,270	$1,007,240
2016	$693,970	$313,270	$1,007,240

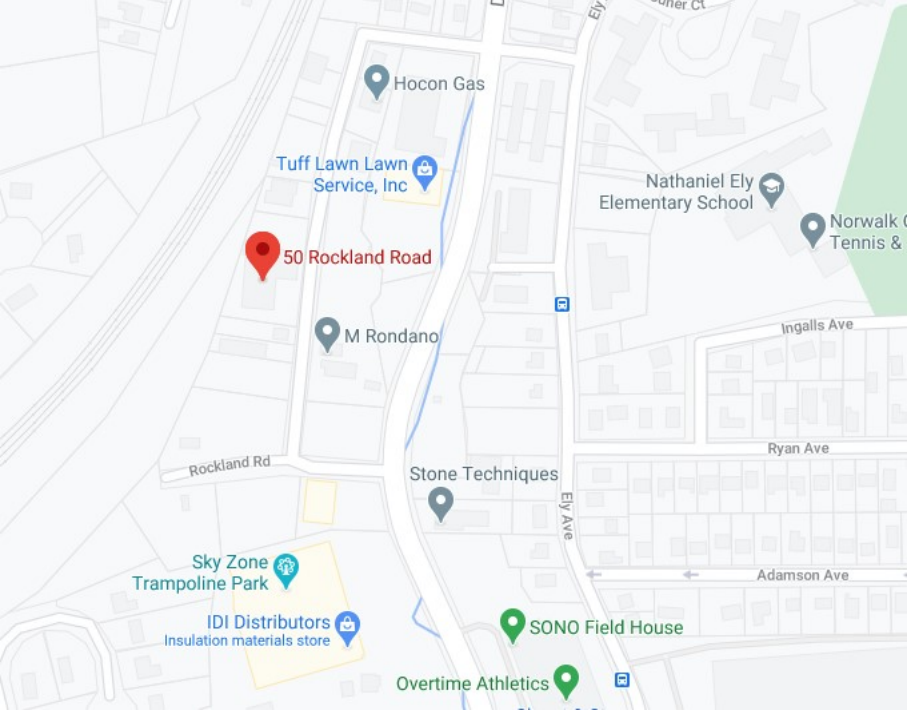

Hocon Gas
Tuff Lawn Lawn Service, Inc
Nathaniel Ely Elementary School
50 Rockland Road
M Rondano
Ingalls Ave
Ryan Ave
Rockland Rd
Stone Techniques
Ely Ave
Sky Zone Trampoline Park
Adamson Ave
IDI Distributors
Insulation materials store
SONO Field House
Overtime Athletics

Exhibit C

Construction Drawings

DISH Wireless L.L.C. SITE ID:

NJJER01090A

DISH Wireless L.L.C. SITE ADDRESS:

50 ROCKLAND ROAD
NORWALK, CT 06854

CONNECTICUT CODE COMPLIANCE

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

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

SHEET INDEX

SCOPE OF WORK

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

TOWER SCOPE OF WORK:
- REMOVE EMPTY MOUNT AT 178'-0" CL
- INSTALL (3) PROPOSED PANEL ANTENNAS (1 PER SECTOR)
- INSTALL (3) PROPOSED ANTENNA MOUNTS (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:
- REMOVE ABANDONED CONCRETE PAD
- INSTALL (1) PROPOSED METAL PLATFORM
- INSTALL (1) PROPOSED PPC CABINET
- INSTALL (1) PROPOSED EQUIPMENT CABINET
- INSTALL (1) PROPOSED POWER CONDUIT
- INSTALL (1) PROPOSED TELCO CONDUIT
- INSTALL (1) PROPOSED TELCO-FIBER BOX
- INSTALL (1) PROPOSED GPS UNIT
- INSTALL (1) PROPOSED 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:	CONNECTICUT LIGHT & POWER
ADDRESS:	PO BOX 2957 NORTHEAST UTILITIES, HARTFORD, CT 06141
TOWER TYPE:	SELF-SUPPORT TOWER
TOWER CO SITE ID:	807133
TOWER APP NUMBER:	548868
COUNTY:	FAIRFIELD
LATITUDE (NAD 83):	41° 4' 54.44" N 41.08178889 N
LONGITUDE (NAD 83):	73° 25' 49.52" W 73.43042222 W
ZONING JURISDICTION:	CONNECTICUT SITING COUNCIL
ZONING DISTRICT:	N/A
PARCEL NUMBER:	NORW-000005-000082-000058
OCCUPANCY GROUP:	U
CONSTRUCTION TYPE:	II-B
POWER COMPANY:	NORTHEAST UTILITIES
TELEPHONE COMPANY:	T.B.D.

PROJECT DIRECTORY

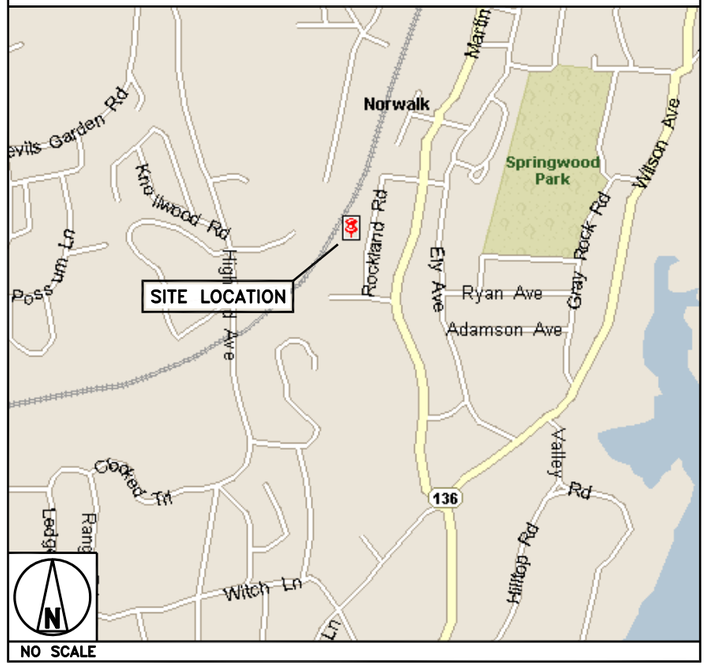
APPLICANT:	DISH Wireless L.L.C. 5701 SOUTH SANTA FE DRIVE LITTLETON, CO 80120
TOWER OWNER:	CROWN CASTLE 2000 CORPORATE DRIVE CANONSBURG, PA 15317 (877) 486-9377
SITE DESIGNER:	B+T GROUP 1717 S. BOULDER AVE, SUITE 300 TULSA, OK 74119 (918) 587-4630
SITE ACQUISITION:	NICHOLAS CURRY NICHOLAS.CURRY@CROWN.CASTLE.COM
CONSTRUCTION MANAGER:	MICHAEL NARDUCCI MICHAEL.NARDUCCI@DISH.COM
RF ENGINEER:	MURUGABIRAN JAYAPAL MURUGABIRAN.JAYAPAL@DISH.COM

DIRECTIONS

DIRECTIONS FROM 3 ADP BLVD ROSELAND, NJ:

GET ON I-280 W FROM LIVINGSTON AVE
TAKE I-287 N AND I-95 N TO CT-136 E/TOKENEKE RD IN DARIEN. TAKE EXIT 12 FROM I-95 N
CONTINUE ON CT-136 E. TAKE WITCH LN TO ROCKLAND RD IN NORWALK

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 — 9/1/21

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

DRAWN BY:	CHECKED BY:	APPROVED BY:
LHT	YXI	MDW

RFDS REV #: 3.0

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	6/16/21	ISSUED FOR REVIEW
0	7/29/21	ISSUED FOR REVIEW
1	9/1/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

82164.010.01

DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER01090A
50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET TITLE

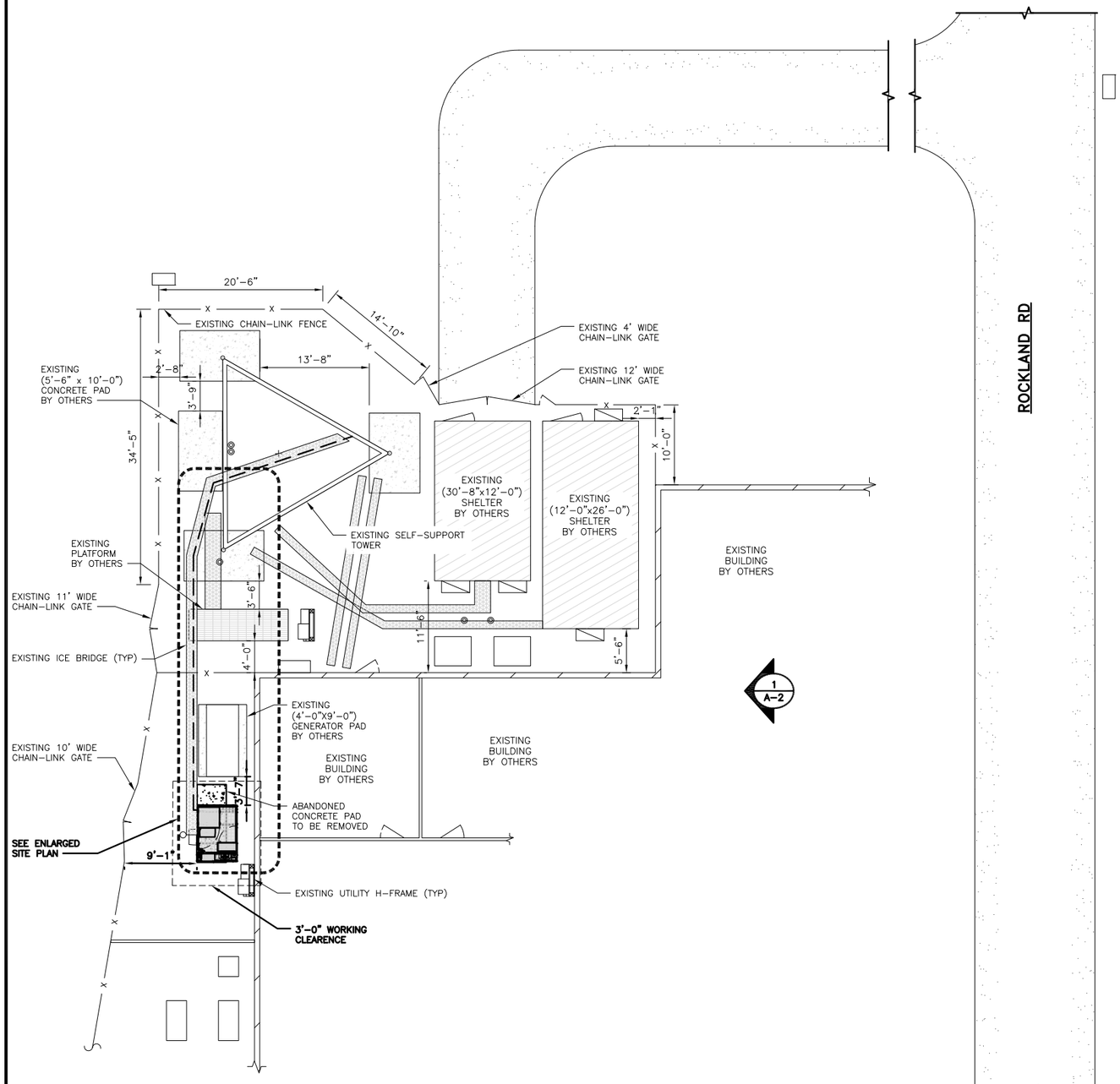
TITLE SHEET

SHEET NUMBER

T-1

NOTES

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



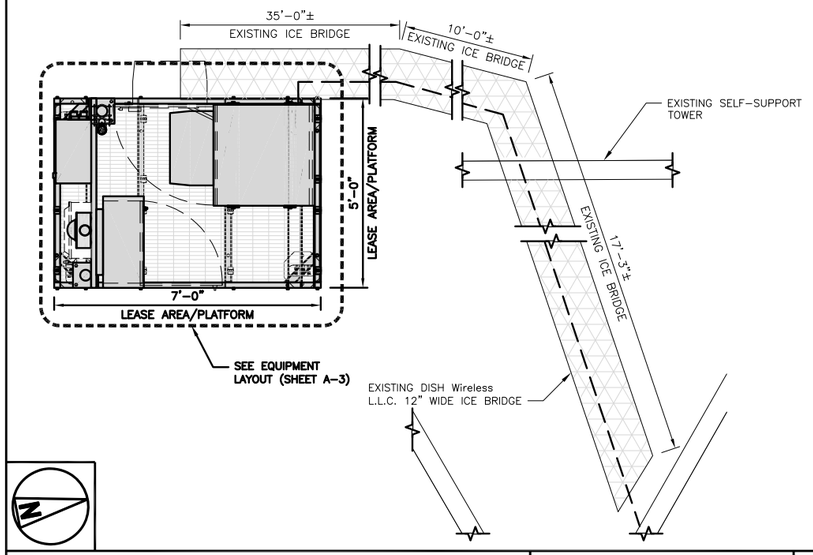
OVERALL SITE PLAN

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

1

NOTES

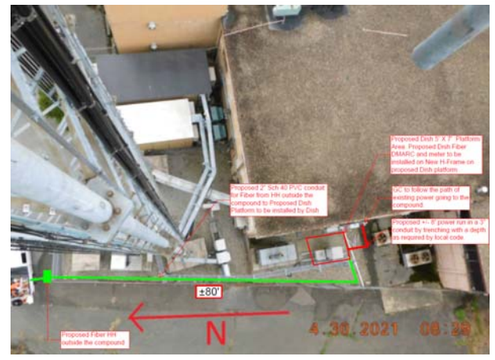
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. CONTRACTOR SHALL MAINTAIN A 10'-0" MINIMUM SEPARATION BETWEEN THE PROPOSED GPS UNIT, TRANSMITTING ANTENNAS AND EXISTING GPS UNITS.
3. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.



ENLARGED SITE PLAN

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

2



OVERALL 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
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STATE OF CONNECTICUT
No. 23924
LICENSED
PROFESSIONAL ENGINEER
9/1/21

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

DRAWN BY:	CHECKED BY:	APPROVED BY:
LHT	YXI	MDW

RFDS REV #: 3.0

CONSTRUCTION DOCUMENTS

SUBMITTALS

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A&E PROJECT NUMBER

82164.010.01

DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER01090A
50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET TITLE

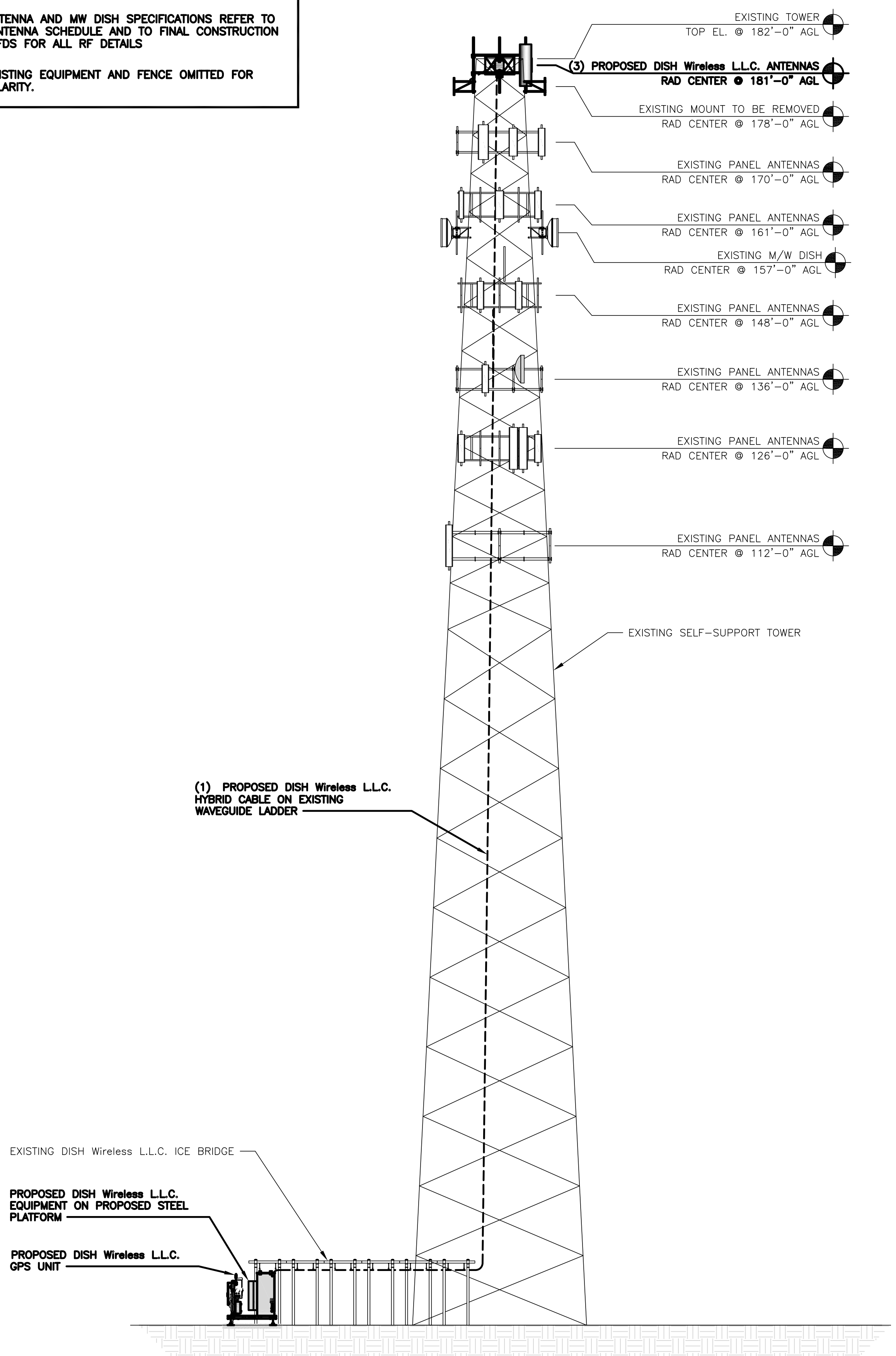
OVERALL AND ENLARGED SITE PLAN

SHEET NUMBER

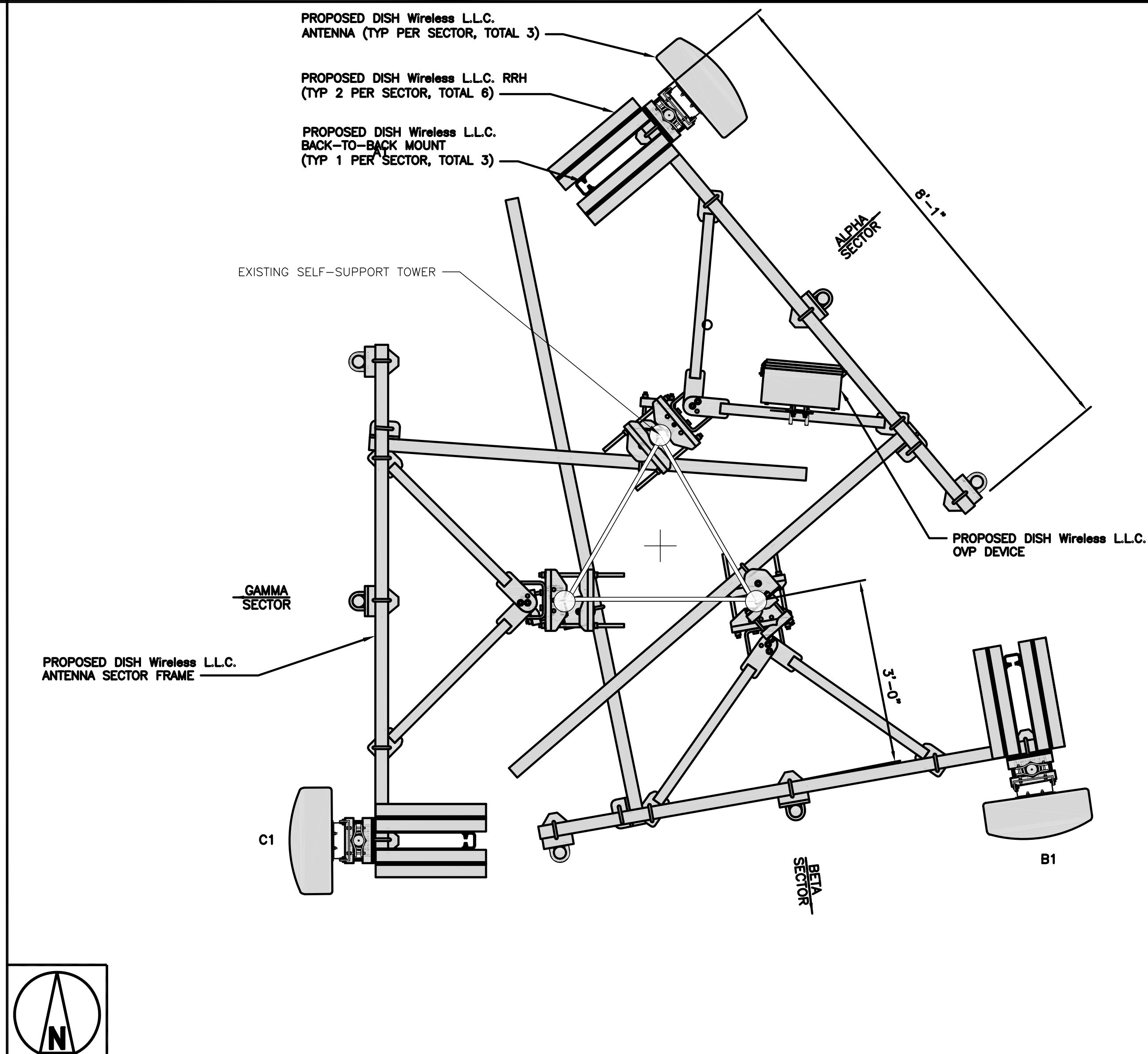
A-1

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



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

SECTOR	POSITION	ANTENNA							TRANSMISSION CABLE
		EXISTING OR PROPOSED	MANUFACTURER – MODEL NUMBER	TECHNOLOGY	SIZE (HxW)	AZIMUTH	RAD CENTER	FEED LINE TYPE AND LENGTH
ALPHA	A1	PROPOSED	JMA WIRELESS–MX08FRO665–21	5G	72.0" x 20.0"	50°	181'–0"	(1) HIGH–CAPACITY HYBRID CABLE (270' LONG)
BETA	B1	PROPOSED	DISH WIRELESS LLC OVP DEVICE	5G	72.0" x 20.0"	170°	181'–0"	
BETA	B1	PROPOSED	JMA WIRELESS–MX08FRO665–21	5G	72.0" x 20.0"	170°	181'–0"	
GAMMA	C1	PROPOSED	JMA WIRELESS–MX08FRO665–21	5G	72.0" x 20.0"	270°	181'–0"	

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

NOTES

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

ANTENNA SCHEDULE — NO SCALE — 3

dish wireless.

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No. 23924 PROFESSIONAL ENGINEER 9/1/21

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

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

DRAWN BY:	CHECKED BY:	APPROVED BY:
LHT	YXI	MDW

RFDS REV #: 3.0

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	6/16/21	ISSUED FOR REVIEW
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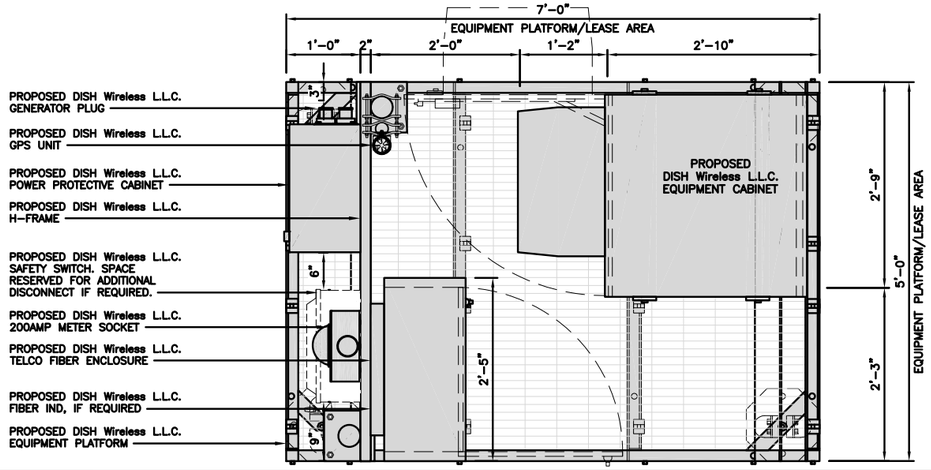
1	9/1/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
82164.010.01

DISH Wireless L.L.C.
PROJECT INFORMATION
NJJER01090A
50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET TITLE
ELEVATION, ANTENNA LAYOUT AND SCHEDULE

SHEET NUMBER
A-2



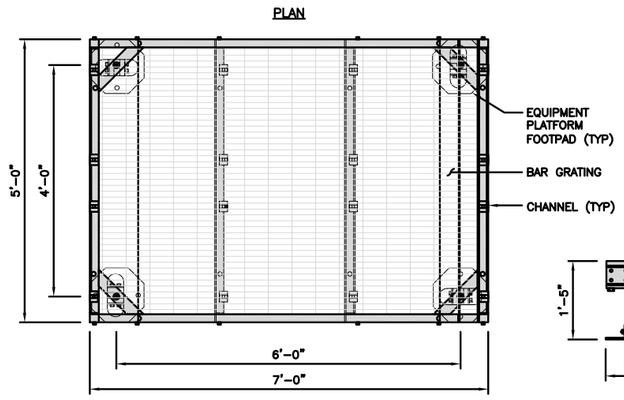
PLATFORM EQUIPMENT PLAN

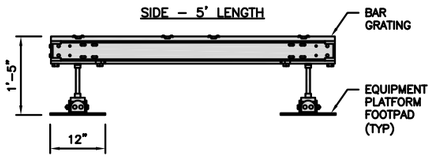
12" 9" 6" 3" 0 1' 2'
1"=1'-0"

1

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

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



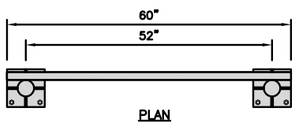


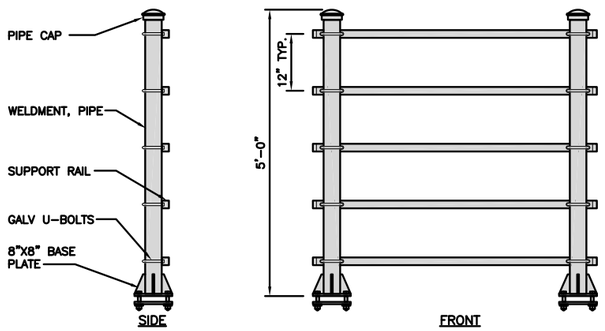
PLATFORM DETAIL

NO SCALE

2

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





H-FRAME DETAIL

NO SCALE

3

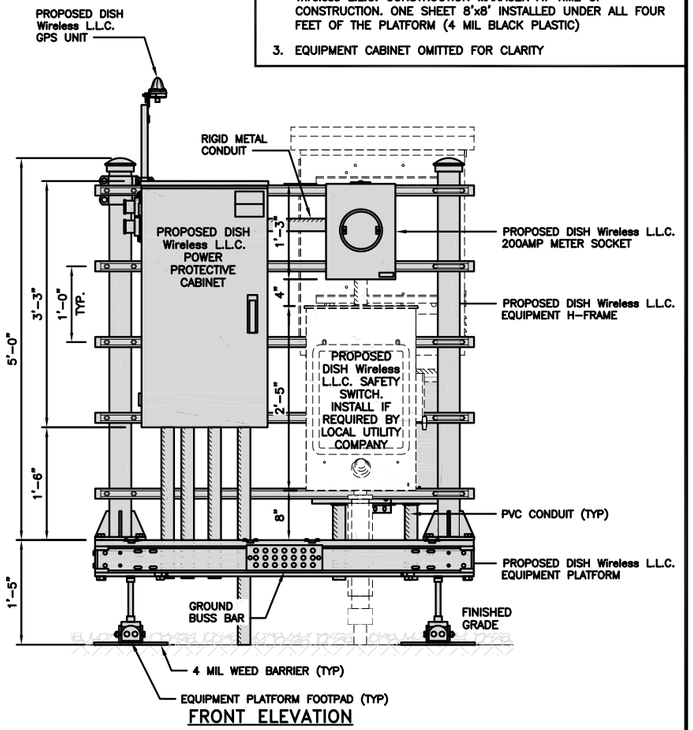
NOT USED

NO SCALE

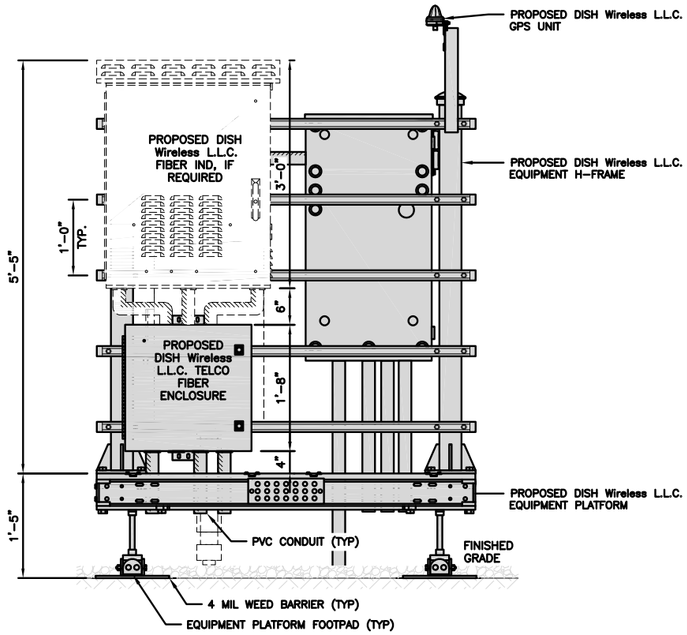
4

NOTES

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



FRONT ELEVATION



BACK ELEVATION

H-FRAME EQUIPMENT ELEVATION

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

5

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DRAWN BY:	CHECKED BY:	APPROVED BY:
LHT	YXI	MDW

RFDS REV #: 3.0

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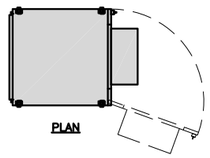
A&E PROJECT NUMBER
82164.010.01

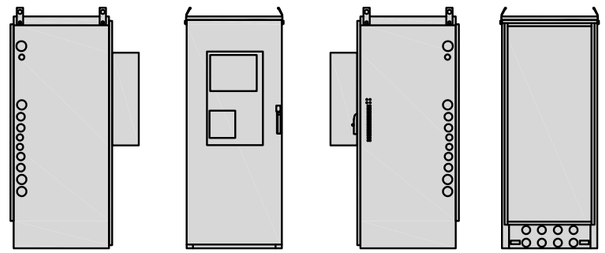
DISH Wireless L.L.C.
PROJECT INFORMATION
NJJER01090A
50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET TITLE
EQUIPMENT PLATFORM AND H-FRAME DETAILS

SHEET NUMBER
A-3

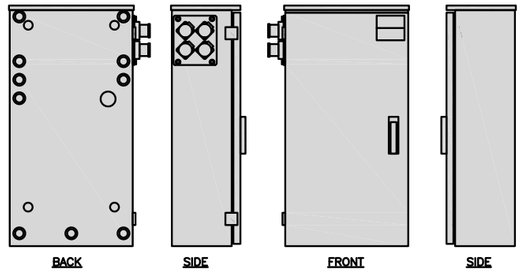
ENERSYS HVAC CABINET 2000005995	
DIMENSIONS (HxWxD):	73"x30"x32"
WEIGHT EMPTY:	371 lbs
HVAC	600W
POWER SYSTEM	-48V ALPHA/600A





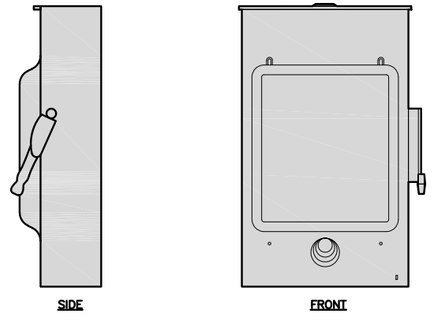
CABINET DETAIL | NO SCALE | 1

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



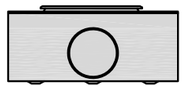
POWER PROTECTION CABINET (PPC) DETAIL | NO SCALE | 2

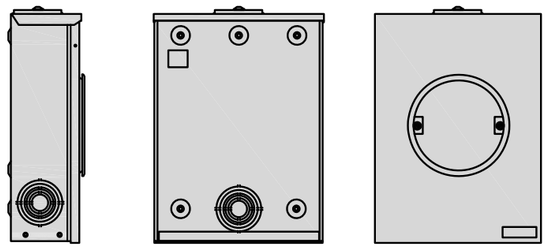
SQUARE D SAFETY SWITCHES D224NRB	
ENCLOSURE DIM (HxWxD)	29.25"x19.00"x8.50"
ENCLOSURE TYPE	NEMA 3R RAINPROOF
UL LISTED	FILE E-2875



SAFETY SWITCH DETAIL | NO SCALE | 3

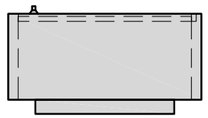
EATON METER SOCKET UNRRS213BEUSE	
METER SOCKET TYPE	RING
ENCLOSURE DIM (HxWxD)	16"x12"x6"
MAIN AMPERE RATING	200A
WEIGHT	18 LBS

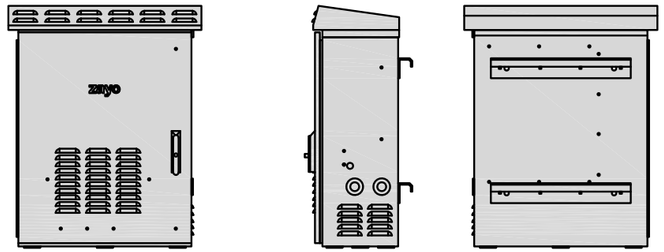




METER SOCKET DETAIL | NO SCALE | 4

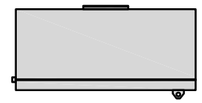
ZAYO 5RU CABINET LEFT SWING DOOR ("LIT" SITES)	
DIMENSIONS (HxWxD)	36.115"x29"x12.9"
WEIGHT	85 LBS
POWER INPUT	20A, -48VDC

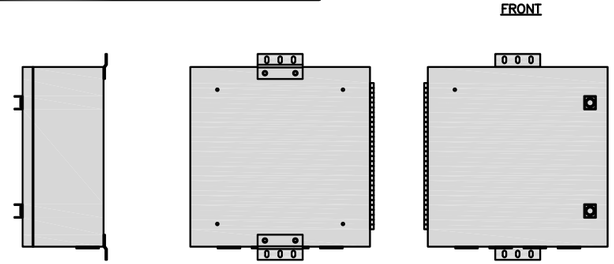




NETWORK INTERFACE UNIT DETAIL | NO SCALE | 5

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

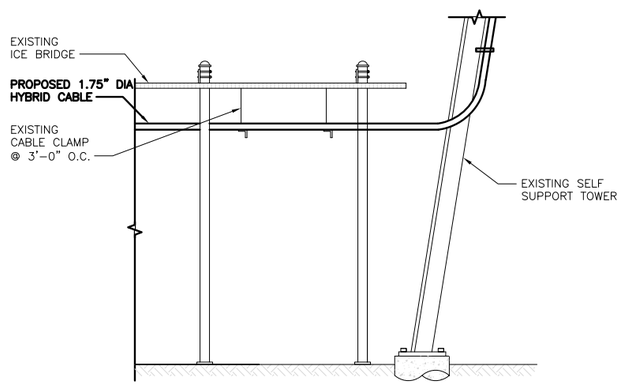




FIBER TELCO ENCLOSURE DETAIL | NO SCALE | 6

NOT USED | NO SCALE | 7

NOT USED | NO SCALE | 8



HYBRID CABLE RUN | NO SCALE | 9

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RFDS REV #: 3.0

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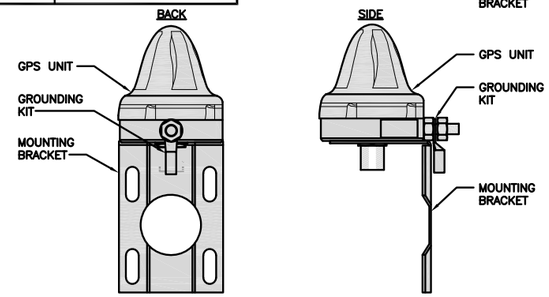
A&E PROJECT NUMBER
82164.010.01

DISH Wireless L.L.C.
PROJECT INFORMATION
NJJER01090A
50 ROCKLAND ROAD
NORWALK, CT 06854

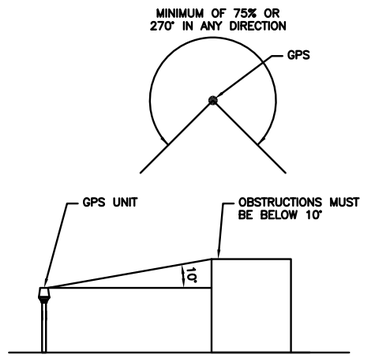
SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER
A-4

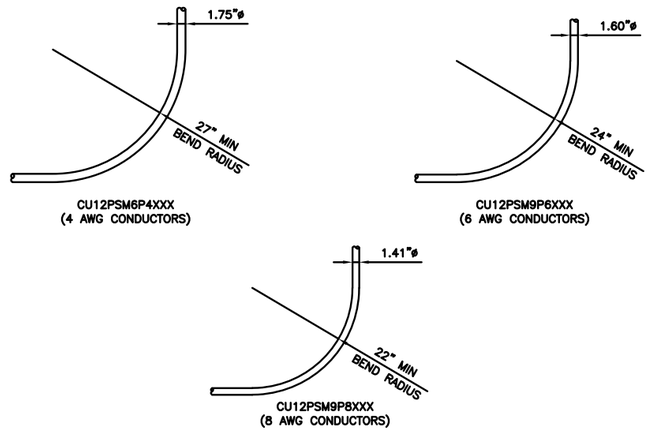
ROSENBERGER GPSGLONASS-36-N-S	
DIMENSION (DIA x H)	69mm x 98.5mm
WEIGHT (WITH ACCESSORIES)	515.74g
CONNECTOR	N-FEMALE
FREQUENCY RANGE	1559 MHz ~ 1610.5MHz



GPS ANTENNA DETAIL | NO SCALE | 1



GPS MINIMUM SKY VIEW REQUIREMENTS | NO SCALE | 2



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

NOT USED | NO SCALE | 4

NOT USED | NO SCALE | 5

NOT USED | NO SCALE | 6

NOT USED | NO SCALE | 7

NOT USED | NO SCALE | 8

NOT USED | NO SCALE | 9

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A&E PROJECT NUMBER

82164.010.01

DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER01090A
50 ROCKLAND ROAD
NORWALK, CT 06854

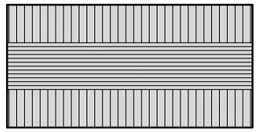
SHEET TITLE

EQUIPMENT DETAILS

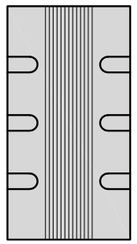
SHEET NUMBER

A-5

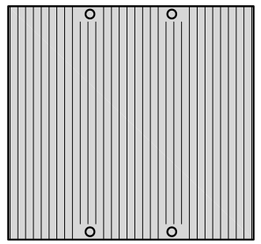
FUJITSU TA08025-B604 RRH	
DIMENSIONS (HxWxD) (KG/IN)	380x400x200/14.9"x15.7"x7.8"
WEIGHT(KG,LB)/ VOLUME	29kg,63.9lb/ 30L
POWER SUPPLY	DC-58~-36V



PLAN



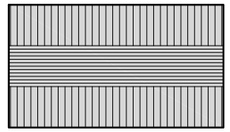
SIDE



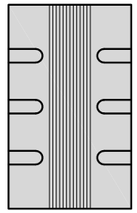
FRONT

REMOTE RADIO HEAD DETAIL | NO SCALE | 1

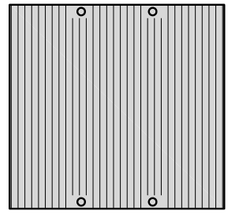
FUJITSU TA08025-B605 RRH	
DIMENSIONS (HxWxD) (KG/IN)	380x400x230/14.9"x15.7"x9.0"
WEIGHT(KG,LB)/ VOLUME	34kg,74.9lb/ 35L
POWER SUPPLY	DC-58~-36V



PLAN



SIDE

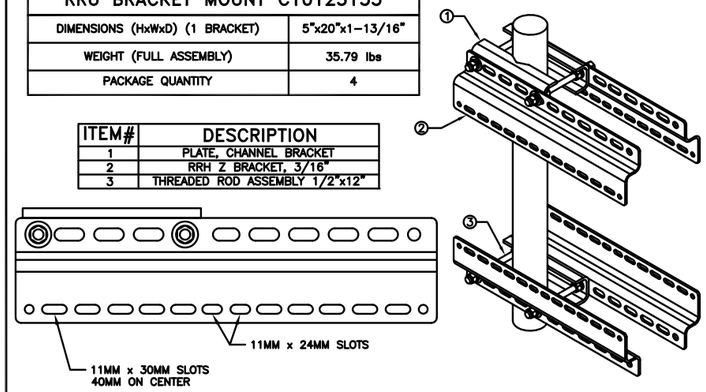


FRONT

REMOTE RADIO HEAD DETAIL | NO SCALE | 2

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

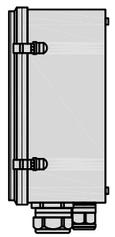
ITEM#	DESCRIPTION
1	PLATE, CHANNEL BRACKET
2	RRH Z BRACKET, 3/16"
3	THREADED ROD ASSEMBLY 1/2"x12"



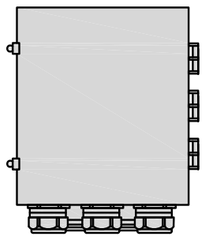
REMOTE RADIO MOUNT DETAIL | NO SCALE | 3

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

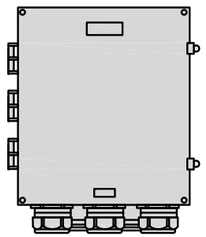
PLAN



SIDE



BACK

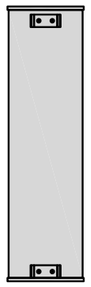


FRONT

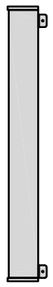
SURGE SUPPRESSION DETAIL (OVP) | NO SCALE | 4

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

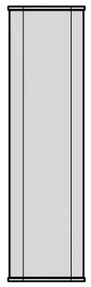
PLAN



BACK



SIDE

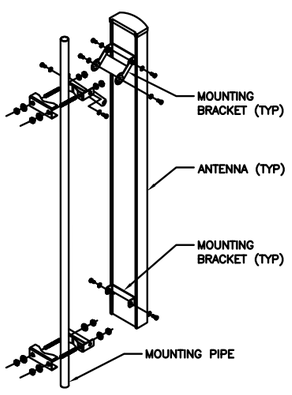


FRONT

ANTENNA DETAIL | NO SCALE | 5

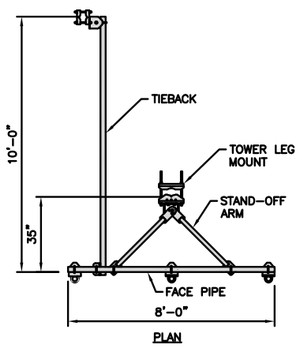
NOT USED | NO SCALE | 6

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

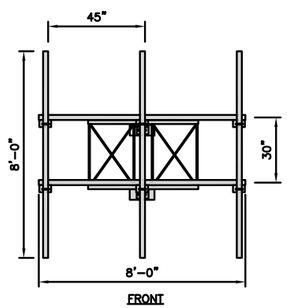


ANTENNA MOUNTING DETAIL | NO SCALE | 7

COMMSCOPE V-FRAME MTC3975083	
FACE SIZE	8'-0"
WEIGHT	352.136 lbs



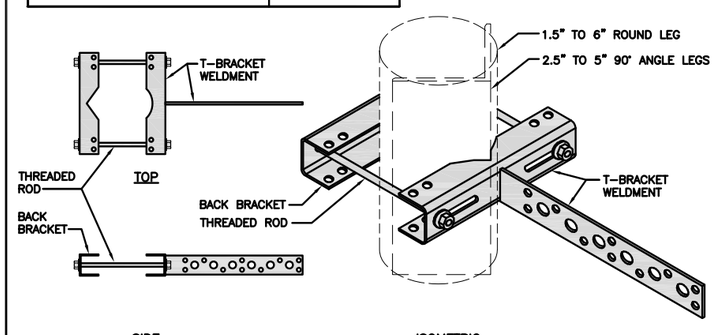
PLAN



FRONT

ANTENNA FRAME DETAIL | NO SCALE | 8

SITEPRO1 T600 UNIVERSAL T-BRACKET	
DIMENSIONS (HxWxL)	2.25"x10.0"x15.25"
WEIGHT/ VOLUME	5.60 LBS



SIDE ISOMETRIC

VERTICAL CABLE SUPPORT DETAIL | NO SCALE | 9

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STATE OF CONNECTICUT No. 23924 LICENSED PROFESSIONAL ENGINEER 9/1/21

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

DRAWN BY:	CHECKED BY:	APPROVED BY:
LHT	YXI	MDW

RFDS REV #: 3.0

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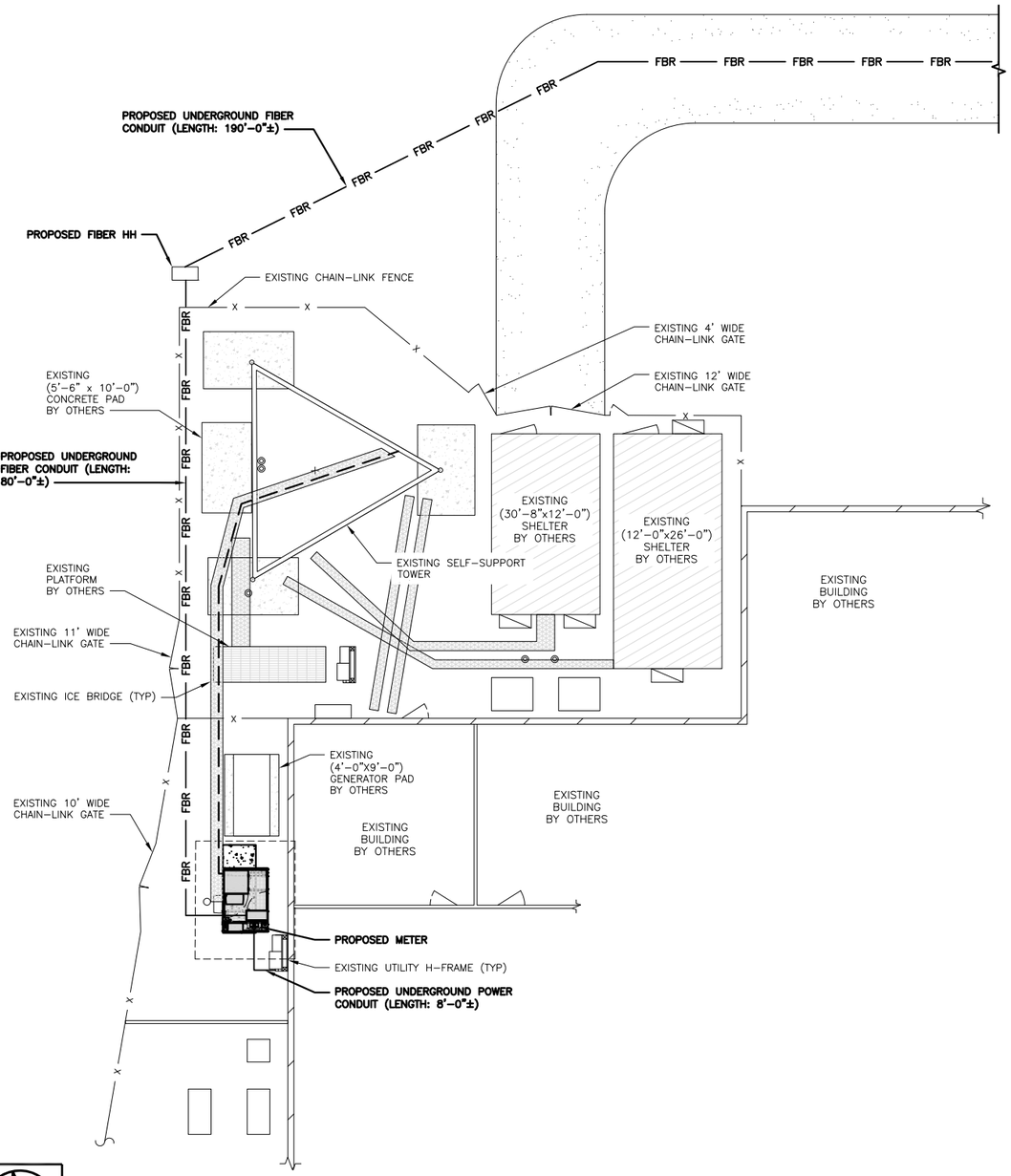
A&E PROJECT NUMBER
82164.010.01

DISH Wireless L.L.C.
PROJECT INFORMATION
NJJER01090A
50 ROCKLAND ROAD
NORWALK, CT 06854

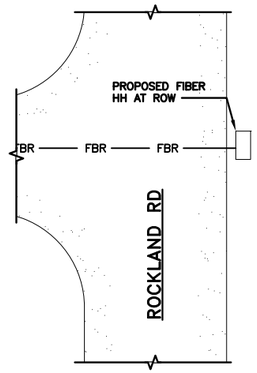
SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER
A-6



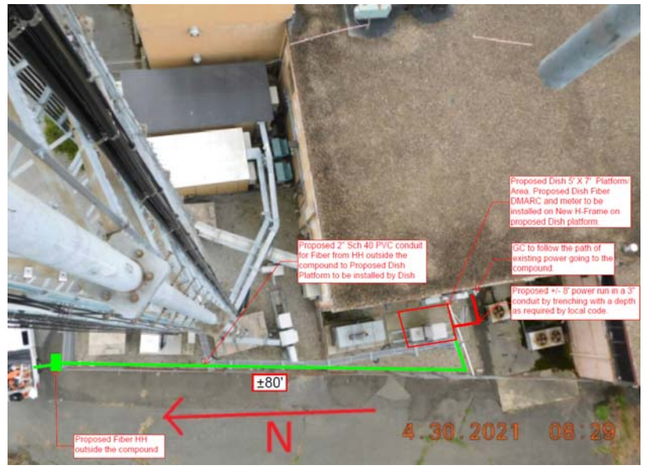
NOTES

1. CONTRACTOR SHALL FIELD VERIFY ALL PROPOSED UNDERGROUND UTILITY CONDUIT ROUTE.
2. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.
3. THE GROUND LEASE PROVIDES BROAD/BLANKET UTILITY RIGHTS. "PWR" AND "FBR" PATH DEPICTED ON A-1 AND E-1 ARE BASED ON BEST AVAILABLE INFORMATION INCLUDING BUT NOT LIMITED TO 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 NOT AN OPTION, 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



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DISH Wireless L.L.C.
PROJECT INFORMATION
NJJER01090A
50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET TITLE
ELECTRICAL/FIBER ROUTE PLAN AND NOTES

SHEET NUMBER
E-1

UTILITY ROUTE PLAN

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

1

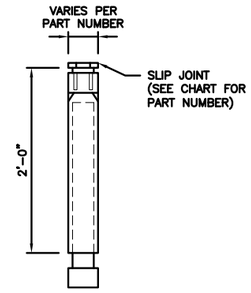
ELECTRICAL NOTES

NO SCALE

2

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"

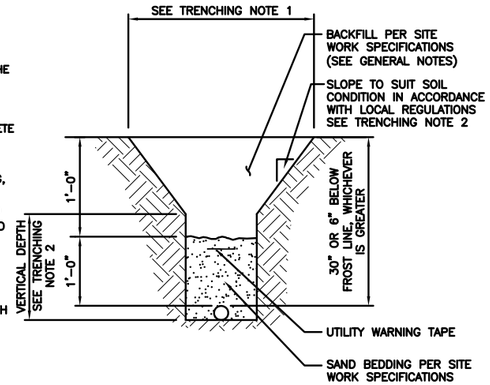


NOTE:
CONTRACTOR TO INSTALL EXPANSION FITTING SLIP JOINT AT METER CENTER CONDUIT TERMINATION, AS PER LOCAL UTILITY POLICY, ORDINANCE AND/OR SPECIFIED REQUIREMENT.

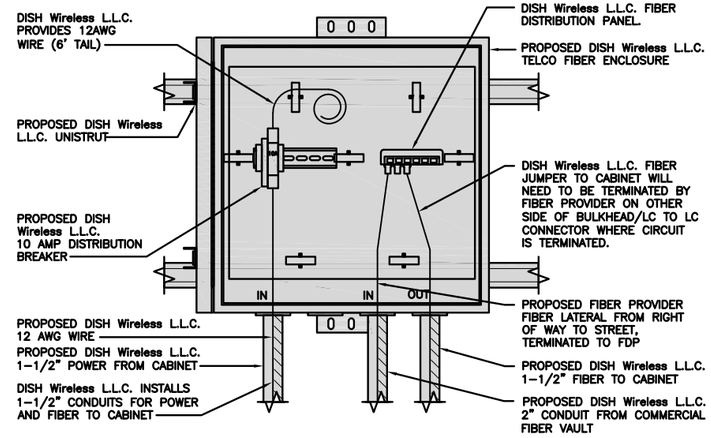
EXPANSION JOINT DETAIL | NO SCALE | 1

TRENCHING NOTES

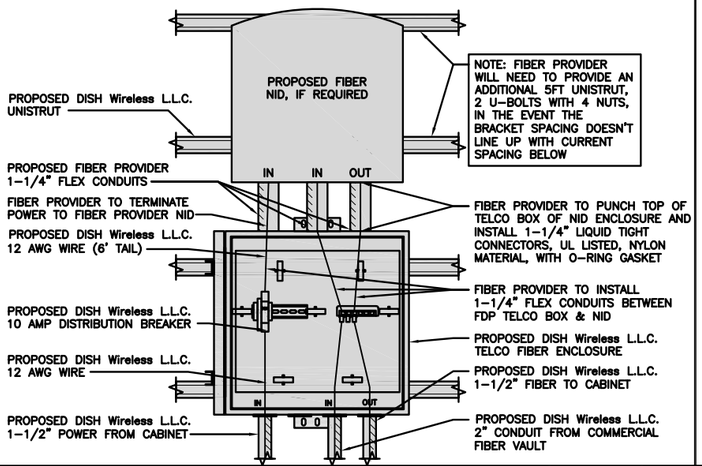
1. CONTRACTOR SHALL RESTORE THE TRENCH TO ITS ORIGINAL CONDITIONS BY EITHER SEEDING OR SODDING GRASS AREAS, OR REPLACING ASPHALT OR CONCRETE AREAS TO ITS ORIGINAL CROSS SECTION.
2. TRENCHING SAFETY; INCLUDING, BUT NOT LIMITED TO SOIL CLASSIFICATION, SLOPING, AND SHORING, SHALL BE GOVERNED BY THE CURRENT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

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DISH Wireless L.L.C.
PROJECT INFORMATION

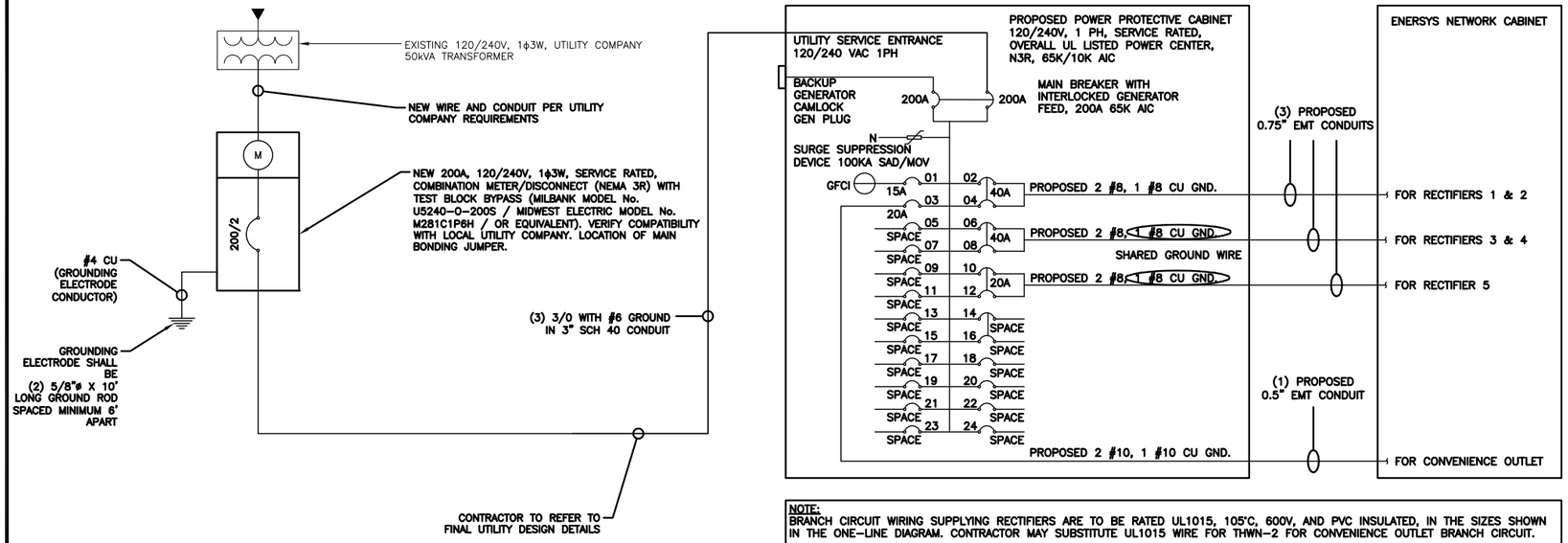
NJJER01090A
50 ROCKLAND ROAD
NORWALK, CT 06854

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:
(2) 40A, 2P BREAKER - SQUARE D P/N:QO240
(1) 20A, 2P BREAKER - SQUARE D P/N:QO220
(1) 20A, 1P BREAKER - SQUARE D P/N:QO120

PPC ONE-LINE DIAGRAM

NO SCALE | 1

NOTES

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 (3 CONDUITS): USING UL1015, CU.

#8 - 0.0552 SQ. IN X 2 = 0.1103 SQ. IN
#8 - 0.0131 SQ. IN X 1 = 0.0131 SQ. IN <BARE GROUND
TOTAL = 0.1234 SQ. IN

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

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

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

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

PROPOSED ENERSYS 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	40A	3840		ENERSYS ALPHA CORDEX
ENERSYS GFCI OUTLET		180	20A	3	B	4			3840	RECTIFIERS 1 & 2
-SPACE-				5	A	6	40A	3840		ENERSYS ALPHA CORDEX
-SPACE-				7	B	8			3840	RECTIFIER 3 & 4
-SPACE-				9	A	10	20A	1920		ENERSYS ALPHA CORDEX
-SPACE-				11	B	12			1920	RECTIFIER 5
-SPACE-				13	A	14				-SPACE-
-SPACE-				15	B	16				-SPACE-
-SPACE-				17	A	18				-SPACE-
-SPACE-				19	B	20				-SPACE-
-SPACE-				21	A	22				-SPACE-
-SPACE-				23	B	24				-SPACE-
VOLTAGE AMPS	180	180						9500	9500	
200A MCB, 1ϕ, 24 SPACE, 120/240V			L1		L2					
MB RATING: 65,000 AIC			9680		9680		VOLTAGE AMPS			
			81		81		AMPS			
			81				MAX AMPS			
			102				MAX 125%			

PANEL SCHEDULE

NO SCALE | 2

NOT USED

NO SCALE | 3

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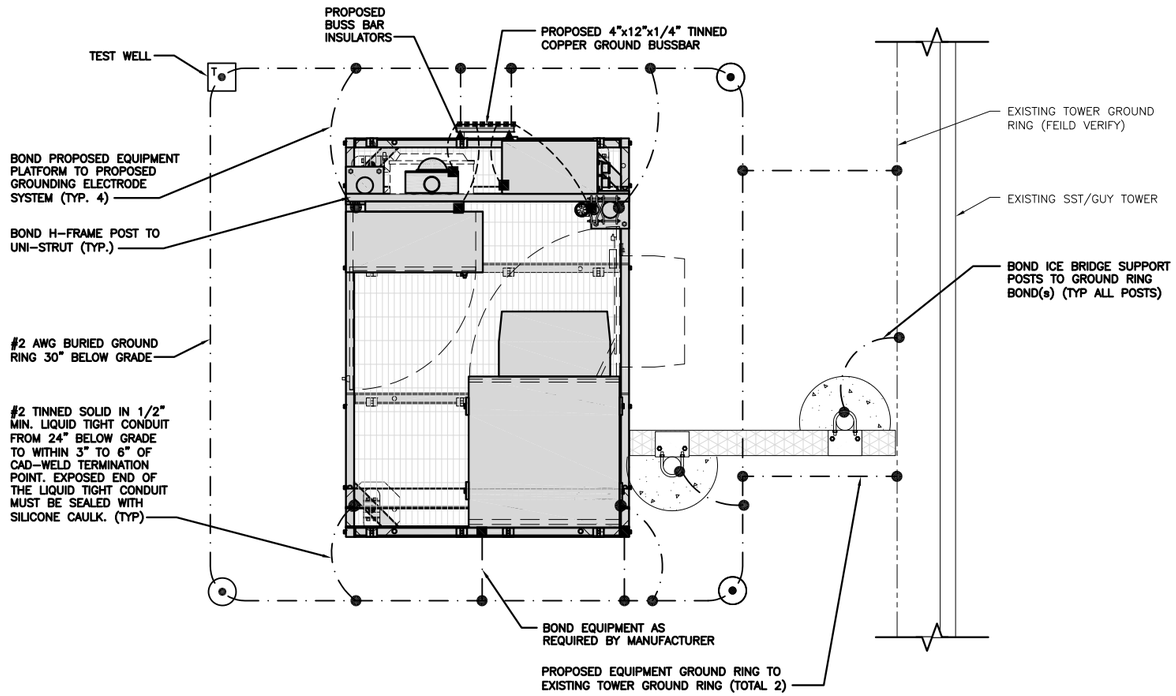
DISH Wireless L.L.C.
PROJECT INFORMATION
NJJER01090A
50 ROCKLAND ROAD
NORWALK, CT 06854

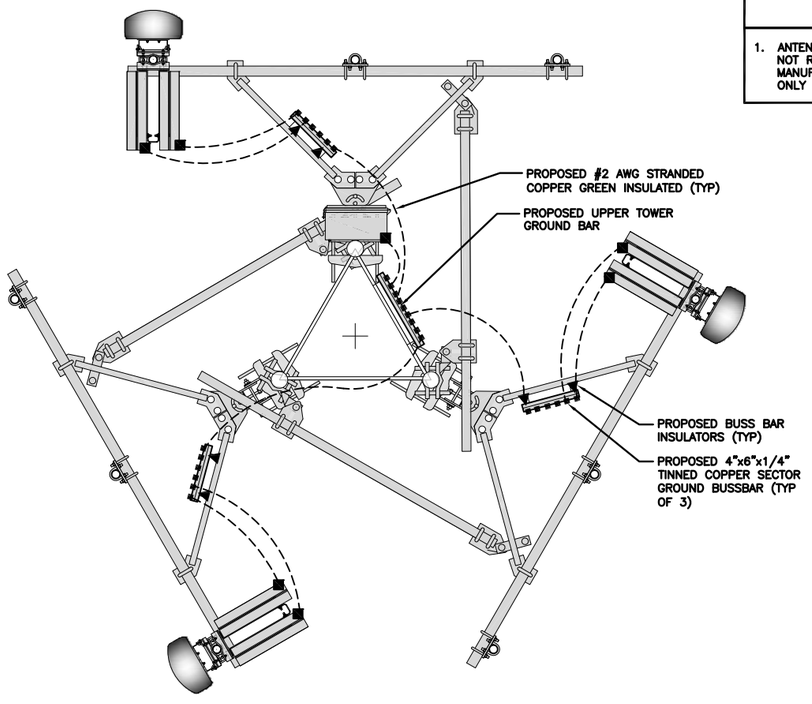
SHEET TITLE
ELECTRICAL ONE-LINE, FAULT CALCS & PANEL SCHEDULE

SHEET NUMBER
E-3



TYPICAL EQUIPMENT GROUNDING PLAN

NO SCALE | 1



TYPICAL ANTENNA GROUNDING PLAN

NO SCALE | 2

NOTES

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

- 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 TOWER STEEL.

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

GROUNDING KEY NOTES

NO SCALE | 3

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LHT	YXI	MDW

RFDS REV #: 3.0

CONSTRUCTION DOCUMENTS

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REV	DATE	DESCRIPTION
A	6/16/21	ISSUED FOR REVIEW
0	7/29/21	ISSUED FOR REVIEW
1	9/1/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

82164.010.01

DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER01090A
50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET TITLE

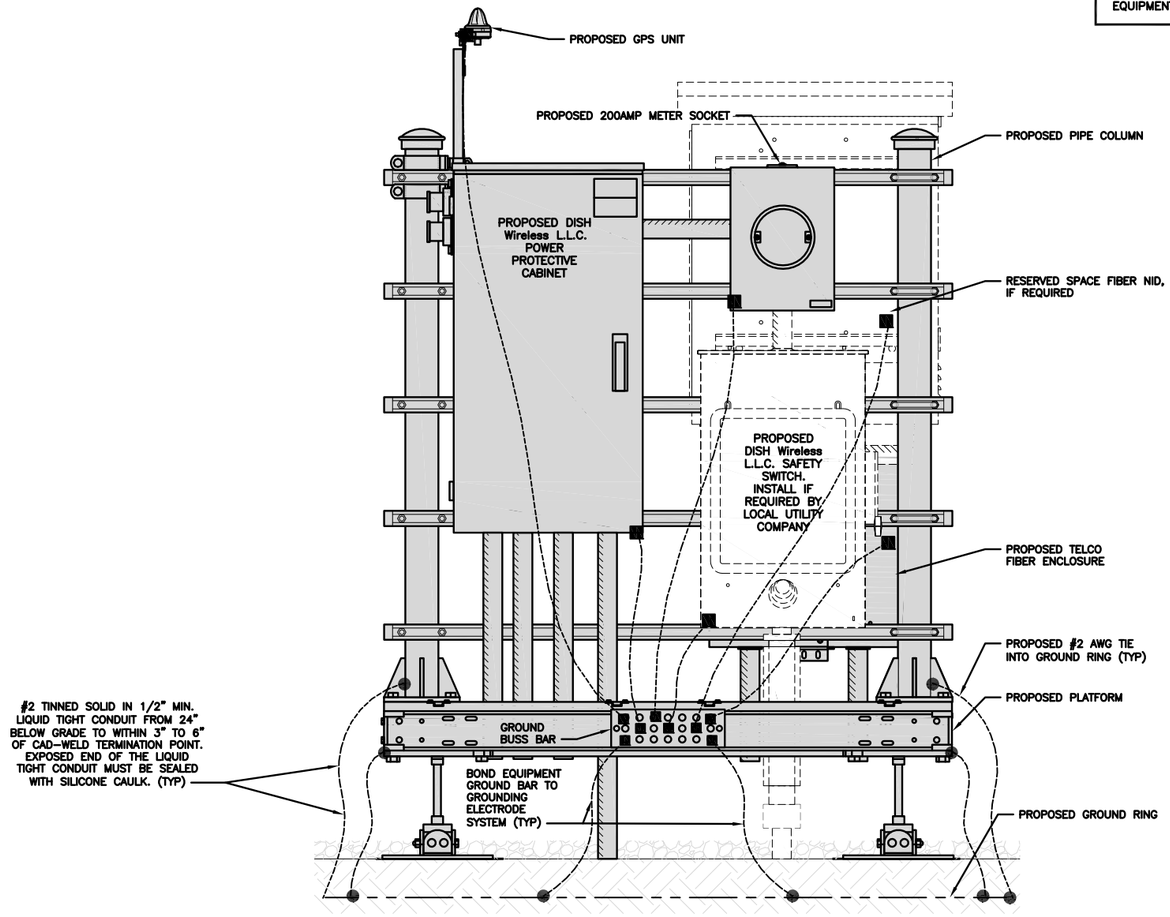
GROUNDING PLANS AND NOTES

SHEET NUMBER

G-1

NOTES

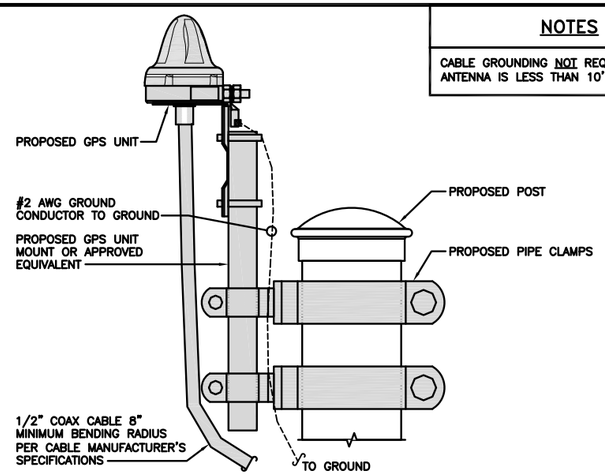
EQUIPMENT CABINET OMITTED FOR CLARITY



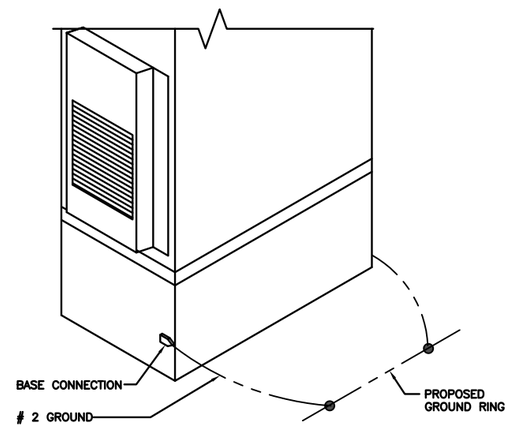
H-FRAME GROUNDING DETAIL | NO SCALE | 1

NOTES

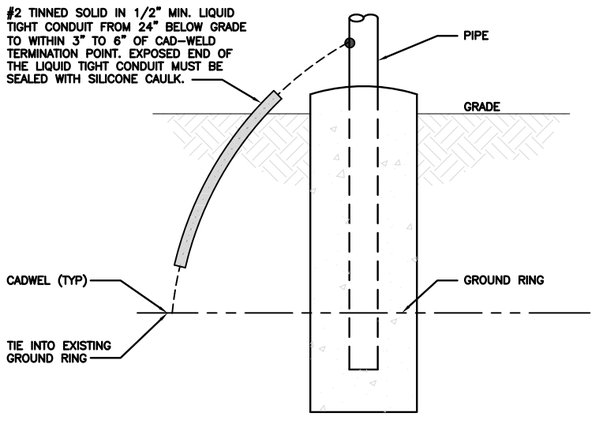
CABLE GROUNDING NOT REQUIRED WHEN ANTENNA IS LESS THAN 10' FROM CABINET



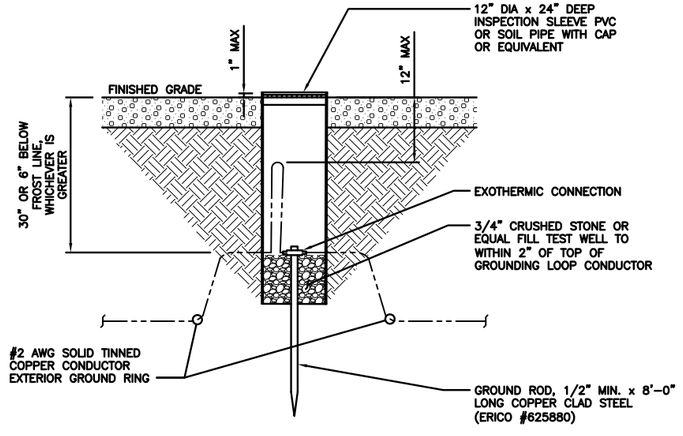
TYPICAL GPS UNIT GROUNDING | NO SCALE | 2



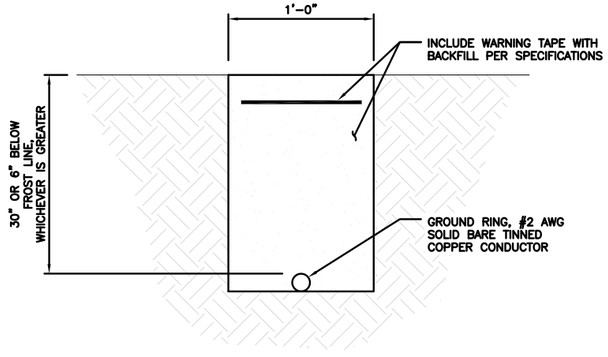
OUTDOOR CABINET GROUNDING | NO SCALE | 3



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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STATE OF CONNECTICUT — No. 23924 — LICENSED PROFESSIONAL ENGINEER — 9/1/21

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

DRAWN BY:	CHECKED BY:	APPROVED BY:
LHT	YXI	MDW

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SHEET TITLE

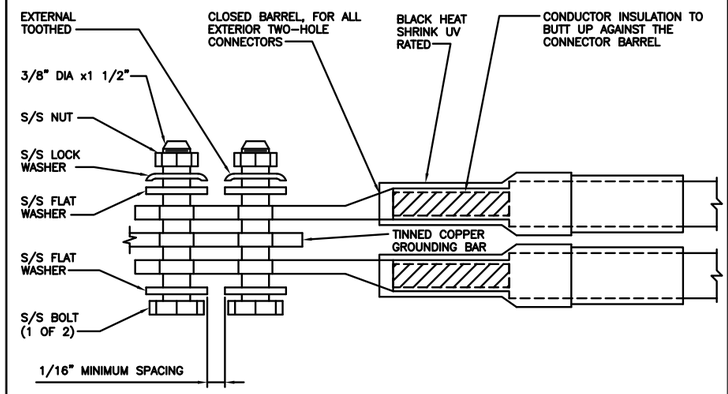
GROUNDING DETAILS

SHEET NUMBER

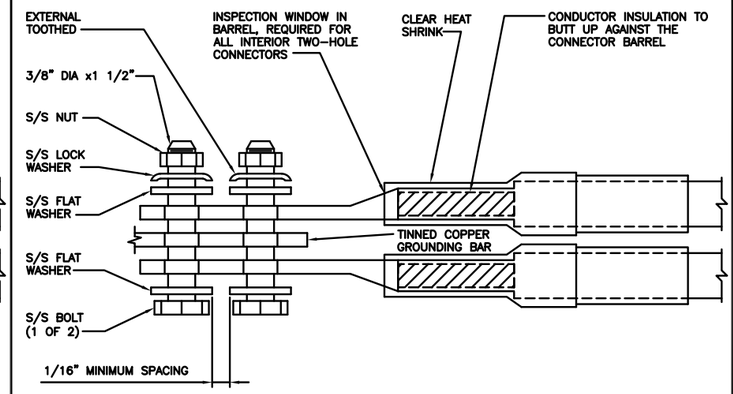
G-2

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).

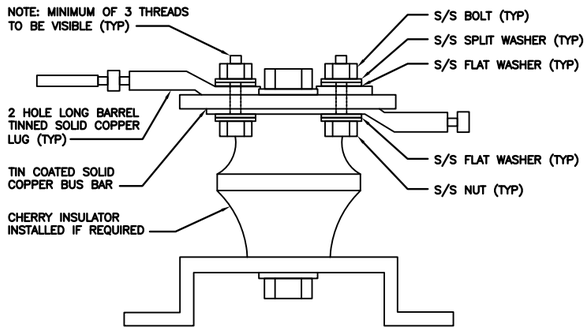
TYPICAL GROUNDING NOTES | NO SCALE | 1



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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50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET TITLE
GROUNDING DETAILS

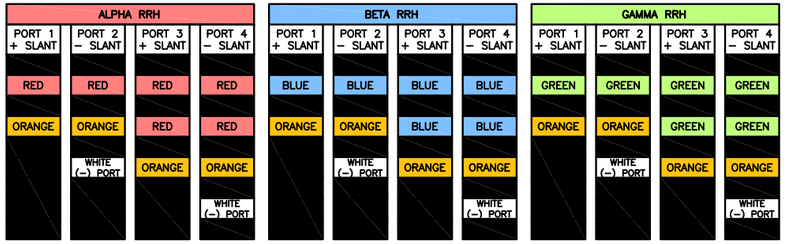
SHEET NUMBER
G-3

RF JUMPER COLOR CODING

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

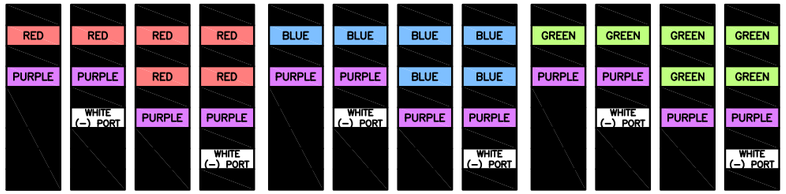
LOW-BAND RRH –
(600MHz N71 BASEBAND) +
(850MHz N26 BAND) +
(700MHz N29 BAND) – OPTIONAL PER MARKET

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)

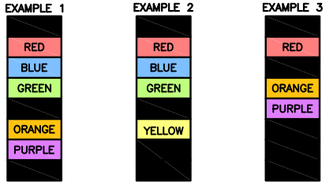


HYBRID/DISCREET CABLES

INCLUDE SECTOR BANDS BEING SUPPORTED
ALONG WITH FREQUENCY BANDS

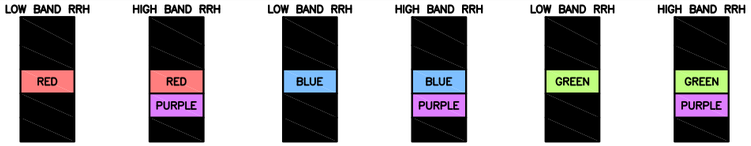
EXAMPLE 1 – HYBRID, OR DISCREET, SUPPORTS
ALL SECTORS, BOTH LOW-BANDS AND MID-BANDS

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



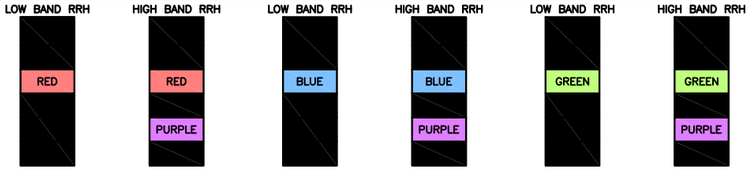
FIBER JUMPERS TO RRHs

LOW-BAND RRH FIBER CABLES HAVE SECTOR
STRIPE ONLY

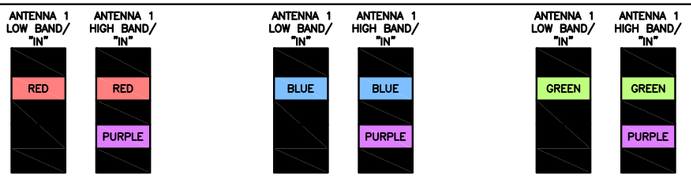


POWER CABLES TO RRHs

LOW-BAND RRH POWER CABLES HAVE SECTOR
STRIPE ONLY



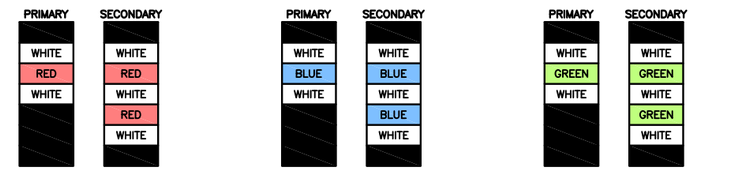
RET MOTORS AT ANTENNAS



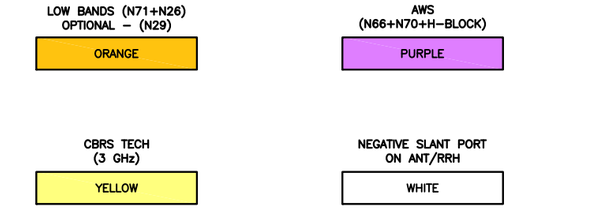
MICROWAVE RADIO LINKS

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



COLOR IDENTIFIER | NO SCALE | 2

NOT USED | NO SCALE | 3

NOT USED | NO SCALE | 4

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50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET TITLE
RF
CABLE COLOR CODE

SHEET NUMBER
RF-1

LEGEND

EXOTHERMIC CONNECTION

MECHANICAL CONNECTION

BUSS BAR INSULATOR

CHEMICAL ELECTROLYTIC GROUNDING SYSTEM

TEST CHEMICAL ELECTROLYTIC GROUNDING SYSTEM — T

EXOTHERMIC WITH INSPECTION SLEEVE

GROUNDING BAR

GROUND ROD

TEST GROUND ROD WITH INSPECTION SLEEVE — T

SINGLE POLE SWITCH

DUPLEX RECEPTACLE

DUPLEX GFCI RECEPTACLE — GFCI

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

SMOKE DETECTION (DC) — SD

EMERGENCY LIGHTING (DC)

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

CHAIN LINK FENCE — x — x — x — x

WOOD/WROUGHT IRON FENCE

WALL STRUCTURE

LEASE AREA

PROPERTY LINE (PL)

SETBACKS

ICE BRIDGE

CABLE TRAY

WATER LINE — W — W — W — W — W

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

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

OVERHEAD POWER — OHP — OHP — OHP — OHP

OVERHEAD TELCO — OHT — OHT — OHT — OHT

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

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

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

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

WORKPOINT — W.P.

SECTION REFERENCE — XX / X–X

DETAIL REFERENCE — XX / X–X

ABBREVIATIONS

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

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SHEET TITLE

LEGEND AND ABBREVIATIONS

SHEET NUMBER

GN-1

SITE ACTIVITY REQUIREMENTS:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

GENERAL NOTES:

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

CONTRACTOR:GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION

CARRIER:DISH Wireless L.L.C.

TOWER OWNER:TOWER OWNER

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

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

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

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

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

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

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

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

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

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

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

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

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

dish wireless.

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

DRAWN BY:	CHECKED BY:	APPROVED BY:
LHT	YXI	MDW

RFDS REV #: 3.0

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	6/16/21	ISSUED FOR REVIEW
0	7/29/21	ISSUED FOR REVIEW
1	9/1/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

82164.010.01

DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER01090A
50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-2

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

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

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

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

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

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

#4 BARS AND SMALLER 40 ksi

#5 BARS AND LARGER 60 ksi

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

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

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

ELECTRICAL INSTALLATION NOTES:

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

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

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

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

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

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

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

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

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

8. TIE WRAPS ARE NOT ALLOWED.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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PEC.0001564
Expires 2/10/22

DRAWN BY:	CHECKED BY:	APPROVED BY:
LHT	YXI	MDW

RFDS REV #: 3.0

CONSTRUCTION DOCUMENTS

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0	7/29/21	ISSUED FOR REVIEW
1	9/1/21	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

82164.010.01

DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER01090A
50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-3

GROUNDING NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

dish wireless.

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9/1/21

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

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RFDS REV #: 3.0

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DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER01090A
50 ROCKLAND ROAD
NORWALK, CT 06854

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-4

Exhibit D

Structural Analysis Report

Date: **June 07, 2021**

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

Subject:	**Structural Analysis Report**	
Carrier Designation:	***DISH Network* Co-Locate**	
	Site Number:	NJJER01090A
	Site Name:	CT-CCI-T-807133
Crown Castle Designation:	**BU Number:**	807133
	Site Name:	BRG 134 943057
	JDE Job Number:	640174
	Work Order Number:	1964193
	Order Number:	548868 Rev. 1
Engineering Firm Designation:	**Crown Castle Project Number:**	1964193
Site Data:	**50 ROCKLAND ROAD, SO NORWALK, FAIRFIELD County, CT**	
	Latitude *41° 4' 54.44"*, Longitude *-73° 25' 49.52"*	
	180 Foot - Self Support Tower	

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

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

LC7: Proposed Equipment Configuration **Sufficient Capacity-84.8%**

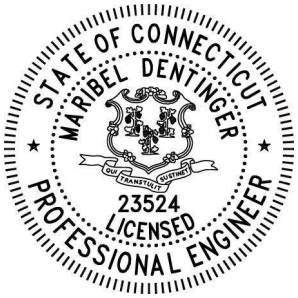
This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - "Analysis Criteria".

Structural analysis prepared by: Melanie Atiles

Respectfully submitted by:

Maribel Dentinger
Maribel Dentinger, P.E.
Senior Project Engineer

Maribel Dentinger
Digitally signed by Maribel Dentinger
Date: 2021.06.08 17:36:28 -04'00'



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1) INTRODUCTION

This tower is a 180 ft Self Support tower designed by ROHN. The tower has been modified in the past to accommodate additional loading.

2) ANALYSIS CRITERIA

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

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
181.0	181.0	3	fujitsu	TA08025-B604	1	1-3/4
		3	fujitsu	TA08025-B605		
		3	jma wireless	MX08FRO665-21 w/ Mount Pipe		
		1	raycap	RDIDC-9181-PF-48		
		1	tower mounts	Commscope MTC3975083 (3)		

Table 2 - Non-Carrier Equipment To Be Removed

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
178.0	178.0	2	tower mounts	Side Arm Mount [SO 305-1]	-	-

Table 3 - 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)
170.0	170.0	3	ericsson	AIR 32 B2A/B66AA w/ Mount Pipe	6	1-3/8
		3	ericsson	AIR 3246 B66_T-MOBILE w/ Mount Pipe		
		3	ericsson	AIR6449 B41 w/ Mount Pipe		
		3	ericsson	RADIO 4449 B71 B85A_T-MOBILE		
		3	ericsson	RRUS 4415 B25_CCIV2		
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
		1	tower mounts	Sector Mount [SM 702-3]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
161.0	161.0	1	andrew	SBNHH-1D65A	6 8 2	1-5/8 5/8 3/8
		2	cci antennas	HPA-65R-BUU-H6		
		1	cci antennas	OPA65R-BU4D w/ Mount Pipe		
		2	cci antennas	OPA65R-BU6D w/ Mount Pipe		
		3	ericsson	RRUS 11		
		3	ericsson	RRUS 32		
		3	ericsson	RRUS 32 B2		
		3	ericsson	RRUS 4426 B66		
		3	ericsson	RRUS 4478 B14		
		3	ericsson	RRUS 4478 B5		
		1	quintel technology	QS46512-2		
		2	quintel technology	QS66512-2		
		4	raycap	DC6-48-60-18-8F		
		1	tower mounts	Sector Mount [SM 201-3]		
157.0	157.0	2	-	VHLP2-18	2	7983A
		2	tower mounts	Side Arm Mount [SO 203-1]		
148.0	148.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER	4	1-1/4
		3	alcatel lucent	800MHZ 2X50W RRH		
		6	alcatel lucent	PCS 1900MHz 4x45W-65MHz		
		9	rfs celwave	ACU-A20-N		
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe		
		3	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe		
		1	tower mounts	Sector Mount [SM 502-3]		
136.0	138.0	1	-	VHLP2-23	6 1 2	5/16 1/2 Conduit
	136.0	1	-	J - Box		
		3	argus technologies	LLPX310R w/ Mount Pipe		
		3	samsung telecommunications	RRH-2WB		
		1	tower mounts	Sector Mount [SM 504-3]		
126.0	133.0	3	samsung telecommunications	CBRS w/ Mount Pipe	7 1	1-5/8 1/2
	130.0	1	gps	GPS_A		
	129.0	6	commscope	JAHH-65C-R3B w/ Mount Pipe		
		4	decibel	DB844G65ZAXY w/ Mount Pipe		
		2	decibel	DB844H80-XY w/ Mount Pipe		
		1	rfs celwave	DB-C1-12C-24AB-0Z		
		3	samsung telecommunications	RFV01U-D1A		
		3	samsung telecommunications	RFV01U-D2A		
	128.0	3	vzw	Sub6 Antenna - VZS01 w/ Mount Pipe		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
	126.0	1	tower mounts	Sector Mount [SM 411-3]		
112.0	112.0	3	kathrein	800 10504 w/ Mount Pipe	-	-
		1	tower mounts	Sector Mount [SM 104-3]		
5.0	6.0	1	decibel	ASPP2933	2	1/4
	5.0	1	gps	GPS_A		
		1	tower mounts	Side Arm Mount [SO 701-1]		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	2311843	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	821566	CCISITES
4-TOWER MANUFACTURER DRAWINGS	392878	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	1257479	CCISITES
4-POST-MODIFICATION INSPECTION	4065020	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.9.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	180 - 160	Leg	ROHN 3 EH	2	-17.157	116.138	14.8	Pass
T2	160 - 153.333	Leg	ROHN 4 EH	35	-24.613	167.901	14.7	Pass
T3	153.333 - 146.667	Leg	ROHN 4 EH	44	-35.886	167.900	21.4	Pass
T4	146.667 - 140	Leg	ROHN 4 EH	56	-46.791	167.901	27.9	Pass
T5	140 - 120	Leg	ROHN 5 EH	68	-85.930	251.347	34.2	Pass
T6	120 - 100	Leg	ROHN 6 EHS	89	-128.015	288.515	44.4	Pass
T7	100 - 80	Leg	ROHN 6 EH	110	-164.542	318.903	51.6	Pass
T8	80 - 70	Leg	ROHN 8 EHS	125	-183.519	405.715	45.2	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T9	70 - 60	Leg	ROHN 8 EHS	135	-202.841	405.715	50.0	Pass
T10	60 - 40	Leg	ROHN 8 EHS	144	-241.080	405.717	59.4	Pass
T11	40 - 20	Leg	ROHN 8 EH	159	-278.864	530.833	52.5	Pass
T12	20 - 0	Leg	ROHN 8 EH	174	-316.499	530.833	59.6	Pass
T1	180 - 160	Diagonal	L2x2x3/16	13	-3.019	10.104	29.9	Pass
T2	160 - 153.333	Diagonal	L2 1/2x2 1/2x1/4	39	-5.019	19.793	25.4	Pass
T3	153.333 - 146.667	Diagonal	L2 1/2x2 1/2x1/4	51	-5.281	17.900	29.5	Pass
T4	146.667 - 140	Diagonal	L2 1/2x2 1/2x1/4	63	-5.954	16.240	36.7	Pass
T5	140 - 120	Diagonal	L2 1/2x2 1/2x1/4	70	-7.793	12.489	62.4	Pass
T6	120 - 100	Diagonal	L3x3x1/4	91	-9.061	17.566	51.6	Pass
T7	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	113	-9.928	18.890	52.6	Pass
T8	80 - 70	Diagonal	L3 1/2x3 1/2x1/4	128	-10.407	17.632	59.0	Pass
T9	70 - 60	Diagonal	2L3 1/2x3 1/2x1/4x3/8	137	-11.141	27.539	40.5	Pass
T10	60 - 40	Diagonal	L4x4x1/4	146	-11.622	20.589	56.4	Pass
T11	40 - 20	Diagonal	L4x4x5/16	161	-12.359	21.559	57.3	Pass
T12	20 - 0	Diagonal	2L4x4x5/16x3/8	176	-13.697	31.656	43.3	Pass
T1	180 - 160	Top Girt	L2x2x1/8	4	-0.482	4.230	11.4	Pass
T3	153.333 - 146.667	Top Girt	L2 1/2x2 1/2x1/8	46	-0.622	4.069	15.3	Pass
T4	146.667 - 140	Top Girt	L2 1/2x2 1/2x1/8	58	-0.812	3.498	23.2	Pass
T1	180 - 160	Mid Girt	L2x2x1/8	9	-0.480	3.097	15.5	Pass
							Summary	
						Leg (T12)	59.6	Pass
						Diagonal (T5)	62.4	Pass
						Top Girt (T4)	23.2	Pass
						Mid Girt (T1)	15.5	Pass
						Bolt Checks	75.8	Pass
						Rating =	75.8	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	47.1	Pass
1	Base Foundation (Structure)	0	84.8	Pass

Structure Rating (max from all components) =	84.8%

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

4.1) Recommendations

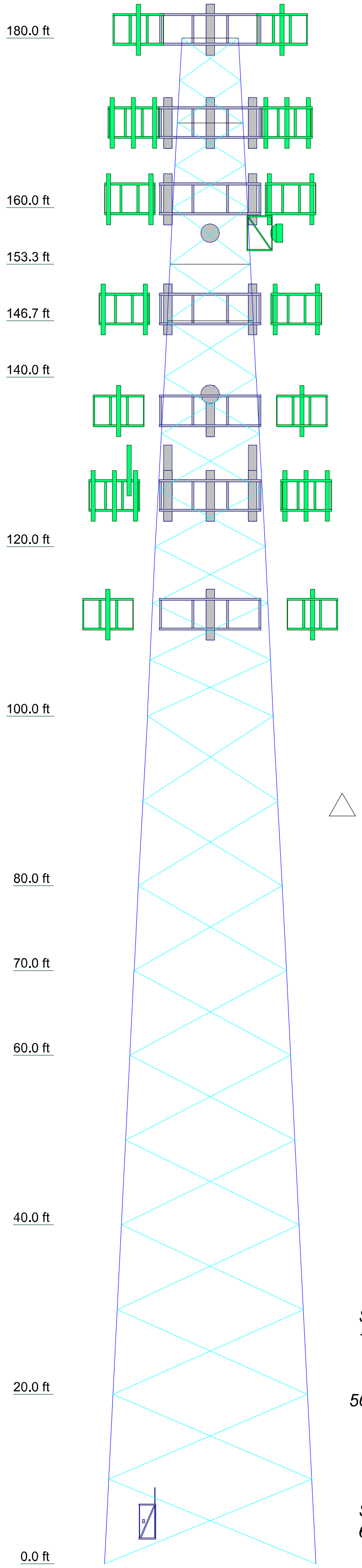
Once the equipment in Table 2 has been removed, the tower and its foundation have sufficient capacity to carry the proposed load configuration. No structural modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
Legs	ROHN 3 EH	ROHN 4 EH			ROHN 5 EH	ROHN 6 EHS	ROHN 6 EH	ROHN 8 EHS			ROHN 8 EH	
Leg Grade	A572-50											
Diagonals	L2x2x3/16	L2 1/2x2 1/2x1/4				L3x3x1/4	L3 1/2x3 1/2x1/4		A	L4x4x1/4	L4x4x5/16	2L4x4x5/16x3/8
Diagonal Grade	A36					A572-50			A36	A572-50		A36
Top Girts	L2x2x1/8	N.A.	L2 1/2x2 1/2x1/8		N.A.							
Mid Girts	L2x2x1/8	N.A.										
Face Width (ft)	6.6875 / 8.76042	8.76042 / 9.45052	9.45052 / 10.1432	10.1432 / 10.8333	10.8333 / 12.9167	12.9167 / 14.8542	14.8542 / 16.9896	16.9896 / 17.9948	17.9948 / 19	19 / 21	21 / 23	23 / 25
# Panels @ (ft)	4 @ 5	9 @ 6.66667					10 @ 10					
Weight (K)	1.3	0.6	0.7	0.7	2.4	2.9	3.2	1.8	2.6	3.9	5.2	8.1

Total Weight (K): 33.3



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	2L3 1/2x3 1/2x1/4x3/8		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 120 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0'
8. TOWER RATING: 75.8%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 326 K
SHEAR: 39 K

UPLIFT: -270 K
SHEAR: 33 K

AXIAL 176 K
SHEAR 19 K
MOMENT 2042 kip-ft
TORQUE 20 kip-ft
50 mph WIND - 1.500 in ICE

AXIAL 79 K
SHEAR 62 K
MOMENT 6495 kip-ft
TORQUE 49 kip-ft
REACTIONS - 120 mph WIND

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

Job: **BU# 807133**		
Project:		
Client: Crown Castle	Drawn by: MAtiles	App'd:
Code: TIA-222-H	Date: 06/07/21	Scale: NTS
Path: C:\Users\matiles\Desktop\Working from Home\807133\WO 1964193 - SA\Prod\807133.eri		Dwg No. E-1

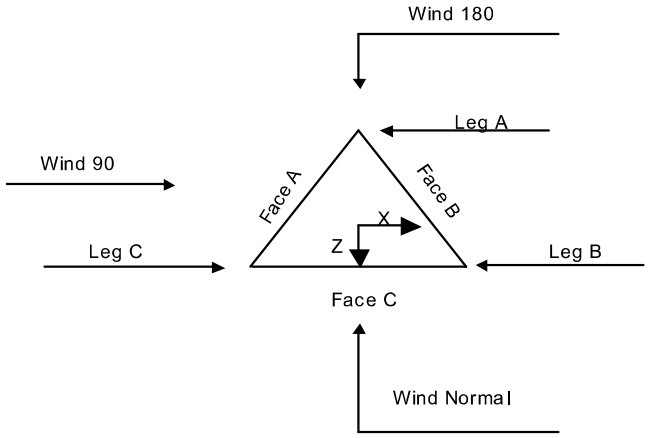
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180' above the ground line.
The base of the tower is set at an elevation of 0' above the ground line.
The face width of the tower is 6'8-1/4" at the top and 25' at the base.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

- Tower is located in Fairfield County, Connecticut.
- Tower base elevation above sea level: 61'.
- Basic wind speed of 120 mph.
- Risk Category II.
- Exposure Category C.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0'.
- Nominal ice thickness of 1.500 in.
- Ice thickness is considered to increase with height.
- Ice density of 56.000 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50.000 °F.
- Deflections calculated using a wind speed of 60 mph.
- Pressures are calculated at each section.
- Stress ratio used in tower member design is 1.
- Tower analysis based on target reliabilities in accordance with Annex S.
- Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
- Maximum demand-capacity ratio is: 1.05.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	180'-160'			6'8-1/4"	1	20'
T2	160'-153'4"			8'9-1/8"	1	6'8"
T3	153'4"-146'8"			9'5-13/32"	1	6'8"
T4	146'8"-140'			10'1-23/32"	1	6'8"
T5	140'-120'			10'10"	1	20'
T6	120'-100'			12'11"	1	20'
T7	100'-80'			14'10-1/4"	1	20'
T8	80'-70'			16'11-7/8"	1	10'
T9	70'-60'			17'11-15/16"	1	10'
T10	60'-40'			19'	1	20'
T11	40'-20'			21'	1	20'
T12	20'-0'			23'	1	20'

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	180'-160'	5'	X Brace	No	No	0.000	0.000
T2	160'-153'4"	6'8"	X Brace	No	No	0.000	0.000
T3	153'4"-146'8"	6'8"	X Brace	No	No	0.000	0.000
T4	146'8"-140'	6'8"	X Brace	No	No	0.000	0.000
T5	140'-120'	6'8"	X Brace	No	No	0.000	0.000
T6	120'-100'	6'8"	X Brace	No	No	0.000	0.000
T7	100'-80'	10'	X Brace	No	No	0.000	0.000
T8	80'-70'	10'	X Brace	No	No	0.000	0.000
T9	70'-60'	10'	X Brace	No	No	0.000	0.000
T10	60'-40'	10'	X Brace	No	No	0.000	0.000
T11	40'-20'	10'	X Brace	No	No	0.000	0.000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T12	20'-0'	10'	X Brace	No	No	0.000	0.000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 180'-160'	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)
T2 160'-153'4"	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T3 153'4"-146'8"	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T4 146'8"-140'	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T5 140'-120'	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T6 120'-100'	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Single Angle	L3x3x1/4	A572-50 (50 ksi)
T7 100'-80'	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T8 80'-70'	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T9 70'-60'	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Double Equal Angle	2L3 1/2x3 1/2x1/4x3/8	A36 (36 ksi)
T10 60'-40'	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Single Angle	L4x4x1/4	A572-50 (50 ksi)
T11 40'-20'	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Single Angle	L4x4x5/16	A572-50 (50 ksi)
T12 20'-0'	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Double Equal Angle	2L4x4x5/16x3/8	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 180'-160'	Equal Angle	L2x2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T3 153'4"-146'8"	Equal Angle	L2 1/2x2 1/2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)
T4 146'8"-140'	Single Angle	L2 1/2x2 1/2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 180'-160'	1	Equal Angle	L2x2x1/8	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft^2	in					in	in	in
T1 180'-160'	0.000	0.250	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T2 160'-153'4"	0.000	0.250	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T3 153'4"-146'8"	0.000	0.250	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T4 146'8"-140'	0.000	0.250	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T5 140'-120'	0.000	0.250	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T6 120'-100'	0.000	0.250	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T7 100'-80'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T8 80'-70'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T9 70'-60'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	120.000	Mid-Pt	Mid-Pt
T10 60'-40'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T11 40'-20'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	Mid-Pt	Mid-Pt	Mid-Pt
T12 20'-0'	0.000	0.375	A36 (36 ksi)	1.03	1	1.05	152.750	Mid-Pt	Mid-Pt

Tower Section Geometry *(cont'd)*

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Brace Diags X	K Brace Diags Y	Single Diags X	Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
ft																	
T1 180'-160'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1	1	1
T2 160'-153'4"	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1	1	1
T3 153'4"-146'8"	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1	1	1
T4 146'8"-140'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1	1	1
T5 140'-120'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1	1	1
T6 120'-100'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1	1	1
T7 100'-80'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1	1	1
T8 80'-70'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1	1	1
T9 70'-60'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1	1	1
T10 60'-40'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1	1	1
T11 40'-20'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1	1	1
T12 20'-0'	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1	1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 180'-160'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 160'-153'4"	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 153'4"-146'8"	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 146'8"-140'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5 140'-120'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 120'-100'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 100'-80'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T8 80'-70'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T9 70'-60'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T10 60'-40'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T11 40'-20'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T12 20'-0'	0.000	1	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub-Diagonal		Redundant Sub-Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 180'-160'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T2 160'-153'4"	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T3 153'4"-146'8"	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T4 146'8"-140'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5 140'-120'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6 120'-100'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7 100'-80'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T8 80'-70'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T9 70'-60'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T10 60'-40'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T11 40'-20'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T12 20'-0'	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 180'-160'	Flange	0.875 A325N	4	0.625 A325N	1	0.625 A325N	1	0.000 A325X	0	0.625 A325N	1	0.625 A325X	0	0.625 A325N	0
T2 160'-153'4"	Flange	0.000 A325N	0	0.625 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T3 153'4"-146'8"	Flange	0.000 A325N	0	0.625 A325N	1	0.625 A325N	1	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T4 146'8"-140'	Flange	1.000 A325N	4	0.625 A325N	1	0.625 A325N	1	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T5 140'-120'	Flange	1.000 A325N	6	0.625 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T6 120'-100'	Flange	1.000 A325N	6	0.625 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T7 100'-80'	Flange	1.000 A325N	8	0.750 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T8 80'-70'	Flange	0.000 A325N	0	0.750 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T9 70'-60'	Flange	1.000 A325N	8	0.750 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T10 60'-40'	Flange	1.000 A325N	8	0.750 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T11 40'-20'	Flange	1.000 A325N	8	0.750 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0
T12 20'-0'	Flange	1.000 A449	0	0.750 A325N	1	0.000 A325N	0	0.000 A325X	0	0.625 A325X	0	0.625 A325X	0	0.625 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
***													
Feedline Ladder (Af)	B	No	No	Af (CaAa)	180' - 0'	0.000	0.38	1	1	3.000	3.000		0.008
***													
HCS 6X12 6AWG(1-3/8)	A	No	No	Ar (CaAa)	170' - 0'	0.000	0.08	6	6	1.380	1.380		0.002
LDF1-50A(1/4)	A	No	No	Ar (CaAa)	5' - 0'	0.000	0.15	2	2	0.345	0.345		0.000
Feedline Ladder (Af)	A	No	No	Af (CaAa)	170' - 0'	0.000	0	1	1	3.000	3.000		0.008
***													
MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	A	No	No	Ar (CaAa)	148' - 0'	0.000	-0.35	4	4	1.250	1.250		0.000
***													
2-1/4" Rigid Conduit	A	No	No	Ar (CaAa)	136' - 0'	0.000	-0.38	2	2	0.850 0.750	2.250		0.003
LDF4-50A(1/2)	A	No	No	Ar (CaAa)	136' - 0'	0.000	-0.395	1	1	0.630	0.630		0.000
9207(5/16)	A	No	No	Ar (CaAa)	136' - 0'	0.000	-0.38	6	6	0.200	0.330		0.001
7983A(ELLIPTICAL)	A	No	No	Ar (CaAa)	157' - 0'	0.000	-0.405	2	1	0.500	0.573		0.000
Feedline Ladder (Af)	A	No	No	Af (CaAa)	160' - 0'	0.000	-0.36	1	1	3.000	3.000		0.008
***													
Feedline Ladder (Af)	C	No	No	Af (CaAa)	180' - 0'	0.000	-0.4	1	1	3.000	3.000		0.008
***													
LDF7-50A(1 5/8)	C	No	No	Ar (CaAa)	126' - 0'	-3.000	-0.4	7	7	1.980	1.980		0.001
LDF4-50A(1/2)	C	No	No	Ar (CaAa)	126' - 0'	-1.000	-0.455	1	1	0.500	0.630		0.000
Feedline Ladder (Af)	C	No	No	Af (CaAa)	126' - 0'	-1.000	-0.4	1	1	3.000	3.000		0.008
***													
Feedline	C	No	No	Af (CaAa)	161' - 0'	0.000	0.4	1	1	3.000	3.000		0.008

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
Ladder (Af) ***													
CR 50 1873(1-5/8)	C	No	No	Ar (CaAa)	161' - 0'	0.000	0.34	6	3	0.850 0.750	1.980		0.001
FB-L98-002-XXX(3/8)	C	No	No	Ar (CaAa)	161' - 0'	0.000	0.36	2	1	0.500	0.394		0.000
WR-VG82ST-BRDA(5/8)	C	No	No	Ar (CaAa)	161' - 0'	4.500	0.34	6	6	0.500	0.645		0.000
WR-VG82ST-BRDA(5/8) ***	C	No	No	Ar (CaAa)	161' - 0'	4.500	0.34	2	2	0.500	0.645		0.000
Safety Line 3/8 ***	B	No	No	Ar (CaAa)	180' - 0'	0.000	0.5	1	1	0.375	0.375		0.000
CU12PSM6P4XXX(1-3/4) ***	B	No	No	Ar (CaAa)	180' - 0'	0.000	0.48	1	1	1.750	1.750		0.003

Feed Line/Linear Appurtenances - Entered As Area

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

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	180'-160'	A	0.000	0.000	13.280	0.000	0.186
		B	0.000	0.000	14.250	0.000	0.227
		C	0.000	0.000	12.283	0.000	0.184
T2	160'-153'4"	A	0.000	0.000	12.607	0.000	0.181
		B	0.000	0.000	4.750	0.000	0.076
		C	0.000	0.000	18.552	0.000	0.162
T3	153'4"-146'8"	A	0.000	0.000	13.617	0.000	0.184
		B	0.000	0.000	4.750	0.000	0.076
		C	0.000	0.000	18.552	0.000	0.162
T4	146'8"-140'	A	0.000	0.000	16.284	0.000	0.193
		B	0.000	0.000	4.750	0.000	0.076
		C	0.000	0.000	18.552	0.000	0.162
T5	140'-120'	A	0.000	0.000	60.228	0.000	0.736
		B	0.000	0.000	14.250	0.000	0.227
		C	0.000	0.000	67.349	0.000	0.573
T6	120'-100'	A	0.000	0.000	63.072	0.000	0.775
		B	0.000	0.000	14.250	0.000	0.227
		C	0.000	0.000	94.635	0.000	0.773
T7	100'-80'	A	0.000	0.000	63.072	0.000	0.775
		B	0.000	0.000	14.250	0.000	0.227
		C	0.000	0.000	94.635	0.000	0.773
T8	80'-70'	A	0.000	0.000	31.536	0.000	0.388
		B	0.000	0.000	7.125	0.000	0.113
		C	0.000	0.000	47.317	0.000	0.387
T9	70'-60'	A	0.000	0.000	31.536	0.000	0.388

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
		B	0.000	0.000	7.125	0.000	0.113
		C	0.000	0.000	47.317	0.000	0.387
T10	60'-40'	A	0.000	0.000	63.072	0.000	0.775
		B	0.000	0.000	14.250	0.000	0.227
		C	0.000	0.000	94.635	0.000	0.773
T11	40'-20'	A	0.000	0.000	63.072	0.000	0.775
		B	0.000	0.000	14.250	0.000	0.227
		C	0.000	0.000	94.635	0.000	0.773
T12	20'-0'	A	0.000	0.000	63.417	0.000	0.776
		B	0.000	0.000	14.250	0.000	0.227
		C	0.000	0.000	94.635	0.000	0.773

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	180'-160'	A	1.502	0.000	0.000	31.386	0.000	0.548
		B		0.000	0.000	32.275	0.000	0.622
		C		0.000	0.000	21.147	0.000	0.447
T2	160'-153'4"	A	1.490	0.000	0.000	28.876	0.000	0.516
		B		0.000	0.000	10.710	0.000	0.206
		C		0.000	0.000	39.448	0.000	0.606
T3	153'4"-146'8"	A	1.483	0.000	0.000	33.094	0.000	0.561
		B		0.000	0.000	10.684	0.000	0.205
		C		0.000	0.000	39.371	0.000	0.604
T4	146'8"-140'	A	1.477	0.000	0.000	41.334	0.000	0.652
		B		0.000	0.000	10.657	0.000	0.204
		C		0.000	0.000	39.292	0.000	0.601
T5	140'-120'	A	1.462	0.000	0.000	162.299	0.000	2.441
		B		0.000	0.000	31.798	0.000	0.607
		C		0.000	0.000	146.065	0.000	2.222
T6	120'-100'	A	1.438	0.000	0.000	170.879	0.000	2.531
		B		0.000	0.000	31.508	0.000	0.598
		C		0.000	0.000	211.836	0.000	3.190
T7	100'-80'	A	1.410	0.000	0.000	169.592	0.000	2.490
		B		0.000	0.000	31.165	0.000	0.587
		C		0.000	0.000	210.430	0.000	3.139
T8	80'-70'	A	1.384	0.000	0.000	84.222	0.000	1.227
		B		0.000	0.000	15.430	0.000	0.289
		C		0.000	0.000	104.589	0.000	1.547
T9	70'-60'	A	1.364	0.000	0.000	83.780	0.000	1.213
		B		0.000	0.000	15.312	0.000	0.285
		C		0.000	0.000	104.105	0.000	1.530
T10	60'-40'	A	1.329	0.000	0.000	165.970	0.000	2.377
		B		0.000	0.000	30.199	0.000	0.558
		C		0.000	0.000	206.474	0.000	2.998
T11	40'-20'	A	1.263	0.000	0.000	162.996	0.000	2.286
		B		0.000	0.000	29.405	0.000	0.535
		C		0.000	0.000	203.223	0.000	2.884
T12	20'-0'	A	1.132	0.000	0.000	159.736	0.000	2.125
		B		0.000	0.000	27.828	0.000	0.491
		C		0.000	0.000	196.781	0.000	2.664

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	180'-160'	3.901	2.082	6.373	3.150
T2	160'-153'4"	-7.859	5.873	-8.694	8.318
T3	153'4"-146'8"	-7.915	5.764	-9.375	8.419

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T4	146'8"-140'	-9.475	6.515	-11.134	9.321
T5	140'-120'	-9.632	9.171	-10.299	12.353
T6	120'-100'	-3.675	11.038	-2.165	14.971
T7	100'-80'	-4.212	12.692	-2.419	17.209
T8	80'-70'	-4.370	13.111	-2.472	17.921
T9	70'-60'	-4.531	13.609	-2.520	18.594
T10	60'-40'	-4.534	13.643	-2.502	19.088
T11	40'-20'	-4.790	14.442	-2.468	20.076
T12	20'-0'	-5.069	15.069	-2.328	20.228

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	2	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T1	4	HCS 6X12 6AWG(1-3/8)	160.00 - 170.00	0.6000	0.6000
T1	9	Feedline Ladder (Af)	160.00 - 170.00	0.6000	0.6000
T1	20	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.6000
T1	33	Feedline Ladder (Af)	160.00 - 161.00	0.6000	0.6000
T1	35	CR 50 1873(1-5/8)	160.00 - 161.00	0.6000	0.6000
T1	36	FB-L98-002-XXX(3/8)	160.00 - 161.00	0.6000	0.6000
T1	37	WR-VG82ST-BRDA(5/8)	160.00 - 161.00	0.6000	0.6000
T1	38	WR-VG82ST-BRDA(5/8)	160.00 - 161.00	0.6000	0.6000
T1	40	Safety Line 3/8	160.00 - 180.00	0.6000	0.6000
T1	42	CU12PSM6P4XXX(1-3/4)	160.00 - 180.00	0.6000	0.6000
T2	2	Feedline Ladder (Af)	153.33 - 160.00	0.6000	0.6000
T2	4	HCS 6X12 6AWG(1-3/8)	153.33 - 160.00	0.6000	0.6000
T2	9	Feedline Ladder (Af)	153.33 - 160.00	0.6000	0.6000
T2	17	7983A(ELLIPTICAL)	153.33 - 157.00	0.6000	0.6000
T2	18	Feedline Ladder (Af)	153.33 - 160.00	0.6000	0.6000
T2	20	Feedline Ladder (Af)	153.33 - 160.00	0.6000	0.6000
T2	33	Feedline Ladder (Af)	153.33 - 160.00	0.6000	0.6000
T2	35	CR 50 1873(1-5/8)	153.33 - 160.00	0.6000	0.6000
T2	36	FB-L98-002-XXX(3/8)	153.33 - 160.00	0.6000	0.6000
T2	37	WR-VG82ST-BRDA(5/8)	153.33 - 160.00	0.6000	0.6000
T2	38	WR-VG82ST-BRDA(5/8)	153.33 - 160.00	0.6000	0.6000
T2	40	Safety Line 3/8	153.33 - 160.00	0.6000	0.6000
T2	42	CU12PSM6P4XXX(1-3/4)	153.33 - 160.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T3	2	Feedline Ladder (Af)	146.67 - 153.33	0.6000	0.6000
T3	4	HCS 6X12 6AWG(1-3/8)	146.67 - 153.33	0.6000	0.6000
T3	9	Feedline Ladder (Af)	146.67 - 153.33	0.6000	0.6000
T3	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	146.67 - 148.00	0.6000	0.6000
T3	17	7983A(ELLIPTICAL)	146.67 - 153.33	0.6000	0.6000
T3	18	Feedline Ladder (Af)	146.67 - 153.33	0.6000	0.6000
T3	20	Feedline Ladder (Af)	146.67 - 153.33	0.6000	0.6000
T3	33	Feedline Ladder (Af)	146.67 - 153.33	0.6000	0.6000
T3	35	CR 50 1873(1-5/8)	146.67 - 153.33	0.6000	0.6000
T3	36	FB-L98-002-XXX(3/8)	146.67 - 153.33	0.6000	0.6000
T3	37	WR-VG82ST-BRDA(5/8)	146.67 - 153.33	0.6000	0.6000
T3	38	WR-VG82ST-BRDA(5/8)	146.67 - 153.33	0.6000	0.6000
T3	40	Safety Line 3/8	146.67 - 153.33	0.6000	0.6000
T3	42	CU12PSM6P4XXX(1-3/4)	146.67 - 153.33	0.6000	0.6000
T4	2	Feedline Ladder (Af)	140.00 - 146.67	0.6000	0.6000
T4	4	HCS 6X12 6AWG(1-3/8)	140.00 - 146.67	0.6000	0.6000
T4	9	Feedline Ladder (Af)	140.00 - 146.67	0.6000	0.6000
T4	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	140.00 - 146.67	0.6000	0.6000
T4	17	7983A(ELLIPTICAL)	140.00 - 146.67	0.6000	0.6000
T4	18	Feedline Ladder (Af)	140.00 - 146.67	0.6000	0.6000
T4	20	Feedline Ladder (Af)	140.00 - 146.67	0.6000	0.6000
T4	33	Feedline Ladder (Af)	140.00 - 146.67	0.6000	0.6000
T4	35	CR 50 1873(1-5/8)	140.00 - 146.67	0.6000	0.6000
T4	36	FB-L98-002-XXX(3/8)	140.00 - 146.67	0.6000	0.6000
T4	37	WR-VG82ST-BRDA(5/8)	140.00 - 146.67	0.6000	0.6000
T4	38	WR-VG82ST-BRDA(5/8)	140.00 - 146.67	0.6000	0.6000
T4	40	Safety Line 3/8	140.00 - 146.67	0.6000	0.6000
T4	42	CU12PSM6P4XXX(1-3/4)	140.00 - 146.67	0.6000	0.6000
T5	2	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	4	HCS 6X12 6AWG(1-3/8)	120.00 - 140.00	0.6000	0.6000
T5	9	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	120.00 - 140.00	0.6000	0.6000
T5	14	2-1/4" Rigid Conduit	120.00 - 136.00	0.6000	0.6000
T5	15	LDF4-50A(1/2)	120.00 - 136.00	0.6000	0.6000
T5	16	9207(5/16)	120.00 -	0.0000	0.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T5	17	7983A(ELLIPTICAL)	136.00 120.00 - 140.00	0.6000	0.6000
T5	18	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	20	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	22	LDF7-50A(1 5/8)	120.00 - 126.00	0.6000	0.6000
T5	24	LDF4-50A(1/2)	120.00 - 126.00	0.6000	0.6000
T5	25	Feedline Ladder (Af)	120.00 - 126.00	0.6000	0.6000
T5	33	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	35	CR 50 1873(1-5/8)	120.00 - 140.00	0.6000	0.6000
T5	36	FB-L98-002-XXX(3/8)	120.00 - 140.00	0.6000	0.6000
T5	37	WR-VG82ST-BRDA(5/8)	120.00 - 140.00	0.6000	0.6000
T5	38	WR-VG82ST-BRDA(5/8)	120.00 - 140.00	0.6000	0.6000
T5	40	Safety Line 3/8	120.00 - 140.00	0.6000	0.6000
T5	42	CU12PSM6P4XXX(1-3/4)	120.00 - 140.00	0.6000	0.6000
T6	2	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	4	HCS 6X12 6AWG(1-3/8)	100.00 - 120.00	0.6000	0.6000
T6	9	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	100.00 - 120.00	0.6000	0.6000
T6	14	2-1/4" Rigid Conduit	100.00 - 120.00	0.6000	0.6000
T6	15	LDF4-50A(1/2)	100.00 - 120.00	0.6000	0.6000
T6	16	9207(5/16)	100.00 - 120.00	0.0000	0.0000
T6	17	7983A(ELLIPTICAL)	100.00 - 120.00	0.6000	0.6000
T6	18	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	20	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	22	LDF7-50A(1 5/8)	100.00 - 120.00	0.6000	0.6000
T6	24	LDF4-50A(1/2)	100.00 - 120.00	0.6000	0.6000
T6	25	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	33	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	35	CR 50 1873(1-5/8)	100.00 - 120.00	0.6000	0.6000
T6	36	FB-L98-002-XXX(3/8)	100.00 - 120.00	0.6000	0.6000
T6	37	WR-VG82ST-BRDA(5/8)	100.00 - 120.00	0.6000	0.6000
T6	38	WR-VG82ST-BRDA(5/8)	100.00 - 120.00	0.6000	0.6000
T6	40	Safety Line 3/8	100.00 - 120.00	0.6000	0.6000
T6	42	CU12PSM6P4XXX(1-3/4)	100.00 - 120.00	0.6000	0.6000
T7	2	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T7	4	HCS 6X12 6AWG(1-3/8)	80.00 - 100.00	0.6000	0.6000
T7	9	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T7	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	80.00 - 100.00	0.6000	0.6000
T7	14	2-1/4" Rigid Conduit	80.00 - 100.00	0.6000	0.6000
T7	15	LDF4-50A(1/2)	80.00 - 100.00	0.6000	0.6000
T7	16	9207(5/16)	80.00 - 100.00	0.0000	0.0000
T7	17	7983A(ELLIPTICAL)	80.00 - 100.00	0.6000	0.6000
T7	18	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T7	20	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T7	22	LDF7-50A(1 5/8)	80.00 - 100.00	0.6000	0.6000
T7	24	LDF4-50A(1/2)	80.00 - 100.00	0.6000	0.6000
T7	25	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T7	33	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T7	35	CR 50 1873(1-5/8)	80.00 - 100.00	0.6000	0.6000
T7	36	FB-L98-002-XXX(3/8)	80.00 - 100.00	0.6000	0.6000
T7	37	WR-VG82ST-BRDA(5/8)	80.00 - 100.00	0.6000	0.6000
T7	38	WR-VG82ST-BRDA(5/8)	80.00 - 100.00	0.6000	0.6000
T7	40	Safety Line 3/8	80.00 - 100.00	0.6000	0.6000
T7	42	CU12PSM6P4XXX(1-3/4)	80.00 - 100.00	0.6000	0.6000
T8	2	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	4	HCS 6X12 6AWG(1-3/8)	70.00 - 80.00	0.6000	0.6000
T8	9	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	70.00 - 80.00	0.6000	0.6000
T8	14	2-1/4" Rigid Conduit	70.00 - 80.00	0.6000	0.6000
T8	15	LDF4-50A(1/2)	70.00 - 80.00	0.6000	0.6000
T8	16	9207(5/16)	70.00 - 80.00	0.0000	0.0000
T8	17	7983A(ELLIPTICAL)	70.00 - 80.00	0.6000	0.6000
T8	18	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	20	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	22	LDF7-50A(1 5/8)	70.00 - 80.00	0.6000	0.6000
T8	24	LDF4-50A(1/2)	70.00 - 80.00	0.6000	0.6000
T8	25	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	33	Feedline Ladder (Af)	70.00 - 80.00	0.6000	0.6000
T8	35	CR 50 1873(1-5/8)	70.00 - 80.00	0.6000	0.6000
T8	36	FB-L98-002-XXX(3/8)	70.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			80.00		
T8	37	WR-VG82ST-BRDA(5/8)	70.00 - 80.00	0.6000	0.6000
T8	38	WR-VG82ST-BRDA(5/8)	70.00 - 80.00	0.6000	0.6000
T8	40	Safety Line 3/8	70.00 - 80.00	0.6000	0.6000
T8	42	CU12PSM6P4XXX(1-3/4)	70.00 - 80.00	0.6000	0.6000
T9	2	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	4	HCS 6X12 6AWG(1-3/8)	60.00 - 70.00	0.6000	0.6000
T9	9	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	60.00 - 70.00	0.6000	0.6000
T9	14	2-1/4" Rigid Conduit	60.00 - 70.00	0.6000	0.6000
T9	15	LDF4-50A(1/2)	60.00 - 70.00	0.6000	0.6000
T9	16	9207(5/16)	60.00 - 70.00	0.0000	0.0000
T9	17	7983A(ELLIPTICAL)	60.00 - 70.00	0.6000	0.6000
T9	18	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	20	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	22	LDF7-50A(1 5/8)	60.00 - 70.00	0.6000	0.6000
T9	24	LDF4-50A(1/2)	60.00 - 70.00	0.6000	0.6000
T9	25	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	33	Feedline Ladder (Af)	60.00 - 70.00	0.6000	0.6000
T9	35	CR 50 1873(1-5/8)	60.00 - 70.00	0.6000	0.6000
T9	36	FB-L98-002-XXX(3/8)	60.00 - 70.00	0.6000	0.6000
T9	37	WR-VG82ST-BRDA(5/8)	60.00 - 70.00	0.6000	0.6000
T9	38	WR-VG82ST-BRDA(5/8)	60.00 - 70.00	0.6000	0.6000
T9	40	Safety Line 3/8	60.00 - 70.00	0.6000	0.6000
T9	42	CU12PSM6P4XXX(1-3/4)	60.00 - 70.00	0.6000	0.6000
T10	2	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	4	HCS 6X12 6AWG(1-3/8)	40.00 - 60.00	0.6000	0.6000
T10	9	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	40.00 - 60.00	0.6000	0.6000
T10	14	2-1/4" Rigid Conduit	40.00 - 60.00	0.6000	0.6000
T10	15	LDF4-50A(1/2)	40.00 - 60.00	0.6000	0.6000
T10	16	9207(5/16)	40.00 - 60.00	0.0000	0.0000
T10	17	7983A(ELLIPTICAL)	40.00 - 60.00	0.6000	0.6000
T10	18	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	20	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T10	22	LDF7-50A(1 5/8)	40.00 - 60.00	0.6000	0.6000
T10	24	LDF4-50A(1/2)	40.00 - 60.00	0.6000	0.6000
T10	25	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	33	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T10	35	CR 50 1873(1-5/8)	40.00 - 60.00	0.6000	0.6000
T10	36	FB-L98-002-XXX(3/8)	40.00 - 60.00	0.6000	0.6000
T10	37	WR-VG82ST-BRDA(5/8)	40.00 - 60.00	0.6000	0.6000
T10	38	WR-VG82ST-BRDA(5/8)	40.00 - 60.00	0.6000	0.6000
T10	40	Safety Line 3/8	40.00 - 60.00	0.6000	0.6000
T10	42	CU12PSM6P4XXX(1-3/4)	40.00 - 60.00	0.6000	0.6000
T11	2	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	4	HCS 6X12 6AWG(1-3/8)	20.00 - 40.00	0.6000	0.6000
T11	9	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	20.00 - 40.00	0.6000	0.6000
T11	14	2-1/4" Rigid Conduit	20.00 - 40.00	0.6000	0.6000
T11	15	LDF4-50A(1/2)	20.00 - 40.00	0.6000	0.6000
T11	16	9207(5/16)	20.00 - 40.00	0.0000	0.0000
T11	17	7983A(ELLIPTICAL)	20.00 - 40.00	0.6000	0.6000
T11	18	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	20	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	22	LDF7-50A(1 5/8)	20.00 - 40.00	0.6000	0.6000
T11	24	LDF4-50A(1/2)	20.00 - 40.00	0.6000	0.6000
T11	25	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	33	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T11	35	CR 50 1873(1-5/8)	20.00 - 40.00	0.6000	0.6000
T11	36	FB-L98-002-XXX(3/8)	20.00 - 40.00	0.6000	0.6000
T11	37	WR-VG82ST-BRDA(5/8)	20.00 - 40.00	0.6000	0.6000
T11	38	WR-VG82ST-BRDA(5/8)	20.00 - 40.00	0.6000	0.6000
T11	40	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T11	42	CU12PSM6P4XXX(1-3/4)	20.00 - 40.00	0.6000	0.6000
T12	2	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	4	HCS 6X12 6AWG(1-3/8)	0.00 - 20.00	0.6000	0.6000
T12	8	LDF1-50A(1/4)	0.00 - 5.00	0.6000	0.6000
T12	9	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	12	MLE Hybrid 3Power/6Fiber RL 2 10AWG(1-1/4)	0.00 - 20.00	0.6000	0.6000
T12	14	2-1/4" Rigid Conduit	0.00 - 20.00	0.6000	0.6000
T12	15	LDF4-50A(1/2)	0.00 - 20.00	0.6000	0.6000
T12	16	9207(5/16)	0.00 - 20.00	0.0000	0.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T12	17	7983A(ELLIPTICAL)	0.00 - 20.00	0.6000	0.6000
T12	18	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	20	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	22	LDF7-50A(1 5/8)	0.00 - 20.00	0.6000	0.6000
T12	24	LDF4-50A(1/2)	0.00 - 20.00	0.6000	0.6000
T12	25	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	33	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T12	35	CR 50 1873(1-5/8)	0.00 - 20.00	0.6000	0.6000
T12	36	FB-L98-002-XXX(3/8)	0.00 - 20.00	0.6000	0.6000
T12	37	WR-VG82ST-BRDA(5/8)	0.00 - 20.00	0.6000	0.6000
T12	38	WR-VG82ST-BRDA(5/8)	0.00 - 20.00	0.6000	0.6000
T12	40	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000
T12	42	CU12PSM6P4XXX(1-3/4)	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
170					
AIR 32 B2A/B66AA w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	170'
AIR 32 B2A/B66AA w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	170'
AIR 32 B2A/B66AA w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	170'
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	170'
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	170'
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	170'
AIR 3246 B66_T-MOBILE w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	170'
AIR 3246 B66_T-MOBILE w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	170'
AIR 3246 B66_T-MOBILE w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	170'
AIR6449 B41 w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	170'
AIR6449 B41 w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	170'
AIR6449 B41 w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	170'
RADIO 4449 B71 B85A_T-MOBILE	A	From Leg	4.000 0'	0.000	170'

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
RADIO 4449 B71 B85A_T-MOBILE	B	From Leg	0' 4.000 0'	0.000	170'
RADIO 4449 B71 B85A_T-MOBILE	C	From Leg	0' 4.000 0'	0.000	170'
RRUS 4415 B25_CCIV2	A	From Leg	0' 4.000 0'	0.000	170'
RRUS 4415 B25_CCIV2	B	From Leg	0' 4.000 0'	0.000	170'
RRUS 4415 B25_CCIV2	C	From Leg	0' 4.000 0'	0.000	170'
Sector Mount [SM 702-3] *161*	C	None		0.000	170'
HPA-65R-BUU-H6	A	From Leg	4.000 0' 0'	0.000	161'
HPA-65R-BUU-H6	B	From Leg	4.000 0' 0'	0.000	161'
SBNHH-1D65A	C	From Leg	4.000 0' 0'	0.000	161'
QS66512-2	A	From Leg	4.000 0' 0'	0.000	161'
QS66512-2	B	From Leg	4.000 0' 0'	0.000	161'
QS46512-2	C	From Leg	4.000 0' 0'	0.000	161'
RRUS 4426 B66	A	From Leg	4.000 0' 0'	0.000	161'
RRUS 4426 B66	B	From Leg	4.000 0' 0'	0.000	161'
RRUS 4426 B66	C	From Leg	4.000 0' 0'	0.000	161'
RRUS 32 B2	B	From Leg	4.000 0' 0'	0.000	161'
RRUS 32 B2	A	From Leg	4.000 0' 0'	0.000	161'
RRUS 32 B2	C	From Leg	4.000 0' 0'	0.000	161'
DC6-48-60-18-8F	A	From Leg	4.000 0' 0'	0.000	161'
DC6-48-60-18-8F	B	From Leg	4.000 0' 0'	0.000	161'
DC6-48-60-18-8F	C	From Leg	4.000 0' 0'	0.000	161'
RRUS 11	A	From Leg	4.000 0'	0.000	161'

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
RRUS 11	B	From Leg	0' 4.000 0'	0.000	161'
RRUS 11	C	From Leg	0' 4.000 0'	0.000	161'
RRUS 32	A	From Leg	0' 4.000 0'	0.000	161'
RRUS 32	B	From Leg	0' 4.000 0'	0.000	161'
RRUS 32	C	From Leg	0' 4.000 0'	0.000	161'
Sector Mount [SM 201-3]	C	None	0'	0.000	161'
OPA65R-BU6D w/ Mount Pipe	A	From Leg	4.000 0'	0.000	161'
OPA65R-BU6D w/ Mount Pipe	B	From Leg	0' 4.000 0'	0.000	161'
OPA65R-BU4D w/ Mount Pipe	C	From Leg	0' 4.000 0'	0.000	161'
RRUS 4478 B5	A	From Leg	0' 4.000 0'	0.000	161'
RRUS 4478 B5	B	From Leg	0' 4.000 0'	0.000	161'
RRUS 4478 B5	C	From Leg	0' 4.000 0'	0.000	161'
RRUS 4478 B14	A	From Leg	0' 4.000 0'	0.000	161'
RRUS 4478 B14	B	From Leg	0' 4.000 0'	0.000	161'
RRUS 4478 B14	C	From Leg	0' 4.000 0'	0.000	161'
DC6-48-60-18-8F	A	From Leg	0' 4.000 0'	0.000	161'
157 Side Arm Mount [SO 203-1]	A	From Leg	1.500 0'	0.000	157'
Side Arm Mount [SO 203-1]	B	From Leg	0' 1.500 0'	0.000	157'
148 APXVTM14-ALU-I20 w/ Mount Pipe	A	From Leg	4.000 0'	0.000	148'
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Leg	0' 4.000 0'	0.000	148'
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Leg	0' 4.000 0'	0.000	148'
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.000	0.000	148'

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
			0' 0'		
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	148'
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	148'
(2) PCS 1900MHz 4x45W-65MHz	A	From Leg	4.000 0' 0'	0.000	148'
(2) PCS 1900MHz 4x45W-65MHz	B	From Leg	4.000 0' 0'	0.000	148'
(2) PCS 1900MHz 4x45W-65MHz	C	From Leg	4.000 0' 0'	0.000	148'
800MHZ 2X50W RRH	A	From Leg	4.000 0' 0'	0.000	148'
800MHZ 2X50W RRH	B	From Leg	4.000 0' 0'	0.000	148'
800MHZ 2X50W RRH	C	From Leg	4.000 0' 0'	0.000	148'
800 EXTERNAL NOTCH FILTER	A	From Leg	4.000 0' 0'	0.000	148'
800 EXTERNAL NOTCH FILTER	B	From Leg	4.000 0' 0'	0.000	148'
800 EXTERNAL NOTCH FILTER	C	From Leg	4.000 0' 0'	0.000	148'
(3) ACU-A20-N	A	From Leg	4.000 0' 0'	0.000	148'
(3) ACU-A20-N	B	From Leg	4.000 0' 0'	0.000	148'
(3) ACU-A20-N	C	From Leg	4.000 0' 0'	0.000	148'
Sector Mount [SM 502-3] *136*	C	None		0.000	148'
LLPX310R w/ Mount Pipe	A	From Leg	4.000 0' 0'	0.000	136'
LLPX310R w/ Mount Pipe	B	From Leg	4.000 0' 0'	0.000	136'
LLPX310R w/ Mount Pipe	C	From Leg	4.000 0' 0'	0.000	136'
RRH-2WB	A	From Leg	4.000 0' 0'	0.000	136'
RRH-2WB	B	From Leg	4.000 0' 0'	0.000	136'
RRH-2WB	C	From Leg	4.000 0' 0'	0.000	136'
J - Box	C	From Leg	0.500	0.000	136'

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
(3) 6' x 2" Mount Pipe	A	From Leg	0' 0' 4.000 0' 0'	0.000	136'
(3) 6' x 2" Mount Pipe	B	From Leg	4.000 0' 0'	0.000	136'
(3) 6' x 2" Mount Pipe	C	From Leg	4.000 0' 0'	0.000	136'
6' x 3" Mount Pipe	A	From Leg	4.000 0' 0'	0.000	136'
6' x 3" Mount Pipe	C	From Leg	4.000 0' 0'	0.000	136'
Sector Mount [SM 504-3] *126*	C	None		0.000	136'
(2) JAHH-65C-R3B w/ Mount Pipe	A	From Leg	4.000 0' 3'	0.000	126'
(2) JAHH-65C-R3B w/ Mount Pipe	B	From Leg	4.000 0' 3'	0.000	126'
(2) JAHH-65C-R3B w/ Mount Pipe	C	From Leg	4.000 0' 3'	0.000	126'
CBRS w/ Mount Pipe	A	From Leg	4.000 0' 7'	0.000	126'
CBRS w/ Mount Pipe	B	From Leg	4.000 0' 7'	0.000	126'
CBRS w/ Mount Pipe	C	From Leg	4.000 0' 7'	0.000	126'
Sub6 Antenna - VZS01 w/ Mount Pipe	A	From Leg	4.000 0' 2'	0.000	126'
Sub6 Antenna - VZS01 w/ Mount Pipe	B	From Leg	4.000 0' 2'	0.000	126'
Sub6 Antenna - VZS01 w/ Mount Pipe	C	From Leg	4.000 0' 2'	0.000	126'
DB-C1-12C-24AB-0Z	C	From Leg	4.000 0' 3'	0.000	126'
(3) RFV01U-D1A	A	From Leg	4.000 0' 3'	0.000	126'
(2) RFV01U-D2A	B	From Leg	4.000 0' 3'	0.000	126'
RFV01U-D2A	C	From Leg	4.000 0' 3'	0.000	126'
(2) DB844G65ZAXY w/ Mount Pipe	A	From Leg	4.000 0' 3'	0.000	126'
DB844H80-XY w/ Mount Pipe	B	From Leg	4.000 0' 3'	0.000	126'
DB844H80-XY w/ Mount Pipe	B	From Leg	4.000	0.000	126'

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
(2) DB844G65ZAXY w/ Mount Pipe	C	From Leg	0' 3' 4.000 0'	0.000	126'
GPS_A	B	From Leg	3' 4.000 0'	0.000	126'
(2) 6' x 2" Mount Pipe	B	From Leg	4' 4.000 0'	0.000	126'
6' x 2" Mount Pipe	C	From Leg	0' 4.000 0'	0.000	126'
5' x 2" Pipe Mount	B	From Leg	0' 1.000 0'	0.000	126'
Sector Mount [SM 411-3]	C	None	0'	0.000	126'
112					
800 10504 w/ Mount Pipe	A	From Leg	4.000 0'	0.000	112'
800 10504 w/ Mount Pipe	B	From Leg	0' 4.000 0'	0.000	112'
800 10504 w/ Mount Pipe	C	From Leg	0' 4.000 0'	0.000	112'
6' x 2" Mount Pipe	A	From Leg	0' 4.000 0'	0.000	112'
6' x 2" Mount Pipe	B	From Leg	0' 4.000 0'	0.000	112'
6' x 2" Mount Pipe	C	From Leg	0' 4.000 0'	0.000	112'
Sector Mount [SM 104-3]	C	None	0'	0.000	112'
5					
GPS_A	A	From Face	2.000 0'	0.000	5'
ASPP2933	A	From Face	0' 0.500 0'	0.000	5'
3' x 2" Pipe Mount	A	From Face	1' 2.000 0'	0.000	5'
Side Arm Mount [SO 701-1]	A	From Face	0' 1.500 0'	0.000	5'
**			0'		
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.000 0'	0.000	181'
MX08FRO665-21 w/ Mount Pipe	B	From Leg	0' 4.000 0'	0.000	181'
MX08FRO665-21 w/ Mount Pipe	C	From Leg	0' 4.000 0'	0.000	181'
TA08025-B604	A	From Leg	0' 4.000 0'	0.000	181'
TA08025-B604	B	From Leg	0' 4.000	0.000	181'

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
			0' 0'		
TA08025-B604	C	From Leg	4.000 0' 0'	0.000	181'
TA08025-B605	A	From Leg	4.000 0' 0'	0.000	181'
TA08025-B605	B	From Leg	4.000 0' 0'	0.000	181'
TA08025-B605	C	From Leg	4.000 0' 0'	0.000	181'
RDIDC-9181-PF-48	A	From Leg	4.000 0' 0'	0.000	181'
(2) 8' x 2" Mount Pipe	A	From Leg	4.000 0' 0'	0.000	181'
(2) 8' x 2" Mount Pipe	B	From Leg	4.000 0' 0'	0.000	181'
(2) 8' x 2" Mount Pipe	C	From Leg	4.000 0' 0'	0.000	181'
Commscope MTC3975083 (3) ***	C	None		0.000	181'

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft
VHLP2-18	A	Paraboloid w/Shroud (HP)	From Leg	3.000 0' 0'	-10.000		157'	2.175
VHLP2-18 **	B	Paraboloid w/Shroud (HP)	From Leg	3.000 0' 0'	-40.000		157'	2.175
VHLP2-23 **	A	Paraboloid w/Shroud (HP)	From Leg	4.000 0' 2'	50.000		136'	2.175

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

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	180 - 160	Leg	Max Tension	15	9.841	-0.168	0.016
			Max. Compression	10	-17.157	0.609	0.057
			Max. Mx	22	7.683	-0.670	-0.050
			Max. My	17	-3.485	-0.020	0.560
			Max. Vy	22	-1.348	0.025	0.004
			Max. Vx	16	1.221	0.009	-0.115
		Diagonal	Max Tension	24	3.105	0.000	0.000
			Max. Compression	25	-3.019	0.000	0.000
			Max. Mx	32	0.502	0.030	0.004
			Max. My	34	0.963	0.029	0.004
			Max. Vy	28	0.030	0.029	-0.004
			Max. Vx	34	-0.002	0.000	0.000
		Top Girt	Max Tension	3	0.426	0.000	0.000
			Max. Compression	14	-0.482	0.000	0.000
			Max. Mx	26	-0.087	-0.056	0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	26	-0.085	0.000	0.002
			Max. Vy	26	-0.034	0.000	0.000
			Max. Vx	26	-0.001	0.000	0.000
		Mid Girt	Max Tension	18	0.483	0.000	0.000
			Max. Compression	23	-0.480	0.000	0.000
			Max. Mx	26	0.010	-0.075	0.000
			Max. My	26	0.008	0.000	0.002
			Max. Vy	26	-0.039	0.000	0.000
			Max. Vx	26	-0.001	0.000	0.000
T2	160 - 153.333	Leg	Max Tension	15	15.867	-0.662	0.071
			Max. Compression	10	-24.613	0.200	-0.020
			Max. Mx	22	14.577	-0.670	-0.050
			Max. My	17	-3.532	-0.020	0.560
			Max. Vy	22	-0.206	-0.670	-0.050
			Max. Vx	16	0.215	-0.028	0.560
		Diagonal	Max Tension	13	4.808	0.000	0.000
			Max. Compression	12	-5.019	0.000	0.000
			Max. Mx	30	1.075	0.049	0.006
			Max. My	38	-1.695	0.044	-0.008
			Max. Vy	29	0.042	0.048	0.006
			Max. Vx	38	0.003	0.000	0.000
T3	153.333 - 146.667	Leg	Max Tension	15	25.052	-0.227	0.001
			Max. Compression	10	-35.886	0.457	-0.042
			Max. Mx	6	22.535	0.520	-0.012
			Max. My	20	-5.032	-0.026	0.538
			Max. Vy	6	0.756	-0.475	-0.012
			Max. Vx	13	0.714	-0.015	-0.397
		Diagonal	Max Tension	13	4.943	0.000	0.000
			Max. Compression	12	-5.281	0.000	0.000
			Max. Mx	31	0.769	0.055	-0.008
			Max. My	28	0.805	0.054	-0.008
			Max. Vy	29	0.045	0.054	-0.008
			Max. Vx	28	0.003	0.000	0.000
		Top Girt	Max Tension	14	0.886	0.000	0.000
			Max. Compression	11	-0.523	0.000	0.000
			Max. Mx	26	0.525	-0.131	0.000
			Max. My	26	0.507	0.000	0.004
			Max. Vy	26	0.055	0.000	0.000
			Max. Vx	26	-0.002	0.000	0.000
T4	146.667 - 140	Leg	Max Tension	15	33.977	-0.468	-0.035
			Max. Compression	10	-46.791	0.178	-0.027
			Max. Mx	6	31.997	-0.475	-0.012
			Max. My	12	-6.472	-0.020	-0.397
			Max. Vy	2	0.103	0.459	0.036
			Max. Vx	13	-0.103	-0.015	-0.397
		Diagonal	Max Tension	13	5.795	0.000	0.000
			Max. Compression	12	-5.954	0.000	0.000
			Max. Mx	31	1.244	0.060	-0.008
			Max. My	35	-1.871	0.050	0.009
			Max. Vy	33	0.047	0.058	0.008
			Max. Vx	35	-0.003	0.000	0.000
		Top Girt	Max Tension	29	0.515	0.000	0.000
			Max. Compression	11	-0.187	0.000	0.000
			Max. Mx	26	0.430	-0.150	0.000
			Max. My	26	0.424	0.000	0.004
			Max. Vy	26	0.059	0.000	0.000
			Max. Vx	26	-0.002	0.000	0.000
T5	140 - 120	Leg	Max Tension	15	66.042	-0.384	-0.022
			Max. Compression	10	-85.931	0.539	-0.044
			Max. Mx	6	40.925	0.778	0.019
			Max. My	12	-10.687	-0.006	-0.785
			Max. Vy	14	-1.026	-0.393	-0.022
			Max. Vx	12	-1.008	-0.039	-0.311
		Diagonal	Max Tension	20	7.772	0.000	0.000
			Max. Compression	20	-7.793	0.000	0.000
			Max. Mx	33	1.820	0.082	-0.011

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	37	-2.016	0.075	0.011
			Max. Vy	33	0.057	0.082	-0.011
			Max. Vx	37	-0.003	0.000	0.000
T6	120 - 100	Leg	Max Tension	15	102.991	-0.484	-0.006
			Max. Compression	10	-128.015	0.840	-0.090
			Max. Mx	3	-124.738	0.850	0.032
			Max. My	12	-11.095	-0.006	-0.785
			Max. Vy	6	-0.463	-0.625	-0.030
			Max. Vx	24	0.437	-0.025	0.458
		Diagonal	Max Tension	20	9.089	0.000	0.000
			Max. Compression	20	-9.061	0.000	0.000
			Max. Mx	35	2.346	0.124	0.015
			Max. My	37	-2.341	0.110	0.016
			Max. Vy	33	0.075	0.121	-0.014
			Max. Vx	37	-0.004	0.000	0.000
T7	100 - 80	Leg	Max Tension	15	135.397	-0.550	-0.028
			Max. Compression	10	-164.542	0.619	-0.061
			Max. Mx	3	-140.996	0.850	0.032
			Max. My	12	-15.004	-0.030	-0.859
			Max. Vy	6	-0.141	-0.818	-0.060
			Max. Vx	10	-0.181	-0.318	-0.796
		Diagonal	Max Tension	8	9.996	0.000	0.000
			Max. Compression	8	-9.928	0.000	0.000
			Max. Mx	33	2.603	0.194	0.026
			Max. My	31	2.274	0.188	-0.028
			Max. Vy	33	0.097	0.194	0.026
			Max. Vx	31	0.006	0.000	0.000
T8	80 - 70	Leg	Max Tension	15	152.246	-0.660	-0.016
			Max. Compression	10	-183.519	2.215	-0.201
			Max. Mx	2	-183.437	2.241	0.074
			Max. My	12	-16.609	0.058	-2.040
			Max. Vy	2	-0.291	2.241	0.074
			Max. Vx	12	0.312	0.058	-2.040
		Diagonal	Max Tension	8	10.283	0.000	0.000
			Max. Compression	8	-10.407	0.000	0.000
			Max. Mx	33	2.253	0.216	-0.027
			Max. My	37	2.126	0.215	0.028
			Max. Vy	33	0.102	0.216	-0.027
			Max. Vx	37	-0.005	0.000	0.000
T9	70 - 60	Leg	Max Tension	15	168.910	-2.020	-0.078
			Max. Compression	2	-202.841	0.329	-0.025
			Max. Mx	2	-202.596	2.241	0.074
			Max. My	12	-17.372	0.058	-2.040
			Max. Vy	2	0.318	2.241	0.074
			Max. Vx	24	0.319	0.054	2.034
		Diagonal	Max Tension	8	10.966	0.000	0.000
			Max. Compression	8	-11.141	0.000	0.000
			Max. Mx	33	2.672	-0.369	-0.043
			Max. My	37	-3.433	-0.330	-0.053
			Max. Vy	33	-0.172	-0.369	-0.043
			Max. Vx	31	-0.009	0.000	0.000
T10	60 - 40	Leg	Max Tension	15	201.617	-1.276	-0.028
			Max. Compression	2	-241.080	1.668	0.037
			Max. Mx	37	19.001	-2.511	0.069
			Max. My	12	-19.488	-0.029	-1.417
			Max. Vy	29	0.382	-2.495	-0.040
			Max. Vx	24	-0.251	-0.032	1.406
		Diagonal	Max Tension	8	11.253	0.000	0.000
			Max. Compression	10	-11.622	0.000	0.000
			Max. Mx	33	2.284	0.291	-0.034
			Max. My	37	-3.114	0.262	0.039
			Max. Vy	33	0.128	0.290	0.036
			Max. Vx	31	0.007	0.000	0.000
T11	40 - 20	Leg	Max Tension	15	233.167	-0.889	-0.005
			Max. Compression	2	-278.864	2.725	0.069
			Max. Mx	37	22.632	-5.859	0.082
			Max. My	12	-22.803	-0.205	-1.507
			Max. Vy	29	0.974	-5.824	-0.047
			Max. Vx	12	-0.195	-0.205	-1.507

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
		Diagonal	Max Tension	8	11.839	0.000	0.000
			Max. Compression	10	-12.359	0.000	0.000
			Max. Mx	33	1.601	0.390	0.042
			Max. My	31	4.654	0.319	-0.049
			Max. Vy	33	0.147	0.390	0.042
			Max. Vx	31	0.008	0.000	0.000
T12	20 - 0	Leg	Max Tension	15	262.575	-1.119	-0.027
			Max. Compression	2	-316.499	0.000	-0.000
			Max. Mx	37	29.451	-5.859	0.082
			Max. My	12	-26.735	-0.283	-2.877
			Max. Vy	29	-1.142	-5.824	-0.047
			Max. Vx	12	-0.431	-0.283	-2.877
		Diagonal	Max Tension	8	12.809	0.000	0.000
			Max. Compression	10	-13.697	0.000	0.000
			Max. Mx	33	-1.081	-0.839	0.073
			Max. My	32	8.039	-0.482	0.099
			Max. Vy	33	-0.267	-0.839	0.073
			Max. Vx	32	-0.014	0.000	0.000

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	322.003	33.271	-18.354
	Max. H_x	18	322.003	33.271	-18.354
	Max. H_z	7	-259.329	-27.849	15.272
	Min. Vert	7	-259.329	-27.849	15.272
	Min. H_x	7	-259.329	-27.849	15.272
	Min. H_z	18	322.003	33.271	-18.354
Leg B	Max. Vert	10	324.665	-33.938	-18.239
	Max. H_x	23	-264.499	28.581	15.215
	Max. H_z	25	-235.160	24.566	15.699
	Min. Vert	23	-264.499	28.581	15.215
	Min. H_x	10	324.665	-33.938	-18.239
	Min. H_z	10	324.665	-33.938	-18.239
Leg A	Max. Vert	2	325.956	-0.408	39.031
	Max. H_x	21	18.322	3.478	1.734
	Max. H_z	2	325.956	-0.408	39.031
	Min. Vert	15	-269.802	0.393	-32.977
	Min. H_x	8	24.692	-3.496	2.360
	Min. H_z	15	-269.802	0.393	-32.977

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	66.048	0.000	0.000	32.518	11.850	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	79.258	0.067	-62.284	-6485.162	6.903	-16.907
0.9 Dead+1.0 Wind 0 deg - No Ice	59.444	0.067	-62.284	-6494.918	3.348	-16.907
1.2 Dead+1.0 Wind 30 deg - No Ice	79.258	28.642	-49.665	-5246.099	-3030.820	23.886
0.9 Dead+1.0 Wind 30 deg - No Ice	59.444	28.642	-49.665	-5255.854	-3034.375	23.886
1.2 Dead+1.0 Wind 60 deg - No Ice	79.258	49.147	-28.458	-3003.106	-5235.550	31.157
0.9 Dead+1.0 Wind 60 deg - No Ice	59.444	49.147	-28.458	-3012.862	-5239.105	31.157

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 90 deg - No Ice	79.258	56.273	-0.030	37.403	-6033.471	32.343
0.9 Dead+1.0 Wind 90 deg - No Ice	59.444	56.273	-0.030	27.647	-6037.027	32.343
1.2 Dead+1.0 Wind 120 deg - No Ice	79.258	53.052	30.679	3271.145	-5567.536	49.244
0.9 Dead+1.0 Wind 120 deg - No Ice	59.444	53.052	30.679	3261.389	-5571.091	49.244
1.2 Dead+1.0 Wind 150 deg - No Ice	79.258	30.248	52.506	5574.888	-3173.490	45.222
0.9 Dead+1.0 Wind 150 deg - No Ice	59.444	30.248	52.506	5565.132	-3177.045	45.222
1.2 Dead+1.0 Wind 180 deg - No Ice	79.258	-0.075	58.854	6280.146	22.375	17.190
0.9 Dead+1.0 Wind 180 deg - No Ice	59.444	-0.075	58.854	6270.390	18.820	17.190
1.2 Dead+1.0 Wind 210 deg - No Ice	79.258	-28.698	49.724	5332.970	3067.521	-23.743
0.9 Dead+1.0 Wind 210 deg - No Ice	59.444	-28.698	49.724	5323.214	3063.966	-23.743
1.2 Dead+1.0 Wind 240 deg - No Ice	79.258	-52.211	30.244	3233.295	5522.842	-31.201
0.9 Dead+1.0 Wind 240 deg - No Ice	59.444	-52.211	30.244	3223.539	5519.287	-31.201
1.2 Dead+1.0 Wind 270 deg - No Ice	79.258	-56.338	0.041	42.066	6071.492	-32.262
0.9 Dead+1.0 Wind 270 deg - No Ice	59.444	-56.338	0.041	32.310	6067.937	-32.262
1.2 Dead+1.0 Wind 300 deg - No Ice	79.258	-50.074	-28.896	-3041.376	5349.826	-49.328
0.9 Dead+1.0 Wind 300 deg - No Ice	59.444	-50.074	-28.896	-3051.131	5346.271	-49.328
1.2 Dead+1.0 Wind 330 deg - No Ice	79.258	-30.248	-52.468	-5490.814	3202.153	-45.483
0.9 Dead+1.0 Wind 330 deg - No Ice	59.444	-30.248	-52.468	-5500.569	3198.598	-45.483
1.2 Dead+1.0 Ice+1.0 Temp	175.612	0.000	-0.000	132.760	52.679	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	175.612	0.018	-18.676	-1818.040	50.701	-3.669
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	175.612	8.750	-15.161	-1474.711	-874.673	8.369
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	175.612	14.621	-8.459	-775.366	-1516.376	11.603
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	175.612	17.316	-0.010	132.001	-1801.372	14.734
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	175.612	16.012	9.251	1108.725	-1635.323	20.447
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	175.612	9.274	16.088	1821.708	-920.791	17.671
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	175.612	-0.019	18.149	2041.388	54.839	3.730
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	175.612	-8.762	15.173	1742.122	981.801	-8.338
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	175.612	-15.098	8.738	1064.247	1661.196	-11.612
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	175.612	-17.330	0.012	133.825	1908.782	-14.717
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	175.612	-15.554	-8.973	-819.934	1703.940	-20.465
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	175.612	-9.275	-16.080	-1554.900	1026.196	-17.727
Dead+Wind 0 deg - Service	66.048	0.018	-16.903	-1720.482	9.925	-4.449
Dead+Wind 30 deg - Service	66.048	7.793	-13.513	-1389.574	-807.531	6.282
Dead+Wind 60 deg - Service	66.048	13.377	-7.745	-786.096	-1400.940	8.193
Dead+Wind 90 deg - Service	66.048	15.321	-0.008	32.092	-1615.757	8.504
Dead+Wind 120 deg - Service	66.048	14.405	8.330	901.132	-1488.305	12.952
Dead+Wind 150 deg - Service	66.048	8.216	14.261	1520.597	-845.075	11.897

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+Wind 180 deg - Service	66.048	-0.020	16.000	1711.029	13.996	4.524
Dead+Wind 210 deg - Service	66.048	-7.808	13.529	1456.934	833.405	-6.244
Dead+Wind 240 deg - Service	66.048	-14.183	8.215	891.171	1492.759	-8.204
Dead+Wind 270 deg - Service	66.048	-15.338	0.011	33.319	1641.978	-8.483
Dead+Wind 300 deg - Service	66.048	-13.621	-7.860	-796.167	1447.228	-12.975
Dead+Wind 330 deg - Service	66.048	-8.216	-14.251	-1453.973	868.835	-11.966

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.000	-66.048	0.000	0.000	66.048	0.000	0.000%
2	0.067	-79.258	-62.284	-0.067	79.258	62.284	0.000%
3	0.067	-59.444	-62.284	-0.067	59.444	62.284	0.000%
4	28.642	-79.258	-49.665	-28.642	79.258	49.665	0.000%
5	28.642	-59.444	-49.665	-28.642	59.444	49.665	0.000%
6	49.147	-79.258	-28.458	-49.147	79.258	28.458	0.000%
7	49.147	-59.444	-28.458	-49.147	59.444	28.458	0.000%
8	56.273	-79.258	-0.030	-56.273	79.258	0.030	0.000%
9	56.273	-59.444	-0.030	-56.273	59.444	0.030	0.000%
10	53.052	-79.258	30.679	-53.052	79.258	-30.679	0.000%
11	53.052	-59.444	30.679	-53.052	59.444	-30.679	0.000%
12	30.248	-79.258	52.506	-30.248	79.258	-52.506	0.000%
13	30.248	-59.444	52.506	-30.248	59.444	-52.506	0.000%
14	-0.075	-79.258	58.854	0.075	79.258	-58.854	0.000%
15	-0.075	-59.444	58.854	0.075	59.444	-58.854	0.000%
16	-28.698	-79.258	49.724	28.698	79.258	-49.724	0.000%
17	-28.698	-59.444	49.724	28.698	59.444	-49.724	0.000%
18	-52.211	-79.258	30.244	52.211	79.258	-30.244	0.000%
19	-52.211	-59.444	30.244	52.211	59.444	-30.244	0.000%
20	-56.338	-79.258	0.041	56.338	79.258	-0.041	0.000%
21	-56.338	-59.444	0.041	56.338	59.444	-0.041	0.000%
22	-50.074	-79.258	-28.896	50.074	79.258	28.896	0.000%
23	-50.074	-59.444	-28.896	50.074	59.444	28.896	0.000%
24	-30.248	-79.258	-52.468	30.248	79.258	52.468	0.000%
25	-30.248	-59.444	-52.468	30.248	59.444	52.468	0.000%
26	0.000	-175.612	0.000	0.000	175.612	0.000	0.000%
27	0.018	-175.612	-18.676	-0.018	175.612	18.676	0.000%
28	8.750	-175.612	-15.161	-8.750	175.612	15.161	0.000%
29	14.621	-175.612	-8.459	-14.621	175.612	8.459	0.000%
30	17.316	-175.612	-0.010	-17.316	175.612	0.010	0.000%
31	16.012	-175.612	9.251	-16.012	175.612	-9.251	0.000%
32	9.274	-175.612	16.088	-9.274	175.612	-16.088	0.000%
33	-0.019	-175.612	18.149	0.019	175.612	-18.149	0.000%
34	-8.762	-175.612	15.173	8.762	175.612	-15.173	0.000%
35	-15.098	-175.612	8.738	15.098	175.612	-8.738	0.000%
36	-17.330	-175.612	0.012	17.330	175.612	-0.012	0.000%
37	-15.554	-175.612	-8.973	15.554	175.612	8.973	0.000%
38	-9.275	-175.612	-16.080	9.275	175.612	16.080	0.000%
39	0.018	-66.048	-16.903	-0.018	66.048	16.903	0.000%
40	7.793	-66.048	-13.513	-7.793	66.048	13.513	0.000%
41	13.377	-66.048	-7.745	-13.377	66.048	7.745	0.000%
42	15.321	-66.048	-0.008	-15.321	66.048	0.008	0.000%
43	14.405	-66.048	8.330	-14.405	66.048	-8.330	0.000%
44	8.216	-66.048	14.261	-8.216	66.048	-14.261	0.000%
45	-0.020	-66.048	16.000	0.020	66.048	-16.000	0.000%
46	-7.808	-66.048	13.529	7.808	66.048	-13.529	0.000%
47	-14.183	-66.048	8.215	14.183	66.048	-8.215	0.000%
48	-15.338	-66.048	0.011	15.338	66.048	-0.011	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
49	-13.621	-66.048	-7.860	13.621	66.048	7.860	0.000%
50	-8.216	-66.048	-14.251	8.216	66.048	14.251	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	3.117	43	0.137	0.011
T2	160 - 153.333	2.537	43	0.133	0.011
T3	153.333 - 146.667	2.347	43	0.130	0.012
T4	146.667 - 140	2.162	43	0.126	0.012
T5	140 - 120	1.982	43	0.121	0.012
T6	120 - 100	1.473	43	0.107	0.011
T7	100 - 80	1.029	43	0.088	0.009
T8	80 - 70	0.670	43	0.070	0.007
T9	70 - 60	0.517	43	0.061	0.006
T10	60 - 40	0.390	43	0.052	0.005
T11	40 - 20	0.182	43	0.032	0.003
T12	20 - 0	0.051	39	0.017	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
181'	MX08FRO665-21 w/ Mount Pipe	43	3.117	0.137	0.011	Inf
170'	AIR 32 B2A/B66AA w/ Mount Pipe	43	2.826	0.135	0.011	508150
161'	HPA-65R-BUU-H6	43	2.566	0.133	0.011	244090
157'	VHLP2-18	43	2.451	0.132	0.012	140917
148'	APXVTM14-ALU-I20 w/ Mount Pipe	43	2.199	0.127	0.012	130926
138'	VHLP2-23	43	1.928	0.120	0.012	96681
136'	LLPX310R w/ Mount Pipe	43	1.875	0.118	0.012	93511
126'	(2) JAHH-65C-R3B w/ Mount Pipe	43	1.620	0.111	0.011	82881
112'	800 10504 w/ Mount Pipe	43	1.286	0.099	0.010	63615
5'	GPS_A	39	0.009	0.004	0.000	187913

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	180 - 160	11.678	3	0.511	0.041
T2	160 - 153.333	9.505	3	0.497	0.043
T3	153.333 - 146.667	8.794	3	0.486	0.045
T4	146.667 - 140	8.101	3	0.472	0.046
T5	140 - 120	7.423	3	0.454	0.046
T6	120 - 100	5.515	3	0.399	0.041
T7	100 - 80	3.853	3	0.329	0.034
T8	80 - 70	2.505	3	0.260	0.027
T9	70 - 60	1.935	3	0.228	0.022
T10	60 - 40	1.461	3	0.193	0.020
T11	40 - 20	0.682	3	0.121	0.012
T12	20 - 0	0.189	3	0.062	0.004

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
181'	MX08FRO665-21 w/ Mount Pipe	3	11.678	0.511	0.041	284531
170'	AIR 32 B2A/B66AA w/ Mount Pipe	3	10.587	0.506	0.042	142265
161'	HPA-65R-BUU-H6	3	9.613	0.498	0.043	67736
157'	VHLP2-18	3	9.183	0.492	0.044	38094
148'	APXVTM14-ALU-I20 w/ Mount Pipe	3	8.238	0.475	0.046	35262
138'	VHLP2-23	3	7.223	0.448	0.046	25619
136'	LLPX310R w/ Mount Pipe	3	7.025	0.443	0.046	24759
126'	(2) JAHH-65C-R3B w/ Mount Pipe	3	6.065	0.416	0.043	21896
112'	800 10504 w/ Mount Pipe	3	4.815	0.373	0.039	16844
5'	GPS_A	3	0.032	0.016	0.001	50252

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	180	Leg	A325N	0.875	4	2.460	41.556	0.059	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	3.105	8.135	0.382	1.05	Member Block Shear
		Top Girt	A325N	0.625	1	0.426	5.423	0.079	1.05	Member Block Shear
		Mid Girt	A325N	0.625	1	0.483	5.423	0.089	1.05	Member Block Shear
T2	160	Diagonal	A325N	0.625	1	4.808	11.310	0.425	1.05	Member Bearing
T3	153.333	Diagonal	A325N	0.625	1	4.943	11.310	0.437	1.05	Member Bearing
		Top Girt	A325N	0.625	1	0.886	5.655	0.157	1.05	Member Bearing
T4	146.667	Leg	A325N	1.000	4	8.494	54.517	0.156	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	5.795	11.310	0.512	1.05	Member Bearing
		Top Girt	A325N	0.625	1	0.812	5.655	0.144	1.05	Member Bearing
T5	140	Leg	A325N	1.000	6	11.007	54.517	0.202	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	7.772	11.310	0.687	1.05	Member Bearing
T6	120	Leg	A325N	1.000	6	17.165	54.517	0.315	1.05	Bolt Tension
		Diagonal	A325N	0.625	1	9.089	12.675	0.717	1.05	Member Bearing
T7	100	Leg	A325N	1.000	8	16.925	54.517	0.310	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	9.996	14.137	0.707	1.05	Member Bearing
T8	80	Diagonal	A325N	0.750	1	10.283	14.137	0.727	1.05	Member Bearing
T9	70	Leg	A325N	1.000	8	21.114	54.517	0.387	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	10.966	20.227	0.542	1.05	Gusset Bearing
T10	60	Leg	A325N	1.000	8	25.202	54.517	0.462	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	11.253	14.137	0.796	1.05	Member Bearing
T11	40	Leg	A325N	1.000	8	29.146	54.517	0.535	1.05	Bolt Tension
		Diagonal	A325N	0.750	1	11.839	17.672	0.670	1.05	Member Bearing
T12	20	Diagonal	A325N	0.750	1	12.809	20.227	0.633	1.05	Gusset Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	180 - 160	ROHN 3 EH	20'7/16' '	5'3/32"	52.9 K=1.00	3.016	-17.157	110.608	0.155 [1]
T2	160 - 153.333	ROHN 4 EH	6'8-5/32"	6'8-5/32"	54.3 K=1.00	4.407	-24.613	159.906	0.154 [1]
T3	153.333 - 146.667	ROHN 4 EH	6'8-5/32"	6'8-5/32"	54.3 K=1.00	4.407	-35.886	159.905	0.224 [1]
T4	146.667 - 140	ROHN 4 EH	6'8-5/32"	6'8-5/32"	54.3 K=1.00	4.407	-46.791	159.906	0.293 [1]
T5	140 - 120	ROHN 5 EH	20'7/16' '	6'8-5/32"	43.6 K=1.00	6.112	-85.930	239.378	0.359 [1]
T6	120 - 100	ROHN 6 EHS	20'3/8"	6'8-1/8"	36.0 K=1.00	6.713	-128.015	274.776	0.466 [1]
T7	100 - 80	ROHN 6 EH	20'15/32"	10'7/32' '	54.8 K=1.00	8.405	-164.542	303.717	0.542 [1]
T8	80 - 70	ROHN 8 EHS	10'7/32' '	10'7/32' '	41.2 K=1.00	9.719	-183.519	386.395	0.475 [1]
T9	70 - 60	ROHN 8 EHS	10'7/32' '	10'7/32' '	41.2 K=1.00	9.719	-202.841	386.395	0.525 [1]
T10	60 - 40	ROHN 8 EHS	20'13/32"	10'7/32' '	41.2 K=1.00	9.719	-241.080	386.397	0.624 [1]
T11	40 - 20	ROHN 8 EH	20'13/32"	10'7/32' '	41.8 K=1.00	12.763	-278.864	505.555	0.552 [1]
T12	20 - 0	ROHN 8 EH	20'13/32"	10'7/32' '	41.8 K=1.00	12.763	-316.499	505.555	0.626 [1]

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	180 - 160	L2x2x3/16	9'10-3/8"	4'9-15/32"	145.8 K=1.00	0.715	-3.019	9.623	0.314 [1]
T2	160 - 153.333	L2 1/2x2 1/2x1/4	11'3-7/16"	5'6"	134.4 K=1.00	1.190	-5.019	18.851	0.266 [1]
T3	153.333 - 146.667	L2 1/2x2 1/2x1/4	11'10-7/32"	5'9-13/32"	141.4 K=1.00	1.190	-5.281	17.047	0.310 [1]
T4	146.667 - 140	L2 1/2x2 1/2x1/4	12'5-5/32"	6'7/8"	148.4 K=1.00	1.190	-5.954	15.466	0.385 [1]
T5	140 - 120	L2 1/2x2 1/2x1/4	14'2-3/4"	6'11-3/32"	169.2 K=1.00	1.190	-7.793	11.895	0.655 [1]
T6	120 - 100	L3x3x1/4	15'11-7/8"	7'8-29/32"	157.0 K=1.00	1.440	-9.061	16.730	0.542 [1]
T7	100 - 80	L3 1/2x3 1/2x1/4	19'3-3/32"	9'5-25/32"	164.0 K=1.00	1.690	-9.928	17.990	0.552 [1]
T8	80 - 70	L3 1/2x3 1/2x1/4	20'1-13/16"	9'9-25/32"	169.7 K=1.00	1.690	-10.407	16.792	0.620 [1]
T9	70 - 60	2L3 1/2x3 1/2x1/4x3/8 2L 'a' > 58.773 in - 137	21'11/32"	10'3-3/32"	189.4 K=1.00	3.380	-11.141	26.228	0.425 [1]
T10	60 - 40	L4x4x1/4	22'9-23/32"	11'1-25/32"	168.3 K=1.00	1.940	-11.622	19.609	0.593 [1]
T11	40 - 20	L4x4x5/16	24'7-1/2"	12'11/16"	182.9 K=1.00	2.400	-12.359	20.532	0.602 [1]
T12	20 - 0	2L4x4x5/16x3/8 2L 'a' > 74.511 in - 176	26'5-9/16"	12'11-3/4"	211.6 K=1.00	4.800	-13.697	30.149	0.454 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/8	6'8-1/4"	6'1-3/4"	185.5 K=1.00	0.484	-0.482	4.028	0.120 [1]
T3	153.333 - 146.667	L2 1/2x2 1/2x1/8 KL/R > 200 (C) - 46	9'5-13/32"	8'9-29/32"	212.2 K=1.00	0.609	-0.622	3.875	0.161 [1]
T4	146.667 - 140	L2 1/2x2 1/2x1/8 KL/R > 200 (C) - 58	10'1-23/32"	9'6-7/32"	228.8 K=1.00	0.609	-0.812	3.331	0.244 [1]

[1] P_u / ϕP_n controls

Mid Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/8 KL/R > 200 (C) - 9	7'8-11/16"	7'2-3/16"	216.8 K=1.00	0.484	-0.480	2.950	0.163 [1]

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	ROHN 3 EH	20'7/16' '	5'3/32"	52.9	3.016	9.841	135.717	0.073 [1]
T2	160 - 153.333	ROHN 4 EH	6'8-5/32"	6'8-5/32"	54.3	4.407	15.867	198.335	0.080 [1]
T3	153.333 - 146.667	ROHN 4 EH	6'8-5/32"	6'8-5/32"	54.3	4.407	25.052	198.335	0.126 [1]
T4	146.667 - 140	ROHN 4 EH	6'8-5/32"	6'8-5/32"	54.3	4.407	33.977	198.335	0.171 [1]
T5	140 - 120	ROHN 5 EH	20'7/16' '	6'8-5/32"	43.6	6.112	66.042	275.039	0.240 [1]
T6	120 - 100	ROHN 6 EHS	20'3/8"	6'8-1/8"	36.0	6.713	102.991	302.097	0.341 [1]
T7	100 - 80	ROHN 6 EH	20'15/32"	10'7/32' '	54.8	8.405	135.397	378.222	0.358 [1]
T8	80 - 70	ROHN 8 EHS	10'7/32' '	10'7/32' '	41.2	9.719	152.246	437.369	0.348 [1]
T9	70 - 60	ROHN 8 EHS	10'7/32' '	10'7/32' '	41.2	9.719	168.910	437.369	0.386 [1]
T10	60 - 40	ROHN 8 EHS	20'13/32"	10'7/32' '	41.2	9.719	201.617	437.369	0.461 [1]
T11	40 - 20	ROHN 8 EH	20'13/32"	10'7/32' '	41.8	12.763	233.167	574.322	0.406 [1]
T12	20 - 0	ROHN 8 EH	20'13/32"	10'7/32' '	41.8	12.763	262.575	574.322	0.457 [1]

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x3/16	9'10-3/8"	4'9-15/32"	95.6	0.431	3.105	18.739	0.166 [1]
T2	160 - 153.333	L2 1/2x2 1/2x1/4	11'3-7/16"	5'6"	87.8	0.752	4.808	32.707	0.147 [1]
T3	153.333 - 146.667	L2 1/2x2 1/2x1/4	11'10-7/32"	5'9-13/32"	92.2	0.752	4.943	32.707	0.151 [1]
T4	146.667 - 140	L2 1/2x2 1/2x1/4	12'5-5/32"	6'7/8"	96.7	0.752	5.795	32.707	0.177 [1]
T5	140 - 120	L2 1/2x2 1/2x1/4	14'2-3/4"	6'11-3/32"	110.0	0.752	7.772	32.707	0.238 [1]
T6	120 - 100	L3x3x1/4	15'11-7/8"	7'8-29/32"	101.5	0.939	9.089	45.794	0.198 [1]
T7	100 - 80	L3 1/2x3 1/2x1/4	19'3-3/32"	9'5-25/32"	105.9	1.103	9.996	53.793	0.186 [1]
T8	80 - 70	L3 1/2x3 1/2x1/4	20'1-13/16"	9'9-25/32"	109.6	1.103	10.283	53.793	0.191 [1]
T9	70 - 60	2L3 1/2x3 1/2x1/4x3/8 2L 'a' > 58.773 in - 136	21'11/32"	10'3-3/32"	114.4	2.207	10.966	95.999	0.114 [1]
T10	60 - 40	L4x4x1/4	22'9-23/32"	11'1-25/32"	108.3	1.291	11.253	62.933	0.179 [1]
T11	40 - 20	L4x4x5/16	23'8-9/16"	11'7-1/4"	113.6	1.595	11.839	77.752	0.152 [1]
T12	20 - 0	2L4x4x5/16x3/8 2L 'a' > 74.511 in - 175	26'5-9/16"	12'11-3/4"	126.9	3.190	12.809	138.758	0.092 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/8	6'8-1/4"	6'1-3/4"	122.6	0.293	0.426	12.744	0.033 [1]
T3	153.333 - 146.667	L2 1/2x2 1/2x1/8	9'5-13/32"	8'9-29/32"	138.3	0.387	0.886	16.822	0.053 [1]
T4	146.667 - 140	L2 1/2x2 1/2x1/8	10'1-23/32"	9'6-7/32"	148.9	0.387	0.812	16.822	0.048 [1]

[1] P_u / ϕP_n controls

Mid Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	180 - 160	L2x2x1/8	7'8-11/16"	7'2-3/16"	142.4	0.293	0.483	12.744	0.038 [1]

[1] P_u / ϕP_n controls

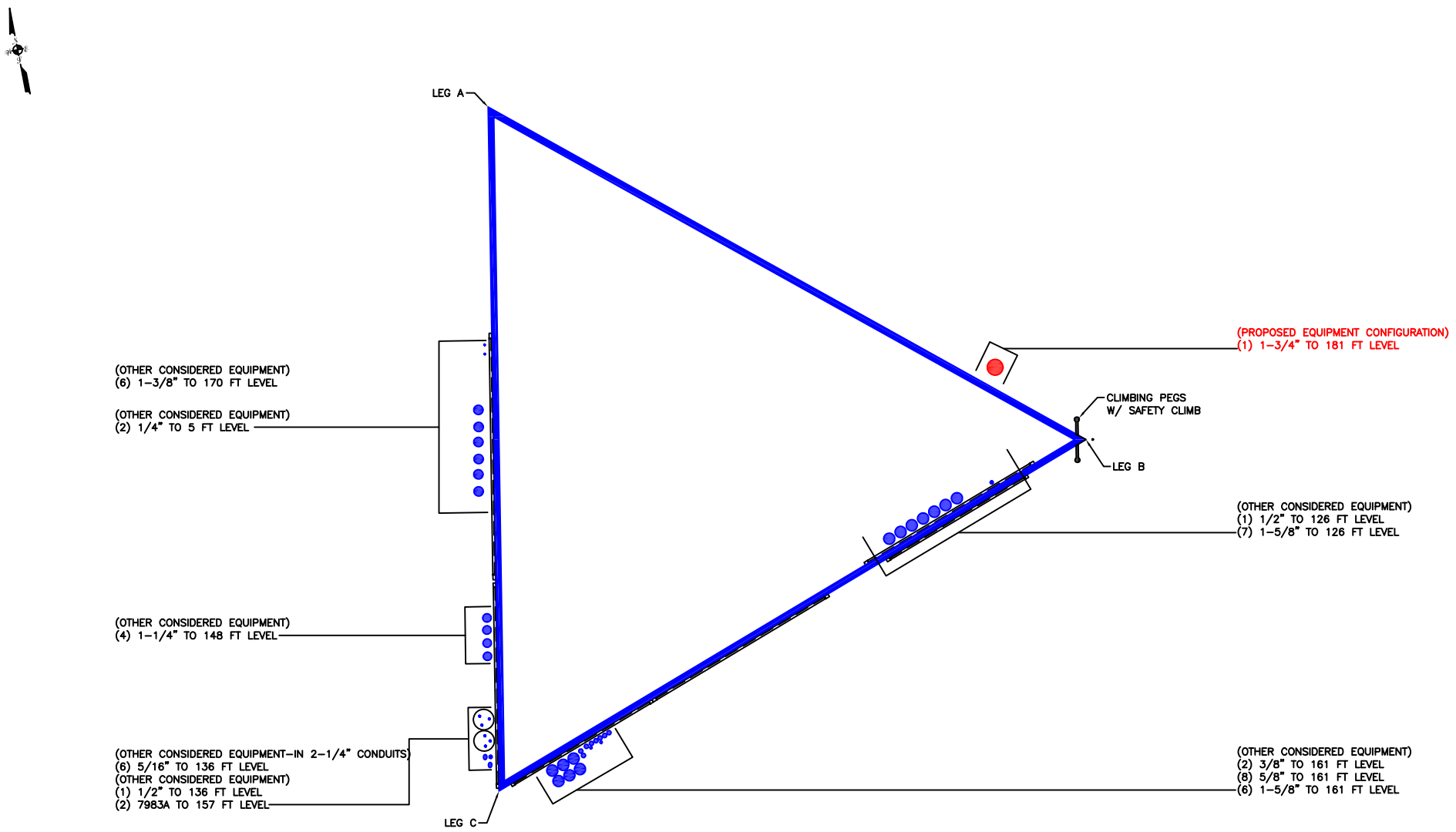
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	180 - 160	Leg	ROHN 3 EH	2	-17.157	116.138	14.8	Pass
T2	160 - 153.333	Leg	ROHN 4 EH	35	-24.613	167.901	14.7	Pass
T3	153.333 - 146.667	Leg	ROHN 4 EH	44	-35.886	167.900	21.4	Pass
T4	146.667 - 140	Leg	ROHN 4 EH	56	-46.791	167.901	27.9	Pass
T5	140 - 120	Leg	ROHN 5 EH	68	-85.930	251.347	34.2	Pass
T6	120 - 100	Leg	ROHN 6 EHS	89	-128.015	288.515	44.4	Pass
T7	100 - 80	Leg	ROHN 6 EH	110	-164.542	318.903	51.6	Pass
T8	80 - 70	Leg	ROHN 8 EHS	125	-183.519	405.715	45.2	Pass
T9	70 - 60	Leg	ROHN 8 EHS	135	-202.841	405.715	50.0	Pass
T10	60 - 40	Leg	ROHN 8 EHS	144	-241.080	405.717	59.4	Pass
T11	40 - 20	Leg	ROHN 8 EH	159	-278.864	530.833	52.5	Pass
T12	20 - 0	Leg	ROHN 8 EH	174	-316.499	530.833	59.6	Pass
T1	180 - 160	Diagonal	L2x2x3/16	13	-3.019	10.104	29.9	Pass
T2	160 - 153.333	Diagonal	L2 1/2x2 1/2x1/4	39	-5.019	19.793	25.4	Pass
T3	153.333 - 146.667	Diagonal	L2 1/2x2 1/2x1/4	51	-5.281	17.900	29.5	Pass
T4	146.667 - 140	Diagonal	L2 1/2x2 1/2x1/4	63	-5.954	16.240	36.7	Pass
T5	140 - 120	Diagonal	L2 1/2x2 1/2x1/4	70	-7.793	12.489	62.4	Pass
T6	120 - 100	Diagonal	L3x3x1/4	91	-9.061	17.566	51.6	Pass
T7	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	113	-9.928	18.890	52.6	Pass
T8	80 - 70	Diagonal	L3 1/2x3 1/2x1/4	128	-10.407	17.632	59.0	Pass
T9	70 - 60	Diagonal	2L3 1/2x3 1/2x1/4x3/8	137	-11.141	27.539	40.5	Pass
T10	60 - 40	Diagonal	L4x4x1/4	146	-11.622	20.589	56.4	Pass
T11	40 - 20	Diagonal	L4x4x5/16	161	-12.359	21.559	57.3	Pass
T12	20 - 0	Diagonal	2L4x4x5/16x3/8	176	-13.697	31.656	43.3	Pass
T1	180 - 160	Top Girt	L2x2x1/8	4	-0.482	4.230	11.4	Pass
T3	153.333 - 146.667	Top Girt	L2 1/2x2 1/2x1/8	46	-0.622	4.069	15.3	Pass
T4	146.667 - 140	Top Girt	L2 1/2x2 1/2x1/8	58	-0.812	3.498	23.2	Pass
T1	180 - 160	Mid Girt	L2x2x1/8	9	-0.480	3.097	15.5	Pass
							Summary	
						Leg (T12)	59.6	Pass
						Diagonal (T5)	62.4	Pass
						Top Girt (T4)	23.2	Pass
						Mid Girt (T1)	15.5	Pass
						Bolt Checks	75.8	Pass
						RATING =	**75.8**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


LEG A
(PROPOSED EQUIPMENT CONFIGURATION)
(1) 1-3/4" TO 181 FT LEVEL
CLIMBING PEGS
W/ SAFETY CLIMB
LEG B
(OTHER CONSIDERED EQUIPMENT)
(6) 1-3/8" TO 170 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(2) 1/4" TO 5 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 126 FT LEVEL
(7) 1-5/8" TO 126 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(4) 1-1/4" TO 148 FT LEVEL
(OTHER CONSIDERED EQUIPMENT-IN 2-1/4" CONDUITS)
(6) 5/16" TO 136 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 136 FT LEVEL
(2) 7983A TO 157 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(2) 3/8" TO 161 FT LEVEL
(8) 5/8" TO 161 FT LEVEL
(6) 1-5/8" TO 161 FT LEVEL
LEG C

APPENDIX C

ADDITIONAL CALCULATIONS

Self Support Anchor Rod Capacity

Site Info	
BU #	807133
Site Name	BRG 134 943057
Order #	548868, Rev. 1

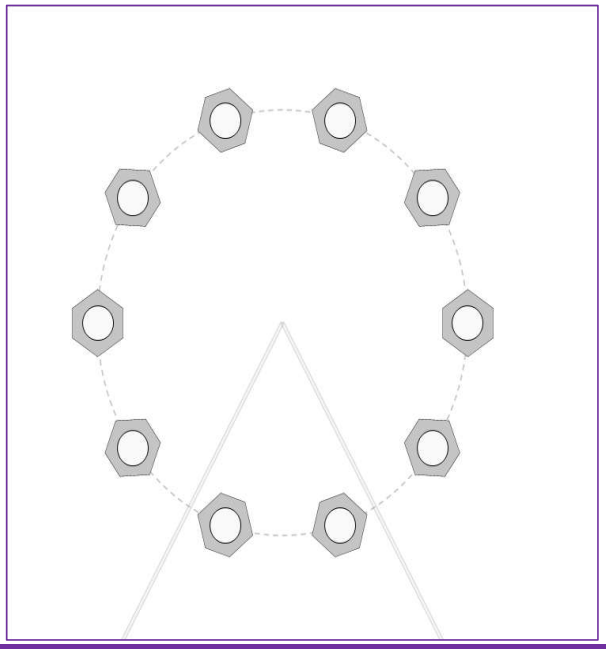
Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	Yes
l_{ar} (in)	1.5

Applied Loads		
	Comp.	Uplift
Axial Force (kips)	325.96	269.80
Shear Force (kips)	39.03	32.98

**TIA-222-H Section 15.5 Applied*

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

**Anchor Rod Eccentricity Applied*



Connection Properties

Anchor Rod Data

(10) 1" ø bolts (A449 N; Fy=92 ksi, Fu=120 ksi)

l_{ar} (in): 1.5

Analysis Results

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

Pu_t = 26.98	ϕPn_t = 54.54	**Stress Rating**
Vu = 3.3	ϕVn = 35.34	**47.1%**
Mu = n/a	ϕMn = n/a	**Pass**

BU: 807133
WO: 1964193

Done By: MAA
Checked By:
Date: 6/7/2021

Foundation Analysis - Rock Anchors

Applied Loads:

$U := 270kip$ Uplift Force per Leg

$C := 326kip$ Compression Force per Leg

$d_{pier} := 9ft$ $b_{pier} := 6.25ft$ Pier Dimensions

$L_{pier} := 9ft$ Pier Length

$n := 4$ Number of Anchors

$W_{conc} := \gamma_c \cdot L_{pier} \cdot d_{pier} \cdot b_{pier} = 75.94 \cdot kip$ Pier Weight

$R_u := U - 0.9 \cdot W_{conc} = 201.66 \cdot kip$ Applied Uplift Force

$R_c := C + 1.2 \cdot W_{conc} = 417.13 \cdot kip$ Applied Compression Force

Compression Analysis:

$q_{ult} := 30ksf$ Ultimate Bearing Capacity

$\phi := 0.75$ Bearing Strength Reduction Factor

$A_{bearing} := d_{pier} \cdot b_{pier} = 56.25\ ft^2$ Bearing Area

$R_{n\_bearing} := q_{ult} \cdot A_{bearing} = 1687.5 \cdot kip$ Nominal Bearing Capacity

$\phi R_{n\_bearing} := \phi \cdot R_{n\_bearing} = 1265.63 \cdot kip$ Bearing Capacity

$R_c = 417.13 \cdot kip$ Applied Compression Force

$Compression := \frac{R_c}{\phi R_{n\_bearing}} = 32.96 \cdot \%$ Bearing Stress Rating

Lateral Analysis:

$\mu := 0.3$ Sliding Friction Factor

$\phi := 0.75$ Sliding Strength Reduction Factor

$R_v := 44kip$ Compression Shear per Leg

$R_c = 417.13 \cdot kip$ Applied Compression Force per Leg

$R_s := R_c \cdot \mu = 125.14 \cdot kip$ Nominal Lateral Resistance

$\phi R_s := \phi \cdot R_s = 93.85 \cdot kip$ Lateral Resistance

$Lateral := \frac{R_v}{\phi R_s} = 46.88 \cdot \%$ Lateral Stress Rating

Uplift Analysis:

8.1.a Steel Anchor Nominal Tensile Strength:

$F_u := 90ksi$ — A615 Gr. 60 Rebar

$A_{net} := 1.56in^2$ — #11 Rebar

$R_u = 201.66 \cdot kip$ — Uplift Force per Leg

$R_{n\_steel} := F_u \cdot A_{net} = 140.4 \cdot kip$ — Nominal Steel Anchor Strength per Anchor

8.1.b Steel-to-Grout Nominal Bonding Strength:

$L := 8.5ft$ — Embedded Length

$d_{hole} := 2.25in$ — Hole Diameter

$\theta := 0°$ — Batter Angle

$f_c := 4000psi$ — Grout Compressive Strength (Assumed)

$A_s := \pi \cdot d_{hole} \cdot \left(\frac{L}{\cos(\theta)} \right) = 721 \cdot in^2$ — Rebar Surface Area

$F_{s\_g} := 6 \cdot \sqrt{f_c} \cdot \sqrt{psi} = 379.47 \cdot psi$ — Steel-to-Grout Bond Strength

$R_{n\_steel\_to\_grout} := A_s \cdot F_{s\_g} = 273.6 \cdot kip$ — Nominal Steel-to-Grout Bond Strength per Anchor

8.1.c Grout-Rock Nominal Bonding Strength:

$L_{rock} := 8.5ft$ — Length of Embedment Into Rock Layer

$d_{hole} := 2.25in$ — Hole Diameter

$\theta := 0°$ — Batter Angle

$F_{r\_g} := 110psi$ — Grout-Rock Bond Strength

$A_b := \pi \cdot d_{hole} \cdot \left(\frac{L_{rock}}{\cos(\theta)} \right) = 721 \cdot in^2$ — Grout Surface Area

$R_{n\_rock\_grout} := F_{r\_g} \cdot A_b = 79.31 \cdot kip$ — Nominal Grout-Rock Bond Strength per Anchor

8.1.d Nominal Weight of Rock Prism

$L_{eff} := 11.25ft$ Effective Embedment Length Into Rock

$d_{anchors} := 2.083ft$ Diameter of Anchor Group @ Effective Embedment (Assumed)

$\phi_{rock} := 40°$ Interal Friction Angle of Rock

$\gamma_{rock} := 140pcf$ Unit Weight of Rock

$h_{soil} := 20ft$ Soil Layer Height

$\phi_{soil} := 40°$ Internal Friction Angle of Soil

$\gamma_{soil} := 135pcf$ Unit Weight of Soil

$d_1 := d_{anchors} = 2.083\ ft$ Diameter of Anchor Group @ Effective Embedment

$d_2 := 2 \cdot L_{eff} \cdot \tan(\phi_{rock}) + d_{anchors} = 20.96\ ft$ Diameter @ Top of Rock Layer

$d_3 := d_2 + 2 \cdot h_{soil} \cdot \tan(\phi_{soil}) = 54.53\ ft$ Diameter @ Top of Soil Layer

$$V_{rock} := \frac{\pi \cdot L_{eff}}{3} \cdot \left[\left(\frac{d_2}{2} \right)^2 + \left(\frac{d_2}{2} \right) \left(\frac{d_1}{2} \right) + \left(\frac{d_1}{2} \right)^2 \right] = 1435.63 \cdot ft^3$$

$$V_{soil} := \frac{\pi \cdot h_{soil}}{3} \cdot \left[\left(\frac{d_3}{2} \right)^2 + \left(\frac{d_3}{2} \right) \left(\frac{d_2}{2} \right) + \left(\frac{d_2}{2} \right)^2 \right] = 23853.22 \cdot ft^3$$

$W_{rock} := \gamma_{rock} \cdot V_{rock} = 200.99 \cdot kip$ Weight of Rock Cone

$W_{soil} := \gamma_{soil} \cdot V_{soil} = 3220.19 \cdot kip$ Weight of Soil Cone

$R_{n\_rock} := W_{rock} + W_{soil} = 3421.17 \cdot kip$ Total Rock & Soil Prism Weight

$R_n := \min(R_{n\_steel}, R_{n\_steel\_to\_grout}, R_{n\_rock\_grout}, R_{n\_rock}) = 79.31 \cdot kip$

$\phi R_n := \phi \cdot R_n = 59.48 \cdot kip$

$P_u := \frac{R_u}{n} = 50.41 \cdot kip$

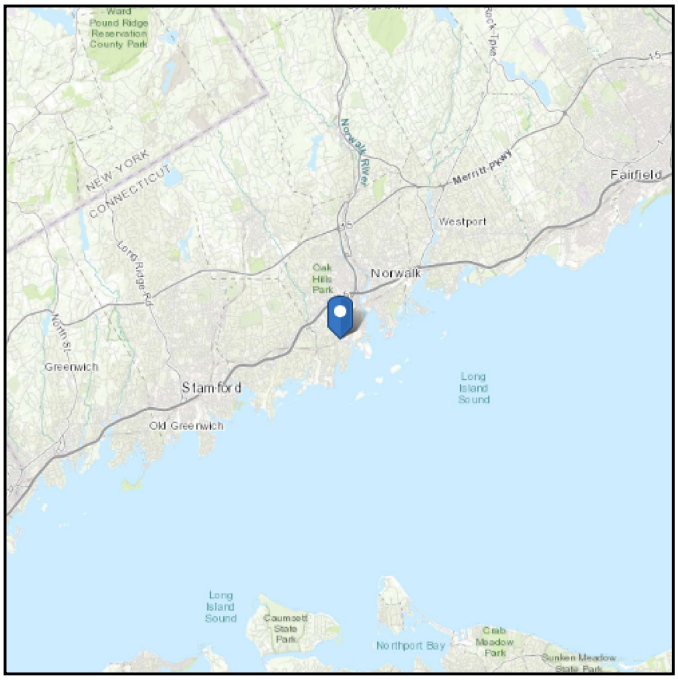
$$Uplift := \frac{P_u}{\phi R_n} = 84.75 \cdot \%$$

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 60.78 ft (NAVD 88)
Latitude: 41.081789
Longitude: -73.430422



Wind

Results:

Wind Speed:	120 Vmph
10-year MRI	76 Vmph
25-year MRI	86 Vmph
50-year MRI	92 Vmph
100-year MRI	98 Vmph

Data Accessed: Thu Apr 15 2021

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

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

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

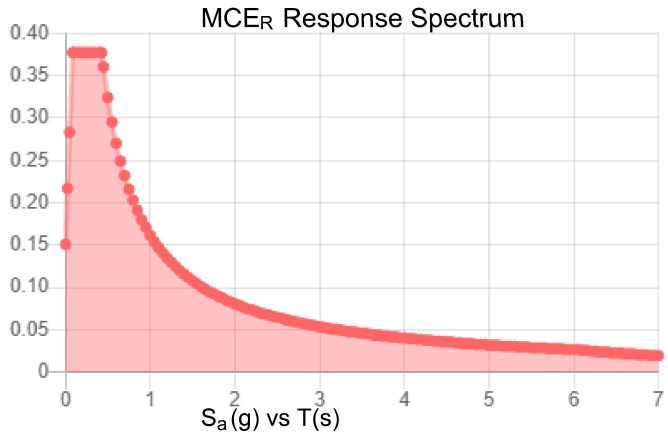
Seismic

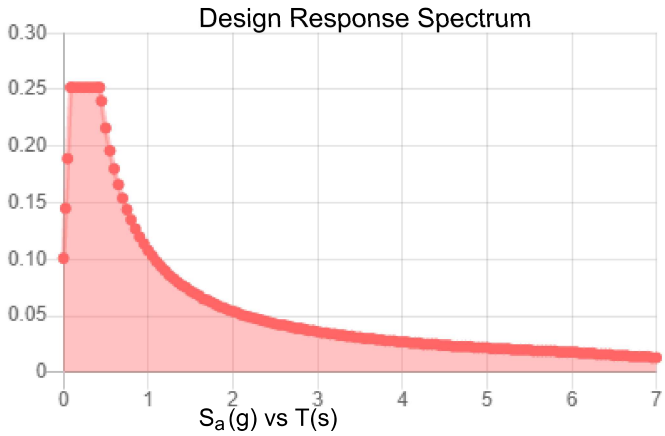
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.236	S_{DS} :	0.252
S_1 :	0.068	S_{D1} :	0.108
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.134
S_{MS} :	0.377	PGA_M :	0.206
S_{M1} :	0.162	F_{PGA} :	1.531
		I_e :	1

Seismic Design Category B





Data Accessed: Thu Apr 15 2021

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

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Thu Apr 15 2021

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

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

Exhibit E

Mount Analysis

Date: **July 27, 2021**

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

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

Subject:	**Mount Replacement Analysis Report**	
Carrier Designation:	**Dish Network Dish 5G**	
	Carrier Site Number:	NJJER01090A
	Carrier Site Name:	CT-CCI-T-807133
Crown Castle Designation:	**Crown Castle BU Number:**	807133
	Crown Castle Site Name:	BRG 134 943057
	Crown Castle JDE Job Number:	640174
	Crown Castle Order Number:	548868 Rev. 1
Engineering Firm Designation:	**Trylon Report Designation:**	188628
Site Data:	**50 Rockland Road, Norwalk OFC – MTSO, So Norwalk, Fairfield County, CT, 06854** **Latitude 41°4'54.44" Longitude -73°25'49.52"**	
Structure Information:	**Tower Height & Type:**	**180.0 ft Self Support**
	Mount Elevation:	**181.0 ft**
	Mount Type:	**8.0 ft Sector Frame**

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:

Sector Frame **Sufficient***

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

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

Mount analysis prepared by: Aura Baltoiu

Respectfully Submitted by:
Cliff Abernathy, P.E.

Cliff Abernathy Digitally signed by Cliff Abernathy
Date: 2021.07.27 17:12:18 -04'00'

TABLE OF CONTENTS

1) INTRODUCTION

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

2) ANALYSIS CRITERIA

Building Code:	2015 IBC
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	120 mph
Exposure Category:	C
Topographic Factor at Base:	1.00
Topographic Factor at Mount:	1.00
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Seismic S_s:	0.232
Seismic S_1:	0.067
Live Loading Wind Speed:	30 mph
Man Live Load at Mid/End-Points:	250 lb
Man Live Load at Mount Pipes:	500 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
181.0	181.0	3	JMA Wireless	MX08FRO665-21	8.0 ft Sector Frame **[Commscope, MTC3975083]**
		3	Fujitsu	TA08025-B604	
		3	Fujitsu	TA08025-B605	
		1	Raycap	RDIDC-9181-PF-48	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Crown Application	Dish Network Application	548868, Rev.1	CCI Sites
Mount Manufacturer Drawings	Commscope	MTC3975083	Trylon
Exposure Category Determination	Crown Castle	6995378	CCI Sites

3.1) Analysis Method

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

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

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

3.2) Assumptions

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

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

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

4) ANALYSIS RESULTS

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

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1,2	Mount Pipe(s)	MP23	181.0	46.3	Pass
	Horizontal(s)	TH		45.8	Pass
	Standoff(s)	SA4		46.6	Pass
	Bracing(s)	B3		40.6	Pass
	Vertical(s)	V4		23.9	Pass
	Plate(s)	MP9		48.1	Pass
	Tieback(s)	MP25		4.6	Pass
	Mount Connection(s)	-		15.9	Pass

Structure Rating (max from all components) =	48.1%

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

Table 4 - Tieback Connection Data Table

Tower Connection Node No.	Existing / Proposed	Resultant End Reaction (lb)	Connected Member Type	Connected Member Size	Member Compressive Capacity (lb)[3]	Notes
N86A	Proposed	814.44	Leg	ROHN 3 EH	5,530.4	1

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

4.1) Recommendations

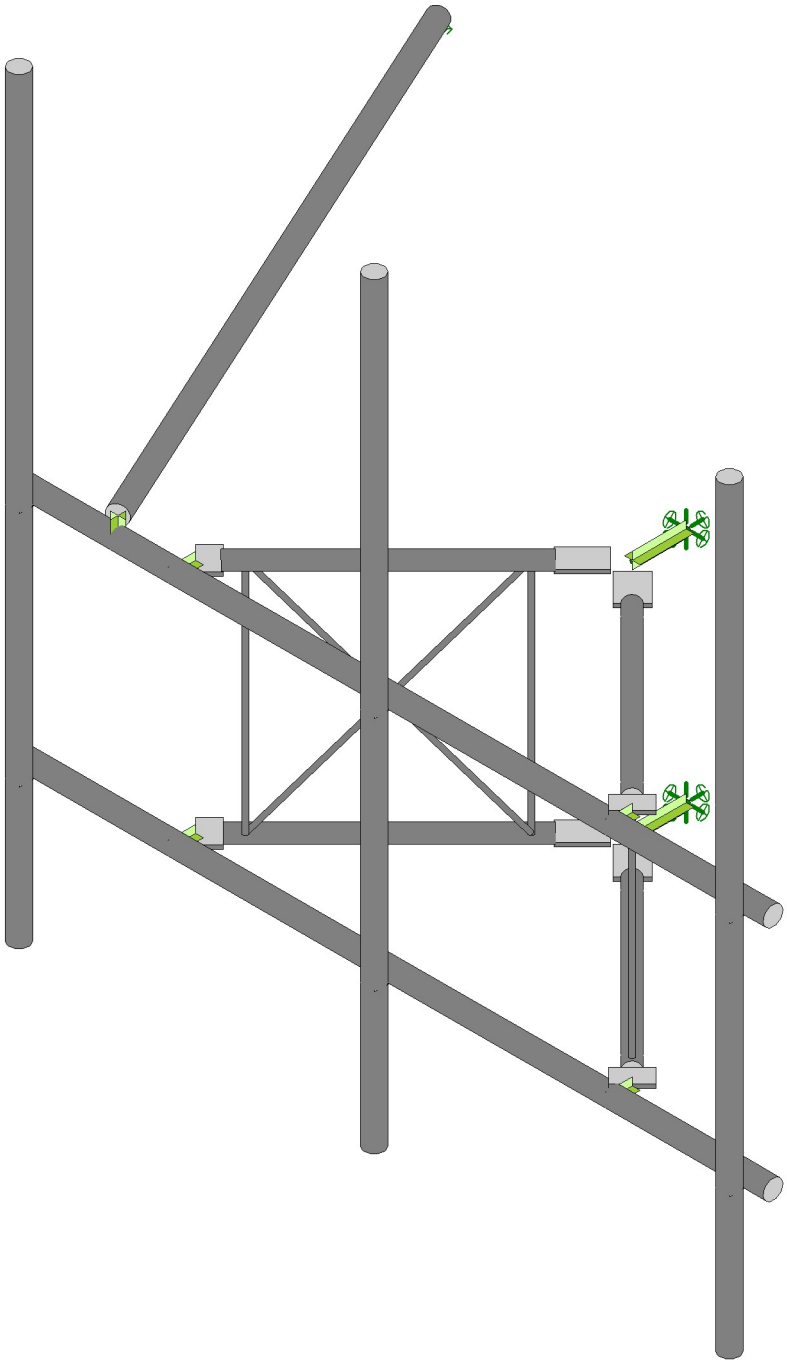
The mount has sufficient capacity to carry the proposed loading configuration. In order for the results of the analysis to be considered valid, the proposed mount listed below must be installed.

1. Commscope, MTC3975083. Install the tiebacks at approximately 12” from the mount edge (from pipe mount position #3).The connection point needs to be within 25% ends of tower leg.

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

APPENDIX A

WIRE FRAME AND RENDERED MODELS



Envelope Only Solution

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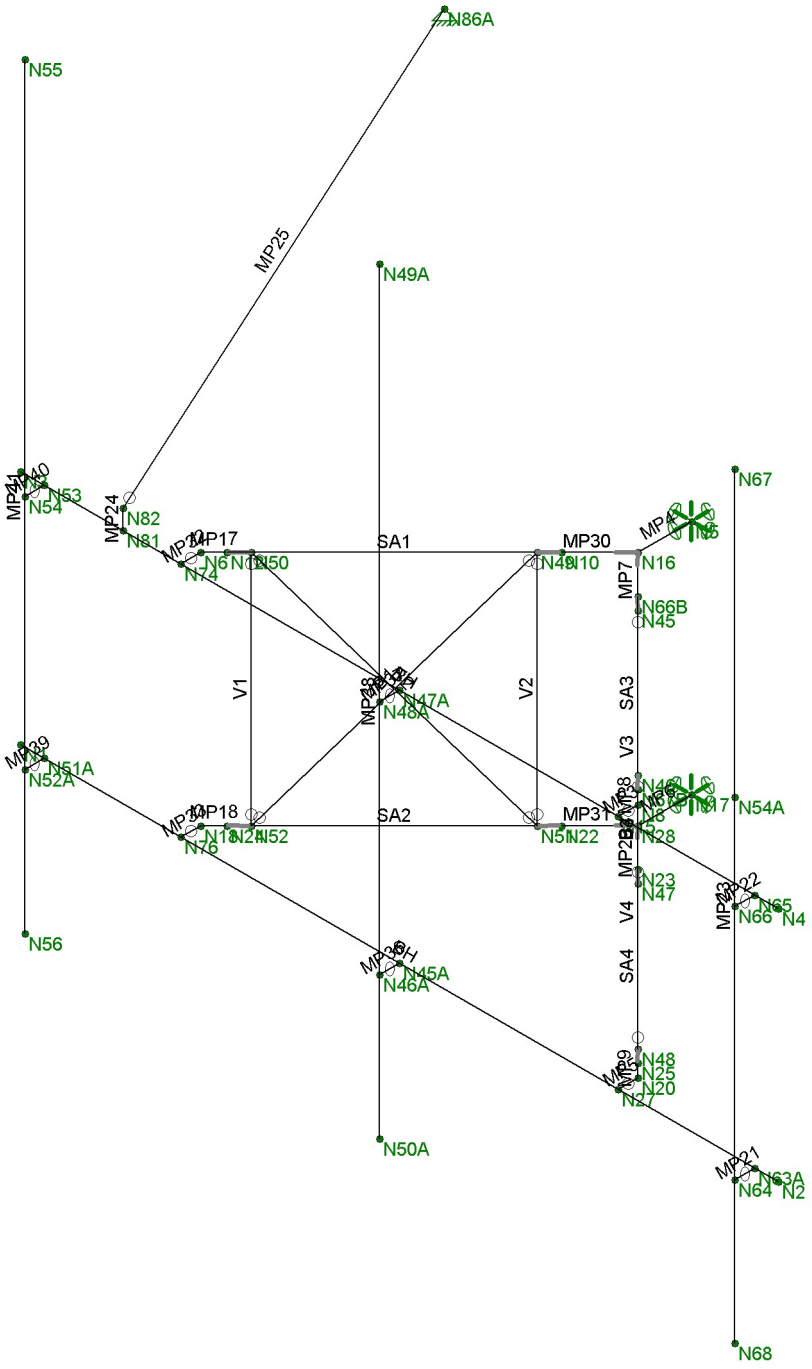
AB		July 27, 2021 at 4:02 PM
188628		807133.r3d



Envelope Only Solution

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AB		July 27, 2021 at 4:02 PM
188628		807133.r3d

APPENDIX B

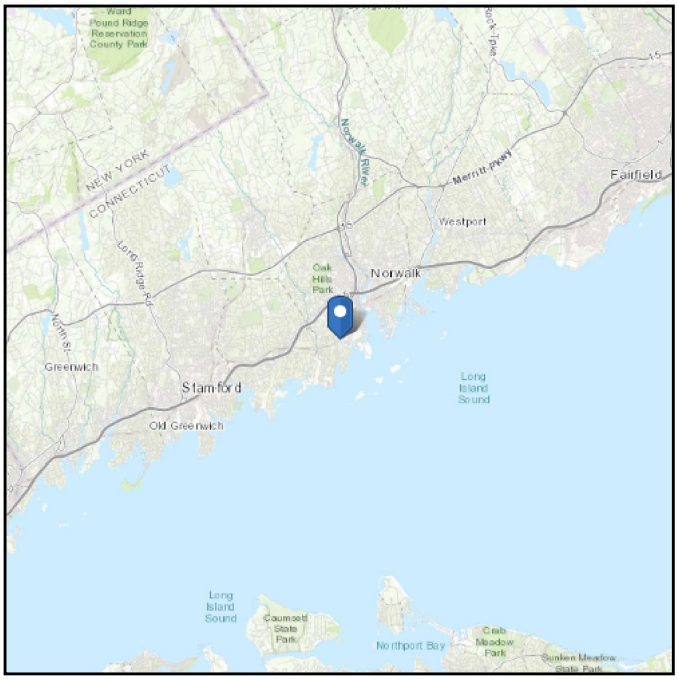
SOFTWARE INPUT CALCULATIONS

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 60.78 ft (NAVD 88)
Latitude: 41.081789
Longitude: -73.430422



Ice

Results:

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

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

Date Accessed: Mon Jul 26 2021

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

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

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

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

TIA LOAD CALCULATOR 2.0

PROJECT DATA	
Job Code:	188628
Carrier Site ID:	NEW JERSEY
Carrier Site Name:	-

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

STRUCTURE DETAILS		
Mount Type:	Sector Frame	--
Mount Elevation:	181.0	ft.
Number of Sectors:	3	--
Structure Type:	Self Support Tower	--
Structure Height:	180.0	ft.

ANALYSIS CRITERIA		
Structure Risk Category:	II	--
Exposure Category:	C	--
Site Class:	D - Stiff Soil	--
Ground Elevation:	60.78	ft.

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

WIND PARAMETERS		
Design Wind Speed:	120	mph
Wind Escalation Factor (K_s):	1.00	--
Velocity Coefficient (K_z):	1.43	--
Directionality Factor (K_d):	0.95	--
Gust Effect Factor (Gh):	1.00	--
Shielding Factor (K_a):	0.90	--
Velocity Pressure (q_z):	50.11	psf

ICE PARAMETERS		
Design Ice Wind Speed:	50	mph
Design Ice Thickness (t_i):	1.50	in
Importance Factor (I_i):	1.00	--
Ice Velocity Pressure (q_{zi}):	50.11	psf
Mount Ice Thickness (t_{iz}):	1.78	in

WIND STRUCTURE CALCULATIONS		
Flat Member Pressure:	90.20	psf
Round Member Pressure:	54.12	psf
Ice Wind Pressure:	7.77	psf

SEISMIC PARAMETERS		
Importance Factor (I_e):	1.00	--
Short Period Accel .(S_s):	0.232	g
1 Second Accel (S_1):	0.067	g
Short Period Des. (S_{DS}):	0.25	g
1 Second Des. (S_{D1}):	0.11	g
Short Period Coeff. (F_a):	1.60	--
1 Second Coeff. (F_v):	2.40	--
Response Coefficient (Cs):	0.12	--
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	181	No Ice	8.01	3.21	82.50
MP23, 0	--	--	w/ Ice	9.62	4.62	293.26
TA08025-B604	1	181	No Ice	1.96	0.98	63.90
MP23, 0	--	--	w/ Ice	2.40	1.32	72.29
TA08025-B605	1	181	No Ice	1.96	1.13	75.00
MP23, 0	--	--	w/ Ice	2.40	1.48	76.99
RDIDC-9181-PF-48	1	181	No Ice	2.01	1.17	21.85
MP23, 0	--	--	w/ Ice	2.46	1.54	75.88
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			

EQUIPMENT LOADING [CONT.]

Appurtenance Name/Location	Qty.	Elevation [ft]	--	EPA $_N$ (ft2)	EPA $_T$ (ft2)	Weight (lbs)
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			

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	181	1.00	1.43	0.95	1.78	50.11	8.70
TA08025-B604	1	181	1.00	1.43	0.95	1.78	50.11	8.70
TA08025-B605	1	181	1.00	1.43	0.95	1.78	50.11	8.70
RDIDC-9181-PF-48	1	181	1.00	1.43	0.95	1.78	50.11	8.70

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	361.24	198.89	307.12	144.77	307.12	198.89
MP23, 0	--	w/ Ice	75.33	45.98	65.55	36.20	65.55	45.98
TA08025-B604	1	No Ice	88.55	55.32	77.48	44.25	77.48	55.32
MP23, 0	--	w/ Ice	18.80	12.46	16.68	10.34	16.68	12.46
TA08025-B605	1	No Ice	88.55	60.34	79.15	50.94	79.15	60.34
MP23, 0	--	w/ Ice	18.80	13.41	17.00	11.62	17.00	13.41
RDIDC-9181-PF-48	1	No Ice	90.73	62.20	81.22	52.68	81.22	62.20
MP23, 0	--	w/ Ice	19.22	13.83	17.43	12.03	17.43	13.83
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
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		No Ice						
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		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						

EQUIPMENT LATERAL WIND FORCE CALCULATIONS [CONT.]

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

EQUIPMENT SEISMIC FORCE CALCULATIONS

Appurtenance Name	Qty.	Elevation [ft]	Weight [lbs]	F_p [lbs]
MX08FRO665-21	1	181	82.5	12.25
TA08025-B604	1	181	63.9	9.49
TA08025-B605	1	181	75	11.14
RDIDC-9181-PF-48	1	181	21.85	3.24

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

(Global) Model Settings

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

Hot Rolled Steel Code	AISC 15th(360-16): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 15th(360-16): LRFD
Cold Formed Steel Code	AISI S100-16: LRFD
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building
Stainless Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)

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

(Global) Model Settings, Continued

Seismic Code	ASCE 7-16
Seismic Base Elevation (in)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	1
Cd X	1
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

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

Cold Formed Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	PIPE_2.0	PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
2	PIPE_1.5	PIPE_1.5	Beam	Pipe	A53 Gr.B	Typical	.749	.293	.293	.586
3	SR 5/8	SR 5/8	Beam	BAR	A36 Gr.36	Typical	.307	.007	.007	.015
4	3.5x0.5	3.5x0.5	Beam	RECT	A36 Gr.36	Typical	1.75	.036	1.786	.133
5	4.25x0.5	4.25x0.5	Beam	RECT	A36 Gr.36	Typical	2.125	.044	3.199	.164
6	SR 1/2"	SR 1/2"	Beam	BAR	A36 Gr.36	Typical	.196	.003	.003	.006

Cold Formed Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	CF1	162T125-18	Beam	None	A653 S S Gr33	Typical	.078	.013	.042	9e-6

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	N5	Reaction	Reaction	Reaction	Reaction	Reaction	
2	N17	Reaction	Reaction	Reaction	Reaction	Reaction	
3	N86A	Reaction	Reaction	Reaction			

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area (M...	Surface...
1	Self Weight	DL			-1		5			
2	Structure Wind X	WLX						26		
3	Structure Wind Y	WLY						26		
4	Wind Load 0 AZI	WLX					5			
5	Wind Load 30 AZI	None					10			
6	Wind Load 45 AZI	None					10			
7	Wind Load 60 AZI	None					10			
8	Wind Load 90 AZI	WLY					5			
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	26		
13	Structure Ice Wind X	OL2						26		
14	Structure Ice Wind Y	OL3						26		
15	Ice Wind Load 0 AZI	OL2					5			
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					5			
20	Ice Wind Load 120 AZI	None					10			
21	Ice Wind Load 135 AZI	None					10			
22	Ice Wind Load 150 AZI	None					10			
23	Seismic Load X	ELX	-.148				5			
24	Seismic Load Y	ELY		-.148			5			
25	Live Load 1 (Lv)	LL					1			
26	Live Load 2 (Lv)	LL					1			
27	Maintenance Load 1 (Lm)	None					1			
28	Maintenance Load 2 (Lm)	None					1			
29	Maintenance Load 3 (Lm)	None					1			
33		ELX								
34		ELY								
35		LL								
36		LL								
41		LL								

Load Combinations

	Description	Solve	PD...	SR...	B...	Factor	BLC	Factor	B...	Fa...	B...	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4DL	Yes	Y		DL	1.4																		
2	1.2DL + 1WL 0 AZI	Yes	Y		DL	1.2	2	1	3		4	1												
3	1.2DL + 1WL 30 AZI	Yes	Y		DL	1.2	2	.866	3	.5	5	1												
4	1.2DL + 1WL 45 AZI	Yes	Y		DL	1.2	2	.707	3	.707	6	1												
5	1.2DL + 1WL 60 AZI	Yes	Y		DL	1.2	2	.5	3	.866	7	1												
6	1.2DL + 1WL 90 AZI	Yes	Y		DL	1.2	2		3	1	8	1												
7	1.2DL + 1WL 120 AZI	Yes	Y		DL	1.2	2	-.5	3	.866	9	1												
8	1.2DL + 1WL 135 AZI	Yes	Y		DL	1.2	2	-.707	3	.707	10	1												
9	1.2DL + 1WL 150 AZI	Yes	Y		DL	1.2	2	-.866	3	.5	11	1												
10	1.2DL + 1WL 180 AZI	Yes	Y		DL	1.2	2	-1	3		4	-1												
11	1.2DL + 1WL 210 AZI	Yes	Y		DL	1.2	2	-.866	3	-.5	5	-1												
12	1.2DL + 1WL 225 AZI	Yes	Y		DL	1.2	2	-.707	3	-.7...	6	-1												
13	1.2DL + 1WL 240 AZI	Yes	Y		DL	1.2	2	-.5	3	-.8...	7	-1												
14	1.2DL + 1WL 270 AZI	Yes	Y		DL	1.2	2		3	-1	8	-1												
15	1.2DL + 1WL 300 AZI	Yes	Y		DL	1.2	2	.5	3	-.8...	9	-1												
16	1.2DL + 1WL 315 AZI	Yes	Y		DL	1.2	2	.707	3	-.7...	10	-1												
17	1.2DL + 1WL 330 AZI	Yes	Y		DL	1.2	2	.866	3	-.5	11	-1												
18	0.9DL + 1WL 0 AZI	Yes	Y		DL	.9	2	1	3		4	1												
19	0.9DL + 1WL 30 AZI	Yes	Y		DL	.9	2	.866	3	.5	5	1												
20	0.9DL + 1WL 45 AZI	Yes	Y		DL	.9	2	.707	3	.707	6	1												
21	0.9DL + 1WL 60 AZI	Yes	Y		DL	.9	2	.5	3	.866	7	1												
22	0.9DL + 1WL 90 AZI	Yes	Y		DL	.9	2		3	1	8	1												
23	0.9DL + 1WL 120 AZI	Yes	Y		DL	.9	2	-.5	3	.866	9	1												
24	0.9DL + 1WL 135 AZI	Yes	Y		DL	.9	2	-.707	3	.707	10	1												
25	0.9DL + 1WL 150 AZI	Yes	Y		DL	.9	2	-.866	3	.5	11	1												
26	0.9DL + 1WL 180 AZI	Yes	Y		DL	.9	2	-1	3		4	-1												
27	0.9DL + 1WL 210 AZI	Yes	Y		DL	.9	2	-.866	3	-.5	5	-1												
28	0.9DL + 1WL 225 AZI	Yes	Y		DL	.9	2	-.707	3	-.7...	6	-1												
29	0.9DL + 1WL 240 AZI	Yes	Y		DL	.9	2	-.5	3	-.8...	7	-1												
30	0.9DL + 1WL 270 AZI	Yes	Y		DL	.9	2		3	-1	8	-1												
31	0.9DL + 1WL 300 AZI	Yes	Y		DL	.9	2	.5	3	-.8...	9	-1												
32	0.9DL + 1WL 315 AZI	Yes	Y		DL	.9	2	.707	3	-.7...	10	-1												
33	0.9DL + 1WL 330 AZI	Yes	Y		DL	.9	2	.866	3	-.5	11	-1												
34	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	1	14		15	1										
35	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	.866	14	.5	16	1										
36	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	.707	14	.707	17	1										
37	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	.5	14	.866	18	1										
38	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13		14	1	19	1										
39	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	-.5	14	.866	20	1										
40	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	-.7...	14	.707	21	1										
41	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	-.8...	14	.5	22	1										
42	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	-1	14		15	-1										
43	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	-.8...	14	-.5	16	-1										
44	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	-.7...	14	-.7...	17	-1										
45	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	-.5	14	-.8...	18	-1										
46	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13		14	-1	19	-1										
47	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	.5	14	-.8...	20	-1										
48	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	.707	14	-.7...	21	-1										
49	1.2DL + 1DLi + 1WL...	Yes	Y		DL	1.2	OL1	1	13	.866	14	-.5	22	-1										
50	(1.2+0.2Sds) + 1.0E...	Yes	Y		DL	1.249	ELX	1	E...															
51	(1.2+0.2Sds) + 1.0E...	Yes	Y		DL	1.249	ELX	.866	E...	.5														

Load Combinations (Continued)

	Description	Solve	PD...	SR...	B...	Factor	BLC	Factor	B...	Fa...	B...	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
52	(1.2+0.2Sds) + 1.0E...	Yes	Y		DL	1.249	ELX	.707	E...	.707														
53	(1.2+0.2Sds) + 1.0E...	Yes	Y		DL	1.249	ELX	.5	E...	.866														
54	(1.2+0.2Sds) + 1.0E...	Yes	Y		DL	1.249	ELX		E...	1														
55	(1.2+0.2Sds) + 1.0E...	Yes	Y		DL	1.249	ELX	-.5	E...	.866														
56	(1.2+0.2Sds) + 1.0E...	Yes	Y		DL	1.249	ELX	-.707	E...	.707														
57	(1.2+0.2Sds) + 1.0E...	Yes	Y		DL	1.249	ELX	-.866	E...	.5														
58	(1.2+0.2Sds) + 1.0E...	Yes	Y		DL	1.249	ELX	-1	E...															
59	(1.2+0.2Sds) + 1.0E...	Yes	Y		DL	1.249	ELX	-.866	E...	-.5														
60	(1.2+0.2Sds) + 1.0E...	Yes	Y		DL	1.249	ELX	-.707	E...	-.7...														
61	(1.2+0.2Sds) + 1.0E...	Yes	Y		DL	1.249	ELX	-.5	E...	-.8...														
62	(1.2+0.2Sds) + 1.0E...	Yes	Y		DL	1.249	ELX		E...	-1														
63	(1.2+0.2Sds) + 1.0E...	Yes	Y		DL	1.249	ELX	.5	E...	-.8...														
64	(1.2+0.2Sds) + 1.0E...	Yes	Y		DL	1.249	ELX	.707	E...	-.7...														
65	(1.2+0.2Sds) + 1.0E...	Yes	Y		DL	1.249	ELX	.866	E...	-.5														
66	(0.9-0.2Sds) + 1.0E ...	Yes	Y		DL	.851	ELX	1	E...															
67	(0.9-0.2Sds) + 1.0E ...	Yes	Y		DL	.851	ELX	.866	E...	.5														
68	(0.9-0.2Sds) + 1.0E ...	Yes	Y		DL	.851	ELX	.707	E...	.707														
69	(0.9-0.2Sds) + 1.0E ...	Yes	Y		DL	.851	ELX	.5	E...	.866														
70	(0.9-0.2Sds) + 1.0E ...	Yes	Y		DL	.851	ELX		E...	1														
71	(0.9-0.2Sds) + 1.0E ...	Yes	Y		DL	.851	ELX	-.5	E...	.866														
72	(0.9-0.2Sds) + 1.0E ...	Yes	Y		DL	.851	ELX	-.707	E...	.707														
73	(0.9-0.2Sds) + 1.0E ...	Yes	Y		DL	.851	ELX	-.866	E...	.5														
74	(0.9-0.2Sds) + 1.0E ...	Yes	Y		DL	.851	ELX	-1	E...															
75	(0.9-0.2Sds) + 1.0E ...	Yes	Y		DL	.851	ELX	-.866	E...	-.5														
76	(0.9-0.2Sds) + 1.0E ...	Yes	Y		DL	.851	ELX	-.707	E...	-.7...														
77	(0.9-0.2Sds) + 1.0E ...	Yes	Y		DL	.851	ELX	-.5	E...	-.8...														
78	(0.9-0.2Sds) + 1.0E ...	Yes	Y		DL	.851	ELX		E...	-1														
79	(0.9-0.2Sds) + 1.0E ...	Yes	Y		DL	.851	ELX	.5	E...	-.8...														
80	(0.9-0.2Sds) + 1.0E ...	Yes	Y		DL	.851	ELX	.707	E...	-.7...														
81	(0.9-0.2Sds) + 1.0E ...	Yes	Y		DL	.851	ELX	.866	E...	-.5														
82	1.2D + 1.5 Lv1	Yes	Y		DL	1.2	25	1.5																
83	1.2D + 1.5 Lv2	Yes	Y		DL	1.2	26	1.5																
84	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	27	1.5	4	.063	2	.063	3											
85	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	27	1.5	5	.063	2	.054	3	.031										
86	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	27	1.5	6	.063	2	.044	3	.044										
87	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	27	1.5	7	.063	2	.031	3	.054										
88	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	27	1.5	8	.063	2	3....	3	.063										
89	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	27	1.5	9	.063	2	-.0...	3	.054										
90	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	27	1.5	10	.063	2	-.0...	3	.044										
91	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	27	1.5	11	.063	2	-.0...	3	.031										
92	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	27	1.5	4	.063	2	-.0...	3	7....										
93	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	27	1.5	5	.063	2	-.0...	3	-.0...										
94	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	27	1.5	6	.063	2	-.0...	3	-.0...										
95	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	27	1.5	7	.063	2	-.0...	3	-.0...										
96	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	27	1.5	8	.063	2	-1....	3	-.0...										
97	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	27	1.5	9	.063	2	.031	3	-.0...										
98	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	27	1.5	10	.063	2	.044	3	-.0...										
99	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	27	1.5	11	.063	2	.054	3	-.0...										
100	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	28	1.5	4	.063	2	.063	3											
101	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	28	1.5	5	.063	2	.054	3	.031										
102	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	28	1.5	6	.063	2	.044	3	.044										
103	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	28	1.5	7	.063	2	.031	3	.054										

Load Combinations (Continued)

	Description	Solve	PD...	SR...	B...	Factor	BLC	Factor	B...	Fa...	B...	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
104	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	28	1.5	8	.063	2	3....	3	.063												
105	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	28	1.5	9	.063	2	-.0...	3	.054												
106	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	28	1.5	10	.063	2	-.0...	3	.044												
107	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	28	1.5	11	.063	2	-.0...	3	.031												
108	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	28	1.5	4	.063	2	-.0...	3	7....												
109	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	28	1.5	5	.063	2	-.0...	3	-.0...												
110	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	28	1.5	6	.063	2	-.0...	3	-.0...												
111	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	28	1.5	7	.063	2	-.0...	3	-.0...												
112	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	28	1.5	8	.063	2	-1....	3	-.0...												
113	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	28	1.5	9	.063	2	.031	3	-.0...												
114	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	28	1.5	10	.063	2	.044	3	-.0...												
115	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	28	1.5	11	.063	2	.054	3	-.0...												
116	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	29	1.5	4	.063	2	.063	3													
117	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	29	1.5	5	.063	2	.054	3	.031												
118	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	29	1.5	6	.063	2	.044	3	.044												
119	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	29	1.5	7	.063	2	.031	3	.054												
120	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	29	1.5	8	.063	2	3....	3	.063												
121	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	29	1.5	9	.063	2	-.0...	3	.054												
122	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	29	1.5	10	.063	2	-.0...	3	.044												
123	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	29	1.5	11	.063	2	-.0...	3	.031												
124	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	29	1.5	4	.063	2	-.0...	3	7....												
125	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	29	1.5	5	.063	2	-.0...	3	-.0...												
126	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	29	1.5	6	.063	2	-.0...	3	-.0...												
127	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	29	1.5	7	.063	2	-.0...	3	-.0...												
128	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	29	1.5	8	.063	2	-1....	3	-.0...												
129	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	29	1.5	9	.063	2	.031	3	-.0...												
130	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	29	1.5	10	.063	2	.044	3	-.0...												
131	1.2D + 1.5Lm + 1.0...	Yes	Y		DL	1.2	29	1.5	11	.063	2	.054	3	-.0...												

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N5	max	1351.35	18	642.51	118	907.61	34	269.69	91	-156.93	26	0	131
2		min	-2199.4	10	-1350	99	189.14	26	-129.89	125	-765.94	34	0	1
3	N17	max	1459.45	37	1345.75	88	784.78	42	231.15	91	-147.45	18	0	131
4		min	289.42	29	-614.16	127	187.08	18	-102.88	125	-663.17	42	0	1
5	N86A	max	721.9	9	353.1	9	45.46	41	0	131	0	131	0	131
6		min	-722.11	17	-354.68	17	10.16	79	0	1	0	1	0	1
7	Totals:	max	1204.66	2	704.95	22	1731.06	43						
8		min	-1204.66	26	-704.95	14	397.18	66						

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

	Member	Shape	Code Check	Loc[in]	LC	She...	Lo...	...	...	phi*P...	phi*P...	phi*M...	phi*M.....	Eqn
1	MP9	4.25x0.5	.506	.21	91	.115	2.51	y	...	66620...	68850	717.19	6096....	H1-1b
2	MP8	4.25x0.5	.501	.21	84	.110	2.51	y	...	66620...	68850	717.19	6071....	1 H1-1b
3	SA4	PIPE_1.5	.490	27.81	91	.116	27....		84	20972...	23593...	1105....	1105.....	H1-1b
4	MP23	PIPE_2.0	.487	48	2	.182	48		10	13787...	32130	1871....	1871.....	H1-1b
5	TH	PIPE_2.0	.481	75	10	.188	76		2	24976...	32130	1871....	1871....	1 H1-1b
6	MP7	3.5x0.5	.458	0	91	.136	4.81	y	...	54863...	56700	590.63	4134....	1 H1-1b
7	SA3	PIPE_1.5	.440	27.81	84	.118	27....		92	20972...	23593...	1105....	1105.....	H1-1b

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

	Member	Shape	Code Check	Loc[in]	LC	She...	Lo...	...	...	phi*P ...	phi*P ...	phi*M...	phi*M.....	Eqn
8	B3	SR 1/2"	.427	0	90	.009	39....		...	1056....	6361....	53.02	53.02	1	H1-...
9	BH	PIPE_2.0	.420	76	84	.085	76		84	24976...	32130	1871....	1871....	1	H1-1b
10	MP29	3.5x0.5	.403	0	99	.142	4.81	y	...	54863...	56700	590.63	4134.....		H1-1b
11	MP18	4.25x0.5	.360	.21	124	.114	.21	y	...	66620...	68850	717.19	6071....	1	H1-1b
12	MP17	4.25x0.5	.359	.21	116	.114	.21	y	...	66620...	68850	717.19	6096.....		H1-1b
13	SA2	PIPE_1.5	.346	27.81	124	.091	27....		...	20972...	23593...	1105....	1105.....		H1-1b
14	SA1	PIPE_1.5	.314	2.19	122	.093	2.19		...	20972...	23593...	1105....	1105.....		H1-1b
15	B1	SR 1/2"	.301	0	124	.011	0		99	1056....	6361....	53.02	53.02	1	H1-...
16	MP30	3.5x0.5	.293	0	122	.141	0	y	...	54863...	56700	590.63	4134.....		H1-1b
17	MP31	3.5x0.5	.253	0	130	.141	0	y	...	54863...	56700	590.63	4134....	1	H1-1b
18	V4	SR 5/8	.251	12.81	84	.027	0		84	4134....	9946.8	96.77	96.77	1	H1-1a
19	V3	SR 5/8	.236	17.5	91	.063	0		91	4134....	9946.8	96.77	96.77	1	H1-1a
20	MP38	PIPE_2.0	.194	48	10	.070	48		91	13787...	32130	1871....	1871.....		H1-1b
21	V1	SR 5/8	.177	0	116	.027	0		94	4134....	9946.8	96.77	96.77	1	H1-...
22	V2	SR 5/8	.165	30	124	.064	0		91	4134....	9946.8	96.77	96.77	1	H1-...
23	MP41	PIPE_2.0	.079	48	17	.071	48		9	13787...	32130	1871....	1871.....		H1-1b
24	MP25	PIPE_2.0	.049	41.3	7	.005	82....		46	18206...	32130	1871....	1871.....		H1-1b
25	B2	SR 1/2"	.018	0	91	.012	0		88	1056....	6361....	53.02	53.02	1	H1-...
26	B4	SR 1/2"	.000	0	131	.007	39....		...	1056....	6361....	53.02	53.02	1	H1-1a

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

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

APPENDIX D

ADDITIONAL CALCUATIONS

Trylon

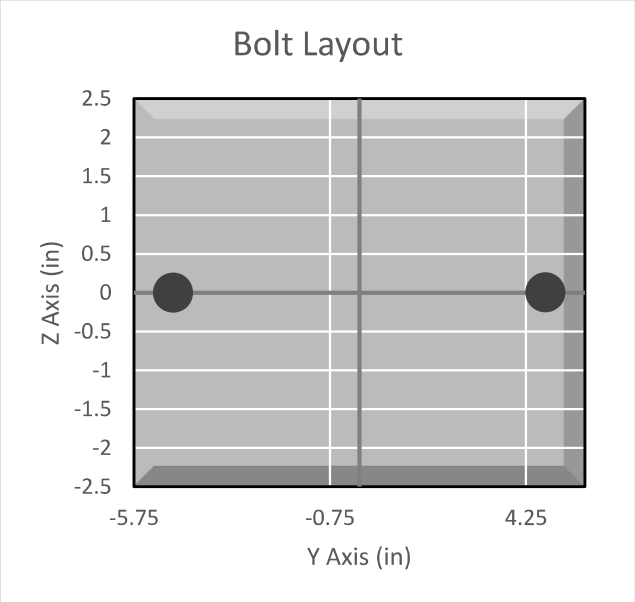
Analysis date: 07/27/21

BOLT TOOL 1.5.2

Project Data	
Job Code:	188628
Carrier Site ID:	NJJER01090A
Carrier Site Name:	CT-CCI-T-807133

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

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



Connection Description
Mount to Tower

Bolt Check*		
Tensile Capacity (ϕT_n):	15050.7	lbs
Shear Capacity (ϕV_n):	9940.2	lbs
Tension Force (T_u):	642.5	lbs
Shear Force (V_u):	967.5	lbs
Tension Usage:	4.1%	--
Shear Usage:	9.3%	--
Interaction:	9.3%	Pass
Controlling Member:	MP4	--
Controlling LC:	99	--

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

Trylon

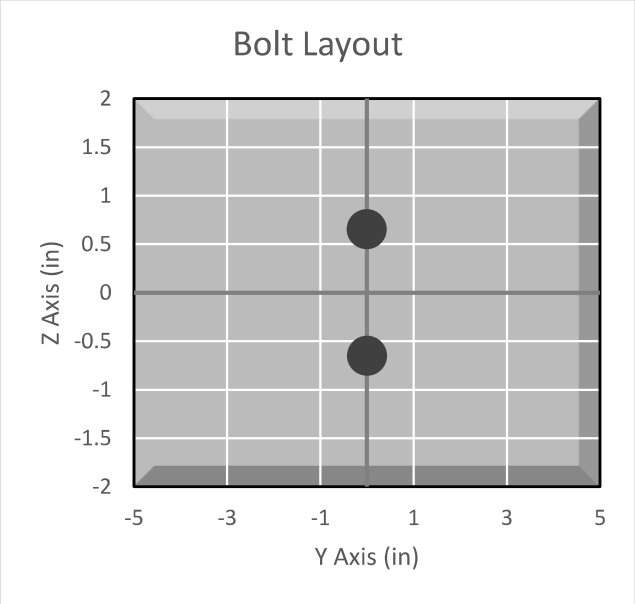
Analysis date: 07/27/21

BOLT TOOL 1.5.2

Project Data	
Job Code:	188628
Carrier Site ID:	NJJER01090A
Carrier Site Name:	CT-CCI-T-807133

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

Bolt Properties		
Connection Type:	Bolt	
Diameter:	0.5	in
Grade:	A325	--
Yield Strength (Fy):	92	ksi
Ultimate Strength (Fu):	120	ksi
Number of Bolts:	2	--
Threads Included:	Yes	--
Double Shear:	No	--
Connection Pipe Size:	-	in



Connection Description
Stand-off arm to Tower connection kit

Bolt Check*		
Tensile Capacity (ϕT_n):	12770.9	lbs
Shear Capacity (ϕV_n):	8835.7	lbs
Tension Force (T_u):	2134.7	lbs
Shear Force (V_u):	946.6	lbs
Tension Usage:	15.9%	--
Shear Usage:	10.2%	--
Interaction:	15.9%	Pass
Controlling Member:	MP4	--
Controlling LC:	91	--

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

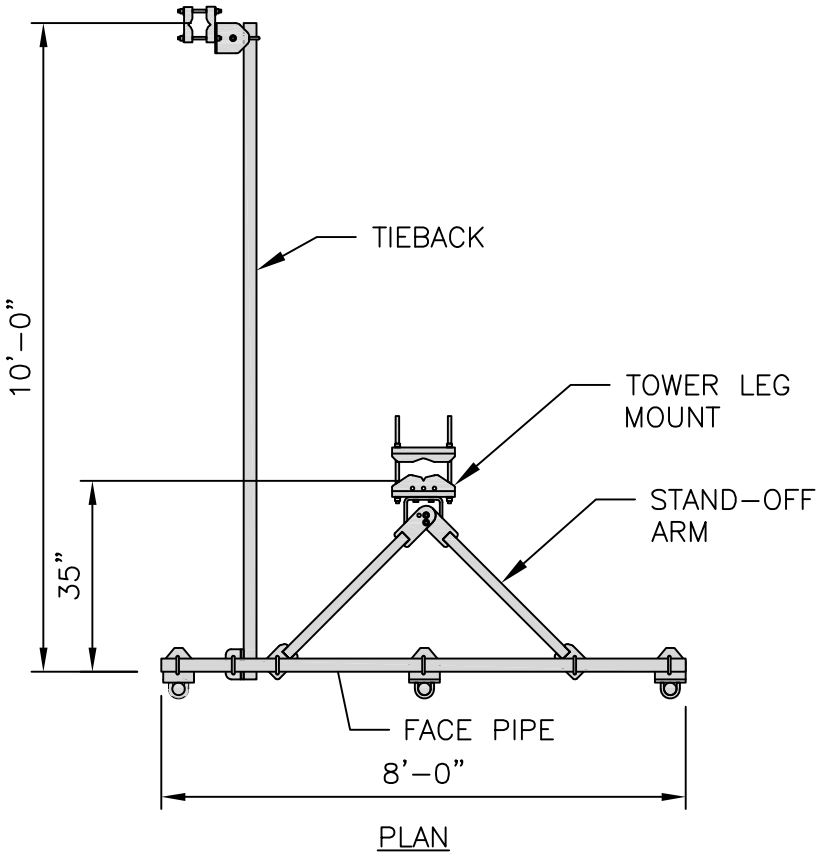
1825 W. Walnut Hill Lane, Suite 120
Irving, Texas 75038

APPENDIX E

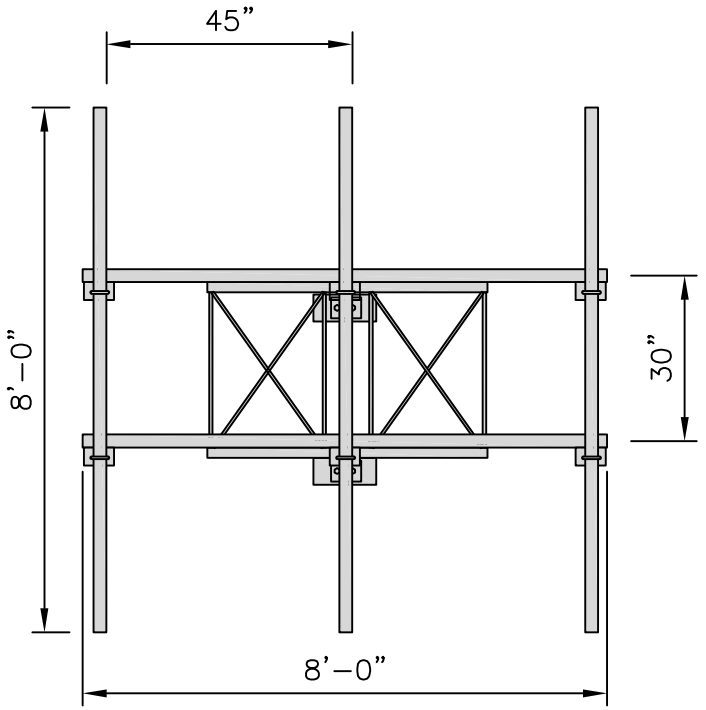
SUPPLEMENTAL DRAWINGS

COMMSCOPE V-FRAME MTC3975083	
FACE SIZE	8'-0"
WEIGHT	352.136 lbs

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



PLAN



FRONT

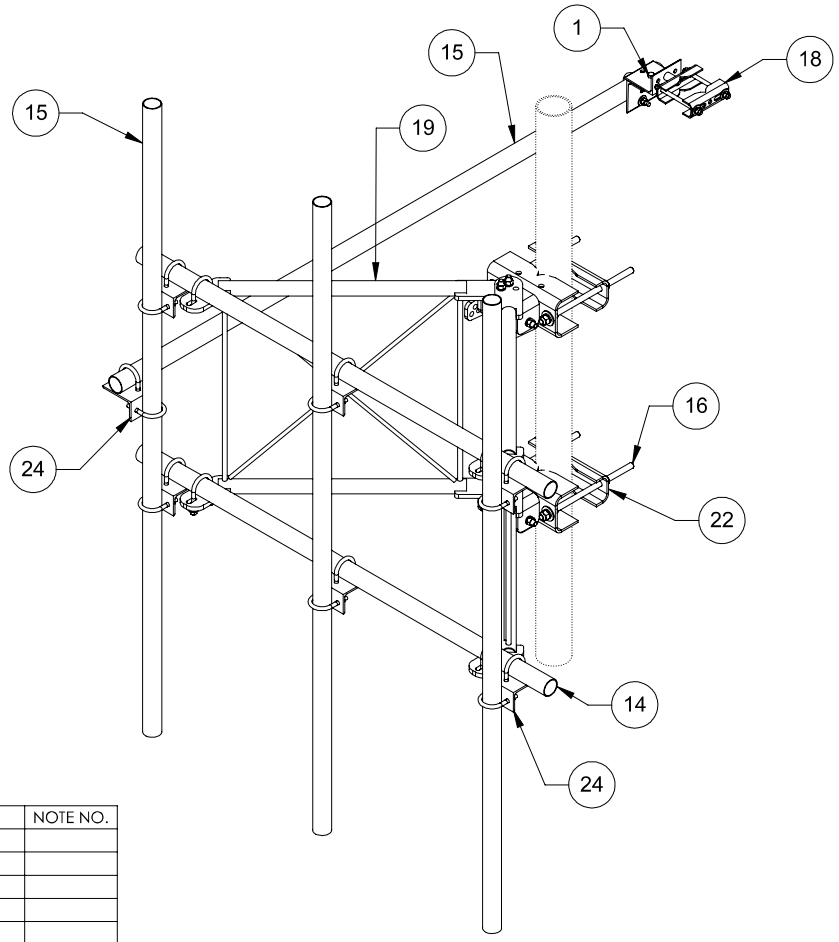
ANTENNA FRAME DETAIL

NOTES:
1.0 ALL METRIC DIMENSIONS ARE IN BRACKETS.

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

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

TALLEY®



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

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

COMMSCOPE, INC. OF NORTH CAROLINA

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

SAP MATERIAL MASTER: MTC3975083

FINISH: GALV A123

MATERIAL: A1011/A1018, A500, A529

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

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

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

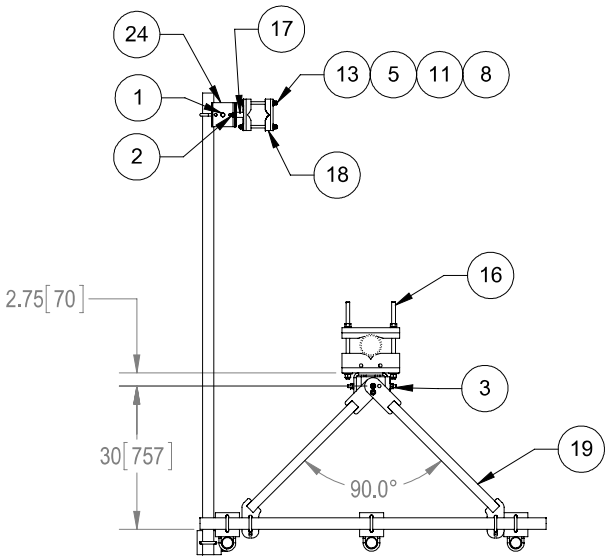
SCALE: 1:12

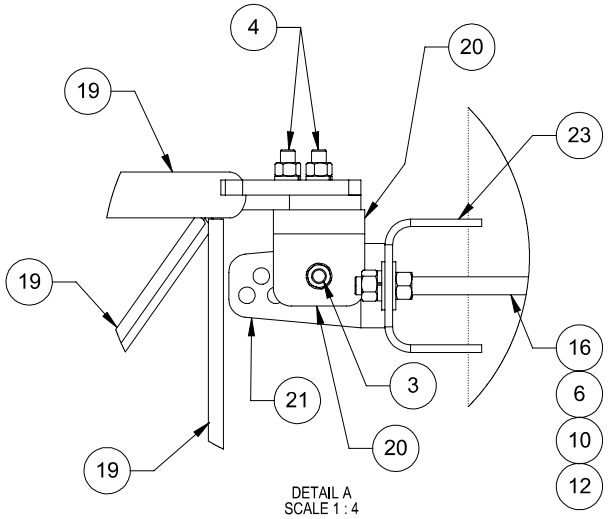
DOCUMENT NO.: MTC3975083

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

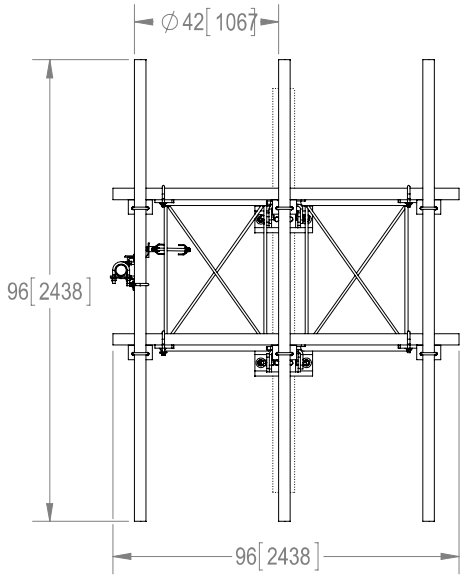
NOTES:

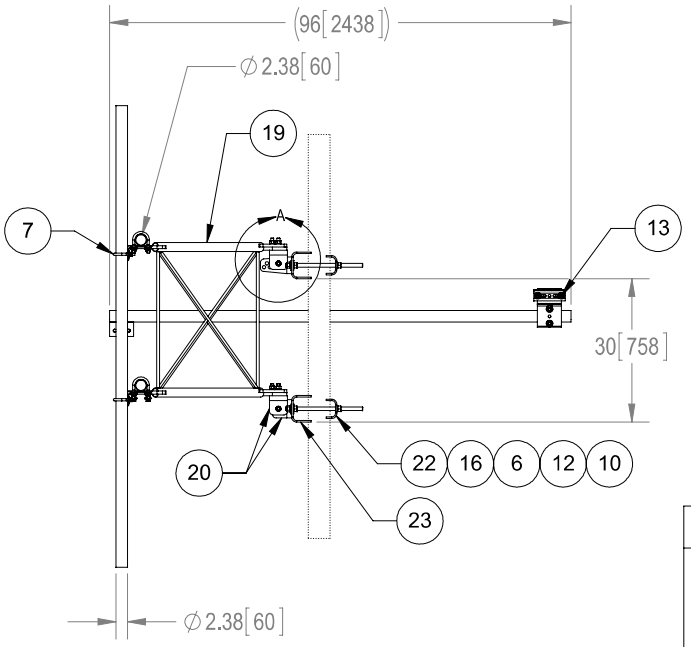
1.0 ALL METRIC DIMENSIONS ARE IN BRACKETS.





DETAIL A
SCALE 1 : 4





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

Exhibit F

Power Density/RF Emissions Report

EBI Consulting

environmental | engineering | due diligence

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

Dish Wireless Existing Facility

Site ID: NJJER01090A

807133
50 Rockland Road
Norwalk, Connecticut 06854

September 9, 2021

EBI Project Number: 6221004862

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**24.00%**

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

September 9, 2021

Dish Wireless

Emissions Analysis for Site: NJJER01090A - 807133

EBI Consulting was directed to analyze the proposed Dish Wireless facility located at **50 Rockland Road** in **Norwalk, 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 50 Rockland Road in Norwalk, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since Dish Wireless is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 20 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

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

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

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

3) 4 n66 channels (AWS Band - 2190 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

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

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

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

6) The antennas used in this modeling are the JMA MX08FRO665-20 for the 600 MHz / 1900 MHz / 2190 MHz channel(s) in Sector A, the JMA MX08FRO665-20 for the 600 MHz / 1900 MHz / 2190 MHz channel(s) in Sector B, the JMA MX08FRO665-20 for the 600 MHz / 1900 MHz / 2190 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 20 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

7) The antenna mounting height centerline of the proposed antennas is 181 feet above ground level (AGL).

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

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

Dish Wireless Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	JMA MX08FRO665-20	Make / Model:	JMA MX08FRO665-20	Make / Model:	JMA MX08FRO665-20
Frequency Bands:	600 MHz / 1900 MHz / 2190 MHz	Frequency Bands:	600 MHz / 1900 MHz / 2190 MHz	Frequency Bands:	600 MHz / 1900 MHz / 2190 MHz
Gain:	17.45 dBd / 22.65 dBd / 22.65 dBd	Gain:	17.45 dBd / 22.65 dBd / 22.65 dBd	Gain:	17.45 dBd / 22.65 dBd / 22.65 dBd
Height (AGL):	181 feet	Height (AGL):	181 feet	Height (AGL):	181 feet
Channel Count:	12	Channel Count:	12	Channel Count:	12
Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts
ERP (W):	5,236.31	ERP (W):	5,236.31	ERP (W):	5,236.31
Antenna A1 MPE %:	**0.77%**	Antenna B1 MPE %:	**0.77%**	Antenna C1 MPE %:	**0.77%**

Site Composite MPE %	
Carrier	**MPE %**
Dish Wireless (Max at Sector A):	0.77%
AT&T	3.45%
Metro PCS	1.56%
Verizon	5.01%
T-Mobile	10.58%
Sprint	2.63%
Site Total MPE % :	24.00%

Dish Wireless MPE % Per Sector	
Dish Wireless Sector A Total:	0.77%
Dish Wireless Sector B Total:	0.77%
Dish Wireless Sector C Total:	0.77%
Site Total MPE % :	24.00%

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	181.0	1.05	600 MHz n71	400	0.26%
Dish Wireless 1900 MHz n70	4	542.70	181.0	2.55	1900 MHz n70	1000	0.25%
Dish Wireless 2190 MHz n66	4	542.70	181.0	2.55	2190 MHz n66	1000	0.25%
						Total:	**0.77%**

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

Summary

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

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

Dish Wireless Sector	Power Density Value (%)
Sector A:	0.77%
Sector B:	0.77%
Sector C:	0.77%
Dish Wireless Maximum MPE % (Sector A):	0.77%
Site Total:	24.00%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **24.00%** 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:
50 ROCKLAND ROAD NORWALK OFC - MTSO, SO NORWALK, CT 06854

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

Crown Site ID/Name: 807133/BRG 134 943057
Customer Site ID: NJJER01090A/CT-CCI-T-807133
Site Address: 50 ROCKLAND ROAD NORWALK OFC - MTSO, SO NORWALK, CT 06854

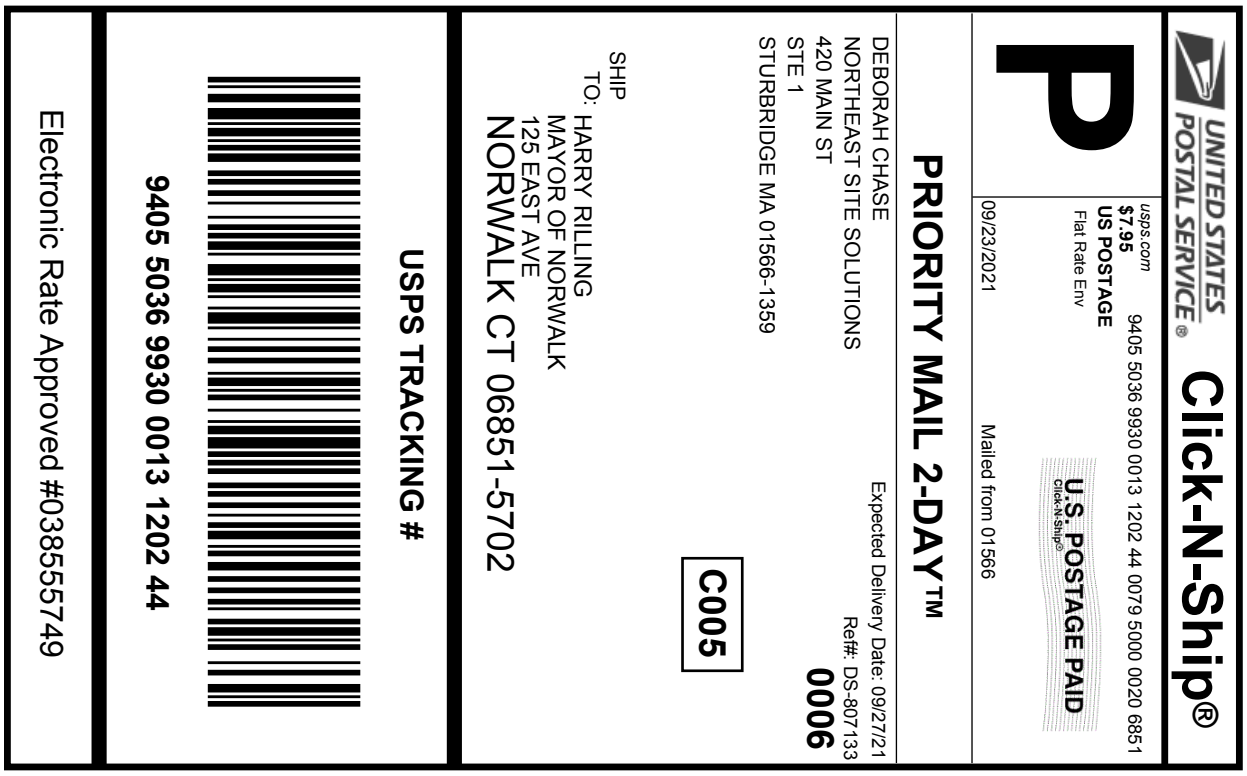
Crown Castle

By: _____ Date: 8/30/2021

Richard Zajac
Site Acquisition Specialist

Exhibit H

Recipient Mailings



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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 0013 1202 44

Trans. #:	544355104
Print Date:	09/23/2021
Ship Date:	09/23/2021
Expected Delivery Date:	09/27/2021

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

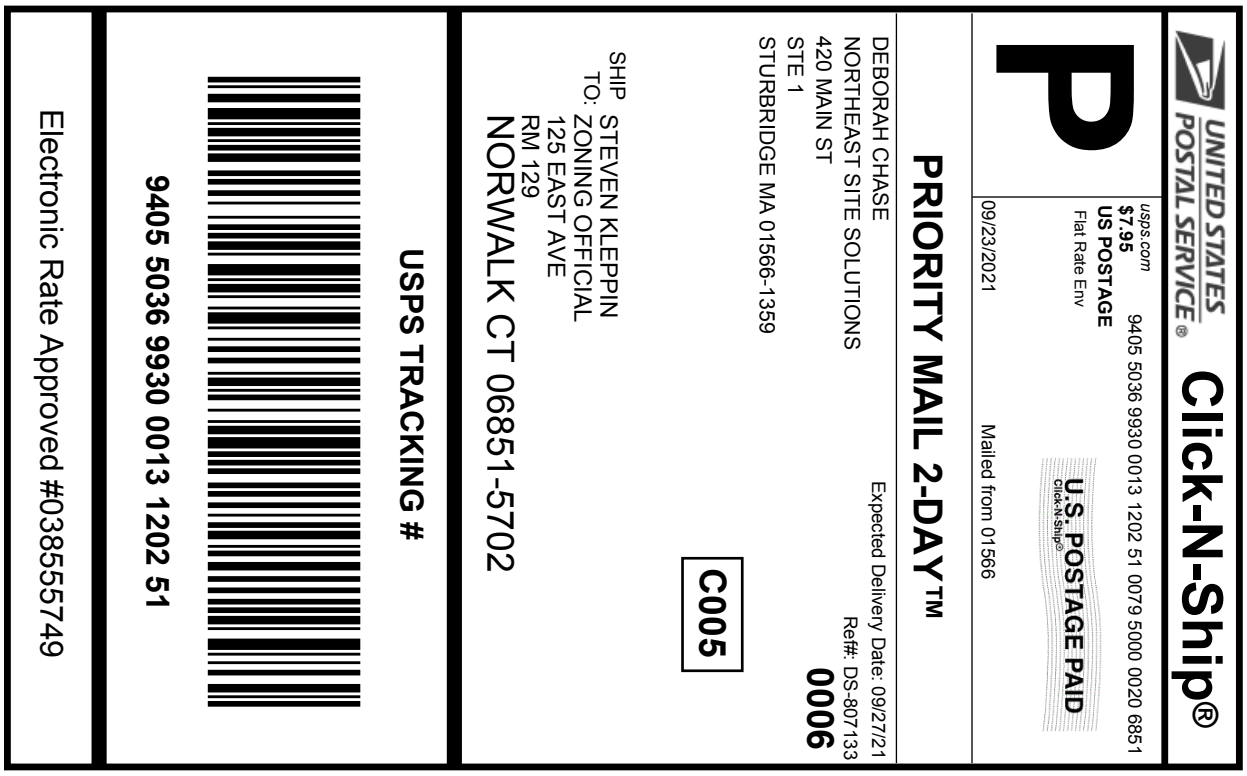
From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Ref#: DS-807133

To: HARRY RILLING
MAYOR OF NORWALK
125 EAST AVE
NORWALK CT 06851-5702

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

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



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Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0013 1202 51

Trans. #:	544355104
Print Date:	09/23/2021
Ship Date:	09/23/2021
Expected Delivery Date:	09/27/2021

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

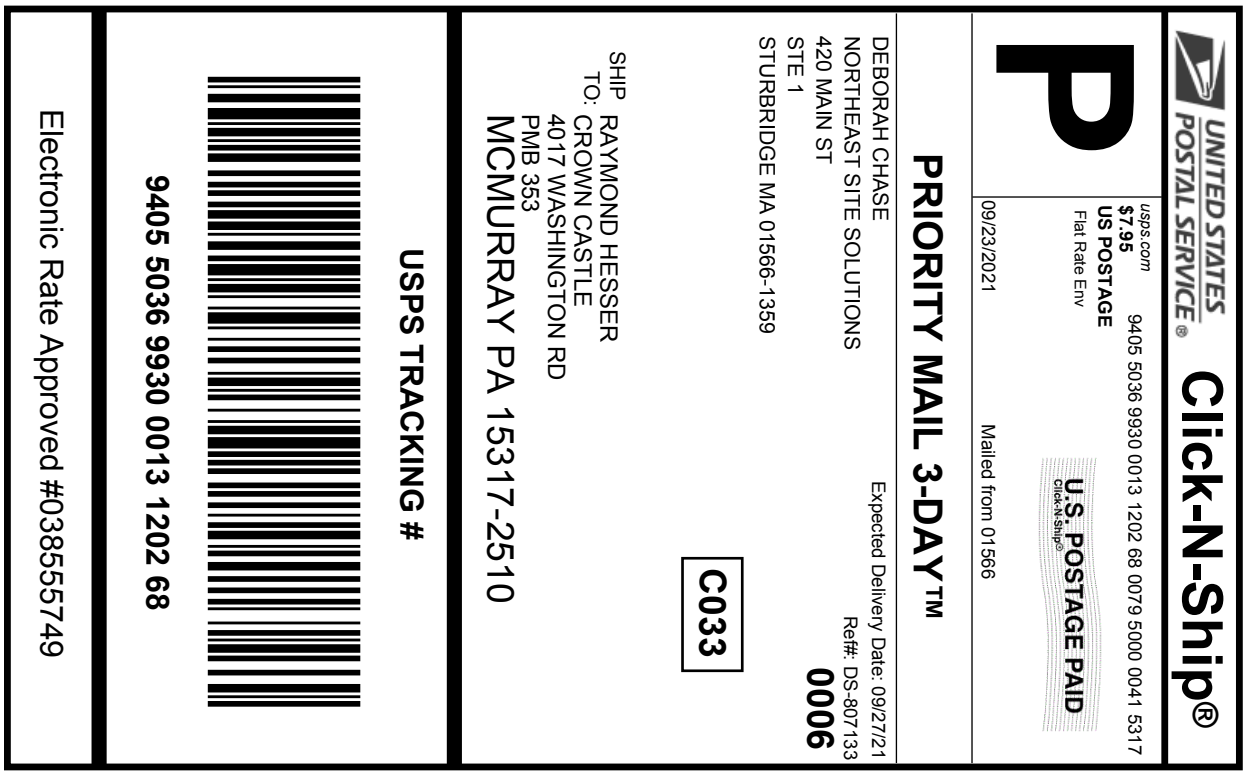
From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Ref#: DS-807133

To: STEVEN KLEPPIN
ZONING OFFICIAL
125 EAST AVE
RM 129
NORWALK CT 06851-5702

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

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



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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 0013 1202 68

Trans. #:	544355104
Print Date:	09/23/2021
Ship Date:	09/23/2021
Expected Delivery Date:	09/27/2021

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

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

Ref#: DS-807133

To: RAYMOND HESSER
CROWN CASTLE
4017 WASHINGTON RD
PMB 353
MCMURRAY PA 15317-2510

* 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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807133- Norwalk

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

09/24/2021 11:16 AM

Product	Qty	Unit Price	Price
Prepaid Mail Norwalk, CT 06851 Weight: 1 lb 7.60 oz Acceptance Date: Fri 09/24/2021 Tracking #: 9405 5036 9930 0013 1202 51	1		$0.00
Prepaid Mail Norwalk, CT 06851 Weight: 1 lb 7.50 oz Acceptance Date: Fri 09/24/2021 Tracking #: 9405 5036 9930 0013 1202 44	1		$0.00
Prepaid Mail Canonsburg, PA 15317 Weight: 1 lb 7.50 oz Acceptance Date: Fri 09/24/2021 Tracking #: 9405 5036 9930 0013 1202 68	1		$0.00
Grand Total:			$0.00

****
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