Tectonic
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Tectonic Engineering
Theresa Ranciato-Viele
63-3 N. Branford Road
Branford, CT 06405
Tranciato@Tectonicengineering.com
203-606-5127

January 19, 2023

Ms. Melanie Bachman, Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: **Notice of Exempt Modification to an existing 148' monopole located at 515 Post Road East, Westport, Connecticut**

Latitude: 41° 08' 24.65" / Longitude: -73° 20' 49.92"

Dear Ms. Bachman:

This letter and attachments are submitted on behalf of Dish Wireless, LLC ("Dish"). Dish plans to install antennas and related equipment to the tower site at the existing 148'monopole tower facility located at 515 Post Road East, Westport, Connecticut (See Original Facility Approval attached as Exhibit A) ("Facility"). The property and tower are owned by The Town of Westport (See Westport Assessor Card attached hereto as Exhibit B).

Dish proposes to install three (3) 600/1900/2100 MHz JMA – MX08Fr0665-21 antennas and six (6) FUJITSU TA08025 RRUs on the tower at the one hundred thirty foot (130') centerline AGL. Dish further proposes to install one (1) 1.5" Hybrid Cable. Dish will also install its equipment cabinets on a 5' X 7' platform within its 10' X 15' lease area. The installation is shown on plans completed by Tectonic Engineering, dated January 11, 2023 and attached hereto as Exhibit C.

Dish requests that the Connecticut Siting Council ("Council") find that the proposed shared use of this Facility satisfies the criteria of C.G.S. sec. 16-50aa and accordingly issue an order approving the proposed shared use. This proposed installation constitutes an exempt modification pursuant to R.C.S.A. 16-50j-89. Pursuant to R.C.S.A. 16-50j-73, Dish is providing notice to Jennifer Tooker, First Selecwoman of the Town of Westport, Mary Young, Planning and Zoning Director, and the property and tower owner, Town of Westport.

Under the Council's regulations, Dish's plans do not constitute a modification subject to the Council's review in that:

Dish will not change the existing 148' height of the Tower as the Dish antennas will be installed at a height of 130'.

The proposed installation will not extend the existing boundaries of the compound as depicted in Exhibit C;

The proposed installation will not increase the noise levels at the facility by six (6) decibels or more, or to levels that exceed local and state criteria; and

The proposed antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard. The attached Exhibit F indicates that the combined site operations will result in a total power density of 9.6752%.

Tower

The Facility consists of a One hundred forty eight foot (148') monopole tower located at 515 Post Road East, Westport, Connecticut. As indicated above, the property and tower are owned by the Town of Westport. The tower currently supports municipal antennas at the one hundred forty eight foot (148'), one hundred forty four foot (144') AGL, one hundred foot (100') AGL, and fifty three foot (53' AGL), Sprint at the one hundred forty eight foot (148') AGL, which antennas are to be removed, AT&T at the one hundred twenty foot (120') AGL, and T-Mobile at the eighty five foot (85') centerline AGL. The antenna locations are set forth on Sheet A-2 of the attached drawings in Exhibit C.

A. TECHNICAL FEASIBILTY

The existing monopole has been deemed structurally capable of supporting the proposed Dish loading. The structural and mount analyses are attached hereto as Exhibits D and E respectively.

B. LEGAL FEASIBILITY

C.G.S. Se. 16-50aa authorizes the Council to issue orders approving the shared use of existing towers such as the above referenced tower. Under the authority granted to the Council, an order of the Council approving the requested shared use would permit Dish to obtain a building permit from the Town of Westport to proceed with the proposed installation. Additionally, a Lease Agreement is attached as Exhibit G, granting Dish the authority from the tower owner to proceed with this application for shared use.

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C. ENVIRONMENTAL FEASIBILITY

The proposed shared use of this Facility would have a minimal environmental impact. The installation of the Dish equipment at the 118' level of the existing tower would have an insignificant visual impact on the area surrounding the tower. The proposed Dish ground equipment would be installed within the existing Facility compound. The Dish installation would not cause any significant alteration to the physical or environmental characteristics of the existing Facility. Additionally, as evidenced by Exhibit F, the proposed antennas would not increase the radio frequency emissions to a level at or above the Federal Communications Commission safety standards.

D. ECONOMIC FEASIBILTY

Dish has entered into a Lease Agreement (Exhibit G) with the Facility owner for the proposed colocation. Therefore, this shared use is economically feasible.

E. PUBLIC SAFETY CONCERNS

As set forth above, the tower is structurally capable of supporting the proposed Dish loading. Dish is not aware of any public safety concerns relative to the proposed sharing of the existing tower.

For the reasons set forth herein, the proposed shared use of the existing tower at 515 Post Road East, Westport, satisfies the criteria stated in C.G.S. sec. 16-50aa, and supports the general goal of preventing the unnecessary proliferation of tower sites in Connecticut. Dish respectfully requests the Council issue an order approving the proposed shared use.

Respectfully submitted,
Dish Wireless, LLC

By: _____

Theresa Ranciato-Viele, consultant
63-3 N. Branford Road
Branford, CT 06405
Tranciato@Tectonicengineering.com
203-606-5127

cc: Westport First Selectwoman, Jennifer Tooker
110 Myrtle Ave., Room 310
Westport, CT 06880

Westport Planning and Zoning Director, Mary Young
110 Myrtle Ave., Room 203
Second Floor
Westport, CT 06880

Exhibit A

Original Facility Approval

TOWN OF WESTPORT
Zoning Board of Appeals
Town Hall, 110 Myrtle Ave.
Westport, CT 06880
Phone (203) 341-1081; Facsimile (203) 341-1153

April 15, 1999

COPY

Richard Gough
Fire Chief / Fire Marshal
Westport Department of Fire Services
515 Post Road East
Westport, CT 06880

MODIFIED RESOLUTION

RE: ZBA CASE # 5631
ADDRESS: 515 Post Road East
OWNER OF PROPERTY: Department of Fire Services / Town of Westport

Dear Chief Gough :

This is to certify that at the work session of the Zoning Board of Appeals held on February 23, 1999, the Board voted 5-0 (Ezzes, Watson, Farrell, Wong & Altschuh) in favor to GRANT WITH CONDITIONS your department's request for variance, and the following resolution was adopted:

RESOLVED: The application of Department of Fire Services / Town of Westport for the property located at 515 Post Road East for a Variance of Sec. 24-5 (height over 25'); Sec. 24-4 (setback/residential zone less than 30'); Sec. 24-6 (building coverage over 25%): Sec. 24-8.1 (building floor area over 10,000 sq. ft), of the zoning regulations is hereby granted to permit the addition of a triangular platform w/ panel antennas to the existing monopole tower at 120' +/- above grade, to re-locate the fire department's antenna to top of tower, and to permit the construction of a 569 sq. ft. 2 story addition to the rear of the fire station in a GBD zone. (Assessors' Map # 5318-1, Lot 6). The Zoning Board of Appeals found the following unusual hardship from the application of the regulations to the subject property:

- Tower sharing & co-location of commercial uses
- Conformance with the 1996 Federal Telecommunications Act
- Safety Concerns

The variance was approved subject to the following conditions:

- The Power density of the antenna must be limited to the density offered by the applicant with this application (0.0531 mW/cm²).

The above being GRANTED in accordance with the plans submitted with the application ("ZONING MAP OF PROPERTY PREPARED FOR DEPARTMENT OF FIRE SERVICES, 515 POST ROAD EAST, WESTPORT, CONNECTICUT; SCALE: 1" = 20'; DATE: JAN. 25, 1999; CERTIFIED SUBSTANTIALLY CORRECT AS NOTED ON SURVEY BY WALTER H. SKIDD, L.S."), and said Plans stamped "APPROVED" by the Zoning Board of Appeals on February 23, 1999.

Effective Date: Contingent upon applicant filing this resolution with the Town Clerk no later than March 23, 1999.

A Zoning Permit must be obtained within one year of the effective date of this variance, or it becomes null and void.

The project must be built in conformance with the approved plans. The structure cannot be demolished unless it has been specifically requested on the application

Execution of this variance by filing with the Town Clerk authorizes you to obtain the necessary permits. Before you can proceed with your project you must obtain a Zoning and Building Permit.

Yours Truly,

James C. Ezzes Aperkz

James C. Ezzes, Chairman
Zoning Board of Appeals

JE:RZ
Certified Mail:RRR
cc: ZEO
enc.

WESTPORT CONNECTICUT
PLANNING & ZONING DEPARTMENT
TOWN HALL, 110 MYRTLE AVENUE
WESTPORT, CONNNECTICUT 06880
(203) 341-1030 • (203) 341-1079
(203) 454-6145 - fax

Hearing: March 18, 1999
Decision: April 15, 1999

April 19, 1999

Chief Richard Gough
Westport Department of Fire Services
515 Post Road East
Westport, CT 06880

Re: **515 Post Road East, Appl. #99-001**

Dear Mr. Gough:

This is to certify that at a meeting of the Westport Planning and Zoning Commission held on April 15, 1999 it was moved by Robert Graham and seconded by Eleanor Lowenstein to adopt the following resolution.

RESOLUTION # 99-001

WHEREAS, THE PLANNING AND ZONING COMMISSION met on April 15, 1999 and made the following findings:

- The proposed relocation of the Fire Department antenna will not extend the height of the tower, but will provide for better utilization for emergency communications and the commercial carriers.
- The addition of the SNET panels is in conformance with the Town Plan of Development, which called for the "maximum use of existing communication towers for additional service wherever possible."
- The addition of the two-story extension at the rear of the site will not interfere with traffic movements and will provide for needed storage for the Fire Department and communications equipment.
- No additional parking spaces are required for this use.

NOW THEREFORE, BE IT RESOLVED that Application #99-001 by the Town of Westport for property owned by the Town of Westport for a site plan approval to add a triangular platform with panel antennas to existing monopole tower, to relocate primary fire department antenna to top of tower and construct a two story addition to rear of fire headquarters in a GBD, Map 5318-1, Lot 6 be **GRANTED** subject to the conditions listed below:

CONDITIONS

1. Conformance to the ZBA Variance #5631

2. Conformance to Existing Conditions Map, prepared by Walter H. Skidd, dated 1/25/99.

3. Conformance to Site Plan (sheet C-1) prepared by the Maguire Group, dated 11/17/98 and received by P&Z on 1/6/99.

4. Conformance to Building Floor Plans and Elevations (sheets A-1, A-2, and C-3) prepared by the Maguire Group, dated 11/17/98 and received by P&Z on 1/6/99.

5. Prior to the issuance of a Zoning Permit please submit the following documents to the office:

   A. Three sets of site and building plans.

   B. Site plan must be modified to indicate additional buffer and ornamental landscaping on the Crescent Road side of the property. Dead or out-of-control plants must be replaced.

6. A certified "As-Built" shall be submitted prior to an issuance of a Certificate of Zoning Compliance.

7. All new utilities shall be placed underground.

8. A zoning permit shall be obtained within one year of this approval or said approval shall become null and void.

9. All plantings shown on an approved Site Plan shall be maintained in a healthy growing condition and all fences and walls shall be maintained in good physical condition throughout the duration of the use. Plants, fences or walls not so maintained shall be replaced with new materials no later than the beginning of the next immediately following growing season.

10. All work approved pursuant to this Site Plan and Special Permit shall be completed within 5 years of date of approval, by April 15, 2004.

11. This is a conditional approval. Each and every condition is an integral part of the Commission decision. Should any of the conditions, on appeal from this decision, be found to be void or of no legal effect, then this conditional approval is likewise void. The applicant may refile another application for review.

Reasons:

The proposed use has been found to be in conformance with the Town Plan of Development; and it will

1. be in conformance with the applicable zoning regulations of the Town of Westport; and

2. not prevent or inhibit the orderly growth and development of the area; and

3. not have a significant adverse affect on adjacent areas located within the close proximity to the use.

VOTE:

AYES	-7-	(Lowenstein, Graham, MacLachlan, Crowther, Getraer, Stashower, Wexler)
NAYS	-0-	
ABSTENTIONS	-0-	

Very truly yours,

Eleanor Lowenstein

Eleanor Lowenstein
Chairman,
Planning & Zoning Commission

cc: Glenn Werfelman; Assessor

Exhibit B

Property Card

Property Location 515 POST RD E | Map ID E09/ / 064/000 / | Bldg Name | State Use 928
Vision ID 10376 | Account # 29177 | Bldg # 1 | Sec # 1 of 1 | Card # 1 of 1 | Print Date 5/3/2022 7:46:51 AM

CURRENT OWNER

WESTPORT TOWN OF
FIRE HOUSE
110 MYRTLE AVE

WESTPORT CT 06880

TOPO	UTILITIES	STRT / ROAD	LOCATION
1 Level	1 All Public	1 Public	4 Bus. District
	4 Gas		

SUPPLEMENTAL DATA

Alt Prcl ID	531816	Lift Hse	
Historic ID		Asking $	
Census	502		
WestportC	E50		
Survey Ma	6970		
Survey Ma			
GIS ID	E09064000	Assoc Pid#	

CURRENT ASSESSMENT

Description	Code	Appraised	Assessed
EX COM LN	21	2,499,100	1,749,400
EX COM BL	22	3,074,900	2,152,400
EX CM OTB	25	1,030,900	721,600
	Total	6,604,900	4,623,400

6158

WESTPORT, CT

VISION

RECORD OF OWNERSHIP

RECORD OF OWNERSHIP	BK-VOL/PAGE		SALE DATE	Q/U	V/I	SALE PRICE	VC
WESTPORT TOWN OF	0523	0172	09-17-1979	U	I	0	29

PREVIOUS ASSESSMENTS (HISTORY)

Year	Code	Assessed	Year	Code	Assessed	Year	Code	Assessed
2021	21	1,749,400	2020	21	1,749,400	2020	21	1,749,400
	22	2,152,400		22	2,152,400		22	2,152,400
	25	721,600		25	32,800		25	32,800
	Total	4,623,400		Total	3,934,600		Total	3,934,600

EXEMPTIONS

Year	Code	Description	Amount
		Total	0.00

OTHER ASSESSMENTS

Code	Description	Number	Amount	Comm Int

This signature acknowledges a visit by a Data Collector or Assessor

ASSESSING NEIGHBORHOOD

Nbhd	Nbhd Name	B	Tracing	Batch
0001				

NOTES

WESTPORT FIRE HQTRS, BLDG DEPT &
CELL TOWER
10/10/17 MEMORANDUM OF LEASE
V/3844 PG/18 FILED 2/28/18 NOW
INCLUDES CELL TOWER (#14749 DELETED)
MONOPOLE: 10 X 10 X 148' HGT =
19 ANTENNAS AS OF 4/21/09
4 CELL SITES
FULL TIME FIRE HOUSE
PERMITS: 56145, 62861, 64163, 64203,
70501, 70354

APPRAISED VALUE SUMMARY

Appraised Bldg. Value (Card)	3,074,900
Appraised Xf (B) Value (Bldg)	0
Appraised Ob (B) Value (Bldg)	1,030,900
Appraised Land Value (Bldg)	2,499,100
Special Land Value	0
Total Appraised Parcel Value	6,604,900
Valuation Method	C
Total Appraised Parcel Value	6,604,900

BUILDING PERMIT RECORD

Permit Id	Issue Date	Type	Description	Amount	Insp Date	% Comp	Date Comp	Comments
76561	04-26-2013	NA	Miscellaneous	25,000	09-16-2015	100		UPGRADE ANTENNAS**NEE
73210	06-15-2011	NA	Miscellaneous	20,000	10-01-2011	100		ADD 3 ANTENNAS TO EXISTI
70501	04-01-2009	AD	Additions	58,000	03-01-2010	100	01-27-2010	ADD (3) ANTENNAS TO EXIS
62861	12-03-2002		INSTALLATION	56,000		100	02-19-2003	INSTALLATION OF OUTDOO
62233	05-31-2002		ADDITIONS-IN	140		100	07-26-2002	ADDITIONS-INSTALL 12' LON
59412	01-20-2000		TWO ST BLOC	154,000		100		TWO ST BLOCK ADD APPRO

VISIT / CHANGE HISTORY

Date	Id	Type	Is	Cd	Purpost/Result
09-01-2021	PF	7	5	57	Office review - town record
06-25-2020	BL			19	Field Review
09-16-2015	MJF	2		69	Partial Int Inspn (See Perm
01-22-2013	TM	2		57	Office review - town record
05-13-2010	J			11	QC - Check/Field Review
04-21-2010	TM	6		14	QC - Measure & Inter. Insp
03-01-2010	TM	2		55	NOAH - Visual

LAND LINE VALUATION SECTION

B	Use Code	Description	Zone	Land	Land Units		Unit Price	I. Factor	Site Index	Cond.	Nbhd.	Nhbd Adj	Notes	Location Adjustment		Adj Unit Pric	Land Value
1	928	Fire Dept	GBD		1.280	AC	1,620,000.	0.92708	C	1.00	I	1.300			0		2,499,100
		Total Card Land Units			1	AC	Parcel Total Land Area: 1									Total Land Value	2,499,100

Property Location 515 POST RD E | Map ID E09/ / 064/000 / | Bldg Name | State Use 928
Vision ID 10376 | Account # 29177 | Bldg # 1 | Sec # 1 of 1 | Card # 1 of 1 | Print Date 5/3/2022 7:46:51 AM

CONSTRUCTION DETAIL

Element	Cd	Description
Style:	59	Fire Station
Model	96	Commercial
Grade	03	Average
Stories:	2	
Occupancy	2.00	
Exterior Wall 1	20	Brick/Masonry
Exterior Wall 2	15	Concr/CinderBk
Roof Structure	01	Flat
Roof Cover	04	T&G/Rubber
Interior Wall 1	01	Minimum
Interior Wall 2	05	Drywall
Interior Floor 1	03	Concr-Finished
Interior Floor 2	14	Carpet
Heating Fuel	03	Gas
Heating Type	09	HydroAir
AC Type	03	Central
Bldg Use	928	Fire Dept
Income Adj		
Heat/AC	01	Heat/AC Pkgs
Frame Type	06	Fireprf Steel
Baths/Plumbing	02	Average
Ceiling/Walls	06	Ceil & Walls
Rooms/Prtns	02	Average
Wall Height	12.00	
% Comn Wall		
1st Floor Use:	928	

CONSTRUCTION DETAIL (CONTINUED)

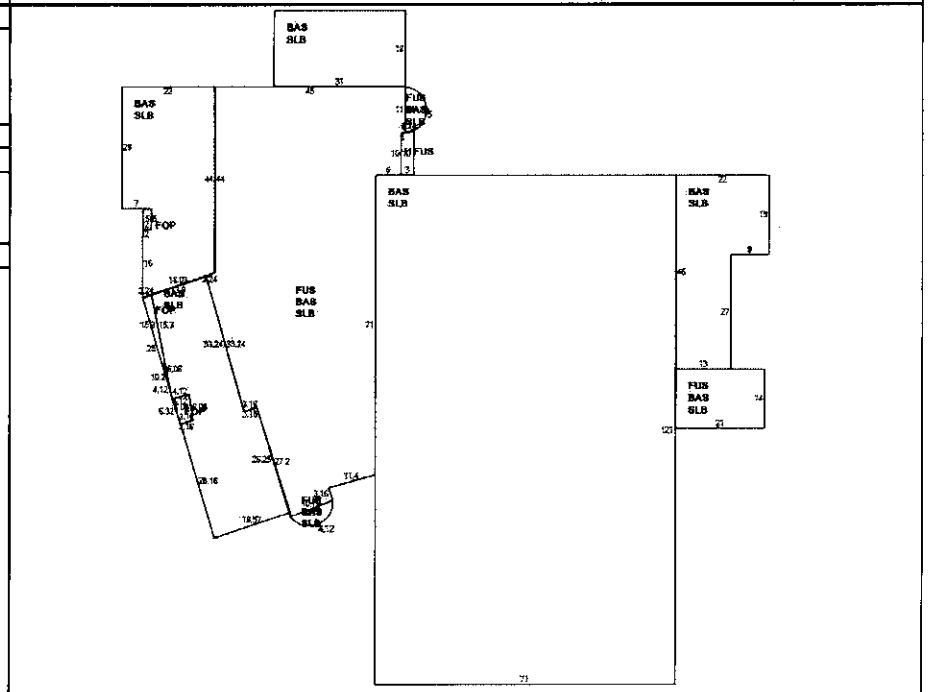
Element	Cd	Description

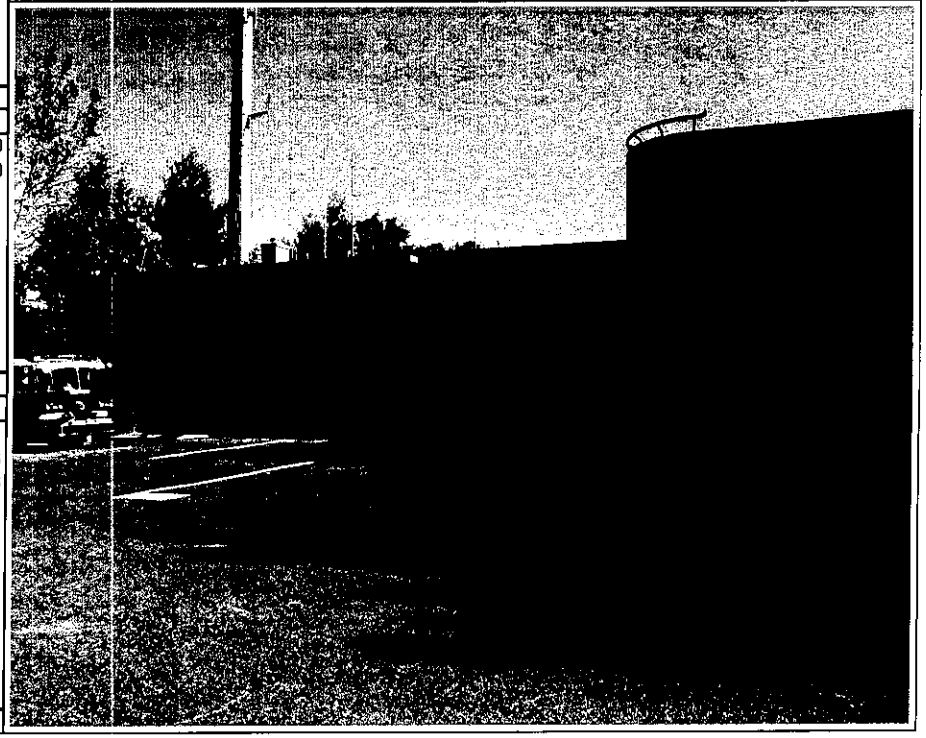
MIXED USE

Code	Description	Percentage
928	Fire Dept	100
		0
		0

COST / MARKET VALUATION

RCN	3,843,647
Year Built	1900
Effective Year Built	
Depreciation Code	VG
Remodel Rating	
Year Remodeled	
Depreciation %	20
Functional Obsol	
External Obsol	
Trend Factor	1
Condition	
Condition %	
Percent Good	80
Cns Sect Rcnld	3,074,900
Dep % Ovr	
Dep Ovr Comment	
Misc Imp Ovr	
Misc Imp Ovr Comment	
Cost to Cure Ovr	
Cost to Cure Ovr Comment	





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

Code	Description	L/B	Units	Unit Price	Yr Blt	Cond. Cd	% Good	Grade	Grade Adj	Appr. Value
PAV1	Paving Asph.	L	25,000	2.50	1997	6	75		0.00	46,900
CELL	Cell on TWR	L	3	328000.0			100	3	1.00	984,000

BUILDING SUB-AREA SUMMARY SECTION

Code	Description	Living Area	Floor Area	Eff Area	Unit Cost	Undeprec Value
BAS	First Floor	15,655	15,655		192.20	3,008,891
FOP	Porch, Open	0	61		47.26	2,883
FUS	Upper Story, Finished	3,871	3,871		192.20	744,006
SLB	Slab	0	15,655		0.00	0
	Ttl Gross Liv / Lease Area	19,526	35,242			3,755,780

Exhibit C

Project Plans

dish wireless™

DISH Wireless L.L.C. SITE ID:

NJJER01115A

DISH Wireless L.L.C. SITE ADDRESS:

515 POST ROAD EAST
WESTPORT, CT 06880

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	2022 CT STATE BUILDING CODE/2021 IBC W/ CT AMENDMENTS
MECHANICAL	2022 CT STATE BUILDING CODE/2021 IMC W/ CT AMENDMENTS
ELECTRICAL	2022 CT STATE BUILDING CODE/2020 NEC W/ CT AMENDMENTS

SHEET INDEX

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

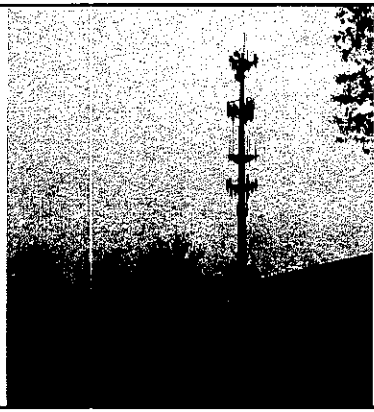
SCOPE OF WORK

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

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

GROUND SCOPE OF WORK:
- REUSE EXISTING ABANDONED STEEL 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 CIENA BOX (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:	TOWN OF WESTPORT
ADDRESS:	515 POST ROAD EAST WESTPORT, CT 06880
TOWER TYPE:	MONOPOLE
TOWER CO SITE ID:	N/A
TOWER APP NUMBER:	N/A
COUNTY:	FAIRFIELD COUNTY
LATITUDE (NAD 83):	41° 08' 24.56" N 41.140160° N
LONGITUDE (NAD 83):	73° 20' 50.04" W 73.3472° W
ZONING JURISDICTION:	TOWN OF WESTPORT/ CT SITING COUNCIL
ZONING DISTRICT:	GBD
PARCEL NUMBER:	E09-064-000
OCCUPANCY GROUP:	U
CONSTRUCTION TYPE:	II-B
POWER COMPANY:	EVERSOURCE
TELEPHONE COMPANY:	T.B.D.

PROJECT DIRECTORY

APPLICANT:	DISH Wireless L.L.C. 5701 SOUTH SANTA FE DRIVE LITTLETON, CO80120
TOWER OWNER:	TOWN OF WESTPORT 110 MYRTLE AVENUE WESTPORT, CT 06880
SITE DESIGNER:	TECTONIC ENGINEERING CONSULTANTS, GEOLOGISTS & SURVEYORS, D.P.C, INC. 1279 ROUTE 300 NEWBURGH, NY 12550 (845) 567-6656
SITE ACQUISITION:	TECTONIC ENGINEERING CONSULTANTS, GEOLOGISTS & SURVEYORS, D.P.C, INC. 1279 ROUTE 300 NEWBURGH, NY 12550 (845) 567-6656
CONSTRUCTION MANAGER:	RAFAL ROSOLOWSKI RAFAL.ROSOLOWSKI@DISH.COM
RF ENGINEER:	PAWAN MADAHAR PAWAN.MADAHAR@DISH.COM

DIRECTIONS

DIRECTIONS FROM 3 ADP BOULEVARD ROSELAND, NJ:

GET ON I-280 W FROM LIVINGSTON AVE. HEAD NORTHEAST TOWARD ADP BLVD. TURN LEFT. TURN LEFT TOWARD ADP BLVD. TURN LEFT TOWARD ADP BLVD. TURN LEFT ONTO ADP BLVD. TURN RIGHT TOWARD CHOCTAW WAY. SLIGHT RIGHT ONTO CHOCTAW WAY. USE THE RIGHT LANE TO TURN RIGHT ONTO LIVINGSTON AVE. USE THE RIGHT LANE TO MERGE ONTO I-280 [illegible] VIA THE RAMP TO PARSIPPANY. TAKE I-287 N AND I-87 S TO SAW MILL RIVER PKWY N IN ELMSFORD. TAKE EXIT 8A FROM I-87 S. MERGE ONTO I-280 [illegible]. TAKE THE I-287 EXIT TOWARD US-46/MAHWAH/MORRISTOWN. KEEP RIGHT AT THE FORK, FOLLOW SIGNS FOR I-287 N AND MERGE ONTO I-287 N. ENTERING NEW YORK. TAKE THE I-87 S/NEW YORK STATE THRUWAY/I-287 EXIT TOWARD GOV MARIO M. CUOMO BR/NEW YORK CITY. MERGE ONTO I-287 E/I-87 S. TOLL ROAD. KEEP LEFT AT THE FORK TO CONTINUE ON I-287 E. FOLLOW SIGNS FOR WHITE PLAINS/RYE. KEEP LEFT TO STAY ON I-287 E. MERGE ONTO I-95 N. TAKE EXIT 17 TO MERGE ONTO PARK ST. USE THE RIGHT LANE TO MERGE ONTO PARK ST. CONTINUE ONTO CHARLES ST. TURN LEFT ONTO RIVERSIDE AVE. TURN RIGHT ONTO BRIDGE ST. TURN LEFT ONTO COMPO RD S. TURN RIGHT ONTO POST RD E/STATE ST E. TURN LEFT ONTO CRESCENT RD. DESTINATION WILL BE ON THE LEFT.

VICINITY MAP

NO SCALE

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

Tectonic

STATE OF CONNECTICUT
MANOJKUMAR PATEL
PEN.0022038
LICENSED
PROFESSIONAL ENGINEER
1/12/23

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DRAWN BY:	CHECKED BY:	APPROVED BY:
JW	JO	----

RFDS REV #: ----

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	[illegible]	ISSUED FOR OWNER REVIEW
1	01/11/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
10710.NJJER01115A

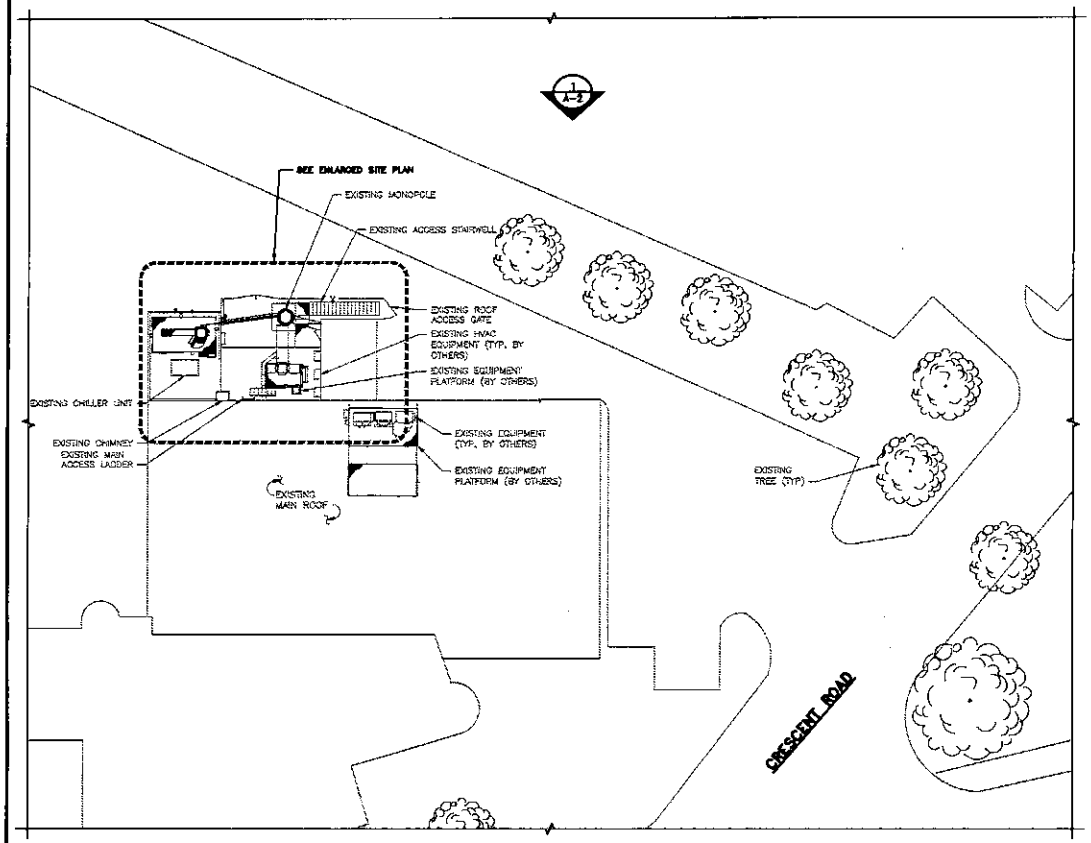
DISH Wireless L.L.C.
PROJECT INFORMATION
NJJER01115A
515 POST ROAD EAST
WESTPORT, CT 06880

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

NOTES

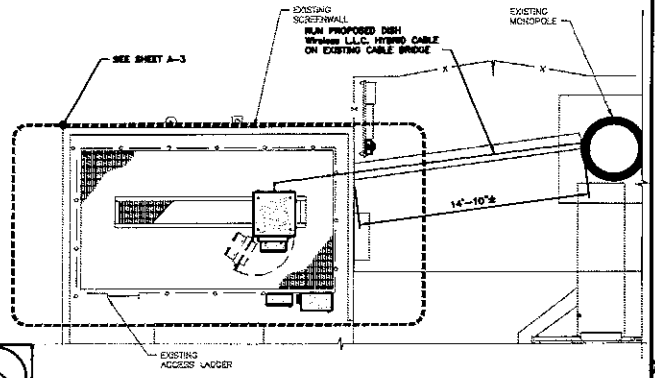
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.
3. REFER TO STRUCTURAL ANALYSIS REPORT DATED 12/07/22 PREPARED BY TECTONIC
4. REFER TO MOUNT ANALYSIS REPORT DATED 10/20/22 PREPARED BY TECTONIC



OVERALL SITE PLAN | 16' 12' 8' 4' 0 16' 32' 1/16"=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.
4. REFER TO STRUCTURAL ANALYSIS REPORT DATED 12/07/22 PREPARED BY TECTONIC
5. REFER TO MOUNT ANALYSIS REPORT DATED 10/20/22 PREPARED BY TECTONIC



ENLARGED SITE PLAN | 12" 6" 0 1' 2' 3' 4' 5' 6' 7' 3/8"=1'-0" | 2

NOT USED | 3

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LICENSED PROFESSIONAL ENGINEER
12/23

DRAWN BY:	CHECKED BY:	APPROVED BY:
JW	JQ	—

RFDS REV #: —

CONSTRUCTION DOCUMENTS

SUBMITTALS

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0	10/28/22	ISSUED FOR OWNER REVIEW
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DISH Wireless L.L.C.
PROJECT INFORMATION
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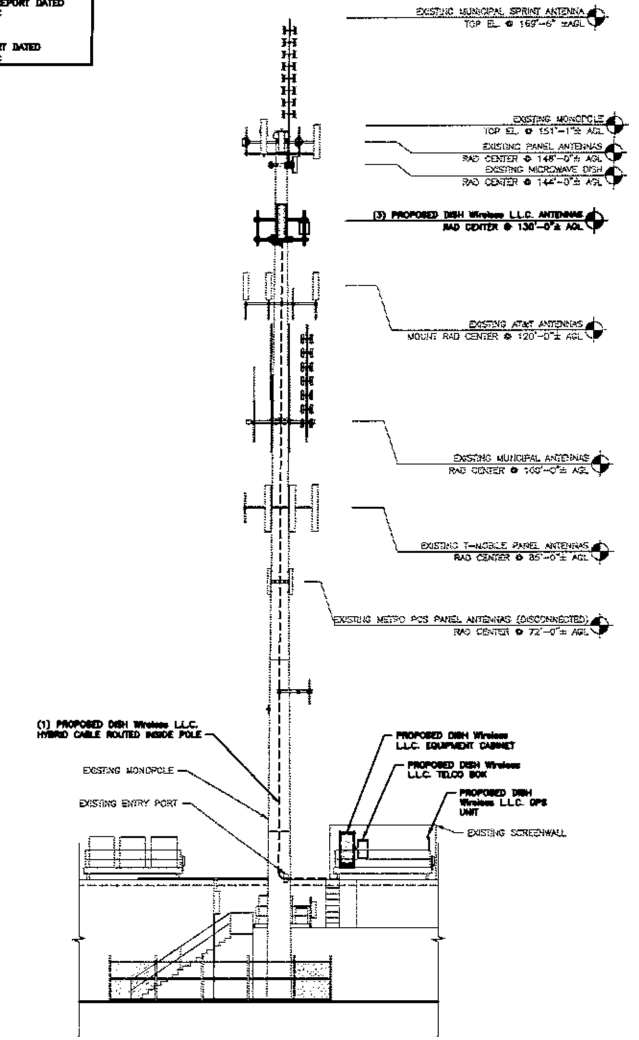
WESTPORT, CT 06880

SHEET TITLE
OVERALL AND ENLARGED SITE PLAN

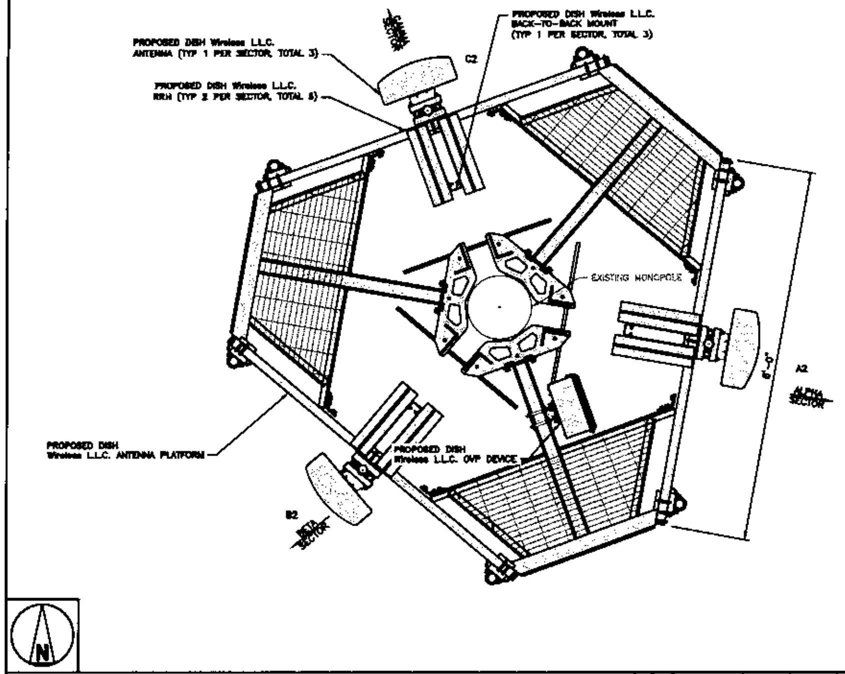
SHEET NUMBER
A-1

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. REFER TO STRUCTURAL ANALYSIS REPORT DATED 12/07/22 PREPARED BY TECTONIC
4. REFER TO MOUNT ANALYSIS REPORT DATED 10/20/22 PREPARED BY TECTONIC



PROPOSED NORTH ELEVATION — 3/16"=1'-0" — 1



ANTENNA LAYOUT — 3/4"=1'-0" — 2

SECTOR POS.	ANTENNA: EXISTING OR PROPOSED	ANTENNA: MANUFACTURER – MODEL NUMBER	ANTENNA: TECH	ANTENNA: AZIMUTH	ANTENNA: RAD CENTER	TRANSMISSION CABLE: FEED LINE TYPE AND LENGTH	RRH: MANUFACTURER – MODEL NUMBER	RRH: TECH	RRH: POS.	OVP: MANUFACTURER MODEL
A1	—	—	—	—	—	(1) HIGH-CAPACITY HYBRID CABLE (125' LONG)	FUJITSU – TA08025-B604	5G	A2	RDIDC-9181-PF-48
A2	PROPOSED	JMA – MX08FRO665-21	5G	100°	130'-0"		FUJITSU – TA08025-B605	5G	A2	
A3	—	—	—	—	—		—	—	—	
B1	—	—	—	—	—	SHARED W/ALPHA	FUJITSU – TA08025-B604	5G	B2	SHARED W/ALPHA
B2	PROPOSED	JMA – MX08FRO665-21	5G	230°	130'-0"		FUJITSU – TA08025-B605	5G	B2	
B3	—	—	—	—	—		—	5G	—	
C1	—	—	—	—	—	SHARED W/ALPHA	FUJITSU – TA08025-B604	5G	C2	SHARED W/ALPHA
C2	PROPOSED	JMA – MX08FRO665-21	5G	340°	130'-0"		FUJITSU – TA08025-B605	5G	C2	
C3	—	—	—	—	—		—	—	—	

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.
3. AZIMUTHS ARE SUBJECT TO CHANGE AND NEED TO BE CONFIRMED WITH THE LATEST RFDS PRIOR TO THE START OF CONSTRUCTION.

ANTENNA SCHEDULE — NO SCALE — 3

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JW	JQ	——

RFDS REV #: ——

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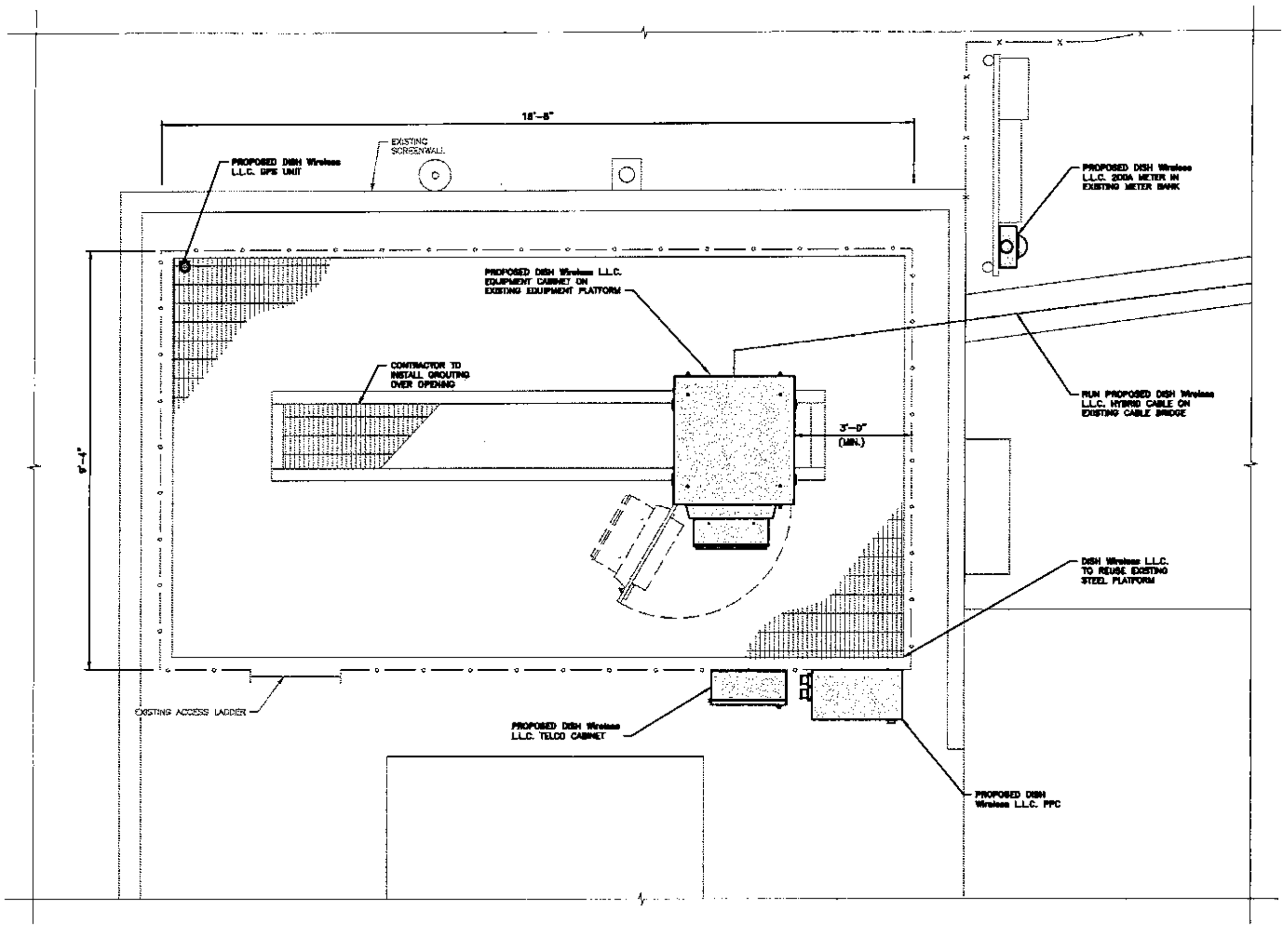
PROJECT INFORMATION
NJJER01115A
515 POST ROAD EAST
WESTPORT, CT 06880

SHEET TITLE
ELEVATION, ANTENNA LAYOUT AND SCHEDULE

SHEET NUMBER
A-2



ENLARGED EQUIPMENT PLATFORM PLAN

3/4"=1'-0"

1

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PROJECT INFORMATION

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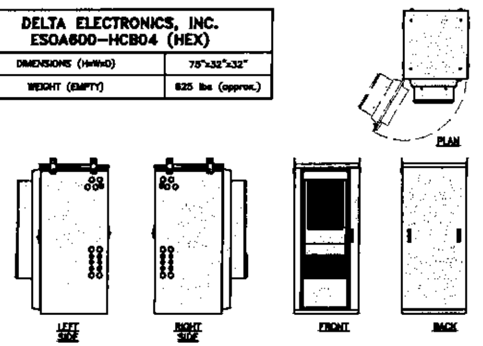
515 POST ROAD EAST
WESTPORT, CT 06880

SHEET TITLE
ELEVATION, ANTENNA LAYOUT AND SCHEDULE

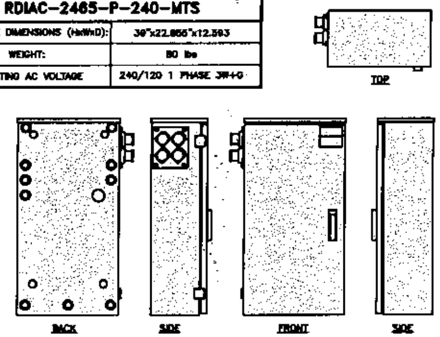
SHEET NUMBER
A-3

DELTA ELECTRONICS, INC. ESOA600-HCB04 (HEX)	
DIMENSIONS (HxWxD)	75"x32"x32"
WEIGHT (EMPTY)	825 lbs (approx.)



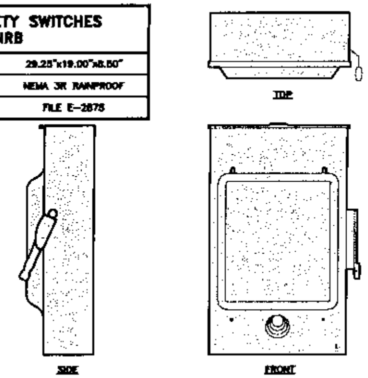
CABINET DETAIL — NO SCALE — 1

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



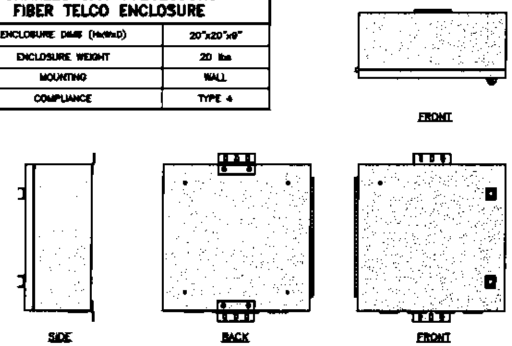
POWER PROTECTION CABINET (PPC) DETAIL — NO SCALE — 2

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

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 — 4

DETAIL NOT USED — NO SCALE — 5

DETAIL NOT USED — NO SCALE — 6

DETAIL NOT USED — NO SCALE — 7

DETAIL NOT USED — NO SCALE — 8

DETAIL NOT USED — NO SCALE — 9

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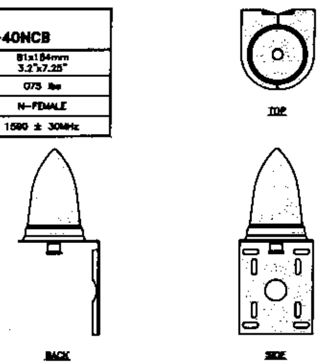
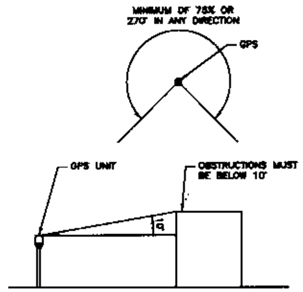
SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER
A-4

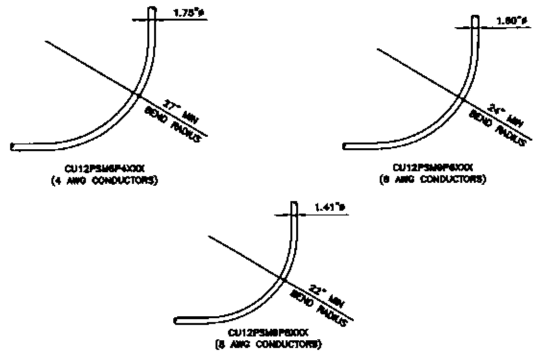
PCTEL GPSGL-TMG-SPI-40NCB	
DIMENSIONS (DIAxH) MM/INCH	81x184mm 3.2"x7.25"
WEIGHT W/ACCESSORIES	075 lbs
CONNECTOR	N-FEMALE
FREQUENCY RANGE	1590 ± 30MHz



GPS DETAIL — NO SCALE — 1



GPS MINIMUM SKY VIEW REQUIREMENTS — NO SCALE — 2



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

NOT USED — NO SCALE — 4

NOT USED — NO SCALE — 5

NOT USED — NO SCALE — 6

NOT USED — NO SCALE — 7

NOT USED — NO SCALE — 8

NOT USED — NO SCALE — 9

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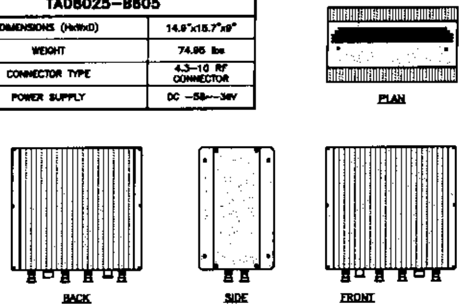
SHEET TITLE
EQUIPMENT DETAILS

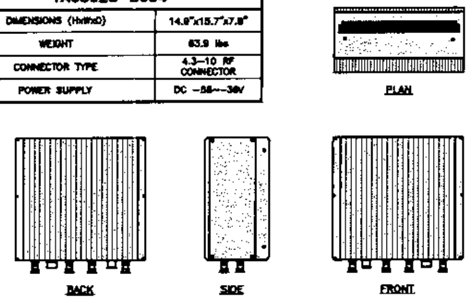
SHEET NUMBER
A-5

FUJITSU TRIPLE BAND TA08025-B605	
DIMENSIONS (HxWxD)	14.9"x15.7"x9"
WEIGHT	74.95 lbs
CONNECTOR TYPE	4.3-10 RF CONNECTOR
POWER SUPPLY	DC -58--38V



RRH DETAIL — NO SCALE — 1

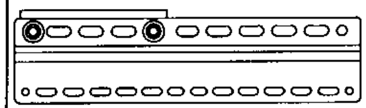
FUJITSU DUAL BAND TA08025-B604	
DIMENSIONS (HxWxD)	14.9"x15.7"x7.8"
WEIGHT	63.9 lbs
CONNECTOR TYPE	4.3-10 RF CONNECTOR
POWER SUPPLY	DC -58--38V

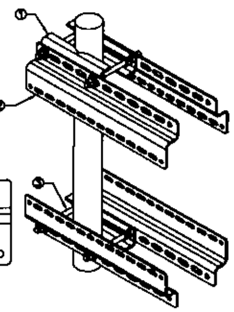


RRH DETAIL — NO SCALE — 2

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

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

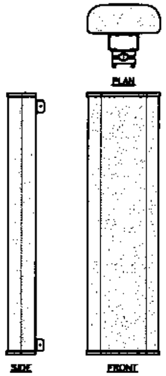




NOTE:
OR DISH Wireless L.L.C. APPROVED EQUIVALENT

RRH MOUNT DETAIL — NO SCALE — 3

JMA MX08FRO665-21	
DIMENSIONS (HxWxD)	72"x20.0"x8.0"
RF PORTS, CONNECTOR TYPE	8 x 4.3-10 FEMALE
WEIGHT	64.5 lbs
WEIGHT WITH BRACKETS	82.5 lbs

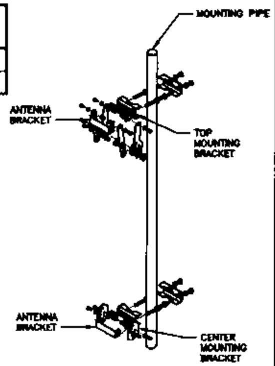


ANTENNA DETAIL — NO SCALE — 4

JMA ANTENNA MOUNT BRACKET #91900318	
TOTAL WEIGHT (WITH BRACKETS)	18 lbs (8.18 Kg)
POLE DIAMETER RANGE	2.5" TO 4.5"

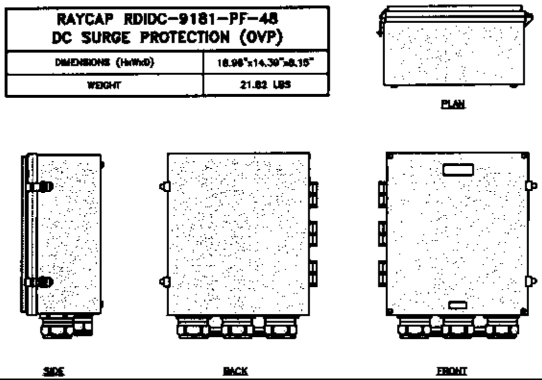
NOTE:
KIT #91900318: TOP AND BOTTOM BRACKETS FOR 4-, 6-, AND 8-FOOT ANTENNAS
ANTENNA BRACKET NOT PART OF KIT

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



ANTENNA BRACKET DETAIL — NO SCALE — 5

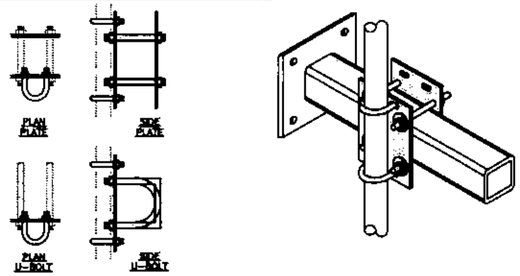
RAYCAP RDIDC-9181-PF-48 DC SURGE PROTECTION (OVP)	
DIMENSIONS (HxWxD)	18.96"x14.39"x8.15"
WEIGHT	21.82 LBS



SURGE SUPPRESSION DETAIL (OVP) — NO SCALE — 6

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

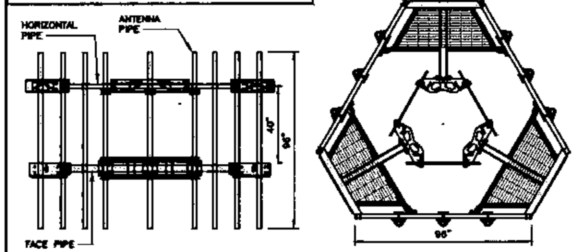
NOTE:
OR DISH Wireless L.L.C. APPROVED EQUIVALENT



RRH/OVP MOUNT DETAIL — NO SCALE — 7

COMMSCOPE MC-PK8-DSH	
FACE WIDTH	96"
WEIGHT	1373.08 lbs
NOTE: 15" TO 36" O.D.	

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



ANTENNA PLATFORM DETAIL — NO SCALE — 8

NOT USED — NO SCALE — 9

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SHEET TITLE
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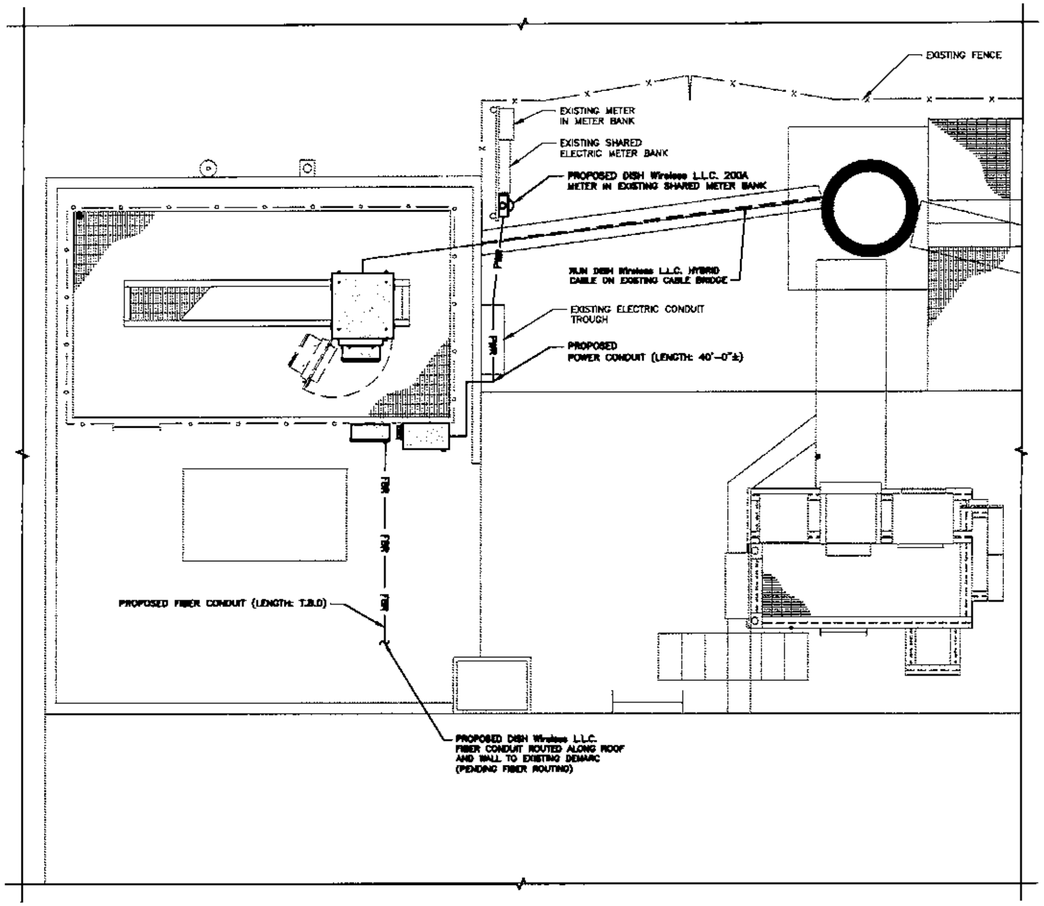
SHEET NUMBER
A-6



NOTES

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

UTILITY ROUTE PLAN — 1

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

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

ELECTRICAL NOTES — NO SCALE — 2

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MANOJKUMAR PATEL
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1/12/23

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DRAWN BY:	CHECKED BY:	APPROVED BY:
JW	JQ	——

RFDS REV #: ——

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	10/05/22	ISSUED FOR OWNER REVIEW
1	01/11/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
10710.NJJER01115A

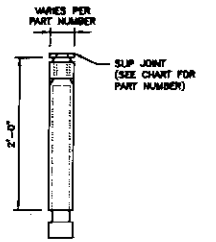
DISH Wireless L.L.C.
PROJECT INFORMATION
NJJER01115A
515 POST ROAD EAST
WESTPORT, CT 06880

SHEET TITLE
ELECTRICAL/FIBER ROUTE PLAN AND NOTES

SHEET NUMBER
E-1

CARLON EXPANSION FITTINGS

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

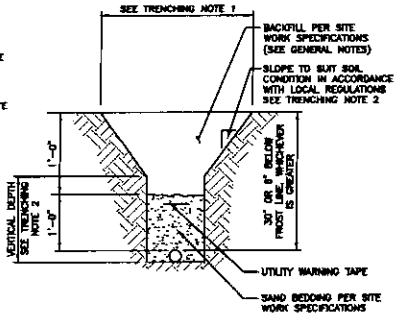


NOTE:
CONTRACTOR TO INSTALL EXPANSION FITTING SLIP JOINT AT METER CENTER CONDUIT TERMINATION, AS PER LOCAL UTILITY POLICY, ORDINANCE AND/OR SPECIFIED REQUIREMENT.

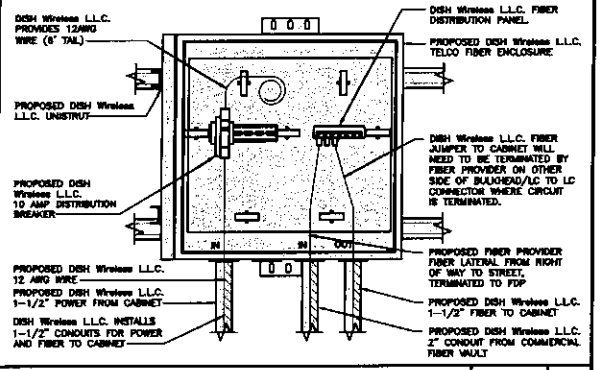
EXPANSION JOINT DETAIL | NO SCALE | 1

TRENCHING NOTES

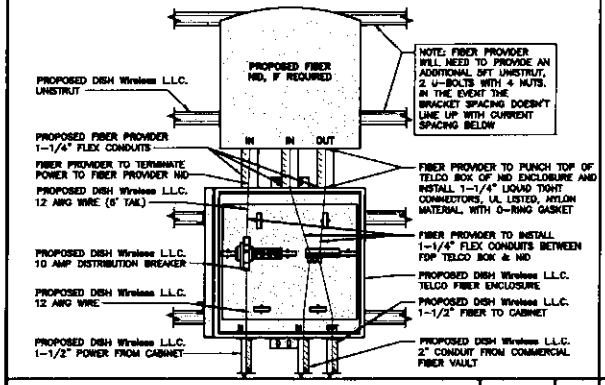
1. CONTRACTOR SHALL RESTORE THE TRENCH TO ITS ORIGINAL CONDITIONS BY EITHER SEEDING OR SODDING GRASS AREAS, OR REPLACING ASPHALT OR CONCRETE AREAS TO ITS ORIGINAL CROSS SECTION.
2. TRENCHING SAFETY; INCLUDING, BUT NOT LIMITED TO SOIL CLASSIFICATION, SLOPING, AND SHORING, SHALL BE GOVERNED BY THE CURRENT 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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A&E PROJECT NUMBER
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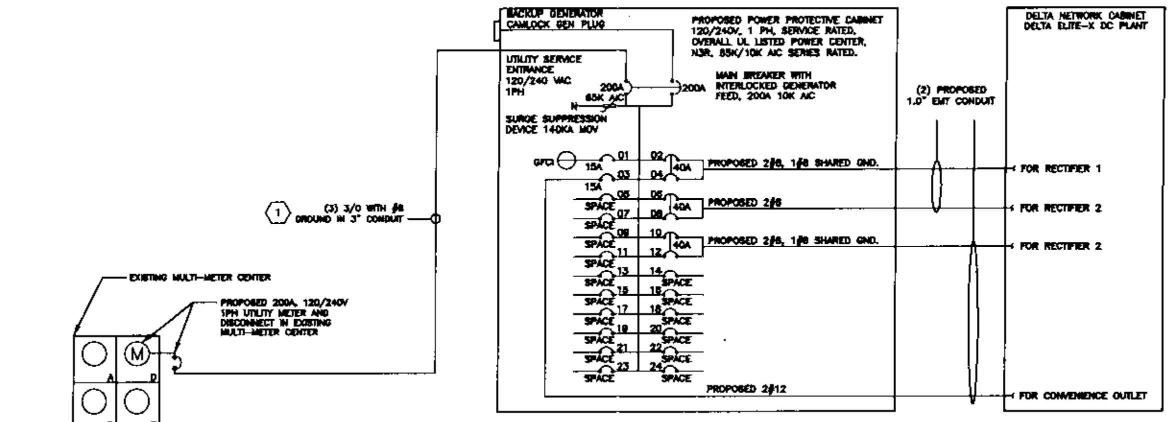
DISH Wireless L.L.C.
PROJECT INFORMATION
NJJER01115A
515 POST ROAD EAST
WESTPORT, CT 06880

SHEET TITLE
ELECTRICAL DETAILS

SHEET NUMBER
E-2



PROPOSED GROUND PER NEC

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:
(3) 40A, 2P BREAKER – SQUARE D P/N:00240
(2) 15A, 1P BREAKER – SQUARE D P/N:00115

SERVICE/FEEDER CONDUCTOR LENGTH TABLE
(BASED ON INDUSTRY STANDARD 3% VOLTAGE DROP AND 3% NEC ALLOWABLE LIMIT)

	CONDUCTOR SIZES					
DESIGN LOADS	250 kcmil AL	300 kcmil AL	3/0 CU	4/0 CU	250 kcmil CU	300 kcmil CU
[illegible] CONTINUOUS LOAD (160A) (NEC ARTICLE 220 & 230 3% VOLTAGE DROP)	130'	155'	145'	180'	215'	250'
[illegible] CONTINUOUS LOAD (160A) (NEC ARTICLE 220 & 230 5% VOLTAGE DROP)	220'	260'	240'	300'	360'	425'

NOTES:
1. 250 MCM/KCMIL AL + #2 AL GRD MAY BE USED AS A REPLACEMENT FOR 3/0 CU + #6 CU GRD SERVICE CONDUCTOR FROM THE DISH Wireless L.L.C. FIRST MEANS OF DISCONNECT/UTILITY COMPANY MEET-ME POINT. REFER TO VALUES ABOVE TO LIMIT VOLTAGE DROP TO 3%.
2. ALUMINUM/COPPER CONDUCTORS MUST BE RATED 75°C.
3. ALUMINUM TO COPPER BUSS CONNECTIONS MUST MEET AND CONFORM TO ANSI AND BE UL LISTED. USE ANTI CORROSION CONDUCTIVE LUBRICANT ON CONNECTIONS.
4. PPC MAIN DISCONNECT CIRCUIT BREAKERS ACCEPT #4 – 300KCMIL AL OR CU CONDUCTORS.
5. VOLTAGE DROP FOR SINGLE METER ENCLOSURE FED FROM TRANSFORMER WITH MULTIPLE CUSTOMERS IS CALCULATED FROM THE TRANSFORMER TO PPC. (SERVICE AND FEEDER CONDUCTOR LENGTH)
6. VOLTAGE DROP FOR MULTI-METER ENCLOSURE IS CALCULATED FROM THE METER TO PPC. (FEEDER CONDUCTOR LENGTH)
7. VOLTAGE DROP CALCULATIONS ARE BASED ON A POWER FACTOR OF 1, A LINE TO GROUND VOLTAGE PER CONDUCTOR OF 120V, NO CORRECTION FACTOR FOR AMBIENT TEMPERATURE OR ADJUSTMENT FACTOR FOR MORE THAN THREE CURRENT-CARRYING CONDUCTORS IN A SINGLE CONDUCT OR RACEWAY. A POWER FACTOR LESS THAN 1 OR VOLTAGE LESS THAN 120 WILL RESULT IN SHORTER DISTANCES THAN SHOWN IN TABLE.

PPC ONE-LINE DIAGRAM

NO SCALE 1

NOTES

THE (2) CONDUITS WITH (4) CURRENT CARRYING CONDUCTORS EACH, SHALL APPLY THE ADJUSTMENT FACTOR OF 80% PER 2020 NEC TABLE 310.15(C)(1) FOR UL1015 WIRE. (ALL WIRE AND TERMINATION HARDWARE TO BE RATED 75°C)

#12 FOR 20A OCPD WIRE DERATING: 0.8 x 25A = 20.0A
#8 FOR 40A OCPD WIRE DERATING: 0.8 x 50A = 40.0A

CONDUIT SIZING: AT 40% FILL PER NEC CHAPTER 9, TABLE 4, ARTICLE 358.

1.0" CONDUIT – .3460 SQ. IN AREA
3.0" CONDUIT – 3.538 SQ. IN AREA

(2 CONDUIT): USING THWN-2, CU.
RECTIFIER CONDUCTORS
#8 – 0.0366 SQ. IN X 4 = 0.1464 SQ. IN
#8 – 0.0366 SQ. IN X 1 = 0.0366 SQ. IN <GROUND
TOTAL = 0.1830 SQ. IN

RECTIFIER & GFCI CONDUCTORS
#12 – 0.0133 SQ. IN X 2 = 0.0266 SQ. IN
#8 – 0.0366 SQ. IN X 2 = 0.0732 SQ. IN
#8 – 0.0366 SQ. IN X 1 = 0.0366 SQ. IN <GROUND
TOTAL = 0.1364 SQ. IN

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

PPC FEED CONDUCTORS (1 CONDUIT): USING THWN, CU.
3/0 – 0.2679 SQ. IN X 3 = 0.8037 SQ. IN
#6 – 0.0507 SQ. IN X 1 = 0.0507 SQ. IN <GROUND
TOTAL = 0.8544 SQ. IN

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

(1) PPC FEED CONDUCTORS (1 CONDUIT): USING THWN, AL.
250kcmil AL – 0.3970 SQ. IN X 3 = 1.191 SQ. IN
#4 AL – 0.0824 SQ. IN X 1 = 0.0824 SQ.IN <GROUND
TOTAL = 1.2734 SQ. IN

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

PANEL NAME	LOCATION		
DELTA	EQUIPMENT PLATFORM	VOLTAGE: 240/120 1Ø MAIN C/B: 200 AMPS BUS RATING: 200 AMPS	MOUNTING/ENCLOSURE: SURFACE/NEMA 3R AVAIL. FAULT CURRENT: SHORT CIRCUIT RATING: 65,000 / 10,000 SERIES RATED

AMPS POLES	WIRE & CONDUIT	TYPE	DESCRIPTION	KVA	CKT	A	B	CKT	KVA	DESCRIPTION	TYPE	WIRE & CONDUIT	AMPS POLES
15/1	2 #12, 1 #12G	R	INTERNAL GFCI	0.18	1	1.68		2	1.50	RECTIFIER	EQ	SEE ONE LINE	40/2
15/1	SEE ONE LINE	R	CONVENIENCE OUTLET	0.18	3		1.68	4	1.50		EQ		
			SPACE		5	1.50		6	1.50	RECTIFIER	EQ	SEE ONE LINE	40/2
			SPACE		7		1.50	8	1.50		EQ		
			SPACE		9	1.50		10	1.50	RECTIFIER	EQ	SEE ONE LINE	40/2
			SPACE		11		1.50	12	1.50		EQ		
			SPACE		13			14		SPACE			
			SPACE		15			16		SPACE			
			SPACE		17			18		SPACE			
			SPACE		19			20		SPACE			
			SPACE		21			22		SPACE			
			SPACE		23			24		SPACE			
					PHASED LOAD	4.7	4.7	KVA					

TOTAL CONNECTED LOAD	9.4 KVA	39 A
TOTAL DEMAND LOAD	9.4 KVA	39 A

LOAD TYPE	DESCRIPTION	CONN. LOAD KVA	CONN. LOAD AMPS	DEMAND FACTOR	DESIGN LOAD KVA	DESIGN LOAD AMPS
L	LIGHTING	0.0	0.0	1.25	0.0	0.0
R	RECEPTACLE	0.4	1.5	NEC	0.4	1.5
M	MOTOR	0.0	0.0	NEC	0.0	0.0
H	HEATING	0.0	0.0	1.00	0.0	0.0
AC	HVAC	0.0	0.0	1.00	0.0	0.0
EQ	EQUIPMENT	9.0	37.5	1.00	9.0	37.5
E	EXISTING	0.0	0.0	1.25	0.0	0.0

*ALL EQUIPMENT LOADS CONSIDERED CONTINUOUS LOADS

PANEL SCHEDULE

NO SCALE 2

NOT USED

NO SCALE 3

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JW	JQ	——

RFDS REV #:

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
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1	01/11/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
10710.NJJER01115A

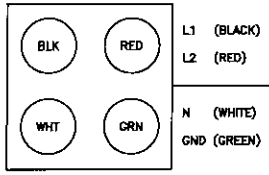
DISH Wireless L.L.C.
PROJECT INFORMATION
NJJER01115A
515 POST ROAD EAST
WESTPORT, CT 06880

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

SHEET NUMBER
E-3

NOTES:

1. HAZARD OF ELECTRICAL SHOCK OR BURN. TURN OFF POWER SUPPLYING THIS EQUIPMENT BEFORE WORKING INSIDE.
2. 100 OR 200 AMP, 240 VOLTS, SINGLE PHASE ALTERNATING CURRENT CIRCUIT ONLY
3. GENERATOR SHORT CIRCUIT RATING: 10,000 / 20,000 AMPS RMS SYMMETRICAL AMPERES AT 240 VOLTS
4. UTILITY SHORT CIRCUIT RATING: 65,000 AMPS RMS SYMMETRICAL AMPERES AT 240 VOLTS
5. SUITABLE FOR USE AS SERVICE EQUIPMENT
6. SUITABLE FOR USE IN ACCORDANCE WITH ARTICLE 702 OF THE NATIONAL ELECTRIC CODE ANSI/NFPA 70
7. BONDED NEUTRAL WHEN INSTALLED AS SHOWN IN WIRING DIAGRAM
8. RAIN PROOF TYPE 3R
9. USE CU–AL WIRE 60–75 °C
10. EQUIPPED WITH SLIDE BAR MECHANICAL INTERLOCK
11. INTERLOCK PROHIBITS BOTH POWER SOURCES FROM BEING IN THE ON POSITION SIMULTANEOUSLY
12. EQUIPPED WITH SQUARE D BREAKERS OR ALTERNATIVE MANUFACTURER EQUIVALENT
13. WHEN REPLACE LOAD CENTER BREAKERS, USE ONLY SQUARE D (QO TYPE) OF THE SAME RATING OR EQUIVALENT
14. WHEN RESETTING BREAKERS TURN TO OFF POSITION, THEN TO ON POSITION
15. WARNING: MAKE CONTINUITY CHECK WITH OHM METER TO VERIFY CORRECT PHASING AND GROUNDING CONNECTIONS BEFORE POWER UP
16. VERIFY PIN OUT CONFIGURATION OF GENERATOR PRIOR TO USE.
17. RISK OF ELECTRIC SHOCK, BOTH ENDS OF DISCONNECTING MEANS MAY BE ENERGIZED. TEST BEFORE SERVICING
18. THIS SWITCH BOARD MAY CONTAIN A TAP ON THE SERVICE SIDE OF THE MAIN POWER DISCONNECT FOR REMOTE MONITORING OF UTILITY/STANDBY POWER
19. THE NORMAL AC POWER MONITORING CIRCUIT MUST UTILIZE A DISCONNECTING MEANS WITH A SHORT CIRCUIT RATING GREATER THAN THE AVAILABLE INTERRUPTING CURRENT
20. A RED PUSH–TO–TRIP BUTTON PROVIDES A MEANS TO MECHANICALLY TRIP THE CIRCUIT BREAKER. THIS ACTION EXERCISES THE TRIPPING PORTION OF THE MECHANISM AND ALLOWS MAINTENANCE CHECK ON THE BREAKER



CAM–LOCK GENERATOR RECEPTACLE

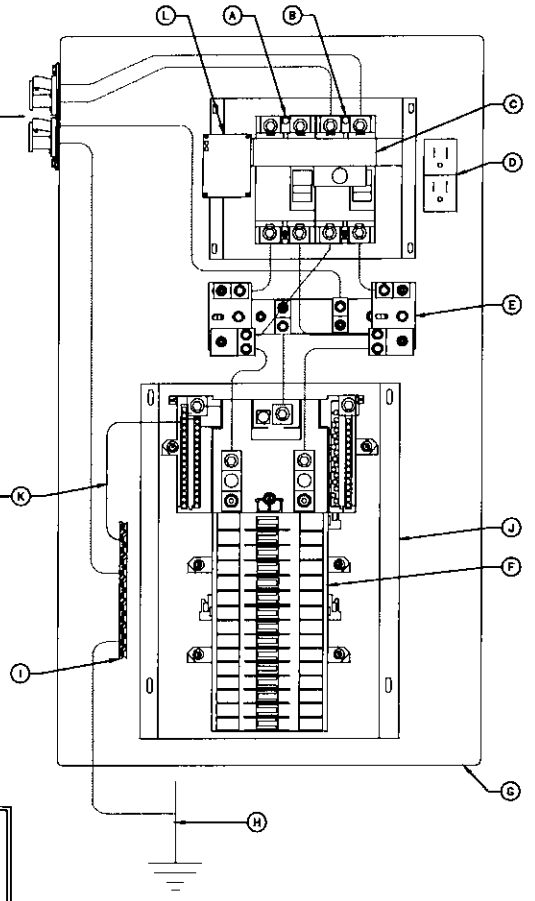
(AS VIEWED FROM OUTSIDE OF ENCLOSURE)
USE LINE UP PIN AS REFERENCE

REFER TO RECEPTACLE FOR MODEL NUMBER

DANGER:

HAZARD OF ELECTRICAL SHOCK OR BURN. TURN OFF POWER SUPPLYING THIS EQUIPMENT BEFORE WORKING INSIDE.

RAYCAP CUSTOMER SERVICE
(800) 890–2589



SUITABLE FOR USE AS SERVICE EQUIPMENT

ELECTRICAL RATING 120/240 VOLTS SINGLE PHASE 60 Hz	
NORMAL AC POWER 100A☐ 200A☐	GENERATOR POWER 100A☐ 200A☐

CAUTION:

- THE OPERATING HANDLE ASSUMES A CENTER POSITION WHEN THE CIRCUIT BREAKER IS TRIPPED
- THE BREAKER CAN BE RESET BY OPERATING THE HANDLE TO THE EXTREME OFF POSITION AND THEN TO ON
- SLIDE BAR MECHANICAL INTERLOCK TRANSFERS NORMAL AC POWER TO GENERATOR POWER. THE SLIDE BAR MECHANICAL INTERLOCK PROHIBITS BOTH POWER SOURCES FROM BEING IN THE ON POSITION SIMULTANEOUSLY
- TO TRANSFER FROM ON POWER SOURCE TO THE OTHER POWER SOURCE, SWITCH ON BREAKER TO THE OFF POSITION, MOVE THE SLIDE BAR TO THE OTHER SIDE AND THE SWITCH THE OTHER BREAKER TO THE ON POSITION

200A UTILITY FEED

THIS SWITCHBOARD UTILITY MAIN BREAKER IS SUITABLE FOR USE ON CIRCUIT CAPABLE OF DELIVERING NOT MORE THAN 65,000 RMS SYMMETRICAL AMPS, 240 VOLTS MAXIMUM.

LOAD SIZE CIRCUIT BREAKERS				LINE SIDE MAIN CIRCUIT BREAKER					
MFR.	TYPE	POLES	AMP RATING	MFR.	TYPE	AMP RATING	SYMMET. AMP RMS	VOLTS AC	PHASES
SQ–D	QO	1 2	15–100A	SQ–D	QOL	200A	65,000A	240V	2

200A GENERATOR FEED

THIS SWITCHBOARD GENERATOR POWER CIRCUIT IS SUITABLE FOR USE ON A CIRCUIT CAPABLE OF DELIVERING NOT MORE THAN 10,000 RMS SYMMETRICAL AMPS, 240 VOLTS MAXIMUM.

LOAD SIZE CIRCUIT BREAKERS				LINE SIDE MAIN CIRCUIT BREAKER					
MFR.	TYPE	POLES	AMP RATING	MFR.	TYPE	AMP RATING	SYMMET. AMP RMS	VOLTS AC	PHASES
SQ–D	QO	1 2	15–100A	SQ–D	QOL	200A	65,000A	240V	2

MAXIMUM CONTINUOUS LOADS NOT TO EXCEED 80% OF THE OVER–CURRENT PROTECTIVE DEVICE (CIRCUIT BREAKER AND FUSES) RATINGS EMPLOYED IN OTHER THAN MOTOR CIRCUITS, EXCEPT FOR THOSE CIRCUITS EMPLOYING CIRCUIT BREAKERS MARKED AS SUITABLE FOR CONTINUOUS OPERATION AT 100% OF THEIR RATINGS. CONDUCTORS ARE NOT TO ENTER OR LEAVE THE ENCLOSURE DIRECTLY OPPOSITE THE WIRING TERMINAL

NEUTRAL–TO–GROUND NOTES:

- WHEN THE PPC IS USED AS THE SERVICE ENTRANCE DEVICE, THE NEUTRAL TO GROUND BOND NEEDS TO BE ESTABLISHED IN THE PPC.
- WHEN THE SERVICE ENTRY DEVICE IS A MULTI–METER CENTER OR A PRE–PPC DISCONNECT IS USED AND HAS "NEUTRAL TO GROUND" ACCOMMODATIONS, THE NEUTRAL TO GROUND WIRE IN THE PPC IS NOT REQUIRED.
- THE GREEN #6 WIRE IS PROVIDED WITH THE PPC CABINET AS A SEPARATE UNINSTALLED PART TO BE INSTALLED BY CONTRACTOR IF NEEDED.

NEUTRAL–TO–GROUND CONDING JUMPER

INSTALLTION INSTRUCTIONS:

- IF REQUIRED, THE N–G BONDING KIT SHOULD BE INSTALLED BY QUALIFIED PERSONNEL
- ENSURE THE MAIN BREAKERS ARE OFF
- USE THE GREEN #6 WIRE PROVIDED WITH THE PPC
- INSTALL THE JUMPER AS SHOWN IN THE WIRING DIAGRAM
- TIGHTEN TERMINALS TO TORQUE VALUE SHOWN IN TORQUE TABLE
- PLACE THE PROVIDED "SERVICE" LABEL IN THE SPACE BELOW THE WORDS "AC POWER" LOCATED ABOVE THE MAIN CIRCUIT BREAKER IN THE UPPER PORTION OF THE DEAD FRONT

LEGEND:

A. UTILITY DISCONNECT (SERVICE RATED)
B. GENERATOR DISCONNECT
C. MAIN DISCONNECT CIRCUIT BREAKERS W/ MECHANICAL INTERLOCK
D. GFCI RECEPTACLE 15A
E. SPD STRIKESORB KELVIN CONNECTION (TYP OF 2)
F. BREAKER PANEL – 24 POSITION (CONTRACTOR TO ADD APPROPRIATE BREAKER PER ONE–LINE DIAGRAM PANEL SCHEDULE)
G. POWER PROTECTION CABINET (PPC) (FULLY ASSEMBLED FROM MANUFACTURER)
H. CONTRACTOR TO ATTACH TO UNDERGROUND GROUNDING HALO OR INSTALL GROUND ROD WHEN REQUIRED BY CODE
I. GROUND BAR
J. SQUARE D Q SERIES LOAD CENTER
K. METURAL–TO–GROUND (N–G) BONDING JUMPER (CONTRACTOR INSTALLED IF REQUIRED)
L. OPTIONAL SPD STATUS INDICATORS

RAYCAP POWER PROTECTION CABINET – RDIAC–2485–P–240–MTS (NEUTRAL–TO–GROUND)

NO SCALE | 1

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DRAWN BY:	CHECKED BY:	APPROVED BY:
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A&E PROJECT NUMBER

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DISH Wireless L.L.C.
PROJECT INFORMATION

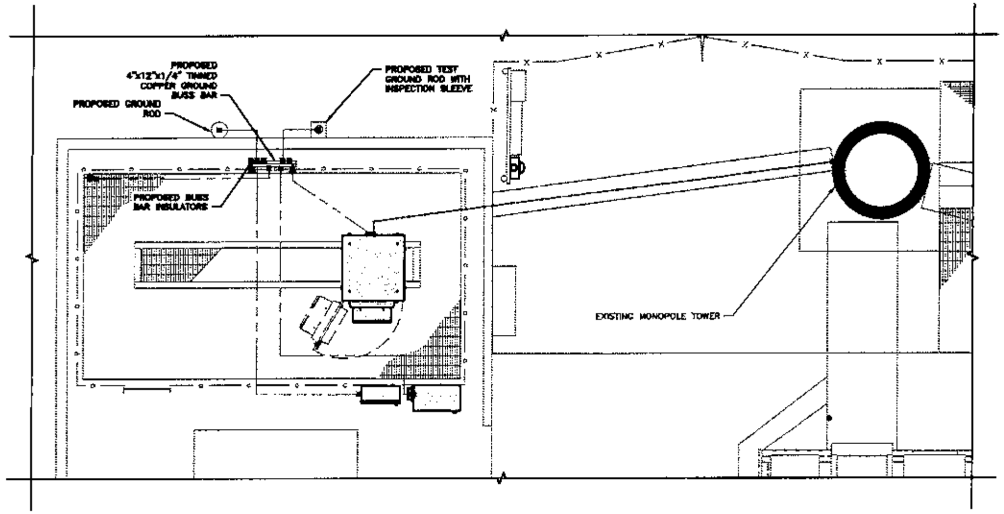
NJJER01115A
515 POST ROAD EAST
WESTPORT, CT 06880

SHEET TITLE

PPC NEUTRAL–TO–GROUND SCHEMATIC

SHEET NUMBER

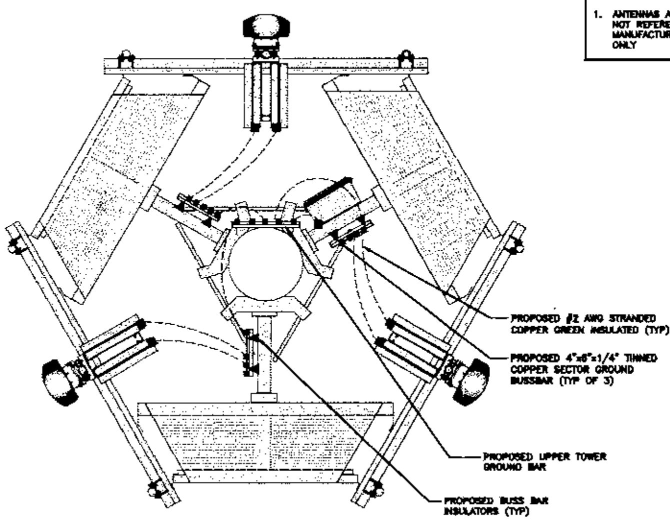
E-4



TYPICAL EQUIPMENT GROUNDING PLAN | NO SCALE | 1

NOTES

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



TYPICAL ANTENNA GROUNDING PLAN | NO SCALE | 2

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

GROUNDING LEGEND

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

GROUNDING KEY NOTES

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

GROUNDING KEY NOTES | NO SCALE | 3

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DRAWN BY:	CHECKED BY:	APPROVED BY:
JW	JQ	----

RFDS REV #: ----

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	10/05/22	ISSUED FOR OWNER REVIEW
1	01/11/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
10710.NJJER01115A

DISH Wireless L.L.C.
PROJECT INFORMATION
NJJER01115A
515 POST ROAD EAST
WESTPORT, CT 06880

SHEET TITLE
GROUNDING PLANS AND NOTES

SHEET NUMBER
G-1

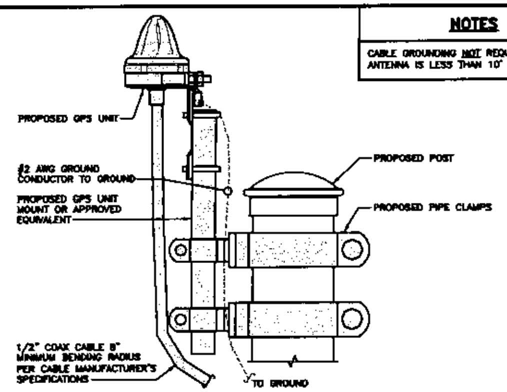
NOTES

EQUIPMENT CABINET OMITTED FOR CLARITY

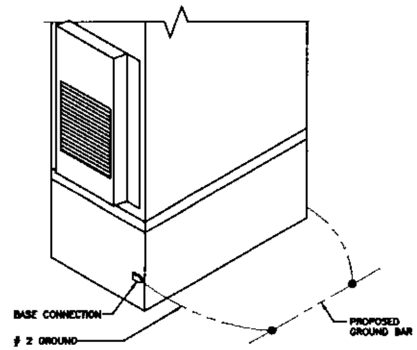
DETAIL NOT USED — NO SCALE — 1

NOTES

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

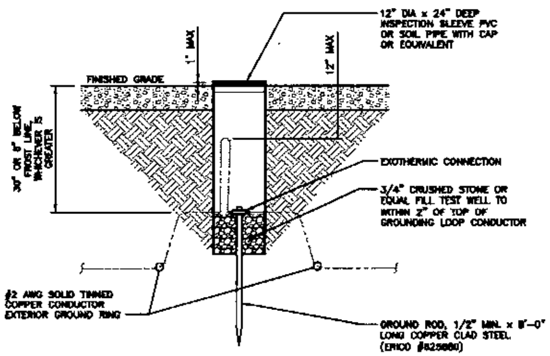


TYPICAL GPS UNIT GROUNDING — NO SCALE — 2

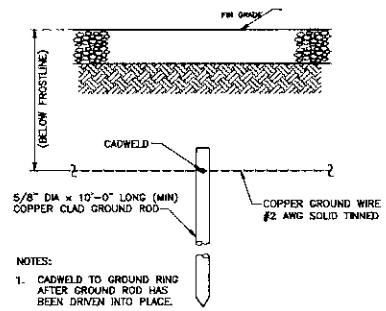


OUTDOOR CABINET GROUNDING — NO SCALE — 3

DETAIL NOT USED — NO SCALE — 4



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



NOTES:

1. CADWELD TO GROUND RING AFTER GROUND ROD HAS BEEN DRIVEN INTO PLACE.

GROUND ROD — NO SCALE — 6

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DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER01115A
515 POST ROAD EAST
WESTPORT, CT 06880

SHEET TITLE

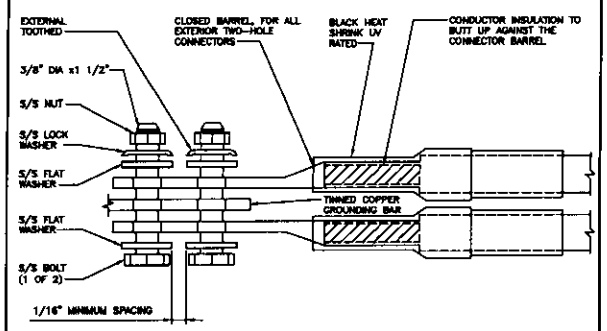
GROUNDING DETAILS

SHEET NUMBER

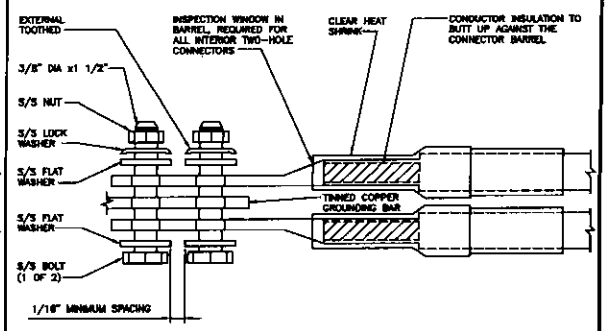
G-2

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).

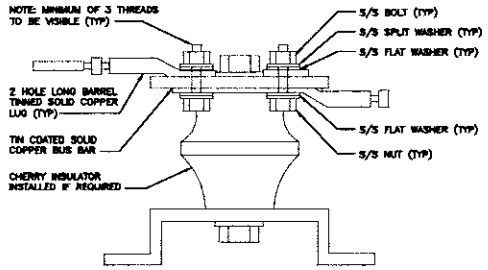
TYPICAL GROUNDING NOTES | NO SCALE | 1



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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ANNOJKUMAR PATEL
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10/12/23

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DISH Wireless L.L.C.
PROJECT INFORMATION
NJJER01115A
515 POST ROAD EAST
WESTPORT, CT 06880

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

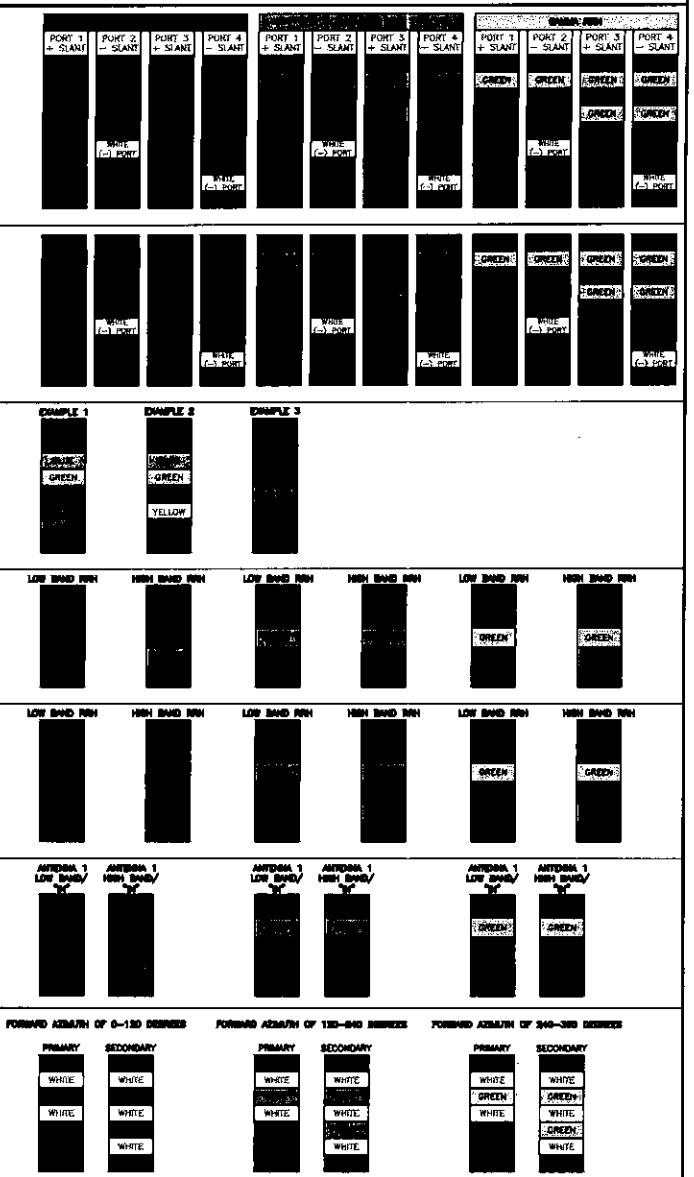
LOW–BAND RRH POWER CABLES HAVE SECTOR STRIPE ONLY

RET MOTORS AT ANTENNAS

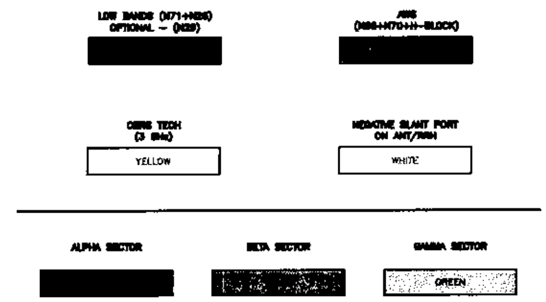
MICROWAVE RADIO LINKS

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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MANOJKUMAR PATEL
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1/12/23

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RFDS REV #:

CONSTRUCTION DOCUMENTS

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A&E PROJECT NUMBER
10710.NJJER01115A

DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER01115A
515 POST ROAD EAST
WESTPORT, CT 06880

SHEET TITLE
RF
CABLE COLOR CODES

SHEET NUMBER
RF-1

LEGEND

EXOTHERMIC CONNECTION	●
MECHANICAL CONNECTION	■
BUSS BAR INSULATOR	▲
CHEMICAL ELECTROLYTIC GROUNDING SYSTEM	
TEST CHEMICAL ELECTROLYTIC GROUNDING SYSTEM	T
EXOTHERMIC WITH INSPECTION SLEEVE	
GROUNDING BAR	
GROUND ROD	
TEST GROUND ROD WITH INSPECTION SLEEVE	T
SINGLE POLE SWITCH	$
DUPLEX RECEPTACLE	
DUPLEX GFCI RECEPTACLE	
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	UNINTERRUPTIBLE POWER SYSTEM (DC POWER PLANT)
VIF	VERIFIED IN FIELD
W	WIDE
W/	WITH
WD	WOOD
WP	WEATHERPROOF
WT	WEIGHT

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STATE OF CONNECTICUT
MANOJKUMAR PATEL
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LICENSED
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CONSTRUCTION DOCUMENTS

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DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER01115A
515 POST ROAD EAST
WESTPORT, CT 06880

SHEET TITLE
LEGEND AND ABBREVIATIONS

SHEET NUMBER
GN-1

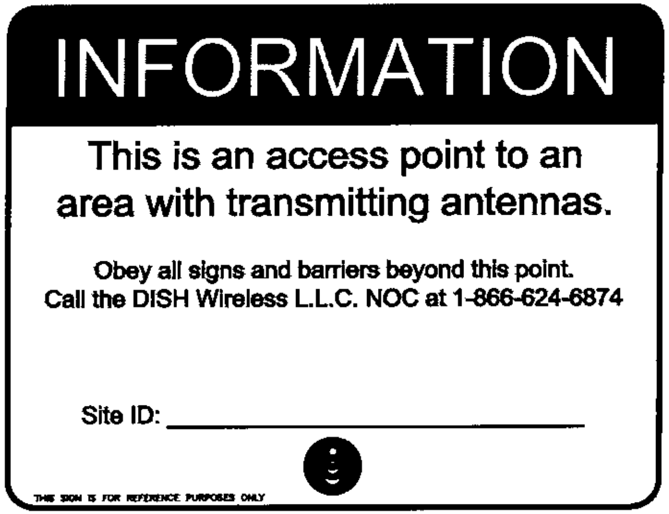
SIGN TYPES		
TYPE	COLOR	COLOR CODE PURPOSE
INFORMATION	GREEN	"INFORMATIONAL SIGN" TO NOTIFY OTHERS OF SITE OWNERSHIP & CONTACT NUMBER AND POTENTIAL RF EXPOSURE.
NOTICE	BLUE	"NOTICE BEYOND THIS POINT" RF FIELDS BEYOND THIS POINT MAY EXCEED THE FCC GENERAL PUBLIC EXPOSURE LIMIT. OBEY ALL POSTED SIGNS AND SITE GUIDELINES FOR WORKING IN RF ENVIRONMENTS. IN ACCORDANCE WITH FEDERAL COMMUNICATIONS COMMISSION RULES ON RADIO FREQUENCY EMISSIONS 47 CFR-1.1307(b)
CAUTION	YELLOW	"CAUTION BEYOND THIS POINT" RF FIELDS BEYOND THIS POINT MAY EXCEED THE FCC GENERAL PUBLIC EXPOSURE LIMIT. OBEY ALL POSTED SIGNS AND SITE GUIDELINES FOR WORKING IN RF ENVIRONMENTS. IN ACCORDANCE WITH FEDERAL COMMUNICATIONS COMMISSION RULES ON RADIO FREQUENCY EMISSIONS 47 CFR-1.1307(b)
WARNING	ORANGE/RED	"WARNING BEYOND THIS POINT" RF FIELDS AT THIS SITE EXCEED FCC RULES FOR HUMAN EXPOSURE. FAILURE TO OBEY ALL POSTED SIGNS AND SITE GUIDELINES FOR WORKING IN RF ENVIRONMENTS COULD RESULT IN SERIOUS INJURY. IN ACCORDANCE WITH FEDERAL COMMUNICATIONS COMMISSION RULES ON RADIO FREQUENCY EMISSIONS 47 CFR-1.1307(b)

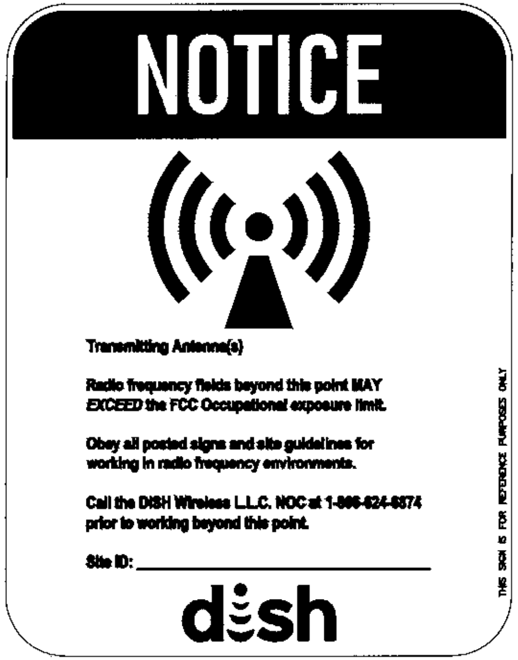
SIGN PLACEMENT:

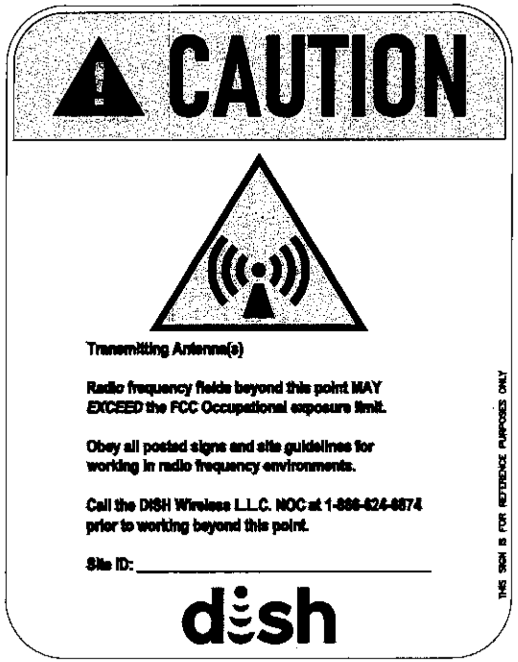
- RF SIGNAGE PLACEMENT SHALL FOLLOW THE RECOMMENDATIONS OF AN EXISTING EME REPORT, CREATED BY A THIRD PARTY PREVIOUSLY AUTHORIZED BY DISH Wireless L.L.C.
- INFORMATION SIGN (GREEN) SHALL BE LOCATED ON EXISTING DISH Wireless L.L.C EQUIPMENT.
  A) IF THE INFORMATION SIGN IS A STICKER, IT SHALL BE PLACED ON EXISTING DISH Wireless L.L.C EQUIPMENT CABINET.
  B) IF THE INFORMATION SIGH IS A METAL SIGN IT SHALL BE PLACED ON EXISTING DISH Wireless L.L.C H-FRAME WITH A SECURE ATTACH METHOD.
- IF EME REPORT IS NOT AVAILABLE AT THE TIME OF CREATION OF CONSTRUCTION DOCUMENTS; PLEASE CONTACT DISH Wireless L.L.C. CONSTRUCTION MANAGER FOR FURTHER INSTRUCTION ON HOW TO PROCEED.

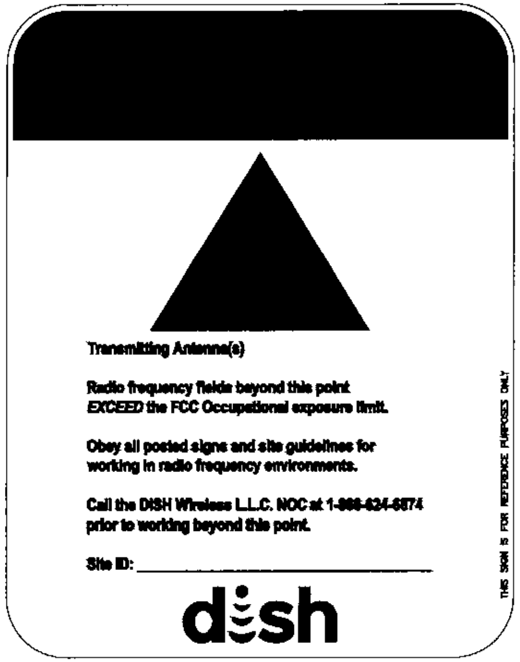
NOTES:

1. FOR DISH Wireless L.L.C. LOGO, SEE DISH Wireless L.L.C. DESIGN SPECIFICATIONS (PROVIDED BY DISH Wireless L.L.C.)
2. SITE ID SHALL BE APPLIED TO SIGNS USING "LASER ENGRAVING" OR ANY OTHER WEATHER RESISTANT METHOD (DISH Wireless L.L.C. APPROVAL REQUIRED)
3. TEXT FOR SIGNAGE SHALL INDICATE CORRECT SITE NAME AND NUMBER AS PER DISH Wireless L.L.C. CONSTRUCTION MANAGER RECOMMENDATIONS.
4. CABINET/SHELTER MOUNTING APPLICATION REQUIRES ANOTHER PLATE APPLIED TO THE FACE OF THE CABINET WITH WATER PROOF POLYURETHANE ADHESIVE
5. ALL SIGNS WILL BE SECURED WITH EITHER STAINLESS STEEL ZIP TIES OR STAINLESS STEEL TECH SCREWS
6. ALL SIGNS TO BE 8.5"x11" AND MADE WITH 0.04" OF ALUMINUM MATERIAL









RF SIGNAGE

dish wireless
5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

Tectonic

STATE OF CONNECTICUT
MANOJKUMAR PATEL
PEN.0022038
LICENSED
PROFESSIONAL ENGINEER
01/12/23

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:
JW	JQ	----

RFDS REV #: ----

CONSTRUCTION DOCUMENTS

SUBMITTALS		
REV	DATE	DESCRIPTION
0	10/08/22	ISSUED FOR OWNER REVIEW
1	01/11/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
10710.NJJER01115A

DISH Wireless L.L.C.
PROJECT INFORMATION
NJJER01115A
515 POST ROAD EAST
WESTPORT, CT 06880

SHEET TITLE
RF SIGNAGE

SHEET NUMBER
GN-2

SITE ACTIVITY REQUIREMENTS:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

GENERAL NOTES:

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

CONTRACTOR:GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION

CARRIER:DISH Wireless L.L.C.

TOWER OWNER:TOWER OWNER

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

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

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

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

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

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

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

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

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

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

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

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

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

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

Tectonic

STATE OF CONNECTICUT
MANOJKUMAR PATIL
PEN.0022038
LICENSED
PROFESSIONAL ENGINEER
01/12/23

DRAWN BY:	CHECKED BY:	APPROVED BY:
JW	JQ	———

RFDS REV #: ———

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	10/06/22	ISSUED FOR OWNER REVIEW
1	01/11/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
10710.NJJER01115A

DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER01115A
515 POST ROAD EAST
WESTPORT, CT 06880

SHEET TITLE
GENERAL NOTES

SHEET NUMBER
GN-3

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

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

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

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

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

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

#4 BARS AND SMALLER 40 ksi

#5 BARS AND LARGER 60 ksi

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

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

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

ELECTRICAL INSTALLATION NOTES:

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

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

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

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

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

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

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

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

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

8. TIE WRAPS ARE NOT ALLOWED.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

dish wireless

5701 SOUTH SANTA FE DRIVE
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CONSTRUCTION DOCUMENTS

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A&E PROJECT NUMBER
10710.NJJER01115A

DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER01115A
515 POST ROAD EAST
WESTPORT, CT 06880

SHEET TITLE
GENERAL NOTES

SHEET NUMBER
GN-4

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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LITTLETON, CO 80120

Tectonic

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STATE OF CONNECTICUT
PANKAJKUMAR PATEL
PEN.0022038
LICENSED
PROFESSIONAL ENGINEER
11/2/23

DRAWN BY:	CHECKED BY:	APPROVED BY:
JW	JQ	—

RFDS REV #: —

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	10/06/23	ISSUED FOR OWNER REVIEW
1	11/11/23	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

10710.NJJER01115A

DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER01115A
515 POST ROAD EAST
WESTPORT, CT 06880

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-5

Exhibit D

Structural Analysis

Tectonic

PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Date: **December 7, 2022**

Structural Analysis Report – Revision 1

Carrier: Dish Wireless

Site ID: NJJER01115A
Site Data: 515 Post Road East, Westport, Fairfield County, CT 06880
Latitude *41° 08' 24.65"*, Longitude *-73° 20' 49.92"*
148 Foot Monopole

Tectonic Project Number: 10710.NJJER01115A

Tectonic Engineering Consultants, Geologists & Land Surveyors, D.P.C., Inc. 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 to be:

Structure: **Sufficient – 84.3%**
Foundation: **Sufficient – 76.6%**

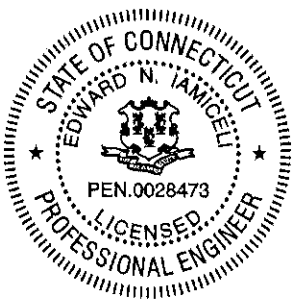
This analysis has been performed in accordance with the 2022 Connecticut State Building Code and the 2021 International Building Code based upon an ultimate 3-second gust wind speed of 130 mph per Appendix P as required for use in the ANSI/TIA-222-H-1-2019 Standard. Exposure Category B with a maximum topographic factor, Kzt, of 1.0 and Risk Category III were used in this analysis.

All modifications and equipment proposed in this report shall be installed in accordance with drawing for the determined available structural capacity to be effective.

We at Tectonic appreciate the opportunity of providing our continuing professional services to you and Dish Wireless. If you have any questions or need further assistance on this or any other projects please give us a call.

Structural analysis prepared by: John-Fritz Julien / Ian Marinaccio

Respectfully submitted by:
Tectonic Engineering Consultants, Geologists & Land Surveyors, D.P.C., Inc.



Edward N. Iamiceli, P.E.
Managing Director - Structural

Project Contact Info

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Equal Opportunity Employer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 148 ft Monopole tower designed by Summit in February of 1997. The tower was previously modified by Paul J. Ford and Company in April of 2011.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	III
Wind Speed:	130 mph ultimate 3-second gust *per the town of Westport, CT*
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	0.75 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph
Seismic S_1 / S_s:	0.233 / 0.056

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Carrier Designation	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Notes
130.0	Dish Wireless	1	CommScope	8' Platform Mount (MC-PK8-DSH)	1	Hybrid	-
		3	Fujitsu	TA08025-B604			
		3	Fujitsu	TA08025-B605			
		3	JMA Wireless	MX08FRO665-21			
		1	Raycap	RDIDC-9181-PF-48			

Table 2 – Existing/Reserved Antenna and Cable Information

Mounting Level (ft)	Carrier Designation	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Notes
148.0	Municipal	1	Decibel	DB420	6 2 4 2	5/16 1/2 1-1/4 2	1
		2	Andrew	VHLP800-11			
		3	CommScope	LLPX310R-V1			
		3	Samsung Telecommunications	FDD_R6_RRH			
		1	-	Top Hat			
	Sprint	3	-	800 Notch Filter			1
		1	Tower Mounts	Platform Mount			
		3	Alcatel Lucent	B66A RRH4X45			
		3	Alcatel Lucent	FD-RRH-2x50-800			
		3	Alcatel Lucent	TD-RRH8x20-25			
		3	RFS Celwave	ACU-A20-N			
		3	RFS Celwave	APXVSPP18-C-A20			
		3	RFS Celwave	APXVTM14-C-120			
144.0	Municipal	1	Tower Mounts	Dish Mount	1	EW90	1
		1	-	4' Dish			

Mounting Level (ft)	Carrier Designation	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Notes
120.0	AT&T	3	Quintel Technology	QS6616-7	2	DC	2
		3	Ericsson	AIR 6419 N77G			
		3	Ericsson	AIR 6449 N77D			
		1	Raycap	DC6-48-60-18-8F			
		3	Ericsson	RRUS 32 B2	6 6 3	1-5/8 DC Fiber	1
		3	Ericsson	RRUS 4478 B14			
		3	Ericsson	RRUS 4449 B5/B12			
		3	Ericsson	RRUS 32 B30			
		3	Ericsson	RRUS 32 B66A			
		3	Ericsson	RRUS E2			
		1	Raycap	DC6-48-60-0-8C-EV			
		3	CCI Antennas	DMP65R-BU6DA			
		2	Raycap	DC6-48-60-18-8F			
		1	Tower Mounts	Platform Mount (RMPQ)			
100.0	Municipal	1	Celwave	PD220	5 8	1/2 7/8	1
		1	decibel	DB205-A			
		1	decibel	DB220-B			
		1	decibel	DB224			
		2	Celwave	PD1110			
		2	Celwave	PD201			
		1	Tower Mounts	Platform Mount			
		2	Celwave	PD83-1			
85.0	T-Mobile	1	Tower Mounts	Platform Mount	18 6	7/8 1-1/4	1
		6	Andrew	ETW190VS12UB			
		3	Ericsson	AIR 32 B2a/B66Aa			
		3	Ericsson	AIR 6449 B41			
		3	Ericsson	RADIO 4449 B71+B85			
		3	Ericsson	RRUS 4415 B25			
		3	RFS Celwave	APXVAARR24_43-U-NA20			
		3	RFS Celwave	ATMAA1412D-1A20			
72.0	-	1	Tower Mounts	Collar Mount	6	1-5/8	1
		3	Kathrein	800 10504			
53.0	Municipal	1	-	BSA150B	3	1/2	1
		1	Tower Mounts	Side Mount			

Notes:
1) Existing equipment
2) Reserved equipment by others

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Dated
Structural Modification Analysis Report	Paul J. Ford and Company	04/13/2011
Structural Analysis Report	Destek Engineering, LLC	08/24/2018
Structural Analysis Report	Hudson Design Group LLC	12/10/2021
Site Visit	Tectonic	05/05/2021
RFDS	Dish Wireless	06/09/2021
Construction Drawings	Hudson Design Group LLC	04/28/2022

3.1) Analysis Method

tnxTower (version 8.1.1.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

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

3.2) Assumptions

1) Tower and structures were built and maintained in accordance with the manufacturer's specifications.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2.
3) Existing tower modifications and are based on the structural modification analysis report by Paul J. Ford and Company and site visit photos by Tectonic, referenced above.
4) Existing and reserved load configurations are based on the previous structural analysis report Hudson Design Group LLC and site visit photos by Tectonic, referenced above.
5) Existing base plate and foundation information are based on the structural modification analysis report by Paul J. Ford and Company.

This analysis is solely for the supporting tower structure, and it may be affected if any assumptions are not valid or have been made in error. Tectonic should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
L1	148 - 143	Pole	TP23.015x22x0.25	Pole	9.2%	Pass
L2	143 - 138	Pole	TP24.029x23.015x0.25	Pole	16.3%	Pass
L3	138 - 133	Pole	TP25.044x24.029x0.25	Pole	22.7%	Pass
L4	133 - 128	Pole	TP26.059x25.044x0.25	Pole	29.8%	Pass
L5	128 - 123	Pole	TP27.074x26.059x0.25	Pole	37.5%	Pass
L6	123 - 118	Pole	TP28.088x27.074x0.25	Pole	46.6%	Pass
L7	118 - 113	Pole	TP29.103x28.088x0.25	Pole	57.0%	Pass
L8	113 - 108	Pole	TP30.118x29.103x0.25	Pole	66.6%	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
L9	108 - 100.5	Pole	TP31.64x30.118x0.25	Pole	72.9%	Pass
L10	100.5 - 99.5	Pole	TP31.344x30.328x0.375	Pole	49.2%	Pass
L11	99.5 - 94.5	Pole	TP32.359x31.344x0.375	Pole	53.7%	Pass
L12	94.5 - 89.5	Pole	TP33.374x32.359x0.375	Pole	58.3%	Pass
L13	89.5 - 84.5	Pole	TP34.39x33.374x0.375	Pole	62.8%	Pass
L14	84.5 - 79.5	Pole	TP35.405x34.39x0.375	Pole	67.8%	Pass
L15	79.5 - 74.5	Pole	TP36.42x35.405x0.375	Pole	72.5%	Pass
L16	74.5 - 69.5	Pole	TP37.436x36.42x0.375	Pole	76.9%	Pass
L17	69.5 - 69.25	Pole	TP37.486x37.436x0.375	Pole	77.1%	Pass
L18	69.25 - 64.25	Pole	TP38.502x37.486x0.375	Pole	81.2%	Pass
L19	64.25 - 58.25	Pole	TP39.72x38.502x0.375	Pole	82.0%	Pass
L20	58.25 - 57.25	Pole	TP39.171x37.955x0.4375	Pole	72.9%	Pass
L21	57.25 - 53	Pole	TP40.033x39.171x0.4375	Pole	75.3%	Pass
L22	53 - 52.75	Pole	TP40.084x40.033x0.4375	Pole	75.4%	Pass
L23	52.75 - 47.75	Pole	TP41.098x40.084x0.4375	Pole	78.0%	Pass
L24	47.75 - 42.75	Pole	TP42.111x41.098x0.4375	Pole	80.5%	Pass
L25	42.75 - 37.75	Pole	TP43.125x42.111x0.4375	Pole	82.8%	Pass
L26	37.75 - 37	Pole	TP43.277x43.125x0.4375	Pole	83.2%	Pass
L27	37 - 36.75	Pole	TP43.328x43.277x0.4375	Pole	83.3%	Pass
L28	36.75 - 28.75	Pole	TP44.95x43.328x0.4375	Pole	84.3%	Pass
L29	28.75 - 27.75	Pole	TP44.281x42.909x0.5	Pole	75.6%	Pass
L30	27.75 - 22.75	Pole	TP45.297x44.281x0.5	Pole	77.2%	Pass
L31	22.75 - 22.5	Pole	TP45.348x45.297x0.5	Pole	77.3%	Pass
L32	22.5 - 22.25	Pole	TP45.398x45.348x0.5	Pole	77.3%	Pass
L33	22.25 - 22	Pole + Reinf.	TP45.449x45.398x0.75	Reinf. 1 Tension Rupture	73.9%	Pass
L34	22 - 17	Pole + Reinf.	TP46.465x45.449x0.7375	Reinf. 1 Tension Rupture	75.3%	Pass
L35	17 - 12	Pole + Reinf.	TP47.481x46.465x0.7375	Reinf. 1 Tension Rupture	76.5%	Pass
L36	12 - 7	Pole + Reinf.	TP48.498x47.481x0.725	Reinf. 1 Tension Rupture	77.7%	Pass
L37	7 - 2	Pole + Reinf.	TP49.514x48.498x0.725	Reinf. 1 Tension Rupture	78.8%	Pass
L38	2 - 0	Pole + Reinf.	TP49.92x49.514x0.725	Reinf. 1 Tension Rupture	79.2%	Pass
					Summary	
				Pole	84.3%	Pass
				Reinforcement	79.2%	Pass
				Overall	84.3%	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	67.0	Pass
1	Base Plate	0	48.1	Pass
1	Base Foundation (Structure)	0	48.8	Pass
1	Base Foundation (Soil Interaction)	0	76.6	Pass

Structure Rating (max from all components) =	84.3%

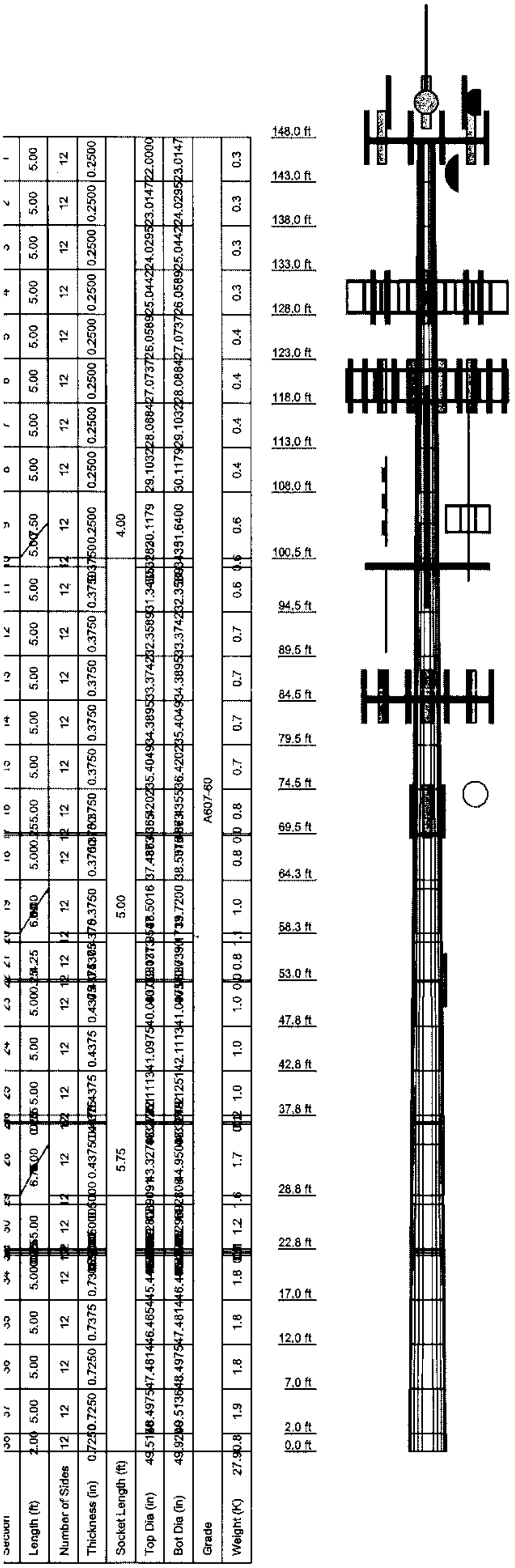
Note:
1) See additional documentation in "Appendix B – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Result / Conclusions

The tower and its foundation have sufficient capacity to support the proposed Dish Wireless and existing load configuration. No modification is required at this time.

APPENDIX A

TNXTOWER OUTPUT



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION
LLPX310R-V1_TIA w/ Mount Pipe	148
LLPX310R-V1_TIA w/ Mount Pipe	148
LLPX310R-V1_TIA w/ Mount Pipe	148
FDD_R6_RRH	148
FDD_R6_RRH	148
FDD_R6_RRH	148
DB420	148
Top Hat	148
APXVSPP18-C-A20_TIA w/ Mount Pipe	148
APXVSPP18-C-A20_TIA w/ Mount Pipe	148
APXVSPP18-C-A20_TIA w/ Mount Pipe	148
APXVTM14-C-120_TIA w/ Mount Pipe	148
APXVTM14-C-120_TIA w/ Mount Pipe	148
APXVTM14-C-120_TIA w/ Mount Pipe	148
TD-RRH8x20-25	148
TD-RRH8x20-25	148
TD-RRH8x20-25	148
FD-RRH-2x50-800	148
FD-RRH-2x50-800	148
FD-RRH-2x50-800	148
B66A RRH4X45	148
B66A RRH4X45	148
B66A RRH4X45	148
ACU-A20-N	148
ACU-A20-N	148
ACU-A20-N	148
800 Notch Filter	148
800 Notch Filter	148
800 Notch Filter	148
(2) Dish Pipe	148
(2) Dish Pipe	148
(3) Empty Pipe	148
(3) Empty Pipe	148
(2) Empty Pipe	148
Platform Mount	148
VHLP800-11	148
VHLP800-11	148
Dish Mount	144
4' Dish	144
TA08025-B605	130
TA08025-B605	130
TA08025-B605	130
TA08025-B604	130
TA08025-B604	130
TA08025-B604	130
RDIDC-9181-PF-48	130
(2) 8' long Pipe	130
(2) 8' long Pipe	130
(2) 8' long Pipe	130
8' Platform Mount	130
MX08FRO665-21 w/ Mount Pipe	130
MX08FRO665-21 w/ Mount Pipe	130
MX08FRO665-21 w/ Mount Pipe	130
AIR6449 B77D + AIR6419 B77G w/ Mount Pipe	120
AIR6449 B77D + AIR6419 B77G w/ Mount Pipe	120
AIR6449 B77D + AIR6419 B77G w/ Mount Pipe	120
RRUS 32 B2	120
RRUS 32 B2	120
RRUS 32 B2	120
RRUS 32 B30	120
RRUS 32 B30	120

TYPE	ELEVATION
RRUS 32 B30	120
RRUS 32 B66A	120
RRUS 32 B66A	120
RRUS 32 B66A	120
RRUS E2 B29	120
RRUS E2 B29	120
RRUS E2 B29	120
DC6-48-60-18-8F	120
DC6-48-60-18-8F	120
DC6-48-60-18-8F	120
RRUS 4478 B14	120
RRUS 4478 B14	120
RRUS 4478 B14	120
RRUS 4449 B5/B12	120
RRUS 4449 B5/B12	120
RRUS 4449 B5/B12	120
DC6-48-60-18-8C-EV	120
DMP65R-BU6D w/ Mount Pipe	120
DMP65R-BU6D w/ Mount Pipe	120
DMP65R-BU6D w/ Mount Pipe	120
Platform Mount (RMPQ)	120
QD6616-7 w/ Mount Pipe	120
QD6616-7 w/ Mount Pipe	120
QD6616-7 w/ Mount Pipe	120
DB220-B	100
(2) PD1110	100
(2) PD201	100
(2) PD83-1	100
(3) Mount Pipes	100
(3) Mount Pipes	100
(4) Mount Pipes	100
Platform Mount	100
PD220	100
DB205-A	100
DB224	100
AIR 32 B2a/B66Aa w/ Mount Pipe	85
AIR 32 B2a/B66Aa w/ Mount Pipe	85
AIR 32 B2a/B66Aa w/ Mount Pipe	85
AIR 6449 B41 w/ Mount Pipe	85
AIR 6449 B41 w/ Mount Pipe	85
AIR 6449 B41 w/ Mount Pipe	85
(2) ETW190VS12UB	85
(2) ETW190VS12UB	85
(2) ETW190VS12UB	85
RRUS 4415 B25	85
RRUS 4415 B25	85
RRUS 4415 B25	85
RADIO 4449 B71+B85	85
RADIO 4449 B71+B85	85
RADIO 4449 B71+B85	85
ATMAA1412D-1A20	85
ATMAA1412D-1A20	85
ATMAA1412D-1A20	85
Platform Mount	85
APXVAARR24_43-U-NA20_TIA w/ Mount Pipe	85
APXVAARR24_43-U-NA20_TIA w/ Mount Pipe	85
APXVAARR24_43-U-NA20_TIA w/ Mount Pipe	85
Collar Mount	72
800 10504_TIA w/ Mount Pipe	72
800 10504_TIA w/ Mount Pipe	72
800 10504_TIA w/ Mount Pipe	72
Side Mount	53
BSA150B	53

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi			

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Newburgh, NY 12550
Phone: (845) 567-6656
FAX: (845) 567-8703

Job: **10710.NJJER01115A - Revision 1**			
Project: **148' Monopole**			
Client: Dish Wireless	Drawn by: John-Fritz Julien	App'd:	
Code: TIA-222-H	Date: 12/07/22	Scale:	
Path:		Dwg N	

MATERIAL STRENGTH

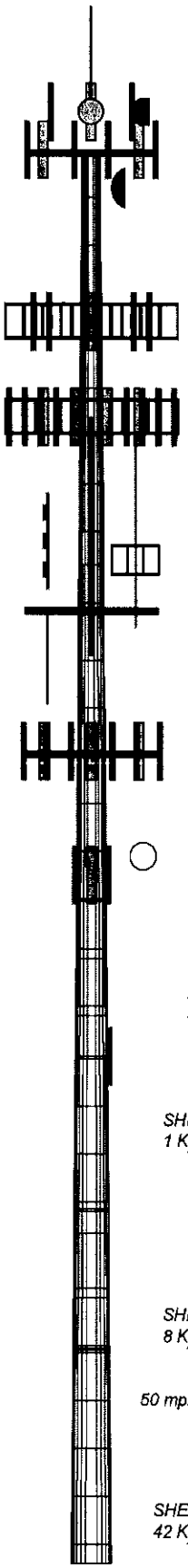
GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi			

TOWER DESIGN NOTES

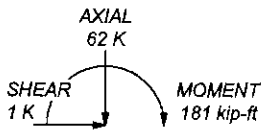
1. Tower designed for Exposure B to the TIA-222-H Standard.
2. Tower designed for a 130 mph basic wind in accordance with the TIA-222-H Standard.
3. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category III.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. Seismic loads generated by spreadsheet
8. Seismic calculations are in accordance with TIA-222-H-1
9. TOWER RATING 84.3%

Section		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
Length (ft)		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	2.00
Number of Sides		12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Thickness (in)		0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125	0.3125
Socket Length (ft)																																																					
Top Dia (in)		22.0000	23.0147	23.0294	24.0294	25.0442	26.0589	27.0737	28.0884	29.1032	30.1179	31.6400	32.3358	33.3742	34.3895	35.4049	36.4202	37.4356	38.5016	39.7200	41.0975	42.1113	43.1251	44.9500	46.4654	47.4813	48.4975	49.5136	50.5298	51.5459	52.5621	53.5782	54.5944	55.6105	56.6267	57.6428	58.6590	59.6751	60.6913	61.7074	62.7236	63.7397	64.7559	65.7720	66.7882	67.8043	68.8205	69.8366	70.8528	71.8689
Bot Dia (in)		23.0147	24.0294	25.0442	26.0589	27.0737	28.0884	29.1032	30.1179	31.6400	32.3358	33.3742	34.3895	35.4049	36.4202	37.4356	38.5016	39.7200	41.0975	42.1113	43.1251	44.9500	46.4654	47.4813	48.4975	49.5136	50.5298	51.5459	52.5621	53.5782	54.5944	55.6105	56.6267	57.6428	58.6590	59.6751	60.6913	61.7074	62.7236	63.7397	64.7559	65.7720	66.7882	67.8043	68.8205	69.8366	70.8528	71.8689
Grade		A607-60																																																		
Weight (K)		0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	1.0	1.1	1.0	1.0	1.0	1.2	1.7	1.8	1.8	1.8	1.9	1.9	2.0	2.0	2.1	2.1	2.2	2.2	2.3	2.3	2.4	2.4	2.5	2.5	2.6	2.6	2.7	2.7	2.8	2.8	2.9	1.5

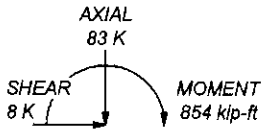
148.0 ft
143.0 ft
138.0 ft
133.0 ft
128.0 ft
123.0 ft
118.0 ft
113.0 ft
108.0 ft
100.5 ft
94.5 ft
89.5 ft
84.5 ft
79.5 ft
74.5 ft
69.5 ft
64.3 ft
58.3 ft
53.0 ft
47.8 ft
42.8 ft
37.8 ft
28.8 ft
22.8 ft
17.0 ft
12.0 ft
7.0 ft
2.0 ft
0.0 ft



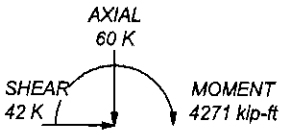
ALL REACTIONS ARE FACTORED



TORQUE 0 kip-ft
SEISMIC



TORQUE 1 kip-ft
50 mph WIND - 0.7500 in ICE



TORQUE 6 kip-ft
REACTIONS - 130 mph WIND

Tectonic
Tectonic
1279 Route 300
Newburgh, NY 12550
Phone: (845) 567-6656
FAX: (845) 567-8703

Job:	***10710.NJJER01115A - Revision 1***		
Project:	***148' Monopole***		
Client: Dish Wireless		Drawn by: John-Fritz Jullen	App'd:
Code: TIA-222-H		Date: 12/07/22	Scale:
Path:			Dwg N

Tower Input Data

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

- Tower base elevation above sea level: 0.00 ft.
- Basic wind speed of 130 mph.
- Risk Category III.
- Exposure Category B.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.00 ft.
- Nominal ice thickness of 0.7500 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- Seismic loads generated by spreadsheet.
- Seismic calculations are in accordance with TIA-222-H-1.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	148.00-143.00	5.00	0.00	12	22.0000	23.0147	0.2500	1.0000	A607-60 (60 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L2	143.00-138.00	5.00	0.00	12	23.0147	24.0295	0.2500	1.0000	A607-60 (60 ksi)
L3	138.00-133.00	5.00	0.00	12	24.0295	25.0442	0.2500	1.0000	A607-60 (60 ksi)
L4	133.00-128.00	5.00	0.00	12	25.0442	26.0589	0.2500	1.0000	A607-60 (60 ksi)
L5	128.00-123.00	5.00	0.00	12	26.0589	27.0737	0.2500	1.0000	A607-60 (60 ksi)
L6	123.00-118.00	5.00	0.00	12	27.0737	28.0884	0.2500	1.0000	A607-60 (60 ksi)
L7	118.00-113.00	5.00	0.00	12	28.0884	29.1032	0.2500	1.0000	A607-60 (60 ksi)
L8	113.00-108.00	5.00	0.00	12	29.1032	30.1179	0.2500	1.0000	A607-60 (60 ksi)
L9	108.00-100.50	7.50	4.00	12	30.1179	31.6400	0.2500	1.0000	A607-60 (60 ksi)
L10	100.50-99.50	5.00	0.00	12	30.3282	31.3435	0.3750	1.5000	A607-60 (60 ksi)
L11	99.50-94.50	5.00	0.00	12	31.3435	32.3589	0.3750	1.5000	A607-60 (60 ksi)
L12	94.50-89.50	5.00	0.00	12	32.3589	33.3742	0.3750	1.5000	A607-60 (60 ksi)
L13	89.50-84.50	5.00	0.00	12	33.3742	34.3895	0.3750	1.5000	A607-60 (60 ksi)
L14	84.50-79.50	5.00	0.00	12	34.3895	35.4049	0.3750	1.5000	A607-60 (60 ksi)
L15	79.50-74.50	5.00	0.00	12	35.4049	36.4202	0.3750	1.5000	A607-60 (60 ksi)
L16	74.50-69.50	5.00	0.00	12	36.4202	37.4355	0.3750	1.5000	A607-60 (60 ksi)
L17	69.50-69.25	0.25	0.00	12	37.4355	37.4863	0.3750	1.5000	A607-60 (60 ksi)
L18	69.25-64.25	5.00	0.00	12	37.4863	38.5016	0.3750	1.5000	A607-60 (60 ksi)
L19	64.25-58.25	6.00	5.00	12	38.5016	39.7200	0.3750	1.5000	A607-60 (60 ksi)
L20	58.25-57.25	6.00	0.00	12	37.9547	39.1713	0.4375	1.7500	A607-60 (60 ksi)
L21	57.25-53.00	4.25	0.00	12	39.1713	40.0330	0.4375	1.7500	A607-60 (60 ksi)
L22	53.00-52.75	0.25	0.00	12	40.0330	40.0837	0.4375	1.7500	A607-60 (60 ksi)
L23	52.75-47.75	5.00	0.00	12	40.0837	41.0975	0.4375	1.7500	A607-60 (60 ksi)
L24	47.75-42.75	5.00	0.00	12	41.0975	42.1113	0.4375	1.7500	A607-60 (60 ksi)
L25	42.75-37.75	5.00	0.00	12	42.1113	43.1251	0.4375	1.7500	A607-60 (60 ksi)
L26	37.75-37.00	0.75	0.00	12	43.1251	43.2772	0.4375	1.7500	A607-60 (60 ksi)
L27	37.00-36.75	0.25	0.00	12	43.2772	43.3279	0.4375	1.7500	A607-60 (60 ksi)
L28	36.75-28.75	8.00	5.75	12	43.3279	44.9500	0.4375	1.7500	A607-60 (60 ksi)
L29	28.75-27.75	6.75	0.00	12	42.9091	44.2808	0.5000	2.0000	A607-60 (60 ksi)
L30	27.75-22.75	5.00	0.00	12	44.2808	45.2969	0.5000	2.0000	A607-60 (60 ksi)
L31	22.75-22.50	0.25	0.00	12	45.2969	45.3477	0.5000	2.0000	A607-60 (60 ksi)
L32	22.50-22.25	0.25	0.00	12	45.3477	45.3985	0.5000	2.0000	A607-60 (60 ksi)
L33	22.25-22.00	0.25	0.00	12	45.3985	45.4493	0.7500	3.0000	A607-60 (60 ksi)
L34	22.00-17.00	5.00	0.00	12	45.4493	46.4654	0.7375	2.9500	A607-60 (60 ksi)
L35	17.00-12.00	5.00	0.00	12	46.4654	47.4814	0.7375	2.9500	A607-60 (60 ksi)
L36	12.00-7.00	5.00	0.00	12	47.4814	48.4975	0.7250	2.9000	A607-60 (60 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L37	7.00-2.00	5.00	0.00	12	48.4975	49.5136	0.7250	2.9000	(60 ksi) A607-60 (60 ksi)
L38	2.00-0.00	2.00		12	49.5136	49.9200	0.7250	2.9000	A607-60 (60 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	22.6879	17.5087	1057.2060	7.7865	11.3960	92.7699	2142.1860	8.6173	5.2260	20.904
	23.7384	18.3256	1212.1873	8.1498	11.9216	101.6796	2456.2201	9.0193	5.4979	21.992
L2	23.7384	18.3256	1212.1873	8.1498	11.9216	101.6796	2456.2201	9.0193	5.4979	21.992
	24.7890	19.1425	1381.6198	8.5131	12.4473	110.9978	2799.5363	9.4213	5.7699	23.08
L3	24.7890	19.1425	1381.6198	8.5131	12.4473	110.9978	2799.5363	9.4213	5.7699	23.08
	25.8395	19.9593	1566.1476	8.8763	12.9729	120.7245	3173.4396	9.8234	6.0418	24.167
L4	25.8395	19.9593	1566.1476	8.8763	12.9729	120.7245	3173.4396	9.8234	6.0418	24.167
	26.8900	20.7762	1766.4148	9.2396	13.4985	130.8597	3579.2354	10.2254	6.3138	25.255
L5	26.8900	20.7762	1766.4148	9.2396	13.4985	130.8597	3579.2354	10.2254	6.3138	25.255
	27.9405	21.5931	1983.0657	9.6029	14.0242	141.4034	4018.2288	10.6275	6.5857	26.343
L6	27.9405	21.5931	1983.0657	9.6029	14.0242	141.4034	4018.2288	10.6275	6.5857	26.343
	28.9911	22.4099	2216.7444	9.9662	14.5498	152.3556	4491.7252	11.0295	6.8577	27.431
L7	28.9911	22.4099	2216.7444	9.9662	14.5498	152.3556	4491.7252	11.0295	6.8577	27.431
	30.0416	23.2268	2468.0951	10.3294	15.0754	163.7163	5001.0298	11.4315	7.1296	28.519
L8	30.0416	23.2268	2468.0951	10.3294	15.0754	163.7163	5001.0298	11.4315	7.1296	28.519
	31.0921	24.0437	2737.7618	10.6927	15.6011	175.4855	5547.4477	11.8336	7.4016	29.606
L9	31.0921	24.0437	2737.7618	10.6927	15.6011	175.4855	5547.4477	11.8336	7.4016	29.606
	32.6679	25.2690	3178.0138	11.2376	16.3895	193.9052	6439.5175	12.4366	7.8095	31.238
L10	32.1067	36.1685	4141.9345	10.7232	15.7100	263.6493	8392.6822	17.8010	7.1230	18.995
	32.3169	37.3945	4577.5727	11.0867	16.2360	281.9405	9275.4032	18.4044	7.3951	19.72
L11	32.3169	37.3945	4577.5727	11.0867	16.2360	281.9405	9275.4032	18.4044	7.3951	19.72
	33.3681	38.6205	5042.7337	11.4502	16.7619	300.8451	10217.945 6	19.0078	7.6672	20.446
L12	33.3681	38.6205	5042.7337	11.4502	16.7619	300.8451	10217.945 6	19.0078	7.6672	20.446
	34.4192	39.8465	5538.3855	11.8137	17.2878	320.3632	11222.270 5	19.6112	7.9393	21.171
L13	34.4192	39.8465	5538.3855	11.8137	17.2878	320.3632	11222.270 5	19.6112	7.9393	21.171
	35.4704	41.0725	6065.4960	12.1772	17.8138	340.4947	12290.339 2	20.2147	8.2114	21.897
L14	35.4704	41.0725	6065.4960	12.1772	17.8138	340.4947	12290.339 2	20.2147	8.2114	21.897
	36.5215	42.2985	6625.0331	12.5407	18.3397	361.2397	13424.113 2	20.8181	8.4835	22.623
L15	36.5215	42.2985	6625.0331	12.5407	18.3397	361.2397	13424.113 2	20.8181	8.4835	22.623
	37.5727	43.5246	7217.9648	12.9042	18.8657	382.5982	14625.553 6	21.4215	8.7556	23.348
L16	37.5727	43.5246	7217.9648	12.9042	18.8657	382.5982	14625.553 6	21.4215	8.7556	23.348
	38.6238	44.7506	7845.2590	13.2677	19.3916	404.5701	15896.621 8	22.0249	9.0277	24.074
L17	38.6238	44.7506	7845.2590	13.2677	19.3916	404.5701	15896.621 8	22.0249	9.0277	24.074
	38.6764	44.8119	7877.5431	13.2858	19.4179	405.6848	15962.038 1	22.0550	9.0413	24.11
L18	38.6764	44.8119	7877.5431	13.2858	19.4179	405.6848	15962.038 1	22.0550	9.0413	24.11
	39.7275	46.0379	8541.9597	13.6493	19.9438	428.3008	17308.326 2	22.6584	9.3134	24.836
L19	39.7275	46.0379	8541.9597	13.6493	19.9438	428.3008	17308.326 2	22.6584	9.3134	24.836
	40.9889	47.5091	9387.3225	14.0855	20.5750	456.2499	19021.260 4	23.3825	9.6400	25.707

Section	Tip Dia. in	Area in²	I in⁴	r in	C in	I/C in³	J in⁴	It/Q in²	w in	w/t
L20	40.1888	52.8523	9495.3317	13.4311	19.6605	482.9644	19240.1164	26.0123	8.9994	20.57
	40.3987	54.5662	10449.3319	13.8667	20.2907	514.9811	21173.1794	26.8558	9.3254	21.315
L21	40.3987	54.5662	10449.3319	13.8667	20.2907	514.9811	21173.1794	26.8558	9.3254	21.315
	41.2909	55.7802	11162.3893	14.1752	20.7371	538.2814	22618.0270	27.4533	9.5563	21.843
L22	41.2909	55.7802	11162.3893	14.1752	20.7371	538.2814	22618.0270	27.4533	9.5563	21.843
	41.3434	55.8516	11205.3150	14.1933	20.7633	539.6680	22705.0062	27.4884	9.5699	21.874
L23	41.3434	55.8516	11205.3150	14.1933	20.7633	539.6680	22705.0062	27.4884	9.5699	21.874
	42.3929	57.2798	12087.0970	14.5563	21.2885	567.7758	24491.7356	28.1914	9.8416	22.495
L24	42.3929	57.2798	12087.0970	14.5563	21.2885	567.7758	24491.7356	28.1914	9.8416	22.495
	43.4425	58.7080	13013.9666	14.9192	21.8137	596.5971	26369.8245	28.8943	10.1133	23.116
L25	43.4425	58.7080	13013.9666	14.9192	21.8137	596.5971	26369.8245	28.8943	10.1133	23.116
	44.4921	60.1362	13987.0479	15.2822	22.3388	626.1320	28341.5511	29.5972	10.3850	23.737
L26	44.4921	60.1362	13987.0479	15.2822	22.3388	626.1320	28341.5511	29.5972	10.3850	23.737
	44.6495	60.3504	14137.0653	15.3366	22.4176	630.6237	28645.5271	29.7026	10.4258	23.83
L27	44.6495	60.3504	14137.0653	15.3366	22.4176	630.6237	28645.5271	29.7026	10.4258	23.83
	44.7020	60.4218	14187.3085	15.3548	22.4438	632.1246	28747.3333	29.7378	10.4394	23.861
L28	44.7020	60.4218	14187.3085	15.3548	22.4438	632.1246	28747.3333	29.7378	10.4394	23.861
	46.3813	62.7070	15858.6363	15.9355	23.2841	681.0929	32133.8966	30.8625	10.8741	24.855
L29	45.4561	68.2787	15674.3435	15.1825	22.2269	705.1964	31760.4694	33.6047	10.1596	20.319
	45.6665	70.4871	17244.9971	15.6735	22.9375	751.8269	34943.0395	34.6916	10.5273	21.055
L30	45.6665	70.4871	17244.9971	15.6735	22.9375	751.8269	34943.0395	34.6916	10.5273	21.055
	46.7184	72.1230	18473.7505	16.0373	23.4638	787.3304	37432.8270	35.4967	10.7996	21.599
L31	46.7184	72.1230	18473.7505	16.0373	23.4638	787.3304	37432.8270	35.4967	10.7996	21.599
	46.7710	72.2048	18536.6743	16.0555	23.4901	789.1271	37560.3277	35.5370	10.8132	21.626
L32	46.7710	72.2048	18536.6743	16.0555	23.4901	789.1271	37560.3277	35.5370	10.8132	21.626
	46.8236	72.2866	18599.7408	16.0737	23.5164	790.9259	37688.1176	35.5772	10.8268	21.654
L33	46.7354	107.8261	27436.1566	15.9842	23.5164	1166.6811	55593.0916	53.0687	10.1568	13.542
	46.7880	107.9488	27529.9184	16.0023	23.5427	1169.3596	55783.0783	53.1291	10.1704	13.561
L34	46.7924	106.1793	27093.8037	16.0068	23.5427	1150.8352	54899.3919	52.2582	10.2039	13.836
	47.8443	108.5922	28983.2087	16.3706	24.0691	1204.1689	58727.8386	53.4458	10.4762	14.205
L35	47.8443	108.5922	28983.2087	16.3706	24.0691	1204.1689	58727.8386	53.4458	10.4762	14.205
	48.8962	111.0051	30958.4723	16.7343	24.5954	1258.7108	62730.2582	54.6334	10.7485	14.574
L36	48.9006	109.1529	30458.1742	16.7388	24.5954	1238.3697	61716.5186	53.7217	10.7820	14.872
	49.9526	111.5249	32487.3107	17.1026	25.1217	1293.1969	65828.0992	54.8892	11.0543	15.247
L37	49.9526	111.5249	32487.3107	17.1026	25.1217	1293.1969	65828.0992	54.8892	11.0543	15.247

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
	51.0045	113.8969	34604.6245	17.4663	25.6480	1349.2118	70118.3510	56.0566	11.3266	15.623
L38	51.0045	113.8969	34604.6245	17.4663	25.6480	1349.2118	70118.3510	56.0566	11.3266	15.623
	51.4252	114.8457	35476.6598	17.6118	25.8586	1371.9503	71885.3309	56.5236	11.4356	15.773

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 148.00-143.00				1	1	1			
L2 143.00-138.00				1	1	1			
L3 138.00-133.00				1	1	1			
L4 133.00-128.00				1	1	1			
L5 128.00-123.00				1	1	1			
L6 123.00-118.00				1	1	1			
L7 118.00-113.00				1	1	1			
L8 113.00-108.00				1	1	1			
L9 108.00-100.50				1	1	1			
L10 100.50-99.50				1	1	1			
L11 99.50-94.50				1	1	1			
L12 94.50-89.50				1	1	1			
L13 89.50-84.50				1	1	1			
L14 84.50-79.50				1	1	1			
L15 79.50-74.50				1	1	1			
L16 74.50-69.50				1	1	1			
L17 69.50-69.25				1	1	1			
L18 69.25-64.25				1	1	1			
L19 64.25-58.25				1	1	1			
L20 58.25-57.25				1	1	1			
L21 57.25-53.00				1	1	1			
L22 53.00-52.75				1	1	1			
L23 52.75-47.75				1	1	1			
L24 47.75-42.75				1	1	1			
L25 42.75-37.75				1	1	1			
L26 37.75-37.00				1	1	1			
L27 37.00-36.75				1	1	1			
L28 36.75-28.75				1	1	1			
L29 28.75-				1	1	1			

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
27.75									
L30 27.75-22.75				1	1	1			
L31 22.75-22.50				1	1	1			
L32 22.50-22.25				1	1	1			
L33 22.25-22.00				1	1	0.971896			
L34 22.00-17.00				1	1	0.981201			
L35 17.00-12.00				1	1	0.97461			
L36 12.00-7.00				1	1	0.984736			
L37 7.00-2.00				1	1	0.97859			
L38 2.00-0.00				1	1	0.976203			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
**										
Step Bolts	C	No	Surface Ar (CaAa)	148.00 - 5.00	1	1	0.000 0.000	0.3750		2.00
Safety Line 3/8	C	No	Surface Ar (CaAa)	148.00 - 5.00	3	3	0.000 0.000	0.3750		0.22
**										
PL1-1/4x6-1/2	A	No	Surface Ar (CaAa)	35.00 - 0.00	1	1	0.000 0.000	6.5000		0.00
PL1-1/4x6-1/2	B	No	Surface Ar (CaAa)	35.00 - 0.00	1	1	0.000 0.000	6.5000		0.00
PL1-1/4x6-1/2	C	No	Surface Ar (CaAa)	15.00 - 0.00	1	1	0.300 0.300	6.5000		0.00
PL1-1/4x6-1/2	C	No	Surface Ar (CaAa)	15.00 - 0.00	1	1	-0.300 -0.300	6.5000		0.00
PL1-1/4x6-1/2	C	No	Surface Ar (CaAa)	35.00 - 9.00	1	1	0.000 0.000	6.5000		0.00
PL1x6	A	No	Surface Ar (CaAa)	55.00 - 35.00	1	1	0.000 0.000	6.0000		0.00
PL1x6	B	No	Surface Ar (CaAa)	55.00 - 35.00	1	1	0.000 0.000	6.0000		0.00
PL1x6	C	No	Surface Ar (CaAa)	55.00 - 35.00	1	1	0.000 0.000	6.0000		0.00
PL1x4-1/2	A	No	Surface Ar (CaAa)	70.50 - 60.50	1	1	0.000 0.000	4.5000		0.00
PL1x4-1/2	B	No	Surface Ar (CaAa)	70.50 - 60.50	1	1	0.000 0.000	4.5000		0.00
PL1x4-1/2	C	No	Surface Ar (CaAa)	70.50 - 60.50	1	1	0.000 0.000	4.5000		0.00
*										

Feed Line/Linear Appurtenances - Entered As Area

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

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
ATCB-B01-006(5/16)	C	No	No	Inside Pole	148.00 - 20.00	6	No Ice	0.00	0.07
							1/2" Ice	0.00	0.07
							1" Ice	0.00	0.07
FLC 114-50J(1-1/4)	C	No	No	Inside Pole	148.00 - 20.00	4	No Ice	0.00	0.70
							1/2" Ice	0.00	0.70
							1" Ice	0.00	0.70
FLC 12-50J(1/2")	C	No	No	Inside Pole	148.00 - 20.00	2	No Ice	0.00	0.17
							1/2" Ice	0.00	0.17
							1" Ice	0.00	0.17
WC166(2")	C	No	No	Inside Pole	148.00 - 20.00	2	No Ice	0.00	2.80
							1/2" Ice	0.00	2.80
							1" Ice	0.00	2.80
**									
EW90(ELLIPTICAL)	C	No	No	Inside Pole	144.00 - 20.00	1	No Ice	0.00	0.32
							1/2" Ice	0.00	0.32
							1" Ice	0.00	0.32
**									
LDF4P-50A(1/2)	C	No	No	Inside Pole	100.00 - 12.00	5	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
LDF5-50A(7/8)	C	No	No	Inside Pole	100.00 - 12.00	8	No Ice	0.00	0.33
							1/2" Ice	0.00	0.33
							1" Ice	0.00	0.33
**									
LCF158-50A(1-5/8")	A	No	No	Inside Pole	120.00 - 20.00	6	No Ice	0.00	0.80
							1/2" Ice	0.00	0.80
							1" Ice	0.00	0.80
DC Trunk	A	No	No	Inside Pole	120.00 - 20.00	8	No Ice	0.00	1.16
							1/2" Ice	0.00	1.16
							1" Ice	0.00	1.16
Fiber Trunk	A	No	No	Inside Pole	120.00 - 20.00	3	No Ice	0.00	0.80
							1/2" Ice	0.00	0.80
							1" Ice	0.00	0.80
**									
FLC78-50J(7/8")	C	No	No	Inside Pole	85.00 - 12.00	18	No Ice	0.00	0.40
							1/2" Ice	0.00	0.40
							1" Ice	0.00	0.40
FLC 114-50J(1-1/4")	C	No	No	Inside Pole	85.00 - 12.00	6	No Ice	0.00	0.70
							1/2" Ice	0.00	0.70
							1" Ice	0.00	0.70
**									
FLC 158-50J(1-5/8)	C	No	No	Inside Pole	72.00 - 12.00	6	No Ice	0.00	0.92
							1/2" Ice	0.00	0.92
							1" Ice	0.00	0.92
**									
FLC 12-50J(1/2)	C	No	No	Inside Pole	50.00 - 12.00	3	No Ice	0.00	0.17
							1/2" Ice	0.00	0.17
							1" Ice	0.00	0.17
**									
CU12PSM9P6XXX_6AWG	C	No	No	Inside Pole	130.00 - 12.00	1	No Ice	0.00	2.35
							1/2" Ice	0.00	2.35
							1" Ice	0.00	2.35
*									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	148.00-143.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.750	0.000	0.06

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L2	143.00-138.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.750	0.000	0.06
L3	138.00-133.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.750	0.000	0.06
L4	133.00-128.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.750	0.000	0.07
L5	128.00-123.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.750	0.000	0.07
L6	123.00-118.00	A	0.000	0.000	0.000	0.000	0.03
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.750	0.000	0.07
L7	118.00-113.00	A	0.000	0.000	0.000	0.000	0.08
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.750	0.000	0.07
L8	113.00-108.00	A	0.000	0.000	0.000	0.000	0.08
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.750	0.000	0.07
L9	108.00-100.50	A	0.000	0.000	0.000	0.000	0.12
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	1.125	0.000	0.11
L10	100.50-99.50	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.150	0.000	0.02
L11	99.50-94.50	A	0.000	0.000	0.000	0.000	0.08
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.750	0.000	0.09
L12	94.50-89.50	A	0.000	0.000	0.000	0.000	0.08
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.750	0.000	0.09
L13	89.50-84.50	A	0.000	0.000	0.000	0.000	0.08
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.750	0.000	0.09
L14	84.50-79.50	A	0.000	0.000	0.000	0.000	0.08
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.750	0.000	0.15
L15	79.50-74.50	A	0.000	0.000	0.000	0.000	0.08
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.750	0.000	0.15
L16	74.50-69.50	A	0.000	0.000	0.450	0.000	0.08
		B	0.000	0.000	0.450	0.000	0.00
		C	0.000	0.000	1.200	0.000	0.16
L17	69.50-69.25	A	0.000	0.000	0.112	0.000	0.00
		B	0.000	0.000	0.112	0.000	0.00
		C	0.000	0.000	0.150	0.000	0.01
L18	69.25-64.25	A	0.000	0.000	2.250	0.000	0.08
		B	0.000	0.000	2.250	0.000	0.00
		C	0.000	0.000	3.000	0.000	0.17
L19	64.25-58.25	A	0.000	0.000	1.688	0.000	0.10
		B	0.000	0.000	1.688	0.000	0.00
		C	0.000	0.000	2.587	0.000	0.21
L20	58.25-57.25	A	0.000	0.000	0.000	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.150	0.000	0.03
L21	57.25-53.00	A	0.000	0.000	1.200	0.000	0.07
		B	0.000	0.000	1.200	0.000	0.00
		C	0.000	0.000	1.837	0.000	0.15
L22	53.00-52.75	A	0.000	0.000	0.150	0.000	0.00
		B	0.000	0.000	0.150	0.000	0.00
		C	0.000	0.000	0.188	0.000	0.01
L23	52.75-47.75	A	0.000	0.000	3.000	0.000	0.08
		B	0.000	0.000	3.000	0.000	0.00
		C	0.000	0.000	3.750	0.000	0.18
L24	47.75-42.75	A	0.000	0.000	3.000	0.000	0.08
		B	0.000	0.000	3.000	0.000	0.00
		C	0.000	0.000	3.750	0.000	0.18

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
L25	42.75-37.75	A	0.000	0.000	3.000	0.000	0.08
		B	0.000	0.000	3.000	0.000	0.00
		C	0.000	0.000	3.750	0.000	0.18
L26	37.75-37.00	A	0.000	0.000	0.450	0.000	0.01
		B	0.000	0.000	0.450	0.000	0.00
		C	0.000	0.000	0.563	0.000	0.03
L27	37.00-36.75	A	0.000	0.000	0.150	0.000	0.00
		B	0.000	0.000	0.150	0.000	0.00
		C	0.000	0.000	0.188	0.000	0.01
L28	36.75-28.75	A	0.000	0.000	5.112	0.000	0.13
		B	0.000	0.000	5.112	0.000	0.00
		C	0.000	0.000	6.313	0.000	0.28
L29	28.75-27.75	A	0.000	0.000	0.650	0.000	0.02
		B	0.000	0.000	0.650	0.000	0.00
		C	0.000	0.000	0.800	0.000	0.04
L30	27.75-22.75	A	0.000	0.000	3.250	0.000	0.08
		B	0.000	0.000	3.250	0.000	0.00
		C	0.000	0.000	4.000	0.000	0.18
L31	22.75-22.50	A	0.000	0.000	0.163	0.000	0.00
		B	0.000	0.000	0.163	0.000	0.00
		C	0.000	0.000	0.200	0.000	0.01
L32	22.50-22.25	A	0.000	0.000	0.163	0.000	0.00
		B	0.000	0.000	0.163	0.000	0.00
		C	0.000	0.000	0.200	0.000	0.01
L33	22.25-22.00	A	0.000	0.000	0.163	0.000	0.00
		B	0.000	0.000	0.163	0.000	0.00
		C	0.000	0.000	0.200	0.000	0.01
L34	22.00-17.00	A	0.000	0.000	3.250	0.000	0.03
		B	0.000	0.000	3.250	0.000	0.00
		C	0.000	0.000	4.000	0.000	0.15
L35	17.00-12.00	A	0.000	0.000	3.250	0.000	0.00
		B	0.000	0.000	3.250	0.000	0.00
		C	0.000	0.000	7.900	0.000	0.13
L36	12.00-7.00	A	0.000	0.000	3.250	0.000	0.00
		B	0.000	0.000	3.250	0.000	0.00
		C	0.000	0.000	9.200	0.000	0.01
L37	7.00-2.00	A	0.000	0.000	3.250	0.000	0.00
		B	0.000	0.000	3.250	0.000	0.00
		C	0.000	0.000	6.800	0.000	0.01
L38	2.00-0.00	A	0.000	0.000	1.300	0.000	0.00
		B	0.000	0.000	1.300	0.000	0.00
		C	0.000	0.000	2.600	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	148.00-143.00	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	3.142	0.000	0.08
L2	143.00-138.00	A	0.997	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	3.134	0.000	0.08
L3	138.00-133.00	A	0.993	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	3.126	0.000	0.08
L4	133.00-128.00	A	0.990	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	3.117	0.000	0.08
L5	128.00-123.00	A	0.986	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	3.109	0.000	0.09
L6	123.00-118.00	A	0.982	0.000	0.000	0.000	0.000	0.03
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	3.100	0.000	0.09

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
L7	118.00-113.00	A	0.978	0.000	0.000	0.000	0.000	0.08
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	3.090	0.000	0.09
L8	113.00-108.00	A	0.973	0.000	0.000	0.000	0.000	0.08
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	3.081	0.000	0.09
L9	108.00-100.50	A	0.968	0.000	0.000	0.000	0.000	0.12
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	4.602	0.000	0.14
L10	100.50-99.50	A	0.964	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.614	0.000	0.02
L11	99.50-94.50	A	0.961	0.000	0.000	0.000	0.000	0.08
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	3.052	0.000	0.11
L12	94.50-89.50	A	0.956	0.000	0.000	0.000	0.000	0.08
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	3.041	0.000	0.11
L13	89.50-84.50	A	0.950	0.000	0.000	0.000	0.000	0.08
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	3.029	0.000	0.11
L14	84.50-79.50	A	0.945	0.000	0.000	0.000	0.000	0.08
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	3.016	0.000	0.16
L15	79.50-74.50	A	0.939	0.000	0.000	0.000	0.000	0.08
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	3.003	0.000	0.16
L16	74.50-69.50	A	0.932	0.000	0.000	0.636	0.000	0.09
		B		0.000	0.000	0.636	0.000	0.01
		C		0.000	0.000	3.625	0.000	0.18
L17	69.50-69.25	A	0.929	0.000	0.000	0.159	0.000	0.01
		B		0.000	0.000	0.159	0.000	0.00
		C		0.000	0.000	0.308	0.000	0.01
L18	69.25-64.25	A	0.925	0.000	0.000	3.175	0.000	0.11
		B		0.000	0.000	3.175	0.000	0.03
		C		0.000	0.000	6.148	0.000	0.22
L19	64.25-58.25	A	0.918	0.000	0.000	2.376	0.000	0.12
		B		0.000	0.000	2.376	0.000	0.02
		C		0.000	0.000	5.922	0.000	0.25
L20	58.25-57.25	A	0.912	0.000	0.000	0.000	0.000	0.02
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.591	0.000	0.04
L21	57.25-53.00	A	0.908	0.000	0.000	1.563	0.000	0.09
		B		0.000	0.000	1.563	0.000	0.02
		C		0.000	0.000	4.057	0.000	0.18
L22	53.00-52.75	A	0.904	0.000	0.000	0.195	0.000	0.01
		B		0.000	0.000	0.195	0.000	0.00
		C		0.000	0.000	0.341	0.000	0.01
L23	52.75-47.75	A	0.900	0.000	0.000	3.900	0.000	0.12
		B		0.000	0.000	3.900	0.000	0.04
		C		0.000	0.000	6.814	0.000	0.23
L24	47.75-42.75	A	0.890	0.000	0.000	3.890	0.000	0.12
		B		0.000	0.000	3.890	0.000	0.04
		C		0.000	0.000	6.784	0.000	0.23
L25	42.75-37.75	A	0.880	0.000	0.000	3.880	0.000	0.12
		B		0.000	0.000	3.880	0.000	0.04
		C		0.000	0.000	6.750	0.000	0.23
L26	37.75-37.00	A	0.873	0.000	0.000	0.581	0.000	0.02
		B		0.000	0.000	0.581	0.000	0.01
		C		0.000	0.000	1.009	0.000	0.03
L27	37.00-36.75	A	0.872	0.000	0.000	0.194	0.000	0.01
		B		0.000	0.000	0.194	0.000	0.00
		C		0.000	0.000	0.336	0.000	0.01
L28	36.75-28.75	A	0.862	0.000	0.000	6.491	0.000	0.19
		B		0.000	0.000	6.491	0.000	0.06
		C		0.000	0.000	11.019	0.000	0.37
L29	28.75-27.75	A	0.849	0.000	0.000	0.822	0.000	0.02
		B		0.000	0.000	0.822	0.000	0.01
		C		0.000	0.000	1.388	0.000	0.05

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
L30	27.75-22.75	A	0.840	0.000	0.000	4.090	0.000	0.12
		B		0.000	0.000	4.090	0.000	0.04
		C		0.000	0.000	6.870	0.000	0.23
L31	22.75-22.50	A	0.831	0.000	0.000	0.204	0.000	0.01
		B		0.000	0.000	0.204	0.000	0.00
		C		0.000	0.000	0.342	0.000	0.01
L32	22.50-22.25	A	0.830	0.000	0.000	0.204	0.000	0.01
		B		0.000	0.000	0.204	0.000	0.00
		C		0.000	0.000	0.342	0.000	0.01
L33	22.25-22.00	A	0.829	0.000	0.000	0.204	0.000	0.01
		B		0.000	0.000	0.204	0.000	0.00
		C		0.000	0.000	0.342	0.000	0.01
L34	22.00-17.00	A	0.818	0.000	0.000	4.068	0.000	0.07
		B		0.000	0.000	4.068	0.000	0.04
		C		0.000	0.000	6.800	0.000	0.20
L35	17.00-12.00	A	0.794	0.000	0.000	4.044	0.000	0.04
		B		0.000	0.000	4.044	0.000	0.04
		C		0.000	0.000	11.576	0.000	0.22
L36	12.00-7.00	A	0.761	0.000	0.000	4.011	0.000	0.03
		B		0.000	0.000	4.011	0.000	0.03
		C		0.000	0.000	13.034	0.000	0.11
L37	7.00-2.00	A	0.707	0.000	0.000	3.957	0.000	0.03
		B		0.000	0.000	3.957	0.000	0.03
		C		0.000	0.000	8.905	0.000	0.07
L38	2.00-0.00	A	0.608	0.000	0.000	1.543	0.000	0.01
		B		0.000	0.000	1.543	0.000	0.01
		C		0.000	0.000	3.086	0.000	0.02

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	148.00-143.00	0.0000	0.8634	0.0000	2.0857
L2	143.00-138.00	0.0000	0.8655	0.0000	2.1103
L3	138.00-133.00	0.0000	0.8674	0.0000	2.1330
L4	133.00-128.00	0.0000	0.8692	0.0000	2.1540
L5	128.00-123.00	0.0000	0.8708	0.0000	2.1732
L6	123.00-118.00	0.0000	0.8723	0.0000	2.1908
L7	118.00-113.00	0.0000	0.8738	0.0000	2.2070
L8	113.00-108.00	0.0000	0.8751	0.0000	2.2217
L9	108.00-100.50	0.0000	0.8767	0.0000	2.2382
L10	100.50-99.50	0.0000	0.8782	0.0000	2.2472
L11	99.50-94.50	0.0000	0.8789	0.0000	2.2488
L12	94.50-89.50	0.0000	0.8799	0.0000	2.2590
L13	89.50-84.50	0.0000	0.8810	0.0000	2.2680
L14	84.50-79.50	0.0000	0.8819	0.0000	2.2757
L15	79.50-74.50	0.0000	0.8828	0.0000	2.2822
L16	74.50-69.50	0.0000	0.8142	0.0000	2.1211
L17	69.50-69.25	0.0000	0.6223	0.0000	1.6505
L18	69.25-64.25	0.0000	0.6251	0.0000	1.6571
L19	64.25-58.25	0.0000	0.7070	0.0000	1.8596
L20	58.25-57.25	0.0000	0.8858	0.0000	2.2949
L21	57.25-53.00	0.0000	0.7087	0.0000	1.8823
L22	53.00-52.75	0.0000	0.5634	0.0000	1.5742
L23	52.75-47.75	0.0000	0.5676	0.0000	1.5791
L24	47.75-42.75	0.0000	0.5755	0.0000	1.5874
L25	42.75-37.75	0.0000	0.5832	0.0000	1.5940
L26	37.75-37.00	0.0000	0.5875	0.0000	1.5969
L27	37.00-36.75	0.0000	0.5883	0.0000	1.5974
L28	36.75-28.75	0.0000	0.5779	0.0000	1.5766
L29	28.75-27.75	0.0000	0.5738	0.0000	1.5717
L30	27.75-22.75	0.0000	0.5782	0.0000	1.5589
L31	22.75-22.50	0.0000	0.5820	0.0000	1.5576
L32	22.50-22.25	0.0000	0.5823	0.0000	1.5575

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L33	22.25-22.00	0.0000	0.5832	0.0000	1.5590
L34	22.00-17.00	0.0000	0.5869	0.0000	1.5560
L35	17.00-12.00	0.0000	3.0310	0.0000	3.6793
L36	12.00-7.00	0.0000	3.5546	0.0000	4.1042
L37	7.00-2.00	0.0000	1.8961	0.0000	2.1339
L38	2.00-0.00	0.0000	1.6969	0.0000	1.6092

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	23	Step Bolts	143.00 - 148.00	1.0000	1.0000
L1	24	Safety Line 3/8	143.00 - 148.00	1.0000	1.0000
L2	23	Step Bolts	138.00 - 143.00	1.0000	1.0000
L2	24	Safety Line 3/8	138.00 - 143.00	1.0000	1.0000
L3	23	Step Bolts	133.00 - 138.00	1.0000	1.0000
L3	24	Safety Line 3/8	133.00 - 138.00	1.0000	1.0000
L4	23	Step Bolts	128.00 - 133.00	1.0000	1.0000
L4	24	Safety Line 3/8	128.00 - 133.00	1.0000	1.0000
L5	23	Step Bolts	123.00 - 128.00	1.0000	1.0000
L5	24	Safety Line 3/8	123.00 - 128.00	1.0000	1.0000
L6	23	Step Bolts	118.00 - 123.00	1.0000	1.0000
L6	24	Safety Line 3/8	118.00 - 123.00	1.0000	1.0000
L7	23	Step Bolts	113.00 - 118.00	1.0000	1.0000
L7	24	Safety Line 3/8	113.00 - 118.00	1.0000	1.0000
L8	23	Step Bolts	108.00 - 113.00	1.0000	1.0000
L8	24	Safety Line 3/8	108.00 - 113.00	1.0000	1.0000
L9	23	Step Bolts	100.50 - 108.00	1.0000	1.0000
L9	24	Safety Line 3/8	100.50 - 108.00	1.0000	1.0000
L10	23	Step Bolts	99.50 - 100.50	1.0000	1.0000
L10	24	Safety Line 3/8	99.50 - 100.50	1.0000	1.0000
L11	23	Step Bolts	94.50 - 99.50	1.0000	1.0000
L11	24	Safety Line 3/8	94.50 - 99.50	1.0000	1.0000
L12	23	Step Bolts	89.50 - 94.50	1.0000	1.0000
L12	24	Safety Line 3/8	89.50 - 94.50	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L13	23	Step Bolts	84.50 - 89.50	1.0000	1.0000
L13	24	Safety Line 3/8	84.50 - 89.50	1.0000	1.0000
L14	23	Step Bolts	79.50 - 84.50	1.0000	1.0000
L14	24	Safety Line 3/8	79.50 - 84.50	1.0000	1.0000
L15	23	Step Bolts	74.50 - 79.50	1.0000	1.0000
L15	24	Safety Line 3/8	74.50 - 79.50	1.0000	1.0000
L16	23	Step Bolts	69.50 - 74.50	1.0000	1.0000
L16	24	Safety Line 3/8	69.50 - 74.50	1.0000	1.0000
L16	34	PL1x4-1/2	69.50 - 70.50	1.0000	1.0000
L16	35	PL1x4-1/2	69.50 - 70.50	1.0000	1.0000
L16	36	PL1x4-1/2	69.50 - 70.50	1.0000	1.0000
L17	23	Step Bolts	69.25 - 69.50	1.0000	1.0000
L17	24	Safety Line 3/8	69.25 - 69.50	1.0000	1.0000
L17	34	PL1x4-1/2	69.25 - 69.50	1.0000	1.0000
L17	35	PL1x4-1/2	69.25 - 69.50	1.0000	1.0000
L17	36	PL1x4-1/2	69.25 - 69.50	1.0000	1.0000
L18	23	Step Bolts	64.25 - 69.25	1.0000	1.0000
L18	24	Safety Line 3/8	64.25 - 69.25	1.0000	1.0000
L18	34	PL1x4-1/2	64.25 - 69.25	1.0000	1.0000
L18	35	PL1x4-1/2	64.25 - 69.25	1.0000	1.0000
L18	36	PL1x4-1/2	64.25 - 69.25	1.0000	1.0000
L19	23	Step Bolts	58.25 - 64.25	1.0000	1.0000
L19	24	Safety Line 3/8	58.25 - 64.25	1.0000	1.0000
L19	34	PL1x4-1/2	60.50 - 64.25	1.0000	1.0000
L19	35	PL1x4-1/2	60.50 - 64.25	1.0000	1.0000
L19	36	PL1x4-1/2	60.50 - 64.25	1.0000	1.0000
L20	23	Step Bolts	57.25 - 58.25	1.0000	1.0000
L20	24	Safety Line 3/8	57.25 - 58.25	1.0000	1.0000
L21	23	Step Bolts	53.00 - 57.25	1.0000	1.0000
L21	24	Safety Line 3/8	53.00 - 57.25	1.0000	1.0000
L21	31	PL1x6	53.00 - 55.00	1.0000	1.0000
L21	32	PL1x6	53.00 - 55.00	1.0000	1.0000
L21	33	PL1x6	53.00 - 55.00	1.0000	1.0000
L22	23	Step Bolts	52.75 - 53.00	1.0000	1.0000
L22	24	Safety Line 3/8	52.75 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L22	31	PL1x6	53.00 - 52.75	1.0000	1.0000
L22	32	PL1x6	53.00 - 52.75	1.0000	1.0000
L22	33	PL1x6	53.00 - 52.75	1.0000	1.0000
L23	23	Step Bolts	53.00 - 47.75	1.0000	1.0000
L23	24	Safety Line 3/8	52.75 - 47.75	1.0000	1.0000
L23	31	PL1x6	52.75 - 47.75	1.0000	1.0000
L23	32	PL1x6	52.75 - 47.75	1.0000	1.0000
L23	33	PL1x6	52.75 - 47.75	1.0000	1.0000
L24	23	Step Bolts	47.75 - 42.75	1.0000	1.0000
L24	24	Safety Line 3/8	47.75 - 42.75	1.0000	1.0000
L24	31	PL1x6	47.75 - 42.75	1.0000	1.0000
L24	32	PL1x6	47.75 - 42.75	1.0000	1.0000
L24	33	PL1x6	47.75 - 42.75	1.0000	1.0000
L25	23	Step Bolts	42.75 - 37.75	1.0000	1.0000
L25	24	Safety Line 3/8	42.75 - 37.75	1.0000	1.0000
L25	31	PL1x6	42.75 - 37.75	1.0000	1.0000
L25	32	PL1x6	42.75 - 37.75	1.0000	1.0000
L25	33	PL1x6	42.75 - 37.75	1.0000	1.0000
L26	23	Step Bolts	37.75 - 37.00	1.0000	1.0000
L26	24	Safety Line 3/8	37.75 - 37.00	1.0000	1.0000
L26	31	PL1x6	37.75 - 37.00	1.0000	1.0000
L26	32	PL1x6	37.75 - 37.00	1.0000	1.0000
L26	33	PL1x6	37.75 - 37.00	1.0000	1.0000
L27	23	Step Bolts	37.00 - 36.75	1.0000	1.0000
L27	24	Safety Line 3/8	37.00 - 36.75	1.0000	1.0000
L27	31	PL1x6	37.00 - 36.75	1.0000	1.0000
L27	32	PL1x6	37.00 - 36.75	1.0000	1.0000
L27	33	PL1x6	37.00 - 36.75	1.0000	1.0000
L28	23	Step Bolts	36.75 - 35.00	1.0000	1.0000
L28	24	Safety Line 3/8	36.75 - 35.00	1.0000	1.0000
L28	26	PL1-1/4x6-1/2	36.75 - 35.00	1.0000	1.0000
L28	27	PL1-1/4x6-1/2	35.00 - 35.00	1.0000	1.0000
L28	30	PL1-1/4x6-1/2	35.00 - 35.00	1.0000	1.0000
L28	31	PL1x6	35.00 - 36.75	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L28	32	PL1x6	35.00 - 36.75	1.0000	1.0000
L28	33	PL1x6	35.00 - 36.75	1.0000	1.0000
L29	23	Step Bolts	27.75 - 28.75	1.0000	1.0000
L29	24	Safety Line 3/8	27.75 - 28.75	1.0000	1.0000
L29	26	PL1-1/4x6-1/2	27.75 - 28.75	1.0000	1.0000
L29	27	PL1-1/4x6-1/2	27.75 - 28.75	1.0000	1.0000
L29	30	PL1-1/4x6-1/2	27.75 - 28.75	1.0000	1.0000
L30	23	Step Bolts	22.75 - 27.75	1.0000	1.0000
L30	24	Safety Line 3/8	22.75 - 27.75	1.0000	1.0000
L30	26	PL1-1/4x6-1/2	22.75 - 27.75	1.0000	1.0000
L30	27	PL1-1/4x6-1/2	22.75 - 27.75	1.0000	1.0000
L30	30	PL1-1/4x6-1/2	22.75 - 27.75	1.0000	1.0000
L31	23	Step Bolts	22.50 - 22.75	1.0000	1.0000
L31	24	Safety Line 3/8	22.50 - 22.75	1.0000	1.0000
L31	26	PL1-1/4x6-1/2	22.50 - 22.75	1.0000	1.0000
L31	27	PL1-1/4x6-1/2	22.50 - 22.75	1.0000	1.0000
L31	30	PL1-1/4x6-1/2	22.50 - 22.75	1.0000	1.0000
L32	23	Step Bolts	22.25 - 22.50	1.0000	1.0000
L32	24	Safety Line 3/8	22.25 - 22.50	1.0000	1.0000
L32	26	PL1-1/4x6-1/2	22.25 - 22.50	1.0000	1.0000
L32	27	PL1-1/4x6-1/2	22.25 - 22.50	1.0000	1.0000
L32	30	PL1-1/4x6-1/2	22.25 - 22.50	1.0000	1.0000
L33	23	Step Bolts	22.00 - 22.25	1.0000	1.0000
L33	24	Safety Line 3/8	22.00 - 22.25	1.0000	1.0000
L33	26	PL1-1/4x6-1/2	22.00 - 22.25	1.0000	1.0000
L33	27	PL1-1/4x6-1/2	22.00 - 22.25	1.0000	1.0000
L33	30	PL1-1/4x6-1/2	22.00 - 22.25	1.0000	1.0000
L34	23	Step Bolts	17.00 - 22.00	1.0000	1.0000
L34	24	Safety Line 3/8	17.00 - 22.00	1.0000	1.0000
L34	26	PL1-1/4x6-1/2	17.00 - 22.00	1.0000	1.0000
L34	27	PL1-1/4x6-1/2	17.00 - 22.00	1.0000	1.0000
L34	30	PL1-1/4x6-1/2	17.00 - 22.00	1.0000	1.0000
L35	23	Step Bolts	12.00 - 17.00	1.0000	1.0000
L35	24	Safety Line 3/8	12.00 - 17.00	1.0000	1.0000
L35	26	PL1-1/4x6-1/2	12.00 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L35	27	PL1-1/4x6-1/2	17.00 12.00 -	1.0000	1.0000
L35	28	PL1-1/4x6-1/2	17.00 12.00 -	1.0000	1.0000
L35	29	PL1-1/4x6-1/2	15.00 12.00 -	1.0000	1.0000
L35	30	PL1-1/4x6-1/2	15.00 12.00 -	1.0000	1.0000
L36	23	Step Bolts	17.00 7.00 - 12.00	1.0000	1.0000
L36	24	Safety Line 3/8	7.00 - 12.00	1.0000	1.0000
L36	26	PL1-1/4x6-1/2	7.00 - 12.00	1.0000	1.0000
L36	27	PL1-1/4x6-1/2	7.00 - 12.00	1.0000	1.0000
L36	28	PL1-1/4x6-1/2	7.00 - 12.00	1.0000	1.0000
L36	29	PL1-1/4x6-1/2	7.00 - 12.00	1.0000	1.0000
L36	30	PL1-1/4x6-1/2	9.00 - 12.00	1.0000	1.0000
L37	23	Step Bolts	5.00 - 7.00	1.0000	1.0000
L37	24	Safety Line 3/8	5.00 - 7.00	1.0000	1.0000
L37	26	PL1-1/4x6-1/2	2.00 - 7.00	1.0000	1.0000
L37	27	PL1-1/4x6-1/2	2.00 - 7.00	1.0000	1.0000
L37	28	PL1-1/4x6-1/2	2.00 - 7.00	1.0000	1.0000
L37	29	PL1-1/4x6-1/2	2.00 - 7.00	1.0000	1.0000
L38	26	PL1-1/4x6-1/2	0.00 - 2.00	1.0000	1.0000
L38	27	PL1-1/4x6-1/2	0.00 - 2.00	1.0000	1.0000
L38	28	PL1-1/4x6-1/2	0.00 - 2.00	1.0000	1.0000
L38	29	PL1-1/4x6-1/2	0.00 - 2.00	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
**									
LLPX310R-V1_TIA w/ Mount Pipe	A	From Leg	4.00 0.00 4.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	4.57 4.92 5.29	3.00 3.54 4.10	0.06 0.10 0.14
LLPX310R-V1_TIA w/ Mount Pipe	B	From Leg	4.00 0.00 4.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	4.57 4.92 5.29	3.00 3.54 4.10	0.06 0.10 0.14
LLPX310R-V1_TIA w/ Mount Pipe	C	From Leg	4.00 0.00 4.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	4.57 4.92 5.29	3.00 3.54 4.10	0.06 0.10 0.14
FDD_R6_RRH	A	From Leg	4.00 0.00 4.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	1.53 1.69 1.85	0.68 0.80 0.92	0.03 0.04 0.06
FDD_R6_RRH	B	From Leg	4.00 0.00 4.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	1.53 1.69 1.85	0.68 0.80 0.92	0.03 0.04 0.06
FDD_R6_RRH	C	From Leg	4.00 0.00 4.00	0.0000	148.00	No Ice 1/2" Ice 1" Ice	1.53 1.69 1.85	0.68 0.80 0.92	0.03 0.04 0.06
DB420	A	From Leg	4.00	0.0000	148.00	No Ice	6.00	6.00	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2"	8.03	8.03	0.09
			10.00			Ice	10.08	10.08	0.15
						1" Ice			
Top Hat	A	From Leg	4.00	0.0000	148.00	No Ice	1.49	1.49	0.05
			0.00			1/2"	2.08	2.08	0.07
			2.50			Ice	2.40	2.40	0.09
						1" Ice			
**									
APXVSPP18-C-A20_TIA w/ Mount Pipe	A	From Leg	4.00	0.0000	148.00	No Ice	8.26	7.47	0.10
			0.00			1/2"	8.82	8.66	0.17
			0.00			Ice	9.35	9.56	0.24
						1" Ice			
APXVSPP18-C-A20_TIA w/ Mount Pipe	B	From Leg	4.00	0.0000	148.00	No Ice	8.26	7.47	0.10
			0.00			1/2"	8.82	8.66	0.17
			0.00			Ice	9.35	9.56	0.24
						1" Ice			
APXVSPP18-C-A20_TIA w/ Mount Pipe	C	From Leg	4.00	0.0000	148.00	No Ice	8.26	7.47	0.10
			0.00			1/2"	8.82	8.66	0.17
			0.00			Ice	9.35	9.56	0.24
						1" Ice			
APXVTM14-C-120_TIA w/ Mount Pipe	A	From Leg	4.00	0.0000	148.00	No Ice	6.58	4.96	0.08
			0.00			1/2"	7.03	5.75	0.13
			0.00			Ice	7.47	6.47	0.19
						1" Ice			
APXVTM14-C-120_TIA w/ Mount Pipe	B	From Leg	4.00	0.0000	148.00	No Ice	6.58	4.96	0.08
			0.00			1/2"	7.03	5.75	0.13
			0.00			Ice	7.47	6.47	0.19
						1" Ice			
APXVTM14-C-120_TIA w/ Mount Pipe	C	From Leg	4.00	0.0000	148.00	No Ice	6.58	4.96	0.08
			0.00			1/2"	7.03	5.75	0.13
			0.00			Ice	7.47	6.47	0.19
						1" Ice			
TD-RRH8x20-25	A	From Leg	4.00	0.0000	148.00	No Ice	4.05	1.53	0.07
			0.00			1/2"	4.30	1.71	0.10
			0.00			Ice	4.56	1.90	0.13
						1" Ice			
TD-RRH8x20-25	B	From Leg	4.00	0.0000	148.00	No Ice	4.05	1.53	0.07
			0.00			1/2"	4.30	1.71	0.10
			0.00			Ice	4.56	1.90	0.13
						1" Ice			
TD-RRH8x20-25	C	From Leg	4.00	0.0000	148.00	No Ice	4.05	1.53	0.07
			0.00			1/2"	4.30	1.71	0.10
			0.00			Ice	4.56	1.90	0.13
						1" Ice			
FD-RRH-2x50-800	A	From Leg	4.00	0.0000	148.00	No Ice	1.36	3.01	0.05
			0.00			1/2"	1.52	3.22	0.08
			0.00			Ice	1.68	3.45	0.10
						1" Ice			
FD-RRH-2x50-800	B	From Leg	4.00	0.0000	148.00	No Ice	1.36	3.01	0.05
			0.00			1/2"	1.52	3.22	0.08
			0.00			Ice	1.68	3.45	0.10
						1" Ice			
FD-RRH-2x50-800	C	From Leg	4.00	0.0000	148.00	No Ice	1.36	3.01	0.05
			0.00			1/2"	1.52	3.22	0.08
			0.00			Ice	1.68	3.45	0.10
						1" Ice			
B66A RRH4X45	A	From Leg	4.00	0.0000	148.00	No Ice	2.58	1.63	0.06
			0.00			1/2"	2.79	1.81	0.08
			0.00			Ice	3.01	2.00	0.10
						1" Ice			
B66A RRH4X45	B	From Leg	4.00	0.0000	148.00	No Ice	2.58	1.63	0.06
			0.00			1/2"	2.79	1.81	0.08
			0.00			Ice	3.01	2.00	0.10
						1" Ice			
B66A RRH4X45	C	From Leg	4.00	0.0000	148.00	No Ice	2.58	1.63	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2"	2.79	1.81	0.08
			0.00			Ice	3.01	2.00	0.10
						1" Ice			
ACU-A20-N	A	From Leg	4.00	0.0000	148.00	No Ice	0.07	0.12	0.00
			0.00			1/2"	0.10	0.16	0.00
			0.00			Ice	0.15	0.21	0.00
						1" Ice			
ACU-A20-N	B	From Leg	4.00	0.0000	148.00	No Ice	0.07	0.12	0.00
			0.00			1/2"	0.10	0.16	0.00
			0.00			Ice	0.15	0.21	0.00
						1" Ice			
ACU-A20-N	C	From Leg	4.00	0.0000	148.00	No Ice	0.07	0.12	0.00
			0.00			1/2"	0.10	0.16	0.00
			0.00			Ice	0.15	0.21	0.00
						1" Ice			
800 Notch Filter	A	From Leg	4.00	0.0000	148.00	No Ice	0.07	0.12	0.00
			0.00			1/2"	0.10	0.16	0.00
			0.00			Ice	0.15	0.21	0.00
						1" Ice			
800 Notch Filter	B	From Leg	4.00	0.0000	148.00	No Ice	0.07	0.12	0.00
			0.00			1/2"	0.10	0.16	0.00
			0.00			Ice	0.15	0.21	0.00
						1" Ice			
800 Notch Filter	C	From Leg	4.00	0.0000	148.00	No Ice	0.07	0.12	0.00
			0.00			1/2"	0.10	0.16	0.00
			0.00			Ice	0.15	0.21	0.00
						1" Ice			
(2) Dish Pipe	A	From Leg	4.00	0.0000	148.00	No Ice	1.49	1.49	0.05
			0.00			1/2"	2.08	2.08	0.07
			0.00			Ice	2.40	2.40	0.09
						1" Ice			
(2) Dish Pipe	B	From Leg	4.00	0.0000	148.00	No Ice	1.49	1.49	0.05
			0.00			1/2"	2.08	2.08	0.07
			0.00			Ice	2.40	2.40	0.09
						1" Ice			
(3) Empty Pipe	A	From Leg	4.00	0.0000	148.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice			
(3) Empty Pipe	B	From Leg	4.00	0.0000	148.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice			
(2) Empty Pipe	C	From Leg	4.00	0.0000	148.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice			
Platform Mount	C	None		0.0000	148.00	No Ice	18.38	18.38	2.10
						1/2"	22.11	22.11	2.65
						Ice	25.87	25.87	3.26
						1" Ice			
**********									
Dish Mount	C	From Leg	0.50	0.0000	144.00	No Ice	1.50	1.50	0.05
			0.00			1/2"	2.08	2.08	0.07
			2.50			Ice	2.40	2.40	0.09
						1" Ice			
**********									
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.00	0.0000	130.00	No Ice	12.96	7.77	0.09
			0.00			1/2"	13.67	9.05	0.19
			0.00			Ice	14.34	10.19	0.29
						1" Ice			
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.00	0.0000	130.00	No Ice	12.96	7.77	0.09
			0.00			1/2"	13.67	9.05	0.19
			0.00			Ice	14.34	10.19	0.29
						1" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	12.96 13.67 14.34	7.77 9.05 10.19	0.09 0.19 0.29
TA08025-B605	A	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	1.96 2.14 2.32	1.19 1.33 1.48	0.07 0.09 0.11
TA08025-B605	B	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	1.96 2.14 2.32	1.19 1.33 1.48	0.07 0.09 0.11
TA08025-B605	C	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	1.96 2.14 2.32	1.19 1.33 1.48	0.07 0.09 0.11
TA08025-B604	A	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	1.96 2.14 2.32	1.03 1.17 1.31	0.06 0.08 0.10
TA08025-B604	B	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	1.96 2.14 2.32	1.03 1.17 1.31	0.06 0.08 0.10
TA08025-B604	C	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	1.96 2.14 2.32	1.03 1.17 1.31	0.06 0.08 0.10
RDIDC-9181-PF-48	C	From Face	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	1.87 2.04 2.21	1.07 1.20 1.35	0.02 0.04 0.06
(2) 8' long Pipe	A	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
(2) 8' long Pipe	B	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
(2) 8' long Pipe	C	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	0.03 0.04 0.06
8' Platform Mount	C	None		0.0000	130.00	No Ice 1/2" Ice 1" Ice	19.42 22.01 24.63	18.40 20.72 23.22	1.24 1.62 2.06
**********									
QD6616-7 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	14.09 14.82 15.53	8.74 10.05 11.22	0.09 0.19 0.31
QD6616-7 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	14.09 14.82 15.53	8.74 10.05 11.22	0.09 0.19 0.31
QD6616-7 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	14.09 14.82 15.53	8.74 10.05 11.22	0.09 0.19 0.31
AIR6449 B77D + AIR6419 B77G w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	9.15 9.87 10.54	6.75 7.97 9.02	0.19 0.27 0.35

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
AIR6449 B77D + AIR6419 B77G w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	9.15 9.87 10.54	6.75 7.97 9.02	0.19 0.27 0.35
AIR6449 B77D + AIR6419 B77G w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	9.15 9.87 10.54	6.75 7.97 9.02	0.19 0.27 0.35
RRUS 32 B2	A	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	2.71 2.93 3.16	1.66 1.85 2.04	0.05 0.07 0.10
RRUS 32 B2	B	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	2.71 2.93 3.16	1.66 1.85 2.04	0.05 0.07 0.10
RRUS 32 B2	C	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	2.71 2.93 3.16	1.66 1.85 2.04	0.05 0.07 0.10
RRUS 32 B30	A	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	2.69 2.91 3.14	1.57 1.76 1.95	0.06 0.08 0.10
RRUS 32 B30	B	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	2.69 2.91 3.14	1.57 1.76 1.95	0.06 0.08 0.10
RRUS 32 B30	C	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	2.69 2.91 3.14	1.57 1.76 1.95	0.06 0.08 0.10
RRUS 32 B66A	A	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	2.74 2.96 3.19	1.67 1.86 2.05	0.05 0.07 0.10
RRUS 32 B66A	B	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	2.74 2.96 3.19	1.67 1.86 2.05	0.05 0.07 0.10
RRUS 32 B66A	C	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	2.74 2.96 3.19	1.67 1.86 2.05	0.05 0.07 0.10
RRUS E2 B29	A	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	3.15 3.36 3.59	1.29 1.44 1.60	0.06 0.08 0.11
RRUS E2 B29	B	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	3.15 3.36 3.59	1.29 1.44 1.60	0.06 0.08 0.11
RRUS E2 B29	C	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	3.15 3.36 3.59	1.29 1.44 1.60	0.06 0.08 0.11
DC6-48-60-18-8F	A	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	0.92 1.46 1.64	0.92 1.46 1.64	0.02 0.04 0.06
DC6-48-60-18-8F	B	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	0.92 1.46 1.64	0.92 1.46 1.64	0.02 0.04 0.06
DC6-48-60-18-8F	C	From Leg	4.00	0.0000	120.00	No Ice	0.92	0.92	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00				1/2" Ice	1.46	1.46	0.04
			0.00				1" Ice	1.64	1.64	0.06
RRUS 4478 B14	A	From Leg	4.00		0.0000	120.00	No Ice	1.84	1.06	0.06
			0.00				1/2" Ice	2.01	1.20	0.08
			0.00				1" Ice	2.19	1.34	0.09
RRUS 4478 B14	B	From Leg	4.00		0.0000	120.00	No Ice	1.84	1.06	0.06
			0.00				1/2" Ice	2.01	1.20	0.08
			0.00				1" Ice	2.19	1.34	0.09
RRUS 4478 B14	C	From Leg	4.00		0.0000	120.00	No Ice	1.84	1.06	0.06
			0.00				1/2" Ice	2.01	1.20	0.08
			0.00				1" Ice	2.19	1.34	0.09
RRUS 4449 B5/B12	A	From Leg	4.00		0.0000	120.00	No Ice	1.97	1.41	0.07
			0.00				1/2" Ice	2.14	1.56	0.09
			0.00				1" Ice	2.33	1.73	0.11
RRUS 4449 B5/B12	B	From Leg	4.00		0.0000	120.00	No Ice	1.97	1.41	0.07
			0.00				1/2" Ice	2.14	1.56	0.09
			0.00				1" Ice	2.33	1.73	0.11
RRUS 4449 B5/B12	C	From Leg	4.00		0.0000	120.00	No Ice	1.97	1.41	0.07
			0.00				1/2" Ice	2.14	1.56	0.09
			0.00				1" Ice	2.33	1.73	0.11
DC6-48-60-18-8C-EV	B	From Leg	4.00		0.0000	120.00	No Ice	2.74	2.74	0.03
			0.00				1/2" Ice	2.96	2.96	0.05
			0.00				1" Ice	3.20	3.20	0.08
DMP65R-BU6D w/ Mount Pipe	A	From Leg	4.00		0.0000	120.00	No Ice	12.95	7.26	0.10
			0.00				1/2" Ice	13.55	8.43	0.20
			0.00				1" Ice	14.11	9.31	0.30
DMP65R-BU6D w/ Mount Pipe	B	From Leg	4.00		0.0000	120.00	No Ice	12.95	7.26	0.10
			0.00				1/2" Ice	13.55	8.43	0.20
			0.00				1" Ice	14.11	9.31	0.30
DMP65R-BU6D w/ Mount Pipe	C	From Leg	4.00		0.0000	120.00	No Ice	12.95	7.26	0.10
			0.00				1/2" Ice	13.55	8.43	0.20
			0.00				1" Ice	14.11	9.31	0.30
Platform Mount (RMPQ)	C	None			0.0000	120.00	No Ice	23.81	23.81	1.59
							1/2" Ice	30.24	30.24	2.10
							1" Ice	36.33	36.33	2.73
*										
PD220	A	From Leg	4.00		0.0000	100.00	No Ice	3.56	3.56	0.02
			0.00				1/2" Ice	7.13	7.13	0.05
			10.00				1" Ice	10.70	10.70	0.07
DB205-A	B	From Leg	4.00		0.0000	100.00	No Ice	1.20	1.20	0.04
			0.00				1/2" Ice	2.16	2.16	0.05
			8.00				1" Ice	3.12	3.12	0.06
DB224	C	From Leg	4.00		0.0000	100.00	No Ice	3.15	3.15	0.03
			0.00				1/2" Ice	5.67	5.67	0.04
			7.00				1" Ice	8.19	8.19	0.05
DB220-B	B	From Leg	4.00		0.0000	100.00	No Ice	0.70	0.70	0.01
			0.00				1/2" Ice	1.26	1.26	0.02
			7.00				1" Ice	1.82	1.82	0.02
(2) PD1110	B	From Leg	4.00		0.0000	100.00	No Ice	3.06	3.06	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2"	5.10	5.10	0.06
			5.00			Ice	7.14	7.14	0.10
						1" Ice			
(2) PD201	A	From Leg	4.00	0.0000	100.00	No Ice	0.68	0.68	0.00
			0.00			1/2"	1.80	1.80	0.01
			5.00			Ice	2.92	2.92	0.02
						1" Ice			
(2) PD83-1	C	From Leg	4.00	0.0000	100.00	No Ice	0.95	0.95	0.01
			0.00			1/2"	1.89	1.89	0.02
			-5.00			Ice	2.83	2.83	0.04
						1" Ice			
(3) Mount Pipes	A	From Leg	4.00	0.0000	100.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice			
(3) Mount Pipes	B	From Leg	4.00	0.0000	100.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice			
(4) Mount Pipes	C	From Leg	4.00	0.0000	100.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice			
Platform Mount	C	None		0.0000	100.00	No Ice	18.38	18.38	2.10
						1/2"	22.11	22.11	2.65
						Ice	25.87	25.87	3.26
*						1" Ice			
APXVAARR24_43-U-NA20_TIA w/ Mount Pipe	A	From Leg	4.00	0.0000	85.00	No Ice	20.48	11.02	0.19
			0.00			1/2"	21.23	12.55	0.32
			0.00			Ice	21.99	14.10	0.47
						1" Ice			
APXVAARR24_43-U-NA20_TIA w/ Mount Pipe	B	From Leg	4.00	0.0000	85.00	No Ice	20.48	11.02	0.19
			0.00			1/2"	21.23	12.55	0.32
			0.00			Ice	21.99	14.10	0.47
						1" Ice			
APXVAARR24_43-U-NA20_TIA w/ Mount Pipe	C	From Leg	4.00	0.0000	85.00	No Ice	20.48	11.02	0.19
			0.00			1/2"	21.23	12.55	0.32
			0.00			Ice	21.99	14.10	0.47
						1" Ice			
AIR 32 B2a/B66Aa w/ Mount Pipe	A	From Leg	4.00	0.0000	85.00	No Ice	6.75	6.07	0.15
			0.00			1/2"	7.20	6.87	0.21
			0.00			Ice	7.65	7.58	0.28
						1" Ice			
AIR 32 B2a/B66Aa w/ Mount Pipe	B	From Leg	4.00	0.0000	85.00	No Ice	6.75	6.07	0.15
			0.00			1/2"	7.20	6.87	0.21
			0.00			Ice	7.65	7.58	0.28
						1" Ice			
AIR 32 B2a/B66Aa w/ Mount Pipe	C	From Leg	4.00	0.0000	85.00	No Ice	6.75	6.07	0.15
			0.00			1/2"	7.20	6.87	0.21
			0.00			Ice	7.65	7.58	0.28
						1" Ice			
AIR 6449 B41 w/ Mount Pipe	A	From Leg	4.00	0.0000	85.00	No Ice	6.90	4.32	0.13
			0.00			1/2"	7.74	5.37	0.19
			0.00			Ice	8.49	6.28	0.26
						1" Ice			
AIR 6449 B41 w/ Mount Pipe	B	From Leg	4.00	0.0000	85.00	No Ice	6.90	4.32	0.13
			0.00			1/2"	7.74	5.37	0.19
			0.00			Ice	8.49	6.28	0.26
						1" Ice			
AIR 6449 B41 w/ Mount Pipe	C	From Leg	4.00	0.0000	85.00	No Ice	6.90	4.32	0.13
			0.00			1/2"	7.74	5.37	0.19
			0.00			Ice	8.49	6.28	0.26
						1" Ice			
(2) ETW190VS12UB	A	From Leg	4.00	0.0000	85.00	No Ice	0.65	0.30	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	0.76	0.38	0.02
			0.00			1" Ice	0.87	0.46	0.03
(2) ETW190VS12UB	B	From Leg	4.00	0.0000	85.00	No Ice	0.65	0.30	0.01
			0.00			1/2" Ice	0.76	0.38	0.02
			0.00			1" Ice	0.87	0.46	0.03
(2) ETW190VS12UB	C	From Leg	4.00	0.0000	85.00	No Ice	0.65	0.30	0.01
			0.00			1/2" Ice	0.76	0.38	0.02
			0.00			1" Ice	0.87	0.46	0.03
RRUS 4415 B25	A	From Leg	4.00	0.0000	85.00	No Ice	1.64	0.68	0.04
			0.00			1/2" Ice	1.80	0.79	0.06
			0.00			1" Ice	1.97	0.91	0.07
RRUS 4415 B25	B	From Leg	4.00	0.0000	85.00	No Ice	1.64	0.68	0.04
			0.00			1/2" Ice	1.80	0.79	0.06
			0.00			1" Ice	1.97	0.91	0.07
RRUS 4415 B25	C	From Leg	4.00	0.0000	85.00	No Ice	1.64	0.68	0.04
			0.00			1/2" Ice	1.80	0.79	0.06
			0.00			1" Ice	1.97	0.91	0.07
RADIO 4449 B71+B85	A	From Leg	4.00	0.0000	85.00	No Ice	1.64	1.31	0.07
			0.00			1/2" Ice	1.80	1.46	0.09
			0.00			1" Ice	1.97	1.61	0.11
RADIO 4449 B71+B85	B	From Leg	4.00	0.0000	85.00	No Ice	1.64	1.31	0.07
			0.00			1/2" Ice	1.80	1.46	0.09
			0.00			1" Ice	1.97	1.61	0.11
RADIO 4449 B71+B85	C	From Leg	4.00	0.0000	85.00	No Ice	1.64	1.31	0.07
			0.00			1/2" Ice	1.80	1.46	0.09
			0.00			1" Ice	1.97	1.61	0.11
ATMAA1412D-1A20	A	From Leg	4.00	0.0000	85.00	No Ice	0.41	1.00	0.01
			0.00			1/2" Ice	0.50	1.13	0.02
			0.00			1" Ice	0.59	1.26	0.03
ATMAA1412D-1A20	B	From Leg	4.00	0.0000	85.00	No Ice	0.41	1.00	0.01
			0.00			1/2" Ice	0.50	1.13	0.02
			0.00			1" Ice	0.59	1.26	0.03
ATMAA1412D-1A20	C	From Leg	4.00	0.0000	85.00	No Ice	0.41	1.00	0.01
			0.00			1/2" Ice	0.50	1.13	0.02
			0.00			1" Ice	0.59	1.26	0.03
Platform Mount	C	None		0.0000	85.00	No Ice	18.38	18.38	2.10
						1/2" Ice	22.11	22.11	2.65
						1" Ice	25.87	25.87	3.26
****									
800 10504_TIA w/ Mount Pipe	A	From Leg	0.50	0.0000	72.00	No Ice	3.59	3.18	0.04
			0.00			1/2" Ice	4.01	3.91	0.07
			0.00			1" Ice	4.42	4.58	0.11
800 10504_TIA w/ Mount Pipe	B	From Leg	0.50	0.0000	72.00	No Ice	3.59	3.18	0.04
			0.00			1/2" Ice	4.01	3.91	0.07
			0.00			1" Ice	4.42	4.58	0.11
800 10504_TIA w/ Mount Pipe	C	From Leg	0.50	0.0000	72.00	No Ice	3.59	3.18	0.04
			0.00			1/2" Ice	4.01	3.91	0.07
			0.00			1" Ice	4.42	4.58	0.11
Collar Mount	C	None		0.0000	72.00	No Ice	0.30	0.30	0.20

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1/2" Ice	0.71	0.71	0.22
						1" Ice	1.00	1.00	0.23
**									
BSA150B	B	From Leg	3.00 0.00 0.00	0.0000	53.00	No Ice 1/2" Ice 1" Ice	0.30 0.32 0.35	0.30 0.32 0.34	0.01 0.02 0.02
Side Mount	B	None		0.0000	53.00	No Ice 1/2" Ice 1" Ice	0.62 0.74 0.89	1.49 2.07 2.54	0.03 0.04 0.06
*									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
**											
VHLP800-11	A	Paraboloid w/Shroud (HP)	From Leg	4.00 0.00 4.00	Worst		148.00	2.80	No Ice 1/2" Ice 1" Ice	6.16 6.53 6.90	0.05 0.08 0.12
VHLP800-11	B	Paraboloid w/Shroud (HP)	From Leg	4.00 0.00 4.00	Worst		148.00	2.80	No Ice 1/2" Ice 1" Ice	6.16 6.53 6.90	0.05 0.08 0.12
*											
4' Dish	B	Paraboloid w/o Radome	From Leg	1.50 0.00 0.00	Worst		144.00	4.23	No Ice 1/2" Ice 1" Ice	14.08 14.63 15.19	0.10 0.18 0.25
**											

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	148 - 143	Pole	Max Tension	26	0.00	0.00	-0.00
			Max. Compression	26	-9.16	-2.01	1.78
			Max. Mx	8	-4.45	-49.67	0.68
			Max. My	2	-4.45	-0.54	49.50
			Max. Vy	8	9.07	-49.67	0.68
			Max. Vx	2	-9.07	-0.54	49.50
			Max. Torque	12			5.38
L2	143 - 138	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-9.79	-2.02	1.76
			Max. Mx	8	-4.86	-96.30	0.68
			Max. My	2	-4.86	-0.58	96.12
			Max. Vy	8	9.59	-96.30	0.68
			Max. Vx	2	-9.59	-0.58	96.12
			Max. Torque	12			5.38
L3	138 - 133	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-10.44	-2.04	1.72
			Max. Mx	8	-5.29	-145.54	0.67
			Max. My	2	-5.29	-0.62	145.34
			Max. Vy	8	10.11	-145.54	0.67
			Max. Vx	2	-10.11	-0.62	145.34
			Max. Torque	12			5.38
L4	133 - 128	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-15.53	-2.06	1.38
			Max. Mx	8	-7.97	-203.52	0.57
			Max. My	2	-7.96	-0.66	203.24
			Max. Vy	8	13.69	-203.52	0.57
			Max. Vx	2	-13.72	-0.66	203.24
			Max. Torque	12			5.38
L5	128 - 123	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-16.24	-2.08	1.35
			Max. Mx	8	-8.47	-273.30	0.56
			Max. My	2	-8.47	-0.71	273.15
			Max. Vy	8	14.23	-273.30	0.56
			Max. Vx	2	-14.26	-0.71	273.15
			Max. Torque	12			5.27
L6	123 - 118	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-25.40	-2.49	1.08
			Max. Mx	8	-13.06	-358.85	0.49
			Max. My	2	-13.06	-0.87	358.57
			Max. Vy	8	21.22	-358.85	0.49
			Max. Vx	2	-21.25	-0.87	358.57
			Max. Torque	12			5.54
L7	118 - 113	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-26.26	-2.52	1.05
			Max. Mx	8	-13.75	-466.27	0.48
			Max. My	2	-13.75	-0.92	466.13
			Max. Vy	8	21.76	-466.27	0.48
			Max. Vx	2	-21.79	-0.92	466.13
			Max. Torque	12			5.53
L8	113 - 108	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-27.13	-2.54	1.00
			Max. Mx	8	-14.47	-576.42	0.46
			Max. My	2	-14.47	-0.96	576.41
			Max. Vy	8	22.31	-576.42	0.46
			Max. Vx	2	-22.34	-0.96	576.41
			Max. Torque	12			5.53
L9	108 - 100.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-27.76	-2.56	0.97
			Max. Mx	8	-15.00	-655.15	0.45
			Max. My	2	-14.99	-0.99	655.22
			Max. Vy	8	22.69	-655.15	0.45
			Max. Vx	2	-22.72	-0.99	655.22
			Max. Torque	12			5.53
L10	100.5 - 99.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-34.14	-3.05	0.26
			Max. Mx	8	-19.16	-775.10	0.11
			Max. My	2	-19.16	-1.14	774.80
			Max. Vy	8	25.56	-775.10	0.11
			Max. Vx	14	25.59	-1.14	-774.48
			Max. Torque	14			5.78
L11	99.5 - 94.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.34	-3.08	0.21
			Max. Mx	8	-20.21	-904.29	0.09
			Max. My	2	-20.21	-1.18	904.11
			Max. Vy	8	26.13	-904.29	0.09
			Max. Vx	14	26.16	-1.18	-903.84
			Max. Torque	14			5.78
L12	94.5 - 89.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-36.57	-3.10	0.16
			Max. Mx	8	-21.28	-1036.32	0.07
			Max. My	2	-21.28	-1.21	1036.26
			Max. Vy	8	26.70	-1036.32	0.07
			Max. Vx	14	26.73	-1.21	-1036.04
			Max. Torque	14			5.78
L13	89.5 - 84.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-45.54	-3.12	0.11
			Max. Mx	8	-26.82	-1173.37	0.06
			Max. My	2	-26.82	-1.24	1173.44
			Max. Vy	8	31.65	-1173.37	0.06
			Max. Vx	14	31.68	-1.24	-1173.26
			Max. Torque	14			5.78
L14	84.5 - 79.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-46.89	-3.12	0.06
			Max. Mx	8	-28.06	-1332.93	0.04
			Max. My	2	-28.06	-1.27	1333.11
			Max. Vy	8	32.20	-1332.93	0.04
			Max. Vx	14	32.23	-1.27	-1332.98
			Max. Torque	14			5.77

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L15	79.5 - 74.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-48.28	-3.12	0.01
			Max. Mx	8	-29.33	-1495.17	0.02
			Max. My	2	-29.33	-1.30	1495.48
			Max. Vy	8	32.73	-1495.17	0.02
			Max. Vx	14	32.76	-1.30	-1495.39
			Max. Torque	14			5.77
L16	74.5 - 69.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-50.33	-3.12	-0.04
			Max. Mx	8	-31.03	-1660.97	-0.01
			Max. My	2	-31.03	-1.32	1661.39
			Max. Vy	8	33.62	-1660.97	-0.01
			Max. Vx	14	33.65	-1.32	-1661.36
			Max. Torque	14			5.77
L17	69.5 - 69.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-50.41	-3.12	-0.04
			Max. Mx	8	-31.11	-1669.38	-0.01
			Max. My	2	-31.11	-1.32	1669.80
			Max. Vy	8	33.64	-1669.38	-0.01
			Max. Vx	14	33.66	-1.32	-1669.77
			Max. Torque	14			5.76
L18	69.25 - 64.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-51.98	-3.12	-0.10
			Max. Mx	8	-32.47	-1838.98	-0.03
			Max. My	14	-32.48	-1.34	-1839.37
			Max. Vy	8	34.23	-1838.98	-0.03
			Max. Vx	14	34.19	-1.34	-1839.37
			Max. Torque	14			5.76
L19	64.25 - 58.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-52.29	-3.12	-0.11
			Max. Mx	8	-32.75	-1873.24	-0.04
			Max. My	14	-32.76	-1.34	-1873.59
			Max. Vy	8	34.33	-1873.24	-0.04
			Max. Vx	14	34.29	-1.34	-1873.59
			Max. Torque	14			5.76
L20	58.25 - 57.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-55.51	-3.12	-0.17
			Max. Mx	8	-35.48	-2081.40	-0.07
			Max. My	14	-35.49	-1.37	-2081.55
			Max. Vy	8	35.07	-2081.40	-0.07
			Max. Vx	14	35.03	-1.37	-2081.55
			Max. Torque	14			5.76
L21	57.25 - 53	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-56.99	-3.12	-0.22
			Max. Mx	8	-36.83	-2231.26	-0.09
			Max. My	14	-36.83	-1.38	-2231.27
			Max. Vy	8	35.49	-2231.26	-0.09
			Max. Vx	14	35.45	-1.38	-2231.27
			Max. Torque	14			5.76
L22	53 - 52.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-57.16	-3.21	-0.27
			Max. Mx	8	-36.97	-2240.22	-0.13
			Max. My	14	-36.97	-1.45	-2240.19
			Max. Vy	8	35.58	-2240.22	-0.13
			Max. Vx	14	35.53	-1.45	-2240.19
			Max. Torque	14			5.80
L23	52.75 - 47.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-58.99	-3.21	-0.33
			Max. Mx	8	-38.57	-2419.52	-0.16
			Max. My	14	-38.58	-1.46	-2419.10
			Max. Vy	8	36.17	-2419.52	-0.16
			Max. Vx	14	36.05	-1.46	-2419.10
			Max. Torque	14			5.80
L24	47.75 - 42.75	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-60.85	-3.21	-0.39
			Max. Mx	8	-40.22	-2601.70	-0.18
			Max. My	14	-40.23	-1.47	-2600.47
			Max. Vy	8	36.74	-2601.70	-0.18
			Max. Vx	14	36.53	-1.47	-2600.47
			Max. Torque	14			5.80
L25	42.75 - 37.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-62.74	-3.21	-0.44
			Max. Mx	8	-41.91	-2786.63	-0.21
			Max. My	14	-41.92	-1.47	-2784.18
			Max. Vy	8	37.27	-2786.63	-0.21
			Max. Vx	14	36.98	-1.47	-2784.18
			Max. Torque	14			5.80
L26	37.75 - 37	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-63.03	-3.21	-0.45
			Max. Mx	8	-42.17	-2814.59	-0.22
			Max. My	14	-42.18	-1.47	-2811.93
			Max. Vy	8	37.35	-2814.59	-0.22
			Max. Vx	14	37.04	-1.47	-2811.93
			Max. Torque	14			5.80
L27	37 - 36.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-63.12	-3.21	-0.45
			Max. Mx	8	-42.26	-2823.93	-0.22
			Max. My	14	-42.27	-1.47	-2821.19
			Max. Vy	8	37.36	-2823.93	-0.22
			Max. Vx	14	37.06	-1.47	-2821.19
			Max. Torque	14			5.80
L28	36.75 - 28.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-63.99	-3.21	-0.48
			Max. Mx	8	-43.02	-2908.23	-0.23
			Max. My	14	-43.03	-1.48	-2904.78
			Max. Vy	8	37.60	-2908.23	-0.23
			Max. Vx	14	37.26	-1.48	-2904.78
			Max. Torque	14			5.80
L29	28.75 - 27.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-68.55	-3.21	-0.56
			Max. Mx	8	-46.93	-3164.83	-0.27
			Max. My	14	-46.94	-1.48	-3158.74
			Max. Vy	8	38.44	-3164.83	-0.27
			Max. Vx	14	37.99	-1.48	-3158.74
			Max. Torque	14			5.80
L30	27.75 - 22.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-70.69	-3.21	-0.62
			Max. Mx	8	-48.86	-3358.15	-0.30
			Max. My	14	-48.87	-1.48	-3349.63
			Max. Vy	8	38.93	-3358.15	-0.30
			Max. Vx	14	38.40	-1.48	-3349.63
			Max. Torque	14			5.79
L31	22.75 - 22.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-70.79	-3.21	-0.62
			Max. Mx	8	-48.97	-3367.88	-0.30
			Max. My	14	-48.98	-1.48	-3359.22
			Max. Vy	8	38.94	-3367.88	-0.30
			Max. Vx	14	38.40	-1.48	-3359.22
			Max. Torque	14			5.79
L32	22.5 - 22.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-70.90	-3.21	-0.62
			Max. Mx	8	-49.06	-3377.62	-0.30
			Max. My	14	-49.07	-1.48	-3368.83
			Max. Vy	8	38.96	-3377.62	-0.30
			Max. Vx	14	38.42	-1.48	-3368.83
			Max. Torque	14			5.79
L33	22.25 - 22	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-71.04	-3.21	-0.63
			Max. Mx	8	-49.19	-3387.36	-0.31

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	14	-49.20	-1.48	-3378.44
			Max. Vy	8	38.99	-3387.36	-0.31
			Max. Vx	14	38.44	-1.48	-3378.44
			Max. Torque	14			5.79
L34	22 - 17	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-73.78	-3.21	-0.69
			Max. Mx	8	-51.67	-3583.69	-0.34
			Max. My	14	-51.67	-1.48	-3571.85
			Max. Vy	8	39.56	-3583.69	-0.34
			Max. Vx	14	38.93	-1.48	-3571.85
			Max. Torque	14			5.79
L35	17 - 12	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-76.52	-3.21	-0.84
			Max. Mx	8	-54.12	-3782.88	-0.37
			Max. My	14	-54.13	-1.48	-3767.65
			Max. Vy	8	40.15	-3782.88	-0.37
			Max. Vx	14	39.41	-1.48	-3767.65
			Max. Torque	14			5.79
L36	12 - 7	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-79.15	-3.21	-1.02
			Max. Mx	8	-56.47	-3984.79	-0.40
			Max. My	14	-56.48	-1.48	-3965.79
			Max. Vy	8	40.65	-3984.79	-0.40
			Max. Vx	14	39.87	-1.48	-3965.79
			Max. Torque	14			5.79
L37	7 - 2	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-81.76	-3.21	-1.11
			Max. Mx	8	-58.85	-4189.09	-0.42
			Max. My	14	-58.86	-1.48	-4166.25
			Max. Vy	8	41.11	-4189.09	-0.42
			Max. Vx	14	40.34	-1.48	-4166.25
			Max. Torque	14			5.79
L38	2 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-82.79	-3.21	-1.14
			Max. Mx	8	-59.82	-4271.47	-0.42
			Max. My	14	-59.82	-1.48	-4247.08
			Max. Vy	8	41.30	-4271.47	-0.42
			Max. Vx	14	40.53	-1.48	-4247.08
			Max. Torque	14			5.79

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	82.79	-0.00	0.00
	Max. H_x	20	59.83	41.28	0.00
	Max. H_z	3	44.87	0.00	40.51
	Max. M_x	2	4246.27	0.00	40.51
	Max. M_z	8	4271.47	-41.28	0.00
	Max. Torsion	14	5.79	0.00	-40.51
	Min. Vert	11	44.87	-35.68	-20.61
	Min. H_x	8	59.83	-41.28	0.00
	Min. H_z	15	44.87	0.00	-40.51
	Min. M_x	14	-4247.08	0.00	-40.51
	Min. M_z	20	-4268.40	41.28	0.00
	Min. Torsion	2	-5.79	0.00	40.51

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	49.86	0.00	0.00	0.33	-1.20	-0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	59.83	0.00	-40.51	-4246.27	-1.47	5.79
0.9 Dead+1.0 Wind 0 deg - No Ice	44.87	0.00	-40.51	-4200.34	-1.08	5.76
1.2 Dead+1.0 Wind 30 deg - No Ice	59.83	20.95	-36.32	-3696.88	-2134.01	4.62
0.9 Dead+1.0 Wind 30 deg - No Ice	44.87	20.95	-36.32	-3657.06	-2110.59	4.61
1.2 Dead+1.0 Wind 60 deg - No Ice	59.83	35.68	-20.61	-2126.21	-3681.27	2.12
0.9 Dead+1.0 Wind 60 deg - No Ice	44.87	35.68	-20.61	-2103.29	-3641.04	2.12
1.2 Dead+1.0 Wind 90 deg - No Ice	59.83	41.28	0.00	0.42	-4271.47	-1.04
0.9 Dead+1.0 Wind 90 deg - No Ice	44.87	41.28	0.00	0.31	-4224.98	-1.01
1.2 Dead+1.0 Wind 120 deg - No Ice	59.83	35.68	20.61	2127.04	-3681.26	-3.68
0.9 Dead+1.0 Wind 120 deg - No Ice	44.87	35.68	20.61	2103.91	-3641.03	-3.64
1.2 Dead+1.0 Wind 150 deg - No Ice	59.83	20.95	36.32	3697.69	-2134.00	-5.41
0.9 Dead+1.0 Wind 150 deg - No Ice	44.87	20.95	36.32	3657.67	-2110.59	-5.37
1.2 Dead+1.0 Wind 180 deg - No Ice	59.83	0.00	40.51	4247.08	-1.47	-5.79
0.9 Dead+1.0 Wind 180 deg - No Ice	44.87	0.00	40.51	4200.95	-1.08	-5.76
1.2 Dead+1.0 Wind 210 deg - No Ice	59.83	-20.95	36.32	3697.64	2131.02	-4.62
0.9 Dead+1.0 Wind 210 deg - No Ice	44.87	-20.95	36.32	3657.63	2108.40	-4.61
1.2 Dead+1.0 Wind 240 deg - No Ice	59.83	-35.68	20.61	2126.98	3678.22	-2.12
0.9 Dead+1.0 Wind 240 deg - No Ice	44.87	-35.68	20.61	2103.87	3638.80	-2.12
1.2 Dead+1.0 Wind 270 deg - No Ice	59.83	-41.28	0.00	0.42	4268.40	1.04
0.9 Dead+1.0 Wind 270 deg - No Ice	44.87	-41.28	0.00	0.31	4222.73	1.01
1.2 Dead+1.0 Wind 300 deg - No Ice	59.83	-35.68	-20.61	-2126.16	3678.23	3.67
0.9 Dead+1.0 Wind 300 deg - No Ice	44.87	-35.68	-20.61	-2103.25	3638.80	3.64
1.2 Dead+1.0 Wind 330 deg - No Ice	59.83	-20.95	-36.32	-3696.83	2131.03	5.41
0.9 Dead+1.0 Wind 330 deg - No Ice	44.87	-20.95	-36.32	-3657.02	2108.41	5.37
1.2 Dead+1.0 Ice+1.0 Temp	82.79	0.00	-0.00	1.14	-3.21	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	82.79	-0.00	-7.89	-849.06	-3.38	1.08
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	82.79	3.98	-6.90	-735.59	-428.40	0.74
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	82.79	6.86	-3.96	-424.12	-739.40	0.19
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	82.79	7.88	0.00	1.17	-852.92	-0.43
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	82.79	6.86	3.96	426.46	-739.40	-0.89
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	82.79	3.98	6.90	737.92	-428.40	-1.13
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	82.79	0.00	7.89	851.40	-3.38	-1.08
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	82.79	-3.98	6.90	737.92	421.64	-0.74

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
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	82.79	-6.86	3.96	426.45	732.64	-0.19
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	82.79	-7.88	-0.00	1.17	846.16	0.43
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	82.79	-6.86	-3.96	-424.12	732.64	0.89
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	82.79	-3.98	-6.90	-735.58	421.64	1.13
Dead+Wind 0 deg - Service	49.86	0.00	-7.72	-804.87	-1.27	1.12
Dead+Wind 30 deg - Service	49.86	4.00	-6.93	-700.71	-405.62	0.89
Dead+Wind 60 deg - Service	49.86	6.80	-3.93	-402.89	-698.99	0.41
Dead+Wind 90 deg - Service	49.86	7.87	0.00	0.34	-810.91	-0.20
Dead+Wind 120 deg - Service	49.86	6.80	3.93	403.56	-698.99	-0.71
Dead+Wind 150 deg - Service	49.86	4.00	6.93	701.39	-405.62	-1.04
Dead+Wind 180 deg - Service	49.86	0.00	7.72	805.55	-1.27	-1.12
Dead+Wind 210 deg - Service	49.86	-4.00	6.93	701.39	403.09	-0.89
Dead+Wind 240 deg - Service	49.86	-6.80	3.93	403.56	696.45	-0.41
Dead+Wind 270 deg - Service	49.86	-7.87	0.00	0.34	808.37	0.20
Dead+Wind 300 deg - Service	49.86	-6.80	-3.93	-402.89	696.45	0.71
Dead+Wind 330 deg - Service	49.86	-4.00	-6.93	-700.71	403.09	1.04

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-49.86	0.00	0.00	49.86	0.00	0.000%
2	0.00	-59.83	-40.51	0.00	59.83	40.51	0.000%
3	0.00	-44.87	-40.51	0.00	44.87	40.51	0.000%
4	20.95	-59.83	-36.32	-20.95	59.83	36.32	0.000%
5	20.95	-44.87	-36.32	-20.95	44.87	36.32	0.000%
6	35.68	-59.83	-20.61	-35.68	59.83	20.61	0.000%
7	35.68	-44.87	-20.61	-35.68	44.87	20.61	0.000%
8	41.28	-59.83	0.00	-41.28	59.83	0.00	0.000%
9	41.28	-44.87	0.00	-41.28	44.87	0.00	0.000%
10	35.68	-59.83	20.61	-35.68	59.83	-20.61	0.000%
11	35.68	-44.87	20.61	-35.68	44.87	-20.61	0.000%
12	20.95	-59.83	36.32	-20.95	59.83	-36.32	0.000%
13	20.95	-44.87	36.32	-20.95	44.87	-36.32	0.000%
14	0.00	-59.83	40.51	0.00	59.83	-40.51	0.000%
15	0.00	-44.87	40.51	0.00	44.87	-40.51	0.000%
16	-20.95	-59.83	36.32	20.95	59.83	-36.32	0.000%
17	-20.95	-44.87	36.32	20.95	44.87	-36.32	0.000%
18	-35.68	-59.83	20.61	35.68	59.83	-20.61	0.000%
19	-35.68	-44.87	20.61	35.68	44.87	-20.61	0.000%
20	-41.28	-59.83	0.00	41.28	59.83	0.00	0.000%
21	-41.28	-44.87	0.00	41.28	44.87	0.00	0.000%
22	-35.68	-59.83	-20.61	35.68	59.83	20.61	0.000%
23	-35.68	-44.87	-20.61	35.68	44.87	20.61	0.000%
24	-20.95	-59.83	-36.32	20.95	59.83	36.32	0.000%
25	-20.95	-44.87	-36.32	20.95	44.87	36.32	0.000%
26	0.00	-82.79	0.00	-0.00	82.79	0.00	0.000%
27	-0.00	-82.79	-7.89	0.00	82.79	7.89	0.000%
28	3.98	-82.79	-6.90	-3.98	82.79	6.90	0.000%
29	6.86	-82.79	-3.96	-6.86	82.79	3.96	0.000%
30	7.88	-82.79	0.00	-7.88	82.79	-0.00	0.000%
31	6.86	-82.79	3.96	-6.86	82.79	-3.96	0.000%
32	3.98	-82.79	6.90	-3.98	82.79	-6.90	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
33	0.00	-82.79	7.89	-0.00	82.79	-7.89	0.000%
34	-3.98	-82.79	6.90	3.98	82.79	-6.90	0.000%
35	-6.86	-82.79	3.96	6.86	82.79	-3.96	0.000%
36	-7.88	-82.79	-0.00	7.88	82.79	0.00	0.000%
37	-6.86	-82.79	-3.96	6.86	82.79	3.96	0.000%
38	-3.98	-82.79	-6.90	3.98	82.79	6.90	0.000%
39	0.00	-49.86	-7.72	0.00	49.86	7.72	0.000%
40	4.00	-49.86	-6.93	-4.00	49.86	6.93	0.000%
41	6.80	-49.86	-3.93	-6.80	49.86	3.93	0.000%
42	7.87	-49.86	0.00	-7.87	49.86	0.00	0.000%
43	6.80	-49.86	3.93	-6.80	49.86	-3.93	0.000%
44	4.00	-49.86	6.93	-4.00	49.86	-6.93	0.000%
45	0.00	-49.86	7.72	0.00	49.86	-7.72	0.000%
46	-4.00	-49.86	6.93	4.00	49.86	-6.93	0.000%
47	-6.80	-49.86	3.93	6.80	49.86	-3.93	0.000%
48	-7.87	-49.86	0.00	7.87	49.86	0.00	0.000%
49	-6.80	-49.86	-3.93	6.80	49.86	3.93	0.000%
50	-4.00	-49.86	-6.93	4.00	49.86	6.93	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	6	0.00000001	0.00005525
3	Yes	5	0.00000001	0.00048221
4	Yes	6	0.00000001	0.00039838
5	Yes	6	0.00000001	0.00012479
6	Yes	6	0.00000001	0.00036336
7	Yes	6	0.00000001	0.00011250
8	Yes	5	0.00000001	0.00027613
9	Yes	5	0.00000001	0.00011326
10	Yes	6	0.00000001	0.00035455
11	Yes	6	0.00000001	0.00010946
12	Yes	6	0.00000001	0.00040530
13	Yes	6	0.00000001	0.00012722
14	Yes	6	0.00000001	0.00005523
15	Yes	5	0.00000001	0.00048205
16	Yes	6	0.00000001	0.00035132
17	Yes	6	0.00000001	0.00010833
18	Yes	6	0.00000001	0.00038223
19	Yes	6	0.00000001	0.00011936
20	Yes	5	0.00000001	0.00027578
21	Yes	5	0.00000001	0.00011316
22	Yes	6	0.00000001	0.00039375
23	Yes	6	0.00000001	0.00012338
24	Yes	6	0.00000001	0.00034708
25	Yes	6	0.00000001	0.00010686
26	Yes	4	0.00000001	0.00018445
27	Yes	6	0.00000001	0.00021554
28	Yes	6	0.00000001	0.00023307
29	Yes	6	0.00000001	0.00023261
30	Yes	6	0.00000001	0.00021672
31	Yes	6	0.00000001	0.00023225
32	Yes	6	0.00000001	0.00023344
33	Yes	6	0.00000001	0.00021522
34	Yes	6	0.00000001	0.00022899
35	Yes	6	0.00000001	0.00022886
36	Yes	6	0.00000001	0.00021274
37	Yes	6	0.00000001	0.00022986
38	Yes	6	0.00000001	0.00022928
39	Yes	5	0.00000001	0.00005326
40	Yes	5	0.00000001	0.00010095
41	Yes	5	0.00000001	0.00008073
42	Yes	4	0.00000001	0.00069635

43	Yes	5	0.00000001	0.00007921
44	Yes	5	0.00000001	0.00010617
45	Yes	5	0.00000001	0.00005322
46	Yes	5	0.00000001	0.00007837
47	Yes	5	0.00000001	0.00008945
48	Yes	4	0.00000001	0.00069125
49	Yes	5	0.00000001	0.00009714
50	Yes	5	0.00000001	0.00007919

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 143	19.984	42	1.2337	0.0128
L2	143 - 138	18.696	42	1.2259	0.0115
L3	138 - 133	17.420	42	1.2101	0.0101
L4	133 - 128	16.164	42	1.1874	0.0089
L5	128 - 123	14.935	42	1.1590	0.0078
L6	123 - 118	13.739	42	1.1243	0.0069
L7	118 - 113	12.582	42	1.0838	0.0060
L8	113 - 108	11.472	42	1.0359	0.0052
L9	108 - 100.5	10.415	42	0.9816	0.0045
L10	104.5 - 99.5	9.711	42	0.9404	0.0040
L11	99.5 - 94.5	8.740	42	0.9107	0.0037
L12	94.5 - 89.5	7.810	42	0.8635	0.0033
L13	89.5 - 84.5	6.932	42	0.8138	0.0029
L14	84.5 - 79.5	6.107	42	0.7624	0.0026
L15	79.5 - 74.5	5.336	42	0.7090	0.0023
L16	74.5 - 69.5	4.622	42	0.6539	0.0020
L17	69.5 - 69.25	3.967	42	0.5973	0.0017
L18	69.25 - 64.25	3.936	42	0.5945	0.0017
L19	64.25 - 58.25	3.343	42	0.5368	0.0015
L20	63.25 - 57.25	3.232	42	0.5252	0.0014
L21	57.25 - 53	2.594	42	0.4865	0.0013
L22	53 - 52.75	2.181	42	0.4407	0.0011
L23	52.75 - 47.75	2.158	42	0.4380	0.0011
L24	47.75 - 42.75	1.728	42	0.3840	0.0009
L25	42.75 - 37.75	1.354	42	0.3301	0.0008
L26	37.75 - 37	1.036	42	0.2762	0.0006
L27	37 - 36.75	0.993	42	0.2682	0.0006
L28	36.75 - 28.75	0.980	42	0.2655	0.0006
L29	34.5 - 27.75	0.860	42	0.2414	0.0005
L30	27.75 - 22.75	0.544	42	0.2018	0.0004
L31	22.75 - 22.5	0.358	42	0.1526	0.0003
L32	22.5 - 22.25	0.350	42	0.1501	0.0003
L33	22.25 - 22	0.342	42	0.1477	0.0003
L34	22 - 17	0.335	42	0.1460	0.0003
L35	17 - 12	0.199	42	0.1124	0.0002
L36	12 - 7	0.099	42	0.0793	0.0001
L37	7 - 2	0.034	42	0.0459	0.0001
L38	2 - 0	0.003	42	0.0130	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
152.00	VHLP800-11	42	19.984	1.2337	0.0128	23740
148.00	LLPX310R-V1_TIA w/ Mount Pipe	42	19.984	1.2337	0.0128	23740
144.00	4' Dish	42	18.953	1.2280	0.0117	23740
130.00	MX08FRO665-21 w/ Mount Pipe	42	15.423	1.1711	0.0082	9760
120.00	QD6616-7 w/ Mount Pipe	42	13.040	1.1008	0.0064	6893

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
100.00	PD220	42	8.835	0.9139	0.0037	7291
85.00	APXVAARR24_43-U-NA20_TIA w/ Mount Pipe	42	6.187	0.7677	0.0026	5496
72.00	800 10504_TIA w/ Mount Pipe	42	4.287	0.6257	0.0018	5076
53.00	BSA150B	42	2.181	0.4407	0.0011	5350

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 143	105.094	8	6.4774	0.0666
L2	143 - 138	98.342	8	6.4407	0.0598
L3	138 - 133	91.651	8	6.3610	0.0524
L4	133 - 128	85.062	8	6.2445	0.0462
L5	128 - 123	78.610	8	6.0973	0.0407
L6	123 - 118	72.328	8	5.9166	0.0359
L7	118 - 113	66.251	8	5.7053	0.0314
L8	113 - 108	60.414	8	5.4549	0.0271
L9	108 - 100.5	54.856	8	5.1702	0.0233
L10	104.5 - 99.5	51.149	8	4.9542	0.0209
L11	99.5 - 94.5	46.039	8	4.7983	0.0193
L12	94.5 - 89.5	41.148	8	4.5500	0.0172
L13	89.5 - 84.5	36.524	8	4.2891	0.0152
L14	84.5 - 79.5	32.177	8	4.0185	0.0134
L15	79.5 - 74.5	28.118	8	3.7376	0.0118
L16	74.5 - 69.5	24.358	8	3.4469	0.0103
L17	69.5 - 69.25	20.906	8	3.1489	0.0089
L18	69.25 - 64.25	20.742	8	3.1339	0.0088
L19	64.25 - 58.25	17.620	8	2.8299	0.0075
L20	63.25 - 57.25	17.034	8	2.7685	0.0073
L21	57.25 - 53	13.669	8	2.5646	0.0065
L22	53 - 52.75	11.494	8	2.3233	0.0057
L23	52.75 - 47.75	11.373	8	2.3091	0.0057
L24	47.75 - 42.75	9.104	8	2.0245	0.0048
L25	42.75 - 37.75	7.134	8	1.7398	0.0039
L26	37.75 - 37	5.461	8	1.4559	0.0031
L27	37 - 36.75	5.235	8	1.4136	0.0030
L28	36.75 - 28.75	5.162	8	1.3995	0.0030
L29	34.5 - 27.75	4.532	8	1.2722	0.0027
L30	27.75 - 22.75	2.865	8	1.0637	0.0022
L31	22.75 - 22.5	1.887	8	0.8039	0.0016
L32	22.5 - 22.25	1.845	8	0.7910	0.0015
L33	22.25 - 22	1.804	8	0.7781	0.0015
L34	22 - 17	1.764	8	0.7694	0.0015
L35	17 - 12	1.051	8	0.5925	0.0011
L36	12 - 7	0.522	8	0.4176	0.0008
L37	7 - 2	0.177	8	0.2420	0.0004
L38	2 - 0	0.014	8	0.0687	0.0001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
152.00	VHLP800-11	8	105.094	6.4774	0.0666	5053
148.00	LLPX310R-V1_TIA w/ Mount Pipe	8	105.094	6.4774	0.0666	5053
144.00	4' Dish	8	99.690	6.4508	0.0612	5053
130.00	MX08FRO665-21 w/ Mount Pipe	8	81.172	6.1602	0.0428	1940
120.00	QD6616-7 w/ Mount Pipe	8	68.655	5.7943	0.0331	1350

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
100.00	PD220	8	46.541	4.8147	0.0195	1407
85.00	APXVAARR24_43-U-NA20_TIA w/ Mount Pipe	8	32.599	4.0461	0.0136	1054
72.00	800 10504_TIA w/ Mount Pipe	8	22.593	3.2986	0.0095	969
53.00	BSA150B	8	11.494	2.3233	0.0057	1018

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	148 - 143 (1)	TP23.0147x22x0.25	5.00	0.00	0.0	18.3256	-4.45	989.58	0.004
L2	143 - 138 (2)	TP24.0295x23.0147x0.25	5.00	0.00	0.0	19.1425	-4.86	1033.69	0.005
L3	138 - 133 (3)	TP25.0442x24.0295x0.25	5.00	0.00	0.0	19.9593	-5.29	1077.80	0.005
L4	133 - 128 (4)	TP26.0589x25.0442x0.25	5.00	0.00	0.0	20.7762	-7.96	1121.92	0.007
L5	128 - 123 (5)	TP27.0737x26.0589x0.25	5.00	0.00	0.0	21.5931	-8.47	1166.03	0.007
L6	123 - 118 (6)	TP28.0884x27.0737x0.25	5.00	0.00	0.0	22.4099	-13.06	1210.14	0.011
L7	118 - 113 (7)	TP29.1032x28.0884x0.25	5.00	0.00	0.0	23.2268	-13.75	1254.25	0.011
L8	113 - 108 (8)	TP30.1179x29.1032x0.25	5.00	0.00	0.0	24.0437	-14.47	1298.36	0.011
L9	108 - 100.5 (9)	TP31.64x30.1179x0.25	7.50	0.00	0.0	24.6155	-14.99	1329.23	0.011
L10	100.5 - 99.5 (10)	TP31.3435x30.3282x0.375	5.00	0.00	0.0	37.3945	-19.16	2019.30	0.009
L11	99.5 - 94.5 (11)	TP32.3589x31.3435x0.375	5.00	0.00	0.0	38.6205	-20.20	2085.51	0.010
L12	94.5 - 89.5 (12)	TP33.3742x32.3589x0.375	5.00	0.00	0.0	39.8465	-21.28	2151.71	0.010
L13	89.5 - 84.5 (13)	TP34.3895x33.3742x0.375	5.00	0.00	0.0	41.0725	-26.82	2217.92	0.012
L14	84.5 - 79.5 (14)	TP35.4049x34.3895x0.375	5.00	0.00	0.0	42.2985	-28.06	2284.12	0.012
L15	79.5 - 74.5 (15)	TP36.4202x35.4049x0.375	5.00	0.00	0.0	43.5246	-29.33	2350.33	0.012
L16	74.5 - 69.5 (16)	TP37.4355x36.4202x0.375	5.00	0.00	0.0	44.7506	-31.03	2416.53	0.013
L17	69.5 - 69.25 (17)	TP37.4863x37.4355x0.375	0.25	0.00	0.0	44.8119	-31.11	2419.84	0.013
L18	69.25 - 64.25 (18)	TP38.5016x37.4863x0.375	5.00	0.00	0.0	46.0379	-32.47	2486.05	0.013
L19	64.25 - 58.25 (19)	TP39.72x38.5016x0.375	6.00	0.00	0.0	46.2831	-32.76	2499.29	0.013
L20	58.25 - 57.25 (20)	TP39.1713x37.9547x0.4375	6.00	0.00	0.0	54.5662	-35.48	2946.57	0.012
L21	57.25 - 53 (21)	TP40.033x39.1713x0.4375	4.25	0.00	0.0	55.7802	-36.83	3012.13	0.012
L22	53 - 52.75 (22)	TP40.0837x40.033x0.4375	0.25	0.00	0.0	55.8516	-36.97	3015.98	0.012
L23	52.75 - 47.75 (23)	TP41.0975x40.0837x0.4375	5.00	0.00	0.0	57.2798	-38.57	3093.11	0.012
L24	47.75 - 42.75 (24)	TP42.1113x41.0975x0.4375	5.00	0.00	0.0	58.7080	-40.22	3170.23	0.013
L25	42.75 - 37.75	TP43.1251x42.1113x0.4375	5.00	0.00	0.0	60.136	-41.91	3247.35	0.013

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
	(25)	75				2			
L26	37.75 - 37	TP43.2772x43.1251x0.43	0.75	0.00	0.0	60.350	-42.17	3258.92	0.013
	(26)	75				4			
L27	37 - 36.75	TP43.3279x43.2772x0.43	0.25	0.00	0.0	60.421	-42.26	3262.78	0.013
	(27)	75				8			
L28	36.75 - 28.75	TP44.95x43.3279x0.4375	8.00	0.00	0.0	61.064	-43.02	3297.49	0.013
	(28)					5			
L29	28.75 - 27.75	TP44.2808x42.9091x0.5	6.75	0.00	0.0	70.487	-46.93	3806.30	0.012
	(29)					1			
L30	27.75 - 22.75	TP45.2969x44.2808x0.5	5.00	0.00	0.0	72.123	-48.86	3894.64	0.013
	(30)					0			
L31	22.75 - 22.5	TP45.3477x45.2969x0.5	0.25	0.00	0.0	72.204	-48.97	3899.06	0.013
	(31)					8			
L32	22.5 - 22.25	TP45.3985x45.3477x0.5	0.25	0.00	0.0	72.286	-49.06	3903.47	0.013
	(32)					6			
L33	22.25 - 22	TP45.4493x45.3985x0.75	0.25	0.00	0.0	107.94	-49.19	5829.23	0.008
	(33)					90			
L34	22 - 17 (34)	TP46.4654x45.4493x0.73	5.00	0.00	0.0	108.59	-51.67	5863.98	0.009
		75				20			
L35	17 - 12 (35)	TP47.4814x46.4654x0.73	5.00	0.00	0.0	111.00	-54.12	5994.28	0.009
		75				50			
L36	12 - 7 (36)	TP48.4975x47.4814x0.72	5.00	0.00	0.0	111.52	-56.47	6022.35	0.009
		5				50			
L37	7 - 2 (37)	TP49.5136x48.4975x0.72	5.00	0.00	0.0	113.89	-58.85	6150.43	0.010
		5				70			
L38	2 - 0 (38)	TP49.92x49.5136x0.725	2.00	0.00	0.0	114.84	-59.82	6201.67	0.010
						60			

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	148 - 143 (1)	TP23.0147x22x0.25	49.91	565.02	0.088	0.00	565.02	0.000
L2	143 - 138 (2)	TP24.0295x23.0147x0.25	96.53	608.04	0.159	0.00	608.04	0.000
L3	138 - 133 (3)	TP25.0442x24.0295x0.25	145.76	651.80	0.224	0.00	651.80	0.000
L4	133 - 128 (4)	TP26.0589x25.0442x0.25	203.66	696.19	0.293	0.00	696.19	0.000
L5	128 - 123 (5)	TP27.0737x26.0589x0.25	273.54	741.13	0.369	0.00	741.13	0.000
L6	123 - 118 (6)	TP28.0884x27.0737x0.25	359.03	786.51	0.456	0.00	786.51	0.000
L7	118 - 113 (7)	TP29.1032x28.0884x0.25	466.55	832.24	0.561	0.00	832.24	0.000
L8	113 - 108 (8)	TP30.1179x29.1032x0.25	576.80	878.22	0.657	0.00	878.22	0.000
L9	108 - 100.5	TP31.64x30.1179x0.25	655.60	910.50	0.720	0.00	910.50	0.000
	(9)							
L10	100.5 - 99.5	TP31.3435x30.3282x0.37	775.26	1598.60	0.485	0.00	1598.60	0.000
	(10)	5						
L11	99.5 - 94.5	TP32.3589x31.3435x0.37	904.55	1705.79	0.530	0.00	1705.79	0.000
	(11)	5						
L12	94.5 - 89.5	TP33.3742x32.3589x0.37	1036.67	1799.29	0.576	0.00	1799.29	0.000
	(12)	5						
L13	89.5 - 84.5	TP34.3895x33.3742x0.37	1173.82	1894.43	0.620	0.00	1894.43	0.000
	(13)	5						
L14	84.5 - 79.5	TP35.4049x34.3895x0.37	1333.47	1990.84	0.670	0.00	1990.84	0.000
	(14)	5						
L15	79.5 - 74.5	TP36.4202x35.4049x0.37	1495.73	2088.41	0.716	0.00	2088.41	0.000
	(15)	5						
L16	74.5 - 69.5	TP37.4355x36.4202x0.37	1661.67	2187.04	0.760	0.00	2187.04	0.000
	(16)	5						
L17	69.5 - 69.25	TP37.4863x37.4355x0.37	1670.08	2192.00	0.762	0.00	2192.00	0.000
	(17)	5						
L18	69.25 - 64.25	TP38.5016x37.4863x0.37	1839.72	2291.66	0.803	0.00	2291.66	0.000
	(18)	5						
L19	64.25 - 58.25	TP39.72x38.5016x0.375	1873.97	2311.69	0.811	0.00	2311.69	0.000
	(19)							
L20	58.25 - 57.25	TP39.1713x37.9547x0.43	2082.07	2886.97	0.721	0.00	2886.97	0.000
	(20)	75						

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L21	57.25 - 53 (21)	TP40.033x39.1713x0.4375	2231.88	2996.98	0.745	0.00	2996.98	0.000
L22	53 - 52.75 (22)	TP40.0837x40.033x0.4375	2240.83	3003.48	0.746	0.00	3003.48	0.000
L23	52.75 - 47.75 (23)	TP41.0975x40.0837x0.4375	2420.00	3134.33	0.772	0.00	3134.33	0.000
L24	47.75 - 42.75 (24)	TP42.1113x41.0975x0.4375	2601.88	3266.57	0.797	0.00	3266.57	0.000
L25	42.75 - 37.75 (25)	TP43.1251x42.1113x0.4375	2786.35	3400.07	0.819	0.00	3400.07	0.000
L26	37.75 - 37 (26)	TP43.2772x43.1251x0.4375	2814.59	3420.20	0.823	0.00	3420.20	0.000
L27	37 - 36.75 (27)	TP43.3279x43.2772x0.4375	2823.93	3426.92	0.824	0.00	3426.92	0.000
L28	36.75 - 28.75 (28)	TP44.95x43.3279x0.4375	2908.23	3487.48	0.834	0.00	3487.48	0.000
L29	28.75 - 27.75 (29)	TP44.2808x42.9091x0.5	3164.83	4228.94	0.748	0.00	4228.94	0.000
L30	27.75 - 22.75 (30)	TP45.2969x44.2808x0.5	3358.16	4397.54	0.764	0.00	4397.54	0.000
L31	22.75 - 22.5 (31)	TP45.3477x45.2969x0.5	3367.88	4406.02	0.764	0.00	4406.02	0.000
L32	22.5 - 22.25 (32)	TP45.3985x45.3477x0.5	3377.63	4414.50	0.765	0.00	4414.50	0.000
L33	22.25 - 22 (33)	TP45.4493x45.3985x0.75	3387.37	6630.27	0.511	0.00	6630.27	0.000
L34	22 - 17 (34)	TP46.4654x45.4493x0.7375	3583.69	6827.63	0.525	0.00	6827.63	0.000
L35	17 - 12 (35)	TP47.4814x46.4654x0.7375	3782.88	7136.89	0.530	0.00	7136.89	0.000
L36	12 - 7 (36)	TP48.4975x47.4814x0.725	3984.78	7332.42	0.543	0.00	7332.42	0.000
L37	7 - 2 (37)	TP49.5136x48.4975x0.725	4189.09	7650.03	0.548	0.00	7650.03	0.000
L38	2 - 0 (38)	TP49.92x49.5136x0.725	4271.47	7778.96	0.549	0.00	7778.96	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	148 - 143 (1)	TP23.0147x22x0.25	9.07	296.88	0.031	3.39	594.48	0.006
L2	143 - 138 (2)	TP24.0295x23.0147x0.25	9.59	310.11	0.031	3.39	648.66	0.005
L3	138 - 133 (3)	TP25.0442x24.0295x0.25	10.11	323.34	0.031	3.39	705.20	0.005
L4	133 - 128 (4)	TP26.0589x25.0442x0.25	13.71	336.57	0.041	3.50	764.10	0.005
L5	128 - 123 (5)	TP27.0737x26.0589x0.25	14.26	349.81	0.041	3.50	825.37	0.004
L6	123 - 118 (6)	TP28.0884x27.0737x0.25	21.24	363.04	0.059	4.04	889.00	0.005
L7	118 - 113 (7)	TP29.1032x28.0884x0.25	21.79	376.27	0.058	4.04	954.98	0.004
L8	113 - 108 (8)	TP30.1179x29.1032x0.25	22.33	389.51	0.057	4.04	1023.34	0.004
L9	108 - 100.5 (9)	TP31.64x30.1179x0.25	22.72	398.77	0.057	4.04	1072.59	0.004
L10	100.5 - 99.5 (10)	TP31.3435x30.3282x0.375	25.59	605.79	0.042	4.47	1650.22	0.003
L11	99.5 - 94.5 (11)	TP32.3589x31.3435x0.375	26.16	625.65	0.042	4.47	1760.21	0.003
L12	94.5 - 89.5 (12)	TP33.3742x32.3589x0.375	26.72	645.51	0.041	4.47	1873.73	0.002
L13	89.5 - 84.5 (13)	TP34.3895x33.3742x0.375	31.68	665.38	0.048	4.46	1990.82	0.002
L14	84.5 - 79.5 (14)	TP35.4049x34.3895x0.375	32.22	685.24	0.047	4.46	2111.44	0.002
L15	79.5 - 74.5 (15)	TP36.4202x35.4049x0.375	32.75	705.10	0.046	5.53	2235.61	0.002
L16	74.5 - 69.5 (16)	TP37.4355x36.4202x0.375	33.64	724.96	0.046	5.53	2363.33	0.002

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L17	69.5 - 69.25 (17)	TP37.4863x37.4355x0.375	33.66	725.95	0.046	5.52	2369.81	0.002
L18	69.25 - 64.25 (18)	TP38.5016x37.4863x0.375	34.21	745.81	0.046	5.52	2501.26	0.002
L19	64.25 - 58.25 (19)	TP39.72x38.5016x0.375	34.31	749.79	0.046	5.52	2527.97	0.002
L20	58.25 - 57.25 (20)	TP39.1713x37.9547x0.4375	35.06	883.97	0.040	5.52	3011.81	0.002
L21	57.25 - 53 (21)	TP40.033x39.1713x0.4375	35.47	903.64	0.039	5.52	3147.32	0.002
L22	53 - 52.75 (22)	TP40.0837x40.033x0.4375	35.56	904.79	0.039	5.55	3155.38	0.002
L23	52.75 - 47.75 (23)	TP41.0975x40.0837x0.4375	36.13	927.93	0.039	5.54	3318.82	0.002
L24	47.75 - 42.75 (24)	TP42.1113x41.0975x0.4375	36.66	951.07	0.039	5.54	3486.38	0.002
L25	42.75 - 37.75 (25)	TP43.1251x42.1113x0.4375	37.16	974.21	0.038	5.54	3658.07	0.002
L26	37.75 - 37 (26)	TP43.2772x43.1251x0.4375	37.35	977.68	0.038	1.04	3684.18	0.000
L27	37 - 36.75 (27)	TP43.3279x43.2772x0.4375	37.36	978.83	0.038	1.04	3692.91	0.000
L28	36.75 - 28.75 (28)	TP44.95x43.3279x0.4375	37.60	989.25	0.038	1.04	3771.89	0.000
L29	28.75 - 27.75 (29)	TP44.2808x42.9091x0.5	38.44	1141.89	0.034	1.04	4397.52	0.000
L30	27.75 - 22.75 (30)	TP45.2969x44.2808x0.5	38.93	1168.39	0.033	1.04	4604.01	0.000
L31	22.75 - 22.5 (31)	TP45.3477x45.2969x0.5	38.94	1169.72	0.033	1.04	4614.46	0.000
L32	22.5 - 22.25 (32)	TP45.3985x45.3477x0.5	38.96	1171.04	0.033	1.04	4624.92	0.000
L33	22.25 - 22 (33)	TP45.4493x45.3985x0.75	38.99	1748.77	0.022	1.04	6875.96	0.000
L34	22 - 17 (34)	TP46.4654x45.4493x0.7375	39.56	1759.19	0.022	1.04	7076.11	0.000
L35	17 - 12 (35)	TP47.4814x46.4654x0.7375	40.15	1798.28	0.022	1.04	7394.07	0.000
L36	12 - 7 (36)	TP48.4975x47.4814x0.725	40.65	1806.70	0.022	1.04	7592.15	0.000
L37	7 - 2 (37)	TP49.5136x48.4975x0.725	41.11	1845.13	0.022	1.04	7918.53	0.000
L38	2 - 0 (38)	TP49.92x49.5136x0.725	41.30	1860.50	0.022	1.04	8051.02	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	148 - 143 (1)	0.004	0.088	0.000	0.031	0.006	0.094	1.000	4.8.2
L2	143 - 138 (2)	0.005	0.159	0.000	0.031	0.005	0.165	1.000	4.8.2
L3	138 - 133 (3)	0.005	0.224	0.000	0.031	0.005	0.230	1.000	4.8.2
L4	133 - 128 (4)	0.007	0.293	0.000	0.041	0.005	0.302	1.000	4.8.2
L5	128 - 123 (5)	0.007	0.369	0.000	0.041	0.004	0.378	1.000	4.8.2
L6	123 - 118 (6)	0.011	0.456	0.000	0.059	0.005	0.471	1.000	4.8.2
L7	118 - 113 (7)	0.011	0.561	0.000	0.058	0.004	0.575	1.000	4.8.2
L8	113 - 108 (8)	0.011	0.657	0.000	0.057	0.004	0.672	1.000	4.8.2
L9	108 - 100.5 (9)	0.011	0.720	0.000	0.057	0.004	0.735	1.000	4.8.2
L10	100.5 - 99.5 (10)	0.009	0.485	0.000	0.042	0.003	0.496	1.000	4.8.2
L11	99.5 - 94.5 (11)	0.010	0.530	0.000	0.042	0.003	0.542	1.000	4.8.2

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L12	94.5 - 89.5 (12)	0.010	0.576	0.000	0.041	0.002	0.588	1.000	4.8.2
L13	89.5 - 84.5 (13)	0.012	0.620	0.000	0.048	0.002	0.634	1.000	4.8.2
L14	84.5 - 79.5 (14)	0.012	0.670	0.000	0.047	0.002	0.684	1.000	4.8.2
L15	79.5 - 74.5 (15)	0.012	0.716	0.000	0.046	0.002	0.731	1.000	4.8.2
L16	74.5 - 69.5 (16)	0.013	0.760	0.000	0.046	0.002	0.775	1.000	4.8.2
L17	69.5 - 69.25 (17)	0.013	0.762	0.000	0.046	0.002	0.777	1.000	4.8.2
L18	69.25 - 64.25 (18)	0.013	0.803	0.000	0.046	0.002	0.818	1.000	4.8.2
L19	64.25 - 58.25 (19)	0.013	0.811	0.000	0.046	0.002	0.826	1.000	4.8.2
L20	58.25 - 57.25 (20)	0.012	0.721	0.000	0.040	0.002	0.735	1.000	4.8.2
L21	57.25 - 53 (21)	0.012	0.745	0.000	0.039	0.002	0.759	1.000	4.8.2
L22	53 - 52.75 (22)	0.012	0.746	0.000	0.039	0.002	0.760	1.000	4.8.2
L23	52.75 - 47.75 (23)	0.012	0.772	0.000	0.039	0.002	0.786	1.000	4.8.2
L24	47.75 - 42.75 (24)	0.013	0.797	0.000	0.039	0.002	0.811	1.000	4.8.2
L25	42.75 - 37.75 (25)	0.013	0.819	0.000	0.038	0.002	0.834	1.000	4.8.2
L26	37.75 - 37 (26)	0.013	0.823	0.000	0.038	0.000	0.837	1.000	4.8.2
L27	37 - 36.75 (27)	0.013	0.824	0.000	0.038	0.000	0.838	1.000	4.8.2
L28	36.75 - 28.75 (28)	0.013	0.834	0.000	0.038	0.000	0.848	1.000	4.8.2
L29	28.75 - 27.75 (29)	0.012	0.748	0.000	0.034	0.000	0.762	1.000	4.8.2
L30	27.75 - 22.75 (30)	0.013	0.764	0.000	0.033	0.000	0.777	1.000	4.8.2
L31	22.75 - 22.5 (31)	0.013	0.764	0.000	0.033	0.000	0.778	1.000	4.8.2
L32	22.5 - 22.25 (32)	0.013	0.765	0.000	0.033	0.000	0.779	1.000	4.8.2
L33	22.25 - 22 (33)	0.008	0.511	0.000	0.022	0.000	0.520	1.000	4.8.2
L34	22 - 17 (34)	0.009	0.525	0.000	0.022	0.000	0.534	1.000	4.8.2
L35	17 - 12 (35)	0.009	0.530	0.000	0.022	0.000	0.540	1.000	4.8.2
L36	12 - 7 (36)	0.009	0.543	0.000	0.022	0.000	0.553	1.000	4.8.2
L37	7 - 2 (37)	0.010	0.548	0.000	0.022	0.000	0.558	1.000	4.8.2
L38	2 - 0 (38)	0.010	0.549	0.000	0.022	0.000	0.559	1.000	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	148 - 143	Pole	TP23.0147x22x0.25	1	-4.45	989.58	9.2	Pass
L2	143 - 138	Pole	TP24.0295x23.0147x0.25	2	-4.86	1033.69	16.3	Pass
L3	138 - 133	Pole	TP25.0442x24.0295x0.25	3	-5.29	1077.80	22.7	Pass
L4	133 - 128	Pole	TP26.0589x25.0442x0.25	4	-7.96	1121.92	29.8	Pass
L5	128 - 123	Pole	TP27.0737x26.0589x0.25	5	-8.47	1166.03	37.5	Pass
L6	123 - 118	Pole	TP28.0884x27.0737x0.25	6	-13.06	1210.14	46.6	Pass
L7	118 - 113	Pole	TP29.1032x28.0884x0.25	7	-13.75	1254.25	57.0	Pass
L8	113 - 108	Pole	TP30.1179x29.1032x0.25	8	-14.47	1298.36	66.6	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L9	108 - 100.5	Pole	TP31.64x30.1179x0.25	9	-14.99	1329.23	72.9	Pass
L10	100.5 - 99.5	Pole	TP31.3435x30.3282x0.375	10	-19.16	2019.30	49.2	Pass
L11	99.5 - 94.5	Pole	TP32.3589x31.3435x0.375	11	-20.20	2085.51	53.7	Pass
L12	94.5 - 89.5	Pole	TP33.3742x32.3589x0.375	12	-21.28	2151.71	58.3	Pass
L13	89.5 - 84.5	Pole	TP34.3895x33.3742x0.375	13	-26.82	2217.92	62.8	Pass
L14	84.5 - 79.5	Pole	TP35.4049x34.3895x0.375	14	-28.06	2284.12	67.8	Pass
L15	79.5 - 74.5	Pole	TP36.4202x35.4049x0.375	15	-29.33	2350.33	72.5	Pass
L16	74.5 - 69.5	Pole	TP37.4355x36.4202x0.375	16	-31.03	2416.53	76.9	Pass
L17	69.5 - 69.25	Pole	TP37.4863x37.4355x0.375	17	-31.11	2419.84	77.1	Pass
L18	69.25 - 64.25	Pole	TP38.5016x37.4863x0.375	18	-32.47	2486.05	81.2	Pass
L19	64.25 - 58.25	Pole	TP39.72x38.5016x0.375	19	-32.76	2499.29	82.0	Pass
L20	58.25 - 57.25	Pole	TP39.1713x37.9547x0.4375	20	-35.48	2946.57	72.9	Pass
L21	57.25 - 53	Pole	TP40.033x39.1713x0.4375	21	-36.83	3012.13	75.3	Pass
L22	53 - 52.75	Pole	TP40.0837x40.033x0.4375	22	-36.97	3015.98	75.4	Pass
L23	52.75 - 47.75	Pole	TP41.0975x40.0837x0.4375	23	-38.57	3093.11	78.0	Pass
L24	47.75 - 42.75	Pole	TP42.1113x41.0975x0.4375	24	-40.22	3170.23	80.5	Pass
L25	42.75 - 37.75	Pole	TP43.1251x42.1113x0.4375	25	-41.91	3247.35	82.8	Pass
L26	37.75 - 37	Pole	TP43.2772x43.1251x0.4375	26	-42.17	3258.92	83.2	Pass
L27	37 - 36.75	Pole	TP43.3279x43.2772x0.4375	27	-42.26	3262.78	83.3	Pass
L28	36.75 - 28.75	Pole	TP44.95x43.3279x0.4375	28	-43.02	3297.49	84.3	Pass
L29	28.75 - 27.75	Pole	TP44.2808x42.9091x0.5	29	-46.93	3806.30	75.6	Pass
L30	27.75 - 22.75	Pole	TP45.2969x44.2808x0.5	30	-48.86	3894.64	77.2	Pass
L31	22.75 - 22.5	Pole	TP45.3477x45.2969x0.5	31	-48.97	3899.06	77.3	Pass
L32	22.5 - 22.25	Pole	TP45.3985x45.3477x0.5	32	-49.06	3903.47	77.3	Pass
L33	22.25 - 22	Pole	TP45.4493x45.3985x0.75	33	-49.19	5829.23	73.9	Pass
L34	22 - 17	Pole	TP46.4654x45.4493x0.7375	34	-51.67	5863.98	75.3	Pass
L35	17 - 12	Pole	TP47.4814x46.4654x0.7375	35	-54.12	5994.28	76.5	Pass
L36	12 - 7	Pole	TP48.4975x47.4814x0.725	36	-56.47	6022.35	77.7	Pass
L37	7 - 2	Pole	TP49.5136x48.4975x0.725	37	-58.85	6150.43	78.8	Pass
L38	2 - 0	Pole	TP49.92x49.5136x0.725	38	-59.82	6201.67	79.2	Pass
							Summary	
						Pole (L28)	84.3	Pass
						RATING =	**84.3**	**Pass**

APPENDIX B

ADDITIONAL CALCULATIONS

POLE REINFORCEMENT

per TIA-222- H

Work Order #: 10710.NJJER01115A

Site Name: NJJER01115A

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	148	47.5	4	12	22	31.64	0.25	Auto	A607-60
2	104.5	46.25	5	12	30.33	39.72	0.375	Auto	A607-60
3	63.25	34.5	5.75	12	37.95	44.95	0.4375	Auto	A607-60
4	34.5	34.5	0	12	42.91	49.92	0.5	Auto	A607-60

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12
1	0	22.25	plate	CCI-WSFP-065125	2												
2	0	22.25	plate	CCI-WSFP-065125	2												
3	22.75	32.25	plate	CCI-SFP-065125	1												
4	37	53	plate	CCI-SFP-060100	3												
5	61.5	69.5	plate	CCI-SFP-045100	3												
6																	
7																	
8																	
9																	
10																	

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Type	Bottom Termination Length (in)	Top Termination Type	Top Termination Length (in)	Lu (in)	Net Area (in2)	Bolt Hole Size (in)	Reinforcement Material
1	6.5	1.25	8.125	0.625	Welded	n/a	PC 8.8 - M20 (100)	33.000	19.000	6.563	1.1875	A572-65
2	6.5	1.25	8.125	0.625	Welded	n/a	PC 8.8 - M20 (100)	33.000	19.000	6.563	1.1875	A572-65
3	6.5	1.25	8.125	0.625	PC 8.8 - M20 (100)	33	PC 8.8 - M20 (100)	33.000	19.000	6.563	1.1875	A572-65
4	6	1	6	0.5	PC 8.8 - M20 (100)	24	PC 8.8 - M20 (100)	24.000	16.000	4.750	1.1875	A572-65
5	4.5	1	4.5	0.5	PC 8.8 - M20 (100)	18	PC 8.8 - M20 (100)	18.000	20.000	3.250	1.1875	A572-65

Connection Details for Custom Reinforcements

Reinforcement	End	# Bolts	N or X	Bolt Spacing (in)	Edge Dist (in)	Weld Grade (ksi)	Transverse (Horiz.) Weld Type	Horiz. Weld Length (in)	Horiz. Groove Depth (in)	Horiz. Groove Angle (deg)	Horiz. Fillet Size (in)	Vertical Weld Length (in)	Vertical Fillet Size (in)	Rev H Connection Capacity (kip)

Analysis Date: 12/7/2022

TNX Geometry Input

Increment (ft): 5 Export to TNX

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	148 - 143	5		12	22.000	23.015	0.25	A607-60	1.000
2	143 - 138	5		12	23.015	24.029	0.25	A607-60	1.000
3	138 - 133	5		12	24.029	25.044	0.25	A607-60	1.000
4	133 - 128	5		12	25.044	26.059	0.25	A607-60	1.000
5	128 - 123	5		12	26.059	27.074	0.25	A607-60	1.000
6	123 - 118	5		12	27.074	28.088	0.25	A607-60	1.000
7	118 - 113	5		12	28.088	29.103	0.25	A607-60	1.000
8	113 - 108	5		12	29.103	30.118	0.25	A607-60	1.000
9	108 - 104.5	7.5	4	12	30.118	31.640	0.25	A607-60	1.000
10	104.5 - 99.5	5		12	30.328	31.344	0.375	A607-60	1.000
11	99.5 - 94.5	5		12	31.344	32.359	0.375	A607-60	1.000
12	94.5 - 89.5	5		12	32.359	33.374	0.375	A607-60	1.000
13	89.5 - 84.5	5		12	33.374	34.390	0.375	A607-60	1.000
14	84.5 - 79.5	5		12	34.390	35.405	0.375	A607-60	1.000
15	79.5 - 74.5	5		12	35.405	36.420	0.375	A607-60	1.000
16	74.5 - 69.5	5		12	36.420	37.436	0.375	A607-60	1.000
17	69.5 - 69.25	0.25		12	37.436	37.486	0.375	A607-60	1.000
18	69.25 - 64.25	5		12	37.486	38.502	0.375	A607-60	1.000
19	64.25 - 63.25	6	5	12	38.502	39.720	0.375	A607-60	1.000
20	63.25 - 57.25	6		12	37.955	39.171	0.4375	A607-60	1.000
21	57.25 - 53	4.25		12	39.171	40.033	0.4375	A607-60	1.000
22	53 - 52.75	0.25		12	40.033	40.084	0.4375	A607-60	1.000
23	52.75 - 47.75	5		12	40.084	41.098	0.4375	A607-60	1.000
24	47.75 - 42.75	5		12	41.098	42.111	0.4375	A607-60	1.000
25	42.75 - 37.75	5		12	42.111	43.125	0.4375	A607-60	1.000
26	37.75 - 37	0.75		12	43.125	43.277	0.4375	A607-60	1.000
27	37 - 36.75	0.25		12	43.277	43.328	0.4375	A607-60	1.000
28	36.75 - 34.5	8	5.75	12	43.328	44.950	0.4375	A607-60	1.000
29	34.5 - 27.75	6.75		12	42.909	44.281	0.5	A607-60	1.000
30	27.75 - 22.75	5		12	44.281	45.297	0.5	A607-60	1.000
31	22.75 - 22.5	0.25		12	45.297	45.348	0.5	A607-60	1.000
32	22.5 - 22.25	0.25		12	45.348	45.398	0.5	A607-60	1.000
33	22.25 - 22	0.25		12	45.398	45.449	0.75	A607-60	0.972
34	22 - 17	5		12	45.449	46.465	0.7375	A607-60	0.981
35	17 - 12	5		12	46.465	47.481	0.7375	A607-60	0.975
36	12 - 7	5		12	47.481	48.498	0.725	A607-60	0.985
37	7 - 2	5		12	48.498	49.514	0.725	A607-60	0.979
38	2 - 0	2		12	49.514	49.920	0.725	A607-60	0.976

TNX Section Forces

Increment (ft):	5	TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	148 - 143	4.45	49.97	9.07
2	143 - 138	4.86	96.60	9.59
3	138 - 133	5.29	145.83	10.11
4	133 - 128	7.97	203.74	13.70
5	128 - 123	8.47	273.55	14.24
6	123 - 118	13.06	359.06	21.22
7	118 - 113	13.75	466.55	21.79
8	113 - 108	14.47	576.80	22.33
9	108 - 104.5	14.99	655.60	22.72
10	104.5 - 99.5	19.16	775.26	25.59
11	99.5 - 94.5	20.20	904.55	26.16
12	94.5 - 89.5	21.28	1036.67	26.72
13	89.5 - 84.5	26.82	1173.82	31.68
14	84.5 - 79.5	28.06	1333.47	32.22
15	79.5 - 74.5	29.33	1495.80	32.75
16	74.5 - 69.5	31.03	1661.70	33.64
17	69.5 - 69.25	31.11	1670.10	33.66
18	69.25 - 64.25	32.47	1839.72	34.21
19	64.25 - 63.25	32.75	1873.97	34.31
20	63.25 - 57.25	35.48	2082.06	35.06
21	57.25 - 53	36.83	2231.88	35.47
22	53 - 52.75	36.97	2240.84	35.56
23	52.75 - 47.75	38.57	2420.00	36.13
24	47.75 - 42.75	40.22	2601.88	36.66
25	42.75 - 37.75	41.91	2786.63	37.27
26	37.75 - 37	42.17	2814.59	37.35
27	37 - 36.75	42.26	2823.93	37.36
28	36.75 - 34.5	43.02	2908.23	37.60
29	34.5 - 27.75	46.93	3164.83	38.44
30	27.75 - 22.75	48.86	3358.15	38.93
31	22.75 - 22.5	48.97	3367.89	38.94
32	22.5 - 22.25	49.06	3377.62	38.96
33	22.25 - 22	49.19	3387.36	38.99
34	22 - 17	51.67	3583.69	39.56
35	17 - 12	54.12	3782.88	40.15
36	12 - 7	56.47	3984.79	40.65
37	7 - 2	58.85	4189.09	41.11
38	2 - 0	59.82	4271.47	41.30

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
148 - 143	Pole	TP23.015x22x0.25	Pole	9.2%	Pass
143 - 138	Pole	TP24.029x23.015x0.25	Pole	16.3%	Pass
138 - 133	Pole	TP25.044x24.029x0.25	Pole	22.7%	Pass
133 - 128	Pole	TP26.059x25.044x0.25	Pole	29.8%	Pass
128 - 123	Pole	TP27.074x26.059x0.25	Pole	37.5%	Pass
123 - 118	Pole	TP28.088x27.074x0.25	Pole	46.6%	Pass
118 - 113	Pole	TP29.103x28.088x0.25	Pole	57.0%	Pass
113 - 108	Pole	TP30.118x29.103x0.25	Pole	66.6%	Pass
108 - 104.5	Pole	TP31.64x30.118x0.25	Pole	72.9%	Pass
104.5 - 99.5	Pole	TP31.344x30.328x0.375	Pole	49.2%	Pass
99.5 - 94.5	Pole	TP32.359x31.344x0.375	Pole	53.7%	Pass
94.5 - 89.5	Pole	TP33.374x32.359x0.375	Pole	58.3%	Pass
89.5 - 84.5	Pole	TP34.39x33.374x0.375	Pole	62.8%	Pass
84.5 - 79.5	Pole	TP35.405x34.39x0.375	Pole	67.8%	Pass
79.5 - 74.5	Pole	TP36.42x35.405x0.375	Pole	72.5%	Pass
74.5 - 69.5	Pole	TP37.436x36.42x0.375	Pole	76.9%	Pass
69.5 - 69.25	Pole	TP37.486x37.436x0.375	Pole	77.1%	Pass
69.25 - 64.25	Pole	TP38.502x37.486x0.375	Pole	81.2%	Pass
64.25 - 63.25	Pole	TP39.72x38.502x0.375	Pole	82.0%	Pass
63.25 - 57.25	Pole	TP39.171x37.955x0.4375	Pole	72.9%	Pass
57.25 - 53	Pole	TP40.033x39.171x0.4375	Pole	75.3%	Pass
53 - 52.75	Pole	TP40.084x40.033x0.4375	Pole	75.4%	Pass
52.75 - 47.75	Pole	TP41.098x40.084x0.4375	Pole	78.0%	Pass
47.75 - 42.75	Pole	TP42.111x41.098x0.4375	Pole	80.5%	Pass
42.75 - 37.75	Pole	TP43.125x42.111x0.4375	Pole	82.8%	Pass
37.75 - 37	Pole	TP43.277x43.125x0.4375	Pole	83.2%	Pass
37 - 36.75	Pole	TP43.328x43.277x0.4375	Pole	83.3%	Pass
36.75 - 34.5	Pole	TP44.95x43.328x0.4375	Pole	84.3%	Pass
34.5 - 27.75	Pole	TP44.281x42.909x0.5	Pole	75.6%	Pass
27.75 - 22.75	Pole	TP45.297x44.281x0.5	Pole	77.2%	Pass
22.75 - 22.5	Pole	TP45.348x45.297x0.5	Pole	77.3%	Pass
22.5 - 22.25	Pole	TP45.398x45.348x0.5	Pole	77.3%	Pass
22.25 - 22	Pole + Reinf.	TP45.449x45.398x0.75	Reinf. 1 Tension Rupture	73.9%	Pass
22 - 17	Pole + Reinf.	TP46.465x45.449x0.7375	Reinf. 1 Tension Rupture	75.3%	Pass
17 - 12	Pole + Reinf.	TP47.481x46.465x0.7375	Reinf. 1 Tension Rupture	76.5%	Pass
12 - 7	Pole + Reinf.	TP48.498x47.481x0.725	Reinf. 1 Tension Rupture	77.7%	Pass
7 - 2	Pole + Reinf.	TP49.514x48.498x0.725	Reinf. 1 Tension Rupture	78.8%	Pass
2 - 0	Pole + Reinf.	TP49.92x49.514x0.725	Reinf. 1 Tension Rupture	79.2%	Pass
				Summary	
			Pole	84.3%	Pass
			Reinforcement	79.2%	Pass
			Overall	84.3%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity					
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4	R5
148 - 143	1214	n/a	1214	18.30	n/a	18.30	9.2%					
143 - 138	1383	n/a	1383	19.12	n/a	19.12	16.3%					
138 - 133	1568	n/a	1568	19.93	n/a	19.93	22.7%					
133 - 128	1769	n/a	1769	20.75	n/a	20.75	29.8%					
128 - 123	1986	n/a	1986	21.56	n/a	21.56	37.5%					
123 - 118	2220	n/a	2220	22.38	n/a	22.38	46.6%					
118 - 113	2471	n/a	2471	23.19	n/a	23.19	57.0%					
113 - 108	2741	n/a	2741	24.01	n/a	24.01	66.6%					
108 - 104.5	2942	n/a	2942	24.58	n/a	24.58	72.9%					
104.5 - 99.5	4584	n/a	4584	37.34	n/a	37.34	49.2%					
99.5 - 94.5	5050	n/a	5050	38.57	n/a	38.57	53.7%					
94.5 - 89.5	5546	n/a	5546	39.79	n/a	39.79	58.3%					
89.5 - 84.5	6074	n/a	6074	41.01	n/a	41.01	62.8%					
84.5 - 79.5	6634	n/a	6634	42.24	n/a	42.24	67.8%					
79.5 - 74.5	7228	n/a	7228	43.46	n/a	43.46	72.5%					
74.5 - 69.5	7856	n/a	7856	44.69	n/a	44.69	76.9%					
69.5 - 69.25	7888	n/a	7888	44.75	n/a	44.75	77.1%					
69.25 - 64.25	8554	n/a	8554	45.97	n/a	45.97	81.2%					
64.25 - 63.25	8691	n/a	8691	46.22	n/a	46.22	82.0%					
63.25 - 57.25	10464	n/a	10464	54.49	n/a	54.49	72.9%					
57.25 - 53	11178	n/a	11178	55.70	n/a	55.70	75.3%					
53 - 52.75	11221	n/a	11221	55.77	n/a	55.77	75.4%					
52.75 - 47.75	12104	n/a	12104	57.20	n/a	57.20	78.0%					
47.75 - 42.75	13032	n/a	13032	58.62	n/a	58.62	80.5%					
42.75 - 37.75	14006	n/a	14006	60.05	n/a	60.05	82.8%					
37.75 - 37	14156	n/a	14156	60.26	n/a	60.26	83.2%					
37 - 36.75	14207	n/a	14207	60.34	n/a	60.34	83.3%					
36.75 - 34.5	14665	n/a	14665	60.98	n/a	60.98	84.3%					
34.5 - 27.75	17269	n/a	17269	70.39	n/a	70.39	75.6%					
27.75 - 22.75	18499	n/a	18499	72.02	n/a	72.02	77.2%					
22.75 - 22.5	18562	n/a	18562	72.10	n/a	72.10	77.3%					
22.5 - 22.25	18625	n/a	18625	72.18	n/a	72.18	77.3%					
22.25 - 22	18730	8817	27547	72.26	32.50	104.76	53.5%	73.9%	68.6%			
22 - 17	20028	9203	29231	73.90	32.50	106.40	54.9%	75.3%	69.9%			
17 - 12	21384	9598	30982	75.53	32.50	108.03	56.3%	76.5%	71.2%			
12 - 7	22800	10001	32802	77.17	32.50	109.67	57.6%	77.7%	72.4%			
7 - 2	24277	10413	34691	78.80	32.50	111.30	58.8%	78.8%	73.5%			
2 - 0	24886	10580	35466	79.45	32.50	111.95	59.3%	79.2%	73.9%			

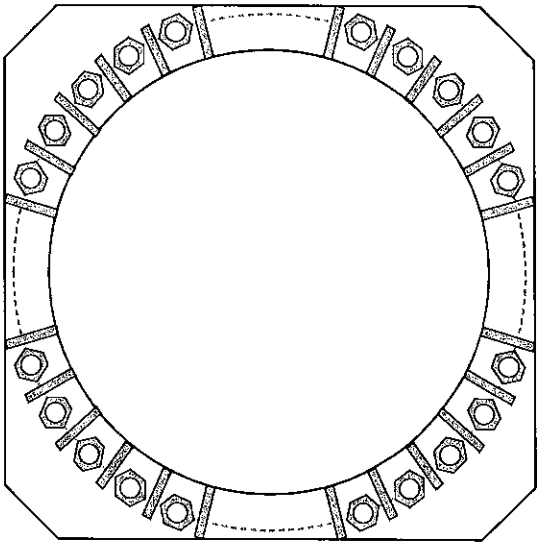
Note: Section capacity checked using 5 degree increments.

Monopole Base Plate Connection

Site Info	
Work Order #:	10710.NJJER01115A
Site Number:	NJJER01115A

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	0

Applied Loads	
Moment (kip-ft)	4271.47
Axial Force (kips)	59.82
Shear Force (kips)	41.30



Connection Properties

Anchor Rod Data

(20) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 58" BC
Anchor Spacing: 6 in

Base Plate Data

60" OD x 2.75" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

Stiffener Data

(24) 18"H x 6"W x 1"T, Notch: 0.75"
plate: Fy= 50 ksi ; weld: Fy= 70 ksi
horiz. weld: 0.5" groove, 45° dbl bevel, 0.5" fillet
vert. weld: 0.375" fillet

Pole Data

49.92" x 0.5" 12-sided pole (A607-60; Fy=60 ksi, Fu=75 ksi)

Analysis Results

Anchor Rod Summary		*(units of kips, klp-in)*
Pu_c = 179.63	ϕPn_c = 268.39	**Stress Rating**
Vu = 2.06	ϕVn = 120.77	**67.0%**
Mu = n/a	ϕMn = n/a	Pass

Base Plate Summary		
Max Stress (ksi):	5.44	(Shear)
Allowable Stress (ksi):	29.25	
Stress Rating:	**18.6%**	Pass

Stiffener Summary		
Horizontal Weld:	**46.4%**	Pass
Vertical Weld:	**40.4%**	Pass
Plate Flexure+Shear:	**11.0%**	Pass
Plate Tenslon+Shear:	**46.7%**	Pass
Plate Compression:	**48.1%**	Pass
Pole Summary		
Punching Shear:	**8.9%**	Pass

Drilled Pier Foundation

Work Order # :	10710.NJJER01115A
Site Name:	NJJER01115A

TIA-222 Revison:	H
Tower Type:	Monopole

Applied Loads	Comp.	Uplift
Moment (kip-ft)	4271.47	
Axial Force (kips)	59.82	
Shear Force (kips)	41.3	

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

Pier Design Data		
Depth	22.5	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
From 0.5' above grade to 22.5' below grade		
Pier Diameter	7	ft
Rebar Quantity	40	
Rebar Size	11	
Clear Cover to Ties	4	in
Tie Size	5	
Tie Spacing	12	in

Rebar & Pier Options

Embedded Pole Inputs

Belled Pier Inputs

Analysis Results		
Soil Lateral Check	*Compression*	*Uplift*
$D_{V=0}$ (ft from TOC)	5.28	-
Soil Safety Factor	1.74	-
Max Moment (kip-ft)	4463.76	-
Rating	*76.6%*	-
Soil Vertical Check	*Compression*	*Uplift*
Skin Friction (kips)	0.00	-
End Bearing (kips)	288.63	-
Weight of Concrete (kips)	159.33	-
Total Capacity (kips)	288.63	-
Axial (kips)	219.15	-
Rating	*75.9%*	-
Reinforced Concrete Flexure	*Compression*	*Uplift*
Critical Depth (ft from TOC)	5.13	-
Critical Moment (kip-ft)	4463.40	-
Critical Moment Capacity	9139.86	-
Rating	*48.8%*	-
Reinforced Concrete Shear	*Compression*	*Uplift*
Critical Depth (ft from TOC)	0.00	-
Critical Shear (kip)	41.30	-
Critical Shear Capacity	481.71	-
Rating	*8.6%*	-

Soil Interaction Rating	**76.6%**
Structural Foundation Rating	**48.8%**

Soil Profile

Groundwater Depth	99	# of Layers	3

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	3.5	3.5	0	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	3.5	6	2.5	100	150	1		0.550	0.550	0.00	0.00			Cohesive
3	6	22.5	16.5	135	150		38	0.000	0.000	0.00	0.00	10		Cohesionless

SEISMIC CALCULATIONS

Site Name: NJJER01115A
WO: 10710.NJJER01115A

Structure: A

Rev: 1

Location

	Decimal Degrees		Deg	Min	Sec
Lat:	41.140181	+	41	8	24.65
Long:	-73.347200	-	73	20	49.92

Code and Site Parameters

Seismic Design Code: TIA-222-H-1
Site Soil: D (Default) Default
Risk Category: III

USGS Seismic Reference

S_S: 0.2300 g
S_1: 0.0560 g
T_L: 6 s

Seismic Design Category Determination

Importance Factor, I_e:	1.25
Acceleration-based site coefficient, F_a:	1.6000
Velocity-based site coefficient, F_v:	2.4000

Design spectral response acceleration short period, S_{DS}:	0.2453	g
Design spectral response acceleration 1 s period, S_{D1}:	0.0896	g
T_s:	0.3652	

Seismic Design Category Based on S_{DS}:	B
Seismic Design Category Based on S_{D1}:	B
Seismic Design Category Based on S_1:	N/A

Controlling Seismic Design Category:

Analysis Date: 12/7/2022

Site Name:	NJJER01115A	Structure:	A
WO:	10710.NJJER01115A	Rev:	1

Tower Details

Tower Type:	Tapered Monopole		
Height, h:	148	ft	
Effective Seismic Weight, W:	49.82	kips	
Amplification Factor, A_s:	1.0		2.7.8.1

Seismic Base Shear

Response Modification Factor, R:	1.5		
Discrete Appurtenance Weight in Top 1/3 of Structure, W_u:	12.6232	kips	
W_t:	37.19343887	kips	
E:	29000.0	ksi	
g:	386.088	in/s^2	
Average Moment of Inertia, I_{avg}:	10644.49917	in^4	
F_a:	0.274856212	hz	
Approximate Fundamental Period Monopole, T_a:	3.6383	s	2.7.7.1.3.3
Seismic Response Coefficient, C_s	0.2044		2.7.7.1.1
Seismic Response Coefficient Max 1, C_{smax}	0.0205		2.7.7.1.1
Seismic Response Coefficient Max 2, C_{smax}	N/A		2.7.7.1.1
Seismic Response Coefficient Min 1, C_{smin}	0.0300		2.7.7.1.1
Seismic Response Coefficient Min 2, C_{smin}	N/A		2.7.7.1.1
Controlling Seismic Response Coefficient, C_{sc}	0.0300		
Seismic Base Shear, V		kips	2.7.7.1.1

Vertical Distribution Factors

Period Related Exponent, k:	2.000
Sum of $w_i h_i^k$	380370.83

Analysis Date: 12/7/2022

Section Number	Length	Top Height	Mid Height h_i	Section Weight w_i	$w_i h_i^2$	C_{s_i}	F_{s_i}	F_{s_i}
2 - 1	5.00	143.00	140.50	0.3183	6282.98	0.0165	0.0247	0.0156
4 - 1	5.00	133.00	130.50	0.3460	5893.13	0.0155	0.0232	0.0170
6 - 1	5.00	123.00	120.50	0.3738	5427.60	0.0143	0.0213	0.0183
8 - 1	5.00	113.00	110.50	0.4016	4903.04	0.0129	0.0193	0.0197
10 - 1	5.00	104.50	102.00	0.6249	6501.47	0.0171	0.0255	0.0307
12 - 1	5.00	94.50	92.00	0.6666	5641.76	0.0148	0.0222	0.0327
14 - 1	5.00	84.50	82.00	0.7082	4762.06	0.0125	0.0187	0.0347
16 - 1	5.00	74.50	72.00	0.7499	3887.36	0.0102	0.0153	0.0368
18 - 1	5.00	69.25	66.75	0.7717	3438.57	0.0090	0.0135	0.0379
20 - 1	6.00	63.25	60.25	1.0950	3974.90	0.0105	0.0156	0.0537
22 - 1	0.25	53.00	52.88	0.0474	132.56	0.0003	0.0005	0.0023
24 - 1	5.00	47.75	45.25	0.9853	2017.44	0.0053	0.0079	0.0483
26 - 1	0.75	37.75	37.38	0.1535	214.46	0.0006	0.0008	0.0075
28 - 1	8.00	36.75	32.75	1.6735	1794.96	0.0047	0.0071	0.0821
30 - 1	5.00	27.75	25.25	1.2114	772.37	0.0020	0.0030	0.0594
32 - 1	0.25	22.50	22.38	0.0614	30.72	0.0001	0.0001	0.0030
34 - 1	5.00	22.00	19.50	1.7901	680.70	0.0018	0.0027	0.0878
36 - 1	5.00	12.00	9.50	1.8460	166.60	0.0004	0.0007	0.0906
38 - 1	2.00	2.00	1.00	0.7588	0.76	0.0000	0.0000	0.0372
			Sum					

Name	h_x	w_x	$w_x h_x^k$	C_{vx}	F	F_x
commscope LLPX310R-V1_TIA w/ Mount Pipe	148.00	0.0600	1314.24	0.0035	0.0052	0.0029
samsung telecommunications FDD_R6_RRH	148.00	0.0300	657.12	0.0017	0.0026	0.0015
samsung telecommunications FDD_R6_RRH	148.00	0.0300	657.12	0.0017	0.0026	0.0015
Top Hat	148.00	0.0500	1095.20	0.0029	0.0043	0.0025
rfs celwave APXVSPP18-C-A20_TIA w/ Mount Pipe	148.00	0.1000	2190.40	0.0058	0.0086	0.0049
rfs celwave APXVTM14-C-120_TIA w/ Mount Pipe	148.00	0.0800	1752.32	0.0046	0.0069	0.0039
rfs celwave APXVTM14-C-120_TIA w/ Mount Pipe	148.00	0.0800	1752.32	0.0046	0.0069	0.0039
alcatel lucent TD-RRH8x20-25	148.00	0.0700	1533.28	0.0040	0.0060	0.0034
alcatel lucent FD-RRH-2x50-800	148.00	0.0500	1095.20	0.0029	0.0043	0.0025
alcatel lucent FD-RRH-2x50-800	148.00	0.0500	1095.20	0.0029	0.0043	0.0025
alcatel lucent B66A RRH4X45	148.00	0.0600	1314.24	0.0035	0.0052	0.0029
rfs celwave ACU-A20-N	148.00	0.0010	22.78	0.0001	0.0001	0.0001
rfs celwave ACU-A20-N	148.00	0.0010	22.78	0.0001	0.0001	0.0001
800 Notch Filter	148.00	0.0010	22.78	0.0001	0.0001	0.0001
(2) Dish Pipe	148.00	0.1000	2190.40	0.0058	0.0086	0.0049
(3) Empty Pipe	148.00	0.0600	1314.24	0.0035	0.0052	0.0029
(2) Empty Pipe	148.00	0.0400	876.16	0.0023	0.0034	0.0020
Dish Mount	144.00	0.0500	1036.80	0.0027	0.0041	0.0025
jma wireless MX08FRO665-21 w/ Mount Pipe	130.00	0.0900	1521.00	0.0040	0.0060	0.0044
fujitsu TA08025-B605	130.00	0.0700	1183.00	0.0031	0.0046	0.0034
fujitsu TA08025-B605	130.00	0.0700	1183.00	0.0031	0.0046	0.0034
fujitsu TA08025-B604	130.00	0.0600	1014.00	0.0027	0.0040	0.0029
raycap RDIDC-9181-PF-48	130.00	0.0200	338.00	0.0009	0.0013	0.0010
(2) 8' long Pipe	130.00	0.0600	1014.00	0.0027	0.0040	0.0029
8' Platform Mount	130.00	1.2405	20963.77	0.0551	0.0824	0.0609
quintel technology QD6616-7 w/ Mount Pipe	120.00	0.0900	1296.00	0.0034	0.0051	0.0044
ericsson AIR6449 B77D + AIR6419 B77G w/ Mount Pipe	120.00	0.1900	2736.00	0.0072	0.0107	0.0093
ericsson AIR6449 B77D + AIR6419 B77G w/ Mount Pipe	120.00	0.1900	2736.00	0.0072	0.0107	0.0093
ericsson RRUS 32 B2	120.00	0.0500	720.00	0.0019	0.0028	0.0025
ericsson RRUS 32 B30	120.00	0.0600	864.00	0.0023	0.0034	0.0029
ericsson RRUS 32 B30	120.00	0.0600	864.00	0.0023	0.0034	0.0029
RRUS 32 B66A	120.00	0.0500	720.00	0.0019	0.0028	0.0025
RRUS E2 B29	120.00	0.0600	864.00	0.0023	0.0034	0.0029
RRUS E2 B29	120.00	0.0600	864.00	0.0023	0.0034	0.0029
raycap DC6-48-60-18-8F	120.00	0.0200	288.00	0.0008	0.0011	0.0010
ericsson RRUS 4478 B14	120.00	0.0600	864.00	0.0023	0.0034	0.0029
ericsson RRUS 4478 B14	120.00	0.0600	864.00	0.0023	0.0034	0.0029
ericsson RRUS 4449 B5/B12	120.00	0.0700	1008.00	0.0027	0.0040	0.0034
DC6-48-60-18-8C-EV	120.00	0.0300	432.00	0.0011	0.0017	0.0015
cci antennas DMP65R-BU6D w/ Mount Pipe	120.00	0.1000	1440.00	0.0038	0.0057	0.0049

Platform Mount (RMPQ)	120.00	1.5885	22874.40	0.0601	0.0899	0.0779
decibel DB205-A	100.00	0.0380	380.00	0.0010	0.0015	0.0019
decibel DB220-B	100.00	0.0130	130.00	0.0003	0.0005	0.0006
(2) celwave PD201	100.00	0.0080	80.00	0.0002	0.0003	0.0004
(3) Mount Pipes	100.00	0.0600	600.00	0.0016	0.0024	0.0029
(4) Mount Pipes	100.00	0.0800	800.00	0.0021	0.0031	0.0039
rfs celwave APXVAARR24_43-U-NA20_TIA w/ Mount Pipe	85.00	0.1900	1372.75	0.0036	0.0054	0.0093
rfs celwave APXVAARR24_43-U-NA20_TIA w/ Mount Pipe	85.00	0.1900	1372.75	0.0036	0.0054	0.0093
ericsson AIR 32 B2a/B66Aa w/ Mount Pipe	85.00	0.1500	1083.75	0.0028	0.0043	0.0074
ericsson AIR 6449 B41 w/ Mount Pipe	85.00	0.1300	939.25	0.0025	0.0037	0.0064
ericsson AIR 6449 B41 w/ Mount Pipe	85.00	0.1300	939.25	0.0025	0.0037	0.0064
(2) andrew ETW190V512UB	85.00	0.0200	144.50	0.0004	0.0006	0.0010
ericsson RRUS 4415 B25	85.00	0.0400	289.00	0.0008	0.0011	0.0020
ericsson RRUS 4415 B25	85.00	0.0400	289.00	0.0008	0.0011	0.0020
ericsson RADIO 4449 B71+B85	85.00	0.0700	505.75	0.0013	0.0020	0.0034
rfs celwave ATMAA1412D-1A20	85.00	0.0100	72.25	0.0002	0.0003	0.0005
rfs celwave ATMAA1412D-1A20	85.00	0.0100	72.25	0.0002	0.0003	0.0005
kathrein 800 10504_TIA w/ Mount Pipe	72.00	0.0400	207.36	0.0005	0.0008	0.0020
kathrein 800 10504_TIA w/ Mount Pipe	72.00	0.0400	207.36	0.0005	0.0008	0.0020
BSA150B	53.00	0.0150	42.14	0.0001	0.0002	0.0007
andrew VHLP800-11	148.00	0.0500	1095.20	0.0029	0.0043	0.0025
4' Dish	144.00	0.1000	2073.60	0.0055	0.0081	0.0049
	Sum					

Name	Start Height	End Height	F_a	w_a	w_a^2	C_{AA}	F_a	F_a
(6) andrew ATCB-B01-006(5/16) From 20 to 148	128.00	138.00	133.00	0.0040	70.05	0.0002	0.0003	0.0002
(6) andrew ATCB-B01-006(5/16) From 20 to 148	108.00	118.00	113.00	0.0040	50.57	0.0001	0.0002	0.0002
(6) andrew ATCB-B01-006(5/16) From 20 to 148	88.00	98.00	93.00	0.0040	34.25	0.0001	0.0001	0.0002
(6) andrew ATCB-B01-006(5/16) From 20 to 148	68.00	78.00	73.00	0.0040	21.10	0.0001	0.0001	0.0002
(6) andrew ATCB-B01-006(5/16) From 20 to 148	48.00	58.00	53.00	0.0040	11.12	0.0000	0.0000	0.0002
(6) andrew ATCB-B01-006(5/16) From 20 to 148	28.00	38.00	33.00	0.0040	4.31	0.0000	0.0000	0.0002
(4) rfs celwave FLC 114-50J(1-1/4) From 20 to 148	138.00	148.00	143.00	0.0280	572.57	0.0015	0.0022	0.0014
(4) rfs celwave FLC 114-50J(1-1/4) From 20 to 148	118.00	128.00	123.00	0.0280	423.61	0.0011	0.0017	0.0014
(4) rfs celwave FLC 114-50J(1-1/4) From 20 to 148	98.00	108.00	103.00	0.0280	297.05	0.0008	0.0012	0.0014
(4) rfs celwave FLC 114-50J(1-1/4) From 20 to 148	78.00	88.00	83.00	0.0280	192.89	0.0005	0.0008	0.0014
(4) rfs celwave FLC 114-50J(1-1/4) From 20 to 148	58.00	68.00	63.00	0.0280	111.13	0.0003	0.0004	0.0014
(4) rfs celwave FLC 114-50J(1-1/4) From 20 to 148	38.00	48.00	43.00	0.0280	51.77	0.0001	0.0002	0.0014
(4) rfs celwave FLC 114-50J(1-1/4) From 20 to 148	20.00	28.00	24.00	0.0224	12.90	0.0000	0.0001	0.0011
(2) rfs celwave FLC 12-50J(1/2") From 20 to 148	128.00	138.00	133.00	0.0034	60.14	0.0002	0.0002	0.0002
(2) rfs celwave FLC 12-50J(1/2") From 20 to 148	108.00	118.00	113.00	0.0034	43.41	0.0001	0.0002	0.0002
(2) rfs celwave FLC 12-50J(1/2") From 20 to 148	88.00	98.00	93.00	0.0034	29.41	0.0001	0.0001	0.0002
(2) rfs celwave FLC 12-50J(1/2") From 20 to 148	68.00	78.00	73.00	0.0034	18.12	0.0000	0.0001	0.0002
(2) rfs celwave FLC 12-50J(1/2") From 20 to 148	48.00	58.00	53.00	0.0034	9.55	0.0000	0.0000	0.0002
(2) rfs celwave FLC 12-50J(1/2") From 20 to 148	28.00	38.00	33.00	0.0034	3.70	0.0000	0.0000	0.0002
(2) andrew WC166(2") From 20 to 148	138.00	148.00	143.00	0.0560	1145.14	0.0030	0.0045	0.0027
(2) andrew WC166(2") From 20 to 148	118.00	128.00	123.00	0.0560	847.22	0.0022	0.0033	0.0027
(2) andrew WC166(2") From 20 to 148	98.00	108.00	103.00	0.0560	594.10	0.0016	0.0023	0.0027
(2) andrew WC166(2") From 20 to 148	78.00	88.00	83.00	0.0560	385.78	0.0010	0.0015	0.0027
(2) andrew WC166(2") From 20 to 148	58.00	68.00	63.00	0.0560	222.26	0.0006	0.0009	0.0027
(2) andrew WC166(2") From 20 to 148	38.00	48.00	43.00	0.0560	103.54	0.0003	0.0004	0.0027
(2) andrew WC166(2") From 20 to 148	20.00	28.00	24.00	0.0448	25.80	0.0001	0.0001	0.0022
andrew EW90(ELLIPTICAL) From 20 to 144	128.00	138.00	133.00	0.0032	56.60	0.0001	0.0002	0.0002
andrew EW90(ELLIPTICAL) From 20 to 144	108.00	118.00	113.00	0.0032	40.86	0.0001	0.0002	0.0002
andrew EW90(ELLIPTICAL) From 20 to 144	88.00	98.00	93.00	0.0032	27.68	0.0001	0.0001	0.0002
andrew EW90(ELLIPTICAL) From 20 to 144	68.00	78.00	73.00	0.0032	17.05	0.0000	0.0001	0.0002
andrew EW90(ELLIPTICAL) From 20 to 144	48.00	58.00	53.00	0.0032	8.99	0.0000	0.0000	0.0002
andrew EW90(ELLIPTICAL) From 20 to 144	28.00	38.00	33.00	0.0032	3.48	0.0000	0.0000	0.0002
(5) andrew LDF4P-50A(1/2) From 12 to 100	98.00	100.00	99.00	0.0015	14.70	0.0000	0.0001	0.0001
(5) andrew LDF4P-50A(1/2) From 12 to 100	78.00	88.00	83.00	0.0075	51.67	0.0001	0.0002	0.0004
(5) andrew LDF4P-50A(1/2) From 12 to 100	58.00	68.00	63.00	0.0075	29.77	0.0001	0.0001	0.0004
(5) andrew LDF4P-50A(1/2) From 12 to 100	38.00	48.00	43.00	0.0075	13.87	0.0000	0.0001	0.0004
(5) andrew LDF4P-50A(1/2) From 12 to 100	18.00	28.00	23.00	0.0075	3.97	0.0000	0.0000	0.0004
(8) andrew LDF5-50A(7/8) From 12 to 100	98.00	100.00	99.00	0.0053	51.75	0.0001	0.0002	0.0003
(8) andrew LDF5-50A(7/8) From 12 to 100	78.00	88.00	83.00	0.0264	181.87	0.0005	0.0007	0.0013
(8) andrew LDF5-50A(7/8) From 12 to 100	58.00	68.00	63.00	0.0264	104.78	0.0003	0.0004	0.0013
(8) andrew LDF5-50A(7/8) From 12 to 100	38.00	48.00	43.00	0.0264	53.87	0.0001	0.0002	0.0013

(8) andrew LDF5-50A(7/8) From 12 to 100	38.00	48.00	43.00	0.0264	48.81	0.0001	0.0002	0.0013
(8) andrew LDF5-50A(7/8) From 12 to 100	18.00	28.00	23.00	0.0264	13.97	0.0000	0.0001	0.0013
(6) rfs celwave LCF158-50A(1-5/8") From 20 to 120	118.00	120.00	119.00	0.0096	135.95	0.0004	0.0005	0.0005
(6) rfs celwave LCF158-50A(1-5/8") From 20 to 120	98.00	108.00	103.00	0.0480	509.23	0.0013	0.0020	0.0024
(6) rfs celwave LCF158-50A(1-5/8") From 20 to 120	78.00	88.00	83.00	0.0480	330.67	0.0009	0.0013	0.0024
(6) rfs celwave LCF158-50A(1-5/8") From 20 to 120	58.00	68.00	63.00	0.0480	190.51	0.0005	0.0007	0.0024
(6) rfs celwave LCF158-50A(1-5/8") From 20 to 120	38.00	48.00	43.00	0.0480	88.75	0.0002	0.0003	0.0024
(6) rfs celwave LCF158-50A(1-5/8") From 20 to 120	20.00	28.00	24.00	0.0384	22.12	0.0001	0.0001	0.0019
(8) DC Trunk From 20 to 120	108.00	118.00	113.00	0.0928	1184.96	0.0031	0.0047	0.0046
(8) DC Trunk From 20 to 120	88.00	98.00	93.00	0.0928	802.63	0.0021	0.0032	0.0046
(8) DC Trunk From 20 to 120	68.00	78.00	73.00	0.0928	494.53	0.0013	0.0019	0.0046
(8) DC Trunk From 20 to 120	48.00	58.00	53.00	0.0928	260.68	0.0007	0.0010	0.0046
(8) DC Trunk From 20 to 120	28.00	38.00	33.00	0.0928	101.06	0.0003	0.0004	0.0046
(3) Fiber Trunk From 20 to 120	118.00	120.00	119.00	0.0048	67.97	0.0002	0.0003	0.0002
(3) Fiber Trunk From 20 to 120	98.00	108.00	103.00	0.0240	254.62	0.0007	0.0010	0.0012
(3) Fiber Trunk From 20 to 120	78.00	88.00	83.00	0.0240	165.34	0.0004	0.0006	0.0012
(3) Fiber Trunk From 20 to 120	58.00	68.00	63.00	0.0240	95.26	0.0003	0.0004	0.0012
(3) Fiber Trunk From 20 to 120	38.00	48.00	43.00	0.0240	44.38	0.0001	0.0002	0.0012
(3) Fiber Trunk From 20 to 120	20.00	28.00	24.00	0.0192	11.06	0.0000	0.0000	0.0009
(18) rfs celwave FLC78-50J(7/8") From 12 to 85	68.00	78.00	73.00	0.0720	383.69	0.0010	0.0015	0.0035
(18) rfs celwave FLC78-50J(7/8") From 12 to 85	48.00	58.00	53.00	0.0720	202.25	0.0005	0.0008	0.0035
(18) rfs celwave FLC78-50J(7/8") From 12 to 85	28.00	38.00	33.00	0.0720	78.41	0.0002	0.0003	0.0035
(18) rfs celwave FLC78-50J(7/8") From 12 to 85	12.00	18.00	15.00	0.0432	9.72	0.0000	0.0000	0.0021
(6) rfs celwave FLC 114-50J(1-1/4") From 12 to 85	68.00	78.00	73.00	0.0420	223.82	0.0006	0.0009	0.0021
(6) rfs celwave FLC 114-50J(1-1/4") From 12 to 85	48.00	58.00	53.00	0.0420	117.98	0.0003	0.0005	0.0021
(6) rfs celwave FLC 114-50J(1-1/4") From 12 to 85	28.00	38.00	33.00	0.0420	45.74	0.0001	0.0002	0.0021
(6) rfs celwave FLC 114-50J(1-1/4") From 12 to 85	12.00	18.00	15.00	0.0252	5.67	0.0000	0.0000	0.0012
(6) rfs celwave FLC 158-50J(1-5/8) From 12 to 72	58.00	68.00	63.00	0.0552	219.09	0.0006	0.0009	0.0027
(6) rfs celwave FLC 158-50J(1-5/8) From 12 to 72	38.00	48.00	43.00	0.0552	102.06	0.0003	0.0004	0.0027
(6) rfs celwave FLC 158-50J(1-5/8) From 12 to 72	18.00	28.00	23.00	0.0552	29.20	0.0001	0.0001	0.0027
(3) rfs celwave FLC 12-50J(1/2) From 12 to 50	48.00	50.00	49.00	0.0010	2.45	0.0000	0.0000	0.0001
(3) rfs celwave FLC 12-50J(1/2) From 12 to 50	28.00	38.00	33.00	0.0051	5.55	0.0000	0.0000	0.0003
(3) rfs celwave FLC 12-50J(1/2) From 12 to 50	12.00	18.00	15.00	0.0031	0.69	0.0000	0.0000	0.0002
miscl Step Bolts From 5 to 148	128.00	138.00	133.00	0.0200	353.78	0.0009	0.0014	0.0010
miscl Step Bolts From 5 to 148	108.00	118.00	113.00	0.0200	255.38	0.0007	0.0010	0.0010
miscl Step Bolts From 5 to 148	88.00	98.00	93.00	0.0200	172.98	0.0005	0.0007	0.0010
miscl Step Bolts From 5 to 148	68.00	78.00	73.00	0.0200	106.58	0.0003	0.0004	0.0010
miscl Step Bolts From 5 to 148	48.00	58.00	53.00	0.0200	56.18	0.0001	0.0002	0.0010
miscl Step Bolts From 5 to 148	28.00	38.00	33.00	0.0200	21.78	0.0001	0.0001	0.0010
miscl Step Bolts From 5 to 148	8.00	18.00	13.00	0.0200	3.38	0.0000	0.0000	0.0010
(3) miscl Safety Line 3/8 From 5 to 148	138.00	148.00	143.00	0.0066	134.96	0.0004	0.0005	0.0003
(3) miscl Safety Line 3/8 From 5 to 148	118.00	128.00	123.00	0.0066	99.85	0.0003	0.0004	0.0003
(3) miscl Safety Line 3/8 From 5 to 148	98.00	108.00	103.00	0.0066	70.02	0.0002	0.0003	0.0003

(3) miscl Safety Line 3/8 From 5 to 148	78.00	88.00	83.00	0.0066	45.47	0.0001	0.0002	0.0003
(3) miscl Safety Line 3/8 From 5 to 148	58.00	68.00	63.00	0.0066	26.20	0.0001	0.0001	0.0003
(3) miscl Safety Line 3/8 From 5 to 148	38.00	48.00	43.00	0.0066	12.20	0.0000	0.0000	0.0003
(3) miscl Safety Line 3/8 From 5 to 148	18.00	28.00	23.00	0.0066	3.49	0.0000	0.0000	0.0003
(3) miscl Safety Line 3/8 From 5 to 148	5.00	8.00	6.50	0.0020	0.08	0.0000	0.0000	0.0001
CU12PSM9P6XXX_6AWG From 12 to 130	118.00	128.00	123.00	0.0235	354.93	0.0009	0.0014	0.0012
CU12PSM9P6XXX_6AWG From 12 to 130	98.00	108.00	103.00	0.0235	248.89	0.0007	0.0010	0.0012
CU12PSM9P6XXX_6AWG From 12 to 130	78.00	88.00	83.00	0.0235	161.62	0.0004	0.0006	0.0012
CU12PSM9P6XXX_6AWG From 12 to 130	58.00	68.00	63.00	0.0235	93.11	0.0002	0.0004	0.0012
CU12PSM9P6XXX_6AWG From 12 to 130	38.00	48.00	43.00	0.0235	43.38	0.0001	0.0002	0.0012
CU12PSM9P6XXX_6AWG From 12 to 130	18.00	28.00	23.00	0.0235	12.41	0.0000	0.0000	0.0012
			Sum					

Municipality	Basic Design Wind Speeds, V (mph)				Allowable Stress Design Wind Speeds, V_{asd} (mph)				Ground Snow Load p_g (psf)	MCE Ground Accelerations		Wind-Borne Debris Region[1]		Hurricane-Prone Region
	Risk Cat. I	Risk Cat. II	Risk Cat. III	Risk Cat. IV	Risk Cat. I	Risk Cat. II	Risk Cat. III	Risk Cat. IV		S_S (g)	S_1 (g)	Risk Cat. III Occup. I-2	Risk Cat. IV	
Sherman	110	115	125	130	85	89	97	101	35	0.203	0.055			
Simsbury	110	120	125	130	85	93	97	101	35	0.177	0.054			Yes
Somers	110	120	130	135	85	93	101	105	35	0.174	0.055			Yes
South Windsor	110	120	130	135	85	93	101	105	30	0.183	0.055			Yes
Southbury	110	120	130	130	85	93	101	101	35	0.199	0.054			Yes
Southington	110	120	130	135	85	93	101	105	30	0.196	0.055			Yes
Sprague	115	125	135	140	89	97	105	108	30	0.191	0.054			Yes
Stafford	110	120	130	135	85	93	101	105	35	0.176	0.055			Yes
Stamford	110	120	130	135	85	93	101	105	30	0.261	0.058		Type B	Yes
Sterling	115	125	135	140	89	97	105	108	35	0.187	0.054			Yes
Stonington	120	130	140	145	93	101	108	112	30	0.182	0.051	Type B	Type A	Yes
Stratford	110	120	130	135	85	93	101	105	30	0.206	0.054		Type B	Yes
Suffield	110	120	125	130	85	93	97	101	35	0.170	0.054			Yes
Thomaston	110	120	125	130	85	93	97	101	35	0.184	0.054			Yes
Thompson	110	120	130	135	85	93	101	105	40	0.185	0.056			Yes
Tolland	110	120	130	135	85	93	101	105	35	0.182	0.055			Yes
Torrington	110	115	125	130	85	89	97	101	40	0.175	0.054			
Trumbull	110	120	130	135	85	93	101	105	30	0.210	0.054			Yes
Union	110	120	130	135	85	93	101	105	40	0.178	0.055			Yes
Vernon	110	120	130	135	85	93	101	105	30	0.186	0.055			Yes
Voluntown	120	130	135	140	93	101	105	108	30	0.188	0.053			Yes
Wallingford	110	120	130	135	85	93	101	105	30	0.205	0.055			Yes
Warren	110	115	125	130	85	89	97	101	40	0.179	0.054			
Washington	110	115	125	130	85	89	97	101	35	0.189	0.054			
Waterbury	110	120	130	135	85	93	101	105	35	0.193	0.054			Yes
Waterford	120	130	140	140	93	101	108	108	30	0.194	0.053	Type B	Type B	Yes
Watertown	110	120	130	130	85	93	101	101	35	0.189	0.054			Yes
West Hartford	110	120	130	135	85	93	101	105	30	0.187	0.055			Yes
West Haven	110	125	130	135	85	97	101	105	30	0.200	0.053	Type B	Type B	Yes
Westbrook	115	125	135	140	89	97	105	108	30	0.204	0.054	Type B	Type B	Yes
Weston	110	120	130	135	85	93	101	105	30	0.233	0.056			Yes
Westport	110	120	130	135	85	93	101	105	30	0.232	0.056		Type B	Yes

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Seismic

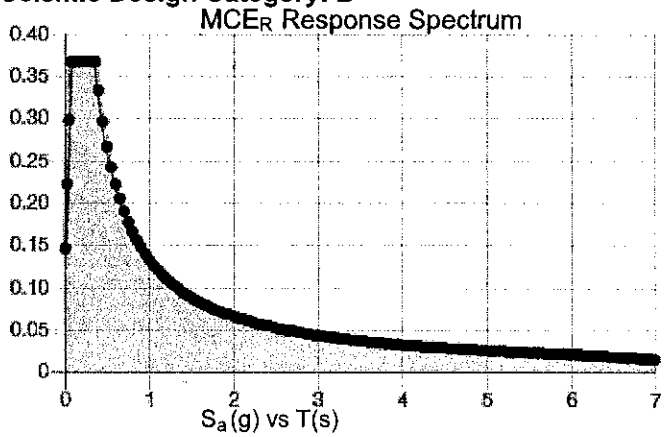
D - Default (see Section 11.4.3)

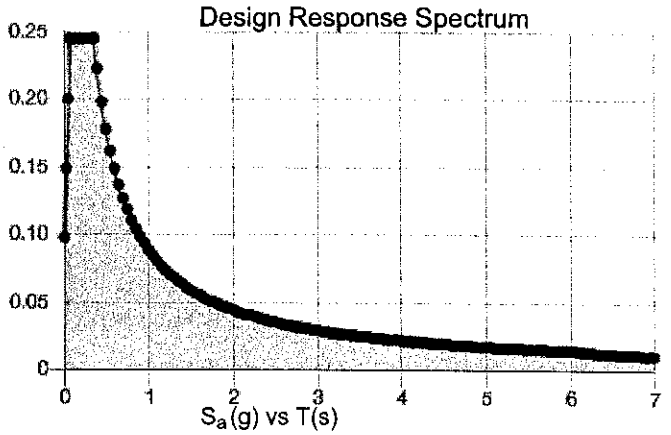
Site Soil Class:

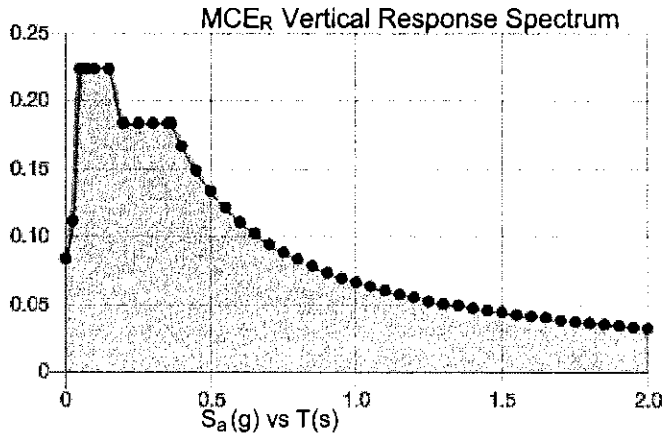
Results:

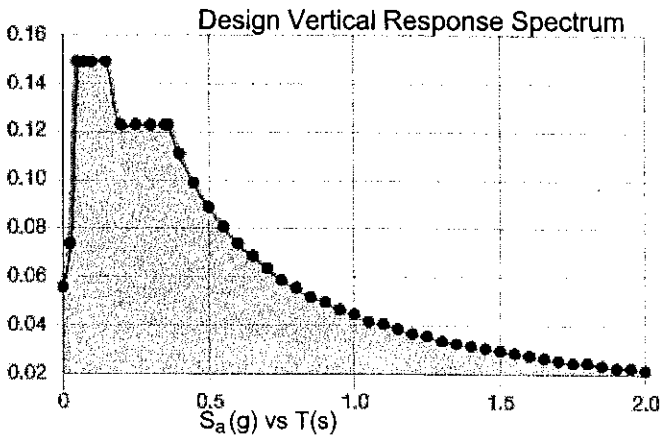
S_S :	0.23	S_{D1} :	0.089
S_1 :	0.056	T_L :	6
F_a :	1.6	PGA :	0.134
F_v :	2.4	PGA_M :	0.205
S_{MS} :	0.368	F_{PGA} :	1.532
S_{M1} :	0.134	I_e :	1.25
S_{DS} :	0.245	C_v :	0.76

Seismic Design Category: B









Data Accessed: **Thu Dec 01 2022**

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

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Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	15 F
Gust Speed	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Thu Dec 01 2022

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 500-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

Tectonic

PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Date: **October 20, 2022**

Proposed Mount Analysis Report

Project Information:

Carrier:	Dish Wireless
Site Number:	NJJER01115A
Site Address:	515 Post Road East, Westport, Fairfield County, CT 06880
Site Type:	Platform w/ Railing Mount on Monopole

Tectonic Project Number: 10710.NJJER01115A

Tectonic Engineering Consultants, Geologists & Land Surveyors, D.P.C., Inc. is pleased to submit this **"Mount Analysis Report"** to determine the structural integrity of the above-mentioned proposed mount.

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:

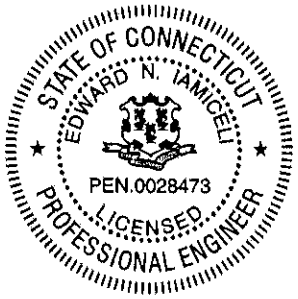
Mount: **Sufficient – 34%**

This analysis has been performed in accordance with the 2022 Connecticut State Building Code and the 2021 International Building Code based upon an ultimate 3-second gust wind speed of 130 mph per Appendix P as required for use in the ANSI/TIA-222-H-1-2019 Standard. Exposure Category B with a maximum topographic factor, Kzt, of 1.0 and Risk Category III was used in this analysis.

We at Tectonic appreciate the opportunity of providing our continuing professional services to you and Dish Wireless. If you have any questions or need further assistance on this or any other projects, please give us a call.

Structural analysis prepared by: John-Fritz Julien / Ian Marinaccio

Respectfully submitted by:
Tectonic Engineering Consultants, Geologists & Land Surveyors D.P.C., Inc.



Edward N. Iamiceli, P.E.
Managing Director - Structural

Project Contact Info

1279 Route 300 | Newburgh, NY 12550
845.567.6656 Tel | 845.567.8703 Fax

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TABLE OF CONTENTS

1) INTRODUCTION

Analysis of the proposed antenna mounts due to the loading of the proposed antennas, equipment, and related appurtenances. The proposed mount is a platform mount manufactured by CommScope, P/N: MC-PK8-DSH with a handrail.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	III
Wind Speed:	130 mph
Exposure Category:	B
Topographic Factor:	1.0
Ice Thickness:	1.0 in
Wind Speed with Ice:	50 mph
Maintenance Load:	30 mph
Seismic S_s / S_1:	0.23 / 0.056

Table 1 - Proposed Equipment Loading Information

Mounting Level (ft)	Carrier Designation	Number of Antennas	Antenna Manufacturer	Antenna Model	Proposed Mount Type	Note
130.0	Dish Wireless	3	JMA	MX08FR0665-21	CommScope MC-PK8-DSH w/ HR	1
		3	Fujitsu	TA08025-B604 RRH		
		3	Fujitsu	TA08025-B605 RRH		
		1	Raycap	RDIDC-9181-PF-48		

Note:
1) Proposed equipment to be installed on the proposed mounts.

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Dated
Mount Assembly Drawings	CommScope, P/N: MC-PK8- DSH	03/17/2021
Field Notes & Photos	Tectonic	05/05/2021
RFDS	Dish Wireless	06/09/2021
Tower Structural Analysis	Tectonic	09/27/2021
Construction Drawings	Tectonic	10/05/2022

3.1) Analysis Method

A tool internally developed, using Microsoft Excel, was used to calculate wind loading on all appurtenances and mount members. This information was then used in conjunction with another program, RISA-3D, which is a commercially available analysis software package, used to check the antenna mounting system and calculate member stresses for various loading cases. The selected output from the analysis is included in Appendices B and C.

3.2) Assumptions

1) The antenna mounting system was properly fabricated, installed, and maintained in good condition in accordance with its original design, TIA Standards, and/or manufacturer's specifications.
2) The configuration of antennas, mounts, and other appurtenances are as specified in Tables 1 and 2.
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) Member length and sizes are based solely on the assembly drawing by CommScope, referenced above.
5) Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM 500 (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. Tectonic should be notified to determine the effect on the structural integrity of the mount.

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity

Notes	Component	Mount Centerline (ft)	% Capacity	Pass / Fail
1	Standoff End Plate	130.0	31	Pass
	Grating Support Angle		13	Pass
	Face Horizontal		22	Pass
	Mount Pipe		27	Pass
	Standoff Channel		33	Pass
	Standoff		29	Pass
	Rail Connector		22	Pass
	Railing		21	Pass
2	Collar Connection		34	Pass
Structure Rating (max from all components) =				**34 %**

Notes:
1) See additional documentation in "Appendix C - Analysis Output" for calculations supporting the % capacity consumed.
2) See additional documentation in "Appendix D – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Result / Conclusions

The proposed platform mount has adequate capacity to support the proposed antenna and equipment installation as detailed in the following report.

This structural analysis only includes evaluation of the antenna mounts and not the monopole. The monopole has been analyzed under a separate structural analysis by Tectonic referenced above.

Contractor shall field verify existing conditions and recommendations as noted on the construction drawings and notify the design engineer of any discrepancies prior to construction. Any further changes to the antenna and/or appurtenance configuration should be reviewed with respect to their effect on structural loads prior to implementation.

APPENDIX A

SOFTWARE INPUT CALCULATIONS

Tectonic
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Job No.:	10710.NJJER01115A		
Sheet No.:	1	of	4
Calculated By:	JJ	Date :	10/20/22
Checked By:	IM	Date :	10/20/22

WIND AND ICE LOADS PER TIA-222-H

Work Order #:	
Site Name:	
Location:	
County:	

Tower Type		Monopole
Structure Height		ft
Supporting Str Height		Ground Mounted
Risk Category		Substanial risk
Exposure Category		Suburban/wooded/obstructed
Topo Category		Flat or rolling terrain
Height of crest		ft
Mean elevation (zs)		ft

Basic Wind Speed (3-sec gust):		
Without ice		mph
With ice		mph
Maintenance Wind		mph
Ice thickness		in

Importance Factor	
Ice thickness	1.15
Earthquake	1.25
Supporting Data:	
K_s	1.00
K_e	1.00
K_c	0.90
K_t	N/A
f	N/A
z_g	1200
α	7
$K_{z,min}$	0.7
K_d	0.95
G_h	1.00

Height	z (ft)*	
	Kh	N/A
	Kzt	1.00
	Kz	1.07
	Kiz	1.15
Wind Pressure, qz (psf)	No Ice	43.59
	With Ice	6.45
	Service	2.32
(tiz)	Ice Thk	1.43
Appurtenances (qzGh)	No Ice	43.59
	With Ice	6.45
	Service	2.32

Note : *Ultimate 3-second gust wind speed of 125 mph per Appendix P.

Tectonic

PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Job No.	10710.NJJER01115A		
Sheet No.	2	of	4
Calculated By	JJ	Date :	10/20/22
Checked By	IM	Date :	10/20/22

Equipment Information

Shielding factor, Ka [redacted] Section 16.6

WIND WITHOUT ICE

Antenna Configuration	(E) or (P)	Qty	z (ft)	Length or Diameter (ft)	Width (in)	Depth (in)	Flat or Cylindrical?	Antenna $(Ca)_N$	Antenna $(Ca)_T$	Face Normal $(A_a)_N$ (ft^2)	Windward Face Normal $(C_aA_a)_N$ (ft^2)	Side Face $(Aa)_T$ (ft^2)	Wind ward Side Face (CaAa)T (ft^2)	Normal Antenna Wind Load Each (lb)	Transverse Antenna Wind Load Each (lb)	Antenna Weight (lb)	Total Weight (lb)
[redacted]			130	6.00	20.00	8.00	[redacted]	1.25	1.47	10.00	33.72	4.00	15.84	490	230	82.5	247.5
[redacted]			130	1.24	15.70	7.80	[redacted]	1.20	1.20	1.62	5.26	0.81	2.61	76	38	63.9	191.7
[redacted]			130	1.24	15.70	9.00	[redacted]	1.20	1.20	1.62	5.26	0.93	3.02	76	44	74.9	224.7
[redacted]			130	1.58	14.39	8.15	[redacted]	1.20	1.20	1.90	2.05	1.07	1.16	89	51	21.3	21.3
										$\sum(CaAA)_N$	46.30	$\sum(CaAA)_T$	22.63				685

WIND WITH ICE Ice Thk = 1.43 in

Antenna Configuration	(E) or (P)	Qty	z (ft)	Length or Diameter (ft)	Width (in)	Depth (in)	Flat or Cylindrical?	Antenna $(Ca)_N$	Antenna $(Ca)_T$	Face Normal $(A_a)_N$ (ft^2)	Windward Face Normal $(C_aA_a)_N$ (ft^2)	Side Face $(A_a)_T$ (ft^2)	Windward Side Face (CaAa)T (ft^2)	Normal Antenna Wind Load Each (lb)	Transverse Antenna Wind Load Each (lb)	Ice Area for Weight (ft^2)	Ice Weight Alone (lbs)
MX08FR0665-21	P	3	130	6.24	22.87	10.87	Cylindrical	0.72	0.72	11.89	23.02	5.65	10.94	49	24	28.0	187.3
TA08025-B604-RRH	P	3	130	1.48	18.57	10.67	Cylindrical	0.7	0.7	2.29	4.33	1.32	2.49	9	5	4.9	32.5
TA08025-B605-RRH	P	3	130	1.48	18.57	11.87	Cylindrical	0.7	0.7	2.29	4.33	1.46	2.77	9	6	5.1	34.2
RDIDC-9181-PF-48	P	1	130	1.82	17.26	11.02	Cylindrical	0.7	0.7	2.62	1.65	1.67	1.05	11	7	5.9	39.8
										$\sum(CaAA)_N$	33.33	$\sum(CaAA)_T$	17.25				294

MAINTENANCE WIND

Antenna Configuration	(E) or (P)	Qty	z (ft)	Length or Diameter (ft)	Width (in)	Depth (in)	Flat or Cylindrical?	Antenna $(Ca)_N$	Antenna $(Ca)_T$	Face Normal $(A_a)_N$ (ft^2)	Windward Face Normal $(C_aA_a)_N$ (ft^2)	Side Face $(A_a)_T$ (ft^2)	Windward Side Face (CaAa)T (ft^2)	Normal Antenna Wind Load Each (lb)	Transverse Antenna Wind Load Each (lb)
MX08FR0665-21	P	3	130	6.00	20.00	8.00	Flat	1.25	1.47	10.00	33.72	4.00	15.84	26	12
TA08025-B604-RRH	P	3	130	1.24	15.70	7.80	Flat	1.20	1.20	1.62	5.26	0.81	2.61	4	2
TA08025-B605-RRH	P	3	130	1.24	15.70	9.00	Flat	1.20	1.20	1.62	5.26	0.93	3.02	4	2
RDIDC-9181-PF-48	P	1	130	1.58	14.39	8.15	Flat	1.20	1.20	1.90	2.05	1.07	1.16	5	3
										$\sum(CaAA)_N$	46.30	$\sum(CaAA)_T$	22.63		

Tectonic
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Job No.	10710.NJJER01115A		
Sheet No.	3	of	4
Calculated By	JJ	Date :	10/20/22
Checked By	IM	Date :	10/20/22

Mounting System Information

Mount Center Line:	130 ft

									Reduction Factor =			Section 16.6	
Mount Part	Quantity	Length (ft)	Projected Width (in)	Depth (in)	Flat or Cylindrical?	Force Coefficient	Projected Area (ft^2)	Wind Force (lbs/ft)	Ice Weight Area (ft^2)	Ice Weight (lbs/ft)	Projected Area with Ice (ft^2)	Wind Force Ice (lbs/ft)	Maintenance Wind Force (lbs/ft)
[redacted]						2	9.75	47.2	10.31	7.7	14.05	10.1	2.5
[redacted]						2	3.00	43.6	3.19	7.1	4.43	9.5	2.3
[redacted]						2	5.00	14.5	10.00	4.5	12.17	5.2	0.8
[redacted]						1.2	8.40	15.3	21.98	6.1	15.28	4.1	0.8
[redacted]						1.2	20.70	12.5	54.17	5.0	41.35	3.7	0.7
[redacted]						2	9.30	24.6	14.96	6.1	17.18	6.7	1.3
[redacted]						2	6.84	29.1	13.68	8.9	11.74	7.4	1.5
[redacted]						2	9.90	47.9	16.58	12.3	14.20	10.2	2.6
[redacted]						1.2	8.63	12.5	22.57	5.0	17.23	3.7	0.7

Note:
Note: The member sizes are based on the assembly drawings by Commscope, date 03/17/21

Tectonic
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Job No.	10710.NJJER01115A			
Sheet No.	4	of	4	
Calculated By	JJ	Date :	10/20/22	
Checked By	IM	Date :	10/20/22	

Seismic Check

Tower Information

Tower Type:	MP	
Structure Height	148	ft
Supporting Structure Height	GM	ft
Mount Height	130	ft

Geographic Information

City: [redacted]
State: [redacted]
County: [redacted]
Latitude: [redacted] Longitude: [redacted]

Seismic Information

Risk Category	III		
Importance Factor	1.25		
Site Soil Classification	[redacted]		Table 2-10
S_s	[redacted]		https://asce7hazardtool.online/
S_1	[redacted]		
F_a	[redacted]		(Table 2-11, interpolation allowed)
F_V	[redacted]		(Table 2-12, interpolation allowed)
S_{DS}	0.246		Section 2.7.5
S_{D1}	0.090		
R	[redacted]		Section 16.7
As	1.00		Section 16.7 & 2.7.8
Cs	0.21	>	0.03

Equivalent Lateral Force Procedure

Equipment (Discrete Appurtenances)

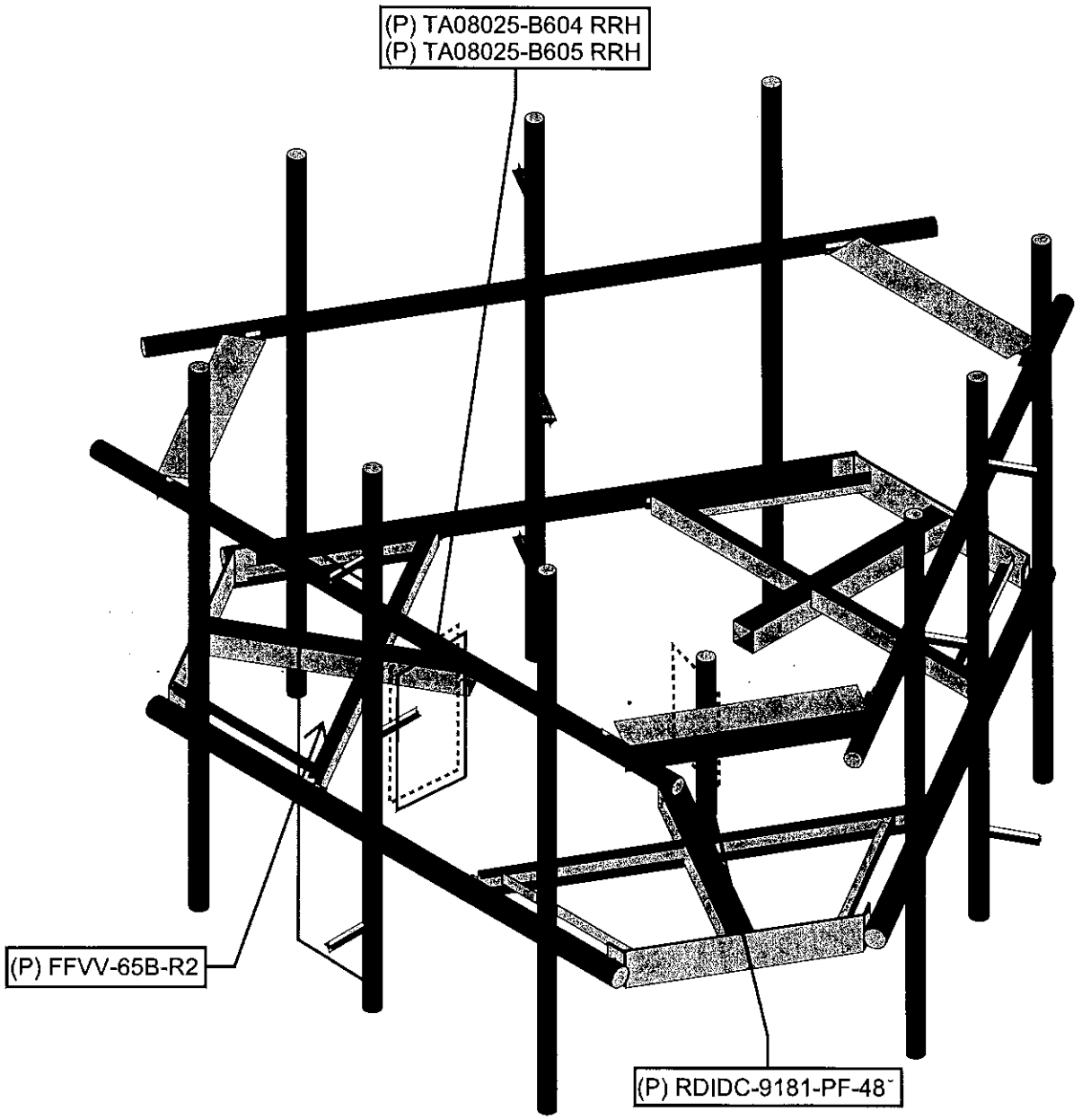
Antenna Configuration	(E) or (P)	Qty	z (ft)	Antenna Weight (lb)	Shear Vs= Cs*W (lbs)	Vert. Seismic load (Ev, lbs)	Seismic load (Eh, lbs)
MX08FR0665-21	P	3	130	83	17	4	17
TA08025-B604-RRH	P	3	130	64	13	3	13
TA08025-B605-RRH	P	3	130	75	16	4	16
RDIDC-9181-PF-48	P	1	130	21	4	1	4

Mounting System (Discrete Appurtenances)

Ev =0.2S_{DS} * D	0.0492 x D	"D" is the dead weight of the mount members.
Eh= rho * Q_E	0.21 x W	"W" total weight of structure above ground

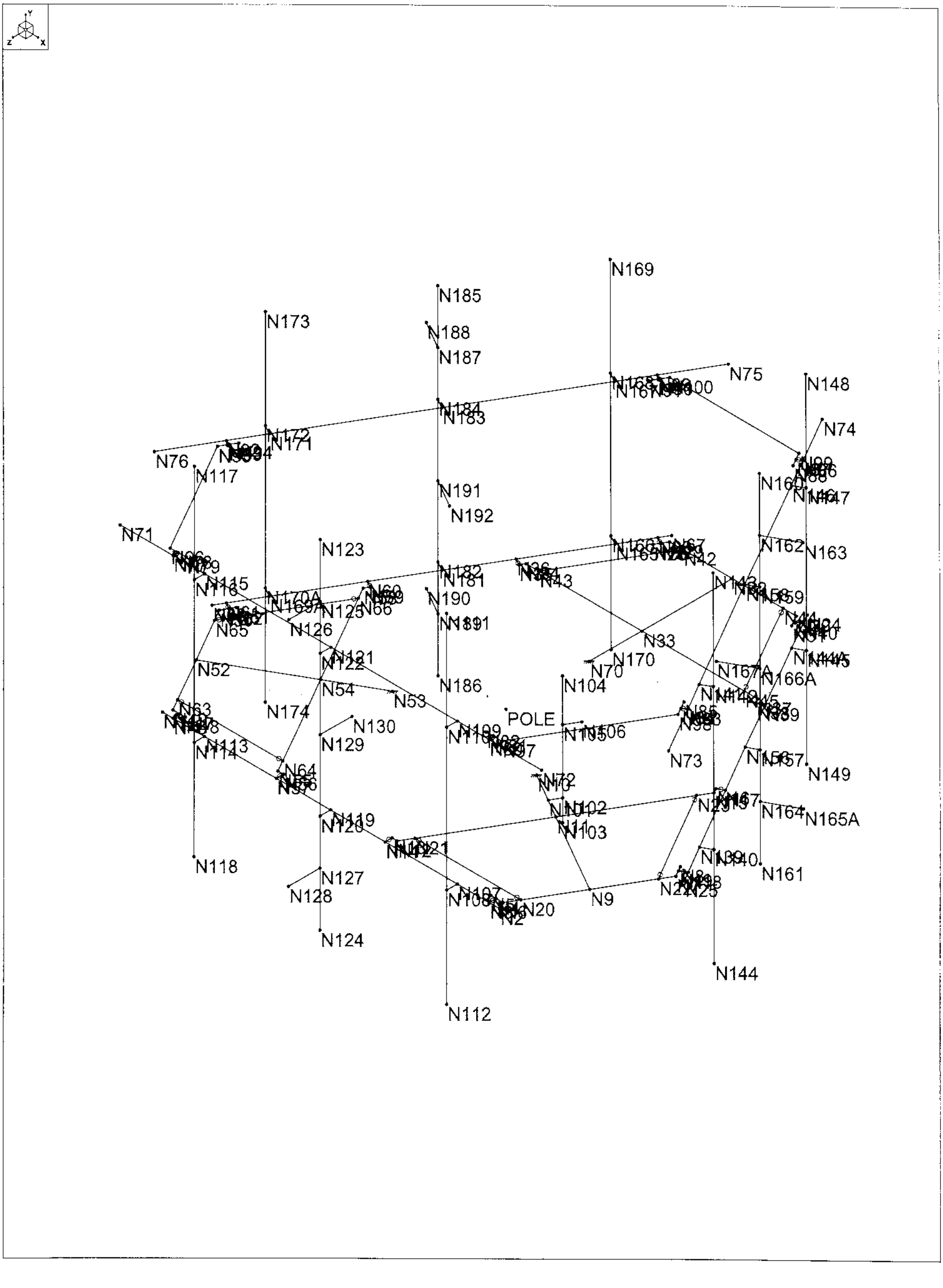
Notes:
1. Wind loads govern over seismic loads

Proposed Platform Mount



(P) PROPOSED

NOTES:
1) PROPOSED ANTENNAS AND MOUNTING PIPES HAVE BEEN VERTICALLY CENTERED ALONG THE EXISTING MOUNT (NO OFFSET).
2) LISTED PROPOSED APPURTENANCES ABOVE ARE TYPICAL FOR ALL SECTORS.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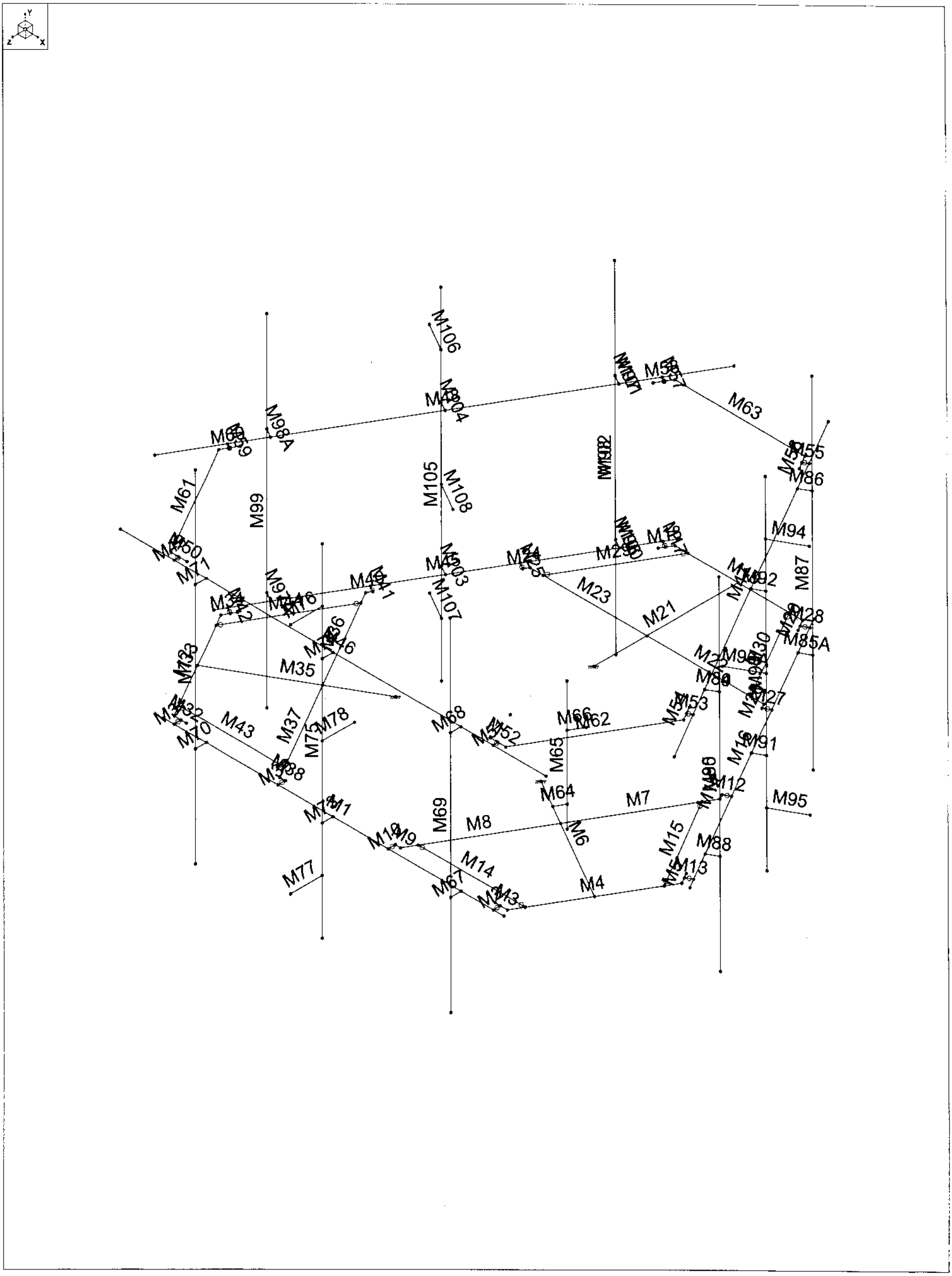

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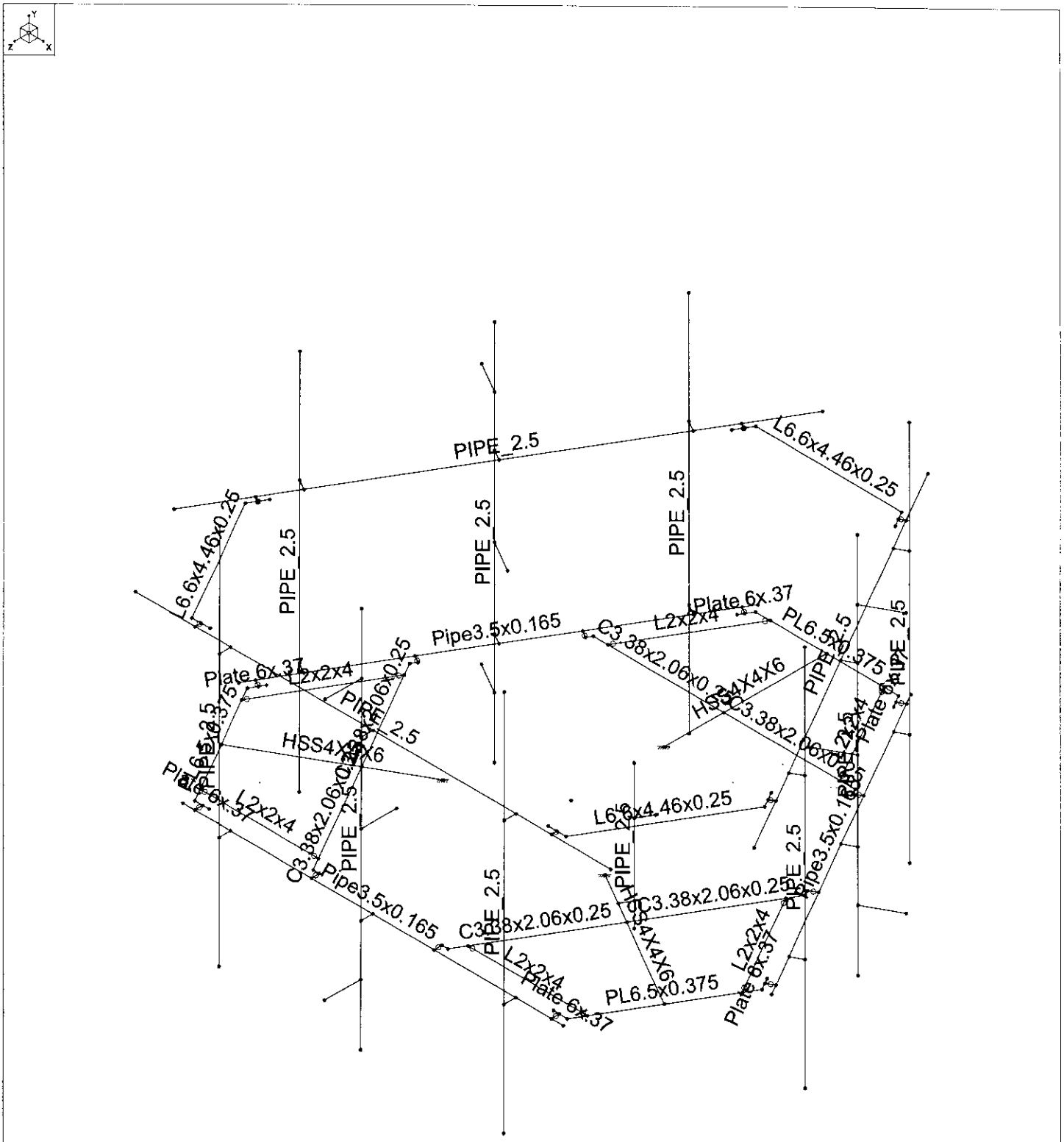
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Pipe3.5x0.165
C3.38x2.06x0.25
PL6.5x0.375
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Plate 6x.37
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PIPE_2.5
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L2x2x4
C3.38x2.06x0.25
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PIPE_2.5
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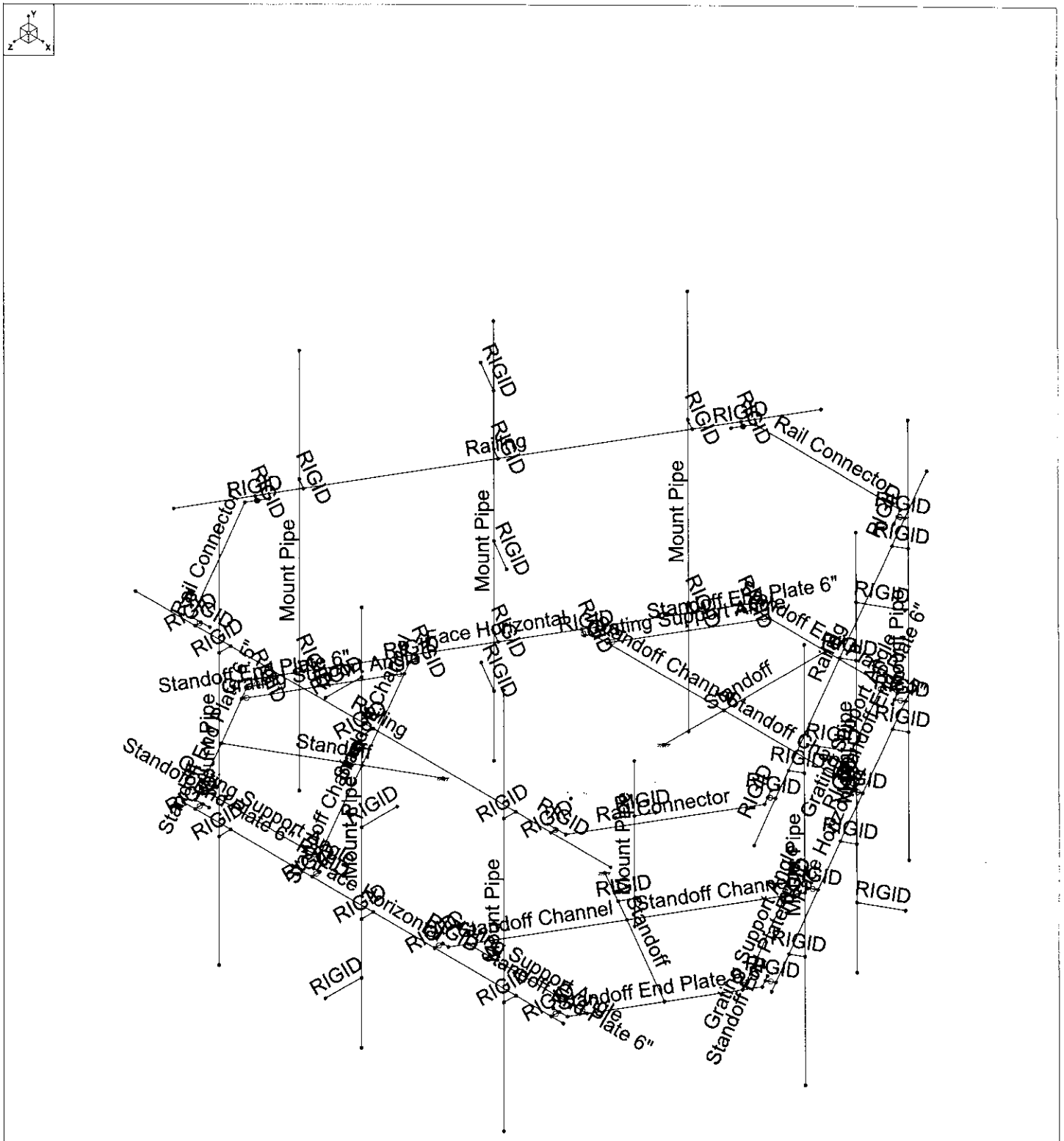
PIPE_2.5


Railing
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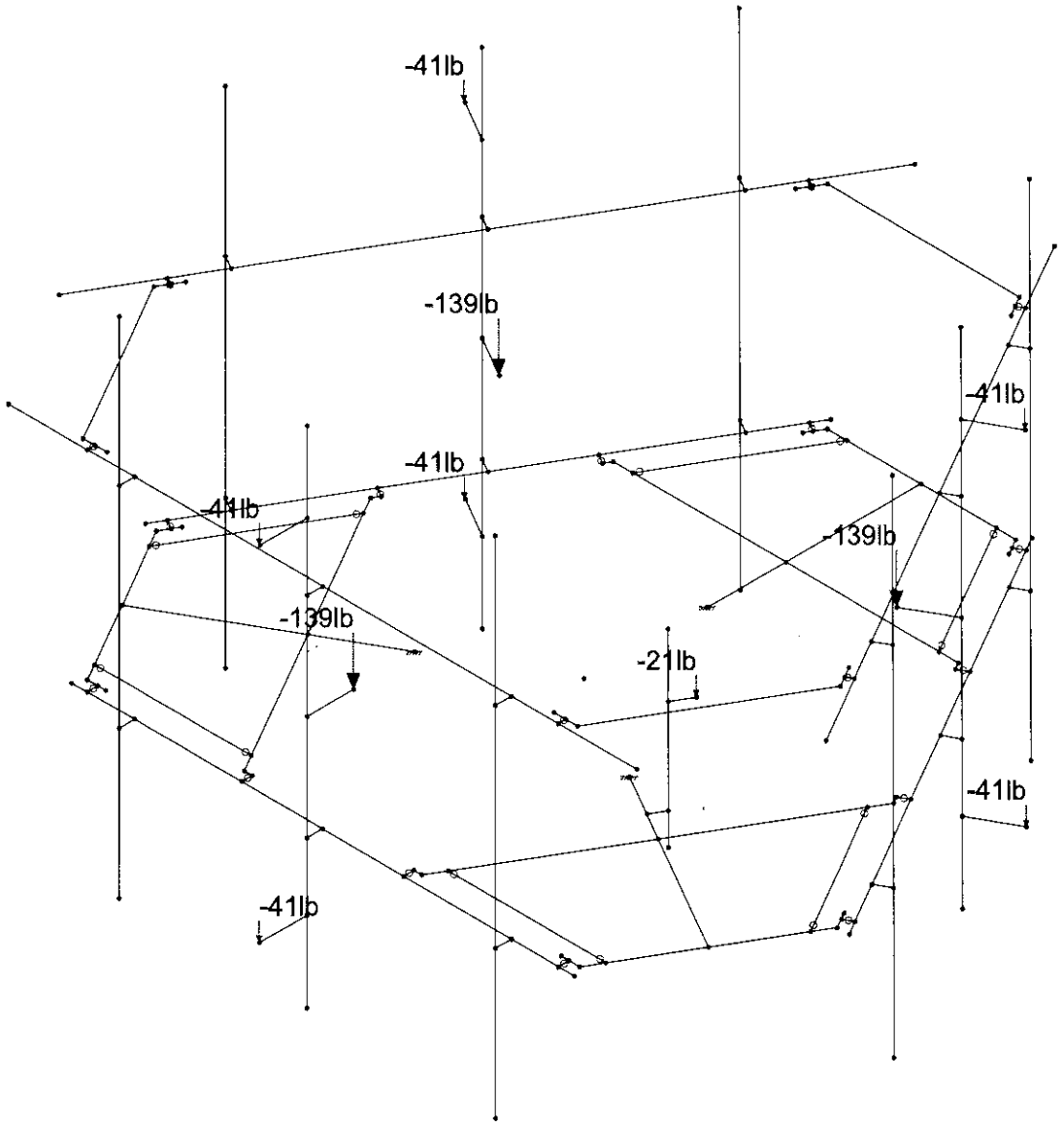
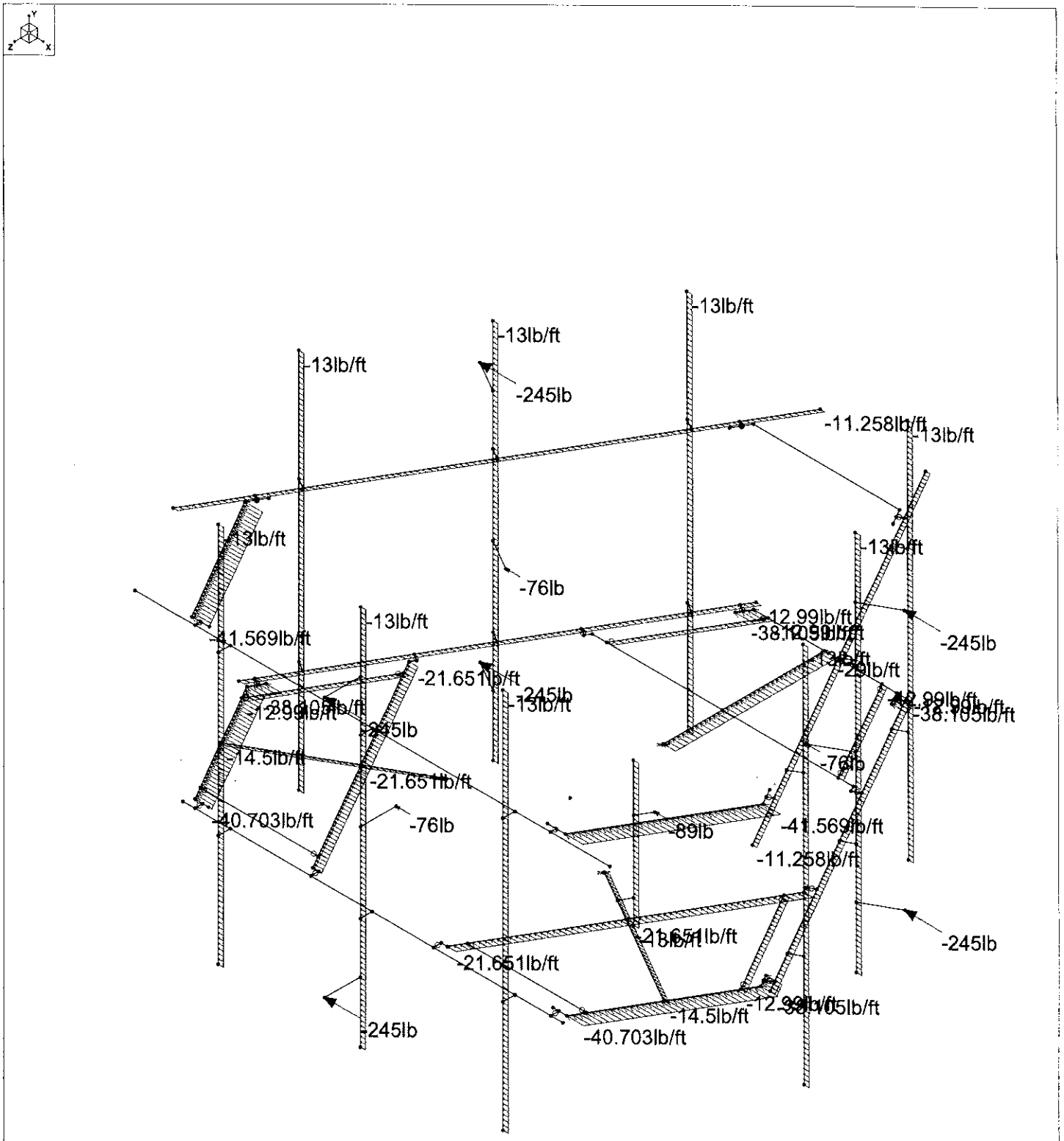
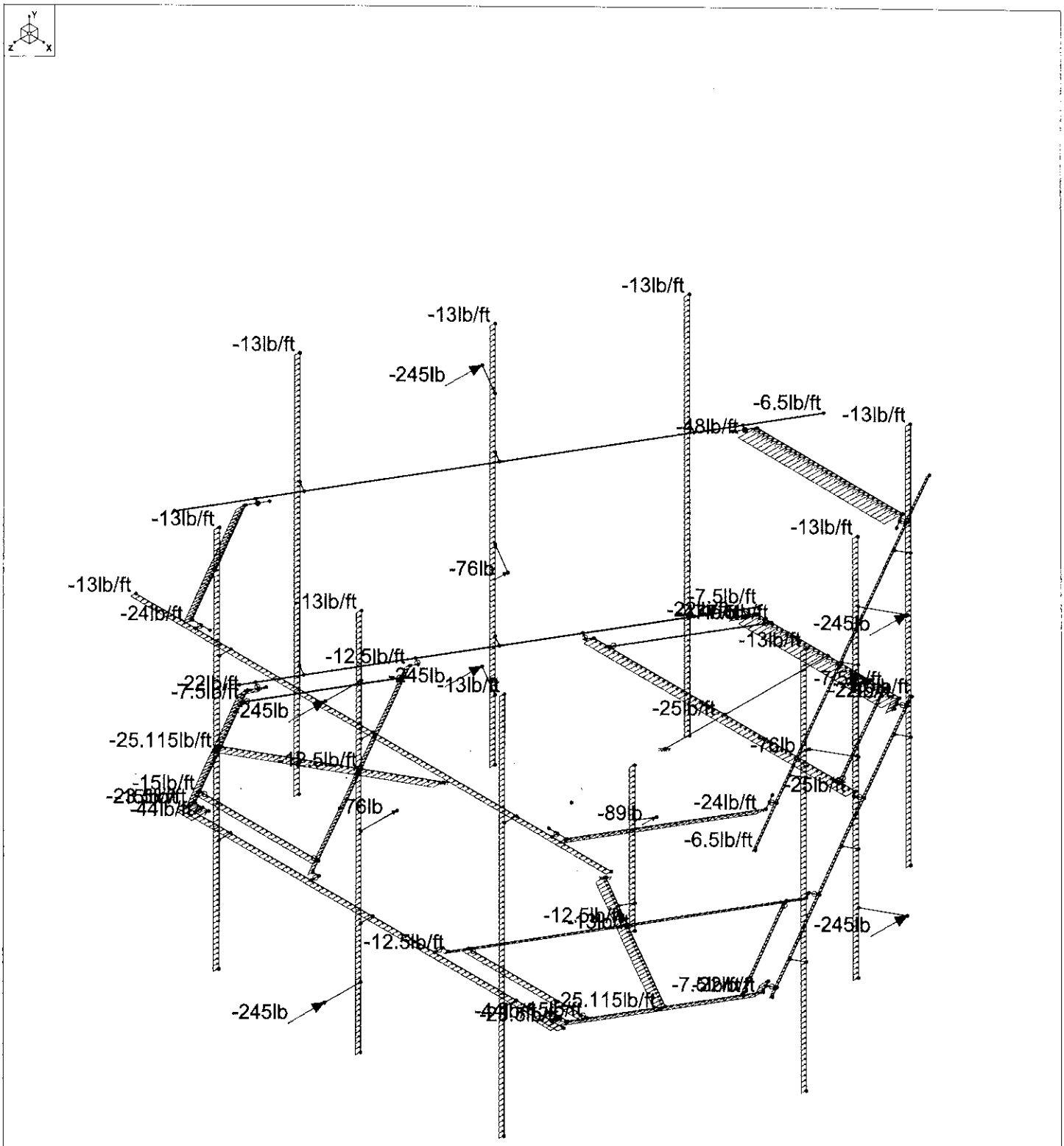
Mount Pipe
Standoff End Plate 6"
Standoff Channel
Standoff
Grating Support Angle
Grating
RIGID



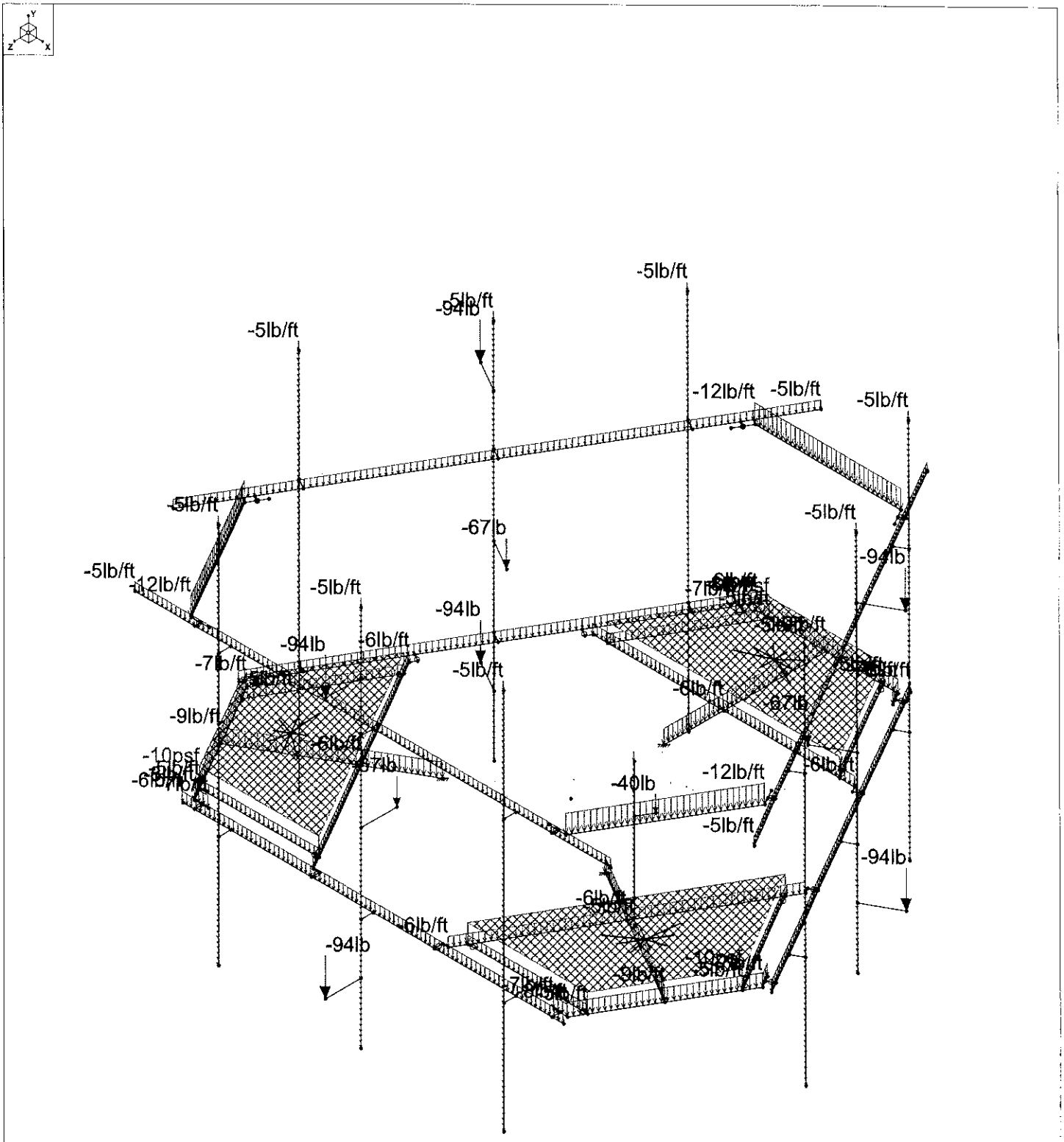
Loads: BLC 1, DL



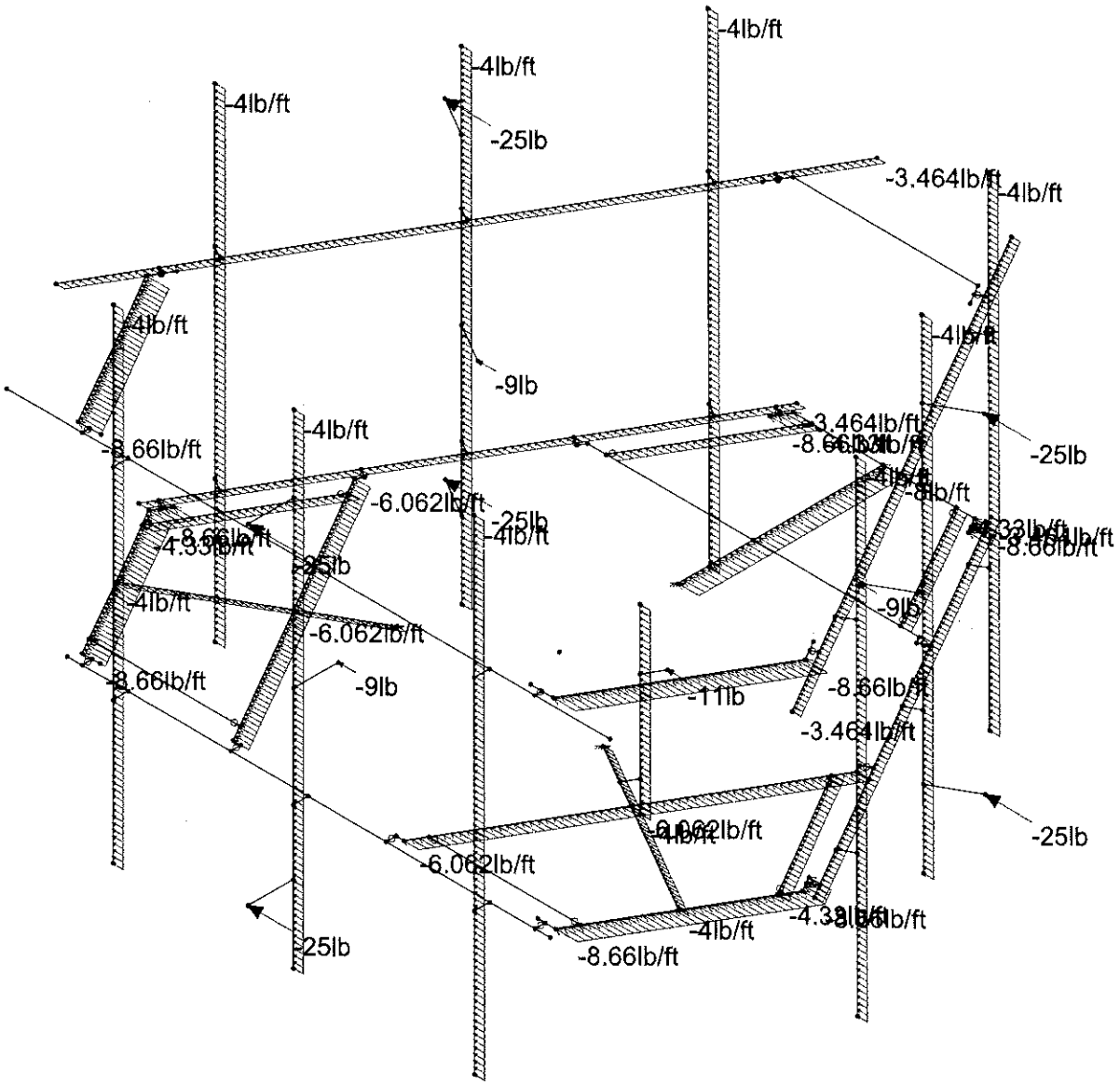
Loads: BLC 2, WLX



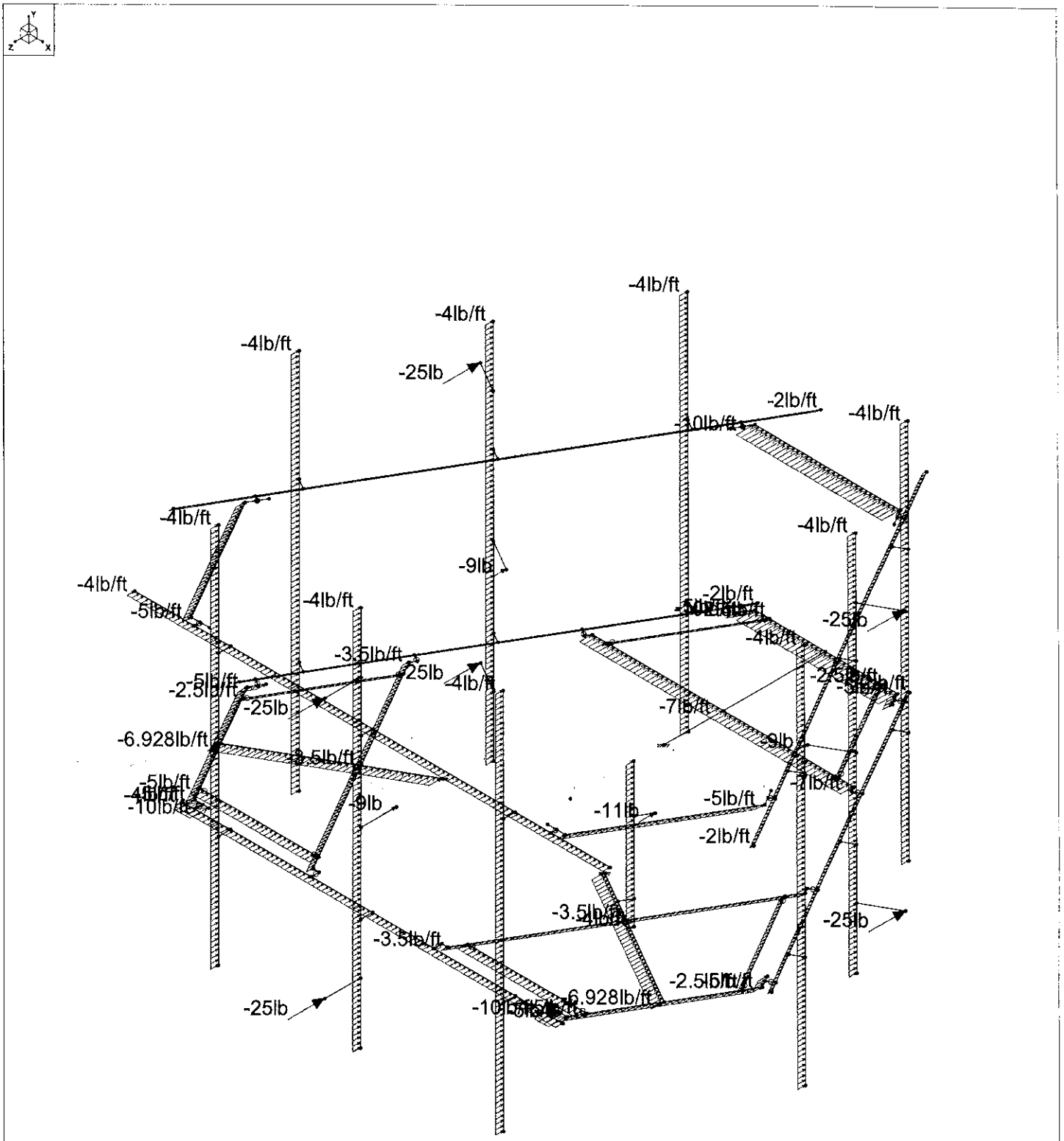
Loads: BLC 3, WLZ



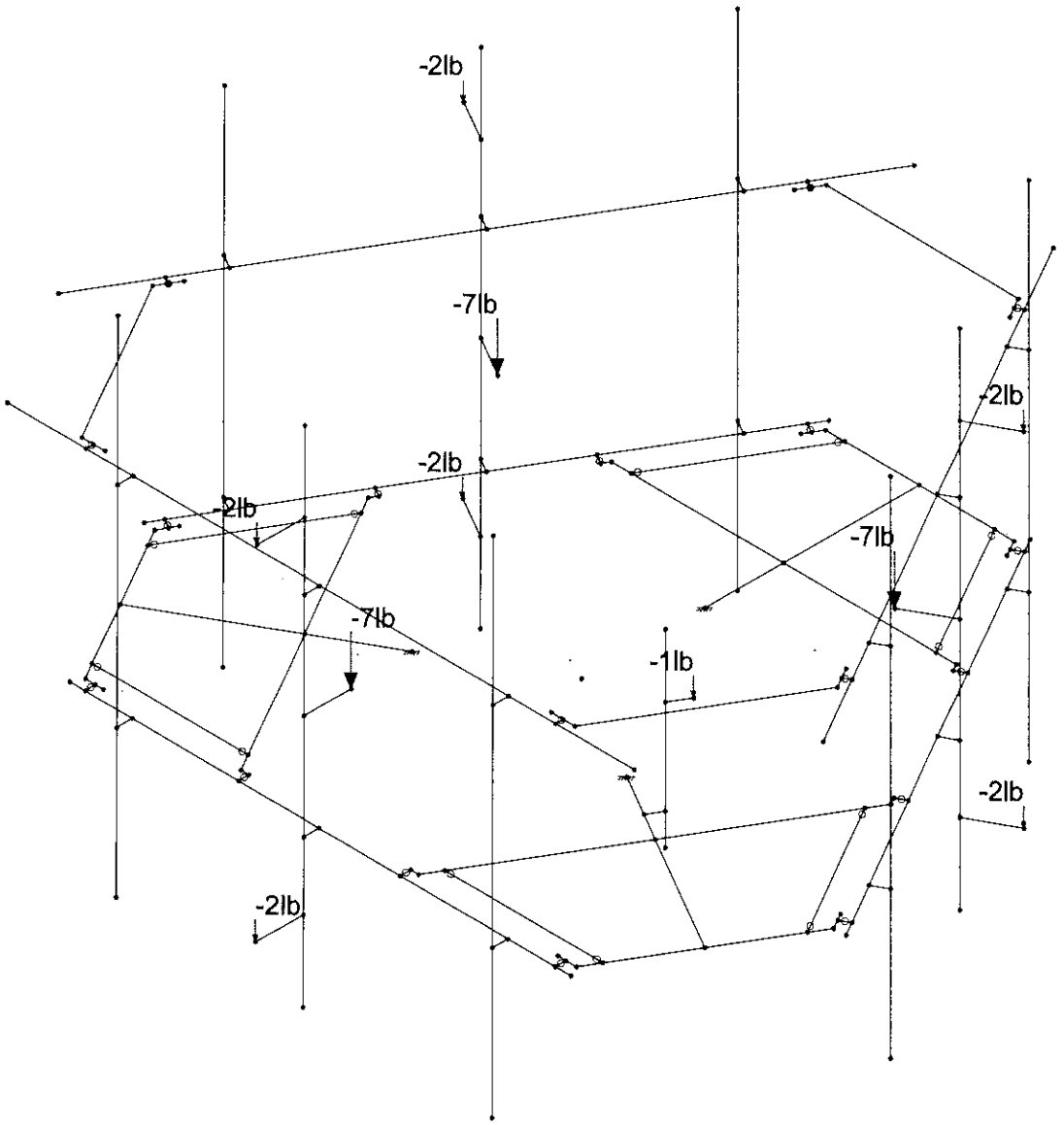
Loads: BLC 4, DLi



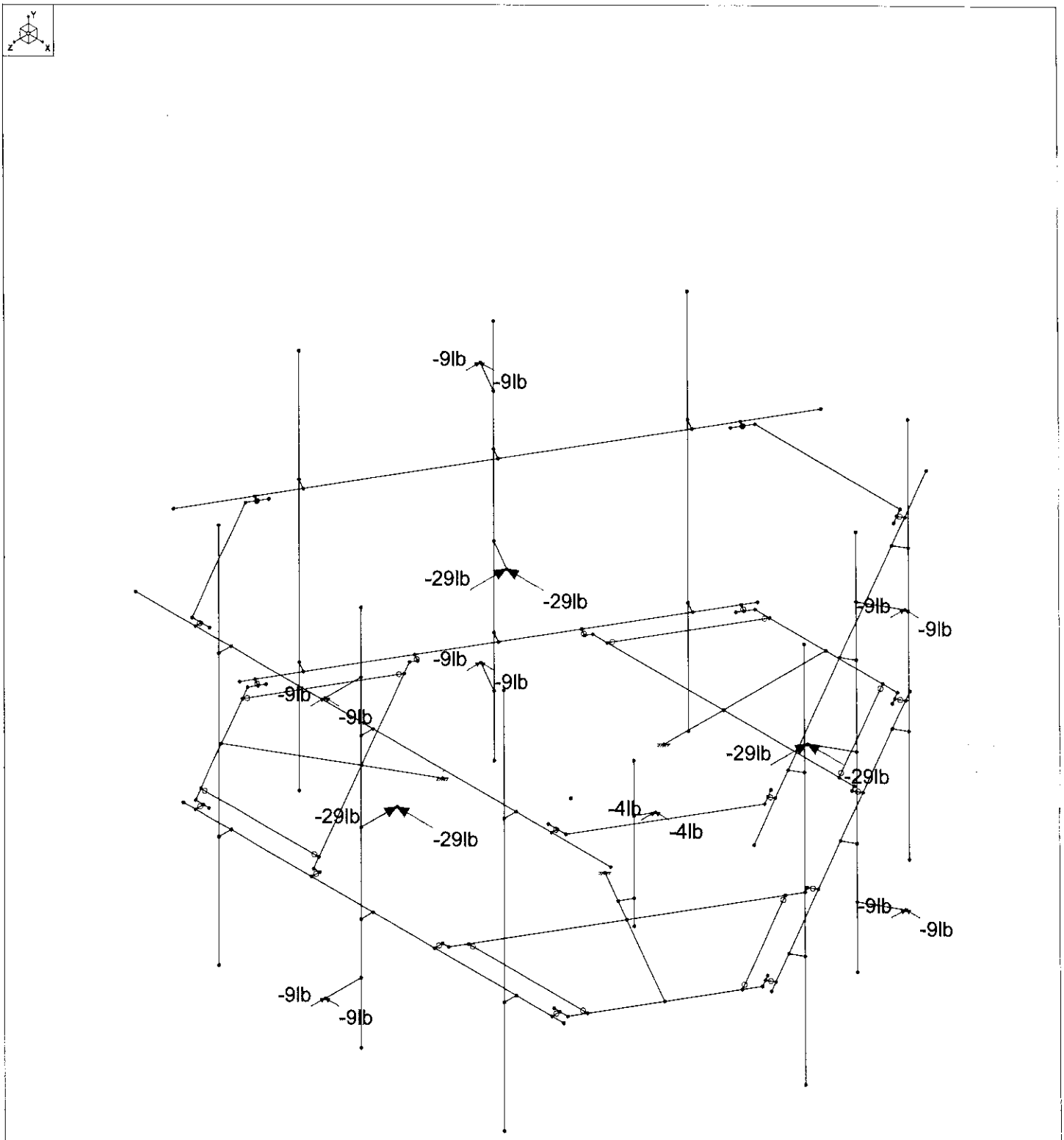
Loads: BLC 5, WLXi



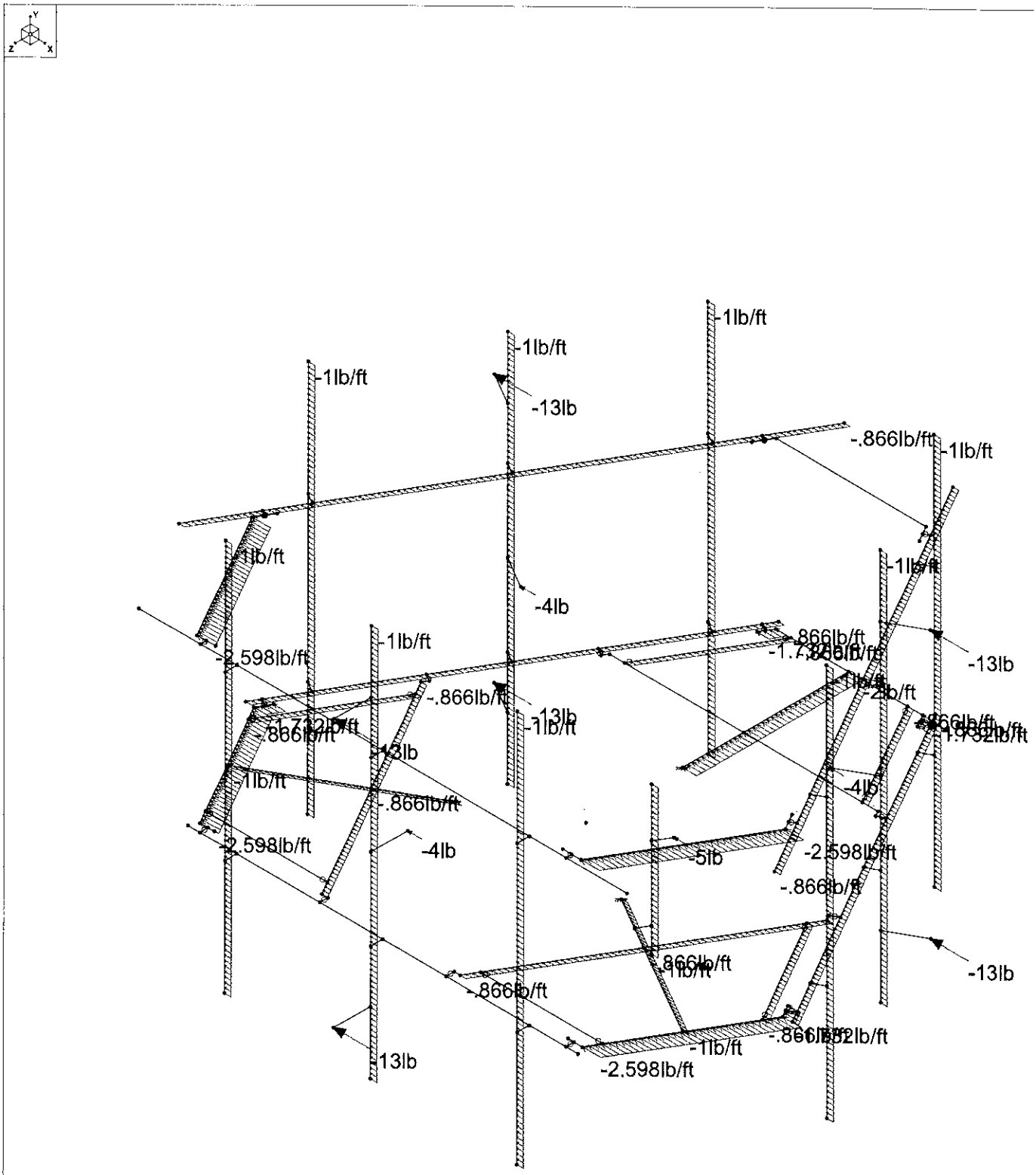
Loads: BLC 6, WLZi



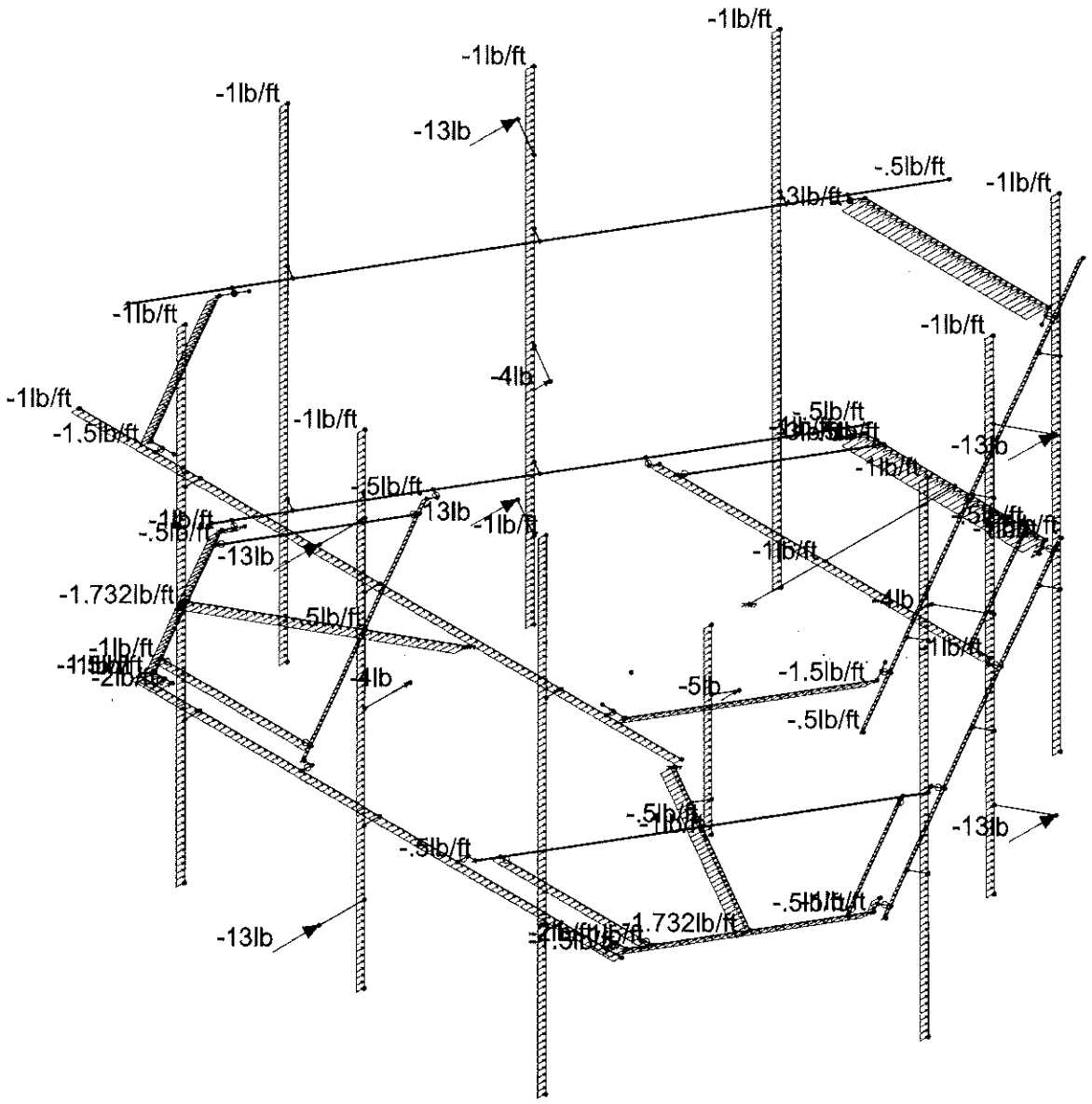
Loads: BLC 7, ELv



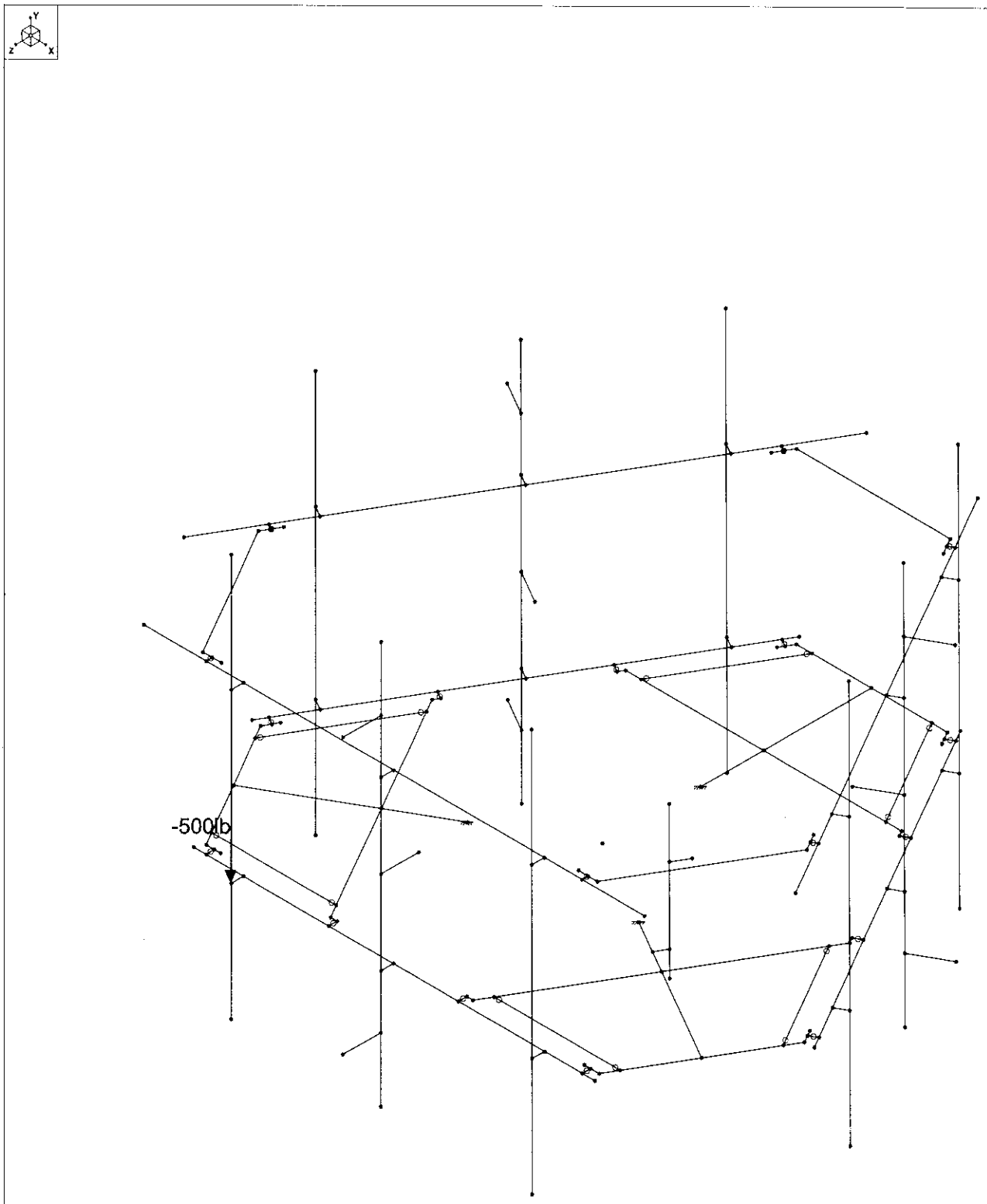
Loads: BLC 8, ELh



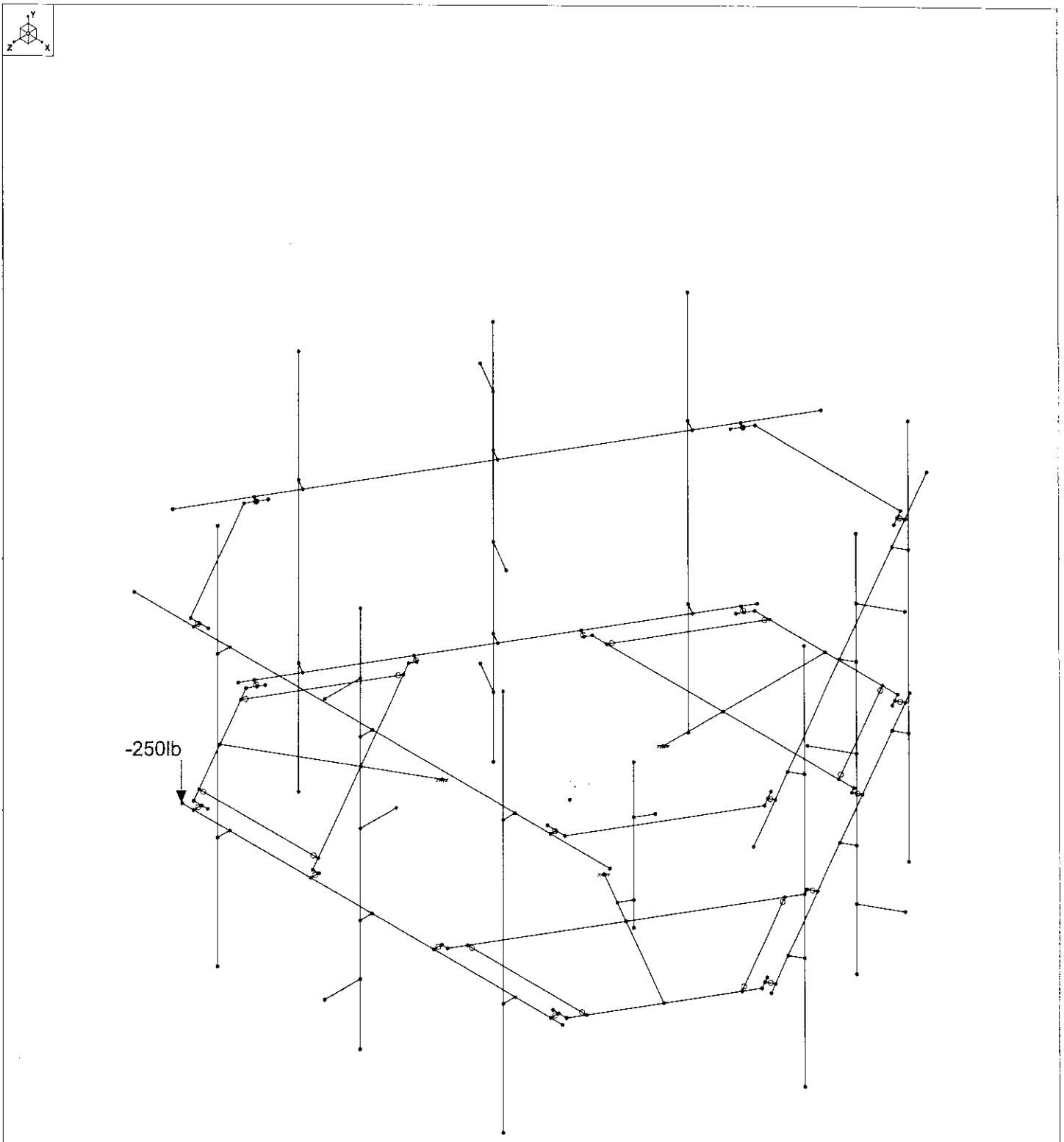
Loads: BLC 9, WLX (MAINT)



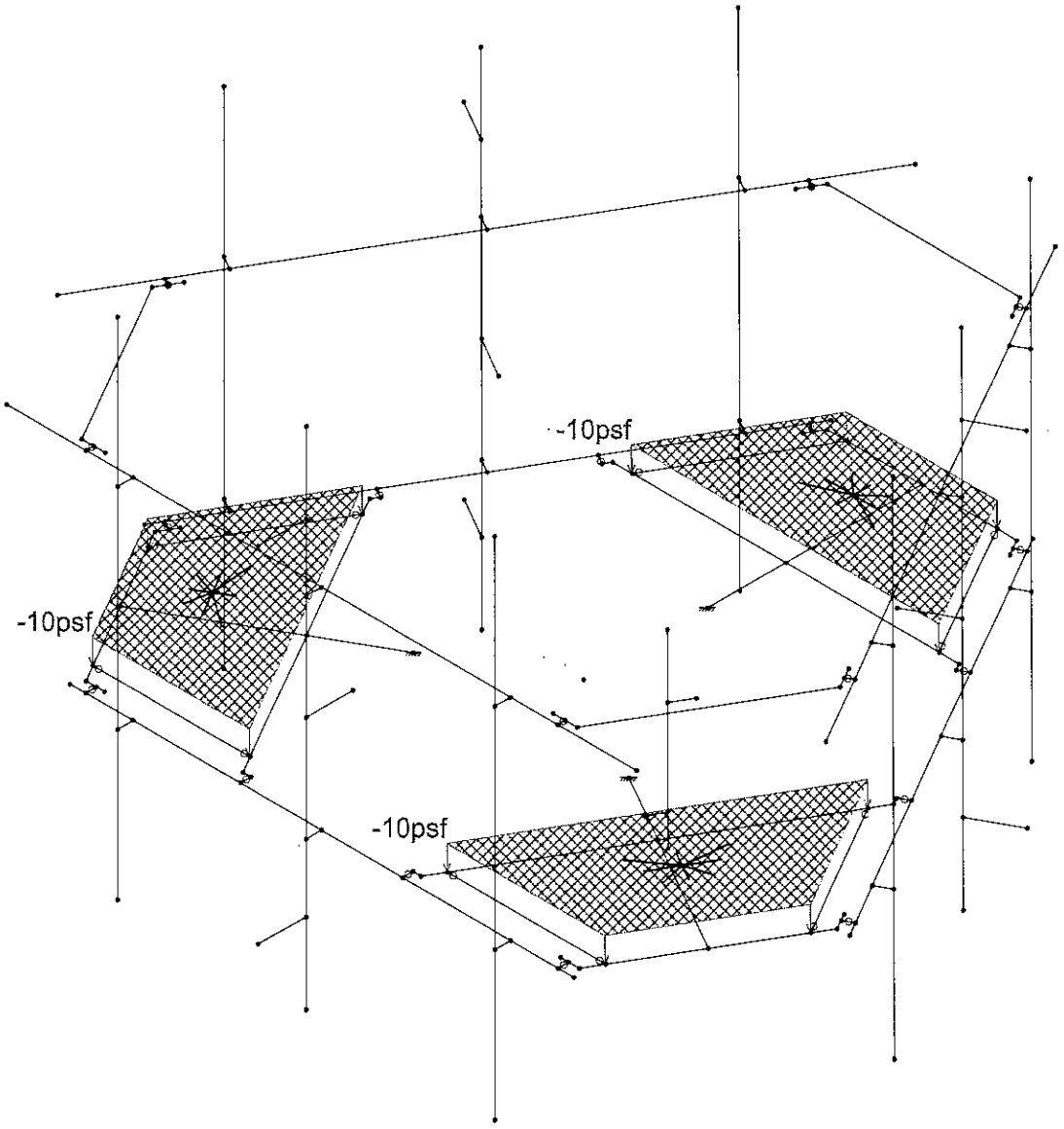
Loads: BLC 10, WLZ (MAINT)



Loads: BLC 11, Lm1



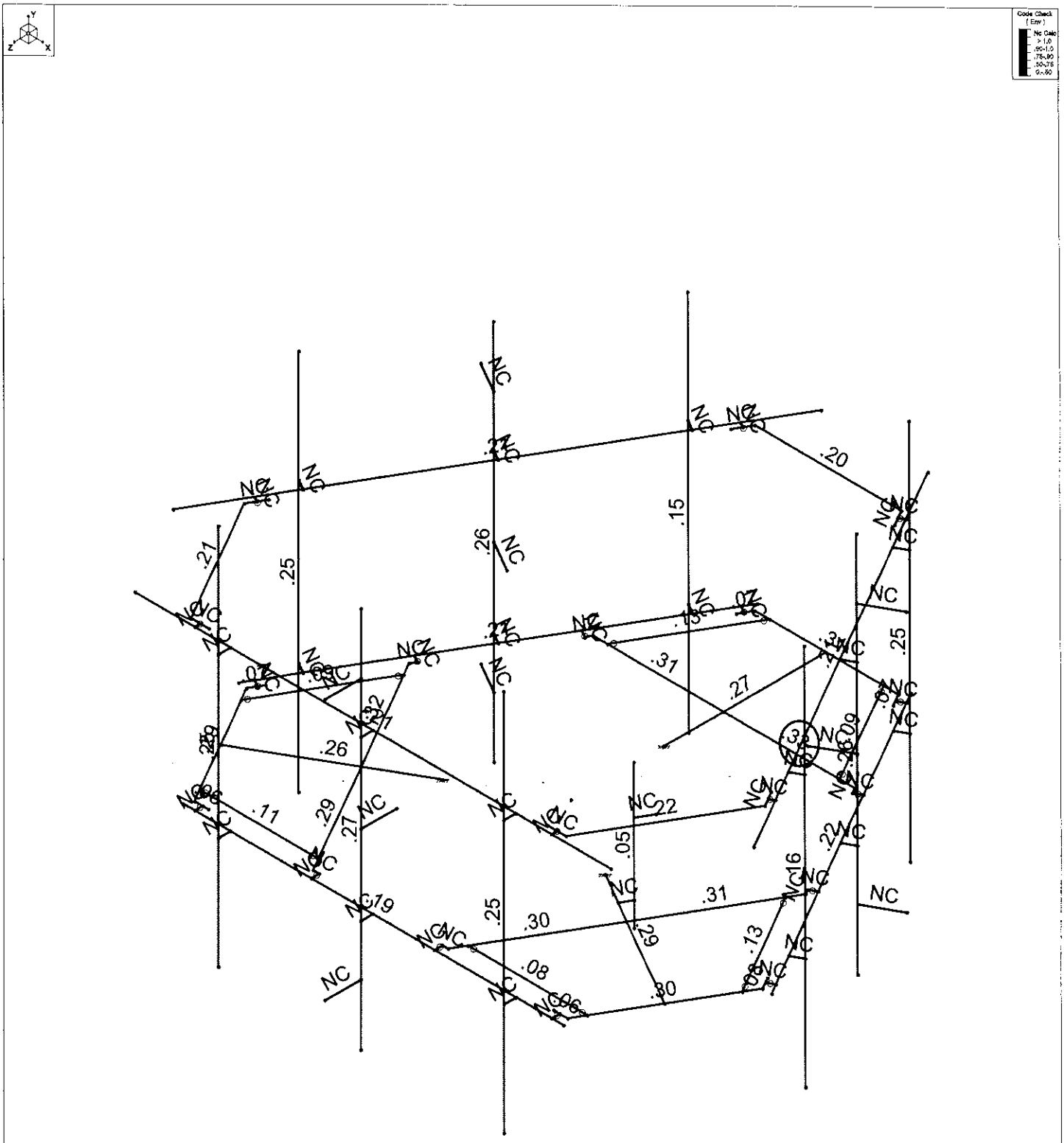
Loads: BLC 14, Lv1



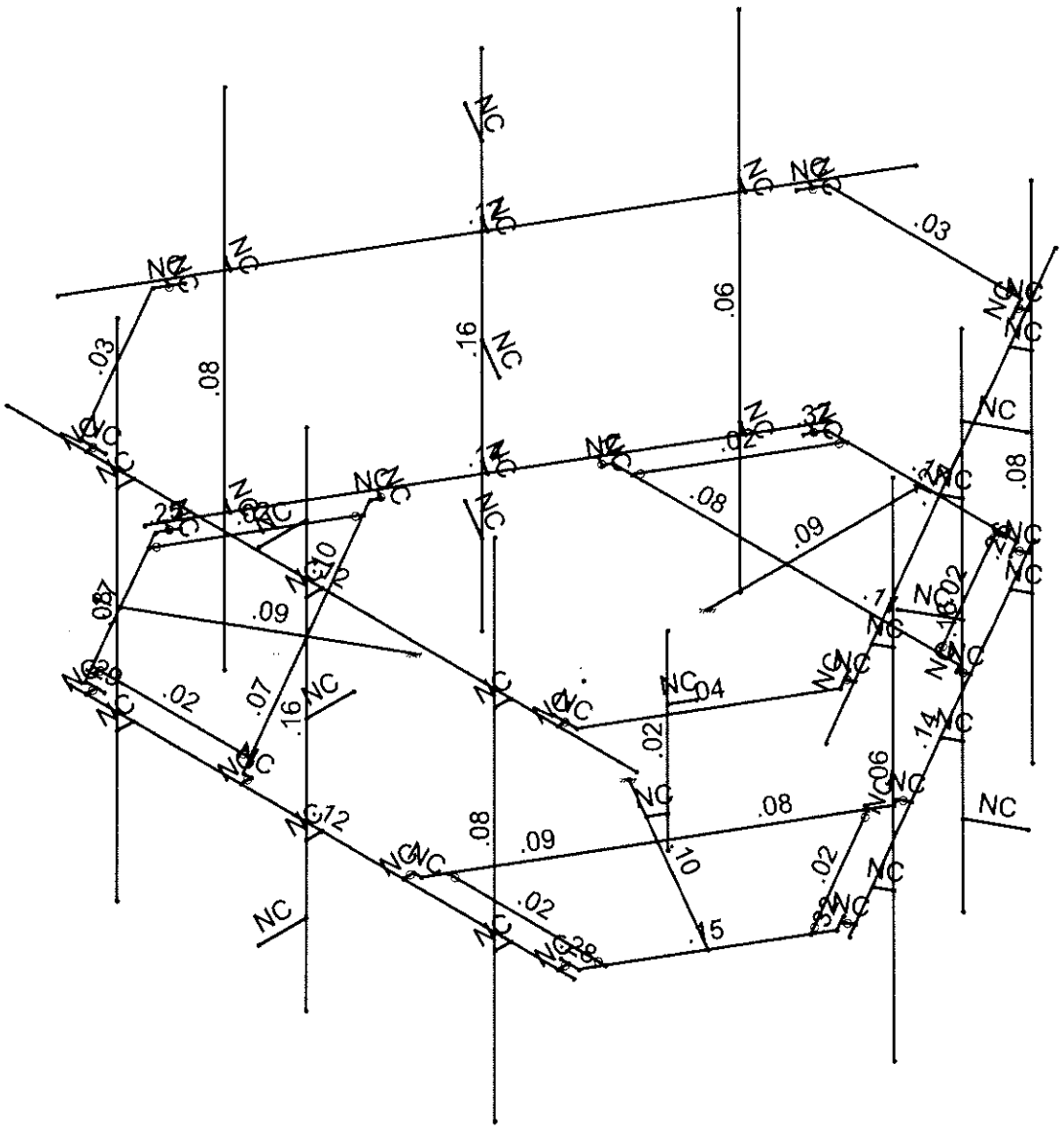
Loads: BLC 16, DL (Strd)

APPENDIX C

SOFTWARE ANALYSIS OUTPUT



Member Code Checks Displayed (Enveloped)
Envelope Only Solution



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Standoff End Plate 6.5"	PL6.5x0.375	Beam	RECT	A36 Gr.36	Typical	2.438	.029	8.582	.11
2	Standoff End Plate 6"	Plate 6x.37	Beam	RECT	A36 Gr.36	Typical	2.22	.025	6.66	.097
3	Grating Support Angle	L2x2x4	Beam	Single An...	A36 Gr.36	Typical	.944	.346	.346	.021
4	Face Horizontal	Pipe3.5x0.165	Beam	Pipe	A53 Gr.B	Typical	1.729	2.409	2.409	4.819
5	Mount Pipe	PIPE 2.5	Column	Pipe	A53 Gr.B	Typical	1.61	1.45	1.45	2.89
6	Standoff Channel	C3.38x2.06x0.25	Beam	Channel	A36 Gr.36	Typical	1.75	.715	3.026	.034
7	Standoff	HSS4X4X6	Beam	SquareT...	A500 Gr.B R...	Typical	4.78	10.3	10.3	17.5
8	Rail Connector	L6.6x4.46x0.25	Beam	Single An...	A36 Gr.36	Typical	2.703	4.759	12.473	.055
9	Railing	PIPE 2.5	Beam	Pipe	A53 Gr.B	Typical	1.61	1.45	1.45	2.89
10	OVP Pipe	PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical	1.61	1.45	1.45	2.89

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
1	DL	DL				10				
2	WLX	WLX				10		45		
3	WLZ	WLZ				10		45		
4	DLi	OL1				10		45	3	
5	WLXi	WLX				10		45		
6	WLZi	WLZ				10		45		
7	ELv	ELY		-.049		10				
8	ELh	ELZ	-.21		-.21	20				
9	WLX (MAINT)	WL+X				10		45		
10	WLZ (MAINT)	WL+Z				10		45		
11	Lm1	OL1				1				
12	Lm2	OL2				1				
13	Lm3	OL3				1				
14	Lv1	OL4					1			
15	Lv2	OL5					1			
16	DL (Strd)	OL6		-1.05					3	
17	BLC 16 Transient ...	None						18		
18	BLC 4 Transient Ar...	None						18		

Load Combinations

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	**LRFD**																									
2	1.4D	Yes	Y		1	1.4	16	1.4																		
3	1.2D+(WLX+WLZ) - 0 Deg	Yes	Y		1	1.2	2	1	16	1.2																
4	1.2D+(WLX+WLZ) - 30 Deg	Yes	Y		1	1.2	2	.866	3	.5	16	1.2														
5	1.2D+(WLX+WLZ) - 60 Deg	Yes	Y		1	1.2	2	.5	3	.866	16	1.2														
6	1.2D+(WLX+WLZ) - 90 Deg	Yes	Y		1	1.2	2		3	1	16	1.2														
7	1.2D+(WLX+WLZ) - 120 Deg	Yes	Y		1	1.2	2	-.5	3	.866	16	1.2														

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
8	1.2D+(WLX+WLZ) - 150 Deg	Yes	Y		1	1.2	2	-.8...	3	.5	16	1.2												
9	1.2D+(WLX+WLZ) - 180 Deg	Yes	Y		1	1.2	2	-1	3		16	1.2												
10	1.2D+(WLX+WLZ) - 210 Deg	Yes	Y		1	1.2	2	-.8...	3	-.5	16	1.2												
11	1.2D+(WLX+WLZ) - 240 Deg	Yes	Y		1	1.2	2	-.5	3	-.8...	16	1.2												
12	1.2D+(WLX+WLZ) - 270 Deg	Yes	Y		1	1.2	2		3	-1	16	1.2												
13	1.2D+(WLX+WLZ) - 300 Deg	Yes	Y		1	1.2	2	.5	3	-.8...	16	1.2												
14	1.2D+(WLX+WLZ) - 330 Deg	Yes	Y		1	1.2	2	.866	3	-.5	16	1.2												
15	**Wind Load with Ice**																							
16	1.2D+1.0Di+1.0(WLXi+WLZi) - ...	Yes	Y		1	1.2	4	1	5	1	6		16	1.2										
17	1.2D+1.0Di+1.0(WLXi+WLZi) - ...	Yes	Y		1	1.2	4	1	5	.866	6	.5	16	1.2										
18	1.2D+1.0Di+1.0(WLXi+WLZi) - ...	Yes	Y		1	1.2	4	1	5	.5	6	.866	16	1.2										
19	1.2D+1.0Di+1.0(WLXi+WLZi) - ...	Yes	Y		1	1.2	4	1	5		6	1	16	1.2										
20	1.2D+1.0Di+1.0(WLXi+WLZi) - ...	Yes	Y		1	1.2	4	1	5	-.5	6	.866	16	1.2										
21	1.2D+1.0Di+1.0(WLXi+WLZi) - ...	Yes	Y		1	1.2	4	1	5	-.8...	6	.5	16	1.2										
22	1.2D+1.0Di+1.0(WLXi+WLZi) - ...	Yes	Y		1	1.2	4	1	5	-1	6		16	1.2										
23	1.2D+1.0Di+1.0(WLXi+WLZi) - ...	Yes	Y		1	1.2	4	1	5	-.8...	6	-.5	16	1.2										
24	1.2D+1.0Di+1.0(WLXi+WLZi) - ...	Yes	Y		1	1.2	4	1	5	-.5	6	-.8...	16	1.2										
25	1.2D+1.0Di+1.0(WLXi+WLZi) - ...	Yes	Y		1	1.2	4	1	5		6	-1	16	1.2										
26	1.2D+1.0Di+1.0(WLXi+WLZi) - ...	Yes	Y		1	1.2	4	1	5	.5	6	-.8...	16	1.2										
27	1.2D+1.0Di+1.0(WLXi+WLZi) - ...	Yes	Y		1	1.2	4	1	5	.866	6	-.5	16	1.2										
28	**Seismic Load**																							
29	1.2D+ELv+ELh	Yes	Y		1	1.2	7	1	8	1	16	1.2												
30	**Maintenance Load (With Servi..																							
31	1.2D+1.5Lm1+1.0WLX (service)	Yes	Y		1	1.2	11	1.5	9	1	10		16	1.2										
32	1.2D+1.5Lm1+1.0WLZ (service)	Yes	Y		1	1.2	11	1.5	9		10	1	16	1.2										
33	1.2D+1.5Lm1+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	11	1.5	9	1	10		16	1.2										
34	1.2D+1.5Lm1+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	11	1.5	9	.87	10	.5	16	1.2										
35	1.2D+1.5Lm1+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	11	1.5	9	.5	10	.87	16	1.2										
36	1.2D+1.5Lm1+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	11	1.5	9		10	1	16	1.2										
37	1.2D+1.5Lm1+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	11	1.5	9	-.5	10	.87	16	1.2										
38	1.2D+1.5Lm1+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	11	1.5	9	-.87	10	.5	16	1.2										
39	1.2D+1.5Lm1+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	11	1.5	9	-1	10		16	1.2										
40	1.2D+1.5Lm1+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	11	1.5	9	-.87	10	-.5	16	1.2										
41	1.2D+1.5Lm1+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	11	1.5	9	-.5	10	-.87	16	1.2										
42	1.2D+1.5Lm1+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	11	1.5	9		10	-1	16	1.2										
43	1.2D+1.5Lm1+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	11	1.5	9	.5	10	-.87	16	1.2										
44	1.2D+1.5Lm1+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	11	1.5	9	.87	10	-.5	16	1.2										
45	**Maintenance Load (With Servi...																							
46	1.2D+1.5Lm2+1.0WLX (service)	Yes	Y		1	1.2	12	1.5	9	1	10		16	1.2										
47	1.2D+1.5Lm2+1.0WLZ (service)	Yes	Y		1	1.2	12	1.5	9		10	1	16	1.2										
48	1.2D+1.5Lm2+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	12	1.5	9	1	10		16	1.2										
49	1.2D+1.5Lm2+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	12	1.5	9	.87	10	.5	16	1.2										
50	1.2D+1.5Lm2+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	12	1.5	9	.5	10	.87	16	1.2										
51	1.2D+1.5Lm2+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	12	1.5	9		10	1	16	1.2										
52	1.2D+1.5Lm2+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	12	1.5	9	-.5	10	.87	16	1.2										
53	1.2D+1.5Lm2+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	12	1.5	9	-.87	10	.5	16	1.2										
54	1.2D+1.5Lm2+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	12	1.5	9	-1	10		16	1.2										
55	1.2D+1.5Lm2+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	12	1.5	9	-.87	10	-.5	16	1.2										
56	1.2D+1.5Lm2+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	12	1.5	9	-.5	10	-.87	16	1.2										
57	1.2D+1.5Lm2+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	12	1.5	9		10	-1	16	1.2										
58	1.2D+1.5Lm2+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	12	1.5	9	.5	10	-.87	16	1.2										
59	1.2D+1.5Lm2+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	12	1.5	9	.87	10	-.5	16	1.2										
60	**Maintenance Load (With Servi..																							
61	1.2D+1.5Lm3+1.0WLX (service)	Yes	Y		1	1.2	13	1.5	9	1	10		16	1.2										
62	1.2D+1.5Lm3+1.0WLZ (service)	Yes	Y		1	1.2	13	1.5	9		10	1	16	1.2										
63	1.2D+1.5Lm3+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	13	1.5	9	1	10		16	1.2										
64	1.2D+1.5Lm3+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	13	1.5	9	.87	10	.5	16	1.2										

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
65	1.2D+1.5Lm3+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	13	1.5	9	.5	10	.87	16	1.2										
66	1.2D+1.5Lm3+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	13	1.5	9		10	1	16	1.2										
67	1.2D+1.5Lm3+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	13	1.5	9	-.5	10	.87	16	1.2										
68	1.2D+1.5Lm3+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	13	1.5	9	-.87	10	.5	16	1.2										
69	1.2D+1.5Lm3+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	13	1.5	9	-1	10		16	1.2										
70	1.2D+1.5Lm3+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	13	1.5	9	-.87	10	-.5	16	1.2										
71	1.2D+1.5Lm3+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	13	1.5	9	-.5	10	-.87	16	1.2										
72	1.2D+1.5Lm3+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	13	1.5	9		10	-1	16	1.2										
73	1.2D+1.5Lm3+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	13	1.5	9	.5	10	-.87	16	1.2										
74	1.2D+1.5Lm3+1.0(WLX+WLZ, ...	Yes	Y		1	1.2	13	1.5	9	.87	10	-.5	16	1.2										
75	***Man Vertical Load***		Y																					
76	1.2D+1.5Lv1	Yes	Y		1	1.2	14	1.5	16	1.2														
77	1.2D+1.5Lv2	Yes	Y		1	1.2	15	1.5	16	1.2														

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N10	max	1420.903	14	1973.112	10	2164.451	7	.893	3	2.499	13	4.679	10
2		min	-1416.817	8	-59.361	4	-2157.659	13	-2.94	69	-2.485	7	-1.197	4
3	N53	max	1236.013	4	1884.587	14	2003.355	5	.891	9	2.356	5	1.18	8
4		min	-1245.455	10	-155.168	8	-2007.818	11	-2.909	31	-2.352	11	-4.291	14
5	N70	max	2299.686	3	1969.078	6	657.918	6	5.229	6	2.262	9	.837	3
6		min	-2294.42	9	-120.104	12	-670.573	12	-1.34	12	-2.246	3	-.958	9
7	Totals:	max	4512.656	3	4995.961	27	4693.906	6						
8		min	-4512.658	9	2744.998	8	-4693.905	12						

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

	Member	Shape	Code	Loc[ft]	LC	Shear	Loc[	Dir	LC	phi*Pn	phi*Pnt	phi*Mn	phi*Mn	Cb	Eqn
1	M22	C3.38x2.06x0...	.330	2.75	5	.106	.286	z	11	47760....	56700	2.203	5.752	1...	H1-1b
2	M36	C3.38x2.06x0...	.320	2.75	14	.103	.286	z	7	47760....	56700	2.203	5.752	1...	H1-1b
3	M23	C3.38x2.06x0...	.312	0	6	.078	2.464	z	7	47760....	56700	2.203	5.752	1...	H1-1b
4	M7	C3.38x2.06x0...	.307	0	10	.077	2.464	z	11	47760....	56700	2.203	5.752	1...	H1-1b
5	M19	PL6.5x0.375	.306	1.5	5	.173	3	y	11	4979.1...	78975	.617	8.911	1...	H1-1b
6	M8	C3.38x2.06x0...	.297	2.75	10	.091	.286	z	3	47760....	56700	2.203	5.752	1...	H1-1b
7	M4	PL6.5x0.375	.295	1.5	11	.152	0	y	3	4979.1...	78975	.617	9.131	1...	H1-1b
8	M37	C3.38x2.06x0...	.293	0	14	.067	2.464	z	14	47760....	56700	2.203	5.752	1...	H1-1b
9	M33	PL6.5x0.375	.291	1.5	13	.166	3	y	7	4979.1...	78975	.617	9.022	1...	H1-1b
10	M6	HSS4X4X6	.286	3.417	11	.100	2.634	z	13	187775...	197892	22.046	22.046	1...	H1-1b
11	M21	HSS4X4X6	.271	3.417	5	.095	3.417	z	9	187775...	197892	22.046	22.046	1...	H1-1b
12	M75	PIPE 2.5	.268	5.667	9	.160	4		9	30038....	50715	3.596	3.596	3...	H1-1b
13	M93	PIPE 2.5	.265	5.667	5	.164	4		5	30038....	50715	3.596	3.596	2...	H1-1b
14	M35	HSS4X4X6	.264	3.417	13	.094	3.417	z	11	187775...	197892	22.046	22.046	1...	H1-1b
15	M105	PIPE 2.5	.258	5.667	13	.161	4		13	30038....	50715	3.596	3.596	2...	H1-1b
16	M87	PIPE 2.5	.254	5.667	5	.076	5.667		3	30038....	50715	3.596	3.596	3...	H1-1b
17	M72	PIPE 2.5	.253	5.667	3	.077	5.667		5	30038....	50715	3.596	3.596	3...	H1-1b
18	M69	PIPE 2.5	.251	5.667	9	.079	5.667		7	30038....	50715	3.596	3.596	3...	H1-1b
19	M99	PIPE 2.5	.249	5.667	13	.077	5.667		11	30038....	50715	3.596	3.596	2...	H1-1b
20	M16	Pipe3.5x0.165	.220	5.333	5	.141	5.25		11	38821....	54463.5	4.822	4.822	1...	H1-1b
21	M62	L6.6x4.46x0.25	.220	3.06	3	.036	3.06	y	13	51620....	87561	2.465	7.125	1...	H2-1
22	M45	Pipe3.5x0.165	.215	5.333	7	.139	2.75		7	38821....	54463.5	4.822	4.822	1...	H1-1b
23	M46	PIPE 2.5	.213	7.917	9	.121	2.083		14	22373....	50715	3.596	3.596	1...	H1-1b
24	M47	PIPE 2.5	.211	2.083	11	.120	7.917		6	22373....	50715	3.596	3.596	1...	H1-1b
25	M61	L6.6x4.46x0.25	.209	0	9	.032	0	y	5	51620....	87561	2.465	7.125	1...	H2-1
26	M48	PIPE 2.5	.208	2.083	7	.120	2.083		6	22373....	50715	3.596	3.596	1...	H1-1b
27	M63	L6.6x4.46x0.25	.199	3.06	11	.033	.351	y	9	51620....	87561	2.465	7.125	1...	H2-1

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

	Member	Shape	Code ...	Loc[ft]	LC	Shear..	Loc[...	Dir	LC	phi*Pn...	phi*Pnt...	phi*Mn...	phi*Mn...	Cb	Eqn
28	M1	Pipe3.5x0.165	.193	2.667	9	.124	2.75		3	38821....	54463.5	4.822	4.822	1...	H1-1b
29	M85	PIPE_2.5	.157	5.667	11	.062	5.667		13	30038....	50715	3.596	3.596	2...	H1-1b
30	M90	PIPE_2.5	.157	5.667	11	.062	5.667		13	30038....	50715	3.596	3.596	2...	H1-1b
31	M98	PIPE_2.5	.154	5.667	7	.060	5.667		9	30038....	50715	3.596	3.596	3...	H1-1b
32	M102	PIPE_2.5	.154	5.667	7	.060	5.667		9	30038....	50715	3.596	3.596	3...	H1-1b
33	M29	L2x2x4	.132	0	13	.019	0	y	3	22280....	30585.6	.691	1.577	1...	H2-1
34	M15	L2x2x4	.130	0	5	.019	0	z	6	22280....	30585.6	.691	1.577	1...	H2-1
35	M43	L2x2x4	.112	0	9	.019	2.502	y	12	22280....	30585.6	.691	1.577	1...	H2-1
36	M30	L2x2x4	.093	0	5	.024	2.502	y	10	22280....	30585.6	.691	1.577	2...	H2-1
37	M44	L2x2x4	.089	0	13	.023	2.502	y	6	22280....	30585.6	.691	1.577	2...	H2-1
38	M14	L2x2x4	.078	0	9	.023	2.502	y	14	22280....	30585.6	.691	1.577	2...	H2-1
39	M5	Plate 6x.37	.076	.164	6	.324	0	y	11	67974....	71928	.554	8.991	2...	H1-1b
40	M34	Plate 6x.37	.074	.164	6	.253	0	y	13	67974....	71928	.554	8.991	1...	H1-1b
41	M18	Plate 6x.37	.073	.128	14	.319	.292	y	7	67974....	71928	.554	8.991	2...	H1-1b
42	M20	Plate 6x.37	.073	.164	10	.258	0	y	5	67974....	71928	.554	8.991	1...	H1-1b
43	M3	Plate 6x.37	.064	.128	14	.281	.292	y	69	67974....	71928	.554	8.991	1...	H1-1b
44	M32	Plate 6x.37	.064	.128	10	.289	.292	y	3	67974....	71928	.554	8.991	2...	H1-1b
45	M65	PIPE_2.5	.051	.5	7	.017	.5		10	47114....	50715	3.596	3.596	1...	H1-1b

The maximum member stress is at 33% of its capacity, therefore the proposed mount will have sufficient capacity to support the proposed load configurations upon installations.

APPENDIX D

ADDITIONAL CALCULATIONS

Tectonic

PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Job No. 10710.NJJER01115A
Calculated By: JJ Date : 10/20/22
Checked By: IM Date : 10/20/22

Connection Details		
Bolt Details		
Bolt Quantity =	[redacted]	
Bolt Diameter =	[redacted]	in
Vertical Spacing =	[redacted]	in
Horizontal Spacing =	[redacted]	in
Bolt Grade =	[redacted]	
Bolt F_u if "Other" =	[redacted]	ksi

Loading Details		
Node N70, LC5		
Shear, X =	[redacted]	k
Shear, Y =	[redacted]	k
Tension, Z =	[redacted]	k
Mx =	[redacted]	k-ft
My =	[redacted]	k-ft
Torsion, Mz =	[redacted]	k-ft

1 - Tensile Capacity

$$R_{nt} = F_{nt} A_b$$ AISC [Eqn. J3-1]

Φ =	0.75	
F_{nt} =	90	ksi
A_b =	0.307	in^2
$ΦR_{nt}$ =	20.72	k
T_{max} =	5.24	k

AISC [Table J3.2]

ΦRnt > Tmax

[redacted]

OK

2 - Shear Capacity

$$R_{nv} = F_{nv} A_b$$ AISC [Eqn. J3-1]

Φ =	0.75	
F_{nv} =	54	ksi
A_b =	0.307	in^2
$ΦR_{nv}$ =	12.43	k
V_{max} =	0.81	k

AISC [Table J3.2]

ΦRnv > Vmax

[redacted]

OK

3 - Combined Tension and Shear Capacity

$$R'_{nt} = F'_{nt} A_b$$ AISC [Eqn. J3-2]

$$F'_{nt} = 1.3F_{nt} - \frac{F_{nt}}{\phi F_{nv}} f_{rv} \leq F_{nt}$$ AISC [Eqn. J3-3a]

Φ =	0.75	
F'_{nt} =	90	ksi
A_b =	0.307	in^2
$ΦR'_{nt}$ =	20.72	k
T_{max} =	5.24	k

ΦR'nt > Tmax

[redacted]

OK

Tectonic

PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Job No. 10710.NJJER01115A
Calculated By: JJ Date : 10/20/22
Checked By: IM Date : 10/20/22

Connection Details		
Weld Details		
Weld Type		
# of Sides		
Electrodes		XX
Size of Weld =		in
HSS Height =		in
HSS Width =		in
HSS Thickness =		in
Plate Details		
Height/Width =		in
Thickness =		in
F_y =		ksi

4 - Weld Capacity

$$F_{nw} = 0.6F_{EXX}$$

AISC [Table J2.5]

Φ =	0.75	
ΦF_{nw} =	63.00	ksi
$f_{V,max}$ =	1.313	ksi
$f_{b,max}$ =	16.47	ksi

Min(ΦFnw,ΦFnbm) > √(fv,max+fm,max)

[redacted] **OK**

5 - Plate Capacity

Φ =	0.9	
ΦF_{byy} =	45.00	ksi
f_b =	15.22	ksi

ΦFbyy > Fb

[redacted] **OK**

Municipality	Basic Design Wind Speeds, V (mph)				Allowable Stress Design Wind Speeds, V_{asd} (mph)				Ground Snow Load p_g (psf)	MCE Ground Accelerations		Wind-Borne Debris Region[1]		Hurricane-Prone Region
	Risk Cat. I	Risk Cat. II	Risk Cat. III	Risk Cat. IV	Risk Cat. I	Risk Cat. II	Risk Cat. III	Risk Cat. IV		S_S (g)	S_1 (g)	Risk Cat. III Occup. I-2	Risk Cat. IV	
Sherman	110	115	125	130	85	89	97	101	35	0.203	0.055			
Simsbury	110	120	125	130	85	93	97	101	35	0.177	0.054			Yes
Somers	110	120	130	135	85	93	101	105	35	0.174	0.055			Yes
South Windsor	110	120	130	135	85	93	101	105	30	0.183	0.055			Yes
Southbury	110	120	130	130	85	93	101	101	35	0.199	0.054			Yes
Southington	110	120	130	135	85	93	101	105	30	0.196	0.055			Yes
Sprague	115	125	135	140	89	97	105	108	30	0.191	0.054			Yes
Stafford	110	120	130	135	85	93	101	105	35	0.176	0.055			Yes
Stamford	110	120	130	135	85	93	101	105	30	0.261	0.058		Type B	Yes
Sterling	115	125	135	140	89	97	105	108	35	0.187	0.054			Yes
Stonington	120	130	140	145	93	101	108	112	30	0.182	0.051	Type B	Type A	Yes
Stratford	110	120	130	135	85	93	101	105	30	0.206	0.054		Type B	Yes
Suffield	110	120	125	130	85	93	97	101	35	0.170	0.054			Yes
Thomaston	110	120	125	130	85	93	97	101	35	0.184	0.054			Yes
Thompson	110	120	130	135	85	93	101	105	40	0.185	0.056			Yes
Tolland	110	120	130	135	85	93	101	105	35	0.182	0.055			Yes
Torrington	110	115	125	130	85	89	97	101	40	0.175	0.054			
Trumbull	110	120	130	135	85	93	101	105	30	0.210	0.054			Yes
Union	110	120	130	135	85	93	101	105	40	0.178	0.055			Yes
Vernon	110	120	130	135	85	93	101	105	30	0.186	0.055			Yes
Voluntown	120	130	135	140	93	101	105	108	30	0.188	0.053			Yes
Wallingford	110	120	130	135	85	93	101	105	30	0.205	0.055			Yes
Warren	110	115	125	130	85	89	97	101	40	0.179	0.054			
Washington	110	115	125	130	85	89	97	101	35	0.189	0.054			
Waterbury	110	120	130	135	85	93	101	105	35	0.193	0.054			Yes
Waterford	120	130	140	140	93	101	108	108	30	0.194	0.053	Type B	Type B	Yes
Watertown	110	120	130	130	85	93	101	101	35	0.189	0.054			Yes
West Hartford	110	120	130	135	85	93	101	105	30	0.187	0.055			Yes
West Haven	110	125	130	135	85	97	101	105	30	0.200	0.053	Type B	Type B	Yes
Westbrook	115	125	135	140	89	97	105	108	30	0.204	0.054	Type B	Type B	Yes
Weston	110	120	130	135	85	93	101	105	30	0.233	0.056			Yes
Westport	110	120	130	135	85	93	101	105	30	0.232	0.056		Type B	Yes

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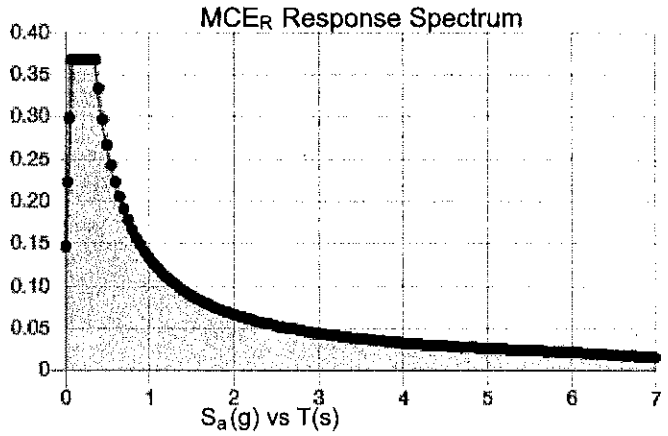
Seismic

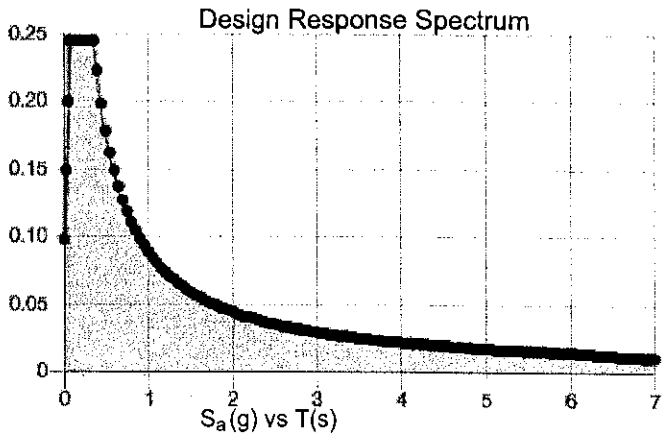
Site Soil Class: D - Default (see Section 11.4.3)

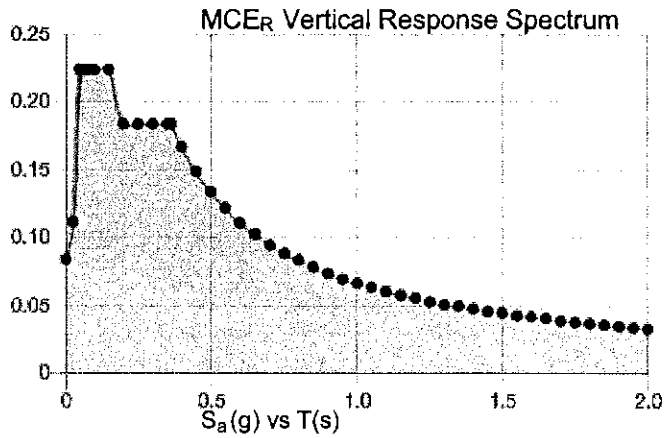
Results:

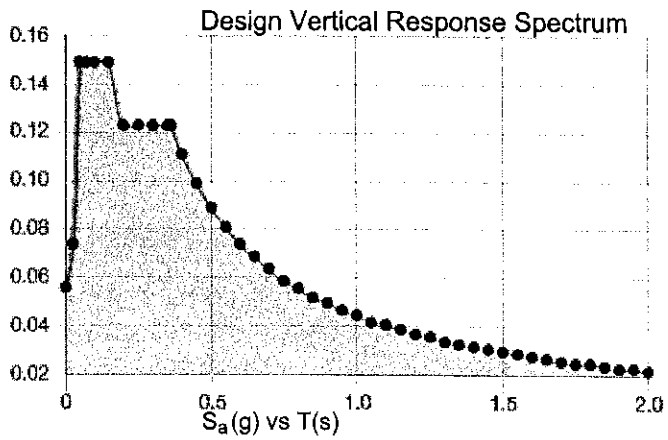
S_S :	0.23	S_{D1} :	0.089
S_1 :	0.056	T_L :	6
F_a :	1.6	PGA :	0.134
F_v :	2.4	PGA_M :	0.205
S_{MS} :	0.368	F_{PGA} :	1.532
S_{M1} :	0.134	I_e :	1.25
S_{DS} :	0.245	C_v :	0.76

Seismic Design Category B









Data Accessed: **Wed Oct 12 2022**

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

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Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	15 F
Gust Speed	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Wed Oct 12 2022

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 500-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 F

Emissions Report

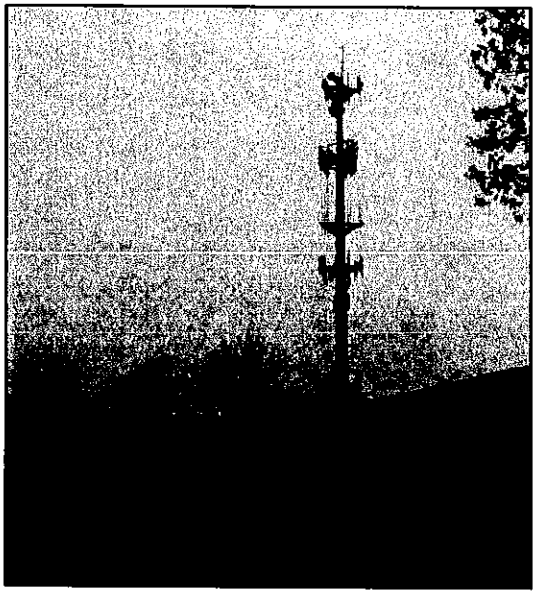
APPROVED
By Pawan Madahar at 5:13 pm, Oct 03, 2022

Pinnacle Telecom Group

Professional and Technical Services

Telecom Consulting

Antenna Site FCC RF Compliance Assessment and Report for Municipal Submission



Prepared for:	DISH Wireless, LLC
Site ID:	NJJER01115A
Site Address:	515 Post Road East Westport, CT
Latitude:	N 41.140180
Longitude:	W 73.347200
Structure type:	Monopole
Report date:	September 26, 2022
Compliance Conclusion:	DISH Wireless, LLC will be in compliance with the rules and regulations as described in OET Bulletin 65, following the implementation of the proposed mitigation as detailed in the report.

14 Ridgedale Avenue - Suite 260 • Cedar Knolls, NJ 07927 • 973-451-1630

Contents

Introduction and Summary

At the request of DISH Wireless, LLC ("DISH"), Pinnacle Telecom Group has performed an independent expert assessment of radiofrequency (RF) levels and related FCC compliance for proposed wireless base station antenna operations on an existing monopole located at 515 Post Road East in Westport, CT. DISH refers to the antenna site by the code "NJJER01115A", and its proposed operation involves directional panel antennas and transmission in the 600 MHz, 2000 MHz and 2100 MHz frequency bands licensed to it by the FCC.

The FCC requires all wireless antenna operators to perform an assessment of potential human exposure to radiofrequency (RF) fields emanating from all the transmitting antennas at a site whenever antenna operations are added or modified, and to ensure compliance with the Maximum Permissible Exposure (MPE) limit in the FCC's regulations. In this case, the compliance assessment needs to take into account the RF effects of other existing antenna operations at the site by AT&T, Sprint, T-Mobile, the State of Connecticut and the Town of Westport. Note that FCC regulations require any future antenna collocators to assess and assure continuing compliance based on the cumulative effects of all then-proposed and then-existing antennas at the site.

This report describes a mathematical analysis of RF levels resulting around the site in areas of unrestricted public access, that is, at street level around the site. The compliance analysis employs a standard FCC formula for calculating the effects of the antennas in a very conservative manner, in order to overstate the RF levels and to ensure "safe-side" conclusions regarding compliance with the FCC limit for safe continuous exposure of the general public.

The results of a compliance assessment can be described in layman's terms by expressing the calculated RF levels as simple percentages of the FCC MPE limit. If the normalized reference for that limit is 100 percent, then calculated RF levels higher than 100 percent indicate the MPE limit is exceeded and there is a need to mitigate the potential exposure. On the other hand, calculated RF levels consistently below 100 percent serve as a clear and sufficient demonstration of

compliance with the MPE limit. We can (and will) also describe the overall worst-case result via the "plain-English" equivalent "times-below-the-limit" factor.

The result of the RF compliance assessment in this case is as follows:

- At street level, the conservatively calculated maximum RF level from the combination of proposed and existing antenna operations at the site is 9.6752 percent of the FCC general population MPE limit – well below the 100-percent reference for compliance. In other words, the worst-case calculated RF level – intentionally and significantly overstated by the calculations – is still more than 10 times below the FCC limit for safe, continuous exposure of the general public.
- A supplemental analysis of the RF levels at the same height as the DISH antennas indicate that the FCC MPE limit is potentially exceeded. Therefore, it is recommended that three Caution signs and NOC Information signs be installed at the base of the monopole.
- The results of the calculations, along with the proposed mitigation, combine to satisfy the FCC requirements and associated guidelines on RF compliance at street level around the site and on the subject roof. Moreover, because of the significant conservatism incorporated in the analysis, RF levels actually caused by the antennas will be lower than these calculations indicate.

The remainder of this report provides the following:

- relevant technical data on the proposed DISH antenna operations at the site, as well as on the other existing antenna operations;
- a description of the applicable FCC mathematical model for calculating RF levels, and application of the relevant technical data to that model;
- analysis of the results of the calculations against the FCC MPE limit, and the compliance conclusion for the site.

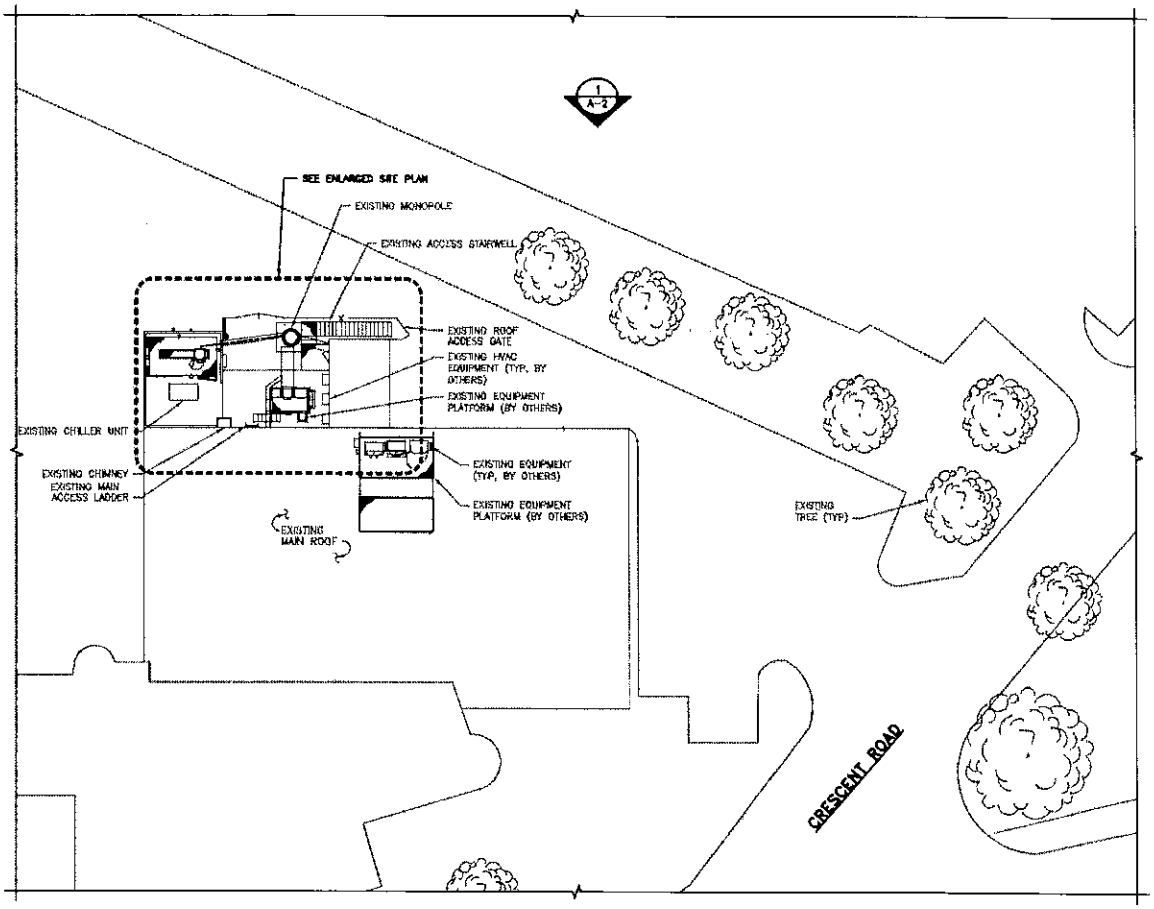
In addition, four Appendices are included. Appendix A provides information on the documents used to prepare the analysis. Appendix B provides background on the

FCC MPE limit. Appendix C details the proposed mitigation to satisfy the FCC requirements and associated guidelines on RF compliance. Appendix D provides a summary of the qualifications of the expert certifying FCC compliance for this site.

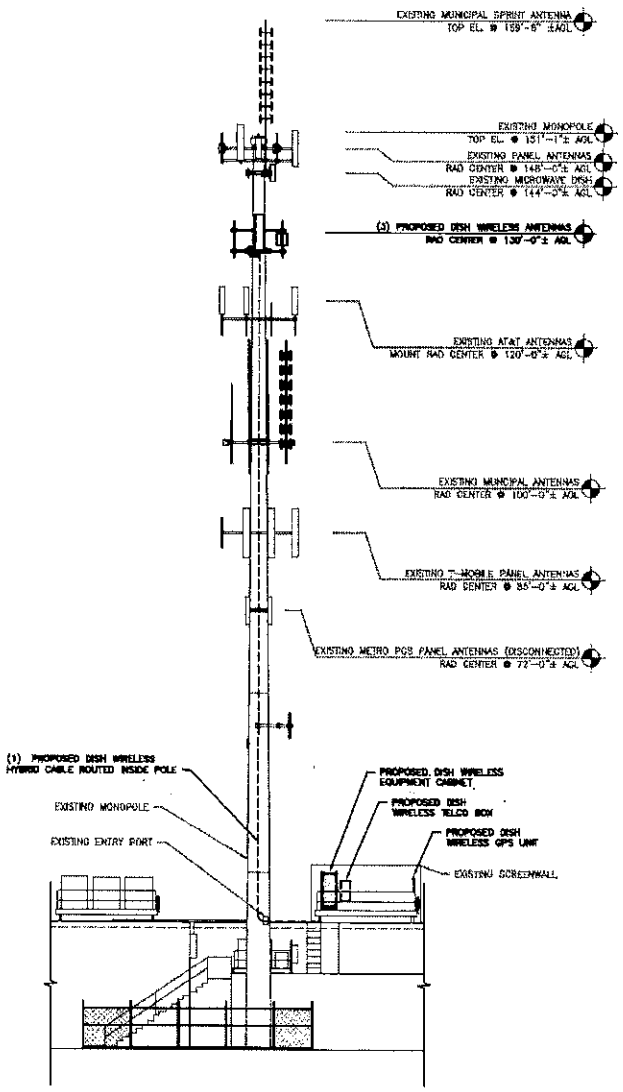
Antenna and Transmission Data

The plan and elevation views that follow, extracted from the site drawings, illustrate the mounting positions of the DISH antennas at the site.

Plan View:



Elevation View:



The table that follows summarizes the relevant data for the proposed DISH antenna operations. Note that the "Z" height references the centerline of the antenna.

Ant. ID	Carrier	Antenna Manufacturer	Antenna Model	Type	F.C. (MHz)	Ant. Dim. (m)	Total Input Power (Watts)	Total ERP (Watts)	Z Axis (m)	Ant. Gain (dBd)	BMT	Azimuth	EDT	MDT
1	DISH	JMA Wireless	MX08FRO665-21	Panel	600	6	120	1637	130.0	11.46	68	100	2	0
1	DISH	JMA Wireless	MX08FRO665-21	Panel	2000	6	160	6011	130.0	16.16	62	100	2	0
1	DISH	JMA Wireless	MX08FRO665-21	Panel	2100	6	160	7567	130.0	16.66	64	100	2	0
2	DISH	JMA Wireless	MX08FRO665-21	Panel	600	6	120	1637	130.0	11.46	68	230	2	0
2	DISH	JMA Wireless	MX08FRO665-21	Panel	2000	6	160	6011	130.0	16.16	62	230	2	0
2	DISH	JMA Wireless	MX08FRO665-21	Panel	2100	6	160	7567	130.0	16.66	64	230	2	0
3	DISH	JMA Wireless	MX08FRO665-21	Panel	600	6	120	1637	130.0	11.46	68	340	2	0
3	DISH	JMA Wireless	MX08FRO665-21	Panel	2000	6	160	6011	130.0	16.16	62	340	2	0
3	DISH	JMA Wireless	MX08FRO665-21	Panel	2100	6	160	7567	130.0	16.66	64	340	2	0

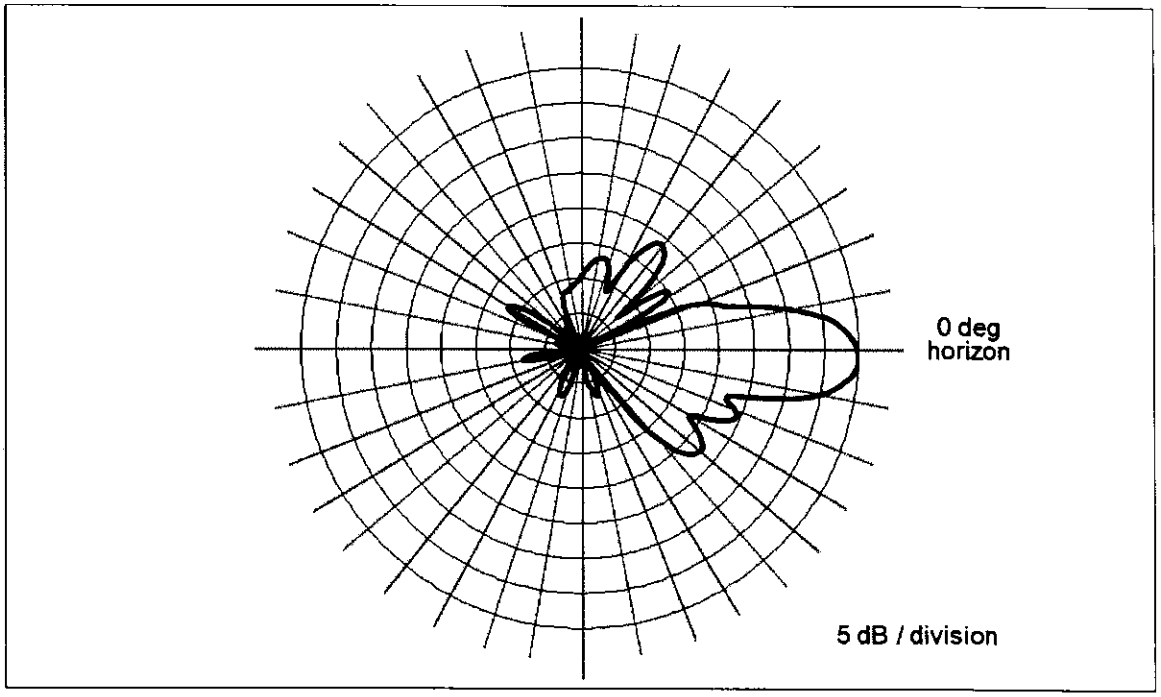
The area below the antennas, at street level, is of interest in terms of potential "uncontrolled" exposure of the general public, so the antenna's vertical-plane emission characteristic is used in the calculations, as it is a key determinant of the relative amount of RF emissions in the "downward" direction.

By way of illustration, Figure 1 that follows shows the vertical-plane radiation pattern of the proposed antenna model in the 600 MHz frequency band. In this type of antenna radiation pattern diagram, the antenna is effectively pointed at the three o'clock position (the horizon) and the relative strength of the pattern at different angles is described using decibel units.

Note that the use of a decibel scale to describe the relative pattern at different angles actually serves to significantly understate the actual focusing effects of the antenna. Where the antenna pattern reads 20 dB the relative RF energy emitted at the corresponding downward angle is 1/100th of the maximum that occurs in the main beam (at 0 degrees); at 30 dB, the energy is only 1/1000th of the maximum.

Finally, note that the automatic pattern-scaling feature of our internal software may skew side-by-side visual comparisons of different antenna models, or even different parties' depictions of the same antenna model.

Figure 1. JMA Wireless MX08FRO665-21– 600 MHz Vertical-plane Pattern



As noted at the outset, there are existing antenna operations to include in the compliance assessment. For each of the wireless operators, we will conservatively assume operation with maximum channel capacity and at maximum transmitter power per channel to be used by each wireless operator in each of their respective FCC-licensed frequency bands. For each of the other operators, we will rely on the transmission parameters in their respective FCC licenses.

The table that follows summarizes the relevant data for the collocated antenna operations.

Carrier	Antenna Manufacturer	Antenna Model	Type	Freq (MHz)	Total ERP (watts)	Ant. Gain (dBd)	Azimuth
AT&T	Generic	Generic	Panel	700	4945	11.26	N/A
AT&T	Generic	Generic	Panel	850	2400	11.76	N/A
AT&T	Generic	Generic	Panel	1900	5756	15.56	N/A
AT&T	Generic	Generic	Panel	2100	5890	15.66	N/A
AT&T	Generic	Generic	Panel	2300	4131	16.16	N/A
Sprint	Generic	Generic	Panel	800	2168	13.36	N/A
Sprint	Generic	Generic	Panel	1900	6168	15.86	N/A
Sprint	Generic	Generic	Panel	2500	4669	15.90	N/A
T-Mobile	Generic	Generic	Panel	600	3163	12.96	N/A
T-Mobile	Generic	Generic	Panel	700	867	13.36	N/A
T-Mobile	Generic	Generic	Panel	1900	4123	15.36	N/A
T-Mobile	Generic	Generic	Panel	1900	1452	15.60	N/A
T-Mobile	Generic	Generic	Panel	2100	4626	15.86	N/A
T-Mobile	Generic	Generic	Panel	1900	1419	15.50	N/A
T-Mobile	Generic	Generic	Panel	2500	12804	22.35	N/A
State of Connecticut	Generic	Generic	Omnidirectional	39	300	0.00	N/A
Town of Westport	Generic	Generic	Omnidirectional	851	95	6.00	N/A

Compliance Analysis

FCC Office of Engineering and Technology Bulletin 65 ("OET Bulletin 65") provides guidelines for mathematical models to calculate the RF levels at various points around transmitting antennas. Different models apply in different areas around antennas, with one model applying to street level around a site, and another applying to the rooftop near the antennas. We will address each area of interest in turn in the subsections that follow.

Street Level Analysis

At street-level around an antenna site (in what is called the "far field" of the antennas), the RF levels are directly proportional to the total antenna input power and the relative antenna gain in the downward direction of interest – and the levels are otherwise inversely proportional to the square of the straight-line distance to the antenna.

Conservative calculations also assume the potential RF exposure is enhanced by reflection of the RF energy from the intervening ground. Our calculations will assume a 100% "perfect", mirror-like reflection, which is the absolute worst-case scenario.

The formula for street-level compliance assessment for any given wireless antenna operation is as follows:

$$MPE\% = (100 * Chans * TxPower * 10^{(Gmax-Vdisc/10)} * 4) / (MPE * 4\pi * R^2)$$

where

MPE%	=	RF level, expressed as a percentage of the MPE limit applicable to continuous exposure of the general public
100	=	factor to convert the raw result to a percentage
Chans	=	maximum number of RF channels per sector
TxPower	=	maximum transmitter power per channel, in milliwatts

$10^{(Gmax-Vdlsc/10)}$	=	numeric equivalent of the relative antenna gain in the downward direction of interest; data on the antenna vertical-plane pattern is taken from manufacturer specifications
4	=	factor to account for a 100-percent-efficient energy reflection from the ground, and the squared relationship between RF field strength and power density ($2^2 = 4$)
MPE	=	FCC general population MPE limit
R	=	straight-line distance from the RF source to the point of interest, centimeters

The MPE% calculations are performed out to a distance of 500 feet from the facility to points 6.5 feet (approximately two meters, the FCC-recommended standing height) off the ground, as illustrated in Figure 2, below.

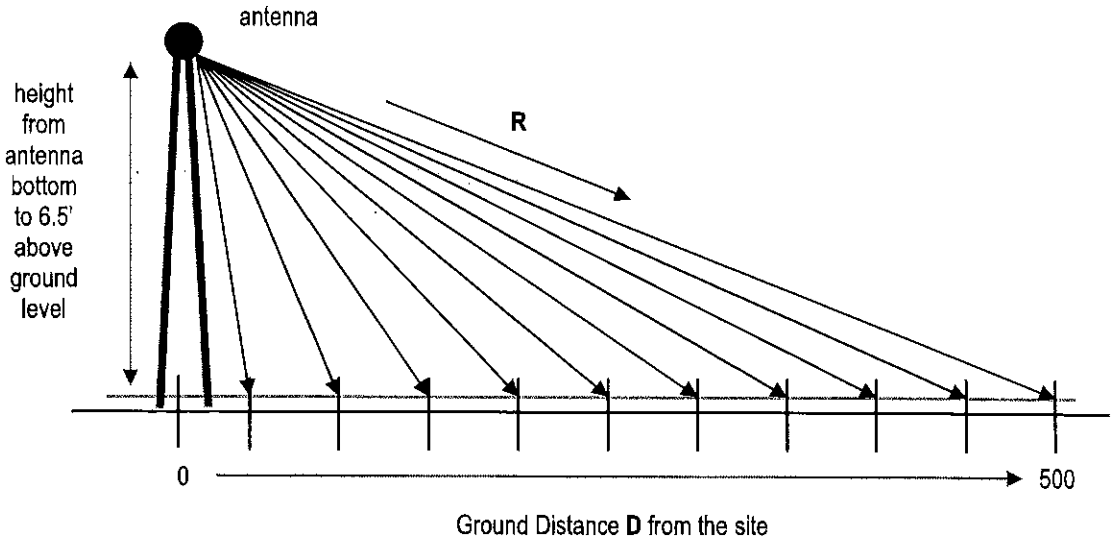


Figure 2. Street-level MPE% Calculation Geometry

It is popularly understood that the farther away one is from an antenna, the lower the RF level – which is generally but not universally correct. The results of MPE% calculations fairly close to the site will reflect the variations in the vertical-plane antenna pattern as well as the variation in straight-line distance to the antenna.

Therefore, RF levels may actually increase slightly with increasing distance within the range of zero to 500 feet from the site. As the distance approaches 500 feet and beyond, though, the antenna pattern factor becomes less significant, the RF levels become primarily distance-controlled and, as a result, the RF levels generally decrease with increasing distance. In any case, the RF levels more than 500 feet from a wireless antenna site are well understood to be sufficiently low to be comfortably in compliance.

According to the FCC, when directional antennas (such as panels) are used, compliance assessments are based on the RF effect of a single (facing) antenna sector, as the effects of directional antennas pointed away from the point(s) of interest are considered insignificant. If the different parameters apply in the different sectors, compliance is based on the worst-case parameters.

Street level FCC compliance for a collocated antenna site is assessed in the following manner. At each distance point along the ground, an MPE% calculation is made for each antenna operation (including each frequency band), and the sum of the individual MPE% contributions at each point is compared to 100 percent, the normalized reference for compliance with the MPE limit. We refer to the sum of the individual MPE% contributions as "total MPE%", and any calculated total MPE% result exceeding 100 percent is, by definition, higher than the FCC limit and represents non-compliance and a need to mitigate the potential exposure. If all results are consistently below 100 percent, on the other hand, that set of results serves as a clear and sufficient demonstration of compliance with the MPE limit.

Note that the following conservative methodology and assumptions are incorporated into the MPE% calculations on a general basis:

1. The antennas are assumed to be operating continuously at maximum power and maximum channel capacity.
2. The power-attenuation effects of shadowing or other obstructions to the line-of-sight path from the antenna to the point of interest are ignored.
3. The calculations intentionally minimize the distance factor (R) by assuming a 6'6" human and performing the calculations from the bottom (rather than

the centerline) of each operator's lowest-mounted antenna, as applicable.

4. The calculations also conservatively take into account, when applicable, the different technical characteristics and related RF effects of the use of multiple antennas for transmission in the same frequency band.
5. The RF exposure at ground level is assumed to be 100-percent enhanced (increased) via a "perfect" field reflection from the intervening ground.

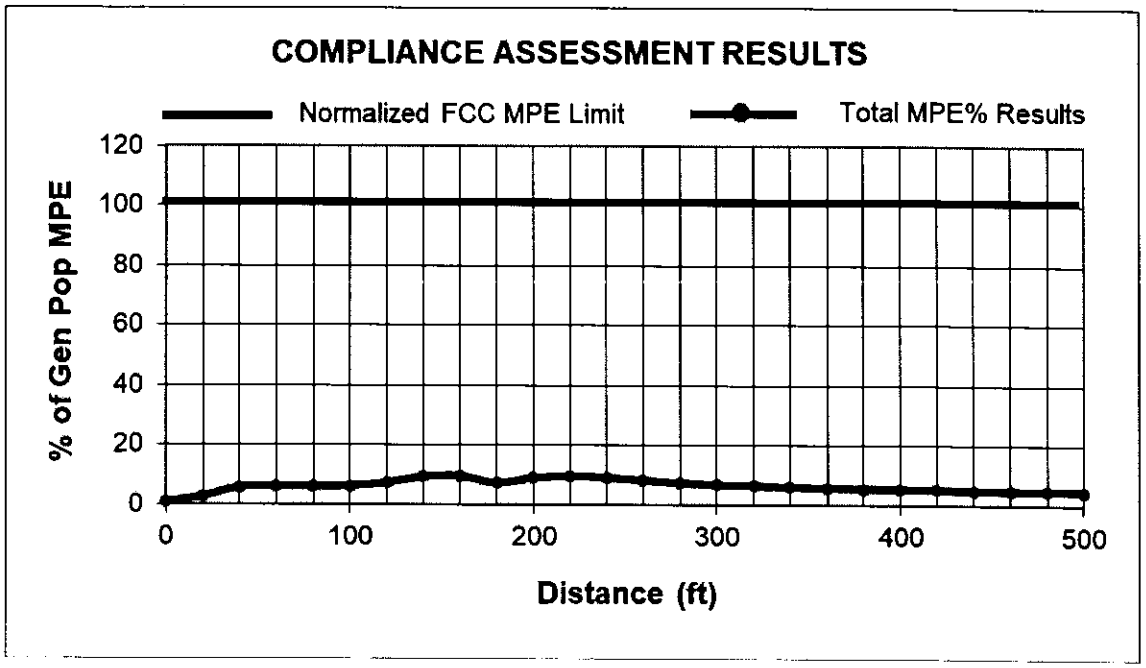
The net result of these assumptions is to intentionally and significantly overstate the calculated RF levels relative to the levels that will actually result from the antenna operations – and the purpose of this conservatism is to allow very "safe-side" conclusions about compliance.

The table that follows provides the results of the MPE% calculations for each antenna operation, with the overall worst-case calculated result highlighted in bold in the last column. Note that the transmission parameters for each DISH antenna sector are identical, and the calculations reflect the worst-case result for any/all sectors.

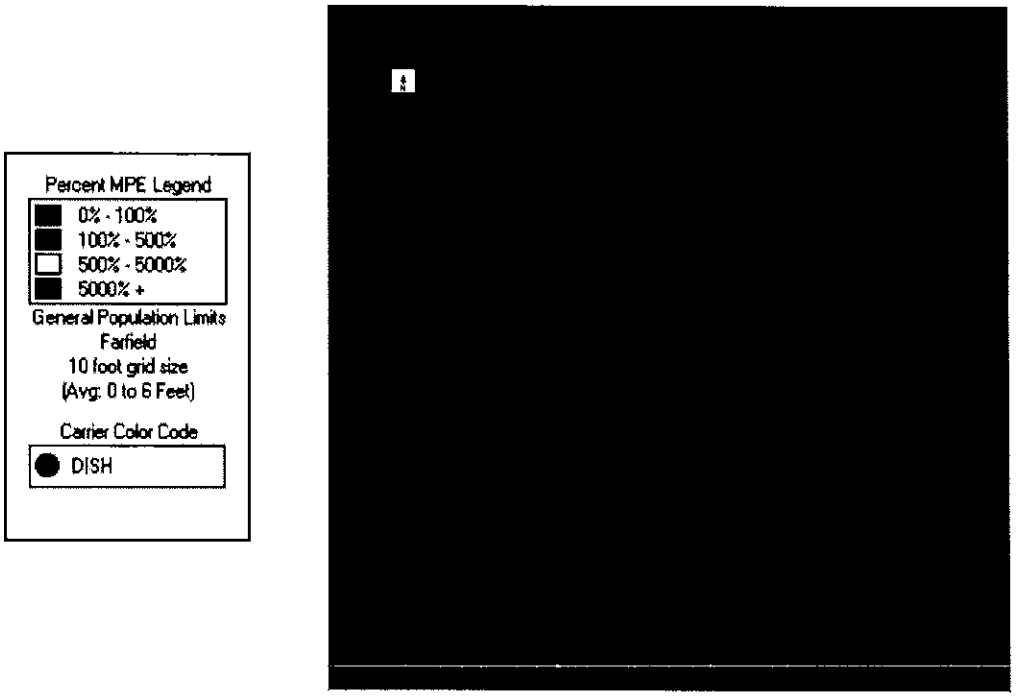
Ground Distance (ft)	DISH 600 MHz MPE%	DISH 2000 MHz MPE%	DISH 2100 MHz MPE%	AT&T MPE%	Sprint MPE%	T-Mobile MPE%	State of CT MPE%	Town of Westport MPE%	Total MPE%
0	0.0010	0.0013	0.0000	0.0912	0.0205	0.6887	0.0049	0.0000	0.8076
20	0.0030	0.0054	0.0018	0.1174	0.0104	1.1863	1.2844	0.0021	2.6108
40	0.0070	0.0196	0.0115	0.2264	0.0095	2.2073	3.2792	0.0056	5.7661
60	0.0027	0.0139	0.0094	0.4048	0.0134	1.2244	4.3272	0.0073	6.0031
80	0.0025	0.0057	0.0199	0.5264	0.0300	1.1801	4.2334	0.0040	6.0020
100	0.0342	0.0076	0.0576	0.3320	0.0344	2.0006	3.6919	0.0004	6.1587
120	0.1005	0.0072	0.2562	0.2315	0.0526	3.6574	3.1095	0.0010	7.4159
140	0.1176	0.2027	0.3522	0.4825	0.0480	5.5855	2.5988	0.0055	9.3928
160	**0.0724**	**0.2732**	**0.1847**	**0.8585**	**0.0529**	**6.0674**	**2.1570**	**0.0091**	**9.6752**
180	0.0373	0.0245	0.0064	0.9718	0.1125	4.3113	1.8180	0.0098	7.2916
200	0.0300	0.0101	0.0206	0.8516	0.1214	6.5465	1.5187	0.0085	9.1074
220	0.0507	0.0152	0.0017	0.7025	0.0802	7.4699	1.3148	0.0063	9.6413
240	0.0669	0.0744	0.0270	0.5787	0.0385	7.2868	1.1251	0.0040	9.2014
260	0.0723	0.0569	0.0394	0.4767	0.0253	6.6259	0.9726	0.0020	8.2711
280	0.0654	0.0196	0.0191	0.2668	0.0346	6.1254	0.8484	0.0007	7.3800
300	0.0483	0.0118	0.0162	0.1603	0.0506	5.7641	0.7460	0.0005	6.7978
320	0.0368	0.0303	0.0318	0.1186	0.0535	5.4538	0.6608	0.0005	6.3861
340	0.0281	0.0359	0.0343	0.1661	0.0569	5.1830	0.5892	0.0009	6.0944
360	0.0254	0.0270	0.0209	0.2794	0.0614	4.7502	0.5407	0.0015	5.7065
380	0.0304	0.0186	0.0114	0.4404	0.0623	4.4153	0.4876	0.0023	5.4683
400	0.0438	0.0228	0.0203	0.6151	0.0538	4.1685	0.4418	0.0034	5.3695
420	0.0400	0.0208	0.0186	0.7782	0.0357	3.7935	0.4021	0.0047	5.0936
440	0.0624	0.0296	0.0356	0.7132	0.0172	3.6518	0.3675	0.0061	4.8834
460	0.0931	0.0273	0.0385	0.8591	0.0118	3.3496	0.3371	0.0056	4.7221
480	0.0860	0.0252	0.0355	1.0265	0.0109	3.2874	0.3103	0.0070	4.7888
500	0.1233	0.0112	0.0198	0.9498	0.0215	3.1171	0.2933	0.0083	4.5443

As indicated, the maximum calculated overall RF level is 9.6752 percent of the FCC MPE limit – well below the 100-percent reference for compliance.

A graph of the overall calculation results, shown below, perhaps provides a clearer *visual* illustration of the relative compliance of the calculated RF levels. The line representing the overall calculation results shows an obviously clear, consistent margin to the FCC MPE limit.



The graphic output for the areas at street level surrounding the site is reproduced on the next page.

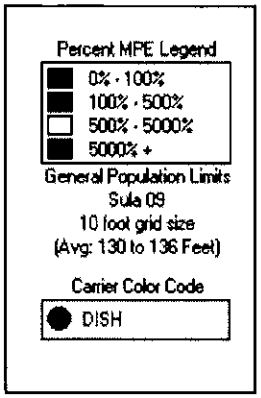


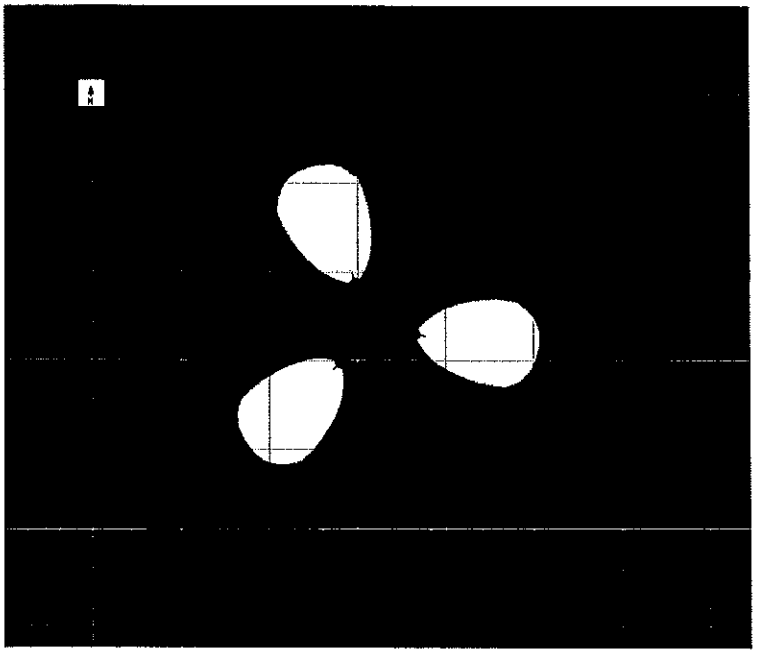
Near-field Analysis

The compliance analysis for the same height as the antennas is performed using the RoofMaster program by Waterford Consultants.

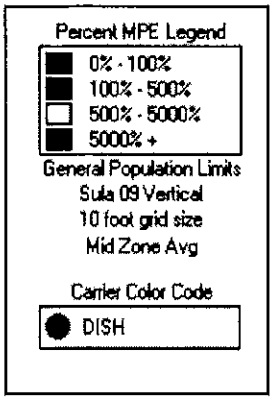
RF levels in the near field of an antenna depend on the power input to the antenna, the antenna's length and horizontal beamwidth, the mounting height of the antenna above nearby roof, and one's position and distance from the antenna. RF levels in front of a directional antenna are higher than they are to the sides or rear, and in any given horizontal direction are inversely proportional to the straight-line distance to the antenna.

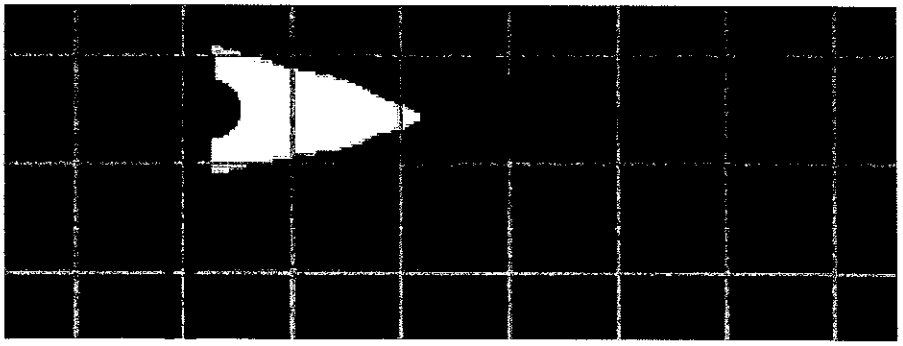
The RoofMaster graphic outputs for the same height as the DISH antennas are reproduced on the next page.





RoofMaster – Same Height as the Antennas – Alpha / Beta / Gamma sectors





RoofMaster – Same Height as the Antennas – Alpha / Beta / Gamma sectors

Compliance Conclusion

According to the FCC, the MPE limit has been constructed in such a manner that continuous human exposure to RF fields up to and including 100 percent of the MPE limit is acceptable and safe.

The conservative analysis in this case shows that the maximum calculated RF level from the combination of proposed and existing antenna operations at street level around the site is 9.6752 percent of the FCC general population MPE limit. At the same height as the antennas, the analysis shows that the calculated RF levels potentially exceed the FCC MPE limit. Per DISH guidelines, and consistent with FCC guidance on compliance, it is recommended that three Caution signs and NOC Information signs be installed at the base of the monopole.

The results of the calculations, along with the described RF mitigation, combine to satisfy the FCC's RF compliance requirements and associated guidelines on compliance.

Moreover, because of the extremely conservative calculation methodology and operational assumptions we applied in the analysis, RF levels actually caused by the antennas will be significantly lower than the calculation results here indicate.

Certification

It is the policy of Pinnacle Telecom Group that all FCC RF compliance assessments are reviewed, approved, and signed by the firm's Chief Technical Officer who certifies as follows:

1. I have read and fully understand the FCC regulations concerning RF safety and the control of human exposure to RF fields (47 CFR 1.1301 *et seq*).
2. To the best of my knowledge, the statements and information disclosed in this report are true, complete and accurate.
3. The analysis of site RF compliance provided herein is consistent with the applicable FCC regulations, additional guidelines issued by the FCC, and industry practice.
4. The results of the analysis indicate that the subject antenna operations will be in compliance with the FCC regulations concerning the control of potential human exposure to the RF emissions from antennas.

9/26/22

Daniel J. Collins
Chief Technical Officer
Pinnacle Telecom Group, LLC

Date

Appendix A. Documents Used to Prepare the Analysis

RFDS: NJJER01115A_RFDS_20220825

CD: NJJER01115A_PCDs_20220825

Appendix B. Background on the FCC MPE Limit

As directed by the Telecommunications Act of 1996, the FCC has established limits for maximum continuous human exposure to RF fields.

The FCC maximum permissible exposure (MPE) limits represent the consensus of federal agencies and independent experts responsible for RF safety matters. Those agencies include the National Council on Radiation Protection and Measurements (NCRP), the Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH), the American National Standards Institute (ANSI), the Environmental Protection Agency (EPA), and the Food and Drug Administration (FDA). In formulating its guidelines, the FCC also considered input from the public and technical community – notably the Institute of Electrical and Electronics Engineers (IEEE).

The FCC's RF exposure guidelines are incorporated in Section 1.301 *et seq* of its Rules and Regulations (47 CFR 1.1301-1.1310). Those guidelines specify MPE limits for both occupational and general population exposure.

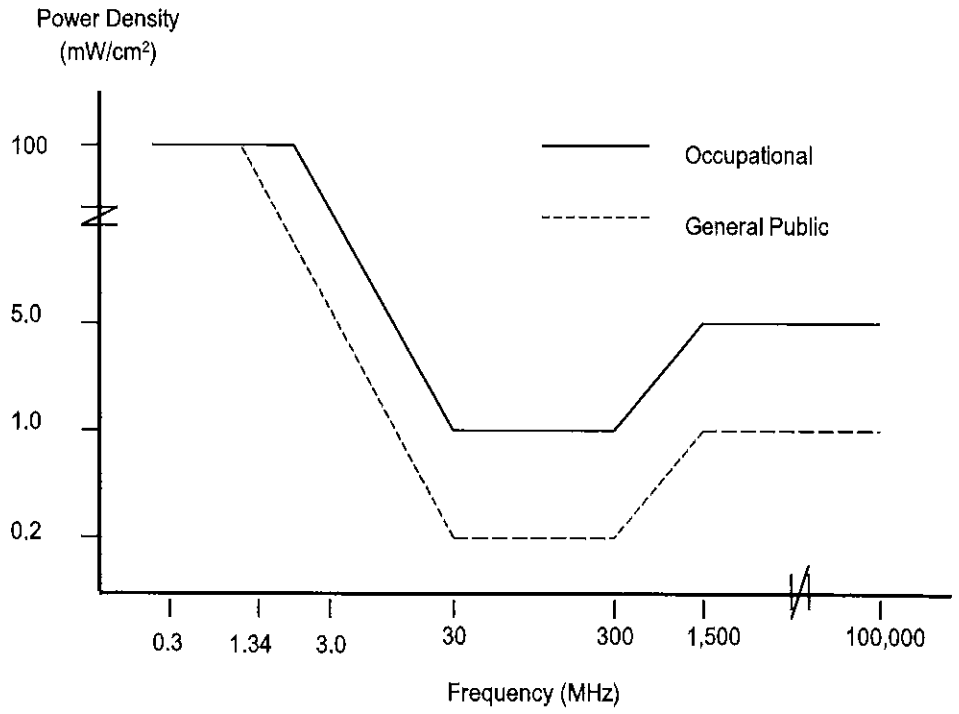
The specified continuous exposure MPE limits are based on known variation of human body susceptibility in different frequency ranges, and a Specific Absorption Rate (SAR) of 4 watts per kilogram, which is universally considered to accurately represent human capacity to dissipate incident RF energy (in the form of heat). The occupational MPE guidelines incorporate a safety factor of 10 or greater with respect to RF levels known to represent a health hazard, and an additional safety factor of five is applied to the MPE limits for general population exposure. Thus, the general population MPE limit has a built-in safety factor of more than 50. The limits were constructed to appropriately protect humans of both sexes and all ages and sizes and under all conditions – and continuous exposure at levels equal to or below the applicable MPE limits is considered to result in no adverse health effects or even health risk.

The reason for *two* tiers of MPE limits is based on an understanding and assumption that members of the general public are unlikely to have had appropriate RF safety training and may not be aware of the exposures they receive; occupational exposure in controlled environments, on the other hand, is assumed to involve individuals who have had such training, are aware of the exposures, and know how to maintain a safe personal work environment.

The FCC's RF exposure limits are expressed in two equivalent forms, using alternative units of field strength (expressed in volts per meter, or V/m), and power density (expressed in milliwatts per square centimeter, or mW/cm^2). The table on the next page lists the FCC limits for both occupational and general population exposures, using the mW/cm^2 reference, for the different radio frequency ranges.

Frequency Range (F) (MHz)	Occupational Exposure (mW/cm^2)	General Public Exposure (mW/cm^2)
0.3 - 1.34	100	100
1.34 - 3.0	100	$180 / F^2$
3.0 - 30	$900 / F^2$	$180 / F^2$
30 - 300	1.0	0.2
300 - 1,500	F / 300	F / 1500
1,500 - 100,000	5.0	1.0

The diagram below provides a graphical illustration of both the FCC's occupational and general population MPE limits.



Because the FCC's RF exposure limits are frequency-shaped, the exact MPE limits applicable to the instant situation depend on the frequency range used by the systems of interest.

The most appropriate method of determining RF compliance is to calculate the RF power density attributable to a particular system and compare that to the MPE limit applicable to the operating frequency in question. The result is usually expressed as a percentage of the MPE limit.

For potential exposure from multiple systems, the respective percentages of the MPE limits are added, and the total percentage compared to 100 (percent of the limit). If the result is less than 100, the total exposure is in compliance; if it is more than 100, exposure mitigation measures are necessary to achieve compliance.

Note that the FCC "categorically excludes" all "non-building-mounted" wireless antenna operations whose mounting heights are more than 10 meters (32.8 feet) from the routine requirement to demonstrate compliance with the MPE limit, because such operations "are deemed, individually and cumulatively, to have no significant effect on the human environment". The categorical exclusion also applies to *all* point-to-point antenna operations, regardless of the type of structure they're mounted on. Note that the FCC considers any facility qualifying for the categorical exclusion to be automatically in compliance.

In addition, FCC Rules and Regulations Section 1.1307(b)(3) describes a provision known in the industry as "the 5% rule". It describes that when a specific location – like a spot on a rooftop – is subject to an overall exposure level exceeding the applicable MPE limit, operators with antennas whose MPE% contributions at the point of interest are less than 5% are exempted from the obligation otherwise shared by all operators to bring the site into compliance, and those antennas are automatically deemed by the FCC to satisfy the rooftop compliance requirement.

FCC References on RF Compliance

47 CFR, FCC Rules and Regulations, Part 1 (Practice and Procedure), Section 1.1310 (Radiofrequency radiation exposure limits).

FCC Second Memorandum Opinion and Order and Notice of Proposed Rulemaking (FCC 97-303), *In the Matter of Procedures for Reviewing Requests for Relief From State and Local Regulations Pursuant to Section 332(c)(7)(B)(v) of the Communications Act of 1934 (WT Docket 97-192), Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation (ET Docket 93-62), and Petition for Rulemaking of the Cellular Telecommunications Industry Association Concerning Amendment of the Commission's Rules to Preempt State and Local Regulation of Commercial Mobile Radio Service Transmitting Facilities*, released August 25, 1997.

FCC First Memorandum Opinion and Order, ET Docket 93-62, *In the Matter of Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation*, released December 24, 1996.

FCC Report and Order, ET Docket 93-62, *In the Matter of Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation*, released August 1, 1996.

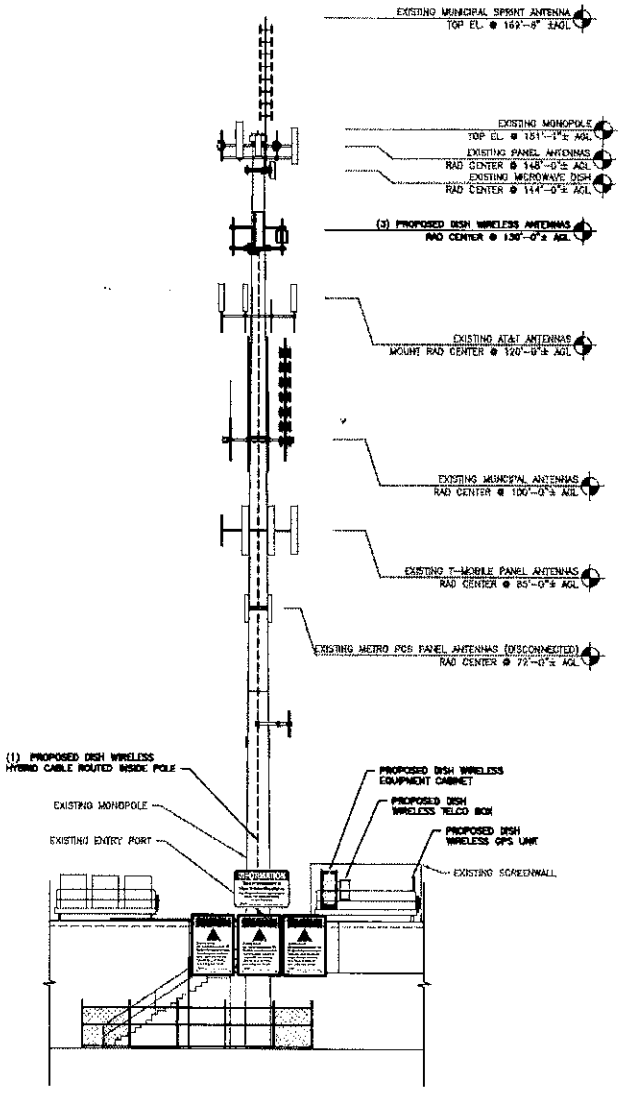
FCC Report and Order, Notice of Proposed Rulemaking, Memorandum Opinion and Order (FCC 19-126), *Proposed Changes in the Commission's Rules Regarding Human Exposure to Radiofrequency Electromagnetic Fields; Reassessment of Federal Communications Commission Radiofrequency Exposure Limits and Policies,* released December 4, 2019.

FCC Office of Engineering and Technology (OET) Bulletin 65, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields", Edition 97-01, August 1997.

FCC Office of Engineering and Technology (OET) Bulletin 56, "Questions and Answers About Biological Effects and Potential Hazards of RF Radiation", edition 4, August 1999.

Appendix C. Proposed Signage

Final Compliance Configuration							
	GUIDELINES	NOTICE	CAUTION	WARNING	NOC INFO	BARRIER/MARKER	
Access Point(s)	0	0	0	0	1	0	
Alpha	0	0	1	0	0	0	
Beta	0	0	1	0	0	0	
Gamma	0	0	1	0	0	0	



Appendix D. Summary of Expert Qualifications

Daniel J. Collins, Chief Technical Officer, Pinnacle Telecom Group, LLC

Synopsis:	• 40+ years of experience in all aspects of wireless system engineering, related regulation, and RF exposure • Has performed or led RF exposure compliance assessments on more than 20,000 antenna sites since the latest FCC regulations went into effect in 1997 • Has provided testimony as an RF compliance expert more than 1,500 times since 1997 • Have been accepted as an FCC compliance expert in New York, New Jersey, Connecticut, Pennsylvania and more than 40 other states, as well as by the FCC
Education:	• B.E.E., City College of New York (Sch. Of Eng.), 1971 • M.B.A., 1982, Fairleigh Dickinson University, 1982 • Bronx High School of Science, 1966
Current Responsibilities:	• Leads all PTG staff work involving RF safety and FCC compliance, microwave and satellite system engineering, and consulting on wireless technology and regulation
Prior Experience:	• Edwards & Kelcey, VP – RF Engineering and Chief Information Technology Officer, 1996-99 • Bellcore (a Bell Labs offshoot after AT&T's 1984 divestiture), Executive Director – Regulation and Public Policy, 1983-96 • AT&T (Corp. HQ), Division Manager – RF Engineering, and Director – Radio Spectrum Management, 1977-83 • AT&T Long Lines, Group Supervisor – Microwave Radio System Design, 1972-77
Specific RF Safety / Compliance Experience:	• Involved in RF exposure matters since 1972 • Have had lead corporate responsibility for RF safety and compliance at AT&T, Bellcore, Edwards & Kelcey, and PTG • While at AT&T, helped develop the mathematical models for calculating RF exposure levels • Have been relied on for compliance by all major wireless carriers, as well as by the federal government, several state and local governments, equipment manufacturers, system integrators, and other consulting / engineering firms
Other Background:	• Author, *Microwave System Engineering* (AT&T, 1974) • Co-author and executive editor, *A Guide to New Technologies and Services* (Bellcore, 1993) • National Spectrum Management Association (NSMA) – former three-term President and Chairman of the Board of Directors; was founding member, twice-elected Vice President, long-time member of the Board, and was named an NSMA Fellow in 1991 • Have published more than 35 articles in industry magazines

Exhibit G

Lease Agreement

SITE LEASE AGREEMENT

This Site Lease Agreement (the "**Agreement**") is made and effective as of the date the last Party executes this Agreement (the "**Effective Date**"), by and between TOWN OF WESTPORT, a Connecticut municipal corporation, with an address of 110 Myrtle Avenue, Westport, CT 06880 ("**Landlord**"), and DISH WIRELESS L.L.C., a Colorado limited liability company, having a place of business at 9601 S. Meridian Blvd., Englewood, Colorado 80112 ("**Tenant**," and together with Landlord, the "**Parties**," each a "**Party**").

1. Definitions.

"**Affiliate(s)**" means, with respect to a Party, any person or entity, directly or indirectly, controlling, controlled by, or under common control with such Party, in each case for so long as such control continues. For purposes of this definition, "control" shall mean (i) the ownership, directly or indirectly, or at least fifty percent (50%) of either: (a) the voting rights attached to issued voting shares; or (b) the power to elect fifty percent (50%) of the directors managers of such entity, or (ii) the ability to direct the actions of the entity. Notwithstanding the preceding, for purposes of this Agreement, EchoStar Corporation and its direct and indirect subsidiaries shall not be deemed to be "Affiliates" of Tenant unless after the Effective Date any such entity qualifies as a direct or indirect subsidiary of DISH Network Corporation.

"**Applicable Law**" means any applicable federal, state or local act, law, statute, ordinance, building code, rule, regulation or permit, or any order, judgment, consent or approval of any Governmental Authority having jurisdiction over the Parties or this Agreement.

"**Equipment**" means and includes the antennas, cables, wires, conduits, fasteners, connectors, cabinets and the like designed to transmit and receive radio frequency signals and customarily associated with a cellular telecommunications tower.

"**Governmental Authority**" means any: (i) federal, state, county, municipal, tribal or other local government and any political subdivision thereof having jurisdiction over the Parties or this Agreement; (ii) any court or administrative tribunal exercising proper jurisdiction; or (iii) any other governmental, quasi-governmental, self-regulatory, judicial, public or statutory instrumentality, authority, body, agency, bureau or entity of competent jurisdiction.

"**Installation**" means the installation of Tenant's Equipment at the Premises.

"**Property**" means that certain parcel of real property upon which the Tower is located.

"**Tower**" means that certain monopole tower located on the Property.

"**Upgrade Protocol**" means the Landlord's Telecommunications Facility Upgrade Protocol, a copy of which is attached as Exhibit C.

2. Premises, Term, Rent and Contingencies.

2.1 Premises. Landlord is the owner of the Property located at 515 Post Road East, Westport, Connecticut, as more particularly described in Exhibit A. Landlord leases to Tenant approximately [redacted] square feet of space for Tenant's Equipment in connection with the use and operation of its facilities as

such are initially described in Exhibit B, collectively referred to as the **"Premises"**. Landlord also grants to Tenant: (a) the right to use any available electrical systems and/or fiber installed at the Property to support Tenant's Installation: and (b) any easements on, over, under, and across the Property for utilities, fiber and access to the Premises. Landlord agrees that providers of utility or fiber services may use such easement(s) and/or available conduit(s) for the installation of any Equipment necessary to provide utility or fiber service. If the existing utility or fiber sources located within the Premises or on the Property are insufficient for Tenant's Permitted Use, Landlord agrees to grant Tenant and/or the applicable third-party utility or fiber provider the right, at Tenant's sole cost and expense, to install such utilities or fiber on, over and/or under the Property as is necessary for Tenant's Permitted Use; provided that Landlord and Tenant shall mutually agree on the location of such installation(s).

2.2 Term. This Agreement shall be effective as of the Effective Date. The initial term of this Agreement (the **"Initial Term"**) will commence on the later of sixty (60) days after the Effective Date or first (1st) day of the month following the commencement of Tenant's Installation (the **"Commencement Date"**) and will expire on the last day of the month that is [redacted] months after the Commencement Date unless terminated sooner, renewed or extended in accordance with this Agreement. The Initial Term shall automatically renew for [redacted] additional term of [redacted] months (the **"Renewal Term"** and together with the Initial Term, the **"Term"**). However, Tenant may, in Tenant's sole and absolute discretion, elect not to renew the lease at the end of the Initial Term by giving Landlord written Notice at least ninety (90) days prior to the end of the Initial Term. The Parties agree that, subject to the Contingencies, this Agreement constitutes a binding and valid obligation on each Party and that each Party has vested rights in this Agreement as of the Effective Date.

2.3 Rent. Beginning on the Commencement Date and continuing through the term of this Agreement, Tenant shall pay Landlord rent for the Premises (**"Rent"**) in the amount [redacted] per year. The first Rent payment shall be made within sixty (60) days of the Commencement Date, with subsequent payments due on each anniversary of the Commencement Date. On each anniversary of the Commencement Date, the Rent shall be automatically increased by [redacted] of the then-current Rent. Payments shall be delivered to the address designated by Landlord in Section 12.11, or by electronic payment. All payments for any fractional month shall be prorated based upon the number of days during such month that the payment obligation was in force (**"Payment Terms"**). Tenant shall require receipt of a validly completed IRS approved W-9 form (or its equivalent) prior to paying any Rent or any other amount(s) due under this Agreement. Tenant will pay Landlord a fee of $50.00 for any check returned for any reason by Landlord's bank. If Tenant fails to pay the monthly Rent when due, or any other amount payable under this Agreement when due, and such failure continues for ten (10) days after any such due date, then after five (5) days' notice from Landlord to Tenant without cure, Tenant shall pay to Landlord a late charge equal to five percent (5%) of the amount not paid by such tenth (10th) day, and the parties hereto understand and agree that the foregoing shall not in any way limit, condition or detract from Landlord's other rights and remedies set forth in this Agreement or otherwise available to Landlord at law or in equity. Any payment more than fifteen (15) days overdue will bear interest from the date due to the date of actual payment at ten percent (10%).

2.4 Rent Guarantee. All Rent due for the Initial Term and, unless Tenant elects not to renew this Agreement, the Renewal Term, is guaranteed by Tenant to Landlord, meaning that Tenant will not be released from its payment obligations under this Agreement if Tenant terminates this Agreement except if the reason for the termination is: (a) that Tenant is unable to operate the Installation due an event described in Section 8.4, Force Majeure (Section 12.5), or (c) Taking (Section 12.3); or (b) an event of Landlord's default (Section 8.2) which remains uncured beyond all applicable cure and grace periods.

2.5 Site Development Fee. Tenant shall pay Landlord a one (1) time fee in the amount of [redacted] to defray Landlord's costs associated with engineering and legal review fees, which is a condition precedent to Tenant's use of the Premises ("**Site Development Fee**"). Tenant shall pay the Site Development Fee to Landlord within sixty (60) days following the Effective Date The Site Development Fee shall be non-refundable.

2.6 Contingencies. Tenant's ability to lawfully use the Premises is contingent upon Tenant obtaining all certificates, permits, approvals and other authorizations that may be required by any Governmental Authority in accordance with Applicable Law (collectively, the "**Governmental Approvals**"). Tenant will endeavor to obtain all Governmental Approvals promptly. Landlord hereby authorizes Tenant, at Tenant's sole cost and expense, to file and submit for the Governmental Approvals. Landlord shall: (a) cooperate with Tenant in Tenant's efforts to obtain the Governmental Approvals; (b) promptly execute and deliver all documents necessary to obtain and maintain the Government Approvals; and (c) not take any action that would adversely affect Tenant's ability to obtain and/or maintain the Governmental Approvals. If any application for a Governmental Approval is rejected, conditioned, materially delayed or otherwise not approved for any or no reason ("**Contingencies**"), then, Tenant shall have the right, in its sole and absolute discretion, to terminate this Agreement immediately upon Notice to Landlord, without penalty or further obligation to Landlord (or Landlord's affiliates, employees, officers, agents or lenders). If, following the Commencement Date, and through no fault of Tenant, any Governmental Approval, related to this Premises, issued to Tenant is canceled, expires, lapses or is otherwise withdrawn or terminated by the applicable Governmental Authority, then Tenant shall have the right, in its sole and absolute discretion, to terminate this Agreement upon ninety (90) days' Notice to Landlord without penalty or further obligation to Landlord (or Landlord's affiliates, employees, officers, agents or lenders). If this Agreement is terminated, this Agreement shall be of no further force or effect (except as set forth to the contrary herein).

3. Use, Access and Modifications to Tenant's Equipment.

3.1 Tenant's Permitted Use. Tenant shall have the right to use the Premises for the purpose of the installation, operation, maintenance and management of a telecommunications facility (including, without limitation, installation of Tenant's Equipment) ("**Tenant's Permitted Use**"). Subject to Tenant's compliance with the Upgrade Protocol, Tenant's Permitted Use includes the right to replace, repair, upgrade, or otherwise modify any or all of Tenant's Equipment and the frequencies over which Tenant's Equipment operates. If radio frequency signage and/or barricades are required by Applicable Law, then Tenant shall have the right to install the same on the Property.

3.2 Access. Commencing on the Effective Date and continuing throughout the Term and subject to Section 6.3, Tenant, its employees, agents and contractors shall have unrestricted access to the Premises. Further, Landlord grants to Tenant the right of ingress and egress to the Tower and the Premises.

3.3 Maintenance, Repairs, Modifications and Upgrades. The drawings and descriptions indicated on Exhibit B specifically describe the quantity of Equipment, the numbers, and locations of antennas, and the locations of cables to be installed within the Premises. In the event of a conflict between the general description set forth above, and the specific descriptions drawn and depicted on Exhibit B, then Exhibit B shall govern. The descriptions and depictions indicated on Exhibit B are specific

to the equipment and specifications on Exhibit B. Tenant has no future right to modify Exhibit B after the Effective Date without a duly executed written amendment to this Agreement. Tenant shall have the right to complete the installation of the Equipment indicated on Exhibit B and to maintain and repair the Equipment indicated on Exhibit B without Landlord's consent. All modifications and upgrades of Tenant's Equipment are subject to the Upgrade Protocol. Tenant shall not attempt to circumvent the Upgrade Protocol or commence modification or upgrade work unless and until Tenant has fully complied with the Upgrade Protocol.

4. Utilities, Liens and Taxes.

4.1 Utilities. Tenant shall furnish and install an electrical meter at the Premises for the measurement of electrical power used by Tenant at the Premises and Tenant shall pay the utility company directly. So long as this Agreement remains in effect, Landlord at all times shall provide Tenant with access to the utilities at the Property so that the Premises shall have electrical, gas and telephone service. In connection with the electric, gas and telephone utility sources located on the Property that is/are necessary for Tenant to operate its Installation, Landlord agrees to grant the local utility provider the right to install its equipment or other improvements on, over and/or under the Property and Landlord shall cooperate in connection therewith, including without limitation, executing any documents, permitting any testing and performing any work such utility provider requires in connection with same.

4.2 Liens. Tenant will use commercially reasonable efforts to prevent any lien from attaching to the Tower, Premises or the Property. If any lien is filed purporting to be for labor or material furnished or to be furnished at the request of Tenant, then Tenant shall do all acts necessary to discharge such lien by payment, satisfaction or posting of bond within ninety (90) days of receipt of Notice of the same from Landlord; provided, that Tenant may contest any such lien if Tenant provides Landlord with cash or a letter of credit in the amount of the lien as security for its payment within the ninety (90) day period, and thereafter diligently contests such lien. If Tenant fails to deposit the security with Landlord and fails to pay any lien claim after entry of final judgment in favor of the claimant, then Landlord shall have the right to expend all sums reasonably necessary to discharge the lien claim.

4.3 Taxes. Landlord acknowledges that the Property and the Tower are at present exempt from real property taxation because Landlord is a municipality. Tenant shall be liable for all taxes against Tenant's Equipment, personal property or fixtures placed in the Premises, whether levied or assessed against Landlord or Tenant. Landlord shall reasonably cooperate with Tenant, at Tenant's expense, in any appeal or challenge to taxes. If, as a result of any appeal or challenge by Tenant, there is a reduction, credit or repayment received by Landlord for any taxes previously paid by Tenant, Landlord agrees to promptly reimburse to Tenant the amount of the reduction, credit or repayment. If Tenant does not have the standing rights to pursue a good faith and reasonable dispute of any taxes under this section, Landlord will pursue such dispute at Tenant's sole cost and expense upon written request of Tenant.

5. Interference and Relocation of Tenant's Equipment.

5.1 Interference. Tenant shall not cause Interference (as defined below) with any other equipment installed on the Tower as of the Effective Date. Following the Effective Date, Landlord shall not install, or to permit others to install, any structure or equipment which could block or otherwise interfere with any transmission or reception by Tenant's Equipment ("**Interference**"). If Interference continues for a period more than forty-eight (48) hours following a Party's receipt of notification thereof,

Landlord shall cause any interfering party to cease operating, and/or relocate, the source of Interference, or to reduce the power sufficiently to minimize the Interference until the Interference can be remedied.

5.2 Relocation of Tenant's Equipment. Following Tenant's receipt of a written Notice from Landlord, Tenant agrees to temporarily relocate Tenant's Equipment to a mutually agreed upon location on the Property (a "**Temporary Location**") to facilitate Landlord's performance of maintenance, repair or similar work at the Property or on the Tower, provided that: (a) Tenant shall pay the costs of the Temporary Relocation of Tenant's Equipment and receive a rental abatement until Tenant recoups all of the cost of the Temporary Relocation of Tenant's Equipment as well as the costs incurred by Tenant in moving Tenant's Equipment back to the original location; (b) Landlord gives Tenant at least six (6) months prior written Notice (except in the case of a bona fide emergency which is reasonably likely to result in damage or injury to persons, the Tower or the Property (an "**Emergency**"), in which event Landlord will provide the greatest amount of notice possible under the circumstances; and (c) except for an Emergency Tenant shall not be required to relocate Tenant's Equipment to a Temporary Location more than one (1) time within any five (5) year period. If Tenant's use of the Temporary Location requires Tenant to undergo re-zoning or re-permitting, Landlord shall not require Tenant to relocate Tenant's Equipment, absent an Emergency, until Tenant's receipt of all Governmental Approvals applicable to Tenant's use of the Temporary Location.

6. Maintenance and Repair Obligations.

6.1 Landlord's Maintenance of the Tower. Landlord represents and warrants that, as of the Effective Date, the Tower, the Tower's systems and all structural elements of the Tower are in compliance with Applicable Law. Throughout the term of this Agreement, Landlord shall maintain, at its sole cost and expense, the Tower and the Property (but not Tenant's Equipment located thereon) in good operating condition. Landlord shall not have any obligation to maintain, repair or replace Tenant's Equipment except to the extent required due to the acts and/or omissions of Landlord, Landlord's agents or contractors. Landlord agrees to safeguard Tenant's Equipment with the same standard of care it uses to protect its own property, but in no event less than reasonable care.

6.2 Tenant Maintenance of Tenant's Equipment. Tenant assumes sole responsibility for the maintenance, repair and/or replacement of Tenant's Equipment, except as set forth in Section 6.1. Tenant shall perform all maintenance, repair or replacement of Tenant's Equipment ("**Tenant Maintenance**") in accordance with Applicable Law, and in a good and workmanlike manner.

6.3 Access to Premises. Landlord shall allow Tenant access to the Premises during ordinary business hours (8:00 a.m. – 4:30 p.m., Monday through Friday) for regular or routine maintenance and repairs, and twenty-four (24) hours a day, seven (7) days a week for unscheduled repairs and other emergency purposes. If Tenant needs access after ordinary business hours, Tenant will endeavor to give Landlord prior notice, if feasible. Except for emergency access, prior to access to the Property, Tenant shall provide a minimum of 24 hours' prior e-mail and telephone notice to the Landlord's Designated Site Representative so that arrangements can be made for an employee or consultant of the Landlord to accompany the contractors or technicians. As of the Effective Date, the "**Designated Site Representative**" is **Assistant Chief Matthew Cohen, 203-341-5044, mcohen@westportct.gov**. Landlord reserves the right to change the name and/or contact information of the Designated Site Representative upon written notice to the Tenant. All contractors and technicians must carry and provide proper identification at all times. If, after Tenant's initial installation as indicated on Exhibit B, Tenant's presence at the Property exceeds three one-half days per calendar month, Tenant shall reimburse the Landlord to cover the actual

commercially reasonable costs associated with having an employee or consultant on site beyond the three one-half days. A half day shall be calculated as any time beyond four (4) hours. Any time beyond four (4) hours on any given day shall be counted as a second 1/2 day. Except in the event of an emergency, no work shall be permitted on weekends or holidays unless specifically authorized by the Designated Site Representative. Landlord shall permit emergency work or a project having extenuating circumstances on weekends, holidays or outside ordinary 8:00 a.m. to 4:30 p.m. business hours, provided Tenant agrees to reimbursement of the Landlord's employee or consultant, at an hourly rate of $150.00 per hour. In order for any inspection, repair, maintenance, modification or upgrade work to be performed which will include the need for any climbing on the Tower, the following information/documentation will be required: (a) a letter describing the scope of work to be done; (b) letter indicating that the contractor or contractors, is/are authorized to perform the work on behalf of the Tenant; (c) photo ID for each technician who will be on site; (d) a climbing certificate/certification for each technician who will be climbing the Tower; and (e) an insurance certificate or certificates indicating that each firm employing the technician or technicians has current insurance coverage with limits at least as high as those described in Section 10.2 and including the Landlord as certificate holder and additional insured.

6.4 Inspections. Landlord has the right to retain an independent engineering firm to conduct annual structural and safety inspections of the Premises and the Tower. Tenant will pay its proportionate share (i.e., 1/3 or ¼, depending on the number of carriers co-locating on the Tower) of the cost of each annual inspection within sixty (60) days of receipt of an invoice from Landlord. Landlord will deliver to Tenant a copy of each inspection report upon request. If an inspection report commissioned by Landlord contains a recommendation by the engineering firm for repair or improvement of Tenant's Installation or a recommendation that Tenant modify Tenant's Equipment for the safety and integrity of the Structure, then Tenant shall comply with the recommendation within a commercially reasonable period of time, not to exceed sixty (60) days, at Tenant's sole cost and expense.

6.5 Construction. Tenant shall cause all construction to occur in compliance with all applicable laws and ordinances. Landlord acknowledges that it shall neither interfere with any aspects of construction nor attempt to direct construction personnel as to the location of or method of construction of the Installation. The Tenant's Installation shall remain the exclusive property of Tenant and shall not be considered fixtures.

6.6 Equipment Removal. At the time of Tenant's Installation, Tenant shall, at no cost to Landlord, cause to be removed from the Tower and disposed of, in compliance with all applicable laws and regulations, the Town-owned equipment listed on Exhibit D, attached hereto. For the avoidance of doubt, the equipment to be removed by Tenant consists of the yellow-highlighted antennas at 100' elevation plus the 3' microwave dish at 145' elevation.

7. Surrender and Hold Over.

7.1 Surrender. Within ninety (90) days following the expiration or termination of this Agreement (the "**Equipment Removal Period**"), Tenant will surrender the Premises to Landlord in a condition similar to that which existed immediately prior to Tenant's Installation together with any additions, alterations and improvements to the Premises, in either case, normal wear and tear excepted. Rent will accrue during the Equipment Removal Period. If Tenant's Equipment is not removed prior to the expiration of the Equipment Removal Period, Tenant will be deemed to be in Hold Over (as defined in Section 7.2) until Tenant's Equipment is removed from the Premises. Tenant shall have the right to access

the Premises or remove any or all of Tenant's Equipment from the Premises at any time during the Term or the Equipment Removal Period. Tenant will, at Tenant's expense, promptly repair any and all damage to the Tower and the Premises caused by Tenant's contractors and technicians while removing Tenant's Equipment. If Tenant fails to promptly repair any damage to the Tower caused by Tenant's contractors and technicians while removing Tenant's Equipment, Landlord may, but shall have no obligation to, repair the damage and forward an invoice or invoices and supporting documentation to Tenant for payment. Tenant will pay any invoices delivered by Landlord pursuant to the immediately preceding sentence within sixty (60) days of receipt.

7.2 Hold Over. If Tenant occupies the Premises beyond the Equipment Removal Period or any period upon lease expiration, without Landlord's written consent ("**Hold Over**"), Tenant will be deemed to occupy the Premises on a month-to-month basis, terminable by either Party on thirty (30) days' written Notice to the other Party. All of the terms and provisions of this Agreement shall be applicable during the Hold Over period, except that Tenant shall pay Landlord a rental fee at the rate of one hundred fifty percent (150%) of the Rent applicable at the expiration or termination of the Agreement. Tenant's payments shall be paid on the first day of each month in advance for the duration of the Hold Over.

8. Default, Remedies and Termination.

8.1 Default By Tenant. If there is a breach by Tenant with respect to any of the provisions of this Agreement or Tenant's obligations under this Agreement, including, without limitation, the timely payment of Rent, Landlord shall give Tenant written notice of the breach. After receipt of written notice, Tenant shall have thirty (30) days in which to cure any monetary breach and thirty (30) days in which to cure any non-monetary breach, provided that Tenant shall have such extended period as may be required beyond the thirty (30) days if the nature of the cure is such that it reasonably requires more than thirty (30) days, and Tenant commences the cure within the thirty (30) day period and thereafter continuously and diligently pursues the cure to completion. Landlord may not maintain any action or effect any remedies for default against Tenant unless and until Tenant has failed to cure the breach within the time periods provided in this Section.

8.2 Default By Landlord. If there is a breach by Landlord with respect to any of the provisions of this Agreement or Landlord's obligations under this Agreement, Tenant shall give Landlord written notice of the breach. After receipt of the written notice, Landlord shall have thirty (30) days in which to cure the breach, provided that Landlord shall have such extended period as may be required beyond the thirty (30) days if the nature of the cure is such that it reasonably requires more than thirty (30) days and Landlord commences the cure within the thirty (30) day period and thereafter continuously and diligently pursues the cure to completion. Tenant may not maintain any action or effect any remedies for default against Landlord unless and until Landlord has failed to cure the breach within the time periods provided in this Section. Notwithstanding the foregoing to the contrary, it shall be a default under this Agreement if Landlord fails, within five (5) days after receipt of written notice of breach, to perform an obligation required to be performed by Landlord if the failure to perform the obligation interferes with Tenant's ability to conduct its business at the Property; provided, however, that if the nature of Landlord's obligation is such that more than five (5) days after such notice is reasonably required for its performance, then it shall not be a default under this Agreement if performance is commenced within the five (5) day period and thereafter diligently pursued to completion.

8.3 Remedies. Upon a default beyond all applicable notice and cure periods, the non-defaulting Party may at its option (but without obligation to do so), perform the defaulting Party's duty or obligation on the defaulting Party's behalf, including but not limited to the obtaining of reasonably required insurance policies. The costs and expenses of any such performance by the non-defaulting Party shall be due and payable by the defaulting Party upon invoice therefor. In the event of a default beyond all applicable notice and cure periods, by either Party with respect to a material provision of this Agreement, without limiting the non-defaulting Party in the exercise of any right or remedy which the non-defaulting Party may have by reason of such default, the non-defaulting Party may terminate this Agreement immediately upon written Notice to the other Party.

8.4 Termination. Tenant shall have the right to terminate this Agreement without further liability upon thirty (30) days prior written Notice to Landlord due to any one or more of the following: (i) changes in Applicable Law which prohibit or adversely affect Tenant's ability to operate Tenant's Equipment at the Premises; (ii) Landlord or a third party installs any structure, equipment, or other item which blocks, hinders, limits, or prevents Tenant from being able to use the Tenant Equipment for Tenant's Permitted Use.

9. Limitation of Liability and Indemnification.

9.1 Limitation of Liability. EXCEPT FOR EACH PARTY'S INDEMNIFICATION OBLIGATIONS SET FORTH BELOW IN THIS SECTION 9, NEITHER PARTY NOR ANY OF ITS AGENTS, CONTRACTORS OR EMPLOYEES, SHALL BE LIABLE TO THE OTHER PARTY OR ANY PERSON CLAIMING THROUGH THAT PARTY FOR ANY EXEMPLARY, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR ANY CAUSE WHATSOEVER, INCLUDING, WITHOUT LIMITATION, CLAIMS CAUSED BY OR RESULTING FROM THE NEGLIGENCE, GROSS NEGLIGENCE OR WILLFUL MISCONDUCT OF THAT PARTY, ITS AGENTS, CONTRACTORS OR EMPLOYEES.

9.2 Tenant's Indemnity. Except to the extent caused by the breach of this Agreement by Landlord or the acts or omissions of Landlord, its agents, employees, contractors, or any other person or entity for whom Landlord is legally responsible, Tenant shall defend, indemnify and hold Landlord and its elected and appointed officials, employees, agents and representatives ("**Landlord's Representatives**") harmless from and against any and all claims, demands, litigation, settlements, judgments, damages, liabilities, costs and expenses (including, without limitation, reasonable attorneys' fees) (individually or collectively, a "**Claim**") arising directly or indirectly out of: (i) any act or omission of Tenant, its officers, agents, employees, contractors, or any other person or entity for whom Tenant is legally responsible ("**Tenant's Representatives**"); or (ii) a breach of any representation, warranty or covenant of Tenant contained or incorporated in this Agreement. Tenant's obligations under this Section 9.2 shall survive the expiration or earlier termination of this Agreement.

9.3 Landlord's Indemnity. Except to the extent caused by the breach of this Agreement by Tenant or the acts or omissions of Tenant or Tenant's Representatives, Landlord shall defend, indemnify and hold Tenant, its officers, directors, shareholders, employees, agents and representatives harmless from and against any and all Claims arising directly or indirectly out of: (i) any act or omission of Landlord, its agents, employees, contractors or any other person or entity for whom Landlord is legally responsible; (ii) a breach of any representation, warranty or covenant of Landlord contained or incorporated in this Agreement; and/or (iii) the generation, possession, use, storage, presence, release, spill, treatment, transportation, manufacture, refinement, handling, production and/or disposal of Hazardous Substances in, on, about, adjacent to, under or near the Premises, the Tower and/or the Property, and/or any

contamination of the Premises, the Tower and/or the Property by any Hazardous Substance, but only to the extent not caused by Tenant or Tenant's Representatives. Landlord's obligations under this Section 9.3 shall survive the expiration or earlier termination of this Agreement.

9.4 Indemnification Procedure. The Party seeking indemnification (the **"Indemnified Party"**) shall promptly send Notice to the Party from whom indemnification is being sought (the **"Indemnifying Party"**) of the claim or suit for which indemnification is sought. The Indemnified Party shall not make any admission as to liability or agree to any settlement of or compromise any claim without the prior written consent of the Indemnifying Party. The Indemnified Party shall, at the Indemnifying Party request and expense, give the Indemnifying Party all reasonable assistance in connection with those negotiations and litigation.

10. Insurance.

10.1 Landlord Obligations. Throughout the Term, Landlord shall maintain, at Landlord's sole cost and expense, the following insurance coverage Commercial General Liability, from a company or companies with an A.M. Best rating of A- (VII) or better of not less than $1,000,000 per occurrence and $2,000,000 aggregate. All such policies shall be endorsed to include Tenant as an additional insured. Subject to the policy minimums set forth above in this Section 10.1, the insurance required of Landlord may be maintained by a blanket or master policy that includes properties other than the Property.

10.2 Tenant Obligations. Throughout the Term, Tenant shall maintain, at Tenant's sole cost and expense, the following insurance coverages from a company or companies with an A.M. Best rating of A- (VII) or better. The insurance shall protect the Landlord from claims that may arise out of or result from the Tenant's obligations under this Agreement or from the obligations of any contractor or any other person or entity directly or indirectly employed by Tenant or by anyone for whose acts Tenant may be liable. For each policy required by this Agreement, Tenant shall, before the execution of this Agreement by the Landlord, provide the Landlord with certificates of insurance. Tenant shall provide updated certificates of insurance at least ten (10) days before any renewal of any such coverage. The certificates shall require notice of cancellation to the Landlord according to policy provisions.

A. Workers Compensation:

Tenant shall provide workers compensation insurance required by law with employer's liability limits for at least the amounts of liability for bodily injury by accident of $500,000 each accident and bodily injury by disease of $500,000 including a waiver of subrogation.

B. Commercial General Liability Insurance:

Tenant shall provide commercial general liability insurance including products and completed operations and including XCU coverage if applicable. Limits shall be at least: Bodily injury & property damage coverage with an occurrence limit of $1,000,000; Personal & advertising injury limit of $1,000,000 per occurrence; General aggregate limit of $2,000,000 (other than products and completed operations); Products and completed operations aggregate limit of $2,000,000.

- The policy shall name the Town as an additional insured and include ISO Form CG 2010 (04/13) and CG 2037 (04/13) or equivalent.

- Coverage will be provided on an occurrence basis and shall be primary and shall not contribute in any way to any insurance or self-insured retention carried by the Landlord.
- Coverage shall contain a broad form contractual liability endorsement or wording within the policy form to comply with the hold harmless and indemnity provision(s) of all agreements between the Landlord and the Tenant.
- Deductible and self-insured retentions shall be declared and are subject to the approval of the Landlord.

C. Commercial Automobile Insurance:

Tenant shall provide commercial automobile insurance for any owned, non-owned or hired autos, in the amount of $1,000,000 each accident covering bodily injury and property damage on a combined single limit basis. The policy shall name the Landlord as an additional insured and provide a waiver of subrogation.

D. Umbrella or Excess Liability Insurance:

Tenant shall provide an umbrella or excess liability policy in excess (without restriction or limitation) of those limits and coverages described in items (A) through (C). The policy shall contain limits of liability in the amount of $5,000,000 each occurrence and $5,000,000 in the aggregate.

10.3 Waiver of Subrogation. To the fullest extent permitted by law, Landlord and Tenant for themselves and any and all parties claiming under or through them, including, without limitation, their respective insurers, hereby mutually release and discharge each other and the other's Affiliates, and their respective officers, directors, shareholders, agents, employees, contractors, and/or any other person or entity for whom a Party is legally responsible from any claims for damage to any person or to the Premises or any other real or personal property that are or are claimed to have been caused by or result from risks insured against under any insurance policies carried by the waiving party and in force at the time of such damage and hereby waive any right of subrogation that might otherwise exist in or accrue to any person on account thereof. All policies required to be carried by either Party herein shall contain an endorsement in favor of the other Party waiving the insurance company's right of subrogation against such other Party. THIS RELEASE SHALL APPLY EVEN IF THE LOSS OR DAMAGE IS CAUSED BY THE FAULT OR NEGLIGENCE OF A PARTY HERETO OR BY ANY PERSON FOR WHICH SUCH PARTY IS RESPONSIBLE. EACH PARTY AGREES TO NOTIFY ITS INSURANCE CARRIER(S) OF THIS PROVISION.

11. Representations and Warranties.

11.1 Representations and Warranties. Landlord represents, warrants and covenants that: (a) Landlord has the right and authority to execute and perform this Agreement and has taken all necessary action to approve this Agreement which would include having this agreement approved by the Landlord's Board of Selectwomen; (b) there are no liens, judgments or other title matters materially and adversely affecting Landlord's title to the Property; (c) there are no covenants, easements or restrictions that prevent the use of the Premises for Tenant's Permitted Use; (d) the Tower and the Premises are in good repair and suitable for Tenant's Permitted Use; (e) Landlord will comply with all federal, state, and local laws in connection with any substances brought on to the Property and/or Tower that are identified as toxic or hazardous by any Applicable Law, ordinance or regulation (**"Hazardous Substance"**); and (f) Tenant's use and quiet enjoyment of the Premises shall not be disturbed. In no event shall Tenant have

any liability with respect to any Hazardous Substance that was on, about, adjacent to, under or near the Tower prior to the Effective Date, or that was generated, possessed, used, stored, released, spilled, treated, transported, manufactured, refined, handled, produced or disposed of on, about, adjacent to, under or near the Property and/or Tower by: (i) Landlord, its agents, employees, contractors or invitees; or (ii) any third party who is not an employee, agent, contractor or invitee of Tenant.

12. Miscellaneous.

12.1 Assignment. Neither Party may assign or otherwise transfer any of its rights or obligations under this Agreement to any third party without the prior written approval of the other Party, which consent shall not be unreasonably withheld, conditioned or delayed. Notwithstanding the foregoing, either Party may assign or transfer some or all of its rights and/or obligations under the Agreement to: (i) an Affiliate; (ii) a successor entity to its business, whether by merger, consolidation, reorganization, or by sale of all or substantially all of its assets or stock; (iii) any entity in which a Party or its Affiliates have any direct or indirect equity investment; and/or (iv) any other entity directly or indirectly controlling, controlled by or under common control with any of the foregoing, and in each case, such assignment, transfer or other such transaction shall not be considered an assignment under this Section 12.1 requiring consent and the non-assigning Party shall have no right to delay, alter or impede such assignment or transfer.

12.2 Rights Upon Sale of Property or Tower. Should Landlord, at any time during the Term, sell or transfer all or any part of the Property or the Tower to a purchaser other than Tenant, such transfer shall be subject to this Agreement and Landlord shall require any such purchaser or transferee to recognize Tenant's rights under the terms of this Agreement in a written instrument signed by Landlord and the third-party transferee. If Landlord completes any such transfer without executing such a written instrument, then Landlord shall not be released from its obligations to Tenant under this Agreement, and Tenant shall have the right to look to Landlord and the third party for the full performance of this Agreement

12.3 Condemnation. If all or any portion of the Premises is condemned, taken by a Governmental Authority or otherwise appropriated by the exercise of the right of eminent domain or a deed or conveyance in lieu of eminent domain (each, a "**Taking**"), either Party hereto shall have the right to terminate this Agreement immediately upon Notice to the other Party. If either Party elects to terminate this Agreement, the Rent set forth herein shall be abated, and Tenant's liability therefor will cease as of the date of such Taking, this Agreement shall terminate as of such date, and any prepaid rent shall be returned to Tenant. If this Agreement is not terminated as herein provided, then it shall continue in full force and effect, and Landlord shall, within a reasonable time after possession is physically taken by the condemning authority restore the remaining portion of the Premises to render it reasonably suitable for the uses permitted by this Agreement and the Rent shall be proportionately and equitably reduced. Notwithstanding the foregoing, Landlord shall not be obligated to expend an amount greater than the proceeds received from the condemning authority less all expenses reasonably incurred in connection therewith (including attorneys' fees) for the restoration. All compensation awarded in connection with a Taking shall be the property of Landlord, provided that if allowed under Applicable Law, Tenant may apply for and keep as its property a separate award for (i) the value of Tenant's leasehold interest; (ii) the value of Tenant's Equipment or other personal property of Tenant; (iii) Tenant's relocation expenses; and (iv) damages to Tenant's business incurred as a result of such Taking.

12.4 Recording. If requested by Tenant, Landlord and Tenant agree to execute a Memorandum of Lease that Tenant may record at Tenant's sole cost and expense.

12.5 Force Majeure. Notwithstanding anything to the contrary in this Agreement, neither Party shall be liable to the other Party for nonperformance or delay in performance of any of its obligations under this Agreement due to causes beyond its reasonable control, including, without limitation, acts of God, accidents, technical failure governmental restrictions, insurrections, riots, enemy act, war, fire, explosion, flood, windstorm, earthquake, natural disaster or other casualty (**"Force Majeure"**). Upon the occurrence of a Force Majeure condition, the affected Party shall immediately notify the other Party with as much detail as possible and shall promptly inform the other Party of any further developments. Immediately after the Force Majeure event is removed or abates, the affected Party shall perform such obligations with all due speed. Neither Party shall be deemed in default of this Agreement to the extent that a delay or other breach is due to or related to a Force Majeure event. A proportion of the Rent herein reserved, according to the extent that such Force Majeure event shall interfere with the full enjoyment and use of the Premises, shall be suspended and abated from the date of commencement of such Force Majeure event until the date that such Force Majeure event subsides. If such Force Majeure event prevents the affected Party from performing its obligations under this Agreement, in whole or in part, for a period of forty-five (45) or more days, then the other Party may terminate this Agreement immediately upon Notice to the affected Party.

12.6 Successors and Assigns. The respective rights and obligations provided in this Agreement shall bind and shall continue to apply for the benefit of the Parties hereto, their legal representative, heirs, successors and permitted assigns. No rights, however, shall continue to apply for the benefit of any assignee, unless such assignment was made in accordance with Section 12.1 of this Agreement.

12.7 Governing Law and Construction. This Agreement shall be construed, governed and enforced in accordance with the laws of the state in which the Premises is located. The section and paragraph headings contained in this Agreement are solely for reference purposes and shall not affect in any way the meaning or interpretation of this Agreement.

12.8 Severability. Each provision of this Agreement shall be construed as separable and divisible from every other provision and the enforceability of any one provision shall not limit the enforceability, in whole or in part, of any other provision. If a court or administrative body of competent jurisdiction holds any provision of this Agreement to be invalid, illegal, void or less than fully enforceable as to time, scope or otherwise, such provision shall be construed by limiting and reducing it so that such provision is valid, legal and fully enforceable while preserving to the greatest extent permissible the original intent of the parties; the remaining terms and conditions of this Agreement shall not be affected by such alteration, and shall remain in full force and effect.

12.9 Waiver; Remedies. It is agreed that, except as expressly set forth in this Agreement, the rights and remedies herein provided in case of Default or breach by either Landlord or Tenant are cumulative and shall not affect in any manner any other remedies that the non-breaching Party may have by reason of such default or breach. The exercise of any right or remedy herein provided shall be without prejudice to the right to exercise any other right or remedy provided herein, at law, in equity or otherwise. In addition to, and not in limitation of, the preceding, the Parties acknowledge and agree that there will not be an adequate remedy at law for noncompliance with the provisions of Section 5, and therefore either Party shall have the right to equitable remedies, including, without limitation, injunctive relief and specific performance.

12.10 Notice. All notices or requests that are required or permitted to be given pursuant to this Agreement must be given in writing by certified US mail (postage pre-paid) with return receipt requested or by courier service (charges prepaid), or solely in the case of notice to Landlord by email, to the party to be notified, addressed to such party at the address(es) or email address(es) set forth below, or such other address(es), email address(es) or fax number(s) as such Party may have substituted by written notice (given in accordance with this Section 12.10) to the other Party ("Notice"). The sending of such Notice to the proper email address (in the case of email transmission) or the receipt of such Notice (in the case of delivery by first-class certified mail or by courier service) will constitute the giving thereof.

If to be given to Landlord:	**If to be given to Tenant:**
Town of Westport	DISH Wireless L.L.C.
Attention First Selectwoman	Attn: Lease Administration
110 Myrtle Avenue	5701 South Santa Fe Dr.
Westport, CT 06880	Littleton, Colorado 80120

12.11 Entire Agreement. This Agreement sets forth the entire, final and complete understanding between the Parties hereto regarding the subject matter of this Agreement, and it supersedes and replaces all previous understandings or agreements, written, oral, or implied, regarding the subject matter of this Agreement made or existing before the date of this Agreement. Except as expressly provided by this Agreement, no waiver or modification of any of the terms or conditions of this Agreement shall be effective unless in writing and signed by both Parties. Any provision of this Agreement that logically would be expected to survive termination or expiration, shall survive for a reasonable time period under the circumstances, whether or not specifically provided in this Agreement.

12.12 Compliance with Law. Each Party shall, with respect to its actions and/or inactions pursuant to and in connection with this Agreement, comply with all applicable statutes, laws, rules, ordinances, codes and governmental or quasi-governmental orders or regulations (in each case, whether federal, state, local or otherwise) and all amendments thereto, now enacted or hereafter promulgated and in force during the term of this Agreement, a Renewal Term or any extension of either of the foregoing.

12.13 Counterparts. This Agreement may be executed in any number of identical counterparts and, if so executed, shall constitute one agreement, binding on all the Parties hereto, notwithstanding that all the Parties are not signatories to the original or the same counterpart. Execution of this Agreement by facsimile or electronic signature shall be effective to create a binding agreement and, if requested, Landlord and Tenant agree to exchange original signed counterparts in their possession.

12.14 Attorneys' Fees. If an action is brought by either Party for breach of any covenant and/or to enforce or interpret any provision of this Agreement, the prevailing Party shall be entitled to recover its costs, expenses and reasonable attorneys' fees, both at trial and on appeal, in addition to all other sums allowed by law.

12.15 Incorporation of Exhibits. All exhibits referenced herein and attached hereto are hereby incorporated herein in their entirety by this reference.

IN WITNESS WHEREOF, the Parties have caused their duly authorized representatives to execute this Agreement as of the Effective Date.

LANDLORD:	**TENANT:**
TOWN OF WESTPORT	**DISH WIRELESS L.L.C.**
By: _____	By: _____
Name: Jennifer S. Tooker	Name: Richard Leitao
Its: First Selectwoman	Its: VP, National Development

(Signature page to Site Lease Agreement)

EXHIBIT A

The Property is 515 Post Road East, Westport, CT, legally described as follows:

That certain parcel of land located in the Town of Westport, and described as follows: BEGINNING at a point on the northerly side of Post Road East (U.S.Route No.1) said point being 161.96 feet easterly of the southeasterly corner of property of Humble Oil and Refining Company, as measured along the northerly side of Post Road East; thence running in a northeasterly direction on a bearing of N-47-22-50 E a distance of 304.00 feet; thence running in a southeasterly direction on bearings of S19-30-30 E a distance of 93.52 feet; S 18-40-40 E a distance of 78.12 feet; S 20-54-50 E a distance of 40.14 feet; S 19-16-30 E a distance of 80.18 feet and S 21-36-10 E a distance of 39.71 feet to the northerly street line of Crescent Road; thence along the northerly street line of Crescent Road in a southwesterly direction on a bearing of S88-43-10 W for a distance of 143.42 feet; thence along an arc of curve to the right having a radius of 80.00 feet for a distance of 48.46 feet; thence in a northwesterly direction along the northerly street line of Post Road East on a bearing of N 56-34-30 W a distance of 175.12 feet to point or place of beginning. Said parcel contains an area of 1.278 acres (55,679 sq. ft.) and is shown and designated as Parcel "A" on a certain map entitled "Re-Subdivision Map of property prepared for Town of Westport on property of Dan Coppola a/k/a Donald J. Coppola, Westport, Connecticut, Scale 1"=40' July 28, 1979 Rev. to Sept. 17 1979 and certified by John T. Cahill, Registered Land Surveyor No. 5030.

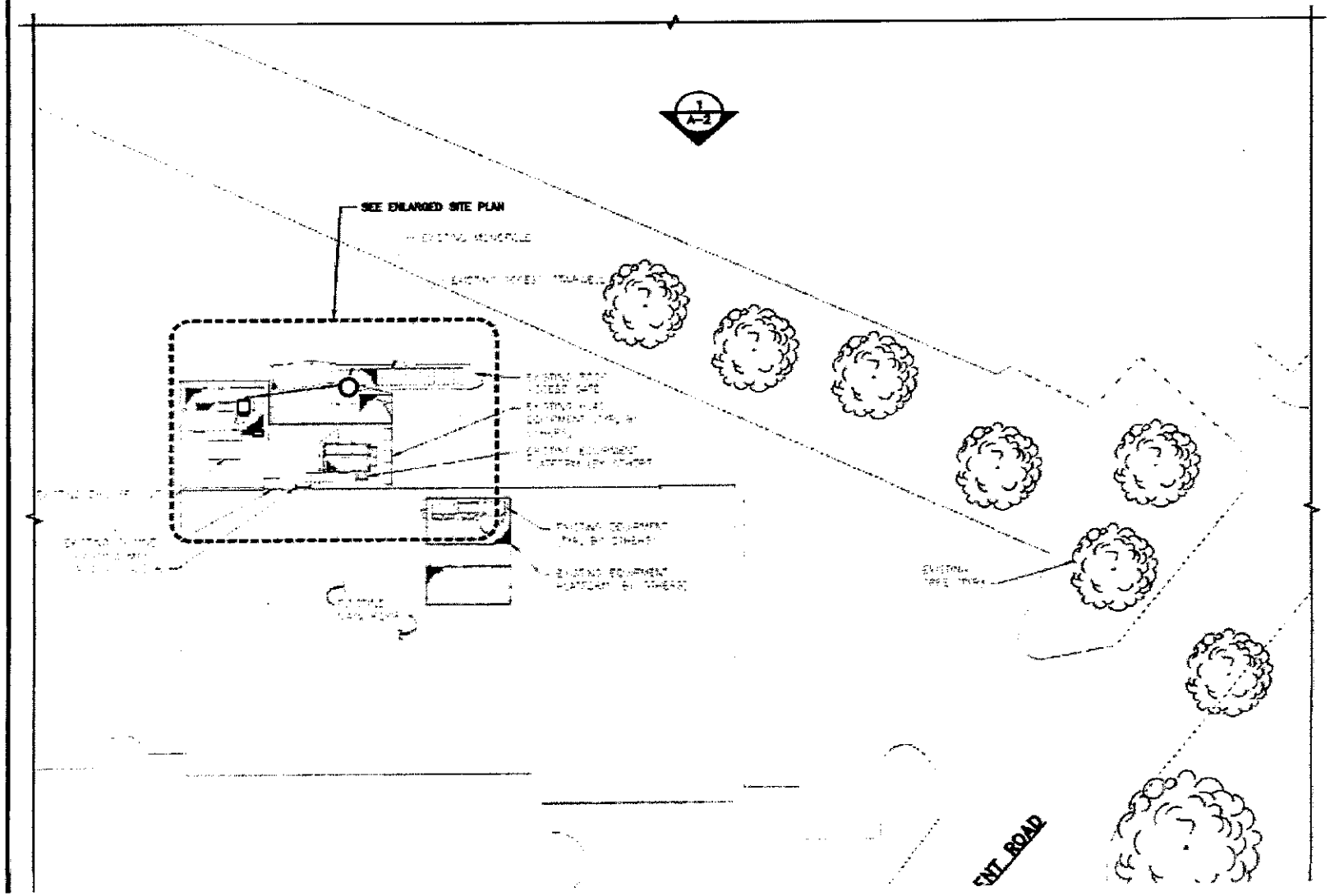
EXHIBIT B

SITE PLAN

[Attached]

NOTES

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.
3. REFER TO STRUCTURAL ANALYSIS DATED 09/24/21 PREPARED BY TECTONIC ENGINEERING.

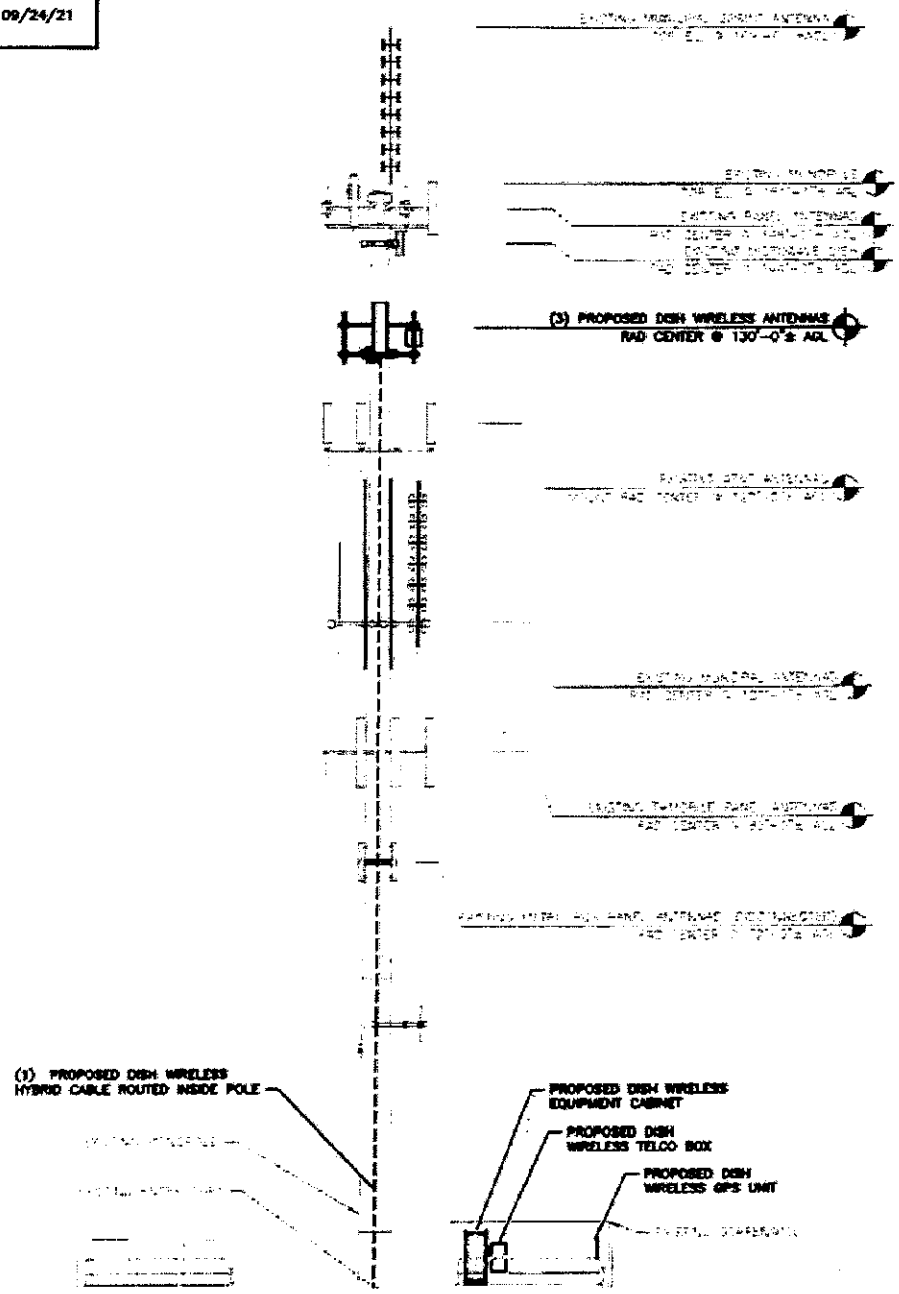


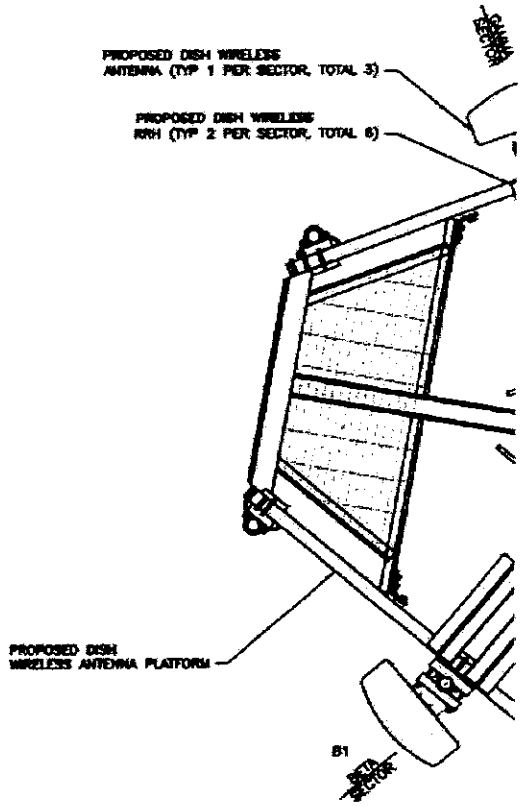
SEE SHEET

ENLARGE

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
4. REFER TO STRUCTURAL ANALYSIS DATED 09/24/21 PREPARED BY TECTONIC ENGINEERING.





N

ANTENNA LAYOUT

SECTOR POS.	ANTENNA				
	EXISTING OR PROPOSED	MANUFACTURER – MODEL NUMBER	TECH	AZIMUTH	
A1	PROPOSED	JMA – MX08FRO665-21	5G	100°	1
A2	—	—	—	—	
A3	—	—	—	—	
B1	PROPOSED	JMA – MX08FRO665-21	5G	230°	1

EXHIBIT C

TOWN OF WESTPORT

TELECOMMUNICATIONS FACILITY UPGRADE PROTOCOL

Revised May 25, 2017

A. All equipment upgrade submissions must comply with all applicable ordinances and regulations of the Town of Westport and all applicable regulations, rules, standards, requirements and conditions of the Connecticut Siting Council.

B. Initial written submission of Tenant's proposed equipment upgrades must be delivered to Town of Westport, 110 Myrtle Avenue, Westport, CT 06880, Attention: Town Attorney. The initial submission ("Initial Submission") must include:

(1) Copy of existing As-Built on file with Tenant, encompassing the telecommunications equipment that will be upgraded or changed in some manner;

(2) Drawings showing proposed equipment upgrades or changes and a detailed written scope of work including plans and specifications describing the proposed equipment upgrades or changes ("Scope of Work"); and

(3) Estimated construction schedule, detailing length of time for Tenant to perform construction work.

C. Upon review of the Initial Submission, the Landlord may make reasonable written requests for additional related documentation and/or modifications.

D. Upon receipt of a request under Paragraph C, Tenant shall supply the additional related documentation and/or make modifications to the Initial Submission, as reasonably requested by the Landlord.

E. A "Final Submittal" shall be made by the Tenant to the Landlord in the same manner described for the Initial Submission in Paragraph B. The Final Submittal shall include the following.

(1) Final plans and specifications for the proposed equipment changes, and a revised Scope of Work, if different from what was provided in the Initial Submission.

(2) A Radio-frequency (RF) emissions report by a licensed engineer or other qualified professional, if Tenant 's proposed upgrades or changes include the addition of new antennas, to show compliance with any existing equipment and FCC regulations regarding RF emissions.

(3) Final construction schedule, detailing the length of time for Tenant to perform the proposed work ("Construction Schedule").

(4) A deposit, in an amount not to exceed $5,000.00, to cover all reasonable costs incurred by Landlord related to the proposed work, including, but not limited to, expenses

incurred by the Landlord for the review of the drawings and Scope of Work by Landlord's staff or Landlord's outside engineering firm and any related supervision or inspection fees, regardless of whether the proposed upgrades or changes will involve work on the Tower, the ground, a roof or all of the above. Landlord shall access the deposit only pursuant to the terms set forth in Paragraph O below.

(5) If, after review, Landlord determines that the proposed upgrade will impact the structural integrity of the Tower or building, an appropriate engineering study will be undertaken. Landlord will provide Tenant with a written explanation of the reasons for the structural integrity study. The actual costs of the structural integrity study shall be paid by the Tenant. The study shall be performed by an engineer selected by the Landlord. Tenant will be responsible for the cost of any and all structural modifications or reinforcements of the Tower or the building that may be required in order to accommodate any new or modified equipment added by Tenant in connection with an upgrade. Tenant shall include any and all structural modifications and reinforcements in the Scope of Work and the Construction Schedule. Landlord shall have the right to deny authorization for any modifications to the building or Property that will, in the Landlord's judgment, materially interfere with operations of the Westport Fire Department or diminish the usable space within the building.

(6) If the proposed upgrades require additional ground space, rooftop space or Tower space or additional antennae or any other equipment to be added, the Landlord will be entitled to a reasonable increase in the rental fee due under the Lease. Tenant shall not start work until the Landlord and Tenant have agreed upon the amount of the rental fee increase. If the Landlord and Tenant are unable to reach agreement upon the amount of the rental fee increase, then Tenant shall not start work until the amount of the rental fee increase has been determined pursuant to Paragraph R.

F. Following the Final Submittal, the Landlord and Tenant will cooperate with each other in finalizing any further changes or modifications agreed upon by both parties.

G. Landlord's consent and/or approval of the proposed equipment upgrades or changes shall not be unreasonably withheld, conditioned, delayed or denied.

H. When the Final Submission is approved by the Landlord, the Landlord will deliver a written Notice to Proceed delineating the approved Scope of Work and Construction Schedule. The Notice to Proceed will set forth the name, phone number and email address of the agent or representative of the Landlord who Tenant should contact to coordinate the approved work and access to the site.

I. Tenant shall confirm the date and time that Tenant and its agents and representatives will perform the upgrade work and the names of the Tenant agents and/or representatives who will be entering the property to perform/supervise the work. Prior to accessing the Property to perform the upgrade work the Tenant shall provide a minimum of 48 hours' prior notice, by contacting the Landlord agent/representative referenced in Section 6.3, at the phone number and email address provided. The Landlord agent/representative will be reasonably available by phone during normal business hours and will not unreasonably delay Tenant's ability to access the property to perform the upgrade work. Once Tenant has notified the Landlord as indicated

above, the Landlord will provide access to Tenant in furtherance of the Notice to Proceed, within 48 hours.

J. The Landlord, its engineer and/or inspector may be on site to inspect the work and confirm compliance with the Notice to Proceed. Actual costs of inspection shall be paid by the Tenant within sixty (60) days of receipt of an invoice together with reasonable supporting documentation evidencing the costs.

K. The upgrade work shall take place during normal business hours (Monday through Friday 8:00 a.m. to 4:30 p.m.). No upgrade work shall be permitted on weekends or holidays recognized by the Town of Westport. Notwithstanding the foregoing, the Landlord will consider permitting work on weekends, holidays or outside of the aforementioned normal business hours, provided Tenant agrees to the full reimbursement for any actual, reasonable expenses associated with the time spent by Landlord's engineer or inspector monitoring the work, such expenses to be paid within sixty (60) days of receipt of an invoice together with reasonable supporting documentation evidencing the expenses.

L. Absent unforeseen and/or extenuating circumstances, Tenant shall have sixty (60) calendar days to complete construction/upgrades after the work has started. Construction will be deemed started when physical work at the site begins by Tenant.

M. Upon substantial completion of the work, Tenant shall submit to Landlord written notice indicating the substantial completion of the upgrades or changes to allow the Landlord to schedule an engineering inspection. Within thirty (30) days of the Landlord's receipt of Tenant's written notice of substantial completion, the Landlord shall submit to Tenant a written acceptance of the work or a reasonable punch list of items to be completed and/or addressed. Punch list items must be directly related to the Tenant's recently performed upgrades or changes and construction shall be deemed complete if a punch list is not submitted within the thirty (30) day period. Tenant shall use reasonable efforts to complete all punch list items within thirty (30) days of the receipt of the punch list. If the items on the punch list are not completed within said thirty (30) days, Landlord shall, upon ten (10) days' notice to Tenant, have the option of completing such items at Tenant's expense, provided that Landlord itemizes to Tenant all reasonable expenditures incurred and Tenant has not completed same following the ten (10) days' notice.

N. Once all work has been approved by Landlord or its engineer, Tenant shall submit at its cost and expense: (1) New As-Built drawings by an engineer or architect licensed in Connecticut, if the upgrade modifications are substantial, or new As-Built addendum report by an engineer or architect licensed in Connecticut to reflect minor upgrade modifications; and (2) Color photographs of the completed work.

O. The Landlord shall submit a final, detailed bill to Tenant detailing the time and work reasonably performed, within sixty (60) days after Tenant's completion of the work. Landlord may use the Deposit to pay such final bill. If the bill exceeds the Deposit, Tenant shall pay the excess within sixty (60) days after receipt of the bill. If the bill is less than the Deposit, a refund shall be made within sixty (60) days thereafter.

P. This Upgrade Protocol is applicable only to work where Tenant seeks to upgrade or modify its

existing equipment installation. It does not apply to: (1) maintenance or repair of any existing equipment; and (2) replacement of broken or non-functioning equipment with like kind or similar equipment.

Q. To the extent that any proposed upgrade work at the site is relatively minor and has little impact on the site, the Lessor may waive some or all of the formalities of this Upgrade Protocol provided that any such waiver must be in writing.

R. If Landlord and Tenant are unable to reach agreement upon the amount of a rental fee increase due under Paragraph E(6), then the amount of the rental fee increase shall be determined as follows.

(1) Negotiation. First, representatives of Tenant and Landlord shall meet either alone or together with their respective advisors, in the spirit of good faith, to attempt to negotiate a resolution of the dispute by mutual agreement in writing.

(2) Arbitration. If Landlord and Tenant are unable to resolve the dispute by mutual agreement under Paragraph R(1) within two (2) weeks following the initiation of negotiations between the parties thereunder, then, upon demand of either Landlord or Tenant, the dispute shall be submitted to binding arbitration in accordance with the Commercial Arbitration Rules of the American Arbitration Association (the "Commercial Arbitration Rules"). The parties may agree upon one (1) arbitrator. If they cannot so agree within two (2) weeks following demand for arbitration, then each party shall select an arbitrator, and the arbitrators so selected shall select a third arbitrator (the "Deciding Arbitrator"), and the decision of the Deciding Arbitrator shall be binding and conclusive. If either party refuses or fails to join in the appointment of an arbitrator, an arbitrator shall be appointed in accordance with the Commercial Arbitration Rules. All arbitration hearings shall take place in Fairfield County, Connecticut.

(3) Controls Over Statutes and Regulations. Landlord and Tenant agree that the method of determining the rental fee increase under this Paragraph R shall apply as between them in lieu of any applicable mechanism prescribed under the statutes or regulations of the State of Connecticut, including, without limitation CGS Section 16-50aa(d)(1). Landlord and Tenant waive the right to proceed under CGS Section 16-50aa(d)(1) in connection with the determination of the rental fee increase due under Paragraph E(6).

Exhibit D

List of Equipment to be Removed

[Attached]

203-341-5044
Voice

Westport Fire Headquarters Antenna Removal 02-21-2022

RADIO SYSTEM	FREQ.	HEIGHT	MANUFACTURER	ANT. TYPE	MODEL NUMBER	GAIN	CABLE TYPE	CABLE LENTH	CONN. ANT. END	CONN. RADIO END	JUMPER	COLOR CODE
WESTPORT FIRE UHF F1	460.625	150'	Decible Products	Dipole	DB420D	6.6 DB	7/8" LDF5-50A	250'	N-FEMALE	N-MALE	N/A	WHITE
WESTPORT FIRE UHF F2	460.575	150'	Decible Products	Dipole	DB420D	6.6 DB	7/8" LDF5-50A	250'	N-FEMALE	N-MALE	N/A	WHITE/WHITE
WESTPORT POLICE	855.7125	100'	Celwave	Stick	PD1110	9 DB	7/8" LDF5-50A	180'	N-FEMALE	N-MALE	3' NM-NM	VIOLET
RECREATION	458.775	100'	Celwave	Stick	PD201	5 DB	7/8" LDF5-50A	180'	N-FEMALE	N-MALE	3' NM-NM	BLUE/RED
STATION MONITOR	460.625	100'	Celwave	Stick	PD201	5 DB	7/8" LDF5-50A	180'	N-FEMALE	N-MALE	3' NM-NM	GREEN/ORANGE
SPARE		100'					7/8" LDF5-50A	180'	N-FEMALE	N-MALE		GREEN/RED
WESTPORT EMS	155.355	100'	Celwave	Stick	PD220	5.25 DB	1/2" LDF4-50A	180'	N-MALE	N-MALE	N/A	YELLOW
WESTPORT EMERG. MANG.	39.5	100'	Celwave	Stick	DB205	Unity	1/2" LDF4-50A/RG-8U	180'	UHF-MALE	UHF- FEMALE	N/A	WHITE
WESTPORT PUBLIC WORKS	45.74	100'	Celwave	Stick	PD83	Unity	1/2" LDF4-50A/RG-8U	115'	UHF-MALE	UHF-FEMALE	N/A	YELLOW/WHITE
COUNTY FIRE	33.86	100'	Celwave	Stick	PD83	Unity	1/2" LDF4-50A/RG-8U	115'	UHF-MALE	UHF-FEMALE	N/A	BROWN
STATE WIDE FIRE	46.16	100'	Celwave	Stick	PD83	Unity	1/2" LDF4-50A/RG-8U	115'	UHF-MALE	UHF-FEMALE	N/A	BLUE
AREA #1 STATE CP	155.775	100'	Decible Product	Yagi	DB230	7 DB	1/2" LDF4-50A/RG-8U	115'	N-FEMALE	UHF-FEMALE	N/A	RED/WHITE
ARDIS	855.0125	100'	Sinclair	stick	SC-421	5 DB	7/8" LDF5-50A	150'	N-FEMALE	N-FEMALE	6' NM-NM	YELLOW/ORANGE
ARDIS	855.8375	100'	sinclair	stick	SC-421	5 DB	7/8" LDF5-50A	150'	N-FEMALE	N-FEMALE	6' NM-NM	YELLOW/BROWN
CSU SCANNER	RECEIVE	50'	Channel Master	Monitor	5094A	N/A	RG-8	140'	UHF-MALE	UHF-MALE	N/A	BLUE/WHITE
SCANNER/ WEATHER ALERT	RECEIVE	50'	Channel Master	Monitor	5094A	N/A	RG-8	200'	UHF-MALE	UHF-MALE	N/A	
WESTPORT PD CONTROL STA.	810.7125	BUILDING	Decible Product	Yagi	DB493-K	6 DB	1/2" LDF4-50A	120'	N-MALE	N-MALE	N/A	RED
NORWALK FD CONTROL STA.	153.89	BUILDING	Decible Product	Yagi	DB230	7 DB	1/2" LDF4-50A/RG-8U	120'	N-FEMALE	UHF-MALE	N/A	VIOLET
FAIRFIELD FD CONTROL STA.	465.6	BUILDING	Celwave	Stick	PD455	10 db	1/2" LDF4-50A/RG-8U	120'	N-MALE	UHF-MALE	N/A	GREEN
TALK ALARM	166.25	BUILDING	Celwave	Dipole	PD340	6 DB	1/2" LDF4-50A	120'	N-MALE	UHF-MALE	N/A	ORANGE
COAST GUARD	VHF	BUILDING	Celwave	Dipole	PD340	6 DB	1/2" LDF4-50A/RG-8U	200'	N-MALE	UHF MALE	N/A	VIOLET/ORANGE
NETCLOCK GPS	GPS	BUILDING	Spectracomm	GPS			RG-213	100'	N-MALE	N-MALE	N/A	RED/VIOLET

Remove 3' Microwave Dish at 145' elevation
Remove Highlighted antennas at 100' elevation
~~Remove Metro PCS antennas at 80' elevation~~

Note: The Town will reach out to T-Mobile about these antennas. DISH Network may disregard this.

Prepared by
Eric Fine

HSG

Exhibit G

Mailing Receipts

FROM:
LEV MAYZLER
(203) 488-0712
CONSTRUCTION SERVICES OF BRANF
63-3 NORTH BRANFORD ROAD
BRANFORD CT 06405-2848

LTR 1 OF 1

SHIP TO:

PLANNING & ZONING DIR.
MS. MARY YOUNG
ROOM 203
110 MYRTLE AVE.
WESTPORT CT 06880

CT 066 9-02

UPS 2ND DAY AIR **2**
TRACKING #: 1Z E05 345 02 6134 8982

BILLING: P/P

WS 22.0.17 SHARP MX-3070 02.0A 01/2023

Fold here and place in label pouch

Proof of Delivery

Dear Customer,

This notice serves as proof of delivery for the shipment listed below.

Tracking Number

1ZE053450261348982

Service

UPS 2nd Day Air®

Delivered On

01/24/2023 10:06 A.M.

Delivered To

WESTPORT TOWN
110 MYRTLE AVE
WESTPORT, CT, 06880, US

Received By

PAUL

Left At

Inside Delivery

Please print for your records as photo and details are only available for a limited time.

Sincerely,

UPS

Tracking results provided by UPS: 01/30/2023 7:10 A.M. EST

LTR 1 OF 1

FROM:
LEV MAYZLER
(203) 488-0712
CONSTRUCTION SERVICES OF BRANF
63-3 NORTH BRANFORD ROAD
BRANFORD CT 06405-2848

SHIP TO:

FIRST SELECTWOMAN
HON. JENNIFER TOOKER
ROOM 310
110 MYRTLE AVE.
WESTPORT CT 06880

CT 066 9-02

UPS 2ND DAY AIR **2**
TRACKING #: 1Z E05 345 02 6335 7174

BILLING: P/P

WS 22.0.17 SHARP MX-3070 02.0A 01/2023

Fold here and place in label pouch

Proof of Delivery

Dear Customer,

This notice serves as proof of delivery for the shipment listed below.

Tracking Number
1ZE053450263357174

Service

UPS 2nd Day Air®

Delivered On

01/24/2023 10:06 A.M.

Delivered To
WESTPORT TOWN
110 MYRTLE AVE
WESTPORT, CT, 06880, US
Received By

PAUL

Left At
Inside Delivery

Please print for your records as photo and details are only available for a limited time.

Sincerely,

UPS

Tracking results provided by UPS: 01/30/2023 7:12 A.M. EST