



Tower Engineering Solutions

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**REVIEWED
FOR
CODE
COMPLIANCE
11/16/2021**

Structural Analysis Report

Existing 140 ft Valmont Self Supporting Tower

Customer Name: SBA Communications Corp

Customer Site Number: CO09874-A

Customer Site Name: Hayden 2, CO

Carrier Name: UNION TELEPHONE COMPANY (App#: 141829, V4)

Carrier Site ID / Name: 59 / Hayden

Site Location: 6985 Homesteader Lane

Hayden, Colorado

Routt County

Latitude: 40.520863

Longitude: -107.297072

Exp.10/31/2021



Analysis Result:

Max Structural Usage: 63.7% [Pass]

Max Foundation Usage: 54.4% [Pass]

Additional Usage Caused by New Mount: +1.0%

09/24/2021

Report Prepared By: Younus Alkarawi



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Introduction

The purpose of this report is to summarize the analysis results on the 140 ft Valmont Self Supporting Tower to support the proposed antennas and transmission lines in addition to those currently installed. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

Sources of Information

Tower Drawings	Valmont, Job # 18286-05, dated 6/24/05
Foundation Drawing	Not Available
Geotechnical Report	NWCC, Job # 99-4132, dated 9/15/99
Modification Drawings	N/A
Mount Analysis	N/A

Analysis Criteria

The feasibility analysis was performed in accordance with the requirements and stipulations of the TIA-222-H. In accordance with this standard, the structure was analyzed using **TESTowers**, a proprietary analysis software. The program considers the structure as an elastic 3-D model with second-order effects and temperature effects incorporated in the analysis. The analysis was performed using multiple wind directions.

Wind Speed Used in the Analysis:	105.0 mph (3-Sec. Gust) (Ultimate wind speed)
Wind Speed with Ice:	50 mph (3-Sec. Gust) with 1/4" radial ice concurrent
Service Load Wind Speed:	60 mph + 0" Radial ice
Standard/Codes:	TIA-222-H / 2018 IBC
Exposure Category:	C
Risk Category:	II
Topographic Category:	1
Crest Height:	0 ft
Seismic Parameters:	$S_S = 0.394$, $S_1 = 0.084$

This structural analysis is based upon the tower being classified as a Risk Category II; however, if a different classification is required subsequent to the date hereof, the tower classification will be changed to meet such requirement and a new structural analysis will be run.

Existing Antennas, Mounts and Transmission Lines

The table below summarizes the antennas, mounts and transmission lines that were considered in the analysis as existing on the tower.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	145.0	2	Db System Inc 5100A Antenna	(2) Connect- it HS6 Mount @ 138' elevation	(2) 1-5/8" Coax	Harris Corp
2	80' to 137'	1	6-Bay FM	Side Arm	(2) 3"	Always Mountain Time
3		1	6-Bay FM			
4	85.0	1	6 ft Dish w/Radome	Pipe	(1) EW63	UBET Wireless
5	70.0	2	42"x8.5"x7.5" Panel	Sector Frame	(2) 1 5/8"	NC Telecom, Inc
6	62.0	1	Electric Supply 22" x 20" x 8" Junction Box	Leg	-	Zirkel Wireless
7	61.0	1	Motorola 9000APF - Panel	(3) Sector Frame	(3) 2" Conduit (Each conduit housing (13) CAT5 cables)	
8	60.0	2	Cambium Networks 5GHZ PMP 450			
9		1	Cambium Networks 3GHz PMP 450			
10	60.0	2	72" x 12" Panel	Leg	-	UBET Wireless
-	57.0	2	800 10634 - Panel	Leg	(2) 7/8"	Union Telephone
-	56.0	2	800 10634 - Panel	Leg	(2) 7/8"	
-	53.0	2	800 10634 - Panel	Leg	(2) 7/8"	
16	56.0	6	Commscope NNH4-65C-R6-V3-panel	(6) Rosenberg D218RRDSM	(3) 20.44 mm DC (1) 10 mm Fiber	AT&T
17		1	Raycap DC9-48-60-24-8C-EV- OVP			
18	55.0	6	Nokia AHLBA 4T4R B12/B14 320W-RRU			
19		6	Nokia AHFIB 4T4R B25/B66 320W-RRU			
20	42.0	1	6 ft Dish w/Radome - Dish	Pipe	(1) EW63	UBET Wireless
21	37.0	1	2 Bay FM	Leg	(1) 1/2"	Always Mountain Time
22	34.0	1	4 ft Dish	Pipe	(1) 1/2"	Fones West Digital
23	30.0	1	4 ft Dish	Pipe	(1) 1/2"	
24	30.0	1	6 ft Grid Dish		(1) 7/8"	Always Mountain Time
25	28.0	1	Radiowave SPR-5-8NS - Dish	Pipe	(1) 1 1/4"	Union Telephone
26	25.0	1	3 ft Dish	Pipe	(1) 1/2"	Fones West Digital
27	23.0	1	3 ft Dish	Pipe	(1) 1/2"	
28	23.0	1	Dragonwave A-ANT-11G-4-C - Dish	Pipe	-	Zirkel Wireless
29		1	Dragonwave A-ANT-11G-3-C - Dish			
30	22.0	1	Cambium Networks 11 GHZ PTP820S	Valmont R5 Universal	-	
31	21.0	1	Saf Tehnika 11 GHz Integra-S	Leg	-	
32	19.0	1	Dragonwave 23 GHz Horizon Compact	Leg	-	
33		1	WB Manufacuring OSF-R2-23C - Dish	Leg	-	
34	17.0	3	Motorola 2450AP - Panel	Pipe	-	
35		8	Cambium Networks 5GHZ PMP 450	(3) McCown Technology M-TOW-3P-38 (Sector Mount)	-	
36		1	Cambium Networks 3GHz PMP 450		-	
37		1	Electric Supply 22" x 20" x 8" Junction Box		-	

Existing Antennas, Mounts and Transmission Lines

The table below summarizes the antennas, mounts and transmission lines that were considered in the analysis as existing on the tower.

-	13.0	1	HPX8-65-P6A - Dish	Pipe	(2) EW63	Union Telephone
-	12.0	1	HP6-107-PGA - Dish	Pipe	(1) EW90	
41	10.0	1	1' Yagi	Leg	(1) 1/2"	Always Mountain Time
42	10.0	2	Cambium Networks GPS	Leg	-	Zirkel Wireless

Proposed Carrier's Final Configuration of Antennas, Mounts and Transmission Lines

Information pertaining to the proposed carrier's final configuration of antennas and transmission lines was provided by SBA Communications Corp. The proposed antennas and lines are listed below.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	78.0	12	HUAWEI RRU 3252 -	(3) Sector frames VFA10-HD @73'	(1) 10 mm Fiber (3) 32.3mm DC Power	UNION TELEPHONE COMP
2	76.0	1	Rosenberg PR-UWPT612-xxxxft			
3	75.0	6	EPBQ-654L8H*-L2-EPI - Panel			
4	72.0	2	Rosenberg PR-UWPT612-xxxxft			
5	53.0	1	Rosenberg FB-L98B-A0303-xxx -	(3) Sector frames VFA12-HD @55'		
6	15.0	2	RFU-C - TMA/TTA	Pipe	(2) EW63 (2) 1/2"	
7	13.0	1	HPX8-65-P6A - Dish	Pipe		
8	12.0	1	USX6-6W - Dish	Pipe		
9	10.0	1	GPS-TMG-40N	Pipe		

See the attached coax layout for the line placement considered in the analysis.

Analysis Results

The results of the structural analysis, performed for the wind and ice loading and antenna equipment as defined above, are summarized as the following:

Tower Component	Legs	Diagonals	Horizontals
Max. Usage:	41.9%	63.7%	2.3%
Pass/Fail	Pass	Pass	Pass

Foundations

	Compression (Kips)	Uplift (Kips)	Shear (Kips)
Original Design Reactions	176.4	164.1	20.3
Analysis Reactions	114.0	91.3	14.9
Factored Reactions*	238.1	221.5	27.4
% of Design Reactions	47.9%	41.2%	54.4%

* Per section 15.6.2 of the TIA-222-H standard, factored reactions were obtained by multiplying a 1.35 factor to the original design reactions.

No foundation drawing is available for the analysis of the existing foundation. Since the reactions calculated from the current analysis are less than those indicated on the original structural design drawing, the foundations are assumed to be adequate to resist the reactions from the current analysis.

Service Load Condition (Rigidity):

The maximum twist and sway of the microwave dishes under the operational wind speed as specified in the Analysis Criteria are listed in the table below:

Elevation (ft)	Antenna / Dish	Carrier	Twist (deg)	Sway (deg)
85.0	6 ft Dish w/Radome - Dish	UBET Wireless	0.027	0.085
42.0	6 ft Dish w/Radome - Dish	UBET Wireless	0.009	0.055
34.0	4 ft Std Dish - Dish	Fones West Digital	0.010	0.057
30.0	4 ft Std Dish - Dish	Fones West Digital	0.003	0.034
30.0	6 ft Grid Dish - Dish	Always Mountain Time	0.003	0.034
25.0	3 ft Std Dish - Dish	Fones West Digital	0.003	0.034
23.0	3 ft Std Dish - Dish	Fones West Digital	0.003	0.034
23.0	A-ANT-11G-4-C - Dish	Zirkel Wireless	0.003	0.034
23.0	A-ANT-11G-3-C - Dish	Zirkel Wireless	0.003	0.034
19.0	OSF-R2-23C - Dish	Zirkel Wireless	0.003	0.035
13.0	HPX8-65-P6A - Dish	UNION TELEPHONE COMP	0.003	0.035
12.0	USX6-6W - Dish	UNION TELEPHONE COMP	0.003	0.035

It is recommended that the carriers review the twist and sway values of the microwave dishes.

Conclusions

Based on the analysis results, the existing structure and its foundation were found to be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the TIA-222 Standard under the design basic wind speed as specified in the Analysis Criteria.

Standard Conditions

1. This analysis was performed based on the information supplied to **(TES) Tower Engineering Solutions, LLC**. Verification of the information provided was not included in the Scope of Work for **TES**. The accuracy of the analysis is dependent on the accuracy of the information provided.
2. The structural analysis was performance based upon the evidence available at the time of this report. All information provided by the client is considered to be accurate.
3. The analyses will be performed based on the codes as specified by the client or based on the best knowledge of the engineering staff of **TES**. In the absence of information to the contrary, all work will be performed in accordance with the latest relevant revision of ANSI/TIA-222. If wind speed and/or ice loads are different from the minimum values recommended by the ANSI/TIA-222 standard or other codes, **TES** should be notified in writing and the applicable minimum values provided by the client.
4. The configuration of the existing mounts, antennas, coax and other appurtenances were supplied by the customer for the current structural analysis. **TES** has not visited the tower site to verify the adequacy of the information provided. If there is any discrepancy found in the report regarding the existing conditions, **TES** should be notified immediately to evaluate the effect of the discrepancy on the analysis results.
5. The client will assume responsibility for rework associated with the differences in initially provided information, including tower and foundation information, existing and/or proposed equipment and transmission lines.
6. If a feasibility analysis was performed, final acceptance of changed conditions shall be based upon a rigorous structural analysis.

Structure: CO09874-A-SBA

Site Name: Hayden 2, CO

Code: EIA/TIA-222-H

9/24/2021

Type: Self Support

Base Shape: Triangle

Basic WS: 105.00

Height: 140.00 (ft)

Base Width: 17.00

Basic Ice WS: 50.00

Base Elev: 0.00 (ft)

Top Width: 5.00

Operational WS: 60.00

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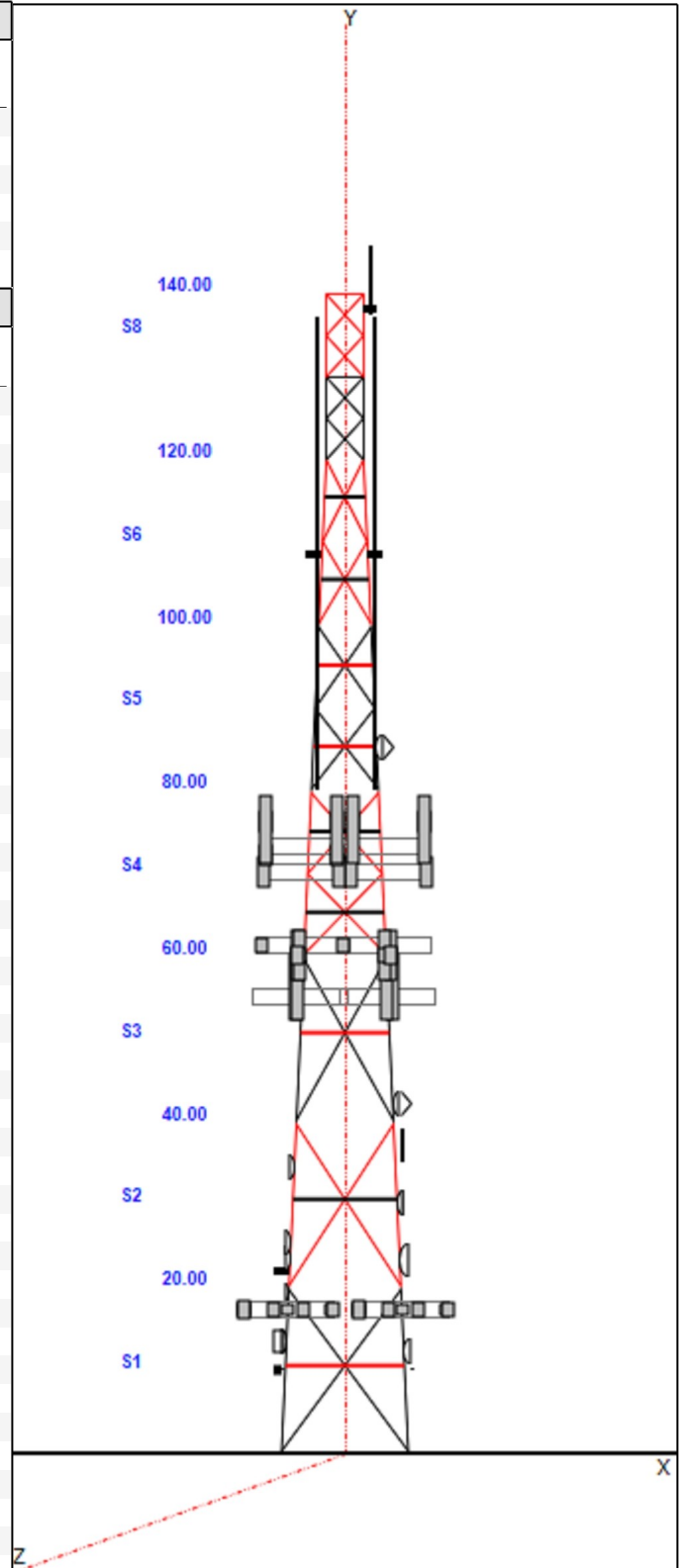


Section Properties

Sect	Leg Members	Diagonal Members	Horizontal Members
1	PST 8" DIA PIPE	PST 2-1/2" DIA PIPE	
2-3	PST 6" DIA PIPE	PST 2-1/2" DIA PIPE	
4	PST 5" DIA PIPE	PST 1-1/2" DIA PIPE	
5	PST 4" DIA PIPE	PST 1-1/2" DIA PIPE	
6	PST 3-1/2" DIA PIPE	PST 1-1/2" DIA PIPE	
7-8	PST 2-1/2" DIA PIPE	SAE 1.75X1.75X0.1875	SAE 2X2X0.1875

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description
138.00	141.30	2	5100A
138.00	138.00	2	Side Arm (L. Heavy)
108.50	108.50	1	6-Bay FM
108.50	108.50	1	6-Bay FM
108.50	108.50	2	Side Arm
85.00	85.00	1	6 ft Dish w/Radome
85.00	85.00	1	Pipe Mount
73.00	75.00	6	EPBQ-654L8H*-L2-EPI
73.00	73.00	1	(3) VFA10-HD
73.00	78.00	12	HUAWEI RRU 3252
73.00	76.00	2	Rosenberg PR-UWPT612-xxxxft
73.00	72.00	1	Rosenberg PR-UWPT612-xxxxft
70.00	70.00	1	Sector Frame
70.00	70.00	2	42"x8.5"x7.5" Panel
62.00	62.00	1	22" x 20" x 8" Junction Box
61.00	61.00	1	24" x 20" x 8" Pipe Mount
61.00	61.00	3	Sector Frame
61.00	61.00	1	9000APF
60.00	60.00	2	5GHZ PMP 450
60.00	60.00	2	72" x 12" Panel
60.00	60.00	1	3GHz PMP 450
56.00	56.00	6	NNH4-65C-R6
56.00	56.00	1	DC9-48-60-24-8C-EV
55.00	53.00	1	Rosenberg FB-L98B-A0303-xxx
55.00	55.00	6	AHLBA 4T4R B12/B14 320W
55.00	55.00	6	AirScale Dual RRH 4T4R B25/66
55.00	55.00	1	(6) Rosenberg D218RRDSM
55.00	55.00	3	VFA12-HD
42.00	42.00	1	6 ft Dish w/Radome
42.00	42.00	1	Pipe Mount
37.00	37.00	1	2 Bay FM
34.00	34.00	1	Pipe Mount
34.00	34.00	1	4 ft Std Dish
30.00	30.00	1	4 ft Std Dish
30.00	30.00	1	6 ft Grid Dish
30.00	30.00	2	Pipe Mount
28.00	28.00	1	Pipe Mount
25.00	25.00	1	Pipe Mount
25.00	25.00	1	3 ft Std Dish
23.00	23.00	1	3 ft Std Dish
23.00	23.00	1	Pipe Mount
23.00	23.00	1	A-ANT-11G-4-C
23.00	23.00	1	Pipe Mount



Structure: CO09874-A-SBA

Site Name: Hayden 2, CO

Code: EIA/TIA-222-H

9/24/2021

Type: Self Support

Base Shape: Triangle

Basic WS: 105.00

Height: 140.00 (ft)

Base Width: 17.00

Basic Ice WS: 50.00

Base Elev: 0.00 (ft)

Top Width: 5.00

Operational WS: 60.00

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23.00	23.00	1	A-ANT-11G-3-C
22.00	22.00	1	11 GHZ PTP820S
22.00	22.00	1	Valmont R5 Universal Stand-Off
21.00	21.00	1	11 GHZ Integra-S
19.00	19.00	1	23 GHZ Horizon Compact
19.00	19.00	1	OSF-R2-23C
17.00	17.00	1	3GHz PMP 450
17.00	17.00	3	McCown Technology M-TOW-3P-38
17.00	17.00	8	5GHZ PMP 450
17.00	17.00	3	2450AP
17.00	17.00	1	22" x 20" x 8" Junction Box
15.00	15.00	2	RFU-C
13.00	13.00	1	Pipe Mount
13.00	13.00	1	HPX8-65-P6A
12.00	12.00	1	USX6-6W
12.00	12.00	1	Pipe Mount
10.00	10.00	1	1' Yagi
10.00	10.00	1	GPS-TMG-SP-40N
10.00	10.00	2	Cambium Networks GPS

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Qty	Description
0.00	140.00	1	Climbing Ladder
0.00	140.00	1	Safety Cable
0.00	138.00	2	1 5/8" Coax
0.00	138.00	1	W/G Ladder
0.00	108.50	2	3" Coax
0.00	90.00	1	W/G Ladder
0.00	85.00	1	EW63
0.00	61.00	3	2" Conduit
0.00	56.00	1	10 mm Fiber
0.00	56.00	3	20.44 mm DC
0.00	55.00	1	10 mm Fiber
0.00	55.00	3	32.2" DC Power
0.00	42.00	1	EW63
0.00	37.00	1	1/2" Coax
0.00	34.00	1	1/2" Coax
0.00	30.00	1	1/2" Coax
0.00	30.00	1	7/8" Coax
0.00	28.00	1	1 1/4" Coax
0.00	25.00	1	1/2" Coax
0.00	23.00	1	1/2" Coax
0.00	13.00	2	EW63
0.00	12.00	2	1/2" Coax
0.00	10.00	1	1/2" Coax

Base Reactions

Leg	Overtuning
Max Uplift: -91.26 (kips)	Moment: 1503.25 (ft-kips)
Max Down: 113.96 (kips)	Total Down: 35.58 (kips)
Max Shear: 14.92 (kips)	Total Shear: 23.66 (kips)

Structure: CO09874-A-SBA

Site Name: Hayden 2, CO

Type: Self Support

Height: 140.00 (ft)

Base Elev: 0.00 (ft)

Base Shape: Triangle

Base Width: 17.00

Top Width: 5.00

Code: EIA/TIA-222-H

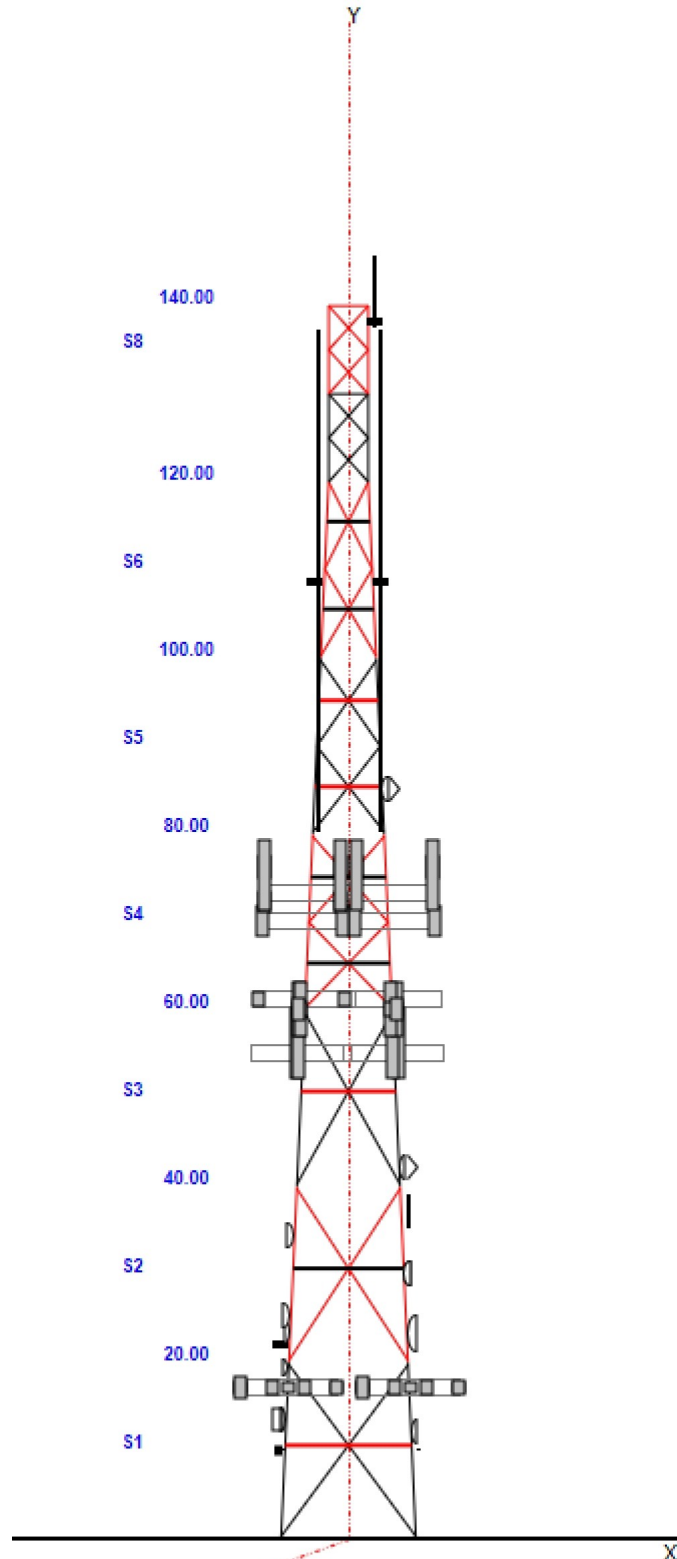
Basic WS: 105.00

Basic Ice WS: 50.00

Operational WS: 60.00

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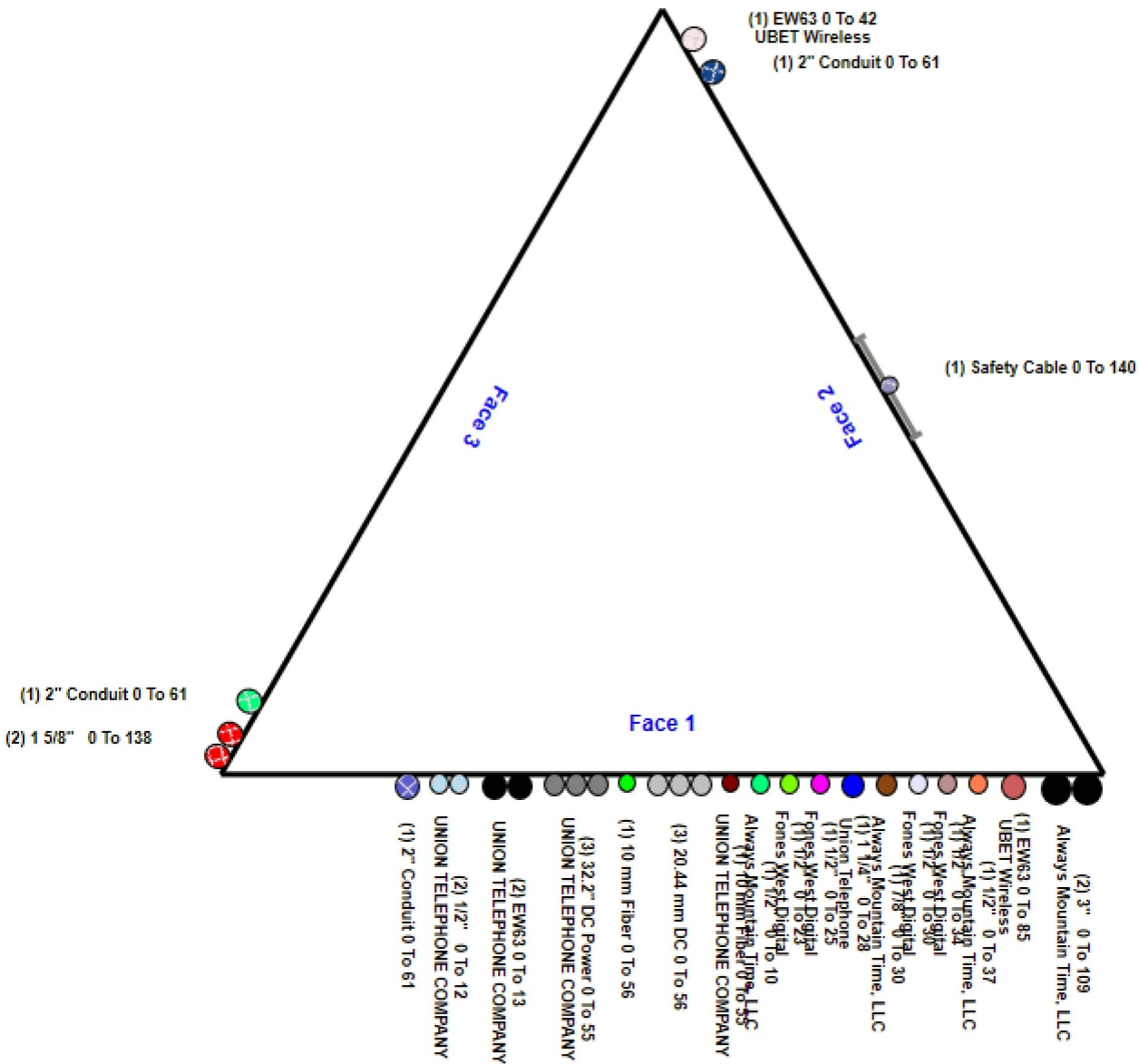
Structure: CO09874-A-SBA - Coax Line Placement

Type: Self Support
Site Name: Hayden 2, CO
Height: 140.00 (ft)

9/24/2021



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Loading Summary

Structure: CO09874-A-SBA	Code: EIA/TIA-222-H	9/24/2021
Site Name: Hayden 2, CO	Exposure: C	
Height: 140.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 0.85	Topography: 1	Struct Class: II
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Discrete Appurtenances Properties

Attach Elev (ft)	Description	Qty	No Ice		Ice		Len (in)	Width (in)	Depth (in)	Ka	Orientation Factor	Vert Ecc (ft)
			Weight (lb)	CaAa (sf)	Weight (lb)	CaAa (sf)						
138.00	5100A	2	22.00	2.590	41.05	2.822	100.000	3.660	3.660	1.00	1.00	3.300
138.00	Side Arm (L. Heavy)	2	120.00	4.500	137.27	5.365	0.000	0.000	0.000	1.00	1.00	0.000
108.50	6-Bay FM	1	928.00	44.810	1137.66	51.684	384.000	0.000	0.000	1.00	1.00	0.000
108.50	6-Bay FM	1	928.00	44.810	1137.66	51.684	384.000	0.000	0.000	1.00	1.00	0.000
108.50	Side Arm	2	160.00	6.000	182.56	7.130	0.000	0.000	0.000	1.00	1.00	0.000
85.00	6 ft Dish w/Radome	1	162.00	24.410	249.89	24.786	0.000	0.000	0.000	1.00	1.00	0.000
85.00	Pipe Mount	1	50.00	2.000	56.63	2.221	0.000	0.000	0.000	1.00	1.00	0.000
73.00	EPBQ-654L8H*-L2-EPI	6	87.90	18.090	145.43	18.377	96.000	21.000	6.300	0.80	0.70	2.000
73.00	(3) VFA10-HD	1	2007.0	44.700	2309.92	53.374	0.000	0.000	0.000	0.75	1.00	0.000
73.00	HUAWEI RRU 3252	12	33.00	1.800	39.24	1.949	16.000	11.600	5.000	0.80	0.67	5.000
73.00	Rosenberg PR-UWPT612-xxxxft	2	13.50	2.060	25.61	2.203	28.800	8.300	11.000	0.90	1.16	3.000
73.00	Rosenberg PR-UWPT612-xxxxft	1	13.50	2.060	25.61	2.203	28.800	8.300	11.000	1.00	1.00	-1.000
70.00	Sector Frame	1	300.00	10.000	336.22	10.776	0.000	0.000	0.000	1.00	1.00	0.000
70.00	42"x8.5"x7.5" Panel	2	15.00	3.300	28.40	3.361	42.000	8.500	7.500	1.00	1.00	0.000
62.00	22" x 20" x 8" Junction Box	1	15.00	4.270	17.71	4.495	8.000	20.000	22.000	1.00	1.00	0.000
61.00	24" x 20" x 8" Pipe Mount	1	49.00	4.000	55.60	4.720	0.000	0.000	0.000	1.00	1.00	0.000
61.00	Sector Frame	3	450.00	14.000	504.34	15.087	0.000	0.000	0.000	0.75	0.75	0.000
61.00	9000APF	1	12.50	1.950	19.85	2.096	19.500	12.000	4.800	0.80	1.00	0.000
60.00	5GHZ PMP 450	2	11.00	1.030	15.50	1.093	20.000	6.000	5.000	1.00	1.00	0.000
60.00	72" x 12" Panel	2	45.00	8.160	69.65	8.579	72.000	12.000	6.000	1.00	1.00	0.000
60.00	3GHz PMP 450	1	11.00	1.300	15.19	1.374	28.000	5.000	2.700	1.00	1.00	0.000
56.00	NNH4-65C-R6	6	150.58	17.070	198.68	17.330	96.000	19.600	7.800	1.00	1.00	0.000
56.00	DC9-48-60-24-8C-EV	1	26.20	1.140	42.03	1.377	31.400	10.200	18.200	1.00	1.00	0.000
55.00	Rosenberg FB-L98B-A0303-xxx	1	7.50	0.720	10.12	0.812	9.000	8.300	3.400	1.00	1.00	-2.000
55.00	AHLBA 4T4R B12/B14 320W	6	101.40	3.680	116.09	3.795	28.700	15.400	9.500	1.00	1.00	0.000
55.00	AirScale Dual RRRH 4T4R B25/66	6	88.20	3.680	103.22	3.796	28.700	15.400	9.500	1.00	1.00	0.000
55.00	(6) Rosenberg D218RRDSM	1	109.00	5.000	122.63	5.521	0.000	0.000	0.000	1.00	1.00	0.000
55.00	VFA12-HD	3	739.00	18.900	846.85	22.446	0.000	0.000	0.000	0.75	0.75	0.000
42.00	6 ft Dish w/Radome	1	162.00	24.410	244.87	24.764	0.000	0.000	0.000	1.00	1.00	0.000
42.00	Pipe Mount	1	50.00	2.000	56.25	2.208	0.000	0.000	0.000	1.00	1.00	0.000
37.00	2 Bay FM	1	30.00	10.500	98.88	10.842	48.000	43.000	0.000	0.00	0.00	0.000
34.00	Pipe Mount	1	50.00	2.000	56.19	2.331	0.000	0.000	0.000	1.00	1.00	0.000
34.00	4 ft Std Dish	1	188.00	20.910	232.08	21.346	0.000	0.000	0.000	1.00	1.00	0.000
30.00	4 ft Std Dish	1	188.00	20.910	232.08	21.346	0.000	0.000	0.000	1.00	1.00	0.000
30.00	6 ft Grid Dish	1	198.00	16.790	296.06	48.370	0.000	0.000	0.000	1.00	1.00	0.000
30.00	Pipe Mount	2	50.00	2.000	56.19	2.331	0.000	0.000	0.000	1.00	1.00	0.000
28.00	Pipe Mount	1	50.00	2.000	56.19	2.331	0.000	0.000	0.000	1.00	1.00	0.000
25.00	Pipe Mount	1	50.00	2.000	56.19	2.331	0.000	0.000	0.000	1.00	1.00	0.000
25.00	3 ft Std Dish	1	100.00	11.760	124.76	12.110	0.000	0.000	0.000	1.00	1.00	0.000
23.00	3 ft Std Dish	1	100.00	11.760	124.76	12.110	0.000	0.000	0.000	1.00	1.00	0.000
23.00	Pipe Mount	1	50.00	2.000	56.19	2.331	0.000	0.000	0.000	1.00	1.00	0.000
23.00	A-ANT-11G-4-C	1	121.00	17.760	171.73	18.110	50.800	50.800	26.100	1.00	1.00	0.000
23.00	Pipe Mount	1	50.00	2.000	56.19	2.331	0.000	0.000	0.000	1.00	1.00	0.000
23.00	A-ANT-11G-3-C	1	49.60	8.920	75.49	9.169	35.000	35.000	0.000	1.00	1.00	0.000
22.00	11 GHZ PTP820S	1	5.50	0.730	7.94	0.780	10.600	8.300	2.800	1.00	1.00	0.000
22.00	Valmont R5 Universal Stand-Off	1	35.00	2.000	39.33	2.331	0.000	0.000	0.000	1.00	1.00	0.000
21.00	11 GHZ Integra-S	1	18.00	2.150	23.06	1.627	17.000	11.000	4.000	1.00	1.00	0.000
19.00	23 GHZ Horizon Compact	1	14.00	1.010	18.47	1.057	11.000	11.000	8.000	1.00	1.00	0.000

Loading Summary

Structure: CO09874-A-SBA	Code: EIA/TIA-222-H	9/24/2021	
Site Name: Hayden 2, CO	Exposure: C		
Height: 140.00 (ft)	Crest Height: 0.00		
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil		
Gh: 0.85	Topography: 1	Struct Class: II	Page: 6



19.00	OSF-R2-23C	1	27.00	4.690	39.41	4.852	26.100	26.100	0.000	1.00	1.00	0.000
17.00	3GHz PMP 450	1	11.00	1.300	14.53	1.363	28.000	5.000	2.700	1.00	1.00	0.000
17.00	McCown Technology M-TOW-3P-38	3	49.00	4.000	57.70	4.405	0.000	0.000	0.000	0.75	0.75	0.000
17.00	5GHZ PMP 450	8	11.00	1.030	14.80	1.083	20.000	6.000	5.000	1.00	1.00	0.000
17.00	2450AP	3	1.00	0.340	2.60	0.401	11.700	3.400	3.400	1.00	1.00	0.000
17.00	22" x 20" x 8" Junction Box	1	15.00	4.270	17.23	4.455	8.000	20.000	22.000	1.00	1.00	0.000
15.00	RFU-C	2	9.00	0.600	10.94	0.672	7.900	7.900	3.400	1.00	1.00	0.000
13.00	Pipe Mount	1	50.00	2.000	55.55	2.296	0.000	0.000	0.000	1.00	1.00	0.000
13.00	HPX8-65-P6A	1	470.00	63.420	709.61	64.010	0.000	0.000	0.000	1.00	1.00	0.000
12.00	USX6-6W	1	198.00	16.790	285.86	48.370	0.000	0.000	0.000	1.00	1.00	0.000
12.00	Pipe Mount	1	50.00	2.000	55.55	2.296	0.000	0.000	0.000	1.00	1.00	0.000
10.00	1' Yagi	1	1.80	0.770	5.62	1.017	12.000	30.000	0.000	1.00	1.00	0.000
10.00	GPS-TMG-SP-40N	1	0.70	0.130	1.45	0.159	7.200	3.200	3.200	1.00	1.00	0.000
10.00	Cambium Networks GPS	2	0.50	0.090	1.27	0.096	4.000	4.000	4.000	1.00	1.00	0.000
Totals:		118	14,612.78		18,089.38					Number of Appurtenances : 62		

Loading Summary

Structure: CO09874-A-SBA	Code: EIA/TIA-222-H	9/24/2021
Site Name: Hayden 2, CO	Exposure: C	
Height: 140.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 0.85	Topography: 1	Struct Class: II



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Linear Appurtenances Properties

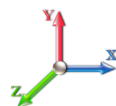
Elev. From (ft)	Elev. To (ft)	Description	Qty	Width (in)	Weight (lb/ft)	Pct In Block	Spread On Faces	Bundling Arrangement	Cluster Dia (in)	Out of Zone	Spacing (in)	Orientation Factor	Ka Override
0.00	140.00	Climbing Ladder	1	2.50	6.90	100.00	2	Individual NR		N	1.00	1.00	
0.00	140.00	Safety Cable	1	0.38	0.27	100.00	2	Individual NR		N	1.00	1.00	
0.00	138.00	1 5/8" Coax	2	1.98	1.04	100.00	3	Individual IR		N	1.00	1.00	
0.00	138.00	W/G Ladder	1	3.00	6.00	100.00	3	Individual NR		N	1.00	1.00	
0.00	108.50	3" Coax	2	3.02	1.78	100.00	1	Individual NR		N	1.00	1.00	
0.00	90.00	W/G Ladder	1	2.50	6.00	100.00	1	Individual NR		N	1.00	1.00	
0.00	85.00	EW63	1	2.01	0.51	100.00	1	Individual NR		N	1.00	1.00	
0.00	61.00	2" Conduit	3	2.00	1.61	100.00	1,2,3	Individual NR		N	1.00	1.00	
0.00	56.00	10 mm Fiber	1	0.39	0.20	100.00	1	Individual NR		N	1.00	1.00	
0.00	56.00	20.44 mm DC	3	0.88	0.20	100.00	1	Individual NR		N	1.00	1.00	
0.00	55.00	10 mm Fiber	1	0.39	0.20	100.00	1	Individual NR		N	1.00	1.00	
0.00	55.00	32.2" DC Power	3	0.88	0.65	100.00	1	Individual NR		N	1.00	1.00	
0.00	42.00	EW63	1	2.01	0.51	100.00	2	Individual NR		N	1.00	1.00	
0.00	37.00	1/2" Coax	1	0.65	0.16	100.00	1	Individual NR		N	1.00	1.00	
0.00	34.00	1/2" Coax	1	0.65	0.16	100.00	1	Individual NR		N	1.00	1.00	
0.00	30.00	1/2" Coax	1	0.65	0.16	100.00	1	Individual NR		N	1.00	1.00	
0.00	30.00	7/8" Coax	1	1.11	0.52	100.00	1	Individual NR		N	1.00	1.00	
0.00	28.00	1 1/4" Coax	1	1.55	0.66	100.00	1	Individual NR		N	1.00	1.00	
0.00	25.00	1/2" Coax	1	0.65	0.16	100.00	1	Individual NR		N	1.00	1.00	
0.00	23.00	1/2" Coax	1	0.65	0.16	100.00	1	Individual NR		N	1.00	1.00	
0.00	13.00	EW63	2	2.01	0.51	100.00	1	Individual NR		N	1.00	1.00	
0.00	12.00	1/2" Coax	2	0.65	0.16	100.00	1	Individual NR		N	1.00	1.00	
0.00	10.00	1/2" Coax	1	0.65	0.16	100.00	1	Individual NR		N	1.00	1.00	

Section Forces

Structure: CO09874-A-SBA
Site Name: Hayden 2, CO
Height: 140.00 (ft)
Base Elev: 0.000 (ft)
Gh: 0.85

Topography: 1

Code: EIA/TIA-222-H
Exposure: C
Crest Height: 0.00
Site Class: D - Stiff Soil
Struct Class: II

9/24/2021

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Load Case: 1.2D + 1.0W Normal Wind

1.2D + 1.0W 105 mph Wind at Normal To Face

Wind Load Factor: 1.00

Wind Importance Factor: 1.00

Dead Load Factor: 1.20

Ice Dead Load Factor: 0.00

Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Ice													
						Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)	
1	10.0	15.66	2.657	40.54	0.00	0.13	2.85	1.00	1.00	0.00	23.24	73.47	0.00	4,257.5	0.0	881.46	789.46	1,670.92	
2	30.0	18.10	2.322	33.36	0.00	0.12	2.87	1.00	1.00	0.00	20.30	62.04	0.00	3,397.0	0.0	897.88	785.64	1,683.52	
3	50.0	20.15	1.987	32.83	0.00	0.14	2.81	1.00	1.00	0.00	19.50	52.14	0.00	3,265.7	0.0	940.10	752.73	1,692.83	
4	70.0	21.63	2.910	27.13	0.00	0.14	2.80	1.00	1.00	0.00	17.94	34.48	0.00	2,376.5	0.0	921.96	574.13	1,496.09	
5	90.0	22.81	2.325	22.78	0.00	0.15	2.77	1.00	1.00	0.00	15.39	29.38	0.00	1,918.7	0.0	826.98	514.80	1,341.78	
6	110.0	23.79	1.734	20.47	0.00	0.18	2.68	1.00	1.00	0.00	13.53	20.67	0.00	1,589.9	0.0	733.66	389.98	1,123.63	
7	125.0	24.44	4.765	4.79	0.00	0.18	2.66	1.00	1.00	0.00	7.50	8.20	0.00	628.5	0.0	414.05	168.31	582.36	
8	135.0	24.84	4.778	4.79	0.00	0.18	2.65	1.00	1.00	0.00	7.52	7.04	0.00	609.1	0.0	421.45	148.35	569.80	
														18,042.9	0.0				10,160.94

Load Case: 1.2D + 1.0W 60° Wind

1.2D + 1.0W 105 mph Wind at 60° From Face

Wind Load Factor: 1.00

Wind Importance Factor: 1.00

Dead Load Factor: 1.20

Ice Dead Load Factor: 0.00

Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Ice			Struct Force (lb)	Linear Force (lb)	Total Force (lb)	
												Linear Area (sqft)	Linear Area (sqft)	Total Weight (lb)				
1	10.0	15.66	2.657	40.54	0.00	0.13	2.85	0.80	1.00	0.00	22.70	73.47	0.00	4,257.5	0.0	861.30	789.46	1,650.76
2	30.0	18.10	2.322	33.36	0.00	0.12	2.87	0.80	1.00	0.00	19.84	62.04	0.00	3,397.0	0.0	877.34	785.64	1,662.98
3	50.0	20.15	1.987	32.83	0.00	0.14	2.81	0.80	1.00	0.00	19.11	52.14	0.00	3,265.7	0.0	920.95	752.73	1,673.68
4	70.0	21.63	2.910	27.13	0.00	0.14	2.80	0.80	1.00	0.00	17.35	34.48	0.00	2,376.5	0.0	892.05	574.13	1,466.18
5	90.0	22.81	2.325	22.78	0.00	0.15	2.77	0.80	1.00	0.00	14.92	29.38	0.00	1,918.7	0.0	801.99	514.80	1,316.80
6	110.0	23.79	1.734	20.47	0.00	0.18	2.68	0.80	1.00	0.00	13.19	20.67	0.00	1,589.9	0.0	714.85	389.98	1,104.83
7	125.0	24.44	4.765	4.79	0.00	0.18	2.66	0.80	1.00	0.00	6.55	8.20	0.00	628.5	0.0	361.47	168.31	529.77
8	135.0	24.84	4.778	4.79	0.00	0.18	2.65	0.80	1.00	0.00	6.56	7.04	0.00	609.1	0.0	367.87	148.35	516.22
														18,042.9	0.0			9,921.22

Section Forces

Structure: CO09874-A-SBA

Code: EIA/TIA-222-H

9/24/2021

Site Name: Hayden 2, CO

Exposure: C

Height: 140.00 (ft)

Crest Height: 0.00

Base Elev: 0.000 (ft)

Site Class: D - Stiff Soil

Gh: 0.85

Topography: 1

Struct Class: II



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Load Case: 1.2D + 1.0W 90° Wind

1.2D + 1.0W 105 mph Wind at 90° From Face

Wind Load Factor: 1.00

Wind Importance Factor: 1.00

Dead Load Factor: 1.20

Ice Dead Load Factor: 0.00

Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Ice										Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
						Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Linear Area (sqft)							
1	10.0	15.66	2.657	40.54	0.00	0.13	2.85	0.85	1.00	0.00	22.84	73.47	0.00	4,257.5	0.0	866.34	789.46	1,655.80		
2	30.0	18.10	2.322	33.36	0.00	0.12	2.87	0.85	1.00	0.00	19.95	62.04	0.00	3,397.0	0.0	882.48	785.64	1,668.11		
3	50.0	20.15	1.987	32.83	0.00	0.14	2.81	0.85	1.00	0.00	19.21	52.14	0.00	3,265.7	0.0	925.74	752.73	1,678.47		
4	70.0	21.63	2.910	27.13	0.00	0.14	2.80	0.85	1.00	0.00	17.50	34.48	0.00	2,376.5	0.0	899.52	574.13	1,473.66		
5	90.0	22.81	2.325	22.78	0.00	0.15	2.77	0.85	1.00	0.00	15.04	29.38	0.00	1,918.7	0.0	808.24	514.80	1,323.05		
6	110.0	23.79	1.734	20.47	0.00	0.18	2.68	0.85	1.00	0.00	13.27	20.67	0.00	1,589.9	0.0	719.55	389.98	1,109.53		
7	125.0	24.44	4.765	4.79	0.00	0.18	2.66	0.85	1.00	0.00	6.79	8.20	0.00	628.5	0.0	374.61	168.31	542.92		
8	135.0	24.84	4.778	4.79	0.00	0.18	2.65	0.85	1.00	0.00	6.80	7.04	0.00	609.1	0.0	381.26	148.35	529.62		
														18,042.9	0.0				9,981.15	

Load Case: 0.9D + 1.0W Normal Wind

0.9D + 1.0W 105 mph Wind at Normal To Face

Wind Load Factor: 1.00

Wind Importance Factor: 1.00

Dead Load Factor: 0.90

Ice Dead Load Factor: 0.00

Ice Importance Factor: 1.00

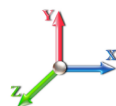
Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Ice			Struct Force (lb)	Linear Force (lb)	Total Force (lb)
												Linear Area (sqft)	Linear Area (sqft)	Total Weight (lb)			
1	10.0	15.66	2.657	40.54	0.00	0.13	2.85	1.00	1.00	0.00	23.24	73.47	0.00	3,193.1	0.0	881.46	1,670.92
2	30.0	18.10	2.322	33.36	0.00	0.12	2.87	1.00	1.00	0.00	20.30	62.04	0.00	2,547.7	0.0	897.88	1,683.52
3	50.0	20.15	1.987	32.83	0.00	0.14	2.81	1.00	1.00	0.00	19.50	52.14	0.00	2,449.3	0.0	940.10	1,692.83
4	70.0	21.63	2.910	27.13	0.00	0.14	2.80	1.00	1.00	0.00	17.94	34.48	0.00	1,782.4	0.0	921.96	1,496.09
5	90.0	22.81	2.325	22.78	0.00	0.15	2.77	1.00	1.00	0.00	15.39	29.38	0.00	1,439.1	0.0	826.98	1,341.78
6	110.0	23.79	1.734	20.47	0.00	0.18	2.68	1.00	1.00	0.00	13.53	20.67	0.00	1,192.4	0.0	733.66	1,123.63
7	125.0	24.44	4.765	4.79	0.00	0.18	2.66	1.00	1.00	0.00	7.50	8.20	0.00	471.3	0.0	414.05	582.36
8	135.0	24.84	4.778	4.79	0.00	0.18	2.65	1.00	1.00	0.00	7.52	7.04	0.00	456.8	0.0	421.45	569.80
													13,532.1	0.0	10,160.94		

Section Forces

Structure: CO09874-A-SBA
Site Name: Hayden 2, CO
Height: 140.00 (ft)
Base Elev: 0.000 (ft)
Gh: 0.85

Topography: 1

Code: EIA/TIA-222-H
Exposure: C
Crest Height: 0.00
Site Class: D - Stiff Soil
Struct Class: II

9/24/2021

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Load Case: 0.9D + 1.0W 60° Wind

0.9D + 1.0W 105 mph Wind at 60° From Face

Wind Load Factor: 1.00

Wind Importance Factor: 1.00

Dead Load Factor: 0.90

Ice Importance Factor: 1.00

Ice Dead Load Factor: 0.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Ice										Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
						Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Linear Area (sqft)							
1	10.0	15.66	2.657	40.54	0.00	0.13	2.85	0.80	1.00	0.00	22.70	73.47	0.00	3,193.1	0.0	861.30	789.46	1,650.76		
2	30.0	18.10	2.322	33.36	0.00	0.12	2.87	0.80	1.00	0.00	19.84	62.04	0.00	2,547.7	0.0	877.34	785.64	1,662.98		
3	50.0	20.15	1.987	32.83	0.00	0.14	2.81	0.80	1.00	0.00	19.11	52.14	0.00	2,449.3	0.0	920.95	752.73	1,673.68		
4	70.0	21.63	2.910	27.13	0.00	0.14	2.80	0.80	1.00	0.00	17.35	34.48	0.00	1,782.4	0.0	892.05	574.13	1,466.18		
5	90.0	22.81	2.325	22.78	0.00	0.15	2.77	0.80	1.00	0.00	14.92	29.38	0.00	1,439.1	0.0	801.99	514.80	1,316.80		
6	110.0	23.79	1.734	20.47	0.00	0.18	2.68	0.80	1.00	0.00	13.19	20.67	0.00	1,192.4	0.0	714.85	389.98	1,104.83		
7	125.0	24.44	4.765	4.79	0.00	0.18	2.66	0.80	1.00	0.00	6.55	8.20	0.00	471.3	0.0	361.47	168.31	529.77		
8	135.0	24.84	4.778	4.79	0.00	0.18	2.65	0.80	1.00	0.00	6.56	7.04	0.00	456.8	0.0	367.87	148.35	516.22		
														13,532.1	0.0				9,921.22	

Load Case: 0.9D + 1.0W 90° Wind

0.9D + 1.0W 105 mph Wind at 90° From Face

Wind Load Factor: 1.00

Wind Importance Factor: 1.00

Dead Load Factor: 0.90

Ice Importance Factor: 1.00

Ice Dead Load Factor: 0.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Ice			Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
												Linear Area (sqft)	Linear Area (sqft)						
1	10.0	15.66	2.657	40.54	0.00	0.13	2.85	0.85	1.00	0.00	22.84	73.47	0.00	3,193.1	0.0	866.34	789.46	1,655.80	
2	30.0	18.10	2.322	33.36	0.00	0.12	2.87	0.85	1.00	0.00	19.95	62.04	0.00	2,547.7	0.0	882.48	785.64	1,668.11	
3	50.0	20.15	1.987	32.83	0.00	0.14	2.81	0.85	1.00	0.00	19.21	52.14	0.00	2,449.3	0.0	925.74	752.73	1,678.47	
4	70.0	21.63	2.910	27.13	0.00	0.14	2.80	0.85	1.00	0.00	17.50	34.48	0.00	1,782.4	0.0	899.52	574.13	1,473.66	
5	90.0	22.81	2.325	22.78	0.00	0.15	2.77	0.85	1.00	0.00	15.04	29.38	0.00	1,439.1	0.0	808.24	514.80	1,323.05	
6	110.0	23.79	1.734	20.47	0.00	0.18	2.68	0.85	1.00	0.00	13.27	20.67	0.00	1,192.4	0.0	719.55	389.98	1,109.53	
7	125.0	24.44	4.765	4.79	0.00	0.18	2.66	0.85	1.00	0.00	6.79	8.20	0.00	471.3	0.0	374.61	168.31	542.92	
8	135.0	24.84	4.778	4.79	0.00	0.18	2.65	0.85	1.00	0.00	6.80	7.04	0.00	456.8	0.0	381.26	148.35	529.62	
													13,532.1	0.0					9,981.15

Section Forces

Structure: CO09874-A-SBA

Code: EIA/TIA-222-H

9/24/2021

Site Name: Hayden 2, CO

Exposure: C

Height: 140.00 (ft)

Crest Height: 0.00

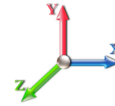
Base Elev: 0.000 (ft)

Site Class: D - Stiff Soil

Gh: 0.85

Topography: 1

Struct Class: II



Page: 11

Load Case: 1.2D + 1.0Di + 1.0Wi Normal Wind

1.2D + 1.0Di + 1.0Wi 50 mph Wind at Normal From Face

Wind Load Factor: 1.00

Wind Importance Factor: 1.00

Dead Load Factor: 1.20

Ice Dead Load Factor: 1.00

Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	3.55	2.657	43.89	3.35	0.14	2.81	1.00	1.00	0.22	27.72	78.10	19.23	4,807.9	550.3	235.34	307.80	543.14
2	30.0	4.10	2.322	37.00	3.64	0.13	2.83	1.00	1.00	0.25	23.42	67.01	15.97	3,922.9	525.9	231.08	305.10	536.17
3	50.0	4.57	1.987	36.56	3.73	0.15	2.76	1.00	1.00	0.26	22.90	57.28	11.55	3,767.2	501.5	245.54	279.01	524.54
4	70.0	4.91	2.910	31.44	4.31	0.16	2.72	1.00	1.00	0.27	20.97	39.74	3.73	2,769.5	393.0	238.05	191.07	429.12
5	90.0	5.17	2.325	26.95	4.17	0.17	2.69	1.00	1.00	0.28	17.83	34.27	2.99	2,264.9	346.2	210.56	171.16	381.72
6	110.0	5.40	1.734	24.52	4.06	0.21	2.58	1.00	1.00	0.28	15.97	22.55	3.62	1,883.1	293.2	188.71	126.89	315.60
7	125.0	5.54	4.765	7.33	2.54	0.23	2.50	1.00	1.00	0.29	9.02	9.15	1.43	798.9	170.4	106.31	53.27	159.58
8	135.0	5.63	4.778	7.35	2.56	0.23	2.50	1.00	1.00	0.29	9.04	7.90	1.25	775.4	166.4	108.27	47.02	155.29
														20,989.8	2946.9	3,045.17		

Load Case: 1.2D + 1.0Di + 1.0Wi 60° Wind

1.2D + 1.0Di + 1.0Wi 50 mph Wind at 60° From Face

Wind Load Factor: 1.00

Wind Importance Factor: 1.00

Dead Load Factor: 1.20

Ice Dead Load Factor: 1.00

Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	3.55	2.657	43.89	3.35	0.14	2.81	0.80	1.00	0.22	27.18	78.10	19.23	4,807.9	550.3	230.83	307.80	538.63
2	30.0	4.10	2.322	37.00	3.64	0.13	2.83	0.80	1.00	0.25	22.95	67.01	15.97	3,922.9	525.9	226.49	305.10	531.59
3	50.0	4.57	1.987	36.56	3.73	0.15	2.76	0.80	1.00	0.26	22.50	57.28	11.55	3,767.2	501.5	241.28	279.01	520.28
4	70.0	4.91	2.910	31.44	4.31	0.16	2.72	0.80	1.00	0.27	20.39	39.74	3.73	2,769.5	393.0	231.44	191.07	422.51
5	90.0	5.17	2.325	26.95	4.17	0.17	2.69	0.80	1.00	0.28	17.37	34.27	2.99	2,264.9	346.2	205.07	171.16	376.23
6	110.0	5.40	1.734	24.52	4.06	0.21	2.58	0.80	1.00	0.28	15.62	22.55	3.62	1,883.1	293.2	184.61	126.89	311.50
7	125.0	5.54	4.765	7.33	2.54	0.23	2.50	0.80	1.00	0.29	8.06	9.15	1.43	798.9	170.4	95.07	53.27	148.34
8	135.0	5.63	4.778	7.35	2.56	0.23	2.50	0.80	1.00	0.29	8.09	7.90	1.25	775.4	166.4	96.83	47.02	143.85
														20,989.8	2946.9	2,992.94		

Section Forces

Structure: CO09874-A-SBA

Code: EIA/TIA-222-H

9/24/2021

Site Name: Hayden 2, CO

Exposure: C

Height: 140.00 (ft)

Crest Height: 0.00

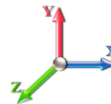
Base Elev: 0.000 (ft)

Site Class: D - Stiff Soil

Gh: 0.85

Topography: 1

Struct Class: II



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Load Case: 1.2D + 1.0Di + 1.0Wi 90° Wind

1.2D + 1.0Di + 1.0Wi 50 mph Wind at 90° From Face

Wind Load Factor: 1.00

Wind Importance Factor: 1.00

Dead Load Factor: 1.20

Ice Dead Load Factor: 1.00

Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	3.55	2.657	43.89	3.35	0.14	2.81	0.85	1.00	0.22	27.32	78.10	19.23	4,807.9	550.3	231.96	307.80	539.76
2	30.0	4.10	2.322	37.00	3.64	0.13	2.83	0.85	1.00	0.25	23.07	67.01	15.97	3,922.9	525.9	227.64	305.10	532.74
3	50.0	4.57	1.987	36.56	3.73	0.15	2.76	0.85	1.00	0.26	22.60	57.28	11.55	3,767.2	501.5	242.34	279.01	521.35
4	70.0	4.91	2.910	31.44	4.31	0.16	2.72	0.85	1.00	0.27	20.53	39.74	3.73	2,769.5	393.0	233.09	191.07	424.17
5	90.0	5.17	2.325	26.95	4.17	0.17	2.69	0.85	1.00	0.28	17.48	34.27	2.99	2,264.9	346.2	206.44	171.16	377.60
6	110.0	5.40	1.734	24.52	4.06	0.21	2.58	0.85	1.00	0.28	15.71	22.55	3.62	1,883.1	293.2	185.64	126.89	312.52
7	125.0	5.54	4.765	7.33	2.54	0.23	2.50	0.85	1.00	0.29	8.30	9.15	1.43	798.9	170.4	97.88	53.27	151.15
8	135.0	5.63	4.778	7.35	2.56	0.23	2.50	0.85	1.00	0.29	8.33	7.90	1.25	775.4	166.4	99.69	47.02	146.71
														20,989.8	2946.9			3,006.00

Load Case: 1.0D + 1.0W Normal Wind

1.0D + 1.0W 60 mph Wind at Normal To Face

Wind Load Factor: 1.00

Wind Importance Factor: 1.00

Dead Load Factor: 1.00

Ice Dead Load Factor: 0.00

Ice Importance Factor: 1.00

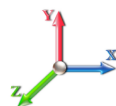
Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	5.11	2.657	40.54	0.00	0.13	2.85	1.00	1.00	0.00	25.79	73.47	0.00	3,547.9	0.0	319.45	257.78	577.23
2	30.0	5.91	2.322	33.36	0.00	0.12	2.87	1.00	1.00	0.00	21.33	62.04	0.00	2,830.8	0.0	308.06	256.53	564.60
3	50.0	6.58	1.987	32.83	0.00	0.14	2.81	1.00	1.00	0.00	20.73	52.14	0.00	2,721.4	0.0	326.33	245.79	572.12
4	70.0	7.06	2.910	27.13	0.00	0.14	2.80	1.00	1.00	0.00	18.46	34.48	0.00	1,980.4	0.0	309.79	187.47	497.27
5	90.0	7.45	2.325	22.78	0.00	0.15	2.77	1.00	1.00	0.00	15.39	29.38	0.00	1,599.0	0.0	270.03	168.10	438.13
6	110.0	7.77	1.734	20.47	0.00	0.18	2.68	1.00	1.00	0.00	13.53	20.67	0.00	1,324.9	0.0	239.56	127.34	366.90
7	125.0	7.98	4.765	4.79	0.00	0.18	2.66	1.00	1.00	0.00	7.50	8.20	0.00	523.7	0.0	135.20	54.96	190.16
8	135.0	8.11	4.778	4.79	0.00	0.18	2.65	1.00	1.00	0.00	7.52	7.04	0.00	507.6	0.0	137.61	48.44	186.06
														15,035.7	0.0			3,392.47

Section Forces

Structure: CO09874-A-SBA
Site Name: Hayden 2, CO
Height: 140.00 (ft)
Base Elev: 0.000 (ft)
Gh: 0.85

Topography: 1

Code: EIA/TIA-222-H
Exposure: C
Crest Height: 0.00
Site Class: D - Stiff Soil
Struct Class: II

9/24/2021

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Load Case: 1.0D + 1.0W 60° Wind

1.0D + 1.0W 60 mph Wind at 60° From Face

Wind Load Factor: 1.00

Wind Importance Factor: 1.00

Dead Load Factor: 1.00

Ice Dead Load Factor: 0.00

Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	5.11	2.657	40.54	0.00	0.13	2.85	0.80	1.00	0.00	25.26	73.47	0.00	3,547.9	0.0	312.87	257.78	570.65
2	30.0	5.91	2.322	33.36	0.00	0.12	2.87	0.80	1.00	0.00	20.87	62.04	0.00	2,830.8	0.0	301.36	256.53	557.89
3	50.0	6.58	1.987	32.83	0.00	0.14	2.81	0.80	1.00	0.00	20.34	52.14	0.00	2,721.4	0.0	320.08	245.79	565.87
4	70.0	7.06	2.910	27.13	0.00	0.14	2.80	0.80	1.00	0.00	17.87	34.48	0.00	1,980.4	0.0	300.03	187.47	487.50
5	90.0	7.45	2.325	22.78	0.00	0.15	2.77	0.80	1.00	0.00	14.92	29.38	0.00	1,599.0	0.0	261.88	168.10	429.98
6	110.0	7.77	1.734	20.47	0.00	0.18	2.68	0.80	1.00	0.00	13.19	20.67	0.00	1,324.9	0.0	233.42	127.34	360.76
7	125.0	7.98	4.765	4.79	0.00	0.18	2.66	0.80	1.00	0.00	6.55	8.20	0.00	523.7	0.0	118.03	54.96	172.99
8	135.0	8.11	4.778	4.79	0.00	0.18	2.65	0.80	1.00	0.00	6.56	7.04	0.00	507.6	0.0	120.12	48.44	168.56
														15,035.7	0.0	3,314.19		

Load Case: 1.0D + 1.0W 90° Wind

1.0D + 1.0W 60 mph Wind at 90° From Face

Wind Load Factor: 1.00

Wind Importance Factor: 1.00

Dead Load Factor: 1.00

Ice Dead Load Factor: 0.00

Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	5.11	2.657	40.54	0.00	0.13	2.85	0.85	1.00	0.00	25.39	73.47	0.00	3,547.9	0.0	314.52	257.78	572.30
2	30.0	5.91	2.322	33.36	0.00	0.12	2.87	0.85	1.00	0.00	20.98	62.04	0.00	2,830.8	0.0	303.03	256.53	559.57
3	50.0	6.58	1.987	32.83	0.00	0.14	2.81	0.85	1.00	0.00	20.44	52.14	0.00	2,721.4	0.0	321.64	245.79	567.43
4	70.0	7.06	2.910	27.13	0.00	0.14	2.80	0.85	1.00	0.00	18.02	34.48	0.00	1,980.4	0.0	302.47	187.47	489.94
5	90.0	7.45	2.325	22.78	0.00	0.15	2.77	0.85	1.00	0.00	15.04	29.38	0.00	1,599.0	0.0	263.92	168.10	432.01
6	110.0	7.77	1.734	20.47	0.00	0.18	2.68	0.85	1.00	0.00	13.27	20.67	0.00	1,324.9	0.0	234.96	127.34	362.30
7	125.0	7.98	4.765	4.79	0.00	0.18	2.66	0.85	1.00	0.00	6.79	8.20	0.00	523.7	0.0	122.32	54.96	177.28
8	135.0	8.11	4.778	4.79	0.00	0.18	2.65	0.85	1.00	0.00	6.80	7.04	0.00	507.6	0.0	124.49	48.44	172.94
														15,035.7	0.0	3,333.76		

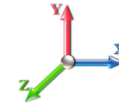
Force/Stress Compression Summary

Structure: CO09874-A-SBA
Site Name: Hayden 2, CO
Height: 140.00 (ft)
Base Elev: 0.000 (ft)
Gh: 0.85

Topography: 1

Code: EIA/TIA-222-H
Exposure: C
Crest Height: 0.00
Site Class: D - Stiff Soil
Struct Class: II

9/24/2021



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LEG MEMBERS

Top Sect	Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing %			KL/R	Fy (ksi)	Mem Cap (kips)	Leg Use %	Controls
						X	Y	Z					
1	20	PST - 8" DIA PIPE	-114.27	1.2D + 1.0W Normal Wind	0.25	50	50	50	0.51	46.00	347.75	32.9	Member X
2	40	PST - 6" DIA PIPE	-80.57	1.2D + 1.0W Normal Wind	19.53	50	50	50	52.09	46.00	192.48	41.9	Member X
3	60	PST - 6" DIA PIPE	-69.37	1.2D + 1.0W Normal Wind	0.25	50	50	50	0.67	46.00	231.01	30.0	Member X
4	80	PST - 5" DIA PIPE	-44.42	1.2D + 1.0W Normal Wind	0.25	50	50	50	0.80	46.00	178.01	25.0	Member X
5	100	PST - 4" DIA PIPE	-27.50	1.2D + 1.0W Normal Wind	0.25	50	50	50	1.00	46.00	131.23	21.0	Member X
6	120	PST - 3-1/2" DIA PIPE	-15.88	1.2D + 1.0W Normal Wind	0.25	50	50	50	1.12	46.00	110.94	14.3	Member X
7	130	PST - 2-1/2" DIA PIPE	-4.25	1.2D + 1.0W Normal Wind	5.00	100	100	100	63.36	46.00	53.85	7.9	Member X
8	140	PST - 2-1/2" DIA PIPE	-1.46	1.2D + 1.0W Normal Wind	5.00	100	100	100	63.36	46.00	53.85	2.7	Member X

HORIZONTAL MEMBERS

Top Sect	Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing %			KL/R	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	Use %	Controls
						X	Y	Z									
1	20										0.00	0	0				
2	40										0.00	0	0				
3	60										0.00	0	0				
4	80										0.00	0	0				
5	100										0.00	0	0				
6	120										0.00	0	0				
7	130	SAE - 2X2X0.1875	-0.20	0.9D + 1.0W 60° Wind	5.00	100	100	100	152.28	36.00	8.76	1	1	13.81	13.05	2.3	Member Z
8	140	SAE - 2X2X0.1875	-0.15	1.2D + 1.0W Normal Wind	5.00	100	100	100	152.28	36.00	8.76	1	1	13.81	13.05	1.8	Member Z

DIAGONAL MEMBERS

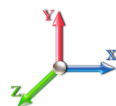
Top Sect	Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing %			KL/R	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	Use %	Controls
						X	Y	Z									
1	20	PST - 2-1/2" DIA PIPE	-8.79	1.2D + 1.0W 90° Wind	25.23	50	50	50	159.85	46.00	15.06	1	1	13.81		63.7	Bolt Shear
2	40	PST - 2-1/2" DIA PIPE	-6.79	0.9D + 1.0W 90° Wind	24.01	50	50	50	152.13	46.00	16.63	1	1	13.81		49.2	Bolt Shear
3	60	PST - 2-1/2" DIA PIPE	-7.80	1.2D + 1.0W 90° Wind	22.90	50	50	50	145.11	46.00	18.28	1	1	13.81		56.5	Bolt Shear
4	80	PST - 1-1/2" DIA PIPE	-3.20	1.2D + 1.0W Normal Wind	14.32	50	50	50	137.94	46.00	9.49	1	1	13.81		33.7	Member X
5	100	PST - 1-1/2" DIA PIPE	-2.27	1.2D + 1.0W Normal Wind	12.31	50	50	50	118.93	46.00	12.76	1	1	13.81		17.8	Member X
6	120	PST - 1-1/2" DIA PIPE	-2.66	1.2D + 1.0W Normal Wind	11.82	50	50	50	115.34	46.00	13.52	1	1	13.81		19.7	Member X
7	130	SAE - 1.75X1.75X0.1875	-1.07	1.2D + 1.0W 90° Wind	7.07	50	50	50	123.69	36.00	11.58	1	1	13.81	13.0	9.2	Member Z
8	140	SAE - 1.75X1.75X0.1875	-0.51	1.2D + 1.0W 90° Wind	7.07	50	50	50	123.69	36.00	11.58	1	1	13.81	13.0	4.4	Member Z

Force/Stress Tension Summary

Structure: CO09874-A-SBA
Site Name: Hayden 2, CO
Height: 140.00 (ft)
Base Elev: 0.000 (ft)
Gh: 0.85

Topography: 1

Code: EIA/TIA-222-H
Exposure: C
Crest Height: 0.00
Site Class: D - Stiff Soil
Struct Class: II

9/24/2021

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LEG MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Leg Use %	Controls
1	20	PST - 8" DIA PIPE	92.10	0.9D + 1.0W 60° Wind	46	347.76	26.5	Member
2	40	PST - 6" DIA PIPE	72.13	0.9D + 1.0W 60° Wind	46	231.01	31.2	Member
3	60	PST - 6" DIA PIPE	53.32	0.9D + 1.0W 60° Wind	46	231.01	23.1	Member
4	80	PST - 5" DIA PIPE	33.49	0.9D + 1.0W 60° Wind	46	178.02	18.8	Member
5	100	PST - 4" DIA PIPE	22.14	0.9D + 1.0W 60° Wind	46	131.24	16.9	Member
6	120	PST - 3-1/2" DIA PIPE	12.03	0.9D + 1.0W 60° Wind	46	110.95	10.8	Member
7	130	PST - 2-1/2" DIA PIPE	3.61	0.9D + 1.0W 60° Wind	46	70.55	5.1	Member
8	140	PST - 2-1/2" DIA PIPE	0.79	0.9D + 1.0W 60° Wind	46	70.55	1.1	Member

HORIZONTAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	B.S. Cap (kips)	Use %	Controls
1	20	-			46	0.00	0	0					
2	40	-			46	0.00	0	0					
3	60	-			46	0.00	0	0					
4	80	-			46	0.00	0	0					
5	100	-			46	0.00	0	0					
6	120	-			46	0.00	0	0					
7	130	SAE - 2X2X0.1875	0.11	1.2D + 1.0W 60° Wind	36	18.58	1	1	13.81	9.79	8.51	1.3	Blck Shear
8	140	SAE - 2X2X0.1875	0.16	0.9D + 1.0W Normal Wi	36	18.58	1	1	13.81	9.79	8.51	1.9	Blck Shear

DIAGONAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	B.S. Cap (kips)	Use %	Controls
1	20	PST - 2-1/2" DIA PIPE	7.15	0.9D + 1.0W 60° Wind	46	70.55	1	1	13.81			51.8	Bolt Shear
2	40	PST - 2-1/2" DIA PIPE	7.41	1.2D + 1.0W 90° Wind	46	70.55	1	1	13.81			53.6	Bolt Shear
3	60	PST - 2-1/2" DIA PIPE	7.05	0.9D + 1.0W 90° Wind	46	70.55	1	1	13.81			51.1	Bolt Shear
4	80	PST - 1-1/2" DIA PIPE	3.25	0.9D + 1.0W 90° Wind	46	33.08	1	1	13.81			23.5	Bolt Shear
5	100	PST - 1-1/2" DIA PIPE	2.32	1.2D + 1.0W Normal Wi	46	33.08	1	1	13.81			16.8	Bolt Shear
6	120	PST - 1-1/2" DIA PIPE	2.28	0.9D + 1.0W 60° Wind	46	33.08	1	1	13.81			16.5	Bolt Shear
7	130	SAE - 1.75X1.75X0.1875	0.89	0.9D + 1.0W 90° Wind	36	15.64	1	1	13.81	9.79	6.48	13.8	Blck Shear
8	140	SAE - 1.75X1.75X0.1875	0.45	0.9D + 1.0W 90° Wind	36	15.64	1	1	13.81	9.79	6.48	7.0	Blck Shear

Seismic Section Forces

Structure: CO09874-A-SBA

Code: EIA/TIA-222-H

9/24/2021

Site Name: Hayden 2, CO

Exposure: C

Height: 140.00 (ft)

Crest Height: 0.00

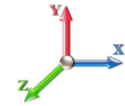
Base Elev: 0.000 (ft)

Site Class: D - Stiff Soil

Gh: 0.85

Topography: 1

Struct Class: II



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Load Case: 1.2D + 1.0Ev + 1.0Eh

Dead Load Factor	1.20	Sds 0.390	Ss 0.3940	Fa 1.4848	Ke 1.0000	TL 4.0000
Seismic Load Factor	1.00	Sd1 0.134	S1 0.0840	Fv 2.4000	Kg 0.0000	Cs 0.1033
Seismic Importance Factor	1.00	W1 15.00	R 3.0000	Vs 3.0635	T 0.4338	f1 2.3054

Sect #	Elev (ft)	Wz (lb)	Lateral Fsz (lbs)	Vertical Ev (lbs)
1	10.00	4642.4	81.94	362.30
2	30.00	4213.9	223.13	328.86
3	50.00	7457.1	658.10	581.96
4	70.00	6707.8	828.76	523.48
5	90.00	1810.9	287.67	141.33
6	110.00	3500.8	679.70	273.21
7	125.00	523.72	115.55	40.87
8	135.00	791.56	188.61	61.77

Load Case: 0.9D + 1.0Ev + 1.0Eh

Dead Load Factor	0.90	Sds 0.390	Ss 0.3940	Fa 1.4848	Ke 1.0000	TL 4.0000
Seismic Load Factor	1.00	Sd1 0.134	S1 0.0840	Fv 2.4000	Kg 0.0000	Cs 0.1033
Seismic Importance Factor	1.00	W1 15.00	R 3.0000	Vs 3.0635	T 0.4338	f1 2.3054

Sect #	Elev (ft)	Wz (lb)	Lateral Fsz (lbs)	Vertical Ev (lbs)
1	10.00	4642.4	81.94	362.30
2	30.00	4213.9	223.13	328.86
3	50.00	7457.1	658.10	581.96
4	70.00	6707.8	828.76	523.48
5	90.00	1810.9	287.67	141.33
6	110.00	3500.8	679.70	273.21
7	125.00	523.72	115.55	40.87
8	135.00	791.56	188.61	61.77

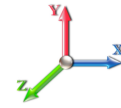
Support Forces Summary

Structure: CO09874-A-SBA
Site Name: Hayden 2, CO
Height: 140.00 (ft)
Base Elev: 0.000 (ft)
Gh: 0.85

Topography: 1

Code: EIA/TIA-222-H
Exposure: C
Crest Height: 0.00
Site Class: D - Stiff Soil
Struct Class: II

9/24/2021



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Load Case	Node	FX (kips)	FY (kips)	FZ (kips)	(-) = Uplift (+) = Down
1.2D + 1.0W Normal Wind	1	-0.27	113.96	-14.92	
	1a	4.65	-39.08	-4.50	
	1b	-4.38	-39.31	-4.25	
1.2D + 1.0W 60° Wind	1	-1.72	62.19	-7.85	
	1a	-7.74	61.79	2.50	
	1b	-10.82	-88.40	-6.36	
1.2D + 1.0W 90° Wind	1	-1.85	11.93	-0.89	
	1a	-11.91	98.85	5.63	
	1b	-9.71	-75.20	-4.74	
0.9D + 1.0W Normal Wind	1	-0.27	110.91	-14.70	
	1a	4.83	-42.03	-4.60	
	1b	-4.57	-42.20	-4.36	
0.9D + 1.0W 60° Wind	1	-1.72	59.17	-7.64	
	1a	-7.55	58.77	2.39	
	1b	-11.01	-91.26	-6.47	
0.9D + 1.0W 90° Wind	1	-1.85	8.95	-0.68	
	1a	-11.73	95.80	5.52	
	1b	-9.90	-78.07	-4.85	
1.2D + 1.0Di + 1.0Wi Normal Wind	1	0.00	38.23	-4.38	
	1a	1.04	-2.99	-1.10	
	1b	-1.04	-3.19	-1.03	
1.2D + 1.0Di + 1.0Wi 60° Wind	1	-0.44	24.43	-2.42	
	1a	-2.30	24.02	0.77	
	1b	-2.85	-16.40	-1.58	
1.2D + 1.0Di + 1.0Wi 90° Wind	1	-0.51	10.97	-0.48	
	1a	-3.42	33.93	1.62	
	1b	-2.54	-12.85	-1.15	
1.2D + 1.0Ev + 1.0Eh	1	0.00	29.14	-2.12	
	1a	0.44	4.37	-0.45	
	1b	-0.44	4.37	-0.45	
0.9D + 1.0Ev + 1.0Eh	1	0.00	26.17	-1.92	
	1a	0.62	1.42	-0.55	
	1b	-0.62	1.42	-0.55	
1.0D + 1.0W Normal Wind	1	-0.09	43.27	-5.34	
	1a	1.15	-6.72	-1.26	
	1b	-1.06	-6.90	-1.18	
1.0D + 1.0W 60° Wind	1	-0.57	26.36	-3.02	
	1a	-2.92	26.23	1.03	
	1b	-3.17	-22.94	-1.87	
1.0D + 1.0W 90° Wind	1	-0.62	9.94	-0.73	
	1a	-4.30	38.34	2.06	
	1b	-2.81	-18.63	-1.34	

Max Reactions

Leg			Overturning		
Max Uplift:	-91.26	(kips)	Moment:	1503.25	(ft-kips)
Max Down:	113.96	(kips)	Total Down:	35.58	(kips)
Max Shear:	14.92	(kips)	Total Shear:	23.66	(kips)

Analysis Summary

Structure: CO09874-A-SBA	Code: EIA/TIA-222-H	9/24/2021
Site Name: Hayden 2, CO	Exposure: C	
Height: 140.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 0.85	Topography: 1	Struct Class: II
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Max Reactions

Leg			Overturning		
Max Uplift:	-91.26	(kips)	Moment:	1503.25	(ft-kips)
Max Down:	113.96	(kips)	Total Down:	35.58	(kips)
Max Shear:	14.92	(kips)	Total Shear:	23.66	(kips)

Anchor Bolts

Bolt Size (in.): 1.25	Number Bolts: 4	Type: UnGrouted
Yield Strength (Ksi): 55.00	Tensile Strength (Ksi): 75.00	
	Length: 1.00	

Interaction Ratios:

Tensile: 0.43	Compression: 0.49
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Max Usages

Max Leg: 41.9% (1.2D + 1.0W Normal Wind - Sect 2)
 Max Diag: 63.7% (1.2D + 1.0W 90° Wind - Sect 1)
 Max Horiz: 2.3% (0.9D + 1.0W 60° Wind - Sect 7)

Max Deflection, Twist and Sway

Load Case	Elevation (ft)	Deflection (ft)	Twist (deg)	Sway (deg)
0.9D + 1.0Ev + 1.0Eh - Normal To Face	0.25	0.0000	0.0000	0.0012
	19.75	0.0067	-0.0004	0.0198
	20.25	0.0068	-0.0004	0.0178
	39.75	0.0075	-0.0012	0.0311
	40.25	0.0068	0.0012	0.0256
	59.75	0.0180	-0.0016	0.0372
	60.00	0.0181	-0.0017	0.0385
	60.25	0.0183	-0.0017	0.0400
	70.00	0.0226	-0.0016	0.0337
	80.25	0.0302	-0.0020	0.0466
	110.13	0.0537	0.0021	0.0516
	140.00	0.0832	-0.0001	0.0578
0.9D + 1.0W 105 mph Wind at 60° From Face	0.25	0.0000	0.0001	0.0014
	19.75	0.0147	0.0091	0.1037
	20.25	0.0157	0.0095	0.1040
	39.75	0.0446	0.0324	0.1628
	40.25	0.0433	0.0198	0.1505
	59.75	0.0946	0.0565	0.2039
	60.00	0.0955	0.0568	0.2063
	60.25	0.0964	0.0574	0.2057
	70.00	0.1259	0.0767	0.1595
	80.25	0.1614	0.0865	0.2591
	110.13	0.2867	-0.0331	0.2649
	140.00	0.4299	-0.0127	0.2675

0.9D + 1.0W 105 mph Wind at 90° From Face	0.25	0.0000	0.0001	0.0015
	19.75	0.0139	-0.0090	0.0955
	20.25	0.0148	-0.0093	0.0960
	39.75	0.0429	0.0285	0.1548
	40.25	0.0470	0.0280	0.1650
	59.75	0.0944	0.0480	0.2032
	60.00	0.0953	0.0482	0.2053
	60.25	0.0962	0.0486	0.2049
	70.00	0.1262	0.0636	0.1379
	80.25	0.1612	0.0751	0.2553
	110.13	0.2872	-0.0325	0.2642
	140.00	0.4302	0.0095	0.2443
0.9D + 1.0W 105 mph Wind at Normal To Face	0.25	0.0000	0.0001	0.0017
	19.75	0.0158	0.0053	0.1028
	20.25	0.0168	0.0056	0.1029
	39.75	0.0474	0.0236	0.1734
	40.25	0.0428	-0.0005	0.1567
	59.75	0.0961	0.0440	0.1886
	60.00	0.0969	0.0443	0.1909
	60.25	0.0978	0.0449	0.1906
	70.00	0.1282	0.0633	0.2139
	80.25	0.1633	0.0701	0.2271
	110.13	0.2936	-0.0328	0.2687
	140.00	0.4429	-0.0384	0.3441
1.0D + 1.0W 60 mph Wind at 60° From Face	0.25	0.0000	0.0000	0.0004
	19.75	0.0042	0.0029	0.0332
	20.25	0.0046	0.0030	0.0335
	39.75	0.0141	0.0102	0.0526
	40.25	0.0145	0.0062	0.0498
	59.75	0.0307	0.0178	0.0698
	60.00	0.0310	0.0179	0.0706
	60.25	0.0313	0.0181	0.0705
	70.00	0.0413	0.0242	0.0525
	80.25	0.0528	0.0273	0.0845
	110.13	0.0946	-0.0110	0.0885
	140.00	0.1424	-0.0042	0.0894
1.0D + 1.0W 60 mph Wind at 90° From Face	0.25	0.0000	0.0000	0.0006
	19.75	0.0051	-0.0029	0.0314
	20.25	0.0054	-0.0030	0.0314
	39.75	0.0136	0.0092	0.0500
	40.25	0.0159	0.0090	0.0547
	59.75	0.0310	0.0155	0.0692
	60.00	0.0313	0.0155	0.0700
	60.25	0.0316	0.0157	0.0699
	70.00	0.0413	0.0205	0.0455
	80.25	0.0528	0.0242	0.0833
	110.13	0.0946	-0.0104	0.0885
	140.00	0.1424	0.0030	0.0821
1.0D + 1.0W 60 mph Wind at Normal To Face	0.25	0.0000	0.0000	0.0007
	19.75	0.0058	0.0017	0.0346
	20.25	0.0061	0.0018	0.0344
	39.75	0.0161	0.0076	0.0575
	40.25	0.0137	0.0000	0.0510
	59.75	0.0318	0.0141	0.0630
	60.00	0.0321	0.0142	0.0635
	60.25	0.0324	0.0144	0.0634
	70.00	0.0420	0.0203	0.0700
	80.25	0.0534	0.0225	0.0740
	110.13	0.0962	-0.0103	0.0892
	140.00	0.1452	-0.0126	0.1124

1.2D + 1.0Di + 1.0Wi 50 mph Wind at 60° From Face	0.25	0.0000	0.0000	0.0008
	19.75	0.0062	0.0020	0.0324
	20.25	0.0065	0.0021	0.0315
	39.75	0.0116	0.0072	0.0415
	40.25	0.0119	0.0045	0.0403
	59.75	0.0268	0.0126	0.0559
	60.00	0.0270	0.0127	0.0562
	60.25	0.0273	0.0128	0.0555
	70.00	0.0344	0.0171	0.0444
	80.25	0.0447	0.0193	0.0713
	110.13	0.0784	-0.0085	0.0748
	140.00	0.1193	-0.0041	0.0760
1.2D + 1.0Di + 1.0Wi 50 mph Wind at 90° From Face	0.25	0.0000	0.0000	0.0008
	19.75	0.0058	-0.0022	0.0300
	20.25	0.0060	-0.0023	0.0292
	39.75	0.0113	0.0066	0.0395
	40.25	0.0130	0.0065	0.0444
	59.75	0.0265	0.0112	0.0554
	60.00	0.0268	0.0112	0.0556
	60.25	0.0270	0.0113	0.0550
	70.00	0.0341	0.0147	0.0391
	80.25	0.0444	0.0174	0.0697
	110.13	0.0782	-0.0078	0.0744
	140.00	0.1189	0.0021	0.0704
1.2D + 1.0Di + 1.0Wi 50 mph Wind at Normal From Face	0.25	0.0000	0.0000	0.0006
	19.75	0.0046	0.0011	0.0241
	20.25	0.0048	0.0012	0.0240
	39.75	0.0132	0.0051	0.0477
	40.25	0.0112	0.0000	0.0406
	59.75	0.0262	0.0096	0.0516
	60.00	0.0264	0.0097	0.0517
	60.25	0.0266	0.0098	0.0512
	70.00	0.0347	0.0140	0.0561
	80.25	0.0444	0.0154	0.0620
	110.13	0.0796	-0.0080	0.0737
	140.00	0.1204	-0.0110	0.0922
1.2D + 1.0Ev + 1.0Eh - Normal To Face	0.25	0.0000	0.0000	0.0011
	19.75	0.0064	0.0004	0.0194
	20.25	0.0066	0.0004	0.0175
	39.75	0.0078	-0.0012	0.0313
	40.25	0.0067	0.0012	0.0255
	59.75	0.0179	-0.0016	0.0360
	60.00	0.0181	-0.0017	0.0374
	60.25	0.0182	0.0017	0.0389
	70.00	0.0226	0.0016	0.0337
	80.25	0.0302	-0.0020	0.0467
	110.13	0.0537	0.0021	0.0516
	140.00	0.0833	-0.0001	0.0579
1.2D + 1.0W 105 mph Wind at 60° From Face	0.25	0.0000	0.0001	0.0014
	19.75	0.0145	0.0091	0.1033
	20.25	0.0155	0.0095	0.1037
	39.75	0.0444	0.0324	0.1627
	40.25	0.0435	0.0198	0.1509
	59.75	0.0946	0.0565	0.2055
	60.00	0.0955	0.0568	0.2079
	60.25	0.0964	0.0574	0.2074
	70.00	0.1261	0.0767	0.1599
	80.25	0.1617	0.0865	0.2595
	110.13	0.2875	-0.0331	0.2663
	140.00	0.4315	-0.0128	0.2689

1.2D + 1.0W 105 mph Wind at 90° From Face	0.25	0.0000	0.0001	0.0015
	19.75	0.0141	-0.0090	0.0952
	20.25	0.0150	-0.0093	0.0958
	39.75	0.0428	0.0285	0.1547
	40.25	0.0473	0.0280	0.1656
	59.75	0.0944	0.0480	0.2047
	60.00	0.0953	0.0483	0.2068
	60.25	0.0963	0.0486	0.2064
	70.00	0.1263	0.0636	0.1383
	80.25	0.1614	0.0752	0.2556
	110.13	0.2879	-0.0326	0.2657
	140.00	0.4317	0.0096	0.2458

1.2D + 1.0W 105 mph Wind at Normal To Face	0.25	0.0000	0.0001	0.0018
	19.75	0.0161	0.0053	0.1032
	20.25	0.0170	0.0056	0.1032
	39.75	0.0477	0.0236	0.1739
	40.25	0.0427	-0.0005	0.1567
	59.75	0.0963	0.0440	0.1886
	60.00	0.0972	0.0443	0.1899
	60.25	0.0980	0.0449	0.1896
	70.00	0.1283	0.0632	0.2142
	80.25	0.1635	0.0701	0.2273
	110.13	0.2941	-0.0328	0.2698
	140.00	0.4438	-0.0385	0.3447
