



**Tower Engineering Solutions**

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## **Structural Analysis Report**

**Existing 159 ft SABRE Monopole**

**Customer Name: SBA Communications Corp**

**Customer Site Number: OH47491-A**

**Customer Site Name: Nw Dublin**

**Carrier Name: Dish Wireless (App#: 162231, V2)**

**Carrier Site ID / Name: CVCMH00910B / OH47491-A**

**Site Location: 6790 B Coffman**

**Dublin, Ohio**

**Franklin County**

**Latitude: 40.110083**

**Longitude: -83.130138**

Exp.12/31/2021



### **Analysis Result:**

**Max Structural Usage: 73.1% [Pass]**

**Max Foundation Usage: 70.0% [Pass]**

**Additional Usage Caused by New Mount/Mount Modification: N/A**

06/25/2021

**Report Prepared By : Delu Zhou**

## Introduction

The purpose of this report is to summarize the analysis results on the 159 ft SABRE Monopole 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

<b>Tower Drawings</b>	Original structural design report prepared by Sabre Communications Corporation. Dated 12-21-2005. Drawing No 06-12155-PE. Job No 06-12155.
<b>Foundation Drawing</b>	Original foundation design prepared by Sabre Communications Corporation. Dated 12-21-2005. Job No 06-12155.
<b>Geotechnical Report</b>	Geotechnical report prepared by URS Corporation. Dated 12-20-2004. Project No 13810158.20000.
<b>Modification Drawings</b>	Previous modifications by Vertical Solutions, Inc. Dated 11-15-2010. Project No 1000063.04. / Close-Out Letter by Vertical Solutions, Inc. Dated 12-13-2010. Project No 1000063.06 Revision 0.
<b>Mount Analysis</b>	N/A

## Analysis Criteria

The rigorous analysis was performed in accordance with the requirements and stipulations of the TIA-222-G-2. In accordance with this standard, the structure was analyzed using **TESPoles**, 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.

<b>Wind Speed Used in the Analysis:</b>	Ultimate Design Wind Speed $V_{ult} = 115.0$ mph (3-Sec. Gust)/ Nominal Design Wind Speed $V_{asd} = 89.0$ mph (3-Sec. Gust)
<b>Wind Speed with Ice:</b>	40 mph (3-Sec. Gust) with 3/4" radial ice concurrent
<b>Operational Wind Speed:</b>	60 mph + 0" Radial ice
<b>Standard/Codes:</b>	TIA-222-G-2 / 2015 IBC / 2017 Ohio Building Code
<b>Exposure Category:</b>	C
<b>Structure Class:</b>	II
<b>Topographic Category:</b>	1
<b>Crest Height:</b>	0 ft
<b>Seismic Parameters:</b>	$S_S = 0.124$ , $S_1 = 0.062$

This structural analysis is based upon the tower being classified as a Structure Class 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	169.0	1	Andrew ASPA685 - Whip	(3) T-Arms	(1) 7/8"	DCSD
6	146.0	3	Commscope NNVV-65B-R4 - Panel	Platform w/ Hand Rail (Sabre CI0855225C)	(3) 1.5" Hybrid; (1) 1.544" Hybrid	Sprint Nextel
7		3	Samsung MMU-H65V9 - Panel			
8		1	Andrew VHLP2/HP2-23 - Dish			
9		1	Ceragon Radio			
10		1	DragonWave HP Duo			
11		3	Samsung 4 port radio/RFD01F-26A			
12		3	Samsung RRH-P4			
13	139.0	4	2' Stadium Lights	(2) 4' Standoff Arm	(4) 1/2"	
14	136.0	4	2' Stadium Lights	(2) 4' Standoff Arm	(4) 1/2"	
15		2	Band-On Mount	15' Catwalk w/ Handrail		
16	134.0	1	2'x2'x3'	(2) 4' Standoff Arm	(4) 1/2"	
17		4	2' Stadium Lights			
18	131.0	4	2' Stadium Lights	(2) 4' Standoff Arm	(4) 1/2"	
19	130.0	1	Band-On Mount	15' Catwalk w/ Handrail	(1) 1 5/8"	
20	125.0	4	1' Box Light	(2) 4' Standoff Arm	(4) 1/2"	
21	10.5		Light Ballast	Direct	-	
22	7.5		Band-On Mount			
23			Light Ballast			
24		4.5				

## **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
2	156.0	3	JMA Wireless MX08FRO665-21 Panel	Commscope MC-PK8-DSH LP Platform	(1) 1.75" Hybrid	Dish Wireless
3		3	Fujitsu TA08025-B605 RRH			
4		3	Fujitsu TA08025-B604 RRH			
5		1	Raycap RDIDC-9181-PF-48 OVP			

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:

	Pole shafts	Anchor Bolts	Base Plate
Max. Usage:	<b>73.1%</b>	<b>43.6%</b>	<b>59.4%</b>
Pass/Fail	<b>Pass</b>	<b>Pass</b>	<b>Pass</b>

## **Foundations**

	Moment (Kip-Ft)	Shear (Kips)	Axial (Kips)
Analysis Reactions	3268.7	28.3	62.0

The foundation has been investigated using the supplied documents and soils report and was found adequate. Therefore, no modification to the foundation will be required.

## **Operational 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)
146.0	Andrew VHLP2/HP2-23 Dish	Sprint Nextel	0.000	1.681

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.

# Usage Diagram - Max Ratio 73.10% at 53.3ft

**Structure:** OH47491-A-SBA  
**Site Name:** Nw Dublin  
**Height:** 159.00 (ft)  
**Base Elev:** 1.000 (ft)

**Code:** EIA/TIA-222-G  
**Exposure:** C  
**Gh:** 1.1

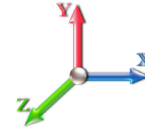
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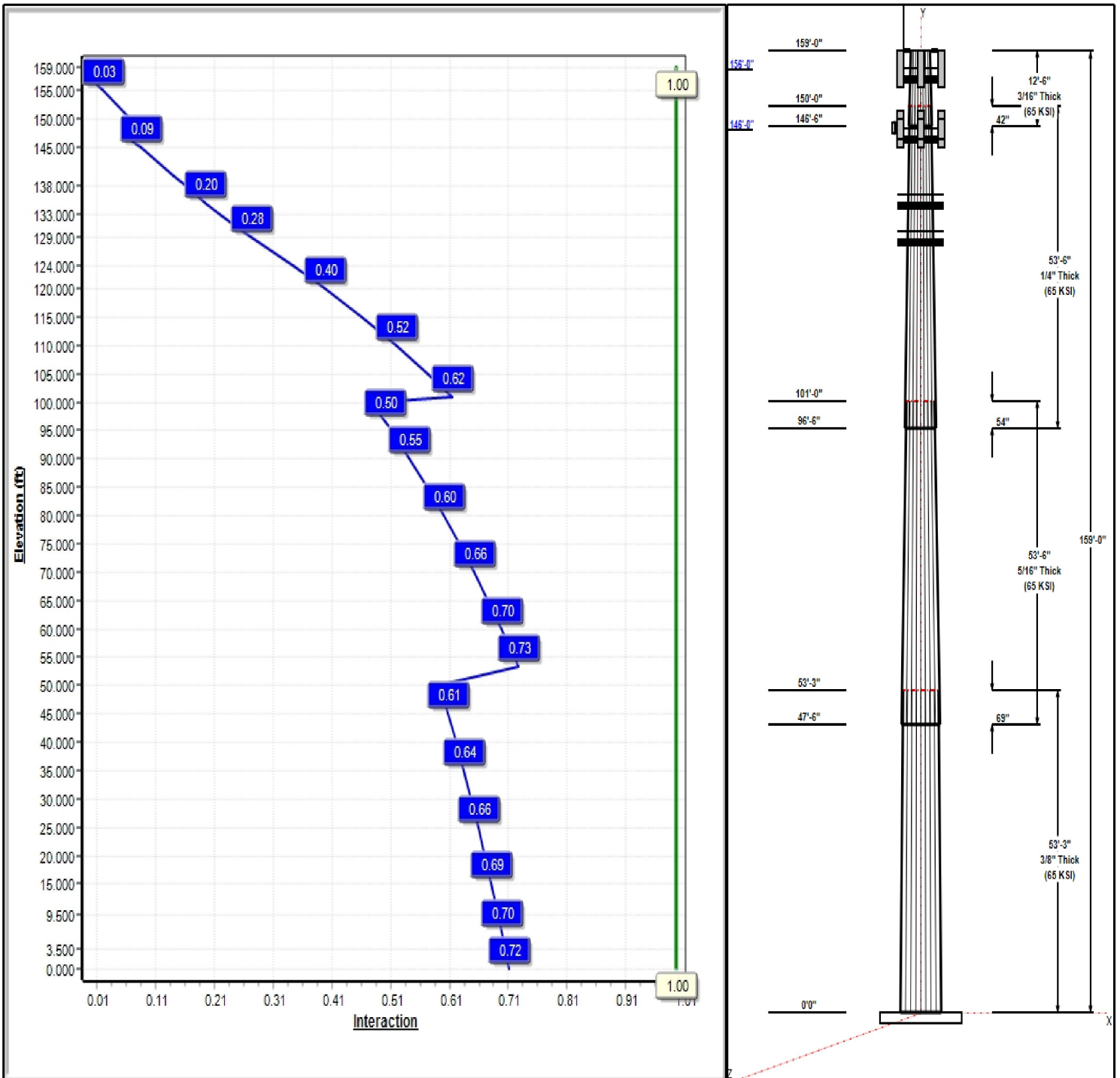
**Dead Load Factor:** 1.20  
**Wind Load Factor:** 1.60

**Load Case : 1.2D + 1.6W 89 mph Wind**



**Iterations:** 26

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## Structure: OH47491-A-SBA

**Type:** Tapered  
**Site Name:** Nw Dublin  
**Height:** 159.00 (ft)  
**Base Elev:** 1.00 (ft)

**Base Shape:** 18 Sided  
**Taper:** 0.19748

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### Shaft Properties

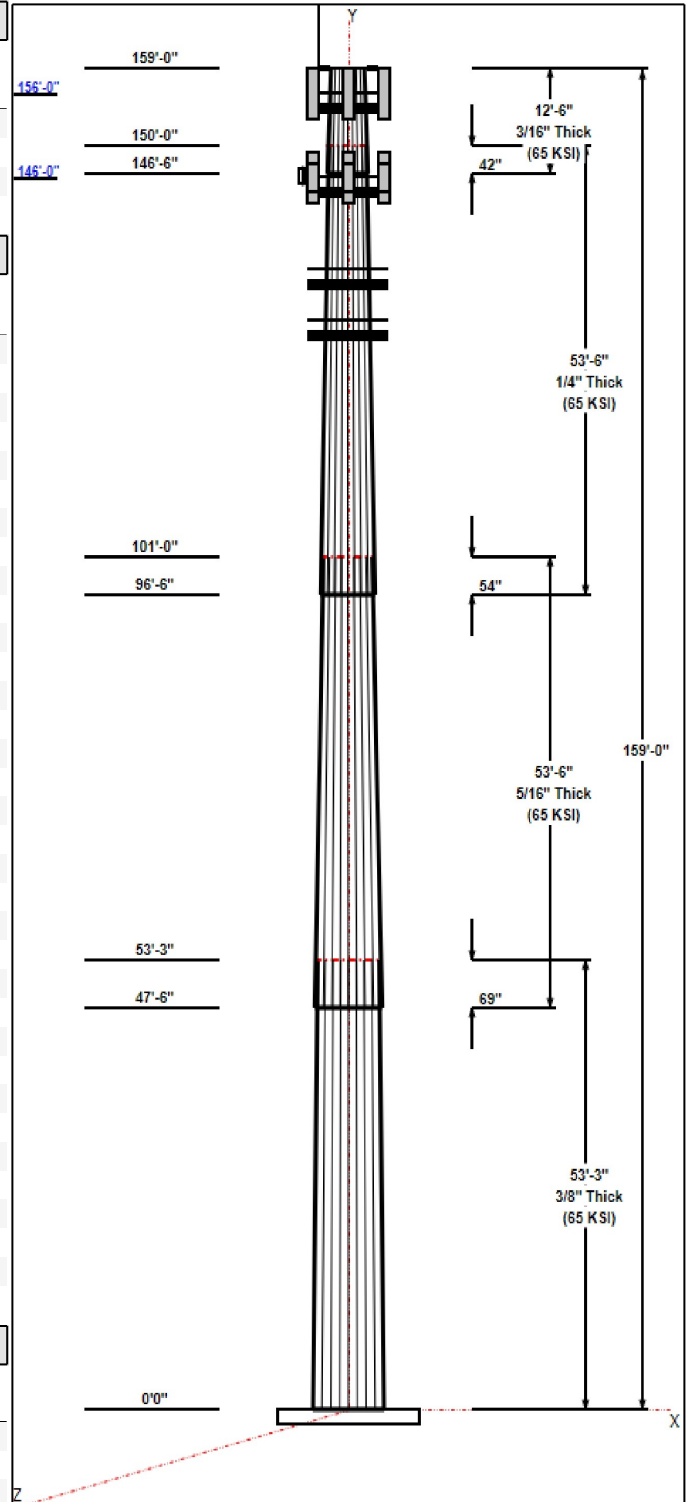
Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	53.25	43.38	53.90	0.375		0.19748	65
2	53.50	34.58	45.14	0.313	Slip	0.19748	65
3	53.50	25.40	35.97	0.250	Slip	0.19748	65
4	12.50	24.00	26.47	0.188	Slip	0.19748	65

### Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
159.00	168.00	1	Andrew ASPA685	DCSD
159.00	159.00	3	T-Arms	DCSD
156.00	156.00	3	MX08FRO665-21	Dish Wireless
156.00	156.00	1	MC-PK8-DSH	Dish Wireless
156.00	156.00	3	TA08025-B605	Dish Wireless
156.00	156.00	3	TA08025-B604	Dish Wireless
156.00	156.00	1	RDIDC-9181-PF-48	Dish Wireless
146.00	146.00	3	Samsung MMU-H65V9	Sprint Nextel
146.00	146.00	3	Commscope	Sprint Nextel
146.00	146.00	1	Andrew VHLP2/HP2-23	Sprint Nextel
146.00	146.00	1	Ceragon Radio	Sprint Nextel
146.00	146.00	3	Samsung 4 port	Sprint Nextel
146.00	146.00	3	Samsung RRH-P4	Sprint Nextel
146.00	146.00	1	Platform w/ Hand Rail	Sprint Nextel
145.00	145.00	1	DragonWave HP Duo	Sprint Nextel
138.00	138.00	4	2' Stadium Lights	---
138.00	138.00	2	4' Standoff Arm	---
135.00	135.00	1	15' Catwalk w/ Handrail	---
135.00	135.00	2	Band-On Mount	---
135.00	135.00	4	2' Stadium Lights	---
135.00	135.00	2	4' Standoff Arm	---
133.00	133.00	4	2' Stadium Lights	---
133.00	133.00	2	4' Standoff Arm	---
133.00	133.00	1	2'x2'x3'	---
130.00	130.00	4	2' Stadium Lights	---
130.00	130.00	2	4' Standoff Arm	---
129.00	129.00	1	Band-On Mount	---
129.00	129.00	1	15' Catwalk w/ Handrail	---
124.00	124.00	4	1' Box Light	---
124.00	124.00	2	4' Standoff Arm	---
9.50	9.50	1	Light Ballast	---
6.50	6.50	1	Light Ballast	---
6.50	6.50	1	Band-On Mount	---
3.50	3.50	1	Light Ballast	---

### Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
3.00	159.00	Inside	7/8" Coax	DCSD
3.00	156.00	Inside	1.75" Hybrid	Dish Wireless
3.00	145.00	Inside	1.5" Hybrid	Sprint Nextel
3.00	145.00	Inside	1.544" Hybrid	Sprint Nextel
3.00	138.00	Inside	1/2" Coax	---
3.00	135.00	Inside	1/2" Coax	---
3.00	133.00	Inside	1/2" Coax	---
3.00	130.00	Inside	1/2" Coax	---



**Structure: OH47491-A-SBA**

**Type:** Tapered  
**Site Name:** Nw Dublin  
**Height:** 159.00 (ft)  
**Base Elev:** 1.00 (ft)

**Base Shape:** 18 Sided  
**Taper:** 0.19748

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3.00	129.00	Inside	1 5/8" Coax	---
3.00	124.00	Inside	1/2" Coax	---

**Anchor Bolts**

Qty	Specifications	Grade (ksi)	Arrangement
24	2.25" 18J	75.0	Cluster

**Base Plate**

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
2.5000	64.0	60.0	Clipped

**Reactions**

Load Case	Moment (FT-Kips)	Shear (Kips)	Axial (Kips)
1.2D + 1.6W 89 mph Wind	3268.7	28.3	42.1
0.9D + 1.6W 89 mph Wind	3226.2	28.3	31.6
1.2D + 1.0Di + 1.0Wi 40 mph Wind	759.5	6.5	62.0
1.2D + 1.0E	141.8	1.1	42.1
0.9D + 1.0E	139.8	1.1	31.6
1.0D + 1.0W 60 mph Wind	921.8	8.0	35.1



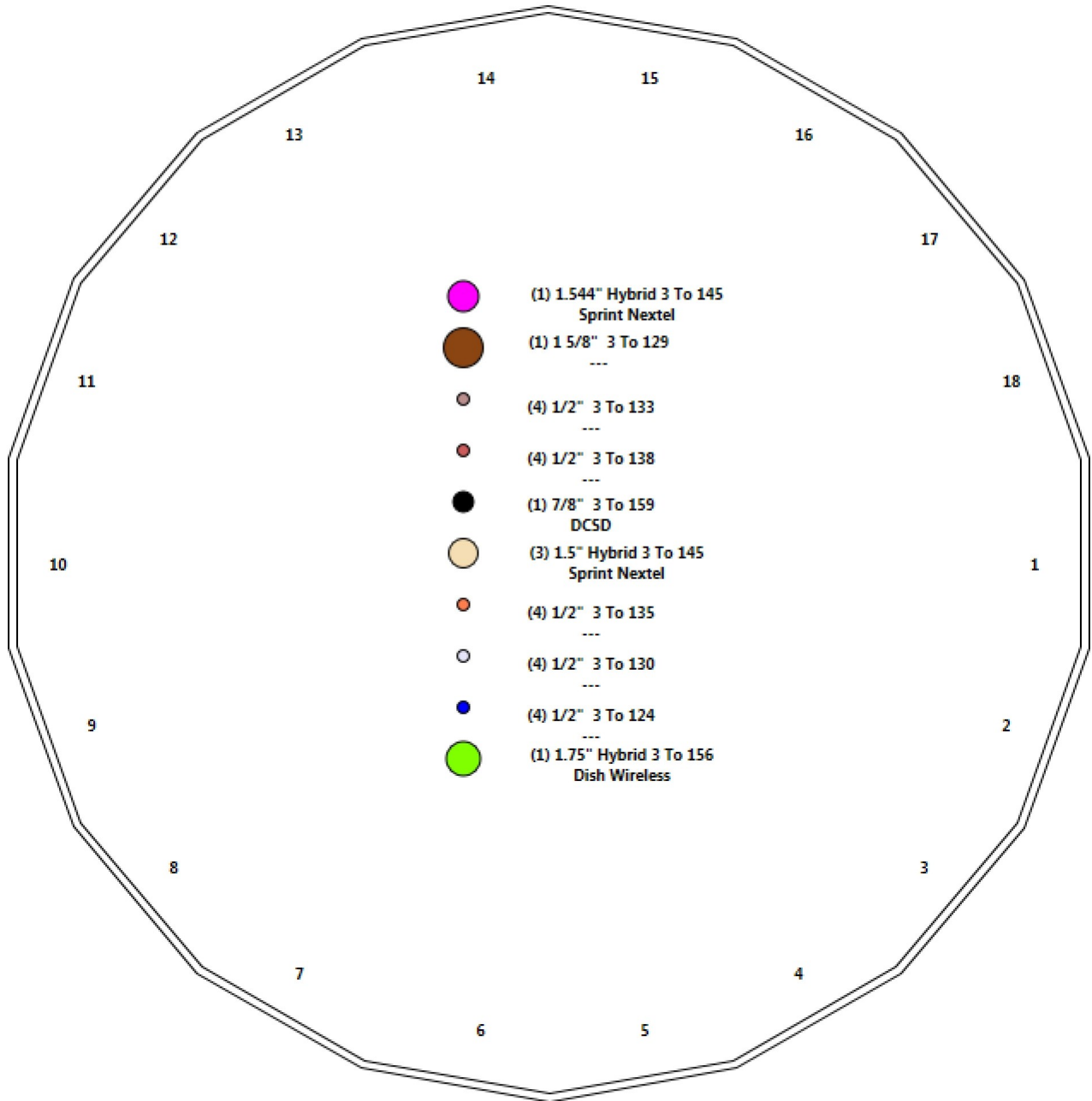
# Structure: OH47491-A-SBA - Coax Line Placement

Type: Monopole  
Site Name: Nw Dublin  
Height: 159.00 (ft)

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## Shaft Properties

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	18	53.250	0.3750	65		0.00	10,409
2	18	53.500	0.3125	65	Slip	69.00	7,141
3	18	53.500	0.2500	65	Slip	54.00	4,396
4	18	12.500	0.1875	65	Slip	42.00	634
<b>Total Shaft Weight:</b>							<b>22,581</b>

Bottom

Top

Sec. No.	Dia (in)	Elev (ft)	Area (sqin)	Ix (in^4)	W/t Ratio	D/t Ratio	Dia (in)	Elev (ft)	Area (sqin)	Ix (in^4)	W/t Ratio	D/t Ratio	Taper
1	53.90	0.00	63.71	23059.28	23.93	143.73	43.38	53.25	51.19	11963.3	18.99	115.6	0.197484
2	45.14	47.50	44.47	11291.68	24.06	144.46	34.58	101.00	33.99	5042.05	18.10	110.6	0.197484
3	35.97	96.50	28.34	4568.12	23.96	143.87	25.40	150.00	19.96	1595.22	16.51	101.6	0.197484
4	26.47	146.5	15.64	1364.82	23.48	141.17	24.00	159.00	14.17	1015.22	21.16	128.0	0.197484

## Load Summary

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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### Discrete Appurtenances

No.	Elev (ft)	Description	Qty	No Ice			Ice			Hor. Ecc. (ft)	Vert Ecc (ft)
				Weight (lb)	CaAa (sf)	CaAa Factor	Weight (lb)	CaAa (sf)	CaAa Factor		
1	159.00	Andrew ASPA685	1	55.00	5.40	1.00	191.64	11.842	1.00	0.00	9.00
2	159.00	T-Arms	3	350.00	8.00	0.75	595.91	15.026	0.75	0.00	0.00
3	156.00	MX08FRO665-21	3	64.50	12.49	0.74	356.70	13.961	0.74	0.00	0.00
4	156.00	MC-PK8-DSH	1	1727.00	37.59	1.00	3422.55	85.040	1.00	0.00	0.00
5	156.00	TA08025-B605	3	75.00	1.96	0.67	127.54	2.523	0.67	0.00	0.00
6	156.00	TA08025-B604	3	63.90	1.96	0.67	114.76	2.523	0.67	0.00	0.00
7	156.00	RDIDC-9181-PF-48	1	21.85	2.01	1.00	75.22	2.581	1.00	0.00	0.00
8	146.00	Samsung MMU-H65V9	3	153.30	6.78	0.67	310.54	7.872	0.67	0.00	0.00
9	146.00	Commscope NNVV-65B-R4	3	84.70	12.27	0.73	396.56	13.723	0.73	0.00	0.00
10	146.00	Andrew VHLP2/HP2-23	1	27.00	4.68	1.00	124.66	21.608	1.00	0.00	0.00
11	146.00	Ceragon Radio	1	10.00	0.29	0.60	28.47	0.559	0.60	0.00	0.00
12	146.00	Samsung 4 port radio/RFD01F-26A	3	48.00	1.58	0.60	108.75	2.112	0.60	0.00	0.00
13	146.00	Samsung RRH-P4	3	62.70	2.74	0.67	136.96	3.427	0.67	0.00	0.00
14	146.00	Platform w/ Hand Rail (Sabre	1	2246.00	51.70	1.00	4593.11	89.879	1.00	0.00	0.00
15	145.00	DragonWave HP Duo	1	12.00	0.29	0.60	30.45	0.559	0.60	0.00	0.00
16	138.00	2' Stadium Lights	4	25.00	2.80	1.00	68.30	3.925	1.00	0.00	0.00
17	138.00	4' Standoff Arm	2	76.00	2.00	1.00	227.37	6.504	1.00	0.00	0.00
18	135.00	15' Catwalk w/ Handrail	1	1000.00	30.00	1.00	2080.12	37.183	1.00	0.00	0.00
19	135.00	Band-On Mount	2	5.00	0.10	1.00	13.64	0.140	1.00	0.00	0.00
20	135.00	2' Stadium Lights	4	25.00	2.80	1.00	68.20	3.923	1.00	0.00	0.00
21	135.00	4' Standoff Arm	2	76.00	2.00	1.00	227.04	6.495	1.00	0.00	0.00
22	133.00	2' Stadium Lights	4	25.00	2.80	1.00	68.14	3.921	1.00	0.00	0.00
23	133.00	4' Standoff Arm	2	76.00	2.00	1.00	226.82	6.488	1.00	0.00	0.00
24	133.00	2'x2'x3'	1	45.00	5.60	1.00	122.65	5.604	1.00	0.00	0.00
25	130.00	2' Stadium Lights	4	25.00	2.80	1.00	68.04	3.918	1.00	0.00	0.00
26	130.00	4' Standoff Arm	2	76.00	2.00	1.00	226.48	6.478	1.00	0.00	0.00
27	129.00	Band-On Mount	1	5.00	0.10	1.00	13.60	0.140	1.00	0.00	0.00
28	129.00	15' Catwalk w/ Handrail	1	1000.00	30.00	1.00	2075.26	37.151	1.00	0.00	0.00
29	124.00	1' Box Light	4	25.00	1.40	1.00	67.84	1.957	1.00	0.00	0.00
30	124.00	4' Standoff Arm	2	76.00	2.00	1.00	225.78	6.457	1.00	0.00	0.00
31	9.50	Light Ballast	1	300.00	6.30	1.00	701.31	8.255	1.00	0.00	0.00
32	6.50	Light Ballast	1	300.00	6.30	1.00	688.03	8.191	1.00	0.00	0.00
33	6.50	Band-On Mount	1	5.00	0.10	1.00	11.47	0.130	1.00	0.00	0.00
34	3.50	Light Ballast	1	300.00	6.30	1.00	668.71	8.096	1.00	0.00	0.00
<b>Totals:</b>			<b>71</b>	<b>11,030.15</b>			<b>24,926.83</b>				

### Linear Appurtenances

Bottom Elev. (ft)	Top Elev. (ft)	Description	Exposed Width	Exposed
3.00	159.00	(1) 7/8" Coax	0.00	Inside
3.00	156.00	(1) 1.75" Hybrid	0.00	Inside
3.00	145.00	(3) 1.5" Hybrid	0.00	Inside
3.00	145.00	(1) 1.544" Hybrid	0.00	Inside
3.00	138.00	(4) 1/2" Coax	0.00	Inside
3.00	135.00	(4) 1/2" Coax	0.00	Inside
3.00	133.00	(4) 1/2" Coax	0.00	Inside

## Discrete Appurtenances

No.	Elev (ft)	Description	Qty	No Ice			Ice			Hor. Ecc. (ft)	Vert Ecc (ft)
				Weight (lb)	CaAa (sf)	CaAa Factor	Weight (lb)	CaAa (sf)	CaAa Factor		
3.00	130.00	(4) 1/2" Coax		0.00		Inside					
3.00	129.00	(1) 1 5/8" Coax		0.00		Inside					
3.00	124.00	(4) 1/2" Coax		0.00		Inside					

## Shaft Section Properties

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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**Increment Length:** 5 (ft)

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fpy (ksi)	S (in^3)	Weight (lb)
0.00		0.3750	53.900	63.706	23059.3	23.93	143.73	73.3	842.6	0.0
3.50		0.3750	53.209	62.883	22177.4	23.61	141.89	73.6	820.9	753.8
5.00		0.3750	52.913	62.531	21806.5	23.47	141.10	73.8	811.7	320.1
6.50		0.3750	52.616	62.178	21439.7	23.33	140.31	74.0	802.6	318.3
9.50		0.3750	52.024	61.473	20718.5	23.05	138.73	74.3	784.4	631.1
10.00		0.3750	51.925	61.355	20599.9	23.00	138.47	74.3	781.4	104.5
15.00		0.3750	50.938	60.180	19438.7	22.54	135.83	74.9	751.6	1033.9
20.00		0.3750	49.950	59.005	18322.0	22.08	133.20	75.4	722.5	1013.9
25.00		0.3750	48.963	57.830	17248.8	21.61	130.57	76.0	693.9	993.9
30.00		0.3750	47.975	56.654	16218.5	21.15	127.93	76.5	665.8	973.9
35.00		0.3750	46.988	55.479	15229.9	20.68	125.30	77.1	638.4	953.9
40.00		0.3750	46.001	54.304	14282.4	20.22	122.67	77.6	611.5	933.9
45.00		0.3750	45.013	53.129	13375.1	19.75	120.04	78.2	585.2	913.9
47.50	Bot - Section 2	0.3750	44.519	52.541	12936.2	19.52	118.72	78.4	572.3	449.5
50.00		0.3750	44.026	51.953	12507.0	19.29	117.40	78.7	559.5	820.7
53.25	Top - Section 1	0.3125	44.009	43.340	10455.2	23.42	140.83	0.0	0.0	1053.1
55.00		0.3125	43.663	42.997	10209.1	23.23	139.72	74.1	460.5	257.1
60.00		0.3125	42.676	42.018	9527.3	22.67	136.56	74.7	439.7	723.2
65.00		0.3125	41.689	41.038	8876.5	22.11	133.40	75.4	419.4	706.6
70.00		0.3125	40.701	40.059	8256.0	21.55	130.24	76.0	399.5	689.9
75.00		0.3125	39.714	39.080	7665.2	21.00	127.08	76.7	380.2	673.2
80.00		0.3125	38.726	38.100	7103.2	20.44	123.92	77.4	361.3	656.6
85.00		0.3125	37.739	37.121	6569.4	19.88	120.76	78.0	342.9	639.9
90.00		0.3125	36.751	36.142	6063.0	19.33	117.60	78.7	324.9	623.2
95.00		0.3125	35.764	35.162	5583.4	18.77	114.44	79.3	307.5	606.6
96.50	Bot - Section 3	0.3125	35.468	34.868	5444.6	18.60	113.50	79.5	302.4	178.7
100.00		0.3125	34.777	34.183	5129.7	18.21	111.29	80.0	290.5	745.5
101.00	Top - Section 2	0.2500	35.079	27.636	4235.6	23.33	140.32	0.0	0.0	210.3
105.00		0.2500	34.289	27.009	3953.9	22.77	137.16	74.6	227.1	371.9
110.00		0.2500	33.302	26.226	3619.7	22.08	133.21	75.4	214.1	452.9
115.00		0.2500	32.314	25.442	3304.8	21.38	129.26	76.3	201.4	439.5
120.00		0.2500	31.327	24.659	3008.8	20.68	125.31	77.1	189.2	426.2
124.00		0.2500	30.537	24.032	2785.2	20.13	122.15	77.7	179.6	331.4
125.00		0.2500	30.339	23.875	2731.0	19.99	121.36	77.9	177.3	81.5
129.00		0.2500	29.550	23.248	2521.5	19.43	118.20	78.5	168.1	320.7
130.00		0.2500	29.352	23.092	2470.9	19.29	117.41	78.7	165.8	78.8
133.00		0.2500	28.760	22.622	2323.0	18.87	115.04	79.2	159.1	233.3
135.00		0.2500	28.365	22.308	2227.8	18.60	113.46	79.5	154.7	152.9
138.00		0.2500	27.772	21.838	2089.9	18.18	111.09	80.0	148.2	225.3
140.00		0.2500	27.377	21.525	2001.2	17.90	109.51	80.3	144.0	147.6
145.00		0.2500	26.390	20.741	1790.6	17.20	105.56	81.2	133.6	359.6
146.00		0.2500	26.192	20.584	1750.3	17.06	104.77	81.3	131.6	70.3
146.50	Bot - Section 4	0.2500	26.094	20.506	1730.4	16.99	104.37	81.4	130.6	35.0
150.00	Top - Section 3	0.1875	25.777	15.229	1259.9	22.83	137.48	0.0	0.0	424.8
155.00		0.1875	24.790	14.641	1119.6	21.90	132.21	75.6	89.0	254.1
156.00		0.1875	24.592	14.523	1092.9	21.72	131.16	75.9	87.5	49.6
159.00		0.1875	24.000	14.171	1015.2	21.16	128.00	76.5	83.3	146.5

**22580.9**

## Wind Loading - Shaft

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



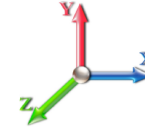
Page: 9

**Load Case:** 1.2D + 1.6W 89 mph Wind

**Iterations** 26

**Dead Load Factor** 1.20

**Wind Load Factor** 1.60



Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	16.374	18.01	374.24	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
3.50	Appurtenance(s)	1.00	0.85	16.374	18.01	369.45	0.650	0.000	3.50	15.861	10.31	297.1	0.0	904.6
5.00		1.00	0.85	16.374	18.01	367.39	0.650	0.000	1.50	6.735	4.38	126.2	0.0	384.1
6.50	Appurtenance(s)	1.00	0.85	16.374	18.01	365.33	0.650	0.000	1.50	6.697	4.35	125.5	0.0	381.9
9.50	Appurtenance(s)	1.00	0.85	16.374	18.01	361.22	0.650	0.000	3.00	13.282	8.63	248.8	0.0	757.4
10.00		1.00	0.85	16.374	18.01	360.53	0.650	0.000	0.50	2.199	1.43	41.2	0.0	125.4
15.00		1.00	0.86	16.576	18.23	355.85	0.650	0.000	5.00	21.760	14.14	412.7	0.0	1240.7
20.00		1.00	0.91	17.553	19.31	359.09	0.650	0.000	5.00	21.343	13.87	428.6	0.0	1216.7
25.00		1.00	0.95	18.360	20.20	359.99	0.650	0.000	5.00	20.925	13.60	439.5	0.0	1192.7
30.00		1.00	0.99	19.053	20.96	359.32	0.650	0.000	5.00	20.507	13.33	447.0	0.0	1168.7
35.00		1.00	1.02	19.662	21.63	357.51	0.650	0.000	5.00	20.089	13.06	451.9	0.0	1144.7
40.00		1.00	1.05	20.208	22.23	354.82	0.650	0.000	5.00	19.671	12.79	454.8	0.0	1120.7
45.00		1.00	1.07	20.704	22.77	351.44	0.650	0.000	5.00	19.254	12.51	456.0	0.0	1096.7
47.50	Bot - Section 2	1.00	1.09	20.936	23.03	349.53	0.650	0.000	2.50	9.470	6.16	226.8	0.0	539.4
50.00		1.00	1.10	21.158	23.27	347.48	0.650	0.000	2.50	9.498	6.17	229.9	0.0	984.8
53.25	Top - Section 1	1.00	1.11	21.435	23.58	344.65	0.650	0.000	3.25	12.191	7.92	299.0	0.0	1263.8
55.00		1.00	1.12	21.579	23.74	348.03	0.650	0.000	1.75	6.491	4.22	160.2	0.0	308.5
60.00		1.00	1.14	21.971	24.17	343.24	0.650	0.000	5.00	18.265	11.87	459.1	0.0	867.9
65.00		1.00	1.16	22.339	24.57	338.09	0.650	0.000	5.00	17.847	11.60	456.1	0.0	847.9
70.00		1.00	1.18	22.685	24.95	332.63	0.650	0.000	5.00	17.429	11.33	452.3	0.0	827.9
75.00		1.00	1.19	23.012	25.31	326.89	0.650	0.000	5.00	17.012	11.06	447.8	0.0	807.9
80.00		1.00	1.21	23.323	25.66	320.91	0.650	0.000	5.00	16.594	10.79	442.7	0.0	787.9
85.00		1.00	1.23	23.619	25.98	314.70	0.650	0.000	5.00	16.176	10.51	437.1	0.0	767.9
90.00		1.00	1.24	23.901	26.29	308.30	0.650	0.000	5.00	15.758	10.24	430.9	0.0	747.9
95.00		1.00	1.25	24.172	26.59	301.71	0.650	0.000	5.00	15.340	9.97	424.2	0.0	727.9
96.50	Bot - Section 3	1.00	1.26	24.251	26.68	299.70	0.650	0.000	1.50	4.521	2.94	125.4	0.0	214.5
100.00		1.00	1.27	24.432	26.88	294.95	0.650	0.000	3.50	10.550	6.86	294.9	0.0	894.5
101.00	Top - Section 2	1.00	1.27	24.483	26.93	293.58	0.650	0.000	1.00	2.977	1.93	83.4	0.0	252.3
105.00		1.00	1.28	24.682	27.15	292.30	0.650	0.000	4.00	11.740	7.63	331.5	0.0	446.3
110.00		1.00	1.29	24.922	27.41	285.26	0.650	0.000	5.00	14.299	9.29	407.7	0.0	543.4
115.00		1.00	1.31	25.155	27.67	278.09	0.650	0.000	5.00	13.881	9.02	399.4	0.0	527.4
120.00		1.00	1.32	25.379	27.92	270.79	0.650	0.000	5.00	13.463	8.75	390.9	0.0	511.4
124.00	Appurtenance(s)	1.00	1.33	25.553	28.11	264.87	0.650	0.000	4.00	10.470	6.81	306.1	0.0	397.6
125.00		1.00	1.33	25.596	28.16	263.38	0.650	0.000	1.00	2.576	1.67	75.4	0.0	97.8
129.00	Appurtenance(s)	1.00	1.34	25.765	28.34	257.37	0.650	0.000	4.00	10.135	6.59	298.7	0.0	384.8
130.00	Appurtenance(s)	1.00	1.34	25.807	28.39	255.85	0.650	0.000	1.00	2.492	1.62	73.6	0.0	94.6
133.00	Appurtenance(s)	1.00	1.35	25.930	28.52	251.29	0.650	0.000	3.00	7.376	4.79	218.8	0.0	280.0
135.00	Appurtenance(s)	1.00	1.35	26.011	28.61	248.22	0.650	0.000	2.00	4.834	3.14	143.8	0.0	183.5
138.00	Appurtenance(s)	1.00	1.36	26.131	28.74	243.60	0.650	0.000	3.00	7.125	4.63	213.0	0.0	270.4
140.00		1.00	1.36	26.210	28.83	240.49	0.650	0.000	2.00	4.667	3.03	139.9	0.0	177.1
145.00	Appurtenance(s)	1.00	1.37	26.403	29.04	232.67	0.650	0.000	5.00	11.374	7.39	343.6	0.0	431.5
146.00	Appurtenance(s)	1.00	1.37	26.441	29.08	231.10	0.650	0.000	1.00	2.225	1.45	67.3	0.0	84.4
146.50	Bot - Section 4	1.00	1.37	26.460	29.11	230.31	0.650	0.000	0.50	1.106	0.72	33.5	0.0	41.9
150.00	Top - Section 3	1.00	1.38	26.590	29.25	224.76	0.650	0.000	3.50	7.737	5.03	235.3	0.0	509.7
155.00		1.00	1.39	26.773	29.45	220.10	0.650	0.000	5.00	10.697	6.95	327.6	0.0	304.9
156.00	Appurtenance(s)	1.00	1.39	26.809	29.49	218.49	0.650	0.000	1.00	2.089	1.36	64.1	0.0	59.5
159.00	Appurtenance(s)	1.00	1.40	26.917	29.61	213.65	0.650	0.000	3.00	6.168	4.01	189.9	0.0	175.8

## Wind Loading - Shaft

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II
		<b>Page:</b> 10



<b>Totals:</b>	<b>159.00</b>	<b>13,159.1</b>	<b>27,097.1</b>
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## Discrete Appurtenance Forces

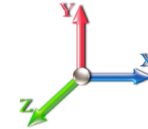
<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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**Load Case:** 1.2D + 1.6W 89 mph Wind

**Dead Load Factor** 1.20  
**Wind Load Factor** 1.60



**Iterations** 26

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	159.00	Andrew ASPA685	1	27.228	29.951	1.00	1.00	5.40	66.00	0.000	9.000	258.78	0.00	2329.01
2	159.00	T-Arms	3	26.917	29.608	0.56	0.75	13.50	1260.00	0.000	0.000	639.54	0.00	0.00
3	156.00	RDIDC-9181-PF-48	1	26.809	29.490	1.00	1.00	2.01	26.22	0.000	0.000	94.84	0.00	0.00
4	156.00	TA08025-B604	3	26.809	29.490	0.50	0.75	2.95	230.04	0.000	0.000	139.42	0.00	0.00
5	156.00	TA08025-B605	3	26.809	29.490	0.50	0.75	2.95	270.00	0.000	0.000	139.42	0.00	0.00
6	156.00	MC-PK8-DSH	1	26.809	29.490	1.00	1.00	37.59	2072.40	0.000	0.000	1773.67	0.00	0.00
7	156.00	MX08FRO665-21	3	26.809	29.490	0.55	0.75	20.80	232.20	0.000	0.000	981.25	0.00	0.00
8	146.00	Andrew VHLP2/HP2-23	1	26.441	29.085	0.75	0.75	3.51	32.40	0.000	0.000	163.34	0.00	0.00
9	146.00	Samsung MMU-H65V9	3	26.441	29.085	0.50	0.75	10.22	551.88	0.000	0.000	475.63	0.00	0.00
10	146.00	Commscope	3	26.441	29.085	0.55	0.75	20.15	304.92	0.000	0.000	937.85	0.00	0.00
11	146.00	Samsung RRH-P4	3	26.441	29.085	0.50	0.75	4.13	225.72	0.000	0.000	192.22	0.00	0.00
12	146.00	Ceragon Radio	1	26.441	29.085	0.45	0.75	0.13	12.00	0.000	0.000	6.07	0.00	0.00
13	146.00	Samsung 4 port	3	26.441	29.085	0.45	0.75	2.13	172.80	0.000	0.000	99.26	0.00	0.00
14	146.00	Platform w/ Hand Rail	1	26.441	29.085	1.00	1.00	51.70	2695.20	0.000	0.000	2405.88	0.00	0.00
15	145.00	DragonWave HP Duo	1	26.403	29.043	0.45	0.75	0.13	14.40	0.000	0.000	6.06	0.00	0.00
16	138.00	4' Standoff Arm	2	26.131	28.744	1.00	1.00	4.00	182.40	0.000	0.000	183.96	0.00	0.00
17	138.00	2' Stadium Lights	4	26.131	28.744	1.00	1.00	11.20	120.00	0.000	0.000	515.09	0.00	0.00
18	135.00	4' Standoff Arm	2	26.011	28.612	1.00	1.00	4.00	182.40	0.000	0.000	183.12	0.00	0.00
19	135.00	2' Stadium Lights	4	26.011	28.612	1.00	1.00	11.20	120.00	0.000	0.000	512.73	0.00	0.00
20	135.00	Band-On Mount	2	26.011	28.612	1.00	1.00	0.20	12.00	0.000	0.000	9.16	0.00	0.00
21	135.00	15' Catwalk w/ Handrail	1	26.011	28.612	1.00	1.00	30.00	1200.00	0.000	0.000	1373.39	0.00	0.00
22	133.00	4' Standoff Arm	2	25.930	28.523	1.00	1.00	4.00	182.40	0.000	0.000	182.55	0.00	0.00
23	133.00	2' Stadium Lights	4	25.930	28.523	1.00	1.00	11.20	120.00	0.000	0.000	511.14	0.00	0.00
24	133.00	2'x2'x3'	1	25.930	28.523	1.00	1.00	5.60	54.00	0.000	0.000	255.57	0.00	0.00
25	130.00	2' Stadium Lights	4	25.807	28.388	1.00	1.00	11.20	120.00	0.000	0.000	508.70	0.00	0.00
26	130.00	4' Standoff Arm	2	25.807	28.388	1.00	1.00	4.00	182.40	0.000	0.000	181.68	0.00	0.00
27	129.00	15' Catwalk w/ Handrail	1	25.765	28.342	1.00	1.00	30.00	1200.00	0.000	0.000	1360.41	0.00	0.00
28	129.00	Band-On Mount	1	25.765	28.342	1.00	1.00	0.10	6.00	0.000	0.000	4.53	0.00	0.00
29	124.00	4' Standoff Arm	2	25.553	28.109	1.00	1.00	4.00	182.40	0.000	0.000	179.90	0.00	0.00
30	124.00	1' Box Light	4	25.553	28.109	1.00	1.00	5.60	120.00	0.000	0.000	251.85	0.00	0.00
31	9.50	Light Ballast	1	16.374	18.012	1.00	1.00	6.30	360.00	0.000	0.000	181.56	0.00	0.00
32	6.50	Band-On Mount	1	16.374	18.012	1.00	1.00	0.10	6.00	0.000	0.000	2.88	0.00	0.00
33	6.50	Light Ballast	1	16.374	18.012	1.00	1.00	6.30	360.00	0.000	0.000	181.56	0.00	0.00
34	3.50	Light Ballast	1	16.374	18.012	1.00	1.00	6.30	360.00	0.000	0.000	181.56	0.00	0.00

**Totals:** 13,236.18

15,074.56



## Total Applied Force Summary

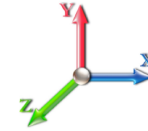
<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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**Load Case:** 1.2D + 1.6W 89 mph Wind

**Dead Load Factor** 1.20  
**Wind Load Factor** 1.60



**Iterations** 26

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
3.50	(1) attachments	478.67	1271.04	0.00	0.00
5.00		126.16	403.45	0.00	0.00
6.50	(2) attachments	309.90	767.29	0.00	0.00
9.50	(1) attachments	430.36	1156.11	0.00	0.00
10.00		41.19	131.84	0.00	0.00
15.00		412.65	1305.25	0.00	0.00
20.00		428.58	1281.26	0.00	0.00
25.00		439.51	1257.26	0.00	0.00
30.00		446.99	1233.27	0.00	0.00
35.00		451.88	1209.28	0.00	0.00
40.00		454.77	1185.28	0.00	0.00
45.00		456.03	1161.29	0.00	0.00
47.50		226.82	571.65	0.00	0.00
50.00		229.90	1017.07	0.00	0.00
53.25		298.95	1305.75	0.00	0.00
55.00		160.25	331.08	0.00	0.00
60.00		459.09	932.44	0.00	0.00
65.00		456.09	912.44	0.00	0.00
70.00		452.31	892.45	0.00	0.00
75.00		447.84	872.45	0.00	0.00
80.00		442.74	852.46	0.00	0.00
85.00		437.07	832.46	0.00	0.00
90.00		430.88	812.47	0.00	0.00
95.00		424.21	792.47	0.00	0.00
96.50		125.42	233.84	0.00	0.00
100.00		294.88	939.75	0.00	0.00
101.00		83.37	265.26	0.00	0.00
105.00		331.48	497.93	0.00	0.00
110.00		407.67	608.02	0.00	0.00
115.00		399.45	592.02	0.00	0.00
120.00		390.88	576.02	0.00	0.00
124.00	(6) attachments	737.81	751.70	0.00	0.00
125.00		75.42	109.96	0.00	0.00
129.00	(2) attachments	1663.69	1639.43	0.00	0.00
130.00	(6) attachments	763.96	407.91	0.00	0.00
133.00	(7) attachments	1168.05	666.79	0.00	0.00
135.00	(9) attachments	2222.23	1716.59	0.00	0.00
138.00	(6) attachments	912.06	598.58	0.00	0.00
140.00		139.92	192.72	0.00	0.00
145.00	(1) attachments	349.62	485.00	0.00	0.00
146.00	(15) attachments	4347.55	4082.31	0.00	0.00
146.50		33.48	43.45	0.00	0.00
150.00		235.35	520.28	0.00	0.00
155.00		327.65	319.98	0.00	0.00
156.00	(11) attachments	3192.67	2893.42	0.00	0.00
159.00	(4) attachments	1088.24	1503.63	0.00	2329.01

## Total Applied Force Summary

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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<b>Totals:</b>	<b>28,233.68</b>	<b>42,132.40</b>	<b>0.00</b>	<b>2,329.01</b>
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## Calculated Forces

**Structure:** OH47491-A-SBA  
**Site Name:** Nw Dublin  
**Height:** 159.00 (ft)  
**Base Elev:** 1.000 (ft)  
**Gh:** 1.1

**Topography:** 1

**Code:** EIA/TIA-222-G  
**Exposure:** C  
**Crest Height:** 0.00  
**Site Class:** C - Very Dense Soil  
**Struct Class:** II

6/25/2021

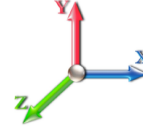
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**Load Case:** 1.2D + 1.6W 89 mph Wind

**Iterations** 26

**Dead Load Factor** 1.20  
**Wind Load Factor** 1.60



Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-42.10	-28.29	0.00	-3268.7	0.00	3268.72	4199.85	2099.92	9244.78	4629.26	0.00	0.000	0.000	0.716
3.50	-40.78	-27.88	0.00	-3169.7	0.00	3169.73	4167.25	2083.62	9053.74	4533.60	0.05	-0.139	0.000	0.709
5.00	-40.35	-27.79	0.00	-3127.9	0.00	3127.92	4153.10	2076.55	8972.06	4492.70	0.11	-0.200	0.000	0.706
6.50	-39.54	-27.54	0.00	-3086.2	0.00	3086.23	4138.85	2069.43	8890.50	4451.86	0.18	-0.260	0.000	0.703
9.50	-38.35	-27.15	0.00	-3003.6	0.00	3003.61	4110.04	2055.02	8727.78	4370.38	0.38	-0.382	0.000	0.697
10.00	-38.16	-27.18	0.00	-2990.0	0.00	2990.03	4105.20	2052.60	8700.71	4356.82	0.42	-0.402	0.000	0.696
15.00	-36.77	-26.89	0.00	-2854.1	0.00	2854.12	4056.14	2028.07	8430.88	4221.71	0.95	-0.604	0.000	0.685
20.00	-35.40	-26.57	0.00	-2719.6	0.00	2719.67	4005.93	2002.97	8162.71	4087.42	1.69	-0.808	0.000	0.674
25.00	-34.05	-26.24	0.00	-2586.8	0.00	2586.81	3954.57	1977.28	7896.34	3954.04	2.65	-1.014	0.000	0.663
30.00	-32.73	-25.88	0.00	-2455.6	0.00	2455.63	3902.04	1951.02	7631.91	3821.63	3.82	-1.222	0.000	0.651
35.00	-31.44	-25.52	0.00	-2326.2	0.00	2326.21	3848.37	1924.18	7369.57	3690.26	5.22	-1.432	0.000	0.639
40.00	-30.18	-25.15	0.00	-2198.6	0.00	2198.61	3793.53	1896.77	7109.45	3560.01	6.83	-1.643	0.000	0.626
45.00	-28.96	-24.74	0.00	-2072.8	0.00	2072.88	3737.54	1868.77	6851.70	3430.94	8.66	-1.856	0.000	0.612
47.50	-28.35	-24.54	0.00	-2011.0	0.00	2011.04	3709.12	1854.56	6723.75	3366.87	9.66	-1.964	0.000	0.605
50.00	-27.29	-24.34	0.00	-1949.6	0.00	1949.68	3680.40	1840.20	6596.45	3303.13	10.72	-2.073	0.000	0.598
53.25	-25.95	-24.04	0.00	-1870.5	0.00	1870.58	2880.71	1440.35	5175.93	2591.81	12.18	-2.214	0.000	0.731
55.00	-25.56	-23.94	0.00	-1828.5	0.00	1828.52	2866.80	1433.40	5109.91	2558.75	13.01	-2.291	0.000	0.724
60.00	-24.54	-23.55	0.00	-1708.8	0.00	1708.82	2826.28	1413.14	4922.13	2464.72	15.54	-2.538	0.000	0.702
65.00	-23.55	-23.15	0.00	-1591.0	0.00	1591.09	2784.61	1392.30	4735.69	2371.36	18.33	-2.784	0.000	0.680
70.00	-22.59	-22.75	0.00	-1475.3	0.00	1475.34	2741.78	1370.89	4550.74	2278.75	21.38	-3.030	0.000	0.656
75.00	-21.65	-22.35	0.00	-1361.5	0.00	1361.59	2697.80	1348.90	4367.43	2186.96	24.68	-3.274	0.000	0.631
80.00	-20.73	-21.94	0.00	-1249.8	0.00	1249.85	2652.66	1326.33	4185.88	2096.05	28.24	-3.516	0.000	0.604
85.00	-19.84	-21.54	0.00	-1140.1	0.00	1140.14	2606.36	1303.18	4006.26	2006.11	32.05	-3.756	0.000	0.576
90.00	-18.97	-21.13	0.00	-1032.4	0.00	1032.47	2558.91	1279.46	3828.69	1917.19	36.10	-3.991	0.000	0.546
95.00	-18.16	-20.70	0.00	-926.83	0.00	926.83	2510.31	1255.15	3653.33	1829.38	40.40	-4.221	0.000	0.514
96.50	-17.89	-20.59	0.00	-895.79	0.00	895.79	2495.50	1247.75	3601.17	1803.26	41.74	-4.291	0.000	0.504
100.00	-16.94	-20.25	0.00	-823.73	0.00	823.73	2460.55	1230.28	3480.30	1742.74	44.94	-4.448	0.000	0.480
101.00	-16.65	-20.18	0.00	-803.48	0.00	803.48	1839.54	919.77	2634.41	1319.16	45.88	-4.493	0.000	0.619
105.00	-16.10	-19.87	0.00	-722.75	0.00	722.75	1813.75	906.87	2538.14	1270.96	49.71	-4.665	0.000	0.578
110.00	-15.45	-19.48	0.00	-623.41	0.00	623.41	1780.47	890.23	2418.76	1211.18	54.73	-4.907	0.000	0.524
115.00	-14.83	-19.08	0.00	-526.03	0.00	526.03	1746.03	873.02	2300.59	1152.00	59.98	-5.133	0.000	0.466
120.00	-14.23	-18.68	0.00	-430.62	0.00	430.62	1710.44	855.22	2183.75	1093.50	65.47	-5.339	0.000	0.403
124.00	-13.52	-17.90	0.00	-355.89	0.00	355.89	1681.14	840.57	2091.35	1047.23	70.00	-5.488	0.000	0.348
125.00	-13.40	-17.83	0.00	-337.99	0.00	337.99	1673.69	836.85	2068.40	1035.74	71.15	-5.523	0.000	0.335
129.00	-11.91	-16.03	0.00	-266.65	0.00	266.65	1643.47	821.73	1977.29	990.11	75.83	-5.649	0.000	0.277
130.00	-11.56	-15.24	0.00	-250.62	0.00	250.62	1635.79	817.90	1954.68	978.79	77.01	-5.678	0.000	0.263
133.00	-11.00	-14.03	0.00	-204.89	0.00	204.89	1612.50	806.25	1887.28	945.04	80.60	-5.757	0.000	0.224
135.00	-9.50	-11.65	0.00	-176.83	0.00	176.83	1596.74	798.37	1842.72	922.73	83.02	-5.804	0.000	0.198
138.00	-8.99	-10.69	0.00	-141.87	0.00	141.87	1572.75	786.37	1776.45	889.55	86.68	-5.865	0.000	0.165
140.00	-8.80	-10.54	0.00	-120.49	0.00	120.49	1556.53	778.26	1732.67	867.62	89.14	-5.901	0.000	0.145
145.00	-8.35	-10.15	0.00	-67.78	0.00	67.78	1515.16	757.58	1624.67	813.54	95.35	-5.967	0.000	0.089
146.00	-4.74	-5.40	0.00	-57.63	0.00	57.63	1506.75	753.37	1603.33	802.85	96.60	-5.977	0.000	0.075
146.50	-4.70	-5.36	0.00	-54.93	0.00	54.93	1502.52	751.26	1592.69	797.53	97.22	-5.982	0.000	0.072
150.00	-4.21	-5.08	0.00	-36.16	0.00	36.16	1021.73	510.87	1074.91	538.26	101.61	-6.008	0.000	0.071
155.00	-3.92	-4.72	0.00	-10.77	0.00	10.77	996.70	498.35	1007.82	504.66	107.91	-6.029	0.000	0.025
156.00	-1.38	-1.24	0.00	-6.05	0.00	6.05	991.55	495.78	994.51	497.99	109.17	-6.031	0.000	0.014
159.00	0.00	-1.09	0.00	-2.33	0.00	2.33	975.84	487.92	954.81	478.11	112.95	-6.035	0.000	0.005

## Calculated Forces

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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## Wind Loading - Shaft

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



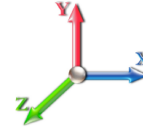
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**Load Case:** 0.9D + 1.6W 89 mph Wind

**Iterations** 26

**Dead Load Factor** 0.90

**Wind Load Factor** 1.60



Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	16.374	18.01	374.24	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
3.50	Appurtenance(s)	1.00	0.85	16.374	18.01	369.45	0.650	0.000	3.50	15.861	10.31	297.1	0.0	678.4
5.00		1.00	0.85	16.374	18.01	367.39	0.650	0.000	1.50	6.735	4.38	126.2	0.0	288.1
6.50	Appurtenance(s)	1.00	0.85	16.374	18.01	365.33	0.650	0.000	1.50	6.697	4.35	125.5	0.0	286.4
9.50	Appurtenance(s)	1.00	0.85	16.374	18.01	361.22	0.650	0.000	3.00	13.282	8.63	248.8	0.0	568.0
10.00		1.00	0.85	16.374	18.01	360.53	0.650	0.000	0.50	2.199	1.43	41.2	0.0	94.0
15.00		1.00	0.86	16.576	18.23	355.85	0.650	0.000	5.00	21.760	14.14	412.7	0.0	930.5
20.00		1.00	0.91	17.553	19.31	359.09	0.650	0.000	5.00	21.343	13.87	428.6	0.0	912.5
25.00		1.00	0.95	18.360	20.20	359.99	0.650	0.000	5.00	20.925	13.60	439.5	0.0	894.5
30.00		1.00	0.99	19.053	20.96	359.32	0.650	0.000	5.00	20.507	13.33	447.0	0.0	876.5
35.00		1.00	1.02	19.662	21.63	357.51	0.650	0.000	5.00	20.089	13.06	451.9	0.0	858.5
40.00		1.00	1.05	20.208	22.23	354.82	0.650	0.000	5.00	19.671	12.79	454.8	0.0	840.5
45.00		1.00	1.07	20.704	22.77	351.44	0.650	0.000	5.00	19.254	12.51	456.0	0.0	822.5
47.50	Bot - Section 2	1.00	1.09	20.936	23.03	349.53	0.650	0.000	2.50	9.470	6.16	226.8	0.0	404.5
50.00		1.00	1.10	21.158	23.27	347.48	0.650	0.000	2.50	9.498	6.17	229.9	0.0	738.6
53.25	Top - Section 1	1.00	1.11	21.435	23.58	344.65	0.650	0.000	3.25	12.191	7.92	299.0	0.0	947.8
55.00		1.00	1.12	21.579	23.74	348.03	0.650	0.000	1.75	6.491	4.22	160.2	0.0	231.4
60.00		1.00	1.14	21.971	24.17	343.24	0.650	0.000	5.00	18.265	11.87	459.1	0.0	650.9
65.00		1.00	1.16	22.339	24.57	338.09	0.650	0.000	5.00	17.847	11.60	456.1	0.0	635.9
70.00		1.00	1.18	22.685	24.95	332.63	0.650	0.000	5.00	17.429	11.33	452.3	0.0	620.9
75.00		1.00	1.19	23.012	25.31	326.89	0.650	0.000	5.00	17.012	11.06	447.8	0.0	605.9
80.00		1.00	1.21	23.323	25.66	320.91	0.650	0.000	5.00	16.594	10.79	442.7	0.0	590.9
85.00		1.00	1.23	23.619	25.98	314.70	0.650	0.000	5.00	16.176	10.51	437.1	0.0	575.9
90.00		1.00	1.24	23.901	26.29	308.30	0.650	0.000	5.00	15.758	10.24	430.9	0.0	560.9
95.00		1.00	1.25	24.172	26.59	301.71	0.650	0.000	5.00	15.340	9.97	424.2	0.0	545.9
96.50	Bot - Section 3	1.00	1.26	24.251	26.68	299.70	0.650	0.000	1.50	4.521	2.94	125.4	0.0	160.9
100.00		1.00	1.27	24.432	26.88	294.95	0.650	0.000	3.50	10.550	6.86	294.9	0.0	670.9
101.00	Top - Section 2	1.00	1.27	24.483	26.93	293.58	0.650	0.000	1.00	2.977	1.93	83.4	0.0	189.3
105.00		1.00	1.28	24.682	27.15	292.30	0.650	0.000	4.00	11.740	7.63	331.5	0.0	334.7
110.00		1.00	1.29	24.922	27.41	285.26	0.650	0.000	5.00	14.299	9.29	407.7	0.0	407.6
115.00		1.00	1.31	25.155	27.67	278.09	0.650	0.000	5.00	13.881	9.02	399.4	0.0	395.6
120.00		1.00	1.32	25.379	27.92	270.79	0.650	0.000	5.00	13.463	8.75	390.9	0.0	383.6
124.00	Appurtenance(s)	1.00	1.33	25.553	28.11	264.87	0.650	0.000	4.00	10.470	6.81	306.1	0.0	298.2
125.00		1.00	1.33	25.596	28.16	263.38	0.650	0.000	1.00	2.576	1.67	75.4	0.0	73.4
129.00	Appurtenance(s)	1.00	1.34	25.765	28.34	257.37	0.650	0.000	4.00	10.135	6.59	298.7	0.0	288.6
130.00	Appurtenance(s)	1.00	1.34	25.807	28.39	255.85	0.650	0.000	1.00	2.492	1.62	73.6	0.0	71.0
133.00	Appurtenance(s)	1.00	1.35	25.930	28.52	251.29	0.650	0.000	3.00	7.376	4.79	218.8	0.0	210.0
135.00	Appurtenance(s)	1.00	1.35	26.011	28.61	248.22	0.650	0.000	2.00	4.834	3.14	143.8	0.0	137.6
138.00	Appurtenance(s)	1.00	1.36	26.131	28.74	243.60	0.650	0.000	3.00	7.125	4.63	213.0	0.0	202.8
140.00		1.00	1.36	26.210	28.83	240.49	0.650	0.000	2.00	4.667	3.03	139.9	0.0	132.8
145.00	Appurtenance(s)	1.00	1.37	26.403	29.04	232.67	0.650	0.000	5.00	11.374	7.39	343.6	0.0	323.6
146.00	Appurtenance(s)	1.00	1.37	26.441	29.08	231.10	0.650	0.000	1.00	2.225	1.45	67.3	0.0	63.3
146.50	Bot - Section 4	1.00	1.37	26.460	29.11	230.31	0.650	0.000	0.50	1.106	0.72	33.5	0.0	31.5
150.00	Top - Section 3	1.00	1.38	26.590	29.25	224.76	0.650	0.000	3.50	7.737	5.03	235.3	0.0	382.3
155.00		1.00	1.39	26.773	29.45	220.10	0.650	0.000	5.00	10.697	6.95	327.6	0.0	228.7
156.00	Appurtenance(s)	1.00	1.39	26.809	29.49	218.49	0.650	0.000	1.00	2.089	1.36	64.1	0.0	44.7
159.00	Appurtenance(s)	1.00	1.40	26.917	29.61	213.65	0.650	0.000	3.00	6.168	4.01	189.9	0.0	131.8

## Wind Loading - Shaft

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II
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<b>Totals:</b>	<b>159.00</b>	<b>13,159.1</b>	<b>20,322.8</b>
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## Discrete Appurtenance Forces

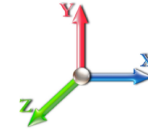
<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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**Load Case:** 0.9D + 1.6W 89 mph Wind

**Dead Load Factor** 0.90  
**Wind Load Factor** 1.60



**Iterations** 26

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)	
1	159.00	Andrew ASPA685	1	27.228	29.951	1.00	1.00	5.40	49.50	0.000	9.000	258.78	0.00	2329.01	
2	159.00	T-Arms	3	26.917	29.608	0.56	0.75	13.50	945.00	0.000	0.000	639.54	0.00	0.00	
3	156.00	RDIDC-9181-PF-48	1	26.809	29.490	1.00	1.00	2.01	19.67	0.000	0.000	94.84	0.00	0.00	
4	156.00	TA08025-B604	3	26.809	29.490	0.50	0.75	2.95	172.53	0.000	0.000	139.42	0.00	0.00	
5	156.00	TA08025-B605	3	26.809	29.490	0.50	0.75	2.95	202.50	0.000	0.000	139.42	0.00	0.00	
6	156.00	MC-PK8-DSH	1	26.809	29.490	1.00	1.00	37.59	1554.30	0.000	0.000	1773.67	0.00	0.00	
7	156.00	MX08FRO665-21	3	26.809	29.490	0.55	0.75	20.80	174.15	0.000	0.000	981.25	0.00	0.00	
8	146.00	Andrew VHLP2/HP2-23	1	26.441	29.085	0.75	0.75	3.51	24.30	0.000	0.000	163.34	0.00	0.00	
9	146.00	Samsung MMU-H65V9	3	26.441	29.085	0.50	0.75	10.22	413.91	0.000	0.000	475.63	0.00	0.00	
10	146.00	Commscope	3	26.441	29.085	0.55	0.75	20.15	228.69	0.000	0.000	937.85	0.00	0.00	
11	146.00	Samsung RRH-P4	3	26.441	29.085	0.50	0.75	4.13	169.29	0.000	0.000	192.22	0.00	0.00	
12	146.00	Ceragon Radio	1	26.441	29.085	0.45	0.75	0.13	9.00	0.000	0.000	6.07	0.00	0.00	
13	146.00	Samsung 4 port	3	26.441	29.085	0.45	0.75	2.13	129.60	0.000	0.000	99.26	0.00	0.00	
14	146.00	Platform w/ Hand Rail	1	26.441	29.085	1.00	1.00	51.70	2021.40	0.000	0.000	2405.88	0.00	0.00	
15	145.00	DragonWave HP Duo	1	26.403	29.043	0.45	0.75	0.13	10.80	0.000	0.000	6.06	0.00	0.00	
16	138.00	4' Standoff Arm	2	26.131	28.744	1.00	1.00	4.00	136.80	0.000	0.000	183.96	0.00	0.00	
17	138.00	2' Stadium Lights	4	26.131	28.744	1.00	1.00	11.20	90.00	0.000	0.000	515.09	0.00	0.00	
18	135.00	4' Standoff Arm	2	26.011	28.612	1.00	1.00	4.00	136.80	0.000	0.000	183.12	0.00	0.00	
19	135.00	2' Stadium Lights	4	26.011	28.612	1.00	1.00	11.20	90.00	0.000	0.000	512.73	0.00	0.00	
20	135.00	Band-On Mount	2	26.011	28.612	1.00	1.00	0.20	9.00	0.000	0.000	9.16	0.00	0.00	
21	135.00	15' Catwalk w/ Handrail	1	26.011	28.612	1.00	1.00	30.00	900.00	0.000	0.000	1373.39	0.00	0.00	
22	133.00	4' Standoff Arm	2	25.930	28.523	1.00	1.00	4.00	136.80	0.000	0.000	182.55	0.00	0.00	
23	133.00	2' Stadium Lights	4	25.930	28.523	1.00	1.00	11.20	90.00	0.000	0.000	511.14	0.00	0.00	
24	133.00	2'x2'x3'	1	25.930	28.523	1.00	1.00	5.60	40.50	0.000	0.000	255.57	0.00	0.00	
25	130.00	2' Stadium Lights	4	25.807	28.388	1.00	1.00	11.20	90.00	0.000	0.000	508.70	0.00	0.00	
26	130.00	4' Standoff Arm	2	25.807	28.388	1.00	1.00	4.00	136.80	0.000	0.000	181.68	0.00	0.00	
27	129.00	15' Catwalk w/ Handrail	1	25.765	28.342	1.00	1.00	30.00	900.00	0.000	0.000	1360.41	0.00	0.00	
28	129.00	Band-On Mount	1	25.765	28.342	1.00	1.00	0.10	4.50	0.000	0.000	4.53	0.00	0.00	
29	124.00	4' Standoff Arm	2	25.553	28.109	1.00	1.00	4.00	136.80	0.000	0.000	179.90	0.00	0.00	
30	124.00	1' Box Light	4	25.553	28.109	1.00	1.00	5.60	90.00	0.000	0.000	251.85	0.00	0.00	
31	9.50	Light Ballast	1	16.374	18.012	1.00	1.00	6.30	270.00	0.000	0.000	181.56	0.00	0.00	
32	6.50	Band-On Mount	1	16.374	18.012	1.00	1.00	0.10	4.50	0.000	0.000	2.88	0.00	0.00	
33	6.50	Light Ballast	1	16.374	18.012	1.00	1.00	6.30	270.00	0.000	0.000	181.56	0.00	0.00	
34	3.50	Light Ballast	1	16.374	18.012	1.00	1.00	6.30	270.00	0.000	0.000	181.56	0.00	0.00	
<b>Totals:</b>									<b>9,927.14</b>						<b>15,074.56</b>

## Total Applied Force Summary

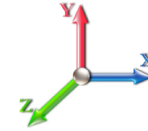
<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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**Load Case:** 0.9D + 1.6W 89 mph Wind

**Dead Load Factor** 0.90  
**Wind Load Factor** 1.60



**Iterations** 26

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
3.50	(1) attachments	478.67	953.28	0.00	0.00
5.00		126.16	302.59	0.00	0.00
6.50	(2) attachments	309.90	575.47	0.00	0.00
9.50	(1) attachments	430.36	867.08	0.00	0.00
10.00		41.19	98.88	0.00	0.00
15.00		412.65	978.94	0.00	0.00
20.00		428.58	960.94	0.00	0.00
25.00		439.51	942.95	0.00	0.00
30.00		446.99	924.95	0.00	0.00
35.00		451.88	906.96	0.00	0.00
40.00		454.77	888.96	0.00	0.00
45.00		456.03	870.96	0.00	0.00
47.50		226.82	428.73	0.00	0.00
50.00		229.90	762.80	0.00	0.00
53.25		298.95	979.31	0.00	0.00
55.00		160.25	248.31	0.00	0.00
60.00		459.09	699.33	0.00	0.00
65.00		456.09	684.33	0.00	0.00
70.00		452.31	669.34	0.00	0.00
75.00		447.84	654.34	0.00	0.00
80.00		442.74	639.34	0.00	0.00
85.00		437.07	624.35	0.00	0.00
90.00		430.88	609.35	0.00	0.00
95.00		424.21	594.35	0.00	0.00
96.50		125.42	175.38	0.00	0.00
100.00		294.88	704.82	0.00	0.00
101.00		83.37	198.95	0.00	0.00
105.00		331.48	373.45	0.00	0.00
110.00		407.67	456.01	0.00	0.00
115.00		399.45	444.01	0.00	0.00
120.00		390.88	432.02	0.00	0.00
124.00	(6) attachments	737.81	563.78	0.00	0.00
125.00		75.42	82.47	0.00	0.00
129.00	(2) attachments	1663.69	1229.57	0.00	0.00
130.00	(6) attachments	763.96	305.93	0.00	0.00
133.00	(7) attachments	1168.05	500.09	0.00	0.00
135.00	(9) attachments	2222.23	1287.44	0.00	0.00
138.00	(6) attachments	912.06	448.94	0.00	0.00
140.00		139.92	144.54	0.00	0.00
145.00	(1) attachments	349.62	363.75	0.00	0.00
146.00	(15) attachments	4347.55	3061.73	0.00	0.00
146.50		33.48	32.59	0.00	0.00
150.00		235.35	390.21	0.00	0.00
155.00		327.65	239.99	0.00	0.00
156.00	(11) attachments	3192.67	2170.06	0.00	0.00
159.00	(4) attachments	1088.24	1127.72	0.00	2329.01



## Total Applied Force Summary

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II
		Page: 20



<b>Totals:</b>	<b>28,233.68</b>	<b>31,599.30</b>	<b>0.00</b>	<b>2,329.01</b>
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## Calculated Forces

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II

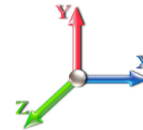


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**Load Case:** 0.9D + 1.6W 89 mph Wind

**Iterations** 26

**Dead Load Factor** 0.90  
**Wind Load Factor** 1.60



Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-31.56	-28.27	0.00	-3226.1	0.00	3226.19	4199.85	2099.92	9244.78	4629.26	0.00	0.000	0.000	0.705
3.50	-30.56	-27.84	0.00	-3127.2	0.00	3127.24	4167.25	2083.62	9053.74	4533.60	0.05	-0.137	0.000	0.697
5.00	-30.23	-27.75	0.00	-3085.4	0.00	3085.47	4153.10	2076.55	8972.06	4492.70	0.10	-0.197	0.000	0.694
6.50	-29.62	-27.48	0.00	-3043.8	0.00	3043.85	4138.85	2069.43	8890.50	4451.86	0.18	-0.257	0.000	0.691
9.50	-28.72	-27.08	0.00	-2961.4	0.00	2961.40	4110.04	2055.02	8727.78	4370.38	0.38	-0.376	0.000	0.685
10.00	-28.57	-27.10	0.00	-2947.8	0.00	2947.86	4105.20	2052.60	8700.71	4356.82	0.42	-0.397	0.000	0.684
15.00	-27.50	-26.77	0.00	-2812.3	0.00	2812.38	4056.14	2028.07	8430.88	4221.71	0.94	-0.596	0.000	0.673
20.00	-26.45	-26.42	0.00	-2678.5	0.00	2678.53	4005.93	2002.97	8162.71	4087.42	1.67	-0.797	0.000	0.662
25.00	-25.42	-26.06	0.00	-2546.4	0.00	2546.41	3954.57	1977.28	7896.34	3954.04	2.61	-0.999	0.000	0.651
30.00	-24.41	-25.68	0.00	-2416.1	0.00	2416.11	3902.04	1951.02	7631.91	3821.63	3.77	-1.204	0.000	0.639
35.00	-23.43	-25.30	0.00	-2287.7	0.00	2287.70	3848.37	1924.18	7369.57	3690.26	5.14	-1.410	0.000	0.626
40.00	-22.46	-24.90	0.00	-2161.2	0.00	2161.22	3793.53	1896.77	7109.45	3560.01	6.73	-1.618	0.000	0.613
45.00	-21.53	-24.48	0.00	-2036.7	0.00	2036.73	3737.54	1868.77	6851.70	3430.94	8.54	-1.827	0.000	0.600
47.50	-21.07	-24.28	0.00	-1975.5	0.00	1975.54	3709.12	1854.56	6723.75	3366.87	9.52	-1.934	0.000	0.593
50.00	-20.26	-24.06	0.00	-1914.8	0.00	1914.85	3680.40	1840.20	6596.45	3303.13	10.56	-2.041	0.000	0.585
53.25	-19.25	-23.76	0.00	-1836.6	0.00	1836.65	2880.71	1440.35	5175.93	2591.81	12.00	-2.179	0.000	0.716
55.00	-18.94	-23.65	0.00	-1795.0	0.00	1795.06	2866.80	1433.40	5109.91	2558.75	12.82	-2.255	0.000	0.708
60.00	-18.17	-23.24	0.00	-1676.8	0.00	1676.83	2826.28	1413.14	4922.13	2464.72	15.31	-2.497	0.000	0.687
65.00	-17.41	-22.82	0.00	-1560.6	0.00	1560.65	2784.61	1392.30	4735.69	2371.36	18.05	-2.739	0.000	0.665
70.00	-16.67	-22.41	0.00	-1446.5	0.00	1446.54	2741.78	1370.89	4550.74	2278.75	21.05	-2.980	0.000	0.641
75.00	-15.95	-21.99	0.00	-1334.5	0.00	1334.50	2697.80	1348.90	4367.43	2186.96	24.29	-3.219	0.000	0.616
80.00	-15.24	-21.58	0.00	-1224.5	0.00	1224.55	2652.66	1326.33	4185.88	2096.05	27.79	-3.457	0.000	0.590
85.00	-14.56	-21.16	0.00	-1116.6	0.00	1116.67	2606.36	1303.18	4006.26	2006.11	31.54	-3.691	0.000	0.562
90.00	-13.90	-20.74	0.00	-1010.8	0.00	1010.88	2558.91	1279.46	3828.69	1917.19	35.52	-3.921	0.000	0.533
95.00	-13.29	-20.31	0.00	-907.15	0.00	907.15	2510.31	1255.15	3653.33	1829.38	39.75	-4.146	0.000	0.501
96.50	-13.08	-20.20	0.00	-876.69	0.00	876.69	2495.50	1247.75	3601.17	1803.26	41.06	-4.215	0.000	0.492
100.00	-12.37	-19.88	0.00	-805.98	0.00	805.98	2460.55	1230.28	3480.30	1742.74	44.21	-4.368	0.000	0.468
101.00	-12.14	-19.80	0.00	-786.11	0.00	786.11	1839.54	919.77	2634.41	1319.16	45.13	-4.413	0.000	0.603
105.00	-11.72	-19.48	0.00	-706.91	0.00	706.91	1813.75	906.87	2538.14	1270.96	48.89	-4.581	0.000	0.563
110.00	-11.23	-19.08	0.00	-609.50	0.00	609.50	1780.47	890.23	2418.76	1211.18	53.81	-4.818	0.000	0.510
115.00	-10.75	-18.69	0.00	-514.09	0.00	514.09	1746.03	873.02	2300.59	1152.00	58.97	-5.039	0.000	0.453
120.00	-10.30	-18.29	0.00	-420.65	0.00	420.65	1710.44	855.22	2183.75	1093.50	64.36	-5.240	0.000	0.391
124.00	-9.78	-17.52	0.00	-347.49	0.00	347.49	1681.14	840.57	2091.35	1047.23	68.80	-5.385	0.000	0.338
125.00	-9.68	-17.45	0.00	-329.97	0.00	329.97	1673.69	836.85	2068.40	1035.74	69.93	-5.420	0.000	0.325
129.00	-8.59	-15.69	0.00	-260.18	0.00	260.18	1643.47	821.73	1977.29	990.11	74.52	-5.543	0.000	0.268
130.00	-8.35	-14.90	0.00	-244.49	0.00	244.49	1635.79	817.90	1954.68	978.79	75.69	-5.571	0.000	0.255
133.00	-7.95	-13.70	0.00	-199.78	0.00	199.78	1612.50	806.25	1887.28	945.04	79.21	-5.648	0.000	0.217
135.00	-6.88	-11.37	0.00	-172.38	0.00	172.38	1596.74	798.37	1842.72	922.73	81.58	-5.693	0.000	0.191
138.00	-6.52	-10.42	0.00	-138.27	0.00	138.27	1572.75	786.37	1776.45	889.55	85.17	-5.753	0.000	0.160
140.00	-6.38	-10.27	0.00	-117.43	0.00	117.43	1556.53	778.26	1732.67	867.62	87.59	-5.788	0.000	0.140
145.00	-6.04	-9.89	0.00	-66.06	0.00	66.06	1515.16	757.58	1624.67	813.54	93.68	-5.853	0.000	0.085
146.00	-3.44	-5.26	0.00	-56.16	0.00	56.16	1506.75	753.37	1603.33	802.85	94.90	-5.863	0.000	0.072
146.50	-3.41	-5.22	0.00	-53.53	0.00	53.53	1502.52	751.26	1592.69	797.53	95.51	-5.867	0.000	0.069
150.00	-3.04	-4.95	0.00	-35.26	0.00	35.26	1021.73	510.87	1074.91	538.26	99.82	-5.893	0.000	0.069
155.00	-2.84	-4.60	0.00	-10.52	0.00	10.52	996.70	498.35	1007.82	504.66	105.99	-5.913	0.000	0.024
156.00	-1.01	-1.20	0.00	-5.92	0.00	5.92	991.55	495.78	994.51	497.99	107.23	-5.915	0.000	0.013
159.00	0.00	-1.09	0.00	-2.33	0.00	2.33	975.84	487.92	954.81	478.11	110.94	-5.918	0.000	0.005

## Calculated Forces

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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## Wind Loading - Shaft

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II

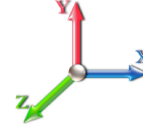


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**Load Case:** 1.2D + 1.0Di + 1.0Wi 40 mph Wind

**Iterations** 25

**Dead Load Factor** 1.20  
**Wind Load Factor** 1.00



Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	3.308	3.64	0.00	1.200	1.057	0.00	0.000	0.00	0.0	0.0	0.0
3.50	Appurtenance(s)	1.00	0.85	3.308	3.64	0.00	1.200	1.229	3.50	16.578	19.89	72.4	293.4	1198.0
5.00		1.00	0.85	3.308	3.64	0.00	1.200	1.265	1.50	7.051	8.46	30.8	128.8	512.9
6.50	Appurtenance(s)	1.00	0.85	3.308	3.64	0.00	1.200	1.293	1.50	7.021	8.42	30.7	131.0	513.0
9.50	Appurtenance(s)	1.00	0.85	3.308	3.64	0.00	1.200	1.338	3.00	13.951	16.74	60.9	268.3	1025.7
10.00		1.00	0.85	3.308	3.64	0.00	1.200	1.344	0.50	2.311	2.77	10.1	44.8	170.2
15.00		1.00	0.86	3.348	3.68	0.00	1.200	1.395	5.00	22.923	27.51	101.3	457.4	1698.1
20.00		1.00	0.91	3.546	3.90	0.00	1.200	1.434	5.00	22.537	27.04	105.5	461.5	1678.1
25.00		1.00	0.95	3.709	4.08	0.00	1.200	1.465	5.00	22.145	26.57	108.4	462.6	1655.3
30.00		1.00	0.99	3.849	4.23	0.00	1.200	1.491	5.00	21.749	26.10	110.5	461.9	1630.6
35.00		1.00	1.02	3.972	4.37	0.00	1.200	1.513	5.00	21.350	25.62	111.9	459.7	1604.4
40.00		1.00	1.05	4.082	4.49	0.00	1.200	1.533	5.00	20.949	25.14	112.9	456.4	1577.1
45.00		1.00	1.07	4.182	4.60	0.00	1.200	1.551	5.00	20.546	24.66	113.4	452.3	1549.0
47.50	Bot - Section 2	1.00	1.09	4.229	4.65	0.00	1.200	1.559	2.50	10.120	12.14	56.5	225.0	764.3
50.00		1.00	1.10	4.274	4.70	0.00	1.200	1.567	2.50	10.151	12.18	57.3	226.8	1211.6
53.25	Top - Section 1	1.00	1.11	4.330	4.76	0.00	1.200	1.576	3.25	13.045	15.65	74.6	292.6	1556.3
55.00		1.00	1.12	4.359	4.79	0.00	1.200	1.581	1.75	6.953	8.34	40.0	156.9	465.3
60.00		1.00	1.14	4.438	4.88	0.00	1.200	1.595	5.00	19.594	23.51	114.8	442.3	1310.1
65.00		1.00	1.16	4.512	4.96	0.00	1.200	1.608	5.00	19.187	23.02	114.3	435.9	1283.8
70.00		1.00	1.18	4.582	5.04	0.00	1.200	1.619	5.00	18.779	22.53	113.6	429.2	1257.1
75.00		1.00	1.19	4.648	5.11	0.00	1.200	1.631	5.00	18.370	22.04	112.7	422.2	1230.1
80.00		1.00	1.21	4.711	5.18	0.00	1.200	1.641	5.00	17.961	21.55	111.7	414.8	1202.7
85.00		1.00	1.23	4.771	5.25	0.00	1.200	1.651	5.00	17.552	21.06	110.5	407.2	1175.1
90.00		1.00	1.24	4.828	5.31	0.00	1.200	1.660	5.00	17.142	20.57	109.2	399.4	1147.2
95.00		1.00	1.25	4.883	5.37	0.00	1.200	1.669	5.00	16.731	20.08	107.8	391.3	1119.2
96.50	Bot - Section 3	1.00	1.26	4.899	5.39	0.00	1.200	1.672	1.50	4.939	5.93	31.9	116.6	331.1
100.00		1.00	1.27	4.935	5.43	0.00	1.200	1.678	3.50	11.529	13.83	75.1	271.7	1166.3
101.00	Top - Section 2	1.00	1.27	4.945	5.44	0.00	1.200	1.679	1.00	3.257	3.91	21.3	77.3	329.7
105.00		1.00	1.28	4.986	5.48	0.00	1.200	1.686	4.00	12.864	15.44	84.7	303.8	750.1
110.00		1.00	1.29	5.034	5.54	0.00	1.200	1.693	5.00	15.710	18.85	104.4	371.1	914.5
115.00		1.00	1.31	5.081	5.59	0.00	1.200	1.701	5.00	15.298	18.36	102.6	362.3	889.7
120.00		1.00	1.32	5.126	5.64	0.00	1.200	1.708	5.00	14.887	17.86	100.7	353.3	864.8
124.00	Appurtenance(s)	1.00	1.33	5.162	5.68	0.00	1.200	1.714	4.00	11.612	13.93	79.1	276.8	674.5
125.00		1.00	1.33	5.170	5.69	0.00	1.200	1.715	1.00	2.861	3.43	19.5	68.8	166.7
129.00	Appurtenance(s)	1.00	1.34	5.204	5.72	0.00	1.200	1.720	4.00	11.282	13.54	77.5	269.5	654.3
130.00	Appurtenance(s)	1.00	1.34	5.213	5.73	0.00	1.200	1.722	1.00	2.779	3.33	19.1	67.0	161.6
133.00	Appurtenance(s)	1.00	1.35	5.238	5.76	0.00	1.200	1.726	3.00	8.239	9.89	57.0	197.6	477.6
135.00	Appurtenance(s)	1.00	1.35	5.254	5.78	0.00	1.200	1.728	2.00	5.410	6.49	37.5	130.2	313.7
138.00	Appurtenance(s)	1.00	1.36	5.278	5.81	0.00	1.200	1.732	3.00	7.991	9.59	55.7	192.0	462.4
140.00		1.00	1.36	5.294	5.82	0.00	1.200	1.734	2.00	5.245	6.29	36.7	126.5	303.5
145.00	Appurtenance(s)	1.00	1.37	5.333	5.87	0.00	1.200	1.741	5.00	12.825	15.39	90.3	306.5	738.0
146.00	Appurtenance(s)	1.00	1.37	5.341	5.87	0.00	1.200	1.742	1.00	2.515	3.02	17.7	60.9	145.3
146.50	Bot - Section 4	1.00	1.37	5.345	5.88	0.00	1.200	1.742	0.50	1.251	1.50	8.8	30.4	72.3
150.00	Top - Section 3	1.00	1.38	5.371	5.91	0.00	1.200	1.746	3.50	8.755	10.51	62.1	210.6	720.4
155.00		1.00	1.39	5.408	5.95	0.00	1.200	1.752	5.00	12.157	14.59	86.8	291.1	596.0
156.00	Appurtenance(s)	1.00	1.39	5.415	5.96	0.00	1.200	1.753	1.00	2.382	2.86	17.0	57.8	117.4
159.00	Appurtenance(s)	1.00	1.40	5.437	5.98	0.00	1.200	1.757	3.00	7.046	8.46	50.6	169.9	345.7

## Wind Loading - Shaft

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II
		<b>Page:</b> 24



<b>Totals:</b>	<b>159.00</b>	<b>3,327.8</b>	<b>39,730.7</b>
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## Discrete Appurtenance Forces

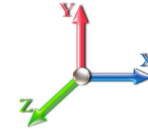
<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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**Load Case:** 1.2D + 1.0Di + 1.0Wi 40 mph Wind

**Dead Load Factor** 1.20  
**Wind Load Factor** 1.00



**Iterations** 25

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)	
1	159.00	Andrew ASPA685	1	5.500	6.050	1.00	1.00	11.84	163.84	0.000	9.000	71.65	0.00	644.82	
2	159.00	T-Arms	3	5.437	5.981	0.56	0.75	25.36	1787.74	0.000	0.000	151.65	0.00	0.00	
3	156.00	RDIDC-9181-PF-48	1	5.415	5.957	1.00	1.00	2.58	101.44	0.000	0.000	15.37	0.00	0.00	
4	156.00	TA08025-B604	3	5.415	5.957	0.50	0.75	3.80	346.32	0.000	0.000	22.66	0.00	0.00	
5	156.00	TA08025-B605	3	5.415	5.957	0.50	0.75	3.80	389.83	0.000	0.000	22.66	0.00	0.00	
6	156.00	MC-PK8-DSH	1	5.415	5.957	1.00	1.00	85.04	3394.95	0.000	0.000	506.57	0.00	0.00	
7	156.00	MX08FRO665-21	3	5.415	5.957	0.55	0.75	23.25	907.20	0.000	0.000	138.47	0.00	0.00	
8	146.00	Andrew VHLP2/HP2-23	1	5.341	5.875	0.75	0.75	16.21	157.06	0.000	0.000	95.21	0.00	0.00	
9	146.00	Samsung MMU-H65V9	3	5.341	5.875	0.50	0.75	11.87	1023.60	0.000	0.000	69.72	0.00	0.00	
10	146.00	Commscope	3	5.341	5.875	0.55	0.75	22.54	1065.00	0.000	0.000	132.42	0.00	0.00	
11	146.00	Samsung RRH-P4	3	5.341	5.875	0.50	0.75	5.17	404.10	0.000	0.000	30.35	0.00	0.00	
12	146.00	Ceragon Radio	1	5.341	5.875	0.45	0.75	0.25	30.47	0.000	0.000	1.48	0.00	0.00	
13	146.00	Samsung 4 port	3	5.341	5.875	0.45	0.75	2.85	355.05	0.000	0.000	16.75	0.00	0.00	
14	146.00	Platform w/ Hand Rail	1	5.341	5.875	1.00	1.00	89.88	4038.31	0.000	0.000	528.04	0.00	0.00	
15	145.00	DragonWave HP Duo	1	5.333	5.867	0.45	0.75	0.25	32.85	0.000	0.000	1.48	0.00	0.00	
16	138.00	4' Standoff Arm	2	5.278	5.806	1.00	1.00	13.01	511.15	0.000	0.000	75.53	0.00	0.00	
17	138.00	2' Stadium Lights	4	5.278	5.806	1.00	1.00	15.70	-30.80	0.000	0.000	91.16	0.00	0.00	
18	135.00	4' Standoff Arm	2	5.254	5.780	1.00	1.00	12.99	510.49	0.000	0.000	75.07	0.00	0.00	
19	135.00	2' Stadium Lights	4	5.254	5.780	1.00	1.00	15.69	-31.18	0.000	0.000	90.68	0.00	0.00	
20	135.00	Band-On Mount	2	5.254	5.780	1.00	1.00	0.28	-172.72	0.000	0.000	1.62	0.00	0.00	
21	135.00	15' Catwalk w/ Handrail	1	5.254	5.780	1.00	1.00	37.18	1180.12	0.000	0.000	214.90	0.00	0.00	
22	133.00	4' Standoff Arm	2	5.238	5.762	1.00	1.00	12.98	510.04	0.000	0.000	74.76	0.00	0.00	
23	133.00	2' Stadium Lights	4	5.238	5.762	1.00	1.00	15.68	-31.44	0.000	0.000	90.36	0.00	0.00	
24	133.00	2'x2'x3'	1	5.238	5.762	1.00	1.00	5.60	-1333.35	0.000	0.000	32.29	0.00	0.00	
25	130.00	2' Stadium Lights	4	5.213	5.734	1.00	1.00	15.67	-31.83	0.000	0.000	89.88	0.00	0.00	
26	130.00	4' Standoff Arm	2	5.213	5.734	1.00	1.00	12.96	509.36	0.000	0.000	74.29	0.00	0.00	
27	129.00	15' Catwalk w/ Handrail	1	5.204	5.725	1.00	1.00	37.15	1175.26	0.000	0.000	212.69	0.00	0.00	
28	129.00	Band-On Mount	1	5.204	5.725	1.00	1.00	0.14	-86.40	0.000	0.000	0.80	0.00	0.00	
29	124.00	4' Standoff Arm	2	5.162	5.678	1.00	1.00	12.91	507.95	0.000	0.000	73.32	0.00	0.00	
30	124.00	1' Box Light	4	5.162	5.678	1.00	1.00	7.83	-32.63	0.000	0.000	44.44	0.00	0.00	
31	9.50	Light Ballast	1	3.308	3.638	1.00	1.00	8.26	955.31	0.000	0.000	30.03	0.00	0.00	
32	6.50	Band-On Mount	1	3.308	3.638	1.00	1.00	0.13	-88.53	0.000	0.000	0.47	0.00	0.00	
33	6.50	Light Ballast	1	3.308	3.638	1.00	1.00	8.19	942.03	0.000	0.000	29.80	0.00	0.00	
34	3.50	Light Ballast	1	3.308	3.638	1.00	1.00	8.10	922.71	0.000	0.000	29.46	0.00	0.00	
<b>Totals:</b>									<b>20,083.31</b>						<b>3,136.04</b>

## Total Applied Force Summary

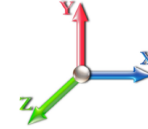
<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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**Load Case:** 1.2D + 1.0Di + 1.0Wi 40 mph Wind

**Dead Load Factor** 1.20  
**Wind Load Factor** 1.00



**Iterations** 25

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
3.50	(1) attachments	101.83	2127.14	0.00	0.00
5.00		30.78	532.24	0.00	0.00
6.50	(2) attachments	60.92	1385.83	0.00	0.00
9.50	(1) attachments	90.94	2019.71	0.00	0.00
10.00		10.09	176.69	0.00	0.00
15.00		101.32	1762.64	0.00	0.00
20.00		105.48	1742.73	0.00	0.00
25.00		108.41	1719.91	0.00	0.00
30.00		110.49	1695.14	0.00	0.00
35.00		111.93	1668.95	0.00	0.00
40.00		112.88	1641.68	0.00	0.00
45.00		113.42	1613.54	0.00	0.00
47.50		56.49	796.60	0.00	0.00
50.00		57.27	1243.84	0.00	0.00
53.25		74.56	1598.32	0.00	0.00
55.00		40.00	487.93	0.00	0.00
60.00		114.79	1374.71	0.00	0.00
65.00		114.28	1348.39	0.00	0.00
70.00		113.58	1321.69	0.00	0.00
75.00		112.72	1294.64	0.00	0.00
80.00		111.69	1267.30	0.00	0.00
85.00		110.53	1239.68	0.00	0.00
90.00		109.24	1211.82	0.00	0.00
95.00		107.83	1183.73	0.00	0.00
96.50		31.93	350.48	0.00	0.00
100.00		75.10	1211.50	0.00	0.00
101.00		21.26	342.57	0.00	0.00
105.00		84.65	801.73	0.00	0.00
110.00		104.39	979.12	0.00	0.00
115.00		102.61	954.32	0.00	0.00
120.00		100.74	929.36	0.00	0.00
124.00	(6) attachments	196.88	1201.47	0.00	0.00
125.00		19.53	178.80	0.00	0.00
129.00	(2) attachments	291.00	1791.77	0.00	0.00
130.00	(6) attachments	183.29	650.04	0.00	0.00
133.00	(7) attachments	254.37	-346.72	0.00	0.00
135.00	(9) attachments	419.80	1819.15	0.00	0.00
138.00	(6) attachments	222.37	968.49	0.00	0.00
140.00		36.65	319.17	0.00	0.00
145.00	(1) attachments	91.76	809.98	0.00	0.00
146.00	(15) attachments	891.70	7221.88	0.00	0.00
146.50		8.83	73.82	0.00	0.00
150.00		62.08	730.92	0.00	0.00
155.00		86.79	611.11	0.00	0.00
156.00	(11) attachments	722.77	5260.13	0.00	0.00
159.00	(4) attachments	273.86	2299.14	0.00	644.82

## Total Applied Force Summary

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Struct Class:</b> II	Page: 27



<b>Totals:</b>	<b>6,463.84</b>	<b>61,613.11</b>	<b>0.00</b>	<b>644.82</b>
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## Calculated Forces

**Structure:** OH47491-A-SBA  
**Site Name:** Nw Dublin  
**Height:** 159.00 (ft)  
**Base Elev:** 1.000 (ft)  
**Gh:** 1.1

**Topography:** 1

**Code:** EIA/TIA-222-G  
**Exposure:** C  
**Crest Height:** 0.00  
**Site Class:** C - Very Dense Soil  
**Struct Class:** II

6/25/2021

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**Load Case:** 1.2D + 1.0Di + 1.0Wi 40 mph Wind

**Iterations** 25

**Dead Load Factor** 1.20  
**Wind Load Factor** 1.00



Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-61.96	-6.48	0.00	-759.46	0.00	759.46	4199.85	2099.92	9244.78	4629.26	0.00	0.000	0.000	0.179
3.50	-59.83	-6.40	0.00	-736.77	0.00	736.77	4167.25	2083.62	9053.74	4533.60	0.01	-0.032	0.000	0.177
5.00	-59.29	-6.39	0.00	-727.17	0.00	727.17	4153.10	2076.55	8972.06	4492.70	0.02	-0.046	0.000	0.176
6.50	-57.91	-6.35	0.00	-717.59	0.00	717.59	4138.85	2069.43	8890.50	4451.86	0.04	-0.061	0.000	0.175
9.50	-55.88	-6.27	0.00	-698.56	0.00	698.56	4110.04	2055.02	8727.78	4370.38	0.09	-0.089	0.000	0.173
10.00	-55.71	-6.28	0.00	-695.42	0.00	695.42	4105.20	2052.60	8700.71	4356.82	0.10	-0.094	0.000	0.173
15.00	-53.94	-6.22	0.00	-664.01	0.00	664.01	4056.14	2028.07	8430.88	4221.71	0.22	-0.140	0.000	0.171
20.00	-52.19	-6.15	0.00	-632.90	0.00	632.90	4005.93	2002.97	8162.71	4087.42	0.39	-0.188	0.000	0.168
25.00	-50.47	-6.08	0.00	-602.13	0.00	602.13	3954.57	1977.28	7896.34	3954.04	0.62	-0.236	0.000	0.165
30.00	-48.77	-6.01	0.00	-571.72	0.00	571.72	3902.04	1951.02	7631.91	3821.63	0.89	-0.284	0.000	0.162
35.00	-47.09	-5.93	0.00	-541.69	0.00	541.69	3848.37	1924.18	7369.57	3690.26	1.21	-0.333	0.000	0.159
40.00	-45.45	-5.84	0.00	-512.06	0.00	512.06	3793.53	1896.77	7109.45	3560.01	1.59	-0.382	0.000	0.156
45.00	-43.83	-5.74	0.00	-482.86	0.00	482.86	3737.54	1868.77	6851.70	3430.94	2.02	-0.432	0.000	0.152
47.50	-43.03	-5.70	0.00	-468.50	0.00	468.50	3709.12	1854.56	6723.75	3366.87	2.25	-0.457	0.000	0.151
50.00	-41.79	-5.66	0.00	-454.25	0.00	454.25	3680.40	1840.20	6596.45	3303.13	2.49	-0.482	0.000	0.149
53.25	-40.19	-5.58	0.00	-435.87	0.00	435.87	2880.71	1440.35	5175.93	2591.81	2.83	-0.515	0.000	0.182
55.00	-39.69	-5.57	0.00	-426.10	0.00	426.10	2866.80	1433.40	5109.91	2558.75	3.03	-0.533	0.000	0.180
60.00	-38.32	-5.48	0.00	-398.27	0.00	398.27	2826.28	1413.14	4922.13	2464.72	3.62	-0.591	0.000	0.175
65.00	-36.96	-5.38	0.00	-370.88	0.00	370.88	2784.61	1392.30	4735.69	2371.36	4.27	-0.648	0.000	0.170
70.00	-35.64	-5.29	0.00	-343.96	0.00	343.96	2741.78	1370.89	4550.74	2278.75	4.98	-0.705	0.000	0.164
75.00	-34.34	-5.20	0.00	-317.51	0.00	317.51	2697.80	1348.90	4367.43	2186.96	5.75	-0.762	0.000	0.158
80.00	-33.07	-5.10	0.00	-291.53	0.00	291.53	2652.66	1326.33	4185.88	2096.05	6.57	-0.819	0.000	0.152
85.00	-31.83	-5.00	0.00	-266.04	0.00	266.04	2606.36	1303.18	4006.26	2006.11	7.46	-0.875	0.000	0.145
90.00	-30.61	-4.90	0.00	-241.04	0.00	241.04	2558.91	1279.46	3828.69	1917.19	8.41	-0.930	0.000	0.138
95.00	-29.43	-4.79	0.00	-216.53	0.00	216.53	2510.31	1255.15	3653.33	1829.38	9.41	-0.983	0.000	0.130
96.50	-29.07	-4.77	0.00	-209.34	0.00	209.34	2495.50	1247.75	3601.17	1803.26	9.72	-1.000	0.000	0.128
100.00	-27.86	-4.68	0.00	-192.66	0.00	192.66	2460.55	1230.28	3480.30	1742.74	10.47	-1.036	0.000	0.122
101.00	-27.52	-4.67	0.00	-187.98	0.00	187.98	1839.54	919.77	2634.41	1319.16	10.69	-1.047	0.000	0.157
105.00	-26.71	-4.59	0.00	-169.31	0.00	169.31	1813.75	906.87	2538.14	1270.96	11.58	-1.087	0.000	0.148
110.00	-25.73	-4.49	0.00	-146.36	0.00	146.36	1780.47	890.23	2418.76	1211.18	12.75	-1.144	0.000	0.135
115.00	-24.78	-4.39	0.00	-123.90	0.00	123.90	1746.03	873.02	2300.59	1152.00	13.98	-1.197	0.000	0.122
120.00	-23.85	-4.29	0.00	-101.95	0.00	101.95	1710.44	855.22	2183.75	1093.50	15.26	-1.246	0.000	0.107
124.00	-22.65	-4.07	0.00	-84.79	0.00	84.79	1681.14	840.57	2091.35	1047.23	16.32	-1.281	0.000	0.094
125.00	-22.47	-4.06	0.00	-80.72	0.00	80.72	1673.69	836.85	2068.40	1035.74	16.59	-1.290	0.000	0.091
129.00	-20.68	-3.73	0.00	-64.49	0.00	64.49	1643.47	821.73	1977.29	990.11	17.68	-1.320	0.000	0.078
130.00	-20.04	-3.54	0.00	-60.76	0.00	60.76	1635.79	817.90	1954.68	978.79	17.96	-1.327	0.000	0.074
133.00	-20.04	-3.29	0.00	-50.14	0.00	50.14	1612.50	806.25	1887.28	945.04	18.80	-1.346	0.000	0.066
135.00	-18.23	-2.83	0.00	-43.56	0.00	43.56	1596.74	798.37	1842.72	922.73	19.37	-1.357	0.000	0.059
138.00	-17.27	-2.59	0.00	-35.07	0.00	35.07	1572.75	786.37	1776.45	889.55	20.22	-1.373	0.000	0.050
140.00	-16.95	-2.55	0.00	-29.89	0.00	29.89	1556.53	778.26	1732.67	867.62	20.80	-1.381	0.000	0.045
145.00	-16.14	-2.44	0.00	-17.14	0.00	17.14	1515.16	757.58	1624.67	813.54	22.26	-1.398	0.000	0.032
146.00	-8.94	-1.37	0.00	-14.70	0.00	14.70	1506.75	753.37	1603.33	802.85	22.55	-1.401	0.000	0.024
146.50	-8.87	-1.36	0.00	-14.01	0.00	14.01	1502.52	751.26	1592.69	797.53	22.70	-1.402	0.000	0.023
150.00	-8.14	-1.28	0.00	-9.24	0.00	9.24	1021.73	510.87	1074.91	538.26	23.73	-1.409	0.000	0.025
155.00	-7.53	-1.18	0.00	-2.82	0.00	2.82	996.70	498.35	1007.82	504.66	25.21	-1.414	0.000	0.013
156.00	-2.29	-0.33	0.00	-1.64	0.00	1.64	991.55	495.78	994.51	497.99	25.50	-1.414	0.000	0.006
159.00	0.00	-0.27	0.00	-0.64	0.00	0.64	975.84	487.92	954.81	478.11	26.39	-1.415	0.000	0.001

## Calculated Forces

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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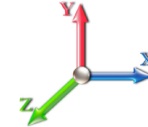
## Seismic Segment Forces (Factored)

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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<b>Load Case:</b> 1.2D + 1.0E						<b>Iterations</b> 23
<b>Gust Response Factor</b>	1.10			<b>Sds</b>	0.10	<b>Ss</b> 0.12
<b>Dead Load Factor</b>	1.20	<b>Seismic Load Factor</b>	1.00	<b>Sd1</b>	0.07	<b>S1</b> 0.06
<b>Wind Load Factor</b>	0.00	<b>Structure Frequency (f1)</b>	0.31	<b>SA</b>	0.02	<b>Seismic Importance Factor</b> 1.00



Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.01	0.00	0.00	
3.50	Appurtenance(s)	1053.8	0.00	0.03	0.02	7.95	
5.00		320.07	0.00	0.04	0.02	2.93	
6.50	Appurtenance(s)	623.27	0.00	0.04	0.02	6.53	
9.50	Appurtenance(s)	931.13	0.01	0.05	0.03	11.61	
10.00		104.49	0.01	0.05	0.03	1.33	
15.00		1033.9	0.02	0.06	0.04	15.13	
20.00		1013.9	0.03	0.07	0.04	15.90	
25.00		993.91	0.05	0.07	0.04	16.21	
30.00		973.91	0.07	0.07	0.04	16.34	
35.00		953.91	0.10	0.07	0.04	16.39	
40.00		933.92	0.12	0.07	0.03	16.42	
45.00		913.92	0.16	0.07	0.03	16.36	
47.50	Bot - Section 2	449.46	0.17	0.07	0.03	8.09	
50.00		820.65	0.19	0.06	0.02	14.80	
53.25	Top - Section 1	1053.1	0.22	0.06	0.02	18.89	
55.00		257.06	0.23	0.06	0.02	4.57	
60.00		723.22	0.27	0.05	0.01	12.26	
65.00		706.55	0.32	0.04	0.01	10.77	
70.00		689.89	0.37	0.03	0.01	8.60	
75.00		673.23	0.43	0.01	0.01	5.72	
80.00		656.57	0.48	-0.01	0.01	2.30	
85.00		639.90	0.55	-0.03	0.01	-1.32	
90.00		623.24	0.61	-0.06	0.02	-4.66	
95.00		606.58	0.68	-0.08	0.03	-7.24	
96.50	Bot - Section 3	178.72	0.70	-0.09	0.03	-2.32	
100.00		745.46	0.75	-0.10	0.04	-11.00	
101.00	Top - Section 2	210.29	0.77	-0.11	0.05	-3.17	
105.00		371.89	0.83	-0.12	0.06	-5.77	
110.00		452.86	0.91	-0.12	0.09	-6.36	
115.00		439.53	0.99	-0.11	0.13	-4.50	
120.00		426.20	1.08	-0.08	0.18	-1.75	
124.00	Appurtenance(s)	583.37	1.15	-0.03	0.22	1.45	
125.00		81.51	1.17	-0.02	0.23	0.36	
129.00	Appurtenance(s)	1325.7	1.25	0.05	0.29	17.02	
130.00	Appurtenance(s)	330.84	1.27	0.08	0.31	5.03	
133.00	Appurtenance(s)	530.33	1.33	0.16	0.36	12.10	
135.00	Appurtenance(s)	1414.8	1.37	0.22	0.40	40.14	
138.00	Appurtenance(s)	477.33	1.43	0.34	0.46	17.86	
140.00		147.55	1.47	0.42	0.51	6.48	
145.00	Appurtenance(s)	371.55	1.57	0.70	0.63	23.01	
146.00	Appurtenance(s)	3399.4	1.60	0.76	0.66	223.76	
146.50	Bot - Section 4	34.96	1.61	0.80	0.68	2.37	
150.00	Top - Section 3	424.77	1.68	1.06	0.79	35.00	
155.00		254.10	1.80	1.52	0.97	26.77	
156.00	Appurtenance(s)	2408.6	1.82	1.63	1.01	265.58	

## Seismic Segment Forces (Factored)

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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159.00	Appurtenance(s)	1251.4	1.89	1.98	1.14	157.16	
	<b>Totals:</b>	<b>33,611.0</b>				<b>1,015.1</b>	<b>Total Wind: 28,233.7</b>

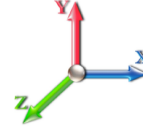
Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

## Calculated Forces

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



<b>Load Case:</b> 1.2D + 1.0E										<b>Iterations</b> 23
<b>Gust Response Factor</b> 1.10					<b>Sds</b> 0.10					<b>Ss</b> 0.12
<b>Dead Load Factor</b> 1.20			<b>Seismic Load Factor</b> 1.00			<b>Sd1</b> 0.07		<b>S1</b> 0.06		
<b>Wind Load Factor</b> 0.00		<b>Structure Frequency (f1)</b> 0.31		<b>SA</b> 0.02		<b>Seismic Importance Factor</b> 1.00				



Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-42.13	-1.06	0.00	-141.83	0.00	141.83	4199.85	2099.92	9244.78	4629.26	0.00	0.00	0.00	0.041
3.50	-40.86	-1.06	0.00	-138.10	0.00	138.10	4167.25	2083.62	9053.74	4533.60	0.00	-0.01	0.00	0.040
5.00	-40.46	-1.06	0.00	-136.51	0.00	136.51	4153.10	2076.55	8972.06	4492.70	0.00	-0.01	0.00	0.040
6.50	-39.69	-1.05	0.00	-134.93	0.00	134.93	4138.85	2069.43	8890.50	4451.86	0.01	-0.01	0.00	0.040
9.50	-38.53	-1.04	0.00	-131.77	0.00	131.77	4110.04	2055.02	8727.78	4370.38	0.02	-0.02	0.00	0.040
10.00	-38.40	-1.05	0.00	-131.24	0.00	131.24	4105.20	2052.60	8700.71	4356.82	0.02	-0.02	0.00	0.039
15.00	-37.10	-1.04	0.00	-126.01	0.00	126.01	4056.14	2028.07	8430.88	4221.71	0.04	-0.03	0.00	0.039
20.00	-35.82	-1.03	0.00	-120.83	0.00	120.83	4005.93	2002.97	8162.71	4087.42	0.07	-0.04	0.00	0.039
25.00	-34.56	-1.01	0.00	-115.70	0.00	115.70	3954.57	1977.28	7896.34	3954.04	0.12	-0.04	0.00	0.038
30.00	-33.32	-1.00	0.00	-110.63	0.00	110.63	3902.04	1951.02	7631.91	3821.63	0.17	-0.05	0.00	0.037
35.00	-32.12	-0.99	0.00	-105.62	0.00	105.62	3848.37	1924.18	7369.57	3690.26	0.23	-0.06	0.00	0.037
40.00	-30.93	-0.98	0.00	-100.68	0.00	100.68	3793.53	1896.77	7109.45	3560.01	0.30	-0.07	0.00	0.036
45.00	-29.77	-0.96	0.00	-95.79	0.00	95.79	3737.54	1868.77	6851.70	3430.94	0.38	-0.08	0.00	0.036
47.50	-29.20	-0.96	0.00	-93.38	0.00	93.38	3709.12	1854.56	6723.75	3366.87	0.43	-0.09	0.00	0.036
50.00	-28.18	-0.94	0.00	-90.99	0.00	90.99	3680.40	1840.20	6596.45	3303.13	0.48	-0.09	0.00	0.035
53.25	-26.87	-0.92	0.00	-87.93	0.00	87.93	2880.71	1440.35	5175.93	2591.81	0.54	-0.10	0.00	0.043
55.00	-26.54	-0.92	0.00	-86.31	0.00	86.31	2866.80	1433.40	5109.91	2558.75	0.58	-0.10	0.00	0.043
60.00	-25.61	-0.91	0.00	-81.69	0.00	81.69	2826.28	1413.14	4922.13	2464.72	0.69	-0.11	0.00	0.042
65.00	-24.70	-0.91	0.00	-77.12	0.00	77.12	2784.61	1392.30	4735.69	2371.36	0.82	-0.13	0.00	0.041
70.00	-23.80	-0.90	0.00	-72.59	0.00	72.59	2741.78	1370.89	4550.74	2278.75	0.96	-0.14	0.00	0.041
75.00	-22.93	-0.90	0.00	-68.09	0.00	68.09	2697.80	1348.90	4367.43	2186.96	1.11	-0.15	0.00	0.040
80.00	-22.08	-0.90	0.00	-63.60	0.00	63.60	2652.66	1326.33	4185.88	2096.05	1.27	-0.16	0.00	0.039
85.00	-21.25	-0.90	0.00	-59.11	0.00	59.11	2606.36	1303.18	4006.26	2006.11	1.45	-0.18	0.00	0.038
90.00	-20.43	-0.90	0.00	-54.61	0.00	54.61	2558.91	1279.46	3828.69	1917.19	1.64	-0.19	0.00	0.036
95.00	-19.64	-0.90	0.00	-50.10	0.00	50.10	2510.31	1255.15	3653.33	1829.38	1.85	-0.20	0.00	0.035
96.50	-19.41	-0.90	0.00	-48.74	0.00	48.74	2495.50	1247.75	3601.17	1803.26	1.91	-0.20	0.00	0.035
100.00	-18.47	-0.90	0.00	-45.58	0.00	45.58	2460.55	1230.28	3480.30	1742.74	2.06	-0.21	0.00	0.034
101.00	-18.20	-0.90	0.00	-44.68	0.00	44.68	1839.54	919.77	2634.41	1319.16	2.11	-0.21	0.00	0.044
105.00	-17.70	-0.90	0.00	-41.07	0.00	41.07	1813.75	906.87	2538.14	1270.96	2.29	-0.22	0.00	0.042
110.00	-17.10	-0.91	0.00	-36.55	0.00	36.55	1780.47	890.23	2418.76	1211.18	2.53	-0.24	0.00	0.040
115.00	-16.50	-0.91	0.00	-32.02	0.00	32.02	1746.03	873.02	2300.59	1152.00	2.79	-0.25	0.00	0.037
120.00	-15.93	-0.91	0.00	-27.48	0.00	27.48	1710.44	855.22	2183.75	1093.50	3.06	-0.26	0.00	0.034
124.00	-15.18	-0.90	0.00	-23.85	0.00	23.85	1681.14	840.57	2091.35	1047.23	3.29	-0.27	0.00	0.032
125.00	-15.07	-0.91	0.00	-22.94	0.00	22.94	1673.69	836.85	2068.40	1035.74	3.35	-0.28	0.00	0.031
129.00	-13.43	-0.88	0.00	-19.32	0.00	19.32	1643.47	821.73	1977.29	990.11	3.58	-0.29	0.00	0.028
130.00	-13.02	-0.88	0.00	-18.44	0.00	18.44	1635.79	817.90	1954.68	978.79	3.64	-0.29	0.00	0.027
133.00	-12.35	-0.86	0.00	-15.81	0.00	15.81	1612.50	806.25	1887.28	945.04	3.82	-0.29	0.00	0.024
135.00	-10.64	-0.81	0.00	-14.09	0.00	14.09	1596.74	798.37	1842.72	922.73	3.95	-0.30	0.00	0.022
138.00	-10.04	-0.79	0.00	-11.65	0.00	11.65	1572.75	786.37	1776.45	889.55	4.14	-0.30	0.00	0.019
140.00	-9.84	-0.79	0.00	-10.06	0.00	10.06	1556.53	778.26	1732.67	867.62	4.26	-0.31	0.00	0.018
145.00	-9.36	-0.76	0.00	-6.13	0.00	6.13	1515.16	757.58	1624.67	813.54	4.59	-0.31	0.00	0.014
146.00	-5.28	-0.52	0.00	-5.37	0.00	5.37	1506.75	753.37	1603.33	802.85	4.65	-0.31	0.00	0.010
146.50	-5.23	-0.51	0.00	-5.11	0.00	5.11	1502.52	751.26	1592.69	797.53	4.69	-0.31	0.00	0.010
150.00	-4.71	-0.48	0.00	-3.32	0.00	3.32	1021.73	510.87	1074.91	538.26	4.92	-0.31	0.00	0.011
155.00	-4.39	-0.45	0.00	-0.94	0.00	0.94	996.70	498.35	1007.82	504.66	5.25	-0.32	0.00	0.006
156.00	-1.50	-0.17	0.00	-0.50	0.00	0.50	991.55	495.78	994.51	497.99	5.31	-0.32	0.00	0.003
159.00	0.00	-0.16	0.00	0.00	0.00	0.00	975.84	487.92	954.81	478.11	5.51	-0.32	0.00	0.000

## Calculated Forces

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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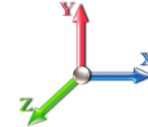
## Seismic Segment Forces (Factored)

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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<b>Load Case:</b> 0.9D + 1.0E						<b>Iterations</b> 23
<b>Gust Response Factor</b>	1.10			<b>Sds</b>	0.10	<b>Ss</b> 0.12
<b>Dead Load Factor</b>	0.90	<b>Seismic Load Factor</b>	1.00	<b>Sd1</b>	0.07	<b>S1</b> 0.06
<b>Wind Load Factor</b>	0.00	<b>Structure Frequency (f1)</b>	0.31	<b>SA</b>	0.02	<b>Seismic Importance Factor</b> 1.00



Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.01	0.00	0.00	
3.50	Appurtenance(s)	1053.8	0.00	0.03	0.02	7.95	
5.00		320.07	0.00	0.04	0.02	2.93	
6.50	Appurtenance(s)	623.27	0.00	0.04	0.02	6.53	
9.50	Appurtenance(s)	931.13	0.01	0.05	0.03	11.61	
10.00		104.49	0.01	0.05	0.03	1.33	
15.00		1033.9	0.02	0.06	0.04	15.13	
20.00		1013.9	0.03	0.07	0.04	15.90	
25.00		993.91	0.05	0.07	0.04	16.21	
30.00		973.91	0.07	0.07	0.04	16.34	
35.00		953.91	0.10	0.07	0.04	16.39	
40.00		933.92	0.12	0.07	0.03	16.42	
45.00		913.92	0.16	0.07	0.03	16.36	
47.50	Bot - Section 2	449.46	0.17	0.07	0.03	8.09	
50.00		820.65	0.19	0.06	0.02	14.80	
53.25	Top - Section 1	1053.1	0.22	0.06	0.02	18.89	
55.00		257.06	0.23	0.06	0.02	4.57	
60.00		723.22	0.27	0.05	0.01	12.26	
65.00		706.55	0.32	0.04	0.01	10.77	
70.00		689.89	0.37	0.03	0.01	8.60	
75.00		673.23	0.43	0.01	0.01	5.72	
80.00		656.57	0.48	-0.01	0.01	2.30	
85.00		639.90	0.55	-0.03	0.01	-1.32	
90.00		623.24	0.61	-0.06	0.02	-4.66	
95.00		606.58	0.68	-0.08	0.03	-7.24	
96.50	Bot - Section 3	178.72	0.70	-0.09	0.03	-2.32	
100.00		745.46	0.75	-0.10	0.04	-11.00	
101.00	Top - Section 2	210.29	0.77	-0.11	0.05	-3.17	
105.00		371.89	0.83	-0.12	0.06	-5.77	
110.00		452.86	0.91	-0.12	0.09	-6.36	
115.00		439.53	0.99	-0.11	0.13	-4.50	
120.00		426.20	1.08	-0.08	0.18	-1.75	
124.00	Appurtenance(s)	583.37	1.15	-0.03	0.22	1.45	
125.00		81.51	1.17	-0.02	0.23	0.36	
129.00	Appurtenance(s)	1325.7	1.25	0.05	0.29	17.02	
130.00	Appurtenance(s)	330.84	1.27	0.08	0.31	5.03	
133.00	Appurtenance(s)	530.33	1.33	0.16	0.36	12.10	
135.00	Appurtenance(s)	1414.8	1.37	0.22	0.40	40.14	
138.00	Appurtenance(s)	477.33	1.43	0.34	0.46	17.86	
140.00		147.55	1.47	0.42	0.51	6.48	
145.00	Appurtenance(s)	371.55	1.57	0.70	0.63	23.01	
146.00	Appurtenance(s)	3399.4	1.60	0.76	0.66	223.76	
146.50	Bot - Section 4	34.96	1.61	0.80	0.68	2.37	
150.00	Top - Section 3	424.77	1.68	1.06	0.79	35.00	
155.00		254.10	1.80	1.52	0.97	26.77	
156.00	Appurtenance(s)	2408.6	1.82	1.63	1.01	265.58	

## Seismic Segment Forces (Factored)

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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159.00	Appurtenance(s)	1251.4	1.89	1.98	1.14	157.16	
<b>Totals:</b>		<b>33,611.0</b>				<b>1,015.1</b>	<b>Total Wind: 28,233.7</b>

Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

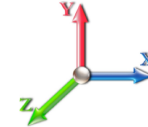


## Calculated Forces

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



<b>Load Case:</b> 0.9D + 1.0E										<b>Iterations</b> 23
<b>Gust Response Factor</b> 1.10					<b>Sds</b> 0.10					<b>Ss</b> 0.12
<b>Dead Load Factor</b> 0.90			<b>Seismic Load Factor</b> 1.00			<b>Sd1</b> 0.07			<b>S1</b> 0.06	
<b>Wind Load Factor</b> 0.00		<b>Structure Frequency (f1)</b> 0.31		<b>SA</b> 0.02		<b>Seismic Importance Factor</b> 1.00				



Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-31.60	-1.06	0.00	-139.81	0.00	139.81	4199.85	2099.92	9244.78	4629.26	0.00	0.00	0.00	0.038
3.50	-30.65	-1.06	0.00	-136.09	0.00	136.09	4167.25	2083.62	9053.74	4533.60	0.00	-0.01	0.037	
5.00	-30.34	-1.06	0.00	-134.50	0.00	134.50	4153.10	2076.55	8972.06	4492.70	0.00	-0.01	0.037	
6.50	-29.77	-1.05	0.00	-132.92	0.00	132.92	4138.85	2069.43	8890.50	4451.86	0.01	-0.01	0.037	
9.50	-28.90	-1.04	0.00	-129.76	0.00	129.76	4110.04	2055.02	8727.78	4370.38	0.02	-0.02	0.037	
10.00	-28.80	-1.04	0.00	-129.24	0.00	129.24	4105.20	2052.60	8700.71	4356.82	0.02	-0.02	0.037	
15.00	-27.82	-1.03	0.00	-124.03	0.00	124.03	4056.14	2028.07	8430.88	4221.71	0.04	-0.03	0.036	
20.00	-26.86	-1.02	0.00	-118.87	0.00	118.87	4005.93	2002.97	8162.71	4087.42	0.07	-0.03	0.036	
25.00	-25.92	-1.01	0.00	-113.78	0.00	113.78	3954.57	1977.28	7896.34	3954.04	0.11	-0.04	0.035	
30.00	-24.99	-0.99	0.00	-108.75	0.00	108.75	3902.04	1951.02	7631.91	3821.63	0.17	-0.05	0.035	
35.00	-24.09	-0.98	0.00	-103.78	0.00	103.78	3848.37	1924.18	7369.57	3690.26	0.23	-0.06	0.034	
40.00	-23.20	-0.97	0.00	-98.88	0.00	98.88	3793.53	1896.77	7109.45	3560.01	0.30	-0.07	0.034	
45.00	-22.33	-0.95	0.00	-94.05	0.00	94.05	3737.54	1868.77	6851.70	3430.94	0.38	-0.08	0.033	
47.50	-21.90	-0.94	0.00	-91.67	0.00	91.67	3709.12	1854.56	6723.75	3366.87	0.42	-0.09	0.033	
50.00	-21.13	-0.93	0.00	-89.31	0.00	89.31	3680.40	1840.20	6596.45	3303.13	0.47	-0.09	0.033	
53.25	-20.15	-0.91	0.00	-86.29	0.00	86.29	2880.71	1440.35	5175.93	2591.81	0.53	-0.10	0.040	
55.00	-19.91	-0.91	0.00	-84.69	0.00	84.69	2866.80	1433.40	5109.91	2558.75	0.57	-0.10	0.040	
60.00	-19.21	-0.90	0.00	-80.14	0.00	80.14	2826.28	1413.14	4922.13	2464.72	0.68	-0.11	0.039	
65.00	-18.52	-0.89	0.00	-75.64	0.00	75.64	2784.61	1392.30	4735.69	2371.36	0.81	-0.12	0.039	
70.00	-17.85	-0.89	0.00	-71.18	0.00	71.18	2741.78	1370.89	4550.74	2278.75	0.94	-0.14	0.038	
75.00	-17.20	-0.88	0.00	-66.76	0.00	66.76	2697.80	1348.90	4367.43	2186.96	1.09	-0.15	0.037	
80.00	-16.56	-0.88	0.00	-62.35	0.00	62.35	2652.66	1326.33	4185.88	2096.05	1.25	-0.16	0.036	
85.00	-15.93	-0.88	0.00	-57.95	0.00	57.95	2606.36	1303.18	4006.26	2006.11	1.43	-0.17	0.035	
90.00	-15.32	-0.88	0.00	-53.53	0.00	53.53	2558.91	1279.46	3828.69	1917.19	1.61	-0.18	0.034	
95.00	-14.73	-0.88	0.00	-49.11	0.00	49.11	2510.31	1255.15	3653.33	1829.38	1.81	-0.20	0.033	
96.50	-14.55	-0.88	0.00	-47.79	0.00	47.79	2495.50	1247.75	3601.17	1803.26	1.88	-0.20	0.032	
100.00	-13.85	-0.88	0.00	-44.69	0.00	44.69	2460.55	1230.28	3480.30	1742.74	2.03	-0.21	0.031	
101.00	-13.65	-0.88	0.00	-43.81	0.00	43.81	1839.54	919.77	2634.41	1319.16	2.07	-0.21	0.041	
105.00	-13.28	-0.89	0.00	-40.27	0.00	40.27	1813.75	906.87	2538.14	1270.96	2.25	-0.22	0.039	
110.00	-12.82	-0.89	0.00	-35.84	0.00	35.84	1740.47	890.23	2418.76	1211.18	2.49	-0.23	0.037	
115.00	-12.38	-0.89	0.00	-31.41	0.00	31.41	1746.03	873.02	2300.59	1152.00	2.74	-0.25	0.034	
120.00	-11.94	-0.89	0.00	-26.97	0.00	26.97	1710.44	855.22	2183.75	1093.50	3.01	-0.26	0.032	
124.00	-11.38	-0.89	0.00	-23.41	0.00	23.41	1681.14	840.57	2091.35	1047.23	3.23	-0.27	0.029	
125.00	-11.30	-0.89	0.00	-22.53	0.00	22.53	1673.69	836.85	2068.40	1035.74	3.29	-0.27	0.029	
129.00	-10.07	-0.86	0.00	-18.98	0.00	18.98	1643.47	821.73	1977.29	990.11	3.52	-0.28	0.025	
130.00	-9.76	-0.86	0.00	-18.12	0.00	18.12	1635.79	817.90	1954.68	978.79	3.58	-0.28	0.024	
133.00	-9.26	-0.84	0.00	-15.54	0.00	15.54	1612.50	806.25	1887.28	945.04	3.76	-0.29	0.022	
135.00	-7.98	-0.80	0.00	-13.86	0.00	13.86	1596.74	798.37	1842.72	922.73	3.88	-0.29	0.020	
138.00	-7.53	-0.78	0.00	-11.46	0.00	11.46	1572.75	786.37	1776.45	889.55	4.06	-0.30	0.018	
140.00	-7.38	-0.77	0.00	-9.90	0.00	9.90	1556.53	778.26	1732.67	867.62	4.19	-0.30	0.016	
145.00	-7.02	-0.75	0.00	-6.04	0.00	6.04	1515.16	757.58	1624.67	813.54	4.51	-0.31	0.012	
146.00	-3.96	-0.51	0.00	-5.29	0.00	5.29	1506.75	753.37	1603.33	802.85	4.57	-0.31	0.009	
146.50	-3.93	-0.51	0.00	-5.04	0.00	5.04	1502.52	751.26	1592.69	797.53	4.60	-0.31	0.009	
150.00	-3.54	-0.47	0.00	-3.27	0.00	3.27	1021.73	510.87	1074.91	538.26	4.83	-0.31	0.010	
155.00	-3.30	-0.44	0.00	-0.93	0.00	0.93	996.70	498.35	1007.82	504.66	5.15	-0.31	0.005	
156.00	-1.13	-0.16	0.00	-0.49	0.00	0.49	991.55	495.78	994.51	497.99	5.22	-0.31	0.002	
159.00	0.00	-0.16	0.00	0.00	0.00	0.00	975.84	487.92	954.81	478.11	5.41	-0.31	0.000	

## Calculated Forces

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II
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## Wind Loading - Shaft

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	<b>6/25/2021</b>
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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**Load Case:** 1.0D + 1.0W 60 mph Wind

**Iterations** 25

**Dead Load Factor** 1.00

**Wind Load Factor** 1.00



Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	7.442	8.19	252.30	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
3.50	Appurtenance(s)	1.00	0.85	7.442	8.19	249.06	0.650	0.000	3.50	15.861	10.31	84.4	0.0	753.8
5.00		1.00	0.85	7.442	8.19	247.68	0.650	0.000	1.50	6.735	4.38	35.8	0.0	320.1
6.50	Appurtenance(s)	1.00	0.85	7.442	8.19	246.29	0.650	0.000	1.50	6.697	4.35	35.6	0.0	318.3
9.50	Appurtenance(s)	1.00	0.85	7.442	8.19	243.52	0.650	0.000	3.00	13.282	8.63	70.7	0.0	631.1
10.00		1.00	0.85	7.442	8.19	243.06	0.650	0.000	0.50	2.199	1.43	11.7	0.0	104.5
15.00		1.00	0.86	7.534	8.29	239.90	0.650	0.000	5.00	21.760	14.14	117.2	0.0	1033.9
20.00		1.00	0.91	7.978	8.78	242.08	0.650	0.000	5.00	21.343	13.87	121.7	0.0	1013.9
25.00		1.00	0.95	8.345	9.18	242.69	0.650	0.000	5.00	20.925	13.60	124.8	0.0	993.9
30.00		1.00	0.99	8.659	9.53	242.24	0.650	0.000	5.00	20.507	13.33	127.0	0.0	973.9
35.00		1.00	1.02	8.936	9.83	241.02	0.650	0.000	5.00	20.089	13.06	128.4	0.0	953.9
40.00		1.00	1.05	9.184	10.10	239.21	0.650	0.000	5.00	19.671	12.79	129.2	0.0	933.9
45.00		1.00	1.07	9.410	10.35	236.92	0.650	0.000	5.00	19.254	12.51	129.5	0.0	913.9
47.50	Bot - Section 2	1.00	1.09	9.515	10.47	235.64	0.650	0.000	2.50	9.470	6.16	64.4	0.0	449.5
50.00		1.00	1.10	9.616	10.58	234.26	0.650	0.000	2.50	9.498	6.17	65.3	0.0	820.7
53.25	Top - Section 1	1.00	1.11	9.742	10.72	232.35	0.650	0.000	3.25	12.191	7.92	84.9	0.0	1053.1
55.00		1.00	1.12	9.807	10.79	234.63	0.650	0.000	1.75	6.491	4.22	45.5	0.0	257.1
60.00		1.00	1.14	9.986	10.98	231.40	0.650	0.000	5.00	18.265	11.87	130.4	0.0	723.2
65.00		1.00	1.16	10.153	11.17	227.92	0.650	0.000	5.00	17.847	11.60	129.6	0.0	706.6
70.00		1.00	1.18	10.310	11.34	224.24	0.650	0.000	5.00	17.429	11.33	128.5	0.0	689.9
75.00		1.00	1.19	10.459	11.50	220.38	0.650	0.000	5.00	17.012	11.06	127.2	0.0	673.2
80.00		1.00	1.21	10.600	11.66	216.34	0.650	0.000	5.00	16.594	10.79	125.8	0.0	656.6
85.00		1.00	1.23	10.734	11.81	212.16	0.650	0.000	5.00	16.176	10.51	124.2	0.0	639.9
90.00		1.00	1.24	10.863	11.95	207.84	0.650	0.000	5.00	15.758	10.24	122.4	0.0	623.2
95.00		1.00	1.25	10.986	12.08	203.40	0.650	0.000	5.00	15.340	9.97	120.5	0.0	606.6
96.50	Bot - Section 3	1.00	1.26	11.022	12.12	202.04	0.650	0.000	1.50	4.521	2.94	35.6	0.0	178.7
100.00		1.00	1.27	11.104	12.21	198.84	0.650	0.000	3.50	10.550	6.86	83.8	0.0	745.5
101.00	Top - Section 2	1.00	1.27	11.127	12.24	197.92	0.650	0.000	1.00	2.977	1.93	23.7	0.0	210.3
105.00		1.00	1.28	11.218	12.34	197.06	0.650	0.000	4.00	11.740	7.63	94.2	0.0	371.9
110.00		1.00	1.29	11.327	12.46	192.31	0.650	0.000	5.00	14.299	9.29	115.8	0.0	452.9
115.00		1.00	1.31	11.432	12.58	187.48	0.650	0.000	5.00	13.881	9.02	113.5	0.0	439.5
120.00		1.00	1.32	11.534	12.69	182.56	0.650	0.000	5.00	13.463	8.75	111.0	0.0	426.2
124.00	Appurtenance(s)	1.00	1.33	11.614	12.78	178.57	0.650	0.000	4.00	10.470	6.81	86.9	0.0	331.4
125.00		1.00	1.33	11.633	12.80	177.56	0.650	0.000	1.00	2.576	1.67	21.4	0.0	81.5
129.00	Appurtenance(s)	1.00	1.34	11.710	12.88	173.51	0.650	0.000	4.00	10.135	6.59	84.9	0.0	320.7
130.00	Appurtenance(s)	1.00	1.34	11.729	12.90	172.49	0.650	0.000	1.00	2.492	1.62	20.9	0.0	78.8
133.00	Appurtenance(s)	1.00	1.35	11.785	12.96	169.41	0.650	0.000	3.00	7.376	4.79	62.2	0.0	233.3
135.00	Appurtenance(s)	1.00	1.35	11.822	13.00	167.34	0.650	0.000	2.00	4.834	3.14	40.9	0.0	152.9
138.00	Appurtenance(s)	1.00	1.36	11.876	13.06	164.22	0.650	0.000	3.00	7.125	4.63	60.5	0.0	225.3
140.00		1.00	1.36	11.912	13.10	162.13	0.650	0.000	2.00	4.667	3.03	39.7	0.0	147.6
145.00	Appurtenance(s)	1.00	1.37	12.000	13.20	156.86	0.650	0.000	5.00	11.374	7.39	97.6	0.0	359.6
146.00	Appurtenance(s)	1.00	1.37	12.017	13.22	155.80	0.650	0.000	1.00	2.225	1.45	19.1	0.0	70.3
146.50	Bot - Section 4	1.00	1.37	12.026	13.23	155.26	0.650	0.000	0.50	1.106	0.72	9.5	0.0	35.0
150.00	Top - Section 3	1.00	1.38	12.085	13.29	151.52	0.650	0.000	3.50	7.737	5.03	66.9	0.0	424.8
155.00		1.00	1.39	12.168	13.39	148.38	0.650	0.000	5.00	10.697	6.95	93.1	0.0	254.1
156.00	Appurtenance(s)	1.00	1.39	12.185	13.40	147.30	0.650	0.000	1.00	2.089	1.36	18.2	0.0	49.6
159.00	Appurtenance(s)	1.00	1.40	12.233	13.46	144.03	0.650	0.000	3.00	6.168	4.01	53.9	0.0	146.5

## Wind Loading - Shaft

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II
		<b>Page:</b> 39



<b>Totals:</b>	<b>159.00</b>	<b>3,737.9</b>	<b>22,580.9</b>
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## Discrete Appurtenance Forces

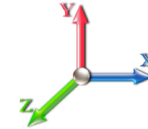
<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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**Load Case:** 1.0D + 1.0W 60 mph Wind

**Dead Load Factor** 1.00  
**Wind Load Factor** 1.00



**Iterations** 25

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor	x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	159.00	Andrew ASPA685	1	12.375	13.612	1.00	1.00	1.00	5.40	55.00	0.000	9.000	73.51	0.00	661.57
2	159.00	T-Arms	3	12.233	13.457	0.56	0.75	13.50	1050.00	0.000	0.000	181.66	0.00	0.00	
3	156.00	RDIDC-9181-PF-48	1	12.185	13.403	1.00	1.00	2.01	21.85	0.000	0.000	26.94	0.00	0.00	
4	156.00	TA08025-B604	3	12.185	13.403	0.50	0.75	2.95	191.70	0.000	0.000	39.60	0.00	0.00	
5	156.00	TA08025-B605	3	12.185	13.403	0.50	0.75	2.95	225.00	0.000	0.000	39.60	0.00	0.00	
6	156.00	MC-PK8-DSH	1	12.185	13.403	1.00	1.00	37.59	1727.00	0.000	0.000	503.82	0.00	0.00	
7	156.00	MX08FRO665-21	3	12.185	13.403	0.55	0.75	20.80	193.50	0.000	0.000	278.73	0.00	0.00	
8	146.00	Andrew VHLP2/HP2-23	1	12.017	13.219	0.75	0.75	3.51	27.00	0.000	0.000	46.40	0.00	0.00	
9	146.00	Samsung MMU-H65V9	3	12.017	13.219	0.50	0.75	10.22	459.90	0.000	0.000	135.11	0.00	0.00	
10	146.00	Commscope	3	12.017	13.219	0.55	0.75	20.15	254.10	0.000	0.000	266.40	0.00	0.00	
11	146.00	Samsung RRH-P4	3	12.017	13.219	0.50	0.75	4.13	188.10	0.000	0.000	54.60	0.00	0.00	
12	146.00	Ceragon Radio	1	12.017	13.219	0.45	0.75	0.13	10.00	0.000	0.000	1.73	0.00	0.00	
13	146.00	Samsung 4 port	3	12.017	13.219	0.45	0.75	2.13	144.00	0.000	0.000	28.20	0.00	0.00	
14	146.00	Platform w/ Hand Rail	1	12.017	13.219	1.00	1.00	51.70	2246.00	0.000	0.000	683.40	0.00	0.00	
15	145.00	DragonWave HP Duo	1	12.000	13.200	0.45	0.75	0.13	12.00	0.000	0.000	1.72	0.00	0.00	
16	138.00	4' Standoff Arm	2	11.876	13.064	1.00	1.00	4.00	152.00	0.000	0.000	52.26	0.00	0.00	
17	138.00	2' Stadium Lights	4	11.876	13.064	1.00	1.00	11.20	100.00	0.000	0.000	146.31	0.00	0.00	
18	135.00	4' Standoff Arm	2	11.822	13.004	1.00	1.00	4.00	152.00	0.000	0.000	52.02	0.00	0.00	
19	135.00	2' Stadium Lights	4	11.822	13.004	1.00	1.00	11.20	100.00	0.000	0.000	145.64	0.00	0.00	
20	135.00	Band-On Mount	2	11.822	13.004	1.00	1.00	0.20	10.00	0.000	0.000	2.60	0.00	0.00	
21	135.00	15' Catwalk w/ Handrail	1	11.822	13.004	1.00	1.00	30.00	1000.00	0.000	0.000	390.12	0.00	0.00	
22	133.00	4' Standoff Arm	2	11.785	12.963	1.00	1.00	4.00	152.00	0.000	0.000	51.85	0.00	0.00	
23	133.00	2' Stadium Lights	4	11.785	12.963	1.00	1.00	11.20	100.00	0.000	0.000	145.19	0.00	0.00	
24	133.00	2'x2'x3'	1	11.785	12.963	1.00	1.00	5.60	45.00	0.000	0.000	72.60	0.00	0.00	
25	130.00	2' Stadium Lights	4	11.729	12.902	1.00	1.00	11.20	100.00	0.000	0.000	144.50	0.00	0.00	
26	130.00	4' Standoff Arm	2	11.729	12.902	1.00	1.00	4.00	152.00	0.000	0.000	51.61	0.00	0.00	
27	129.00	15' Catwalk w/ Handrail	1	11.710	12.881	1.00	1.00	30.00	1000.00	0.000	0.000	386.43	0.00	0.00	
28	129.00	Band-On Mount	1	11.710	12.881	1.00	1.00	0.10	5.00	0.000	0.000	1.29	0.00	0.00	
29	124.00	4' Standoff Arm	2	11.614	12.775	1.00	1.00	4.00	152.00	0.000	0.000	51.10	0.00	0.00	
30	124.00	1' Box Light	4	11.614	12.775	1.00	1.00	5.60	100.00	0.000	0.000	71.54	0.00	0.00	
31	9.50	Light Ballast	1	7.442	8.186	1.00	1.00	6.30	300.00	0.000	0.000	51.57	0.00	0.00	
32	6.50	Band-On Mount	1	7.442	8.186	1.00	1.00	0.10	5.00	0.000	0.000	0.82	0.00	0.00	
33	6.50	Light Ballast	1	7.442	8.186	1.00	1.00	6.30	300.00	0.000	0.000	51.57	0.00	0.00	
34	3.50	Light Ballast	1	7.442	8.186	1.00	1.00	6.30	300.00	0.000	0.000	51.57	0.00	0.00	

**Totals:** **11,030.15** **4,282.01**

## Total Applied Force Summary

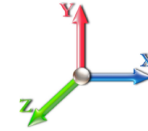
<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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**Load Case:** 1.0D + 1.0W 60 mph Wind

**Dead Load Factor** 1.00  
**Wind Load Factor** 1.00



**Iterations** 25

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
3.50	(1) attachments	135.97	1059.20	0.00	0.00
5.00		35.84	336.21	0.00	0.00
6.50	(2) attachments	88.03	639.41	0.00	0.00
9.50	(1) attachments	122.24	963.42	0.00	0.00
10.00		11.70	109.87	0.00	0.00
15.00		117.22	1087.71	0.00	0.00
20.00		121.74	1067.72	0.00	0.00
25.00		124.85	1047.72	0.00	0.00
30.00		126.97	1027.72	0.00	0.00
35.00		128.36	1007.73	0.00	0.00
40.00		129.18	987.73	0.00	0.00
45.00		129.54	967.74	0.00	0.00
47.50		64.43	476.37	0.00	0.00
50.00		65.30	847.56	0.00	0.00
53.25		84.92	1088.13	0.00	0.00
55.00		45.52	275.90	0.00	0.00
60.00		130.41	777.03	0.00	0.00
65.00		129.55	760.37	0.00	0.00
70.00		128.48	743.71	0.00	0.00
75.00		127.21	727.04	0.00	0.00
80.00		125.76	710.38	0.00	0.00
85.00		124.15	693.72	0.00	0.00
90.00		122.39	677.05	0.00	0.00
95.00		120.50	660.39	0.00	0.00
96.50		35.63	194.87	0.00	0.00
100.00		83.76	783.13	0.00	0.00
101.00		23.68	221.05	0.00	0.00
105.00		94.16	414.94	0.00	0.00
110.00		115.80	506.68	0.00	0.00
115.00		113.47	493.35	0.00	0.00
120.00		111.03	480.02	0.00	0.00
124.00	(6) attachments	209.58	626.42	0.00	0.00
125.00		21.42	91.63	0.00	0.00
129.00	(2) attachments	472.58	1366.19	0.00	0.00
130.00	(6) attachments	217.01	339.93	0.00	0.00
133.00	(7) attachments	331.79	555.66	0.00	0.00
135.00	(9) attachments	631.24	1430.49	0.00	0.00
138.00	(6) attachments	259.07	498.82	0.00	0.00
140.00		39.75	160.60	0.00	0.00
145.00	(1) attachments	99.31	404.17	0.00	0.00
146.00	(15) attachments	1234.94	3401.92	0.00	0.00
146.50		9.51	36.21	0.00	0.00
150.00		66.85	433.56	0.00	0.00
155.00		93.07	266.65	0.00	0.00
156.00	(11) attachments	906.89	2411.18	0.00	0.00
159.00	(4) attachments	309.12	1253.02	0.00	661.57

## Total Applied Force Summary

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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<b>Totals:</b>	<b>8,019.92</b>	<b>35,110.33</b>	<b>0.00</b>	<b>661.57</b>
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## Calculated Forces

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	<b>6/25/2021</b>
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II

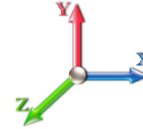


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**Load Case:** 1.0D + 1.0W 60 mph Wind

**Iterations** 25

**Dead Load Factor** 1.00  
**Wind Load Factor** 1.00



Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-35.11	-8.03	0.00	-921.78	0.00	921.78	4199.85	2099.92	9244.78	4629.26	0.00	0.000	0.000	0.207
3.50	-34.04	-7.91	0.00	-893.67	0.00	893.67	4167.25	2083.62	9053.74	4533.60	0.01	-0.039	0.000	0.205
5.00	-33.71	-7.89	0.00	-881.81	0.00	881.81	4153.10	2076.55	8972.06	4492.70	0.03	-0.056	0.000	0.204
6.50	-33.06	-7.81	0.00	-869.98	0.00	869.98	4138.85	2069.43	8890.50	4451.86	0.05	-0.073	0.000	0.203
9.50	-32.10	-7.70	0.00	-846.54	0.00	846.54	4110.04	2055.02	8727.78	4370.38	0.11	-0.108	0.000	0.202
10.00	-31.98	-7.70	0.00	-842.70	0.00	842.70	4105.20	2052.60	8700.71	4356.82	0.12	-0.113	0.000	0.201
15.00	-30.89	-7.62	0.00	-804.17	0.00	804.17	4056.14	2028.07	8430.88	4221.71	0.27	-0.170	0.000	0.198
20.00	-29.81	-7.52	0.00	-766.10	0.00	766.10	4005.93	2002.97	8162.71	4087.42	0.48	-0.228	0.000	0.195
25.00	-28.76	-7.42	0.00	-728.50	0.00	728.50	3954.57	1977.28	7896.34	3954.04	0.75	-0.286	0.000	0.192
30.00	-27.72	-7.32	0.00	-691.40	0.00	691.40	3902.04	1951.02	7631.91	3821.63	1.08	-0.344	0.000	0.188
35.00	-26.71	-7.21	0.00	-654.82	0.00	654.82	3848.37	1924.18	7369.57	3690.26	1.47	-0.403	0.000	0.184
40.00	-25.72	-7.10	0.00	-618.78	0.00	618.78	3793.53	1896.77	7109.45	3560.01	1.92	-0.463	0.000	0.181
45.00	-24.74	-6.98	0.00	-583.28	0.00	583.28	3737.54	1868.77	6851.70	3430.94	2.44	-0.523	0.000	0.177
47.50	-24.26	-6.92	0.00	-565.83	0.00	565.83	3709.12	1854.56	6723.75	3366.87	2.72	-0.553	0.000	0.175
50.00	-23.41	-6.86	0.00	-548.52	0.00	548.52	3680.40	1840.20	6596.45	3303.13	3.02	-0.584	0.000	0.172
53.25	-22.32	-6.78	0.00	-526.21	0.00	526.21	2880.71	1440.35	5175.93	2591.81	3.43	-0.624	0.000	0.211
55.00	-22.04	-6.75	0.00	-514.35	0.00	514.35	2866.80	1433.40	5109.91	2558.75	3.67	-0.645	0.000	0.209
60.00	-21.26	-6.64	0.00	-480.60	0.00	480.60	2826.28	1413.14	4922.13	2464.72	4.38	-0.715	0.000	0.203
65.00	-20.49	-6.52	0.00	-447.42	0.00	447.42	2784.61	1392.30	4735.69	2371.36	5.16	-0.784	0.000	0.196
70.00	-19.74	-6.41	0.00	-414.82	0.00	414.82	2741.78	1370.89	4550.74	2278.75	6.02	-0.853	0.000	0.189
75.00	-19.01	-6.29	0.00	-382.79	0.00	382.79	2697.80	1348.90	4367.43	2186.96	6.95	-0.922	0.000	0.182
80.00	-18.29	-6.17	0.00	-351.34	0.00	351.34	2652.66	1326.33	4185.88	2096.05	7.95	-0.990	0.000	0.175
85.00	-17.60	-6.06	0.00	-320.48	0.00	320.48	2606.36	1303.18	4006.26	2006.11	9.03	-1.057	0.000	0.167
90.00	-16.91	-5.94	0.00	-290.19	0.00	290.19	2558.91	1279.46	3828.69	1917.19	10.17	-1.123	0.000	0.158
95.00	-16.25	-5.82	0.00	-260.48	0.00	260.48	2510.31	1255.15	3653.33	1829.38	11.38	-1.188	0.000	0.149
96.50	-16.06	-5.79	0.00	-251.75	0.00	251.75	2495.50	1247.75	3601.17	1803.26	11.76	-1.207	0.000	0.146
100.00	-15.27	-5.70	0.00	-231.49	0.00	231.49	2460.55	1230.28	3480.30	1742.74	12.66	-1.251	0.000	0.139
101.00	-15.05	-5.68	0.00	-225.79	0.00	225.79	1839.54	919.77	2634.41	1319.16	12.92	-1.264	0.000	0.179
105.00	-14.63	-5.59	0.00	-203.09	0.00	203.09	1813.75	906.87	2538.14	1270.96	14.00	-1.313	0.000	0.168
110.00	-14.12	-5.48	0.00	-175.15	0.00	175.15	1780.47	890.23	2418.76	1211.18	15.41	-1.381	0.000	0.153
115.00	-13.62	-5.36	0.00	-147.77	0.00	147.77	1746.03	873.02	2300.59	1152.00	16.90	-1.444	0.000	0.136
120.00	-13.14	-5.25	0.00	-120.95	0.00	120.95	1710.44	855.22	2183.75	1093.50	18.44	-1.502	0.000	0.118
124.00	-12.52	-5.03	0.00	-99.94	0.00	99.94	1681.14	840.57	2091.35	1047.23	19.72	-1.544	0.000	0.103
125.00	-12.43	-5.01	0.00	-94.90	0.00	94.90	1673.69	836.85	2068.40	1035.74	20.04	-1.554	0.000	0.099
129.00	-11.07	-4.51	0.00	-74.85	0.00	74.85	1643.47	821.73	1977.29	990.11	21.36	-1.589	0.000	0.082
130.00	-10.74	-4.28	0.00	-70.34	0.00	70.34	1635.79	817.90	1954.68	978.79	21.69	-1.597	0.000	0.078
133.00	-10.19	-3.94	0.00	-57.49	0.00	57.49	1612.50	806.25	1887.28	945.04	22.70	-1.619	0.000	0.067
135.00	-8.78	-3.27	0.00	-49.61	0.00	49.61	1596.74	798.37	1842.72	922.73	23.38	-1.632	0.000	0.059
138.00	-8.28	-3.00	0.00	-39.80	0.00	39.80	1572.75	786.37	1776.45	889.55	24.42	-1.650	0.000	0.050
140.00	-8.12	-2.96	0.00	-33.80	0.00	33.80	1556.53	778.26	1732.67	867.62	25.11	-1.660	0.000	0.044
145.00	-7.72	-2.85	0.00	-19.01	0.00	19.01	1515.16	757.58	1624.67	813.54	26.86	-1.678	0.000	0.028
146.00	-4.36	-1.51	0.00	-16.17	0.00	16.17	1506.75	753.37	1603.33	802.85	27.21	-1.681	0.000	0.023
146.50	-4.32	-1.50	0.00	-15.41	0.00	15.41	1502.52	751.26	1592.69	797.53	27.39	-1.682	0.000	0.022
150.00	-3.89	-1.42	0.00	-10.15	0.00	10.15	1021.73	510.87	1074.91	538.26	28.62	-1.690	0.000	0.023
155.00	-3.63	-1.32	0.00	-3.02	0.00	3.02	996.70	498.35	1007.82	504.66	30.40	-1.696	0.000	0.010
156.00	-1.24	-0.35	0.00	-1.70	0.00	1.70	991.55	495.78	994.51	497.99	30.75	-1.696	0.000	0.005
159.00	0.00	-0.31	0.00	-0.66	0.00	0.66	975.84	487.92	954.81	478.11	31.82	-1.697	0.000	0.001



## Calculated Forces

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II
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## Final Analysis Summary

<b>Structure:</b> OH47491-A-SBA	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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### Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)
1.2D + 1.6W 89 mph Wind	28.3	0.00	42.10	0.00	0.00	3268.72
0.9D + 1.6W 89 mph Wind	28.3	0.00	31.56	0.00	0.00	3226.19
1.2D + 1.0Di + 1.0Wi 40 mph Wind	6.5	0.00	61.96	0.00	0.00	759.46
1.2D + 1.0E	1.1	0.00	42.13	0.00	0.00	141.83
0.9D + 1.0E	1.1	0.00	31.60	0.00	0.00	139.81
1.0D + 1.0W 60 mph Wind	8.0	0.00	35.11	0.00	0.00	921.78

### Max Stresses

Load Case	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Elev (ft)	Stress Ratio
1.2D + 1.6W 89 mph Wind	-25.95	-24.04	0.00	-1870.5	0.00	-1870.5	2880.71	1440.3	5175.93	2591.81	53.25	0.731
0.9D + 1.6W 89 mph Wind	-19.25	-23.76	0.00	-1836.6	0.00	-1836.6	2880.71	1440.3	5175.93	2591.81	53.25	0.716
1.2D + 1.0Di + 1.0Wi 40 mph Wind	-40.19	-5.58	0.00	-435.87	0.00	-435.87	2880.71	1440.3	5175.93	2591.81	53.25	0.182
1.2D + 1.0E	-18.20	-0.90	0.00	-44.68	0.00	-44.68	1839.54	919.77	2634.41	1319.16	101.00	0.044
0.9D + 1.0E	-13.65	-0.88	0.00	-43.81	0.00	-43.81	1839.54	919.77	2634.41	1319.16	101.00	0.041
1.0D + 1.0W 60 mph Wind	-22.32	-6.78	0.00	-526.21	0.00	-526.21	2880.71	1440.3	5175.93	2591.81	53.25	0.211

## Base Plate Summary

<b>Structure:</b> OH47491-A-S	<b>Code:</b> EIA/TIA-222-G	6/25/2021
<b>Site Name:</b> Nw Dublin	<b>Exposure:</b> C	
<b>Height:</b> 159.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 1.000 (ft)	<b>Site Class:</b> C - Very Dense Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II
		<b>Page:</b> 46



Reactions	Base Plate	Anchor Bolts
Original Design	<b>Yield (ksi):</b> 60.00	<b>Bolt Circle:</b> 60.25
<b>Moment (kip-ft):</b> 3424.17	<b>Width (in):</b> 64.00	<b>Number Bolts:</b> 24.00
<b>Axial (kip):</b> 37.12	<b>Style:</b> Clipped	<b>Bolt Type:</b> 2.25" 18J
<b>Shear (kip):</b> 27.74	<b>Polygon Sides:</b> 0.00	<b>Bolt Diameter (in):</b> 2.25
Analysis (1.2D + 1.6W)	<b>Clip Length (in):</b> 16.00	<b>Yield (ksi):</b> 75.00
<b>Moment (kip-ft):</b> 3268.72	<b>Effective Len (in):</b> 7.04	<b>Ultimate (ksi):</b> 100.00
<b>Axial (kip):</b> 42.10	<b>Moment (kip-in):</b> 352.70	<b>Arrangement:</b> Clustered
<b>Shear (kip):</b> 28.29	<b>Allow Stress (ksi):</b> 81.00	<b>Cluster Dist (in):</b> 6.00
	<b>Applied Stress (ksi):</b> 47.79	<b>Start Angle (deg):</b> 45.00
	<b>Stress Ratio:</b> 0.59	Compression
		<b>Force (kip):</b> 111.09
		<b>Allowable (kip):</b> 260.00
		<b>Ratio:</b> 0.44
		Tension
		<b>Force (kip):</b> 105.92
		<b>Allowable (kip):</b> 260.00
		<b>Ratio:</b> 0.42



# Monopole Mat Foundation Design

Date  
6/25/2021

<b>Customer Name:</b>	Dish Wireless	<b>EIA/TIA Standard:</b>	EIA-222-G
<b>Site Name:</b>		<b>Structure Height (Ft.):</b>	159
<b>Site Number:</b>	OH47491-A-SBA	<b>Engineer Name:</b>	D. Zhou
<b>Engr. Number:</b>	111200	<b>Engineer Login ID:</b>	

**Foundation Info Obtained from:**

Mapping Operation
Monopole
Analysis

**Structure Type:**

**Analysis or Design?**

**Base Reactions (Factored):**

Axial Load (Kips):	42.1	Shear Force (Kips):	28.3
Uplift Force (Kips):	0.0	Moment (Kips-ft):	3268.7

Allowable overstress %: 5.0%

**Foundation Geometries:**

Diameter of Pier (ft.):	7.0	Depth of Base BG (ft.):	5.5	Mods required -Yes/No ?:	No
Pier Height A. G. (ft.):	1.00	Thickness of Pad (ft.):	2.00		
Length of Pad (ft.):	27.5	Width of Pad (ft.):	27.5		
Final Length of pad (ft)	27.5	Final width of pad (ft):	27.5		

**Material Properties and Rebar Info:**

Concrete Strength (psi):	4000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield (ksi):	60	
Vertical Rebar Size #:	8	Tie / Stirrup Size #:	4	
Qty. of Vertical Rebars:	36	Tie Spacing (in):	12.0	
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	8	
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf

Rebar at the bottom of the concrete pad:

Qty. of Rebar in Pad (L):	40	Qty. of Rebar in Pad (W):	40
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Rebar at the top of the concrete pad:

Qty. of Rebar in Pad (L):	40	Qty. of Rebar in Pad (W):	40
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Apply 1.35 factor for e/w Per G: 1.35

**Soil Design Parameters:**

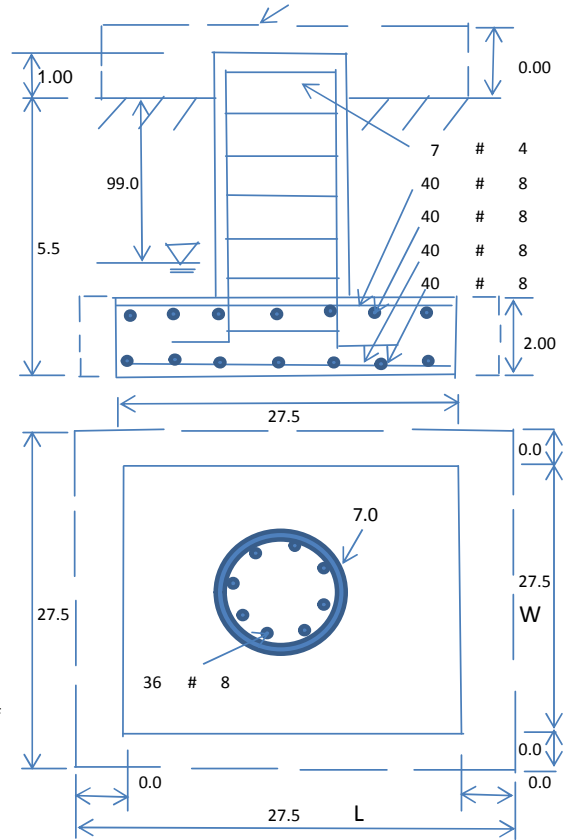
Soil Unit Weight (pcf):	110.0	Soil Buoyant Weight:	47.6	Pcf	
Water Table B.G.S. (ft):	99.0	Unit Weight of Water:	62.4	pcf	Angle from Top of Pad: 30
Ultimate Bearing Pressure (psf):	6000	Ultimate Skin Friction:	0	Psf	Angle from Bottm of Pad: 25
Consider Friction for O.T.M. (Y/N):	No	Consider Friction for bearing (Y/N):	No		Angle from Bottm of Pad: 25
Consider soil hor. resist. for OTM.:	Yes	Reduction factor on the maximum soil bearing pressure:	1.00		

**Foundation Analysis and Design:**

Uplift Strength Reduction Factor:	0.75	Compression Strength Reduction Factor:	0.75
Total Dry Soil Volume (cu. Ft.):	2512.18	Total Dry Soil Weight (Kips):	276.34
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	276.34	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	1685.68	Total Dry Concrete Weight (Kips):	252.85
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	252.85	Total Vertical Load on Base (Kips):	571.29

**Check Soil Capacities:**

Calculated Maxium Net Soil Pressure under the base (psf):	1781	<	Allowable Factored Soil Bearing (psf):	4500	0.40	OK!
Allowable Foundation Overturning Resistance (kips-ft.):	7127.6	>	Design Factored Momont (kips-ft):	3364	0.47	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	2.12					OK!



**Check the capacities of Reinforcing Concrete:**

Strength reduction factor (Flexure and axial tension):	0.90	Strength reduction factor (Shear):	0.75
Strength reduction factor (Axial compression):	0.65	Wind Load Factor on Concrete Design:	1.00

**(1) Concrete Pier:**

Vertical Steel Rebar Area (sq. in./each):	0.79	Tie / Stirrup Area (sq. in./each):	0.20		
Calculated Moment Capacity (Mn,Kips-Ft):	4845.7	> Design Factored Moment (Mu, Kips-F	3396.1	0.70	OK!
Calculated Shear Capacity (Kips):	660.1	> Design Factored Shear (Kips):	28.3	0.04	OK!
Calculated Tension Capacity (Tn, Kips):	1535.8	> Design Factored Tension (Tu Kips):	0.0	0.00	OK!
Calculated Compression Capacity (Pn, Kips):	9747.6	> Design Factored Axial Load (Pu Kips):	42.1	0.00	OK!
Moment & Axial Strength Combination:	0.70	OK! Check Tie Spacing (Design/Required):		1	OK!
Pier Reinforcement Ratio:	0.005	Reinforcement Ratio is satisfied per ACI			

**(2).Concrete Pad:**

One-Way Design Shear Capacity (L-Direction, Kips):	641.8	> One-Way Factored Shear (L-D. Kips):	226.7	0.35	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	641.8	> One-Way Factored Shear (W-D., Kips)	226.7	0.35	OK!
One-Way Design Shear Capacity (Corner-Corner. Kips):	664.5	> One-Way Factored Shear (C-C, Kips):	225.4	0.34	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct. ):	0.0047	OK! Lower Steel Pad Reinf. Ratio (W-Direc	0.0047		
Lower Steel Pad Moment Capacity (L-Direction. Kips-ft):	2795.0	> Moment at Bottom ( L-Dir. K-Ft):	1279.1	0.46	OK!
Lower Steel Pad Moment Capacity (W-Direction. Kips-ft):	2795.0	> Moment at Bottom ( W-Dir. K-Ft):	1279.1	0.46	OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	3915.4	> Moment at Bottom ( C-C Dir. K-Ft):	1808.9	0.46	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct. ):	0.0047	OK! Upper Steel Reinf. Ratio (W-Dir. ):	0.0047		
Upper Steel Pad Moment Capacity (L-Direc. Kips-ft):	2795.0	> Moment at the top (L-Dir K-Ft):	560.4	0.20	OK!
Upper Steel Pad Moment Capacity (W-Direc. Kips-ft):	2795.0	> Moment at the top (W-Dir K-Ft):	560.4	0.20	OK!
Upper Steel Pad Moment Capacity (Corner-Corner. K-ft):	3915.4	> Moment at the top (C-C Dir. K-Ft):	524.3	0.13	OK!

**(3).Check Punching Shear Capacity due to Moment in the Pier:**

Moment transferred by punching shear:	1307.5	k-ft.	Max. factored shear stress $v_{u\_CD}$ :	3.7	Psi
Max. factored shear stress $v_{u\_AB}$ :	14.2	Psi	Factored shear Strength $\phi v_n$ :	189.7	Psi
Max. factored shear stress $v_u$ :	14.2	Psi	Check Usage of Punching Shear Capacity:	0.07	OK!



Pier Foundation Design For Monopole			Date
Customer Name:	Dish Wireless	EIA/TIA Standard:	EIA-222-G
Site Name:		Structure Height (Ft.):	159
Site Number:	OH47491-A-SBA	Engineer Name:	D. Zhou
Engr. Number:	111200	Engineer Login ID:	

**Foundation Info Obtained from:**

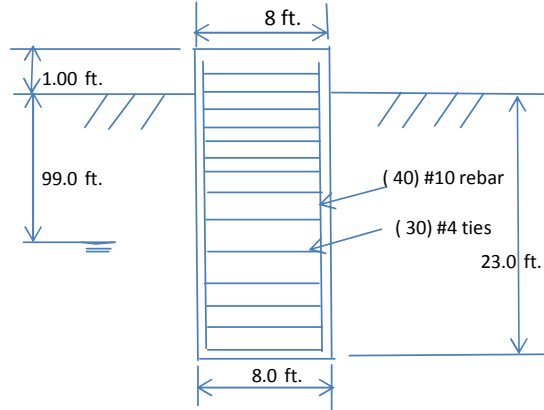
Drawings/Calculations	Acceptable overstress ( % )	5.0%
Structure Type:	Monopole	
Analysis or Design?	Analysis	

**Base Reactions (Factored):**

Axial Load (Kips):	42.1	Shear Force (Kips):	28.3
Uplift Force (Kips):	0.0	Moment (Kips-ft):	3268.7

**Foundation Geometries:**

Diameter of Pier (ft.):	8.0	Depth of Base B. G. S. :	23.0 ft.
Pier Height A. G. (ft.):	1.00		



**Monopole Pier Foundation**

**Material Properties and Rebar Info:**

Concrete Strength (psi):	4000	Steel Elastic Modulus:	29000 ksi
Vertical bar yield (ksi):	60	Tie steel yield strength:	60 ksi
Vertical Rebar Size #:	10	Tie / Stirrup Size #:	4
Qty. of Vertical Rebars:	40	Tie Spacing:	12.0 in.
Concrete Cover (in.):	3	Concrete unit weight:	150.0 pcf

**Soil Design Parameters:**

Water Table B.G.S. (ft):	99.0	Unit weight of water:	62.4 psf
Ratio of Uplift/Axial Skin Friction:	1.0	Pullout failure Angle:	30 (°)

Skin Frictions are to be obtained from: **Soil Report**

Depth of Layers (ft)		$\gamma_{soil}$	$\phi$	Cohesion	Ultimate Skin Friction (psf)	Ultimate Bearing (psf)	Soil Types						
Top	Bottom	(pcf)	(°)	(psf)									
0.0	3.7	110	0	14.4	0	0	Clay						
3.7	19.0	135	0	10910	5455	0	Clay						
19.0	24.0	135	0	10910	5455	21000	Clay						

Soil weight Increase Factor for buoyant soils (1.0 to 1.15): 1.1

**Foundation Analysis and Design:**

Uplift Strength Reduction Factor:	0.75	Soil Bearing Strength Reduction Factor:	0.75
Total Dry Soil Volume from Conical Failure (cu. Ft.):	8035	Dry Soil Weight from Conical Failure:	1054 Kips
Total Buoyant Soil Volume from Conical Failure (cu. Ft.):	0	Buoyant Soil Weight from Conical Failure (K):	0 Kips
Total Dry Concrete Volume (cu. Ft.):	1206	Total Dry Concrete Weight:	181.0 Kips
Total Buoyant Concrete Volume (cu. Ft.):	0.0	Total Buoyant Concrete Weight:	0.00 Kips
Total Effective Concrete Weight (Kips):	181.0	Total Effective Soil Weight:	1053.7 Kips
Total Effective Vertical Load on Base (Kips):	71.4		

**Check Soil Capacities:**

Allowable Foundation Overturning Resistance (kips-ft.):	49602.7	>	Design Factored Moment (kips-ft):	3661	Usage	0.07	OK!
Factor of Safety of Passive Soil Resistance against Moment:	13.55	OK!					

**Check the capacities of Reinforceing Concrete:**

Strength reduction factor (Flexure and axial tension):	0.90	Strength reduction factor (Shear):	0.75
Strength reduction factor (Axial compression):	0.65	Wind Load Factor on Concrete Design:	1.00

Reinforcing Concrete Pier:

Vertical Steel Rebar Area (sq. in./each):	1.27	Tie / Stirrup Area (sq. in./each):	0.20	Usage	
Calculated Moment Capacity (Mn,Kips-Ft):	9673.7	>	Design Factored Moment (Mu, K-Ft):	3384.8	0.35 OK!
Calculated Shear Capacity (Kips):	1472.3	>	Design Factored Shear (Kips):	344.4	0.23 OK!
Calculated Tension Capacity (Tn, Kips):	2743.2	>	Design Factored Tension (Tu Kips):	0.0	0.00 OK!
Calculated Compression Capacity (Pn, Kips):	12707	>	Design Factored Axial Load (Pu Kips):	42.1	0.00 OK!
Moment & Axial Strength Combination:	0.35	OK!	Max. Allowable Tie/Stirrup Spacing:	12.00	in.
Pier Reinforcement Ratio:	0.007	Reinforcement Ratio is satisfied per ACI			