



**AMERICAN TOWER®**  
CORPORATION

This report was prepared for American Tower Corporation by



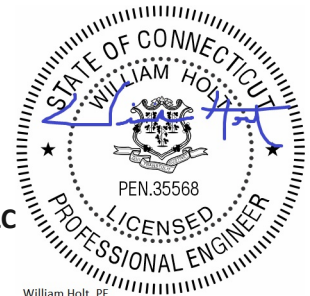
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## Antenna Mount Analysis Report

**ATC Site Name** : Northhaven I  
**ATC Asset Number** : 370629  
**Engineering Number** : 13682689\_C8\_06  
**Mount Elevation** : 122 ft  
**Carrier** : AT&T Mobility  
**Carrier Site Name** : MRCTB050982  
**Carrier Site Number** : MRCTB050982  
**Site Location** : 125 Washington Ave  
North Haven, CT 06473-0000  
41.39783333, -72.85666667  
**County** : New Haven  
**Date** : May 6, 2022  
**Max Usage** : 96%  
**Result** : Contingent Pass\*  
\*See conclusion for requirements

Prepared By:  
**Snehitha Narava**  
Telamon Tower Engineering, PLLC

Reviewed By:  
**William Holt, P.E.**  
Telamon Tower Engineering, PLLC



William Holt, PE  
Director of Engineering  
License No. 35568 Expires: 01/31/2023

**Table of Contents**

Introduction ..... 2

Supporting Documents ..... 2

Analysis ..... 2

Conclusion ..... 3

Antenna Loading ..... 4

Structure Usages .....4

Equipment Layout Plan View .....5

Equipment Layout Front Elevation View .....6

Standard Conditions .....7

Calculations ..... Attached

## Introduction

The proposed equipment is to be mounted to the existing Platform w/ Support Rails. This proposed mounting configuration was analyzed using RISA-3D, a commercially available finite element analysis software package. A selection of input and output from our analysis is attached to the end of this report.

## Supporting Documents

<b>Structural Data</b>	Site Photos dated November 03, 2020 Site Pro 1 Part No. DCP18K, dated January 22, 2013 Site Pro 1 Part No. LP-42, dated February 04, 2011 Site Pro 1 Part No. UWS6-NP, dated January 06, 2012 Site Pro 1 Part No. SQCX4-K, dated November 12, 2018
<b>Previous Analyses</b>	Tower SA by Tower Engineering Professionals for ATC, Engineering #13732379_C3_03, dated October 13, 2021 Mount Analysis by Centek Engineering, Project #17004.74, Rev. 1, dated April 17, 2018
<b>Construction Drawings</b>	Construction Drawings by CENTEK, Job No: 17004.74, dated April 10, 2018
<b>Loading Data</b>	ATC Application, Project #13682689, dated November 03, 2021 AT&T RFDS ID:4387628, Ver. 3.00, dated October 25, 2021

## Analysis

<b>Codes</b>	TIA-222-H
<b>Basic Wind Speed</b>	120 mph, $V_{ult}$ (3-Second Gust)
<b>Basic Wind Speed w/ Ice</b>	50 mph (3-Second Gust) w/ 1" Radial Ice (Escalating)
<b>Exposure Category</b>	B
<b>Topographic Factor Procedure:</b>	Method 2
<b>Feature:</b>	Flat
<b>Crest Height (H):</b>	0 ft
<b>Crest Length (L):</b>	0 ft
<b>Risk Category</b>	II
<b>Maintenance Live Load</b>	$L_M$ : 500 lb
<b>Spectral Response</b>	$S_S$ : 0.20; $S_1$ : 0.05; Site Class: D

## Conclusion

Based on the analysis, the antenna mount meets the requirements per the applicable codes listed above. The mounting configuration considered in this analysis will be capable of supporting the referenced loading pursuant to referenced standards once the following scope is executed:

- Relocate existing mount pipe at position 2 and position 3 as shown. Connect to existing platform base member using (2) 1/2" U-bolts (12 total). Connect to existing support rail using (1) 1/2" U-bolts (6 total).
- Install (2) secondary mount pipe 2 STD x 8'-0" long, A53 Gr. B, at positions 2 and 4 (6 total) with proposed Site Pro 1 DCP18K threaded rod kits (12 total) as shown. Maintain the minimum required 4'-0" separation between panels.
- Install (1) proposed RRH pipe 2 STD x 6'-0" long, A53 Gr. B, mount pipe at each sector (3 total) as shown. Connect to stand-off horizontal HSS tubes with (1) Site Pro 1 SQCX4-K crossover plate kits at each sector (3 total).
- Install (1) proposed Site Pro 1 UWS6-NP ring mount to monopole with (1) Site Pro 1 LP-42 large pole adapter kit as shown and install (2) proposed pipe 2 STD x 6'-0" long mount pipe at each sector for spare panel configuration (6 total) as shown.

If you have any questions or require additional information, please contact American Tower via email at [Engineering@americantower.com](mailto:Engineering@americantower.com). Please include the American Tower site name, site number, and engineering number in the subject line for any questions.

**Antenna Loading**

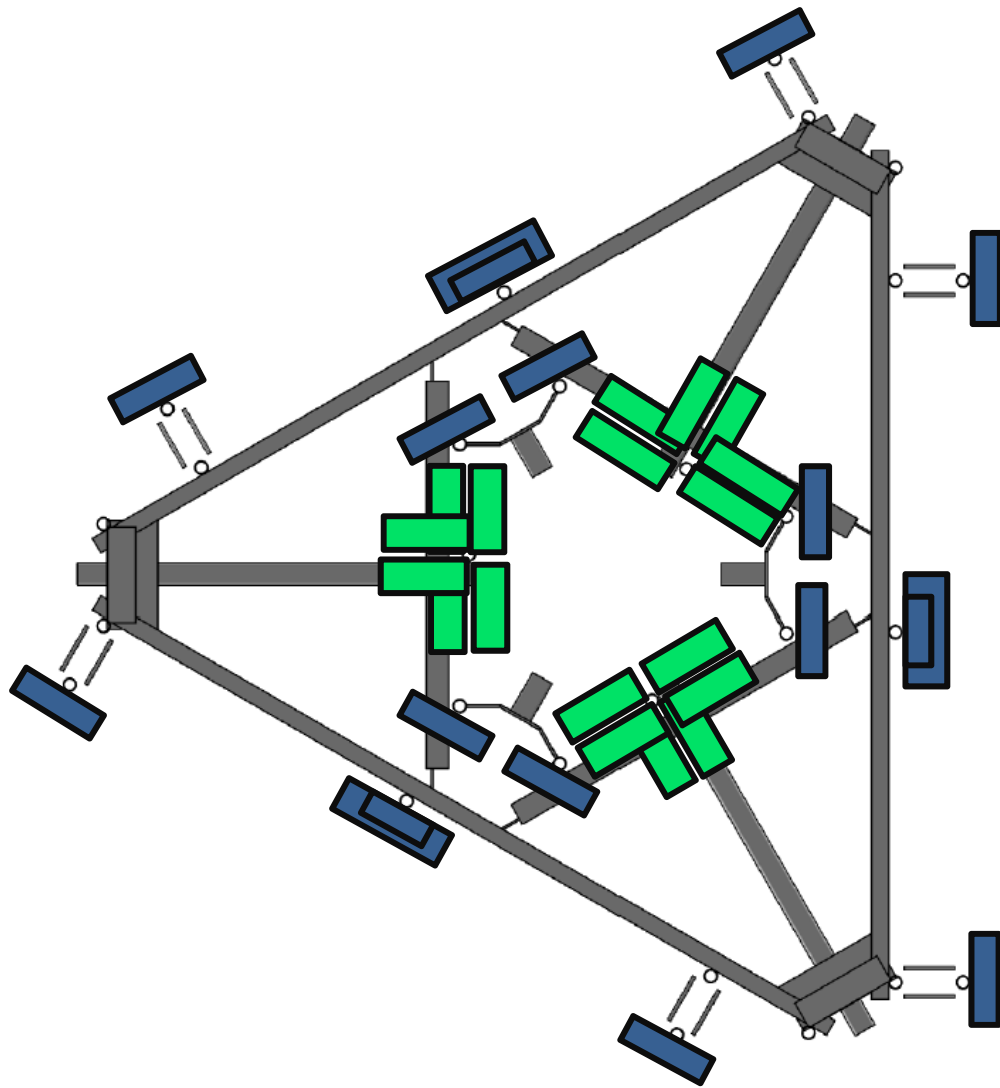
Elevation (ft)		Antennas	
Mount	Rad.	#	Name
122.0	122.0	3	CCI HPA-65R-BUU-H6
		3	Quintel Technology QD6616-7
		3	Quintel Technology QS66512-2
		3	CCI DMP65R-BU6D
		1	Raycap DC9-48-60-24-8C-EV
		3	Ericsson AIR 6449 B77D
		3	Ericsson RRUS 32 B66A
		3	Ericsson RRUS 32 B2
		3	Ericsson RRUS 32 B30
		3	Ericsson RRUS 4449 B5/B12
		3	Ericsson RADIO 2012 B29
		3	Ericsson RRUS 4478 B14
		3	Ericsson AIR 6419 N77G
		2	Raycap DC6-48-60-18-8F

**Structure Usages**

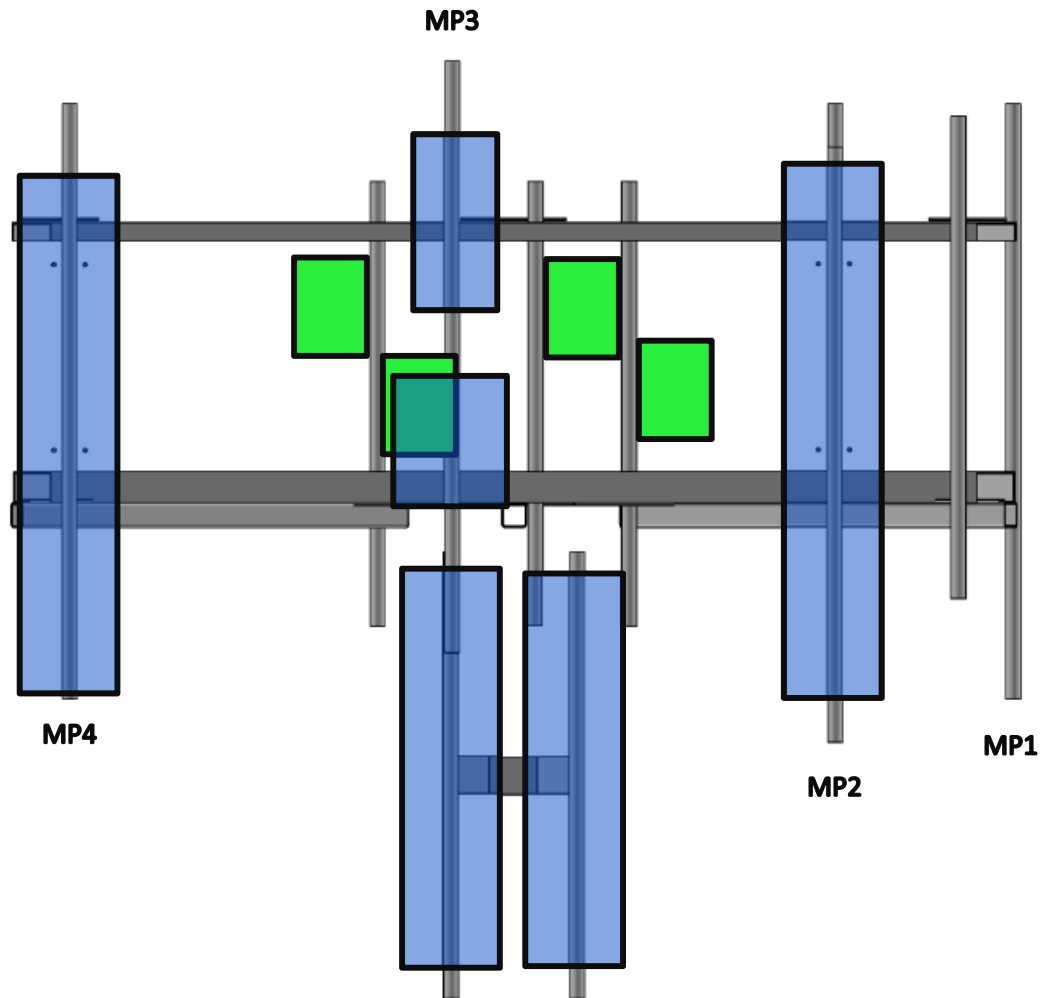
Structural Component	Controlling Usage*	Pass/Fail
Platform Base	96%	Pass
Mount Pipes	80%	Pass
Bracing Members	73%	Pass
Stand-Off Horizontals	61%	Pass
Tower Mount Connections	60%	Pass

\*Rating per TIA-222-H Section 15.5

Equipment Layout Plan View



**Equipment Layout Front Elevation View**



Total #	Equipment	Mount Pipe Position
3	Quintel Technology QD6616-7	P2
3	Ericsson AIR 6449 B77D	P3
3	Ericsson AIR 6419 N77G	P3
3	Cci Antennas DMP65R-BU6D	P4
3	Cci Antennas HPA-65R-BUU-H6	Secondary Collar
3	Quintel Technology QS66512-2	Secondary Collar
1	Raycap DC9-48-60-24-8C-EV	Stand-off
1	Raycap DC6-48-60-18-8F	Stand-off
1	Raycap DC6-48-60-18-8F	Stand-off
3	Ericsson RADIO 2012 B29	RRU Pipe
3	Ericsson RRUS 4478 B14	RRU Pipe
3	Ericsson RRUS 32 B66A	RRU Pipe
3	Ericsson RRUS 32 B2	RRU Pipe
3	Ericsson RRUS 4449 B5/B12	RRU Pipe
3	Ericsson RRUS 32 B30	RRU Pipe

### **Standard Conditions**

This analysis is inclusive of the antenna supporting frames/mounts and all recorded connections that will support the equipment listed in this report. It considers only the theoretical capacity of structural components and it is not a condition assessment. The validity of the analysis may be dependent on the accuracy of structural information supplied by others. The client is responsible for verifying this information. If any provided information is revised after completion of this analysis, Telamon Tower Engineering, PLLC should be notified immediately to revise results.

This analysis assumes the following:

1. The tower or other superstructure and mounts (if existing) were properly constructed as per the original design and have been properly maintained in accordance with applicable code standards.
2. Member sizes and strengths are accurate as supplied or are assumed as stated in the calculations.
3. In the absence of sufficient design information, all welds and connections are assumed to develop at least the capacity of the connected member, unless otherwise stated in this analysis.
4. All prior structural modifications, if any, are assumed to be correctly installed and fully effective.
5. The loading configuration is complete and accurate as supplied and/or as modeled in the previous analysis. All appurtenances are assumed to be properly installed and supported as per manufacturer requirements.
6. Some conservative assumptions may be used regarding appurtenances and their projected areas based on careful interpretation of data supplied, previous experience and standard industry practice.
7. Installation of all equipment and steel should be confirmed not to cause tower conflicts nor impede the tower climbing pegs.

All opinions and conclusions are considered accurate to a reasonable degree of engineering certainty based upon the evidence available at the time of the report. All opinions and conclusions contained herein are subject to revision based upon receipt of new or updated information. All services are provided exercising a level of care and diligence equivalent to the standard of our profession. No warranty or guarantee, either expressed or implied, is offered. All services are confidential in nature and this report will not be released to any other party without the client's consent. The use of this analysis is limited to the expressed purpose for which it was commissioned and it may not be reused, copied or disseminated for any other purpose without consent from Telamon Tower Engineering, PLLC.

All services were performed, results obtained and recommendations made in accordance with generally accepted engineering principles and practices. Telamon Tower Engineering, PLLC is not responsible for the conclusions, opinions or recommendations made by others based on the information supplied in this analysis.

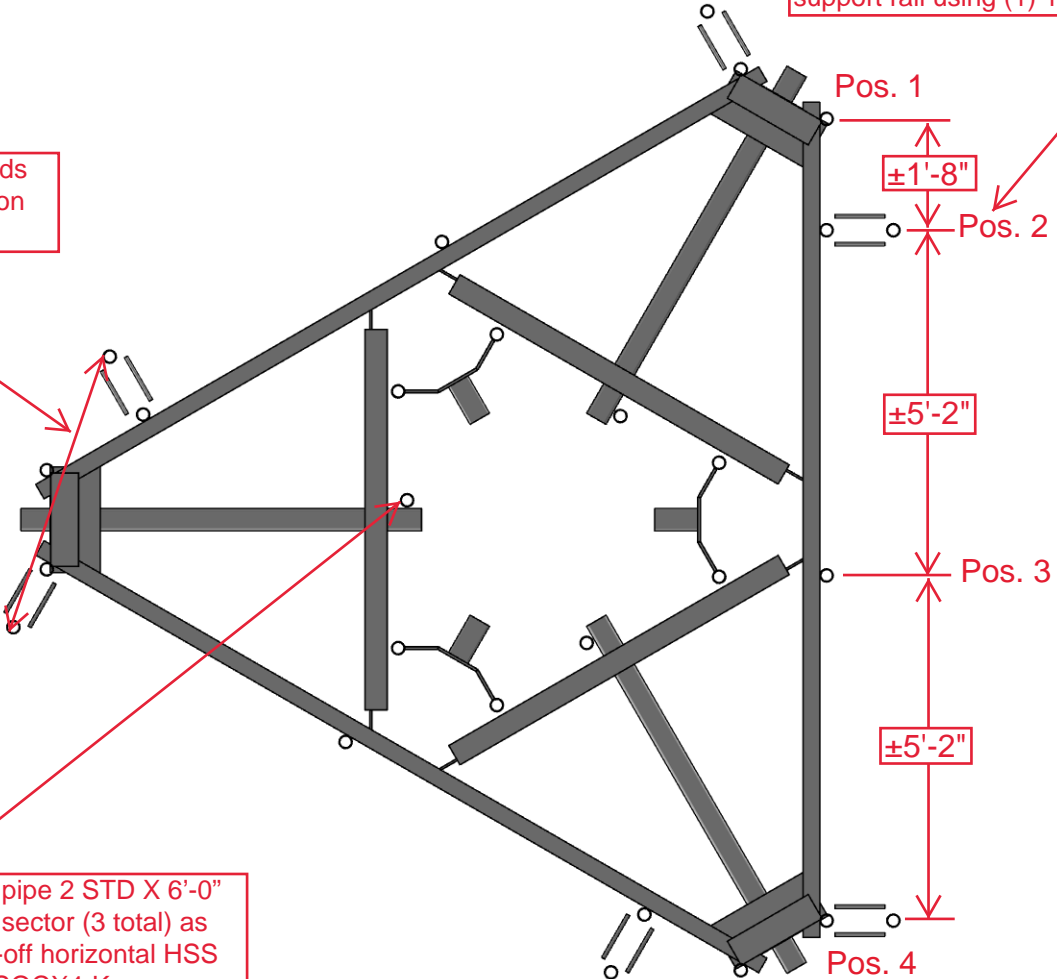
It is not possible to have the fully detailed information necessary to perform a complete and thorough analysis of every structural sub-component of an existing structure. The structural analysis by Telamon Tower Engineering, PLLC verifies the adequacy of the primary members of the structure. Telamon Tower Engineering, PLLC provides a limited scope of service in that we cannot verify the adequacy of every weld, bolt, gusset, etc.





Relocate existing mount pipe at position 2 and position 3 as shown. Connect to existing platform base member using (2) 1/2" Ø U-bolts (12 total). Connect to existing support rail using (1) 1/2" Ø U-bolts (6 total).

Adjust length of threaded rods to maintain MIN. 4' separation between antennas.



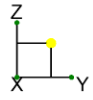
Install (1) proposed RRH pipe 2 STD X 6'-0" Long mount pipe at each sector (3 total) as shown. Connect to stand-off horizontal HSS tubes with (1) Site Pro 1 SQCX4-K crossover plate kits at each sector (3 total).

Envelope Only Solution

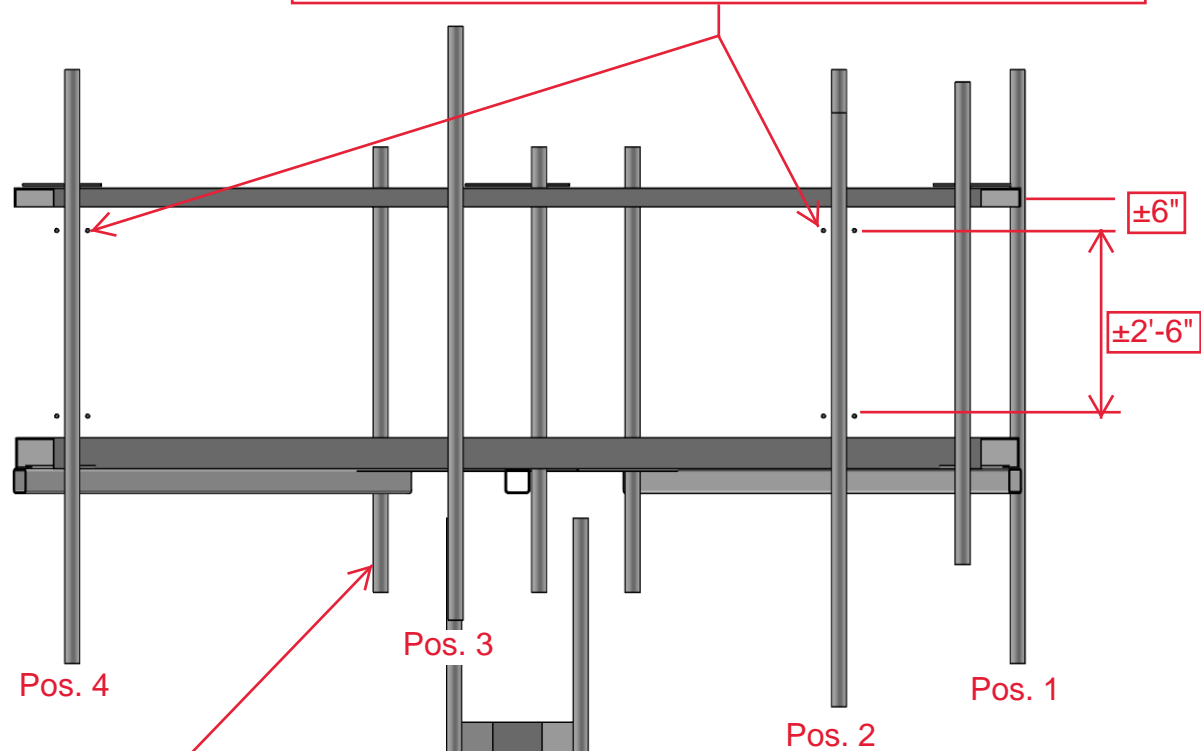
Telamon CLS  
 CWD  
 41124-13682689\_C8\_06-02-MA

41124-13682689\_C8\_05-Northhaven I  
 Proposed Plan View

IN-1  
 May 06, 2022  
 41124-13682689\_C8\_06-02-MA.r3d



Install (2) secondary mount pipe 2 STD x 8'-0" long, A53 Gr. B, at positions 2 & 4 (6 total) with proposed Site Pro 1 DCP18K threaded rod kits (12 total) as shown. Maintain the minimum required separation of 4'-0" between the panels.



Install (1) proposed RRH pipe 2 STD X 6'-0" Long mount pipe at each sector (3 total) as shown. Connect to stand-off horizontal HSS tubes with (1) Site Pro 1 SQCX4-K crossover plate kits at each sector (3 total).

Install (1) proposed Site Pro 1 UWS6-NP ring mount to monopole with (1) Site Pro 1 LP-42 large pole adapter kit as shown and install (2) proposed pipe 2 STD X 6'-0" Long mount pipe at each sector for spare panel configuration (6 total) as shown.

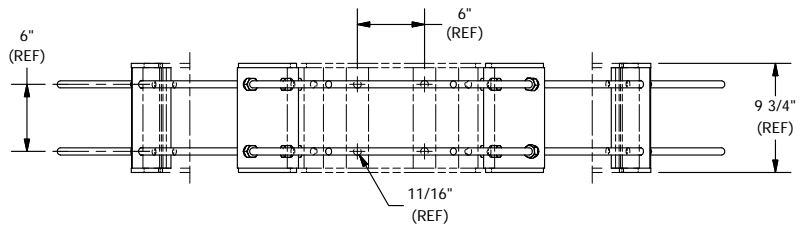
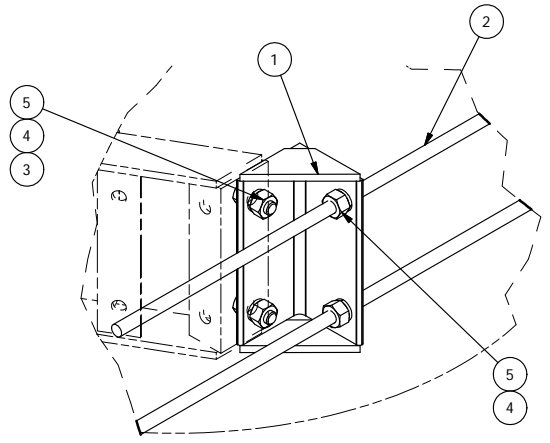
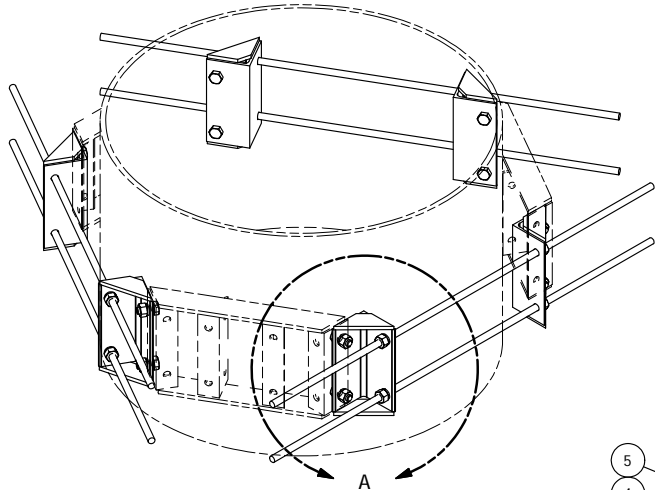
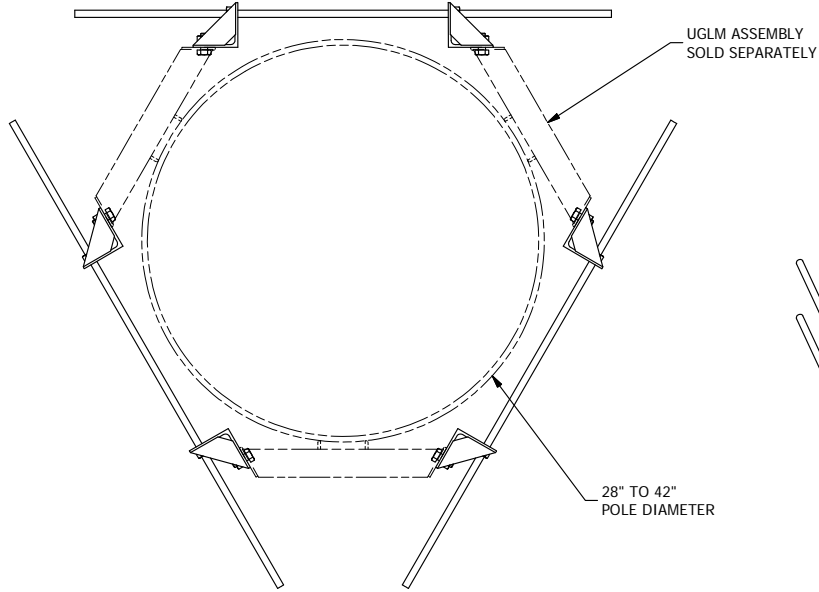
Envelope Only Solution

Telamon CLS  
 CWD  
 41124-13682689\_C8\_06-02-MA

41124-13682689\_C8\_05-Northhaven I  
 Proposed Elevation View

IN-2  
 May 06, 2022  
 41124-13682689\_C8\_06-02-MA.r3d

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	6	X--LP42	ANGLE ADAPTER		6.64	39.86
2	6	G58R-48	5/8" x 48" THREADED ROD (HDG.)	48 in	4.18	25.09
3	12	G58112	5/8" x 1-1/2" HDG BOLT	1 1/2 in	0.25	2.97
4	24	G58LW	5/8" HDG LOCKWASHER		0.03	0.63
5	24	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	3.12
TOTAL WT. #						71.66



**TOLERANCE NOTES**  
**TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:**  
**SAWED, SHEARED AND GAS CUT EDGES ( $\pm 0.030"$ )**  
**DRILLED AND GAS CUT HOLES ( $\pm 0.030"$ ) - NO CONING OF HOLES**  
**LASER CUT EDGES AND HOLES ( $\pm 0.010"$ ) - NO CONING OF HOLES**  
**BENDS ARE  $\pm 1/2$  DEGREE**  
**ALL OTHER MACHINING ( $\pm 0.030"$ )**  
**ALL OTHER ASSEMBLY ( $\pm 0.060"$ )**

PROPRIETARY NOTE:  
 THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION		LARGE POLE ADAPTER MINI RING MOUNT (28" TO 42" DIA)	
CPD NO.	N/A	DRAWN BY	BMC 12/20/2010
CLASS	81	DRAWING USAGE	CUSTOMER
SUB	01	CHECKED BY	RCH 2/4/2011

**SITE PRO 1**  
 A valmont COMPANY

Locations:  
 New York, NY  
 Atlanta, GA  
 Los Angeles, CA  
 Plymouth, IN  
 Salem, OR  
 Dallas, TX

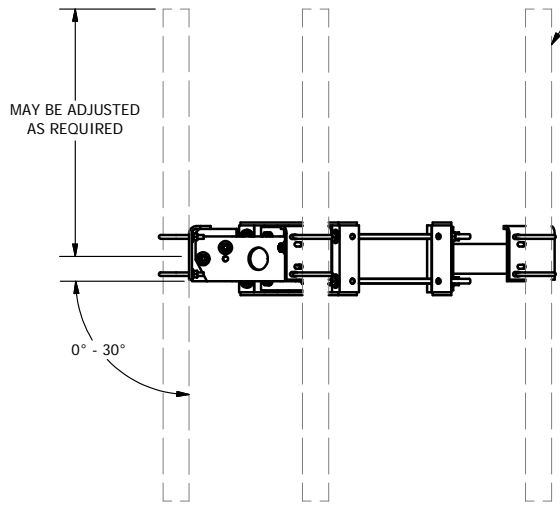
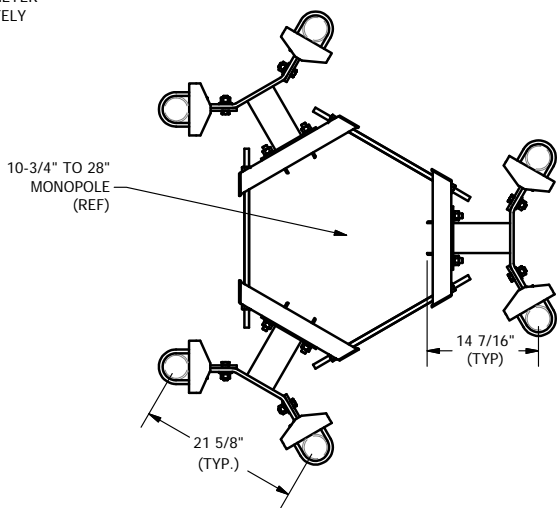
Engineering Support Team:  
 1-888-753-7446

PART NO.	LP-42
DWG. NO.	LP-42

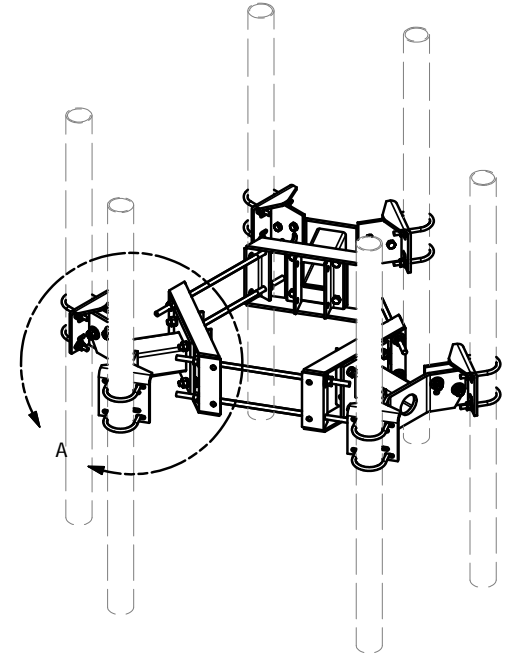
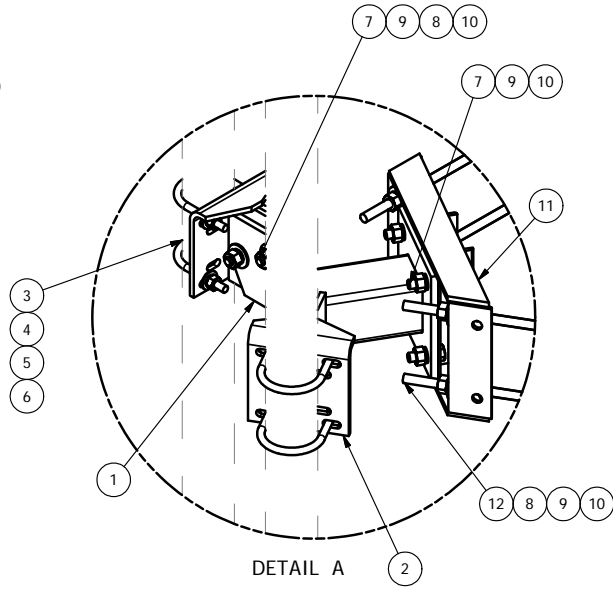
A	LP-42 PUT ON NEW TITLE BLOCK	KC	4/27/2012
REV	DESCRIPTION OF REVISIONS	CPD	BY
REVISION HISTORY			

NOTE:  
 FOR POLE SIZES  
 28" TO 42" DIAMETER  
 ORDER SEPARATELY  
 PART # "LP-42"

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	3	X-210717	STANDOFF BRACKET WELDMENT		28.58	85.74
2	6	X-ATB	PIPE ATTACHMENT BRACKET		10.68	64.10
3	12	X-UB1358	1/2" X 3-5/8" X 5-1/2" X 3" U-BOLT (HDG.)		0.77	9.27
3	12	X-UB1300	1/2" X 3" X 5" X 2" U-BOLT (HDG.)		0.70	8.40
3	12	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.63	7.56
4	24	G12FW	1/2" HDG USS FLATWASHER		0.03	0.82
5	24	G12LW	1/2" HDG LOCKWASHER		0.01	0.33
6	24	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	1.72
7	24	G5802	5/8" x 2" HDG HEX BOLT GR5		0.27	6.52
8	23	G58FW	5/8" HDG USS FLATWASHER		0.07	1.62
9	35	G58LW	5/8" HDG LOCKWASHER		0.03	0.91
10	35	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	4.55
11	3	X-UGLM	MINI RING MOUNT WELDMENT		21.67	65.00
12	6	G58R-24	5/8" x 24" THREADED ROD (HDG.)		2.09	12.54
12	6	G58R-14	5/8" x 14" THREADED ROD (HDG.)		1.22	7.32
					TOTAL WT. #	276.40



2-3/8" TO 3-1/2"  
 O.D. PIPE  
 (ORDER SEPARATELY)




REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	REPLACED X-210746 WITH X-ATB	4779	CEK	1/5/2012
REVISION HISTORY				

**TOLERANCE NOTE**  
 TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:  
 SAWED, SHEARED AND GAS CUT EDGES ( $\pm 0.030"$ )  
 DRILLED AND GAS CUT HOLES ( $\pm 0.030"$ ) - NO CONING OF HOLES  
 LASER CUT EDGES AND HOLES ( $\pm 0.010"$ ) - NO CONING OF HOLES  
 BENDS ARE  $\pm 1/2$  DEGREE - ALL OTHER MACHINING ( $\pm 0.030"$ )  
 ALL OTHER ASSEMBLY ( $\pm 0.060"$ )

**PROPRIETARY NOTE**  
 THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION ANTENNA MOUNT - MONOPOLE (14-1/2" STANDOFF)	
DRAWN BY CEK	CPD NO. 4779
ENG. APPROVAL	CHECKED BY BMC
DRAWING USAGE CUSTOMER	DATE 1/6/2012



**SITE PRO 1**

A valmont COMPANY

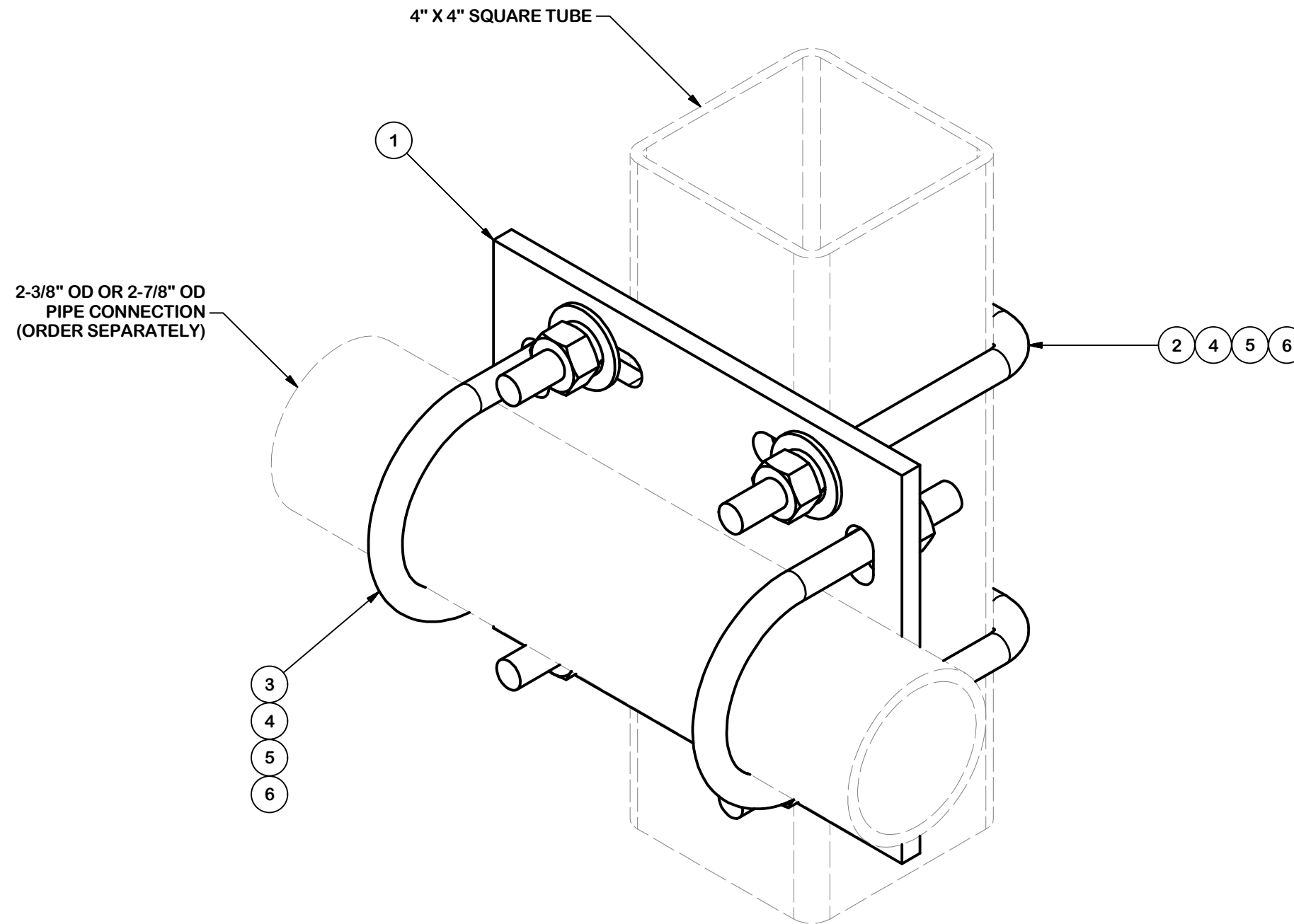
Locations:  
 New York, NY  
 Atlanta, GA  
 Los Angeles, CA  
 Plymouth, IN  
 Salem, OR  
 Dallas, TX

Engineering Support Team:  
 1-888-753-7446

PART NO.	<b>UWS6-NP</b>
DWG. NO.	<b>UWS6-NP</b>

PAGE 1 OF 1

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	SCX4	CROSSOVER PLATE	8 1/2 in	6.02	6.02
2	2	X-SUB1418	SQUARE U-BOLT 0.5" DIA. X 4.125" IW X 6" IL X 3" TR		0.98	1.95
3	2	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.60	1.19
3	2	X-UB1300	1/2" X 3" X 5" X 2" U-BOLT (HDG.)		0.67	1.34
4	8	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	0.27
5	8	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	0.11
6	8	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	0.57
					<b>TOTAL WT. #</b>	<b>11.35</b>



**TOLERANCE NOTES**

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 SAWED, SHEARED AND GAS CUT EDGES ( $\pm 0.030''$ )  
 DRILLED AND GAS CUT HOLES ( $\pm 0.030''$ ) - NO CONING OF HOLES  
 LASER CUT EDGES AND HOLES ( $\pm 0.010''$ ) - NO CONING OF HOLES  
 BENDS ARE  $\pm 1/2$  DEGREE  
 ALL OTHER MACHINING ( $\pm 0.030''$ )  
 ALL OTHER ASSEMBLY ( $\pm 0.060''$ )

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DESCRIPTION  
**CROSSOVER PLATE KIT  
 W/ SQUARE U-BOLTS AND STD. U-BOLTS**

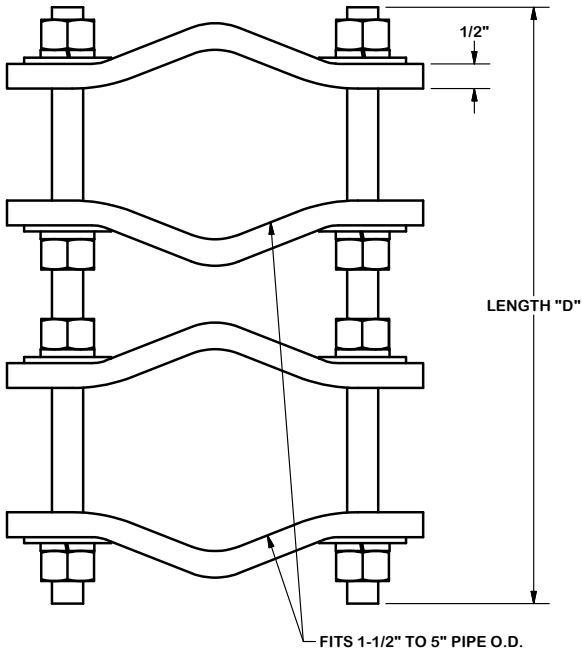
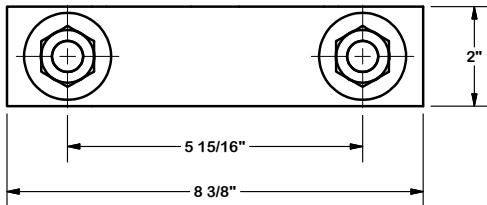
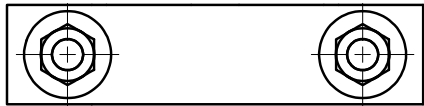
**SITE PRO 1**  
 A valmont COMPANY

Engineering Support Team:  
 1-888-753-7446

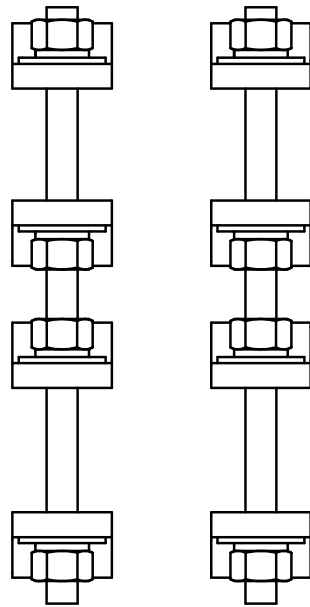
Locations:  
 New York, NY  
 Atlanta, GA  
 Los Angeles, CA  
 Plymouth, IN  
 Salem, OR  
 Dallas, TX

CPD NO.	DRAWN BY	ENG. APPROVAL
	CSL 9/18/2018	3RD PARTY
CLASS	DRAWING USAGE	CHECKED BY
87	CUSTOMER	BMC 11/12/2018

PART NO.	<b>SQCX4-K</b>	PAGE 1 OF 1
DWG. NO.	<b>SQCX4-K</b>	

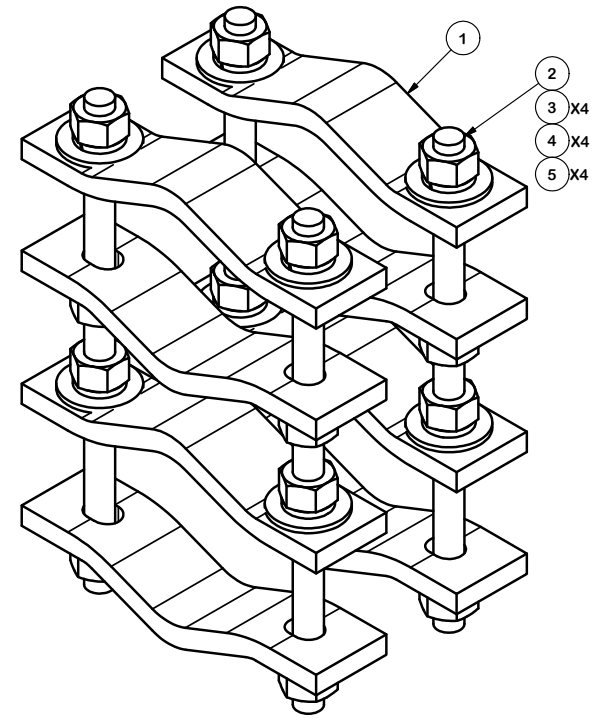


FITS 1-1/2" TO 5" PIPE O.D.



PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	8	DCP	CLAMP HALF, 1/2" THICK, 8-3/8"		2.40	19.20
2	B	C	5/8" THREADED ROD	D	E	F
3	16	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	2.08
4	16	G58LW	5/8" HDG LOCKWASHER		0.03	0.42
5	16	G58FW	5/8" HDG USS FLATWASHER		0.07	1.13

VARIABLE PARTS TABLE						
ASSEMBLY "A"	QTY "B"	PART "C"	LENGTH "D"	UNIT WT. "E"	NET WT. "F"	TOTAL WEIGHT
DCP12K	4	G58R-12	12"	1.05	4.18	27.01
DCP18K	4	G58R-18	18"	1.57	6.27	29.10



**TOLERANCE NOTES**

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 SAWED, SHEARED AND GAS CUT EDGES ( $\pm 0.030"$ )  
 DRILLED AND GAS CUT HOLES ( $\pm 0.030"$ ) - NO CONING OF HOLES  
 LASER CUT EDGES AND HOLES ( $\pm 0.010"$ ) - NO CONING OF HOLES  
 BENDS ARE  $\pm 1/2$  DEGREE  
 ALL OTHER MACHINING ( $\pm 0.030"$ )  
 ALL OTHER ASSEMBLY ( $\pm 0.060"$ )

PROPRIETARY NOTE:  
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DESCRIPTION  
**PIPE TO PIPE CLAMP SET**  
 1-1/2" TO 5" PIPE  
 1/2" THICK CLAMP



Locations:  
 New York, NY  
 Atlanta, GA  
 Los Angeles, CA  
 Plymouth, IN  
 Salem, OR  
 Dallas, TX  
 Engineering Support Team:  
 1-888-753-7446

CPD NO.	DRAWN BY	ENG. APPROVAL
	KC8 8/21/2012	
CLASS	SUB	DRAWING USAGE
81	01	CUSTOMER
	CHECKED BY	
	CEK 1/22/2013	

PART NO.	SEE ASSEMBLY "A"
DWG. NO.	DCPxxK

Wind & Ice Loading			
Nominal Mount Elevation (AGL), $z_{mount}$	122 ft	$K_a$	0.90
Nominal Rad Elevation (AGL), $z_{rad}$	122 ft	$K_d$	0.95
Elevation AMSL (ft)	32 ft	$K_e$	1.00
TIA Standard	H	$K_z$	1.05
Basic Wind Speed, $V_{ult}$ (bare)	120 mph	$K_{zt}$	1.00
Basic Wind Speed, $V$ (ice)	50 mph	$K_s$	1.00
Design Ice Thickness, $t_i$	1 in	$t_{iz}$	1.14 in
Exposure Category	B	$G_h$	1.00
Risk Category	II	$q_z$ (bare)	36.6 psf
Seismic Response Coeff., $C_s$	0.11	$q_z$ (ice)	6.4 psf

Live Loading	
At Mount Pipes, $L_M$	500 lb
Joint Labels Considered	1_M1
	1_M2
	1_M3
	1_M4

Section Set Label	Shape Label	$F_A$ (lb/ft)		Ice Wt. (lb/ft)
		Bare	Ice	
Offset Arm	HSS4X4X4	21.95	1.59	8.68
Bottom Corner Plate	PL9X0.5	49.40	6.46	10.01
Face Horizontal	CH5X2X1/4	27.44	1.66	9.13
Internal Horiz Plate	PL3X0.375	16.47	3.03	4.58
Internal Horiz	L4X4X4	21.95	1.59	8.57
Mount Pipe	PIPE_2.0	7.82	2.66	4.89
MOD-Relo Mount Pipe	PIPE_2.0	7.82	2.66	4.89
MOD Standoff	HSS4X4X3	21.95	1.59	8.68
MOD Plate	PL6X1/2"	32.93	4.75	7.35
MOD Mount Pipe	PIPE_2.0	7.82	2.66	4.89
MOD TR	0.625"SR	2.06	1.66	2.46
Support Rail	L3X3X4	16.47	1.52	6.80
MOD RRH Pipe	PIPE_2.0	7.82	2.66	4.89
Handrail Conn Plates	5X.375PLATE	27.44	4.17	6.35

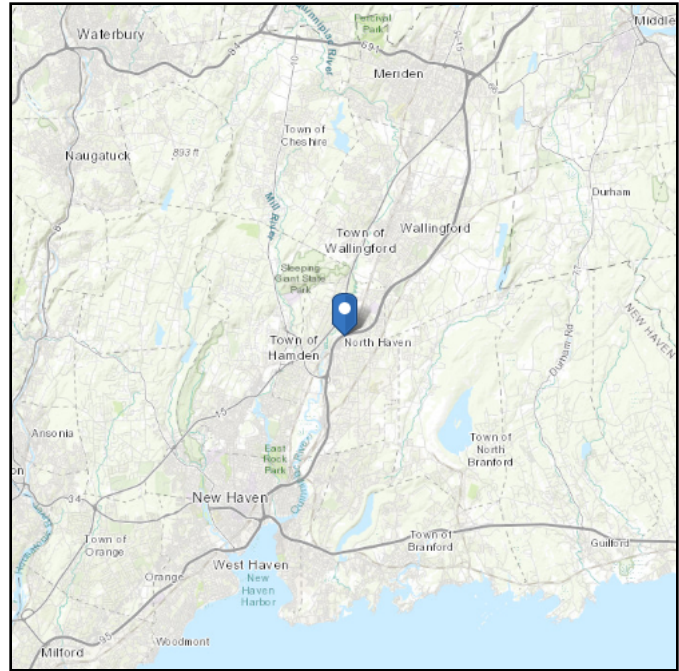
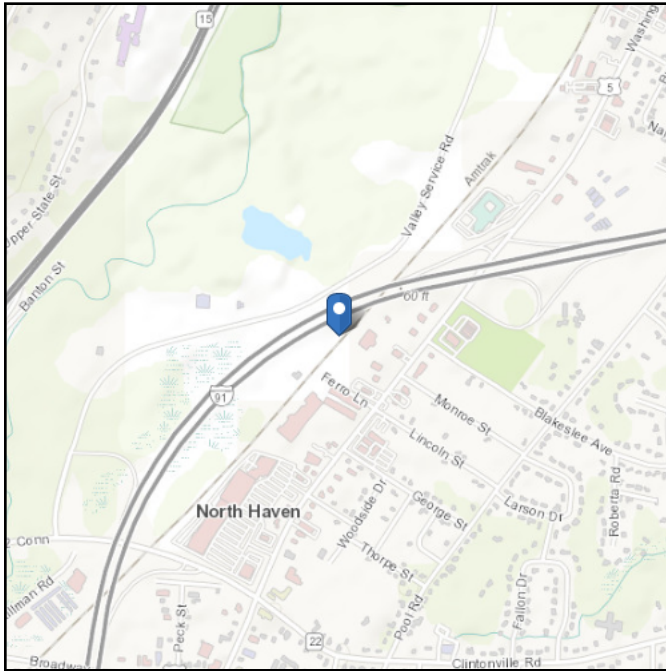
Appurtenances																														
Appurtenance Model	Status	Azimuth Offset (°, U)	Rad Elev. Override (ft)	Swap Width & Depth	Area Factor		Qty. per Azimuth			Total Qty. Override	0° Joints		120° Joints		230° Joints		Height (in)	Width (in)	Depth (in)	Weight (Bare) (lb)	Shape	Weight of Ice (lb)	EPA <sub>A</sub> (Bare) (ft²)		EPA <sub>A</sub> (Ice) (ft²)		F <sub>A</sub> (Bare) (lb)		F <sub>A</sub> (Ice) (lb)	
					Front	Side	0°	120°	230°		1	2	1	2	1	2							N	T	N	T	N	T	N	T
																									N	T	N	T	N	T
QD6616-7				<input type="checkbox"/>			1	1	1	3	1_A1T	1_A1B	2_A1T	2_A1B	3_A1T	3_A1B	72	22	9.6	130	Flat	201.49	13.58	6.80	15.34	8.38	447.13	223.93	87.70	47.88
AIR 6449 B77D				<input type="checkbox"/>			1	1	1	3	1_A2T	1_A2B	2_A2T	2_A2B	3_A2T	3_A2B	30.4	15.9	10.6	81.6	Flat	76.24	4.03	2.72	4.95	3.51	132.64	89.63	28.30	20.08
AIR 6419 N77G				<input type="checkbox"/>			1	1	1	3	1_A3T	1_A3B	2_A3T	2_A3B	3_A3T	3_A3B	15.7	30	6.7	70	Flat	66.62	3.93	0.88	4.84	1.35	129.25	28.87	27.65	7.69
DMP65R-BU6D				<input type="checkbox"/>			1	1	1	3	1_A4T	1_A4B	2_A4T	2_A4B	3_A4T	3_A4B	71.2	20.7	7.7	89.3	Generic	168.58	11.93	4.48	13.64	5.94	392.86	147.53	77.98	33.95
HPA-65R-BUU-H6				<input type="checkbox"/>			1	1	1	3	A1	A2	B1	B2	G1	G2	72.3	14.4	7.3	47.9	Generic	130.68	9.22	4.65	11.00	6.27	303.62	153.13	62.88	35.84
QS66512-2				<input type="checkbox"/>			1	1	1	3	A3	A4	B3	B4	G3	G4	72	12	9.6	111	Generic	130.38	4.01	3.37	4.92	4.26	132.05	110.98	28.14	24.35
DC9-48-60-24-8C-EV				<input type="checkbox"/>				1		1			3_M				31.41	10.24	18.28	26.2	Flat	84.50	2.74	4.78	3.54	5.77	90.12	157.57	20.24	33.00
DC6-48-60-18-8F				<input type="checkbox"/>			1			1	1_M						24	11	11	18.9	Round	40.38	1.28	1.28	1.70	1.70	42.26	42.26	9.70	9.70
DC6-48-60-18-8F				<input type="checkbox"/>			1			1	2_M						24	11	11	18.9	Round	40.38	1.28	1.28	1.70	1.70	42.26	42.26	9.70	9.70
RADIO 2012 B29				<input checked="" type="checkbox"/>			1	1	1	3	1_R1		2_R1		3_R1		16.5	13.5	5.9	43.2	Flat	35.96	0.82	1.86	1.28	2.47	27.01	61.13	7.32	14.12
RRUS 4478 B14				<input checked="" type="checkbox"/>			1	1	1	3	1_R2		2_R2		3_R2		16.5	13.4	7.7	59.9	Flat	36.19	1.06	1.84	1.56	2.45	34.87	60.67	8.93	14.03
RRUS 32 B66A				<input checked="" type="checkbox"/>			1	1	1	3	1_R3		2_R3		3_R3		27.6	12.45	7.41	55.12	Flat	50.88	1.78	2.86	2.46	3.67	58.67	94.30	14.09	20.97
RRUS 32 B2				<input checked="" type="checkbox"/>			1	1	1	3	1_R4		2_R4		3_R4		27.2	12.05	7	52.9	Flat	48.00	1.67	2.73	2.34	3.52	54.93	89.94	13.36	20.13
RRUS 4449 B5/B12				<input checked="" type="checkbox"/>			1	1	1	3	1_R5		2_R5		3_R5		17.9	13.19	9.44	71	Flat	42.19	1.41	1.97	1.97	2.60	46.37	64.79	11.27	14.87
RRUS 32 B30				<input checked="" type="checkbox"/>			1	1	1	3	1_R6		2_R6		3_R6		26.7	12.1	6.7	60	Flat	46.50	1.57	2.69	2.23	3.47	51.79	88.66	12.73	19.85

# ASCE 7 Hazards Report

**Address:**  
No Address at This Location

**Standard:** ASCE/SEI 7-16  
**Risk Category:** II  
**Soil Class:** D - Stiff Soil

**Elevation:** 31.85 ft (NAVD 88)  
**Latitude:** 41.397833  
**Longitude:** -72.856667



## Wind

### Results:

Wind Speed	120 Vmph
10-year MRI	75 Vmph
25-year MRI	85 Vmph
50-year MRI	91 Vmph
100-year MRI	98 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2  
Date Accessed: Tue Mar 22 2022

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

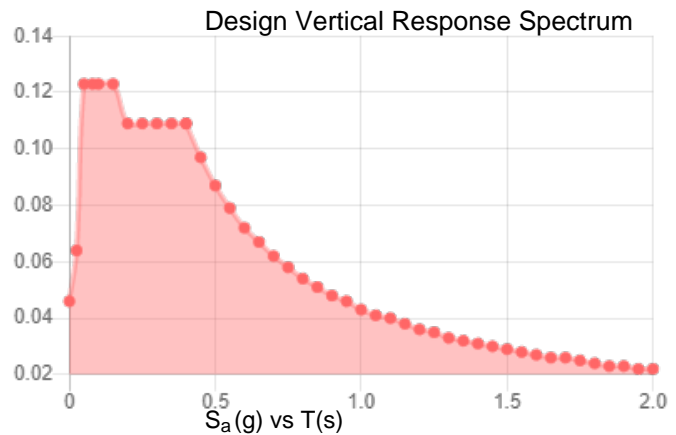
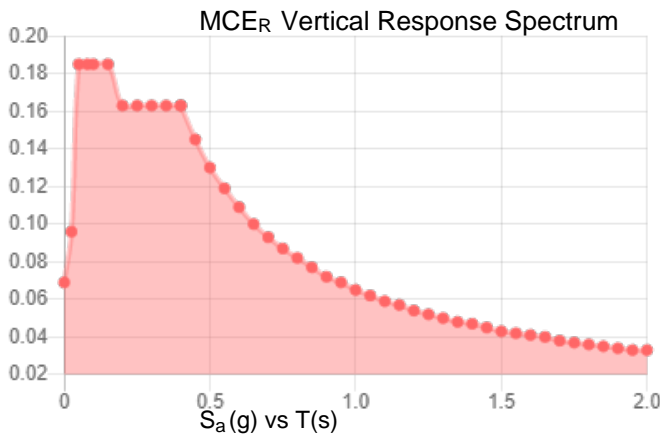
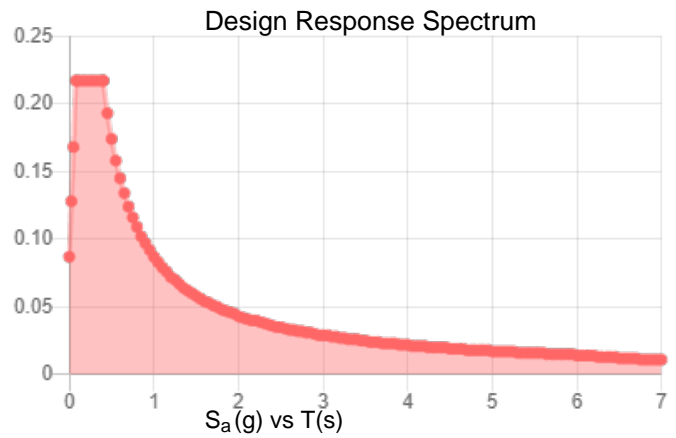
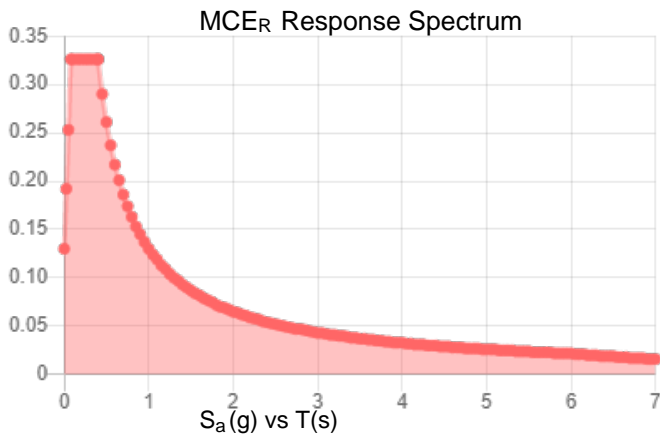


**Site Soil Class:** D - Stiff Soil

**Results:**

$S_s$ :	0.204	$S_{D1}$ :	0.087
$S_1$ :	0.054	$T_L$ :	6
$F_a$ :	1.6	PGA :	0.114
$F_v$ :	2.4	PGA <sub>M</sub> :	0.179
$S_{MS}$ :	0.326	$F_{PGA}$ :	1.572
$S_{M1}$ :	0.13	$I_e$ :	1
$S_{DS}$ :	0.217	$C_v$ :	0.708

**Seismic Design Category** B



**Data Accessed:** Tue Mar 22 2022

**Date Source:**

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

## Ice

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**Results:**

Ice Thickness: 1.00 in.  
Concurrent Temperature: 15 F  
Gust Speed 50 mph

**Data Source:** Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8

**Date Accessed:** Tue Mar 22 2022

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

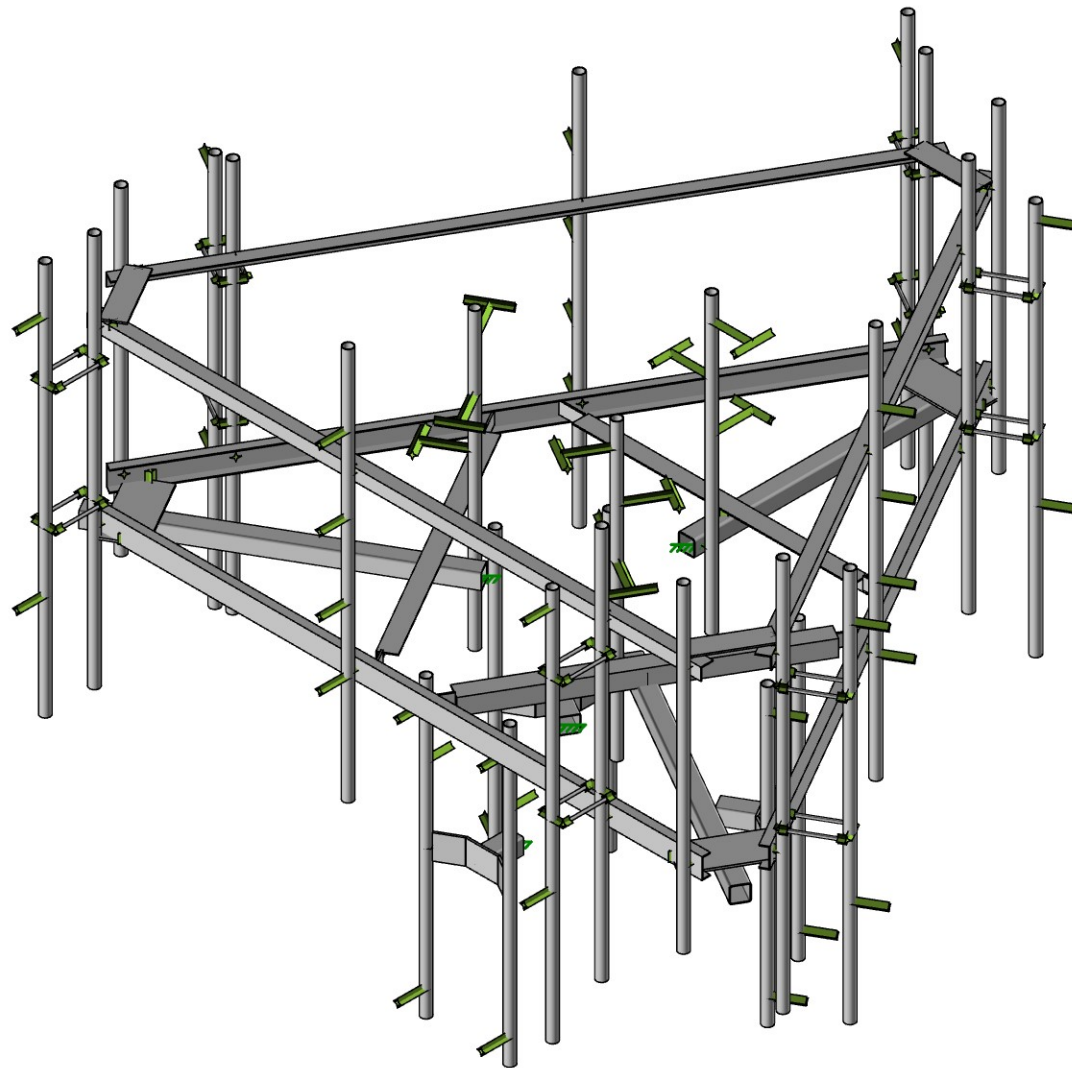
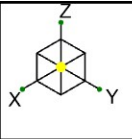
Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

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

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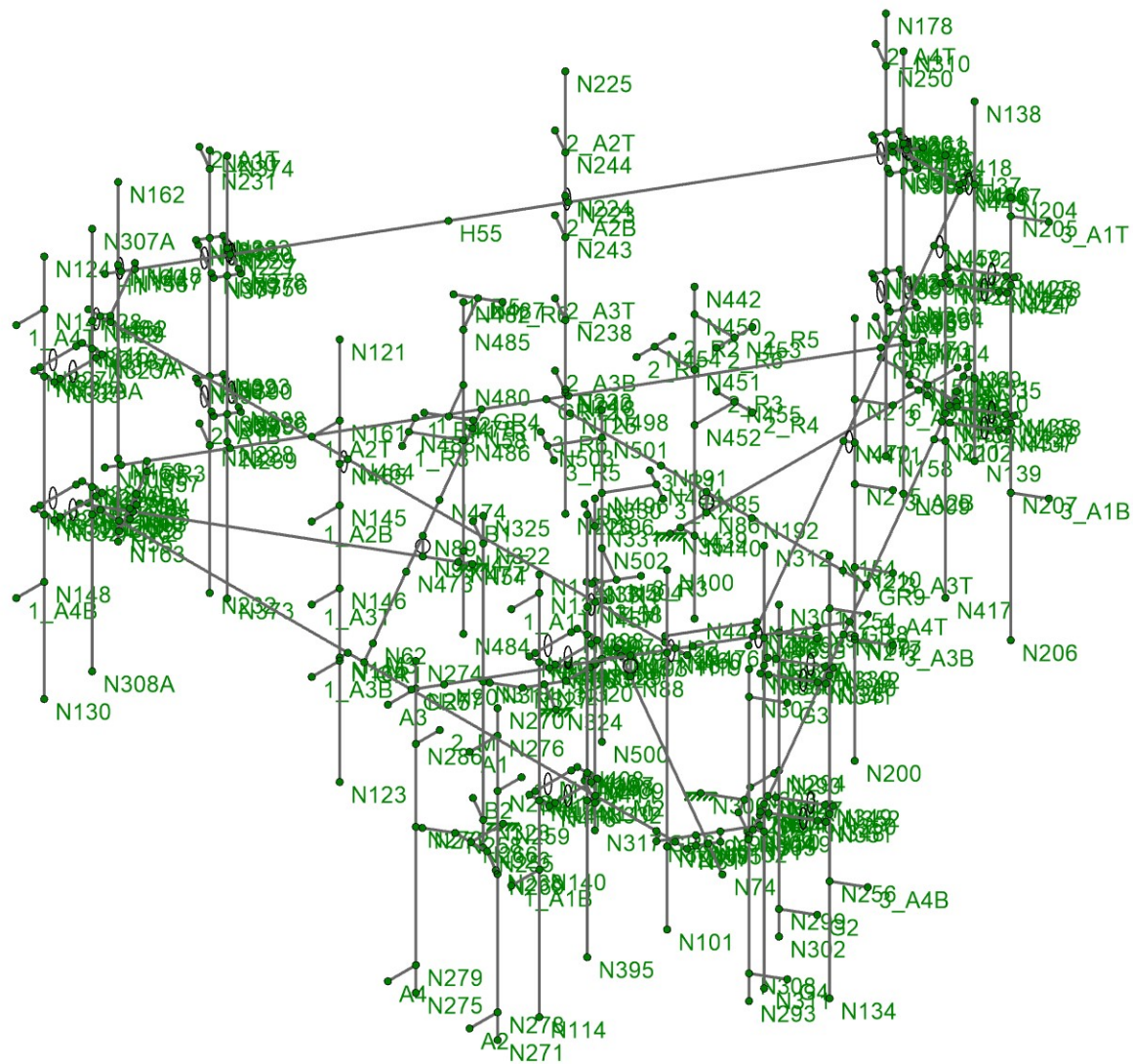
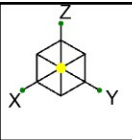


Envelope Only Solution

Telamon CLS  
SN  
41124-13682689\_C8\_06-02-MA

41124-13682689\_C8\_06-Northhaven I  
Rendered

SK-1  
May 06, 2022  
370629\_13682689\_C8\_06\_AT&T MOBILITY.r3d

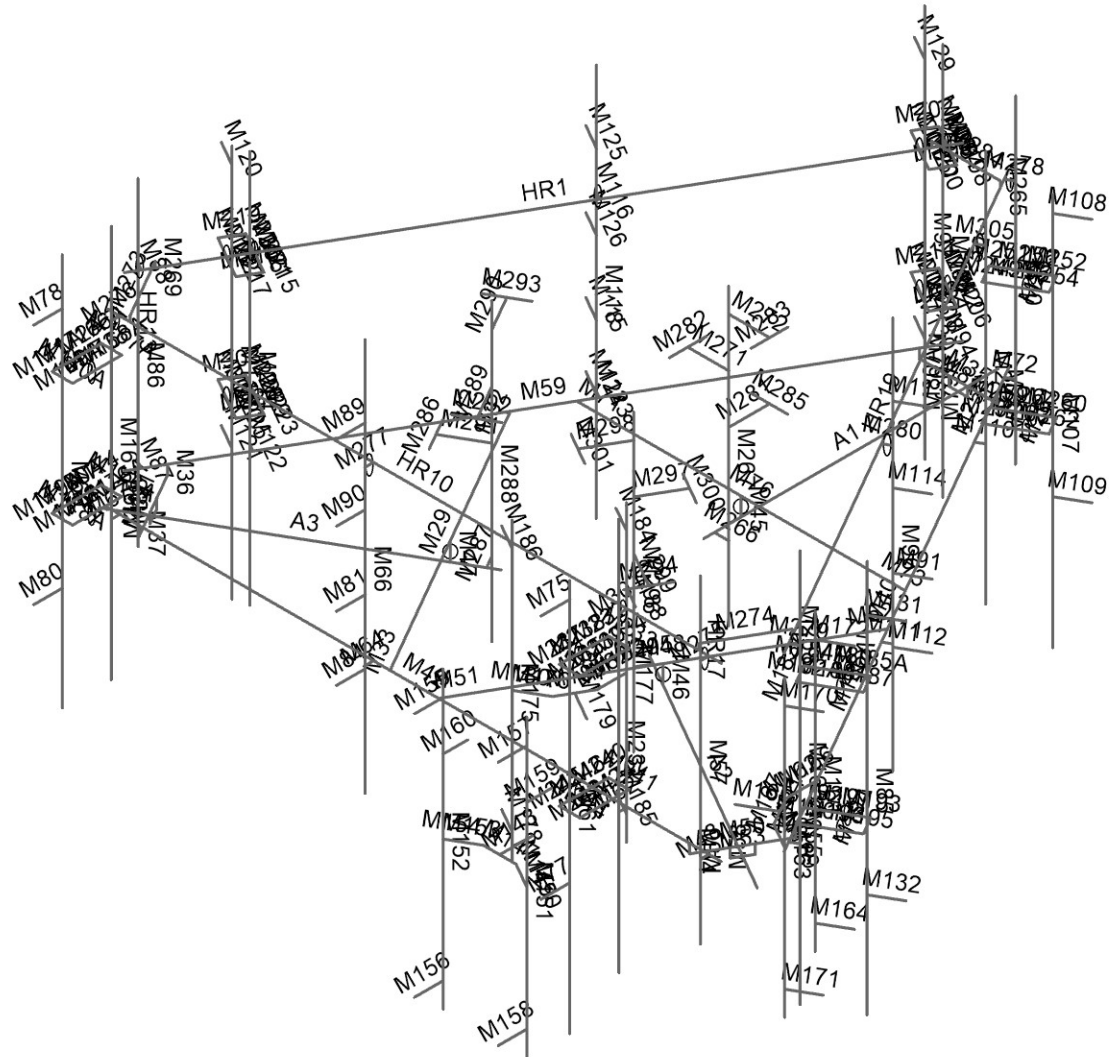
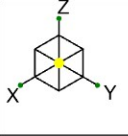


Envelope Only Solution

Telamon CLS  
 SN  
 41124-13682689\_C8\_06-02-MA

41124-13682689\_C8\_06-Northhaven I  
 Joint Labels

SK-2  
 May 06, 2022  
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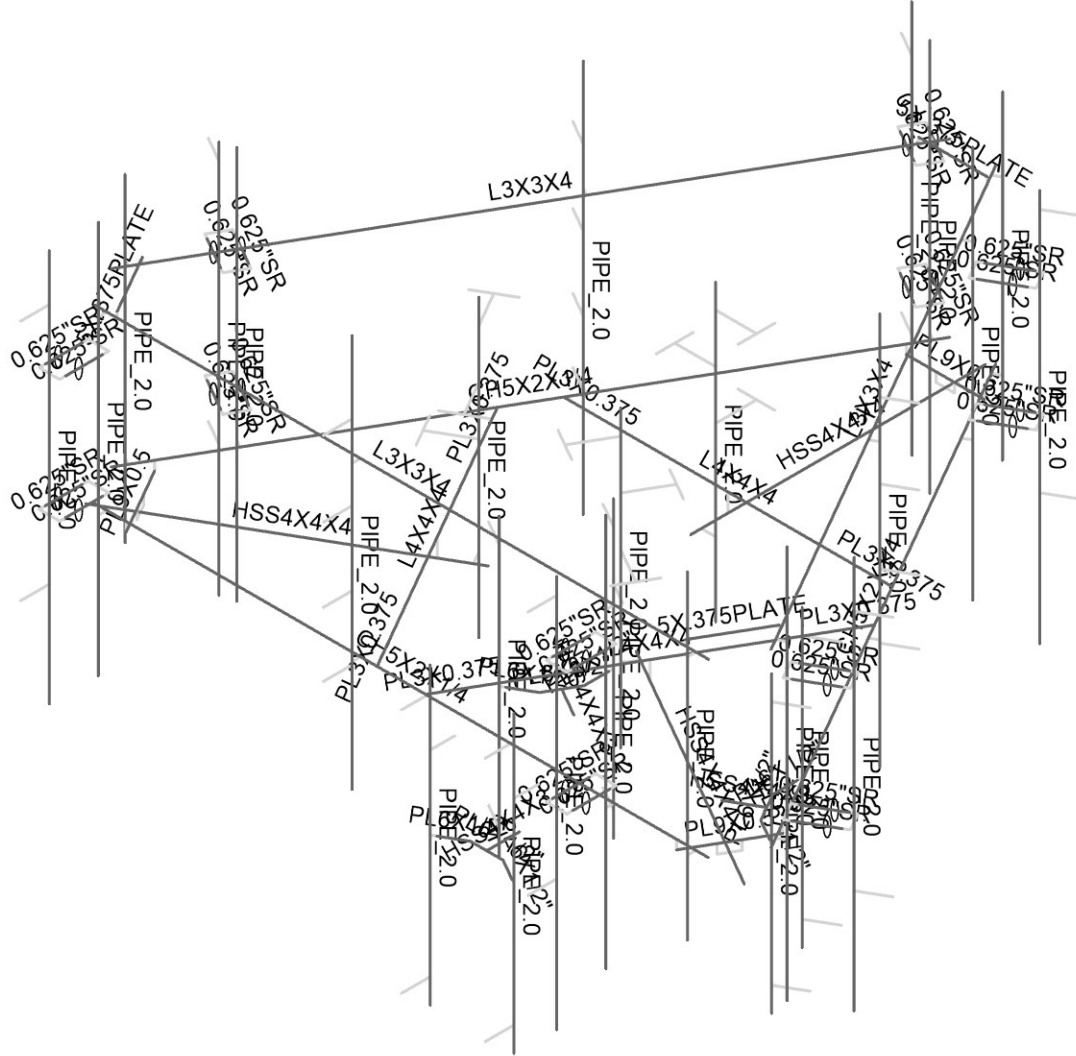
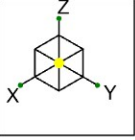


Envelope Only Solution

Telamon CLS  
 SN  
 41124-13682689\_C8\_06-02-MA

41124-13682689\_C8\_06-Northhaven I  
 Member Labels

SK-3  
 May 06, 2022  
 370629\_13682689\_C8\_06\_AT&T MOBILITY.r3d

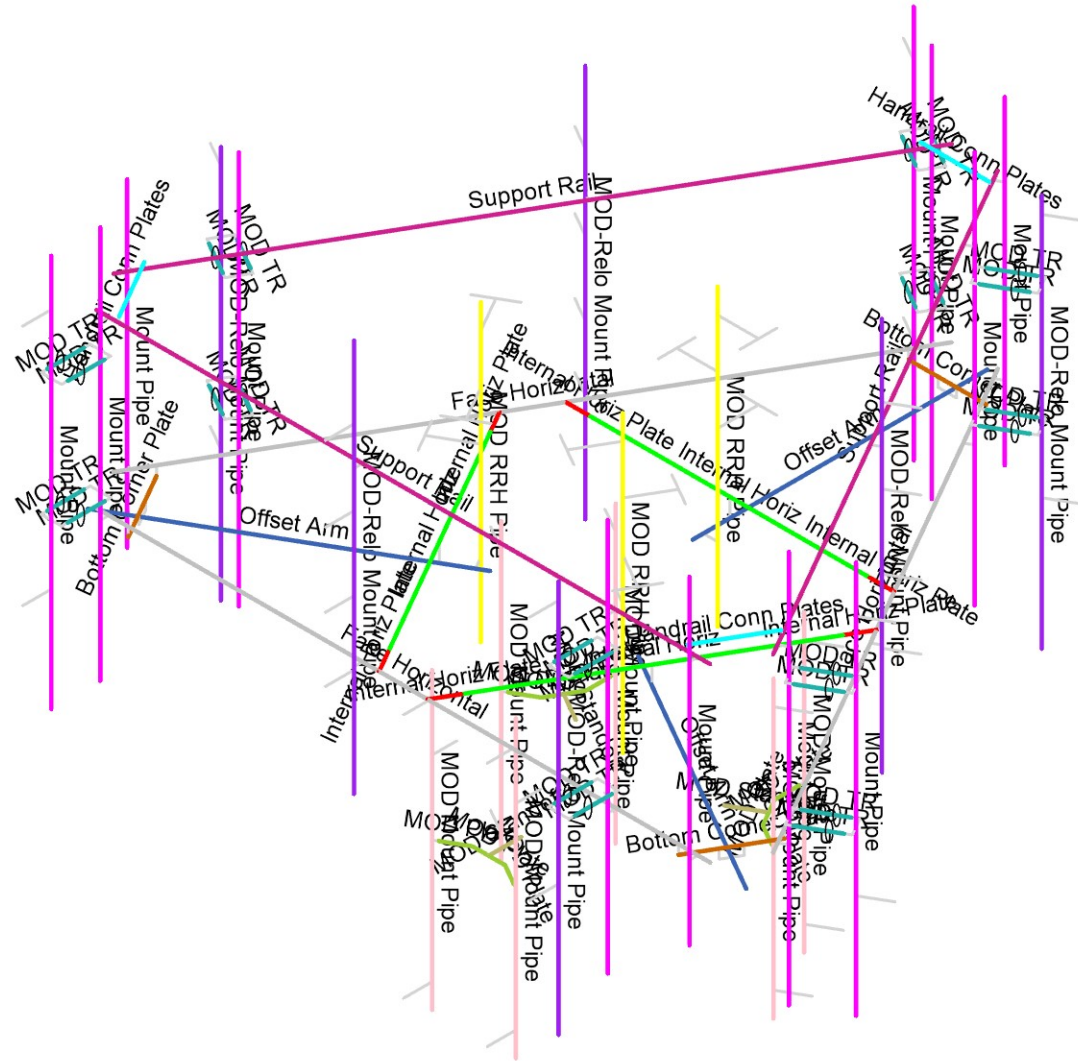
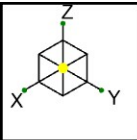


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Telamon CLS  
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41124-13682689\_C8\_06-Northhaven I  
 Member Labels

SK-3.1  
 May 06, 2022  
 370629\_13682689\_C8\_06\_AT&T MOBILITY.r3d



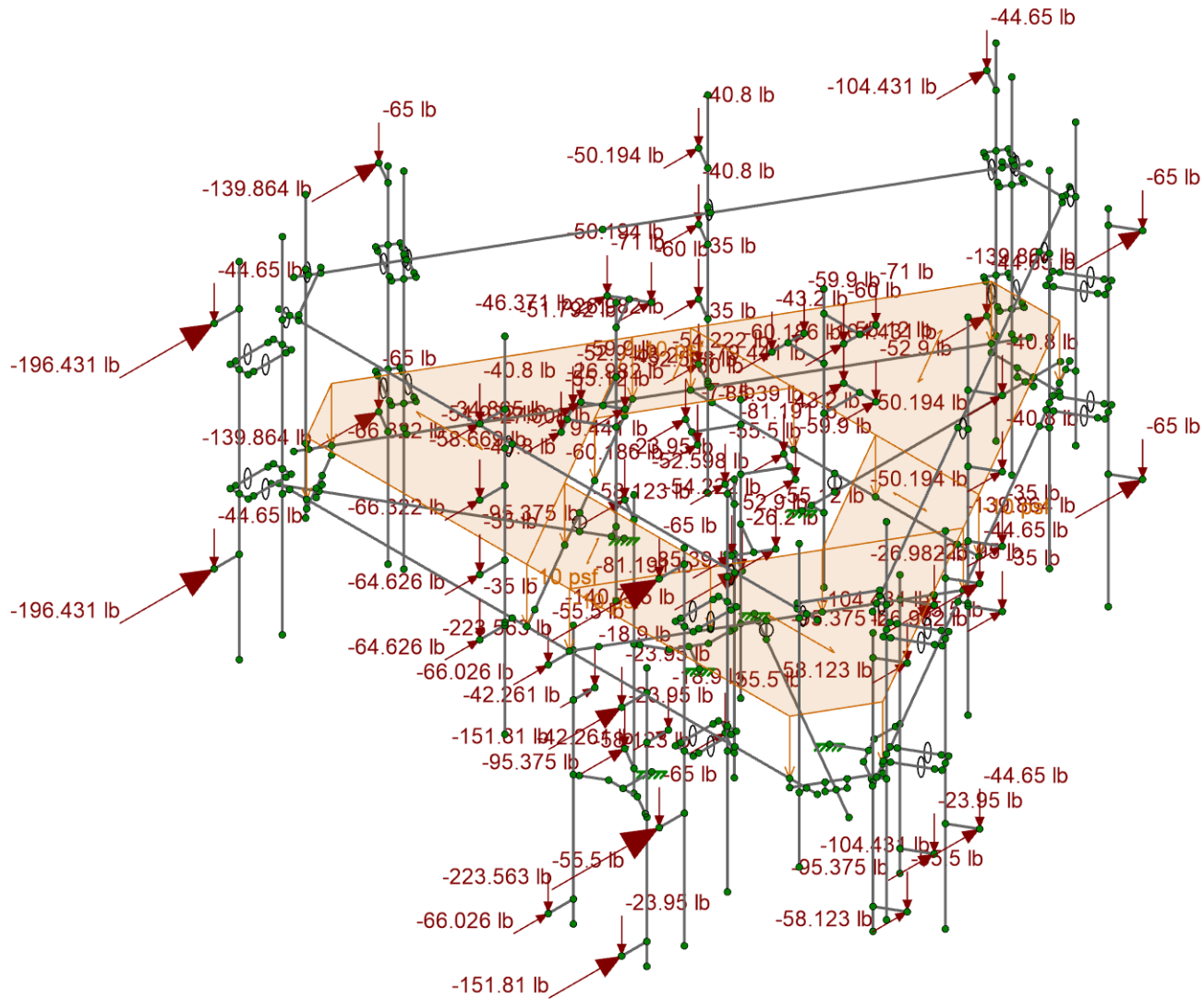
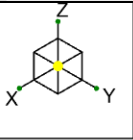
- Section Sets
- Offset Arm
  - Internal Horiz
  - Internal Horiz Plate
  - Face Horizontal
  - Mount Pipe
  - Handrail Conn Plates
  - Bottom Corner Plate
  - MOD RRH Pipe
  - MOD-Relo Mount Pipe
  - MOD Standoff
  - MOD Plate
  - MOD Mount Pipe
  - MOD TR
  - Support Rail
  - RIGID

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 SN  
 41124-13682689\_C8\_06-02-MA

41124-13682689\_C8\_06-Northhaven I  
 Section Sets

SK-4  
 May 06, 2022  
 370629\_13682689\_C8\_06\_AT&T MOBILITY.r3d



Loads: LC 1, DISPLAY (1.0D + 1.0W\_0)  
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SN

41124-13682689\_C8\_06-02-MA

41124-13682689\_C8\_06-Northhaven I

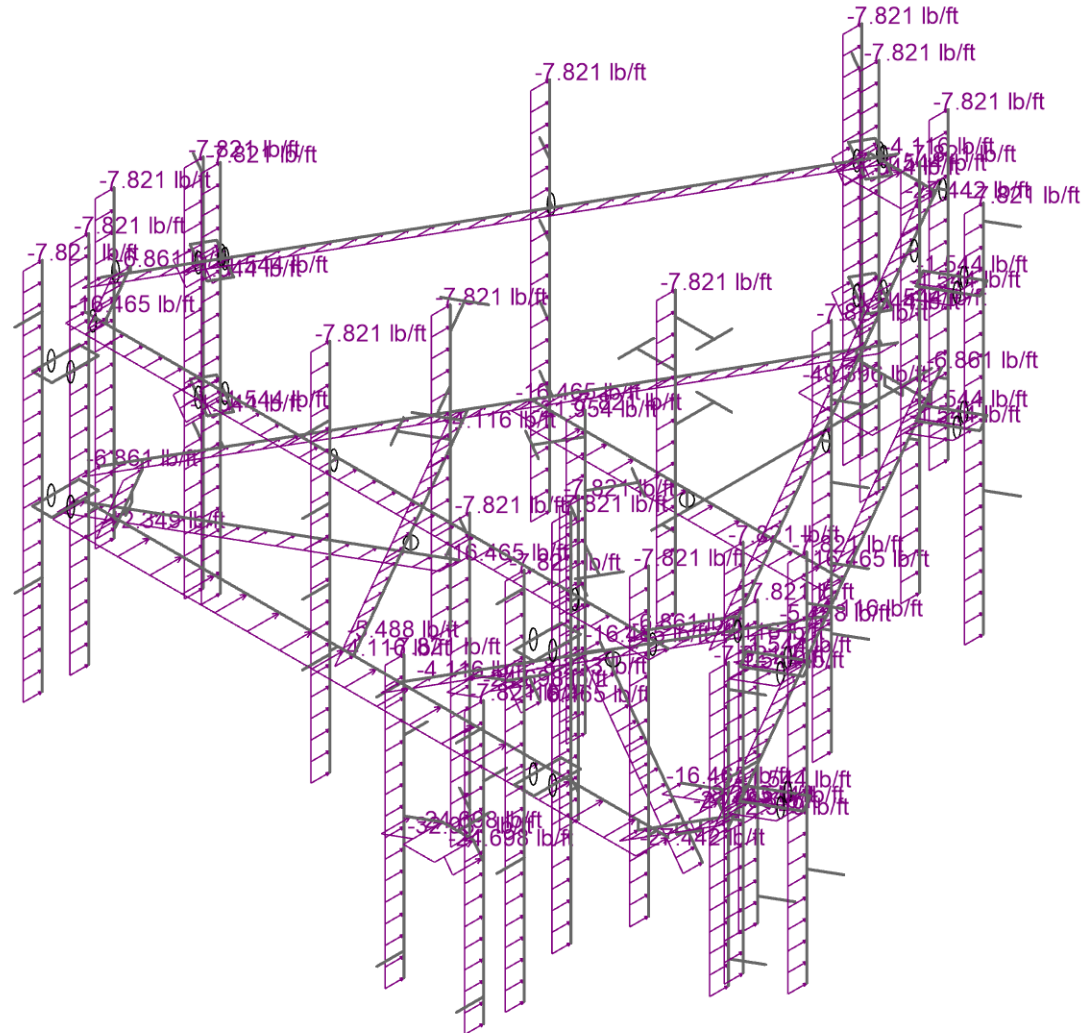
Joint Loads – Dead and Normal Wind

SK-5

May 06, 2022

370629\_13682689\_C8\_06\_AT&T MOBILITY...



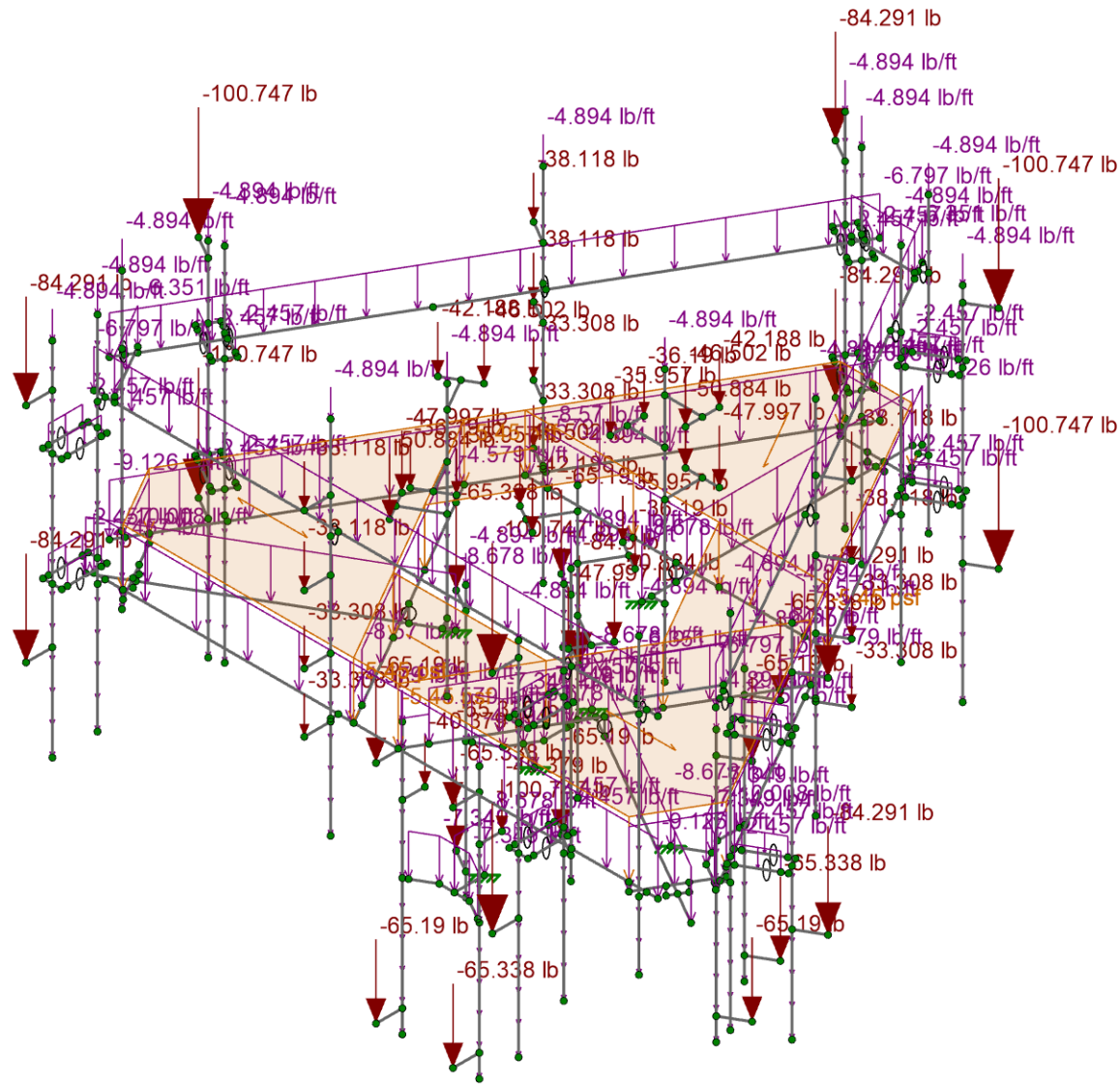
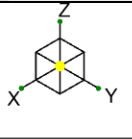


Loads: BLC 5, Structure Wind 0  
Envelope Only Solution

Telamon CLS  
SN  
41124-13682689\_C8\_06-02-MA

41124-13682689\_C8\_06-Northhaven I  
Distributed Load - Normal Wind

SK-6  
May 06, 2022  
370629\_13682689\_C8\_06\_AT&T MOBILITY...



Loads: BLC 2, Ice Dead  
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41124-13682689\_C8\_06-Northhaven I

SK-7

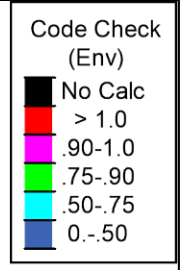
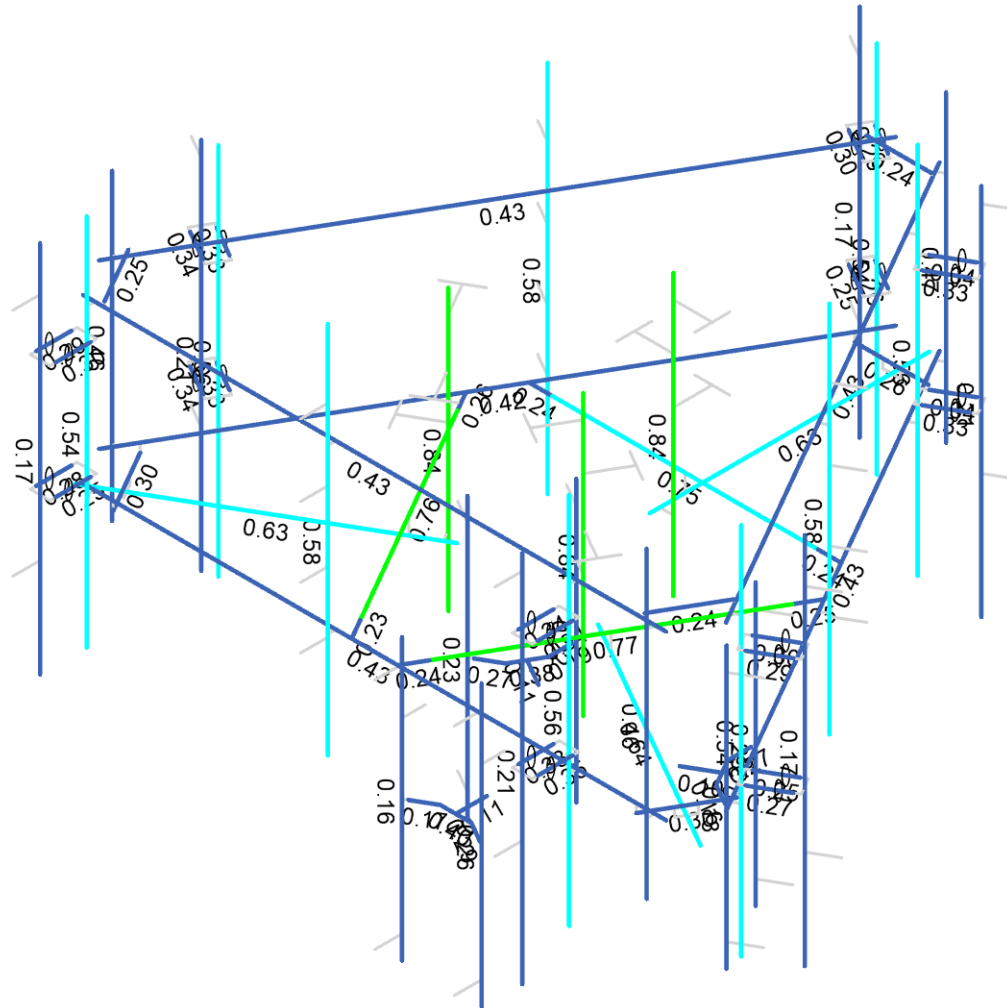
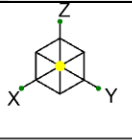
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May 06, 2022

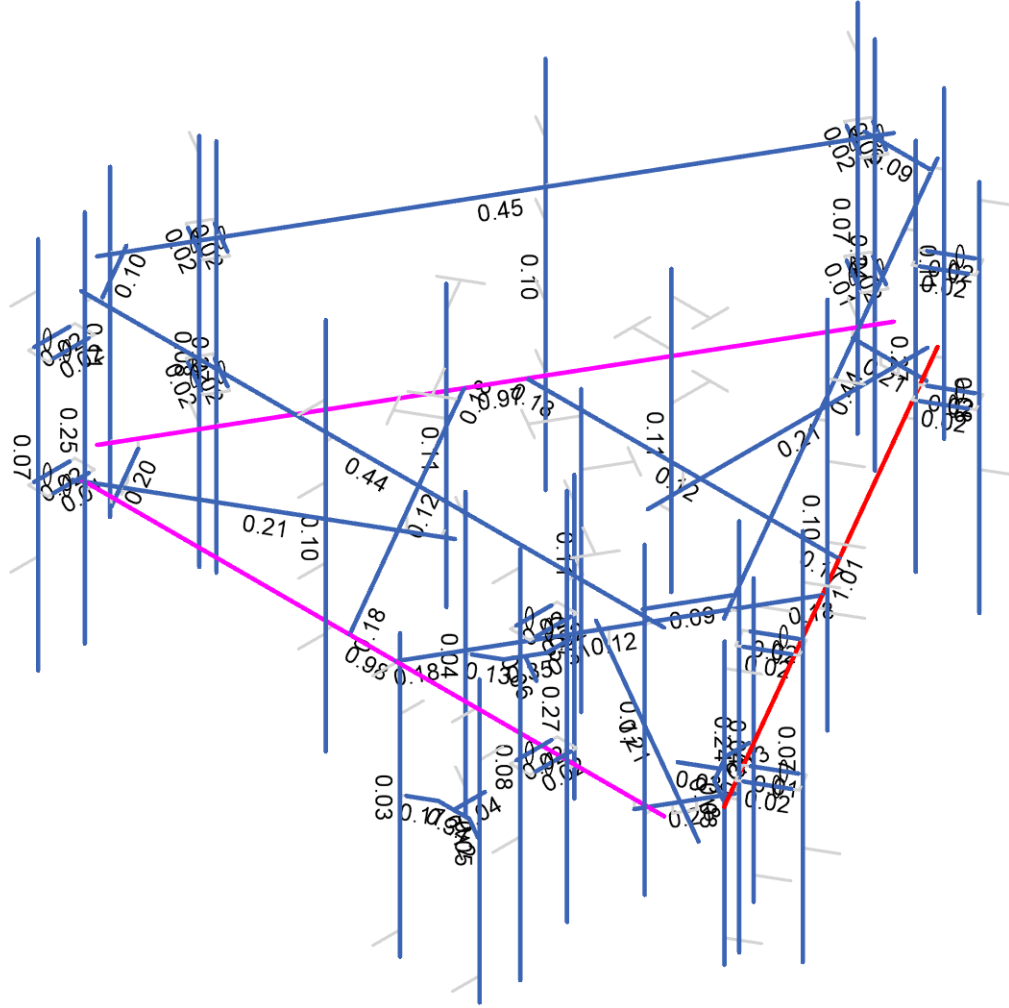
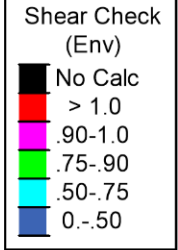
41124-13682689\_C8\_06-02-MA

Ice Dead Loads

370629\_13682689\_C8\_06\_AT&T MOBILITY...



Member Code Checks Displayed (Enveloped) Envelope Only Solution	41124-13682689_C8_06-Northhaven I	SK-8
Telamon CLS		May 06, 2022
SN	Envelope Member Unity Check Results – Bending	370629_13682689_C8_06_AT&T MOBILITY...
41124-13682689_C8_06-02-MA		



Member Shear Checks Displayed (Enveloped) Envelope Only Solution	41124-13682689_C8_06-Northhaven I	SK-9
Telamon CLS		May 06, 2022
SN	Envelope Member Unity Check Results – Bending	370629_13682689_C8_06_AT&T MOBILITY...
41124-13682689_C8_06-02-MA		

**Basic Load Cases**

	BLC Description	Category	Z Gravity	Nodal	Distributed	Area(Member)
1	Dead	DL	-1	57		6
2	Ice Dead	RL		57	87	6
3	BLC 1 Transient Area Loads	None			86	
4	BLC 2 Transient Area Loads	None			89	
5	Structure Wind 0°	None			75	
6	Structure Wind 30°	None			158	
7	Structure Wind 45°	None			174	
8	Structure Wind 60°	None			150	
9	Structure Wind 90°	None			79	
10	Structure Wind 120°	None			150	
11	Structure Wind 135°	None			174	
12	Structure Wind 150°	None			158	
13	Structure Wind 180°	None			75	
14	Structure Wind 210°	None			158	
15	Structure Wind 225°	None			174	
16	Structure Wind 240°	None			150	
17	Structure Wind 270°	None			79	
18	Structure Wind 300°	None			150	
19	Structure Wind 315°	None			174	
20	Structure Wind 330°	None			158	
21	Structure Wind w/ Ice 0°	None			75	
22	Structure Wind w/ Ice 30°	None			158	
23	Structure Wind w/ Ice 45°	None			174	
24	Structure Wind w/ Ice 60°	None			150	
25	Structure Wind w/ Ice 90°	None			79	
26	Structure Wind w/ Ice 120°	None			150	
27	Structure Wind w/ Ice 135°	None			174	
28	Structure Wind w/ Ice 150°	None			158	
29	Structure Wind w/ Ice 180°	None			75	
30	Structure Wind w/ Ice 210°	None			158	
31	Structure Wind w/ Ice 225°	None			174	
32	Structure Wind w/ Ice 240°	None			150	
33	Structure Wind w/ Ice 270°	None			79	
34	Structure Wind w/ Ice 300°	None			150	
35	Structure Wind w/ Ice 315°	None			174	
36	Structure Wind w/ Ice 330°	None			158	
37	Antenna Wind 0°	None		57		
38	Antenna Wind 30°	None		114		
39	Antenna Wind 45°	None		114		
40	Antenna Wind 60°	None		114		
41	Antenna Wind 90°	None		57		
42	Antenna Wind 120°	None		114		
43	Antenna Wind 135°	None		114		
44	Antenna Wind 150°	None		114		
45	Antenna Wind 180°	None		57		
46	Antenna Wind 210°	None		114		
47	Antenna Wind 225°	None		114		
48	Antenna Wind 240°	None		114		
49	Antenna Wind 270°	None		57		
50	Antenna Wind 300°	None		114		
51	Antenna Wind 315°	None		114		
52	Antenna Wind 330°	None		114		
53	Antenna Wind w/ Ice 0°	None		57		
54	Antenna Wind w/ Ice 30°	None		114		
55	Antenna Wind w/ Ice 45°	None		114		

**Basic Load Cases (Continued)**

	BLC Description	Category	Z Gravity	Nodal	Distributed	Area(Member)
56	Antenna Wind w/ Ice 60°	None		114		
57	Antenna Wind w/ Ice 90°	None		57		
58	Antenna Wind w/ Ice 120°	None		114		
59	Antenna Wind w/ Ice 135°	None		114		
60	Antenna Wind w/ Ice 150°	None		114		
61	Antenna Wind w/ Ice 180°	None		57		
62	Antenna Wind w/ Ice 210°	None		114		
63	Antenna Wind w/ Ice 225°	None		114		
64	Antenna Wind w/ Ice 240°	None		114		
65	Antenna Wind w/ Ice 270°	None		57		
66	Antenna Wind w/ Ice 300°	None		114		
67	Antenna Wind w/ Ice 315°	None		114		
68	Antenna Wind w/ Ice 330°	None		114		
69	Seismic X	ELX		57	87	
70	Seismic Y	ELY		57	87	
71	Seismic Z	ELZ		57	87	
72	Maintenance Live 500 (1)	OL1		1		
73	Maintenance Live 500 (2)	OL2		1		
74	Maintenance Live 500 (3)	OL3		1		
75	Maintenance Live 500 (4)	OL4		1		

**Load Combinations**

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	DISPLAY (1.0D + 1.0W 0°)	Yes	Y	DL	1	37	1				
2	1.4D	Yes	Y	DL	1.4						
3	1.2D + 1.0W 0°	Yes	Y	DL	1.2	5	1	37	1		
4	1.2D + 1.0W 30°	Yes	Y	DL	1.2	6	1	38	1		
5	1.2D + 1.0W 45°	Yes	Y	DL	1.2	7	1	39	1		
6	1.2D + 1.0W 60°	Yes	Y	DL	1.2	8	1	40	1		
7	1.2D + 1.0W 90°	Yes	Y	DL	1.2	9	1	41	1		
8	1.2D + 1.0W 120°	Yes	Y	DL	1.2	10	1	42	1		
9	1.2D + 1.0W 135°	Yes	Y	DL	1.2	11	1	43	1		
10	1.2D + 1.0W 150°	Yes	Y	DL	1.2	12	1	44	1		
11	1.2D + 1.0W 180°	Yes	Y	DL	1.2	13	-1	45	-1		
12	1.2D + 1.0W 210°	Yes	Y	DL	1.2	14	-1	46	-1		
13	1.2D + 1.0W 225°	Yes	Y	DL	1.2	15	-1	47	-1		
14	1.2D + 1.0W 240°	Yes	Y	DL	1.2	16	-1	48	-1		
15	1.2D + 1.0W 270°	Yes	Y	DL	1.2	17	-1	49	-1		
16	1.2D + 1.0W 300°	Yes	Y	DL	1.2	18	-1	50	-1		
17	1.2D + 1.0W 315°	Yes	Y	DL	1.2	19	-1	51	-1		
18	1.2D + 1.0W 330°	Yes	Y	DL	1.2	20	-1	52	-1		
19	1.2D + 1.0Di + 1.0Wi 0°	Yes	Y	DL	1.2	21	1	53	1	RL	1
20	1.2D + 1.0Di + 1.0Wi 30°	Yes	Y	DL	1.2	22	1	54	1	RL	1
21	1.2D + 1.0Di + 1.0Wi 45°	Yes	Y	DL	1.2	23	1	55	1	RL	1
22	1.2D + 1.0Di + 1.0Wi 60°	Yes	Y	DL	1.2	24	1	56	1	RL	1
23	1.2D + 1.0Di + 1.0Wi 90°	Yes	Y	DL	1.2	25	1	57	1	RL	1
24	1.2D + 1.0Di + 1.0Wi 120°	Yes	Y	DL	1.2	26	1	58	1	RL	1
25	1.2D + 1.0Di + 1.0Wi 135°	Yes	Y	DL	1.2	27	1	59	1	RL	1
26	1.2D + 1.0Di + 1.0Wi 150°	Yes	Y	DL	1.2	28	1	60	1	RL	1
27	1.2D + 1.0Di + 1.0Wi 180°	Yes	Y	DL	1.2	29	-1	61	-1	RL	1
28	1.2D + 1.0Di + 1.0Wi 210°	Yes	Y	DL	1.2	30	-1	62	-1	RL	1
29	1.2D + 1.0Di + 1.0Wi 225°	Yes	Y	DL	1.2	31	-1	63	-1	RL	1
30	1.2D + 1.0Di + 1.0Wi 240°	Yes	Y	DL	1.2	32	-1	64	-1	RL	1
31	1.2D + 1.0Di + 1.0Wi 270°	Yes	Y	DL	1.2	33	-1	65	-1	RL	1
32	1.2D + 1.0Di + 1.0Wi 300°	Yes	Y	DL	1.2	34	-1	66	-1	RL	1

**Load Combinations (Continued)**

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
33	1.2D + 1.0Di + 1.0Wi 315°	Yes	Y	DL	1.2	35	-1	67	-1	RL	1
34	1.2D + 1.0Di + 1.0Wi 330°	Yes	Y	DL	1.2	36	-1	68	-1	RL	1
35	1.2D + 1.0Ev + 1.0Eh 0°	Yes	Y	DL	1.244	ELX	-1	ELY			
36	1.2D + 1.0Ev + 1.0Eh 30°	Yes	Y	DL	1.244	ELX	-0.866	ELY	0.5		
37	1.2D + 1.0Ev + 1.0Eh 45°	Yes	Y	DL	1.244	ELX	-0.707	ELY	0.707		
38	1.2D + 1.0Ev + 1.0Eh 60°	Yes	Y	DL	1.244	ELX	-0.5	ELY	0.866		
39	1.2D + 1.0Ev + 1.0Eh 90°	Yes	Y	DL	1.244	ELX		ELY	1		
40	1.2D + 1.0Ev + 1.0Eh 120°	Yes	Y	DL	1.244	ELX	0.5	ELY	0.866		
41	1.2D + 1.0Ev + 1.0Eh 135°	Yes	Y	DL	1.244	ELX	0.707	ELY	0.707		
42	1.2D + 1.0Ev + 1.0Eh 150°	Yes	Y	DL	1.244	ELX	0.866	ELY	0.5		
43	1.2D + 1.0Ev + 1.0Eh 180°	Yes	Y	DL	1.244	ELX	1	ELY			
44	1.2D + 1.0Ev + 1.0Eh 210°	Yes	Y	DL	1.244	ELX	0.866	ELY	-0.5		
45	1.2D + 1.0Ev + 1.0Eh 225°	Yes	Y	DL	1.244	ELX	0.707	ELY	-0.707		
46	1.2D + 1.0Ev + 1.0Eh 240°	Yes	Y	DL	1.244	ELX	0.5	ELY	-0.866		
47	1.2D + 1.0Ev + 1.0Eh 270°	Yes	Y	DL	1.244	ELX		ELY	-1		
48	1.2D + 1.0Ev + 1.0Eh 300°	Yes	Y	DL	1.244	ELX	-0.5	ELY	-0.866		
49	1.2D + 1.0Ev + 1.0Eh 315°	Yes	Y	DL	1.244	ELX	-0.707	ELY	-0.707		
50	1.2D + 1.0Ev + 1.0Eh 330°	Yes	Y	DL	1.244	ELX	-0.866	ELY	-0.5		
51	0.9D - 1.0Ev + 1.0Eh 0°	Yes	Y	DL	0.856	ELX	-1	ELY			
52	0.9D - 1.0Ev + 1.0Eh 30°	Yes	Y	DL	0.856	ELX	-0.866	ELY	0.5		
53	0.9D - 1.0Ev + 1.0Eh 45°	Yes	Y	DL	0.856	ELX	-0.707	ELY	0.707		
54	0.9D - 1.0Ev + 1.0Eh 60°	Yes	Y	DL	0.856	ELX	-0.5	ELY	0.866		
55	0.9D - 1.0Ev + 1.0Eh 90°	Yes	Y	DL	0.856	ELX		ELY	1		
56	0.9D - 1.0Ev + 1.0Eh 120°	Yes	Y	DL	0.856	ELX	0.5	ELY	0.866		
57	0.9D - 1.0Ev + 1.0Eh 135°	Yes	Y	DL	0.856	ELX	0.707	ELY	0.707		
58	0.9D - 1.0Ev + 1.0Eh 150°	Yes	Y	DL	0.856	ELX	0.866	ELY	0.5		
59	0.9D - 1.0Ev + 1.0Eh 180°	Yes	Y	DL	0.856	ELX	1	ELY			
60	0.9D - 1.0Ev + 1.0Eh 210°	Yes	Y	DL	0.856	ELX	0.866	ELY	-0.5		
61	0.9D - 1.0Ev + 1.0Eh 225°	Yes	Y	DL	0.856	ELX	0.707	ELY	-0.707		
62	0.9D - 1.0Ev + 1.0Eh 240°	Yes	Y	DL	0.856	ELX	0.5	ELY	-0.866		
63	0.9D - 1.0Ev + 1.0Eh 270°	Yes	Y	DL	0.856	ELX		ELY	-1		
64	0.9D - 1.0Ev + 1.0Eh 300°	Yes	Y	DL	0.856	ELX	-0.5	ELY	-0.866		
65	0.9D - 1.0Ev + 1.0Eh 315°	Yes	Y	DL	0.856	ELX	-0.707	ELY	-0.707		
66	0.9D - 1.0Ev + 1.0Eh 330°	Yes	Y	DL	0.856	ELX	-0.866	ELY	-0.5		
67	1.2D + 1.5Lm 1 + 1.0Wm 0°	Yes	Y	DL	1.2	5	0.066	37	0.066	OL1	1.5
68	1.2D + 1.5Lm 1 + 1.0Wm 30°	Yes	Y	DL	1.2	6	0.066	38	0.066	OL1	1.5
69	1.2D + 1.5Lm 1 + 1.0Wm 45°	Yes	Y	DL	1.2	7	0.066	39	0.066	OL1	1.5
70	1.2D + 1.5Lm 1 + 1.0Wm 60°	Yes	Y	DL	1.2	8	0.066	40	0.066	OL1	1.5
71	1.2D + 1.5Lm 1 + 1.0Wm 90°	Yes	Y	DL	1.2	9	0.066	41	0.066	OL1	1.5
72	1.2D + 1.5Lm 1 + 1.0Wm 120°	Yes	Y	DL	1.2	10	0.066	42	0.066	OL1	1.5
73	1.2D + 1.5Lm 1 + 1.0Wm 135°	Yes	Y	DL	1.2	11	0.066	43	0.066	OL1	1.5
74	1.2D + 1.5Lm 1 + 1.0Wm 150°	Yes	Y	DL	1.2	12	0.066	44	0.066	OL1	1.5
75	1.2D + 1.5Lm 1 + 1.0Wm 180°	Yes	Y	DL	1.2	13	-0.066	45	-0.066	OL1	1.5
76	1.2D + 1.5Lm 1 + 1.0Wm 210°	Yes	Y	DL	1.2	14	-0.066	46	-0.066	OL1	1.5
77	1.2D + 1.5Lm 1 + 1.0Wm 225°	Yes	Y	DL	1.2	15	-0.066	47	-0.066	OL1	1.5
78	1.2D + 1.5Lm 1 + 1.0Wm 240°	Yes	Y	DL	1.2	16	-0.066	48	-0.066	OL1	1.5
79	1.2D + 1.5Lm 1 + 1.0Wm 270°	Yes	Y	DL	1.2	17	-0.066	49	-0.066	OL1	1.5
80	1.2D + 1.5Lm 1 + 1.0Wm 300°	Yes	Y	DL	1.2	18	-0.066	50	-0.066	OL1	1.5
81	1.2D + 1.5Lm 1 + 1.0Wm 315°	Yes	Y	DL	1.2	19	-0.066	51	-0.066	OL1	1.5
82	1.2D + 1.5Lm 1 + 1.0Wm 330°	Yes	Y	DL	1.2	20	-0.066	52	-0.066	OL1	1.5
83	1.2D + 1.5Lm 2 + 1.0Wm 0°	Yes	Y	DL	1.2	5	0.066	37	0.066	OL2	1.5
84	1.2D + 1.5Lm 2 + 1.0Wm 30°	Yes	Y	DL	1.2	6	0.066	38	0.066	OL2	1.5
85	1.2D + 1.5Lm 2 + 1.0Wm 45°	Yes	Y	DL	1.2	7	0.066	39	0.066	OL2	1.5
86	1.2D + 1.5Lm 2 + 1.0Wm 60°	Yes	Y	DL	1.2	8	0.066	40	0.066	OL2	1.5
87	1.2D + 1.5Lm 2 + 1.0Wm 90°	Yes	Y	DL	1.2	9	0.066	41	0.066	OL2	1.5

**Load Combinations (Continued)**

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
88	1.2D + 1.5Lm 2 + 1.0Wm 120°	Yes	Y	DL	1.2	10	0.066	42	0.066	OL2	1.5
89	1.2D + 1.5Lm 2 + 1.0Wm 135°	Yes	Y	DL	1.2	11	0.066	43	0.066	OL2	1.5
90	1.2D + 1.5Lm 2 + 1.0Wm 150°	Yes	Y	DL	1.2	12	0.066	44	0.066	OL2	1.5
91	1.2D + 1.5Lm 2 + 1.0Wm 180°	Yes	Y	DL	1.2	13	-0.066	45	-0.066	OL2	1.5
92	1.2D + 1.5Lm 2 + 1.0Wm 210°	Yes	Y	DL	1.2	14	-0.066	46	-0.066	OL2	1.5
93	1.2D + 1.5Lm 2 + 1.0Wm 225°	Yes	Y	DL	1.2	15	-0.066	47	-0.066	OL2	1.5
94	1.2D + 1.5Lm 2 + 1.0Wm 240°	Yes	Y	DL	1.2	16	-0.066	48	-0.066	OL2	1.5
95	1.2D + 1.5Lm 2 + 1.0Wm 270°	Yes	Y	DL	1.2	17	-0.066	49	-0.066	OL2	1.5
96	1.2D + 1.5Lm 2 + 1.0Wm 300°	Yes	Y	DL	1.2	18	-0.066	50	-0.066	OL2	1.5
97	1.2D + 1.5Lm 2 + 1.0Wm 315°	Yes	Y	DL	1.2	19	-0.066	51	-0.066	OL2	1.5
98	1.2D + 1.5Lm 2 + 1.0Wm 330°	Yes	Y	DL	1.2	20	-0.066	52	-0.066	OL2	1.5
99	1.2D + 1.5Lm 3 + 1.0Wm 0°	Yes	Y	DL	1.2	5	0.066	37	0.066	OL3	1.5
100	1.2D + 1.5Lm 3 + 1.0Wm 30°	Yes	Y	DL	1.2	6	0.066	38	0.066	OL3	1.5
101	1.2D + 1.5Lm 3 + 1.0Wm 45°	Yes	Y	DL	1.2	7	0.066	39	0.066	OL3	1.5
102	1.2D + 1.5Lm 3 + 1.0Wm 60°	Yes	Y	DL	1.2	8	0.066	40	0.066	OL3	1.5
103	1.2D + 1.5Lm 3 + 1.0Wm 90°	Yes	Y	DL	1.2	9	0.066	41	0.066	OL3	1.5
104	1.2D + 1.5Lm 3 + 1.0Wm 120°	Yes	Y	DL	1.2	10	0.066	42	0.066	OL3	1.5
105	1.2D + 1.5Lm 3 + 1.0Wm 135°	Yes	Y	DL	1.2	11	0.066	43	0.066	OL3	1.5
106	1.2D + 1.5Lm 3 + 1.0Wm 150°	Yes	Y	DL	1.2	12	0.066	44	0.066	OL3	1.5
107	1.2D + 1.5Lm 3 + 1.0Wm 180°	Yes	Y	DL	1.2	13	-0.066	45	-0.066	OL3	1.5
108	1.2D + 1.5Lm 3 + 1.0Wm 210°	Yes	Y	DL	1.2	14	-0.066	46	-0.066	OL3	1.5
109	1.2D + 1.5Lm 3 + 1.0Wm 225°	Yes	Y	DL	1.2	15	-0.066	47	-0.066	OL3	1.5
110	1.2D + 1.5Lm 3 + 1.0Wm 240°	Yes	Y	DL	1.2	16	-0.066	48	-0.066	OL3	1.5
111	1.2D + 1.5Lm 3 + 1.0Wm 270°	Yes	Y	DL	1.2	17	-0.066	49	-0.066	OL3	1.5
112	1.2D + 1.5Lm 3 + 1.0Wm 300°	Yes	Y	DL	1.2	18	-0.066	50	-0.066	OL3	1.5
113	1.2D + 1.5Lm 3 + 1.0Wm 315°	Yes	Y	DL	1.2	19	-0.066	51	-0.066	OL3	1.5
114	1.2D + 1.5Lm 3 + 1.0Wm 330°	Yes	Y	DL	1.2	20	-0.066	52	-0.066	OL3	1.5
115	1.2D + 1.5Lm 4 + 1.0Wm 0°	Yes	Y	DL	1.2	5	0.066	37	0.066	OL4	1.5
116	1.2D + 1.5Lm 4 + 1.0Wm 30°	Yes	Y	DL	1.2	6	0.066	38	0.066	OL4	1.5
117	1.2D + 1.5Lm 4 + 1.0Wm 45°	Yes	Y	DL	1.2	7	0.066	39	0.066	OL4	1.5
118	1.2D + 1.5Lm 4 + 1.0Wm 60°	Yes	Y	DL	1.2	8	0.066	40	0.066	OL4	1.5
119	1.2D + 1.5Lm 4 + 1.0Wm 90°	Yes	Y	DL	1.2	9	0.066	41	0.066	OL4	1.5
120	1.2D + 1.5Lm 4 + 1.0Wm 120°	Yes	Y	DL	1.2	10	0.066	42	0.066	OL4	1.5
121	1.2D + 1.5Lm 4 + 1.0Wm 135°	Yes	Y	DL	1.2	11	0.066	43	0.066	OL4	1.5
122	1.2D + 1.5Lm 4 + 1.0Wm 150°	Yes	Y	DL	1.2	12	0.066	44	0.066	OL4	1.5
123	1.2D + 1.5Lm 4 + 1.0Wm 180°	Yes	Y	DL	1.2	13	-0.066	45	-0.066	OL4	1.5
124	1.2D + 1.5Lm 4 + 1.0Wm 210°	Yes	Y	DL	1.2	14	-0.066	46	-0.066	OL4	1.5
125	1.2D + 1.5Lm 4 + 1.0Wm 225°	Yes	Y	DL	1.2	15	-0.066	47	-0.066	OL4	1.5
126	1.2D + 1.5Lm 4 + 1.0Wm 240°	Yes	Y	DL	1.2	16	-0.066	48	-0.066	OL4	1.5
127	1.2D + 1.5Lm 4 + 1.0Wm 270°	Yes	Y	DL	1.2	17	-0.066	49	-0.066	OL4	1.5
128	1.2D + 1.5Lm 4 + 1.0Wm 300°	Yes	Y	DL	1.2	18	-0.066	50	-0.066	OL4	1.5
129	1.2D + 1.5Lm 4 + 1.0Wm 315°	Yes	Y	DL	1.2	19	-0.066	51	-0.066	OL4	1.5
130	1.2D + 1.5Lm 4 + 1.0Wm 330°	Yes	Y	DL	1.2	20	-0.066	52	-0.066	OL4	1.5

**Hot Rolled Steel Properties**

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e <sup>5</sup> F <sup>-1</sup> ]	Density [k/ft <sup>3</sup> ]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
3	A992	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	0.3	0.65	0.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	0.3	0.65	0.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	0.3	0.65	0.49	35	1.6	60	1.2
7	A1085	29000	11154	0.3	0.65	0.49	50	1.4	65	1.3
8	SAE J429	29000	11154	0.3	0.65	0.49	57	1.5	74	1.2



**Hot Rolled Steel Section Sets**

	Label	Shape	Type	Design List	Material	Design Rule	Area [in <sup>2</sup> ]	Iyy [in <sup>4</sup> ]	Izz [in <sup>4</sup> ]	J [in <sup>4</sup> ]
1	Offset Arm	HSS4X4X4	Beam	None	A36 Gr.36	Typical	3.37	7.8	7.8	12.8
2	Internal Horiz	L4X4X4	Beam	None	A36 Gr.36	Typical	1.93	3	3	0.044
3	Internal Horiz Plate	PL3X0.375	Beam	None	A36 Gr.36	Typical	1.125	0.013	0.844	0.049
4	Face Horizontal	CH5X2X1/4	Beam	None	A36 Gr.36	Typical	2.125	0.745	7.544	0.042
5	Mount Pipe	PIPE 2.0	Beam	None	A53 Gr.B	Typical	1.02	0.627	0.627	1.25
6	Handrail	L3X3X4	Beam	None	A36 Gr.36	Typical	1.44	1.23	1.23	0.031
7	Handrail Conn Plates	5X.375PLATE	Beam	None	A36 Gr.36	Typical	1.875	0.022	3.906	0.084
8	Bottom Corner Plate	PL9X0.5	Beam	None	A36 Gr.36	Typical	4.5	0.094	30.375	0.362
9	MOD RRH Pipe	PIPE 2.0	Beam	None	A53 Gr.B	Typical	1.02	0.627	0.627	1.25
10	MOD-Relo Mount Pipe	PIPE 2.0	Beam	None	A53 Gr.B	Typical	1.02	0.627	0.627	1.25
11	MOD Standoff	HSS4X4X3	Beam	None	A36 Gr.36	Typical	2.58	6.21	6.21	10
12	MOD Plate	PL6X1/2"	Beam	None	A36 Gr.36	Typical	3	0.063	9	0.237
13	MOD Mount Pipe	PIPE 2.0	Beam	None	A53 Gr.B	Typical	1.02	0.627	0.627	1.25
14	MOD TR	0.625"SR	Beam	None	A992	Typical	0.307	0.007	0.007	0.015
15	Support Rail	L3X3X4	Beam	None	A36 Gr.36	Typical	1.44	1.23	1.23	0.031
16	SR Conn Plate	PL5X0.375	Beam	None	A36 Gr.36	Typical	1.875	0.022	3.906	0.084
17	MOD SR Conn Angle	L2.5X2.5X4	Beam	None	A36 Gr.36	Typical	1.19	0.692	0.692	0.026

**Hot Rolled Steel Design Parameters**

	Label	Shape	Length [in]	Lb y-y [in]	Lb z-z [in]	Lcomp top [in]	L-Torque [in]	K y-y	K z-z	Channel Conn.	a [in]	Function
1	A1	Offset Arm	72							N/A	N/A	Lateral
2	M35	Bottom Corner Plate	18.978							N/A	N/A	Lateral
3	M42	Face Horizontal	150	61.35	62		48			N/A	N/A	Lateral
4	M71	Internal Horiz Plate	6							N/A	N/A	Lateral
5	M73	Internal Horiz Plate	6							N/A	N/A	Lateral
6	M76	Internal Horiz	68.328							N/A	N/A	Lateral
7	M29	Internal Horiz	68.328							N/A	N/A	Lateral
8	A3	Offset Arm	72							N/A	N/A	Lateral
9	M31	Bottom Corner Plate	18.978							N/A	N/A	Lateral
10	M32	Internal Horiz Plate	6							N/A	N/A	Lateral
11	M33	Internal Horiz Plate	6							N/A	N/A	Lateral
12	M40	Face Horizontal	150	61.35	62		48			N/A	N/A	Lateral
13	M48	Internal Horiz	68.328							N/A	N/A	Lateral
14	A2	Offset Arm	72							N/A	N/A	Lateral
15	M50	Bottom Corner Plate	18.978							N/A	N/A	Lateral
16	M51	Internal Horiz Plate	6							N/A	N/A	Lateral
17	M52	Internal Horiz Plate	6							N/A	N/A	Lateral
18	M59	Face Horizontal	150	61.35	62		48			N/A	N/A	Lateral
19	M57	Mount Pipe	78							N/A	N/A	Lateral
20	M61	MOD-Relo Mount Pipe	96							N/A	N/A	Lateral
21	M66	MOD-Relo Mount Pipe	96							N/A	N/A	Lateral
22	M69	Mount Pipe	96							N/A	N/A	Lateral
23	M70	Mount Pipe	78							N/A	N/A	Lateral
24	M85	Mount Pipe	96							N/A	N/A	Lateral
25	M86	Mount Pipe	78							N/A	N/A	Lateral
26	M97	Mount Pipe	96							N/A	N/A	Lateral
27	M96	MOD-Relo Mount Pipe	96							N/A	N/A	Lateral
28	M107	MOD-Relo Mount Pipe	96							N/A	N/A	Lateral
29	M118	MOD-Relo Mount Pipe	96							N/A	N/A	Lateral
30	M119	MOD-Relo Mount Pipe	96							N/A	N/A	Lateral
31	M148	MOD Standoff	8							N/A	N/A	Lateral
32	M147	MOD Plate	8							N/A	N/A	Lateral
33	M149	MOD Plate	6							N/A	N/A	Lateral
34	M151	MOD Mount Pipe	72							N/A	N/A	Lateral

**Hot Rolled Steel Design Parameters (Continued)**

Label	Shape	Length [in]	Lb y-y [in]	Lb z-z [in]	Lcomp top [in]	L-Torque [in]	K y-y	K z-z	Channel Conn.	a [in]	Function
35	M152	MOD Mount Pipe	72						N/A	N/A	Lateral
36	M153	MOD Plate	6						N/A	N/A	Lateral
37	M161	MOD Mount Pipe	72						N/A	N/A	Lateral
38	M162	MOD Plate	6						N/A	N/A	Lateral
39	M163	MOD Mount Pipe	72						N/A	N/A	Lateral
40	M165	MOD Standoff	8						N/A	N/A	Lateral
41	M167	MOD Plate	8						N/A	N/A	Lateral
42	M168	MOD Plate	6						N/A	N/A	Lateral
43	M175	MOD Mount Pipe	72						N/A	N/A	Lateral
44	M176	MOD Plate	6						N/A	N/A	Lateral
45	M177	MOD Mount Pipe	72						N/A	N/A	Lateral
46	M179	MOD Standoff	8						N/A	N/A	Lateral
47	M181	MOD Plate	8						N/A	N/A	Lateral
48	M182	MOD Plate	6						N/A	N/A	Lateral
49	M163A	Mount Pipe	96						N/A	N/A	Lateral
50	M164A	Mount Pipe	96						N/A	N/A	Lateral
51	M165A	Mount Pipe	96						N/A	N/A	Lateral
52	M172A	MOD TR	9			Lbyy			N/A	N/A	Lateral
53	M173	MOD TR	9			Lbyy			N/A	N/A	Lateral
54	M180A	MOD TR	9			Lbyy			N/A	N/A	Lateral
55	M181A	MOD TR	9			Lbyy			N/A	N/A	Lateral
56	M188A	MOD TR	9			Lbyy			N/A	N/A	Lateral
57	M189	MOD TR	9			Lbyy			N/A	N/A	Lateral
58	M196	MOD TR	9			Lbyy			N/A	N/A	Lateral
59	M197	MOD TR	9			Lbyy			N/A	N/A	Lateral
60	M204	MOD TR	9			Lbyy			N/A	N/A	Lateral
61	M205	MOD TR	9			Lbyy			N/A	N/A	Lateral
62	M212	MOD TR	9			Lbyy			N/A	N/A	Lateral
63	M213	MOD TR	9			Lbyy			N/A	N/A	Lateral
64	M214	Mount Pipe	96						N/A	N/A	Lateral
65	M221	MOD TR	9			Lbyy			N/A	N/A	Lateral
66	M222	MOD TR	9			Lbyy			N/A	N/A	Lateral
67	M229	MOD TR	9			Lbyy			N/A	N/A	Lateral
68	M230	MOD TR	9			Lbyy			N/A	N/A	Lateral
69	M231	Mount Pipe	96						N/A	N/A	Lateral
70	M238	MOD TR	9			Lbyy			N/A	N/A	Lateral
71	M239	MOD TR	9			Lbyy			N/A	N/A	Lateral
72	M246	MOD TR	9			Lbyy			N/A	N/A	Lateral
73	M247	MOD TR	9			Lbyy			N/A	N/A	Lateral
74	M248	Mount Pipe	96						N/A	N/A	Lateral
75	M255	MOD TR	9			Lbyy			N/A	N/A	Lateral
76	M256	MOD TR	9			Lbyy			N/A	N/A	Lateral
77	M263	MOD TR	9			Lbyy			N/A	N/A	Lateral
78	M264	MOD TR	9			Lbyy			N/A	N/A	Lateral
79	HR1	Support Rail	150	138.39	62	Lbyy			N/A	N/A	Lateral
80	HR10	Support Rail	150	138.39	62	Lbyy			N/A	N/A	Lateral
81	HR19	Support Rail	150	138.39	62	Lbyy			N/A	N/A	Lateral
82	M267	MOD RRH Pipe	72			Lbyy			N/A	N/A	Lateral
83	M273	Handrail Conn Plates	16.782			Lbyy	0.65	0.65	N/A	N/A	Lateral
84	M274	Handrail Conn Plates	16.782			Lbyy	0.65	0.65	N/A	N/A	Lateral
85	M284	Handrail Conn Plates	16.782			Lbyy	0.65	0.65	N/A	N/A	Lateral
86	M288	MOD RRH Pipe	72			Lbyy			N/A	N/A	Lateral
87	M296	MOD RRH Pipe	72			Lbyy			N/A	N/A	Lateral

**Member Advanced Data**

	Label	I Release	J Release	Physical	Deflection Ratio Options	Seismic DR
1	A1			Yes	Default	None
2	M35			Yes	Default	None
3	M42			Yes	Default	None
4	M71			Yes	Default	None
5	M73			Yes	Default	None
6	M76			Yes	Default	None
7	M78A			Yes	** NA **	None
8	M79			Yes	** NA **	None
9	M79A			Yes	** NA **	None
10	M80A			Yes	** NA **	None
11	M81A			Yes	** NA **	None
12	M29			Yes	Default	None
13	A3			Yes	Default	None
14	M31			Yes	Default	None
15	M32			Yes	Default	None
16	M33			Yes	Default	None
17	M34			Yes	** NA **	None
18	M36			Yes	** NA **	None
19	M37			Yes	** NA **	None
20	M38			Yes	** NA **	None
21	M39			Yes	** NA **	None
22	M40			Yes	Default	None
23	M48			Yes	Default	None
24	A2			Yes	Default	None
25	M50			Yes	Default	None
26	M51			Yes	Default	None
27	M52			Yes	Default	None
28	M53			Yes	** NA **	None
29	M54			Yes	** NA **	None
30	M55			Yes	** NA **	None
31	M56			Yes	** NA **	None
32	M58			Yes	** NA **	None
33	M59			Yes	Default	None
34	M43			Yes	** NA **	None
35	M45		BenPIN	Yes	** NA **	None
36	M46		BenPIN	Yes	** NA **	None
37	M47		BenPIN	Yes	** NA **	None
38	M57			Yes	Default	None
39	M61			Yes	Default	None
40	M62			Yes	** NA **	None
41	M64			Yes	** NA **	None
42	M66			Yes	Default	None
43	M67			Yes	** NA **	None
44	M69			Yes	Default	None
45	M70			Yes	Default	None
46	M72			Yes	** NA **	None
47	M82			Yes	** NA **	None
48	M85			Yes	Default	None
49	M86			Yes	Default	None
50	M87			Yes	** NA **	None
51	M88	OOOXOO		Yes	** NA **	None
52	M94			Yes	** NA **	None
53	M95	OOOXOO		Yes	** NA **	None
54	M97			Yes	Default	None
55	M75			Yes	** NA **	None

**Member Advanced Data (Continued)**

	Label	I Release	J Release	Physical	Deflection Ratio Options	Seismic DR
56	M77			Yes	** NA **	None
57	M78			Yes	** NA **	None
58	M80			Yes	** NA **	None
59	M81			Yes	** NA **	None
60	M84			Yes	** NA **	None
61	M89			Yes	** NA **	None
62	M90			Yes	** NA **	None
63	M91			Yes	** NA **	None
64	M96			Yes	Default	None
65	M107			Yes	Default	None
66	M108			Yes	** NA **	None
67	M109			Yes	** NA **	None
68	M110			Yes	** NA **	None
69	M111			Yes	** NA **	None
70	M112			Yes	** NA **	None
71	M113			Yes	** NA **	None
72	M114			Yes	** NA **	None
73	M115			Yes	** NA **	None
74	M116	OOOXOO		Yes	** NA **	None
75	M118			Yes	Default	None
76	M119			Yes	Default	None
77	M120			Yes	** NA **	None
78	M121			Yes	** NA **	None
79	M122			Yes	** NA **	None
80	M123			Yes	** NA **	None
81	M124			Yes	** NA **	None
82	M125			Yes	** NA **	None
83	M126			Yes	** NA **	None
84	M129			Yes	** NA **	None
85	M130			Yes	** NA **	None
86	M131			Yes	** NA **	None
87	M132			Yes	** NA **	None
88	M148			Yes	Default	None
89	M147			Yes	Default	None
90	M149			Yes	Default	None
91	M150			Yes	** NA **	None
92	M151			Yes	Default	None
93	M152			Yes	Default	None
94	M153			Yes	Default	None
95	M154			Yes	** NA **	None
96	M155			Yes	** NA **	None
97	M156			Yes	** NA **	None
98	M157			Yes	** NA **	None
99	M158			Yes	** NA **	None
100	M159			Yes	** NA **	None
101	M160			Yes	** NA **	None
102	M161			Yes	Default	None
103	M162			Yes	Default	None
104	M163			Yes	Default	None
105	M164			Yes	** NA **	None
106	M165			Yes	Default	None
107	M166			Yes	** NA **	None
108	M167			Yes	Default	None
109	M168			Yes	Default	None
110	M169			Yes	** NA **	None

**Member Advanced Data (Continued)**

	Label	I Release	J Release	Physical	Deflection Ratio Options	Seismic DR
111	M170			Yes	** NA **	None
112	M171			Yes	** NA **	None
113	M172			Yes	** NA **	None
114	M175			Yes	Default	None
115	M176			Yes	Default	None
116	M177			Yes	Default	None
117	M178			Yes	** NA **	None
118	M179			Yes	Default	None
119	M180			Yes	** NA **	None
120	M181			Yes	Default	None
121	M182			Yes	Default	None
122	M183			Yes	** NA **	None
123	M184			Yes	** NA **	None
124	M185			Yes	** NA **	None
125	M186			Yes	** NA **	None
126	M188			Yes	** NA **	None
127	M163A			Yes	Default	None
128	M164A			Yes	Default	None
129	M165A			Yes	Default	None
130	M166A			Yes	** NA **	None
131	M167A			Yes	** NA **	None
132	M168A			Yes	** NA **	None
133	M169A			Yes	** NA **	None
134	M170A			Yes	** NA **	None
135	M171A			Yes	** NA **	None
136	M172A		OOOXOO	Yes	Default	None
137	M173		OOOXOO	Yes	Default	None
138	M174			Yes	** NA **	None
139	M175A			Yes	** NA **	None
140	M176A			Yes	** NA **	None
141	M177A			Yes	** NA **	None
142	M178A			Yes	** NA **	None
143	M179A			Yes	** NA **	None
144	M180A		OOOXOO	Yes	Default	None
145	M181A		OOOXOO	Yes	Default	None
146	M182A			Yes	** NA **	None
147	M183A			Yes	** NA **	None
148	M184A			Yes	** NA **	None
149	M185A			Yes	** NA **	None
150	M186A			Yes	** NA **	None
151	M187			Yes	** NA **	None
152	M188A		OOOXOO	Yes	Default	None
153	M189		OOOXOO	Yes	Default	None
154	M190			Yes	** NA **	None
155	M191			Yes	** NA **	None
156	M192			Yes	** NA **	None
157	M193			Yes	** NA **	None
158	M194			Yes	** NA **	None
159	M195			Yes	** NA **	None
160	M196		OOOXOO	Yes	Default	None
161	M197		OOOXOO	Yes	Default	None
162	M198			Yes	** NA **	None
163	M199			Yes	** NA **	None
164	M200			Yes	** NA **	None
165	M201			Yes	** NA **	None

**Member Advanced Data (Continued)**

	Label	I Release	J Release	Physical	Deflection Ratio Options	Seismic DR
166	M202			Yes	** NA **	None
167	M203			Yes	** NA **	None
168	M204		OOOXOO	Yes	Default	None
169	M205		OOOXOO	Yes	Default	None
170	M206			Yes	** NA **	None
171	M207			Yes	** NA **	None
172	M208			Yes	** NA **	None
173	M209			Yes	** NA **	None
174	M210			Yes	** NA **	None
175	M211			Yes	** NA **	None
176	M212		OOOXOO	Yes	Default	None
177	M213		OOOXOO	Yes	Default	None
178	M214			Yes	Default	None
179	M215			Yes	** NA **	None
180	M216			Yes	** NA **	None
181	M217			Yes	** NA **	None
182	M218			Yes	** NA **	None
183	M219			Yes	** NA **	None
184	M220			Yes	** NA **	None
185	M221		OOOXOO	Yes	Default	None
186	M222		OOOXOO	Yes	Default	None
187	M223			Yes	** NA **	None
188	M224			Yes	** NA **	None
189	M225			Yes	** NA **	None
190	M228			Yes	** NA **	None
191	M229		OOOXOO	Yes	Default	None
192	M230		OOOXOO	Yes	Default	None
193	M231			Yes	Default	None
194	M232			Yes	** NA **	None
195	M233			Yes	** NA **	None
196	M234			Yes	** NA **	None
197	M235			Yes	** NA **	None
198	M236			Yes	** NA **	None
199	M237			Yes	** NA **	None
200	M238		OOOXOO	Yes	Default	None
201	M239		OOOXOO	Yes	Default	None
202	M240			Yes	** NA **	None
203	M241			Yes	** NA **	None
204	M242			Yes	** NA **	None
205	M243			Yes	** NA **	None
206	M244			Yes	** NA **	None
207	M245			Yes	** NA **	None
208	M246		OOOXOO	Yes	Default	None
209	M247		OOOXOO	Yes	Default	None
210	M248			Yes	Default	None
211	M249			Yes	** NA **	None
212	M250			Yes	** NA **	None
213	M251			Yes	** NA **	None
214	M252			Yes	** NA **	None
215	M253			Yes	** NA **	None
216	M254			Yes	** NA **	None
217	M255		OOOXOO	Yes	Default	None
218	M256		OOOXOO	Yes	Default	None
219	M257			Yes	** NA **	None
220	M258			Yes	** NA **	None

**Member Advanced Data (Continued)**

	Label	I Release	J Release	Physical	Deflection Ratio Options	Seismic DR
221	M259			Yes	** NA **	None
222	M260			Yes	** NA **	None
223	M261			Yes	** NA **	None
224	M262			Yes	** NA **	None
225	M263		OOOXOO	Yes	Default	None
226	M264		OOOXOO	Yes	Default	None
227	HR1			Yes	Default	None
228	HR10			Yes	Default	None
229	HR13			Yes	** NA **	None
230	HR17			Yes	** NA **	None
231	HR19			Yes	Default	None
232	M275	OOOXOO		Yes	** NA **	None
233	M276	OOOXOO		Yes	** NA **	None
234	M277	OOOXOO		Yes	** NA **	None
235	M278	OOOXOO		Yes	** NA **	None
236	M279	OOOXOO		Yes	** NA **	None
237	M280	OOOXOO		Yes	** NA **	None
238	M266			Yes	** NA **	None
239	M267			Yes	Default	None
240	M265			Yes	** NA **	None
241	M268			Yes	** NA **	None
242	M269			Yes	** NA **	None
243	M270			Yes	** NA **	None
244	M273			Yes	Default	None
245	M274			Yes	Default	None
246	M284			Yes	Default	None
247	M271			Yes	** NA **	None
248	M272			Yes	** NA **	None
249	M281			Yes	** NA **	None
250	M282			Yes	** NA **	None
251	M283			Yes	** NA **	None
252	M285			Yes	** NA **	None
253	M286			Yes	** NA **	None
254	M287			Yes	** NA **	None
255	M288			Yes	Default	None
256	M289			Yes	** NA **	None
257	M290			Yes	** NA **	None
258	M291			Yes	** NA **	None
259	M292			Yes	** NA **	None
260	M293			Yes	** NA **	None
261	M294			Yes	** NA **	None
262	M295			Yes	** NA **	None
263	M296			Yes	Default	None
264	M297			Yes	** NA **	None
265	M298			Yes	** NA **	None
266	M299			Yes	** NA **	None
267	M300			Yes	** NA **	None
268	M301			Yes	** NA **	None
269	M302			Yes	** NA **	None
270	M303			Yes	** NA **	None
271	M304	OOOXOO		Yes	** NA **	None
272	M305	OOOXOO		Yes	** NA **	None
273	M306	OOOXOO		Yes	** NA **	None

**Node Boundary Conditions**

Node Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot [k-ft/rad]	Y Rot [k-ft/rad]	Z Rot [k-ft/rad]
1 N35	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2 N54	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3 N75	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
4 N259	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
5 N300	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
6 N324	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

**Envelope Node Reactions**

Node Label	X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC	
1 N35	max	-163.07	3	1965.249	15	3394.602	19	1453.475	6	7916.83	3	1960.88	7
2	min	-6407.111	27	-1982.515	7	694.497	11	-1190.088	14	-2708.452	11	-2008.251	15
3 N54	max	3291.84	19	-7.173	14	3420.391	30	2210.294	6	1631.493	5	1953.874	18
4	min	-238.514	11	-5540.092	22	709.467	6	-6993.604	14	-4018.84	13	-2014.747	10
5 N75	max	3314.504	3	5512.467	32	3476.362	24	6907.831	8	1575.849	18	1961.69	12
6	min	-614.925	11	244.293	8	754.586	16	-2288.74	16	-4544.08	10	-2007.02	4
7 N259	max	660.69	3	465.35	15	732.034	27	63.117	7	-190.91	1	575.123	14
8	min	-660.687	11	-465.349	7	223.727	51	-192.268	15	-923.256	27	-574.476	6
9 N300	max	456.684	4	527.337	15	605.916	30	754.517	23	361.566	19	540.352	8
10	min	-456.684	12	-527.337	7	191.352	54	246.385	64	89.001	58	-540.918	16
11 N324	max	570.364	3	634.319	15	721.858	31	-96.119	6	630.941	19	605.423	5
12	min	-570.361	11	-634.319	7	213.792	55	-727.691	30	54.959	11	-605.222	13
13 Totals:	max	7807.003	3	7772.659	15	11683.58	30						
14	min	-7806.989	11	-7772.704	7	4289.993	54						

**Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks**

Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [lb-ft]	phi*Mn z-z [lb-ft]	Cb	Eqn
1 M40	CH5X2X1/4	0.428	146.842	12	1.007	81.316	z	13	39110.547	68850	2198.105	9829.688	2.459	H1-1b
2 M42	CH5X2X1/4	0.429	146.842	17	0.979	81.316	z	3	39110.547	68850	2198.105	9829.688	2.484	H1-1b
3 M59	CH5X2X1/4	0.425	146.842	7	0.973	81.316	z	8	39110.547	68850	2198.105	9829.688	2.406	H1-1b
4 HR1	L3X3X4	0.429	143.684	12	0.45	146.842	y	17	5813.058	46656	1688.138	2306.411	1	H2-1
5 HR19	L3X3X4	0.431	143.684	18	0.439	5.526	z	5	5813.058	46656	1688.138	2306.411	1	H2-1
6 HR10	L3X3X4	0.429	143.684	7	0.438	146.842	y	11	5813.058	46656	1688.138	2306.411	1	H2-1
7 M181	PL6X1/2"	0.38	4	18	0.349	4	y	33	82685.728	97200	1012.5	12150	1.274	H1-1b
8 M147	PL6X1/2"	0.403	4	12	0.34	4	y	27	82685.728	97200	1012.5	12150	1.293	H1-1b
9 M167	PL6X1/2"	0.376	4	15	0.335	4	y	21	82685.728	97200	1012.5	12150	1.228	H1-1b
10 M182	PL6X1/2"	0.193	0	7	0.315	0	y	14	88748.021	97200	1012.5	12150	1.359	H1-1b
11 M231	PIPE 2.0	0.563	61.642	7	0.275	61.642		9	14916.096	32130	1871.625	1871.625	1	H1-1b
12 M214	PIPE 2.0	0.558	61.642	12	0.274	61.642		15	14916.096	32130	1871.625	1871.625	1	H1-1b
13 M248	PIPE 2.0	0.563	61.642	17	0.274	61.642		4	14916.096	32130	1871.625	1871.625	1	H1-1b
14 M163A	PIPE 2.0	0.543	61.642	15	0.249	20.211		9	14916.096	32130	1871.625	1871.625	1	H1-1b
15 M165A	PIPE 2.0	0.54	61.642	10	0.244	25.768		3	14916.096	32130	1871.625	1871.625	1	H1-1b
16 M164A	PIPE 2.0	0.539	61.642	5	0.244	25.768		14	14916.096	32130	1871.625	1871.625	1	H1-1b
17 A3	HSS4X4X4	0.633	0	14	0.214	0	y	16	97043.622	109188	12663	12663	2.371	H1-1b
18 A2	HSS4X4X4	0.64	0	8	0.213	0	y	11	97043.622	109188	12663	12663	2.372	H1-1b
19 A1	HSS4X4X4	0.629	0	3	0.211	0	y	6	97043.622	109188	12663	12663	2.375	H1-1b
20 M50	PL9X0.5	0.303	11.786	74	0.21	11.786	y	19	58680.451	145800	1518.75	27337.5	1.963	H1-1b
21 M35	PL9X0.5	0.261	7.192	33	0.205	11.786	y	30	58680.451	145800	1518.75	27337.5	1.993	H1-1b
22 M31	PL9X0.5	0.304	7.192	124	0.197	11.786	y	24	58680.451	145800	1518.75	27337.5	1.964	H1-1b
23 M168	PL6X1/2"	0.156	0	3	0.182	0	y	19	88748.021	97200	1012.5	12150	1.316	H1-1b
24 M52	PL3X0.375	0.248	6	23	0.181	6	y	24	31007.302	36450	284.766	2278.125	1.96	H1-1b
25 M33	PL3X0.375	0.228	6	28	0.178	6	y	30	31007.302	36450	284.766	2278.125	1.995	H1-1b
26 M32	PL3X0.375	0.261	0	31	0.176	0	y	30	31006.994	36450	284.766	2278.125	1.665	H1-1b



**Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks (Continued)**

Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [lb-ft]	phi*Mn z-z [lb-ft]	Cb	Eqn
27	M71	PL3X0.375	0.242	6	33	0.175	6	y	1931007.302	36450	284.766	2278.125	1.861	H1-1b
28	M51	PL3X0.375	0.242	0	26	0.175	0	y	2431006.994	36450	284.766	2278.125	1.689	H1-1b
29	M73	PL3X0.375	0.24	0	20	0.171	0	y	1931006.994	36450	284.766	2278.125	1.674	H1-1b
30	M153	PL6X1/2"	0.173	0	17	0.168	0	y	2688748.021	97200	1012.5	12150	1.3	H1-1b
31	M176	PL6X1/2"	0.275	0	10	0.131	0	y	3488748.021	97200	1012.5	12150	1.342	H1-1b
32	M162	PL6X1/2"	0.275	0	15	0.131	0	y	2388748.021	97200	1012.5	12150	1.342	H1-1b
33	M48	L4X4X4	0.774	34.164	25	0.123	34.164	z	2441036.753	62532	3137.597	6067.469	1.291	H2-1
34	M29	L4X4X4	0.764	34.164	30	0.123	34.164	z	3041036.753	62532	3137.597	6063.452	1.287	H2-1
35	M76	L4X4X4	0.752	34.164	19	0.12	34.164	z	1941036.753	62532	3137.597	6066.521	1.29	H2-1
36	M149	PL6X1/2"	0.29	0	4	0.116	0	y	2888748.021	97200	1012.5	12150	1.405	H1-1b
37	M57	PIPE 2.0	0.465	59.937	7	0.111	59.937	13	19360.206	32130	1871.625	1871.625	1	H1-1b
38	M86	PIPE 2.0	0.461	59.937	12	0.11	59.937	18	19360.206	32130	1871.625	1871.625	1	H1-1b
39	M70	PIPE 2.0	0.467	59.937	17	0.11	59.937	7	19360.206	32130	1871.625	1871.625	1	H1-1b
40	M267	PIPE 2.0	0.843	53.811	4	0.108	53.811	14	20866.733	32130	1871.625	1871.625	1	H1-1b
41	M296	PIPE 2.0	0.843	53.811	10	0.108	53.811	3	20866.733	32130	1871.625	1871.625	1	H1-1b
42	M288	PIPE 2.0	0.843	53.811	15	0.108	53.811	8	20866.733	32130	1871.625	1871.625	1	H1-1b
43	M66	PIPE 2.0	0.584	68.716	15	0.104	68.716	13	14916.096	32130	1871.625	1871.625	1	H1-1b
44	M118	PIPE 2.0	0.58	68.716	4	0.1	68.716	18	14916.096	32130	1871.625	1871.625	1	H1-1b
45	M96	PIPE 2.0	0.58	68.716	10	0.1	68.716	7	14916.096	32130	1871.625	1871.625	1	H1-1b
46	M273	5X.375PLATE	0.247	16.782	17	0.097	16.782	y	1735595.273	60750	474.609	6328.125	1.591	H1-1b
47	M284	5X.375PLATE	0.244	16.782	7	0.092	16.782	y	735595.273	60750	474.609	6328.125	2.003	H1-1b
48	M274	5X.375PLATE	0.243	16.782	12	0.092	16.782	y	1235595.273	60750	474.609	6328.125	2.014	H1-1b
49	M119	PIPE 2.0	0.207	49.011	8	0.079	19.2	16	14916.096	32130	1871.625	1871.625	1	H1-1b
50	M107	PIPE 2.0	0.207	49.011	14	0.079	19.2	6	14916.096	32130	1871.625	1871.625	1	H1-1b
51	M61	PIPE 2.0	0.207	49.011	3	0.079	19.2	11	14916.096	32130	1871.625	1871.625	1	H1-1b
52	M69	PIPE 2.0	0.168	56.084	3	0.072	55.579	17	14916.096	32130	1871.625	1871.625	1	H1-1b
53	M97	PIPE 2.0	0.168	56.084	8	0.071	55.579	7	14916.096	32130	1871.625	1871.625	1	H1-1b
54	M85	PIPE 2.0	0.168	56.084	14	0.071	55.579	12	14916.096	32130	1871.625	1871.625	1	H1-1b
55	M179	HSS4X4X3	0.11	0	14	0.063	0	z	483475.071	83592	9909	9909	1.196	H1-1b
56	M177	PIPE 2.0	0.224	36	13	0.052	36	12	20866.733	32130	1871.625	1871.625	1	H1-1b
57	M151	PIPE 2.0	0.26	36	11	0.048	36	5	20866.733	32130	1871.625	1871.625	1	H1-1b
58	M148	HSS4X4X3	0.107	0	13	0.043	0	z	1583475.071	83592	9909	9909	1.212	H1-1b
59	M175	PIPE 2.0	0.232	36	8	0.042	36	11	20866.733	32130	1871.625	1871.625	1	H1-1b
60	M161	PIPE 2.0	0.231	36	14	0.042	36	16	20866.733	32130	1871.625	1871.625	1	H1-1b
61	M165	HSS4X4X3	0.097	0	24	0.034	0	y	2683475.071	83592	9909	9909	1.238	H1-1b
62	M152	PIPE 2.0	0.159	36	11	0.032	36	7	20866.733	32130	1871.625	1871.625	1	H1-1b
63	M163	PIPE 2.0	0.129	36	6	0.028	36	18	20866.733	32130	1871.625	1871.625	1	H1-1b
64	M222	0.625"SR	0.344	0	20	0.02	0	24	10831.952	13805.82	143.808	143.808	1	H1-1b
65	M256	0.625"SR	0.343	0	26	0.02	0	29	10831.952	13805.82	143.808	143.808	1	H1-1b
66	M239	0.625"SR	0.342	0	31	0.02	0	19	10831.952	13805.82	143.808	143.808	1	H1-1b
67	M238	0.625"SR	0.335	0	22	0.02	0	20	10831.952	13805.82	143.808	143.808	1	H1-1b
68	M255	0.625"SR	0.335	0	32	0.02	0	31	10831.952	13805.82	143.808	143.808	1	H1-1b
69	M221	0.625"SR	0.334	0	27	0.02	0	26	10831.952	13805.82	143.808	143.808	1	H1-1b
70	M229	0.625"SR	0.327	9	3	0.019	0	3	10831.952	13805.82	143.808	143.808	1	H1-1b
71	M263	0.625"SR	0.326	9	8	0.019	0	8	10831.952	13805.82	143.808	143.808	1	H1-1b
72	M246	0.625"SR	0.326	9	14	0.019	0	14	10831.952	13805.82	143.808	143.808	1	H1-1b
73	M247	0.625"SR	0.347	9	9	0.019	0	8	10831.952	13805.82	143.808	143.808	1	H1-1b
74	M264	0.625"SR	0.34	9	3	0.019	0	3	10831.952	13805.82	143.808	143.808	1	H1-1b
75	M230	0.625"SR	0.34	9	14	0.019	0	14	10831.952	13805.82	143.808	143.808	1	H1-1b
76	M173	0.625"SR	0.298	0	32	0.018	0	34	10831.952	13805.82	143.808	143.808	1	H1-1b
77	M189	0.625"SR	0.297	0	27	0.017	0	28	10831.952	13805.82	143.808	143.808	1	H1-1b
78	M205	0.625"SR	0.297	0	21	0.017	0	23	10831.952	13805.82	143.808	143.808	1	H1-1b
79	M188A	0.625"SR	0.294	0	19	0.017	0	33	10831.952	13805.82	143.808	143.808	1	H1-1b
80	M204	0.625"SR	0.294	0	29	0.017	0	28	10831.952	13805.82	143.808	143.808	1	H1-1b
81	M172A	0.625"SR	0.293	0	24	0.017	0	23	10831.952	13805.82	143.808	143.808	1	H1-1b

**Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks (Continued)**

Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [lb-ft]	phi*Mn z-z [lb-ft]	Cb	Eqn
82	M180A	0.625"SR	0.276	9	13	0.015	0	14	10831.952	13805.82	143.808	143.808	1	H1-1b
83	M196	0.625"SR	0.265	9	8	0.015	0	8	10831.952	13805.82	143.808	143.808	1	H1-1b
84	M212	0.625"SR	0.265	9	3	0.015	0	3	10831.952	13805.82	143.808	143.808	1	H1-1b
85	M213	0.625"SR	0.249	0	11	0.015	0	14	10831.952	13805.82	143.808	143.808	1	H1-1b
86	M197	0.625"SR	0.248	0	16	0.015	0	3	10831.952	13805.82	143.808	143.808	1	H1-1b
87	M181A	0.625"SR	0.248	0	6	0.015	0	8	10831.952	13805.82	143.808	143.808	1	H1-1b

# TOWER-MOUNT CONNECTION ANALYSIS

v.1.0.0

SITE INFORMATION	
Site ID	370629'
Site Name	Northhaven I
Project ID	41124-13682689_CB_06-02-MA

ANALYSIS PARAMETERS	
TIA Revision	H

APPLIED FORCES FROM R3D		
Member Label		A1
Member End Label		I
Force-X	Fx, lbs	163.1
Force-Y	Fy, lbs	3398.4
Force-Z	Fz, lbs	-1983.2
Moment X-X	Mx, lbs-ft	-1453.5
Moment Y-Y	My, lbs-ft	-2008.3
Moment Z-Z	Mz, lbs-ft	7916.8

STANDOFF MEMBER PROPERTIES	
Standoff Member Type	Square/Rect. HSS
Standoff Member Shape	HSS4X4X1/4
Standoff Member Grade	A36
Member to Plate Weld Size, in	3/16

BOLT & PLATE PROPERTIES	
Bolt Quantity	4
Bolt Edge Distance (e), in	1.00
Nominal Bolt Diameter ( $\varnothing$ Db), in	0.625
Bolt Grade	A325
Plate Height (H), in	8.00
Plate Width (W), in	8.00
Plate Thickness (T), in	0.75
Plate Grade	A36

BOLT ANALYSIS	
Shear Demand (Vu), k	1.24
Shear Capacity ( $\Phi$ Rnv), k	13.81
Tension Demand (Tu), k	11.51
Tension Capacity ( $\Phi$ Rnt), k	20.34
Shear Utilization	9.0%
Tension Utilization	56.6%
Interaction Utilization	32.8%

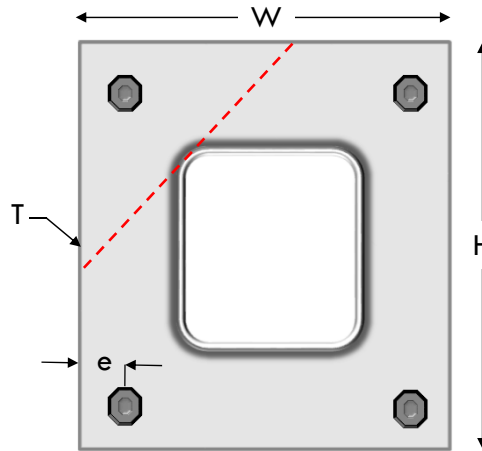
PLATE ANALYSIS	
Moment Demand (Mu), k-in	16.28
Flexural Capacity ( $\Phi$ Mn), k-in	25.77
Plate Utilization	63.2%

PASS

PASS



319 Chapanoke Road, Suite 118  
 Raleigh, NC 27603  
 Office: (405) 348-5460  
 Fax: (405) 341-6334



MATERIAL PROPERTIES	
Standoff Member - Yield Strength (Fy), ksi	36
Standoff Member - Ultimate Strength (Fu), ksi	58
Bolt - Yield Strength (Fy), ksi	92
Bolt - Tensile Strength (Fu), ksi	120
Plate - Yield Strength (Fy), ksi	36
Plate - Ultimate Strength (Fu), ksi	58