



COUNTY FACILITIES PLANNING WORK INITIATION REQUEST FORM

Please complete a form for each new proposal review request.

Work Proposal Name:

New Cingular @ County Grounds East Water Tower

Date of Request:

11/1/19

Requesting Department:

DAS-Economic Development

Department Contact Name:

Adam Stehly

High Org:

115

Low Org:

1191

Approval Signature of Department Head:

AaronHertzberg

Digitally signed by AaronHertzberg
Date: 2019.11.01 15:51:03 -05'00'

DESCRIPTION

Please provide a detailed description of the request:

New Cingular (aka AT&T) has requested a lease amendment to modify the description of its equipment attached to the water tower. SBA, the County's consultant, has reviewed and recommended approval. The amendment does not affect rent or term.

How will this proposal improve your operations, enhance customer service or otherwise benefit your department and the County?

Updates the lease to show changes to equipment installed on the tower.

Desired Timeline:

Begin Date:

11/7/19

End Date:

12/6/19

Duration:

1 month

Anticipated Funding Source (select all that apply):

Requestor's Operating Budget

Capital Budget

Other (i.e. grants, donations, etc.; please describe):

Request Involves:

Parks Property

BHD Property



COUNTY FACILITIES PLANNING WORK INITIATION REQUEST DETERMINATION

CFPSC ACTION FOR CFPSC USE ONLY

CFPSC Project Tracking #:

2019-031

TYPE OF REQUEST (Refer to paragraph 4.3 of the CFPSC charter for more details)

- | | | |
|---|--|--|
| <input checked="" type="checkbox"/> 1. Property Management | <input type="checkbox"/> 2. Move Management | <input type="checkbox"/> 3. Property Improvements |
| <input type="checkbox"/> 4. New Footprint | <input type="checkbox"/> 5. Contractual Obligations | <input type="checkbox"/> 6. Centralized Facilities Management Process Improvement |

CFPSC Review Comments:

FOR EASEMENTS ONLY

Reviewed & Recommended for Approval:

DAS — FM, AE&ES (Legal Description)

Director, DAS

Corporation Counsel

Note:

- 1. Easements affecting lands zoned "Parks" require County Board approval.*
- 2. Forward a copy of the recorded easement to AE&ES.*

CFPSC RECOMMENDATION

The County Facilities Planning Steering Committee reviewed this proposal on . As evidenced by the authorized signature below, the County Facilities Planning Steering Committee recommends approval of this proposal.

Chair or Vice-Chair:

Date:

County Facilities Planning Steering Committee

Amendment VIII

This Amendment VIII (this "Amendment VIII"), dated this ____ day of _____, 20____ ("Effective Date"), is made to the Water Tower/Land Lease and Option Agreement, dated November 11, 1998 as amended by Estoppel and Consent Certificate and Lease Amendment dated June 26, 2000, Amendment II dated June 6, 2008, Amendment III dated April 1, 2009, Amendment IV dated July 17, 2012, Amendment V dated May 26, 2015, Amendment VI dated September 13, 2016 and Amendment VII dated July 20, 2017, (collectively, the "Agreement") by and between **NEW CINGULAR WIRELESS PCS, LLC** a Delaware limited liability company ("Lessee") and **MILWAUKEE COUNTY** a Wisconsin municipal corporation ("Lessor"), with respect to the site known as County Grounds-East Watertower/Milwaukee County located at 9250 Watertown Plank Road, City of Wauwatosa, County of Milwaukee, Wisconsin 53226 ("Premises").

Licensor's managing agent with respect to the Agreement is SBA Site Management, LLC ("SBAM"), a Florida limited liability company, having an address at 900 South Highway Drive, Suite 201, Fenton, Missouri 63026.

Lessee and Lessor desire to amend the Agreement for the purpose of adding and/or modifying equipment at the Premises as further described herein ("Equipment Modification") and for other purposes as may be set forth in this Amendment VIII.

In consideration of the foregoing and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Lessee and Lessor agree as follows:

1. Capitalized Terms. Capitalized terms used in this Amendment VIII will have the meanings set forth in the Agreement unless otherwise indicated.
2. Equipment. Notwithstanding anything to the contrary in the Agreement, from and after the Effective Date of this Amendment VIII, Exhibit C-5 to the Agreement is deleted in its entirety and superseded and replaced with Exhibit C-6 attached hereto.
3. Counterparts. This Amendment VIII may be executed in counterparts, each of which shall be deemed an original, but all of which taken together shall constitute but one and the same instrument.
4. Structural Analysis. Prior to installing any Equipment, Lessee shall complete a structural analysis study (the "Study") of the Tower, at Lessee's sole cost and expense, to determine the feasibility of installing Lessee's proposed Equipment Modification on the Tower, and will furnish to Lessor a copy of the completed Study. In the event the Study indicates that the Tower cannot structurally support Lessee's Equipment at the agreed upon height, Lessee may elect to terminate this Amendment VIII upon ten days prior written notice to Lessor. In the event Lessee elects to terminate this Amendment VIII pursuant to this Paragraph 4, neither party hereto shall have any further rights or obligations hereunder except those that by their terms survive the termination of this Amendment VIII.
5. Notices. Notwithstanding anything to the contrary in the Agreement, from and after the Effective Date of this Amendment VIII, Lessee's addresses in the Agreement are hereby superseded and replaced with the following:

New Cingular Wireless PCS, LLC
RE: Cell Site #: WI1023
Cell Site Name: Regional Medical Center (WI)
Fixed Asset #: 10080333
1025 Lenox Park Boulevard NE
Third Floor
Atlanta, Georgia 30319-5309
Attn: Network Real Estate Administration

with a copy to: New Cingular Wireless PCS, LLC
RE: Cell Site #: WI1023
Cell Site Name: Regional Medical Center (WI)
Fixed Asset #: 10080333
208 S. Akard Street
Dallas, Texas 75202-4206
Attn: AT&T Legal Department - Network Counsel

6. Confirmation. Except as expressly amended by this Amendment VIII, the Agreement shall remain in full force and effect without modification or amendment. This Amendment VIII will form a part of the Agreement for all purposes and the Agreement and this Amendment VIII will hereafter be read together. In case of any inconsistencies between the terms and conditions of the Agreement and the terms and conditions of this Amendment VIII, the terms and conditions of this Amendment VIII will control.

[The next page is the signature page to this Amendment VIII]

IN WITNESS WHEREOF, the parties have executed this Amendment VIII as of the Effective Date.

**NEW CINGULAR WIRELESS PCS, LLC
BY: AT&T MOBILITY CORPORATION
ITS: MANAGER**

By: _____
Name:
Title:
Date:

MILWAUKEE COUNTY

By: _____
Name:
Title:
Date:

[Signature page to this Amendment VIII]

Approved with regards to County Ordinance Chapter 42:

By: _____ Date: _____
Community Business Development Partners
Rick Norris

Reviewed by:

By: _____ Date: _____
Risk Management
Paul Schwegel

Approved for execution:

By: _____ Date: _____
Corporation Counsel
Paul D. Kuglitsch

Approved:

As to adequacy of funds (with submitted Form 1684 R4)

By: _____ Date: _____
Comptroller
Scott Manske

Approved:

By: _____ Date: _____
County Executive
Chris Abele

Approved as to Wis. Stats. 59.42:

By: _____ Date: _____
Corporation Counsel
Paul D. Kuglitsch

[Approval page to this Amendment VIII]

Exhibit C-6

Equipment

Note: Any Equipment of Lessee not listed on Exhibit C-6 may not be installed by Lessee, unless the Agreement provides otherwise.

Antennas: Total Nine (9)

Quantity: 3
Type: Panel
Manufacturer: Commscope
Model: NNHH-65C-R4
Dimensions: 96"x19.6"x7.8"
Weight: 99.2 lbs.
Mounting Height: 184'

Quantity: 3
Type: Panel
Manufacturer: Commscope
Model: SBNHH-1D65C
Dimensions: 96"x11.9"x7.1"
Weight: 49.6 lbs.
Mounting Height: 184'

Quantity: 3
Type: Panel
Manufacturer: Commscope
Model: NNH4-65C-R6
Dimensions: 96"x19.6"x7.8"
Weight: 102 lbs.
Mounting Height: 184'

Cables: Total Twenty-Five (25)

Number of Lines: 12
Type: Coax
Size: 1 5/8"

Number of Lines: 4
Type: Fiber
Size: 3/8"

Number of Lines: 8
Type: DC Power
Size: 7/8"

Number of Lines: 1
Type: RET
Size: 3/8"

Mount Equipment: Total Twelve (12)

Quantity: 12
Type: Pipe Mounts
Pipe Mount Dimensions: 2.88" Diameter
Corral Dimensions: 24' Diameter
Weight: 600 lbs.
Mounting Height: 184'
Location: On Corral of Water Tank

Surge Suppressors: Total Nine (9)

Quantity: 1
Manufacturer: Raycap
Model: DC6-48-60-0-8C
Dimensions: 31.4"x10.24"x10.24"
Weight: 26.2 lbs.
Mounting Height: 184'

Quantity: 6
Manufacturer: Raycap
Model: DC2-48-60-0-9E
Dimensions: 10.25"x10.38"x6.2"
Weight: 16 lbs.
Mounting Height: 184'

Quantity: 2
Manufacturer: Raycap
Model: DC6-48-60-18-8C
Dimensions: 31.25"x18.5"x11"
Weight: 32.8 lbs.
Mounting Height: 184'

RRUs: Total Fifteen (15)

Quantity: 3
Manufacturer: Ericsson
Model: RRUS 4449 B5/B12
Dimensions: 14.96"x13.19"x10.43"
Weight: 73 lbs.
Mounting Height: 184'

Quantity: 3
Manufacturer: Ericsson
Model: RRUS-32
Dimensions: 29.9"x13.3"x9.5"
Weight: 77 lbs.
Mounting Height: 184'

Quantity: 3
Manufacturer: Ericsson
Model: RRUS-32 B2
Dimensions: 27.2"x12.1"x7"
Weight: 53 lbs.
Mounting Height: 184'

Quantity: 3
Manufacturer: Ericsson
Model: RRUS 4478 B14
Dimensions: 18.1"x13.4"x8.26"
Weight: 59.4 lbs.
Mounting Height: 184'

Site ID: WI323568-M-04
Site Name: County Grounds-East Watertower/Milwaukee County

Lessee Site ID/FA #: WI1023/10080333
Lessee Site Name: Regional Medical Center

RRUs (continued):

Quantity: 3
Manufacturer: Ericsson
Model: RRUS-32-B66
Dimensions: 27.2"x12.1"x7"
Weight: 53 lbs.
Mounting Height: 184'

Ground Space Requirements:

Square Feet: 399
Lessee Provided Shelter:
Dimensions:
Shelter Type:

Frequencies:

Transmit: 734.5-739.5, 758-768,
869-849, 1975-1980, 2305-2320,
2345-2360 MHz
Receive: 704.5-705.5, 788-798,
824-849, 1895-1900, 1710-1755,
2110-2155 MHz

The identification of the frequencies listed above is for the limited purpose of coordinating frequencies to prevent interference, and identification of the frequencies does not establish any limit on Licensee's rights.

178.5' Water Tank

8948 Watertown Plank Road
Wauwatosa, WI 53229

SBA Site Name: COUNTY GROUNDS-EAST WATERTOWER/MILWAUKEE COUNTY
SBA Site Number: WI32568-M

AT&T Site Name: Regional Medical Center
AT&T Site Number: WI1023
Application Number: 116448, v1

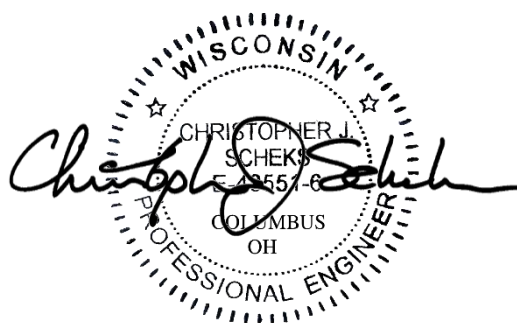
GPD Project Number: 2019778.32568.02

Analysis Results

Water Tank Top Mount	75.0%	Sufficient
Water Tank	91.9%	Sufficient
Foundation	Adequate	Sufficient

September 27, 2019

Respectfully submitted by:



Christopher J. Scheks, P.E.

9/27/2019

Christopher J. Scheks, P.E.
Wisconsin #: E-43551-6

TABLE OF CONTENTS

DESCRIPTION	PAGE NUMBER
EXECUTIVE SUMMARY	1
CONCLUSIONS & RECOMMENDATIONS	1
STRUCTURE DESCRIPTION	2
EQUIPMENT LOADING	3
ASSUMPTIONS	4
SECTION RESULTS	4
DISCLAIMER OF WARRANTIES	5

APPENDICES

1. CALCULATIONS

Executive Summary

The purpose of this analysis is to verify whether the existing water tank and handrail are structurally capable of carrying the proposed antenna and feedline loads as specified by AT&T to SBA. This report was commissioned by Mr. Benjamin Walsh of SBA.

The existing structures have been analyzed per the following requirements:

Governing Code/s	2015 IBC, AWWA D100-11, ASCE 7-10
Wind Speed	120 MPH Ultimate 3 Second Gust
Wind Speed*	93 MPH Nominal 3-Second Gust
Wind Speed w/ Ice	40 MPH 3-Second Gust
Radial Ice Thickness	3/4"
Risk Category	IV
Exposure Category	C
Topographic Category	1

*Wind speed in nominal form is equivalent to a 120 mph Ultimate 3-Second Gust.

Conclusions & Recommendations

Based upon our calculations we have determined that the mount, tower and foundation are structurally sufficient for the proposed loading considering the above analysis criteria and will not require modification.

Structure Description

The existing water tank is located in Wauwatosa, WI. The existing AT&T antennas are mounted to an antenna frame mounted to the top of the water tank. The mounting frame consists of pipe top and middle rails, a flat plate bottom rail, and pipe posts.

Documents Provided:

Document Type	Remarks	Source
Previous Analysis	Ramaker & Associates Project #: 20830, dated 2/3/12	SBA
Previous Analysis	Apex Engineers File #: GT08-148, dated 2/13/09	SBA
Previous Analysis	W-T Communications, dated 5/25/06	SBA
Previous Analysis	GPD Project #: 2014778.32568.01 dated 7/24/2014	SBA
Mounting Frame Design Drawings	Graef, Anhalt, Schloemer & Associates Job #: 19990337.03, dated 6/16/00	SBA
Mounting Frame Modification Design	Ramaker & Associates Project #: 20830, dated 10/17/12	SBA
Collocation Application	SBA Application #: 116448, v1 dated 6/27/2019	SBA

Structure Materials (Assumed):

Structural Components	Material Strength
Angles & Plates	ASTM A36 (36 KSI Yield Strength)
Pipes	ASTM A53-B (35 KSI Yield Strength)

Equipment Loading

The following data shows the major loading that the water tank supports. All Existing/Leased and Proposed loading information was provided by SBA or taken from the previous analyses.

Existing/Leased Loading Configuration

Carrier	Mounting Level (ft)	Center Line Elevation (ft)	# of Antennas	Antenna Manufact.	Antenna/Mount Model	# of Coax	Coax Size (in)	Note
AT&T	184	184	3	Andrew	DBXLH-8585A-R2M	12 4 1 8	1-5/8 3/8 3/8 7/8	
			9	Commscope	SBNHH-1D65C			
			3	Andrew	ETD819G-12UB			
			3	Andrew	E15Z01P13			
			12	Andrew	CBC819-DF			
			3	Ericsson	RRU-11 (19)			
			3	Ericsson	RRU WCS			
			3	Ericsson	RRUS-32 B2			
			3	Ericsson	RRUS-12			
			3	Ericsson	RRUS-32 B66			
			1	Raycap	DC6-48-60-18F-SSB			
			1	Raycap	DC6-48-60-0-1E			
			1	Raycap	DC6-48-60-18-8C			
			6	Raycap	DC2-48-60-0-9E			
Unknown	105	105	9		Panel Antennas			
Unknown	95	95	9		Panel Antennas			
US Cellular	75	75	9		Panel Antennas			

Final Proposed Loading Configuration

Carrier	Mounting Level (ft)	Center Line Elevation (ft)	# of Antennas	Antenna Manufact.	Antenna/Mount Model	# of Coax	Coax Size (in)	Note
AT&T	184	184	3	Commscope	NNHH-65C-R4	12 4 1 8	1-5/8 3/8 3/8 7/8	1
			3	Commscope	NNH4-65C-R6			
			3	Commscope	SBNHH-1D65C			
			3	Ericsson	RRUS 4449 B5/B12			
			3	Ericsson	RRUS-32			
			3	Ericsson	RRUS-32 B2			
			3	Ericsson	RRUS 4478 B14			
			3	Ericsson	RRUS-32 B66			
			1	Raycap	DC6-48-60-0-8C			
			2	Raycap	DC6-48-60-18-8C			
			6	Raycap	DC2-48-60-0-9E			

Notes:

- 1) This represents the final loading configuration for AT&T.

Assumptions

This structural analysis is based on the theoretical capacity of the members and is not a condition assessment of the structures. This analysis is from information supplied, and therefore, its results are based on and are as accurate as that supplied data. GPD has made no independent determination, nor is it required to, of its accuracy. The following assumptions were made for this structural analysis.

- 1) Structures were built in accordance with the manufacturer's specifications.
- 2) Structures have been maintained in accordance with the manufacturer's specification and governing standards.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in the Existing/Leased Loading and Final Proposed Loading Configuration Tables, and the specified documents.
- 4) All mounting hardware, if applicable, is considered adequate to support the loading. No actual analysis of the mount hardware is performed.
- 5) Mount sizes, weights, and manufacturers are best estimates based on photos provided and determined without the benefit of a site visit by GPD.
- 6) All member connections are assumed designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
- 7) Material grade is assumed based on previous experience with similar towers.

If any of these assumptions are not valid or have been made in error, this analysis may be affected, and GPD Group should be allowed to review any new information to determine its effect on the structural integrity of the structures.

Section Results

Capacity Summary of Structural Components

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
	Antenna Frame	184	24.4	Pass
	Pipe Mounts	184	75.0	Pass
	Water Tank	180	75.2	Pass
	Anchor Rods	0	91.9	Pass
	Foundation	0	Adequate	Pass

Disclaimer of Warranties

GPD has not performed a site visit to the tower to verify the member sizes or antenna/coax loading. If the existing conditions are not as represented on the tower elevation contained in this report, we should be contacted immediately to evaluate the significance of the discrepancy. This is not a condition assessment of the tower or foundation. This report does not replace a full tower inspection. The tower and foundations are assumed to have been properly fabricated, erected, maintained, in good condition, twist free, and plumb.

The engineering services rendered by GPD in connection with this Structural Analysis are limited to a computer analysis of the tower structure and theoretical capacity of its main structural members. No allowance was made for any damaged, bent, missing, loose, or rusted members (above and below ground). No allowance was made for loose bolts or cracked welds.

This analysis is limited to the designated maximum wind and seismic conditions per the governing tower standards and code. Wind forces resulting in tower vibrations near the structure's resonant frequencies were not considered in this analysis and are outside the scope of this analysis. Lateral loading from any dynamic response was not evaluated under a time-domain based fatigue analysis.

GPD does not analyze the fabrication of the structure (including welding). It is not possible to have all the very detailed information needed to perform a thorough analysis of every structural sub-component and connection of an existing tower. GPD provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc. The purpose of this report is to assess the capability of adding appurtenances usually accompanied by transmission lines to the structure.

It is the owner's responsibility to determine the amount of ice accumulation in excess of the code specified amount, if any, that should be considered in the structural analysis.

The attached sketches are a schematic representation of the analyzed tower. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions, proper fit, and clearance in the field. Any mentions of structural modifications are reasonable estimates and should not be used as a precise construction document. Precise modification drawings are obtainable from GPD, but are beyond the scope of this report.

Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

Towers are designed to carry gravity, wind, and ice loads. All members, legs, diagonals, struts, and redundant members provide structural stability to the tower with little redundancy. Absence or removal of a member can trigger catastrophic failure unless a substitute is provided before any removal. Legs carry axial loads and derive their strength from shorter unbraced lengths by the presence of redundant members and their connection to the diagonals with bolts or welds. If the bolts or welds are removed without providing any substitute to the frame, the leg is subjected to a higher unbraced length that immediately reduces its load carrying capacity. If a diagonal is also removed in addition to the connection, the unbraced length of the leg is greatly increased, jeopardizing its load carrying capacity. Failure of one leg can result in a tower collapse because there is no redundancy. Redundant members and diagonals are critical to the stability of the tower.

GPD makes no warranties, expressed and/or implied, in connection with this report and disclaims any liability arising from material, fabrication, and erection of this tower. GPD will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of GPD pursuant to this report will be limited to the total fee received for preparation for this report.

CALCULATIONS



TIA-222-G: Mount Analysis Wind Loading
WI32568-M, County Grounds East Watertower/Milwaukee County
2019778.32568.02

Structure Information		
Structure Type:	Monopole	
Structure Height:	180	ft
z (Mount Centerline) =	184	ft
Gh (Mount Gust Effect Factor) =	1.00	
Risk Category:	II	

Code Specifications		
IBC Edition:	2015	
TIA/EIA Code:	G	
Nominal Wind Speed (No Ice) =	89	mph (3-s gust)
Nominal Wind Speed (With Ice) =	40	mph (3-s gust)
Ice Thickness	0.75	in
Exposure Category	C	

Topographic Inputs	
Topographic Feature:	N/A

Section Sets										No Ice		Ice Output	
Mount Components	Member Type	Length (in)	Side (Longest seeing wind) (in)	Other Side (in)	Calculated Dc, for ice weight (in)	Dc, for ice weight (in)	Area Type (Round or Flat)	K _s	User's Wind Multiplier	Normal Wind Force (lb/ft)*		Normal Ice Wind Force (lb/ft)*	Ice Weight (lb/ft)*
Pipe Mount	Pipe	96.000	2.375	2.375		2.38	Round	1.00	1.00	6.58		2.78	9.04
Pipe Mount P2.5	Pipe	96.000	2.875	2.875		2.88	Round	1.00	1.00	7.97		2.93	10.13
Post	Pipe	42.000	2.875	2.875		2.88	Round	1.00	1.00	6.44		2.37	10.13
Top/Mid Rail	Pipe	54.000	2.875	2.875		2.88	Round	1.00	1.00	7.05		2.50	10.13
Bottom Rail	Square/Rect.	54.000	4	0.25		4.01	Flat	1.00	1.00	14.94		3.96	12.60
Kicker	Angle	45.000	3	3		4.24	Flat	1.00	1.00	11.55		3.28	13.11

*All forces are unfactored.

Appurtenances							Shielding			No Ice		Ice Output	
Appurtenance Model	Loading Elevation (ft)	Height (in)	Front Width (in)	Side Depth (in)	Wt (lbs)	Type for Area	Front Shielding (%)	Side Shielding (%)	K _s and/or block shielding	Normal Wind Force (lbs)*	Wt (lbs) (no ice)*	Normal Wind Force (lbs) (w/ ice)*	Wt (lbs) (only ice)*
(3) NNHH-65C-R4	184	96	19.6	7.8	99.2	Flat	0%	0%	1.00	473.26	99.20	105.86	373.55
(3) NNH4-65C-R6	184	96	11.9	7.1	49.6	Flat	0%	0%	1.00	315.70	49.60	73.24	269.10
(3) SBNHH-1D65C	184	96	19.6	7.8	102	Flat	0%	0%	1.00	473.26	102.00	105.86	373.55
(3) RRUS 4449 B5/B12	184	14.96	13.19	10.43	73	Flat	70%	0%	1.00	13.67	73.00	5.84	74.01
(3) RRUS-32	184	29.9	13.9	9.5	77	Flat	90%	0%	1.00	9.60	77.00	6.53	119.41
(3) RRUS 32 B2	184	27.2	7	12.1	53	Flat	85%	0%	1.00	6.94	53.00	5.06	90.27
(3) RRUS 4478 B14	184	18.1	13.4	8.26	59.4	Flat	60%	0%	1.00	22.41	59.40	7.93	75.86
(3) RRUS-32 B66	184	27.2	7	12.1	53	Flat	85%	0%	1.00	6.94	53.00	5.06	90.27
(1) DC6-48-60-8C	184	31.4	10.24	10.24	26.2	Round	30%	30%	1.00	30.87	26.20	10.52	109.15
(2) DC6-48-60-18-8C	184	31.25	18.5	11	32.8	Round	30%	30%	1.00	54.53	32.80	16.18	156.38
(6) DC2-48-60-0-9E	184	10.25	10.38	6.2	16	Round	30%	30%	1.00	10.04	16.00	4.37	39.55

*All forces are unfactored.



Pedesphere Water Tower Analysis (TIA-222-G & AWWA D100-11)
W32568-M, County Grounds-East Watertower/Milwaukee County
2019778.32568.02

Tower Geometry			
Tower Height	180	ft	
Tank Capacity	1,000,000	gallons	
Material Class	2		
Pedestal Diameter	15	ft	
Bell Base Diameter	40	ft	

Gravity Loads	Z (ft)	Weight (k)	Seismic Force (k)
Water Weight	156.0	8341.67	112.51
Roof Snow Load	179.0	6.08	0.08
Roof Live Load	179.0	3.65	0.05

Seismic Criteria	
Response Acceleration (S_s)	0.046
Response Acceleration (S_{DS})	0.093
Response Acceleration (S_{D1})	0.074
Transition Period (T_L , sec)	12
Seismic Use Group (I_s)	III
Response Modification (R)	3.0
Natural Period (T , sec)	3.913
Response Acceleration (S_{a1})	0.019
Horizontal Acceleration (A_h)	0.008
Vertical Acceleration (A_v)	0.013
Design Acceleration	0.013

Wind Criteria	
Nominal Wind Speed (V)	93 mph
Exposure Category	C
Importance Factor (I)	
Gust -Effect Factor (G)	1.00
Z_g	900
α	9.5
K_{zmin}	0.85
Topographic Factor (K_{zt})	1.00

Discrete Appurtenances	Z (ft)	EPA (sf)	K_z	q_z (psf)	Weight (kips)	Wind Force (k)	Seismic Force (k)
(1) AT&T Coral Mount	184	46.88	1.44	31.86	0.00	1.49	0.00
(6) Mount Pipes	184	5.70	1.44	31.86	0.09	0.18	0.00
(6) Mount Pipes	184	6.90	1.44	31.86	0.28	0.22	0.00
(3) NNHH-65C-R4	184	37.91	1.44	31.86	0.30	1.21	0.00
(3) NNHH-65C-R6	184	28.57	1.44	31.86	0.15	0.91	0.00
(3) SBNHH-1D65C	184	37.91	1.44	31.86	0.31	1.21	0.00
(3) RRUS 4449 B5/B12	184	2.69	1.44	31.86	0.22	0.09	0.00
(3) RRUS-32	184	4.16	1.44	31.86	0.23	0.13	0.00
(3) RRUS 32 B2	184	4.49	1.44	31.86	0.16	0.14	0.00
(3) RRUS 4478 B14	184	3.08	1.44	31.86	0.18	0.10	0.00
(3) RRUS-32 B66	184	4.49	1.44	31.86	0.16	0.14	0.00
(1) DC6-48-60-8C	184	1.11	1.44	31.86	0.03	0.04	0.00
(2) DC6-48-60-18-8C	184	3.74	1.44	31.86	0.07	0.12	0.00
(6) DC2-48-60-0-9E	184	1.73	1.44	31.86	0.10	0.06	0.00
(9) Panel	105	59.54	1.28	28.31	0.48	1.69	0.00
(3) Mount	105	51.65	1.28	28.31	1.62	1.46	0.01
(12) Mount Pipes	105	10.26	1.28	28.31	0.56	0.29	0.00
(9) Panel	95	59.54	1.25	27.72	0.32	1.65	0.00
(3) Mount	95	104.25	1.25	27.72	1.62	2.89	0.01
(12) Mount Pipes	95	10.26	1.25	27.72	0.56	0.28	0.00
(9) Panel	75	59.06	1.19	26.38	0.24	1.56	0.00
(9) Mount Pipes	75	12.83	1.19	26.38	0.42	0.34	0.00
Σ =					8.05	16.19	0.07

Note: **Bold** type indicates a proposed or future appurtenance.

Pedesphere	Z (ft)	Thickness (in)	Length (ft)	Area (sf)	C_f	K_z	q_z (psf)	Pw (psf)	Weight (kips)	Wind Force (k)	Seismic Force (k)	FL	Capacity
Tank	156.0	-	-	3200.0	0.5	1.39	30.8	15.4	403.27	49.24	5.44	-	-
Pedestal (117.95' - 117.95')	118.0	0	0	0.0	0.6	1.31	29.0	18.0	0.00	0.00	0.00	0	0.0%
Pedestal (117.95' - 117.95')	118.0	0	0	0.0	0.6	1.31	29.0	18.0	0.00	0.00	0.00	0	0.0%
Pedestal (111.06' - 117.95')	114.5	1.25	6.894	103.4	0.6	1.30	28.8	18.0	16.47	1.86	0.22	18000	74.1%
Pedestal (104.17' - 111.06')	107.6	1.25	6.894	103.4	0.6	1.29	28.5	18.0	16.47	1.86	0.22	18000	74.3%
Pedestal (97.27' - 104.17')	100.7	1.25	6.894	103.4	0.6	1.27	28.1	18.0	16.47	1.86	0.22	18000	74.4%
Pedestal (90.38' - 97.27')	93.8	1.25	6.894	103.4	0.6	1.25	27.6	18.0	16.47	1.86	0.22	18000	74.6%
Pedestal (83.48' - 90.38')	86.9	1.375	6.894	103.4	0.6	1.23	27.2	18.0	18.10	1.86	0.24	18000	68.0%
Pedestal (76.59' - 83.48')	80.0	1.375	6.894	103.4	0.6	1.21	26.7	18.0	18.10	1.86	0.24	18000	68.1%
Pedestal (69.7' - 76.59')	73.1	1.375	6.894	103.4	0.6	1.18	26.2	18.0	18.10	1.86	0.24	18000	68.3%
Pedestal (62.8' - 69.7')	66.3	1.4375	6.894	103.4	0.6	1.16	25.7	18.0	18.92	1.86	0.26	18000	65.5%
Pedestal (55.91' - 62.8')	59.4	1.4375	6.894	103.4	0.6	1.13	25.1	18.0	18.92	1.86	0.26	18000	65.6%
Pedestal (49.02' - 55.91')	52.5	1.5625	6.894	103.4	0.6	1.10	24.5	18.0	20.55	1.86	0.28	18000	60.5%
Pedestal (42.12' - 49.02')	45.6	1.5625	6.894	103.4	0.6	1.07	23.7	18.0	20.55	1.86	0.28	18000	60.7%
Pedestal (35.23' - 42.12')	38.7	1.5625	6.894	103.4	0.6	1.04	22.9	18.0	20.55	1.86	0.28	18000	60.8%
Bell (28.18' - 35.23')	31.5385	1.6875	7.046	123.3	0.6	0.99	22.0	18.0	26.48	2.22	0.36	18000	41.8%
Bell (21.14' - 28.18')	24.5299	1.14	7.046	158.5	0.6	0.94	20.8	18.0	23.09	2.85	0.31	13659	63.3%
Bell (14.09' - 21.14')	17.5078	0.9375	7.046	193.8	0.6	0.88	19.4	18.0	23.24	3.49	0.31	11540	75.2%
Bell (7.05' - 14.09')	10.5	0.9	7.046	229.0	0.6	0.85	18.8	18.0	26.38	4.12	0.36	10722	71.5%
Bell (0' - 7.05')	3.4	0.9	7.046	264.2	0.6	0.85	18.8	18.0	30.44	4.76	0.41	10248	65.6%
Bell (0' - 0')	0.0	0	0.00	0.0	0.6	0.85	18.8	18.0	0.00	0.00	0.00	0	0.0%
Σ =									752.53	89.01	10.15		

Total Base Reactions	
Wind Moment =	12436.980 k-ft
Wind Shear =	105.203 kips
Seismic Moment =	19944.4 k-ft
Seismic Shear =	122.9 kips
Compression (DL+H2O+LL+SL) =	9112.0 kips
Compression (DL+H2O+LL) =	9105.895 kips
Compression (DL) =	760.579 kips

Anchor Bolts	
Material Grade =	A36
Quantity =	24
Bolt Diameter =	1.25 in
Bolt Circle =	40.00 ft
f_t =	17.32 kips
F_u =	18.84 kips
Capacity =	91.9%

Original Design Comparison	
Wind Shear Increase (%)	18.2%
Wind Moment Increase (%)	21.5%
Seismic Shear Increase (%)	0.1%
Seismic Moment Increase (%)	0.0%
Maximum Load Increase (%)	21.5%

ASCE Wind Criteria?	2010
Consider Seismic?	No

AWWA, Table 2	
Force Coefficient, Cf	
Flat	1.00
Cylindrical	0.60
Double Cur	0.50

AWWA Sec. 3.4.3	
(Method 1)	
Class	(t/R)c
1	0.0031
2	0.0035

AWWA, Table 24	
Use Group I _c	
I	1
II	1.25
III	1.5

TIA-222-G, Table 2-8			
Type	2.5	7	25
Flat	1.2	1.4	2
Round	0.7	0.8	1.2

ASCE, Table 6-2			
Exposure	α	Z _g	K _{zmin}
B	7	1200	0.70
C	9.5	900	0.85
D	11.5	700	0.90

AWWA, Table 5			
Grade	Stress	F _y	F _u
F1554-55	18750	55	75
A36	15000	36	58

AWWA, Table 7	
Grade	Stress
1	20000
2	24000

Tank Top Radius =	17	ft
Roof Area =	243.28	sf

Bold Row	Appurtenance Model	Appurtenance Type	Height (in)	Width (in)	Depth (in)	Weight (lb)	% Front Shielded	% Side Shielded	Sector A (0° - 120°)		Sector B (120° - 240°)		Sector C (240° - 360°)		Mount C _g or C _p Factors		Individual EPA	
									Quantity	Azimuth	Quantity	Azimuth	Quantity	Azimuth	Front	Side	Front (sf)	Side (sf)
No	AT&T Coral Mount	Mount	30	150	150	0.964	0%	0%	1	0	0	0	0	0	1.50	1.50	46.88	46.88
No	Mount Pipes	Round Appurtenance	96	2.375	2.375	14.64	100%	0%	2	0	2	120	2	240			0.00	1.90
No	Mount Pipes	Round Appurtenance	96	2.875	2.875	46.4	100%	0%	2	0	2	120	2	240			0.00	2.30
Yes	NNHH-65C-R4	Flat Appurtenance	96	19.6	7.8	99.2	0%	0%	1	0	1	120	1	240			17.07	8.20
Yes	NNH4-65C-R6	Flat Appurtenance	96	11.9	7.1	49.6	0%	0%	1	0	1	120	1	240			11.39	7.66
No	SBNNH-1D65C	Flat Appurtenance	96	19.6	7.8	102	0%	0%	1	0	1	120	1	240			17.07	8.20
Yes	RRUS 4449 B5/B12	Flat Appurtenance	14.96	13.19	10.43	73	70%	0%	1	0	1	120	1	240			0.49	1.30
Yes	RRUS-32	Flat Appurtenance	29.9	13.9	9.5	77	90%	0%	1	0	1	120	1	240			0.35	2.42
No	RRUS 32 B2	Flat Appurtenance	27.2	7	12.1	53	85%	0%	1	0	1	120	1	240			0.25	2.74
Yes	RRUS 4478 B14	Flat Appurtenance	18.1	13.4	8.26	59.4	60%	0%	1	0	1	120	1	240			0.81	1.25
No	RRUS-32 B66	Flat Appurtenance	27.20	7	12.1	53	85%	0%	1	0	1	120	1	240			0.25	2.74
Yes	DC6-48-60-8C	Round Appurtenance	31.4	10.24	10.24	26.2	30%	30%	1	0	0	0	0	0			1.11	1.11
Yes	DC6-48-60-18-8C	Round Appurtenance	31.25	18.5	11	32.8	30%	30%	0		1	120	1	270			1.97	1.18
No	DC2-48-60-0-9E	Round Appurtenance	10.25	10.38	6.2	16	30%	30%	2	0	2	120	2	240			0.36	0.22
No	Panel	Flat Appurtenance	72	5.75	13	53	0%	0%	3	0	3	120	3	240			4.55	8.68
No	Mount	Flat Appurtenance	36	144	6	540	25%	0%	1	0	1	120	1	240			32.40	2.03
No	Mount Pipes	Round Appurtenance	72.00	2.375	2.375	46.4	80%	0%	4	0	4	120	4	240			0.29	1.43
No	Panel	Flat Appurtenance	72	5.75	13	35	0%	0%	3	0	3	120	3	240			4.55	8.68
No	Mount	Flat Appurtenance	72	144	6	540	25%	0%	1	0	1	120	1	240			64.80	4.70
No	Mount Pipes	Round Appurtenance	72.00	2.375	2.375	46.4	80%	0%	4	0	4	120	4	240			0.29	1.43
No	Panel	Flat Appurtenance	72	12	6.5	26.2	0%	0%	3	0	3	120	3	240			8.13	4.99
No	Mount Pipes	Flat Appurtenance	72.00	2.375	2.375	46.4	80%	0%	3	0	3	120	3	240			0.48	2.38

Base Elev. (ft)	Wind Moment	Seismic Moment	Weight
117.95	-	-	-
117.95	2979.96	5759.9	405.524
117.95	2979.96	5759.9	405.524
111.06	3368.16	6575.7	421.990
104.17	3772.09	7393.0	441.110
97.27	4209.47	8211.6	457.576
90.38	4681.99	9031.8	476.533
83.48	5178.17	9853.5	494.633
76.59	5687.11	10676.7	512.733
69.70	6218.87	11501.5	531.487
62.80	6766.41	12327.9	550.403
55.91	7326.72	13155.9	569.319
49.02	7899.82	13985.8	589.866
42.12	8485.70	14817.4	610.412
35.23	9084.39	15651.0	630.959
28.18	9710.26	16505.0	657.436
21.14	10353.98	17361.4	680.522
14.09	11020.02	18219.9	703.758
7.05	11712.86	19080.8	730.135
0.00	12436.98	19944.4	760.579
0.00	12436.98	19944.4	760.579

Riser & Bell Self Weight Multiplier = 1.00

Bolt Calculations	
B.C. =	480 in
I =	691202.3 in ⁴
Ar =	0.94 in ²

Bolt ϕ (in)	Min. Root Area (in ²)
1	0.587
1.125	0.740
1.25	0.942
1.375	1.120
1.5	1.370
1.75	1.850
2	2.430
2.25	3.170
2.5	3.900
2.75	4.830
3	5.850

Note: Min. Root Area per AISC 13th, Table 7-18.

C/c	d1	Area	I	S	t/R	KL/r	Kϕ	DL+H2O+LL+H2O+LL+ W OTM	S OTM	DL+H2O+LL+H2O+LL+ W Wind OTM	Seismic OTM
#DIV/0!	180.00	0.00	0	0	0.0000	0.00	1.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
#DIV/0!	180.00	0.00	0	0	0.0000	0.00	1.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
126.10	177.50	701.95	2803685	31152.06	0.0139	44.79	0.94	12.49	12.50	1.30	2.53
126.10	177.50	701.95	2803685	31152.06	0.0139	44.79	0.94	12.52	12.53	1.45	2.85
126.10	177.50	701.95	2803685	31152.06	0.0139	44.79	0.94	12.54	12.55	1.62	3.16
126.10	177.50	701.95	2803685	31152.06	0.0139	44.79	0.94	12.57	12.58	1.80	3.48
126.10	177.25	771.60	3077620	34195.78	0.0153	44.82	0.94	11.46	11.46	1.82	3.46
126.10	177.25	771.60	3077620	34195.78	0.0153	44.82	0.94	11.48	11.49	2.00	3.75
126.10	177.25	771.60	3077620	34195.78	0.0153	44.82	0.94	11.50	11.51	2.18	4.04
126.10	177.13	806.40	3214154	35712.82	0.0160	44.84	0.94	11.03	11.04	2.27	4.14
126.10	177.13	806.40	3214154	35712.82	0.0160	44.84	0.94	11.05	11.06	2.46	4.42
126.10	176.88	875.90	3486355	38737.28	0.0174	44.87	0.94	10.20	10.21	2.45	4.33
126.10	176.88	875.90	3486355	38737.28	0.0174	44.87	0.94	10.22	10.23	2.63	4.59
126.10	176.88	875.90	3486355	38737.28	0.0174	44.87	0.94	10.25	10.25	2.81	4.85
126.10	236.63	1263.40	6114948	74745.43	0.0141	40.69	0.95	7.13	7.13	1.56	2.65
144.76	297.72	1070.34	8809965	79667.86	0.0076	31.20	0.98	8.43	8.44	1.56	2.62
157.49	358.13	1057.53	13227099	94682.95	0.0052	25.31	0.99	8.56	8.56	1.40	2.31
163.38	418.20	1184.98	20944136	123890.5	0.0043	21.29	1.00	7.66	7.66	1.13	1.85
167.12	478.20	1354.62	32156363	161946.4	0.0038	18.37	1.00	6.72	6.73	0.92	1.48
#DIV/0!	480.00	0.00	0	0	0.0000	0.00	1.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!



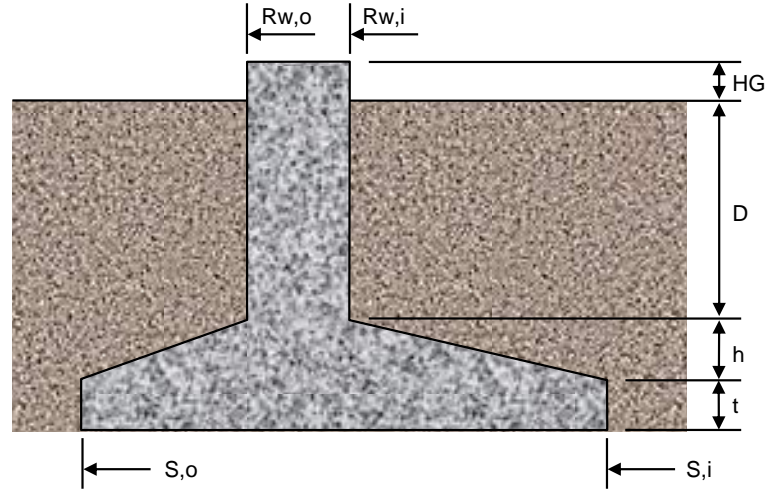
Water Tower Foundation Comparison

WI32568-M, County Grounds-East Watertower/Milwaukee County

2019778.32568.02

Foundation Reactions	Design	Total	
Wind Moment w/ Contents =	11299.9	13542.0	k-ft
Seismic Moment w/ Contents =			k-ft
Compression (DL+H2O+LL) =	9097.8	9105.9	kips
Compression (DL) =	752.5	760.6	kips

Ringwall Foundation		
Ringwall Depth (D) =	8.67	ft
Ringwall OR (Rw,o) =	20.75	ft
Ringwall IR (Rw,i) =	19.25	ft
Slab OR (S,o) =	29.50	ft
Slab IR (S,i) =	4.08	ft
Taper Height (h) =	0.50	ft
Slab Thickness (t) =	0.83	ft
Height Above Grade (HG) =	0.50	ft
Concrete Unit Weight =	0.15	kcf
Soil Unit Weight =	0.10	kcf
Concrete Weight =	708.1	kips
Soil Weight =	2354.0	kips
Foundation Bearing Area =	2681.7	ft ²
Bearing Section Modulus =	20155.7	ft ³

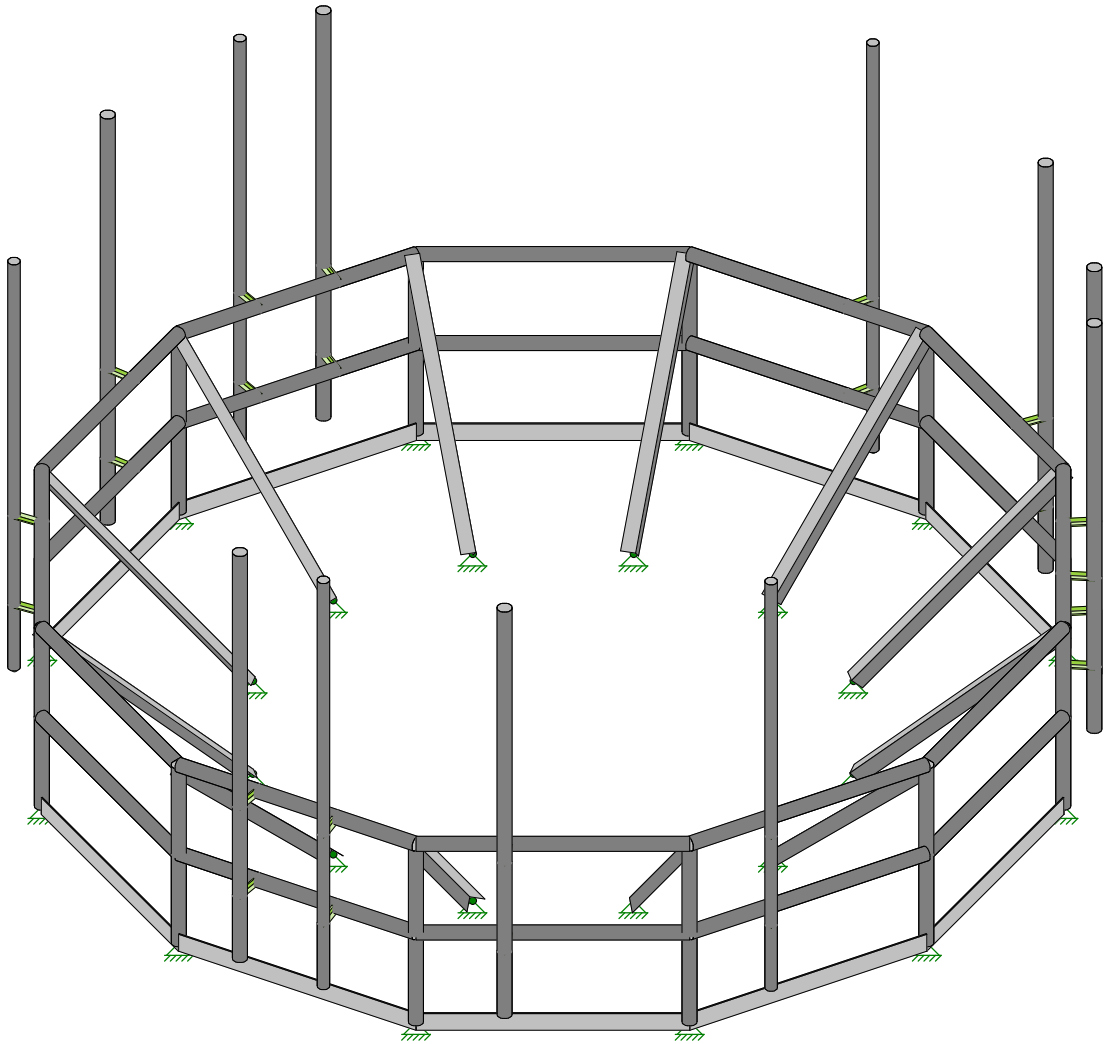
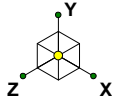


Original Design Comparison	
Allowable Increase (%)	5%
Design Foundation Bearing (psf)	5.095
Total Foundation Bearing (psf)	5.209
Bearing Increase (%)	2.2%
IBC, Section 3403 Comparison	OK

Total Bearing	
Bearing Full Weight =	4.537 ksf
Max Moment Bearing =	0.672 ksf
Full Bearing (Max.) =	5.209 ksf

Foundation Overturning	
Moment Resistance =	112769.8 k-ft
Overturning F.S. =	9.59
Capacity =	15.6%

Design Bearing	
Bearing Full Weight =	4.534 ksf
Max Moment Bearing =	0.561 ksf
Full Bearing (Max.) =	5.095 ksf



Envelope Only Solution

GPD

Beachy, Jaden

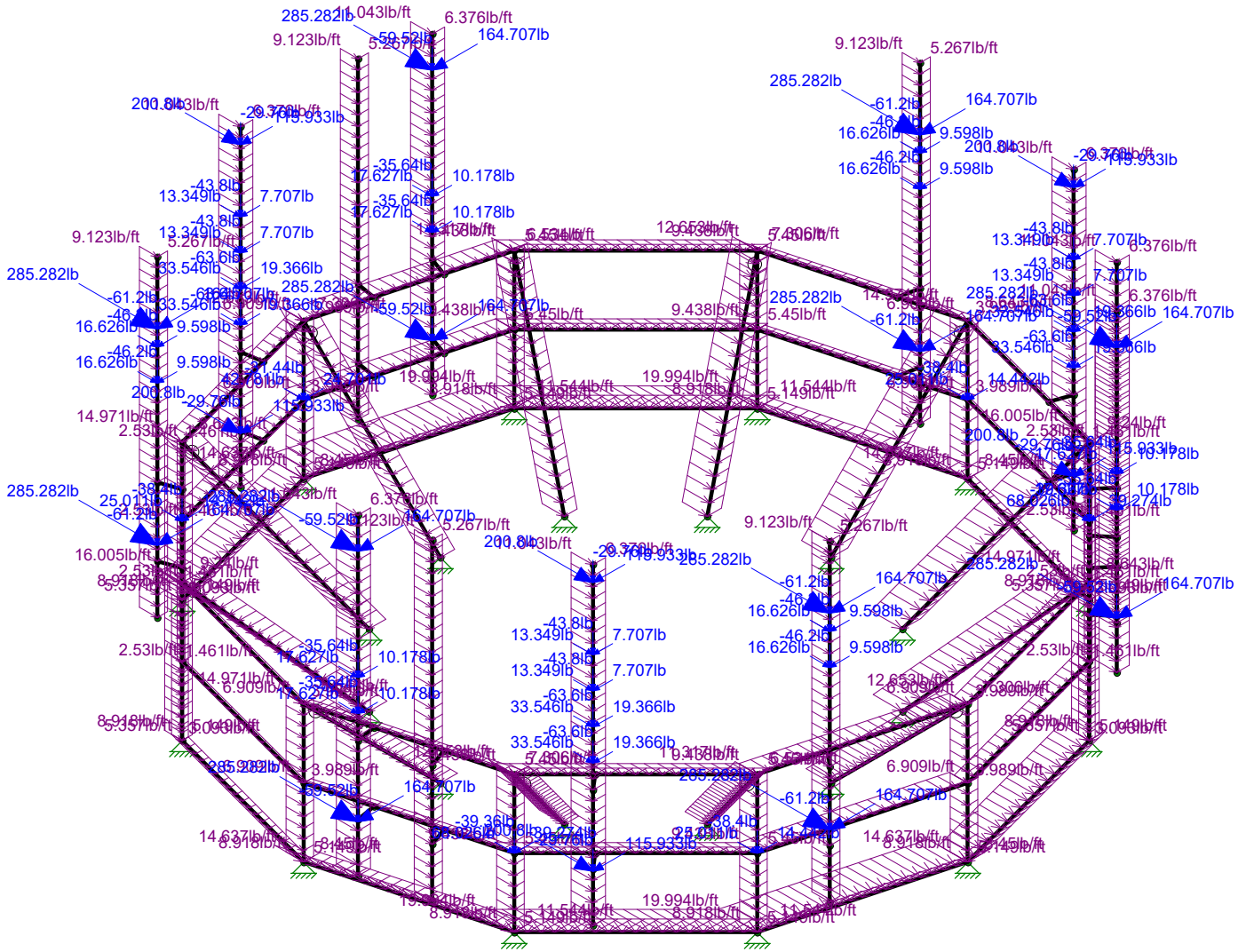
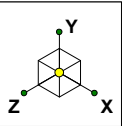
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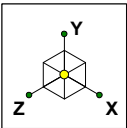
WI32568-M, County Grounds East Watertower/Milwauk...

SK - 1

Sept 27, 2019 at 2:30 PM

County Grounds.Loaded.Loaded.r3d





Section Sets

Pipe Mount

Pipe Mount P2.5

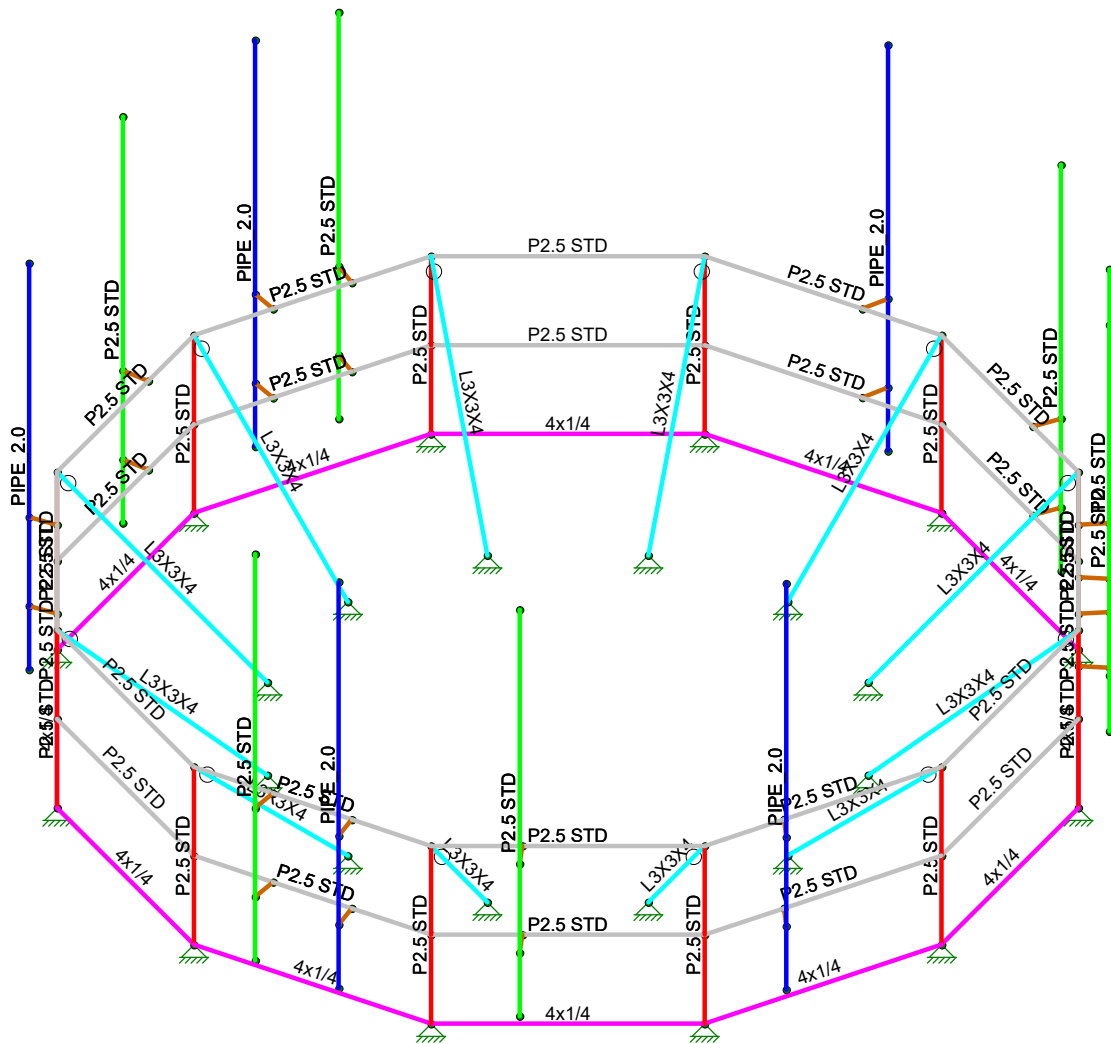
Post

Top/Mid Rail

Bottom Rail

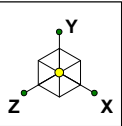
Kicker

RIGID

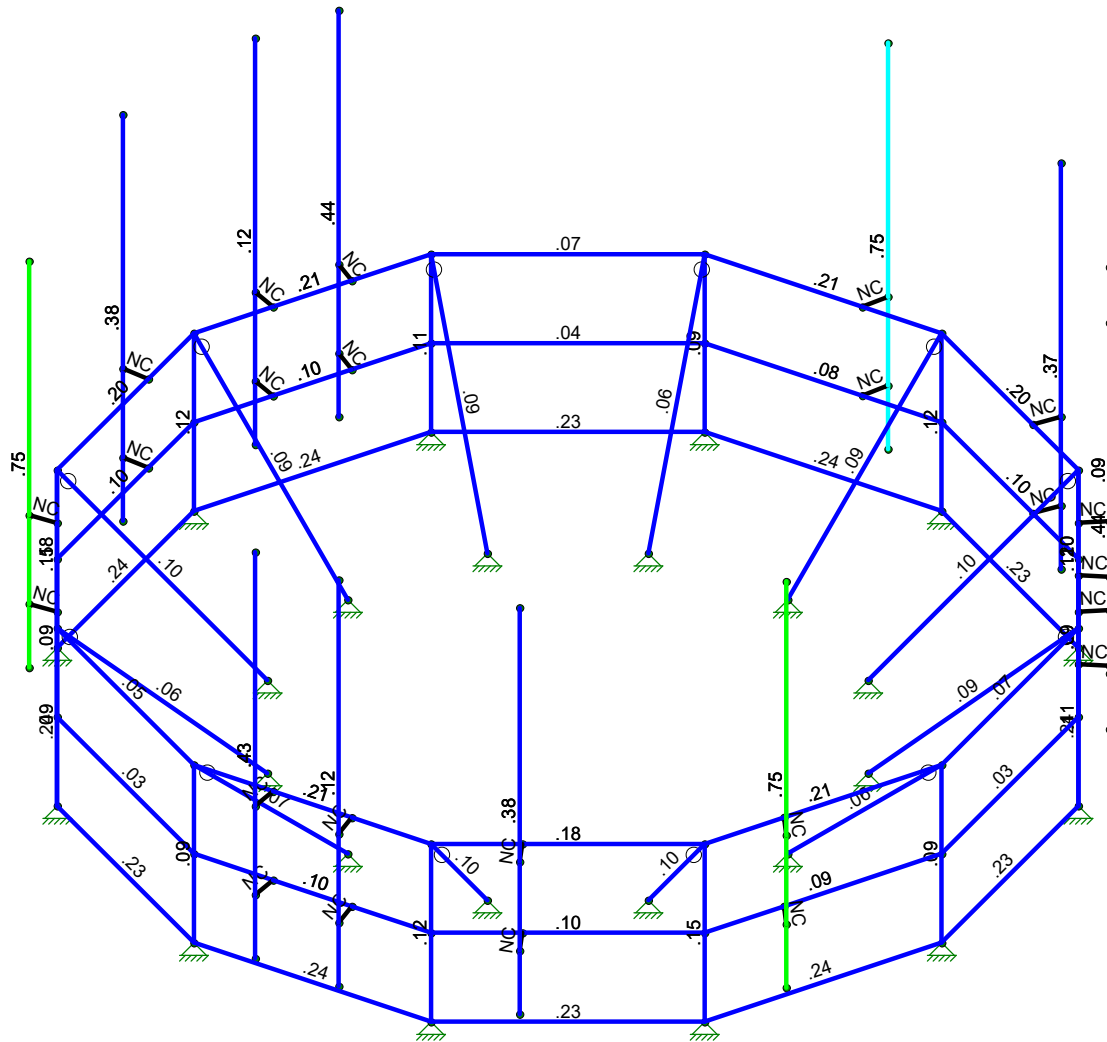


Envelope Only Solution

GPD	WI32568-M, County Grounds East Watertower/Milwauk...	SK - 3
Beachy, Jaden		Sept 27, 2019 at 2:30 PM
2019778.32568.02		County Grounds.Loaded.Loaded.r3d



Code Check (Env)	
No Calc	> 1.0
	.90-1.0
	.75-.90
	.50-.75
	0-.50



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

GPD	WI32568-M, County Grounds East Watertower/Milwauk...	SK - 2
Beachy, Jaden		Sept 27, 2019 at 2:30 PM
2019778.32568.02		County Grounds.Loaded.Loaded.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

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

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR SET ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design...	A [in2]	Iyy [i...	Izz [i...	J [in4]
1	Pipe Mount	PIPE 2.0	Column	Pipe	A53-B	Typical	1.02	.627	.627	1.25
2	Pipe Mount P2.5	P2.5 STD	Column	Pipe	A53-B	Typical	1.704	1.53	1.53	3.059
3	Post	P2.5 STD	Column	Pipe	A53-B	Typical	1.704	1.53	1.53	3.059
4	Top/Mid Rail	P2.5 STD	Beam	Pipe	A53-B	Typical	1.704	1.53	1.53	3.059
5	Bottom Rail	4x1/4	Beam	RECT	A36 Gr.36	Typical	1	.005	1.333	.02
6	Kicker	L3X3X4	Beam	Single Angle	A36 Gr.36	Typical	1.44	1.23	1.23	.031

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N19	N22			Bottom Rail	Beam	RECT	A36 Gr.36	Typical
2	M2	N22	N25			Bottom Rail	Beam	RECT	A36 Gr.36	Typical
3	M3	N25	N28			Bottom Rail	Beam	RECT	A36 Gr.36	Typical
4	M4	N28	N31			Bottom Rail	Beam	RECT	A36 Gr.36	Typical
5	M5	N31	N34			Bottom Rail	Beam	RECT	A36 Gr.36	Typical
6	M6	N34	N37			Bottom Rail	Beam	RECT	A36 Gr.36	Typical
7	M7	N37	N40			Bottom Rail	Beam	RECT	A36 Gr.36	Typical
8	M8	N40	N43			Bottom Rail	Beam	RECT	A36 Gr.36	Typical
9	M9	N43	N46			Bottom Rail	Beam	RECT	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(d...)	Section/Shape	Type	Design List	Material	Design Rules
10	M10	N46	N13			Bottom Rail	Beam	RECT	A36 Gr.36	Typical
11	M11	N13	N16			Bottom Rail	Beam	RECT	A36 Gr.36	Typical
12	M12	N16	N19			Bottom Rail	Beam	RECT	A36 Gr.36	Typical
13	M13	N12	N1			Top/Mid Rail	Beam	Pipe	A53-B	Typical
14	M14	N1	N2			Top/Mid Rail	Beam	Pipe	A53-B	Typical
15	M15	N2	N3			Top/Mid Rail	Beam	Pipe	A53-B	Typical
16	M16	N3	N4			Top/Mid Rail	Beam	Pipe	A53-B	Typical
17	M17	N4	N5			Top/Mid Rail	Beam	Pipe	A53-B	Typical
18	M18	N5	N6			Top/Mid Rail	Beam	Pipe	A53-B	Typical
19	M19	N6	N7			Top/Mid Rail	Beam	Pipe	A53-B	Typical
20	M20	N7	N8			Top/Mid Rail	Beam	Pipe	A53-B	Typical
21	M21	N8	N9			Top/Mid Rail	Beam	Pipe	A53-B	Typical
22	M22	N9	N10			Top/Mid Rail	Beam	Pipe	A53-B	Typical
23	M23	N10	N11			Top/Mid Rail	Beam	Pipe	A53-B	Typical
24	M24	N11	N12			Top/Mid Rail	Beam	Pipe	A53-B	Typical
25	M25	N20	N23			Top/Mid Rail	Beam	Pipe	A53-B	Typical
26	M26	N23	N26			Top/Mid Rail	Beam	Pipe	A53-B	Typical
27	M27	N26	N29			Top/Mid Rail	Beam	Pipe	A53-B	Typical
28	M28	N29	N32			Top/Mid Rail	Beam	Pipe	A53-B	Typical
29	M29	N32	N35			Top/Mid Rail	Beam	Pipe	A53-B	Typical
30	M30	N35	N38			Top/Mid Rail	Beam	Pipe	A53-B	Typical
31	M31	N38	N41			Top/Mid Rail	Beam	Pipe	A53-B	Typical
32	M32	N41	N44			Top/Mid Rail	Beam	Pipe	A53-B	Typical
33	M33	N44	N47			Top/Mid Rail	Beam	Pipe	A53-B	Typical
34	M34	N47	N14			Top/Mid Rail	Beam	Pipe	A53-B	Typical
35	M35	N14	N17			Top/Mid Rail	Beam	Pipe	A53-B	Typical
36	M36	N17	N20			Top/Mid Rail	Beam	Pipe	A53-B	Typical
37	M37	N13	N14			Post	Column	Pipe	A53-B	Typical
38	M38	N14	N15		90	Kicker	Beam	Single Angle	A36 Gr.36	Typical
39	M39	N16	N17			Post	Column	Pipe	A53-B	Typical
40	M40	N17	N18		90	Kicker	Beam	Single Angle	A36 Gr.36	Typical
41	M41	N19	N20			Post	Column	Pipe	A53-B	Typical
42	M42	N20	N21		90	Kicker	Beam	Single Angle	A36 Gr.36	Typical
43	M43	N22	N23			Post	Column	Pipe	A53-B	Typical
44	M44	N23	N24		90	Kicker	Beam	Single Angle	A36 Gr.36	Typical
45	M45	N25	N26			Post	Column	Pipe	A53-B	Typical
46	M46	N26	N27		90	Kicker	Beam	Single Angle	A36 Gr.36	Typical
47	M47	N28	N29			Post	Column	Pipe	A53-B	Typical
48	M48	N29	N30		90	Kicker	Beam	Single Angle	A36 Gr.36	Typical
49	M49	N31	N32			Post	Column	Pipe	A53-B	Typical
50	M50	N32	N33		90	Kicker	Beam	Single Angle	A36 Gr.36	Typical
51	M51	N34	N35			Post	Column	Pipe	A53-B	Typical
52	M52	N35	N36		90	Kicker	Beam	Single Angle	A36 Gr.36	Typical
53	M53	N37	N38			Post	Column	Pipe	A53-B	Typical
54	M54	N38	N39		90	Kicker	Beam	Single Angle	A36 Gr.36	Typical
55	M55	N40	N41			Post	Column	Pipe	A53-B	Typical
56	M56	N41	N42		90	Kicker	Beam	Single Angle	A36 Gr.36	Typical
57	M57	N43	N44			Post	Column	Pipe	A53-B	Typical
58	M58	N44	N45		90	Kicker	Beam	Single Angle	A36 Gr.36	Typical
59	M59	N46	N47			Post	Column	Pipe	A53-B	Typical
60	M60	N47	N48		90	Kicker	Beam	Single Angle	A36 Gr.36	Typical
61	M61	N49	N50			Pipe Mount P2.5	Column	Pipe	A53-B	Typical
62	M62	N51	N52			Pipe Mount	Column	Pipe	A53-B	Typical
63	M63	N53	N54			Pipe Mount P2.5	Column	Pipe	A53-B	Typical
64	M64	N55	N56			Pipe Mount	Column	Pipe	A53-B	Typical
65	M65	N57	N58		90	RIGID	None	None	RIGID	Typical
66	M66	N59	N60		90	RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(d...)	Section/Shape	Type	Design List	Material	Design Rules
67	M67	N61	N62		90	RIGID	None	None	RIGID	Typical
68	M68	N63	N64		90	RIGID	None	None	RIGID	Typical
69	M69	N65	N66		90	RIGID	None	None	RIGID	Typical
70	M70	N67	N68		90	RIGID	None	None	RIGID	Typical
71	M71	N69	N70		90	RIGID	None	None	RIGID	Typical
72	M72	N71	N72			RIGID	None	None	RIGID	Typical
73	M73	N73	N74			Pipe Mount P2.5	Column	Pipe	A53-B	Typical
74	M74	N75	N76			Pipe Mount	Column	Pipe	A53-B	Typical
75	M75	N77	N78			Pipe Mount P2.5	Column	Pipe	A53-B	Typical
76	M76	N79	N80			Pipe Mount	Column	Pipe	A53-B	Typical
77	M77	N81	N82		90	RIGID	None	None	RIGID	Typical
78	M78	N83	N84		90	RIGID	None	None	RIGID	Typical
79	M79	N85	N86		90	RIGID	None	None	RIGID	Typical
80	M80	N87	N88		90	RIGID	None	None	RIGID	Typical
81	M81	N89	N90		90	RIGID	None	None	RIGID	Typical
82	M82	N91	N92		90	RIGID	None	None	RIGID	Typical
83	M83	N93	N94		90	RIGID	None	None	RIGID	Typical
84	M84	N95	N96		90	RIGID	None	None	RIGID	Typical
85	M85	N97	N98			Pipe Mount P2.5	Column	Pipe	A53-B	Typical
86	M86	N99	N100			Pipe Mount P2.5	Column	Pipe	A53-B	Typical
87	M87	N101	N102			Pipe Mount P2.5	Column	Pipe	A53-B	Typical
88	M88	N103	N104			Pipe Mount	Column	Pipe	A53-B	Typical
89	M89	N105	N106		90	RIGID	None	None	RIGID	Typical
90	M90	N107	N108		90	RIGID	None	None	RIGID	Typical
91	M91	N109	N110		90	RIGID	None	None	RIGID	Typical
92	M92	N111	N112		90	RIGID	None	None	RIGID	Typical
93	M93	N113	N114		90	RIGID	None	None	RIGID	Typical
94	M94	N115	N116		90	RIGID	None	None	RIGID	Typical
95	M95	N117	N118		90	RIGID	None	None	RIGID	Typical
96	M96	N119	N120		90	RIGID	None	None	RIGID	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
1	M1						Yes				None
2	M2						Yes				None
3	M3						Yes				None
4	M4						Yes				None
5	M5						Yes				None
6	M6						Yes				None
7	M7						Yes				None
8	M8						Yes				None
9	M9						Yes				None
10	M10						Yes				None
11	M11						Yes				None
12	M12						Yes				None
13	M13						Yes				None
14	M14						Yes				None
15	M15						Yes				None
16	M16						Yes				None
17	M17						Yes				None
18	M18						Yes				None
19	M19						Yes				None
20	M20						Yes				None
21	M21						Yes				None
22	M22						Yes				None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
23	M23						Yes				None
24	M24						Yes				None
25	M25						Yes				None
26	M26						Yes				None
27	M27						Yes				None
28	M28						Yes				None
29	M29						Yes				None
30	M30						Yes				None
31	M31						Yes				None
32	M32						Yes				None
33	M33						Yes				None
34	M34						Yes				None
35	M35						Yes				None
36	M36						Yes				None
37	M37						Yes	** NA **			None
38	M38	BenPIN					Yes				None
39	M39						Yes	** NA **			None
40	M40	BenPIN					Yes				None
41	M41						Yes	** NA **			None
42	M42	BenPIN					Yes				None
43	M43						Yes	** NA **			None
44	M44	BenPIN					Yes				None
45	M45						Yes	** NA **			None
46	M46	BenPIN					Yes				None
47	M47						Yes	** NA **			None
48	M48	BenPIN					Yes				None
49	M49						Yes	** NA **			None
50	M50	BenPIN					Yes				None
51	M51						Yes	** NA **			None
52	M52	BenPIN					Yes				None
53	M53						Yes	** NA **			None
54	M54	BenPIN					Yes				None
55	M55						Yes	** NA **			None
56	M56	BenPIN					Yes				None
57	M57						Yes	** NA **			None
58	M58	BenPIN					Yes				None
59	M59						Yes	** NA **			None
60	M60	BenPIN					Yes				None
61	M61						Yes	** NA **			None
62	M62						Yes	** NA **			None
63	M63						Yes	** NA **			None
64	M64						Yes	** NA **			None
65	M65						Yes	** NA **			None
66	M66						Yes	** NA **			None
67	M67						Yes	** NA **			None
68	M68						Yes	** NA **			None
69	M69						Yes	** NA **			None
70	M70						Yes	** NA **			None
71	M71						Yes	** NA **			None
72	M72						Yes	** NA **			None
73	M73						Yes	** NA **			None
74	M74						Yes	** NA **			None
75	M75						Yes	** NA **			None
76	M76						Yes	** NA **			None
77	M77						Yes	** NA **			None
78	M78						Yes	** NA **			None
79	M79						Yes	** NA **			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
80	M80						Yes	** NA **			None
81	M81						Yes	** NA **			None
82	M82						Yes	** NA **			None
83	M83						Yes	** NA **			None
84	M84						Yes	** NA **			None
85	M85						Yes	** NA **			None
86	M86						Yes	** NA **			None
87	M87						Yes	** NA **			None
88	M88						Yes	** NA **			None
89	M89						Yes	** NA **			None
90	M90						Yes	** NA **			None
91	M91						Yes	** NA **			None
92	M92						Yes	** NA **			None
93	M93						Yes	** NA **			None
94	M94						Yes	** NA **			None
95	M95						Yes	** NA **			None
96	M96						Yes	** NA **			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp ..	Lcomp ..	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Bottom Rail	4.4			Lbyy			.65	.65		Lateral
2	M2	Bottom Rail	4.4			Lbyy			.65	.65		Lateral
3	M3	Bottom Rail	4.4			Lbyy			.65	.65		Lateral
4	M4	Bottom Rail	4.4			Lbyy			.65	.65		Lateral
5	M5	Bottom Rail	4.4			Lbyy			.65	.65		Lateral
6	M6	Bottom Rail	4.4			Lbyy			.65	.65		Lateral
7	M7	Bottom Rail	4.4			Lbyy			.65	.65		Lateral
8	M8	Bottom Rail	4.4			Lbyy			.65	.65		Lateral
9	M9	Bottom Rail	4.4			Lbyy			.65	.65		Lateral
10	M10	Bottom Rail	4.4			Lbyy			.65	.65		Lateral
11	M11	Bottom Rail	4.4			Lbyy			.65	.65		Lateral
12	M12	Bottom Rail	4.4			Lbyy			.65	.65		Lateral
13	M13	Top/Mid Rail	4.4			Lbyy			.65	.65		Lateral
14	M14	Top/Mid Rail	4.4			Lbyy			.65	.65		Lateral
15	M15	Top/Mid Rail	4.4			Lbyy			.65	.65		Lateral
16	M16	Top/Mid Rail	4.4			Lbyy			.65	.65		Lateral
17	M17	Top/Mid Rail	4.4			Lbyy			.65	.65		Lateral
18	M18	Top/Mid Rail	4.4			Lbyy			.65	.65		Lateral
19	M19	Top/Mid Rail	4.4			Lbyy			.65	.65		Lateral
20	M20	Top/Mid Rail	4.4			Lbyy			.65	.65		Lateral
21	M21	Top/Mid Rail	4.4			Lbyy			.65	.65		Lateral
22	M22	Top/Mid Rail	4.4			Lbyy			.65	.65		Lateral
23	M23	Top/Mid Rail	4.4			Lbyy			.65	.65		Lateral
24	M24	Top/Mid Rail	4.4			Lbyy			.65	.65		Lateral
25	M25	Top/Mid Rail	4.4			Lbyy			.65	.65		Lateral
26	M26	Top/Mid Rail	4.4			Lbyy			.65	.65		Lateral
27	M27	Top/Mid Rail	4.4			Lbyy			.65	.65		Lateral
28	M28	Top/Mid Rail	4.4			Lbyy			.65	.65		Lateral
29	M29	Top/Mid Rail	4.4			Lbyy			.65	.65		Lateral
30	M30	Top/Mid Rail	4.4			Lbyy			.65	.65		Lateral
31	M31	Top/Mid Rail	4.4			Lbyy			.65	.65		Lateral
32	M32	Top/Mid Rail	4.4			Lbyy			.65	.65		Lateral
33	M33	Top/Mid Rail	4.4			Lbyy			.65	.65		Lateral
34	M34	Top/Mid Rail	4.4			Lbyy			.65	.65		Lateral
35	M35	Top/Mid Rail	4.4			Lbyy			.65	.65		Lateral

Hot Rolled Steel Design Parameters (Continued)

Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp ...	Lcomp ...	L-torqu...	Kyy	Kzz	Cb	Function
36	M36	Top/Mid Rail	4.4					.65	.65		Lateral
37	M37	Post	3.5					.65	.65		Lateral
38	M38	Kicker	4.95					1	1		Lateral
39	M39	Post	3.5					.65	.65		Lateral
40	M40	Kicker	4.95					1	1		Lateral
41	M41	Post	3.5					.65	.65		Lateral
42	M42	Kicker	4.95					1	1		Lateral
43	M43	Post	3.5					.65	.65		Lateral
44	M44	Kicker	4.95					1	1		Lateral
45	M45	Post	3.5					.65	.65		Lateral
46	M46	Kicker	4.95					1	1		Lateral
47	M47	Post	3.5					.65	.65		Lateral
48	M48	Kicker	4.95					1	1		Lateral
49	M49	Post	3.5					.65	.65		Lateral
50	M50	Kicker	4.95					1	1		Lateral
51	M51	Post	3.5					.65	.65		Lateral
52	M52	Kicker	4.95					1	1		Lateral
53	M53	Post	3.5					.65	.65		Lateral
54	M54	Kicker	4.95					1	1		Lateral
55	M55	Post	3.5					.65	.65		Lateral
56	M56	Kicker	4.95					1	1		Lateral
57	M57	Post	3.5					.65	.65		Lateral
58	M58	Kicker	4.95					1	1		Lateral
59	M59	Post	3.5					.65	.65		Lateral
60	M60	Kicker	4.95					1	1		Lateral
61	M61	Pipe Mount P2.5	8	Segme...	Segme...			2.1	2.1		Lateral
62	M62	Pipe Mount	8	Segme...	Segme...			2.1	2.1		Lateral
63	M63	Pipe Mount P2.5	8	Segme...	Segme...			2.1	2.1		Lateral
64	M64	Pipe Mount	8	Segme...	Segme...			2.1	2.1		Lateral
65	M73	Pipe Mount P2.5	8	Segme...	Segme...			2.1	2.1		Lateral
66	M74	Pipe Mount	8	Segme...	Segme...			2.1	2.1		Lateral
67	M75	Pipe Mount P2.5	8	Segme...	Segme...			2.1	2.1		Lateral
68	M76	Pipe Mount	8	Segme...	Segme...			2.1	2.1		Lateral
69	M85	Pipe Mount P2.5	8	Segme...	Segme...			2.1	2.1		Lateral
70	M86	Pipe Mount P2.5	8	Segme...	Segme...			2.1	2.1		Lateral
71	M87	Pipe Mount P2.5	8	Segme...	Segme...			2.1	2.1		Lateral
72	M88	Pipe Mount	8	Segme...	Segme...			2.1	2.1		Lateral

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me... Surface(...
1	Dead	DL		-1			54		
2	No Ice Wind 0 deg	None					54	72	
3	No Ice Wind 30 deg	None					108	144	
4	No Ice Wind 60 deg	None					108	144	
5	No Ice Wind 90 deg	None					54	72	
6	No Ice Wind 120 deg	None					108	144	
7	No Ice Wind 150 deg	None					108	144	
8	No Ice Wind 180 deg	None					54	72	
9	No Ice Wind 210 deg	None					108	144	
10	No Ice Wind 240 deg	None					108	144	
11	No Ice Wind 270 deg	None					54	72	
12	No Ice Wind 300 deg	None					108	144	
13	No Ice Wind 330 deg	None					108	144	
14	Ice Weight	None					54	72	
15	Ice Wind 0 deg	None					54	72	

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me... Surface(...
16	Ice Wind 30 deg	None					108	144	
17	Ice Wind 60 deg	None					108	144	
18	Ice Wind 90 deg	None					54	72	
19	Ice Wind 120 deg	None					108	144	
20	Ice Wind 150 deg	None					108	144	
21	Ice Wind 180 deg	None					54	72	
22	Ice Wind 210 deg	None					108	144	
23	Ice Wind 240 deg	None					108	144	
24	Ice Wind 270 deg	None					54	72	
25	Ice Wind 300 deg	None					108	144	
26	Ice Wind 330 deg	None					108	144	

Load Combinations

	Description	Solve	PD...	S...	BLC	Fa..B...	Fa..B...	Fa..B...	Fa..B...	Fa..B...	Fa..B...	Fa..B...	Fa..B...	Factor	B...	Fa..B...	Fa...
1	1.4 Dead	Yes	Y		1	1.4	0	0	0	0	0	0	0				
2	1.2 Dead + 1.6 Wind @ 0° - ...	Yes	Y		1	1.2	2	1.6	0	0	0	0	0				
3	0.9 Dead + 1.6 Wind @ 0° - ...	Yes	Y		1	.9	2	1.6	0	0	0	0	0				
4	1.2 Dead + 1.6 Wind @ 30° - ...	Yes	Y		1	1.2	3	1.6	0	0	0	0	0				
5	0.9 Dead + 1.6 Wind @ 30° - ...	Yes	Y		1	.9	3	1.6	0	0	0	0	0				
6	1.2 Dead + 1.6 Wind @ 60° - ...	Yes	Y		1	1.2	4	1.6	0	0	0	0	0				
7	0.9 Dead + 1.6 Wind @ 60° - ...	Yes	Y		1	.9	4	1.6	0	0	0	0	0				
8	1.2 Dead + 1.6 Wind @ 90° - ...	Yes	Y		1	1.2	5	1.6	0	0	0	0	0				
9	0.9 Dead + 1.6 Wind @ 90° - ...	Yes	Y		1	.9	5	1.6	0	0	0	0	0				
10	1.2 Dead + 1.6 Wind @ 120° - ...	Yes	Y		1	1.2	6	1.6	0	0	0	0	0				
11	0.9 Dead + 1.6 Wind @ 120° - ...	Yes	Y		1	.9	6	1.6	0	0	0	0	0				
12	1.2 Dead + 1.6 Wind @ 150° - ...	Yes	Y		1	1.2	7	1.6	0	0	0	0	0				
13	0.9 Dead + 1.6 Wind @ 150° - ...	Yes	Y		1	.9	7	1.6	0	0	0	0	0				
14	1.2 Dead + 1.6 Wind @ 180° - ...	Yes	Y		1	1.2	8	1.6	0	0	0	0	0				
15	0.9 Dead + 1.6 Wind @ 180° - ...	Yes	Y		1	.9	8	1.6	0	0	0	0	0				
16	1.2 Dead + 1.6 Wind @ 210° - ...	Yes	Y		1	1.2	9	1.6	0	0	0	0	0				
17	0.9 Dead + 1.6 Wind @ 210° - ...	Yes	Y		1	.9	9	1.6	0	0	0	0	0				
18	1.2 Dead + 1.6 Wind @ 240° - ...	Yes	Y		1	1.2	10	1.6	0	0	0	0	0				
19	0.9 Dead + 1.6 Wind @ 240° - ...	Yes	Y		1	.9	10	1.6	0	0	0	0	0				
20	1.2 Dead + 1.6 Wind @ 270° - ...	Yes	Y		1	1.2	11	1.6	0	0	0	0	0				
21	0.9 Dead + 1.6 Wind @ 270° - ...	Yes	Y		1	.9	11	1.6	0	0	0	0	0				
22	1.2 Dead + 1.6 Wind @ 300° - ...	Yes	Y		1	1.2	12	1.6	0	0	0	0	0				
23	0.9 Dead + 1.6 Wind @ 300° - ...	Yes	Y		1	.9	12	1.6	0	0	0	0	0				
24	1.2 Dead + 1.6 Wind @ 330° - ...	Yes	Y		1	1.2	13	1.6	0	0	0	0	0				
25	0.9 Dead + 1.6 Wind @ 330° - ...	Yes	Y		1	.9	13	1.6	0	0	0	0	0				
26	1.2 Dead + 1.0 Ice Wind @ 0...	Yes	Y		1	1.2	15	1	14	1	1	0	0	0			
27	1.2 Dead + 1.0 Ice Wind @ 3...	Yes	Y		1	1.2	16	1	14	1	1	0	0	0			
28	1.2 Dead + 1.0 Ice Wind @ 6...	Yes	Y		1	1.2	17	1	14	1	1	0	0	0			
29	1.2 Dead + 1.0 Ice Wind @ 9...	Yes	Y		1	1.2	18	1	14	1	1	0	0	0			
30	1.2 Dead + 1.0 Ice Wind @ 1...	Yes	Y		1	1.2	19	1	14	1	1	0	0	0			
31	1.2 Dead + 1.0 Ice Wind @ 1...	Yes	Y		1	1.2	20	1	14	1	1	0	0	0			
32	1.2 Dead + 1.0 Ice Wind @ 1...	Yes	Y		1	1.2	21	1	14	1	1	0	0	0			
33	1.2 Dead + 1.0 Ice Wind @ 2...	Yes	Y		1	1.2	22	1	14	1	1	0	0	0			
34	1.2 Dead + 1.0 Ice Wind @ 2...	Yes	Y		1	1.2	23	1	14	1	1	0	0	0			
35	1.2 Dead + 1.0 Ice Wind @ 2...	Yes	Y		1	1.2	24	1	14	1	1	0	0	0			
36	1.2 Dead + 1.0 Ice Wind @ 3...	Yes	Y		1	1.2	25	1	14	1	1	0	0	0			
37	1.2 Dead + 1.0 Ice Wind @ 3...	Yes	Y		1	1.2	26	1	14	1	1	0	0	0			

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

Member	Shape	Code Check	Loc[ft]	LC	Shear...	Loc[ft]	Dir	LC	phi*Pnc...	phi*Pnt...	phi*Mn...	phi*Mn...Cb	Eqn
1	M1	4x1/4	.235	4.4	12	.003	4.4	y	30	998.921	32400	168.75	1699.352... H1-1b
2	M2	4x1/4	.243	4.4	10	.004	4.4	y	29	998.921	32400	168.75	2056.7512... H1-1b
3	M3	4x1/4	.229	4.4	22	.003	4.4	y	26	998.921	32400	168.75	1693.0142... H1-1b
4	M4	4x1/4	.238	0	8	.003	0	y	30	998.921	32400	168.75	2042.5442... H1-1b
5	M5	4x1/4	.235	4.4	4	.003	4.4	y	26	998.921	32400	168.75	1713.9112... H1-1b
6	M6	4x1/4	.243	4.4	2	.004	4.4	y	37	998.921	32400	168.75	2047.85 2... H1-1b
7	M7	4x1/4	.232	4.4	14	.003	4.4	y	35	998.921	32400	168.75	1767.2192... H1-1b
8	M8	4x1/4	.237	4.4	12	.003	4.4	y	33	998.921	32400	168.75	1725.8562... H1-1b
9	M9	4x1/4	.233	4.4	20	.004	4.4	y	34	998.921	32400	168.75	1735.1262... H1-1b
10	M10	4x1/4	.244	4.4	18	.004	4.4	y	33	998.921	32400	168.75	2052.2382... H1-1b
11	M11	4x1/4	.229	4.4	6	.003	4.4	y	31	998.921	32400	168.75	1694.1622... H1-1b
12	M12	4x1/4	.237	0	16	.003	0	y	34	998.921	32400	168.75	2110.46 2... H1-1b
13	M13	P2.5 STD	.103	1.467	12	.060	0		12	50190....	53677....	3811.8263811.8262...	H1-1b
14	M14	P2.5 STD	.089	1.467	12	.052	0		12	50190....	53677....	3811.8263811.8262...	H1-1b
15	M15	P2.5 STD	.034	4.4	4	.007	4.4		4	50190....	53677....	3811.8263811.8262...	H1-1b
16	M16	P2.5 STD	.097	4.4	4	.051	4.4		4	50190....	53677....	3811.8263811.8262...	H1-1b
17	M17	P2.5 STD	.103	1.467	4	.059	0		4	50190....	53677....	3811.8263811.8262...	H1-1b
18	M18	P2.5 STD	.091	1.467	2	.052	0		4	50190....	53677....	3811.8263811.8262...	H1-1b
19	M19	P2.5 STD	.030	4.4	24	.006	4.4		18	50190....	53677....	3811.8263811.8262...	H1-1b
20	M20	P2.5 STD	.087	4.4	18	.055	0		24	50190....	53677....	3811.8263811.8262...	H1-1b
21	M21	P2.5 STD	.101	1.467	20	.064	0		20	50190....	53677....	3811.8263811.8262...	H1-1b
22	M22	P2.5 STD	.084	1.467	18	.048	0		34	50190....	53677....	3811.8263811.8262...	H1-1b
23	M23	P2.5 STD	.037	4.4	14	.007	4.4		12	50190....	53677....	3811.8263811.8262...	H1-1b
24	M24	P2.5 STD	.097	4.4	12	.054	0		14	50190....	53677....	3811.8263811.8262...	H1-1b
25	M25	P2.5 STD	.198	1.467	22	.137	0		12	50190....	53677....	3811.8263811.8262...	H1-1b
26	M26	P2.5 STD	.180	1.512	4	.157	0		12	50190....	53677....	3811.8263811.8261...	H1-1b
27	M27	P2.5 STD	.053	4.4	6	.023	4.4		4	50190....	53677....	3811.8263811.8262...	H1-1b
28	M28	P2.5 STD	.210	1.467	16	.125	0		6	50190....	53677....	3811.8263811.8262...	H1-1b
29	M29	P2.5 STD	.182	1.467	12	.138	0		4	50190....	53677....	3811.8263811.8262...	H1-1b
30	M30	P2.5 STD	.213	1.467	12	.161	0		2	50190....	53677....	3811.8263811.8262...	H1-1b
31	M31	P2.5 STD	.069	4.4	24	.018	4.4		22	50190....	53677....	3811.8263811.8261...	H1-1b
32	M32	P2.5 STD	.202	1.512	14	.154	0		24	50190....	53677....	3811.8263811.8262...	H1-1b
33	M33	P2.5 STD	.198	1.467	6	.145	0		20	50190....	53677....	3811.8263811.8262...	H1-1b
34	M34	P2.5 STD	.213	1.467	4	.139	0		18	50190....	53677....	3811.8263811.8262...	H1-1b
35	M35	P2.5 STD	.069	4.4	16	.024	4.4		14	50190....	53677....	3811.8263811.8261...	H1-1b
36	M36	P2.5 STD	.211	1.467	24	.163	0		14	50190....	53677....	3811.8263811.8262...	H1-1b
37	M37	P2.5 STD	.086	3.5	12	.034	3.5		16	51444....	53677....	3811.8263811.8262...	H1-1b
38	M38	L3X3X4	.058	2.526	5	.003	4.95	y	25	27115.07	46656	1688.1383331.03 1...	H2-1
39	M39	P2.5 STD	.110	3.5	4	.062	3.5		16	51444....	53677....	3811.8263811.8262...	H1-1b
40	M40	L3X3X4	.088	2.578	5	.003	4.95	y	23	27115.07	46656	1688.1383331.03 1...	H2-1
41	M41	P2.5 STD	.118	3.5	2	.030	1.75		22	51444....	53677....	3811.8263811.8262...	H1-1b
42	M42	L3X3X4	.095	2.578	3	.003	0	y	21	27115....	46656	1688.1383331.03 1...	H2-1
43	M43	P2.5 STD	.150	3.5	24	.037	3.5		24	51444....	53677....	3811.8263811.8262...	H1-1b
44	M44	L3X3X4	.101	2.578	25	.003	4.95	y	19	27115.07	46656	1688.1383331.03 1...	H2-1
45	M45	P2.5 STD	.093	3.5	24	.035	3.5		12	51444....	53677....	3811.8263811.8261...	H1-1b
46	M46	L3X3X4	.059	2.63	24	.003	4.95	y	17	27115.07	46656	1688.1383331.03 1...	H2-1
47	M47	P2.5 STD	.087	3.5	18	.045	3.5		6	51444....	53677....	3811.8263811.8262...	H1-1b
48	M48	L3X3X4	.073	2.526	19	.003	0	y	15	27115....	46656	1688.1383331.03 1...	H2-1
49	M49	P2.5 STD	.117	3.5	18	.031	3.5		18	51444....	53677....	3811.8263811.8262...	H1-1b
50	M50	L3X3X4	.097	2.578	19	.003	4.95	y	25	27115.07	46656	1688.1383331.03 1...	H2-1
51	M51	P2.5 STD	.149	3.5	16	.038	3.5		14	51444....	53677....	3811.8263811.8262...	H1-1b
52	M52	L3X3X4	.101	2.578	17	.003	4.95	y	23	27115.07	46656	1688.1383331.03 1...	H2-1
53	M53	P2.5 STD	.092	3.5	16	.036	3.5		2	51444....	53677....	3811.8263811.8262...	H1-1b
54	M54	L3X3X4	.061	2.578	15	.003	0	y	21	27115....	46656	1688.1383331.03 1...	H2-1
55	M55	P2.5 STD	.107	3.5	12	.061	3.5		24	51444....	53677....	3811.8263811.8262...	H1-1b
56	M56	L3X3X4	.088	2.578	13	.003	4.95	y	19	27115.07	46656	1688.1383331.03 1...	H2-1

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

Member	Shape	Code Check	Loc[ft]	LC	Shear...	Loc[ft]	Dir	LC	phi*Pnc...	phi*Pnt...	phi*Mn...	phi*Mn...	Cb	Eqn
57	M57	P2.5 STD	.111	3.5	10	.034	3.5		8	51444....	53677....	3811.826	3811.826	H1-1b
58	M58	L3X3X4	.098	2.578	11	.003	4.95	y	17	27115.07	46656	1688.138	3331.03	H2-1
59	M59	P2.5 STD	.124	3.5	8	.032	1.75		4	51444....	53677....	3811.826	3811.826	H1-1b
60	M60	L3X3X4	.090	2.526	7	.003	0	y	15	27115....	46656	1688.138	3331.03	H2-1
61	M61	P2.5 STD	.440	5	14	.057	5		16	21709....	53677....	3811.826	3811.826	H1-1b
62	M62	PIPE 2.0	.121	5	12	.047	5		14	8922.084	32130	1871.625	1871.625	H1-1b
63	M63	P2.5 STD	.377	5	12	.052	5		18	21709....	53677....	3811.826	3811.826	H1-1b
64	M64	PIPE 2.0	.750	5	12	.056	5		4	8922.084	32130	1871.625	1871.625	H1-1b
65	M73	P2.5 STD	.433	5	2	.048	5		12	21709....	53677....	3811.826	3811.826	H1-1b
66	M74	PIPE 2.0	.119	5	4	.040	6.75		4	8922.084	32130	1871.625	1871.625	H1-1b
67	M75	P2.5 STD	.377	5	4	.059	5		8	21709....	53677....	3811.826	3811.826	H1-1b
68	M76	PIPE 2.0	.750	5	4	.055	5		4	8922.084	32130	1871.625	1871.625	H1-1b
69	M85	P2.5 STD	.440	5	2	.057	5		24	21709....	53677....	3811.826	3811.826	H1-1b
70	M86	P2.5 STD	.090	5	14	.043	5		24	21709....	53677....	3811.826	3811.826	H1-1b
71	M87	P2.5 STD	.373	5	16	.050	5		22	21709....	53677....	3811.826	3811.826	H1-1b
72	M88	PIPE 2.0	.747	5	16	.056	5		12	8922.084	32130	1871.625	1871.625	H1-1b