



STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

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VIA ELECTRONIC MAIL

October 9, 2018

Jeffrey Barbadora
Real Estate Specialist
Crown Castle
12 Gill Street, Suite 5800
Woburn, MA 01801

RE: **EM-SPRINT-038-180924** – Sprint notice of intent to modify an existing telecommunications facility located at 149 R Old Blue Hill Road, Durham, Connecticut.

Dear Mr. Barbadora:

The Connecticut Siting Council (Council) is in receipt of your correspondence of October 5, 2018 submitted in response to the Council's September 25, 2018 notification of an incomplete request for exempt modification with regard to the above-referenced matter.

The submission renders the request for exempt modification complete and the Council will process the request in accordance with the Federal Communications Commission 60-day timeframe.

Thank you for your attention and cooperation.

Sincerely,

Melanie A. Bachman
Executive Director

MAB/FOC/IN



Robidoux, Evan

From: Barbadora, Jeff <Jeff.Barbadora@crowncastle.com>
Sent: Friday, October 05, 2018 12:27 PM
To: Robidoux, Evan
Cc: CSC-DL Siting Council
Subject: RE: Council Incomplete Letter for EM-SPRINT-038-180924-Old Blue Hill Road-Durham
Attachments: 806364_Mount_Analysis_Rev1_06142018.pdf

Good afternoon,

Please find the mount analysis which states the new mount details. Mount analysis 4.1 Recommendations is included in the structural analysis, Table 1 Proposed Antenna and Cable Information.

Please let me know if you have additional questions and if I should send the Council hard copies of the attached mount analysis.

Thanks,

Jeffrey Barbadora
781-970-0053
12 Gill Street, Suite 5800, Woburn, MA 01801
CrownCastle.com

From: Robidoux, Evan
Sent: Friday, September 28, 2018 1:53 PM
To: Barbadora, Jeff
Cc: CSC-DL Siting Council
Subject: Council Incomplete Letter for EM-SPRINT-038-180924-Old Blue Hill Road-Durham

Please see the attached correspondence.

Evan Robidoux
Clerk Typist
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

This email may contain confidential or privileged material. Use or disclosure of it by anyone other than the recipient is unauthorized. If you are not an intended recipient, please delete this email.

May 18, 2018
Date: **June 14, 2018 (Rev.1)**



Marianne Dunst
Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Hudson Design Group LLC
45 Beechwood Drive
N. Andover, MA 01845
(978) 557-5553

Subject: Mount Structural Analysis

Carrier Designation: Sprint Equipment Change-Out
Carrier Site Number: CT03XC168
Carrier Site Name: HRT 106(B) 943202

Crown Castle Designation: **Crown Castle BU Number:** 806364
Crown Castle Site Name: HRT 106(B) 943202
Crown Castle JDE Number: 505811
Crown Castle PO Number: 1201952
Crown Castle Application Number: 441307 Rev.1

Engineering Firm Designation: **Crown Castle Report Designation:** 3774857

Site Data: 143 R Old Blue Hill Road, Durham, CT, 06422
Latitude: 41° 27' 33.67" Longitude: -72° 39' 45.83"

Structure Information: **Tower Height & Type:** 120 ft Monopole
Mount Elevation: 89 ft
Mount Width & Type: 12 ft Platform Mount

Dear Marianne Dunst,

Hudson Design Group LLC (HDG) is pleased to submit this "Mount Structural Analysis Report" to determine the structural integrity of Sprint's antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

Based upon our analysis, we have determined the adequacy of the antenna mounting system that will support the existing and proposed loading to be:

Platform Mount (Single)

Conditional

This analysis has been performed in accordance with the 2012 International Building Code and the TIA-222-G based on a basic wind speed of 120 mph as required for use in the TIA-222-G Standard Annex B. Exposure Category B with a maximum topographic factor, K_{zt} , of 1.58 and Risk Category II were used in this analysis.

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

Mount structural analysis prepared by: HDG
Respectfully Submitted by:

Michael Cabral
Structural Dept. Head
CCI Mount Analysis Report – Version 1.0.0



Daniel P. Hamm, P.E.
Principal

TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA

Table 1 - Proposed Equipment Loading Information

Table 2 - Existing and Reserved Equipment Loading Information

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

4) ANALYSIS RESULTS

Table 4 - Mount Component Stresses vs. Capacity

4.1) Recommendations

5) APPENDIX A

Wire Frame and Rendered Models

6) APPENDIX B

RAM Elements Input Calculations

7) APPENDIX C

RAM Elements Analysis Output

8) APPENDIX D

Additional Calculations

1) INTRODUCTION

This mount is a 12' low-profile platform mount. No original structural design documents or fabrication drawings were available for the existing mounts. A mount mapping was not performed at this site. HDG performed a visual assessment using field photographs and mount mapping data from similar mounts to perform this analysis. The mount is installed at an elevation of 89 ft on the 120 ft Monopole.

2) ANALYSIS CRITERIA

The mount structural analysis was conducted in accordance with the requirements of TIA-222-G, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a basic wind speed of 120 mph with no ice, 50 mph with a 1.95 inch escalated ice thickness, Exposure Category B and Topographic category 3 with a crest height of 290 ft. In addition, the mounts have been analyzed for various live loading conditions consisting of a 250 pound man live load applied individually at the midpoint and cantilevered ends of horizontal members as well as a 500 pound man live load applied individually at mount pipe locations using a 3-second gust wind speed of 30 mph.

Table 1 - Proposed Equipment Loading Information

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Proposed Mount Type	Note
89	89	3	Commscope	NNVV-65B-R4	-	1,2
		3	RFS/Celwave	APXVTM14-ALU-I20	-	1,2
		3	Alcatel Lucent	PCS 1900MHZ 4X45W-65MHZ	-	1,2
		6	Alcatel Lucent	RRH2X50-800	-	1,2
		3	Alcatel Lucent	TD-RRH8x20-25	-	1,2

Notes:

- 1) Proposed Equipment
- 2) Proposed Mount

Table 2 - Existing and Reserved Equipment Loading Information

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount Type	Note
89	-	-	-	-	12' Platform	1

Notes:

- 1) Existing Equipment

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
RFDS	Sprint	-	ON FILE

3.1) Analysis Method

RAM Elements (Version 14.0.1), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

3.2) Assumptions

- 1) The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
- 2) The configuration of antennas, mounts, and other appurtenances are as specified in Table 1 and 2 and the referenced drawings.
- 3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
- 4) Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Square, Rectangular)	ASTM A500 (GR B)
Pipe	ASTM A53 (GR 53)
Connection Bolts	ASTM A325

This analysis may be affected if any assumptions are not valid or have been made in error. Crown Castle should be notified to determine the effect on the structural integrity of the antenna mounting system.

4) ANALYSIS RESULTS

Table 4(a) - Mount Component Stresses vs. Capacity (Platform, Alpha Sector)

Notes	Component	Member No.	Centerline (ft)	% Capacity	Pass / Fail
1	Face Horizontal	80	89	36	Pass
1	Standoff Members	85	89	24	Pass
2	Mount-to-Tower Connection	-	89	48	Pass

Table 4(b) - Mount Component Stresses vs. Capacity (Platform, Beta Sector)

Notes	Component	Beam No.	Centerline (ft)	% Capacity	Pass / Fail
1	Face Horizontal	80	89	30	Pass
1	Standoff Members	88	89	21	Pass
2	Mount-to-Tower Connection	-	89	48	Pass

Table 4(c) - Mount Component Stresses vs. Capacity (Platform, Gamma Sector)

Notes	Component	Beam No.	Centerline (ft)	% Capacity	Pass / Fail
1	Face Horizontal	81	89	28	Pass
1	Standoff Members	88	89	21	Pass
2	Mount-to-Tower Connection	-	89	48	Pass

Structure Rating (max from all components) =	99%
---	------------

Notes:

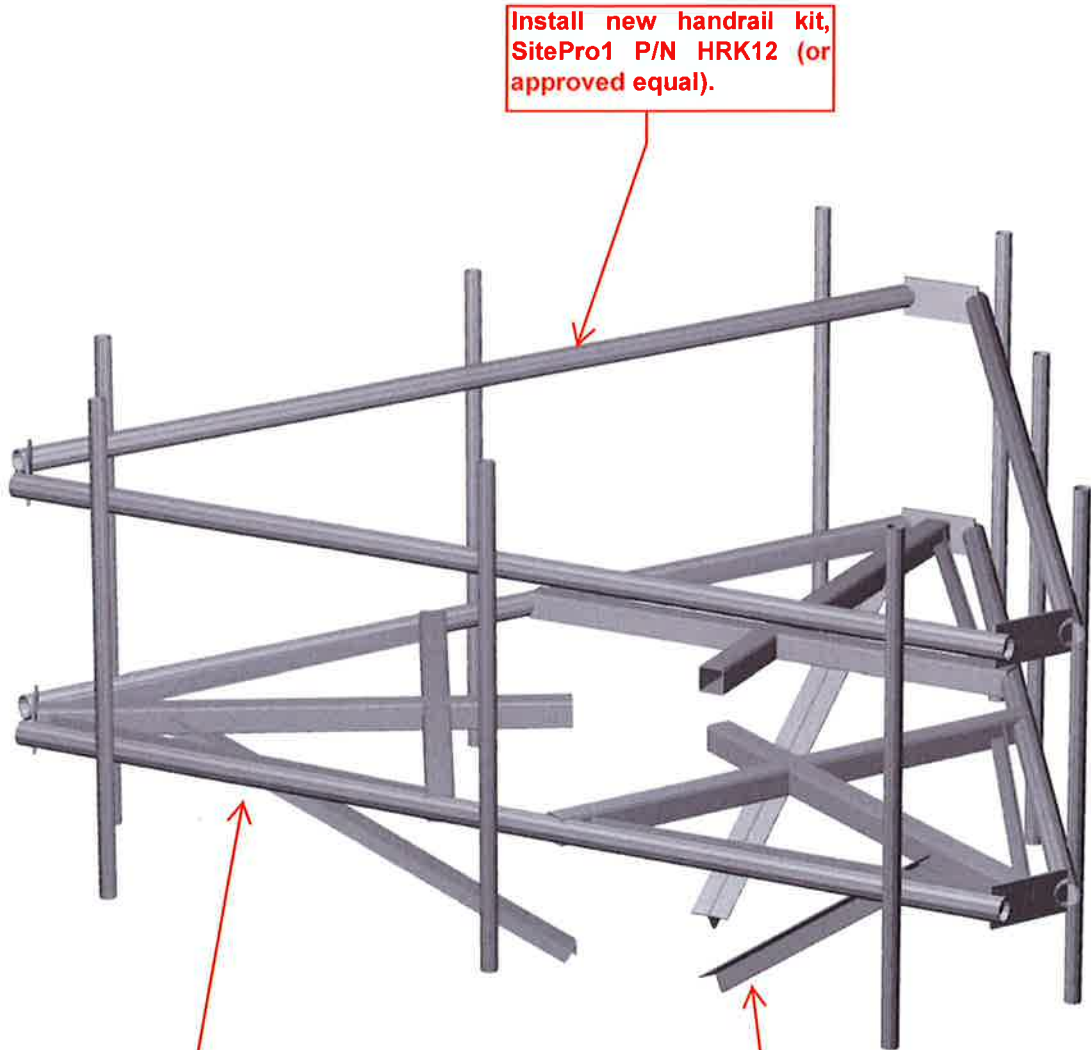
- 1) See additional documentation in "Appendix C – Analysis Output" for calculations supporting the % Capacity consumed.
- 2) See additional documentation in "Appendix D – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

The mount has sufficient capacity to support the existing and proposed loading with the following modifications:

- **Install new mount, SitePro1 P/N RMQP-496 (or approved equal).**
- **Install new handrail kit, SitePro1 P/N HRK12 (or approved equal).**
- **Install new platform reinforcement kit, SitePro1 P/N PRK-1245 (or approved equal).**

APPENDIX A
WIRE FRAMES AND RENDERED MODELS

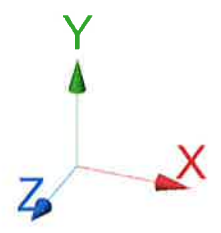
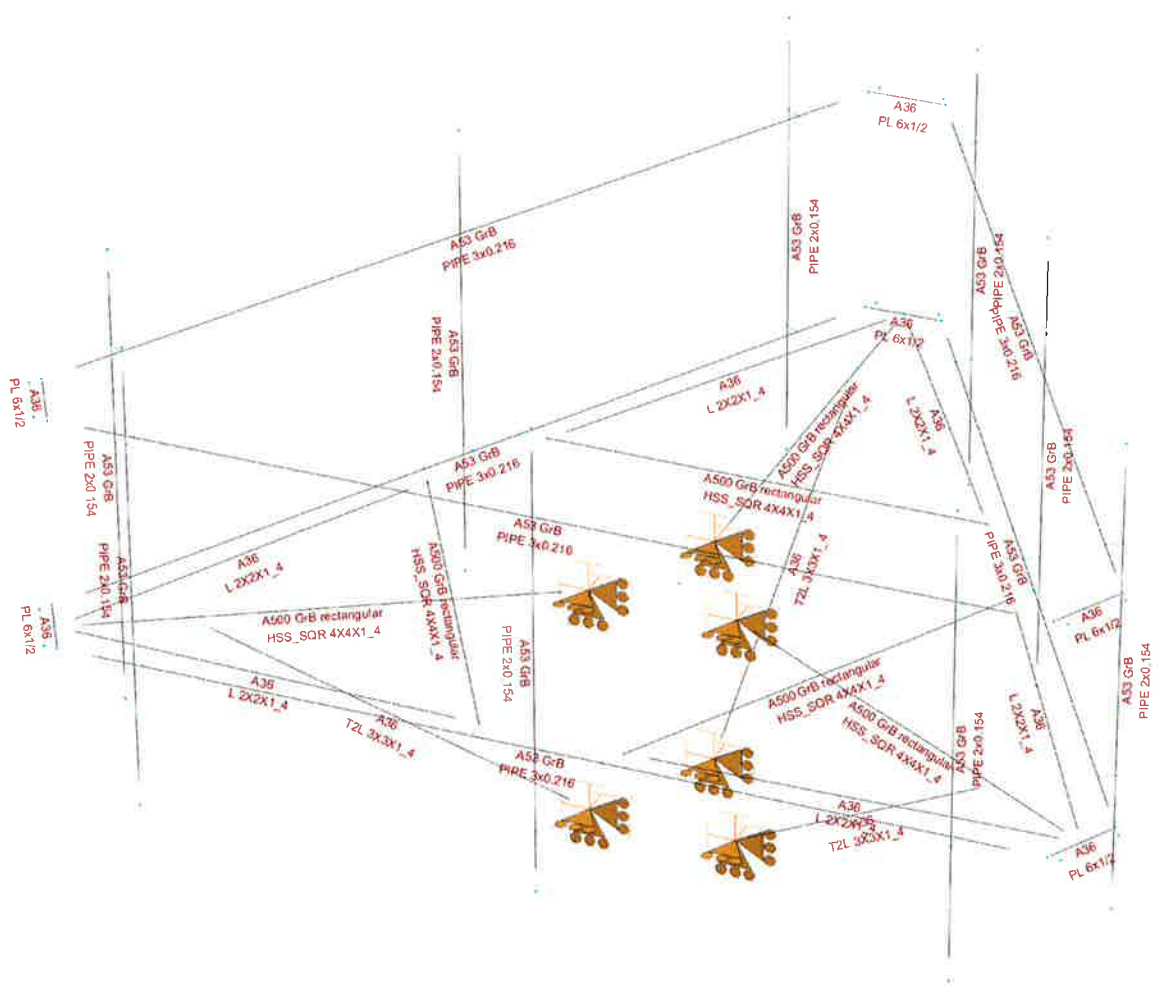


Install new handrail kit,
SitePro1 P/N HRK12 (or
approved equal).

Install new mount,
SitePro1 P/N RMQP-496
(or approved equal).

Install new platform
reinforcement kit, SitePro1
P/N PRK-1245 (or approved
equal).





APPENDIX B
RAM ELEMENTS INPUT CALCULATIONS

Date: 6/13/2018
 Project Name: HRT 106(B) 943202
 Project Number: 806364
 Designed By: BD Checked By: MSC



2.6.5.2 Velocity Pressure Coeff:

$$K_z = 2.01 (z/z_g)^{2/\alpha}$$

$K_z =$ **0.956** $z =$ 89 (ft)
 $z_g =$ 1200 (ft)
 $\alpha =$ 7.0

$K_{zmin} \leq K_z \leq 2.01$

Table 2-4

Exposure	Z_g	α	K_{zmin}	K_e
B	1200 ft	7.0	0.70	0.9
C	900 ft	9.5	0.85	1.0
D	700 ft	11.5	1.03	1.1

2.6.6.4 Topographic Factor:

Table 2-5

Topo. Category	K_t	f
2	0.43	1.25
3	0.53	2.0
4	0.72	1.5

$$K_{zt} = [1 + (K_e K_t / K_h)]^2$$

$$K_h = e^{(fz/h)}$$

$K_{zt} =$ **1.583101384**

$K_h =$ 1.847308

$K_e =$ 0.9 (from Table 2-4)

$K_t =$ 0.53 (from Table 2-5)

f = 2 (from Table 2-5)

z = 89

H = 290 (Ht. of the crest above surrounding terrain)

$K_{zt} =$ 1.58

$K_{iz} =$ 1.10 (from Sec. 2.6.8)

(If Category 1 then $K_{zt} = 1.0$)

Category = **3**

2.6.8 Design Ice Thickness

Max Ice Thickness =

$t_i =$ 0.75 in

$$t_{iz} = 2.0 * t_i * I * K_{iz} * (K_{zt})^{0.35}$$

$t_{iz} =$ 1.95 in

Date: 6/13/2018
 Project Name: HRT 106(B) 943202
 Project Number: 806364
 Designed By: BD Checked By: MSC

2.6.7 Gust Effect Factor

2.6.7.1 Self Supporting Lattice Structures

Gh = 1.0 Latticed Structures > 600 ft

Gh = 0.85 Latticed Structures 450 ft or less

$Gh = 0.85 + 0.15 [h/150 - 3.0]$

h= ht. of structure

h= 120

Gh= 0.85

2.6.7.2 Guyed Masts

Gh= 0.85

2.6.7.3 Pole Structures

Gh= 1.1

2.6.9 Appurtenances

Gh= 1.0

2.6.7.4 Structures Supported on Other Structures

(Cantilevered tubular or latticed spines, pole, structures on buildings (ht. : width ratio > 5)

Gh= 1.35

Gh= 1.00

2.6.9.2 Design Wind Force on Appurtenances

$F = q_z * Gh * (EPA)_A$

$q_z = 0.00256 * K_z * K_{zt} * K_d * V_{max}^2 * I$

$q_z = 52.99$

$q_z (ice) = 9.20$

$q_z (30) = 3.31$

$K_z = 0.956$

$K_{zt} = 1.6$

$K_d = 0.95$

$V_{max} = 120 \text{ mph}$

$V_{max (ice)} = 50 \text{ mph}$

$V_{30} = 30 \text{ mph}$

$I = 1.0$

Table 2-2

Structure Type	Wind Direction Probability Factor, Kd
Latticed structures with triangular, square or rectangular cross sections	0.85
Tubular pole structures, latticed structures with other cross sections, appurtenances	0.95

Determine Ca:

Table 2-8

Force Coefficients (Ca) for Appurtenances				
Member Type		Aspect Ratio ≤ 2.5	Aspect Ratio = 7	Aspect Ratio ≥ 25
		Ca	Ca	Ca
Flat		1.2	1.4	2.0
Round	C < 32 (Subcritical)	0.7	0.8	1.2
	32 ≤ C ≤ 64 (Transitional)	$3.76/(C^{0.485})$	$3.37/(C^{0.415})$	$38.4/(C^{1.0})$
	C > 64 (Supercritical)	0.5	0.6	0.6

Aspect Ratio is the overall length/width ratio in the plane normal to the wind direction.
 (Aspect ratio is independent of the spacing between support points of a linear appurtenance,
 Note: Linear interpolation may be used for aspect ratios other than those shown.

Ice Thickness = **1.95 in** Angle = **0 (deg)** Equivalent Angle = **180 (deg)**

Appurtenances	Height	Width	Depth	Flat Area	Aspect Ratio	Ca	Force (lbs)	Force (lbs) (w/ Ice)	Force (lbs) (30 mph)
NNVV-65B-R4 Antenna	72.0	19.6	7.8	9.80	3.67	1.25	650	143	41
APXVTM14-ALU-I20 Antenna	56.3	12.6	6.3	4.93	4.47	1.29	336	82	21
PCS 1900MHZ 4X45W-65MHZ RRH	25.0	11.1	11.4	1.93	2.25	1.20	123	33	8
PCS 1900MHZ 4X45W-65MHZ RRH (Shielded)	25.0	0.0	11.4	0.00	0.00	1.20	0	0	0
RRH2X50-800 RRH	15.8	13.0	14.0	1.43	1.22	1.20	91	26	6
RRH2X50-800 RRH (Shielded)	15.8	0.0	14.0	0.00	0.00	1.20	0	6	0
TD-RRH8x20-25 RRH	26.1	18.6	6.7	3.37	1.40	1.20	214	52	13
TD-RRH8x20-25 RRH (Shielded)	26.1	0.0	6.7	0.00	0.00	1.20	0	0	0
2" Pipe	2.4	12.0	2.4	0.20	0.20	1.20	13	8	1
3" Pipe	3.0	12.0	3.0	0.25	0.25	2.00	26	14	2

Date: 6/13/2018
 Project Name: HRT 104(B) 943202
 Project Number: 804364
 Designed By: BD Checked By: MSC



WIND LOADS

Angle = 30 (deg) Ice Thickness = 1.95 in. Equivalent Angle = 210 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Aspect Ratio	Aspect Ratio	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
NNVV-65B-R4 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	650	305	564
APXVTM14-ALU-I20 Antenna	56.3	12.6	6.3	4.93	2.46	4.47	8.94	1.29	1.46	336	191	300
PCS 1900MHZ 4X45W-65MHZ RRH	25.0	11.1	11.4	1.93	1.98	2.25	2.19	1.20	1.20	123	126	123
PCS 1900MHZ 4X45W-65MHZ RRH (Shielded)	25.0	5.6	11.4	0.96	1.98	4.50	2.19	1.29	1.20	66	126	81
RRH2X50-800 RRH	15.8	13.0	14.0	1.43	1.54	1.22	1.13	1.20	1.20	91	98	92
RRH2X50-800 RRH (Shielded)	15.8	6.5	14.0	0.71	1.54	2.43	1.13	1.20	1.20	45	98	58
TD-RRH8x20-25 RRH	26.1	18.6	6.7	3.37	1.21	1.40	3.90	1.20	1.26	214	81	181
TD-RRH8x20-25 RRH (Shielded)	26.1	9.3	6.7	1.69	1.21	2.81	3.90	1.21	1.26	108	81	102

WIND LOADS WITH ICE:

NNVV-65B-R4 Antenna	75.9	23.5	11.7	12.38	6.16	3.23	6.49	1.23	1.38	140	78	125
APXVTM14-ALU-I20 Antenna	60.2	16.5	10.2	6.89	4.26	3.65	5.91	1.25	1.35	79	53	73
PCS 1900MHZ 4X45W-65MHZ RRH	28.9	15.0	15.3	3.01	3.07	1.93	1.89	1.20	1.20	33	34	33
PCS 1900MHZ 4X45W-65MHZ RRH (Shielded)	28.9	7.5	15.3	1.50	3.07	3.85	1.89	1.26	1.20	17	34	22
RRH2X50-800 RRH	19.7	16.9	17.9	2.31	2.45	1.17	1.10	1.20	1.20	26	27	26
RRH2X50-800 RRH (Shielded)	19.7	8.4	17.9	1.15	2.45	2.33	1.10	1.20	1.20	13	27	16
TD-RRH8x20-25 RRH	30.0	22.5	10.6	4.68	2.21	1.33	2.83	1.20	1.21	52	25	45
TD-RRH8x20-25 RRH (Shielded)	30.0	11.2	10.6	2.34	2.21	2.67	2.83	1.21	1.21	26	25	26

WIND LOADS AT 30 MPH:

NNVV-65B-R4 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	41	19	35
APXVTM14-ALU-I20 Antenna	56.3	12.6	6.3	4.93	2.46	4.47	8.94	1.29	1.46	21	12	19
PCS 1900MHZ 4X45W-65MHZ RRH	25.0	11.1	11.4	1.93	1.98	2.25	2.19	1.20	1.20	8	8	8
PCS 1900MHZ 4X45W-65MHZ RRH (Shielded)	25.0	5.6	11.4	0.96	1.98	4.50	2.19	1.29	1.20	4	8	5
RRH2X50-800 RRH	15.8	13.0	14.0	1.43	1.54	1.22	1.13	1.20	1.20	6	6	6
RRH2X50-800 RRH (Shielded)	15.8	6.5	14.0	0.71	1.54	2.43	1.13	1.20	1.20	3	6	4
TD-RRH8x20-25 RRH	26.1	18.6	6.7	3.37	1.21	1.40	3.90	1.20	1.26	13	5	11
TD-RRH8x20-25 RRH (Shielded)	26.1	9.3	6.7	1.69	1.21	2.81	3.90	1.21	1.26	7	5	6

Date: 6/13/2018
 Project Name: HRT 106(B) 943202
 Project Number: 806364
 Designed By: BD Checked By: MSC



WIND LOADS

Angle = 60 (deg)

Ice Thickness = 1.95 in.

Equivalent Angle = 240 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
NNVV-65B-R4 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	650	305	391
APXVTM14-ALU-I20 Antenna	56.3	12.6	6.3	4.93	2.46	4.47	8.94	1.29	1.46	336	191	227
PCS 1900MHZ 4X45W-65MHZ RRH	25.0	11.1	11.4	1.93	1.98	2.25	2.19	1.20	1.20	123	126	125
PCS 1900MHZ 4X45W-65MHZ RRH (Shielded)	25.0	8.3	11.4	1.45	1.98	3.00	2.19	1.22	1.20	94	126	118
RRH2X50-800 RRH	15.8	13.0	14.0	1.43	1.54	1.22	1.13	1.20	1.20	91	98	96
RRH2X50-800 RRH (Shielded)	15.8	9.8	14.0	1.07	1.54	1.62	1.13	1.20	1.20	68	98	90
TD-RRH8x20-25 RRH	26.1	18.6	6.7	3.37	1.21	1.40	3.90	1.20	1.26	214	81	115
TD-RRH8x20-25 RRH (Shielded)	26.1	14.0	6.7	2.53	1.21	1.87	3.90	1.20	1.26	161	81	101

WIND LOADS WITH ICE:

NNVV-65B-R4 Antenna	75.9	23.5	11.7	12.38	6.16	3.23	6.49	1.23	1.38	140	78	94
APXVTM14-ALU-I20 Antenna	60.2	16.5	10.2	6.89	4.26	3.65	5.91	1.25	1.35	79	53	60
PCS 1900MHZ 4X45W-65MHZ RRH	28.9	15.0	15.3	3.01	3.07	1.93	1.89	1.20	1.20	33	34	34
PCS 1900MHZ 4X45W-65MHZ RRH (Shielded)	28.9	11.2	15.3	2.26	3.07	2.57	1.89	1.20	1.20	25	34	32
RRH2X50-800 RRH	19.7	16.9	17.9	2.31	2.45	1.17	1.10	1.20	1.20	26	27	27
RRH2X50-800 RRH (Shielded)	19.7	12.7	17.9	1.73	2.45	1.55	1.10	1.20	1.20	19	27	25
TD-RRH8x20-25 RRH	30.0	22.5	10.6	4.68	2.21	1.33	2.83	1.20	1.21	52	25	31
TD-RRH8x20-25 RRH (Shielded)	30.0	16.9	10.6	3.51	2.21	1.78	2.83	1.20	1.21	39	25	28

WIND LOADS AT 30 MPH:

NNVV-65B-R4 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	41	19	24
APXVTM14-ALU-I20 Antenna	56.3	12.6	6.3	4.93	2.46	4.47	8.94	1.29	1.46	21	12	14
PCS 1900MHZ 4X45W-65MHZ RRH	25.0	11.1	11.4	1.93	1.98	2.25	2.19	1.20	1.20	8	8	8
PCS 1900MHZ 4X45W-65MHZ RRH (Shielded)	25.0	8.3	11.4	1.45	1.98	3.00	2.19	1.22	1.20	6	8	7
RRH2X50-800 RRH	15.8	13.0	14.0	1.43	1.54	1.22	1.13	1.20	1.20	6	6	6
RRH2X50-800 RRH (Shielded)	15.8	9.8	14.0	1.07	1.54	1.62	1.13	1.20	1.20	4	6	6
TD-RRH8x20-25 RRH	26.1	18.6	6.7	3.37	1.21	1.40	3.90	1.20	1.26	13	5	7
TD-RRH8x20-25 RRH (Shielded)	26.1	14.0	6.7	2.53	1.21	1.87	3.90	1.20	1.26	10	5	6

Date: 6/13/2018
 Project Name: HRT 106(B) 943202
 Project Number: 806364
 Designed By: BD Checked By: MSC



WIND LOADS

Angle = 90 (deg)

Ice Thickness = 1.95 in.

Equivalent Angle = 270 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
NNVV-65B-R4 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	650	305	305
APXVTM14-ALU-I20 Antenna	56.3	12.6	6.3	4.93	2.46	4.47	8.94	1.29	1.46	336	191	191
PCS 1900MHZ 4X45W-65MHZ RRH	25.0	11.1	11.4	1.93	1.98	2.25	2.19	1.20	1.20	123	126	126
PCS 1900MHZ 4X45W-65MHZ RRH (Shielded)	25.0	0.0	11.4	0.00	1.98	0.00	2.19	1.20	1.20	0	126	126
RRH2X50-800 RRH	15.8	13.0	14.0	1.43	1.54	1.22	1.13	1.20	1.20	91	98	98
RRH2X50-800 RRH (Shielded)	15.8	0.0	14.0	0.00	1.54	0.00	1.13	1.20	1.20	0	98	98
TD-RRH8x20-25 RRH	26.1	18.6	6.7	3.37	1.21	1.40	3.90	1.20	1.26	214	81	81
TD-RRH8x20-25 RRH (Shielded)	26.1	0.0	6.7	0.00	1.21	0.00	3.90	1.20	1.26	0	81	81

WIND LOADS WITH ICE:

NNVV-65B-R4 Antenna	75.9	23.5	11.7	12.38	6.16	3.23	6.49	1.23	1.38	140	78	78
APXVTM14-ALU-I20 Antenna	60.2	16.5	10.2	6.89	4.26	3.65	5.91	1.25	1.35	79	53	53
PCS 1900MHZ 4X45W-65MHZ RRH	28.9	15.0	15.3	3.01	3.07	1.93	1.89	1.20	1.20	33	34	34
PCS 1900MHZ 4X45W-65MHZ RRH (Shielded)	28.9	3.9	15.3	0.78	3.07	7.43	1.89	1.41	1.20	10	34	34
RRH2X50-800 RRH	19.7	16.9	17.9	2.31	2.45	1.17	1.10	1.20	1.20	26	27	27
RRH2X50-800 RRH (Shielded)	19.7	3.9	17.9	0.53	2.45	5.06	1.10	1.31	1.20	6	27	27
TD-RRH8x20-25 RRH	30.0	22.5	10.6	4.68	2.21	1.33	2.83	1.20	1.21	52	25	25
TD-RRH8x20-25 RRH (Shielded)	30.0	3.9	10.6	0.81	2.21	7.71	2.83	1.42	1.21	11	25	25

WIND LOADS AT 30 MPH:

NNVV-65B-R4 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	41	19	19
APXVTM14-ALU-I20 Antenna	56.3	12.6	6.3	4.93	2.46	4.47	8.94	1.29	1.46	21	12	12
PCS 1900MHZ 4X45W-65MHZ RRH	25.0	11.1	11.4	1.93	1.98	2.25	2.19	1.20	1.20	8	8	8
PCS 1900MHZ 4X45W-65MHZ RRH (Shielded)	25.0	0.0	11.4	0.00	1.98	0.00	2.19	1.20	1.20	0	8	8
RRH2X50-800 RRH	15.8	13.0	14.0	1.43	1.54	1.22	1.13	1.20	1.20	6	6	6
RRH2X50-800 RRH (Shielded)	15.8	0.0	14.0	0.00	1.54	0.00	1.13	1.20	1.20	0	6	6
TD-RRH8x20-25 RRH	26.1	18.6	6.7	3.37	1.21	1.40	3.90	1.20	1.26	13	5	5
TD-RRH8x20-25 RRH (Shielded)	26.1	0.0	6.7	0.00	1.21	0.00	3.90	1.20	1.26	0	5	5

Date: 6/13/2018
 Project Name: HRT 104(B) 943202
 Project Number: 806364
 Designed By: BD Checked By: MSC



WIND LOADS

Angle = 120 (deg)

Ice Thickness = 1.95 in.

Equivalent Angle = 300 (deg)

WIND LOADS WITH NO ICE:

<u>Appurtenances</u>	<u>Height</u>	<u>Width</u>	<u>Depth</u>	<u>Flat Area</u> <u>(normal)</u>	<u>Flat Area</u> <u>(side)</u>	<u>Ratio</u> <u>(normal)</u>	<u>Ratio</u> <u>(side)</u>	<u>Ca</u> <u>(normal)</u>	<u>Ca</u> <u>(side)</u>	<u>Force</u> <u>(lbs)</u>	<u>Force</u> <u>(lbs)</u>	<u>Force</u> <u>(lbs)</u>
NNVV-65B-R4 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	650	305	391
APXVTM14-ALU-I20 Antenna	56.3	12.6	6.3	4.93	2.46	4.47	8.94	1.29	1.46	336	191	227
PCS 1900MHZ 4X45W-65MHZ RRH	25.0	11.1	11.4	1.93	1.98	2.25	2.19	1.20	1.20	123	126	125
PCS 1900MHZ 4X45W-65MHZ RRH (Shielded)	25.0	8.3	11.4	1.45	1.98	3.00	2.19	1.22	1.20	94	126	118
RRH2X50-800 RRH	15.8	13.0	14.0	1.43	1.54	1.22	1.13	1.20	1.20	91	98	96
RRH2X50-800 RRH (Shielded)	15.8	9.8	14.0	1.07	1.54	1.62	1.13	1.20	1.20	68	98	90
TD-RRH8x20-25 RRH	26.1	18.6	6.7	3.37	1.21	1.40	3.90	1.20	1.26	214	81	115
TD-RRH8x20-25 RRH (Shielded)	26.1	14.0	6.7	2.53	1.21	1.87	3.90	1.20	1.26	161	81	101

WIND LOADS WITH ICE:

NNVV-65B-R4 Antenna	75.9	23.5	11.7	12.38	6.16	3.23	6.49	1.23	1.38	140	78	94
APXVTM14-ALU-I20 Antenna	60.2	16.5	10.2	6.89	4.26	3.65	5.91	1.25	1.35	79	53	60
PCS 1900MHZ 4X45W-65MHZ RRH	28.9	15.0	15.3	3.01	3.07	1.93	1.89	1.20	1.20	33	34	34
PCS 1900MHZ 4X45W-65MHZ RRH (Shielded)	28.9	11.2	15.3	2.26	3.07	2.57	1.89	1.20	1.20	25	34	32
RRH2X50-800 RRH	19.7	16.9	17.9	2.31	2.45	1.17	1.10	1.20	1.20	26	27	27
RRH2X50-800 RRH (Shielded)	19.7	12.7	17.9	1.73	2.45	1.55	1.10	1.20	1.20	19	27	25
TD-RRH8x20-25 RRH	30.0	22.5	10.6	4.68	2.21	1.33	2.83	1.20	1.21	52	25	31
TD-RRH8x20-25 RRH (Shielded)	30.0	16.9	10.6	3.51	2.21	1.78	2.83	1.20	1.21	39	25	28

WIND LOADS AT 30 MPH:

NNVV-65B-R4 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	41	19	24
APXVTM14-ALU-I20 Antenna	56.3	12.6	6.3	4.93	2.46	4.47	8.94	1.29	1.46	21	12	14
PCS 1900MHZ 4X45W-65MHZ RRH	25.0	11.1	11.4	1.93	1.98	2.25	2.19	1.20	1.20	8	8	8
PCS 1900MHZ 4X45W-65MHZ RRH (Shielded)	25.0	8.3	11.4	1.45	1.98	3.00	2.19	1.22	1.20	6	8	7
RRH2X50-800 RRH	15.8	13.0	14.0	1.43	1.54	1.22	1.13	1.20	1.20	6	6	6
RRH2X50-800 RRH (Shielded)	15.8	9.8	14.0	1.07	1.54	1.62	1.13	1.20	1.20	4	6	6
TD-RRH8x20-25 RRH	26.1	18.6	6.7	3.37	1.21	1.40	3.90	1.20	1.26	13	5	7
TD-RRH8x20-25 RRH (Shielded)	26.1	14.0	6.7	2.53	1.21	1.87	3.90	1.20	1.26	10	5	6

Date: 6/13/2018
 Project Name: HRT 106(B) 943202
 Project Number: 806364
 Designed By: BD Checked By: MSC



WIND LOADS

Angle = 150 (deg)

Ice Thickness = 1.95 in.

Equivalent Angle = 330 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
NNVV-65B-R4 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	650	305	564
APXVTM14-ALU-I20 Antenna	56.3	12.6	6.3	4.93	2.46	4.47	8.94	1.29	1.46	336	191	300
PCS 1900MHZ 4X45W-65MHZ RRH	25.0	11.1	11.4	1.93	1.98	2.25	2.19	1.20	1.20	123	126	123
PCS 1900MHZ 4X45W-65MHZ RRH (Shielded)	25.0	5.6	11.4	0.96	1.98	4.50	2.19	1.29	1.20	66	126	81
RRH2X50-800 RRH	15.8	13.0	14.0	1.43	1.54	1.22	1.13	1.20	1.20	91	98	92
RRH2X50-800 RRH (Shielded)	15.8	6.5	14.0	0.71	1.54	2.43	1.13	1.20	1.20	45	98	58
TD-RRH8x20-25 RRH	26.1	18.6	6.7	3.37	1.21	1.40	3.90	1.20	1.26	214	81	181
TD-RRH8x20-25 RRH (Shielded)	26.1	9.3	6.7	1.69	1.21	2.81	3.90	1.21	1.26	108	81	102

WIND LOADS WITH ICE:

NNVV-65B-R4 Antenna	75.9	23.5	11.7	12.38	6.16	3.23	6.49	1.23	1.38	140	78	125
APXVTM14-ALU-I20 Antenna	60.2	16.5	10.2	6.89	4.26	3.65	5.91	1.25	1.35	79	53	73
PCS 1900MHZ 4X45W-65MHZ RRH	28.9	15.0	15.3	3.01	3.07	1.93	1.89	1.20	1.20	33	34	33
PCS 1900MHZ 4X45W-65MHZ RRH (Shielded)	28.9	7.5	15.3	1.50	3.07	3.85	1.89	1.26	1.20	17	34	22
RRH2X50-800 RRH	19.7	16.9	17.9	2.31	2.45	1.17	1.10	1.20	1.20	26	27	26
RRH2X50-800 RRH (Shielded)	19.7	8.4	17.9	1.15	2.45	2.33	1.10	1.20	1.20	13	27	16
TD-RRH8x20-25 RRH	30.0	22.5	10.6	4.68	2.21	1.33	2.83	1.20	1.21	52	25	45
TD-RRH8x20-25 RRH (Shielded)	30.0	11.2	10.6	2.34	2.21	2.67	2.83	1.21	1.21	26	25	26

WIND LOADS AT 30 MPH:

NNVV-65B-R4 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	41	19	35
APXVTM14-ALU-I20 Antenna	56.3	12.6	6.3	4.93	2.46	4.47	8.94	1.29	1.46	21	12	19
PCS 1900MHZ 4X45W-65MHZ RRH	25.0	11.1	11.4	1.93	1.98	2.25	2.19	1.20	1.20	8	8	8
PCS 1900MHZ 4X45W-65MHZ RRH (Shielded)	25.0	5.6	11.4	0.96	1.98	4.50	2.19	1.29	1.20	4	8	5
RRH2X50-800 RRH	15.8	13.0	14.0	1.43	1.54	1.22	1.13	1.20	1.20	6	6	6
RRH2X50-800 RRH (Shielded)	15.8	6.5	14.0	0.71	1.54	2.43	1.13	1.20	1.20	3	6	4
TD-RRH8x20-25 RRH	26.1	18.6	6.7	3.37	1.21	1.40	3.90	1.20	1.26	13	5	11
TD-RRH8x20-25 RRH (Shielded)	26.1	9.3	6.7	1.69	1.21	2.81	3.90	1.21	1.26	7	5	6

Date: 6/13/2018

Project Name: HRT 106(B) 943202

Project Number: 806364

Designed By: BD Checked By: MSC



HUDSON
Design Group LLC

ICE WEIGHT CALCULATIONS

Thickness of ice: 0.75 in.
Density of ice: 56 pcf

NNVV-65B-R4 Antenna

Weight of ice based on total radial SF area:
Height (in): 72.0
Width (in): 19.6
Depth (in): 7.8
Total weight of ice on object: 111 lbs
Weight of object: 78 lbs
Combined weight of ice and object: 189 lbs

APXVTM14-ALU-I20 Antenna

Weight of ice based on total radial SF area:
Height (in): 56.3
Width (in): 12.6
Depth (in): 6.3
Total weight of ice on object: 61 lbs
Weight of object: 57 lbs
Combined weight of ice and object: 118 lbs

PCS 1900MHZ 4X45W-65MHZ RRH

Weight of ice based on total radial SF area:
Height (in): 25.0
Width (in): 11.1
Depth (in): 11.4
Total weight of ice on object: 37 lbs
Weight of object: 60 lbs
Combined weight of ice and object: 97 lbs

RRH2X50-800 RRH

Weight of ice based on total radial SF area:
Height (in): 15.8
Width (in): 13.0
Depth (in): 14.0
Total weight of ice on object: 33 lbs
Weight of object: 64 lbs
Combined weight of ice and object: 97 lbs

TD-RRH8x20-25 RRH

Weight of ice based on total radial SF area:
Height (in): 26.1
Width (in): 18.6
Depth (in): 6.7
Total weight of ice on object: 42 lbs
Weight of object: 70 lbs
Combined weight of ice and object: 112 lbs

C 3x3.5

Weight of ice based on total radial SF area:
Height (in): 3
Width (in): 3.5
Per foot weight of ice on object: 5 plf

T2L3x3x1/4 Angles

Weight of ice based on total radial SF area:
Thickness (in): 0.25
Height (in): 3
Width (in): 3
Per foot weight of ice on object: 10 plf

2" pipe

Per foot weight of ice:
diameter (in): 2.38
Per foot weight of ice on object: 3 plf

L2x2x1/4 Angles

Weight of ice based on total radial SF area:
Thickness (in): 0.25
Height (in): 2
Width (in): 2
Per foot weight of ice on object: 4 plf

3" Pipe

Per foot weight of ice:
diameter (in): 3.5
Per foot weight of ice on object: 4 plf

HSS 4x4x1/4

Weight of ice based on total radial SF area:
Height (in): 4
Width (in): 4
Per foot weight of ice on object: 6 plf

PL 6x1/2

Weight of ice based on total radial SF area:
Height (in): 6
Width (in): 0.5
Per foot weight of ice on object: 5 plf

Load data

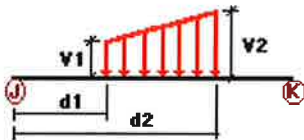
GLOSSARY

Comb : Indicates if load condition is a load combination

Load Conditions

Condition	Description	Comb.	Category
DL	Dead Load	No	DL
W0	Wind Load 0/60/120 deg	No	WIND
W30	Wind Load 30/90/150 deg	No	WIND
Di	Ice Load	No	LL
Wi0	Ice Wind Load 0/60/120 deg	No	WIND
Wi30	Ice Wind Load 30/90/150 deg	No	WIND
WL0	WL 30 mph 0/60/120 deg	No	WIND
WL30	WL 30 mph 30/90/150 deg	No	WIND
LL1	250 lb Live Load Center of Mount	No	LL
LL2	250 lb Live Load End of Mount	No	LL
LLa1	500 lb Live Load Antenna 1	No	LL
LLa2	500 lb Live Load Antenna 2	No	LL
LLa3	500 lb Live Load Antenna 3	No	LL
LLa4	500 lb Live Load Antenna 4	No	LL
W180	-W0	Yes	
W210	-W30	Yes	
Wi180	-Wi0	Yes	
Wi210	-Wi30	Yes	
WL180	-WL0	Yes	
WL210	-WL30	Yes	

Distributed force on members

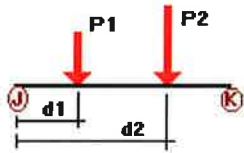


Condition	Member	Dir1	Val1 [Kip/ft]	Val2 [Kip/ft]	Dist1 [ft]	%	Dist2 [ft]	%
DL	91	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	92	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	93	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	94	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	95	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
W0	70	Z	-0.013	-0.013	0.00	Yes	100.00	Yes
	71	Z	-0.013	-0.013	0.00	Yes	100.00	Yes
	72	Z	-0.013	-0.013	0.00	Yes	100.00	Yes

	73	Z	-0.013	-0.013	0.00	Yes	100.00	Yes
	74	Z	-0.013	-0.013	0.00	Yes	100.00	Yes
	76	Z	-0.013	-0.013	0.00	Yes	100.00	Yes
	79	Z	-0.026	-0.026	0.00	Yes	100.00	Yes
	80	Z	-0.026	-0.026	0.00	Yes	100.00	Yes
	81	Z	-0.026	-0.026	0.00	Yes	100.00	Yes
	110	Z	-0.013	-0.013	0.00	Yes	100.00	Yes
	111	Z	-0.013	-0.013	0.00	Yes	100.00	Yes
	109	Z	-0.013	-0.013	0.00	Yes	100.00	Yes
W30	69	X	-0.013	-0.013	0.00	Yes	100.00	Yes
	70	X	-0.013	-0.013	0.00	Yes	100.00	Yes
	71	X	-0.013	-0.013	0.00	Yes	100.00	Yes
	72	X	-0.013	-0.013	0.00	Yes	100.00	Yes
	73	X	-0.013	-0.013	0.00	Yes	100.00	Yes
	74	X	-0.013	-0.013	0.00	Yes	100.00	Yes
	75	X	-0.013	-0.013	0.00	Yes	100.00	Yes
	76	X	-0.013	-0.013	0.00	Yes	100.00	Yes
	77	X	-0.013	-0.013	0.00	Yes	100.00	Yes
	79	X	-0.026	-0.026	0.00	Yes	100.00	Yes
	80	X	-0.026	-0.026	0.00	Yes	100.00	Yes
	81	X	-0.026	-0.026	0.00	Yes	100.00	Yes
	110	X	-0.013	-0.013	0.00	Yes	100.00	Yes
	111	X	-0.013	-0.013	0.00	Yes	100.00	Yes
	109	X	-0.013	-0.013	0.00	Yes	100.00	Yes
Di	69	Y	-0.003	-0.003	0.00	Yes	100.00	Yes
		Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	70	Y	-0.003	-0.003	0.00	Yes	100.00	Yes
		Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	71	Y	-0.003	-0.003	0.00	Yes	100.00	Yes
		Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	72	Y	-0.003	-0.003	0.00	Yes	100.00	Yes
		Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	73	Y	-0.003	-0.003	0.00	Yes	100.00	Yes
		Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	74	Y	-0.003	-0.003	0.00	Yes	100.00	Yes
		Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	75	Y	-0.003	-0.003	0.00	Yes	100.00	Yes
		Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	76	Y	-0.003	-0.003	0.00	Yes	100.00	Yes
		Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	77	Y	-0.003	-0.003	0.00	Yes	100.00	Yes
		Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	82	Y	-0.005	-0.005	0.00	Yes	100.00	Yes
	83	Y	-0.005	-0.005	0.00	Yes	100.00	Yes
	84	Y	-0.005	-0.005	0.00	Yes	100.00	Yes
	85	Y	-0.006	-0.006	0.00	Yes	100.00	Yes
	86	Y	-0.006	-0.006	0.00	Yes	100.00	Yes
	87	Y	-0.006	-0.006	0.00	Yes	100.00	Yes
	88	Y	-0.006	-0.006	0.00	Yes	100.00	Yes
	89	Y	-0.006	-0.006	0.00	Yes	100.00	Yes
	90	Y	-0.006	-0.006	0.00	Yes	100.00	Yes
	91	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	92	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	93	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	94	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	95	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	96	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	110	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	111	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	124	Y	-0.005	-0.005	0.00	Yes	100.00	Yes

	125	Y	-0.005	-0.005	0.00	Yes	100.00	Yes
	126	Y	-0.005	-0.005	0.00	Yes	100.00	Yes
	127	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	128	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	129	Y	-0.01	-0.01	0.00	Yes	100.00	Yes
	109	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
Wi0	70	Z	-0.008	-0.008	0.00	Yes	100.00	Yes
	71	Z	-0.008	-0.008	0.00	Yes	100.00	Yes
	72	Z	-0.008	-0.008	0.00	Yes	100.00	Yes
	73	Z	-0.008	-0.008	0.00	Yes	100.00	Yes
	74	Z	-0.008	-0.008	0.00	Yes	100.00	Yes
	76	Z	-0.008	-0.008	0.00	Yes	100.00	Yes
Wi30	69	X	-0.008	-0.008	0.00	Yes	100.00	Yes
	70	X	-0.008	-0.008	0.00	Yes	100.00	Yes
	71	X	-0.008	-0.008	0.00	Yes	100.00	Yes
	72	X	-0.008	-0.008	0.00	Yes	100.00	Yes
	73	X	-0.008	-0.008	0.00	Yes	100.00	Yes
	74	X	-0.008	-0.008	0.00	Yes	100.00	Yes
	75	X	-0.008	-0.008	0.00	Yes	100.00	Yes
	76	X	-0.008	-0.008	0.00	Yes	100.00	Yes
	77	X	-0.008	-0.008	0.00	Yes	100.00	Yes

Concentrated forces on members



Condition	Member	Dir1	Value1 [Kip]	Dist1 [ft]	%
DL	69	y	-0.039	0.00	No
		y	-0.039	6.00	No
		y	-0.07	3.00	No
	70	y	-0.029	0.66	No
		y	-0.029	5.34	No
		y	-0.06	3.00	No
	71	y	-0.064	2.00	No
		y	-0.064	4.00	No
	72	y	-0.029	0.66	No
		y	-0.029	5.34	No
		y	-0.06	3.00	No
	73	y	-0.039	0.00	No
		y	-0.039	6.00	No
		y	-0.07	3.00	No
	74	y	-0.064	2.00	No
		y	-0.064	4.00	No
		y	-0.029	0.66	No
	75	y	-0.029	5.34	No
		y	-0.06	3.00	No
		y	-0.039	0.00	No
	76	y	-0.039	6.00	No
		y	-0.039	6.00	No
		y	-0.07	3.00	No
	77	y	-0.064	2.00	No
y		-0.064	4.00	No	

W0	69	z	-0.325	0.00	No
		z	-0.325	6.00	No
	70	z	-0.114	0.66	No
		z	-0.114	5.34	No
	71	z	-0.151	2.00	No
		z	-0.151	4.00	No
	72	z	-0.114	0.66	No
		z	-0.114	5.34	No
	73	z	-0.196	0.00	No
		z	-0.196	6.00	No
	74	z	-0.151	2.00	No
		z	-0.151	4.00	No
	75	z	-0.168	0.66	No
		z	-0.168	5.34	No
76	z	-0.196	0.00	No	
	z	-0.196	6.00	No	
W30	69	x	-0.153	0.00	No
		x	-0.153	6.00	No
	70	x	-0.081	3.00	No
		x	-0.15	0.66	No
	71	x	-0.15	5.34	No
		x	-0.081	3.00	No
	72	x	-0.092	2.00	No
		x	-0.092	4.00	No
	73	x	-0.15	0.66	No
		x	-0.15	5.34	No
	74	x	-0.081	3.00	No
		x	-0.282	0.00	No
	75	x	-0.282	6.00	No
		x	-0.102	3.00	No
76	x	-0.092	2.00	No	
	x	-0.092	4.00	No	
77	x	-0.096	0.66	No	
	x	-0.096	5.34	No	
Di	69	y	-0.126	3.00	No
		y	-0.282	0.00	No
	70	y	-0.282	6.00	No
		y	-0.102	3.00	No
	71	y	-0.098	2.00	No
		y	-0.098	4.00	No
	72	y	-0.056	0.00	No
		y	-0.056	6.00	No
	73	y	-0.042	3.00	No
		y	-0.031	0.66	No
	74	y	-0.031	5.34	No
		y	-0.037	3.00	No
	75	y	-0.033	2.00	No
		y	-0.033	4.00	No
76	y	-0.031	0.66	No	
	y	-0.031	5.34	No	
77	y	-0.037	3.00	No	
	y	-0.056	0.00	No	
78	y	-0.056	6.00	No	
	y	-0.042	3.00	No	
79	y	-0.033	2.00	No	
	y	-0.033	4.00	No	
80	y	-0.031	0.66	No	
	y	-0.031	5.34	No	

		y	-0.037	3.00	No
	76	y	-0.056	0.00	No
		y	-0.056	6.00	No
		y	-0.042	3.00	No
	77	y	-0.033	2.00	No
		y	-0.033	4.00	No
Wi0	69	z	-0.072	0.00	No
		z	-0.072	6.00	No
	70	z	-0.03	0.66	No
		z	-0.03	5.34	No
	71	z	-0.031	2.00	No
		z	-0.031	4.00	No
	72	z	-0.03	0.66	No
		z	-0.03	5.34	No
	73	z	-0.047	0.00	No
		z	-0.047	6.00	No
	74	z	-0.031	2.00	No
		z	-0.031	4.00	No
	75	z	-0.041	0.66	No
		z	-0.041	5.34	No
	76	z	-0.047	0.00	No
		z	-0.047	6.00	No
	77	z	-0.052	2.00	No
		z	-0.052	4.00	No
Wi30	69	x	-0.039	0.00	No
		x	-0.039	6.00	No
		x	-0.025	3.00	No
	70	x	-0.037	0.66	No
		x	-0.037	5.34	No
		x	-0.022	3.00	No
	71	x	-0.026	2.00	No
		x	-0.026	4.00	No
	72	x	-0.037	0.66	No
		x	-0.037	5.34	No
		x	-0.022	3.00	No
	73	x	-0.063	0.00	No
		x	-0.063	6.00	No
		x	-0.026	3.00	No
	74	x	-0.026	2.00	No
		x	-0.026	4.00	No
	75	x	-0.027	0.66	No
		x	-0.027	5.34	No
		x	-0.034	3.00	No
	76	x	-0.063	0.00	No
		x	-0.063	6.00	No
		x	-0.026	3.00	No
	77	x	-0.027	2.00	No
		x	-0.027	4.00	No
Wl0	69	z	-0.021	0.00	No
		z	-0.021	6.00	No
	70	z	-0.007	0.66	No
		z	-0.007	5.34	No
	71	z	-0.006	2.00	No
		z	-0.006	4.00	No
	72	z	-0.007	0.66	No
		z	-0.007	5.34	No
	73	z	-0.012	0.00	No
		z	-0.012	6.00	No
	74	z	-0.006	2.00	No
		z	-0.006	4.00	No

	75	z	-0.011	0.66	No
		z	-0.011	5.34	No
	76	z	-0.012	0.00	No
		z	-0.012	6.00	No
	77	z	-0.013	2.00	No
		z	-0.013	4.00	No
WL30	69	x	-0.01	0.00	No
		x	-0.01	6.00	No
		x	-0.005	3.00	No
	70	x	-0.01	0.66	No
		x	-0.01	5.34	No
		x	-0.005	3.00	No
	71	x	-0.006	2.00	No
		x	-0.006	4.00	No
	72	x	-0.01	0.66	No
		x	-0.01	5.34	No
		x	-0.005	3.00	No
	73	x	-0.018	0.00	No
		x	-0.018	6.00	No
		x	-0.006	3.00	No
	74	x	-0.006	2.00	No
		x	-0.006	4.00	No
	75	x	-0.006	0.66	No
		x	-0.006	5.34	No
		x	-0.008	3.00	No
	76	x	-0.018	0.00	No
		x	-0.018	6.00	No
		x	-0.006	3.00	No
	77	x	-0.006	2.00	No
		x	-0.006	4.00	No
LLa1	75	y	-0.50	3.00	No
LLa2	69	y	-0.50	3.00	No

Self weight multipliers for load conditions

Condition	Description	Self weight multiplier			
		Comb.	MultX	MultY	MultZ
DL	Dead Load	No	0.00	-1.00	0.00
W0	Wind Load 0/60/120 deg	No	0.00	0.00	0.00
W30	Wind Load 30/90/150 deg	No	0.00	0.00	0.00
Di	Ice Load	No	0.00	0.00	0.00
Wi0	Ice Wind Load 0/60/120 deg	No	0.00	0.00	0.00
Wi30	Ice Wind Load 30/90/150 deg	No	0.00	0.00	0.00
WL0	WL 30 mph 0/60/120 deg	No	0.00	0.00	0.00
WL30	WL 30 mph 30/90/150 deg	No	0.00	0.00	0.00
LL1	250 lb Live Load Center of Mount	No	0.00	0.00	0.00
LL2	250 lb Live Load End of Mount	No	0.00	0.00	0.00
LLa1	500 lb Live Load Antenna 1	No	0.00	0.00	0.00
LLa2	500 lb Live Load Antenna 2	No	0.00	0.00	0.00
LLa3	500 lb Live Load Antenna 3	No	0.00	0.00	0.00
LLa4	500 lb Live Load Antenna 4	No	0.00	0.00	0.00
W180	-W0	Yes	0.00	0.00	0.00
W210	-W30	Yes	0.00	0.00	0.00
Wi180	-Wi0	Yes	0.00	0.00	0.00
Wi210	-Wi30	Yes	0.00	0.00	0.00

WL180	-WL0	Yes	0.00	0.00	0.00
WL210	-WL30	Yes	0.00	0.00	0.00

Earthquake (Dynamic analysis only)

Condition	a/g	Ang. [Deg]	Damp. [%]
DL	0.00	0.00	0.00
W0	0.00	0.00	0.00
W30	0.00	0.00	0.00
Di	0.00	0.00	0.00
Wi0	0.00	0.00	0.00
Wi30	0.00	0.00	0.00
WL0	0.00	0.00	0.00
WL30	0.00	0.00	0.00
LL1	0.00	0.00	0.00
LL2	0.00	0.00	0.00
LLa1	0.00	0.00	0.00
LLa2	0.00	0.00	0.00
LLa3	0.00	0.00	0.00
LLa4	0.00	0.00	0.00
W180	0.00	0.00	0.00
W210	0.00	0.00	0.00
Wi180	0.00	0.00	0.00
Wi210	0.00	0.00	0.00
WL180	0.00	0.00	0.00
WL210	0.00	0.00	0.00

Geometry data

GLOSSARY

Cb22, Cb33	: Moment gradient coefficients
Cm22, Cm33	: Coefficients applied to bending term in interaction formula
d0	: Tapered member section depth at J end of member
DJX	: Rigid end offset distance measured from J node in axis X
DJY	: Rigid end offset distance measured from J node in axis Y
DJZ	: Rigid end offset distance measured from J node in axis Z
DKX	: Rigid end offset distance measured from K node in axis X
DKY	: Rigid end offset distance measured from K node in axis Y
DKZ	: Rigid end offset distance measured from K node in axis Z
dL	: Tapered member section depth at K end of member
Ig factor	: Inertia reduction factor (Effective Inertia/Gross Inertia) for reinforced concrete members
K22	: Effective length factor about axis 2
K33	: Effective length factor about axis 3
L22	: Member length for calculation of axial capacity
L33	: Member length for calculation of axial capacity
LB pos	: Lateral unbraced length of the compression flange in the positive side of local axis 2
LB neg	: Lateral unbraced length of the compression flange in the negative side of local axis 2
RX	: Rotation about X
RY	: Rotation about Y
RZ	: Rotation about Z
TO	: 1 = Tension only member 0 = Normal member
TX	: Translation in X
TY	: Translation in Y
TZ	: Translation in Z

Nodes

Node	X [ft]	Y [ft]	Z [ft]	Rigid Floor
170	-0.7253	0.00	0.00	0
171	-6.0833	0.00	0.00	0
172	-6.25	0.00	0.00	0
173	-6.3333	0.00	-0.433	0
174	-6.5833	0.00	-0.866	0
175	-3.7376	0.00	-5.2176	0
176	-3.9043	0.00	-5.5062	0
177	-0.892	0.00	-0.2887	0
178	-6.6667	0.00	-0.7217	0
179	-3.179	0.00	-6.7625	0
180	-2.8457	0.00	-6.7625	0
181	-0.50	0.00	-11.4027	0
182	-0.4167	0.00	-11.547	0
183	0.7253	0.00	0.00	0
184	6.0833	0.00	0.00	0
185	6.25	0.00	0.00	0
186	6.3333	0.00	-0.433	0
187	6.5833	0.00	-0.866	0
188	3.7376	0.00	-5.2176	0
189	3.9043	0.00	-5.5062	0
190	0.892	0.00	-0.2887	0
191	6.6667	0.00	-0.7217	0

192	3.179	0.00	-6.7625	0
193	2.8457	0.00	-6.7625	0
194	0.50	0.00	-11.4027	0
195	0.4167	0.00	-11.547	0
196	0.00	0.00	-11.4027	0
201	0.9427	0.00	-3.5453	0
202	0.00	0.00	-5.1781	0
203	-0.9427	0.00	-3.5453	0
249	0.00	0.00	-4.0909	0
250	-3.5428	0.00	-6.1363	0
251	-3.716	0.00	-6.2363	0
252	-3.716	4.25	-6.2363	0
253	-3.716	-1.75	-6.2363	0
254	-6.0428	0.00	-1.8062	0
255	-6.216	0.00	-1.9062	0
256	-6.216	4.25	-1.9062	0
257	-6.216	-1.75	-1.9062	0
258	-1.0428	0.00	-10.4665	0
259	-1.216	0.00	-10.5665	0
260	-1.216	4.25	-10.5665	0
261	-1.216	-1.75	-10.5665	0
274	1.0428	0.00	-10.4664	0
275	1.216	0.00	-10.5664	0
276	1.216	4.25	-10.5664	0
277	1.216	-1.75	-10.5664	0
278	3.5428	0.00	-6.1363	0
279	3.716	0.00	-6.2363	0
280	3.716	4.25	-6.2363	0
281	3.716	-1.75	-6.2363	0
282	6.0428	0.00	-1.8062	0
283	6.216	0.00	-1.9062	0
284	6.216	4.25	-1.9062	0
285	6.216	-1.75	-1.9062	0
286	5.00	0.00	0.00	0
287	5.00	0.00	0.20	0
288	5.00	4.25	0.20	0
289	5.00	-1.75	0.20	0
290	0.00	0.00	0.00	0
291	0.00	0.00	0.20	0
292	0.00	4.25	0.20	0
293	0.00	-1.75	0.20	0
294	-5.00	0.00	0.00	0
295	-5.00	0.00	0.20	0
296	-5.00	4.25	0.20	0
297	-5.00	-1.75	0.20	0
306	-3.5428	3.00	-6.1363	0
307	-3.716	3.00	-6.2363	0
308	-1.0428	3.00	-10.4665	0
309	-1.216	3.00	-10.5665	0
310	1.0428	3.00	-10.4664	0
311	1.216	3.00	-10.5664	0
312	3.5428	3.00	-6.1363	0
313	3.716	3.00	-6.2363	0
314	6.0428	3.00	-1.8062	0
315	6.216	3.00	-1.9062	0
316	5.00	3.00	0.00	0
317	5.00	3.00	0.20	0
318	0.00	3.00	0.00	0
319	0.00	3.00	0.20	0
320	-5.00	3.00	0.00	0

321	-5.00	3.00	0.20	0
322	-6.0428	3.00	-1.8062	0
323	-6.216	3.00	-1.9062	0
324	-6.6667	3.00	-0.7217	0
325	-0.4167	3.00	-11.547	0
326	6.25	3.00	0.00	0
327	-6.25	3.00	0.00	0
328	0.4167	3.00	-11.547	0
329	6.6667	3.00	-0.7217	0
330	-0.9427	-3.00	-3.5453	0
331	0.00	-3.00	-5.1781	0
332	0.9427	-3.00	-3.5453	0
333	-0.50	3.00	-11.4027	0
334	0.50	3.00	-11.4027	0
335	-6.0833	3.00	0.00	0
336	-6.5833	3.00	-0.866	0
337	6.5833	3.00	-0.866	0
338	6.0833	3.00	0.00	0
339	0.00	0.00	-9.8465	0
340	4.9857	0.00	-1.2111	0
341	-4.9857	0.00	-1.2111	0

Restraints

Node	TX	TY	TZ	RX	RY	RZ
201	1	1	1	1	1	1
202	1	1	1	1	1	1
203	1	1	1	1	1	1
330	1	1	1	1	1	1
331	1	1	1	1	1	1
332	1	1	1	1	1	1

Members

Member	NJ	NK	Description	Section	Material	d0 [in]	dL [in]	Ig factor
69	296	297		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
70	257	256		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
71	252	253		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
72	277	276		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
73	261	260		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
74	281	280		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
75	289	288		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
76	285	284		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
77	292	293		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
79	195	191		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
80	185	172		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
81	178	182		PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
82	181	194		PL 6x1/2	A36	0.00	0.00	0.00
83	187	184		PL 6x1/2	A36	0.00	0.00	0.00
84	171	174		PL 6x1/2	A36	0.00	0.00	0.00





85	196	202	HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
86	201	186	HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
87	203	173	HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
88	189	183	HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
89	170	176	HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
90	179	192	HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
91	190	186	L 2X2X1_4	A36	0.00	0.00	0.00
92	186	188	L 2X2X1_4	A36	0.00	0.00	0.00
93	193	196	L 2X2X1_4	A36	0.00	0.00	0.00
94	196	180	L 2X2X1_4	A36	0.00	0.00	0.00
95	175	173	L 2X2X1_4	A36	0.00	0.00	0.00
96	173	177	L 2X2X1_4	A36	0.00	0.00	0.00
110	326	327	PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
111	328	329	PIPE 3x0.216	A53 GrB	0.00	0.00	0.00
124	333	334	PL 6x1/2	A36	0.00	0.00	0.00
125	335	336	PL 6x1/2	A36	0.00	0.00	0.00
126	337	338	PL 6x1/2	A36	0.00	0.00	0.00
127	339	331	T2L 3X3X1_4	A36	0.00	0.00	0.00
128	340	332	T2L 3X3X1_4	A36	0.00	0.00	0.00
129	341	330	T2L 3X3X1_4	A36	0.00	0.00	0.00
109	324	325	PIPE 3x0.216	A53 GrB	0.00	0.00	0.00

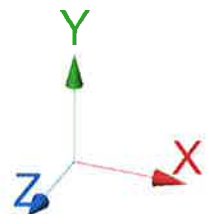
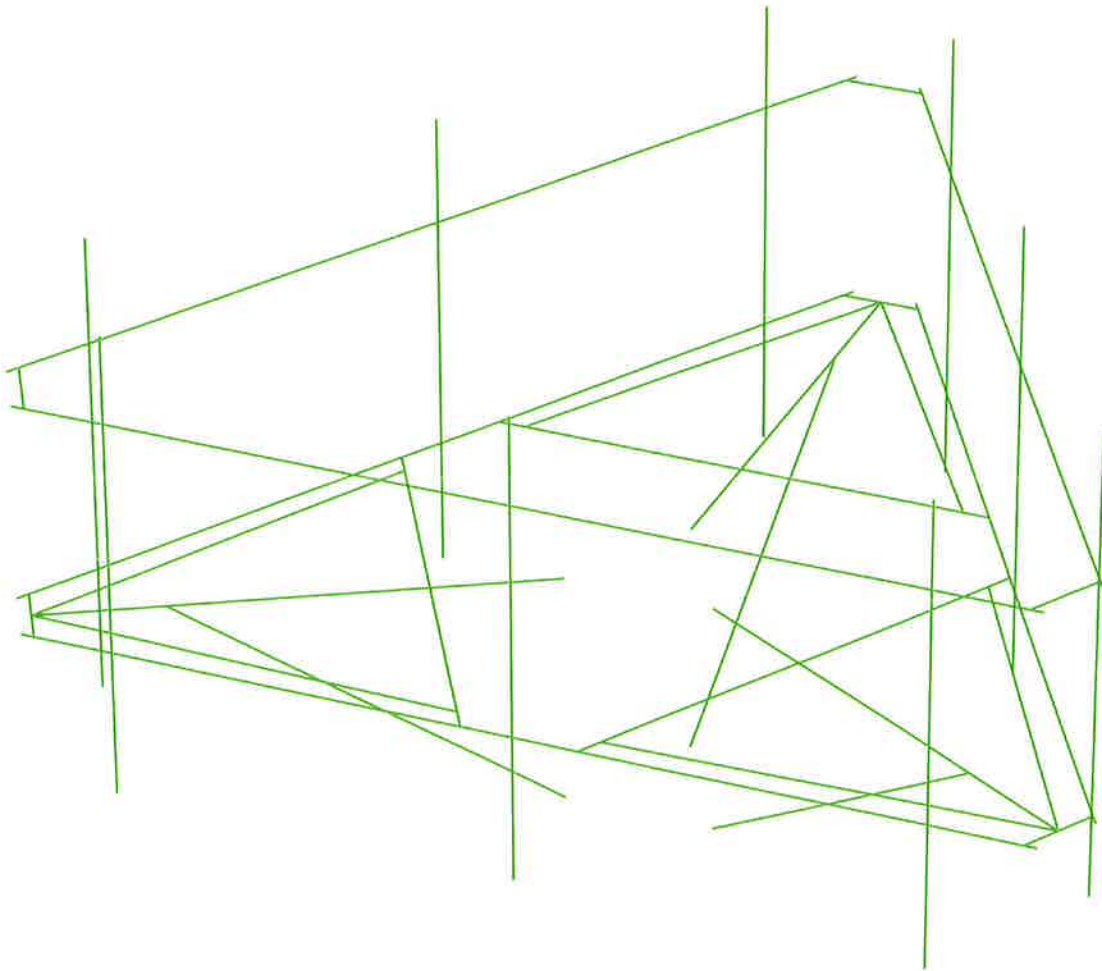
Orientation of local axes

Member	Rotation [Deg]	Axes23	NX	NY	NZ
91	270.00	0	0.00	0.00	0.00
92	270.00	0	0.00	0.00	0.00
93	270.00	0	0.00	0.00	0.00
94	270.00	0	0.00	0.00	0.00
95	270.00	0	0.00	0.00	0.00
96	270.00	0	0.00	0.00	0.00

APPENDIX C
RAM ELEMENTS ANALYSIS OUTPUT

Design status

-  Not designed
-  Error on design
-  Design O.K.
-  With warnings



Steel Code Check

Report: Summary - For all selected load conditions

Load conditions to be included in design :

- W180=-W0
- W210=-W30
- Wi180=-Wi0
- Wi210=-Wi30
- WL180=-WL0
- WL210=-WL30
- LC1=1.2DL+1.6W0
- LC2=1.2DL+1.6W30
- LC3=1.2DL-1.6W0
- LC4=1.2DL-1.6W30
- LC5=0.9DL+1.6W0
- LC6=0.9DL+1.6W30
- LC7=0.9DL-1.6W0
- LC8=0.9DL-1.6W30
- LC9=1.2DL+Di+Wi0
- LC10=1.2DL+Di+Wi30
- LC11=1.2DL+Di-Wi0
- LC12=1.2DL+Di-Wi30
- LC13=1.2DL
- LC14=0.9DL
- LC15=1.2DL+1.5LL1
- LC16=1.2DL+1.5LL2
- LC17=1.2DL+WL0+1.5LLa1
- LC18=1.2DL+WL30+1.5LLa1
- LC19=1.2DL-WL0+1.5LLa1
- LC20=1.2DL-WL30+1.5LLa1
- LC21=1.2DL+WL0+1.5LLa2
- LC22=1.2DL+WL30+1.5LLa2
- LC23=1.2DL-WL0+1.5LLa2
- LC24=1.2DL-WL30+1.5LLa2
- LC25=1.2DL+WL0+1.5LLa3
- LC26=1.2DL+WL30+1.5LLa3
- LC27=1.2DL-WL0+1.5LLa3
- LC28=1.2DL-WL30+1.5LLa3
- LC29=1.2DL+WL0+1.5LLa4
- LC30=1.2DL+WL30+1.5LLa4
- LC31=1.2DL-WL0+1.5LLa4
- LC32=1.2DL-WL30+1.5LLa4

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	HSS_SQR 4X4X1_4	85	LC1 at 25.00%	0.16	OK	Eq. H1-1b
			LC10 at 25.00%	0.10	OK	
			LC11 at 22.92%	0.09	OK	
			LC12 at 25.00%	0.10	OK	
			LC13 at 25.00%	0.06	OK	
			LC14 at 25.00%	0.04	OK	
			LC15 at 25.00%	0.06	OK	
			LC16 at 25.00%	0.06	OK	
			LC17 at 25.00%	0.06	OK	
			LC18 at 25.00%	0.05	OK	
			LC19 at 22.92%	0.05	OK	

LC2 at 100.00%	0.24	OK	Eq. H1-1b
LC20 at 22.92%	0.05	OK	
LC21 at 22.92%	0.06	OK	
LC22 at 22.92%	0.05	OK	
LC23 at 22.92%	0.05	OK	
LC24 at 22.92%	0.05	OK	
LC25 at 25.00%	0.06	OK	
LC26 at 25.00%	0.06	OK	
LC27 at 22.92%	0.06	OK	
LC28 at 25.00%	0.06	OK	
LC29 at 25.00%	0.06	OK	
LC3 at 100.00%	0.05	OK	
LC30 at 25.00%	0.06	OK	
LC31 at 22.92%	0.06	OK	
LC32 at 25.00%	0.06	OK	
LC4 at 100.00%	0.24	OK	
LC5 at 25.00%	0.14	OK	
LC6 at 100.00%	0.23	OK	
LC7 at 22.92%	0.06	OK	
LC8 at 100.00%	0.23	OK	
LC9 at 25.00%	0.11	OK	
W180 at 25.00%	0.06	OK	Eq. H1-1b
W210 at 100.00%	0.13	OK	
Wi180 at 25.00%	0.01	OK	
Wi210 at 100.00%	0.03	OK	
WL180 at 25.00%	0.00	OK	
WL210 at 100.00%	0.01	OK	

86

LC1 at 0.00%	0.16	OK	Eq. H1-1b
LC10 at 75.00%	0.09	OK	
LC11 at 75.00%	0.11	OK	
LC12 at 75.00%	0.11	OK	
LC13 at 75.00%	0.06	OK	
LC14 at 75.00%	0.05	OK	
LC15 at 75.00%	0.06	OK	
LC16 at 75.00%	0.06	OK	
LC17 at 75.00%	0.13	OK	
LC18 at 75.00%	0.13	OK	
LC19 at 75.00%	0.14	OK	
LC2 at 0.00%	0.10	OK	
LC20 at 75.00%	0.14	OK	Eq. H1-1b
LC21 at 75.00%	0.06	OK	
LC22 at 75.00%	0.06	OK	
LC23 at 75.00%	0.06	OK	
LC24 at 75.00%	0.07	OK	
LC25 at 75.00%	0.06	OK	
LC26 at 75.00%	0.06	OK	
LC27 at 75.00%	0.06	OK	
LC28 at 75.00%	0.06	OK	
LC29 at 75.00%	0.06	OK	
LC3 at 0.00%	0.18	OK	Eq. H1-1b
LC30 at 75.00%	0.06	OK	
LC31 at 75.00%	0.06	OK	
LC32 at 75.00%	0.06	OK	
LC4 at 72.92%	0.16	OK	Eq. H1-1b
LC5 at 0.00%	0.16	OK	
LC6 at 0.00%	0.10	OK	
LC7 at 0.00%	0.17	OK	
LC8 at 72.92%	0.15	OK	
LC9 at 75.00%	0.10	OK	
W180 at 0.00%	0.09	OK	
W210 at 72.92%	0.07	OK	
Wi180 at 0.00%	0.02	OK	
Wi210 at 72.92%	0.02	OK	

	WL180 at 0.00%	0.00	OK	
	WL210 at 72.92%	0.00	OK	
87	LC1 at 0.00%	0.20	OK	Eq. H1-1b
	LC10 at 75.00%	0.11	OK	
	LC11 at 75.00%	0.11	OK	
	LC12 at 75.00%	0.09	OK	
	LC13 at 75.00%	0.06	OK	
	LC14 at 75.00%	0.05	OK	
	LC15 at 75.00%	0.06	OK	
	LC16 at 75.00%	0.06	OK	
	LC17 at 75.00%	0.06	OK	
	LC18 at 75.00%	0.07	OK	
	LC19 at 75.00%	0.06	OK	
	LC2 at 72.92%	0.16	OK	Eq. H1-1b
	LC20 at 75.00%	0.06	OK	
	LC21 at 75.00%	0.13	OK	
	LC22 at 75.00%	0.14	OK	Eq. H1-1b
	LC23 at 75.00%	0.14	OK	
	LC24 at 75.00%	0.13	OK	
	LC25 at 75.00%	0.06	OK	
	LC26 at 75.00%	0.06	OK	
	LC27 at 75.00%	0.06	OK	
	LC28 at 75.00%	0.06	OK	
	LC29 at 75.00%	0.06	OK	
	LC3 at 0.00%	0.22	OK	Eq. H1-1b
	LC30 at 75.00%	0.06	OK	
	LC31 at 75.00%	0.06	OK	
	LC32 at 75.00%	0.06	OK	
	LC4 at 0.00%	0.10	OK	
	LC5 at 0.00%	0.20	OK	
	LC6 at 72.92%	0.15	OK	
	LC7 at 0.00%	0.21	OK	
	LC8 at 0.00%	0.09	OK	
	LC9 at 75.00%	0.10	OK	
	W180 at 0.00%	0.12	OK	
	W210 at 75.00%	0.06	OK	
	Wi180 at 0.00%	0.02	OK	
	Wi210 at 75.00%	0.02	OK	
	WL180 at 0.00%	0.00	OK	
	WL210 at 75.00%	0.00	OK	
88	LC1 at 100.00%	0.11	OK	Eq. H1-1b
	LC10 at 48.44%	0.09	OK	
	LC11 at 50.00%	0.10	OK	
	LC12 at 48.44%	0.11	OK	
	LC13 at 50.00%	0.06	OK	
	LC14 at 50.00%	0.05	OK	
	LC15 at 50.00%	0.06	OK	
	LC16 at 50.00%	0.06	OK	
	LC17 at 50.00%	0.09	OK	
	LC18 at 50.00%	0.09	OK	
	LC19 at 50.00%	0.09	OK	
	LC2 at 0.00%	0.13	OK	Eq. H1-1b
	LC20 at 50.00%	0.09	OK	
	LC21 at 50.00%	0.08	OK	
	LC22 at 50.00%	0.08	OK	
	LC23 at 50.00%	0.08	OK	
	LC24 at 50.00%	0.08	OK	
	LC25 at 50.00%	0.06	OK	
	LC26 at 50.00%	0.06	OK	
	LC27 at 50.00%	0.06	OK	
	LC28 at 50.00%	0.06	OK	
	LC29 at 50.00%	0.06	OK	

	LC3 at 50.00%	0.15	OK	Eq. H1-1b
	LC30 at 50.00%	0.06	OK	
	LC31 at 50.00%	0.06	OK	
	LC32 at 50.00%	0.06	OK	
	LC4 at 48.44%	0.17	OK	Eq. H1-1b
	LC5 at 100.00%	0.11	OK	
	LC6 at 0.00%	0.13	OK	
	LC7 at 50.00%	0.14	OK	
	LC8 at 48.44%	0.16	OK	
	LC9 at 50.00%	0.10	OK	
	W180 at 100.00%	0.06	OK	
	W210 at 0.00%	0.07	OK	
	Wi180 at 100.00%	0.01	OK	
	Wi210 at 48.44%	0.02	OK	
	WL180 at 100.00%	0.00	OK	
	WL210 at 0.00%	0.00	OK	
<hr/>				
89	LC1 at 0.00%	0.11	OK	Eq. H1-1b
	LC10 at 51.56%	0.11	OK	
	LC11 at 50.00%	0.11	OK	
	LC12 at 51.56%	0.09	OK	
	LC13 at 50.00%	0.06	OK	
	LC14 at 50.00%	0.05	OK	
	LC15 at 50.00%	0.06	OK	
	LC16 at 50.00%	0.06	OK	
	LC17 at 50.00%	0.08	OK	
	LC18 at 50.00%	0.08	OK	
	LC19 at 50.00%	0.08	OK	
	LC2 at 51.56%	0.17	OK	Eq. H1-1b
	LC20 at 50.00%	0.08	OK	
	LC21 at 50.00%	0.09	OK	
	LC22 at 50.00%	0.09	OK	
	LC23 at 50.00%	0.09	OK	
	LC24 at 50.00%	0.09	OK	
	LC25 at 50.00%	0.06	OK	
	LC26 at 50.00%	0.06	OK	
	LC27 at 50.00%	0.06	OK	
	LC28 at 50.00%	0.06	OK	
	LC29 at 50.00%	0.06	OK	
	LC3 at 50.00%	0.16	OK	Eq. H1-1b
	LC30 at 50.00%	0.06	OK	
	LC31 at 50.00%	0.06	OK	
	LC32 at 50.00%	0.06	OK	
	LC4 at 100.00%	0.12	OK	Eq. H1-1b
	LC5 at 0.00%	0.11	OK	
	LC6 at 51.56%	0.15	OK	
	LC7 at 50.00%	0.15	OK	
	LC8 at 100.00%	0.12	OK	
	LC9 at 50.00%	0.10	OK	
	W180 at 50.00%	0.06	OK	
	W210 at 100.00%	0.07	OK	
	Wi180 at 50.00%	0.01	OK	
	Wi210 at 51.56%	0.02	OK	
	WL180 at 50.00%	0.00	OK	
	WL210 at 100.00%	0.00	OK	
<hr/>				
90	LC1 at 50.00%	0.16	OK	Eq. H1-1b
	LC10 at 50.00%	0.10	OK	
	LC11 at 50.00%	0.09	OK	
	LC12 at 50.00%	0.10	OK	
	LC13 at 50.00%	0.06	OK	
	LC14 at 50.00%	0.05	OK	
	LC15 at 50.00%	0.06	OK	
	LC16 at 50.00%	0.06	OK	

LC17 at 48.44%	0.05	OK
LC18 at 48.44%	0.05	OK
LC19 at 48.44%	0.05	OK
LC2 at 48.44%	0.12	OK
LC20 at 48.44%	0.05	OK
LC21 at 50.00%	0.05	OK
LC22 at 50.00%	0.05	OK
LC23 at 50.00%	0.05	OK
LC24 at 50.00%	0.05	OK
LC25 at 50.00%	0.06	OK
LC26 at 50.00%	0.06	OK
LC27 at 50.00%	0.06	OK
LC28 at 50.00%	0.06	OK
LC29 at 50.00%	0.06	OK
LC3 at 0.00%	0.09	OK
LC30 at 50.00%	0.06	OK
LC31 at 50.00%	0.06	OK
LC32 at 50.00%	0.06	OK
LC4 at 50.00%	0.12	OK
LC5 at 50.00%	0.14	OK
LC6 at 48.44%	0.11	OK
LC7 at 0.00%	0.08	OK
LC8 at 50.00%	0.11	OK
LC9 at 50.00%	0.11	OK
W180 at 50.00%	0.06	OK
W210 at 0.00%	0.05	OK
Wi180 at 50.00%	0.01	OK
Wi210 at 0.00%	0.01	OK
WL180 at 48.44%	0.00	OK
WL210 at 0.00%	0.00	OK

Eq. H1-1b

L 2X2X1_4

91

LC1 at 100.00%	0.25	OK
LC10 at 100.00%	0.18	OK
LC11 at 100.00%	0.17	OK
LC12 at 100.00%	0.19	OK
LC13 at 100.00%	0.13	OK
LC14 at 100.00%	0.10	OK
LC15 at 100.00%	0.13	OK
LC16 at 100.00%	0.13	OK
LC17 at 100.00%	0.16	OK
LC18 at 100.00%	0.16	OK
LC19 at 100.00%	0.16	OK
LC2 at 50.00%	0.12	OK
LC20 at 100.00%	0.16	OK
LC21 at 100.00%	0.14	OK
LC22 at 100.00%	0.14	OK
LC23 at 100.00%	0.14	OK
LC24 at 100.00%	0.14	OK
LC25 at 100.00%	0.14	OK
LC26 at 100.00%	0.13	OK
LC27 at 100.00%	0.13	OK
LC28 at 100.00%	0.13	OK
LC29 at 100.00%	0.14	OK
LC3 at 100.00%	0.33	OK
LC30 at 100.00%	0.13	OK
LC31 at 100.00%	0.13	OK
LC32 at 100.00%	0.13	OK
LC4 at 100.00%	0.33	OK
LC5 at 100.00%	0.21	OK
LC6 at 56.25%	0.11	OK
LC7 at 100.00%	0.30	OK
LC8 at 100.00%	0.30	OK
LC9 at 100.00%	0.20	OK
W180 at 100.00%	0.19	OK

Eq. H2-1

Eq. H2-1

Eq. H2-1

	W210 at 100.00%	0.14	OK	
	Wi180 at 0.00%	0.04	OK	
	Wi210 at 100.00%	0.03	OK	
	WL180 at 0.00%	0.01	OK	
	WL210 at 100.00%	0.01	OK	
92	LC1 at 43.75%	0.08	OK	
	LC10 at 0.00%	0.19	OK	
	LC11 at 0.00%	0.19	OK	
	LC12 at 0.00%	0.18	OK	
	LC13 at 0.00%	0.13	OK	
	LC14 at 0.00%	0.10	OK	
	LC15 at 0.00%	0.13	OK	
	LC16 at 0.00%	0.13	OK	
	LC17 at 0.00%	0.18	OK	
	LC18 at 0.00%	0.19	OK	
	LC19 at 0.00%	0.19	OK	
	LC2 at 0.00%	0.22	OK	
	LC20 at 0.00%	0.18	OK	
	LC21 at 0.00%	0.13	OK	
	LC22 at 0.00%	0.14	OK	
	LC23 at 0.00%	0.14	OK	
	LC24 at 0.00%	0.13	OK	
	LC25 at 0.00%	0.13	OK	
	LC26 at 0.00%	0.13	OK	
	LC27 at 0.00%	0.13	OK	
	LC28 at 0.00%	0.13	OK	
	LC29 at 0.00%	0.13	OK	
	LC3 at 0.00%	0.23	OK	Eq. H2-1
	LC30 at 0.00%	0.13	OK	
	LC31 at 0.00%	0.13	OK	
	LC32 at 0.00%	0.13	OK	
	LC4 at 0.00%	0.49	OK	Eq. H2-1
	LC5 at 43.75%	0.08	OK	
	LC6 at 0.00%	0.19	OK	
	LC7 at 0.00%	0.19	OK	
	LC8 at 0.00%	0.46	OK	
	LC9 at 0.00%	0.17	OK	
	W180 at 0.00%	0.06	OK	
	W210 at 100.00%	0.25	OK	
	Wi180 at 0.00%	0.01	OK	
	Wi210 at 100.00%	0.06	OK	
	WL180 at 0.00%	0.00	OK	
	WL210 at 100.00%	0.01	OK	
93	LC1 at 100.00%	0.41	OK	Eq. H2-1
	LC10 at 100.00%	0.21	OK	
	LC11 at 100.00%	0.19	OK	
	LC12 at 100.00%	0.16	OK	
	LC13 at 100.00%	0.13	OK	
	LC14 at 100.00%	0.10	OK	
	LC15 at 100.00%	0.13	OK	
	LC16 at 100.00%	0.13	OK	
	LC17 at 100.00%	0.13	OK	
	LC18 at 100.00%	0.13	OK	
	LC19 at 100.00%	0.13	OK	
	LC2 at 100.00%	0.27	OK	Eq. H2-1
	LC20 at 100.00%	0.13	OK	
	LC21 at 100.00%	0.13	OK	
	LC22 at 100.00%	0.14	OK	
	LC23 at 100.00%	0.13	OK	
	LC24 at 100.00%	0.13	OK	
	LC25 at 100.00%	0.13	OK	
	LC26 at 100.00%	0.14	OK	

LC27 at 100.00%	0.13	OK
LC28 at 100.00%	0.13	OK
LC29 at 100.00%	0.13	OK
LC3 at 0.00%	0.16	OK
LC30 at 100.00%	0.14	OK
LC31 at 100.00%	0.13	OK
LC32 at 100.00%	0.13	OK
LC4 at 50.00%	0.25	OK
LC5 at 100.00%	0.39	OK
LC6 at 100.00%	0.24	OK
LC7 at 0.00%	0.14	OK
LC8 at 50.00%	0.25	OK
LC9 at 100.00%	0.18	OK
W180 at 100.00%	0.08	OK
W210 at 100.00%	0.17	OK
Wi180 at 100.00%	0.02	OK
Wi210 at 100.00%	0.04	OK
WL180 at 100.00%	0.00	OK
WL210 at 100.00%	0.01	OK

Eq. H2-1

94

LC1 at 0.00%	0.43	OK
LC10 at 0.00%	0.16	OK
LC11 at 0.00%	0.18	OK
LC12 at 0.00%	0.20	OK
LC13 at 0.00%	0.13	OK
LC14 at 0.00%	0.10	OK
LC15 at 0.00%	0.13	OK
LC16 at 0.00%	0.13	OK
LC17 at 0.00%	0.13	OK
LC18 at 0.00%	0.13	OK
LC19 at 0.00%	0.13	OK
LC2 at 50.00%	0.26	OK
LC20 at 0.00%	0.13	OK
LC21 at 0.00%	0.13	OK
LC22 at 0.00%	0.12	OK
LC23 at 0.00%	0.13	OK
LC24 at 0.00%	0.13	OK
LC25 at 0.00%	0.13	OK
LC26 at 0.00%	0.13	OK
LC27 at 0.00%	0.13	OK
LC28 at 0.00%	0.14	OK
LC29 at 0.00%	0.13	OK
LC3 at 100.00%	0.17	OK
LC30 at 0.00%	0.13	OK
LC31 at 0.00%	0.13	OK
LC32 at 0.00%	0.14	OK
LC4 at 0.00%	0.28	OK
LC5 at 0.00%	0.41	OK
LC6 at 43.75%	0.26	OK
LC7 at 100.00%	0.16	OK
LC8 at 0.00%	0.24	OK
LC9 at 0.00%	0.18	OK
W180 at 0.00%	0.09	OK
W210 at 0.00%	0.09	OK
Wi180 at 0.00%	0.02	OK
Wi210 at 0.00%	0.02	OK
WL180 at 0.00%	0.00	OK
WL210 at 0.00%	0.00	OK

Eq. H2-1

Eq. H2-1

Eq. H2-1

95

LC1 at 50.00%	0.08	OK
LC10 at 100.00%	0.18	OK
LC11 at 100.00%	0.20	OK
LC12 at 100.00%	0.20	OK
LC13 at 100.00%	0.13	OK

LC14 at 100.00%	0.10	OK	
LC15 at 100.00%	0.13	OK	
LC16 at 100.00%	0.13	OK	
LC17 at 100.00%	0.13	OK	
LC18 at 100.00%	0.13	OK	
LC19 at 100.00%	0.14	OK	
LC2 at 100.00%	0.45	OK	Eq. H2-1
LC20 at 100.00%	0.14	OK	
LC21 at 100.00%	0.18	OK	
LC22 at 100.00%	0.18	OK	
LC23 at 100.00%	0.19	OK	
LC24 at 100.00%	0.19	OK	
LC25 at 100.00%	0.13	OK	
LC26 at 100.00%	0.13	OK	
LC27 at 100.00%	0.14	OK	
LC28 at 100.00%	0.13	OK	
LC29 at 100.00%	0.13	OK	
LC3 at 100.00%	0.23	OK	Eq. H2-1
LC30 at 100.00%	0.13	OK	
LC31 at 100.00%	0.14	OK	
LC32 at 100.00%	0.13	OK	
LC4 at 100.00%	0.22	OK	
LC5 at 56.25%	0.07	OK	
LC6 at 100.00%	0.43	OK	
LC7 at 100.00%	0.19	OK	
LC8 at 100.00%	0.19	OK	
LC9 at 100.00%	0.17	OK	
W180 at 100.00%	0.06	OK	
W210 at 0.00%	0.08	OK	
Wi180 at 100.00%	0.01	OK	
Wi210 at 0.00%	0.02	OK	
WL180 at 100.00%	0.00	OK	
WL210 at 0.00%	0.00	OK	

96	LC1 at 0.00%	0.25	OK	Eq. H2-1
	LC10 at 0.00%	0.19	OK	
	LC11 at 0.00%	0.17	OK	
	LC12 at 0.00%	0.17	OK	
	LC13 at 0.00%	0.13	OK	
	LC14 at 0.00%	0.10	OK	
	LC15 at 0.00%	0.13	OK	
	LC16 at 0.00%	0.13	OK	
	LC17 at 0.00%	0.14	OK	
	LC18 at 0.00%	0.14	OK	
	LC19 at 0.00%	0.13	OK	
	LC2 at 0.00%	0.35	OK	
	LC20 at 0.00%	0.14	OK	
	LC21 at 0.00%	0.16	OK	
	LC22 at 0.00%	0.16	OK	
	LC23 at 0.00%	0.16	OK	
	LC24 at 0.00%	0.16	OK	
	LC25 at 0.00%	0.13	OK	
	LC26 at 0.00%	0.13	OK	
	LC27 at 0.00%	0.13	OK	
	LC28 at 0.00%	0.13	OK	
	LC29 at 0.00%	0.13	OK	
	LC3 at 0.00%	0.37	OK	Eq. H2-1
	LC30 at 0.00%	0.13	OK	
	LC31 at 0.00%	0.13	OK	
	LC32 at 0.00%	0.13	OK	
	LC4 at 100.00%	0.13	OK	
	LC5 at 0.00%	0.22	OK	
	LC6 at 0.00%	0.33	OK	
	LC7 at 100.00%	0.34	OK	

PIPE 2x0.154

69

LC8 at 43.75%	0.12	OK
LC9 at 0.00%	0.20	OK
W180 at 100.00%	0.21	OK
W210 at 0.00%	0.09	OK
Wi180 at 100.00%	0.04	OK
Wi210 at 0.00%	0.02	OK
WL180 at 100.00%	0.01	OK
WL210 at 0.00%	0.00	OK

LC1 at 68.75%	0.80	OK
LC10 at 68.75%	0.14	OK
LC11 at 68.75%	0.12	OK
LC12 at 68.75%	0.13	OK
LC13 at 68.75%	0.03	OK
LC14 at 68.75%	0.02	OK
LC15 at 68.75%	0.03	OK
LC16 at 68.75%	0.03	OK
LC17 at 68.75%	0.06	OK
LC18 at 68.75%	0.05	OK
LC19 at 68.75%	0.05	OK
LC2 at 68.75%	0.75	OK
LC20 at 70.83%	0.02	OK
LC21 at 68.75%	0.13	OK
LC22 at 68.75%	0.12	OK
LC23 at 68.75%	0.08	OK
LC24 at 68.75%	0.08	OK
LC25 at 68.75%	0.05	OK
LC26 at 68.75%	0.04	OK
LC27 at 68.75%	0.03	OK
LC28 at 68.75%	0.02	OK
LC29 at 68.75%	0.05	OK
LC3 at 68.75%	0.82	OK
LC30 at 68.75%	0.04	OK
LC31 at 68.75%	0.03	OK
LC32 at 68.75%	0.02	OK
LC4 at 68.75%	0.76	OK
LC5 at 68.75%	0.80	OK
LC6 at 68.75%	0.75	OK
LC7 at 68.75%	0.82	OK
LC8 at 68.75%	0.75	OK
LC9 at 68.75%	0.14	OK
W180 at 68.75%	0.51	OK
W210 at 68.75%	0.47	OK
Wi180 at 68.75%	0.11	OK
Wi210 at 68.75%	0.12	OK
WL180 at 70.83%	0.03	OK
WL210 at 68.75%	0.02	OK

Eq. H1-1b

Eq. H1-1b

70

LC1 at 29.17%	0.65	OK
LC10 at 29.17%	0.13	OK
LC11 at 29.17%	0.12	OK
LC12 at 29.17%	0.12	OK
LC13 at 29.17%	0.02	OK
LC14 at 29.17%	0.02	OK
LC15 at 29.17%	0.02	OK
LC16 at 29.17%	0.02	OK
LC17 at 77.08%	0.02	OK
LC18 at 29.17%	0.04	OK
LC19 at 29.17%	0.04	OK
LC2 at 29.17%	0.74	OK
LC20 at 29.17%	0.03	OK
LC21 at 77.08%	0.05	OK
LC22 at 77.08%	0.04	OK
LC23 at 77.08%	0.04	OK

Eq. H1-1b

LC24 at 77.08%	0.04	OK
LC25 at 29.17%	0.01	OK
LC26 at 29.17%	0.04	OK
LC27 at 29.17%	0.04	OK
LC28 at 29.17%	0.03	OK
LC29 at 29.17%	0.01	OK
LC3 at 29.17%	0.65	OK
LC30 at 29.17%	0.04	OK
LC31 at 29.17%	0.04	OK
LC32 at 29.17%	0.03	OK
LC4 at 29.17%	0.70	OK
LC5 at 29.17%	0.65	OK
LC6 at 29.17%	0.74	OK
LC7 at 29.17%	0.65	OK
LC8 at 29.17%	0.71	OK
LC9 at 29.17%	0.09	OK
W180 at 29.17%	0.40	OK
W210 at 29.17%	0.45	OK
Wi180 at 29.17%	0.10	OK
Wi210 at 29.17%	0.12	OK
WL180 at 29.17%	0.02	OK
WL210 at 29.17%	0.02	OK

71

LC1 at 20.83%	0.60	OK
LC10 at 68.75%	0.09	OK
LC11 at 68.75%	0.16	OK
LC12 at 68.75%	0.16	OK
LC13 at 68.75%	0.04	OK
LC14 at 68.75%	0.03	OK
LC15 at 68.75%	0.04	OK
LC16 at 68.75%	0.04	OK
LC17 at 68.75%	0.03	OK
LC18 at 68.75%	0.04	OK
LC19 at 68.75%	0.07	OK
LC2 at 68.75%	0.61	OK
LC20 at 68.75%	0.06	OK
LC21 at 68.75%	0.04	OK
LC22 at 68.75%	0.05	OK
LC23 at 68.75%	0.08	OK
LC24 at 68.75%	0.07	OK
LC25 at 68.75%	0.03	OK
LC26 at 66.67%	0.03	OK
LC27 at 68.75%	0.06	OK
LC28 at 68.75%	0.05	OK
LC29 at 68.75%	0.03	OK
LC3 at 68.75%	0.67	OK
LC30 at 66.67%	0.03	OK
LC31 at 68.75%	0.06	OK
LC32 at 68.75%	0.05	OK
LC4 at 68.75%	0.67	OK
LC5 at 20.83%	0.60	OK
LC6 at 68.75%	0.62	OK
LC7 at 68.75%	0.65	OK
LC8 at 68.75%	0.65	OK
LC9 at 68.75%	0.10	OK
W180 at 68.75%	0.39	OK
W210 at 68.75%	0.39	OK
Wi180 at 68.75%	0.09	OK
Wi210 at 68.75%	0.10	OK
WL180 at 20.83%	0.02	OK
WL210 at 68.75%	0.02	OK

Eq. H1-1b

72

LC1 at 29.17%	0.66	OK
LC10 at 29.17%	0.14	OK

LC11 at 29.17%	0.12	OK
LC12 at 29.17%	0.09	OK
LC13 at 29.17%	0.02	OK
LC14 at 29.17%	0.02	OK
LC15 at 29.17%	0.02	OK
LC16 at 29.17%	0.02	OK
LC17 at 77.08%	0.01	OK
LC18 at 29.17%	0.03	OK
LC19 at 29.17%	0.04	OK
LC2 at 29.17%	0.70	OK
LC20 at 77.08%	0.03	OK
LC21 at 29.17%	0.03	OK
LC22 at 29.17%	0.04	OK
LC23 at 29.17%	0.04	OK
LC24 at 29.17%	0.02	OK
LC25 at 29.17%	0.04	OK
LC26 at 29.17%	0.04	OK
LC27 at 29.17%	0.02	OK
LC28 at 29.17%	0.01	OK
LC29 at 29.17%	0.04	OK
LC3 at 29.17%	0.60	OK
LC30 at 29.17%	0.04	OK
LC31 at 29.17%	0.02	OK
LC32 at 29.17%	0.01	OK
LC4 at 29.17%	0.68	OK
LC5 at 29.17%	0.65	OK
LC6 at 29.17%	0.70	OK
LC7 at 29.17%	0.61	OK
LC8 at 29.17%	0.68	OK
LC9 at 29.17%	0.14	OK
W180 at 29.17%	0.39	OK
W210 at 29.17%	0.43	OK
Wi180 at 29.17%	0.09	OK
Wi210 at 29.17%	0.11	OK
WL180 at 29.17%	0.02	OK
WL210 at 29.17%	0.02	OK

Eq. H1-1b

73

LC1 at 29.17%	0.83	OK
LC10 at 29.17%	0.11	OK
LC11 at 29.17%	0.14	OK
LC12 at 29.17%	0.16	OK
LC13 at 29.17%	0.02	OK
LC14 at 29.17%	0.02	OK
LC15 at 29.17%	0.02	OK
LC16 at 29.17%	0.02	OK
LC17 at 29.17%	0.04	OK
LC18 at 27.08%	0.02	OK
LC19 at 29.17%	0.05	OK
LC2 at 29.17%	0.89	OK
LC20 at 29.17%	0.05	OK
LC21 at 47.92%	0.02	OK
LC22 at 29.17%	0.04	OK
LC23 at 29.17%	0.05	OK
LC24 at 29.17%	0.04	OK
LC25 at 29.17%	0.05	OK
LC26 at 27.08%	0.02	OK
LC27 at 29.17%	0.04	OK
LC28 at 29.17%	0.05	OK
LC29 at 29.17%	0.05	OK
LC3 at 29.17%	0.78	OK
LC30 at 27.08%	0.02	OK
LC31 at 29.17%	0.04	OK
LC32 at 29.17%	0.05	OK
LC4 at 29.17%	0.91	OK

Eq. H1-1b

LC5 at 29.17%	0.83	OK
LC6 at 29.17%	0.89	OK
LC7 at 29.17%	0.79	OK
LC8 at 29.17%	0.91	OK
LC9 at 29.17%	0.16	OK
W180 at 29.17%	0.50	OK
W210 at 29.17%	0.56	OK
Wi180 at 29.17%	0.12	OK
Wi210 at 29.17%	0.14	OK
WL180 at 29.17%	0.02	OK
WL210 at 29.17%	0.03	OK

74

LC1 at 29.17%	0.63	OK
LC10 at 29.17%	0.17	OK
LC11 at 29.17%	0.16	OK
LC12 at 29.17%	0.09	OK
LC13 at 29.17%	0.04	OK
LC14 at 29.17%	0.03	OK
LC15 at 29.17%	0.04	OK
LC16 at 29.17%	0.04	OK
LC17 at 29.17%	0.04	OK
LC18 at 29.17%	0.07	OK
LC19 at 29.17%	0.08	OK
LC2 at 29.17%	0.75	OK
LC20 at 29.17%	0.05	OK
LC21 at 29.17%	0.03	OK
LC22 at 29.17%	0.06	OK
LC23 at 29.17%	0.07	OK
LC24 at 29.17%	0.04	OK
LC25 at 29.17%	0.03	OK
LC26 at 29.17%	0.06	OK
LC27 at 29.17%	0.06	OK
LC28 at 31.25%	0.03	OK
LC29 at 29.17%	0.03	OK
LC3 at 29.17%	0.69	OK
LC30 at 29.17%	0.06	OK
LC31 at 29.17%	0.06	OK
LC32 at 31.25%	0.03	OK
LC4 at 29.17%	0.70	OK
LC5 at 29.17%	0.63	OK
LC6 at 29.17%	0.74	OK
LC7 at 29.17%	0.67	OK
LC8 at 29.17%	0.70	OK
LC9 at 29.17%	0.12	OK
W180 at 29.17%	0.40	OK
W210 at 29.17%	0.45	OK
Wi180 at 29.17%	0.09	OK
Wi210 at 29.17%	0.11	OK
WL180 at 29.17%	0.01	OK
WL210 at 29.17%	0.02	OK

Eq. H1-1b

75

LC1 at 29.17%	0.56	OK
LC10 at 29.17%	0.12	OK
LC11 at 29.17%	0.09	OK
LC12 at 29.17%	0.14	OK
LC13 at 29.17%	0.02	OK
LC14 at 29.17%	0.02	OK
LC15 at 29.17%	0.02	OK
LC16 at 29.17%	0.02	OK
LC17 at 29.17%	0.12	OK
LC18 at 29.17%	0.09	OK
LC19 at 29.17%	0.09	OK
LC2 at 29.17%	0.70	OK
LC20 at 29.17%	0.12	OK

Eq. H1-1b

LC21 at 29.17%	0.05	OK
LC22 at 29.17%	0.02	OK
LC23 at 29.17%	0.03	OK
LC24 at 29.17%	0.05	OK
LC25 at 29.17%	0.04	OK
LC26 at 29.17%	0.02	OK
LC27 at 29.17%	0.02	OK
LC28 at 29.17%	0.04	OK
LC29 at 29.17%	0.04	OK
LC3 at 29.17%	0.58	OK
LC30 at 29.17%	0.02	OK
LC31 at 29.17%	0.02	OK
LC32 at 29.17%	0.04	OK
LC4 at 29.17%	0.70	OK
LC5 at 29.17%	0.56	OK
LC6 at 29.17%	0.70	OK
LC7 at 29.17%	0.58	OK
LC8 at 29.17%	0.70	OK
LC9 at 29.17%	0.11	OK
W180 at 29.17%	0.36	OK
W210 at 29.17%	0.44	OK
Wi180 at 29.17%	0.08	OK
Wi210 at 29.17%	0.11	OK
WL180 at 29.17%	0.02	OK
WL210 at 29.17%	0.02	OK

76

LC1 at 29.17%	0.77	OK
LC10 at 29.17%	0.16	OK
LC11 at 29.17%	0.14	OK
LC12 at 29.17%	0.16	OK
LC13 at 29.17%	0.03	OK
LC14 at 29.17%	0.02	OK
LC15 at 29.17%	0.03	OK
LC16 at 29.17%	0.03	OK
LC17 at 77.08%	0.04	OK
LC18 at 29.17%	0.04	OK
LC19 at 77.08%	0.04	OK
LC2 at 29.17%	0.95	OK
LC20 at 29.17%	0.04	OK
LC21 at 27.08%	0.02	OK
LC22 at 29.17%	0.04	OK
LC23 at 29.17%	0.04	OK
LC24 at 29.17%	0.05	OK
LC25 at 27.08%	0.02	OK
LC26 at 29.17%	0.04	OK
LC27 at 29.17%	0.04	OK
LC28 at 29.17%	0.04	OK
LC29 at 27.08%	0.02	OK
LC3 at 29.17%	0.78	OK
LC30 at 29.17%	0.04	OK
LC31 at 29.17%	0.04	OK
LC32 at 29.17%	0.04	OK
LC4 at 29.17%	0.99	OK
LC5 at 29.17%	0.77	OK
LC6 at 29.17%	0.96	OK
LC7 at 29.17%	0.78	OK
LC8 at 29.17%	0.99	OK
LC9 at 29.17%	0.11	OK
W180 at 29.17%	0.48	OK
W210 at 29.17%	0.61	OK
Wi180 at 29.17%	0.12	OK
Wi210 at 29.17%	0.15	OK
WL180 at 29.17%	0.02	OK
WL210 at 29.17%	0.03	OK

Eq. H1-1b

77	LC1 at 68.75%	0.68	OK	Eq. H1-1b
	LC10 at 68.75%	0.13	OK	
	LC11 at 68.75%	0.05	OK	
	LC12 at 68.75%	0.14	OK	
	LC13 at 68.75%	0.04	OK	
	LC14 at 68.75%	0.03	OK	
	LC15 at 68.75%	0.04	OK	
	LC16 at 68.75%	0.04	OK	
	LC17 at 68.75%	0.07	OK	
	LC18 at 68.75%	0.06	OK	
	LC19 at 20.83%	0.03	OK	
	LC2 at 68.75%	0.59	OK	
	LC20 at 68.75%	0.04	OK	
	LC21 at 68.75%	0.07	OK	
	LC22 at 68.75%	0.04	OK	
	LC23 at 20.83%	0.03	OK	
	LC24 at 68.75%	0.06	OK	
	LC25 at 68.75%	0.05	OK	
	LC26 at 68.75%	0.05	OK	
	LC27 at 33.33%	0.02	OK	
	LC28 at 68.75%	0.05	OK	
	LC29 at 68.75%	0.05	OK	
	LC3 at 68.75%	0.61	OK	
	LC30 at 68.75%	0.05	OK	
	LC31 at 33.33%	0.02	OK	
	LC32 at 68.75%	0.05	OK	
	LC4 at 68.75%	0.62	OK	
	LC5 at 68.75%	0.68	OK	
	LC6 at 68.75%	0.58	OK	
	LC7 at 68.75%	0.62	OK	
	LC8 at 68.75%	0.62	OK	
	LC9 at 68.75%	0.14	OK	
	W180 at 68.75%	0.40	OK	
	W210 at 68.75%	0.37	OK	
Wi180 at 68.75%	0.08	OK		
Wi210 at 68.75%	0.10	OK		
WL180 at 68.75%	0.02	OK		
WL210 at 68.75%	0.02	OK		

PIPE 3x0.216

79	LC1 at 89.84%	0.22	OK
	LC10 at 89.84%	0.09	OK
	LC11 at 10.16%	0.08	OK
	LC12 at 89.84%	0.10	OK
	LC13 at 90.63%	0.04	OK
	LC14 at 90.63%	0.03	OK
	LC15 at 90.63%	0.04	OK
	LC16 at 90.63%	0.04	OK
	LC17 at 56.25%	0.05	OK
	LC18 at 56.25%	0.06	OK
	LC19 at 56.25%	0.05	OK
	LC2 at 10.16%	0.26	OK
	LC20 at 56.25%	0.05	OK
	LC21 at 89.84%	0.03	OK
	LC22 at 89.84%	0.03	OK
	LC23 at 10.16%	0.04	OK
	LC24 at 89.84%	0.04	OK
	LC25 at 89.84%	0.04	OK
	LC26 at 89.84%	0.04	OK
	LC27 at 90.63%	0.03	OK
	LC28 at 89.84%	0.04	OK
	LC29 at 89.84%	0.04	OK
	LC3 at 10.16%	0.21	OK
	LC30 at 89.84%	0.04	OK

	LC31 at 90.63%	0.03	OK	
	LC32 at 89.84%	0.04	OK	
	LC4 at 10.16%	0.32	OK	Eq. H1-1b
	LC5 at 89.84%	0.21	OK	
	LC6 at 10.16%	0.27	OK	
	LC7 at 10.16%	0.20	OK	
	LC8 at 10.16%	0.31	OK	
	LC9 at 89.84%	0.08	OK	
	W180 at 89.84%	0.11	OK	
	W210 at 10.16%	0.18	OK	
	Wi180 at 89.84%	0.02	OK	
	Wi210 at 10.16%	0.04	OK	
	WL180 at 89.84%	0.00	OK	
	WL210 at 89.84%	0.01	OK	
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80	LC1 at 89.84%	0.29	OK	
	LC10 at 10.16%	0.08	OK	
	LC11 at 89.84%	0.10	OK	
	LC12 at 89.84%	0.09	OK	
	LC13 at 90.63%	0.04	OK	
	LC14 at 90.63%	0.03	OK	
	LC15 at 90.63%	0.04	OK	
	LC16 at 90.63%	0.04	OK	
	LC17 at 10.16%	0.14	OK	
	LC18 at 10.16%	0.15	OK	
	LC19 at 10.16%	0.14	OK	
	LC2 at 10.16%	0.23	OK	
	LC20 at 9.38%	0.14	OK	
	LC21 at 89.84%	0.15	OK	
	LC22 at 90.63%	0.14	OK	
	LC23 at 89.84%	0.14	OK	
	LC24 at 89.84%	0.15	OK	
	LC25 at 89.84%	0.04	OK	
	LC26 at 10.16%	0.03	OK	
	LC27 at 89.84%	0.04	OK	
	LC28 at 89.84%	0.04	OK	
	LC29 at 89.84%	0.04	OK	
	LC3 at 89.84%	0.36	OK	Eq. H1-1b
	LC30 at 10.16%	0.03	OK	
	LC31 at 89.84%	0.04	OK	
	LC32 at 89.84%	0.04	OK	
	LC4 at 89.84%	0.22	OK	
	LC5 at 89.84%	0.30	OK	
	LC6 at 10.16%	0.22	OK	
	LC7 at 89.84%	0.35	OK	
	LC8 at 89.84%	0.21	OK	
	LC9 at 89.84%	0.07	OK	
	W180 at 89.84%	0.20	OK	
	W210 at 10.16%	0.13	OK	
	Wi180 at 89.84%	0.04	OK	
	Wi210 at 10.16%	0.03	OK	
	WL180 at 89.84%	0.01	OK	
	WL210 at 10.16%	0.01	OK	
<hr/>				
81	LC1 at 10.16%	0.25	OK	Eq. H1-1b
	LC10 at 89.84%	0.10	OK	
	LC11 at 89.84%	0.09	OK	
	LC12 at 10.16%	0.08	OK	
	LC13 at 90.63%	0.04	OK	
	LC14 at 90.63%	0.03	OK	
	LC15 at 90.63%	0.04	OK	
	LC16 at 90.63%	0.04	OK	
	LC17 at 90.63%	0.04	OK	
	LC18 at 89.84%	0.04	OK	

LC19 at 89.84%	0.04	OK	
LC2 at 89.84%	0.35	OK	Eq. H1-1b
LC20 at 90.63%	0.04	OK	
LC21 at 43.75%	0.05	OK	
LC22 at 43.75%	0.05	OK	
LC23 at 43.75%	0.05	OK	
LC24 at 43.75%	0.05	OK	
LC25 at 89.84%	0.03	OK	
LC26 at 89.84%	0.04	OK	
LC27 at 89.84%	0.04	OK	
LC28 at 90.63%	0.04	OK	
LC29 at 89.84%	0.03	OK	
LC3 at 50.00%	0.20	OK	Eq. H1-1b
LC30 at 89.84%	0.04	OK	
LC31 at 89.84%	0.04	OK	
LC32 at 90.63%	0.04	OK	
LC4 at 89.84%	0.28	OK	
LC5 at 10.16%	0.24	OK	
LC6 at 89.84%	0.34	OK	
LC7 at 50.00%	0.20	OK	
LC8 at 89.84%	0.29	OK	
LC9 at 10.16%	0.08	OK	
W180 at 10.16%	0.13	OK	
W210 at 89.84%	0.20	OK	
Wi180 at 10.16%	0.03	OK	
Wi210 at 89.84%	0.05	OK	
WL180 at 10.16%	0.01	OK	
WL210 at 89.84%	0.01	OK	

109	LC1 at 89.58%	0.27	OK	Eq. H1-1b
	LC10 at 10.42%	0.05	OK	
	LC11 at 89.58%	0.04	OK	
	LC12 at 90.63%	0.04	OK	
	LC13 at 50.00%	0.01	OK	
	LC14 at 50.00%	0.01	OK	
	LC15 at 50.00%	0.01	OK	
	LC16 at 50.00%	0.01	OK	
	LC17 at 50.00%	0.01	OK	
	LC18 at 10.42%	0.02	OK	
	LC19 at 51.04%	0.02	OK	
	LC2 at 90.63%	0.26	OK	Eq. H1-1b
	LC20 at 50.00%	0.01	OK	
	LC21 at 9.38%	0.04	OK	
	LC22 at 10.42%	0.05	OK	
	LC23 at 10.42%	0.04	OK	
	LC24 at 9.38%	0.04	OK	
	LC25 at 89.58%	0.01	OK	
	LC26 at 10.42%	0.01	OK	
	LC27 at 51.04%	0.01	OK	
	LC28 at 50.00%	0.01	OK	
	LC29 at 89.58%	0.01	OK	
	LC3 at 89.58%	0.26	OK	
	LC30 at 10.42%	0.01	OK	
	LC31 at 51.04%	0.01	OK	
	LC32 at 50.00%	0.01	OK	
	LC4 at 90.63%	0.25	OK	
	LC5 at 89.58%	0.26	OK	
	LC6 at 90.63%	0.26	OK	
	LC7 at 89.58%	0.26	OK	
	LC8 at 90.63%	0.25	OK	
	LC9 at 89.58%	0.04	OK	
	W180 at 89.58%	0.16	OK	
	W210 at 90.63%	0.16	OK	
	Wi180 at 89.58%	0.04	OK	

Wi210 at 90.63%	0.04	OK
WL180 at 89.58%	0.01	OK
WL210 at 90.63%	0.01	OK

110

LC1 at 90.63%	0.27	OK
LC10 at 89.58%	0.03	OK
LC11 at 90.63%	0.04	OK
LC12 at 10.42%	0.04	OK
LC13 at 50.00%	0.01	OK
LC14 at 50.00%	0.01	OK
LC15 at 50.00%	0.01	OK
LC16 at 50.00%	0.01	OK
LC17 at 9.38%	0.05	OK
LC18 at 10.42%	0.05	OK
LC19 at 9.38%	0.04	OK
LC2 at 89.58%	0.23	OK
LC20 at 9.38%	0.04	OK
LC21 at 90.63%	0.05	OK
LC22 at 90.63%	0.05	OK
LC23 at 90.63%	0.04	OK
LC24 at 89.58%	0.05	OK
LC25 at 50.00%	0.01	OK
LC26 at 48.96%	0.01	OK
LC27 at 89.58%	0.01	OK
LC28 at 50.00%	0.01	OK
LC29 at 50.00%	0.01	OK
LC3 at 90.63%	0.28	OK
LC30 at 48.96%	0.01	OK
LC31 at 89.58%	0.01	OK
LC32 at 50.00%	0.01	OK
LC4 at 89.58%	0.23	OK
LC5 at 90.63%	0.27	OK
LC6 at 89.58%	0.23	OK
LC7 at 90.63%	0.28	OK
LC8 at 89.58%	0.23	OK
LC9 at 90.63%	0.03	OK
W180 at 90.63%	0.17	OK
W210 at 89.58%	0.14	OK
Wi180 at 90.63%	0.03	OK
Wi210 at 89.58%	0.03	OK
WL180 at 90.63%	0.01	OK
WL210 at 89.58%	0.01	OK

Eq. H1-1b

111

LC1 at 10.42%	0.24	OK
LC10 at 89.58%	0.05	OK
LC11 at 48.96%	0.03	OK
LC12 at 89.58%	0.05	OK
LC13 at 50.00%	0.01	OK
LC14 at 50.00%	0.01	OK
LC15 at 50.00%	0.01	OK
LC16 at 50.00%	0.01	OK
LC17 at 90.63%	0.04	OK
LC18 at 90.63%	0.04	OK
LC19 at 89.58%	0.04	OK
LC2 at 89.58%	0.33	OK
LC20 at 89.58%	0.04	OK
LC21 at 50.00%	0.01	OK
LC22 at 50.00%	0.01	OK
LC23 at 48.96%	0.01	OK
LC24 at 89.58%	0.01	OK
LC25 at 10.42%	0.01	OK
LC26 at 50.00%	0.01	OK
LC27 at 48.96%	0.01	OK
LC28 at 89.58%	0.01	OK

Eq. H1-1b

LC29 at 10.42%	0.01	OK
LC3 at 10.42%	0.23	OK
LC30 at 50.00%	0.01	OK
LC31 at 48.96%	0.01	OK
LC32 at 89.58%	0.01	OK
LC4 at 89.58%	0.34	OK
LC5 at 10.42%	0.24	OK
LC6 at 89.58%	0.34	OK
LC7 at 10.42%	0.23	OK
LC8 at 89.58%	0.34	OK
LC9 at 10.42%	0.04	OK
W180 at 10.42%	0.15	OK
W210 at 89.58%	0.21	OK
Wi180 at 10.42%	0.03	OK
Wi210 at 89.58%	0.05	OK
WL180 at 10.42%	0.01	OK
WL210 at 89.58%	0.01	OK

Eq. H1-1b

PL 6x1/2

82

LC1 at 50.00%	0.23	OK
LC10 at 50.00%	0.11	OK
LC11 at 50.00%	0.10	OK
LC12 at 0.00%	0.11	OK
LC13 at 0.00%	0.06	OK
LC14 at 0.00%	0.05	OK
LC15 at 0.00%	0.06	OK
LC16 at 0.00%	0.06	OK
LC17 at 0.00%	0.06	OK
LC18 at 0.00%	0.06	OK
LC19 at 0.00%	0.06	OK
LC2 at 50.00%	0.11	OK
LC20 at 0.00%	0.06	OK
LC21 at 50.00%	0.06	OK
LC22 at 50.00%	0.06	OK
LC23 at 50.00%	0.06	OK
LC24 at 50.00%	0.06	OK
LC25 at 0.00%	0.06	OK
LC26 at 0.00%	0.06	OK
LC27 at 50.00%	0.06	OK
LC28 at 0.00%	0.06	OK
LC29 at 0.00%	0.06	OK
LC3 at 50.00%	0.21	OK
LC30 at 0.00%	0.06	OK
LC31 at 50.00%	0.06	OK
LC32 at 0.00%	0.06	OK
LC4 at 50.00%	0.13	OK
LC5 at 50.00%	0.23	OK
LC6 at 50.00%	0.11	OK
LC7 at 50.00%	0.21	OK
LC8 at 50.00%	0.13	OK
LC9 at 0.00%	0.11	OK
W180 at 50.00%	0.14	OK
W210 at 50.00%	0.08	OK
Wi180 at 50.00%	0.03	OK
Wi210 at 50.00%	0.02	OK
WL180 at 50.00%	0.01	OK
WL210 at 50.00%	0.00	OK

Eq. H1-1b

Eq. H3-1

83

LC1 at 50.00%	0.18	OK
LC10 at 0.00%	0.10	OK
LC11 at 0.00%	0.11	OK
LC12 at 0.00%	0.11	OK
LC13 at 0.00%	0.06	OK
LC14 at 0.00%	0.05	OK
LC15 at 0.00%	0.06	OK

LC16 at 0.00%	0.06	OK	
LC17 at 50.00%	0.15	OK	
LC18 at 50.00%	0.15	OK	
LC19 at 50.00%	0.15	OK	
LC2 at 46.88%	0.21	OK	
LC20 at 50.00%	0.15	OK	Eq. H3-1
LC21 at 50.00%	0.06	OK	
LC22 at 50.00%	0.06	OK	
LC23 at 50.00%	0.06	OK	
LC24 at 0.00%	0.07	OK	
LC25 at 0.00%	0.06	OK	
LC26 at 50.00%	0.06	OK	
LC27 at 0.00%	0.06	OK	
LC28 at 0.00%	0.06	OK	
LC29 at 0.00%	0.06	OK	
LC3 at 50.00%	0.20	OK	Eq. H1-1b
LC30 at 50.00%	0.06	OK	
LC31 at 0.00%	0.06	OK	
LC32 at 0.00%	0.06	OK	
LC4 at 46.88%	0.24	OK	Eq. H1-1b
LC5 at 50.00%	0.18	OK	
LC6 at 46.88%	0.22	OK	
LC7 at 50.00%	0.20	OK	
LC8 at 46.88%	0.24	OK	
LC9 at 50.00%	0.10	OK	
W180 at 50.00%	0.12	OK	
W210 at 46.88%	0.14	OK	
Wi180 at 50.00%	0.03	OK	
Wi210 at 46.88%	0.03	OK	
WL180 at 50.00%	0.00	OK	
WL210 at 46.88%	0.01	OK	

84

LC1 at 46.88%	0.15	OK	
LC10 at 0.00%	0.11	OK	
LC11 at 0.00%	0.11	OK	
LC12 at 50.00%	0.10	OK	
LC13 at 0.00%	0.06	OK	
LC14 at 0.00%	0.05	OK	
LC15 at 0.00%	0.06	OK	
LC16 at 0.00%	0.06	OK	
LC17 at 0.00%	0.06	OK	
LC18 at 0.00%	0.07	OK	
LC19 at 0.00%	0.07	OK	
LC2 at 50.00%	0.26	OK	Eq. H1-1b
LC20 at 0.00%	0.06	OK	
LC21 at 0.00%	0.15	OK	
LC22 at 0.00%	0.15	OK	
LC23 at 0.00%	0.15	OK	Eq. H3-1
LC24 at 0.00%	0.15	OK	
LC25 at 50.00%	0.06	OK	
LC26 at 0.00%	0.06	OK	
LC27 at 0.00%	0.06	OK	
LC28 at 0.00%	0.06	OK	
LC29 at 50.00%	0.06	OK	
LC3 at 46.88%	0.17	OK	Eq. H1-1b
LC30 at 0.00%	0.06	OK	
LC31 at 0.00%	0.06	OK	
LC32 at 0.00%	0.06	OK	
LC4 at 50.00%	0.24	OK	
LC5 at 46.88%	0.15	OK	
LC6 at 50.00%	0.26	OK	
LC7 at 46.88%	0.17	OK	
LC8 at 50.00%	0.24	OK	
LC9 at 0.00%	0.10	OK	

W180 at 46.88%	0.10	OK
W210 at 50.00%	0.16	OK
Wi180 at 46.88%	0.02	OK
Wi210 at 50.00%	0.04	OK
WL180 at 46.88%	0.00	OK
WL210 at 50.00%	0.01	OK

124

LC1 at 100.00%	0.15	OK
LC10 at 0.00%	0.06	OK
LC11 at 0.00%	0.02	OK
LC12 at 0.00%	0.06	OK
LC13 at 87.50%	0.01	OK
LC14 at 87.50%	0.00	OK
LC15 at 87.50%	0.01	OK
LC16 at 87.50%	0.01	OK
LC17 at 100.00%	0.02	OK
LC18 at 100.00%	0.02	OK
LC19 at 100.00%	0.01	OK
LC2 at 0.00%	0.41	OK
LC20 at 0.00%	0.01	OK
LC21 at 0.00%	0.01	OK
LC22 at 0.00%	0.01	OK
LC23 at 0.00%	0.02	OK
LC24 at 0.00%	0.02	OK
LC25 at 100.00%	0.01	OK
LC26 at 100.00%	0.01	OK
LC27 at 0.00%	0.01	OK
LC28 at 0.00%	0.01	OK
LC29 at 100.00%	0.01	OK
LC3 at 100.00%	0.14	OK
LC30 at 100.00%	0.01	OK
LC31 at 0.00%	0.01	OK
LC32 at 0.00%	0.01	OK
LC4 at 0.00%	0.42	OK
LC5 at 100.00%	0.15	OK
LC6 at 0.00%	0.41	OK
LC7 at 100.00%	0.14	OK
LC8 at 0.00%	0.42	OK
LC9 at 100.00%	0.03	OK
W180 at 100.00%	0.09	OK
W210 at 0.00%	0.24	OK
Wi180 at 100.00%	0.02	OK
Wi210 at 0.00%	0.06	OK
WL180 at 100.00%	0.00	OK
WL210 at 0.00%	0.01	OK

Eq. H3-6

125

LC1 at 0.00%	0.38	OK
LC10 at 0.00%	0.03	OK
LC11 at 0.00%	0.05	OK
LC12 at 100.00%	0.03	OK
LC13 at 87.50%	0.01	OK
LC14 at 87.50%	0.00	OK
LC15 at 87.50%	0.01	OK
LC16 at 87.50%	0.01	OK
LC17 at 0.00%	0.01	OK
LC18 at 100.00%	0.02	OK
LC19 at 100.00%	0.03	OK
LC2 at 0.00%	0.16	OK
LC20 at 100.00%	0.02	OK
LC21 at 100.00%	0.03	OK
LC22 at 100.00%	0.04	OK
LC23 at 100.00%	0.05	OK
LC24 at 100.00%	0.04	OK
LC25 at 0.00%	0.01	OK

Eq. H3-6

LC26 at 0.00%	0.01	OK
LC27 at 100.00%	0.01	OK
LC28 at 100.00%	0.01	OK
LC29 at 0.00%	0.01	OK
LC3 at 100.00%	0.37	OK
LC30 at 0.00%	0.01	OK
LC31 at 100.00%	0.01	OK
LC32 at 100.00%	0.01	OK
LC4 at 0.00%	0.16	OK
LC5 at 0.00%	0.38	OK
LC6 at 0.00%	0.16	OK
LC7 at 100.00%	0.37	OK
LC8 at 0.00%	0.16	OK
LC9 at 0.00%	0.05	OK
W180 at 0.00%	0.22	OK
W210 at 0.00%	0.10	OK
Wi180 at 0.00%	0.05	OK
Wi210 at 0.00%	0.02	OK
WL180 at 0.00%	0.01	OK
WL210 at 0.00%	0.00	OK

Eq. H3-6

126

LC1 at 0.00%	0.30	OK
LC10 at 0.00%	0.04	OK
LC11 at 0.00%	0.04	OK
LC12 at 100.00%	0.04	OK
LC13 at 93.75%	0.01	OK
LC14 at 93.75%	0.00	OK
LC15 at 93.75%	0.01	OK
LC16 at 93.75%	0.01	OK
LC17 at 0.00%	0.03	OK
LC18 at 0.00%	0.04	OK
LC19 at 0.00%	0.04	OK
LC2 at 100.00%	0.30	OK
LC20 at 0.00%	0.03	OK
LC21 at 0.00%	0.01	OK
LC22 at 0.00%	0.02	OK
LC23 at 0.00%	0.02	OK
LC24 at 100.00%	0.01	OK
LC25 at 100.00%	0.01	OK
LC26 at 0.00%	0.01	OK
LC27 at 0.00%	0.01	OK
LC28 at 100.00%	0.01	OK
LC29 at 100.00%	0.01	OK
LC3 at 0.00%	0.30	OK
LC30 at 0.00%	0.01	OK
LC31 at 0.00%	0.01	OK
LC32 at 100.00%	0.01	OK
LC4 at 100.00%	0.31	OK
LC5 at 0.00%	0.30	OK
LC6 at 100.00%	0.30	OK
LC7 at 0.00%	0.30	OK
LC8 at 100.00%	0.31	OK
LC9 at 0.00%	0.04	OK
W180 at 0.00%	0.18	OK
W210 at 100.00%	0.15	OK
Wi180 at 0.00%	0.04	OK
Wi210 at 100.00%	0.03	OK
WL180 at 0.00%	0.01	OK
WL210 at 100.00%	0.01	OK

Eq. H3-1

Eq. H3-6

T2L 3X3X1_4

127

LC1 at 0.00%	0.21	OK
LC10 at 0.00%	0.17	OK
LC11 at 0.00%	0.14	OK
LC12 at 0.00%	0.16	OK

Eq. H2-1

LC13 at 0.00%	0.09	OK
LC14 at 0.00%	0.07	OK
LC15 at 0.00%	0.09	OK
LC16 at 0.00%	0.09	OK
LC17 at 0.00%	0.09	OK
LC18 at 0.00%	0.09	OK
LC19 at 0.00%	0.09	OK
LC2 at 0.00%	0.20	OK
LC20 at 0.00%	0.09	OK
LC21 at 0.00%	0.09	OK
LC22 at 0.00%	0.09	OK
LC23 at 0.00%	0.08	OK
LC24 at 0.00%	0.09	OK
LC25 at 0.00%	0.09	OK
LC26 at 0.00%	0.09	OK
LC27 at 0.00%	0.09	OK
LC28 at 0.00%	0.09	OK
LC29 at 0.00%	0.09	OK
LC3 at 100.00%	0.03	OK
LC30 at 0.00%	0.09	OK
LC31 at 0.00%	0.09	OK
LC32 at 0.00%	0.09	OK
LC4 at 0.00%	0.20	OK
LC5 at 0.00%	0.19	OK
LC6 at 0.00%	0.18	OK
LC7 at 100.00%	0.04	OK
LC8 at 0.00%	0.18	OK
LC9 at 0.00%	0.17	OK
W180 at 0.00%	0.05	OK
W210 at 0.00%	0.07	OK
Wi180 at 0.00%	0.01	OK
Wi210 at 0.00%	0.02	OK
WL180 at 0.00%	0.00	OK
WL210 at 0.00%	0.00	OK

Eq. H2-1

128

LC1 at 0.00%	0.12	OK
LC10 at 0.00%	0.14	OK
LC11 at 0.00%	0.17	OK
LC12 at 0.00%	0.18	OK
LC13 at 0.00%	0.09	OK
LC14 at 0.00%	0.07	OK
LC15 at 0.00%	0.09	OK
LC16 at 0.00%	0.09	OK
LC17 at 0.00%	0.22	OK
LC18 at 0.00%	0.22	OK
LC19 at 0.00%	0.23	OK
LC2 at 0.00%	0.08	OK
LC20 at 0.00%	0.23	OK
LC21 at 0.00%	0.09	OK
LC22 at 0.00%	0.09	OK
LC23 at 0.00%	0.10	OK
LC24 at 0.00%	0.10	OK
LC25 at 0.00%	0.09	OK
LC26 at 0.00%	0.09	OK
LC27 at 0.00%	0.09	OK
LC28 at 0.00%	0.09	OK
LC29 at 0.00%	0.09	OK
LC3 at 0.00%	0.25	OK
LC30 at 0.00%	0.09	OK
LC31 at 0.00%	0.09	OK
LC32 at 0.00%	0.09	OK
LC4 at 0.00%	0.26	OK
LC5 at 0.00%	0.10	OK
LC6 at 0.00%	0.09	OK

Eq. H2-1

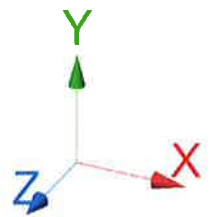
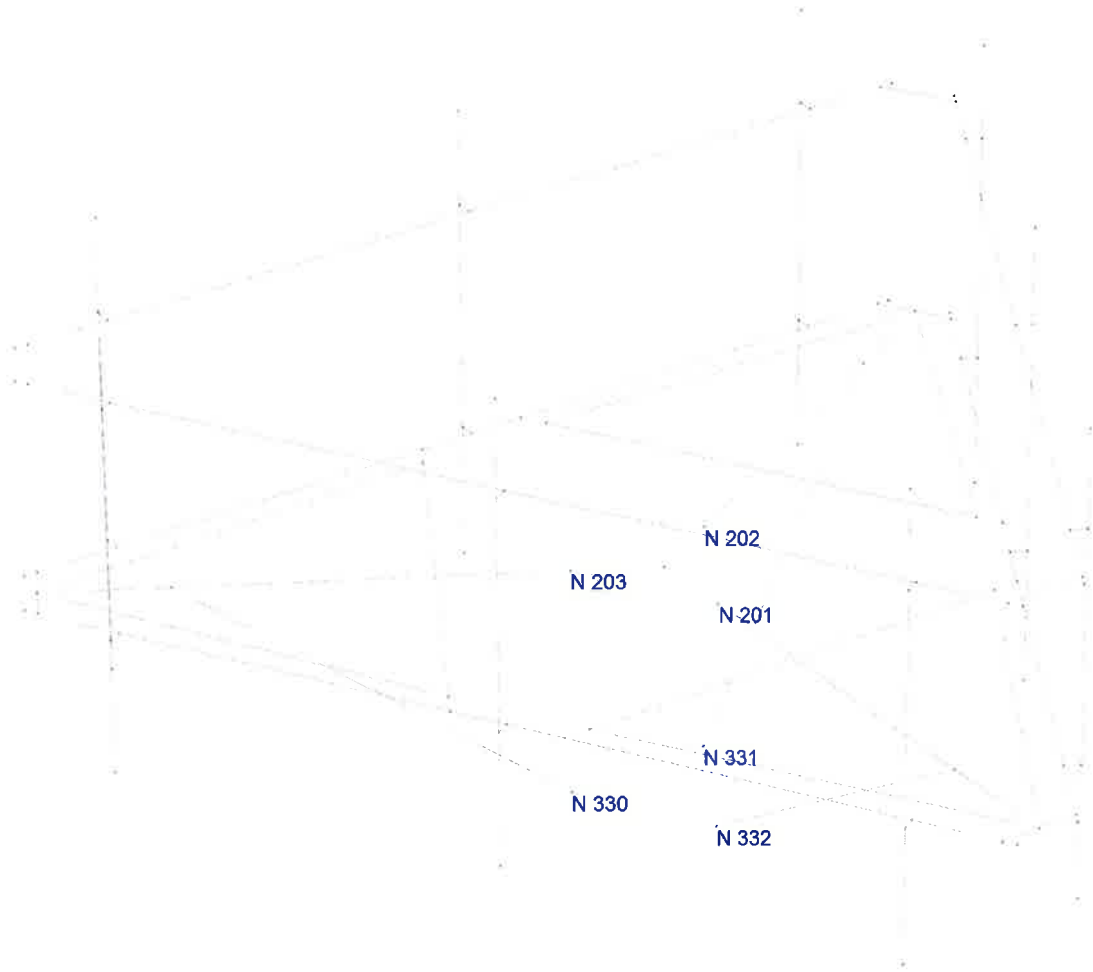
LC7 at 0.00%	0.22	OK
LC8 at 0.00%	0.24	OK
LC9 at 0.00%	0.16	OK
W180 at 0.00%	0.10	OK
W210 at 0.00%	0.11	OK
Wi180 at 0.00%	0.02	OK
Wi210 at 0.00%	0.03	OK
WL180 at 0.00%	0.00	OK
WL210 at 0.00%	0.00	OK

129

LC1 at 0.00%	0.12	OK
LC10 at 0.00%	0.17	OK
LC11 at 0.00%	0.17	OK
LC12 at 0.00%	0.14	OK
LC13 at 0.00%	0.09	OK
LC14 at 0.00%	0.07	OK
LC15 at 0.00%	0.09	OK
LC16 at 0.00%	0.09	OK
LC17 at 0.00%	0.09	OK
LC18 at 0.00%	0.10	OK
LC19 at 0.00%	0.10	OK
LC2 at 0.00%	0.27	OK
LC20 at 0.00%	0.10	OK
LC21 at 0.00%	0.22	OK
LC22 at 0.00%	0.23	OK
LC23 at 0.00%	0.23	OK
LC24 at 0.00%	0.23	OK
LC25 at 0.00%	0.09	OK
LC26 at 0.00%	0.09	OK
LC27 at 0.00%	0.09	OK
LC28 at 0.00%	0.09	OK
LC29 at 0.00%	0.09	OK
LC3 at 0.00%	0.24	OK
LC30 at 0.00%	0.09	OK
LC31 at 0.00%	0.09	OK
LC32 at 0.00%	0.09	OK
LC4 at 0.00%	0.08	OK
LC5 at 0.00%	0.10	OK
LC6 at 0.00%	0.24	OK
LC7 at 0.00%	0.22	OK
LC8 at 0.00%	0.10	OK
LC9 at 0.00%	0.15	OK
W180 at 0.00%	0.09	OK
W210 at 0.00%	0.09	OK
Wi180 at 0.00%	0.02	OK
Wi210 at 0.00%	0.02	OK
WL180 at 0.00%	0.00	OK
WL210 at 0.00%	0.00	OK

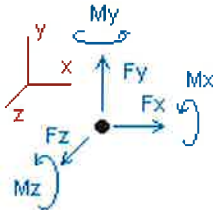
Eq. H2-1

APPENDIX D
ADDITIONAL CALCULATIONS



Analysis result

Reactions



Direction of positive forces and moments

Node	Forces [Kip]			Moments [Kip*ft]		
	FX	FY	FZ	MX	MY	MZ
Condition W180=-W0						
203	0.91212	0.00492	-1.81923	-0.24598	-1.12195	0.11849
201	-0.98643	-0.01341	-1.60305	-0.22503	0.85333	-0.12597
202	0.06969	0.00043	-3.34574	-0.02907	-0.09885	0.00706
331	0.00370	-0.60251	0.98427	0.03350	-0.01394	-0.00896
330	-0.40340	0.30358	0.29168	0.02436	0.03086	0.00460
332	0.40433	0.30699	0.30359	0.04387	-0.06461	0.00495
SUM	0.00000	0.00000	-5.18850	-0.39835	-0.41516	0.00018
Condition W210=-W30						
203	-2.90604	0.01449	1.24083	-0.12469	-0.32371	0.08267
201	-2.96027	-0.00261	-1.21177	0.13303	-0.36774	0.10231
202	-1.36151	-0.00869	-0.02538	-0.00682	1.39979	0.32045
331	0.06064	0.00053	-0.00117	-0.00037	-0.02826	-0.01689
330	0.82330	-0.56588	-0.42651	0.01597	0.05960	-0.04770
332	0.81638	0.56216	0.42399	-0.01484	0.05624	-0.04535
SUM	-5.52750	0.00000	0.00000	0.00228	0.79593	0.39549
Condition Wi180=-Wi0						
203	0.19891	0.00153	-0.36548	-0.05018	-0.21972	0.02361
201	-0.21259	-0.00243	-0.32462	-0.04590	0.16931	-0.02532
202	0.01266	0.00127	-0.70046	-0.00507	-0.01818	0.00147
331	0.00064	-0.13085	0.21381	0.00739	-0.00253	-0.00162
330	-0.08624	0.06485	0.06218	0.00542	0.00696	0.00087
332	0.08662	0.06563	0.06458	0.00913	-0.01335	0.00091
SUM	0.00000	0.00000	-1.05000	-0.07921	-0.07750	-0.00008
Condition Wi210=-Wi30						
203	-0.69090	0.00359	0.28464	-0.03059	-0.09068	0.01988
201	-0.70145	-0.00110	-0.27891	0.03223	-0.09926	0.02385
202	-0.30051	-0.00191	-0.00490	-0.00151	0.30842	0.07699
331	0.01552	0.00018	-0.00037	-0.00009	-0.00971	-0.00593
330	0.20089	-0.13825	-0.10468	0.00272	0.01252	-0.01107
332	0.19945	0.13749	0.10422	-0.00244	0.01175	-0.01058
SUM	-1.27700	0.00000	0.00000	0.00032	0.13304	0.09313

Condition WL180=-WL0						
203	0.03255	0.00014	-0.07085	-0.00982	-0.04607	0.00458
201	-0.03761	-0.00104	-0.05662	-0.00846	0.02825	-0.00507
202	0.00475	-0.00079	-0.12343	-0.00201	-0.00667	0.00044
331	0.00025	-0.02276	0.03710	0.00119	-0.00094	-0.00060
330	-0.01611	0.01211	0.01151	0.00073	0.00083	0.00028
332	0.01617	0.01234	0.01230	0.00203	-0.00307	0.00036

SUM	0.00000	0.00000	-0.19000	-0.01635	-0.02768	-0.00002
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Condition WL210=-WL30						
203	-0.11251	0.00054	0.05534	-0.00458	-0.00515	0.00329
201	-0.11572	0.00019	-0.05359	0.00510	-0.00776	0.00448
202	-0.05657	-0.00055	-0.00152	-0.00044	0.06007	0.01258
331	0.00226	0.00004	-0.00009	-0.00002	-0.00039	-0.00020
330	0.03398	-0.02332	-0.01739	0.00110	0.00322	-0.00219
332	0.03356	0.02309	0.01725	-0.00102	0.00300	-0.00204

SUM	-0.21500	0.00000	0.00000	0.00013	0.05298	0.01592
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Condition LC1=1.2DL+1.6W0						
203	-0.53283	0.29183	2.37444	0.23885	1.79317	-0.45281
201	0.65054	0.32115	2.03064	0.20963	-1.36730	0.46727
202	-0.11030	0.29894	6.42446	0.35177	0.15620	-0.01378
331	-0.00724	1.86160	-2.95944	-0.05820	0.02414	0.01550
330	-0.55246	0.41147	0.22641	-0.03571	-0.04761	-0.00397
332	0.55229	0.40601	0.20508	-0.06894	0.10527	-0.01247

SUM	0.00000	3.59100	8.30160	0.63740	0.66387	-0.00028
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Condition LC2=1.2DL+1.6W30						
203	5.57621	0.27651	-2.52166	0.04479	0.51598	-0.39550
201	3.80868	0.30387	1.40458	-0.36326	0.58642	0.10202
202	2.17961	0.31354	1.11189	0.31617	-2.24163	-0.51520
331	-0.09834	0.89673	-1.38274	-0.00400	0.04704	0.02819
330	-2.51518	1.80261	1.37551	-0.02229	-0.09359	0.07971
332	-0.10699	-0.00226	0.01242	0.02498	-0.08810	0.06801

SUM	8.84400	3.59100	0.00000	-0.00361	-1.27388	-0.63277
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Condition LC3=1.2DL-1.6W0						
203	2.38594	0.30756	-3.44710	-0.54829	-1.79707	-0.07364
201	-2.50604	0.27825	-3.09914	-0.51046	1.36335	0.06417
202	0.11270	0.30033	-4.28191	0.25875	-0.16012	0.00882
331	0.00460	-0.06644	0.19021	0.04901	-0.02048	-0.01317
330	-1.84335	1.38292	1.15978	0.04222	0.05115	0.01075
332	1.84614	1.38838	1.17655	0.07143	-0.10149	0.00338

SUM	0.00000	3.59100	-8.30160	-0.63734	-0.66465	0.00030
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Condition LC4=1.2DL-1.6W30						
203	-3.72310	0.32288	1.44901	-0.35423	-0.51988	-0.13095
201	-5.66418	0.29553	-2.47308	0.06243	-0.59037	0.42942
202	-2.17721	0.28573	1.03066	0.29435	2.23771	0.51024
331	0.09571	0.89843	-1.38649	-0.00519	-0.04338	-0.02587
330	0.11937	-0.00822	0.01069	0.02880	0.09714	-0.07293
332	2.50542	1.79665	1.36920	-0.02250	0.09188	-0.07711

SUM	-8.84400	3.59100	0.00000	0.00367	1.27311	0.63280
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Condition LC5=0.9DL+1.6W0

203	-0.76447	0.21691	2.50853	0.27753	1.79366	-0.38701
201	0.88248	0.24623	2.16420	0.24724	-1.36681	0.40084
202	-0.11060	0.22403	6.15664	0.27545	0.15669	-0.01316
331	-0.00691	1.63720	-2.61329	-0.05705	0.02368	0.01520
330	-0.25298	0.18717	0.05314	-0.03653	-0.04805	-0.00482
332	0.25248	0.18171	0.03237	-0.06926	0.10480	-0.01134

SUM	0.00000	2.69325	8.30160	0.63739	0.66397	-0.00028
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Condition LC6=0.9DL+1.6W30

203	5.34457	0.20159	-2.38758	0.08347	0.51647	-0.32969
201	4.04062	0.22895	1.53814	-0.32565	0.58691	0.03559
202	2.17931	0.23864	0.84407	0.23986	-2.24114	-0.51458
331	-0.09801	0.67233	-1.03659	-0.00285	0.04659	0.02790
330	-2.21570	1.57831	1.20223	-0.02311	-0.09404	0.07886
332	-0.40679	-0.22656	-0.16028	0.02467	-0.08857	0.06915

SUM	8.84400	2.69325	0.00000	-0.00362	-1.27379	-0.63278
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Condition LC7=0.9DL-1.6W0

203	2.15430	0.23264	-3.31301	-0.50961	-1.79658	-0.00783
201	-2.27410	0.20332	-2.96557	-0.47286	1.36385	-0.00226
202	0.11240	0.22542	-4.54973	0.18244	-0.15963	0.00944
331	0.00493	-0.29084	0.53636	0.05016	-0.02093	-0.01346
330	-1.54387	1.15863	0.98651	0.04141	0.05071	0.00990
332	1.54634	1.16408	1.00385	0.07112	-0.10196	0.00451

SUM	0.00000	2.69325	-8.30160	-0.63735	-0.66455	0.00030
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Condition LC8=0.9DL-1.6W30

203	-3.95474	0.24796	1.58309	-0.31555	-0.51939	-0.06515
201	-5.43224	0.22061	-2.33952	0.10003	-0.58987	0.36299
202	-2.17751	0.21082	0.76284	0.21804	2.23820	0.51086
331	0.09604	0.67403	-1.04033	-0.00404	-0.04384	-0.02616
330	0.41885	-0.23252	-0.16259	0.02799	0.09670	-0.07378
332	2.20561	1.57235	1.19650	-0.02281	0.09141	-0.07597

SUM	-8.84400	2.69325	0.00000	0.00366	1.27320	0.63280
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Condition LC9=1.2DL+Di+W10

203	1.29256	0.42442	-0.49911	-0.17129	0.21478	-0.39503
201	-1.28189	0.42840	-0.53471	-0.16469	-0.17430	0.40304
202	-0.00963	0.42458	2.42562	0.43734	0.01322	-0.00774
331	-0.00397	1.58192	-2.44473	-0.01331	0.00716	0.00456
330	-1.84317	1.38554	1.05555	-0.00001	-0.00243	0.00277
332	1.84610	1.38475	1.04737	-0.00880	0.01808	-0.00748

SUM	0.00000	5.62961	1.05000	0.07924	0.07651	0.00012
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Condition LC10=1.2DL+Di+W130

203	2.18237	0.42237	-1.14923	-0.19089	0.08575	-0.39130
201	-0.79304	0.42706	-0.58043	-0.24282	0.09428	0.35387
202	0.30355	0.42775	1.73005	0.43379	-0.31339	-0.08326
331	-0.01886	1.45088	-2.23055	-0.00583	0.01434	0.00887
330	-2.13030	1.58865	1.22241	0.00270	-0.00799	0.01472
332	1.73328	1.31290	1.00773	0.00278	-0.00702	0.00400

SUM	1.27700	5.62961	0.00000	-0.00029	-0.13402	-0.09310
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Condition LC11=1.2DL+Di-Wi0

203	1.69038	0.42749	-1.23007	-0.27166	-0.22465	-0.34781
201	-1.70708	0.42354	-1.18396	-0.25649	0.16433	0.35240
202	0.01569	0.42711	1.02469	0.42721	-0.02315	-0.00480
331	-0.00269	1.32021	-2.01711	0.00147	0.00211	0.00131
330	-2.01564	1.51524	1.17991	0.01084	0.01149	0.00451
332	2.01934	1.51602	1.17654	0.00947	-0.00862	-0.00567

SUM	0.00000	5.62961	-1.05000	-0.07917	-0.07848	-0.00004
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Condition LC12=1.2DL+Di-Wi30

203	0.80057	0.42954	-0.57995	-0.25206	-0.09562	-0.35154
201	-2.19593	0.42487	-1.13825	-0.17837	-0.10425	0.40158
202	-0.29748	0.42394	1.72026	0.43076	0.30346	0.07072
331	0.01219	1.45125	-2.23129	-0.00601	-0.00508	-0.00300
330	-1.72851	1.31214	1.01305	0.00814	0.01705	-0.00743
332	2.13217	1.58787	1.21618	-0.00211	0.01649	-0.01715

SUM	-1.27700	5.62961	0.00000	0.00035	0.13206	0.09317
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Condition LC13=1.2DL

203	0.92655	0.29970	-0.53633	-0.15472	-0.00195	-0.26323
201	-0.92775	0.29970	-0.53425	-0.15041	-0.00197	0.26572
202	0.00120	0.29964	1.07128	0.30526	-0.00196	-0.00248
331	-0.00132	0.89758	-1.38461	-0.00459	0.00183	0.00116
330	-1.19790	0.89720	0.69310	0.00325	0.00177	0.00339
332	1.19921	0.89719	0.69081	0.00124	0.00189	-0.00455

SUM	0.00000	3.59100	0.00000	0.00003	-0.00039	0.00001
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Condition LC14=0.9DL

203	0.69491	0.22477	-0.40224	-0.11604	-0.00146	-0.19742
201	-0.69581	0.22478	-0.40069	-0.11281	-0.00148	0.19929
202	0.00090	0.22473	0.80346	0.22895	-0.00147	-0.00186
331	-0.00099	0.67318	-1.03846	-0.00345	0.00137	0.00087
330	-0.89843	0.67290	0.51982	0.00244	0.00133	0.00254
332	0.89941	0.67289	0.51811	0.00093	0.00142	-0.00341

SUM	0.00000	2.69325	0.00000	0.00002	-0.00029	0.00001
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Condition LC15=1.2DL+1.5LL1

203	0.92655	0.29970	-0.53633	-0.15472	-0.00195	-0.26323
201	-0.92775	0.29970	-0.53425	-0.15041	-0.00197	0.26572
202	0.00120	0.29964	1.07128	0.30526	-0.00196	-0.00248
331	-0.00132	0.89758	-1.38461	-0.00459	0.00183	0.00116
330	-1.19790	0.89720	0.69310	0.00325	0.00177	0.00339
332	1.19921	0.89719	0.69081	0.00124	0.00189	-0.00455

SUM	0.00000	3.59100	0.00000	0.00003	-0.00039	0.00001
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Condition LC16=1.2DL+1.5LL2

203	0.92655	0.29970	-0.53633	-0.15472	-0.00195	-0.26323
201	-0.92775	0.29970	-0.53425	-0.15041	-0.00197	0.26572
202	0.00120	0.29964	1.07128	0.30526	-0.00196	-0.00248
331	-0.00132	0.89758	-1.38461	-0.00459	0.00183	0.00116
330	-1.19790	0.89720	0.69310	0.00325	0.00177	0.00339
332	1.19921	0.89719	0.69081	0.00124	0.00189	-0.00455

SUM	0.00000	3.59100	0.00000	0.00003	-0.00039	0.00001
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Condition **LC17=1.2DL+WL0+1.5LLa1**

203	0.84801	0.36723	-0.46914	-0.25226	0.01715	-0.27684
201	-1.91449	0.26697	-1.09617	-0.27306	0.00569	0.15360
202	-0.03118	0.23912	1.01748	0.24871	0.03662	-0.03477
331	-0.00601	0.87001	-1.34265	-0.00584	0.01154	0.00736
330	-1.20382	0.90597	0.70512	0.00906	0.01440	-0.00262
332	2.30749	1.69170	1.37535	0.06134	-0.05541	-0.03591
SUM	0.00000	4.34100	0.19000	-0.21205	0.02999	-0.18918

Condition **LC18=1.2DL+WL30+1.5LLa1**

203	0.99307	0.36684	-0.59532	-0.25750	-0.02377	-0.27555
201	-1.83638	0.26574	-1.09920	-0.28662	0.04170	0.14404
202	0.03014	0.23888	0.89557	0.24713	-0.03012	-0.04691
331	-0.00802	0.84720	-1.30546	-0.00463	0.01099	0.00696
330	-1.25391	0.94140	0.73402	0.00870	0.01201	-0.00015
332	2.29010	1.68094	1.37039	0.06438	-0.06148	-0.03351
SUM	0.21500	4.34100	0.00000	-0.22853	-0.05067	-0.20513

Condition **LC19=1.2DL-WL0+1.5LLa1**

203	0.91311	0.36752	-0.61084	-0.27190	-0.07499	-0.26768
201	-1.98971	0.26489	-1.20941	-0.28998	0.06219	0.14345
202	-0.02169	0.23754	0.77063	0.24469	0.02328	-0.03390
331	-0.00551	0.82449	-1.26845	-0.00347	0.00966	0.00615
330	-1.23604	0.93020	0.72813	0.01052	0.01606	-0.00206
332	2.33983	1.71637	1.39994	0.06539	-0.06156	-0.03519
SUM	0.00000	4.34100	-0.19000	-0.24475	-0.02536	-0.18923

Condition **LC20=1.2DL-WL30+1.5LLa1**

203	0.76806	0.36792	-0.48465	-0.26666	-0.03407	-0.26897
201	-2.06782	0.26612	-1.20638	-0.27643	0.02617	0.15300
202	-0.08301	0.23777	0.89254	0.24626	0.09002	-0.02176
331	-0.00350	0.84729	-1.30564	-0.00468	0.01021	0.00656
330	-1.18595	0.89477	0.69923	0.01089	0.01845	-0.00452
332	2.35722	1.72713	1.40490	0.06234	-0.05548	-0.03759
SUM	-0.21500	4.34100	0.00000	-0.22826	0.05530	-0.17329

Condition **LC21=1.2DL+WL0+1.5LLa2**

203	1.91835	0.26578	-1.08402	-0.27601	0.00821	-0.15061
201	-0.84415	0.36842	-0.48129	-0.24931	-0.00325	0.27983
202	0.02409	0.23912	1.01748	0.24871	-0.02720	0.02894
331	0.00287	0.87001	-1.34265	-0.00584	-0.00600	-0.00383
330	-2.30624	1.69193	1.37842	0.06465	0.06132	0.03411
332	1.20507	0.90575	0.70205	0.00576	-0.00849	0.00082
SUM	0.00000	4.34100	0.19000	-0.21205	0.02459	0.18926

Condition **LC22=1.2DL+WL30+1.5LLa2**

203	2.06341	0.26538	-1.21021	-0.28125	-0.03271	-0.14932
201	-0.76604	0.36719	-0.48432	-0.26287	0.03276	0.27027
202	0.08541	0.23888	0.89557	0.24713	-0.09394	0.01680
331	0.00087	0.84720	-1.30546	-0.00463	-0.00655	-0.00424
330	-2.35633	1.72736	1.40732	0.06428	0.05893	0.03658
332	1.18768	0.89499	0.69709	0.00880	-0.01457	0.00322
SUM	0.21500	4.34100	0.00000	-0.22853	-0.05608	0.17332

Condition **LC23=1.2DL-WL0+1.5LLa2**

203	1.98346	0.26607	-1.22572	-0.29565	-0.08393	-0.14145
201	-0.91937	0.36635	-0.59453	-0.26623	0.05325	0.26968
202	0.03358	0.23754	0.77063	0.24469	-0.04055	0.02981
331	0.00338	0.82449	-1.26845	-0.00347	-0.00787	-0.00504
330	-2.33846	1.71615	1.40143	0.06610	0.06298	0.03467
332	1.23741	0.93042	0.72664	0.00981	-0.01464	0.00153

SUM	0.00000	4.34100	-0.19000	-0.24475	-0.03077	0.18921
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Condition **LC24=1.2DL-WL30+1.5LLa2**

203	1.83840	0.26646	-1.09953	-0.29041	-0.04301	-0.14274
201	-0.99748	0.36758	-0.59150	-0.25268	0.01723	0.27924
202	-0.02774	0.23777	0.89254	0.24626	0.02619	0.04195
331	0.00538	0.84729	-1.30564	-0.00468	-0.00732	-0.00463
330	-2.28837	1.68073	1.37254	0.06647	0.06536	0.03220
332	1.25481	0.94118	0.73160	0.00676	-0.00857	-0.00086

SUM	-0.21500	4.34100	0.00000	-0.22826	0.04989	0.20516
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Condition **LC25=1.2DL+WL0+1.5LLa3**

203	0.89400	0.29955	-0.46548	-0.14490	0.04412	-0.26781
201	-0.89014	0.30074	-0.47763	-0.14195	-0.03022	0.27080
202	-0.00355	0.30043	1.19471	0.30727	0.00471	-0.00292
331	-0.00157	0.92034	-1.42171	-0.00578	0.00277	0.00176
330	-1.18179	0.88508	0.68159	0.00253	0.00095	0.00311
332	1.18305	0.88486	0.67852	-0.00078	0.00496	-0.00491

SUM	0.00000	3.59100	0.19000	0.01638	0.02729	0.00004
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Condition **LC26=1.2DL+WL30+1.5LLa3**

203	1.03906	0.29916	-0.59166	-0.15014	0.00320	-0.26651
201	-0.81203	0.29951	-0.48066	-0.15551	0.00579	0.26124
202	0.05777	0.30019	1.07279	0.30570	-0.06203	-0.01506
331	-0.00358	0.89753	-1.38452	-0.00457	0.00222	0.00136
330	-1.23188	0.92051	0.71049	0.00216	-0.00144	0.00558
332	1.16565	0.87410	0.67356	0.00226	-0.00111	-0.00251

SUM	0.21500	3.59100	0.00000	-0.00011	-0.05337	-0.01591
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Condition **LC27=1.2DL-WL0+1.5LLa3**

203	0.95910	0.29984	-0.60718	-0.16454	-0.04802	-0.25864
201	-0.96536	0.29866	-0.59087	-0.15888	0.02628	0.26065
202	0.00595	0.29885	0.94785	0.30325	-0.00864	-0.00205
331	-0.00107	0.87482	-1.34752	-0.00341	0.00090	0.00056
330	-1.21401	0.90931	0.70460	0.00398	0.00260	0.00367
332	1.21538	0.90953	0.70311	0.00327	-0.00118	-0.00419

SUM	0.00000	3.59100	-0.19000	-0.01632	-0.02807	-0.00001
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Condition **LC28=1.2DL-WL30+1.5LLa3**

203	0.81405	0.30023	-0.48099	-0.15930	-0.00710	-0.25994
201	-1.04347	0.29989	-0.58784	-0.14532	-0.00974	0.27020
202	-0.05537	0.29909	1.06976	0.30483	0.05810	0.01010
331	0.00094	0.89762	-1.38471	-0.00462	0.00145	0.00096
330	-1.16392	0.87388	0.67571	0.00435	0.00499	0.00120
332	1.23278	0.92029	0.70807	0.00022	0.00489	-0.00659

SUM	-0.21500	3.59100	0.00000	0.00016	0.05260	0.01593
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Condition **LC29=1.2DL+WL0+1.5LLa4**

203	0.89400	0.29955	-0.46548	-0.14490	0.04412	-0.26781
201	-0.89014	0.30074	-0.47763	-0.14195	-0.03022	0.27080
202	-0.00355	0.30043	1.19471	0.30727	0.00471	-0.00292
331	-0.00157	0.92034	-1.42171	-0.00578	0.00277	0.00176
330	-1.18179	0.88508	0.68159	0.00253	0.00095	0.00311
332	1.18305	0.88486	0.67852	-0.00078	0.00496	-0.00491

SUM	0.00000	3.59100	0.19000	0.01638	0.02729	0.00004
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Condition **LC30=1.2DL+WL30+1.5LLa4**

203	1.03906	0.29916	-0.59166	-0.15014	0.00320	-0.26651
201	-0.81203	0.29951	-0.48066	-0.15551	0.00579	0.26124
202	0.05777	0.30019	1.07279	0.30570	-0.06203	-0.01506
331	-0.00358	0.89753	-1.38452	-0.00457	0.00222	0.00136
330	-1.23188	0.92051	0.71049	0.00216	-0.00144	0.00558
332	1.16565	0.87410	0.67356	0.00226	-0.00111	-0.00251

SUM	0.21500	3.59100	0.00000	-0.00011	-0.05337	-0.01591
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Condition **LC31=1.2DL-WL0+1.5LLa4**

203	0.95910	0.29984	-0.60718	-0.16454	-0.04802	-0.25864
201	-0.96536	0.29866	-0.59087	-0.15888	0.02628	0.26065
202	0.00595	0.29885	0.94785	0.30325	-0.00864	-0.00205
331	-0.00107	0.87482	-1.34752	-0.00341	0.00090	0.00056
330	-1.21401	0.90931	0.70460	0.00398	0.00260	0.00367
332	1.21538	0.90953	0.70311	0.00327	-0.00118	-0.00419

SUM	0.00000	3.59100	-0.19000	-0.01632	-0.02807	-0.00001
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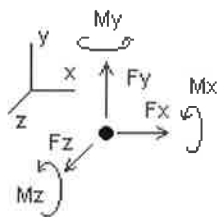
Condition **LC32=1.2DL-WL30+1.5LLa4**

203	0.81405	0.30023	-0.48099	-0.15930	-0.00710	-0.25994
201	-1.04347	0.29989	-0.58784	-0.14532	-0.00974	0.27020
202	-0.05537	0.29909	1.06976	0.30483	0.05810	0.01010
331	0.00094	0.89762	-1.38471	-0.00462	0.00145	0.00096
330	-1.16392	0.87388	0.67571	0.00435	0.00499	0.00120
332	1.23278	0.92029	0.70807	0.00022	0.00489	-0.00659

SUM	-0.21500	3.59100	0.00000	0.00016	0.05260	0.01593
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Envelope for nodal reactions

Note.- **Ic** is the controlling load condition



Direction of positive forces and moments

Envelope of nodal reactions for :

- W180=-W0
- W210=-W30
- Wi180=-Wi0
- Wi210=-Wi30
- WL180=-WL0
- WL210=-WL30
- LC1=1.2DL+1.6W0
- LC2=1.2DL+1.6W30
- LC3=1.2DL-1.6W0
- LC4=1.2DL-1.6W30
- LC5=0.9DL+1.6W0
- LC6=0.9DL+1.6W30
- LC7=0.9DL-1.6W0
- LC8=0.9DL-1.6W30
- LC9=1.2DL+Di+Wi0
- LC10=1.2DL+Di+Wi30
- LC11=1.2DL+Di-Wi0
- LC12=1.2DL+Di-Wi30
- LC13=1.2DL
- LC14=0.9DL
- LC15=1.2DL+1.5LL1
- LC16=1.2DL+1.5LL2
- LC17=1.2DL+WL0+1.5LLa1
- LC18=1.2DL+WL30+1.5LLa1
- LC19=1.2DL-WL0+1.5LLa1
- LC20=1.2DL-WL30+1.5LLa1
- LC21=1.2DL+WL0+1.5LLa2
- LC22=1.2DL+WL30+1.5LLa2
- LC23=1.2DL-WL0+1.5LLa2
- LC24=1.2DL-WL30+1.5LLa2
- LC25=1.2DL+WL0+1.5LLa3
- LC26=1.2DL+WL30+1.5LLa3
- LC27=1.2DL-WL0+1.5LLa3
- LC28=1.2DL-WL30+1.5LLa3
- LC29=1.2DL+WL0+1.5LLa4
- LC30=1.2DL+WL30+1.5LLa4
- LC31=1.2DL-WL0+1.5LLa4
- LC32=1.2DL-WL30+1.5LLa4

Node		Forces						Moments					
		Fx [Kip]	lc	Fy [Kip]	lc	Fz [Kip]	lc	Mx [Kip*ft]	lc	My [Kip*ft]	lc	Mz [Kip*ft]	lc
203	Max	5.576	LC2	0.430	LC12	2.509	LC5	0.27753	LC5	1.79366	LC5	0.11849	W180
	Min	-3.955	LC8	0.000	WL180	-3.447	LC3	-0.54829	LC3	-1.79707	LC3	-0.45281	LC1
201	Max	4.041	LC6	0.428	LC9	2.164	LC5	0.24724	LC5	1.36385	LC7	0.46727	LC1
	Min	-5.664	LC4	-0.013	W180	-3.099	LC3	-0.51046	LC3	-1.36730	LC1	-0.12597	W180
202	Max	2.180	LC2	0.428	LC10	6.424	LC1	0.43734	LC9	2.23820	LC8	0.51086	LC8
	Min	-2.178	LC8	-0.009	W210	-4.550	LC7	-0.02907	W180	-2.24163	LC2	-0.51520	LC2
331	Max	0.096	LC8	1.862	LC1	0.984	W180	0.05016	LC7	0.04704	LC2	0.02819	LC2
	Min	-0.098	LC2	-0.603	W180	-2.959	LC1	-0.05820	LC1	-0.04384	LC8	-0.02616	LC8
330	Max	0.823	W210	1.803	LC2	1.407	LC22	0.06647	LC24	0.09714	LC4	0.07971	LC2
	Min	-2.515	LC2	-0.566	W210	-0.427	W210	-0.03653	LC5	-0.09404	LC6	-0.07378	LC8
332	Max	2.505	LC4	1.797	LC4	1.405	LC20	0.07143	LC3	0.10527	LC1	0.06915	LC6
	Min	-0.407	LC6	-0.227	LC6	-0.160	LC6	-0.06926	LC5	-0.10196	LC7	-0.07711	LC4

Date: 6/13/2018
Project Name: HRT 106(B) 943202
Project Number: 806364
Designed By: BD Checked By: MSC



CHECK CONNECTION CAPACITY (Worse Case)

Reference: AISC Steel Construction Manual 9th Edition (ASD)

Bolt Type = Threaded Rod
Bolt Diameter = 1/2 in.
Steel Grade = A36

Allowable Tensile Load =

$$F_{Tall} = 3750 \text{ lbs.}$$

Allowable Shear Load =

$$F_{Vall} = 1940 \text{ lbs.}$$

WIND FORCES

Reaction $F = 6424 \text{ lbs.}$

GRAVITY LOADS

Ice and Equipment 428 lbs.

No. of Supports = 1

No. of Bolts / Support = 4

Tension Design Load /Bolts =

$$f_t = 1606.00 \text{ lbs.} < 3750 \text{ lbs.} \text{ Therefore, OK !}$$

Shear Design Load / Bolts=

$$f_v = 107.00 \text{ lbs.} < 1940 \text{ lbs.} \text{ Therefore, OK !}$$

CHECK COMBINED TENSION AND SHEAR

$$\begin{array}{rclcl} f_t / F_T & + & f_v / F_v & \leq & 1.0 \\ 0.428 & + & 0.055 & = & 0.483 < 1.0 \text{ Therefore, OK !} \end{array}$$