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Prepared for:
AT&T
550 Cochituate Road Suites 13 & 14
Framingham, MA 01701

Prepared by:
Dewberry Engineers Inc.
99 Summer St., Suite 700
Boston, MA 02110-1200
Project Number: 50123202

Mount Analysis Report and Design Calculations for a Wireless Telecommunications Upgrade

April 28, 2020
(Rev.0)

AT&T Designation:	**Site FA**	10034996
	Site Name	Cheshire CT
	Site ID	CT2036
Analysis Criteria:	**Codes**	TIA-222-H-1, ASCE 7-10, IBC 15 & 2018 CT SBC 125-mph (3-second gust) 50-mph (gust speed) with 0.75" ice
Site Data:		751 Higgins Road, Cheshire, CT 06410 Lat: 41.4874639, Long: -72.9293319 Handrail mounted pipes at 255' centerline Standoff sector frames (B & G) at 255' centerline

Dewberry Engineers, Inc. is pleased to submit this *"Mount Analysis Report"* to determine the structural integrity of the existing antenna mount. The objective of this report is to access the proposed installation of new equipment as detailed in the analysis report.

Analysis Results:

Maximum Utilization of Alpha Sector Structural Member:	**54.0%**	**Pass**
Maximum Utilization of Beta Sector Structural Member:	**67.7%**	**Pass**
Maximum Utilization of Gamma Sector Structural Member:	**65.8%**	**Pass**

Note:

This mount was verified to withstand a **500 lb**. live load concurrent with 30-mph wind speeds.

This analysis has been performed in accordance with the *ANSI/TIA-222-H-2017-H-1 Structural Standard for Antenna Supporting Structures, Antennas, and Small Wind Turbine Support Structures*, *ASCE 7-10*, *2015 International Building Code, 2018 Connecticut State Building Code (SBC)*, and the most recent *AT&T Mount Technical Directive*. If you have any further questions or need further assistance on this or any other projects, please give us a call.

Reviewed by:

Brandon Kelsey
Structural Project Engineer

Approved by:

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JAMES S. DECELLE JR.
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Table of Contents

1.0 PROJECT SUMMARY & RESULTS 1

2.0 RECOMMENDATIONS & CONCLUSION 2

3.0 CODES, STANDARDS, AND REFERENCES 2

4.0 ANALYSIS ASSUMPTIONS 2

5.0 REQUIRED FIELD VERIFICATIONS 2

6.0 WIND CALCULATIONS 3

7.0 ANALYSIS DISCLAIMERS 3

APPENDIX A MOUNT ANALYSIS

APPENDIX B REFERENCE MATERIAL

APPENDIX C SITE PHOTOS

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1.0 PROJECT SUMMARY & RESULTS

The objective of this report is to assess the proposed installation of new antennas and RRH units mounted to the existing mount pipes and proposed steel standoff sector mounts installed on a 250-foot-tall lattice located in Cheshire, CT.

There are currently existing antennas and support equipment mounted to an existing steel handrail in sectors Alpha, Beta, and Gamma. The existing sectors have an approximate antenna centerline of 255 ft.

For mount analysis parameters, refer to the table below:

Table 1: ANALYSIS PARAMETERS

Wind Speed (mph)	Ice Thickness (in)	Ice Wind Speed (mph)	Exposure Category	Risk Category	Topographic Category	Crest Height (ft)	Seismic Design Category
125	**0.75**	**50**	**B**	**II**	**1**	**N/A**	**B**

For the final loading configuration, refer to the table below:

Table 2: FINAL APPURTENANCE LOADING

Elev.	Status	Carrier	Appurtenance Description	Location
255'	**Proposed**	**AT&T**	**(1) – 800-10966 (Alpha)**	**Position 2**
255'	**Proposed**	**AT&T**	**(2) – 800-10965 (Beta & Gamma)**	**Position 2**
252'	**Proposed**	**AT&T**	**(3) – B14 4478**	**Existing Handrail**
252'	**Proposed**	**AT&T**	**(3) – RRUS-32**	**Existing Handrail**
252'	**Proposed**	**AT&T**	**(3) – Raycap DC2**	**Existing Handrail**
255'	Existing	AT&T	(2) – AM-X-CD-16-65-00T (A & B)	Position 1
255'	Existing	AT&T	(1) – SBNH-1D6565C (Gamma)	Position 1
255'	Existing	AT&T	(1) – HPA-65R-BUU-H8 (Alpha)	Position 3
255'	Existing	AT&T	(2) – HPA-65R-BUU-H6 (B & G)	Position 3
252'	Existing	AT&T	(3) – RRUS-11	Existing Handrail
252'	Existing	AT&T	(3) – RRUS-32-B2	Existing Handrail
255'	Existing	AT&T	(3) – DC-48-60-18-8F	Existing Handrail
AT&T				

For the capacity of each individual member group, refer to the table below:

Table 3: MEMBER UTILIZATION				
Sector	Member Type	Member Size	Utilization Ratio	Pass/Fail
Alpha	Platform Handrail Angles	L2.5x2.5x184	**54.0%**	**Pass**
Alpha	Platform Handrail Bent Plates	BP2.75x5x1/4	27.5%	**Pass**
Alpha	Antenna Pipes	2-3/8" O.D. Sch. 40	36.4%	**Pass**
Beta	HSS Standoff Members	HSS 3x3x1/4	**67.7%**	**Pass**
Beta	Mount Horizontal Pipes	2-7/8" O.D. Sch. 40	41.4%	**Pass**
Beta	Antenna Pipes	2-7/8" O.D. Sch. 40	38.0%	**Pass**
Beta	Tower Plate Connection	6"x6"x1/2" A36	14.4%	**Pass**
Beta	Tower Bolt Connection	1/2" dia. A325 bolts	3.4%	**Pass**
Gamma	HSS Standoff Members	HSS 4x4x1/4	40.4%	**Pass**
Gamma	Mount Horizontal Pipes	4" O.D. Sch. 40	**65.8%**	**Pass**
Gamma	Kicker Angles	L4x4x1/4	1.7%	**Pass**
Gamma	Antenna Pipes	2-7/8" O.D. Sch. 40	34.0%	**Pass**
Gamma	Tower Plate Connection	6"x6"x1/4" A36	20.3%	**Pass**
Gamma	Tower Bolt Connection	1/2" dia. A325 bolts	5.0%	**Pass**

2.0 RECOMMENDATIONS & CONCLUSION

The analysis concludes that the existing steel handrail, mounting pipes, and proposed steel standoff sector mounts, as described in the referenced material, **have sufficient** structural capacity to support the proposed installation. Under the proposed conditions, the maximum utilization of a single structural member is **67.7%.**

3.0 CODES, STANDARDS, AND REFERENCES

The structure was analyzed per the provisions of the following codes and standards:

- *International Building Code (IBC) 2015, International Code Council*
- *TIA-222-H-1, Structural Standard for Antenna Supporting Structures and Antennas*
- *Steel Construction Manual 14th Ed, American Institute of Steel Construction (AISC)*
- *ASCE 7-10 Minimum Design Loads for Buildings and Other Structures, American Society of Civil Engineers*
- *2018 Connecticut State Building Code (SBS)*
- *AT&T Mount Technical Directive, Revision 15*

The following documents and references were used for this analysis:

- Radio Frequency Design Sheet by AT&T, date updated 06/06/18.
- Mount photos obtained during site visit by GPD dated 03/31/20.
- Latest Construction Drawings by Dewberry Engineers Inc.
- Platform Mapping by GPD dated 04/09/20.

4.0 ANALYSIS ASSUMPTIONS

- All member properties are A36.
- Existing handrail has a spacing of 5.5 ft. Analysis of the handrail assumes worse case loading, which consists of the heaviest antenna at the mid-point and the four heaviest RRHs/OVPs evenly spaced on the inside face of the handrail
- All equipment is located per latest Construction Drawings by Dewberry Engineers Inc.
- Loading caused by seismic forces does not control the design of the mounts.

5.0 REQUIRED FIELD VERIFICATIONS

- N/A

6.0 WIND CALCULATIONS

The following code-specified strength limit state (LRFD) load combinations were considered in the analysis of the antenna mount *(TIA-222-H)*:

1. 1.4D
2. 1.2D + 1.0W
3. $1.2D + 1.0D_i + 1.0\ W_i$

Where:
D = dead load of mount & equipment
D_i = dead load of ice
W = design wind load
W_i = design ice wind load

The following code-specified serviceability load combinations were considered in the analysis of the antenna mount *(TIA-222-H)*:

1. $1.0D + 1.0W_s$

Where:
W_s = service wind load

In accordance with *AT&T Mount Technical Directive*, Mount Analysis Methods, the following maintenance loads were considered:

1. 1.4D
2. $1.2D + 1.5L_m + 1.0W_m$
3. $1.2D + 1.5L_v$

Where:
W_m = design maintenance wind load
L_m = design maintenance load *(500 lb)*
L_v = design maintenance load *(250 lb)*

The following site-specific design parameters were considered in this analysis per the provisions of *TIA-222-H:*

Risk Category:	II	
Exposure Category:	B	
Design Basic Wind Speed:	125 mph	*2018 CT SBC*
Design Ice Wind Speed:	50 mph	*ASCE 7-10 Hazard Tool*
Design Ice Thickness:	0.75 in	*ASCE 7-10 Hazard Tool*
Gust Effect Factor	1.00	*Sect. 16.6, TIA*
Wind Direction Probability Factor	0.95	*Section 16.6, TIA*
Serviceability Wind Speed:	60 mph	*Sect. 2.8.3, TIA*
Maintenance Wind Speed:	30 mph	*Section 16.3, TIA*

7.0 ANALYSIS DISCLAIMERS

If the actual field conditions vary from what was assumed in this analysis, the results and conclusions expressed in this report are invalid and further evaluation is recommended for any proposed installation to continue. Please note that this analysis is limited to the antenna mount only.

Dewberry Engineers, Inc. reserves the right to add to or modify this report if more information becomes available. The conclusions reached by Dewberry Engineers, Inc. in this report are only applicable to the previously mentioned existing structural elements supporting the proposed wireless telecommunications installation. The results of this report are based on the assumption that existing structural elements have been installed per the original design documents, have been well maintained, and are uncompromised. This report does not imply that a thorough inspection of the existing structure has been performed. Any deviation of the support condition, loading, location, placement, equipment configuration, etc., will require Dewberry Engineers, Inc. to generate an additional structural analysis. Further, no structural qualification is made or implied by this report of any existing structural elements.

APPENDIX A

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Job Number	50123202
Made by:	JSD
Date:	04/22/20
Checked by:	BGK
Date:	04/23/20

(Cheshire CT - Alpha) - Design Wind Load

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Wind Load Design Criteria

Site Name: Cheshire CT - Alpha

General Information & Design Input from TIA-222-H

Item	Value	Description	Reference
V_{ult} =	125.00	Ultimate Design Wind Speed (mph)	*2018 CT State Building Code (SBC)*
V_i =	50.00	Design Ice Wind Speed (mph)	*ASCE 7-10, Hazard Tool*
K_d =	0.95	Wind Direction Probability Factor	*Sect. 16.6, TIA*
Class	II	Risk Category	*Table 2-1, TIA*
I =	1.00	Importance Factor (Ice Thickness)	*Table 2-3, TIA*
z = h =	255.00	ft. (A.G.L.)	*Max. Center of Appurtenance*
Exp. Cat.	B	Exposure Category	*Sect. 2.6.5.1.2, TIA*
z_g =	1200.00	Exposure Category Coeff.	*Table 2-4, TIA*
α' =	7.00	Exposure Category Coeff.	*Table 2-4, TIA*
$K_{z\,(min)}$ =	0.70	Exposure Category Coeff.	*Table 2-4, TIA*
K_c =	0.90	Terrain Constant	*Table 2-4, TIA*
K_t =	N/A	Topographic Constant	*Table 2-5, TIA ("N/A" if Topo. Cat. = 1)*
K_z =	1.29	$= 2.01(z/z_g)^{(2/\alpha')}$	*Sect. 2.6.5.2, TIA*
Topo. Cat.	1	Topographic Category (1-4)	*Sect. 2.6.6.2.1, TIA*
e =	2.72	Natural Logarithmic base	
f =	N/A	Height Attenuation Factor	*Table 2-5, TIA ("N/A" if Topo. Cat. = 1)*
H =	N/A	ft. Height of crest above surrounding terrain	
K_h =	N/A	$e^{((f*z)/H)}$	*Sect. 2.6.6.2.1, TIA*
K_{zt} =	1.00	$= [1+((K_c*K_t)/K_h)]^2$	*Sect. 2.6.6.2.1, TIA*
K_s =	N/A	Rooftop Wind Speed-Up Factor	*Sect. 2.6.7, TIA*
K_e =	1.00	Ground Elevation Factor	*Sect. 2.6.8, TIA*
K_{iz} =	1.23	$= (z/33)^{0.10} \leq 1.4$ (Height escalation factor)	*Sect. 2.6.10, TIA*
G_h =	1.00	Gust Effect Factor	*Sect. 16.6, TIA*
K_a =	0.90	Shielding Factor	*Sect. 16.6.1.2, TIA*
t_i =	0.75	Design Ice Thickness	*ASCE 7-10, Hazard Tool*
t_{iz} =	0.92	$= t_i(I)K_{iz}(K_{zt})^{0.35}$	*Sect. 2.6.10, TIA*
$q_{z\,design}$ =	49.1 psf	$= 0.00256(K_z)(K_{zt})(K_s)(K_e)(K_d)(V^2)$	*Sect. 2.6.11.6, TIA*
$q_{z\,ice}$ =	7.9 psf	$= 0.00256(K_z)(K_{zt})(K_s)(K_e)(K_d)(V_i^2)$	*Sect. 2.6.11.6, TIA*

Design Wind Forces:

Section 2.6.11.2

$F_A = q_{z\,design}G_h(EPA)_A$ *(where $(EPA)_A$ = effective projected area of the appurtenance = $C_a A_a$)*

$F_{Ai} = q_{z\,ice}G_h(EPA)_{Ai}$

(see calculation tables on following pages)

Design Ice Weight:

Section 2.6.10

$F_i = [\pi(t_{iz})(D_c + t_{iz})]*56$ lb/ft³ *(where D_c = largest out to out dimension of member)*

(see calculation tables on following pages)

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(Cheshire CT - Alpha) - Design Wind Load

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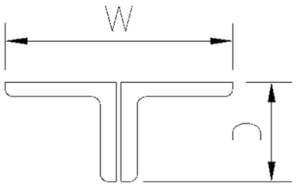
Element Definition

	Description	Dimensions (in.)			Weight	Length /	
		W	D	H	(lb)	# Supports	
	AM-X-CD-16-65-00T	11.80	5.90	72.00	63.50	2.00	
	800-10966	20.00	6.90	96.00	125.70	2.00	*(Worse Case)*
	HPA-65R-BUU-H8	14.80	7.40	92.40	65.60	2.00	
	B14 4478 RRH	13.20	7.40	15.00	59.90	1.00	
	RRUS-32	12.10	7.10	27.20	60.00	1.00	*(4 Worse Case RRH/OVP Loadings)*
	RRUS-32 B2	12.10	7.00	27.20	53.00	1.00	
	RRUS-11	17.00	7.20	19.70	50.70	1.00	
	DC-48-60-18-8F	9.70	9.70	23.50	30.00	1.00	
	STRUCTURAL MEMBERS						
(Mounting Pipe)	2-3/8" OD Pipe	2.38	2.38	12.00	STAAD	*Pipe*	*(See Note 2)*
	L2.5x2.5x1/4	2.50	2.50	12.00	STAAD	*Angle*	
	2x1/4 Plate	2.00	0.25	12.00	STAAD	*Plate*	
	2.75x5x1/4 Bent Plate	2.75	5.00	12.00	STAAD	*Angle*	

Note:

1) *For Double Angles assume the following:*



2) *For mounting pipes that **do not** support equipment or portions which are not shielded by equipment, create an additional entry below.*

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(Cheshire CT - Alpha) - Design Wind Load

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Design Wind Load

Members	Dimensions (ft.)			Area $(A_a)_n$	Area $(A_a)_t$	Aspect Ratio	Aspect Ratio	C_{an}	C_{at}
	Width (Normal)	Depth (Tangent)	Height (or span)	(normal) (sf)	(tangent) (sf)	(normal)	(tangent)	(normal) Table 2-8	(tangent) Table 2-8
AM-X-CD-16-65-00T	0.98	0.49	6.00	5.88	2.94	6.12	12.24	1.36	1.57
800-10966	1.67	0.58	8.00	13.36	4.64	4.79	13.79	1.30	1.63
HPA-65R-BUU-H8	1.23	0.62	7.70	9.47	4.77	6.26	12.42	1.37	1.58
B14 4478 RRH	1.10	0.62	1.25	1.38	0.78	1.14	2.02	1.20	1.20
RRUS-32	1.01	0.59	2.27	2.29	1.34	2.25	3.85	1.20	1.26
RRUS-32 B2	1.01	0.58	2.27	2.29	1.32	2.25	3.91	1.20	1.26
RRUS-11	1.42	0.60	1.64	2.33	0.98	1.15	2.73	1.20	1.21
DC-48-60-18-8F	0.81	0.81	1.96	1.59	1.59	2.42	2.42	1.20	1.20
STRUCTURAL MEMBERS									
2-3/8" OD Pipe	0.20	0.20	1.00	0.20	0.20	5.00	5.00	0.76	0.76
L2.5x2.5x1/4	0.21	0.21	1.00	0.21	0.21	4.76	4.76	1.30	1.30
2x1/4 Plate	0.17	0.02	1.00	0.17	0.02	5.88	50.00	1.35	2.00
2.75x5x1/4 Bent Plate	0.23	0.42	1.00	0.23	0.42	4.35	2.38	1.28	1.20

Design Effective Projected Area & Wind Loads

Members	EPA_a @ 0.0° (sf)	EPA_a @ 30.0° (sf)	EPA_a @ 60.0° (sf)	EPA_a @ 90.0° (sf)	F_a @ 0.0° (lb)	F_a @ 30.0° (lb)	F_a @ 60.0° (lb)	F_a @ 90.0° (lb)	Gravity Load @ Support (lb)
AM-X-CD-16-65-00T	7.20	6.44	4.91	4.15	176.7	158.0	120.7	102.0	31.8
800-10966	15.63	13.43	9.01	6.81	383.7	329.6	221.3	167.1	62.9
HPA-65R-BUU-H8	11.68	10.45	8.01	6.78	286.7	256.6	196.6	166.5	32.8
B14 4478 RRH	1.49	1.33	1.00	0.84	73.2	65.2	49.3	41.4	59.9
RRUS-32	2.47	2.23	1.76	1.52	121.4	109.7	86.3	74.6	60.0
RRUS-32 B2	2.47	2.23	1.74	1.50	121.4	109.4	85.5	73.5	53.0
RRUS-11	2.52	2.15	1.43	1.07	123.6	105.8	70.2	52.4	50.7
DC-48-60-18-8F	1.72	1.72	1.72	1.72	84.3	84.3	84.3	84.3	30.0
STRUCTURAL MEMBERS									
2-3/8" OD Pipe	0.14	-	-	-	6.7	-	-	-	-
L2.5x2.5x1/4	0.25	-	-	-	12.1	-	-	-	-
2x1/4 Plate	0.21	-	-	-	10.1	-	-	-	-
2.75x5x1/4 Bent Plate	0.26	-	-	-	13.0	-	-	-	-

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(Cheshire CT - Alpha) - Design Wind Load

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Design Ice Wind Load

- Design ice thickness included in tabulated dimensions below.

Members	Dimensions (ft.)			Area $(A_a)_{ni}$	Area $(A_a)_{ti}$	Aspect Ratio	Aspect Ratio	C_{ani}	C_{ati}
	Width (Normal)	Depth (Tangent)	Height (or span)	(normal) (sf)	(tangent) (sf)	(normal)	(tangent)	(normal) Table 2-8	(tangent) Table 2-8
AM-X-CD-16-65-00T	1.14	0.65	6.15	7.01	4.00	5.39	9.46	1.33	1.48
800-10966	1.82	0.73	8.15	14.83	5.95	4.48	11.16	1.29	1.54
HPA-65R-BUU-H8	1.39	0.77	7.85	10.91	6.04	5.65	10.19	1.34	1.51
B14 4478 RRH	1.25	0.77	1.40	1.75	1.08	1.12	1.82	1.20	1.20
RRUS-32	1.16	0.75	2.42	2.81	1.82	2.09	3.23	1.20	1.23
RRUS-32 B2	1.16	0.74	2.42	2.81	1.79	2.09	3.27	1.20	1.23
RRUS-11	1.57	0.75	1.80	2.83	1.35	1.15	2.40	1.20	1.20
DC-48-60-18-8F	0.96	0.96	2.11	2.03	2.03	2.20	2.20	1.20	1.20
STRUCTURAL MEMBERS									
2-3/8" OD Pipe	0.35	0.35	1.00	0.35	0.35	2.86	2.86	0.71	0.71
L2.5x2.5x1/4	0.36	0.36	1.00	0.36	0.36	2.78	2.78	1.21	1.21
2x1/4 Plate	0.32	0.17	1.00	0.32	0.17	3.13	5.88	1.23	1.35
2.75x5x1/4 Bent Plate	0.38	0.57	1.00	0.38	0.57	2.63	1.75	1.21	1.20

Design Effective Projected Area & Wind Loads with Ice

Members	EPA_{ai} @ 0.0° (sf)	EPA_{ai} @ 30.0° (sf)	EPA_{ai} @ 60.0° (sf)	EPA_{ai} @ 90.0° (sf)	F_{ai} @ 0.0° (lb)	F_{ai} @ 30.0° (lb)	F_{ai} @ 60.0° (lb)	F_{ai} @ 90.0° (lb)	Ice Load F_i @ Support (lb)
AM-X-CD-16-65-00T	8.39	7.63	6.09	5.33	33.1	30.1	24.1	21.0	47.6
800-10966	17.22	14.97	10.49	8.25	68.0	59.2	41.4	32.6	99.3
HPA-65R-BUU-H8	13.16	11.92	9.45	8.21	52.0	47.1	37.3	32.4	75.6
B14 4478 RRH	1.89	1.71	1.35	1.17	14.9	13.5	10.6	9.2	22.6
RRUS-32	3.03	2.78	2.27	2.01	24.0	22.0	17.9	15.9	38.1
RRUS-32 B2	3.03	2.77	2.24	1.98	24.0	21.9	17.7	15.7	38.0
RRUS-11	3.06	2.66	1.86	1.46	24.1	21.0	14.7	11.5	35.8
DC-48-60-18-8F	2.19	2.19	2.19	2.19	17.3	17.3	17.3	17.3	32.2
STRUCTURAL MEMBERS									
2-3/8" OD Pipe	0.22	-	-	-	1.8	-	-	-	3.7
L2.5x2.5x1/4	0.39	-	-	-	3.1	-	-	-	5.0
2x1/4 Plate	0.35	-	-	-	2.8	-	-	-	3.3
2.75x5x1/4 Bent Plate	0.41	-	-	-	3.3	-	-	-	7.4

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(Cheshire CT - Alpha) - Serviceability Wind Load

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Serviceability Wind Load Design Criteria

General Information & Design Input from TIA-222-H

Item	Value	Description	Reference
V_s =	60.00	Service Wind Speed (mph)	*Sect. 2.8.3, TIA*
K_d =	0.95	Wind Direction Probability Factor	*Sect. 16.6, TIA*
Class	II	Risk Category	*Table 2-1, TIA*
z = h =	255.00	ft. (A.G.L.)	*Max. Center of Appurtenance*
Exp. Cat.	B	Exposure Category	*Sect. 2.6.5.1.2, TIA*
z_g =	1200.00	Exposure Category Coeff.	*Table 2-4, TIA*
α' =	7.00	Exposure Category Coeff.	*Table 2-4, TIA*
$K_{z\,(min)}$ =	0.70	Exposure Category Coeff.	*Table 2-4, TIA*
K_e =	0.90	Terrain Constant	*Table 2-4, TIA*
K_t =	N/A	Topographic Constant	*Table 2-5, TIA ("N/A" if Topo. Cat. = 1)*
K_z =	1.29	$= 2.01(z/z_g)^{(2/\alpha')}$	*Sect. 2.6.5.2, TIA*
Topo. Cat.	1	Topographic Category (1-4)	*Sect. 2.6.6.2.1, TIA*
e =	2.72	Natural Logarithmic base	
f =	N/A	Height Attenuation Factor	*Table 2-5, TIA ("N/A" if Topo. Cat. = 1)*
H =	N/A	ft. Height of crest above surrounding terrain	
K_h =	N/A	$e^{((f*z)/H)}$	*Sect. 2.6.6.2.1, TIA*
K_{zt} =	1.00	$= [1+((K_c*K_t)/K_h)]^2$	*Sect. 2.6.6.2.1, TIA*
K_s =	N/A	Rooftop Wind Speed-Up Factor	*Sect. 2.6.7, TIA*
K_e =	1.00	Ground Elevation Factor	*Sect. 2.6.8, TIA*
G_h =	1.00	Gust Effect Factor	*Sect. 16.6, TIA*
K_a =	0.90	Shielding Factor	*Sect. 16.6.1.2, TIA*
$q_{z\ service}$ =	10.2 psf	$= 0.00256(K_z)(K_{zt})(K_s)(K_e)(K_d)(V_s^2)$	*Sect. 2.6.11.6, TIA*

Design Serviceability Wind Forces:

Section 2.6.11.2

$F_{As} = q_{z\ service} G_h (EPA)_A$ *(where $(EPA)_A$ = effective projected area of the appurtenance = $C_a A_a$)*

(see calculation tables on following pages)

Dewberry®

Job Number	50123202
Made by:	JSD
Date:	04/22/20
Checked by:	BGK
Date:	04/23/20

(Cheshire CT - Alpha) - Serviceability Wind Load

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Element Definition:

	Description	Dimensions (in.)			Weight	Length /
		W	D	H	(lb)	# Supports
	AM-X-CD-16-65-00T	11.80	5.90	72.00	63.50	2.00
	800-10966	20.00	6.90	96.00	125.70	2.00
	HPA-65R-BUU-H8	14.80	7.40	92.40	65.60	2.00
	B14 4478 RRH	13.20	7.40	15.00	59.90	1.00
	RRUS-32	12.10	7.10	27.20	60.00	1.00
	RRUS-32 B2	12.10	7.00	27.20	53.00	1.00
	RRUS-11	17.00	7.20	19.70	50.70	1.00
	DC-48-60-18-8F	9.70	9.70	23.50	30.00	1.00
	STRUCTURAL MEMBERS					
(Mounting Pipe)	2-3/8" OD Pipe	2.38	2.38	12.00	STAAD	Pipe
	L2.5x2.5x1/4	2.50	2.50	12.00	STAAD	Angle
	2x1/4 Plate	2.00	0.25	12.00	STAAD	Plate
	2.75x5x1/4 Bent Plate	2.75	5.00	12.00	STAAD	Angle

Service Wind Load

Members	Dimensions (ft.)			Area $(A_a)_n$	Area $(A_a)_t$	Aspect	Aspect	C_{an}	C_{at}
	Width	Depth	Height	*(normal)*	*(tangent)*	Ratio	Ratio	*(normal)*	*(tangent)*
	(Normal)	*(Tangent)*	*(or span)*	*(sf)*	*(sf)*	*(normal)*	*(tangent)*	*Table 2-8*	*Table 2-8*
AM-X-CD-16-65-00T	0.98	0.49	6.00	5.88	2.94	6.12	12.24	1.36	1.57
800-10966	1.67	0.58	8.00	13.36	4.64	4.79	13.79	1.30	1.63
HPA-65R-BUU-H8	1.23	0.62	7.70	9.47	4.77	6.26	12.42	1.37	1.58
B14 4478 RRH	1.10	0.62	1.25	1.38	0.78	1.14	2.02	1.20	1.20
RRUS-32	1.01	0.59	2.27	2.29	1.34	2.25	3.85	1.20	1.26
RRUS-32 B2	1.01	0.58	2.27	2.29	1.32	2.25	3.91	1.20	1.26
RRUS-11	1.42	0.60	1.64	2.33	0.98	1.15	2.73	1.20	1.21
DC-48-60-18-8F	0.81	0.81	1.96	1.59	1.59	2.42	2.42	1.20	1.20
STRUCTURAL MEMBERS									
2-3/8" OD Pipe	0.20	0.20	1.00	0.20	0.20	5.00	5.00	0.76	0.76
L2.5x2.5x1/4	0.21	0.21	1.00	0.21	0.21	4.76	4.76	1.30	1.30
2x1/4 Plate	0.17	0.02	1.00	0.17	0.02	5.88	50.00	1.35	2.00
2.75x5x1/4 Bent Plate	0.23	0.42	1.00	0.23	0.42	4.35	2.38	1.28	1.20

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(Cheshire CT - Alpha) - Serviceability Wind Load

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Service Effective Projected Area & Wind Loads

Members	EPA_{as} @ 0.0° (sf)	EPA_{as} @ 30.0° (sf)	EPA_{as} @ 60.0° (sf)	EPA_{as} @ 90.0° (sf)	F_{as} @ 0.0° (lb)	F_{as} @ 30.0° (lb)	F_{as} @ 60.0° (lb)	F_{as} @ 90.0° (lb)
AM-X-CD-16-65-00T	7.20	6.44	4.91	4.15	36.7	32.8	25.1	21.2
800-10966	15.63	13.43	9.01	6.81	79.7	68.5	46.0	34.7
HPA-65R-BUU-H8	11.68	10.45	8.01	6.78	59.6	53.3	40.8	34.6
B14 4478 RRH	1.49	1.33	1.00	0.84	15.2	13.5	10.2	8.6
RRUS-32	2.47	2.23	1.76	1.52	25.2	22.8	17.9	15.5
RRUS-32 B2	2.47	2.23	1.74	1.50	25.2	22.7	17.8	15.3
RRUS-11	2.52	2.15	1.43	1.07	25.7	22.0	14.6	10.9
DC-48-60-18-8F	1.72	1.72	1.72	1.72	17.5	17.5	17.5	17.5
STRUCTURAL MEMBERS								
2-3/8" OD Pipe	0.14	-	-	-	1.4	-	-	-
L2.5x2.5x1/4	0.25	-	-	-	2.5	-	-	-
2x1/4 Plate	0.21	-	-	-	2.1	-	-	-
2.75x5x1/4 Bent Plate	0.26	-	-	-	2.7	-	-	-

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Job Number	50123202
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(Cheshire CT - Alpha) - Load Input for STAAD Model

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STAAD Gravity Load Input

Equipment	Dead Load *(lb per support)*	Ice Load *(lb per support)*
AM-X-CD-16-65-00T	31.8	47.6
800-10966	62.9	99.3
HPA-65R-BUU-H8	32.8	75.6
B14 4478 RRH	59.9	22.6
RRUS-32	60.0	38.1
RRUS-32 B2	53.0	38
RRUS-11	50.7	35.8
DC-48-60-18-8F	30.0	32.2

STAAD Wind Load Calculation

Equipment	Axis	Case #1 0°	Case #2 30°	Case #3 60°	Case #4 90°	Case #5 120°	Case #6 150°	Case #7 180°	Case #8 210°	Case #9 240°	Case #10 270°	Case #11 300°	Case #12 330°
Not Shielded	z	$-F_0$	$-0.87F_{30}$	$-0.50F_{60}$	-	$0.50F_{60}$	$0.87F_{30}$	Inverse of Case #1	Inverse of Case #2	Inverse of Case #3	Inverse of Case #4	Inverse of Case #5	Inverse of Case #6
	x	-	$0.50F_{30}$	$0.87F_{60}$	F_{90}	$0.87F_{60}$	$0.50F_{30}$						

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(Cheshire CT - Alpha) - Load Input for STAAD Model

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STAAD Load Input (Design Wind Load)

Equipment	Axis	Case #1 0°	Case #2 30°	Case #3 60°	Case #4 90°	Case #5 120°	Case #6 150°	Case #7 180°	Case #8 210°	Case #9 240°	Case #10 270°	Case #11 300°	Case #12 330°
800-10966	z	-383.7	-286.8	-110.7	-	110.7	286.8	Inverse of Case #1	Inverse of Case #2	Inverse of Case #3	Inverse of Case #4	Inverse of Case #5	Inverse of Case #6
	x	-	164.8	192.5	167.1	192.5	164.8						
B14 4478 RRH	z	-73.2	-56.7	-24.7	-	24.7	56.7						
	x	-	32.6	42.9	41.4	42.9	32.6						
RRUS-32	z	-121.4	-95.4	-43.2	-	43.2	95.4						
	x	-	54.9	75.1	74.6	75.1	54.9						
RRUS-32 B2	z	-121.4	-95.2	-42.8	-	42.8	95.2						
	x	-	54.7	74.4	73.5	74.4	54.7						
RRUS-11	z	-123.6	-92.0	-35.1	-	35.1	92.0						
	x	-	52.9	61.1	52.4	61.1	52.9						
DC-48-60-18-8F	z	-84.3	-73.3	-42.2	-	42.2	73.3						
	x	-	42.2	73.3	84.3	73.3	42.2						

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(Cheshire CT - Alpha) - Load Input for STAAD Model

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STAAD Load Input (Design Wind on Ice Load)

Equipment	Axis	Case #1 0°	Case #2 30°	Case #3 60°	Case #4 90°	Case #5 120°	Case #6 150°	Case #7 180°	Case #8 210°	Case #9 240°	Case #10 270°	Case #11 300°	Case #12 330°
800-10966	z	-68.0	-51.5	-20.7	-	20.7	51.5	Inverse of Case #1	Inverse of Case #2	Inverse of Case #3	Inverse of Case #4	Inverse of Case #5	Inverse of Case #6
	x	-	29.6	36.0	32.6	36.0	29.6						
B14 4478 RRH	z	-14.9	-11.7	-5.3	-	5.3	11.7						
	x	-	6.8	9.2	9.2	9.2	6.8						
RRUS-32	z	-24.0	-19.1	-9.0	-	9.0	19.1						
	x	-	11.0	15.6	15.9	15.6	11.0						
RRUS-32 B2	z	-24.0	-19.1	-8.9	-	8.9	19.1						
	x	-	11.0	15.4	15.7	15.4	11.0						
RRUS-11	z	-24.1	-18.3	-7.4	-	7.4	18.3						
	x	-	10.5	12.8	11.5	12.8	10.5						
DC-48-60-18-8F	z	-17.3	-15.1	-8.7	-	8.7	15.1						
	x	-	8.7	15.1	17.3	15.1	8.7						

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Job Number	50123202
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Date:	04/23/20

(Cheshire CT - Alpha) - Load Input for STAAD Model

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STAAD Load Input (Service Wind Load)

Equipment	Axis	Case #1 0°	Case #2 30°	Case #3 60°	Case #4 90°	Case #5 120°	Case #6 150°	Case #7 180°	Case #8 210°	Case #9 240°	Case #10 270°	Case #11 300°	Case #12 330°
800-10966	z	-79.7	-59.6	-23.0	-	23.0	59.6	Inverse of Case #1	Inverse of Case #2	Inverse of Case #3	Inverse of Case #4	Inverse of Case #5	Inverse of Case #6
	x	-	34.3	40.0	34.7	40.0	34.3						
B14 4478 RRH	z	-15.2	-11.7	-5.1	-	5.1	11.7						
	x	-	6.8	8.9	8.6	8.9	6.8						
RRUS-32	z	-25.2	-19.8	-9.0	-	9.0	19.8						
	x	-	11.4	15.6	15.5	15.6	11.4						
RRUS-32 B2	z	-25.2	-19.7	-8.9	-	8.9	19.7						
	x	-	11.4	15.5	15.3	15.5	11.4						
RRUS-11	z	-25.7	-19.1	-7.3	-	7.3	19.1						
	x	-	11.0	12.7	10.9	12.7	11.0						
DC-48-60-18-8F	z	-17.5	-15.2	-8.8	-	8.8	15.2						
	x	-	8.8	15.2	17.5	15.2	8.8						

Job Information

	Engineer	Checked	Approved
Name:	JSD	BGK	
Date:	4/23/2020		

Project ID	
Project Name	

Structure Type	SPACE FRAME

Number of Nodes	22	Highest Node	22
Number of Elements	23	Highest Beam	23

Number of Basic Load Cases	20
Number of Combination Load Cases	36

Included in this printout are data for:

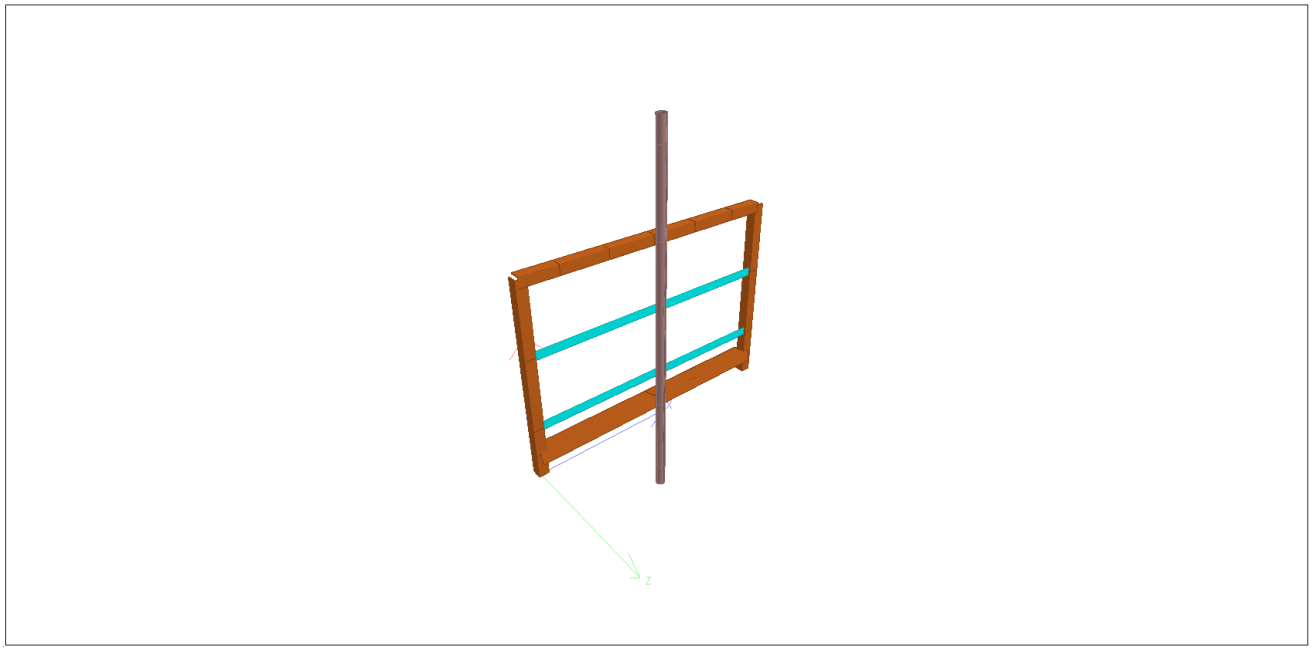
All	The Whole Structure

Included in this printout are results for load cases:

Type	L/C	Name
Primary	1	DEAD
Primary	2	WL#1
Primary	3	WL#2
Primary	4	WL#3
Primary	5	WL#4
Primary	6	WL#5
Primary	7	WL#6
Primary	8	DI
Primary	9	WLI#1
Primary	10	WLI#2
Primary	11	WLI#3
Primary	12	WLI#4
Primary	13	WLI#5
Primary	14	WLI#6
Primary	15	WLS#1
Primary	16	WLS#2
Primary	17	WLS#3
Primary	18	WLS#4
Primary	19	WLS#5
Primary	20	WLS#6
Combination	29	1.2D+1.0WL#1
Combination	30	1.2D+1.0WL#2
Combination	31	1.2D+1.0WL#3
Combination	32	1.2D+1.0WL#4
Combination	33	1.2D+1.0WL#5

Job Information Cont...

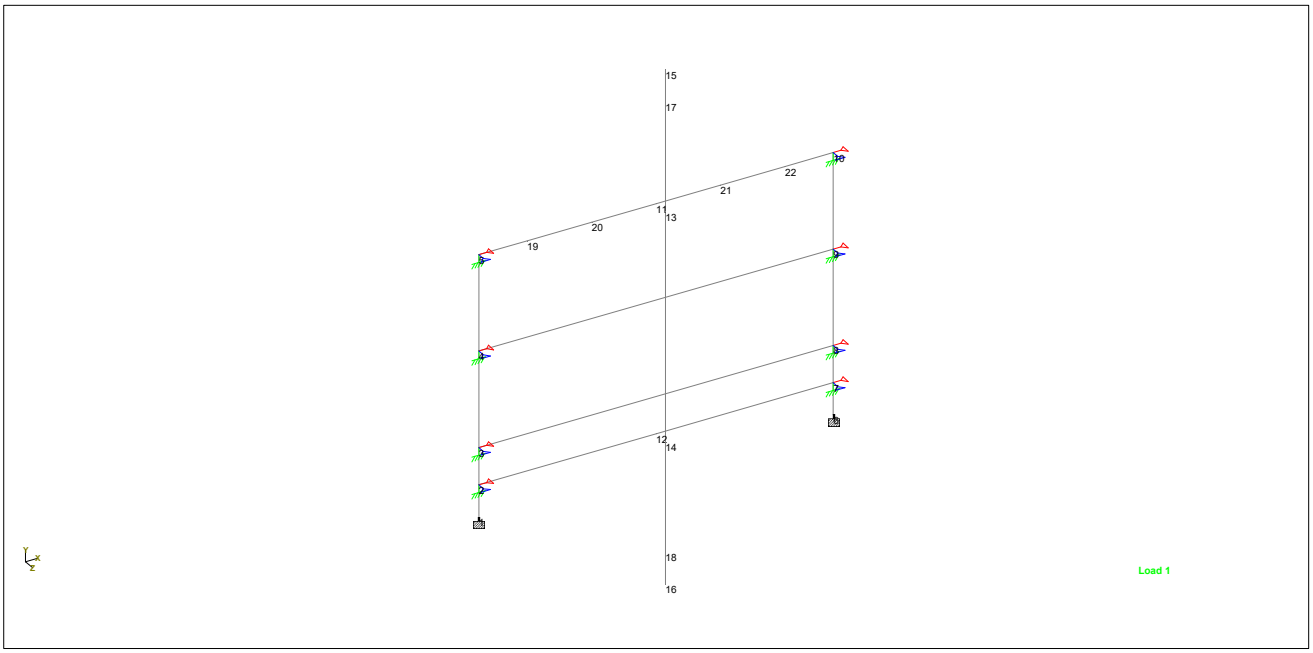
Type	L/C	Name
Combination	37	1.2D+1.0WL#9
Combination	38	1.2D+1.0WL#10
Combination	39	1.2D+1.0WL#11
Combination	40	1.2D+1.0WL#12
Combination	41	1.2D+1.0DI+1.0WI#1
Combination	42	1.2D+1.0DI+1.0WI#2
Combination	43	1.2D+1.0DI+1.0WI#3
Combination	44	1.2D+1.0DI+1.0WI#4
Combination	45	1.2D+1.0DI+1.0WI#5
Combination	46	1.2D+1.0DI+1.0WI#6
Combination	47	1.2D+1.0DI+1.0WI#7
Combination	48	1.2D+1.0DI+1.0WI#8
Combination	49	1.2D+1.0DI+1.0WI#9
Combination	50	1.2D+1.0DI+1.0WI#10
Combination	51	1.2D+1.0DI+1.0WI#11
Combination	52	1.2D+1.0DI+1.0WI#12
Combination	53	1.0D+1.0WLS#1
Combination	54	1.0D+1.0WLS#2
Combination	55	1.0D+1.0WLS#3
Combination	56	1.0D+1.0WLS#4
Combination	57	1.0D+1.0WLS#5
Combination	58	1.0D+1.0WLS#6
Combination	59	1.0D+1.0WLS#7
Combination	60	1.0D+1.0WLS#8
Combination	61	1.0D+1.0WLS#9
Combination	62	1.0D+1.0WLS#10
Combination	63	1.0D+1.0WLS#11
Combination	64	1.0D+1.0WLS#12



3D Rendered View

Nodes

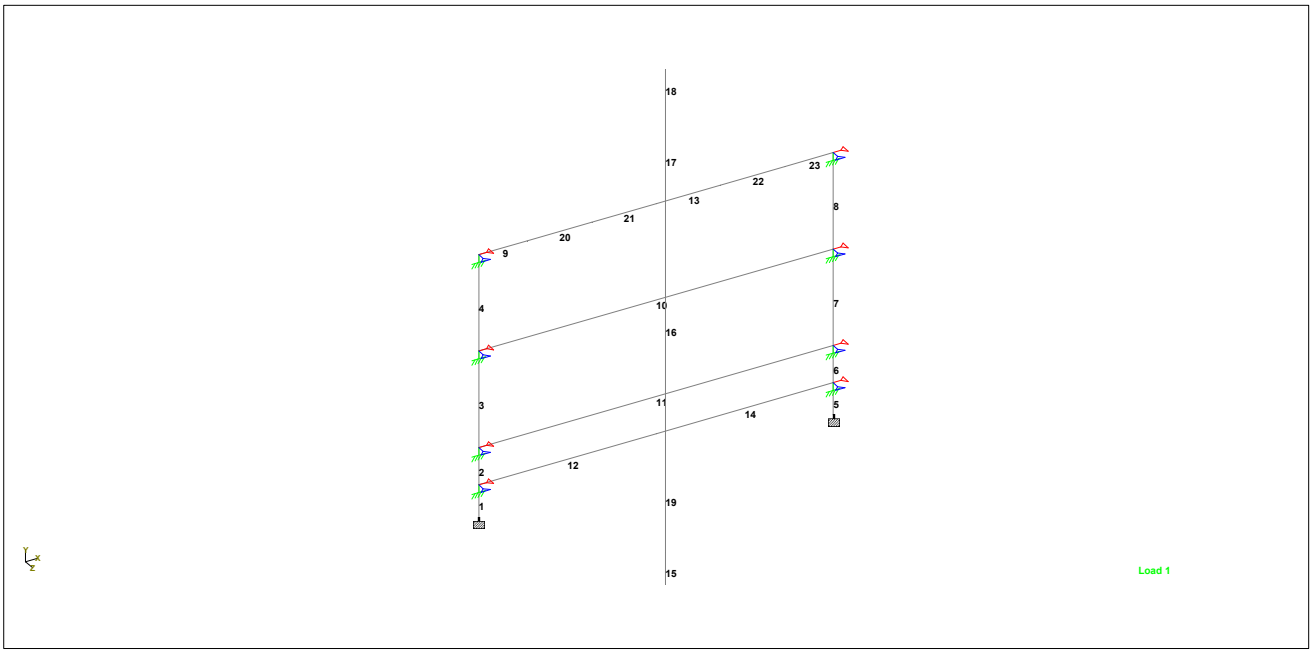
Node	X (ft)	Y (ft)	Z (ft)
1	0	0	0
2	0	0.500	0
3	0	1.080	0
4	0	2.580	0
5	0	4.080	0
6	5.500	0	0
7	5.500	0.500	0
8	5.500	1.080	0
9	5.500	2.580	0
10	5.500	4.080	0
11	2.750	4.080	0
12	2.750	0.500	0
13	2.750	4.080	0.250
14	2.750	0.500	0.250
15	2.750	6.290	0.250
16	2.750	-1.710	0.250
17	2.750	5.790	0.250
18	2.750	-1.210	0.250
19	0.750	4.080	0
20	1.750	4.080	0
21	3.750	4.080	0
22	4.750	4.080	0



Node Labels

Beams

Beam	Node A	Node B	Length (ft)	Property	β (degrees)
1	1	2	0.500	1	45
2	2	3	0.580	1	45
3	3	4	1.500	1	45
4	4	5	1.500	1	45
5	6	7	0.500	1	45
6	7	8	0.580	1	45
7	8	9	1.500	1	45
8	9	10	1.500	1	45
9	5	19	0.750	1	45
10	4	9	5.500	2	0
11	3	8	5.500	2	0
12	2	12	2.750	4	60
13	11	21	1.000	1	45
14	12	7	2.750	4	60
15	16	18	0.500	3	0
16	14	13	3.580	3	0
17	13	17	1.710	3	0
18	17	15	0.500	3	0
19	18	14	1.710	3	0
20	19	20	1.000	1	45
21	20	11	1.000	1	45
22	21	22	1.000	1	45
23	22	10	0.750	1	45



Beam Labels

Section Properties

Prop	Section	Area (in^2)	I_{yy} (in^4)	I_{zz} (in^4)	J (in^4)	Material
1	L25254	1.190	1.118	0.288	0.025	STEEL
2	Rect 2.00x0.25	0.500	0.003	0.167	0.010	STEEL
3	PIPS20	1.000	0.627	0.627	1.254	STEEL
4	BP_2.75X5X0.25	1.875	0.686	5.391	0.040	STEEL

Materials

Mat	Name	E (kip/in^2)	ν	Density (kip/in^3)	α (/°F)
1	CONCRETE	3.15E+3	0.170	0.000	5.5E -6
2	ALUMINUM	10E+3	0.330	9.8e-05	12.8E -6
3	STEEL_50_KSI	29E+3	0.300	0.000283	6.5E -6
4	STAINLESSSTEEL	28E+3	0.300	0.000283	9.9E -6
5	STEEL_36_KSI	29E+3	0.300	0.000283	6.5E -6
6	STEEL_275_NMM2	29.7E+3	0.300	0.000	6.67E -6
7	STEEL	29E+3	0.300	0.000283	6.5E -6
8	STEEL_355_NMM2	29.7E+3	0.300	0.000	6.67E -6

Supports

Node	X (kip/in)	Y (kip/in)	Z (kip/in)	rX (kip-ft/deg)	rY (kip-ft/deg)	rZ (kip-ft/deg)
1	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
2	Fixed	Fixed	Fixed	-	Fixed	-
3	Fixed	Fixed	Fixed	-	Fixed	-
4	Fixed	Fixed	Fixed	-	Fixed	-
5	Fixed	Fixed	Fixed	-	Fixed	-
6	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
7	Fixed	Fixed	Fixed	-	Fixed	-
8	Fixed	Fixed	Fixed	-	Fixed	-
9	Fixed	Fixed	Fixed	-	Fixed	-
10	Fixed	Fixed	Fixed	-	Fixed	-

Releases

There is no data of this type.

Primary Load Cases

Number	Name	Type
1	DEAD	Dead
2	WL#1	Wind
3	WL#2	Wind
4	WL#3	Wind
5	WL#4	Wind
6	WL#5	Wind
7	WL#6	Wind
8	DI	Ice
9	WLI#1	Wind on Ice
10	WLI#2	Wind on Ice
11	WLI#3	Wind on Ice
12	WLI#4	Wind on Ice
13	WLI#5	Wind on Ice
14	WLI#6	Wind on Ice
15	WLS#1	Wind
16	WLS#2	Wind
17	WLS#3	Wind
18	WLS#4	Wind
19	WLS#5	Wind
20	WLS#6	Wind

Combination Load Cases

Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
29	1.2D+1.0WL#1	1	DEAD	1.20
		2	WL#1	1.00
30	1.2D+1.0WL#2	1	DEAD	1.20
		3	WL#2	1.00
31	1.2D+1.0WL#3	1	DEAD	1.20
		4	WL#3	1.00
32	1.2D+1.0WL#4	1	DEAD	1.20
		5	WL#4	1.00
33	1.2D+1.0WL#5	1	DEAD	1.20
		6	WL#5	1.00
34	1.2D+1.0WL#6	1	DEAD	1.20
		7	WL#6	1.00
35	1.2D+1.0WL#7	1	DEAD	1.20
		2	WL#1	-1.00
36	1.2D+1.0WL#8	1	DEAD	1.20
		3	WL#2	-1.00
37	1.2D+1.0WL#9	1	DEAD	1.20
		4	WL#3	-1.00
38	1.2D+1.0WL#10	1	DEAD	1.20
		5	WL#4	-1.00
39	1.2D+1.0WL#11	1	DEAD	1.20
		6	WL#5	-1.00
40	1.2D+1.0WL#12	1	DEAD	1.20
		7	WL#6	-1.00
41	1.2D+1.0DI+1.0WI#1	1	DEAD	1.20
		9	WLI#1	1.00
		8	DI	1.00
42	1.2D+1.0DI+1.0WI#2	1	DEAD	1.20
		10	WLI#2	1.00
		8	DI	1.00
43	1.2D+1.0DI+1.0WI#3	1	DEAD	1.20
		11	WLI#3	1.00
		8	DI	1.00
44	1.2D+1.0DI+1.0WI#4	1	DEAD	1.20
		12	WLI#4	1.00
		8	DI	1.00
45	1.2D+1.0DI+1.0WI#5	1	DEAD	1.20
		13	WLI#5	1.00
		8	DI	1.00
46	1.2D+1.0DI+1.0WI#6	1	DEAD	1.20
		14	WLI#6	1.00
		8	DI	1.00
47	1.2D+1.0DI+1.0WI#7	1	DEAD	1.20
		9	WLI#1	-1.00
		8	DI	1.00

Combination Load Cases Cont...

Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
48	1.2D+1.0DI+1.0WI#8	1	DEAD	1.20
		10	WLI#2	-1.00
		8	DI	1.00
49	1.2D+1.0DI+1.0WI#9	1	DEAD	1.20
		11	WLI#3	-1.00
		8	DI	1.00
50	1.2D+1.0DI+1.0WI#10	1	DEAD	1.20
		12	WLI#4	-1.00
		8	DI	1.00
51	1.2D+1.0DI+1.0WI#11	1	DEAD	1.20
		13	WLI#5	-1.00
		8	DI	1.00
52	1.2D+1.0DI+1.0WI#12	1	DEAD	1.20
		14	WLI#6	-1.00
		8	DI	1.00
53	1.0D+1.0WLS#1	1	DEAD	1.00
		15	WLS#1	1.00
54	1.0D+1.0WLS#2	1	DEAD	1.00
		16	WLS#2	1.00
55	1.0D+1.0WLS#3	1	DEAD	1.00
		17	WLS#3	1.00
56	1.0D+1.0WLS#4	1	DEAD	1.00
		18	WLS#4	1.00
57	1.0D+1.0WLS#5	1	DEAD	1.00
		19	WLS#5	1.00
58	1.0D+1.0WLS#6	1	DEAD	1.00
		20	WLS#6	1.00
59	1.0D+1.0WLS#7	1	DEAD	1.00
		15	WLS#1	-1.00
60	1.0D+1.0WLS#8	1	DEAD	1.00
		16	WLS#2	-1.00
61	1.0D+1.0WLS#9	1	DEAD	1.00
		17	WLS#3	-1.00
62	1.0D+1.0WLS#10	1	DEAD	1.00
		18	WLS#4	-1.00
63	1.0D+1.0WLS#11	1	DEAD	1.00
		19	WLS#5	-1.00
64	1.0D+1.0WLS#12	1	DEAD	1.00
		20	WLS#6	-1.00

1 DEAD : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
11	-	-0.03	-	-	-	-
17	-	-0.0629	-	-	-	-
18	-	-0.0629	-	-	-	-
19	-	-0.0599	-	-	-	-
20	-	-0.06	-	-	-	-
21	-	-0.053	-	-	-	-
22	-	-0.0507	-	-	-	-

1 DEAD : Selfweight

Direction	Factor	Assigned Geometry
Y	-1.000	ALL

2 WL#1 : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
11	-	-	-0.0843	-	-	-
17	-	-	-0.384	-	-	-
18	-	-	-0.384	-	-	-
19	-	-	-0.0732	-	-	-
20	-	-	-0.121	-	-	-
21	-	-	-0.121	-	-	-
22	-	-	-0.124	-	-	-

2 WL#1 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
1	UNI	lbf/ft	GZ	-12.100	-	-	-	-
2	UNI	lbf/ft	GZ	-12.100	-	-	-	-
3	UNI	lbf/ft	GZ	-12.100	-	-	-	-
4	UNI	lbf/ft	GZ	-12.100	-	-	-	-
5	UNI	lbf/ft	GZ	-12.100	-	-	-	-
6	UNI	lbf/ft	GZ	-12.100	-	-	-	-
7	UNI	lbf/ft	GZ	-12.100	-	-	-	-
8	UNI	lbf/ft	GZ	-12.100	-	-	-	-
9	UNI	lbf/ft	GZ	-12.100	-	-	-	-
10	UNI	lbf/ft	GZ	-10.100	-	-	-	-
11	UNI	lbf/ft	GZ	-10.100	-	-	-	-
12	UNI	lbf/ft	GZ	-13.000	-	-	-	-
13	UNI	lbf/ft	GZ	-12.100	-	-	-	-

2 WL#1 : Beam Loads Cont...

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
14	UNI	lbf/ft	GZ	-13.000	-	-	-	-
20	UNI	lbf/ft	GZ	-12.100	-	-	-	-
21	UNI	lbf/ft	GZ	-12.100	-	-	-	-
22	UNI	lbf/ft	GZ	-12.100	-	-	-	-
23	UNI	lbf/ft	GZ	-12.100	-	-	-	-

3 WL#2 : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
11	0.0422	-	-0.0733	-	-	-
17	0.165	-	-0.287	-	-	-
18	0.165	-	-0.287	-	-	-
19	0.0326	-	-0.0567	-	-	-
20	0.0549	-	-0.095	-	-	-
21	0.0547	-	-0.095	-	-	-
22	0.0529	-	-0.092	-	-	-

3 WL#2 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
1	UNI	lbf/ft	GZ	-12.100	-	-	-	-
2	UNI	lbf/ft	GZ	-12.100	-	-	-	-
3	UNI	lbf/ft	GZ	-12.100	-	-	-	-
4	UNI	lbf/ft	GZ	-12.100	-	-	-	-
5	UNI	lbf/ft	GZ	-12.100	-	-	-	-
6	UNI	lbf/ft	GZ	-12.100	-	-	-	-
7	UNI	lbf/ft	GZ	-12.100	-	-	-	-
8	UNI	lbf/ft	GZ	-12.100	-	-	-	-
9	UNI	lbf/ft	GZ	-12.100	-	-	-	-
10	UNI	lbf/ft	GZ	-10.100	-	-	-	-
11	UNI	lbf/ft	GZ	-10.100	-	-	-	-
12	UNI	lbf/ft	GZ	-13.000	-	-	-	-
13	UNI	lbf/ft	GZ	-12.100	-	-	-	-
14	UNI	lbf/ft	GZ	-13.000	-	-	-	-
20	UNI	lbf/ft	GZ	-12.100	-	-	-	-
21	UNI	lbf/ft	GZ	-12.100	-	-	-	-
22	UNI	lbf/ft	GZ	-12.100	-	-	-	-
23	UNI	lbf/ft	GZ	-12.100	-	-	-	-

4 WL#3 : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
11	0.0733	-	-0.0422	-	-	-
17	0.192	-	-0.111	-	-	-
18	0.192	-	-0.111	-	-	-
19	0.0429	-	-0.0247	-	-	-
20	0.0751	-	-0.0432	-	-	-
21	0.0744	-	-0.0428	-	-	-
22	0.0611	-	-0.0351	-	-	-

4 WL#3 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
1	UNI	lbf/ft	GX	12.100	-	-	-	-
2	UNI	lbf/ft	GX	12.100	-	-	-	-
3	UNI	lbf/ft	GX	12.100	-	-	-	-
4	UNI	lbf/ft	GX	12.100	-	-	-	-
5	UNI	lbf/ft	GX	12.100	-	-	-	-
6	UNI	lbf/ft	GX	12.100	-	-	-	-
7	UNI	lbf/ft	GX	12.100	-	-	-	-
8	UNI	lbf/ft	GX	12.100	-	-	-	-
9	UNI	lbf/ft	GX	12.100	-	-	-	-
10	UNI	lbf/ft	GX	10.100	-	-	-	-
11	UNI	lbf/ft	GX	10.100	-	-	-	-
12	UNI	lbf/ft	GX	13.000	-	-	-	-
13	UNI	lbf/ft	GX	12.100	-	-	-	-
14	UNI	lbf/ft	GX	13.000	-	-	-	-
15	UNI	lbf/ft	GX	6.700	-	-	-	-
16	UNI	lbf/ft	GX	6.700	-	-	-	-
17	UNI	lbf/ft	GX	6.700	-	-	-	-
20	UNI	lbf/ft	GX	12.100	-	-	-	-
21	UNI	lbf/ft	GX	12.100	-	-	-	-
22	UNI	lbf/ft	GX	12.100	-	-	-	-
23	UNI	lbf/ft	GX	12.100	-	-	-	-

5 WL#4 : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
11	0.0843	-	-	-	-	-
17	0.167	-	-	-	-	-
18	0.167	-	-	-	-	-
19	0.0414	-	-	-	-	-
20	0.0746	-	-	-	-	-
21	0.0735	-	-	-	-	-
22	0.0524	-	-	-	-	-

5 WL#4 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
1	UNI	lbf/ft	GX	12.100	-	-	-	-
2	UNI	lbf/ft	GX	12.100	-	-	-	-
3	UNI	lbf/ft	GX	12.100	-	-	-	-
4	UNI	lbf/ft	GX	12.100	-	-	-	-
5	UNI	lbf/ft	GX	12.100	-	-	-	-
6	UNI	lbf/ft	GX	12.100	-	-	-	-
7	UNI	lbf/ft	GX	12.100	-	-	-	-
8	UNI	lbf/ft	GX	12.100	-	-	-	-
9	UNI	lbf/ft	GX	12.100	-	-	-	-
10	UNI	lbf/ft	GX	10.100	-	-	-	-
11	UNI	lbf/ft	GX	10.100	-	-	-	-
12	UNI	lbf/ft	GX	13.000	-	-	-	-
13	UNI	lbf/ft	GX	12.100	-	-	-	-
14	UNI	lbf/ft	GX	13.000	-	-	-	-
15	UNI	lbf/ft	GX	6.700	-	-	-	-
16	UNI	lbf/ft	GX	6.700	-	-	-	-
17	UNI	lbf/ft	GX	6.700	-	-	-	-
20	UNI	lbf/ft	GX	12.100	-	-	-	-
21	UNI	lbf/ft	GX	12.100	-	-	-	-
22	UNI	lbf/ft	GX	12.100	-	-	-	-
23	UNI	lbf/ft	GX	12.100	-	-	-	-

6 WL#5 : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
11	0.0733	-	0.0422	-	-	-
17	0.192	-	0.111	-	-	-
18	0.192	-	0.111	-	-	-
19	0.0429	-	0.0247	-	-	-
20	0.0751	-	0.0432	-	-	-
21	0.0744	-	0.0428	-	-	-
22	0.0611	-	0.0351	-	-	-

6 WL#5 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
1	UNI	lbf/ft	GX	12.100	-	-	-	-
2	UNI	lbf/ft	GX	12.100	-	-	-	-
3	UNI	lbf/ft	GX	12.100	-	-	-	-
4	UNI	lbf/ft	GX	12.100	-	-	-	-
5	UNI	lbf/ft	GX	12.100	-	-	-	-
6	UNI	lbf/ft	GX	12.100	-	-	-	-
7	UNI	lbf/ft	GX	12.100	-	-	-	-
8	UNI	lbf/ft	GX	12.100	-	-	-	-
9	UNI	lbf/ft	GX	12.100	-	-	-	-
10	UNI	lbf/ft	GX	10.100	-	-	-	-
11	UNI	lbf/ft	GX	10.100	-	-	-	-
12	UNI	lbf/ft	GX	13.000	-	-	-	-
13	UNI	lbf/ft	GX	12.100	-	-	-	-
14	UNI	lbf/ft	GX	13.000	-	-	-	-
15	UNI	lbf/ft	GX	6.700	-	-	-	-
16	UNI	lbf/ft	GX	6.700	-	-	-	-
17	UNI	lbf/ft	GX	6.700	-	-	-	-
20	UNI	lbf/ft	GX	12.100	-	-	-	-
21	UNI	lbf/ft	GX	12.100	-	-	-	-
22	UNI	lbf/ft	GX	12.100	-	-	-	-
23	UNI	lbf/ft	GX	12.100	-	-	-	-

7 WL#6 : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
11	0.0422	-	0.0733	-	-	-
17	0.165	-	0.287	-	-	-
18	0.165	-	0.287	-	-	-
19	0.0326	-	0.0567	-	-	-
20	0.0549	-	0.095	-	-	-
21	0.0547	-	0.095	-	-	-
22	0.0529	-	0.092	-	-	-

7 WL#6 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
1	UNI	lbf/ft	GZ	12.100	-	-	-	-
2	UNI	lbf/ft	GZ	12.100	-	-	-	-
3	UNI	lbf/ft	GZ	12.100	-	-	-	-
4	UNI	lbf/ft	GZ	12.100	-	-	-	-
5	UNI	lbf/ft	GZ	12.100	-	-	-	-
6	UNI	lbf/ft	GZ	12.100	-	-	-	-
7	UNI	lbf/ft	GZ	12.100	-	-	-	-
8	UNI	lbf/ft	GZ	12.100	-	-	-	-
9	UNI	lbf/ft	GZ	12.100	-	-	-	-
10	UNI	lbf/ft	GZ	10.100	-	-	-	-
11	UNI	lbf/ft	GZ	10.100	-	-	-	-
12	UNI	lbf/ft	GZ	13.000	-	-	-	-
13	UNI	lbf/ft	GZ	12.100	-	-	-	-
14	UNI	lbf/ft	GZ	13.000	-	-	-	-
20	UNI	lbf/ft	GZ	12.100	-	-	-	-
21	UNI	lbf/ft	GZ	12.100	-	-	-	-
22	UNI	lbf/ft	GZ	12.100	-	-	-	-
23	UNI	lbf/ft	GZ	12.100	-	-	-	-

8 DI : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
11	-	-0.044	-	-	-	-
17	-	-0.135	-	-	-	-
18	-	-0.135	-	-	-	-
19	-	-0.0307	-	-	-	-
20	-	-0.052	-	-	-	-
21	-	-0.0518	-	-	-	-
22	-	-0.0486	-	-	-	-

8 DI : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
1	UNI	lbf/ft	GY	-7.200	-	-	-	-
2	UNI	lbf/ft	GY	-7.200	-	-	-	-
3	UNI	lbf/ft	GY	-7.200	-	-	-	-
4	UNI	lbf/ft	GY	-7.200	-	-	-	-
5	UNI	lbf/ft	GY	-7.200	-	-	-	-
6	UNI	lbf/ft	GY	-7.200	-	-	-	-
7	UNI	lbf/ft	GY	-7.200	-	-	-	-
8	UNI	lbf/ft	GY	-7.200	-	-	-	-
9	UNI	lbf/ft	GY	-7.200	-	-	-	-
10	UNI	lbf/ft	GY	-4.900	-	-	-	-
11	UNI	lbf/ft	GY	-4.900	-	-	-	-
12	UNI	lbf/ft	GY	-10.400	-	-	-	-
13	UNI	lbf/ft	GY	-7.200	-	-	-	-
14	UNI	lbf/ft	GY	-10.400	-	-	-	-
15	UNI	lbf/ft	GY	-5.400	-	-	-	-
16	UNI	lbf/ft	GY	-5.400	-	-	-	-
17	UNI	lbf/ft	GY	-5.400	-	-	-	-
20	UNI	lbf/ft	GY	-7.200	-	-	-	-
21	UNI	lbf/ft	GY	-7.200	-	-	-	-
22	UNI	lbf/ft	GY	-7.200	-	-	-	-
23	UNI	lbf/ft	GY	-7.200	-	-	-	-

9 WLI#1 : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
11	-	-	-0.0186	-	-	-
17	-	-	-0.0698	-	-	-
18	-	-	-0.0698	-	-	-
19	-	-	-0.0163	-	-	-
20	-	-	-0.0255	-	-	-
21	-	-	-0.0255	-	-	-
22	-	-	-0.0256	-	-	-

9 WLI#1 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
1	UNI	lbf/ft	GZ	-3.500	-	-	-	-
2	UNI	lbf/ft	GZ	-3.500	-	-	-	-
3	UNI	lbf/ft	GZ	-3.500	-	-	-	-
4	UNI	lbf/ft	GZ	-3.500	-	-	-	-
5	UNI	lbf/ft	GZ	-3.500	-	-	-	-
6	UNI	lbf/ft	GZ	-3.500	-	-	-	-
7	UNI	lbf/ft	GZ	-3.500	-	-	-	-
8	UNI	lbf/ft	GZ	-3.500	-	-	-	-
9	UNI	lbf/ft	GZ	-3.500	-	-	-	-
10	UNI	lbf/ft	GZ	-3.200	-	-	-	-
11	UNI	lbf/ft	GZ	-3.200	-	-	-	-
12	UNI	lbf/ft	GZ	-3.700	-	-	-	-
13	UNI	lbf/ft	GZ	-3.500	-	-	-	-
14	UNI	lbf/ft	GZ	-3.700	-	-	-	-
20	UNI	lbf/ft	GZ	-3.500	-	-	-	-
21	UNI	lbf/ft	GZ	-3.500	-	-	-	-
22	UNI	lbf/ft	GZ	-3.500	-	-	-	-
23	UNI	lbf/ft	GZ	-3.500	-	-	-	-

10 WLI#2 : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
11	0.0093	-	-0.0162	-	-	-
17	0.0305	-	-0.0531	-	-	-
18	0.0305	-	-0.0531	-	-	-
19	0.0074	-	-0.0129	-	-	-
20	0.0118	-	-0.0204	-	-	-
21	0.0117	-	-0.0204	-	-	-
22	0.0112	-	-0.0195	-	-	-

10 WLI#2 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
1	UNI	lbf/ft	GZ	-3.500	-	-	-	-
2	UNI	lbf/ft	GZ	-3.500	-	-	-	-
3	UNI	lbf/ft	GZ	-3.500	-	-	-	-
4	UNI	lbf/ft	GZ	-3.500	-	-	-	-
5	UNI	lbf/ft	GZ	-3.500	-	-	-	-
6	UNI	lbf/ft	GZ	-3.500	-	-	-	-
7	UNI	lbf/ft	GZ	-3.500	-	-	-	-
8	UNI	lbf/ft	GZ	-3.500	-	-	-	-
9	UNI	lbf/ft	GZ	-3.500	-	-	-	-
10	UNI	lbf/ft	GZ	-3.200	-	-	-	-
11	UNI	lbf/ft	GZ	-3.200	-	-	-	-
12	UNI	lbf/ft	GZ	-3.700	-	-	-	-
13	UNI	lbf/ft	GZ	-3.500	-	-	-	-
14	UNI	lbf/ft	GZ	-3.700	-	-	-	-
20	UNI	lbf/ft	GZ	-3.500	-	-	-	-
21	UNI	lbf/ft	GZ	-3.500	-	-	-	-
22	UNI	lbf/ft	GZ	-3.500	-	-	-	-
23	UNI	lbf/ft	GZ	-3.500	-	-	-	-

11 WLI#3 : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
11	0.0162	-	-0.0093	-	-	-
17	0.0378	-	-0.0217	-	-	-
18	0.0378	-	-0.0217	-	-	-
19	0.0103	-	-0.0059	-	-	-
20	0.0169	-	-0.0097	-	-	-
21	0.0167	-	-0.0096	-	-	-
22	0.0139	-	-0.008	-	-	-

11 WLI#3 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
1	UNI	lbf/ft	GX	3.500	-	-	-	-
2	UNI	lbf/ft	GX	3.500	-	-	-	-
3	UNI	lbf/ft	GX	3.500	-	-	-	-
4	UNI	lbf/ft	GX	3.500	-	-	-	-
5	UNI	lbf/ft	GX	3.500	-	-	-	-
6	UNI	lbf/ft	GX	3.500	-	-	-	-
7	UNI	lbf/ft	GX	3.500	-	-	-	-
8	UNI	lbf/ft	GX	3.500	-	-	-	-
9	UNI	lbf/ft	GX	3.500	-	-	-	-
10	UNI	lbf/ft	GX	3.200	-	-	-	-
11	UNI	lbf/ft	GX	3.200	-	-	-	-
12	UNI	lbf/ft	GX	3.700	-	-	-	-
13	UNI	lbf/ft	GX	3.500	-	-	-	-
14	UNI	lbf/ft	GX	3.700	-	-	-	-
15	UNI	lbf/ft	GX	2.000	-	-	-	-
16	UNI	lbf/ft	GX	2.000	-	-	-	-
17	UNI	lbf/ft	GX	2.000	-	-	-	-
20	UNI	lbf/ft	GX	3.500	-	-	-	-
21	UNI	lbf/ft	GX	3.500	-	-	-	-
22	UNI	lbf/ft	GX	3.500	-	-	-	-
23	UNI	lbf/ft	GX	3.500	-	-	-	-

12 WLI#4 : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
11	0.0186	-	-	-	-	-
17	0.0346	-	-	-	-	-
18	0.0346	-	-	-	-	-
19	0.0102	-	-	-	-	-
20	0.0173	-	-	-	-	-
21	0.0171	-	-	-	-	-
22	0.0128	-	-	-	-	-

12 WLI#4 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
1	UNI	lbf/ft	GX	3.500	-	-	-	-
2	UNI	lbf/ft	GX	3.500	-	-	-	-
3	UNI	lbf/ft	GX	3.500	-	-	-	-
4	UNI	lbf/ft	GX	3.500	-	-	-	-
5	UNI	lbf/ft	GX	3.500	-	-	-	-
6	UNI	lbf/ft	GX	3.500	-	-	-	-
7	UNI	lbf/ft	GX	3.500	-	-	-	-
8	UNI	lbf/ft	GX	3.500	-	-	-	-
9	UNI	lbf/ft	GX	3.500	-	-	-	-
10	UNI	lbf/ft	GX	3.200	-	-	-	-
11	UNI	lbf/ft	GX	3.200	-	-	-	-
12	UNI	lbf/ft	GX	3.700	-	-	-	-
13	UNI	lbf/ft	GX	3.500	-	-	-	-
14	UNI	lbf/ft	GX	3.700	-	-	-	-
15	UNI	lbf/ft	GX	2.000	-	-	-	-
16	UNI	lbf/ft	GX	2.000	-	-	-	-
17	UNI	lbf/ft	GX	2.000	-	-	-	-
20	UNI	lbf/ft	GX	3.500	-	-	-	-
21	UNI	lbf/ft	GX	3.500	-	-	-	-
22	UNI	lbf/ft	GX	3.500	-	-	-	-
23	UNI	lbf/ft	GX	3.500	-	-	-	-

13 WLI#5 : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
11	0.0162	-	0.0093	-	-	-
17	0.0378	-	0.0217	-	-	-
18	0.0378	-	0.0217	-	-	-
19	0.0103	-	0.0059	-	-	-
20	0.0169	-	0.0097	-	-	-
21	0.0167	-	0.0096	-	-	-
22	0.0139	-	0.008	-	-	-

13 WLI#5 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
1	UNI	lbf/ft	GX	3.500	-	-	-	-
2	UNI	lbf/ft	GX	3.500	-	-	-	-
3	UNI	lbf/ft	GX	3.500	-	-	-	-
4	UNI	lbf/ft	GX	3.500	-	-	-	-
5	UNI	lbf/ft	GX	3.500	-	-	-	-
6	UNI	lbf/ft	GX	3.500	-	-	-	-
7	UNI	lbf/ft	GX	3.500	-	-	-	-
8	UNI	lbf/ft	GX	3.500	-	-	-	-
9	UNI	lbf/ft	GX	3.500	-	-	-	-
10	UNI	lbf/ft	GX	3.200	-	-	-	-
11	UNI	lbf/ft	GX	3.200	-	-	-	-
12	UNI	lbf/ft	GX	3.700	-	-	-	-
13	UNI	lbf/ft	GX	3.500	-	-	-	-
14	UNI	lbf/ft	GX	3.700	-	-	-	-
15	UNI	lbf/ft	GX	2.000	-	-	-	-
16	UNI	lbf/ft	GX	2.000	-	-	-	-
17	UNI	lbf/ft	GX	2.000	-	-	-	-
20	UNI	lbf/ft	GX	3.500	-	-	-	-
21	UNI	lbf/ft	GX	3.500	-	-	-	-
22	UNI	lbf/ft	GX	3.500	-	-	-	-
23	UNI	lbf/ft	GX	3.500	-	-	-	-

14 WLI#6 : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
11	0.0093	-	0.0162	-	-	-
17	0.0305	-	0.0531	-	-	-
18	0.0305	-	0.0531	-	-	-
19	0.0074	-	0.0129	-	-	-
20	0.0118	-	0.0204	-	-	-
21	0.0117	-	0.0204	-	-	-
22	0.0112	-	0.0195	-	-	-

14 WLI#6 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
1	UNI	lbf/ft	GZ	3.500	-	-	-	-
2	UNI	lbf/ft	GZ	3.500	-	-	-	-
3	UNI	lbf/ft	GZ	3.500	-	-	-	-
4	UNI	lbf/ft	GZ	3.500	-	-	-	-
5	UNI	lbf/ft	GZ	3.500	-	-	-	-
6	UNI	lbf/ft	GZ	3.500	-	-	-	-
7	UNI	lbf/ft	GZ	3.500	-	-	-	-
8	UNI	lbf/ft	GZ	3.500	-	-	-	-
9	UNI	lbf/ft	GZ	3.500	-	-	-	-
10	UNI	lbf/ft	GZ	3.200	-	-	-	-
11	UNI	lbf/ft	GZ	3.200	-	-	-	-
12	UNI	lbf/ft	GZ	3.700	-	-	-	-
13	UNI	lbf/ft	GZ	3.500	-	-	-	-
14	UNI	lbf/ft	GZ	3.700	-	-	-	-
20	UNI	lbf/ft	GZ	3.500	-	-	-	-
21	UNI	lbf/ft	GZ	3.500	-	-	-	-
22	UNI	lbf/ft	GZ	3.500	-	-	-	-
23	UNI	lbf/ft	GZ	3.500	-	-	-	-

15 WLS#1 : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
11	-	-	-0.0175	-	-	-
17	-	-	-0.0797	-	-	-
18	-	-	-0.0797	-	-	-
19	-	-	-0.0152	-	-	-
20	-	-	-0.0252	-	-	-
21	-	-	-0.0252	-	-	-
22	-	-	-0.0257	-	-	-

15 WLS#1 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
1	UNI	lbf/ft	GZ	-2.500	-	-	-	-
2	UNI	lbf/ft	GZ	-2.500	-	-	-	-
3	UNI	lbf/ft	GZ	-2.500	-	-	-	-
4	UNI	lbf/ft	GZ	-2.500	-	-	-	-
5	UNI	lbf/ft	GZ	-2.500	-	-	-	-
6	UNI	lbf/ft	GZ	-2.500	-	-	-	-
7	UNI	lbf/ft	GZ	-2.500	-	-	-	-
8	UNI	lbf/ft	GZ	-2.500	-	-	-	-
9	UNI	lbf/ft	GZ	-2.500	-	-	-	-
10	UNI	lbf/ft	GZ	-2.100	-	-	-	-
11	UNI	lbf/ft	GZ	-2.100	-	-	-	-
12	UNI	lbf/ft	GZ	-2.700	-	-	-	-
13	UNI	lbf/ft	GZ	-2.500	-	-	-	-
14	UNI	lbf/ft	GZ	-2.700	-	-	-	-
20	UNI	lbf/ft	GZ	-2.500	-	-	-	-
21	UNI	lbf/ft	GZ	-2.500	-	-	-	-
22	UNI	lbf/ft	GZ	-2.500	-	-	-	-
23	UNI	lbf/ft	GZ	-2.500	-	-	-	-

16 WLS#2 : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
11	0.0088	-	-0.0152	-	-	-
17	0.0343	-	-0.0596	-	-	-
18	0.0343	-	-0.0596	-	-	-
19	0.0068	-	-0.0117	-	-	-
20	0.0114	-	-0.0198	-	-	-
21	0.0114	-	-0.0197	-	-	-
22	0.011	-	-0.0191	-	-	-

16 WLS#2 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
1	UNI	lbf/ft	GZ	-2.500	-	-	-	-
2	UNI	lbf/ft	GZ	-2.500	-	-	-	-
3	UNI	lbf/ft	GZ	-2.500	-	-	-	-
4	UNI	lbf/ft	GZ	-2.500	-	-	-	-
5	UNI	lbf/ft	GZ	-2.500	-	-	-	-
6	UNI	lbf/ft	GZ	-2.500	-	-	-	-
7	UNI	lbf/ft	GZ	-2.500	-	-	-	-
8	UNI	lbf/ft	GZ	-2.500	-	-	-	-
9	UNI	lbf/ft	GZ	-2.500	-	-	-	-
10	UNI	lbf/ft	GZ	-2.100	-	-	-	-
11	UNI	lbf/ft	GZ	-2.100	-	-	-	-
12	UNI	lbf/ft	GZ	-2.700	-	-	-	-
13	UNI	lbf/ft	GZ	-2.500	-	-	-	-
14	UNI	lbf/ft	GZ	-2.700	-	-	-	-
20	UNI	lbf/ft	GZ	-2.500	-	-	-	-
21	UNI	lbf/ft	GZ	-2.500	-	-	-	-
22	UNI	lbf/ft	GZ	-2.500	-	-	-	-
23	UNI	lbf/ft	GZ	-2.500	-	-	-	-

17 WLS#3 : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
11	0.0152	-	-0.0088	-	-	-
17	0.04	-	-0.023	-	-	-
18	0.04	-	-0.023	-	-	-
19	0.0089	-	-0.0051	-	-	-
20	0.0156	-	-0.009	-	-	-
21	0.0155	-	-0.0089	-	-	-
22	0.0127	-	-0.0073	-	-	-

17 WLS#3 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
1	UNI	lbf/ft	GX	2.500	-	-	-	-
2	UNI	lbf/ft	GX	2.500	-	-	-	-
3	UNI	lbf/ft	GX	2.500	-	-	-	-
4	UNI	lbf/ft	GX	2.500	-	-	-	-
5	UNI	lbf/ft	GX	2.500	-	-	-	-
6	UNI	lbf/ft	GX	2.500	-	-	-	-
7	UNI	lbf/ft	GX	2.500	-	-	-	-
8	UNI	lbf/ft	GX	2.500	-	-	-	-
9	UNI	lbf/ft	GX	2.500	-	-	-	-
10	UNI	lbf/ft	GX	2.100	-	-	-	-
11	UNI	lbf/ft	GX	2.100	-	-	-	-
12	UNI	lbf/ft	GX	2.700	-	-	-	-
13	UNI	lbf/ft	GX	2.500	-	-	-	-
14	UNI	lbf/ft	GX	2.700	-	-	-	-
15	UNI	lbf/ft	GX	1.400	-	-	-	-
16	UNI	lbf/ft	GX	1.400	-	-	-	-
17	UNI	lbf/ft	GX	1.400	-	-	-	-
20	UNI	lbf/ft	GX	2.500	-	-	-	-
21	UNI	lbf/ft	GX	2.500	-	-	-	-
22	UNI	lbf/ft	GX	2.500	-	-	-	-
23	UNI	lbf/ft	GX	2.500	-	-	-	-

18 WLS#4 : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
11	0.0175	-	-	-	-	-
17	0.0347	-	-	-	-	-
18	0.0347	-	-	-	-	-
19	0.0086	-	-	-	-	-
20	0.0155	-	-	-	-	-
21	0.0153	-	-	-	-	-
22	0.0109	-	-	-	-	-

18 WLS#4 : Beam Loads

Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
1	UNI	lbf/ft	GX	2.500	-	-	-	-
2	UNI	lbf/ft	GX	2.500	-	-	-	-
3	UNI	lbf/ft	GX	2.500	-	-	-	-
4	UNI	lbf/ft	GX	2.500	-	-	-	-
5	UNI	lbf/ft	GX	2.500	-	-	-	-
6	UNI	lbf/ft	GX	2.500	-	-	-	-
7	UNI	lbf/ft	GX	2.500	-	-	-	-
8	UNI	lbf/ft	GX	2.500	-	-	-	-
9	UNI	lbf/ft	GX	2.500	-	-	-	-
10	UNI	lbf/ft	GX	2.100	-	-	-	-
11	UNI	lbf/ft	GX	2.100	-	-	-	-
12	UNI	lbf/ft	GX	2.700	-	-	-	-
13	UNI	lbf/ft	GX	2.500	-	-	-	-
14	UNI	lbf/ft	GX	2.700	-	-	-	-
15	UNI	lbf/ft	GX	1.400	-	-	-	-
16	UNI	lbf/ft	GX	1.400	-	-	-	-
17	UNI	lbf/ft	GX	1.400	-	-	-	-
20	UNI	lbf/ft	GX	2.500	-	-	-	-
21	UNI	lbf/ft	GX	2.500	-	-	-	-
22	UNI	lbf/ft	GX	2.500	-	-	-	-
23	UNI	lbf/ft	GX	2.500	-	-	-	-

19 WLS#5 : Node Loads

Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
11	0.0152	-	0.0088	-	-	-
17	0.04	-	0.023	-	-	-
18	0.04	-	0.023	-	-	-
19	0.0089	-	0.0051	-	-	-
20	0.0156	-	0.009	-	-	-
21	0.0155	-	0.0089	-	-	-
22	0.0127	-	0.0073	-	-	-

19 WLS#5 : Beam Loads

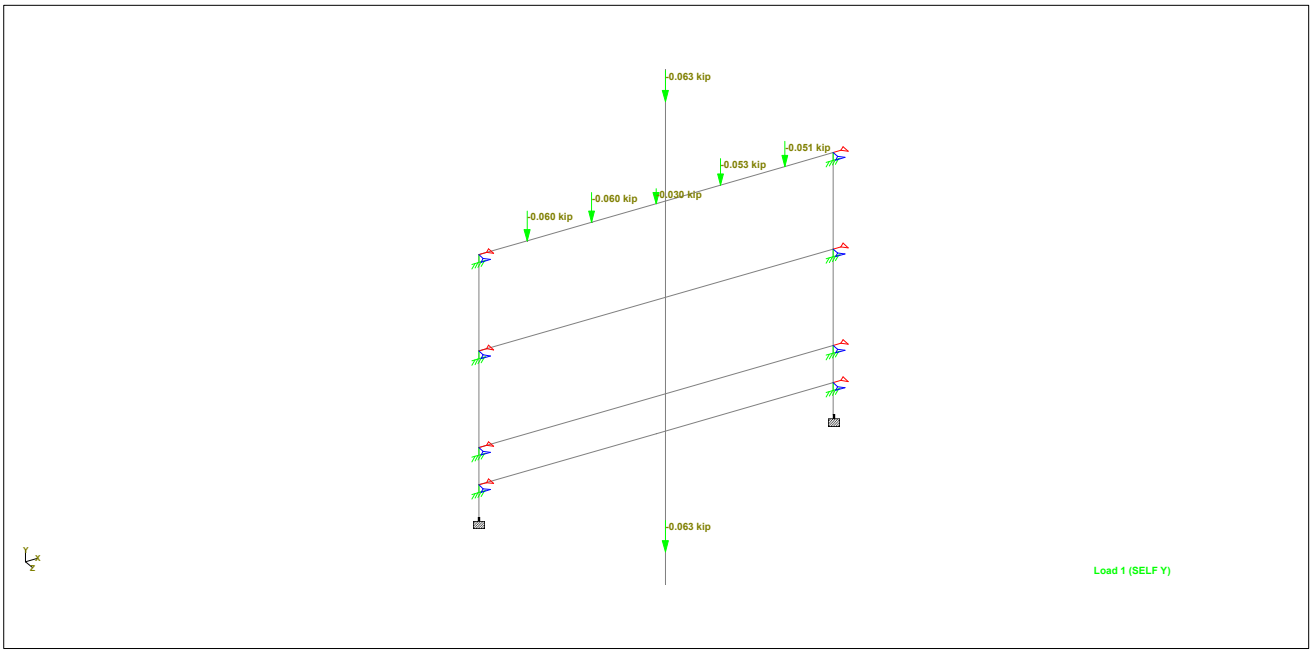
Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
1	UNI	lbf/ft	GX	2.500	-	-	-	-
2	UNI	lbf/ft	GX	2.500	-	-	-	-
3	UNI	lbf/ft	GX	2.500	-	-	-	-
4	UNI	lbf/ft	GX	2.500	-	-	-	-
5	UNI	lbf/ft	GX	2.500	-	-	-	-
6	UNI	lbf/ft	GX	2.500	-	-	-	-
7	UNI	lbf/ft	GX	2.500	-	-	-	-
8	UNI	lbf/ft	GX	2.500	-	-	-	-
9	UNI	lbf/ft	GX	2.500	-	-	-	-
10	UNI	lbf/ft	GX	2.100	-	-	-	-
11	UNI	lbf/ft	GX	2.100	-	-	-	-
12	UNI	lbf/ft	GX	2.700	-	-	-	-
13	UNI	lbf/ft	GX	2.500	-	-	-	-
14	UNI	lbf/ft	GX	2.700	-	-	-	-
15	UNI	lbf/ft	GX	1.400	-	-	-	-
16	UNI	lbf/ft	GX	1.400	-	-	-	-
17	UNI	lbf/ft	GX	1.400	-	-	-	-
20	UNI	lbf/ft	GX	2.500	-	-	-	-
21	UNI	lbf/ft	GX	2.500	-	-	-	-
22	UNI	lbf/ft	GX	2.500	-	-	-	-
23	UNI	lbf/ft	GX	2.500	-	-	-	-

20 WLS#6 : Node Loads

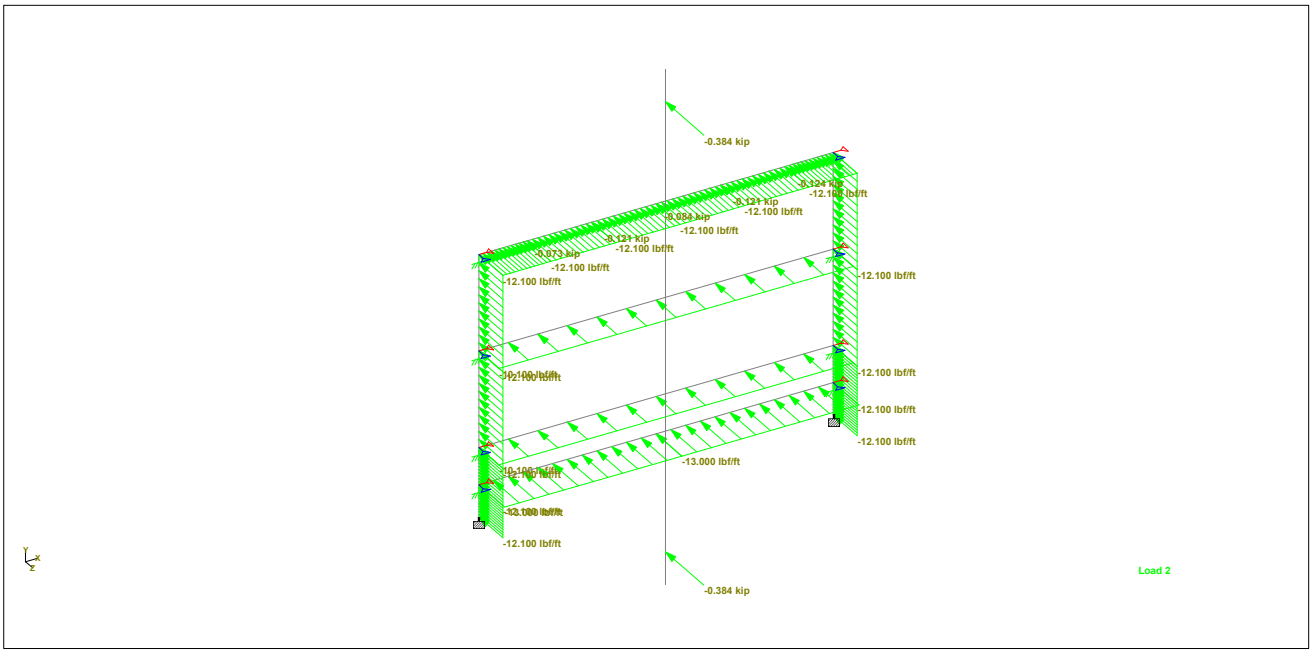
Node	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
11	0.0088	-	0.0152	-	-	-
17	0.0343	-	0.0596	-	-	-
18	0.0343	-	0.0596	-	-	-
19	0.0068	-	0.0117	-	-	-
20	0.0114	-	0.0198	-	-	-
21	0.0114	-	0.0197	-	-	-
22	0.011	-	0.0191	-	-	-

20 WLS#6 : Beam Loads

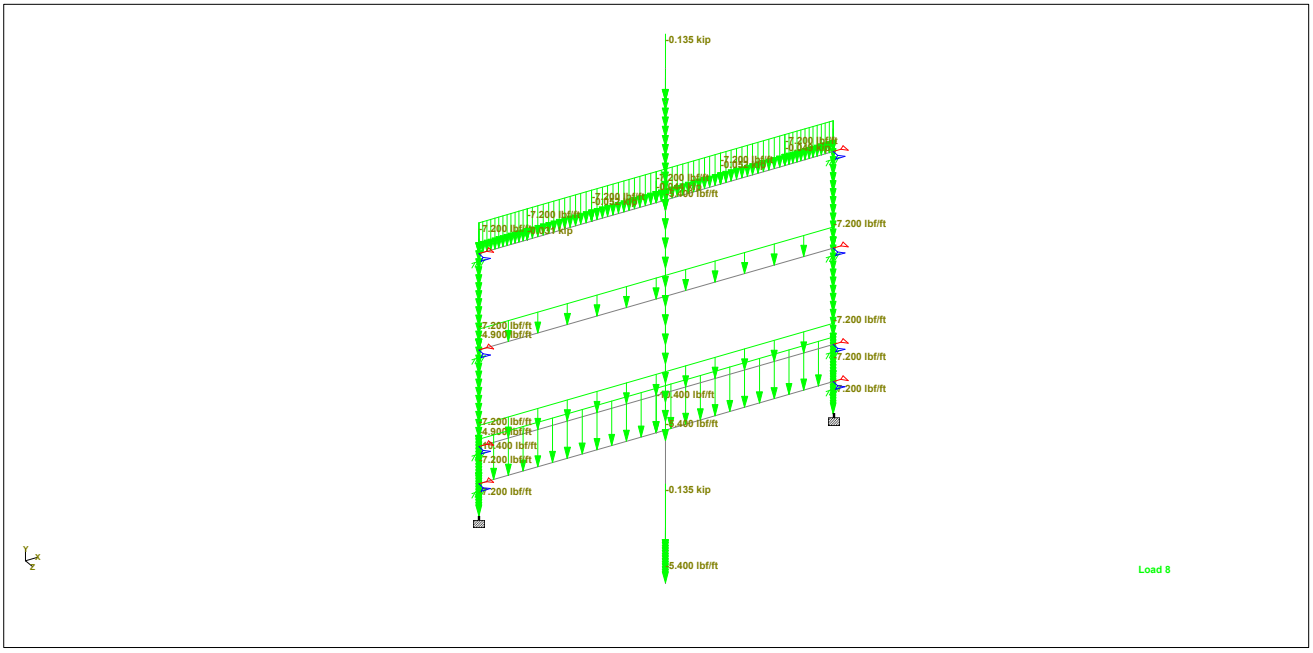
Beam	Type		Direction	Fa	Da (ft)	Fb	Db	Ecc. (ft)
1	UNI	lbf/ft	GZ	2.500	-	-	-	-
2	UNI	lbf/ft	GZ	2.500	-	-	-	-
3	UNI	lbf/ft	GZ	2.500	-	-	-	-
4	UNI	lbf/ft	GZ	2.500	-	-	-	-
5	UNI	lbf/ft	GZ	2.500	-	-	-	-
6	UNI	lbf/ft	GZ	2.500	-	-	-	-
7	UNI	lbf/ft	GZ	2.500	-	-	-	-
8	UNI	lbf/ft	GZ	2.500	-	-	-	-
9	UNI	lbf/ft	GZ	2.500	-	-	-	-
10	UNI	lbf/ft	GZ	2.100	-	-	-	-
11	UNI	lbf/ft	GZ	2.100	-	-	-	-
12	UNI	lbf/ft	GZ	2.700	-	-	-	-
13	UNI	lbf/ft	GZ	2.500	-	-	-	-
14	UNI	lbf/ft	GZ	2.700	-	-	-	-
20	UNI	lbf/ft	GZ	2.500	-	-	-	-
21	UNI	lbf/ft	GZ	2.500	-	-	-	-
22	UNI	lbf/ft	GZ	2.500	-	-	-	-
23	UNI	lbf/ft	GZ	2.500	-	-	-	-



Applied Dead Loads



Typical Applied Wind Loads



Applied Ice Dead Loads

Utilization Ratio

Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (in^2)	Iz (in^4)	Iy (in^4)	Ix (in^4)
1	L25254	L25254	0.171	1.000	0.171	Eq. H2-1	42	1.190	0.276	1.130	0.025
2	L25254	L25254	0.156	1.000	0.156	Eq. H2-1	42	1.190	0.276	1.130	0.025
3	L25254	L25254	0.041	1.000	0.041	Eq. H2-1	49	1.190	0.276	1.130	0.025
4	L25254	L25254	0.197	1.000	0.197	Eq. H2-1	48	1.190	0.276	1.130	0.025
5	L25254	L25254	0.172	1.000	0.172	Eq. H2-1	52	1.190	0.276	1.130	0.025
6	L25254	L25254	0.156	1.000	0.156	Eq. H2-1	52	1.190	0.276	1.130	0.025
7	L25254	L25254	0.041	1.000	0.041	Eq. H2-1	45	1.190	0.276	1.130	0.025
8	L25254	L25254	0.198	1.000	0.198	Eq. H2-1	46	1.190	0.276	1.130	0.025
9	L25254	L25254	0.523	1.000	0.523	Eq. H2-1	29	1.190	0.276	1.130	0.025
10	Rect 2.00x0.	N/A						0.500	0.167	0.003	0.010
11	Rect 2.00x0.	N/A						0.500	0.167	0.003	0.010
12	BP_2.75X5X	BP_2.75X5X	0.275	1.000	0.275	Eq. H2-1	30	1.875	5.391	0.686	0.039
13	L25254	L25254	0.364	1.000	0.364	Eq. H2-1	29	1.190	0.276	1.130	0.025
14	BP_2.75X5X	BP_2.75X5X	0.275	1.000	0.275	Eq. H2-1	40	1.875	5.391	0.686	0.039
15	PIPS20	PIPS20	0.000	1.000	0.000	Eq. H1-1b	31	1.000	0.627	0.627	1.254
16	PIPS20	PIPS20	0.370	1.000	0.370	Eq. H1-1b	29	1.000	0.627	0.627	1.254
17	PIPS20	PIPS20	0.402	1.000	0.402	Eq. H1-1b	30	1.000	0.627	0.627	1.254
18	PIPS20	PIPS20	0.000	1.000	0.000	Sec. E1	29	1.000	0.627	0.627	1.254
19	PIPS20	PIPS20	0.402	1.000	0.402	Eq. H1-1b	30	1.000	0.627	0.627	1.254
20	L25254	L25254	0.187	1.000	0.187	Eq. H2-1	29	1.190	0.276	1.130	0.025
21	L25254	L25254	0.364	1.000	0.364	Eq. H2-1	29	1.190	0.276	1.130	0.025
22	L25254	L25254	0.177	1.000	0.177	Eq. H2-1	29	1.190	0.276	1.130	0.025
23	L25254	L25254	0.540	1.000	0.540	Eq. H2-1	29	1.190	0.276	1.130	0.025

Failed Members

There is no data of this type.

Node Displacement Summary

	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)	rX (rad)	rY (rad)	rZ (rad)
Max X	15	55:1.0D+1.0Wl	**0.016**	-0.017	-0.050	0.055	-0.002	0.000	-0.001
Min X	15	61:1.0D+1.0Wl	**-0.016**	-0.015	0.007	0.024	0.000	-0.000	0.001
Max Y	1	53:1.0D+1.0Wl	0	**0**	0	0	0	0	0
Min Y	11	53:1.0D+1.0Wl	-0.000	**-0.027**	-0.023	0.035	-0.003	-0.000	0.000
Max Z	15	59:1.0D+1.0Wl	-0.000	-0.014	**0.074**	0.075	0.003	-0.000	0.000
Min Z	15	53:1.0D+1.0Wl	-0.000	-0.019	**-0.117**	0.118	-0.004	-0.000	0.000
Max rX	16	53:1.0D+1.0Wl	-0.000	-0.019	-0.062	0.065	**0.003**	-0.000	-0.000
Min rX	15	53:1.0D+1.0Wl	-0.000	-0.019	-0.117	0.118	**-0.004**	-0.000	0.000
Max rY	19	53:1.0D+1.0Wl	-0.000	-0.008	-0.005	0.010	-0.001	**0.001**	-0.001
Min rY	22	53:1.0D+1.0Wl	-0.000	-0.008	-0.005	0.009	-0.001	**-0.001**	0.001
Max rZ	22	53:1.0D+1.0Wl	-0.000	-0.008	-0.005	0.009	-0.001	-0.001	**0.001**
Min rZ	19	53:1.0D+1.0Wl	-0.000	-0.008	-0.005	0.010	-0.001	0.001	**-0.001**
Max Rst	15	53:1.0D+1.0Wl	-0.000	-0.019	-0.117	**0.118**	-0.004	-0.000	0.000

TIA-222 Rev H Maximum Allowable Deflection = 1.5% x Cantilever
1.5% x 24" = 0.360"
0.118" < 0.360" OK!

Dewberry®

Job Number	50123202
Made by:	JSD
Date:	04/22/20
Checked by:	BGK
Date:	04/23/20

(Cheshire CT - Beta) - Design Wind Load

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Wind Load Design Criteria

Site Name: Cheshire CT - Beta

General Information & Design Input from TIA-222-H

Item	Value	Description	Reference
V_{ult} =	125.00	Ultimate Design Wind Speed (mph)	*2018 CT State Building Code (SBC)*
V_i =	50.00	Design Ice Wind Speed (mph)	*ASCE 7-10, Hazard Tool*
K_d =	0.95	Wind Direction Probability Factor	*Sect. 16.6, TIA*
Class	II	Risk Category	*Table 2-1, TIA*
I =	1.00	Importance Factor (Ice Thickness)	*Table 2-3, TIA*
z = h =	255.00	ft. (A.G.L.)	*Max. Center of Appurtenance*
Exp. Cat.	B	Exposure Category	*Sect. 2.6.5.1.2, TIA*
z_g =	1200.00	Exposure Category Coeff.	*Table 2-4, TIA*
α' =	7.00	Exposure Category Coeff.	*Table 2-4, TIA*
$K_{z\,(min)}$ =	0.70	Exposure Category Coeff.	*Table 2-4, TIA*
K_c =	0.90	Terrain Constant	*Table 2-4, TIA*
K_t =	N/A	Topographic Constant	*Table 2-5, TIA ("N/A" if Topo. Cat. = 1)*
K_z =	1.29	$= 2.01(z/z_g)^{(2/\alpha')}$	*Sect. 2.6.5.2, TIA*
Topo. Cat.	1	Topographic Category (1-4)	*Sect. 2.6.6.2.1, TIA*
e =	2.72	Natural Logarithmic base	
f =	N/A	Height Attenuation Factor	*Table 2-5, TIA ("N/A" if Topo. Cat. = 1)*
H =	N/A	ft. Height of crest above surrounding terrain	
K_h =	N/A	$e^{((f*z)/H)}$	*Sect. 2.6.6.2.1, TIA*
K_{zt} =	1.00	$= [1+((K_c*K_t)/K_h)]^2$	*Sect. 2.6.6.2.1, TIA*
K_s =	N/A	Rooftop Wind Speed-Up Factor	*Sect. 2.6.7, TIA*
K_e =	1.00	Ground Elevation Factor	*Sect. 2.6.8, TIA*
K_{iz} =	1.23	$= (z/33)^{0.10} \leq 1.4$ (Height escalation factor)	*Sect. 2.6.10, TIA*
G_h =	1.00	Gust Effect Factor	*Sect. 16.6, TIA*
K_a =	0.90	Shielding Factor	*Sect. 16.6.1.2, TIA*
t_i =	0.75	Design Ice Thickness	*ASCE 7-10, Hazard Tool*
t_{iz} =	0.92	$= t_i(I)K_{iz}(K_{zt})^{0.35}$	*Sect. 2.6.10, TIA*
$q_{z\,design}$ =	49.1 psf	$= 0.00256(K_z)(K_{zt})(K_s)(K_e)(K_d)(V^2)$	*Sect. 2.6.11.6, TIA*
$q_{z\,ice}$ =	7.9 psf	$= 0.00256(K_z)(K_{zt})(K_s)(K_e)(K_d)(V_i^2)$	*Sect. 2.6.11.6, TIA*

Design Wind Forces:

Section 2.6.11.2

$F_A = q_{z\,design}G_h(EPA)_A$ *(where $(EPA)_A$ = effective projected area of the appurtenance = $C_a A_a$)*

$F_{Ai} = q_{z\,ice}G_h(EPA)_{Ai}$

(see calculation tables on following pages)

Design Ice Weight:

Section 2.6.10

$F_i = [\pi(t_{iz})(D_c + t_{iz})]*56$ lb/ft³ *(where D_c = largest out to out dimension of member)*

(see calculation tables on following pages)

Dewberry

Job Number	50123202
Made by:	JSD
Date:	04/22/20
Checked by:	BGK
Date:	04/23/20

(Cheshire CT - Beta) - Design Wind Load

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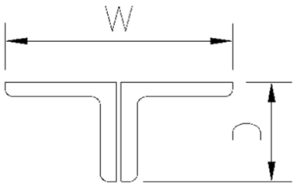
Element Definition

	Description	Dimensions (in.)			Weight	Length /	
		W	D	H	(lb)	# Supports	
	AM-X-CD-16-65-00T	11.80	5.90	72.00	63.50	2.00	
	800-10965	20.00	6.90	78.70	108.60	2.00	
	HPA-65R-BUU-H6	14.80	9.00	72.00	57.90	2.00	
	STRUCTURAL MEMBERS						
(Mounting Pipe)	2-7/8" OD Pipe	2.88	2.88	12.00	STAAD	*Pipe*	*(See Note 2)*
	2-7/8" OD Pipe	2.88	2.88	12.00	STAAD	*Pipe*	
	3x3x1/4 HSS Tube	4.00	4.00	12.00	STAAD	*Tube*	

Note:

1) *For Double Angles assume the following:*



2) *For mounting pipes that **do not** support equipment or portions which are not shielded by equipment, create an additional entry below.*

Dewberry

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(Cheshire CT - Beta) - Design Wind Load

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Design Wind Load

Members	Dimensions (ft.)			Area $(A_a)_n$	Area $(A_a)_t$	Aspect Ratio	Aspect Ratio	C_{an}	C_{at}
	Width (Normal)	Depth (Tangent)	Height (or span)	(normal) (sf)	(tangent) (sf)	(normal)	(tangent)	(normal) Table 2-8	(tangent) Table 2-8
AM-X-CD-16-65-00T	0.98	0.49	6.00	5.88	2.94	6.12	12.24	1.36	1.57
800-10965	1.67	0.58	6.56	10.96	3.80	3.93	11.31	1.26	1.54
HPA-65R-BUU-H6	1.23	0.75	6.00	7.38	4.50	4.88	8.00	1.31	1.43
STRUCTURAL MEMBERS									
2-7/8" OD Pipe	0.24	0.24	1.00	0.24	0.24	4.17	4.17	0.74	0.74
2-7/8" OD Pipe	0.24	0.24	1.00	0.24	0.24	4.17	4.17	0.74	0.74
3x3x1/4 HSS Tube	0.33	0.33	1.00	0.33	0.33	3.03	3.03	1.22	1.22

Design Effective Projected Area & Wind Loads

Members	EPA_a @ 0.0° (sf)	EPA_a @ 30.0° (sf)	EPA_a @ 60.0° (sf)	EPA_a @ 90.0° (sf)	F_a @ 0.0° (lb)	F_a @ 30.0° (lb)	F_a @ 60.0° (lb)	F_a @ 90.0° (lb)	Gravity Load @ Support (lb)
AM-X-CD-16-65-00T	7.20	6.44	4.91	4.15	176.7	158.0	120.7	102.0	31.8
800-10965	12.43	10.64	7.06	5.27	305.1	261.2	173.3	129.3	54.3
HPA-65R-BUU-H6	8.70	7.97	6.52	5.79	213.6	195.8	160.0	142.2	29.0
STRUCTURAL MEMBERS									
2-7/8" OD Pipe	0.16	-	-	-	7.8	-	-	-	-
2-7/8" OD Pipe	0.16	-	-	-	7.8	-	-	-	-
3x3x1/4 HSS Tube	0.36	-	-	-	17.8	-	-	-	-

Dewberry

Job Number	50123202
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(Cheshire CT - Beta) - Design Wind Load

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Design Ice Wind Load

- Design ice thickness included in tabulated dimensions below.

Members	Dimensions (ft.)			Area $(A_a)_{ni}$	Area $(A_a)_{ti}$	Aspect Ratio	Aspect Ratio	C_{ani}	C_{ati}
	Width (Normal)	Depth (Tangent)	Height (or span)	(normal) (sf)	(tangent) (sf)	(normal)	(tangent)	(normal) Table 2-8	(tangent) Table 2-8
AM-X-CD-16-65-00T	1.14	0.65	6.15	7.01	4.00	5.39	9.46	1.33	1.48
800-10965	1.82	0.73	6.71	12.21	4.90	3.69	9.19	1.25	1.47
HPA-65R-BUU-H6	1.39	0.90	6.15	8.55	5.54	4.42	6.83	1.29	1.39
STRUCTURAL MEMBERS									
2-7/8" OD Pipe	0.39	0.39	1.00	0.39	0.39	2.56	2.56	0.70	0.70
2-7/8" OD Pipe	0.39	0.39	1.00	0.39	0.39	2.56	2.56	0.70	0.70
3x3x1/4 HSS Tube	0.49	0.49	1.00	0.49	0.49	2.04	2.04	1.20	1.20

Design Effective Projected Area & Wind Loads with Ice

Members	EPA_{ai} @ 0.0° (sf)	EPA_{ai} @ 30.0° (sf)	EPA_{ai} @ 60.0° (sf)	EPA_{ai} @ 90.0° (sf)	F_{ai} @ 0.0° (lb)	F_{ai} @ 30.0° (lb)	F_{ai} @ 60.0° (lb)	F_{ai} @ 90.0° (lb)	Ice Load F_i @ Support (lb)
AM-X-CD-16-65-00T	8.39	7.63	6.09	5.33	33.1	30.1	24.1	21.0	47.6
800-10965	13.74	11.92	8.30	6.48	54.3	47.1	32.8	25.6	81.4
HPA-65R-BUU-H6	9.93	9.18	7.68	6.93	39.2	36.3	30.3	27.4	61.5
STRUCTURAL MEMBERS									
2-7/8" OD Pipe	0.25	-	-	-	1.9	-	-	-	4.3
2-7/8" OD Pipe	0.25	-	-	-	1.9	-	-	-	4.3
3x3x1/4 HSS Tube	0.53	-	-	-	4.2	-	-	-	7.4

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Job Number	50123202
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(Cheshire CT - Beta) - Serviceability Wind Load

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Serviceability Wind Load Design Criteria

General Information & Design Input from TIA-222-H

Item	Value	Description	Reference
V_s =	60.00	Service Wind Speed (mph)	*Sect. 2.8.3, TIA*
V_m =	30.00	Maintenance Wind Speed (mph)	*Sect. 16.3, TIA*
K_d =	0.95	Wind Direction Probability Factor	*Sect. 16.6, TIA*
Class	II	Risk Category	*Table 2-1, TIA*
z = h =	255.00	ft. (A.G.L.)	*Max. Center of Appurtenance*
Exp. Cat.	B	Exposure Category	*Sect. 2.6.5.1.2, TIA*
z_g =	1200.00	Exposure Category Coeff.	*Table 2-4, TIA*
α' =	7.00	Exposure Category Coeff.	*Table 2-4, TIA*
$K_{z\,(min)}$ =	0.70	Exposure Category Coeff.	*Table 2-4, TIA*
K_e =	0.90	Terrain Constant	*Table 2-4, TIA*
K_t =	N/A	Topographic Constant	*Table 2-5, TIA ("N/A" if Topo. Cat. = 1)*
K_z =	1.29	$= 2.01(z/z_g)^{(2/\alpha')}$	*Sect. 2.6.5.2, TIA*
Topo. Cat.	1	Topographic Category (1-4)	*Sect. 2.6.6.2.1, TIA*
e =	2.72	Natural Logarithmic base	
f =	N/A	Height Attenuation Factor	*Table 2-5, TIA ("N/A" if Topo. Cat. = 1)*
H =	N/A	ft. Height of crest above surrounding terrain	
K_h =	N/A	$e^{((f*z)/H)}$	*Sect. 2.6.6.2.1, TIA*
K_{zt} =	1.00	$= [1+((K_c*K_t)/K_h)]^2$	*Sect. 2.6.6.2.1, TIA*
K_s =	N/A	Rooftop Wind Speed-Up Factor	*Sect. 2.6.7, TIA*
K_e =	1.00	Ground Elevation Factor	*Sect. 2.6.8, TIA*
G_h =	1.00	Gust Effect Factor	*Sect. 16.6, TIA*
K_a =	0.90	Shielding Factor	*Sect. 16.6.1.2, TIA*
$q_{z\,service}$ =	10.2 psf	$= 0.00256(K_z)(K_{zt})(K_s)(K_e)(K_d)(V_s^2)$	*Sect. 2.6.11.6, TIA*
$q_{z\,maint}$ =	2.9 psf	$= 0.00256(K_z)(K_{zt})(K_s)(K_e)(K_d)(V_m^2)$	*Sect. 2.6.11.6, TIA*

Design Serviceability and Maintenance Wind Forces:

Section 2.6.11.2

$F_{As} = q_{z\,service} G_h (EPA)_A$

$F_{Am} = q_{z\,maint} G_h (EPA)_A$

(where $(EPA)_A$ = effective projected area of the appurtenance = $C_a A_a$)

(see calculation tables on following pages)

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Job Number	50123202
Made by:	JSD
Date:	04/22/20
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(Cheshire CT - Beta) - Serviceability Wind Load

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Element Definition:

	Description	Dimensions (in.)			Weight	Length /
		W	D	H	(lb)	# Supports
	AM-X-CD-16-65-00T	11.80	5.90	72.00	63.50	2.00
	800-10965	20.00	6.90	78.70	108.60	2.00
	HPA-65R-BUU-H6	14.80	9.00	72.00	57.90	2.00
	STRUCTURAL MEMBERS					
(Mounting Pipe)	2-7/8" OD Pipe	2.88	2.88	12.00	STAAD	Pipe
	2-7/8" OD Pipe	2.88	2.88	12.00	STAAD	Pipe
	3x3x1/4 HSS Tube	4.00	4.00	12.00	STAAD	Tube

Service & Maintenance Wind Load

Members	Dimensions (ft.)			Area $(A_a)_n$	Area $(A_a)_t$	Aspect Ratio	Aspect Ratio	C_{an}	C_{at}
	Width *(Normal)*	Depth *(Tangent)*	Height *(or span)*	*(normal)* *(sf)*	*(tangent)* *(sf)*	*(normal)*	*(tangent)*	*(normal)* *Table 2-8*	*(tangent)* *Table 2-8*
AM-X-CD-16-65-00T	0.98	0.49	6.00	5.88	2.94	6.12	12.24	1.36	1.57
800-10965	1.67	0.58	6.56	10.96	3.80	3.93	11.31	1.26	1.54
HPA-65R-BUU-H6	1.23	0.75	6.00	7.38	4.50	4.88	8.00	1.31	1.43
STRUCTURAL MEMBERS									
2-7/8" OD Pipe	0.24	0.24	1.00	0.24	0.24	4.17	4.17	0.74	0.74
2-7/8" OD Pipe	0.24	0.24	1.00	0.24	0.24	4.17	4.17	0.74	0.74
3x3x1/4 HSS Tube	0.33	0.33	1.00	0.33	0.33	3.03	3.03	1.22	1.22

Dewberry®

Job Number	50123202
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(Cheshire CT - Beta) - Serviceability Wind Load

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Service Effective Projected Area & Wind Loads

Members	EPA_{as} @ 0.0° (sf)	EPA_{as} @ 30.0° (sf)	EPA_{as} @ 60.0° (sf)	EPA_{as} @ 90.0° (sf)	F_{as} @ 0.0° (lb)	F_{as} @ 30.0° (lb)	F_{as} @ 60.0° (lb)	F_{as} @ 90.0° (lb)
AM-X-CD-16-65-00T	7.20	6.44	4.91	4.15	36.7	32.8	25.1	21.2
800-10965	12.43	10.64	7.06	5.27	63.4	54.3	36.0	26.9
HPA-65R-BUU-H6	8.70	7.97	6.52	5.79	44.4	40.7	33.2	29.5
STRUCTURAL MEMBERS								
2-7/8" OD Pipe	0.16	-	-	-	1.6	-	-	-
2-7/8" OD Pipe	0.16	-	-	-	1.6	-	-	-
3x3x1/4 HSS Tube	0.36	-	-	-	3.7	-	-	-

Maintenance Effective Projected Area & Wind Loads

Members	EPA_{am} @ 0.0° (sf)	EPA_{am} @ 30.0° (sf)	EPA_{am} @ 60.0° (sf)	EPA_{am} @ 90.0° (sf)	F_{am} @ 0.0° (lb)	F_{am} @ 30.0° (lb)	F_{am} @ 60.0° (lb)	F_{am} @ 90.0° (lb)
AM-X-CD-16-65-00T	7.20	6.44	4.91	4.15	10.4	9.3	7.1	6.0
800-10965	12.43	10.64	7.06	5.27	18.0	15.4	10.2	7.6
HPA-65R-BUU-H6	8.70	7.97	6.52	5.79	12.6	11.6	9.5	8.4
STRUCTURAL MEMBERS								
2-7/8" OD Pipe	0.16	-	-	-	0.5	-	-	-
2-7/8" OD Pipe	0.16	-	-	-	0.5	-	-	-
3x3x1/4 HSS Tube	0.36	-	-	-	1.1	-	-	-

Dewberry

Job Number	50123202
Made by:	JSD
Date:	04/22/20
Checked by:	BGK
Date:	04/23/20

(Cheshire CT - Beta) - Load Input for STAAD Model

\\capecod\Projects\50123198\50123202 - CT2036 Cheshire CT\Engineering\Structural\Mount Analysis\Rev.0\Calcs\50123202 - Cheshire CT Wind Load - Beta Sector.xlsx

STAAD Gravity Load Input

Equipment	Dead Load *(lb per support)*	Ice Load *(lb per support)*
AM-X-CD-16-65-00T	31.8	47.6
800-10965	54.3	81.4
HPA-65R-BUU-H6	29.0	61.5

Maintenance Loads - Sect. 16.3, TIA

L_M = 500 lbs - vertical concentrated downward force applied in each mounting pipe location independently

L_V = 250 lbs - vertical concentrated downward force applied at the center of each simply supported horizontal member and at the end of each horizontal cantilevered members independently (excluding tie-backs)

STAAD Wind Load Calculation

Equipment	Axis	Case #1 0°	Case #2 30°	Case #3 60°	Case #4 90°	Case #5 120°	Case #6 150°	Case #7 180°	Case #8 210°	Case #9 240°	Case #10 270°	Case #11 300°	Case #12 330°
Not Shielded	z	$-F_0$	$-0.87F_{30}$	$-0.50F_{60}$	-	$0.50F_{60}$	$0.87F_{30}$	Inverse of Case #1	Inverse of Case #2	Inverse of Case #3	Inverse of Case #4	Inverse of Case #5	Inverse of Case #6
	x	-	$0.50F_{30}$	$0.87F_{60}$	F_{90}	$0.87F_{60}$	$0.50F_{30}$						

Dewberry

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(Cheshire CT - Beta) - Load Input for STAAD Model

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STAAD Load Input (Design Wind Load)

Equipment	Axis	Case #1 0°	Case #2 30°	Case #3 60°	Case #4 90°	Case #5 120°	Case #6 150°	Case #7 180°	Case #8 210°	Case #9 240°	Case #10 270°	Case #11 300°	Case #12 330°
AM-X-CD-16-65-00T	z	-176.7	-137.5	-60.4	-	60.4	137.5	Inverse of Case #1	Inverse of Case #2	Inverse of Case #3	Inverse of Case #4	Inverse of Case #5	Inverse of Case #6
	x	-	79.0	105.0	102.0	105.0	79.0						
800-10965	z	-305.1	-227.2	-86.7	-	86.7	227.2						
	x	-	130.6	150.8	129.3	150.8	130.6						
HPA-65R-BUU-H6	z	-213.6	-170.3	-80.0	-	80.0	170.3						
	x	-	97.9	139.2	142.2	139.2	97.9						

Dewberry

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Date:	04/23/20

(Cheshire CT - Beta) - Load Input for STAAD Model

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STAAD Load Input (Design Wind on Ice Load)

Equipment	Axis	Case #1 0°	Case #2 30°	Case #3 60°	Case #4 90°	Case #5 120°	Case #6 150°	Case #7 180°	Case #8 210°	Case #9 240°	Case #10 270°	Case #11 300°	Case #12 330°
AM-X-CD-16-65-00T	z	-33.1	-26.2	-12.1	-	12.1	26.2	Inverse of Case #1	Inverse of Case #2	Inverse of Case #3	Inverse of Case #4	Inverse of Case #5	Inverse of Case #6
	x	-	15.1	21.0	21.0	21.0	15.1						
800-10965	z	-54.3	-41.0	-16.4	-	16.4	41.0						
	x	-	23.6	28.5	25.6	28.5	23.6						
HPA-65R-BUU-H6	z	-39.2	-31.6	-15.2	-	15.2	31.6						
	x	-	18.2	26.4	27.4	26.4	18.2						

Dewberry

Job Number	50123202
Made by:	JSD
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Checked by:	BGK
Date:	04/23/20

(Cheshire CT - Beta) - Load Input for STAAD Model

\\capecod\Projects\50123198\50123202 - CT2036 Cheshire CT\Engineering\Structural\Mount Analysis\Rev.0\Calcs\50123202 - Cheshire CT Wind Load - Beta Sector.xlsx

STAAD Load Input (Service Wind Load)

Equipment	Axis	Case #1 0°	Case #2 30°	Case #3 60°	Case #4 90°	Case #5 120°	Case #6 150°	Case #7 180°	Case #8 210°	Case #9 240°	Case #10 270°	Case #11 300°	Case #12 330°
AM-X-CD-16-65-00T	z	-36.7	-28.5	-12.6	-	12.6	28.5	Inverse of Case #1	Inverse of Case #2	Inverse of Case #3	Inverse of Case #4	Inverse of Case #5	Inverse of Case #6
	x	-	16.4	21.8	21.2	21.8	16.4						
800-10965	z	-63.4	-47.2	-18.0	-	18.0	47.2						
	x	-	27.2	31.3	26.9	31.3	27.2						
HPA-65R-BUU-H6	z	-44.4	-35.4	-16.6	-	16.6	35.4						
	x	-	20.4	28.9	29.5	28.9	20.4						

Dewberry®

Job Number	50123202
Made by:	JSD
Date:	04/22/20
Checked by:	BGK
Date:	04/23/20

(Cheshire CT - Beta) - Load Input for STAAD Model

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STAAD Load Input (Maintenance Wind Load)

Equipment	Axis	Case #1 0°	Case #2 30°	Case #3 60°	Case #4 90°	Case #5 120°	Case #6 150°	Case #7 180°	Case #8 210°	Case #9 240°	Case #10 270°	Case #11 300°	Case #12 330°
AM-X-CD-16-65-00T	z	-10.4	-8.1	-3.6	-	3.6	8.1	Inverse of Case #1	Inverse of Case #2	Inverse of Case #3	Inverse of Case #4	Inverse of Case #5	Inverse of Case #6
	x	-	4.7	6.2	6.0	6.2	4.7						
800-10965	z	-18.0	-13.4	-5.1	-	5.1	13.4						
	x	-	7.7	8.9	7.6	8.9	7.7						
HPA-65R-BUU-H6	z	-12.6	-10.1	-4.8	-	4.8	10.1						
	x	-	5.8	8.3	8.4	8.3	5.8						

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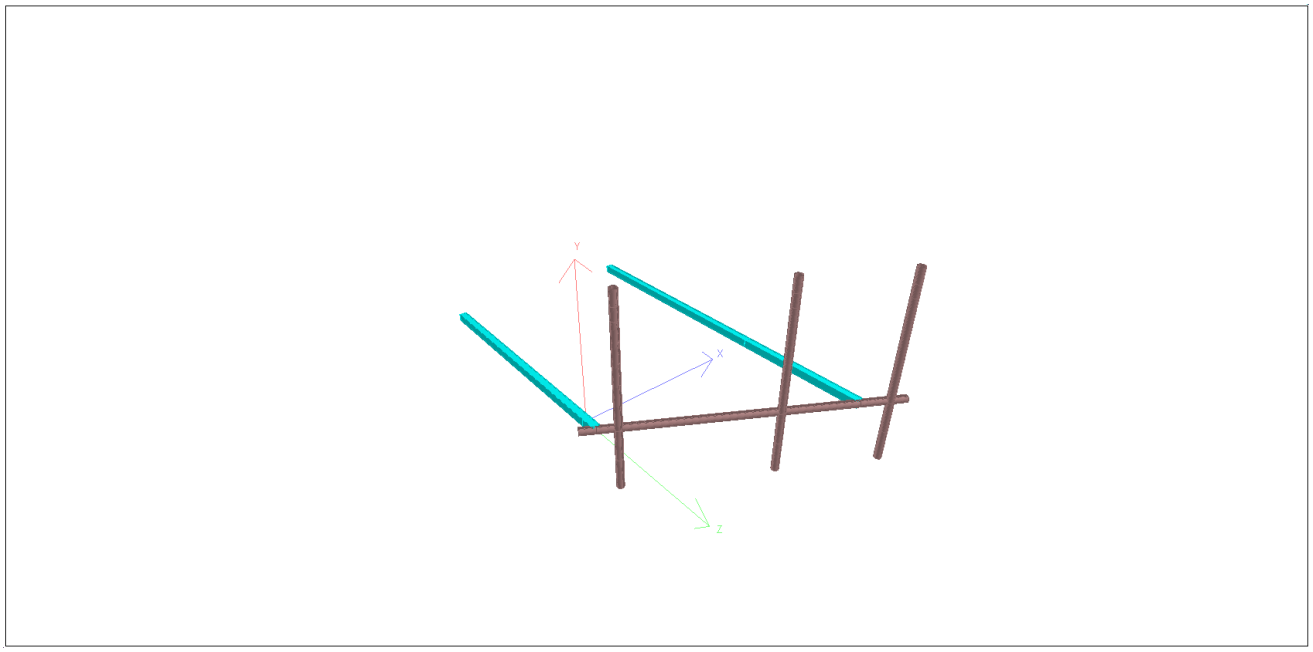
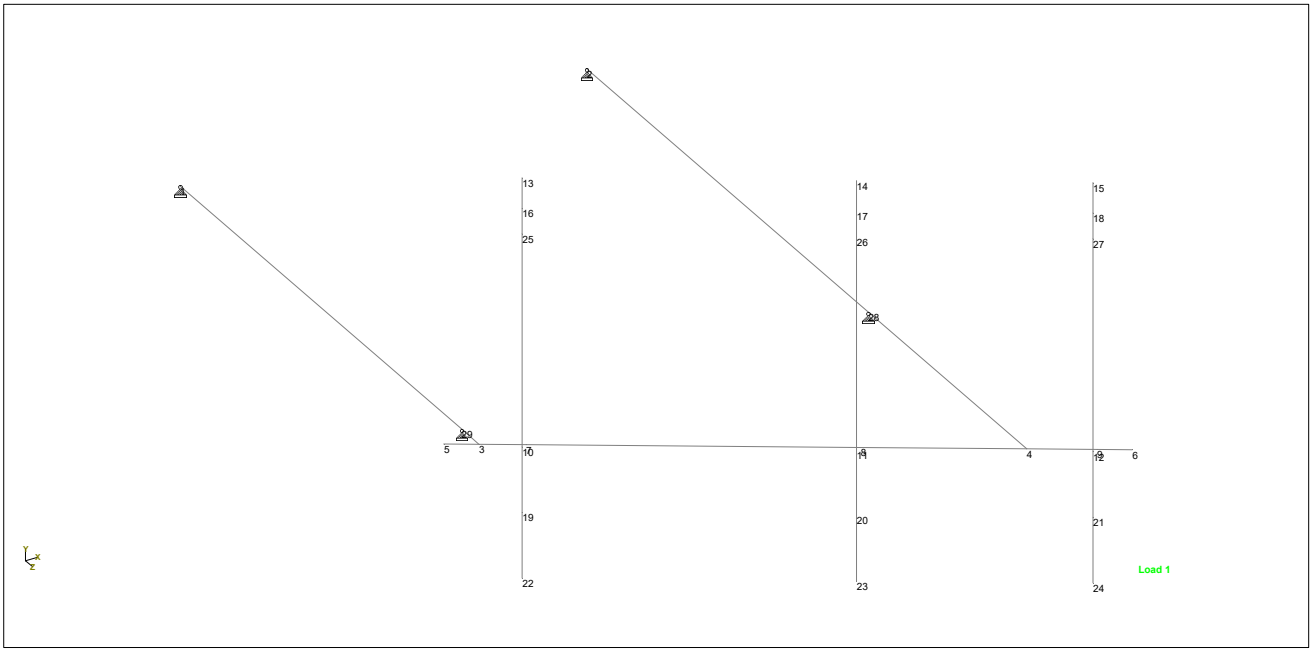
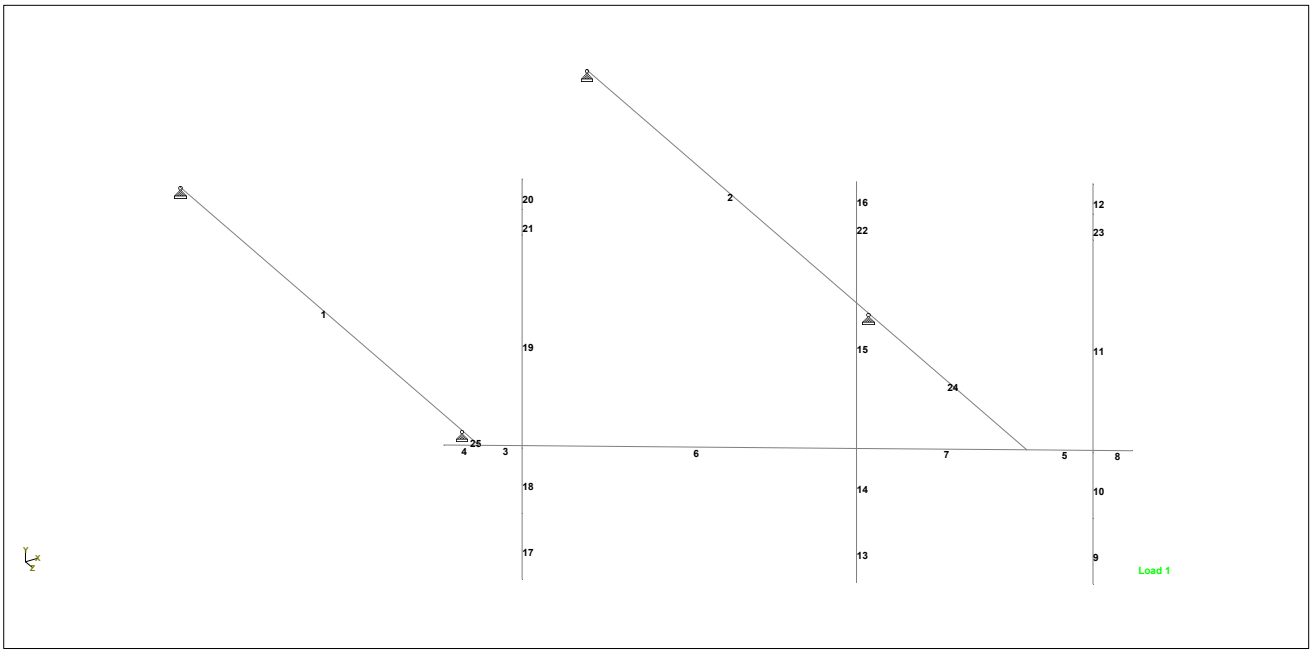
	Part Proposed Beta Sector Standoff Mount		
Job Title Cheshire CT	Ref		
	By JSD	Date 4/22/2020	Chd BGK
Client AT&T	File Cheshire CT - Beta Sectc	Date/Time 28-Apr-2020 12:30	



3D Rendered View



Node Labels



Beam Labels

Beams

Beam	Node A	Node B	Length (ft)	Property	β (degrees)
1	1	29	8.000	3	0
2	2	28	8.000	3	0
3	3	7	0.670	2	0
4	3	5	0.500	2	0
5	4	9	1.000	2	0
6	7	8	4.750	2	0
7	8	4	2.357	2	0
8	9	6	0.500	2	0
9	24	21	1.080	1	0
10	21	12	1.080	1	0
11	12	27	3.500	1	0
12	18	15	0.500	1	0
13	23	20	1.080	1	0
14	20	11	1.080	1	0
15	11	26	3.500	1	0
16	17	14	0.500	1	0
17	22	19	1.080	1	0
18	19	10	1.080	1	0
19	10	25	3.500	1	0
20	16	13	0.500	1	0
21	25	16	0.420	1	0
22	26	17	0.420	1	0
23	27	18	0.420	1	0

Beams Cont...

Beam	Node A	Node B	Length (ft)	Property	β (degrees)
24	28	4	4.500	3	0
25	29	3	0.500	3	0

Section Properties

Prop	Section	Area (in^2)	I_{yy} (in^4)	I_{zz} (in^4)	J (in^4)	Material
1	PIPS25	1.600	1.450	1.450	2.891	STEEL
2	PIPS25	1.600	1.450	1.450	2.891	STEEL
3	HSST3X3X0.25	2.440	3.020	3.020	4.936	STEEL

Materials

Mat	Name	E (kip/in^2)	ν	Density (kip/in^3)	α (/°F)
1	CONCRETE	3.15E+3	0.170	8.68e-05	5.5E -6
2	ALUMINUM	10E+3	0.330	9.8e-05	12.8E -6
3	STEEL_50_KSI	29E+3	0.300	0.000283	6.5E -6
4	STAINLESSSTEEL	28E+3	0.300	0.000283	9.9E -6
5	STEEL_36_KSI	29E+3	0.300	0.000283	6.5E -6
6	STEEL_275_NMM2	29.7E+3	0.300	0.000	6.67E -6
7	STEEL	29E+3	0.300	0.000283	6.5E -6
8	STEEL_355_NMM2	29.7E+3	0.300	0.000	6.67E -6

Supports

Node	X (kip/in)	Y (kip/in)	Z (kip/in)	rX (kip-ft/deg)	rY (kip-ft/deg)	rZ (kip-ft/deg)
1	Fixed	Fixed	Fixed	-	-	-
2	Fixed	Fixed	Fixed	-	-	-
28	Fixed	Fixed	Fixed	-	-	-
29	Fixed	Fixed	Fixed	-	-	-

Combination Load Cases

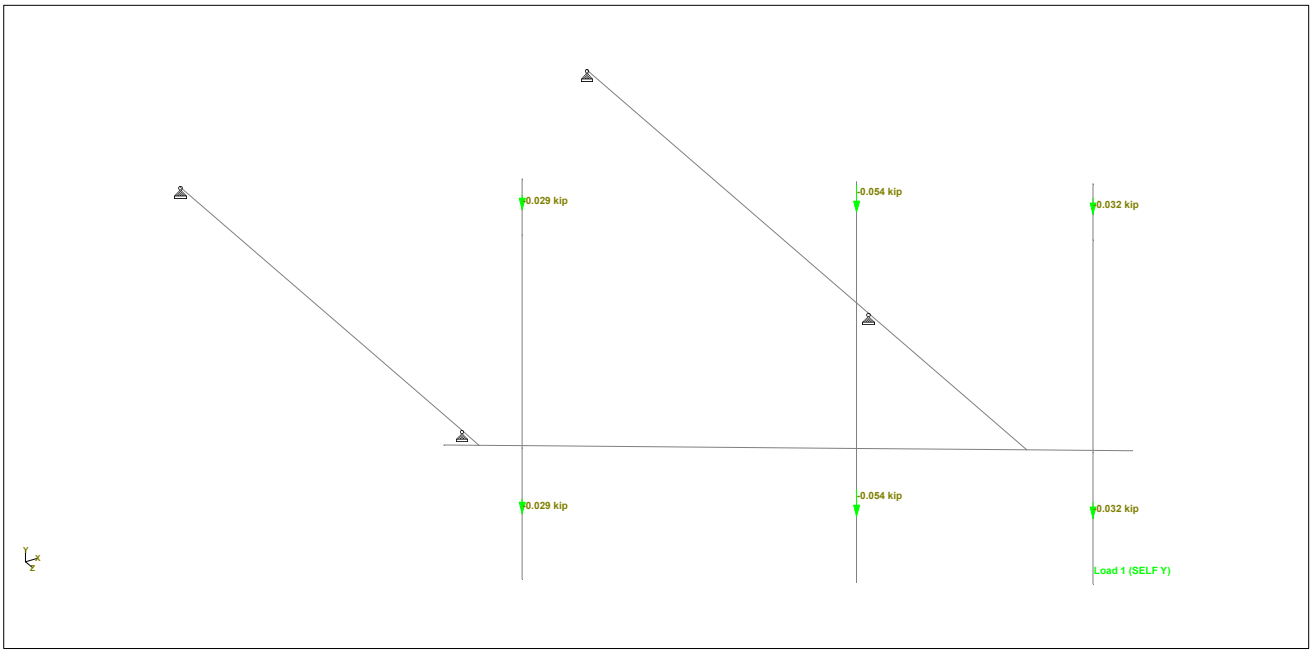
Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
29	1.2D+1.0WL#1	1	DEAD	1.20
		2	WL#1	1.00
30	1.2D+1.0WL#2	1	DEAD	1.20
		3	WL#2	1.00
31	1.2D+1.0WL#3	1	DEAD	1.20
		4	WL#3	1.00
32	1.2D+1.0WL#4	1	DEAD	1.20
		5	WL#4	1.00
33	1.2D+1.0WL#5	1	DEAD	1.20
		6	WL#5	1.00
34	1.2D+1.0WL#6	1	DEAD	1.20
		7	WL#6	1.00
35	1.2D+1.0WL#7	1	DEAD	1.20
		2	WL#1	-1.00
36	1.2D+1.0WL#8	1	DEAD	1.20
		3	WL#2	-1.00
37	1.2D+1.0WL#9	1	DEAD	1.20
		4	WL#3	-1.00
38	1.2D+1.0WL#10	1	DEAD	1.20
		5	WL#4	-1.00
39	1.2D+1.0WL#11	1	DEAD	1.20
		6	WL#5	-1.00
40	1.2D+1.0WL#12	1	DEAD	1.20
		7	WL#6	-1.00
41	1.2D+1.0DI+1.0WI#1	1	DEAD	1.20
		9	WLI#1	1.00
		8	DI	1.00
42	1.2D+1.0DI+1.0WI#2	1	DEAD	1.20
		10	WLI#2	1.00
		8	DI	1.00
43	1.2D+1.0DI+1.0WI#3	1	DEAD	1.20
		11	WLI#3	1.00
		8	DI	1.00
44	1.2D+1.0DI+1.0WI#4	1	DEAD	1.20
		12	WLI#4	1.00
		8	DI	1.00
45	1.2D+1.0DI+1.0WI#5	1	DEAD	1.20
		13	WLI#5	1.00
		8	DI	1.00
46	1.2D+1.0DI+1.0WI#6	1	DEAD	1.20
		14	WLI#6	1.00
		8	DI	1.00
47	1.2D+1.0DI+1.0WI#7	1	DEAD	1.20
		9	WLI#1	-1.00
		8	DI	1.00

Combination Load Cases Cont...

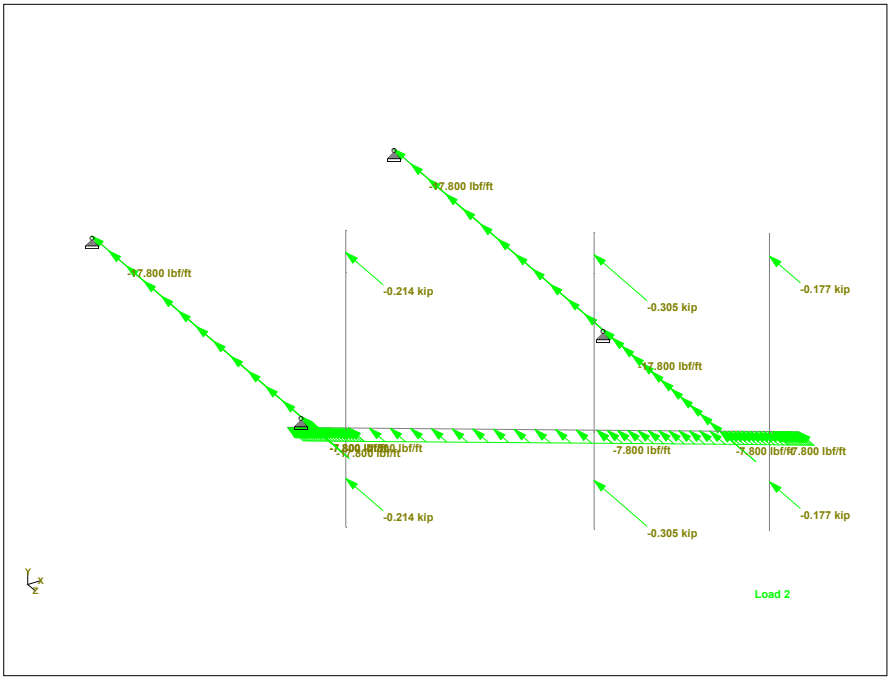
Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
48	1.2D+1.0DI+1.0WI#8	1	DEAD	1.20
		10	WLI#2	-1.00
		8	DI	1.00
49	1.2D+1.0DI+1.0WI#9	1	DEAD	1.20
		11	WLI#3	-1.00
		8	DI	1.00
50	1.2D+1.0DI+1.0WI#10	1	DEAD	1.20
		12	WLI#4	-1.00
		8	DI	1.00
51	1.2D+1.0DI+1.0WI#11	1	DEAD	1.20
		13	WLI#5	-1.00
		8	DI	1.00
52	1.2D+1.0DI+1.0WI#12	1	DEAD	1.20
		14	WLI#6	-1.00
		8	DI	1.00
53	1.0D+1.0WLS#1	1	DEAD	1.00
		15	WLS#1	1.00
54	1.0D+1.0WLS#2	1	DEAD	1.00
		16	WLS#2	1.00
55	1.0D+1.0WLS#3	1	DEAD	1.00
		17	WLS#3	1.00
56	1.0D+1.0WLS#4	1	DEAD	1.00
		18	WLS#4	1.00
57	1.0D+1.0WLS#5	1	DEAD	1.00
		19	WLS#5	1.00
58	1.0D+1.0WLS#6	1	DEAD	1.00
		20	WLS#6	1.00
59	1.0D+1.0WLS#7	1	DEAD	1.00
		15	WLS#1	-1.00
60	1.0D+1.0WLS#8	1	DEAD	1.00
		16	WLS#2	-1.00
61	1.0D+1.0WLS#9	1	DEAD	1.00
		17	WLS#3	-1.00
62	1.0D+1.0WLS#10	1	DEAD	1.00
		18	WLS#4	-1.00
63	1.0D+1.0WLS#11	1	DEAD	1.00
		19	WLS#5	-1.00
64	1.0D+1.0WLS#12	1	DEAD	1.00
		20	WLS#6	-1.00
65	1.4D	1	DEAD	1.40
66	1.2D+1.5LM+1.0WM#1	1	DEAD	1.20
		21	WLM#1	1.00
		27	LM	1.50
67	1.2D+1.5LM+1.0WM#2	1	DEAD	1.20
		22	WLM#2	1.00

Combination Load Cases Cont...

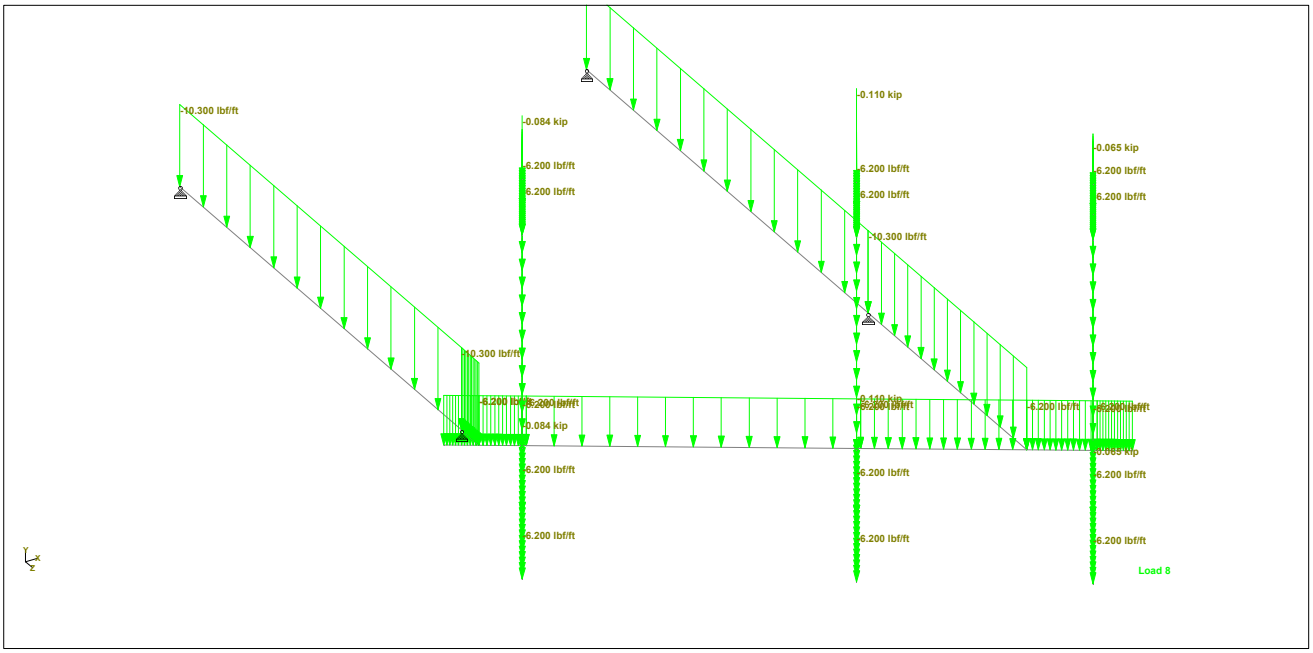
Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
		27	LM	1.50
68	1.2D+1.5LM+1.0WM#3	1	DEAD	1.20
		23	WLM#3	1.00
		27	LM	1.50
69	1.2D+1.5LM+1.0WM#4	1	DEAD	1.20
		24	WLM#4	1.00
		27	LM	1.50
70	1.2D+1.5LM+1.0WM#5	1	DEAD	1.20
		25	WLM#5	1.00
		27	LM	1.50
71	1.2D+1.5LM+1.0WM#6	1	DEAD	1.20
		26	WLM#6	1.00
		27	LM	1.50
72	1.2D+1.5LM+1.0WM#7	1	DEAD	1.20
		21	WLM#1	-1.00
		27	LM	1.50
73	1.2D+1.5LM+1.0WM#8	1	DEAD	1.20
		22	WLM#2	-1.00
		27	LM	1.50
74	1.2D+1.5LM+1.0WM#9	1	DEAD	1.20
		23	WLM#3	-1.00
		27	LM	1.50
75	1.2D+1.5LM+1.0WM#10	1	DEAD	1.20
		24	WLM#4	-1.00
		27	LM	1.50
76	1.2D+1.5LM+1.0WM#11	1	DEAD	1.20
		25	WLM#5	-1.00
		27	LM	1.50
77	1.2D+1.5LM+1.0WM#12	1	DEAD	1.20
		26	WLM#6	-1.00
		27	LM	1.50
78	1.2D+1.5LV	1	DEAD	1.20
		28	LV	1.50



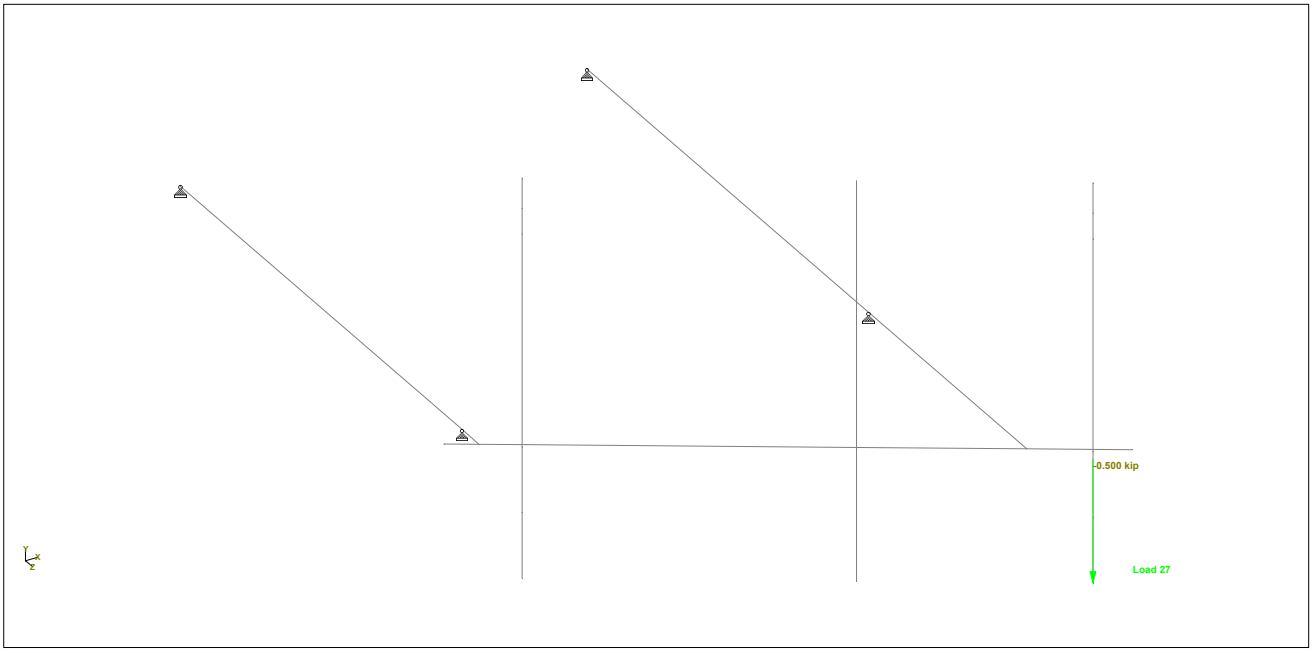
Applied Dead Loads



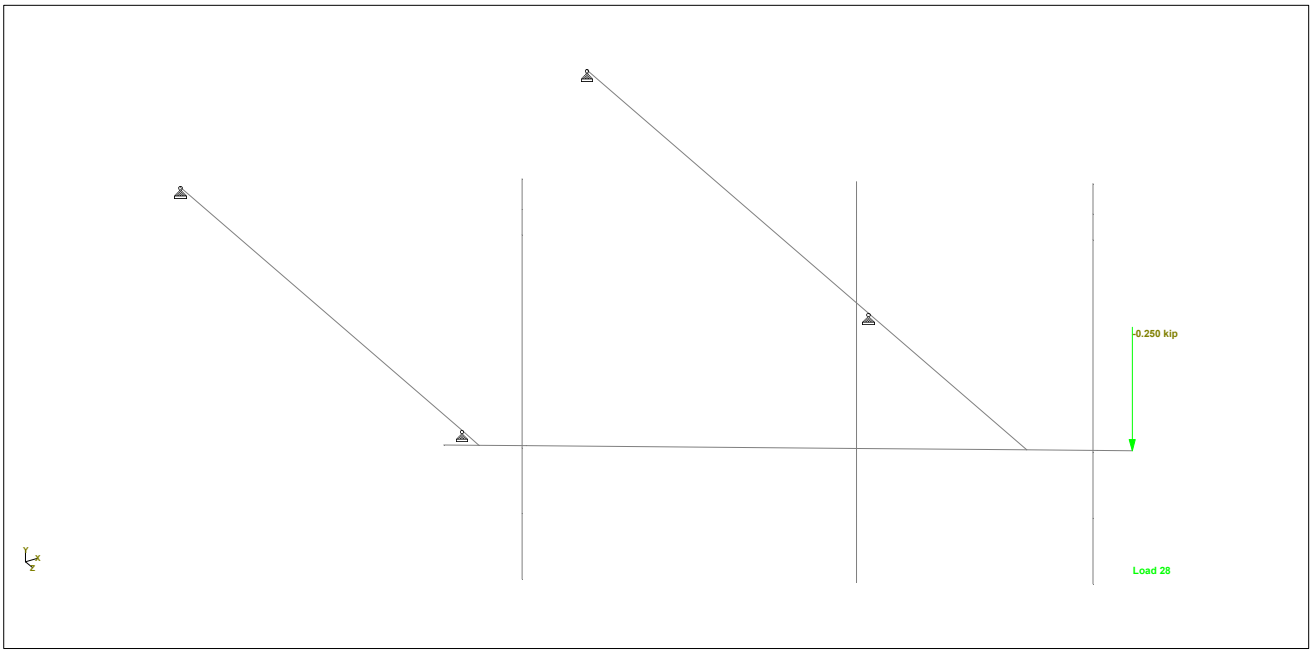
Typical Applied Wind Loads



Applied Ice Dead Loads



Applied LM Load



Applied LV Load

Utilization Ratio

Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (in^2)	Iz (in^4)	Iy (in^4)	Ix (in^4)
1	HSST3X3X0	HSST3X3X0	0.279	1.000	0.279	Eq. H1-1b	36	2.440	3.020	3.020	5.080
2	HSST3X3X0	HSST3X3X0	0.677	1.000	0.677	Eq. H1-1b	72	2.440	3.020	3.020	5.080
3	PIPS25	PIPS25	0.331	1.000	0.331	Eq. H3-6	35	1.600	1.450	1.450	2.900
4	PIPS25	PIPS25	0.000	1.000	0.000	Eq. H1-1b	46	1.600	1.450	1.450	2.900
5	PIPS25	PIPS25	0.233	1.000	0.233	Eq. H1-1b	72	1.600	1.450	1.450	2.900
6	PIPS25	PIPS25	0.251	1.000	0.251	Eq. H1-1b	40	1.600	1.450	1.450	2.900
7	PIPS25	PIPS25	0.414	1.000	0.414	Eq. H1-1b	30	1.600	1.450	1.450	2.900
8	PIPS25	PIPS25	0.051	1.000	0.051	Eq. H1-1b	78	1.600	1.450	1.450	2.900
9	PIPS25	PIPS25	0.015	1.000	0.015	Eq. Sec. D2	66	1.600	1.450	1.450	2.900
10	PIPS25	PIPS25	0.064	1.000	0.064	Eq. H1-1b	30	1.600	1.450	1.450	2.900
11	PIPS25	PIPS25	0.230	1.000	0.230	Eq. H1-1b	30	1.600	1.450	1.450	2.900
12	PIPS25	PIPS25	0.000	1.000	0.000	Eq. H1-1b	31	1.600	1.450	1.450	2.900
13	PIPS25	PIPS25	0.001	1.000	0.001	Eq. H1-1b	31	1.600	1.450	1.450	2.900
14	PIPS25	PIPS25	0.105	1.000	0.105	Eq. H1-1b	30	1.600	1.450	1.450	2.900
15	PIPS25	PIPS25	0.380	1.000	0.380	Eq. H1-1b	30	1.600	1.450	1.450	2.900
16	PIPS25	PIPS25	0.000	1.000	0.000	Eq. H1-1b	31	1.600	1.450	1.450	2.900
17	PIPS25	PIPS25	0.001	1.000	0.001	Eq. H1-1b	31	1.600	1.450	1.450	2.900
18	PIPS25	PIPS25	0.079	1.000	0.079	Eq. H1-1b	30	1.600	1.450	1.450	2.900
19	PIPS25	PIPS25	0.285	1.000	0.285	Eq. H1-1b	30	1.600	1.450	1.450	2.900
20	PIPS25	PIPS25	0.000	1.000	0.000	Eq. H1-1b	31	1.600	1.450	1.450	2.900
21	PIPS25	PIPS25	0.031	1.000	0.031	Eq. H1-1b	30	1.600	1.450	1.450	2.900
22	PIPS25	PIPS25	0.041	1.000	0.041	Eq. H1-1b	30	1.600	1.450	1.450	2.900
23	PIPS25	PIPS25	0.025	1.000	0.025	Eq. H1-1b	30	1.600	1.450	1.450	2.900

Utilization Ratio Cont...

Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (in^2)	Iz (in^4)	Iy (in^4)	Ix (in^4)
24	HSST3X3X0	HSST3X3X0	0.677	1.000	0.677	Eq. H1-1b	72	2.440	3.020	3.020	5.080
25	HSST3X3X0	HSST3X3X0	0.280	1.000	0.280	Eq. H1-1b	36	2.440	3.020	3.020	5.080

Failed Members

There is no data of this type.

Node Displacement Summary

	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)	rX (rad)	rY (rad)	rZ (rad)
Max X	13	55:1.0D+1.0Wl	**0.257**	-0.031	0.021	0.260	0.000	0.000	-0.005
Min X	22	55:1.0D+1.0Wl	**-0.102**	-0.031	-0.023	0.109	0.001	0.000	-0.004
Max Y	5	54:1.0D+1.0Wl	0.001	**0.021**	0.002	0.021	0.000	0.000	-0.004
Min Y	6	58:1.0D+1.0Wl	0.001	**-0.507**	-0.001	0.507	0.009	0.000	-0.001
Max Z	15	59:1.0D+1.0Wl	-0.025	-0.479	**0.552**	0.731	0.011	0.000	0.000
Min Z	24	59:1.0D+1.0Wl	0.011	-0.479	**-0.251**	0.541	0.010	0.000	0.000
Max rX	15	59:1.0D+1.0Wl	-0.025	-0.479	0.552	0.731	**0.011**	0.000	0.000
Min rX	2	58:1.0D+1.0Wl	0	0	0	0	**-0.002**	0.000	-0.000
Max rY	7	54:1.0D+1.0Wl	0.005	-0.030	-0.004	0.031	0.000	**0.001**	-0.004
Min rY	7	60:1.0D+1.0Wl	-0.005	-0.046	0.004	0.046104	0.004	**-0.001**	-0.003
Max rZ	15	61:1.0D+1.0Wl	-0.101	-0.376	0.416	0.569	0.008	-0.000	**0.002**
Min rZ	13	55:1.0D+1.0Wl	0.257	-0.031	0.021	0.260	0.000	0.000	**-0.005**
Max Rst	15	59:1.0D+1.0Wl	-0.025	-0.479	0.552	**0.731**	0.011	0.000	0.000

TIA-222 Rev H Maximum Allowable Deflection = 1.5% x Cantilever
1.5% x 4.5' x 12" / 1' = 0.810"
0.731" < 0.810" OK!

Reaction Summary

			Horizontal	Vertical	Horizontal	Moment		
	Node	L/C	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
Max FX	29	39:1.2D+1.0WI	**1.135**	0.462	0.583	0	0	0
Min FX	29	6:WL#5	**-1.135**	-0.199	-0.583	0	0	0
Max FY	28	70:1.2D+1.5LM	-0.011	**1.793**	0.008	0	0	0
Min FY	2	71:1.2D+1.5LM	-0.000	**-0.526**	-0.0044	0	0	0
Max FZ	28	3:WL#2	-0.133	0.070	**1.026**	0	0	0
Min FZ	28	36:1.2D+1.0WI	0.133	0.458	**-1.026**	0	0	0
Max MX	1	1:DEAD	-0.000	-0.005	0	**0**	0	0
Min MX	1	1:DEAD	-0.000	-0.005	0	**0**	0	0
Max MY	1	1:DEAD	-0.000	-0.005	0	0	**0**	0
Min MY	1	1:DEAD	-0.000	-0.005	0	0	**0**	0
Max MZ	1	1:DEAD	-0.000	-0.005	0	0	0	**0**
Min MZ	1	1:DEAD	-0.000	-0.005	0	0	0	**0**

Job Number	50123202
Made by:	JSD
Date:	4/27/2020
Checked by:	BGK
Date:	4/28/2020

(Cheshire CT - Beta) - Tower Connection Design

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Design Mount Anchorage to Exist. Wall

- Loading is taken from STAAD model
- 2 A325 bolts with 6 in. x 6 in. x 0.5 in. plate

Max. Loading

Shear Loads on Anchors

Direct Shear

F_x = 1.135 k

F_z = 1.026 k

F_r = 1530 lb $(F_x^2+F_y^2)^{0.5}$

Shear due to Torsion

M_y = 0.0 k-in = 0 lb-in

Moment arm (d_y) = 4.2 in $\sqrt{(S_v^2+S_h^2)}$

Tension Loads on Anchors

Direct Tension

F_y = 1.793 k = 1793 lb

Tension due to Prying

M_x = 0.0 k-in = 0 lb-in

Moment arm (d_x) = 3.0 in S_v

M_z = 0.0 k-in = 0 lb-in

Moment arm (d_z) = 3.0 in S_h

Connection Information

Anchor Diameter =	1/2	
n =	2 bolts	*(# of bolts)*
n' =	1 bolts	*(# of bolts resisting moments)*
S_v =	3.00 in	*(Vertical Bolt Spacing)*
S_h =	3.00 in	*(Horizontal Bolt Spacing)*

Max. Loading per Anchor

Max. Shear per Anchor

- Divide shear equally among anchors

$V_{max.} = F_r / n + M_y / d_y n$

= 1530lb / 2 anchors + (0lb-in / in) / 2 anchors

= 765 lb/anchor

Max. Tension per Bolt

- Assume tension (F_z) divided by all anchors and tension due to prying resisted by n' anchors

$T_{max} = F_y / n + M_z / d_z n' + M_x / d_x n'$

= 1.793lb / 2 anchors + (0lb-in / 3in) / 1 anchors + (0lb-in / 3in) / 1 anchors

= 897 lb/anchor

Connection Capacity

Determine allowable loads for a 1/2 in. diameter threaded rod through-bolts with 6 in. x 6 in. plate

Yield Strength of Steel Plate, F_y =	36 ksi	*(A36)*
Φ =	0.9	*(plate)*
Φ =	0.75	*(bolt)*
Through Bolt Diameter =	0.50 in	
Through Bolt Cross Sectional Area, A_B =	0.20 in²	
F_{nv} =	68 ksi	*(Table J3.2 in AISC 15th ed.)*
F_{nt} =	90 ksi	*(Table J3.2 in AISC 15th ed.)*
n =	2 bolts	*(number of bolts)*
n' =	1 bolts	*(number of bolts resisting eccentric loading)*
Steel Plate Thickness =	0.50 in	
Steel Plate Width =	6.00 in	
Steel Plate Height =	6.00 in	

Determine Anchor Capacity

$T_{allow\ bolt}$ = 13254 lb *(Φ x F_{nt} x A_b)*

$V_{allow\ bolt}$ = 10014 lb *(Φ x F_{nv} x A_b)*

Check anchors for Tension/Shear

Allowable Tension =	13254 lb	Max. Tension =	897 lb
Allowable Shear =	10014 lb	Max. Shear =	765 lb

$$\frac{T_{max.}}{T_{allow.}} + \frac{V_{max.}}{V_{allow.}} \leq 1.00$$

$$\frac{897\ lb}{13254\ lb} + \frac{765\ lb}{10014\ lb} = \mathbf{14.4\%}\ \mathbf{OK}$$

Determine Plate Capacity

Plate Capacity, Φp_n = 32.4 ksi *(Φ x F_y)*

Max. Applied Stress, p_a = 1.1 ksi *(EP_a / (w * t))*

p_a / Φp_n = **3.4%** **OK**

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Job Number	50123202
Made by:	JSD
Date:	04/22/20
Checked by:	BGK
Date:	04/23/20

(Cheshire CT - Gamma) - Design Wind Load

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Wind Load Design Criteria

Site Name: Cheshire CT - Gamma

General Information & Design Input from TIA-222-H

Item	Value	Description	Reference
V_{ult} =	125.00	Ultimate Design Wind Speed (mph)	*2018 CT State Building Code (SBC)*
V_i =	50.00	Design Ice Wind Speed (mph)	*ASCE 7-10, Hazard Tool*
K_d =	0.95	Wind Direction Probability Factor	*Sect. 16.6, TIA*
Class	II	Risk Category	*Table 2-1, TIA*
I =	1.00	Importance Factor (Ice Thickness)	*Table 2-3, TIA*
z = h =	255.00	ft. (A.G.L.)	*Max. Center of Appurtenance*
Exp. Cat.	B	Exposure Category	*Sect. 2.6.5.1.2, TIA*
z_g =	1200.00	Exposure Category Coeff.	*Table 2-4, TIA*
α' =	7.00	Exposure Category Coeff.	*Table 2-4, TIA*
$K_{z\,(min)}$ =	0.70	Exposure Category Coeff.	*Table 2-4, TIA*
K_c =	0.90	Terrain Constant	*Table 2-4, TIA*
K_t =	N/A	Topographic Constant	*Table 2-5, TIA ("N/A" if Topo. Cat. = 1)*
K_z =	1.29	$= 2.01(z/z_g)^{(2/\alpha')}$	*Sect. 2.6.5.2, TIA*
Topo. Cat.	1	Topographic Category (1-4)	*Sect. 2.6.6.2.1, TIA*
e =	2.72	Natural Logarithmic base	
f =	N/A	Height Attenuation Factor	*Table 2-5, TIA ("N/A" if Topo. Cat. = 1)*
H =	N/A	ft. Height of crest above surrounding terrain	
K_h =	N/A	$e^{((f*z)/H)}$	*Sect. 2.6.6.2.1, TIA*
K_{zt} =	1.00	$= [1+((K_c*K_t)/K_h)]^2$	*Sect. 2.6.6.2.1, TIA*
K_s =	N/A	Rooftop Wind Speed-Up Factor	*Sect. 2.6.7, TIA*
K_e =	1.00	Ground Elevation Factor	*Sect. 2.6.8, TIA*
K_{iz} =	1.23	$= (z/33)^{0.10} \leq 1.4$ (Height escalation factor)	*Sect. 2.6.10, TIA*
G_h =	1.00	Gust Effect Factor	*Sect. 16.6, TIA*
K_a =	0.90	Shielding Factor	*Sect. 16.6.1.2, TIA*
t_i =	0.75	Design Ice Thickness	*ASCE 7-10, Hazard Tool*
t_{iz} =	0.92	$= t_i(I)K_{iz}(K_{zt})^{0.35}$	*Sect. 2.6.10, TIA*
$q_{z\,design}$ =	49.1 psf	$= 0.00256(K_z)(K_{zt})(K_s)(K_e)(K_d)(V^2)$	*Sect. 2.6.11.6, TIA*
$q_{z\,ice}$ =	7.9 psf	$= 0.00256(K_z)(K_{zt})(K_s)(K_e)(K_d)(V_i^2)$	*Sect. 2.6.11.6, TIA*

Design Wind Forces:

Section 2.6.11.2

$F_A = q_{z\,design}G_h(EPA)_A$ *(where $(EPA)_A$ = effective projected area of the appurtenance = $C_a A_a$)*

$F_{Ai} = q_{z\,ice}G_h(EPA)_{Ai}$

(see calculation tables on following pages)

Design Ice Weight:

Section 2.6.10

$F_i = [\pi(t_{iz})(D_c + t_{iz})]*56$ lb/ft³ *(where D_c = largest out to out dimension of member)*

(see calculation tables on following pages)

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Job Number	50123202
Made by:	JSD
Date:	04/22/20
Checked by:	BGK
Date:	04/23/20

(Cheshire CT - Gamma) - Design Wind Load

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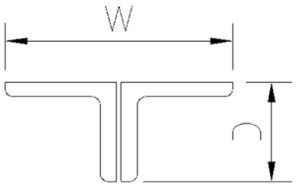
Element Definition

	Description	Dimensions (in.)			Weight	Length /	
		W	D	H	(lb)	# Supports	
	SBNH-1D6565C	11.90	7.10	96.40	66.80	2.00	
	800-10965	20.00	6.90	78.70	108.60	2.00	
	HPA-65R-BUU-H6	14.80	9.00	72.00	57.90	2.00	
	STRUCTURAL MEMBERS						
(Mounting Pipe)	2-7/8" OD Pipe	2.88	2.88	12.00	STAAD	*Pipe*	*(See Note 2)*
	4" OD Pipe	4.00	4.00	12.00	STAAD	*Pipe*	
	4x4x1/4 HSS Tube	4.00	4.00	12.00	STAAD	*Tube*	
	L4x4x1/4	4.00	4.00	12.00	STAAD	*Angle*	

Note:

1) *For Double Angles assume the following:*



2) *For mounting pipes that **do not** support equipment or portions which are not shielded by equipment, create an additional entry below.*

Dewberry

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Date:	04/23/20

(Cheshire CT - Gamma) - Design Wind Load

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Design Wind Load

Members	Dimensions (ft.)			Area $(A_a)_n$	Area $(A_a)_t$	Aspect Ratio	Aspect Ratio	C_{an}	C_{at}
	Width (Normal)	Depth (Tangent)	Height (or span)	(normal) (sf)	(tangent) (sf)	(normal)	(tangent)	(normal) Table 2-8	(tangent) Table 2-8
SBNH-1D6565C	0.99	0.59	8.03	7.95	4.74	8.11	13.61	1.44	1.62
800-10965	1.67	0.58	6.56	10.96	3.80	3.93	11.31	1.26	1.54
HPA-65R-BUU-H6	1.23	0.75	6.00	7.38	4.50	4.88	8.00	1.31	1.43
STRUCTURAL MEMBERS									
2-7/8" OD Pipe	0.24	0.24	1.00	0.24	0.24	4.17	4.17	0.74	0.74
4" OD Pipe	0.33	0.33	1.00	0.33	0.33	3.03	3.03	0.71	0.71
4x4x1/4 HSS Tube	0.33	0.33	1.00	0.33	0.33	3.03	3.03	1.22	1.22
L4x4x1/4	0.33	0.33	1.00	0.33	0.33	3.03	3.03	1.22	1.22

Design Effective Projected Area & Wind Loads

Members	EPA_a @ 0.0° (sf)	EPA_a @ 30.0° (sf)	EPA_a @ 60.0° (sf)	EPA_a @ 90.0° (sf)	F_a @ 0.0° (lb)	F_a @ 30.0° (lb)	F_a @ 60.0° (lb)	F_a @ 90.0° (lb)	Gravity Load @ Support (lb)
SBNH-1D6565C	10.30	9.46	7.76	6.91	252.9	232.1	190.5	169.7	33.4
800-10965	12.43	10.64	7.06	5.27	305.1	261.2	173.3	129.3	54.3
HPA-65R-BUU-H6	8.70	7.97	6.52	5.79	213.6	195.8	160.0	142.2	29.0
STRUCTURAL MEMBERS									
2-7/8" OD Pipe	0.16	-	-	-	7.8	-	-	-	-
4" OD Pipe	0.21	-	-	-	10.4	-	-	-	-
4x4x1/4 HSS Tube	0.36	-	-	-	17.8	-	-	-	-
L4x4x1/4	0.36	-	-	-	17.8	-	-	-	-

Dewberry

Job Number	50123202
Made by:	JSD
Date:	04/22/20
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Date:	04/23/20

(Cheshire CT - Gamma) - Design Wind Load

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Design Ice Wind Load

- Design ice thickness included in tabulated dimensions below.

Members	Dimensions (ft.)			Area $(A_a)_{ni}$	Area $(A_a)_{ti}$	Aspect Ratio	Aspect Ratio	C_{ani}	C_{ati}
	Width (Normal)	Depth (Tangent)	Height (or span)	(normal) (sf)	(tangent) (sf)	(normal)	(tangent)	(normal) Table 2-8	(tangent) Table 2-8
SBNH-1D6565C	1.15	0.75	8.19	9.42	6.14	7.12	10.92	1.40	1.53
800-10965	1.82	0.73	6.71	12.21	4.90	3.69	9.19	1.25	1.47
HPA-65R-BUU-H6	1.39	0.90	6.15	8.55	5.54	4.42	6.83	1.29	1.39
STRUCTURAL MEMBERS									
2-7/8" OD Pipe	0.39	0.39	1.00	0.39	0.39	2.56	2.56	0.70	0.70
4" OD Pipe	0.49	0.49	1.00	0.49	0.49	2.04	2.04	0.70	0.70
4x4x1/4 HSS Tube	0.49	0.49	1.00	0.49	0.49	2.04	2.04	1.20	1.20
L4x4x1/4	0.49	0.49	1.00	0.49	0.49	2.04	2.04	1.20	1.20

Design Effective Projected Area & Wind Loads with Ice

Members	EPA_{ai} @ 0.0° (sf)	EPA_{ai} @ 30.0° (sf)	EPA_{ai} @ 60.0° (sf)	EPA_{ai} @ 90.0° (sf)	F_{ai} @ 0.0° (lb)	F_{ai} @ 30.0° (lb)	F_{ai} @ 60.0° (lb)	F_{ai} @ 90.0° (lb)	Ice Load F_i @ Support (lb)
SBNH-1D6565C	11.87	11.02	9.31	8.45	46.9	43.5	36.8	33.4	66.7
800-10965	13.74	11.92	8.30	6.48	54.3	47.1	32.8	25.6	81.4
HPA-65R-BUU-H6	9.93	9.18	7.68	6.93	39.2	36.3	30.3	27.4	61.5
STRUCTURAL MEMBERS									
2-7/8" OD Pipe	0.25	-	-	-	1.9	-	-	-	4.3
4" OD Pipe	0.31	-	-	-	2.4	-	-	-	5.5
4x4x1/4 HSS Tube	0.53	-	-	-	4.2	-	-	-	7.4
L4x4x1/4	0.53	-	-	-	4.2	-	-	-	7.4

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Job Number	50123202
Made by:	JSD
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Checked by:	BGK
Date:	04/23/20

(Cheshire CT - Gamma) - Serviceability Wind Load

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Serviceability Wind Load Design Criteria

General Information & Design Input from TIA-222-H

Item	Value	Description	Reference
V_s =	60.00	Service Wind Speed (mph)	*Sect. 2.8.3, TIA*
V_m =	30.00	Maintenance Wind Speed (mph)	*Sect. 16.3, TIA*
K_d =	0.95	Wind Direction Probability Factor	*Sect. 16.6, TIA*
Class	II	Risk Category	*Table 2-1, TIA*
z = h =	255.00	ft. (A.G.L.)	*Max. Center of Appurtenance*
Exp. Cat.	B	Exposure Category	*Sect. 2.6.5.1.2, TIA*
z_g =	1200.00	Exposure Category Coeff.	*Table 2-4, TIA*
α' =	7.00	Exposure Category Coeff.	*Table 2-4, TIA*
$K_{z\,(min)}$ =	0.70	Exposure Category Coeff.	*Table 2-4, TIA*
K_e =	0.90	Terrain Constant	*Table 2-4, TIA*
K_t =	N/A	Topographic Constant	*Table 2-5, TIA ("N/A" if Topo. Cat. = 1)*
K_z =	1.29	$= 2.01(z/z_g)^{(2/\alpha')}$	*Sect. 2.6.5.2, TIA*
Topo. Cat.	1	Topographic Category (1-4)	*Sect. 2.6.6.2.1, TIA*
e =	2.72	Natural Logarithmic base	
f =	N/A	Height Attenuation Factor	*Table 2-5, TIA ("N/A" if Topo. Cat. = 1)*
H =	N/A	ft. Height of crest above surrounding terrain	
K_h =	N/A	$e^{((f*z)/H)}$	*Sect. 2.6.6.2.1, TIA*
K_{zt} =	1.00	$= [1+((K_c*K_t)/K_h)]^2$	*Sect. 2.6.6.2.1, TIA*
K_s =	N/A	Rooftop Wind Speed-Up Factor	*Sect. 2.6.7, TIA*
K_e =	1.00	Ground Elevation Factor	*Sect. 2.6.8, TIA*
G_h =	1.00	Gust Effect Factor	*Sect. 16.6, TIA*
K_a =	0.90	Shielding Factor	*Sect. 16.6.1.2, TIA*
$q_{z\,service}$ =	10.2 psf	$= 0.00256(K_z)(K_{zt})(K_s)(K_e)(K_d)(V_s^2)$	*Sect. 2.6.11.6, TIA*
$q_{z\,maint}$ =	2.9 psf	$= 0.00256(K_z)(K_{zt})(K_s)(K_e)(K_d)(V_m^2)$	*Sect. 2.6.11.6, TIA*

Design Serviceability and Maintenance Wind Forces:

Section 2.6.11.2

$F_{As} = q_{z\,service} G_h (EPA)_A$

$F_{Am} = q_{z\,maint} G_h (EPA)_A$

(where $(EPA)_A$ = effective projected area of the appurtenance = $C_a A_a$)

(see calculation tables on following pages)

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Date:	04/22/20
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(Cheshire CT - Gamma) - Serviceability Wind Load

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Element Definition:

	Description	Dimensions (in.)			Weight	Length /
		W	D	H	(lb)	# Supports
	SBNH-1D6565C	11.90	7.10	96.40	66.80	2.00
	800-10965	20.00	6.90	78.70	108.60	2.00
	HPA-65R-BUU-H6	14.80	9.00	72.00	57.90	2.00
	STRUCTURAL MEMBERS					
(Mounting Pipe)	2-7/8" OD Pipe	2.88	2.88	12.00	STAAD	Pipe
	4" OD Pipe	4.00	4.00	12.00	STAAD	Pipe
	4x4x1/4 HSS Tube	4.00	4.00	12.00	STAAD	Tube
	L4x4x1/4	4.00	4.00	12.00	STAAD	Angle

Service & Maintenance Wind Load

Members	Dimensions (ft.)			Area $(A_a)_n$	Area $(A_a)_t$	Aspect	Aspect	C_{an}	C_{at}
	Width	Depth	Height	*(normal)*	*(tangent)*	Ratio	Ratio	*(normal)*	*(tangent)*
	(Normal)	*(Tangent)*	*(or span)*	*(sf)*	*(sf)*	*(normal)*	*(tangent)*	*Table 2-8*	*Table 2-8*
SBNH-1D6565C	0.99	0.59	8.03	7.95	4.74	8.11	13.61	1.44	1.62
800-10965	1.67	0.58	6.56	10.96	3.80	3.93	11.31	1.26	1.54
HPA-65R-BUU-H6	1.23	0.75	6.00	7.38	4.50	4.88	8.00	1.31	1.43
STRUCTURAL MEMBERS									
2-7/8" OD Pipe	0.24	0.24	1.00	0.24	0.24	4.17	4.17	0.74	0.74
4" OD Pipe	0.33	0.33	1.00	0.33	0.33	3.03	3.03	0.71	0.71
4x4x1/4 HSS Tube	0.33	0.33	1.00	0.33	0.33	3.03	3.03	1.22	1.22
L4x4x1/4	0.33	0.33	1.00	0.33	0.33	3.03	3.03	1.22	1.22

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(Cheshire CT - Gamma) - Serviceability Wind Load

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Service Effective Projected Area & Wind Loads

Members	EPA_{as} @ 0.0° (sf)	EPA_{as} @ 30.0° (sf)	EPA_{as} @ 60.0° (sf)	EPA_{as} @ 90.0° (sf)	F_{as} @ 0.0° (lb)	F_{as} @ 30.0° (lb)	F_{as} @ 60.0° (lb)	F_{as} @ 90.0° (lb)
SBNH-1D6565C	10.30	9.46	7.76	6.91	52.5	48.2	39.6	35.2
800-10965	12.43	10.64	7.06	5.27	63.4	54.3	36.0	26.9
HPA-65R-BUU-H6	8.70	7.97	6.52	5.79	44.4	40.7	33.2	29.5
STRUCTURAL MEMBERS								
2-7/8" OD Pipe	0.16	-	-	-	1.6	-	-	-
4" OD Pipe	0.21	-	-	-	2.2	-	-	-
4x4x1/4 HSS Tube	0.36	-	-	-	3.7	-	-	-
L4x4x1/4	0.36	-	-	-	3.7	-	-	-

Maintenance Effective Projected Area & Wind Loads

Members	EPA_{am} @ 0.0° (sf)	EPA_{am} @ 30.0° (sf)	EPA_{am} @ 60.0° (sf)	EPA_{am} @ 90.0° (sf)	F_{am} @ 0.0° (lb)	F_{am} @ 30.0° (lb)	F_{am} @ 60.0° (lb)	F_{am} @ 90.0° (lb)
SBNH-1D6565C	10.30	9.46	7.76	6.91	14.9	13.7	11.3	10.0
800-10965	12.43	10.64	7.06	5.27	18.0	15.4	10.2	7.6
HPA-65R-BUU-H6	8.70	7.97	6.52	5.79	12.6	11.6	9.5	8.4
STRUCTURAL MEMBERS								
2-7/8" OD Pipe	0.16	-	-	-	0.5	-	-	-
4" OD Pipe	0.21	-	-	-	0.6	-	-	-
4x4x1/4 HSS Tube	0.36	-	-	-	1.1	-	-	-
L4x4x1/4	0.36	-	-	-	1.1	-	-	-

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Date:	04/22/20
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(Cheshire CT - Gamma) - Load Input for STAAD Model

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STAAD Gravity Load Input

Equipment	Dead Load *(lb per support)*	Ice Load *(lb per support)*
SBNH-1D6565C	33.4	66.7
800-10965	54.3	81.4
HPA-65R-BUU-H6	29.0	61.5

Maintenance Loads - Sect. 16.3, TIA

L_M = 500 lbs - vertical concentrated downward force applied in each mounting pipe location independently

L_V = 250 lbs - vertical concentrated downward force applied at the center of each simply supported horizontal member and at the end of each horizontal cantilevered members independently (excluding tie-backs)

STAAD Wind Load Calculation

Equipment	Axis	Case #1 0°	Case #2 30°	Case #3 60°	Case #4 90°	Case #5 120°	Case #6 150°	Case #7 180°	Case #8 210°	Case #9 240°	Case #10 270°	Case #11 300°	Case #12 330°
Not Shielded	z	$-F_0$	$-0.87F_{30}$	$-0.50F_{60}$	-	$0.50F_{60}$	$0.87F_{30}$	Inverse of Case #1	Inverse of Case #2	Inverse of Case #3	Inverse of Case #4	Inverse of Case #5	Inverse of Case #6
	x	-	$0.50F_{30}$	$0.87F_{60}$	F_{90}	$0.87F_{60}$	$0.50F_{30}$						

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Job Number	50123202
Made by:	JSD
Date:	04/22/20
Checked by:	BGK
Date:	04/23/20

(Cheshire CT - Gamma) - Load Input for STAAD Model

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STAAD Load Input (Design Wind Load)

Equipment	Axis	Case #1 0°	Case #2 30°	Case #3 60°	Case #4 90°	Case #5 120°	Case #6 150°	Case #7 180°	Case #8 210°	Case #9 240°	Case #10 270°	Case #11 300°	Case #12 330°
SBNH-1D6565C	z	-252.9	-201.9	-95.3	-	95.3	201.9	Inverse of Case #1	Inverse of Case #2	Inverse of Case #3	Inverse of Case #4	Inverse of Case #5	Inverse of Case #6
	x	-	116.1	165.7	169.7	165.7	116.1						
800-10965	z	-305.1	-227.2	-86.7	-	86.7	227.2						
	x	-	130.6	150.8	129.3	150.8	130.6						
HPA-65R-BUU-H6	z	-213.6	-170.3	-80.0	-	80.0	170.3						
	x	-	97.9	139.2	142.2	139.2	97.9						

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Made by:	JSD
Date:	04/22/20
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(Cheshire CT - Gamma) - Load Input for STAAD Model

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STAAD Load Input (Design Wind on Ice Load)

Equipment	Axis	Case #1 0°	Case #2 30°	Case #3 60°	Case #4 90°	Case #5 120°	Case #6 150°	Case #7 180°	Case #8 210°	Case #9 240°	Case #10 270°	Case #11 300°	Case #12 330°
SBNH-1D6565C	z	-46.9	-37.8	-18.4	-	18.4	37.8	Inverse of Case #1	Inverse of Case #2	Inverse of Case #3	Inverse of Case #4	Inverse of Case #5	Inverse of Case #6
	x	-	21.8	32.0	33.4	32.0	21.8						
800-10965	z	-54.3	-41.0	-16.4	-	16.4	41.0						
	x	-	23.6	28.5	25.6	28.5	23.6						
HPA-65R-BUU-H6	z	-39.2	-31.6	-15.2	-	15.2	31.6						
	x	-	18.2	26.4	27.4	26.4	18.2						

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Made by:	JSD
Date:	04/22/20
Checked by:	BGK
Date:	04/23/20

(Cheshire CT - Gamma) - Load Input for STAAD Model

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STAAD Load Input (Service Wind Load)

Equipment	Axis	Case #1 0°	Case #2 30°	Case #3 60°	Case #4 90°	Case #5 120°	Case #6 150°	Case #7 180°	Case #8 210°	Case #9 240°	Case #10 270°	Case #11 300°	Case #12 330°
SBNH-1D6565C	z	-52.5	-41.9	-19.8	-	19.8	41.9	Inverse of Case #1	Inverse of Case #2	Inverse of Case #3	Inverse of Case #4	Inverse of Case #5	Inverse of Case #6
	x	-	24.1	34.5	35.2	34.5	24.1						
800-10965	z	-63.4	-47.2	-18.0	-	18.0	47.2						
	x	-	27.2	31.3	26.9	31.3	27.2						
HPA-65R-BUU-H6	z	-44.4	-35.4	-16.6	-	16.6	35.4						
	x	-	20.4	28.9	29.5	28.9	20.4						

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(Cheshire CT - Gamma) - Load Input for STAAD Model

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STAAD Load Input (Maintenance Wind Load)

Equipment	Axis	Case #1 0°	Case #2 30°	Case #3 60°	Case #4 90°	Case #5 120°	Case #6 150°	Case #7 180°	Case #8 210°	Case #9 240°	Case #10 270°	Case #11 300°	Case #12 330°
SBNH-1D6565C	z	-14.9	-11.9	-5.7	-	5.7	11.9	Inverse of Case #1	Inverse of Case #2	Inverse of Case #3	Inverse of Case #4	Inverse of Case #5	Inverse of Case #6
	x	-	6.9	9.8	10.0	9.8	6.9						
800-10965	z	-18.0	-13.4	-5.1	-	5.1	13.4						
	x	-	7.7	8.9	7.6	8.9	7.7						
HPA-65R-BUU-H6	z	-12.6	-10.1	-4.8	-	4.8	10.1						
	x	-	5.8	8.3	8.4	8.3	5.8						

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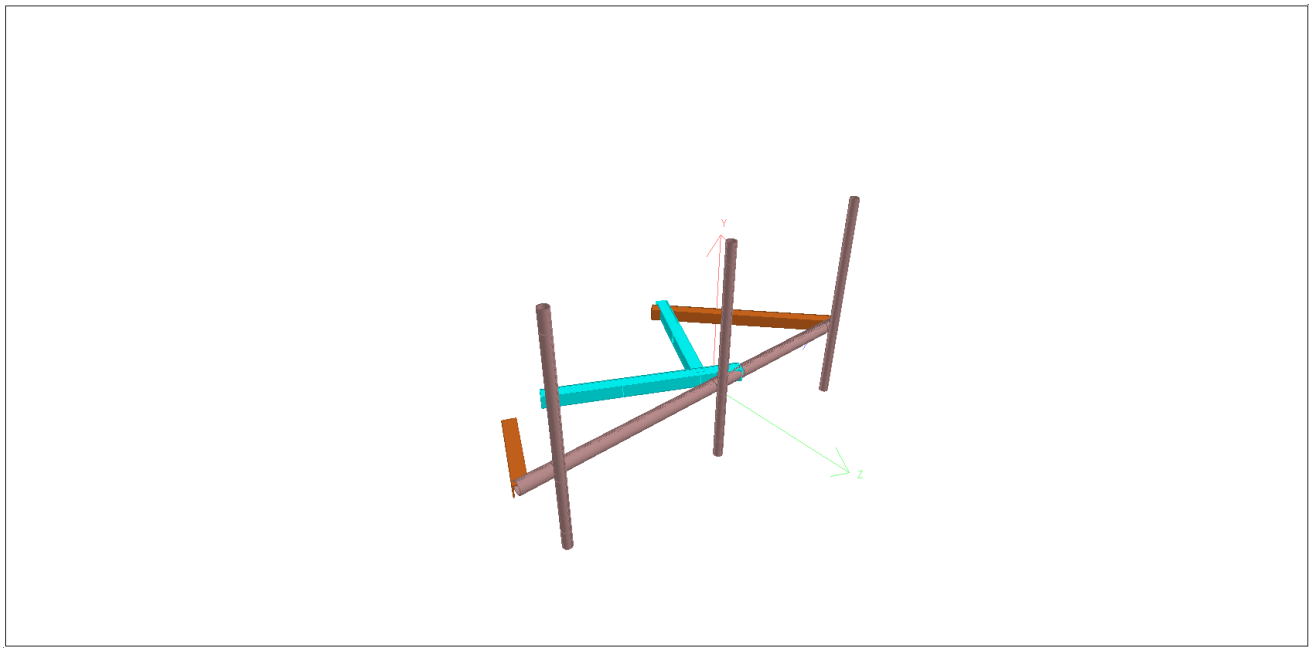
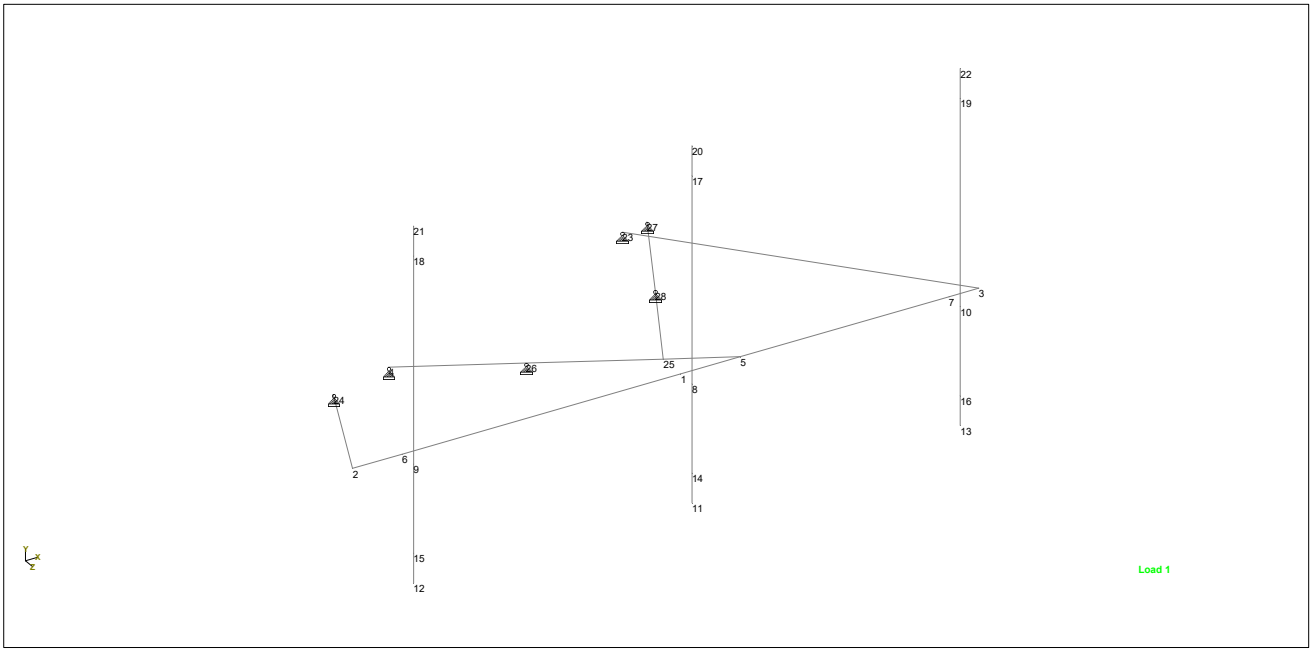
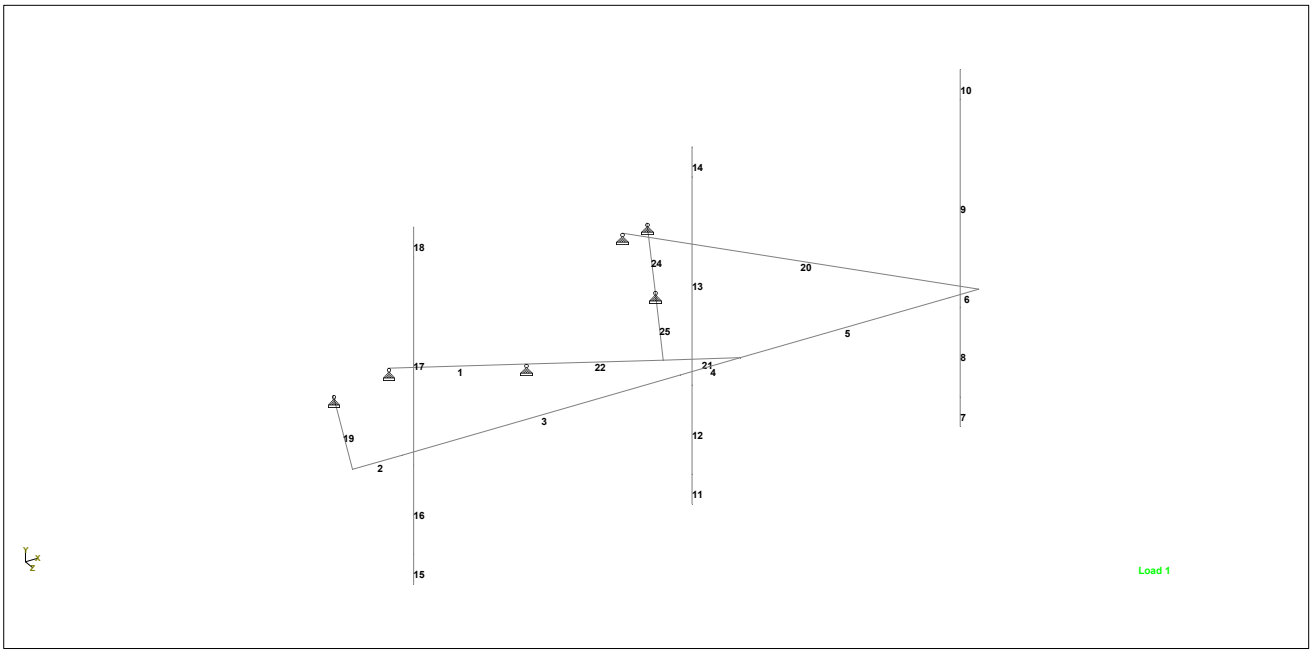
	Part Proposed Gamma Sector Standoff Mount		
Job Title Cheshire CT	Ref		
	By JSD	Date 4/23/2020	Chd BGK
Client AT&T	File Cheshire CT Gamma.STI	Date/Time 28-Apr-2020 12:40	



3D Rendered View



Node Labels



Beam Labels

Nodes

Node	X (ft)	Y (ft)	Z (ft)
1	0	0	0
2	-5.500	0	0
3	5.000	0	0
4	-3.578	0	-2.289
5	1.000	0	0
6	-4.670	0	0
7	4.500	0	0
8	0	0	0.330
9	-4.670	0	0.330
10	4.500	0	0.330
11	0	-2.000	0.330
12	-4.670	-2.000	0.330
13	4.500	-2.000	0.330
14	0	-1.500	0.330
15	-4.670	-1.500	0.330
16	4.500	-1.500	0.330
17	0	3.500	0.330
18	-4.670	3.500	0.330
19	4.500	3.500	0.330
20	0	4.000	0.330
21	-4.670	4.000	0.330
22	4.500	4.000	0.330
23	1.330	0	-4.000

Nodes Cont...

Node	X (ft)	Y (ft)	Z (ft)
24	-4.670	0	-2.000
25	-0.000	0	-0.500
26	-1.789	0	-1.394
27	1.789	0	-4.078
28	0.894	0	-2.289

Beams

Beam	Node A	Node B	Length (ft)	Property	β (degrees)
1	4	26	2.000	3	0
2	2	6	0.830	2	0
3	6	1	4.670	2	0
4	1	5	1.000	2	0
5	5	7	3.500	2	0
6	7	3	0.500	2	0
7	13	16	0.500	1	0
8	16	10	1.500	1	0
9	10	19	3.500	1	0
10	19	22	0.500	1	0
11	11	14	0.500	1	0
12	14	8	1.500	1	0
13	8	17	3.500	1	0
14	17	20	0.500	1	0
15	12	15	0.500	1	0
16	15	9	1.500	1	0
17	9	18	3.500	1	0
18	18	21	0.500	1	0
19	24	2	2.165	4	45
20	23	3	5.429	4	45
21	25	5	1.118	3	0
22	26	25	2.000	3	0
24	27	28	2.000	3	0
25	28	25	2.000	3	0

Section Properties

Prop	Section	Area (in^2)	I_{yy} (in^4)	I_{zz} (in^4)	J (in^4)	Material
1	PIPS25	1.600	1.450	1.450	2.891	STEEL
2	PIPS35	2.500	4.520	4.520	9.043	STEEL
3	HSST4X4X0.25	3.370	7.800	7.800	12.455	STEEL
4	L40405	2.400	5.941	1.498	0.080	STEEL

Materials

Mat	Name	E (kip/in^2)	ν	Density (kip/in^3)	α (/°F)
1	CONCRETE	3.15E+3	0.170	8.68e-05	5.5E -6
2	ALUMINUM	10E+3	0.330	9.8e-05	12.8E -6
3	STEEL_50_KSI	29E+3	0.300	0.000283	6.5E -6
4	STAINLESSSTEEL	28E+3	0.300	0.000283	9.9E -6
5	STEEL_36_KSI	29E+3	0.300	0.000283	6.5E -6
6	STEEL_275_NMM2	29.7E+3	0.300	0.000	6.67E -6
7	STEEL	29E+3	0.300	0.000283	6.5E -6
8	STEEL_355_NMM2	29.7E+3	0.300	0.000	6.67E -6

Supports

Node	X (kip/in)	Y (kip/in)	Z (kip/in)	rX (kip-ft/deg)	rY (kip-ft/deg)	rZ (kip-ft/deg)
4	Fixed	Fixed	Fixed	-	-	-
23	Fixed	Fixed	Fixed	-	-	-
24	Fixed	Fixed	Fixed	-	-	-
26	Fixed	Fixed	Fixed	-	-	-
27	Fixed	Fixed	Fixed	-	-	-
28	Fixed	Fixed	Fixed	-	-	-

Combination Load Cases

Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
29	1.2D+1.0WL#1	1	DEAD	1.20
		2	WL#1	1.00
30	1.2D+1.0WL#2	1	DEAD	1.20
		3	WL#2	1.00
31	1.2D+1.0WL#3	1	DEAD	1.20
		4	WL#3	1.00
32	1.2D+1.0WL#4	1	DEAD	1.20
		5	WL#4	1.00
33	1.2D+1.0WL#5	1	DEAD	1.20
		6	WL#5	1.00
34	1.2D+1.0WL#6	1	DEAD	1.20
		7	WL#6	1.00
35	1.2D+1.0WL#7	1	DEAD	1.20
		2	WL#1	-1.00
36	1.2D+1.0WL#8	1	DEAD	1.20
		3	WL#2	-1.00
37	1.2D+1.0WL#9	1	DEAD	1.20
		4	WL#3	-1.00
38	1.2D+1.0WL#10	1	DEAD	1.20
		5	WL#4	-1.00

Combination Load Cases Cont...

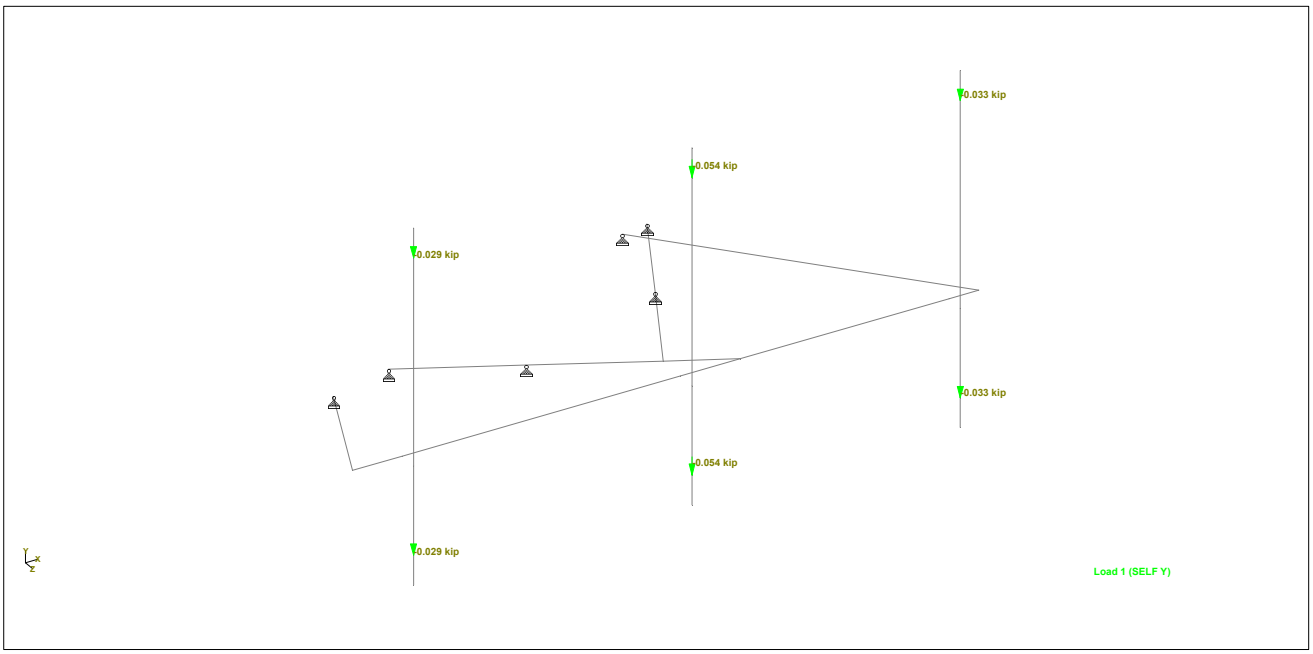
Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
39	1.2D+1.0WL#11	1	DEAD	1.20
		6	WL#5	-1.00
40	1.2D+1.0WL#12	1	DEAD	1.20
		7	WL#6	-1.00
41	1.2D+1.0DI+1.0WI#1	1	DEAD	1.20
		9	WLI#1	1.00
		8	DI	1.00
42	1.2D+1.0DI+1.0WI#2	1	DEAD	1.20
		10	WLI#2	1.00
		8	DI	1.00
43	1.2D+1.0DI+1.0WI#3	1	DEAD	1.20
		11	WLI#3	1.00
		8	DI	1.00
44	1.2D+1.0DI+1.0WI#4	1	DEAD	1.20
		12	WLI#4	1.00
		8	DI	1.00
45	1.2D+1.0DI+1.0WI#5	1	DEAD	1.20
		13	WLI#5	1.00
		8	DI	1.00
46	1.2D+1.0DI+1.0WI#6	1	DEAD	1.20
		14	WLI#6	1.00
		8	DI	1.00
47	1.2D+1.0DI+1.0WI#7	1	DEAD	1.20
		9	WLI#1	-1.00
		8	DI	1.00
48	1.2D+1.0DI+1.0WI#8	1	DEAD	1.20
		10	WLI#2	-1.00
		8	DI	1.00
49	1.2D+1.0DI+1.0WI#9	1	DEAD	1.20
		11	WLI#3	-1.00
		8	DI	1.00
50	1.2D+1.0DI+1.0WI#10	1	DEAD	1.20
		12	WLI#4	-1.00
		8	DI	1.00
51	1.2D+1.0DI+1.0WI#11	1	DEAD	1.20
		13	WLI#5	-1.00
		8	DI	1.00
52	1.2D+1.0DI+1.0WI#12	1	DEAD	1.20
		14	WLI#6	-1.00
		8	DI	1.00
53	1.0D+1.0WLS#1	1	DEAD	1.00
		15	WLS#1	1.00
54	1.0D+1.0WLS#2	1	DEAD	1.00
		16	WLS#2	1.00
55	1.0D+1.0WLS#3	1	DEAD	1.00

Combination Load Cases Cont...

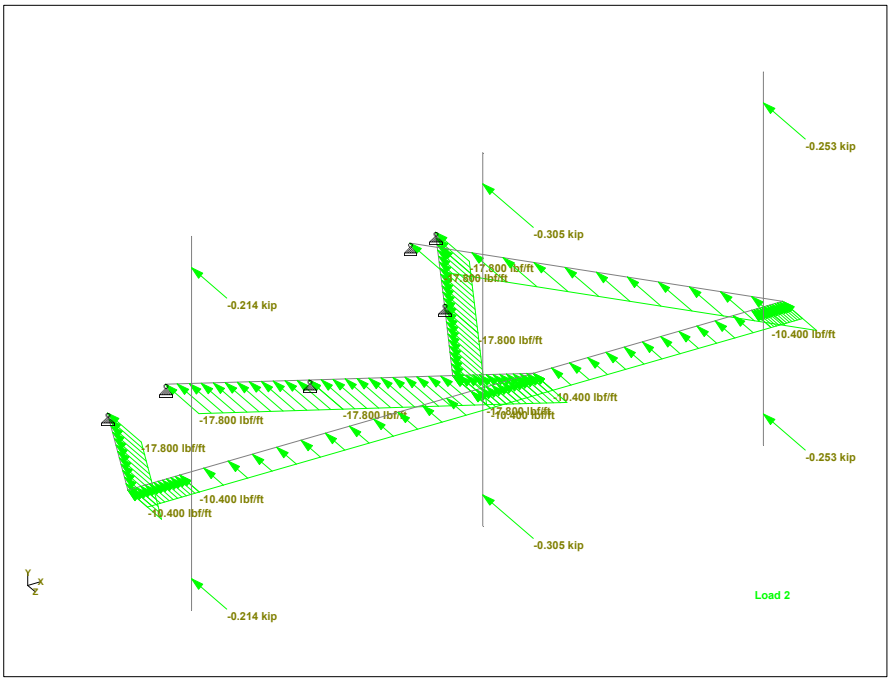
Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
		17	WLS#3	1.00
56	1.0D+1.0WLS#4	1	DEAD	1.00
		18	WLS#4	1.00
57	1.0D+1.0WLS#5	1	DEAD	1.00
		19	WLS#5	1.00
58	1.0D+1.0WLS#6	1	DEAD	1.00
		20	WLS#6	1.00
59	1.0D+1.0WLS#7	1	DEAD	1.00
		15	WLS#1	-1.00
60	1.0D+1.0WLS#8	1	DEAD	1.00
		16	WLS#2	-1.00
61	1.0D+1.0WLS#9	1	DEAD	1.00
		17	WLS#3	-1.00
62	1.0D+1.0WLS#10	1	DEAD	1.00
		18	WLS#4	-1.00
63	1.0D+1.0WLS#11	1	DEAD	1.00
		19	WLS#5	-1.00
64	1.0D+1.0WLS#12	1	DEAD	1.00
		20	WLS#6	-1.00
65	1.4D	1	DEAD	1.40
66	1.2D+1.5LM+1.0WM#1	1	DEAD	1.20
		21	WLM#1	1.00
		27	LM	1.50
67	1.2D+1.5LM+1.0WM#2	1	DEAD	1.20
		22	WLM#2	1.00
		27	LM	1.50
68	1.2D+1.5LM+1.0WM#3	1	DEAD	1.20
		23	WLM#3	1.00
		27	LM	1.50
69	1.2D+1.5LM+1.0WM#4	1	DEAD	1.20
		24	WLM#4	1.00
		27	LM	1.50
70	1.2D+1.5LM+1.0WM#5	1	DEAD	1.20
		25	WLM#5	1.00
		27	LM	1.50
71	1.2D+1.5LM+1.0WM#6	1	DEAD	1.20
		26	WLM#6	1.00
		27	LM	1.50
72	1.2D+1.5LM+1.0WM#7	1	DEAD	1.20
		21	WLM#1	-1.00
		27	LM	1.50
73	1.2D+1.5LM+1.0WM#8	1	DEAD	1.20
		22	WLM#2	-1.00
		27	LM	1.50
74	1.2D+1.5LM+1.0WM#9	1	DEAD	1.20

Combination Load Cases Cont...

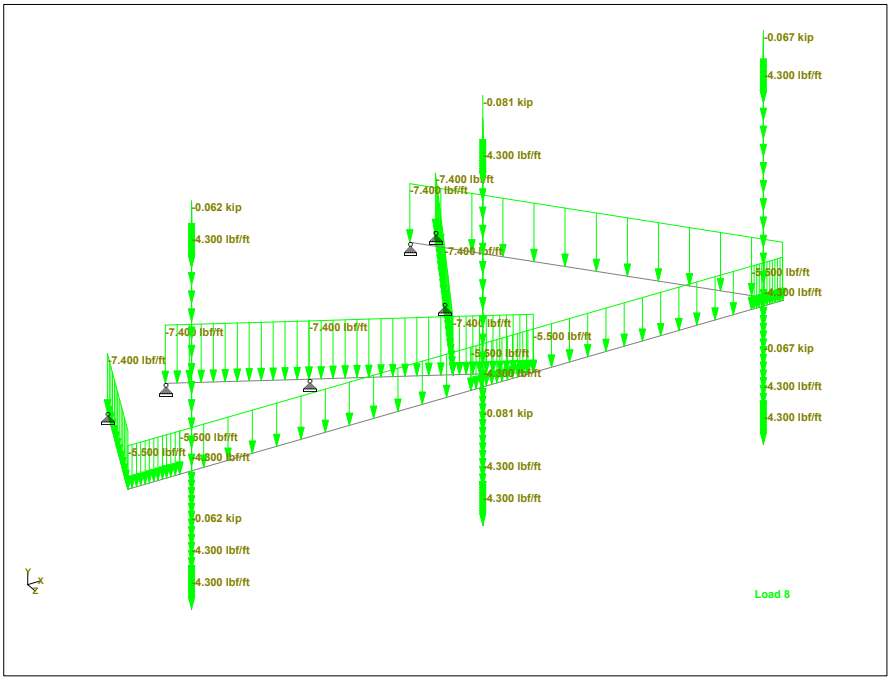
Comb.	Combination L/C Name	Primary	Primary L/C Name	Factor
		23	WLM#3	-1.00
		27	LM	1.50
75	1.2D+1.5LM+1.0WM#10	1	DEAD	1.20
		24	WLM#4	-1.00
		27	LM	1.50
76	1.2D+1.5LM+1.0WM#11	1	DEAD	1.20
		25	WLM#5	-1.00
		27	LM	1.50
77	1.2D+1.5LM+1.0WM#12	1	DEAD	1.20
		26	WLM#6	-1.00
		27	LM	1.50
78	1.2D+1.5LV	1	DEAD	1.20
		28	LV	1.50



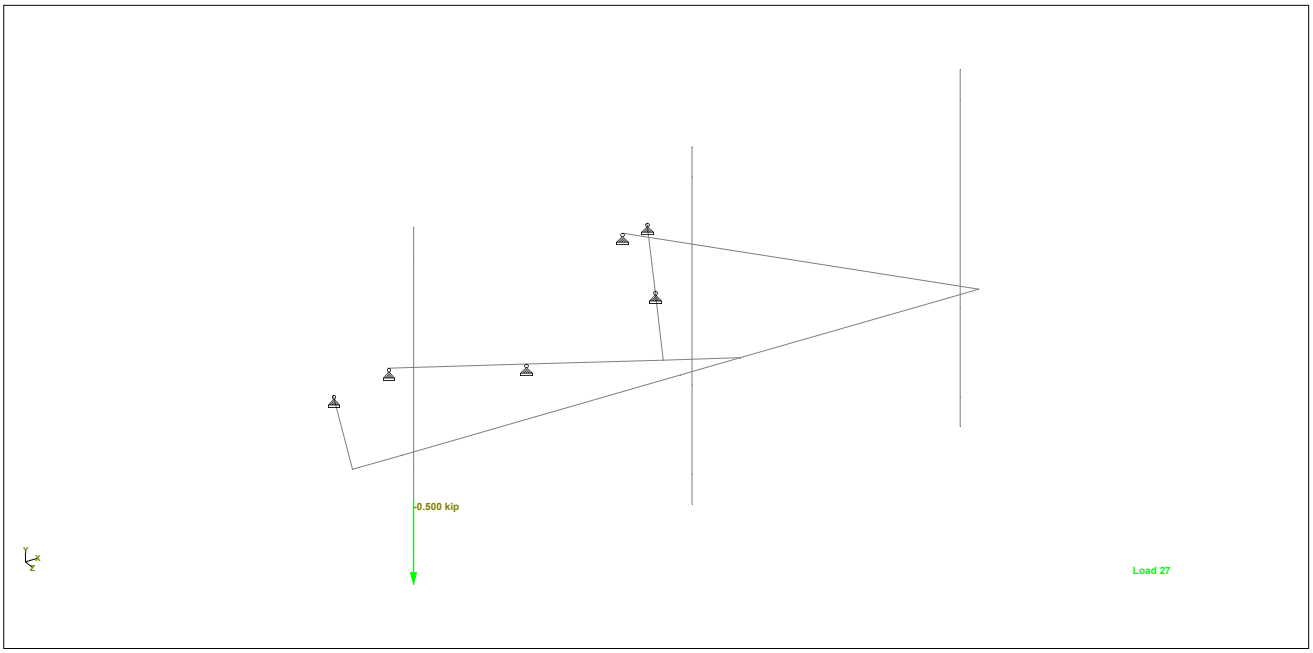
Applied Dead Loads



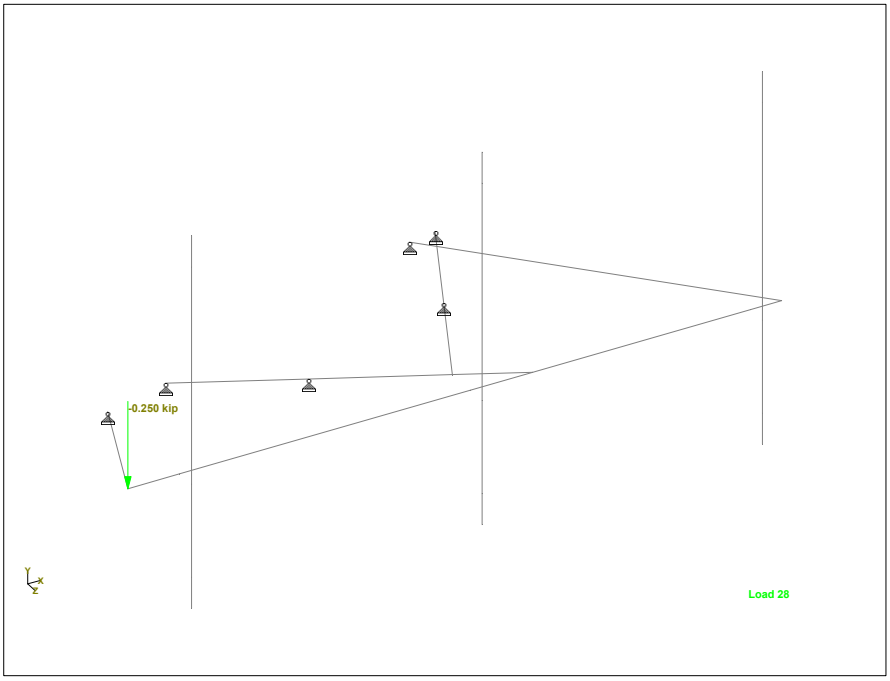
Typical Applied Wind Loads



Applied Ice Dead Loads



Applied LM Load



Applied LV Load

Utilization Ratio

Beam	Analysis Property	Design Property	Actual Ratio	Allowable Ratio	Ratio (Act./Allow.)	Clause	L/C	Ax (in^2)	Iz (in^4)	Iy (in^4)	Ix (in^4)
1	HSST4X4X0	HSST4X4X0	0.160	1.000	0.160	Eq. H1-1b	47	3.370	7.800	7.800	12.800
2	PIPS35	PIPS35	0.042	1.000	0.042	Eq. H1-1b	35	2.500	4.520	4.520	9.040
3	PIPS35	PIPS35	0.520	1.000	0.520	Eq. H1-1b	74	2.500	4.520	4.520	9.040
4	PIPS35	PIPS35	0.658	1.000	0.658	Eq. H1-1b	73	2.500	4.520	4.520	9.040
5	PIPS35	PIPS35	0.172	1.000	0.172	Eq. H1-1b	45	2.500	4.520	4.520	9.040
6	PIPS35	PIPS35	0.031	1.000	0.031	Eq. H1-1b	35	2.500	4.520	4.520	9.040
7	PIPS25	PIPS25	0.000	1.000	0.000	Eq. H1-1b	31	1.600	1.450	1.450	2.900
8	PIPS25	PIPS25	0.129	1.000	0.129	Eq. H1-1b	30	1.600	1.450	1.450	2.900
9	PIPS25	PIPS25	0.302	1.000	0.302	Eq. H1-1b	30	1.600	1.450	1.450	2.900
10	PIPS25	PIPS25	0.000	1.000	0.000	Eq. H1-1b	31	1.600	1.450	1.450	2.900
11	PIPS25	PIPS25	0.000	1.000	0.000	Eq. H1-1b	31	1.600	1.450	1.450	2.900
12	PIPS25	PIPS25	0.146	1.000	0.146	Eq. H1-1b	30	1.600	1.450	1.450	2.900
13	PIPS25	PIPS25	0.340	1.000	0.340	Eq. H1-1b	30	1.600	1.450	1.450	2.900
14	PIPS25	PIPS25	0.000	1.000	0.000	Eq. H1-1b	31	1.600	1.450	1.450	2.900
15	PIPS25	PIPS25	0.015	1.000	0.015	Eq. Sec. D2	66	1.600	1.450	1.450	2.900
16	PIPS25	PIPS25	0.109	1.000	0.109	Eq. H1-1b	30	1.600	1.450	1.450	2.900
17	PIPS25	PIPS25	0.254	1.000	0.254	Eq. H1-1b	30	1.600	1.450	1.450	2.900
18	PIPS25	PIPS25	0.000	1.000	0.000	Eq. H1-1b	31	1.600	1.450	1.450	2.900
19	L40405	L40405	0.009	1.000	0.009	Eq. H2-1	2	2.400	1.464	5.975	0.078
20	L40405	L40405	0.017	1.000	0.017	Eq. H2-1	2	2.400	1.464	5.975	0.078
21	HSST4X4X0	HSST4X4X0	0.404	1.000	0.404	Eq. H3-6	74	3.370	7.800	7.800	12.800
22	HSST4X4X0	HSST4X4X0	0.212	1.000	0.212	Eq. H1-1b	76	3.370	7.800	7.800	12.800
24	HSST4X4X0	HSST4X4X0	0.156	1.000	0.156	Eq. H1-1b	46	3.370	7.800	7.800	12.800
25	HSST4X4X0	HSST4X4X0	0.201	1.000	0.201	Eq. H1-1b	73	3.370	7.800	7.800	12.800

Failed Members

There is no data of this type.

Node Displacement Summary

	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)	rX (rad)	rY (rad)	rZ (rad)
Max X	22	57:1.0D+1.0WI	**0.115**	-0.103	0.121	0.196	0.003	0.000	-0.003
Min X	21	63:1.0D+1.0WI	**-0.161**	-0.158	0.043996	0.230	0.001	0.000	0.004
Max Y	4	53:1.0D+1.0WI	0	**0**	0	0	0.000	0.000	0.000
Min Y	2	61:1.0D+1.0WI	-0.000	**-0.186**	-0.000	0.186	0.002	-0.000	0.003
Max Z	21	59:1.0D+1.0WI	-0.096	-0.141	**0.205**	0.267	0.005	-0.000	0.002
Min Z	12	59:1.0D+1.0WI	0.047	-0.141	**-0.081**	0.169	0.003	-0.000	0.002
Max rX	18	59:1.0D+1.0WI	-0.084	-0.141	0.178	0.242	**0.005**	-0.000	0.002
Min rX	17	53:1.0D+1.0WI	-0.027	-0.024	-0.018	0.041	**-0.001**	-0.000	0.001
Max rY	2	53:1.0D+1.0WI	0.000	-0.136	0.000	0.136	0.000	**0.000**	0.002
Min rY	2	59:1.0D+1.0WI	-0.000	-0.147	-0.000	0.147	0.004	**-0.000**	0.002
Max rZ	21	63:1.0D+1.0WI	-0.161	-0.158	0.043996	0.230	0.001	0.000	**0.004**
Min rZ	22	57:1.0D+1.0WI	0.115	-0.103	0.121	0.196	0.003	0.000	**-0.003**
Max Rst	21	60:1.0D+1.0WI	-0.136	-0.161	0.178	**0.276**	0.004	-0.000	0.003

TIA-222 Rev H Maximum Allowable Deflection = 1.5% x Cantilever
1.5% x 48" = 0.720"
0.276" < 0.720" OK!

Reaction Summary

			Horizontal	Vertical	Horizontal	Moment		
	Node	L/C	FX (kip)	FY (kip)	FZ (kip)	MX (kip-in)	MY (kip-in)	MZ (kip-in)
Max FX	26	39:1.2D+1.0WI	**1.184**	0.906	0.693	0	0	0
Min FX	26	6:WL#5	**-1.184**	-0.124	-0.693	0	0	0
Max FY	26	73:1.2D+1.5LM	0.034	**3.165**	0.026	0	0	0
Min FY	4	47:1.2D+1.0DI-	0.001	**-0.991**	-0.006	0	0	0
Max FZ	28	3:WL#2	-0.359	0.193	**1.190**	0	0	0
Min FZ	28	36:1.2D+1.0WI	0.359	0.540	**-1.190**	0	0	0
Max MX	4	1:DEAD	-0.000	-0.356	0.000	**0**	0	0
Min MX	4	1:DEAD	-0.000	-0.356	0.000	**0**	0	0
Max MY	4	1:DEAD	-0.000	-0.356	0.000	0	**0**	0
Min MY	4	1:DEAD	-0.000	-0.356	0.000	0	**0**	0
Max MZ	4	1:DEAD	-0.000	-0.356	0.000	0	0	**0**
Min MZ	4	1:DEAD	-0.000	-0.356	0.000	0	0	**0**

Job Number	50123202
Made by:	JSD
Date:	4/27/2020
Checked by:	BGK
Date:	4/28/2020

(Cheshire CT - Gamma) - Tower Connection Design

\\capecod\Projects\50123198\50123202 - CT2036 Cheshire CT\Engineering\Structural\Mount Analysis\Rev.0\Calcs\50123202 - Connection Check.xlsx

Design Mount Anchorage to Exist. Wall

- Loading is taken from STAAD model
- 2 A325 bolts with 6 in. x 6 in. x 0.5 in. plate

Max. Loading

Shear Loads on Anchors

Direct Shear

F_x = 1.184 k

F_z = 1.190 k

F_r = 1679 lb $(F_x^2+F_y^2)^{0.5}$

Shear due to Torsion

M_y = 0.0 k-in = 0 lb-in

Moment arm (d_y) = 4.2 in $\sqrt{(S_v^2+S_h^2)}$

Tension Loads on Anchors

Direct Tension

F_y = 3.165 k = 3165 lb

Tension due to Prying

M_x = 0.0 k-in = 0 lb-in

Moment arm (d_x) = 3.0 in S_v

M_z = 0.0 k-in = 0 lb-in

Moment arm (d_z) = 3.0 in S_h

Connection Information

Anchor Diameter =	1/2	
n =	2 bolts	*(# of bolts)*
n' =	1 bolts	*(# of bolts resisting moments)*
S_v =	3.00 in	*(Vertical Bolt Spacing)*
S_h =	3.00 in	*(Horizontal Bolt Spacing)*

Max. Loading per Anchor

Max. Shear per Anchor

- Divide shear equally among anchors

$V_{max.} = F_r / n + M_y / d_y n$

= 1679lb / 2 anchors + (0lb-in / in) / 2 anchors

= 840 lb/anchor

Max. Tension per Bolt

- Assume tension (F_z) divided by all anchors and tension due to prying resisted by n' anchors

$T_{max} = F_y / n + M_z / d_z n' + M_x / d_x n'$

= 3.165lb / 2 anchors + (0lb-in / 3in) / 1 anchors + (0lb-in / 3in) / 1 anchors

= 1583 lb/anchor

Connection Capacity

Determine allowable loads for a 1/2 in. diameter threaded rod through-bolts with 6 in. x 6 in. plate

Yield Strength of Steel Plate, F_y =	36 ksi	*(A36)*
Φ =	0.9	*(plate)*
Φ =	0.75	*(bolt)*
Through Bolt Diameter =	0.50 in	
Through Bolt Cross Sectional Area, A_B =	0.20 in²	
F_{nv} =	68 ksi	*(Table J3.2 in AISC 15th ed.)*
F_{nt} =	90 ksi	*(Table J3.2 in AISC 15th ed.)*
n =	2 bolts	*(number of bolts)*
n' =	1 bolts	*(number of bolts resisting eccentric loading)*
Steel Plate Thickness =	0.50 in	
Steel Plate Width =	6.00 in	
Steel Plate Height =	6.00 in	

Determine Anchor Capacity

$T_{allow\ bolt}$ = 13254 lb *(Φ x F_{nt} x A_b)*

$V_{allow\ bolt}$ = 10014 lb *(Φ x F_{nv} x A_b)*

Check anchors for Tension/Shear

Allowable Tension = 13254 lb Max. Tension = 1583 lb

Allowable Shear = 10014 lb Max. Shear = 840 lb

$$\frac{T_{max.}}{T_{allow.}} + \frac{V_{max.}}{V_{allow.}} \leq 1.00$$

$$\frac{1583\ lb}{13254\ lb} + \frac{840\ lb}{10014\ lb} = \mathbf{20.3\%}\ \mathbf{OK}$$

Determine Plate Capacity

Plate Capacity, Φp_n = 32.4 ksi *(Φ x F_y)* Max. Applied Stress, p_a = 1.6 ksi *(EP_a / (w * t))*

p_a / Φp_n = **5.0%** **OK**

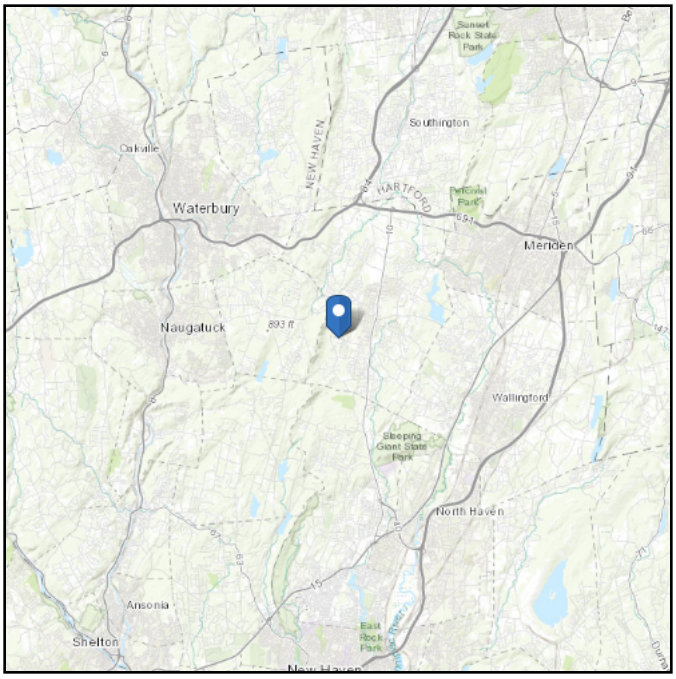
APPENDIX B

ASCE 7 Hazards Report

Address:
751 Higgins Rd
Cheshire, Connecticut
06410

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class:

Elevation: 277.32 ft (NAVD 88)
Latitude: 41.488409
Longitude: -72.928571



Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph

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

Date Accessed: Tue Apr 28 2020

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

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Rain

Results:

15-minute Precipitation Intensity: 6.43 in./h

60-minute Precipitation Intensity: 2.77 in./h

Data Source: NOAA National Weather Service, Precipitation Frequency Data Server, Atlas 14 (https://www.nws.noaa.gov/oh/hdsc/)

Date Accessed: Tue Apr 28 2020

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

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Section 1 - RFDS GENERAL INFORMATION

RFDS NAME:	CTV2036	DATE:	03/29/2017	RF DESIGN ENG:	Fatah
ISSUE:	Bronze Standard	Approved? (Y/N):	Yes	RF DESIGN PHONE:	8607214315
REVISION:	Final	RF MANAGER:	John Benedetto	RF DESIGN EMAIL:	FF5901@ATT.COM
INITIATIVE /PROJECT:	LTE 3C [WCS],LTE4C [B-14]				

RF PERF ENG:		RFDS PROGRAM TYPE:	2018 LTE Next Carrier		
RF PERF PHONE:		RFDS TECHNOLOGY:	LTE		
RF PERF EMAIL:		STATE/STATUS:	As Built/In Progress		
ADDITIONAL WORKFLOW NOTIFICATIONS:		RFDS ID:	1991823		
RFDS VERSION:	2.00	Created By:	ff5901	Updated By:	ak975u
UMTS FREQUENCY:	850	Date Created:	9/25/2017 10:04:41 AM	Date Updated:	6/6/2018 12:04:54 PM
LTE FREQUENCY:	700, 1900	EXPIRATION DATE:			
5G FREQUENCY:		ESTIMATED SQIN:		Calculation ID:	
I-PLAN JOB # 1:	NER-RCTB-17-00793	IPLAN PRD GRP || SUB GRP #1:	LTE Next Carrier || LTE 3C		
I-PLAN JOB # 2:	NER-RCTB-17-06703	IPLAN PRD GRP || SUB GRP #2:	LTE Next Carrier || LTE 4C		
I-PLAN JOB # 3:		IPLAN PRD GRP || SUB GRP #3:			
I-PLAN JOB # 4:		IPLAN PRD GRP || SUB GRP #4:			
I-PLAN JOB # 5:		IPLAN PRD GRP || SUB GRP #5:			
I-PLAN JOB # 6:		IPLAN PRD GRP || SUB GRP #6:			
I-PLAN JOB # 7:		IPLAN PRD GRP || SUB GRP #7:			
I-PLAN JOB # 8:		IPLAN PRD GRP || SUB GRP #8:			

Section 2 - LOCATION INFORMATION

USID:	26014	FA LOCATION CODE:	10034996	LOCATION NAME:	CHESHIRE SW
REGION:	NORTHEAST	MARKET CLUSTER:	NEW ENGLAND	MARKET:	CONNECTICUT
ADDRESS:	751 HIGGINS ROAD	CITY:	CHESHIRE	STATE:	CT
ZIP CODE:	06410	COUNTY:	NEW HAVEN	LONG (DEC. DEG.):	-72.9293319
LATITUDE (D-M-S):	41d 29m 14.87004s	LONGITUDE (D-M-S):	-72d -55m -45.59484s	LAT (DEC. DEG.):	41.4874639
DIRECTIONS, ACCESS AND EQUIPMENT LOCATION:	2036 - CHESHIRE COMBO-8899RT. 10 TO HIGGINS ROAD. CONTINUE ON HIGGINS TO AT&T UNDERGROUND 2ND DRIVEWAY. ENTRANCE AT REAR DOOR,NEXT TO TOWER. GO DOWN TO BOTTOM OF THE STAIRS, THOURGH THE DOORS, CELL SITE ON RIGHT. SITE IS TIED INTO AT&T BACKUP GENERATOR.DEMARC IS IN SECOND LEVEL OF BUNKER USE REAR STAIRS. GO RIGHT AND ON YOUR RIGHT IS SNET ROOM DEAMRC IS IN HERE.ADDRESS:751 HIGGINS ROAD,CHESHIRE, CT ACCESS: 24/7 CONTACT: AT&T SECURITYSECURITY: NO ISSUESPOWER COMPANY: NORTHEAST UTILITIES 800 286-2000AT&T: (800) 247-2020METER NUMBER N/A				

ORACLE PTN # 1:	2051A0ACN3	PACE JOB # 1:	MRCTB022501		
ORACLE PTN # 2:	2051A0EDZ2	PACE JOB # 2:	MRCTB026664		
ORACLE PTN # 3:		PACE JOB # 3:			
ORACLE PTN # 4:		PACE JOB # 4:			
ORACLE PTN # 5:		PACE JOB # 5:			
ORACLE PTN # 6:		PACE JOB # 6:			
ORACLE PTN # 7:		PACE JOB # 7:			
ORACLE PTN # 8:		PACE JOB # 8:			
BORDER CELL WITH CONTOUR COORD:		SEARCH RING NAME:			
AM STUDY REQ'D (Y/N):	No	SEARCH_RING_ID:			
FREQ COORD:		BTA:		MSA / RSA:	
		LAC(UMTS):	05998		
RF DISTRICT:	NPO TRIAGE				
RF ZONE:	HOTSEAT	RNC(UMTS):	BRPTCT04RNC002		
		MME POOL ID(LTE):	FF01		
PARENT NAME(UMTS):	BRIDGEPORT CT RNC002				

Section 3 - LICENSE COVERAGE/FILING INFORMATION

CGSA - NO FILING TRIGGERED (Yes/No):	No	CGSA LOSS:		PCS REDUCED - UPS ZIP:	
CGSA - MINOR FILING NEEDED (Yes/No)::	No	CGSA EXT AGMT NEEDED:		PCS POPS REDUCED:	
CGSA - MAJOR FILING NEEDED (Yes/No):	Yes	CGSA SCORECARD UPDATED:			

CGSA CALL SIGNS:	

Section 4 - TOWER/REGULATORY INFORMATION

STRUCTURE AT&T OWNED?:	Yes	GROUND ELEVATION (ft):	0	STRUCTURE TYPE:	SELF SUPPORT
ADDITIONAL REGULATORY?:	Yes	HEIGHT OVERALL (ft):	250.00	FCC ASR NUMBER:	NR
SUB-LEASE RIGHTS?:	Yes	STRUCTURE HEIGHT (ft):	250.00		
LIGHTING TYPE:	DUAL-RED AND MEDIUM INTENSITY				

MARKET LOCATION 700 MHz Band:			
MARKET LOCATION 850 MHz Band:			
MARKET LOCATION 1900 MHz Band:			
MARKET LOCATION AWS Band:			
MARKET LOCATION WCS Band:			
MARKET LOCATION Future Band:			

Section 5 - E-911 INFORMATION - existing

	PSAP NAME:	PSAP ID:	E911 PHASE:	MPC SVC PROVIDER:	LMU REQUIRED:	ESRN:	DATE LIVE PH1:	DATE LIVE PH2:		
SECTOR A E-911						0				
SECTOR B				INTRADO_MIAMI		0				
SECTOR C						0				
SECTOR D										
SECTOR E										
SECTOR F										
OMNI										

Section 5 - E-911 INFORMATION - final

	PSAP NAME:	PSAP ID:	E911 PHASE:	MPC SVC PROVIDER:	LMU REQUIRED:	ESRN:	DATE LIVE PH1:	DATE LIVE PH2:		
SECTOR A E-911						0				
SECTOR B				INTRADO_MIAMI		0				
SECTOR C						0				
SECTOR D	CHESHIRE POLICE DEPARTMENT	1311								
SECTOR E										
SECTOR F	CHESHIRE POLICE DEPARTMENT	1311								
OMNI										

SECTION 6/7 - BBU INFORMATION - existing

	BBU 1	BBU 2	BBU 3	BBU 4					
BBU RBS ID:	130348	210602	289828	366792					
TECHNOLOGY:	GSM	UMTS	UMTS	LTE					
BBU NAME (CTS Common ID):	049D2036	CTV2036	CTV2036_9	CTL02036					
CELL ID / BCF:	049D2036	CTV2036	CTV2036	CTL02036					
BTA/TID:	049G	318U	318W	318L					
4-9 DIGIT SITE ID:	2036	2036	2036	2036					
COW OR TOY?:	No	No	No	No					
CELL SITE TYPE:	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED					
SITE TYPE:	BTS-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL					
BTS LOCATION ID:	GROUND	INTERNAL	INTERNAL	INTERNAL					
BASE STATION TYPE:	BASE	BASE	OVERLAY	BASE					
EQUIPMENT NAME:	CHESHIRE SW	CHESHIRE SW	CHESHIRE SW	CHESHIRE SW					
DISASTER PRIORITY:	0	0	0	3					
EQUIPMENT VENDOR:	NOKIA	ERICSSON	ERICSSON	ERICSSON					
EQUIPMENT TYPE (Model):	ULTRASITE	3206 INDOOR	3206 INDOOR	6601 INDOOR MU					
BASEBAND CONFIGURATION:									
MARKET STATE CODE:									
NODE B NUMBER:	0	0	0	2036					
SIDEHAUL SWITCH VENDOR:									
SIDEHAUL SWITCH MODEL:									
SIDEHAUL SWITCH NAME:									

SECTION 6/7 - BBU INFORMATION - final

	BBU 1	BBU 2	BBU 3						
BBU RBS ID:	210602	289828	366792						
TECHNOLOGY:	UMTS	UMTS	LTE						
BBU NAME (CTS Common ID):	CTV2036	CTV2036_9	CTL02036						
CELL ID / BCF:	CTV2036	CTV2036	CTL02036						
BTA/TID:	318U	318W	318L						
4-9 DIGIT SITE ID:	2036	2036	2036						
COW OR TOY?:	No	No	No						
CELL SITE TYPE:	SECTORIZED	SECTORIZED	SECTORIZED						
SITE TYPE:	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL						
BTS LOCATION ID:	INTERNAL	INTERNAL	INTERNAL						
BASE STATION TYPE:	BASE	OVERLAY	BASE						
EQUIPMENT NAME:	CHESHIRE SW	CHESHIRE SW	CHESHIRE SW						
DISASTER PRIORITY:	0	0	3						
EQUIPMENT VENDOR:	ERICSSON	ERICSSON	ERICSSON						
EQUIPMENT TYPE (Model):	3206 INDOOR	3206 INDOOR	6601 INDOOR MU						
BASEBAND CONFIGURATION:			1x6601 / 1x5216 / 1xXMU03						
MARKET STATE CODE:			CT						
NODE B NUMBER:	0	0	2036						
SIDEHAUL SWITCH VENDOR:									
SIDEHAUL SWITCH MODEL:									
SIDEHAUL SWITCH NAME:									

Section 8 - RBS/SECTOR ASSOCIATION - existing

	BBU 1	BBU 2	BBU 3	BBU 4																	
CTS Common ID	049D2036	CTV2036	CTV2036_9	CTL02036																	
Soft Sector IDs	318G20361	CTV20361	CTU20364	CTL02036_7A_1																	
	318G20363	CTV20363	CTU20366	CTL02036_7B_1																	
		CTV2036A	CTU20367	CTL02036_7C_1																	
		CTV2036C	CTU20369	CTL02036_9A_1																	
				CTL02036_9B_1																	
				CTL02036_9C_1																	

Section 8 - RBS/SECTOR ASSOCIATION - final

	BBU 1	BBU 2	BBU 3																		
CTS Common ID	CTV2036	CTV2036_9	CTL02036																		
Soft Sector IDs	CTV20361		CTL02036_3A_1																		
	CTV20363		CTL02036_3B_1																		
			CTL02036_3C_1																		
			CTL02036_7A_1																		
			CTL02036_7A_3_F																		
			CTL02036_7B_1																		
			CTL02036_7B_3_F																		
			CTL02036_7C_1																		
			CTL02036_7C_3_F																		
			CTL02036_9A_1																		
			CTL02036_9A_2																		
			CTL02036_9B_1																		
			CTL02036_9B_2																		
			CTL02036_9C_1																		
			CTL02036_9C_2																		

Section 9 - SOFT SECTOR ID - existing

	GSM 1ST 850	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS	LTE 4TH 1900	LTE 5TH 700																
USEID (excluding Hard Sector)	26014.850.25G.1	26014.850.3G.1	26014.1900.3G.3	26014.850.3G.3	26014.1900.3G.4																					
SECTOR A SOFT SECTOR ID	318G20361	CTV20361	CTU20367	CTV2036A	CTU20364	CTL02036_7A_1	CTL02036_9A_1																			
SECTOR B						CTL02036_7B_1	CTL02036_9B_1																			
SECTOR C	318G20363	CTV20363	CTU20369	CTV2036C	CTU20366	CTL02036_7C_1	CTL02036_9C_1																			
SECTOR D																										
SECTOR E																										
SECTOR F																										
OMNI																										

Section 9 - SOFT SECTOR ID - final

	GSM 1ST 850	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS	LTE 4TH 1900	LTE 5TH 700																
USEID (excluding Hard Sector)		26014.850.3G.1																								
SECTOR A SOFT SECTOR ID		CTV20361				CTL02036_7A_1	CTL02036_9A_1	CTL02036_3A_1	CTL02036_9A_2	CTL02036_7A_3_F																
SECTOR B						CTL02036_7B_1	CTL02036_9B_1	CTL02036_3B_1	CTL02036_9B_2	CTL02036_7B_3_F																
SECTOR C		CTV20363				CTL02036_7C_1	CTL02036_9C_1	CTL02036_3C_1	CTL02036_9C_2	CTL02036_7C_3_F																
SECTOR D																										
SECTOR E																										
SECTOR F																										
OMNI																										

Section 9 - Cell Number - existing

	GSM 1ST 850	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS	LTE 4TH 1900	LTE 5TH 700																
USEID (excluding Hard Sector)	26014.850.25G.1	26014.850.3G.1	26014.1900.3G.3	26014.850.3G.3	26014.1900.3G.4																					
SECTOR A CELL NUMBER						15	8																			
SECTOR B						16	9																			
SECTOR C						17	10																			
SECTOR D																										
SECTOR E																										
SECTOR F																										
OMNI																										

Section 9 - Cell Number - final

	GSM 1ST 850	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS	LTE 4TH 1900	LTE 5TH 700																
USEID (excluding Hard Sector)		26014.850.3G.1																								
SECTOR A CELL NUMBER						15	8	149	178	171																
SECTOR B						16	9	150	179	172																
SECTOR C						17	10	151	180	173																
SECTOR D																										
SECTOR E																										
SECTOR F																										
OMNI																										

Section 10 - CID/SAC - existing

		GSM 1ST 850	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS	LTE 4TH 1900	LTE 5TH 700																
SECTOR A	CID/SAC	20361	20361	20367	60361	20364																					
SECTOR B																											
SECTOR C		20363	20363	20369	60363	20366																					
SECTOR D																											
SECTOR E																											
SECTOR F																											
OMNI																											

Section 10 - CID/SAC - final

		GSM 1ST 850	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS	LTE 4TH 1900	LTE 5TH 700																
SECTOR A	CID/SAC		20361																								
SECTOR B																											
SECTOR C			20363																								
SECTOR D																											
SECTOR E																											
SECTOR F																											
OMNI																											

Section 15A - CURRENT TOWER CONFIGURATION - SECTOR A (OR OMNI)

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	AM-X-CD-16-65-00T-RET						HPA-65R-BUU-H8							
ANTENNA VENDOR	KMW						CCI Products							
ANTENNA SIZE (H x W x D)	72X11.8X5.9						92.4X14.8X7.4							
ANTENNA WEIGHT	48.5						68							
AZIMUTH	154						15							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	255						255							
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT	0						0							
FEEDER AMOUNT	2													
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)		Internal						Internal						
SURGE ARRESTOR (QTY/MODEL)							1	DC/Fiber Squid						
DIPLEXER (QTY/MODEL)	2	Powerwave/CM1007-DBPXBC-003												
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Kathrein / 860-10006						LTE RRH						
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	1	CCI DTMABP7819VG12A Twin PCS w/ 700-850BP												
CURRENT INJECTORS FOR TMA (QTY/MODEL)		AISG Diplexer												
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
REPEATER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11 B12 (REUSE ONLY)						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							1	RRUS-32 B2						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)														
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1														
Local Market Note 2														
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1		26014.A.850.3G.1	CTV20361	CTV20361		UMTS 850	AM-X-CD-16-65-00T-RET_850MHz_04DT	16.1		4	None	Andrew 1-5/8 (850)	320						311.89		1	
ANTENNA POSITION 4	PORT 1		26014.A.700.4G.1	CTL02036_7A_1	CTL02036_7A_1		LTE 700	HPA-65R-BUU-H8_725MHz_09DT	15.6		9	Top	FIBER	0						1475.7065		7	
	PORT 3		26014.A.1900.4G.1	CTL02036_9A_1	CTL02036_9A_1		LTE 1900	HPA-65R-BUU-H8_1930MHz_06DT	17.39		6	Top	FIBER	0						3664.3757		7	
	PORT 4			CTL02036_9A_2	CTL02036_9A_2		LTE 1900	HPA-65R-BUU-	17.39		6	Top	FIBER	0						3664.3757		7	

								H8_1930MHz_06DT															

Section 15B - CURRENT TOWER CONFIGURATION - SECTOR B

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	AM-X-CD-16-65-00T-RET			HPA-65R-BUU-H6			
ANTENNA VENDOR	KMW			CCI Products			
ANTENNA SIZE (H x W x D)	72X11.8X5.9			72X14.8X9			
ANTENNA WEIGHT	48.5			51			
AZIMUTH	270			154			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	255			255			
ANTENNA TIP HEIGHT							
MECHANICAL DOWNTILT	0			0			
FEEDER AMOUNT	2						
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	Internal			Internal			
SURGE ARRESTOR (QTY/MODEL)			1	DC/Fiber Squid			
DIPLEXER (QTY/MODEL)	2 Powerwave/CM1007-DBPXBC-003						
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)				LTE RRH			
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	1 CCI DTMABP7819VG12A Twin PCS w/ 700-850BP						
CURRENT INJECTORS FOR TMA (QTY/MODEL)	AISG Diplexer						
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)			1	RRUS-11 B12 (REUSE ONLY)			
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)			1	RRUS-32 B2			
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1							
Local Market Note 2							
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1		26014.B.850.3G.1	CTV20362	CTV20362		UMTS 850	AM-X-CD-16-65-00T-RET_850MHz_04DT	16.1		4	Bottom	Andrew 1-5/8 (850)	320						311.89		9	
ANTENNA POSITION 4	PORT 1		26014.B.700.4G.1	CTL02036_7B_1	CTL02036_7B_1		LTE 700	HPA-65R-BUU-H6_725MHz_03DT	15.6		3	Top	FIBER	0						248.31		15	
	PORT 3		26014.B.1900.4G.1	CTL02036_9B_1	CTL02036_9B_1		LTE 1900	HPA-65R-BUU-H6_1950MHz_03DT	17.3		3	Top	FIBER	0						3664.3757		15	
	PORT 4			CTL02036_9B_2	CTL02036_9B_2		LTE 1900	HPA-65R-BUU-	17.3		3	Top	FIBER	0						3664.3757		15	

								H6_1950MHz_03DT															

Section 15C - CURRENT TOWER CONFIGURATION - SECTOR C

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	SBNH-1D6565C			HPA-65R-BUU-H6			
ANTENNA VENDOR	Andrew			CCI Products			
ANTENNA SIZE (H x W x D)	96.4X11.9X7.1			72X14.8X9			
ANTENNA WEIGHT	66.1			51			
AZIMUTH	15			270			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	255			255			
ANTENNA TIP HEIGHT							
MECHANICAL DOWNTILT	0			0			
FEEDER AMOUNT	2						
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)		Internal		Internal			
SURGE ARRESTOR (QTY/MODEL)				1 DC/Fiber Squid			
DIPLEXER (QTY/MODEL)	2	Powerwave/CM1007-DBPXBC-003					
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)				LTE RRH			
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	1	CCI DTMABP7819VG12A Twin PCS w/ 700-850BP					
CURRENT INJECTORS FOR TMA (QTY/MODEL)		AISG Diplexer					
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)				1 RRUS-11 B12 (REUSE ONLY)			
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)				1 RRUS-32 B2			
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1							
Local Market Note 2							
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1		26014.C.850.3G.1	CTV20363	CTV20363		UMTS 850	SBNH-1D6565C_850MHz_04DT	16.2		4	None	Andrew 1-5/8 (850)	320						296.48		17	
ANTENNA POSITION 4	PORT 1		26014.C.700.4G.1	CTL02036_7C_1	CTL02036_7C_1		LTE 700	HPA-65R-BUU-H6_725MHz_02DT	15.6		2	Top	FIBER	0						1475.7065		23	
	PORT 3		26014.C.1900.4G.1	CTL02036_9C_1	CTL02036_9C_1		LTE 1900	HPA-65R-BUU-H6_1950MHz_03DT	17.3		3	Top	FIBER	0						3664.3757		23	

	PORT 4			CTL02036_9C_2	CTL02036_9C_2		LTE 1900	HPA-65R-BUU-H6_1950MHz_03DT	17.3		3	Top	FIBER	0						3664.3757		23	

Section 16A - PLANNED/PROPOSED TOWER CONFIGURATION - SECTOR A (OR OMNI)

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
Existing Antenna?														
ANTENNA MAKE - MODEL					800-10966									
ANTENNA VENDOR					Kathrien									
ANTENNA SIZE (H x W x D)					96X20X6.9									
ANTENNA WEIGHT					114.6									
AZIMUTH					15									
MAGNETIC DECLINATION														
RADIATION CENTER (feet)					255									
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT														
FEEDER AMOUNT														
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)						36								
Antenna RET Motor (QTY/MODEL)						Internal								
SURGE ARRESTOR (QTY/MODEL)														
DIPLEXER (QTY/MODEL)														
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)						LTE RRH								
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)														
CURRENT INJECTORS FOR TMA (QTY/MODEL)														
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
REPEATER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)					1	4478 B14								
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)														
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)					1	RRUS-32 B30								
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	LTE 3C,4C WCS,B-14 BRONZE STANDARD-Add Oct port Antenna on Position-3/3/3. -Add RRUS-32 for WCS ,RRUS 4478 for B-14-Upgrade DUS to 5216.													
Local Market Note 2														
Local Market Note 3	5216+XMU													

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 3	PORT 1		26014.A.700.4G.5	CTL02036_7A_3_F	CTL02036_7A_3_F		LTE 700	80010966_777MHz_09DT	15.6	15	9	TOP	FIBER	0						2951.413		5	
	PORT 3		26014.A.WCS.4G.1	CTL02036_3A_1	CTL02036_3A_1		LTE WCS	80010966_2355MHz_03DT	18.5	15	3	TOP	FIBER	0						1285.2866		6	

Section 16B - PLANNED/PROPOSED TOWER CONFIGURATION - SECTOR B

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
Existing Antenna?							
ANTENNA MAKE - MODEL			800-10965				
ANTENNA VENDOR			Kathrien				
ANTENNA SIZE (H x W x D)			78.7X20X6.9				
ANTENNA WEIGHT			108.6				
AZIMUTH			154				
MAGNETIC DECLINATION							
RADIATION CENTER (feet)			255				
ANTENNA TIP HEIGHT							
MECHANICAL DOWNTILT							
FEEDER AMOUNT							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)			36				
Antenna RET Motor (QTY/MODEL)			Internal				
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)							
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)			LTE RRH				
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)							
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)			1 4478 B14				
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)							
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)			1 RRUS-32 B30				
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	LTE 3C,4C WCS,B-14 BRONZE STANDARD-Add Oct port Antenna on Position-3/3/3. -Add RRUS-32 for WCS ,RRUS 4478 for B-14-Upgrade DUS to 5216.						
Local Market Note 2							
Local Market Note 3	5216+XMU						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 3	PORT 1		26014.B.700.4G.5	CTL02036_7B_3_F	CTL02036_7B_3_F		LTE 700	80010965_777MHz_03DT	15.3	154	3	TOP	FIBER	0						2951.413		13	
	PORT 3		26014.B.WCS.4G.1	CTL02036_3B_1	CTL02036_3B_1		LTE WCS	80010965_2355MHz_03DT	18.1	154	3	TOP	FIBER	0						1285.2866		14	

Section 16C - PLANNED/PROPOSED TOWER CONFIGURATION - SECTOR C

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
Existing Antenna?							
ANTENNA MAKE - MODEL			800-10965				
ANTENNA VENDOR			Kathrien				
ANTENNA SIZE (H x W x D)			78.7X20X6.9				
ANTENNA WEIGHT			108.6				
AZIMUTH			270				
MAGNETIC DECLINATION							
RADIATION CENTER (feet)			255				
ANTENNA TIP HEIGHT							
MECHANICAL DOWNTILT							
FEEDER AMOUNT							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)			36				
Antenna RET Motor (QTY/MODEL)			Internal				
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)							
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)			LTE RRH				
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)							
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
REPEATER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)			1	4478 B14			
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)							
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)			1	RRUS-32 B30			
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	LTE 3C,4C WCS,B-14 BRONZE STANDARD-Add Oct port Antenna on Position-3/3/3. -Add RRUS-32 for WCS ,RRUS 4478 for B-14-Upgrade DUS to 5216.						
Local Market Note 2							
Local Market Note 3	5216+XMU						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 3	PORT 1		26014.C.700.4G.5	CTL02036_7C_3_F	CTL02036_7C_3_F		LTE 700	80010965_777MHz_02DT	15.7	270	2	TOP	FIBER	0						2951.413		21	
	PORT 3		26014.C.WCS.4G.1	CTL02036_3C_1	CTL02036_3C_1		LTE WCS	80010965_2355MHz_03DT	18.5	270	3	TOP	FIBER	0						1285.2866		22	

Section 17A - FINAL TOWER CONFIGURATION - SECTOR A (OR OMNI)

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	AM-X-CD-16-65-00T-RET				800-10966		HPA-65R-BUU-H8							
ANTENNA VENDOR	KMW				Kathrien		CCI Products							
ANTENNA SIZE (H x W x D)	72X11.8X5.9				96X20X6.9		92.4X14.8X7.4							
ANTENNA WEIGHT	48.5				114.6		68							
AZIMUTH	154				15		15							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	255				255		255							
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT	0						0							
FEEDER AMOUNT	2													
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)						36								
Antenna RET Motor (QTY/MODEL)		Internal				Internal		Internal						
SURGE ARRESTOR (QTY/MODEL)					1	DC/Fiber Squid	1	DC/Fiber Squid						
DIPLEXER (QTY/MODEL)	2	Powerwave/CM1007-DBPXBC-003												
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Kathrein / 860-10006				LTE RRH		LTE RRH						
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	1	CCI DTMABP7819VG12A Twin PCS w/ 700-850BP												
CURRENT INJECTORS FOR TMA (QTY/MODEL)		AISG Diplexer												
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
REPEATER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)					1	4478 B14	1	RRUS-11 B12 (REUSE ONLY)						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							1	RRUS-32 B2						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)					1	RRUS-32 B30								
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	LTE 3C,4C WCS,B-14 BRONZE STANDARD-Add Oct port Antenna on Position-3/3/3. -Add RRUS-32 for WCS ,RRUS 4478 for B-14-Upgrade DUS to 5216.													
Local Market Note 2														
Local Market Note 3	5216+XMU													

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	26014.A.850.3G.1	26014.A.850.3G.1	CTV20361	CTV20361		UMTS 850	AM-X-CD-16-65-00T-RET_850MHz_04DT	16.1	154	4	None	Andrew 1-5/8	320						311.89		1	
ANTENNA POSITION 3	PORT 1	26014.A.700.4G.5	26014.A.700.4G.5	CTL02036_7A_3_F	CTL02036_7A_3_F		LTE 700	80010966_777MHz_09DT	15.6	15	9	TOP	FIBER	0						2951.413		5	
	PORT 3	26014.A.WCS.4G.1	26014.A.WCS.4G.1	CTL02036_3A_1	CTL02036_3A_1		LTE WCS	80010966_2355MHz_03DT	18.5	15	3	TOP	FIBER	0						1285.2866		6	

ANTENNA POSITION 4	**PORT 1**	26014.A.700.4G.1	26014.A.700.4G.1	CTL02036_7A_1	CTL02036_7A_1		LTE 700	HPA-65R-BUU-H8_719MHz_09DT	14.9	15	9	TOP	FIBER	0						1475.7065		7	
	PORT 3	26014.A.1900.4G.1	26014.A.1900.4G.1	CTL02036_9A_1	CTL02036_9A_1		LTE 1900	HPA-65R-BUU-H8_1930MHz_06DT	17.4	15	6	TOP	FIBER	0						4842.058		8	
	PORT 4	26014.A.1900.4G.2,26014.A.1900.4G.1	26014.A.1900.4G.1	CTL02036_9A_2	CTL02036_9A_2		LTE 1900	HPA-65R-BUU-H8_1930MHz_06DT	17.4	15	6	TOP	FIBER	0						4842.058		8	

Section 17B - FINAL TOWER CONFIGURATION - SECTOR B

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	AM-X-CD-16-65-00T-RET				800-10965		HPA-65R-BUU-H6							
ANTENNA VENDOR	KMW				Kathrien		CCI Products							
ANTENNA SIZE (H x W x D)	72X11.8X5.9				78.7X20X6.9		72X14.8X9							
ANTENNA WEIGHT	48.5				108.6		51							
AZIMUTH	270				154		154							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	255				255		255							
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT	0						0							
FEEDER AMOUNT	2													
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)						36								
Antenna RET Motor (QTY/MODEL)		Internal				Internal		Internal						
SURGE ARRESTOR (QTY/MODEL)							1	DC/Fiber Squid						
DIPLEXER (QTY/MODEL)	2	Powerwave/CM1007-DBPXBC-003												
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)						LTE RRH		LTE RRH						
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	1	CCI DTMABP7819VG12A Twin PCS w/ 700-850BP												
CURRENT INJECTORS FOR TMA (QTY/MODEL)		AISG Diplexer												
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
REPEATER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)					1	4478 B14	1	RRUS-11 B12 (REUSE ONLY)						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							1	RRUS-32 B2						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)					1	RRUS-32 B30								
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	LTE 3C,4C WCS,B-14 BRONZE STANDARD-Add Oct port Antenna on Position-3/3/3. -Add RRUS-32 for WCS ,RRUS 4478 for B-14-Upgrade DUS to 5216.													
Local Market Note 2														
Local Market Note 3	5216+XMU													

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1						UMTS 850	AM-X-CD-16-65-00T-RET_850MHz_04DT	16.1	270	4	BOTTOM	Andrew 1-5/8	320						311.89		9	
ANTENNA POSITION 3	PORT 1	26014.B.700.4G.5	26014.B.700.4G.5	CTL02036_7B_3_F	CTL02036_7B_3_F		LTE 700	80010965_777MHz_03DT	15.3	154	3	TOP	FIBER	0						2951.413		13	
	PORT 3	26014.B.WCS.4G.1	26014.B.WCS.4G.1	CTL02036_3B_1	CTL02036_3B_1		LTE WCS	80010965_2355MHz_03DT	18.1	154	3	TOP	FIBER	0						1285.2866		14	

ANTENNA POSITION 4	**PORT 1**	26014.B.700.4G.1	26014.B.700.4G.1	CTL02036_7B_1	CTL02036_7B_1		LTE 700	HPA-65R-BUU-H6_719MHz_03DT	14.22	154	3	TOP	FIBER	0						1475.7065		15	
	PORT 3	26014.B.1900.4G.1	26014.B.1900.4G.1	CTL02036_9B_1	CTL02036_9B_1		LTE 1900	HPA-65R-BUU-H6_1930MHz_03DT	17	154	3	TOP	FIBER	0						4842.058		16	
	PORT 4	26014.B.1900.4G.2,26014.B.1900.4G.1	26014.B.1900.4G.1	CTL02036_9B_2	CTL02036_9B_2		LTE 1900	HPA-65R-BUU-H6_1930MHz_03DT	17	154	3	TOP	FIBER	0						4842.058		16	

Section 17C - FINAL TOWER CONFIGURATION - SECTOR C

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	SBNH-1D6565C				800-10965		HPA-65R-BUU-H6							
ANTENNA VENDOR	Andrew				Kathrien		CCI Products							
ANTENNA SIZE (H x W x D)	96.4X11.9X7.1				78.7X20X6.9		72X14.8X9							
ANTENNA WEIGHT	66.1				108.6		51							
AZIMUTH	15				270		270							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	255				255		255							
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT	0						0							
FEEDER AMOUNT	2													
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)						36								
Antenna RET Motor (QTY/MODEL)		Internal				Internal		Internal						
SURGE ARRESTOR (QTY/MODEL)							1	DC/Fiber Squid						
DIPLEXER (QTY/MODEL)	2	Powerwave/CM1007-DBPXBC-003												
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)						LTE RRH		LTE RRH						
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	1	CCI DTMABP7819VG12A Twin PCS w/ 700-850BP												
CURRENT INJECTORS FOR TMA (QTY/MODEL)		AISG Diplexer												
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
REPEATER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)					1	4478 B14	1	RRUS-11 B12 (REUSE ONLY)						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							1	RRUS-32 B2						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)					1	RRUS-32 B30								
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	LTE 3C,4C WCS,B-14 BRONZE STANDARD-Add Oct port Antenna on Position-3/3/3. -Add RRUS-32 for WCS ,RRUS 4478 for B-14-Upgrade DUS to 5216.													
Local Market Note 2														
Local Market Note 3	5216+XMU													

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	26014.C.850.3G.1	26014.C.850.3G.1	CTV20363	CTV20363		UMTS 850	SBNH-1D6565C_850MHz_04DT	16.2	15	4	None	Andrew 1-5/8	320						296.48		17	
ANTENNA POSITION 3	PORT 1	26014.C.700.4G.5	26014.C.700.4G.5	CTL02036_7C_3_F	CTL02036_7C_3_F		LTE 700	80010965_777MHz_02DT	15.7	270	2	TOP	FIBER	0						2951.413		21	
	PORT 3	26014.C.WCS.4G.1	26014.C.WCS.4G.1	CTL02036_3C_1	CTL02036_3C_1		LTE WCS	80010965_2355MHz_03DT	18.5	270	3	TOP	FIBER	0						1285.2866		22	

ANTENNA POSITION 4	**PORT 1**	26014.C.700.4G.1	26014.C.700.4G.1	CTL02036_7C_1	CTL02036_7C_1		LTE 700	HPA-65R-BUU-H6_719MHz_02DT	14.28	270	2	TOP	FIBER	0						1475.7065		23	
	PORT 3	26014.C.1900.4G.1	26014.C.1900.4G.1	CTL02036_9C_1	CTL02036_9C_1		LTE 1900	HPA-65R-BUU-H6_1930MHz_03DT	17	270	3	TOP	FIBER	0						4842.058		24	
	PORT 4	26014.C.1900.4G.2,26014.C.1900.4G.1	26014.C.1900.4G.1	CTL02036_9C_2	CTL02036_9C_2		LTE 1900	HPA-65R-BUU-H6_1930MHz_03DT	17	270	3	TOP	FIBER	0						4842.058		24	

Diagram - Sector A | Diagram File Name - CT2036_A_B_C_3C_4C_Rev3.vsd

Atoll Site Name - CTV2036 | Location Name - CHESHIRE SW | Market - CONNECTICUT | Market Cluster - NEW ENGLAND

Comments: Important Note: For detailed radio to antenna wiring refer to the latest 4T4R Antenna/ radio Port connections Field Notice (RF-HW-2016-265)

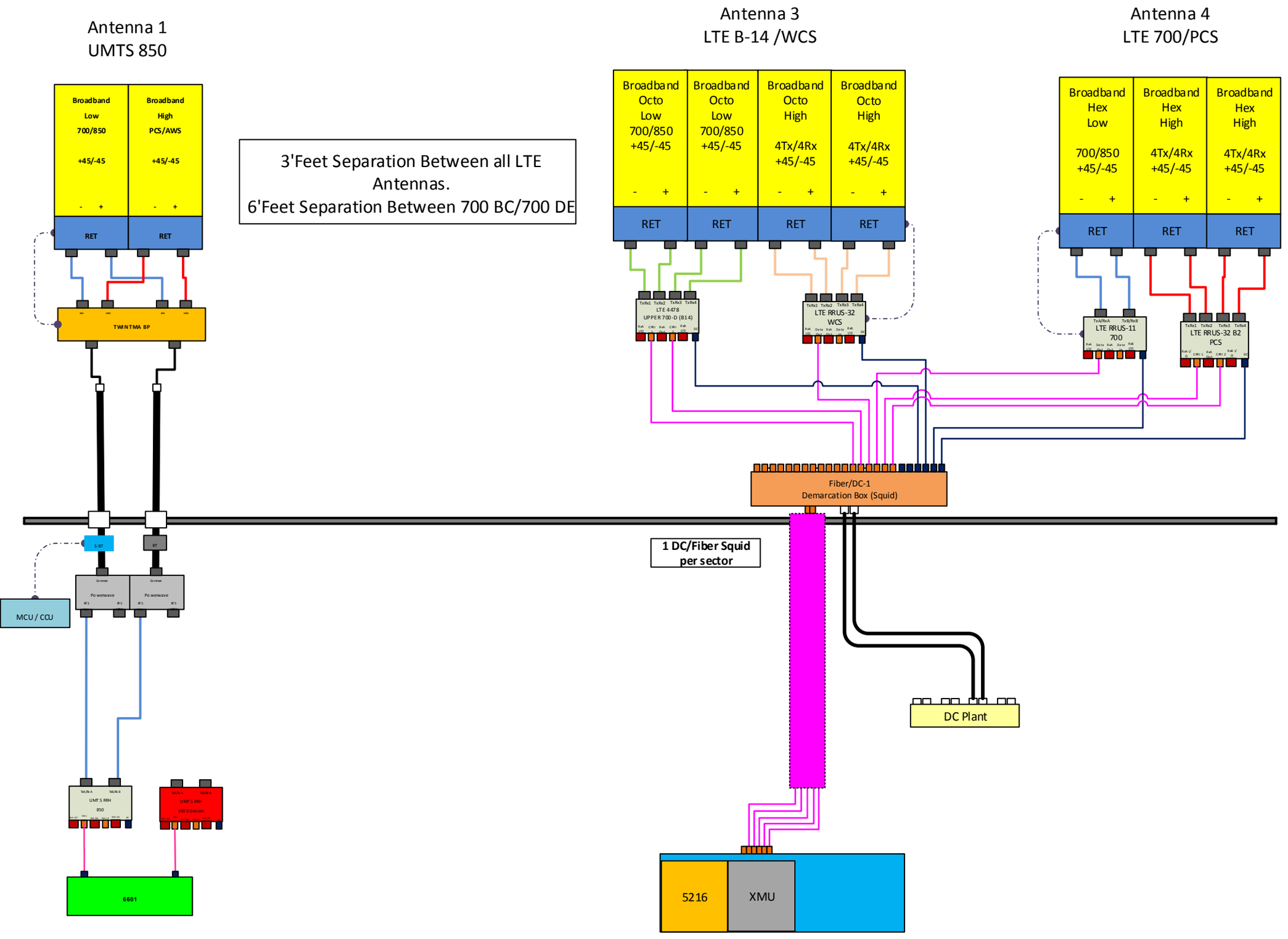


Diagram - Sector B Diagram File Name - CT2036_A_B_C_3C_4C_Rev3.vsd

Atoll Site Name - CTV2036 Location Name - CHESHIRE SW Market - CONNECTICUT Market Cluster - NEW ENGLAND

Comments: Important Note: For detailed radio to antenna wiring refer to the latest 4T4R Antenna/ radio Port connections Field Notice (RF-HW-2016-265)

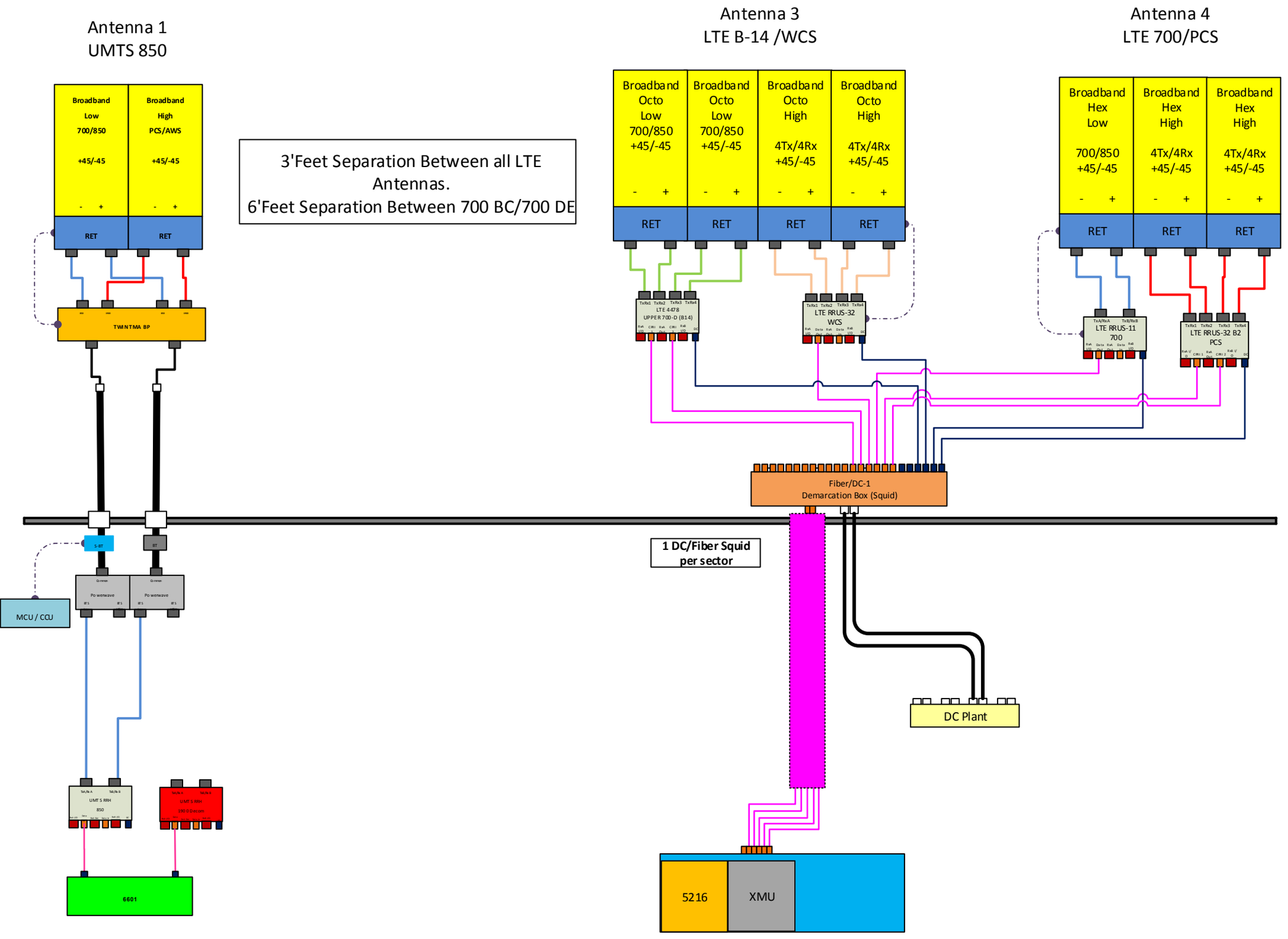
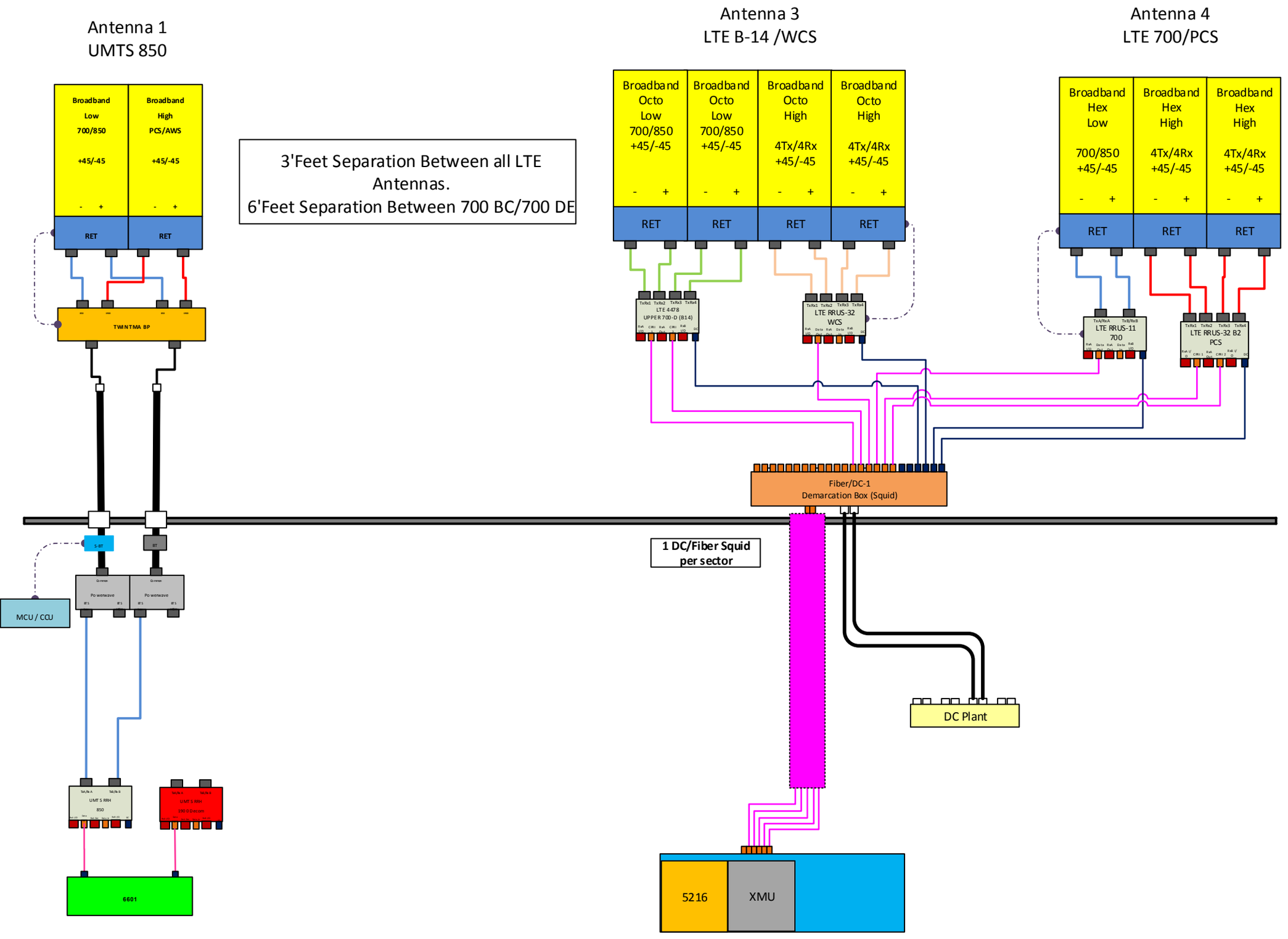


Diagram - Sector C Diagram File Name - CT2036_A_B_C_3C_4C_Rev3.vsd

Atoll Site Name - CTV2036 Location Name - CHESHIRE SW Market - CONNECTICUT Market Cluster - NEW ENGLAND

Comments: Important Note: For detailed radio to antenna wiring refer to the latest 4T4R Antenna/ radio Port connections Field Notice (RF-HW-2016-265)



NOTES			
Date Time (Eastern)	Version	ATTUID	Note
3/4/2018 3:56:02 PM	2.00	mh705r	RFDS VERSION incremented.
3/4/2018 3:56:19 PM	2.00	mh705r	Updating PD for 2nd CPRI for B14 4478, no other changes made to RFDS which could affect the SoW
6/6/2018 12:19:38 PM	2.00	ak975u	RFDS is updated as per demotion comments.
6/7/2018 4:42:36 PM	2.00	ak975u	RFDS updated as per demotion comments.

WORKFLOW SUMMARY							
Date	FROM State / Status	FROM ATTUID	TO State / Status	TO ATTUID	Operation	Comments	PACE Status
10/09/2017	Preliminary In Progress	ff5901	Preliminary In Progress	SP656B	Reassign	Successfully Reassigned	
10/09/2017	Preliminary In Progress	SP656B	Preliminary Submitted for Approval	RC475S	Promote	RFDS updated with First net carrier	NER-RCTB-17-00793 FAILURE 10/09/2017 1:21:46 PM NER-RCTB-17-06703 PENDING 10/09/2017 1:21:46 PM
10/09/2017	Preliminary Submitted for Approval	RC475S	Preliminary Approved	LW826K	Promote		
03/04/2018	Preliminary Approved	LW826K	Preliminary In Progress	mh705r	Pull Back	Pull back to update PDs only to add 2nd CPRI for B14 RRU, no other change to SOW.	
03/04/2018	Preliminary In Progress	mh705r	Preliminary Submitted for Approval	RC475S	Promote	RFDS updated for PDs only for 2nd CPRI for B14.No change to other SOW.	NER-RCTB-17-00793 FAILURE 03/04/2018 11:23:13 PM NER-RCTB-17-06703 FAILURE 03/04/2018 11:23:13 PM
03/06/2018	Preliminary Submitted for Approval	RC475S	Preliminary Approved	LW826K	Promote		
03/06/2018	Preliminary Approved	LW826K	Final RF Approval	OM636A	Promote	Please return in Final Approved status to lw826k	
03/08/2018	Final RF Approval	OM636A	Final RF Approval	SP656B	Reassign	Update RFDS as per promotion comments and RAN tracker	
03/27/2018	Final RF Approval	SP656B	Final Approved	LW826K	Promote	Final	NER-RCTB-17-00793 FAILURE 03/27/2018 11:10:37 AM NER-RCTB-17-06703 FAILURE 03/27/2018 11:10:37 AM
03/28/2018	Final Approved	LW826K	As Built In Progress	SP4408	Promote	Please hold for construction complete. Thanks	NER-RCTB-17-00793 MRCTB022501 SUCCESS 03/28/2018 3:33:19 PM NER-RCTB-17-06703 MRCTB026664 SUCCESS 03/28/2018 3:33:19 PM
05/15/2018	As Built In Progress	SP4408	Final Modification Recommended	OM636A	Demote	Due to this tower having such wide faces, there are currently (3) squid existing on site. Please update the RFDS showing (1) squid existing per sector with no additional squid required.	
06/06/2018	Final Modification Recommended	OM636A	Final Modification Recommended	AK975U	Reassign	Update the RFDS as per demotion comment and RAN tracker	
06/07/2018	Final Modification Recommended	AK975U	Final Approved	SP4408	Promote		
06/26/2018	Final Approved	SP4408	As Built In Progress	SP4408	Promote		NER-RCTB-17-00793 FAILURE 06/26/2018 8:57:00 PM NER-RCTB-17-06703 FAILURE 06/26/2018 8:57:00 PM

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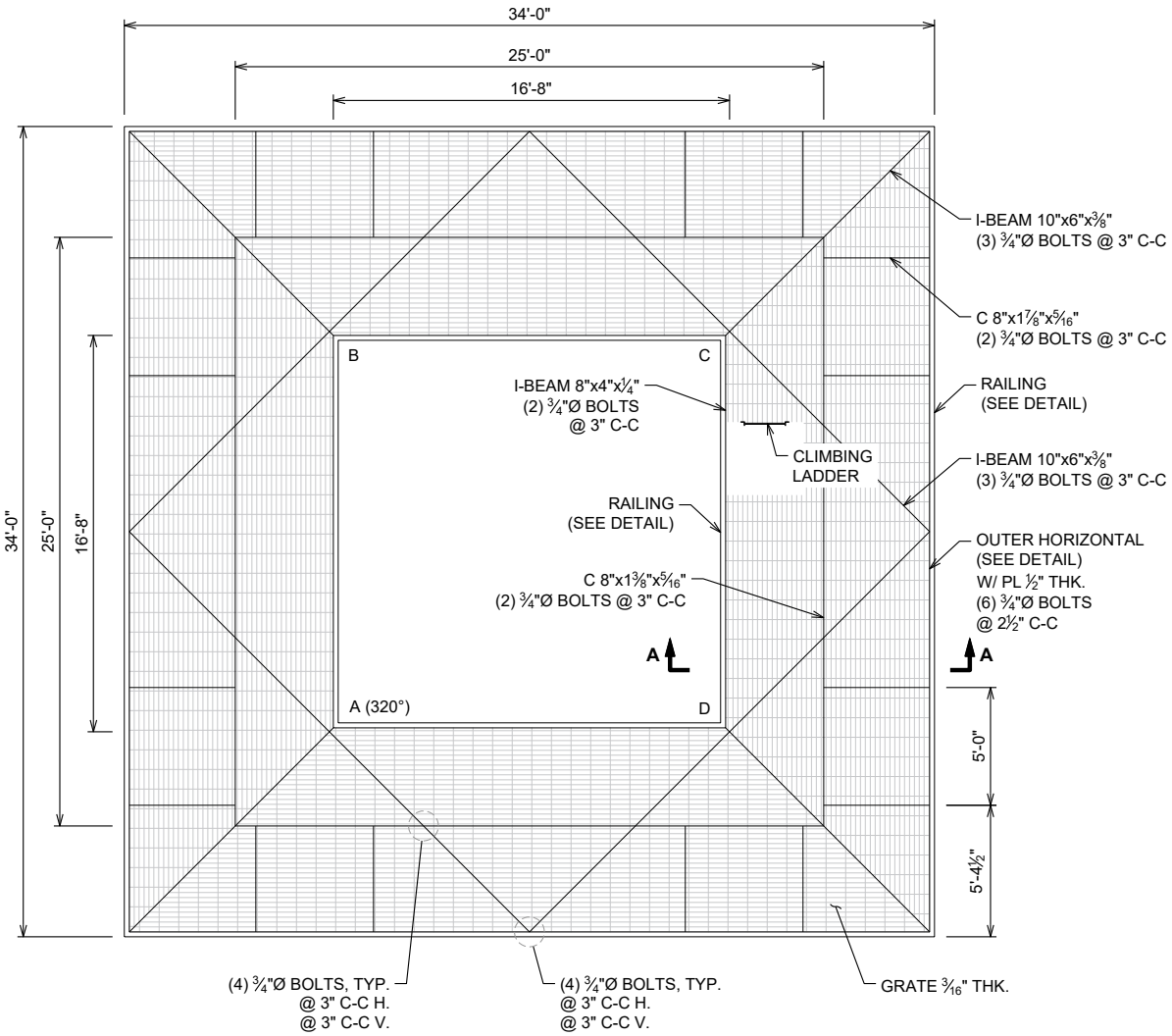
PLATFORM MAPPING

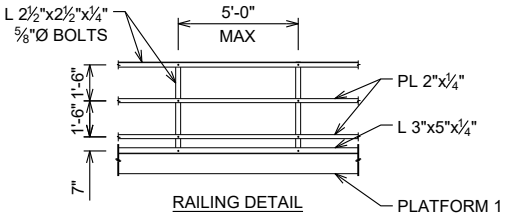
CHESHIRE
TAG0053

GPD Job #: 2020707.17

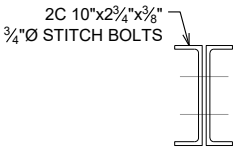
Date: 04/09/2020



NOTE: ALL CHANNEL AND I-BEAM MEMBER THICKNESSES RECORDED
REPRESENT APPROXIMATE AVERAGE FLANGE THICKNESS OF MEMBERS



RAILING DETAIL



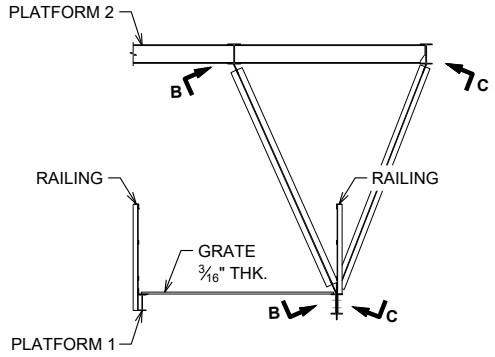
OUTER HORIZONTAL DETAIL

PLATFORM 1 MOUNT DETAIL

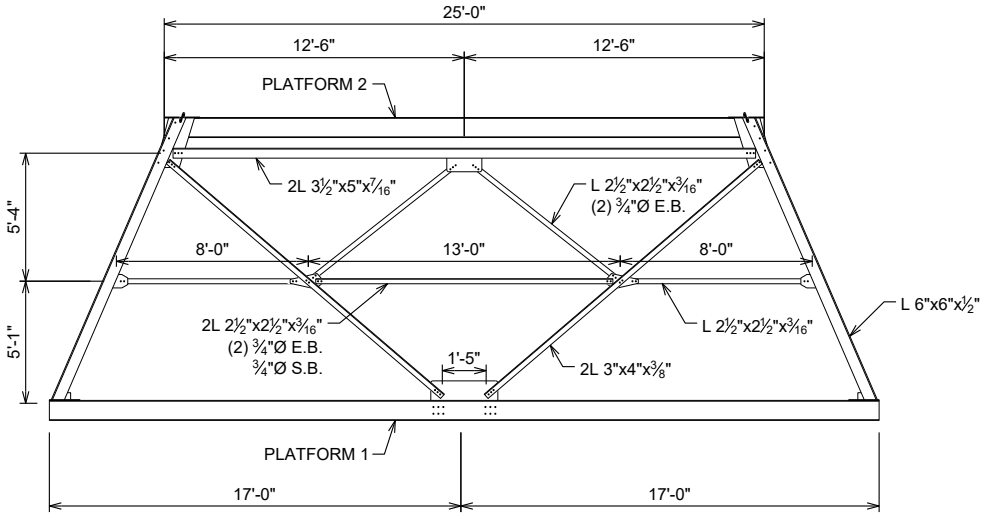
N.T.S

GPD Engineering and Architecture
Professional Corporation

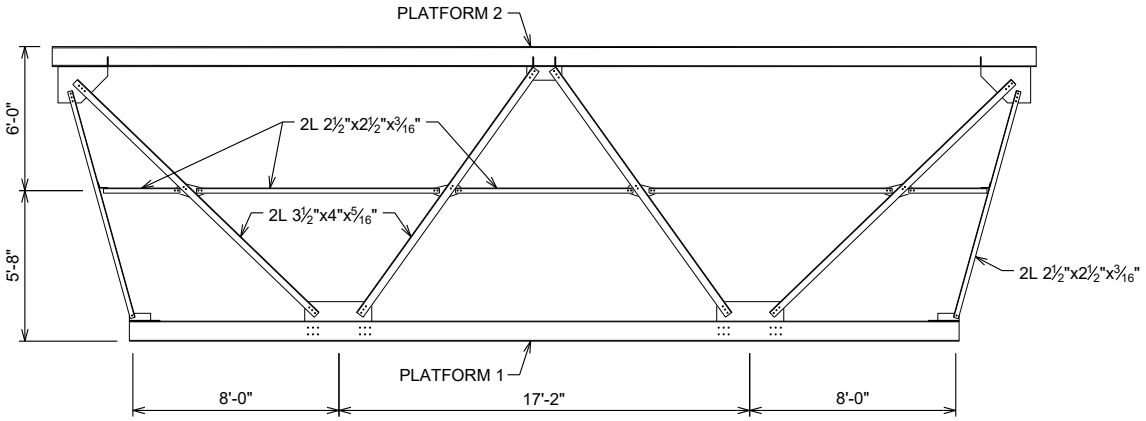
SITE NAME: **CHESHIRE**	ADDRESS: **751 Higgens Rd Cheshire, CT 06410**	REVISION: 0
		DRAWN BY: OT/GT
SITE NUMBER: **TAG0053**	DATE: **04/09/2020**	SHEET NUMBER: S-1



A-A



INTERIOR BRACING (B-B)



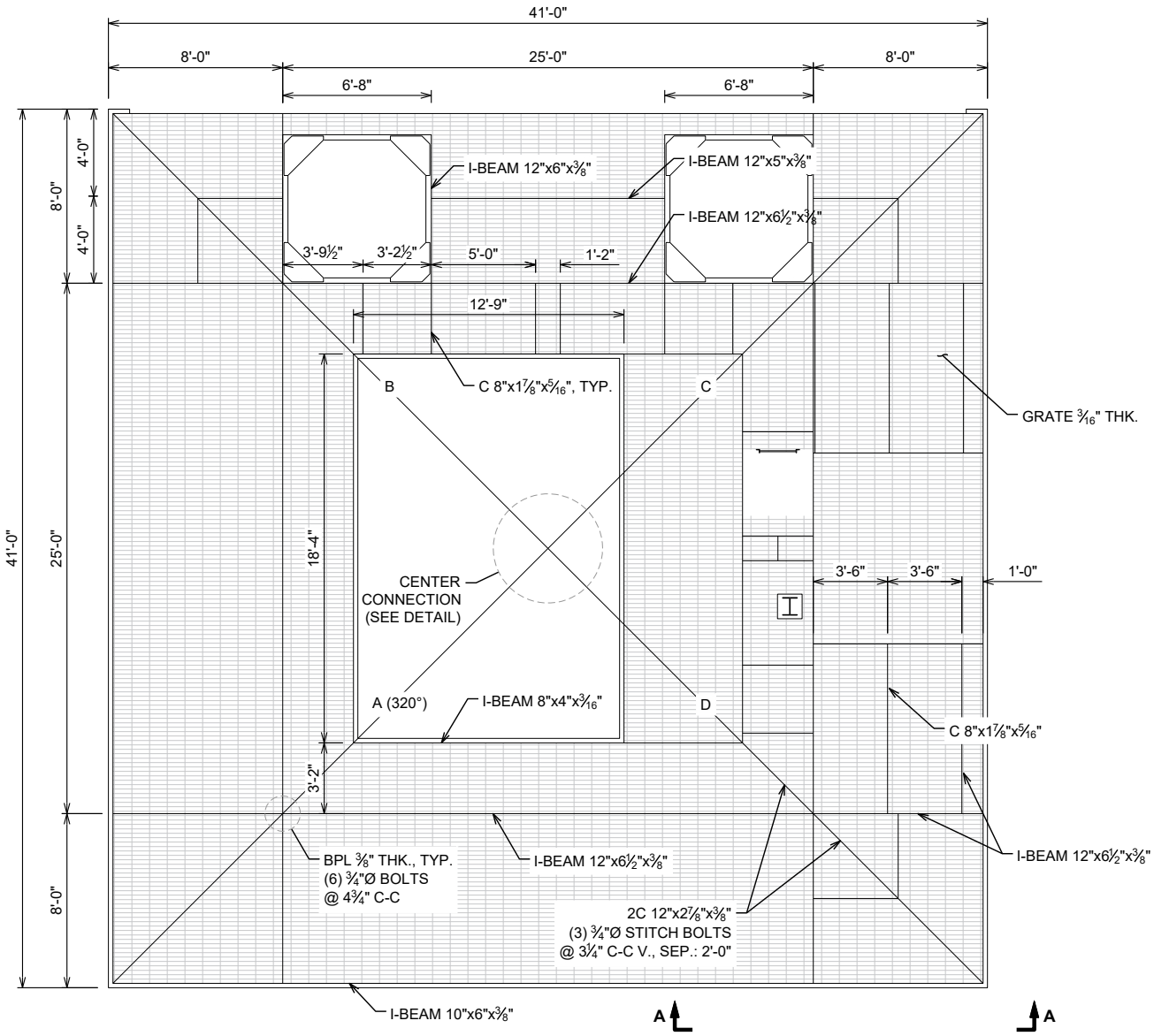
EXTERIOR BRACING (C-C)

PLATFORM MOUNT DETAIL

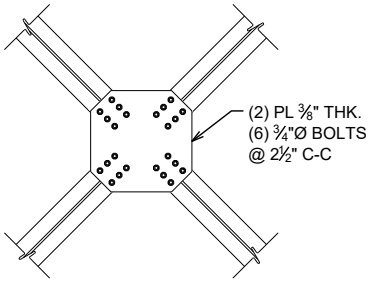
N.T.S

GPD Engineering and Architecture
Professional Corporation

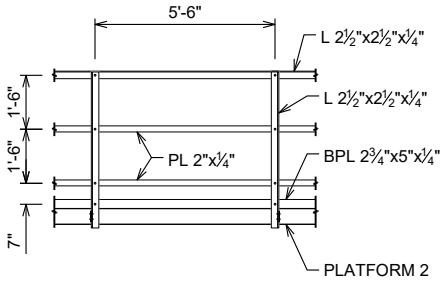
SITE NAME: **CHESHIRE**	ADDRESS: **751 Higgens Rd Cheshire, CT 06410**	REVISION: 0
		DRAWN BY: OT/GT
SITE NUMBER: **TAG0053**	DATE: **04/09/2020**	SHEET NUMBER: S-2



NOTE: ALL CHANNEL AND I-BEAM MEMBER THICKNESSES RECORDED
REPRESENT APPROXIMATE AVERAGE FLANGE THICKNESS OF MEMBERS



CENTER CONNECTION DETAIL



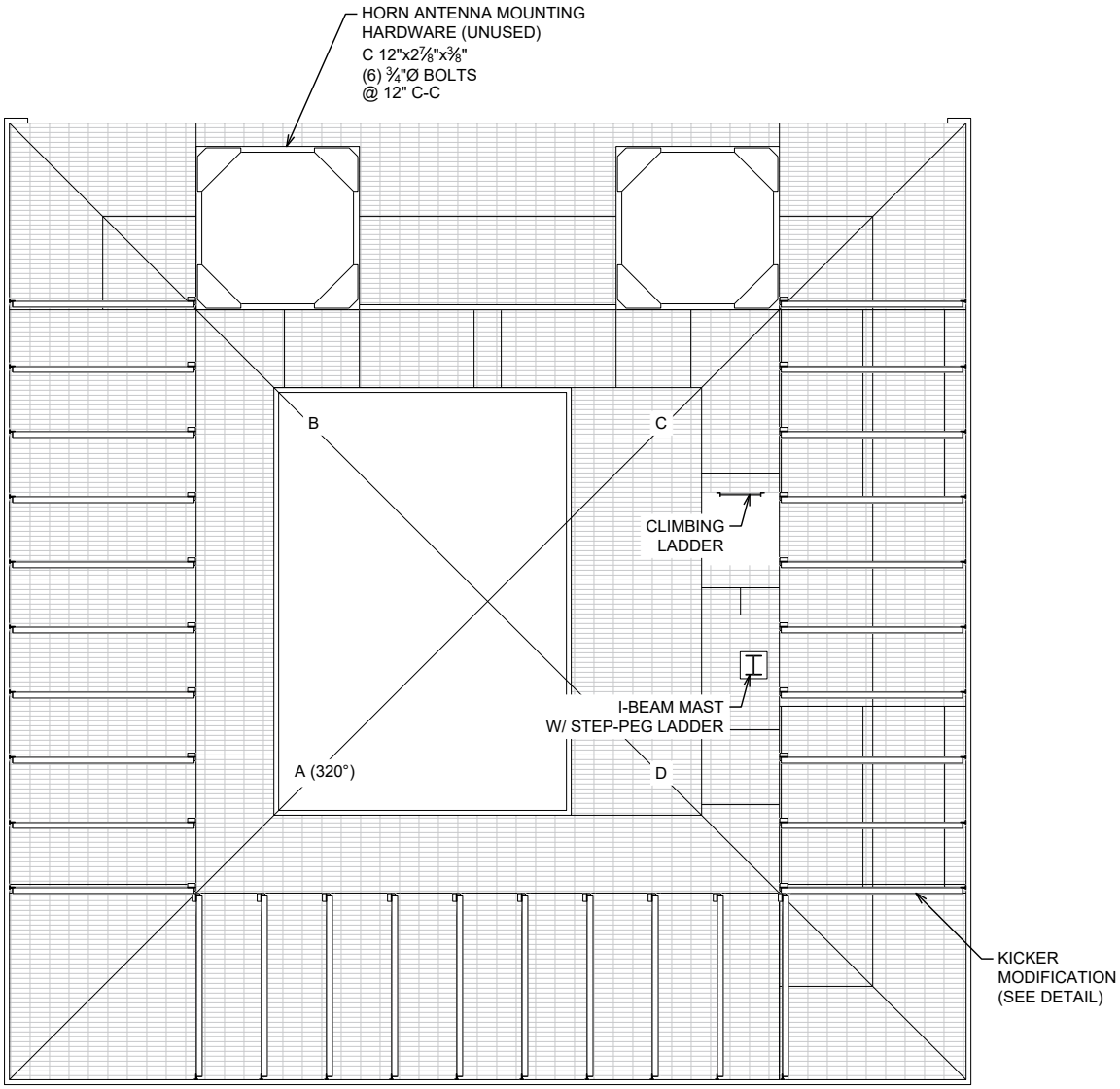
RAILING DETAIL

PLATFORM 2 MOUNT DETAIL

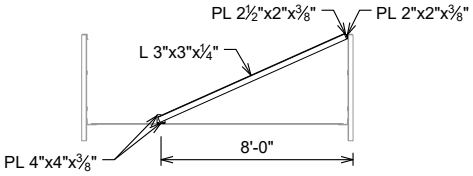
N.T.S

GPD Engineering and Architecture
Professional Corporation

SITE NAME: **CHESHIRE**	ADDRESS: **751 Higgens Rd Cheshire, CT 06410**	REVISION: 0
		DRAWN BY: OT/GT
SITE NUMBER: **TAG0053**	DATE: **04/09/2020**	SHEET NUMBER: S-3



NOTE: ALL CHANNEL AND I-BEAM MEMBER THICKNESSES RECORDED
REPRESENT APPROXIMATE AVERAGE FLANGE THICKNESS OF MEMBERS



KICKER MODIFICATION DETAIL (SIDE VIEW)

PLATFORM 2 MODIFICATION DETAIL

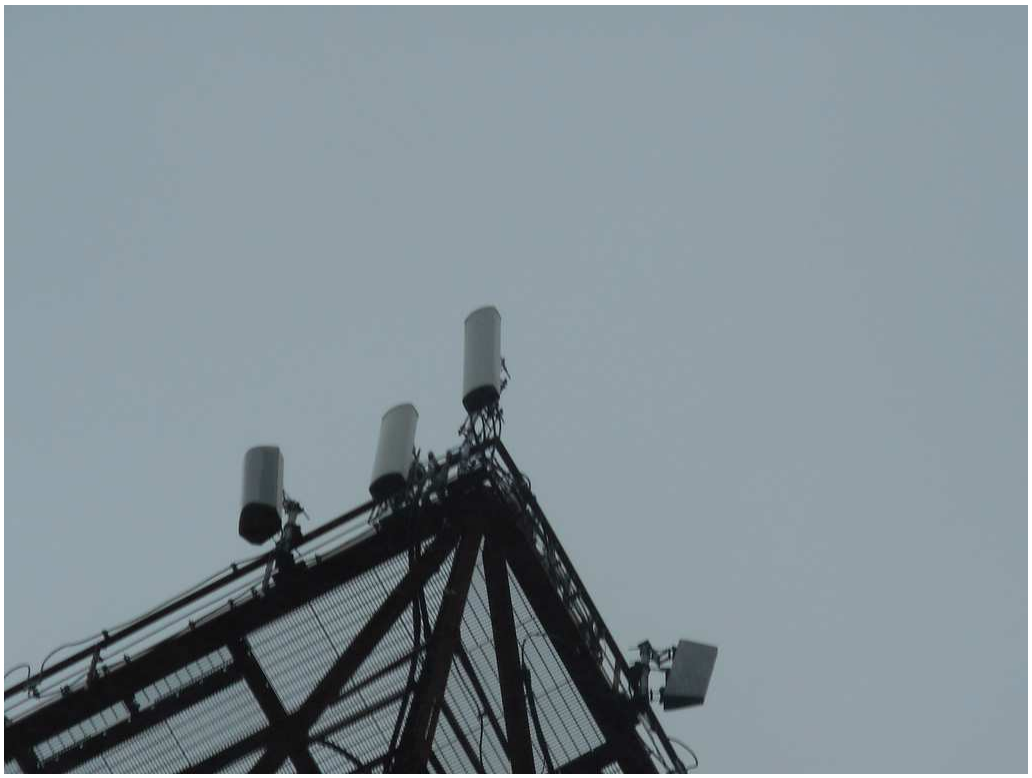
N.T.S

GPD Engineering and Architecture
Professional Corporation

SITE NAME: **CHESHIRE**	ADDRESS: **751 Higgens Rd Cheshire, CT 06410**	REVISION: 0
		DRAWN BY: OT/GT
SITE NUMBER: **TAG0053**	DATE: **04/09/2020**	SHEET NUMBER: S-4

APPENDIX C

Overall Tower



Alpha Sector

Beta Sector

Gamma Sector