Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

January 30, 2019

Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: **Notice of Exempt Modification for Crown Site BU: 876346 – Union**
AT&T Site ID: 10035087 – Union North
23 Holland Road, Union, Tolland County, CT 06076
Latitude: 41° 1′ 45.94″/ Longitude: -72° 8′ 23.54″

Dear Ms. Bachman:

AT&T currently maintains (5) antennas at the 140-foot level of the existing 150-foot monopole at 23 Holland Road, Stafford Springs, Connecticut 06076. The tower is owned by Crown Castle. The property is owned by Transportation Alliance Bank. AT&T intends to replace (5) of the existing antennas with (6) new antennas, replace (3) existing RRHS with (6) RRHs, add (1) hybrid, and add (2) DC power cables.

The facility was approved by the Town of Stafford Springs Planning and Zoning Commission. I have requested the original approval from the Town but have not received same to date.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to First Selectwoman Mary Mitta, Town of Stafford, Dennis Milanovich, Building Official for the Town of Stafford, and Transportation Alliance Bank as the property owner. Crown Castle is the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, Sprint respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Anne Marie Zsamba.

Sincerely,

Anne Marie Zsamba, Esq.
Real Estate Specialist
3 Corporate Park Drive, Suite 101, Clifton Park, NY 12065
(201) 236-9224
annemarie.zsamba@crowncastle.com

Attachments:

Tab 1: Exhibit-A: Compound Plan and Elevation Depicting the Planned Changes
Tab 2: Exhibit-B: Structural Modification Report
Tab 3: Exhibit-C: General Power Density Table Report (RF Emissions Analysis Report)

cc: The Honorable David D. Eaton, First Selectman
Town of Union – Town Hall
1043 Buckley Highway
Union, CT 06076

Joe Pajak, Building Official
Town of Union – Town Hall
1043 Buckley Highway
Union, CT 06076

Transportation Alliance Bank, Inc.
4185 Harrison Blvd. Suite 200
Pogdon, UT 84403

ORIGIN ID:GFLA (518) 373-3523
ANNE MARIE ZSAMBA
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 31JAN19
ACTWGT: 1.50 LB
CAD: 104924194/INET4100

BILL SENDER

TO **THE HONORABLE DAVID EATON**
TOWN OF UNION TOWN HALL
1043 BUCKLEY HWY
UNION CT 06076
(201) 236-9224 REF: 1734.7680
INV:
PO: DEPT:

565J2/0E3D/23AD

FedEx Express

J191019010701uv

FRI - 01 FEB 10:30A
PRIORITY OVERNIGHT

TRK# 0201 **7743 5957 4154**

06076
EB QCWA CT-US **BDL**

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ORIGIN ID:GFLA (518) 373-3523
ANNE MARIE ZSAMBA
CROWN CASTLE
3 CORPORATE PARK DRIVE
SUITE 101
CLIFTON PARK, NY 12065
UNITED STATES US

SHIP DATE: 31JAN19
ACTWGT: 1.50 LB
CAD: 104924194/INET4100

BILL SENDER

TO **JOE PAJAK, BUILDING OFFICIAL**
TOWN OF UNION TOWN HALL
1043 BUCKLEY HWY
UNION CT 06076
(201) 236-9224 REF: 1734.7680
INV:
PO: DEPT:

565J2/0E3D/23AD

FedEx Express

J191019010701uv

FRI - 01 FEB 10:30A
PRIORITY OVERNIGHT

TRK# 0201 **7743 5959 2852**

06076
CT-US **BDL**

EB QCWA

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Robidoux, Evan

From: Zsamba, Anne Marie <AnneMarie.Zsamba@crowncastle.com>
Sent: Thursday, January 31, 2019 12:58 PM
To: CSC-DL Siting Council
Subject: RE: AT&T - 876346 - 23 Holland Road, Stafford Springs - Notice of Exempt Modification Part 2
Attachments: 876346 23 HOLLAND RD CORRECTION.pdf

Good afternoon,

My most sincere apologies. Please see the attached revised cover letter and fedex labels in an effort to preempt a Council incomplete notice. I incorrectly served the wrong jurisdiction. The labels attached and mailings that went out today will allow for service to be properly effectuated by tomorrow morning at 10am for this filing. Again, my apologies.

ANNE MARIE ZSAMBA
Real Estate Specialist
T: (201) 236-9224 | M: (518) 350-3639

CROWN CASTLE
3 Corporate Park Drive, Suite 101, Clifton Park, NY 12065
CrownCastle.com

From: Zsamba, Anne Marie
Sent: Wednesday, January 30, 2019 1:31 PM
To: CSC-DL Siting Council
Subject: AT&T - 876346 - 23 Holland Road, Stafford Springs - Notice of Exempt Modification Part 2

Good afternoon,

Attached please find Part 2 of the Exempt Modification package sent via FedEx for January 31st delivery for AT&T– 23 Holland Road, Stafford Springs, Connecticut. If you have any questions, please do not hesitate to contact me.

Thank you,

ANNE MARIE ZSAMBA
Real Estate Specialist
T: (201) 236-9224 | M: (518) 350-3639

CROWN CASTLE
3 Corporate Park Drive, Suite 101, Clifton Park, NY 12065
CrownCastle.com

Date: **December 27, 2018**

Charles McGruirt
Crown Castle
3 Corporate Dr., St 101
Clifton Park, NY 12065

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
Infinigy Engineering, PLLC
1033 Watervliet Shaker Road
Albany, NY 12205
518-690-0790
structural@infinigy.com

Subject:	**Mount Analysis Report**	
Carrier Designation:	**AT&T Update**	
	Carrier Site Number:	10035087
	Carrier Site Name:	CTL01094
Crown Castle Designation:	**Crown Castle BU Number:**	876346
	Crown Castle Site Name:	Union
	Crown Castle JDE Job Number:	548520
	Crown Castle Order Number:	471505 Rev. 0
Engineering Firm Designation:	**Infinigy Report Designation:**	600-003
Site Data:	**23 Holland Road, Stafford Springs, CT, 06076** **Latitude 42°01'45.94" Longitude -72°08'23.54"**	
Structure Information:	**Tower Height & Type:**	**150 ft Monopole**
	Mount Elevation:	**137 ft**
	Mount Type:	**13.5 ft Platform**

Dear Charles McGruirt,

Infinigy is pleased to submit this **"Mount Analysis Report"** to determine the structural integrity of AT&T's antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

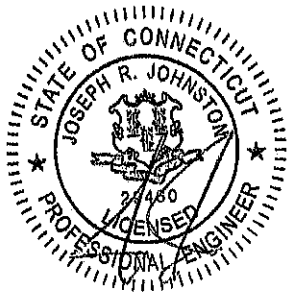
The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

Platform **Sufficient**

The analysis has been performed in accordance with the 2015 International Building Code/ 2018 Connecticut Building Code and TIA-222-H Standard based upon an ultimate 3-second gust wind speed of 125 mph. Exposure Category C with Risk Category II used in this analysis.

Mount analysis prepared by: Ishan Patel, E.I.T
Respectfully Submitted by:

Joe Johnston, P.E.
VP Structural Engineering



12/27/2018

TABLE OF CONTENTS

1) INTRODUCTION

This mount is a existing 13.5 ft Platform mapped on 04/10/2015. This mount is installed at the 137 ft elevation on 3 sectors of the 150 ft monopole.

2) ANALYSIS CRITERIA

Building Code:	2015 IBC
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	125 mph
Exposure Category:	C
Ice Thickness:	1.7 in
Wind Speed with Ice:	50 mph
Man Live Load at End-Points:	250 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Mount type
137.0	137.0	3	CCI HPA65R-BU4A	Platform
		3	Kathrein 80010964	
		2	P/Wave 7770	
		3	Ericsson RRUS 4449 B5/B12	
		3	Ericsson RRUS 8843 B2/B66A	
		4	P/Wave LGP21401	
		2	Raycap DC6-48-60-18-8F	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Crown Application	AT&T	471505, Rev. 0	CCI Sites
TIA Inspecion	--	4/10/2015	CCI Sites

3.1) Analysis Method

RISA-3D (Version 17.0.2), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

3.2) Assumptions

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

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM A53 (GR 35)
Pipe	ASTM A53 (GR 35)
Connection Bolts	ASTM A325

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

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Platform, Alpha Sector)

Notes	Component	Centerline (ft)	% Capacity	Pass / Fail
1,2	Horizontal	137.0	24.2%	Pass
	Mount Pipe		63.7%	
	Stand-off		38.2%	
	Bolts		14.1%	

Structure Rating (max from all components) =	63.7%

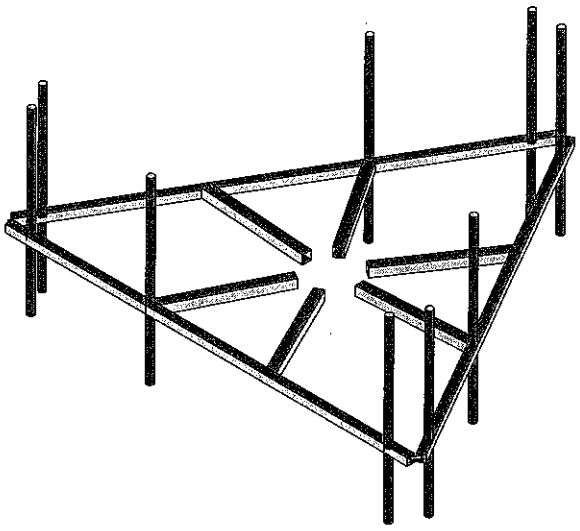
Notes:
1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
2) All sectors are typical

4.1) Recommendations

The Sector Frame Mount has sufficient capacity to support the proposed loading. No modifications are required at this time.

APPENDIX A

WIRE FRAME AND RENDERED MODELS



Envelope Only Solution

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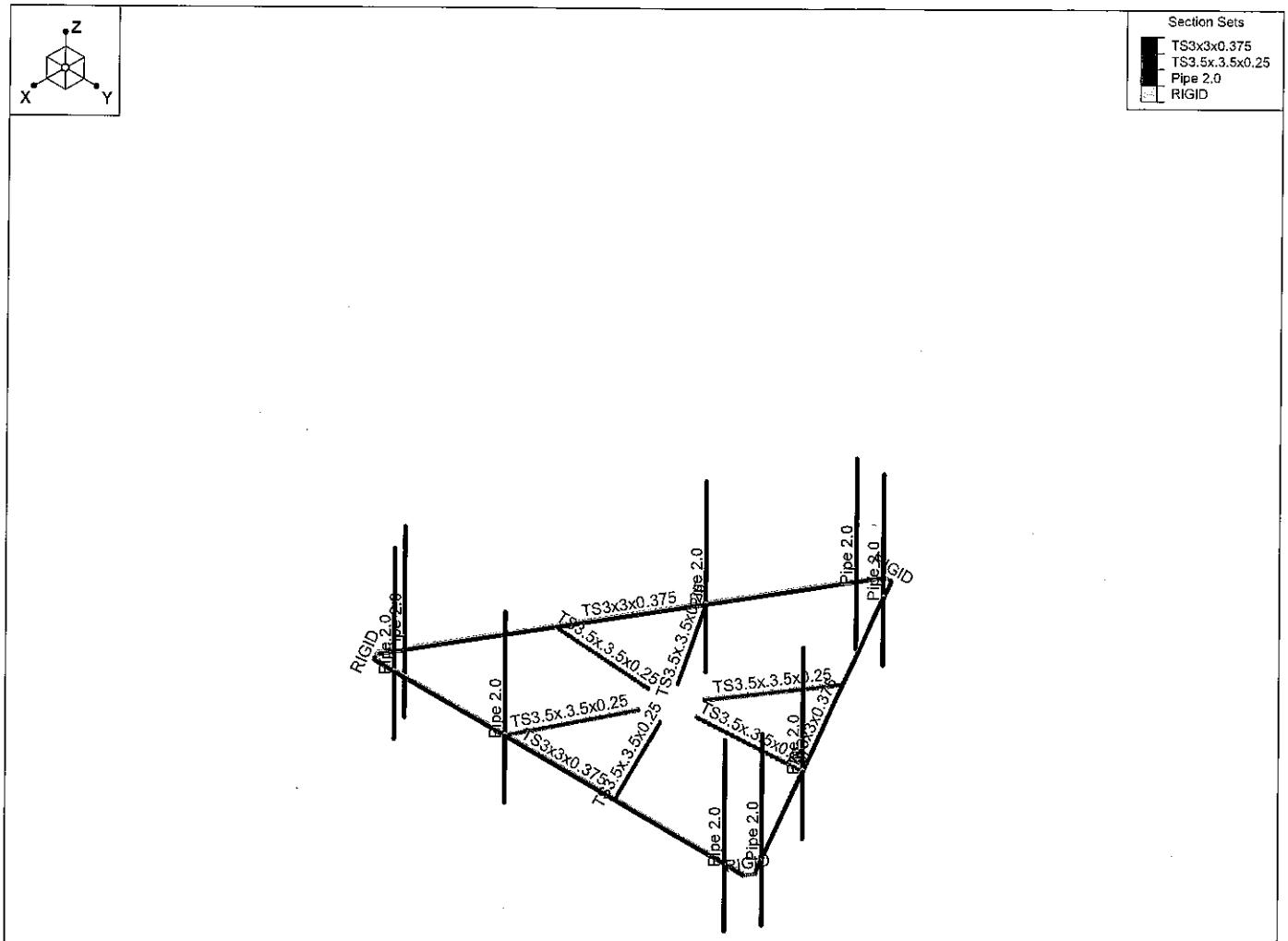

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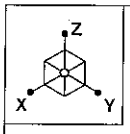

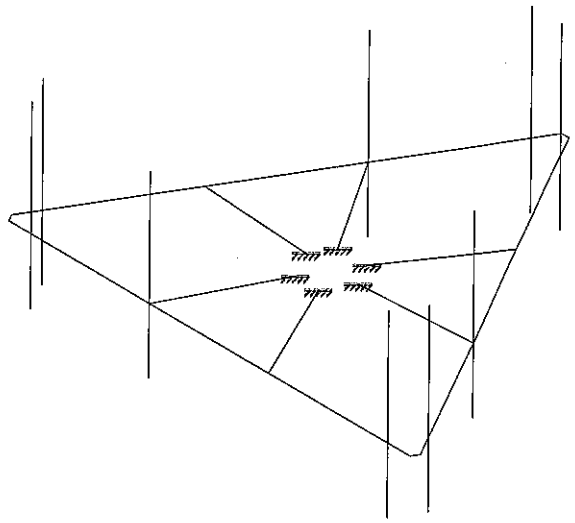

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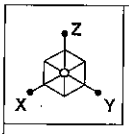

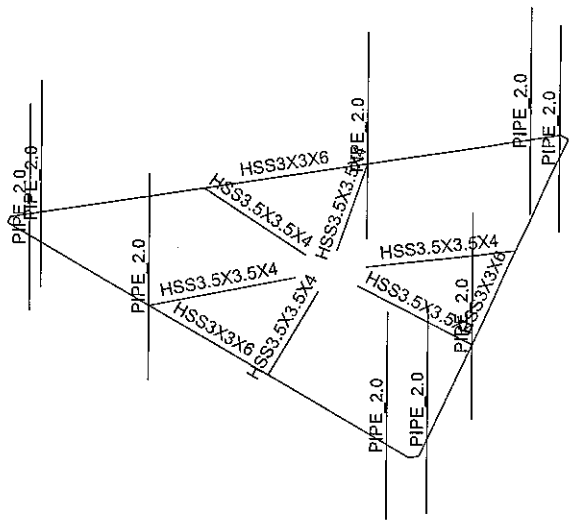

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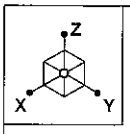

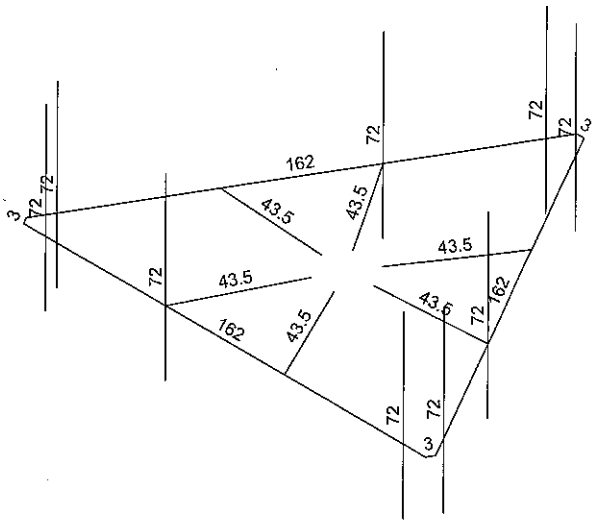

Member Length (in) Displayed
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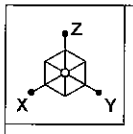

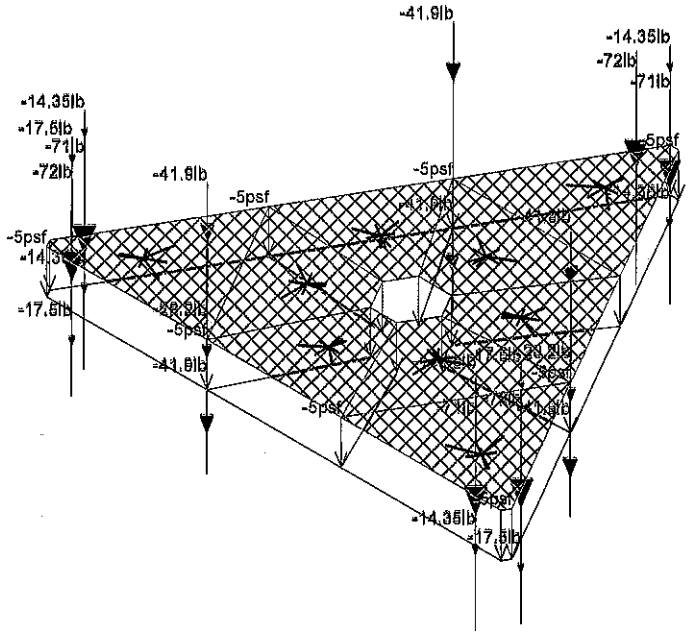

Loads: BLC 1, Self Weight
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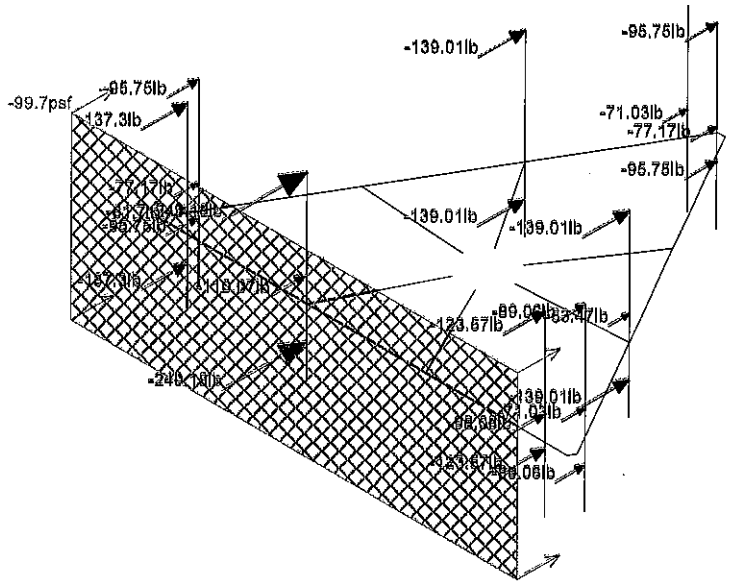

Loads: BLC 2, Wind Load AZI 000
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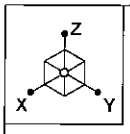

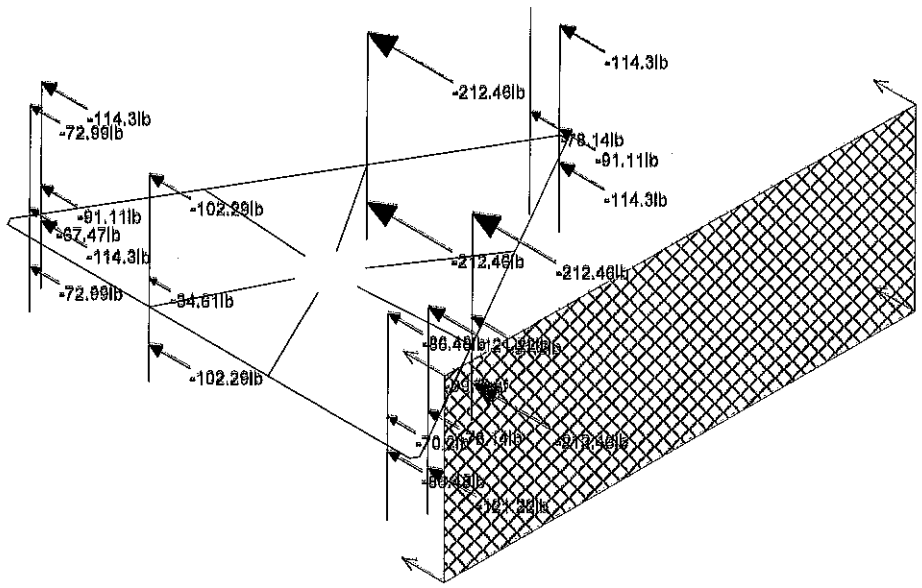

Loads: BLC 3, Wind Load AZI 090
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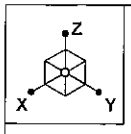

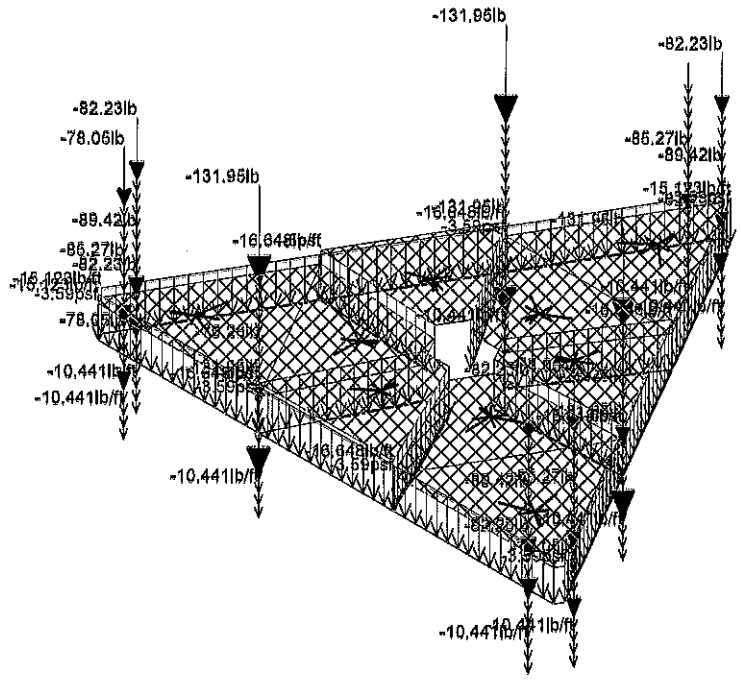

Loads: BLC 4, Ice Weight
Envelope Only Solution

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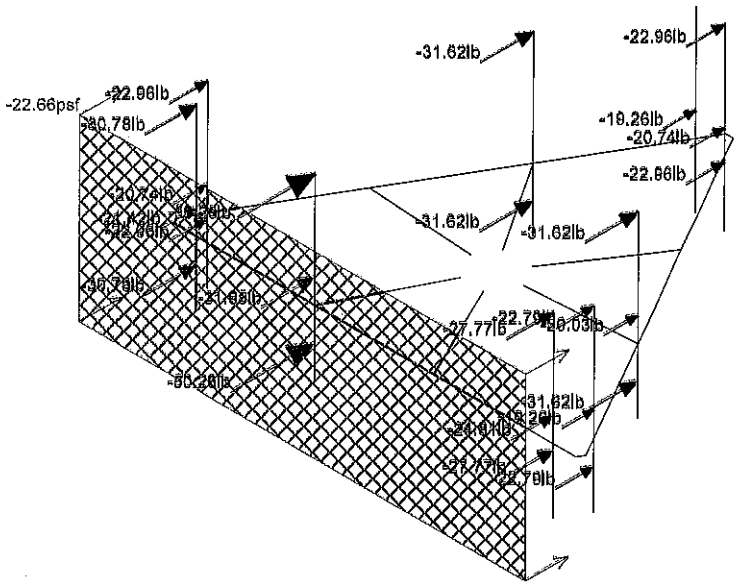

Loads: BLC 5, Wind + Ice Load AZI 000
Envelope Only Solution

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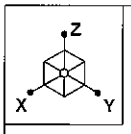

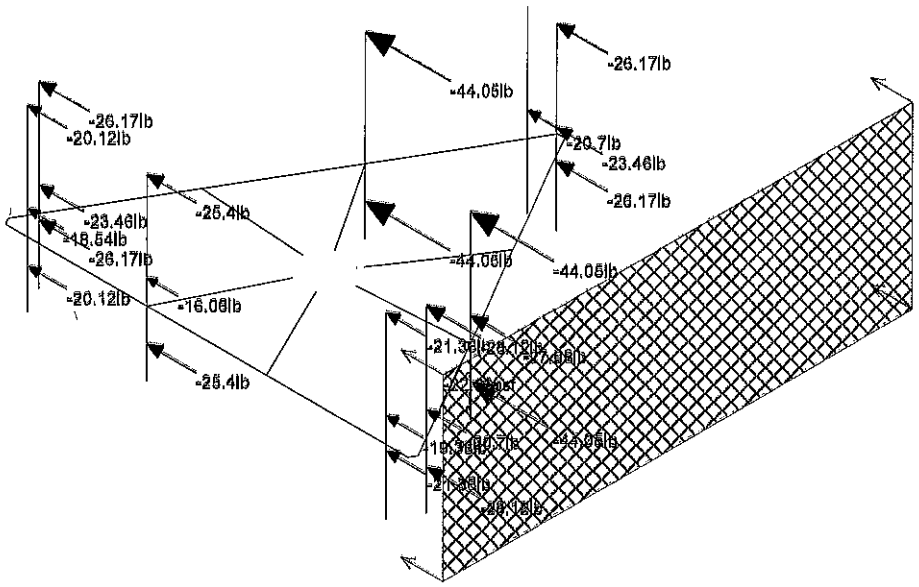

Loads: BLC 6, Wind + Ice Load AZI 090
Envelope Only Solution

Infinigy Engineering	876346	Existing Configuration
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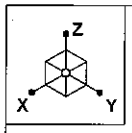

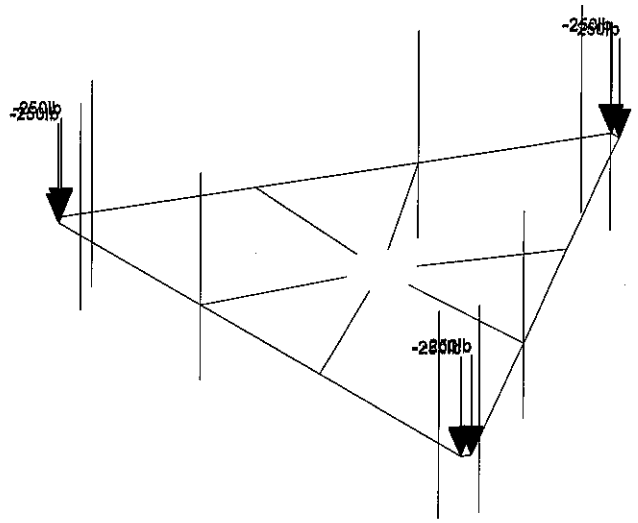

Loads: BLC 7, Service Live 1
Envelope Only Solution

Infinigy Engineering	876346	Existing Configuration
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600-003		AT03XC031.r3d

APPENDIX B

SOFTWARE INPUT CALCULATIONS

Site Name:	876346
Client:	CCI
Carrier:	AT&T
Engineer:	IP
Date:	12/27/2018

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless

INFINIGY WIND LOAD CALCULATOR 3.0.2

Site Information Inputs:

Adopted Building Code:	2015 IBC
Structure Load Standard:	TIA-222-H
Antenna Load Standard:	TIA-222-H
Structure Risk Category:	II
Structure Type:	Mount + Platform
Number of Sectors:	3
Structure Shape 1:	Flat

Rooftop Inputs:

Rooftop Wind Speed-Up?: No

Wind Loading Inputs:

Design Wind Velocity:	125	mph (ultimate 3-second gust)
Wind Centerline 1 (z_1):	137.0	ft
Side Face Angle (θ):	60	degrees
Exposure Category:	C	
Topographic Category:	1	

Wind with No Ice		
q_z (psf)	Gh	F_{ST} (psf)
49.85	1.00	**99.70**

Wind with Ice		
q_z (psf)	Gh	F_{ST} (psf)
7.98	1.00	**22.66**

Ice Loading Inputs:

Is Ice Loading Needed?:	Yes	
Ice Wind Velocity:	50	mph (ultimate 3-second gust)
Base Ice Thickness:	1.70	in

Input Appurtenance Information and Load Placements:

Appurtenance Name	Elevation (ft)	Total Quantity	Ka	Front Shape	Side Shape	q_z (psf)	EPA (ft^2)	Fz (lbs)	Fx (lbs)	Fz(60) (lbs)	Fx(30) (lbs)
CCI HPA65R-BU4A	137.0	3	1.00	Flat	Flat	49.85	4.96	247.14	172.96	191.51	228.60
Kathrein 80010964	137.0	3	1.00	Flat	Flat	49.85	10.00	498.36	204.59	278.03	424.92
P/Wave 7770	137.0	2	1.00	Flat	Flat	49.85	5.51	274.60	145.97	178.13	242.44
Ericsson RRUS 4449 B5/B12	137.0	3	1.00	Flat	Flat	49.85	1.97	98.08	70.20	77.17	91.11
Ericsson RRUS 8843 B2/B66A	137.0	3	1.00	Flat	Flat	49.85	1.64	81.70	67.47	71.03	78.14
P/Wave LGP21401	137.0	4	1.00	Flat	Flat	49.85	1.10	55.03	17.30	26.74	45.60
Raycap DC6-48-60-18-8F	137.0	2	1.00	Round	Round	49.85	1.21	60.40	60.40	60.40	60.40

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N51	N50A			TS3x3x0.375	Beam	Tube	A500 Gr.46	Typical
2	M2	N47	N48A			TS3x3x0.375	Beam	Tube	A500 Gr.46	Typical
3	M3	N54A	N53A			TS3x3x0.375	Beam	Tube	A500 Gr.46	Typical
4	M4	N11	N14			TS3.5x3.5x0.25	Beam	Tube	A500 Gr.46	Typical
5	M5	N8	N15			TS3.5x3.5x0.25	Beam	Tube	A500 Gr.46	Typical
6	M6	N10	N16			TS3.5x3.5x0.25	Beam	Tube	A500 Gr.46	Typical
7	M7	N7	N17			TS3.5x3.5x0.25	Beam	Tube	A500 Gr.46	Typical
8	M8	N12	N18			TS3.5x3.5x0.25	Beam	Tube	A500 Gr.46	Typical
9	M9	N9	N19			TS3.5x3.5x0.25	Beam	Tube	A500 Gr.46	Typical
10	MP3	N54	N50			Pipe 2.0	Beam	Pipe	A53 Gr.B	Typical
11	MP2	N52	N48			Pipe 2.0	Beam	Pipe	A53 Gr.B	Typical
12	MP1	N53	N49			Pipe 2.0	Beam	Pipe	A53 Gr.B	Typical
13	MP6	N31	N28			Pipe 2.0	Beam	Pipe	A53 Gr.B	Typical
14	MP5	N29	N26			Pipe 2.0	Beam	Pipe	A53 Gr.B	Typical
15	MP4	N30	N27			Pipe 2.0	Beam	Pipe	A53 Gr.B	Typical
16	MP9	N38	N35			Pipe 2.0	Beam	Pipe	A53 Gr.B	Typical
17	MP8	N36	N33			Pipe 2.0	Beam	Pipe	A53 Gr.B	Typical
18	MP7	N37	N34			Pipe 2.0	Beam	Pipe	A53 Gr.B	Typical
19	M19	N47	N54A			RIGID	None	None	RIGID	Typical
20	M20	N51	N53A			RIGID	None	None	RIGID	Typical
21	M21	N50A	N48A			RIGID	None	None	RIGID	Typical

Material Takeoff

	Material	Size	Pieces	Length[in]	Weight[LB]
1	General				
2	RIGID		3	9	0
3	Total General		3	9	0
4					
5	Hot Rolled Steel				
6	A500 Gr.46	HSS3.5X3.5X4	6	261	215.4
7	A500 Gr.46	HSS3X3X6	3	486	467.2
8	A53 Gr.B	PIPE_2.0	9	648	187.4
9	Total HR Steel		18	1395	870

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(...
1	Self Weight	DL		-1			24		6	
2	Wind Load AZI 000	WLZ					24		1	
3	Wind Load AZI 090	WLX					24		1	
4	Ice Weight	OL1					24	18	6	
5	Wind + Ice Load AZI 000	OL2					24		1	
6	Wind + Ice Load AZI 090	OL3					24		1	
7	Service Live 1	LL				6				
8	BLC 1 Transient Area Loads	None						54		
9	BLC 2 Transient Area Loads	None						21		
10	BLC 3 Transient Area Loads	None						19		
11	BLC 4 Transient Area Loads	None						54		
12	BLC 5 Transient Area Loads	None						21		
13	BLC 6 Transient Area Loads	None						19		

Load Combinations

	Description	Solve	PDelta	S...	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Fa...
1	1.4D	Yes	Y		DL	1.4						
2	1.2D + 1W AZI 000	Yes	Y		DL	1.2	WLZ	1				
3	1.2D + 1W AZI 030	Yes	Y		DL	1.2	WLZ	.866	WLX	.5		
4	1.2D + 1W AZI 060	Yes	Y		DL	1.2	WLZ	.5	WLX	.866		
5	1.2D + 1W AZI 090	Yes	Y		DL	1.2			WLX	1		
6	1.2D + 1W AZI 120	Yes	Y		DL	1.2	WLZ	-.5	WLX	.866		
7	1.2D + 1W AZI 150	Yes	Y		DL	1.2	WLZ	-.866	WLX	.5		
8	1.2D + 1W AZI 180	Yes	Y		DL	1.2	WLZ	-1				
9	1.2D + 1W AZI 210	Yes	Y		DL	1.2	WLZ	-.866	WLX	-.5		
10	1.2D + 1W AZI 240	Yes	Y		DL	1.2	WLZ	-.5	WLX	-.866		
11	1.2D + 1W AZI 270	Yes	Y		DL	1.2			WLX	-1		
12	1.2D + 1W AZI 300	Yes	Y		DL	1.2	WLZ	.5	WLX	-.866		
13	1.2D + 1W AZI 330	Yes	Y		DL	1.2	WLZ	.866	WLX	-.5		
14	0.9D + 1W AZI 000	Yes	Y		DL	.9	WLZ	1				
15	0.9D + 1W AZI 030	Yes	Y		DL	.9	WLZ	.866	WLX	.5		
16	0.9D + 1W AZI 060	Yes	Y		DL	.9	WLZ	.5	WLX	.866		
17	0.9D + 1W AZI 090	Yes	Y		DL	.9			WLX	1		
18	0.9D + 1W AZI 120	Yes	Y		DL	.9	WLZ	-.5	WLX	.866		
19	0.9D + 1W AZI 150	Yes	Y		DL	.9	WLZ	-.866	WLX	.5		
20	0.9D + 1W AZI 180	Yes	Y		DL	.9	WLZ	-1				
21	0.9D + 1W AZI 210	Yes	Y		DL	.9	WLZ	-.866	WLX	-.5		
22	0.9D + 1W AZI 240	Yes	Y		DL	.9	WLZ	-.5	WLX	-.866		
23	0.9D + 1W AZI 270	Yes	Y		DL	.9			WLX	-1		
24	0.9D + 1W AZI 300	Yes	Y		DL	.9	WLZ	.5	WLX	-.866		
25	0.9D + 1W AZI 330	Yes	Y		DL	.9	WLZ	.866	WLX	-.5		
26	1.2D + 1.0Dl	Yes	Y		DL	1.2	OL1	1				
27	1.2D + 1.0Dl + 1.0Wl AZI ...	Yes	Y		DL	1.2	OL1	1	OL2	1		
28	1.2D + 1.0Dl + 1.0Wl AZI ...	Yes	Y		DL	1.2	OL1	1	OL2	.866	OL3	.5
29	1.2D + 1.0Dl + 1.0Wl AZI ...	Yes	Y		DL	1.2	OL1	1	OL2	.5	OL3	.866
30	1.2D + 1.0Dl + 1.0Wl AZI ...	Yes	Y		DL	1.2	OL1	1			OL3	1
31	1.2D + 1.0Dl + 1.0Wl AZI ...	Yes	Y		DL	1.2	OL1	1	OL2	-.5	OL3	.866
32	1.2D + 1.0Dl + 1.0Wl AZI ...	Yes	Y		DL	1.2	OL1	1	OL2	-.866	OL3	.5
33	1.2D + 1.0Dl + 1.0Wl AZI ...	Yes	Y		DL	1.2	OL1	1	OL2	-1		
34	1.2D + 1.0Dl + 1.0Wl AZI ...	Yes	Y		DL	1.2	OL1	1	OL2	-.866	OL3	-.5
35	1.2D + 1.0Dl + 1.0Wl AZI ...	Yes	Y		DL	1.2	OL1	1	OL2	-.5	OL3	-.8...
36	1.2D + 1.0Dl + 1.0Wl AZI ...	Yes	Y		DL	1.2	OL1	1			OL3	-1
37	1.2D + 1.0Dl + 1.0Wl AZI ...	Yes	Y		DL	1.2	OL1	1	OL2	.5	OL3	-.8...
38	1.2D + 1.0Dl + 1.0Wl AZI ...	Yes	Y		DL	1.2	OL1	1	OL2	.866	OL3	-.5
39	1.2D + 1.5L + 1.0WL (30 ...	Yes	Y		DL	1.2	LL	1.5	WLZ	.058		
40	1.2D + 1.5L + 1.0WL (30 ...	Yes	Y		DL	1.2	LL	1.5	WLZ	.05	WLX	.029
41	1.2D + 1.5L + 1.0WL (30 ...	Yes	Y		DL	1.2	LL	1.5	WLZ	.029	WLX	.05
42	1.2D + 1.5L + 1.0WL (30 ...	Yes	Y		DL	1.2	LL	1.5			WLX	.058
43	1.2D + 1.5L + 1.0WL (30 ...	Yes	Y		DL	1.2	LL	1.5	WLZ	-.029	WLX	.05
44	1.2D + 1.5L + 1.0WL (30 ...	Yes	Y		DL	1.2	LL	1.5	WLZ	-.05	WLX	.029
45	1.2D + 1.5L + 1.0WL (30 ...	Yes	Y		DL	1.2	LL	1.5	WLZ	-.058		
46	1.2D + 1.5L + 1.0WL (30 ...	Yes	Y		DL	1.2	LL	1.5	WLZ	-.05	WLX	-.0...
47	1.2D + 1.5L + 1.0WL (30 ...	Yes	Y		DL	1.2	LL	1.5	WLZ	-.029	WLX	-.05
48	1.2D + 1.5L + 1.0WL (30 ...	Yes	Y		DL	1.2	LL	1.5			WLX	-.0...
49	1.2D + 1.5L + 1.0WL (30 ...	Yes	Y		DL	1.2	LL	1.5	WLZ	.029	WLX	-.05
50	1.2D + 1.5L + 1.0WL (30 ...	Yes	Y		DL	1.2	LL	1.5	WLZ	.05	WLX	-.0...

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N14	max	1094.508	25	1225.905	6	1086.21	31	112.117	24	458.558	14	1520.828	5
2		min	-1208.78	7	-897.936	24	96.016	24	-2161.902	31	-3510.755	33	-1046.395	23
3	N16	max	703.276	3	1596.564	5	1085.293	35	4041.025	36	304.469	14	1317.546	21
4		min	-587.249	21	-1158.625	23	109.996	16	-393.893	17	-397.688	8	-1586.585	3
5	N15	max	648.57	3	1153.802	4	953.525	34	1865.406	35	618.501	15	1554.954	4
6		min	-534.345	21	-832.296	22	-93.94	15	-216.99	16	-3085.299	34	-1080.99	22
7	N19	max	589.515	24	1108.726	6	930.927	30	429.946	23	206.962	15	1334.524	25
8		min	-720.176	6	-703.673	24	-49.432	23	-3497.323	30	-312.83	9	-1623.935	7
9	N18	max	1269.351	2	674.066	5	855.775	27	337.975	22	2742.895	28	1411.86	25
10		min	-1172.33	20	-493.385	23	35.947	20	-1612.57	29	-219.718	21	-1618.696	7
11	N17	max	1069.237	14	361.043	5	793.853	38	1533.548	37	2508.356	38	1311.549	21
12		min	-1150.945	8	-205.658	23	-67.962	19	-396.329	18	-335.443	19	-1493.589	3
13	Totals:	max	4936.281	2	5745.222	5	5459.922	31						
14		min	-4936.281	20	-3918.263	23	1071.167	24						

Envelope AISC 13th(360-05): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*Pnc ...	phi*Pnt [...	phi*Mn y...	phi*Mn z...	Cb	Eqn
1	MP2	PIPE_2.0	.637	26.25	8	.045	26.25		8	20866.7...	32130	1871.625	1871.625	2...	H1-1b
2	MP5	PIPE_2.0	.569	26.25	5	.041	26.25		5	20866.7...	32130	1871.625	1871.625	1...	H1-1b
3	MP8	PIPE_2.0	.528	26.25	5	.032	26.25		5	20866.7...	32130	1871.625	1871.625	1...	H1-1b
4	MP3	PIPE_2.0	.397	26.25	8	.031	26.25		8	20866.7...	32130	1871.625	1871.625	2...	H1-1b
5	M4	HSS3.5X3....	.382	43.5	31	.078	43.5	y	29	111937....	120474	12075	12075	1...	H1-1b
6	MP6	PIPE_2.0	.378	26.25	5	.030	26.25		5	20866.7...	32130	1871.625	1871.625	1...	H1-1b
7	MP1	PIPE_2.0	.376	26.25	8	.031	26.25		8	20866.7...	32130	1871.625	1871.625	2...	H1-1b
8	MP7	PIPE_2.0	.370	26.25	5	.031	26.25		5	20866.7...	32130	1871.625	1871.625	2...	H1-1b
9	MP4	PIPE_2.0	.369	26.25	5	.031	26.25		5	20866.7...	32130	1871.625	1871.625	2...	H1-1b
10	M6	HSS3.5X3....	.352	43.5	27	.082	43.5	y	33	111937....	120474	12075	12075	1...	H1-1b
11	M9	HSS3.5X3....	.327	43.5	31	.073	43.5	y	32	111937....	120474	12075	12075	1...	H1-1b
12	M5	HSS3.5X3....	.316	43.5	31	.064	43.5	y	37	111937....	120474	12075	12075	1...	H1-1b
13	M8	HSS3.5X3....	.280	43.5	31	.059	43.5	y	49	111937....	120474	12075	12075	1...	H1-1b
14	M7	HSS3.5X3....	.275	43.5	27	.057	43.5	y	41	111937....	120474	12075	12075	1...	H1-1b
15	M3	HSS3X3X6	.242	55.687	31	.044	55.687	z	4	32536.8...	140346	11212.5	11212.5	1...	H1-1b
16	M2	HSS3X3X6	.222	106.312	29	.052	0	z	3	32536.8...	140346	11212.5	11212.5	1...	H1-1b
17	M1	HSS3X3X6	.203	106.312	40	.045	0	z	5	32536.8...	140346	11212.5	11212.5	1...	H1-1b
18	MP9	PIPE_2.0	.129	26.25	5	.018	26.25		5	20866.7...	32130	1871.625	1871.625	2...	H1-1b

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	TS3x3x0.375	HSS3X3X6	Beam	Tube	A500 Gr.46	Typical	3.39	3.78	3.78	6.64
2	TS3.5x3.5x0.25	HSS3.5X3.5X4	Beam	Tube	A500 Gr.46	Typical	2.91	5.04	5.04	8.35
3	Pipe 2.0	PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N13						
2	N14	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N18	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
4	N19	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
5	N15	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
6	N16	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
7	N17	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
8	N1						

Joint Boundary Conditions (Continued)

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
9	N5						
10	N3						
11	N47						
12	N48A						
13	N50A						
14	N51						
15	N53A						
16	N54A						

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
1	M1						Yes	Default			None
2	M2						Yes	Default			None
3	M3						Yes	Default			None
4	M4						Yes				None
5	M5						Yes				None
6	M6						Yes				None
7	M7						Yes				None
8	M8						Yes				None
9	M9						Yes				None
10	MP3						Yes				None
11	MP2						Yes				None
12	MP1						Yes				None
13	MP6						Yes				None
14	MP5						Yes				None
15	MP4						Yes				None
16	MP9						Yes				None
17	MP8						Yes				None
18	MP7						Yes				None
19	M19						Yes	** NA **			None
20	M20						Yes	** NA **			None
21	M21						Yes	** NA **			None

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E...	Density[lb/f...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	490	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	490	50	1.1	65	1.1
3	A992	29000	11154	.3	.65	490	50	1.1	65	1.1
4	A500 Gr.42	29000	11154	.3	.65	490	42	1.4	58	1.3
5	A500 Gr.46	29000	11154	.3	.65	490	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	490	35	1.5	60	1.2

Joint Loads and Enforced Displacements (BLC 7 : Service Live 1)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2...
1	N54A	L	Z	-250
2	N47	L	Z	-250
3	N48A	L	Z	-250
4	N50A	L	Z	-250
5	N53A	L	Z	-250
6	N51	L	Z	-250

Member Point Loads (BLC 1 : Self Weight)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	Z	-14.35	24
2	MP2	Z	-41.9	13
3	MP3	Z	-17.5	16
4	MP1	Z	-71	36
5	MP3	Z	-72	36
6	MP2	Z	-28.2	36
7	MP1	Z	-14.35	72
8	MP2	Z	-41.9	72
9	MP3	Z	-17.5	72
10	MP4	Z	-14.35	24
11	MP5	Z	-41.9	13
12	MP6	Z	-17.5	16
13	MP4	Z	-71	36
14	MP6	Z	-72	36
15	MP5	Z	-28.2	36
16	MP4	Z	-14.35	72
17	MP5	Z	-41.9	72
18	MP6	Z	-17.5	72
19	MP7	Z	-14.35	24
20	MP8	Z	-41.9	13
21	MP7	Z	-71	36
22	MP9	Z	-72	36
23	MP7	Z	-14.35	72
24	MP8	Z	-41.9	72

Member Point Loads (BLC 2 : Wind Load AZI 000)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	-123.57	24
2	MP2	X	-249.18	13
3	MP3	X	-137.3	16
4	MP1	X	-98.08	36
5	MP3	X	-81.7	36
6	MP2	X	-110.07	36
7	MP1	X	-123.57	72
8	MP2	X	-249.18	72
9	MP3	X	-137.3	72
10	MP4	X	-95.75	24
11	MP5	X	-139.01	13
12	MP6	X	-89.06	16
13	MP4	X	-77.17	36
14	MP6	X	-71.03	36
15	MP5	X	-53.47	36
16	MP4	X	-95.75	72
17	MP5	X	-139.01	72
18	MP6	X	-89.06	72
19	MP7	X	-95.75	24
20	MP8	X	-139.01	13
21	MP7	X	-77.17	36
22	MP9	X	-71.03	36
23	MP7	X	-95.75	72
24	MP8	X	-139.01	72

Member Point Loads (BLC 3 : Wind Load AZI 090)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	Y	-86.48	24

Member Point Loads (BLC 3 : Wind Load AZI 090) (Continued)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
2	MP2	Y	-102.29	13
3	MP3	Y	-72.99	16
4	MP1	Y	-70.2	36
5	MP3	Y	-67.47	36
6	MP2	Y	-34.61	36
7	MP1	Y	-86.48	72
8	MP2	Y	-102.29	72
9	MP3	Y	-72.99	72
10	MP4	Y	-114.3	24
11	MP5	Y	-212.46	13
12	MP6	Y	-121.22	16
13	MP4	Y	-91.11	36
14	MP6	Y	-78.14	36
15	MP5	Y	-91.2	36
16	MP4	Y	-114.3	72
17	MP5	Y	-212.46	72
18	MP6	Y	-121.22	72
19	MP7	Y	-114.3	24
20	MP8	Y	-212.46	13
21	MP7	Y	-91.11	36
22	MP9	Y	-78.14	36
23	MP7	Y	-114.3	72
24	MP8	Y	-212.46	72

Member Point Loads (BLC 4 : Ice Weight)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	Z	-82.23	24
2	MP2	Z	-131.95	13
3	MP3	Z	-78.05	16
4	MP1	Z	-89.42	36
5	MP3	Z	-85.27	36
6	MP2	Z	-79.25	36
7	MP1	Z	-82.23	72
8	MP2	Z	-131.95	72
9	MP3	Z	-78.05	72
10	MP4	Z	-82.23	24
11	MP5	Z	-131.95	13
12	MP6	Z	-78.05	16
13	MP4	Z	-89.42	36
14	MP6	Z	-85.27	36
15	MP5	Z	-79.25	36
16	MP4	Z	-82.23	72
17	MP5	Z	-131.95	72
18	MP6	Z	-78.05	72
19	MP7	Z	-82.23	24
20	MP8	Z	-131.95	13
21	MP7	Z	-89.42	36
22	MP9	Z	-85.27	36
23	MP7	Z	-82.23	72
24	MP8	Z	-131.95	72

Member Point Loads (BLC 5 : Wind + Ice Load AZI 000)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	-27.77	24
2	MP2	X	-50.26	13
3	MP3	X	-30.78	16

Member Point Loads (BLC 5 : Wind + Ice Load AZI 000) (Continued)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
4	MP1	X	-24.81	36
5	MP3	X	-21.42	36
6	MP2	X	-31.95	36
7	MP1	X	-27.77	72
8	MP2	X	-50.26	72
9	MP3	X	-30.78	72
10	MP4	X	-22.96	24
11	MP5	X	-31.62	13
12	MP6	X	-22.79	16
13	MP4	X	-20.74	36
14	MP6	X	-19.26	36
15	MP5	X	-20.03	36
16	MP4	X	-22.96	72
17	MP5	X	-31.62	72
18	MP6	X	-22.79	72
19	MP7	X	-22.96	24
20	MP8	X	-31.62	13
21	MP7	X	-20.74	36
22	MP9	X	-19.26	36
23	MP7	X	-22.96	72
24	MP8	X	-31.62	72

Member Point Loads (BLC 6 : Wind + Ice Load AZI 090)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	Y	-21.36	24
2	MP2	Y	-25.4	13
3	MP3	Y	-20.12	16
4	MP1	Y	-19.38	36
5	MP3	Y	-18.54	36
6	MP2	Y	-16.06	36
7	MP1	Y	-21.36	72
8	MP2	Y	-25.4	72
9	MP3	Y	-20.12	72
10	MP4	Y	-26.17	24
11	MP5	Y	-44.05	13
12	MP6	Y	-28.12	16
13	MP4	Y	-23.46	36
14	MP6	Y	-20.7	36
15	MP5	Y	-27.98	36
16	MP4	Y	-26.17	72
17	MP5	Y	-44.05	72
18	MP6	Y	-28.12	72
19	MP7	Y	-26.17	24
20	MP8	Y	-44.05	13
21	MP7	Y	-23.46	36
22	MP9	Y	-20.7	36
23	MP7	Y	-26.17	72
24	MP8	Y	-44.05	72

Member Distributed Loads (BLC 4 : Ice Weight)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/f...	Start Location[in,%]	End Location[in,%]
1	M1	Z	-15.123	-15.123	0	%100
2	M2	Z	-15.123	-15.123	0	%100
3	M3	Z	-15.123	-15.123	0	%100
4	M4	Z	-16.648	-16.648	0	%100

Member Distributed Loads (BLC 4 : Ice Weight) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/f...	Start Location[in,%]	End Location[in,%]
5	M5	Z	-16.648	-16.648	0	%100
6	M6	Z	-16.648	-16.648	0	%100
7	M7	Z	-16.648	-16.648	0	%100
8	M8	Z	-16.648	-16.648	0	%100
9	M9	Z	-16.648	-16.648	0	%100
10	MP3	Z	-10.441	-10.441	0	%100
11	MP2	Z	-10.441	-10.441	0	%100
12	MP1	Z	-10.441	-10.441	0	%100
13	MP6	Z	-10.441	-10.441	0	%100
14	MP5	Z	-10.441	-10.441	0	%100
15	MP4	Z	-10.441	-10.441	0	%100
16	MP9	Z	-10.441	-10.441	0	%100
17	MP8	Z	-10.441	-10.441	0	%100
18	MP7	Z	-10.441	-10.441	0	%100

Member Distributed Loads (BLC 8 : BLC 1 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/f...	Start Location[in,%]	End Location[in,%]
1	M2	Z	-.174	-3.947	0	12.96
2	M2	Z	-3.947	-7.384	12.96	25.92
3	M2	Z	-7.384	-8.696	25.92	38.88
4	M2	Z	-8.696	-4.386	38.88	51.84
5	M2	Z	-4.386	-.174	51.84	64.8
6	M3	Z	-1.308	-4.13	0	12.96
7	M3	Z	-4.13	-7.656	12.96	25.92
8	M3	Z	-7.656	-8.764	25.92	38.88
9	M3	Z	-8.764	-3.949	38.88	51.84
10	M3	Z	-3.949	-.141	51.84	64.8
11	M19	Z	-.785	-.785	0	3
12	M4	Z	-4.41	-7.346	0	10.875
13	M4	Z	-7.346	-7.935	10.875	21.75
14	M4	Z	-7.935	-5.624	21.75	32.625
15	M4	Z	-5.624	-2.76	32.625	43.5
16	M9	Z	-10.086	-7.396	4.35	17.4
17	M9	Z	-7.396	-5.872	17.4	30.45
18	M9	Z	-5.872	-5.515	30.45	43.5
19	M1	Z	-.174	-4.386	97.2	110.16
20	M1	Z	-4.386	-8.696	110.16	123.12
21	M1	Z	-8.696	-7.384	123.12	136.08
22	M1	Z	-7.384	-3.947	136.08	149.04
23	M1	Z	-3.947	-.174	149.04	162
24	M2	Z	-.141	-3.949	97.2	110.16
25	M2	Z	-3.949	-8.764	110.16	123.12
26	M2	Z	-8.764	-7.656	123.12	136.08
27	M2	Z	-7.656	-4.13	136.08	149.04
28	M2	Z	-4.13	-1.308	149.04	162
29	M21	Z	-.785	-.785	0	3
30	M5	Z	-4.41	-7.346	0	10.875
31	M5	Z	-7.346	-7.935	10.875	21.75
32	M5	Z	-7.935	-5.624	21.75	32.625
33	M5	Z	-5.624	-2.76	32.625	43.5
34	M6	Z	-10.086	-7.396	4.35	17.4
35	M6	Z	-7.396	-5.872	17.4	30.45
36	M6	Z	-5.872	-5.515	30.45	43.5
37	M1	Z	-.174	-3.947	0	12.96
38	M1	Z	-3.947	-7.384	12.96	25.92
39	M1	Z	-7.384	-8.696	25.92	38.88

Member Distributed Loads (BLC 8 : BLC 1 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/f...	Start Location[in,%]	End Location[in,%]
40	M1	Z	-8.696	-4.386	38.88	51.84
41	M1	Z	-4.386	-.174	51.84	64.8
42	M3	Z	-.141	-3.949	97.2	110.16
43	M3	Z	-3.949	-8.764	110.16	123.12
44	M3	Z	-8.764	-7.656	123.12	136.08
45	M3	Z	-7.656	-4.13	136.08	149.04
46	M3	Z	-4.13	-1.308	149.04	162
47	M20	Z	-.785	-.785	0	3
48	M7	Z	-10.086	-7.396	4.35	17.4
49	M7	Z	-7.396	-5.872	17.4	30.45
50	M7	Z	-5.872	-5.515	30.45	43.5
51	M8	Z	-4.41	-7.346	0	10.875
52	M8	Z	-7.346	-7.935	10.875	21.75
53	M8	Z	-7.935	-5.624	21.75	32.625
54	M8	Z	-5.624	-2.76	32.625	43.5

Member Distributed Loads (BLC 9 : BLC 2 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/f...	Start Location[in,%]	End Location[in,%]
1	M1	X	-12.463	-12.463	0	162
2	M2	X	-24.925	-24.925	0	162
3	M3	X	-12.462	-12.462	0	162
4	M4	X	-12.898	-12.898	0	43.5
5	M5	X	-12.898	-12.898	0	43.5
6	M6	X	-29.02	-29.02	0	43.5
7	M7	X	-16.122	-16.122	0	43.5
8	M8	X	-16.122	-16.122	0	43.5
9	M9	X	-29.02	-29.02	0	43.5
10	MP3	X	-19.732	-19.732	0	72
11	MP2	X	-19.732	-19.732	0	72
12	MP1	X	-19.732	-19.732	0	72
13	MP6	X	-19.732	-19.732	0	72
14	MP5	X	-19.732	-19.732	0	72
15	MP4	X	-19.732	-19.732	0	72
16	MP9	X	-19.732	-19.732	0	72
17	MP8	X	-19.732	-19.732	0	72
18	MP7	X	-19.732	-19.732	0	72
19	M19	X	0	0	0	3
20	M20	X	0	0	0	3
21	M21	X	0	0	0	3

Member Distributed Loads (BLC 10 : BLC 3 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/f...	Start Location[in,%]	End Location[in,%]
1	M1	Y	-21.586	-21.586	0	162
2	M3	Y	-21.586	-21.586	0	162
3	M4	Y	-26.062	-26.062	0	43.5
4	M5	Y	-26.062	-26.062	0	43.5
5	M6	Y	-1.862	-1.862	0	43.5
6	M7	Y	-24.201	-24.201	0	43.5
7	M8	Y	-24.201	-24.201	0	43.5
8	M9	Y	-1.862	-1.862	0	43.5
9	MP3	Y	-19.732	-19.732	0	72
10	MP2	Y	-19.732	-19.732	0	72
11	MP1	Y	-19.732	-19.732	0	72
12	MP6	Y	-19.732	-19.732	0	72
13	MP5	Y	-19.732	-19.732	0	72
14	MP4	Y	-19.732	-19.732	0	72

Member Distributed Loads (BLC 10 : BLC 3 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/f...	Start Location[in,%]	End Location[in,%]
15	MP9	Y	-19.732	-19.732	0	72
16	MP8	Y	-19.732	-19.732	0	72
17	MP7	Y	-19.732	-19.732	0	72
18	M19	Y	0	0	0	3
19	M21	Y	0	0	0	3

Member Distributed Loads (BLC 11 : BLC 4 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/f...	Start Location[in,%]	End Location[in,%]
1	M2	Z	-.125	-2.834	0	12.96
2	M2	Z	-2.834	-5.302	12.96	25.92
3	M2	Z	-5.302	-6.244	25.92	38.88
4	M2	Z	-6.244	-3.149	38.88	51.84
5	M2	Z	-3.149	-.125	51.84	64.8
6	M3	Z	-.939	-2.965	0	12.96
7	M3	Z	-2.965	-5.497	12.96	25.92
8	M3	Z	-5.497	-6.292	25.92	38.88
9	M3	Z	-6.292	-2.835	38.88	51.84
10	M3	Z	-2.835	-.101	51.84	64.8
11	M19	Z	-.564	-.564	0	3
12	M4	Z	-3.167	-5.274	0	10.875
13	M4	Z	-5.274	-5.697	10.875	21.75
14	M4	Z	-5.697	-4.038	21.75	32.625
15	M4	Z	-4.038	-1.982	32.625	43.5
16	M9	Z	-7.242	-5.31	4.35	17.4
17	M9	Z	-5.31	-4.216	17.4	30.45
18	M9	Z	-4.216	-3.96	30.45	43.5
19	M1	Z	-.125	-3.149	97.2	110.16
20	M1	Z	-3.149	-6.244	110.16	123.12
21	M1	Z	-6.244	-5.302	123.12	136.08
22	M1	Z	-5.302	-2.834	136.08	149.04
23	M1	Z	-2.834	-.125	149.04	162
24	M2	Z	-.101	-2.835	97.2	110.16
25	M2	Z	-2.835	-6.292	110.16	123.12
26	M2	Z	-6.292	-5.497	123.12	136.08
27	M2	Z	-5.497	-2.965	136.08	149.04
28	M2	Z	-2.965	-.939	149.04	162
29	M21	Z	-.564	-.564	0	3
30	M5	Z	-3.167	-5.274	0	10.875
31	M5	Z	-5.274	-5.697	10.875	21.75
32	M5	Z	-5.697	-4.038	21.75	32.625
33	M5	Z	-4.038	-1.982	32.625	43.5
34	M6	Z	-7.242	-5.31	4.35	17.4
35	M6	Z	-5.31	-4.216	17.4	30.45
36	M6	Z	-4.216	-3.96	30.45	43.5
37	M1	Z	-.125	-2.834	0	12.96
38	M1	Z	-2.834	-5.302	12.96	25.92
39	M1	Z	-5.302	-6.244	25.92	38.88
40	M1	Z	-6.244	-3.149	38.88	51.84
41	M1	Z	-3.149	-.125	51.84	64.8
42	M3	Z	-.101	-2.835	97.2	110.16
43	M3	Z	-2.835	-6.292	110.16	123.12
44	M3	Z	-6.292	-5.497	123.12	136.08
45	M3	Z	-5.497	-2.965	136.08	149.04
46	M3	Z	-2.965	-.939	149.04	162
47	M20	Z	-.564	-.564	0	3
48	M7	Z	-7.242	-5.31	4.35	17.4

Member Distributed Loads (BLC 11 : BLC 4 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/f...	Start Location[in,%]	End Location[in,%]
49	M7	Z	-5.31	-4.216	17.4	30.45
50	M7	Z	-4.216	-3.96	30.45	43.5
51	M8	Z	-3.167	-5.274	0	10.875
52	M8	Z	-5.274	-5.697	10.875	21.75
53	M8	Z	-5.697	-4.038	21.75	32.625
54	M8	Z	-4.038	-1.982	32.625	43.5

Member Distributed Loads (BLC 12 : BLC 5 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/f...	Start Location[in,%]	End Location[in,%]
1	M1	X	-2.833	-2.833	0	162
2	M2	X	-5.665	-5.665	0	162
3	M3	X	-2.832	-2.832	0	162
4	M4	X	-2.931	-2.931	0	43.5
5	M5	X	-2.931	-2.931	0	43.5
6	M6	X	-6.596	-6.596	0	43.5
7	M7	X	-3.664	-3.664	0	43.5
8	M8	X	-3.664	-3.664	0	43.5
9	M9	X	-6.596	-6.596	0	43.5
10	MP3	X	-4.485	-4.485	0	72
11	MP2	X	-4.485	-4.485	0	72
12	MP1	X	-4.485	-4.485	0	72
13	MP6	X	-4.485	-4.485	0	72
14	MP5	X	-4.485	-4.485	0	72
15	MP4	X	-4.485	-4.485	0	72
16	MP9	X	-4.485	-4.485	0	72
17	MP8	X	-4.485	-4.485	0	72
18	MP7	X	-4.485	-4.485	0	72
19	M19	X	0	0	0	3
20	M20	X	0	0	0	3
21	M21	X	0	0	0	3

Member Distributed Loads (BLC 13 : BLC 6 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F,psf]	End Magnitude[lb/f...	Start Location[in,%]	End Location[in,%]
1	M1	Y	-4.906	-4.906	0	162
2	M3	Y	-4.906	-4.906	0	162
3	M4	Y	-5.924	-5.924	0	43.5
4	M5	Y	-5.924	-5.924	0	43.5
5	M6	Y	-.423	-.423	0	43.5
6	M7	Y	-5.5	-5.5	0	43.5
7	M8	Y	-5.5	-5.5	0	43.5
8	M9	Y	-.423	-.423	0	43.5
9	MP3	Y	-4.485	-4.485	0	72
10	MP2	Y	-4.485	-4.485	0	72
11	MP1	Y	-4.485	-4.485	0	72
12	MP6	Y	-4.485	-4.485	0	72
13	MP5	Y	-4.485	-4.485	0	72
14	MP4	Y	-4.485	-4.485	0	72
15	MP9	Y	-4.485	-4.485	0	72
16	MP8	Y	-4.485	-4.485	0	72
17	MP7	Y	-4.485	-4.485	0	72
18	M19	Y	0	0	0	3
19	M21	Y	0	0	0	3

APPENDIX D

ADDITIONAL CALCUATIONS

Date:	12/27/2018
Client	Crown Castle
Carrier	AT&T
Engineer:	IP
Site:	806376
Job #:	600-003

Code:	LRFD	
Axial:	1596.56	lbs
Shear:	1086.21	lbs

Bolt Capacity (1/2" A307 Bolt)				
	Ult Load / Bolt	Factored Load (ϕ=0.75)	# of Bolts	Factor Joint Capacity
Axial (lb)	8226.7	6170.0	2	12340
Shear(lb)	5133.3	3850.0	2	7700

Interaction Check	
$T/\phi T_n$	12.9%
$V/\phi Vn$	14.1%
≤1.0	3.7%
	OK

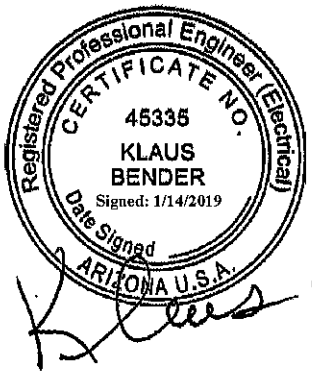
RF EMISSIONS COMPLIANCE REPORT

Crown Castle on behalf of AT&T Mobility, LLC

Crown Castle Site Name: UNION
Crown Castle Site ID: 876346
AT&T Mobility, LLC FA #: 10035087
23 Holland Road
Stafford Springs, CT
1/14/2019

Report Status:

AT&T Mobility, LLC Is Compliant



Klaus Bender
Registered Professional Engineer (Electrical)
Expires December 31, 2021

Prepared By:

Sitesafe, LLC

8618 Westwood Center Drive,
Suite 315

Vienna, VA 22182

Voice 703-276-1100
Fax 703-276-1169

Engineering Statement in Re:
Electromagnetic Energy Analysis
Crown Castle
Stafford Springs, CT

My signature on the cover of this document indicates:

That I am registered as a Professional Engineer in the jurisdiction indicated; and

That I have extensive professional experience in the wireless communications engineering industry; and

That I am an employee of Sitesafe, LLC in Vienna, Virginia; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission ("the FCC" and "the FCC Rules") both in general and specifically as they apply to the FCC's Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; and

That the technical information serving as the basis for this report was supplied by Crown Castle (See attached Site Summary and Carrier documents), and that AT&T Mobility, LLC's installations involve communications equipment, antennas and associated technical equipment at a location referred to as the "UNION" ("the site"); and

That AT&T Mobility, LLC proposes to operate at the site with transmit antennas listed in the carrier summary and with a maximum effective radiated power as specified by AT&T Mobility, LLC and shown on the worksheet, and that worst-case 100% duty cycle have been assumed; and

That this analysis has been performed with the assumption that the ground immediately surrounding the tower is primarily flat or falling; and

That at this time, the FCC requires that certain licensees address specific levels of radio-frequency energy to which workers or members of the public might possibly be exposed (at §1.1307(b) of the FCC Rules); and

That such consideration of possible exposure of humans to radio-frequency radiation must utilize the standards set by the FCC, which is the Federal Agency having jurisdiction over communications facilities; and

That the FCC rules define two tiers of permissible exposure guidelines: 1) "uncontrolled environments," defined as situations in which persons may not be aware of (the "general public"), or may not be able to control their exposure to a transmission facility; and (2) "controlled environments," which defines situations in which persons are aware of their potential for exposure (industry personnel); and

That this statement specifically addresses the uncontrolled environment (which is more conservative than the controlled environment) and the limit set forth in the FCC rules for licensees of AT&T Mobility, LLC's operating frequency as shown on the attached antenna worksheet; and

That when applying the uncontrolled environment standards, the predicted Maximum Power Density at two meters above ground level from the proposed AT&T Mobility, LLC operation is no more than 1.632% of the maximum in any accessible area on the ground and

That it is understood per FCC Guidelines and OET65 Appendix A, that regardless of the existent radio-frequency environment, only those licenses whose contributions exceed five percent of the exposure limit pertinent to their operation(s) bear any responsibility for bringing any non-compliant area(s) into compliance; and

That when applying the uncontrolled environment standards, the cumulative predicted energy density from the proposed operation is no more than 2.557% of the maximum in any accessible area up to two meters above the ground per OET-65; and

That the calculations provided in this report are based on data provided by the client and antenna pattern data supplied by the antenna manufacturer, in accordance with FCC guidelines listed in OET-65. Horizontal and vertical antenna patterns are combined for modeling purposes to accurately reflect the energy two meters above ground level where on-axis energy refers to maximum energy two meters above the ground along the azimuth of the antenna and where area energy refers to the maximum energy anywhere two meters above the ground regardless of the antenna azimuth, accounting for cumulative energy from multiple antennas for the carrier and frequency range indicated; and

That the Occupational Safety and Health Administration has policies in place which address worker safety in and around communications sites, thus individual companies will be responsible for their employees' training regarding Radio Frequency Safety.

In summary, it is stated here that the proposed operation at the site would not result in exposure of the Public to excessive levels of radio-frequency energy as defined in the FCC Rules and Regulations, specifically 47 CFR 1.1307 and that AT&T Mobility, LLC's proposed operation is completely compliant.

Finally, it is stated that access to the tower should be restricted to communication industry professionals, and approved contractor personnel trained in radio-frequency safety; and that the instant analysis addresses exposure levels at two meters above ground level and does not address exposure levels on the tower, or in the immediate proximity of the antennas.

Crown Castle
UNION
Site Summary

Carrier	Area Maximum Percentage MPE
AT&T Mobility, LLC	0.152 %
AT&T Mobility, LLC (Proposed)	0.361 %
AT&T Mobility, LLC (Proposed)	0.29 %
AT&T Mobility, LLC (Proposed)	0.294 %
AT&T Mobility, LLC (Proposed)	0.258 %
AT&T Mobility, LLC (Proposed)	0.277 %
MetroPCS (Decommissioned)	0 %
Sprint	0.335 %
Sprint	0.469 %
Sprint	0.12 %
Composite Site MPE:	2.557 %

AT&T Mobility, LLC
UNION
Carrier Summary

Frequency:	850	MHz
Maximum Permissible Exposure (MPE):	566.67	µW/cm^2
Maximum power density at ground level:	0.86205	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.15213	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Powerwave	7770	140	45	1094	0.533269	0.094106	0.833837	0.147148
Powerwave	7770	140	236	1094	0.533269	0.094106	0.833837	0.147148

AT&T Mobility, LLC (Proposed)
UNION
Carrier Summary

Frequency:	2300	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	3.61341	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.36134	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
CCI Antennas	HPA65R-BU4A	140	30	2985	2.917576	0.291758	3.602336	0.360234
CCI Antennas	HPA65R-BU4A	140	150	2985	2.903362	0.290336	3.602336	0.360234
CCI Antennas	HPA65R-BU4A	140	270	2985	2.917576	0.291758	3.602336	0.360234

AT&T Mobility, LLC (Proposed)
UNION
Carrier Summary

Frequency:	850	MHz
Maximum Permissible Exposure (MPE):	566.67	µW/cm^2
Maximum power density at ground level:	1.64537	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.29036	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
CCI Antennas	HPA65R-BU4A	140	30	1946	1.589316	0.280467	1.641637	0.289701
CCI Antennas	HPA65R-BU4A	140	150	1946	1.592546	0.281038	1.641637	0.289701
CCI Antennas	HPA65R-BU4A	140	270	1946	1.589316	0.280467	1.641637	0.289701

AT&T Mobility, LLC (Proposed)
UNION
Carrier Summary

Frequency:	2100	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	2.93634	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.29363	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	800-10964	140	30	5274	1.174128	0.117413	2.787822	0.278782
Kathrein-Scala	800-10964	140	150	5274	1.145787	0.114579	2.787822	0.278782
Kathrein-Scala	800-10964	140	270	5274	1.174128	0.117413	2.787822	0.278782

AT&T Mobility, LLC (Proposed)
UNION
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	2.58061	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.25806	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	800-10964	140	30	5154	1.131388	0.113139	2.449202	0.24492
Kathrein-Scala	800-10964	140	150	5154	1.132183	0.113218	2.449202	0.24492
Kathrein-Scala	800-10964	140	270	5154	1.131388	0.113139	2.449203	0.24492

AT&T Mobility, LLC (Proposed)
UNION
Carrier Summary

Frequency:	737	MHz
Maximum Permissible Exposure (MPE):	491.33	µW/cm^2
Maximum power density at ground level:	1.36152	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.27711	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	800-10964	140	30	2209	0.900364	0.183249	1.261375	0.256725
Kathrein-Scala	800-10964	140	150	2209	0.894363	0.182028	1.261375	0.256725
Kathrein-Scala	800-10964	140	270	2209	0.894362	0.182028	1.261375	0.256725

MetroPCS (Decommissioned)
UNION
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	0	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Kathrein-Scala	80010504	130	30	0	0	0	0	0
Kathrein-Scala	80010504	130	150	0	0	0	0	0
Kathrein-Scala	80010504	130	270	0	0	0	0	0

Sprint
UNION
Carrier Summary

Frequency:	2500	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	3.34844	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.33484	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
RFS	APXVTM14-C-I20	150	30	6168	1.003626	0.100363	1.877372	0.187737
RFS	APXVTM14-C-I20	150	220	6168	1.003626	0.100363	1.877372	0.187737
RFS	APXVTM14-C-I20	150	240	6168	1.003242	0.100324	1.877372	0.187737

Sprint
UNION
Carrier Summary

Frequency:	1900	MHz
Maximum Permissible Exposure (MPE):	1000	µW/cm^2
Maximum power density at ground level:	4.69487	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.46949	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Commscope	NNVV-65B-R4	150	30	2781	1.03361	0.103361	1.321738	0.132174
Commscope	NNVV-65B-R4	150	30	2781	1.03361	0.103361	1.321738	0.132174
Commscope	NNVV-65B-R4	150	220	2781	1.03361	0.103361	1.321738	0.132174
Commscope	NNVV-65B-R4	150	220	2781	1.03361	0.103361	1.321738	0.132174
Commscope	NNVV-65B-R4	150	240	2781	1.030848	0.103085	1.321738	0.132174
Commscope	NNVV-65B-R4	150	240	2781	1.030848	0.103085	1.321738	0.132174

Sprint
UNION
Carrier Summary

Frequency:	862	MHz
Maximum Permissible Exposure (MPE):	574.67	µW/cm^2
Maximum power density at ground level:	0.6894	µW/cm^2
Highest percentage of Maximum Permissible Exposure:	0.11996	%

					On Axis		Area	
Antenna Make	**Model**	**Height (feet)**	**Orientation (degrees true)**	**ERP (Watts)**	**Max Power Density (µW/cm^2)**	**Percent of MPE**	**Max Power Density (µW/cm^2)**	**Percent of MPE**
Commscope	NNVV-65B-R4	150	30	951	0.398376	0.069323	0.402603	0.070059
Commscope	NNVV-65B-R4	150	220	951	0.398376	0.069323	0.402603	0.070059
Commscope	NNVV-65B-R4	150	240	951	0.399138	0.069456	0.402603	0.070059