October 1, 2020

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

Re:	**Notice of Exempt Modification – Antenna and RRU Add**
Property Address:	**10 Main Street, Essex, CT 06426**
Applicant:	**AT&T Mobility, LLC**

Dear Ms. Bachman:

On behalf of AT&T, please accept this application as notification pursuant to R.C.S.A. §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. §16- 50j-72(b) (2).

AT&T currently maintains a wireless telecommunications facility consisting of nine (9) wireless telecommunication antennas at an antenna center line height of 108-feet on an existing 128-6'-foot Water Tank, owned by MacBeth Ventures LLC c/o HT Partner LLC at 6 Main Street, Suite 312, Centerbrook, CT 06409. AT&T now intends to remove three (3) 4' Kathrein 7770 Panel Antennas, each currently installed in position [3], and remove one (1) 8' KMW AM-X-CD-17-65-00T-RET Panel Antenna, One (1) 8' Andrew SBNH-1D6565C and One (1) 8' Andrew SBNH-1D4545A Panel Antenna, all currently installed in position [4]. AT&T then swap these for three (3) 4-5' Andrew NNHH-65A-RA Panel Antennas, each to be installed in position [3], add Two (2) 8' CCI DMP65R-BU8DA Panel Antennas, and One (1) 4' CCI DMP65R-BU4DA Panel Antenna, in position [4] all sectors. In addition, AT&T intends to remove six (6) Remote Radio Units add one (1) RRUS-4415 B30, one (1) RRUS-8843 B2/B66A and (1) RRUS-4449 B5/B12 in positions [3+4], all sectors, for a total of nine (9) new RRUs. AT&T is also proposing to replace (3) existing Raycap Squids with (3) new Raycap Squids, as well as three (3) fiber lines and (9) DC Power Cables to their equipment configuration. All of the changes will take place on the existing antenna mount.

Attached is a summary of the planned modifications including power density calculations reflecting the change in AT&T's operations at the site. Also included is documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration.

Please accept this letter pursuant to Regulation of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-5l0j-72(b) (2). In accordance with R.C.S.A., a copy of this letter is being sent to David DeLeeuw – Town Building Official, Town of Essex, CT at 29 West Avenue, Essex, CT 06426 and Norman Needleman – First Selectman, Town of Essex, CT at 29 West Avenue, Essex, CT 06426. A copy of this letter is being sent to the property owner HT Partner LLC at 6 Main Street, suite 312, Centerbrook, CT 06409

The following is a list of subsequent decisions by the Connecticut Siting Council:

- **EM-AT&T-050-140203** - American Telephone & Telegraph (AT&T) notice of intent to modify an existing telecommunications facility located at 10 Main Street, Essex, Connecticut.

The planned modifications to AT&T's facility fall squarely within those activities explicitly provided for in R.C.S.A. §16-50j-72(b) (2).

1. The proposed modifications will not result in an increase in the height of the existing tower. AT&T's replacement antennas will be installed at the 108-foot level of the 128-6'-foot Water Tank.
2. The proposed modifications will not involve any changes to ground-mounted equipment and, therefore, will not require and extension of the site boundary.
3. The proposed modifications will not increase the noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative worst-case RF emissions calculation for AT&T's modified facility is provided in the RF Emissions Compliance Report, included in Tab 2.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support AT&T's proposed modifications. (See Structural Analysis Report included in Tab 3).

For the foregoing reasons, AT&T respectfully submits that the proposed modifications to the above referenced telecommunications facility constitutes an exempt modification under R.C.S.A. §16-50j-72(b) (2).

Sincerely,

Kristina Cottone

CC w/enclosures:
David DeLeeuw – Town Building Official, Town of Essex, CT
Norman Needleman – First Selectman, Town of Essex, CT
MacBeth Ventures LLC c/o HT Partner LLC - Property Owner

10/01/2020

Memo: No Initial Zoning Decision Found

Upon consulting with the Building Inspector for the Town of Essex, it was determined that no initial zoning decision for this tower could be found. His phone number is 860-767-4340.

Kristina Cottone
Real Estate Specialist | Smartlink, LLC
85 Rangeway Road, Building 3, Suite 102
North Billerica, MA 01862

6 MAIN ST CTBK

Location	6 MAIN ST CTBK	**Mblu**	33/ 028/ / /
Acct#	00200100	**Owner**	MACBETH VENTURES LLC
Assessment	$2,435,600	**Appraisal**	$3,479,400
PID	1860	**Building Count**	3

Current Value

Appraisal	
Valuation Year	**Total**
2018	$3,479,400

Assessment	
Valuation Year	**Total**
2018	$2,435,600

Owner of Record

Owner	MACBETH VENTURES LLC	**Sale Price**	$1,250,000
Co-Owner	C/O HT PARTNER LLC	**Certificate**	
Address	6 MAIN ST SUITE 312 CENTERBROOK, CT 06409	**Book & Page**	0180/0285
		Sale Date	05/26/1999
		Instrument	07

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
MACBETH VENTURES LLC	$1,250,000		0180/0285	07	05/26/1999

Building Information

Building 1 : Section 1

Year Built: 1910
Living Area: 18,575
Building Percent Good: 61

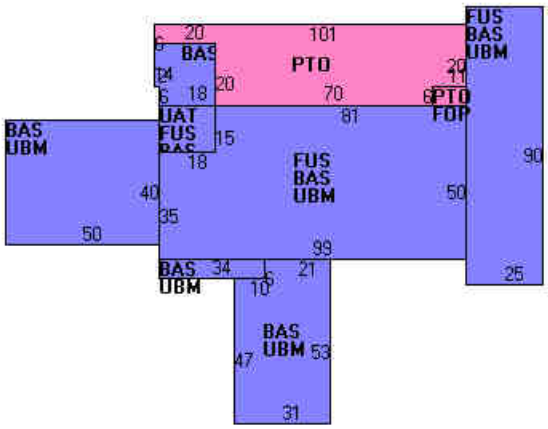
Building Attributes	
Field	**Description**
STYLE	Office

MODEL	Comm/Ind
Grade	C+
Stories:	2 Stories
Occupancy	6.00
Ext Wall 1	Brick
Exterior Wall 2	Asbestos
Roof Structure	Flat
Roof Cover	Tar + Gravel
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	Hardwood
Heating Fuel	Oil
Heating Type	Hot Water
AC Type	Central
Struct Class	
Bldg Use	Commercial MDL-94
Total Rooms	
Total Bedrms	
Total Baths	
Usrfld 218	
Usrfld 219	
1st Floor Use:	
Heat/AC	Heat/AC Packag
Frame Type	Masonry
Baths/Plumbing	Average
Ceiling/Wall	CEIL & WALLS
Rooms/Prtns	Average
Wall Height	10.00
% Comn Wall	

Building Photo

(http://images.vgsi.com/photos/EssexCTPhotos//\01\00\28\11.jpg)

Building Layout



(http://images.vgsi.com/photos/EssexCTPhotos//Sketches/1860_1860.jpg)

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	11,375	11,375
FUS	Full Upper Story	7,200	7,200
FOP	Open Porch	66	0
PTO	Patio	2,226	0
UAT	Unfinished Attic	270	0
UBM	Basement	10,987	0
		32,124	18,575

Building 2 : Section 1

Year Built: 1910
Living Area: 1,742
Building Percent Good: 61

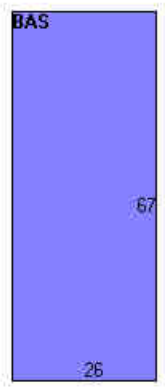
Building Attributes : Bldg 2 of 3	
Field	Description
STYLE	Office

MODEL	Comm/Ind
Grade	C+
Stories:	1 Story
Occupancy	1.00
Ext Wall 1	Brick
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Tar + Gravel
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	
Heating Fuel	Oil
Heating Type	Forced Air
AC Type	Heat Pump
Struct Class	
Bldg Use	Commercial MDL-94
Total Rooms	
Total Bedrms	
Total Baths	
Usrfld 218	
Usrfld 219	
1st Floor Use:	
Heat/AC	Heat Only
Frame Type	Masonry
Baths/Plumbing	Average
Ceiling/Wall	CEIL & WALLS
Rooms/Prtns	Light
Wall Height	12.00
% Comn Wall	

Building Photo

(http://images.vgsi.com/photos/EssexCTPhotos//default.jpg)

Building Layout



(http://images.vgsi.com/photos/EssexCTPhotos//Sketches/1860_5518.jpg)

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	1,742	1,742
		1,742	1,742

Building 3 : Section 1

Year Built: 1910
Living Area: 11,932
Building Percent Good: 61

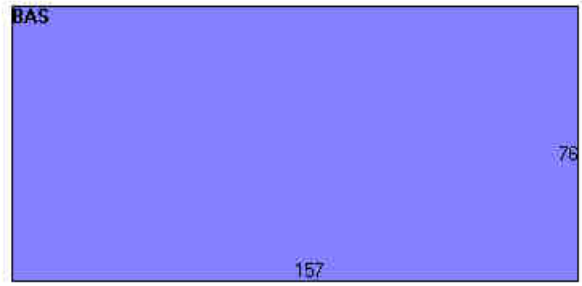
Building Attributes : Bldg 3 of 3	
Field	Description
STYLE	Office
MODEL	Comm/Ind
Grade	C+
Stories:	1 Story

Occupancy	9.00
Ext Wall 1	Brick
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Tar + Gravel
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	
Heating Fuel	Oil
Heating Type	Forced Air
AC Type	Central
Struct Class	
Bldg Use	Commercial MDL-94
Total Rooms	
Total Bedrms	
Total Baths	
Usrfld 218	
Usrfld 219	
1st Floor Use:	
Heat/AC	Heat/AC Packag
Frame Type	Masonry
Baths/Plumbing	Average
Ceiling/Wall	CEIL & WALLS
Rooms/Prtns	Average
Wall Height	10.00
% Comn Wall	

Building Photo

(http://images.vgsi.com/photos/EssexCTPhotos//default.jpg)

Building Layout



(http://images.vgsi.com/photos/EssexCTPhotos//Sketches/1860_5519.jpg)

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	11,932	11,932
		11,932	11,932

Extra Features

Extra Features				Legend
Code	Description	Sub Code	Sub Description	Size
SPR1	Sprinklers-Wet			11932.00 S.F.
SPR1	Sprinklers-Wet			20575.00 S.F.
ELV1	Elevator-Pass			3.00 STOPS
GEN	Generator			1.00 UNITS

Land

Land Use

Land Line Valuation

Use Code	200	**Size (Acres)**	8.52
Description	Commercial MDL-94	**Depth**	
Zone	CML	**Assessed Value**	$646,700
Neighborhood	CI4	**Appraised Value**	$923,900

Outbuildings

Outbuildings				Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**
CELL	Cell Tower			1.00 UNITS
SHD1	Shed-utility			180.00 S.F.
FGR1	Garage-Ave			1350.00 S.F.
SHD1	Shed-utility			1000.00 S.F.
PAV1	Paving			40000.00 S.F.
SHD1	Shed-utility			180.00 S.F.
SHD1	Shed-utility			48.00 S.F.

Valuation History

Appraisal	
Valuation Year	**Total**
2019	$3,479,400

Assessment	
Valuation Year	**Total**
2019	$2,435,600

STRUCTURAL ANALYSIS REPORT

Prepared for: Smartlink/AT&T

New Antenna Installation
on Existing Water Tank Structure

Site No.: CTL02163
Site Name: ESSEX CT
10 Main Street
Essex, CT 06426

August 13, 2020

Henry M. Bellagamba, P.E.

FULLERTON
ENGINEERING · DESIGN

Fullerton Engineering Consultants, LLC
1100 E. Woodfield Road, Suite 500
Schaumburg, IL 60173
Tel: 847.908.8400
www.fullertonengineering.com

Project Number: 2020.0032.0030

Summary

The structural analysis was performed by Fullerton Engineering Consultants, as requested by the client, to determine the conformance of the existing structure with the governing 2018 Connecticut Building Code (2015 International Building Code w/ Amendments) and the industry standards TIA-222-G (Structural Standards for Steel Antenna Towers and Antenna Supporting Structures) and AWWA D100-11 (Welded Carbon Steel Tanks for Water Storage). The analysis considers the structural properties, existing antennas and proposed antennas and the required loading criteria.

Scope

- Determine adequacy of the existing water tank structure to support the existing and proposed antenna and equipment installation.

Conclusion

- The existing water tank structure is **adequate** to support the existing and proposed antenna and equipment installation.

Analysis Data

The following is based on information provided by the client, field investigation, and other determination by Fullerton Engineering Consultants or third parties.

References: Tower Mapping Report by HighTower Solutions Inc. dated 7/29/2020
RFDS by AT&T dated 05/27/2020

Appurtenance Loading Schedule

ELEV. (FT.=AGL)	APPURTENANCE
	Proposed
108'-0" (AT&T)	(2) Commscope NNHH-65C-R4 Antennas (1) Commscope NNHH-65A-R4 Antennas (2) CCI DMP65R-BU8DA Antennas (1) CCI DMP65R-BU4DA Antennas (3) Ericsson RRUS-4415 B30 RRH Units (3) Ericsson RRUS-4449 B5/B12 RRH Units (3) Ericsson RRUS-8843 B2/B66A RRH Units (3) Raycap DC9-48-60-24-PC16-EV Units Proposed antennas and equipment will be installed on existing catwalk handrail.
	Existing (To Remain)
117'-7"	(3) 7' Antennas (3) Alcatel-Lucent TD-RRH8x20-25 RRH Units (3) Alcatel-Lucent RRH1900 4x45 RRH Units (6) Alcatel-Lucent RRH2x50-800 RRH Units Existing antennas and RRH units to remain attached to existing water tank.
108'-0" (AT&T)	(3) Powerwave 7770 Antennas (6) Powerwave LGP 21401 TMA Units Existing antennas and TMA units to remain on existing catwalk handrail.
107'-2"	(2) Amphenol LPA 80080/6CF E-DIN Antennas (3) Amphenol LPA 80063-6CF-EDIN Antennas (6) Commscope SBNHH-1D65B Antennas (3) Alcatel-Lucent RRH4x45 B66A RRH Units (3) Alcatel-Lucent RRH4x30 B13 RRH Units (12) RFS TMA Units (2) Raycap RRFDC-3315-PF-48 Units Existing antennas, RRH, TMA, Raycap units to remain on existing catwalk handrail.
	Existing (To be Removed)
108'-0" (AT&T)	(1) KMW AM-X-CD-17-65-00T-RET Antenna (1) Commscope SBNH-1D6565C Antenna (1) Commscope SBNH-1D4545A Antenna (3) Powerwave 7770 Antennas (3) Ericsson RRUS-11 B12 Units (3) Ericsson RRUS-12 Units (6) Powerwave LGP 21901 Diplexors (3) Raycap DC2 Units Existing antennas and equipment to be removed prior to the installation of new equipment.

Assumptions

This analysis is based on the theoretical capacity of the members and is not a condition assessment of the structure. The analysis is based solely on the information supplied, and the results, in turn, are only as accurate as data extracted from this information. Fullerton has been instructed by the client to assume the information supplied is accurate, and Fullerton has made no independent determination of its accuracy. The exception to the previous statement is if Fullerton has been contracted by the client to provide an independent structural mapping report of the structure and related appurtenances, in which case Fullerton has made an independent determination of the accuracy of the information resulting from the mapping report.

- The structural member sizes and geometry are considered accurate as supplied. The material grade is as per data supplied and/or as assumed and stated in the materials section.
- The existing structure is assumed to have been properly maintained. The existing structure is assumed to be in good condition with no structural defects and with no deterioration to its member capacities.
- The antenna configuration is as supplied and/or stated in the analysis section. It is assumed to be complete and accurate. All antennas, mounts, remote radios, cables and cable supports are assumed to be properly installed and supported as per the manufacturer's requirements.
- The antennas, mounts, remote radios, cables and cable supports stated in the appurtenance loading schedule represent Fullerton's understanding of the overall antenna configuration. If the actual configuration is different than above, then this analysis is invalid. Please refer to this report for the projected wind areas used in the calculations for antennas and mounts. If variations or discrepancies are identified, please inform Fullerton.
- Some assumptions are made regarding antenna and mount sizes and their projected areas based on a best interpretation of the data supplied and a best knowledge of antenna type and industry practice.
- All welds and connections are assumed to develop at least the member capacity, unless determined otherwise and explicitly stated in this report.
- All prior structural modifications, if any, are assumed to be as per date supplied/ available, to be properly installed and to be fully effective.

Scope and Limitations

The engineering services rendered by Fullerton Engineering Consultants, Inc. (Fullerton) in connection with this structural analysis are limited to an analysis of the structure, size and capacity of its members. Fullerton does not analyze the fabrication, including welding and connection capacities, except as included in this report.

The information and conclusions contained in this report were determined by application of the current engineering standards and analysis procedures and formulae, and Fullerton assumes no obligation to revise any of the information or conclusions contained in this report in the event such engineering and analysis procedures and formulae are hereafter modified or revised.

Fullerton makes no warranties, expressed or implied in connection with this report and disclaims any liability arising from original design, material, fabrication and erection deficiencies or the “as-built” condition of this structure.

Installation procedures and loading are not within the scope of this report and should be performed and evaluated by a competent contractor.

Section 1

Structural Calculations

Analysis and Design Criteria

Type of structure: Water Tower

Elevation of antenna centerline above ground		$z := 108ft$	
Structure height above grade		$h := 122.67ft$	
Ultimate Design 3-Second Gust Wind Speed		$V_{ult} := 131$ *mph*	*2018 Connecticut Building Code: Section 1609*
Equivalent Nominal Wind Speed		$V_{asd} := V_{ult}\cdot\sqrt{0.6} = 101.47$ *mph*	*2018 Connecticut Building Code: Section 1609.3.1*
Basic Wind Speed: 3-second gust	*GOVERNS*	$V_{3sec.gust} := 116$ *mph*	*ANSI/TIA-222-G: ANNEX B*
Structure Class		II	*ANSI/TIA-222-G: Section 2.6.6.2*
Exposure Category		C	*ANSI/TIA-222-G: Section 2.6.6.2*
Topographic Category		1	*ANSI/TIA-222-G: Section 2.6.6.2*
Gust Effect Factor		$G_h := 0.85$	*ANSI/TIA-222-G, Section 2.6.9*
Height of crest above surrounding terrain		$H := 5ft$	
Importance Factor for Wind		$I_{wind} = 1$	*ANSI/TIA-222-G: Table 2-3*
Wind Direction Probability Factor		$K_d = 0.95$	*ANSI/TIA-222-G: Table 2-2*
Velocity Pressure Coefficient		$K_z = 1.29$	*ANSI/TIA-222-G: Section 2.6.5.2*
Topographic Factor		$K_{zt} = 1$	*ANSI/TIA-222-G: Section 2.6.6.4*
$q_z := 0.00256\cdot K_z\cdot K_{zt}\cdot K_d\cdot I_{wind}\cdot V^2\cdot psf$		$q_z = 42.09\cdot psf$	*Velocity Pressure ANSI/TIA-222-G: Section 2.6.9.6.*

Tank Dimensions and Properties

$d_{tank} := 82ft$ *Diameter of tank*

$h_{tank} := 122.67ft$ *Overall height of structure*

$h_{main} := 11.083ft$ *Height of flat-sided cylindrical part of tank*

$h_{top} := 6.333ft$ *Height from top of cylindrical part to topmost part of tank.*

$h_{bottom} := 6.333ft$ *Height from bottom of cylindrical part to bottommost part of tank.*

$h_{balcony} := 108ft$ *Elevation of balcony*

Columns

$n_{legs} := 4$ *Number of perimeter columns*

$d_{col} := 17.1in$ *Diameter of column*

LEG := (•) Round ( ) Flat

$Dist_{col} := 24.25ft$ *Distance between column feet*

Center Riser

$d_{riser} := 3.1ft$ *Diameter of the riser*

Diagonal Rods

$n_{bays} := 3$ *Number of bays per side*

$n_{rods} := 2$ *Rods per bay*

$d_{rod} := 1.25in$ *Diameter of rods*

Horizontal Struts *(between tank legs)*

$H_{strut} := 8in$ *Height of individual strut*

Horizontal Rods *(between tank leg and riser)*

$d_{Hrod} := 1in$ *Diameter of horizontal rods*

Discrete Appurtenances

Antennas

Antenna name/model		*Number of antennas*		*Elevation of antennas*			*Flat antenna? 1 = yes 0 = no (round)*
"(N) Commscope NNHH-65C-R4 Antennas"		2		108			1
"(N) Commscope NNHH-65A-R4 Antennas "		1		108			1
"(N) CCI DMP65R-BU8DA Antennas "		2		108			1
"(N) CCI DMP65R-BU4DA Antennas "		1		108			1
"(N) Ericsson RRUS-4415 B30 RRH "		3		108			1
"(N) Ericsson RRUS-4449 B5/B12 RRH "		3		108			1
"(N) Ericsson RRUS-8843 B2/B66A RRH "		3		108			1
"(N) Raycap DC9-48-60-24-PC16-EV "		3		108			0
"(E) 7' Antennas "		3		117.583			1
"(E) Alcatel-Lucent TD-RRH8x20-25 RRH "		3		117.583			1
"(E) Alcatel-Lucent RRH1900 4x45 RRH "	$n_{ant} :=$	3	$z_{ant} :=$	117.583	ft	$shape_{ant} :=$	1
"(E) Alcatel-Lucent RRH2x50-800 RRH "		6		117.583			1
"(E) Powerwave 7770 Antennas "		3		108			1
"(E) Powerwave LGP 21401 TMA "		6		108			1
"(E) Amphenol LPA 80080/6CF E-DIN Antennas "		2		107.167			1
"(E) Amphenol LPA 80063-6CF-EDIN Antennas "		3		107.167			1
"(E) Commscope SBNHH-1D65B Antennas "		6		107.167			1
"(E) Alcatel-Lucent RRH4x45 B66A RRH "		3		107.167			1
"(E) Alcatel-Lucent RRH4x30 B13 RRH "		3		107.167			1
"(E) RFS TMA Units "		12		107.167			1
"(E) Raycap RRFDC-3315-PF-48 "		2		107.167			1

Height of antennas | *Width of antennas* | *Depth of antennas* | *Weight of antennas*

$height_{ant}$ (in)	$width_{ant}$ (in)	$depth_{ant}$ (in)	$weight_{ant}$ (lbf)
96	19.6	7.8	112.9
55.1	19.6	7.8	80.9
96	20.7	7.7	126.8
48	20.7	7.7	76.5
14.96	13.19	5.39	46
14.96	13.19	10.43	73
14.9	13.2	40.9	72
31.41	10.24	10.24	26.2
84	21	6	50
26	18	6.5	52.9
26	12.5	13	60
16	13	10	50
55	11	5.25	50
14.5	9.5	2.75	14
70	6	14	21
70	15	8	27
72	12	7.5	42.6
25	12	7	64
20	11.75	7.25	53
4.5	6.25	1	10
18	15	10	32

$N_{antenna} := 21$ *number of antenna groups*

***Note: Shielding is considered for the noted antennas. Shielding is detailed in TIA-222-G, Section 2.6.9.4.**

Pipes

Length of pipes | *Number of pipes* | *Nominal pipe size* | *Elevation*

$length_{pipe}$ (in)	n_{pipe}	Pipe	z_{pipe} (ft)
108	9	2	117.583
108	12	2	108
108	6	2	107.167

$N_{pipe} := 3$ *number of pipe groups*

***Note: Shielding is considered for the noted pipes. Shielding is detailed in TIA-222-G, Section 2.6.9.4. The pipes are located closely enough to their respect antennas that they can also be considered shielded.**

Dishes and Other Appurtenances (including Platforms and Others)

Number	*Type*	*CaAa*	*Elevation*	*Weight*
$n_{app} := (0)$	("(E) 1 ft Dish")	$CaAa\_app := (0)\cdot ft^2$	$z_{app} := (0)\cdot ft$	$weight_{app} := (0)\cdot lbf$

$N_{app} := 1$ *number of appurtenance groups*

Feedlines

The coax cables are tightly attached. In addition, the total weight of the coax cables is negligible.

	Type	*CaAa (side projection)*	*Weight*	*Elevation*
$n_{coax} := (0)$	("(E) Coax ")	$CaAa\_coax := (0.6)\cdot ft^2$	$weight_{coax} := (0)\cdot lbf$	$z_{coax} := (85)\cdot ft$

$N_{coax} := 1$

Antenna Loads - Per TIA-222-G

$$C := \left(I_{wind} \cdot K_{zt} \cdot K_z\right)^{0.5} \cdot V \cdot width_{ant} \cdot \frac{1}{ft}$$

$C =$

	1
1	214.88
2	214.88
3	226.94
4	226.94
5	144.61
6	144.61
7	144.72
8	112.27
9	230.23
10	197.34
11	137.04
12	142.52
13	120.6
14	104.15
15	65.78
16	164.45
17	131.56
18	131.56
19	128.82
20	68.52
21	164.45

Wind Flow Characteristic TIA-222-G Table 2-8

$C_A :=$ for $n \in 1 .. N_{antenna}$

$Aspect_n \leftarrow \frac{height_{ant_n}}{width_{ant_n}}$ if $shape_{ant_n}$

Aspect Ratio

$p_n \leftarrow$

- 1.2 if $Aspect_n \le 2.5$
- $1.2 + .2 \cdot \frac{Aspect_n - 2.5}{7 - 2.5}$ if $2.5 \le Aspect_n \le 7$
- 1.4 if $Aspect_n = 7$
- $1.4 + .6 \cdot \frac{Aspect_n - 7}{25 - 7}$ if $7 \le Aspect_n \le 25$
- 2.0 if $Aspect_n \ge 25$

Force Coefficient for Appurtenances TIA-222-G Table 2-8

$Aspect_n \leftarrow \frac{height_{ant_n}}{width_{ant_n}}$

otherwise

$p_n \leftarrow$ if $C_n < 32$

continued...

cont.

$$\begin{cases} .7 & \text{if } Aspect_n \le 2.5 \\ .7 + .1\cdot\dfrac{Aspect_n - 2.5}{7 - 2.5} & \text{if } 2.5 \le Aspect_n \le 7 \\ .8 & \text{if } Aspect_n = 7 \\ .8 + .4\cdot\dfrac{Aspect_n - 7}{25 - 7} & \text{if } 7 \le Aspect_n \le 25 \\ 1.2 & \text{if } Aspect_n \ge 25 \end{cases}$$

if $32 \le C_n \le 64$

$$\begin{cases} \dfrac{3.76}{(C_n)^{.485}} & \text{if } Aspect_n \le 2.5 \\ \dfrac{3.76}{(C_n)^{.485}} + \left[\dfrac{3.37}{(C_n)^{.415}} - \dfrac{3.76}{(C_n)^{.485}}\right]\cdot\dfrac{Aspect_n - 2.5}{7 - 2.5} & \text{if } 2.5 \le Aspec \\ \dfrac{3.37}{(C_n)^{.415}} & \text{if } Aspect_n = 7 \\ \dfrac{3.37}{(C_n)^{.415}} + \left[\dfrac{38.4}{C_n} - \dfrac{3.37}{(C_n)^{.415}}\right]\cdot\dfrac{Aspect_n - 7}{25 - 7} & \text{if } 7 \le Aspect_n \le 25 \\ \dfrac{38.4}{C_n} & \text{if } Aspect_n \ge 25 \end{cases}$$

if $C_n > 64$

$$\begin{cases} .5 & \text{if } Aspect_n \le 2.5 \\ .5 + .1\cdot\dfrac{Aspect_n - 2.5}{7 - 2.5} & \text{if } 2.5 \le Aspect_n \le 7 \\ .6 & \text{if } Aspect_n \ge 7 \end{cases}$$

p

$C_A =$

	1
1	1.307
2	1.214
3	1.295
4	1.2
5	1.2
6	1.2
7	1.2
8	0.513
9	1.267
10	1.2
11	1.2
12	1.2
13	1.311
14	1.2
15	1.556
16	1.296
17	1.356
18	1.2
19	1.2
20	1.2
21	1.2

$$A_A := \left| \begin{array}{l} \text{for } n \in 1 .. N_{antenna} \\ \quad p_n \leftarrow height_{ant_n} \cdot width_{ant_n} \\ p \end{array} \right.$$

$A_A =$

	1
1	13.067
2	7.5
3	13.8
4	6.9
5	1.37
6	1.37
7	1.366
8	2.234
9	12.25
10	3.25
11	2.257
12	1.444
13	4.201
14	0.957
15	2.917
16	7.292
17	6
18	2.083
19	1.632
20	0.195
21	1.875

$\cdot ft^2$

Area of Appurtenances

$$F_A := \left| \begin{array}{l} \text{for } n \in 1 .. N_{antenna} \\ \quad p_n \leftarrow n_{ant_n} \cdot G_h \cdot q_z \cdot C_{A_n} \cdot A_{A_n} \cdot SF_{ant_n} \\ p \end{array} \right.$$

$F_A =$

	1
1	818.544
2	218.231
3	856.829
4	198.492
5	70.602
6	70.602
7	70.372
8	49.16
9	1115.918
10	167.449
11	116.284
12	148.844
13	396.156
14	98.573
15	194.801
16	679.775
17	1169.856
18	107.339
19	84.083
20	40.252
21	64.404

$\cdot lbf$

Wind Force on Appurtenances

$$W_{ant} := \sum_{i=1}^{N_{antenna}} \left(n_{ant_i} weight_{ant_i} \right)$$

$W_{ant} = 3224.7 \cdot lbf$

Total Weight of Appurtenances

Pipes

$$\text{Aspect} := \left| \begin{array}{l} \text{for } n \in 1 .. N_{pipe} \\ \quad \text{Aspect}_n \leftarrow \dfrac{\text{length}_{pipe_n}}{D_{pipe_n}} \\ \text{Aspect} \end{array} \right| \qquad \text{Aspect} = \begin{pmatrix} 45.38 \\ 45.38 \\ 45.38 \end{pmatrix}$$

$$C := \left(I_{wind} \cdot K_{zt} \cdot K_z\right)^{0.5} \cdot V \cdot D_{pipe} \cdot \frac{1}{ft} \qquad C = \begin{pmatrix} 26.09 \\ 26.09 \\ 26.09 \end{pmatrix}$$

$$W_{pipe} := \sum_{i=1}^{N_{pipe}} \left(n_{pipe_i} \cdot \text{weight}_{pipe_i} \cdot \text{length}_{pipe_i}\right) \qquad W_{pipe} = 889.38 \cdot \text{lbf}$$

Total Weight of Pipes

$$A_{pipe} := \left| \begin{array}{l} \text{for } n \in 1 .. N_{pipe} \\ \quad a_n \leftarrow \text{length}_{pipe_n} \cdot D_{pipe_n} \\ a \end{array} \right| \qquad A_{pipe} = \begin{pmatrix} 1.78 \\ 1.78 \\ 1.78 \end{pmatrix} ft^2$$

$$C_{A.pipe} := \left| \begin{array}{l} \text{for } n \in 1 .. N_{pipe} \\ \quad \text{Aspect}_n \leftarrow \dfrac{\text{length}_{pipe_n}}{D_{pipe_n}} \\ \quad p_n \leftarrow \left| \begin{array}{l} \text{if } C_n < 32 \\ \quad \left| \begin{array}{l} .7 \text{ if } \text{Aspect}_n \le 2.5 \\ .7 + .1 \cdot \dfrac{\text{Aspect}_n - 2.5}{7 - 2.5} \text{ if } 2.5 \le \text{Aspect}_n \le 7 \\ .8 \text{ if } \text{Aspect}_n = 7 \\ .8 + .4 \cdot \dfrac{\text{Aspect}_n - 7}{25 - 7} \text{ if } 7 \le \text{Aspect}_n \le 25 \\ 1.2 \text{ if } \text{Aspect}_n \ge 25 \end{array} \right. \\ \text{if } 32 \le C_n \le 64 \\ \quad \left| \begin{array}{l} \dfrac{3.76}{(C_n)^{.485}} \text{ if } \text{Aspect}_n \le 2.5 \\ \dfrac{3.76}{(C_n)^{.485}} + \left[\dfrac{3.37}{(C_n)^{.415}} - \dfrac{3.76}{(C_n)^{.485}}\right] \cdot \dfrac{\text{Aspect}_n - 2.5}{7 - 2.5} \text{ if } 2.5 \le \text{Aspect}_n \le 7 \\ \dfrac{3.37}{\quad .415} \text{ if } \text{Aspect}_n = 7 \end{array} \right. \end{array} \right. \end{array} \right| \qquad C_{A.pipe} = \begin{pmatrix} 1.2 \\ 1.2 \\ 1.2 \end{pmatrix}$$

continued...

cont.

$$\left(C_n\right)^{.415}$$

$$\frac{3.37}{\left(C_n\right)^{.415}} + \left[\frac{38.4}{C_n} - \frac{3.37}{\left(C_n\right)^{.415}}\right] \cdot \frac{Aspect_n - 7}{25 - 7} \quad \text{if } 7 \le Aspect_n \le 25$$

$$\frac{38.4}{C_n} \quad \text{if } Aspect_n \ge 25$$

if $C_n > 64$

$$.5 \quad \text{if } Aspect_n \le 2.5$$

$$.5 + .1 \cdot \frac{Aspect_n - 2.5}{7 - 2.5} \quad \text{if } 2.5 \le Aspect_n \le 7$$

$$.6 \quad \text{if } Aspect_n \ge 7$$

p

$$F_{pipe} := \left| \begin{array}{l} \text{for } n \in 1 .. N_{pipe} \\ \quad p_n \leftarrow n_{pipe_n} \cdot C_{A.pipe_n} \cdot A_{pipe_n} \cdot q_z \cdot G_h \cdot SF_{pipe_n} \\ p \end{array} \right. \qquad F_{pipe} = \begin{pmatrix} 137.95 \\ 183.94 \\ 91.97 \end{pmatrix} \cdot lbf$$

Wind Force on Pipes

Dishes and Other Appurtenances (including Platforms and Others)

$$F_{app} := \left| \begin{array}{l} \text{for } n \in 1 .. N_{app} \\ \quad p_n \leftarrow n_{app_n} \cdot G_h \cdot q_z \cdot CaAa\_app_n \cdot SF_{app_n} \\ p \end{array} \right. \qquad F_{app} = (0) \cdot lbf$$

$$W_{app} := \sum_{i=1}^{N_{app}} \left(n_{app_i} \cdot weight_{app_i}\right) \qquad W_{app} = 0 \cdot lbf$$

Feedlines

$$F_{coax} := \left| \begin{array}{l} \text{for } n \in 1 .. N_{coax} \\ \quad p_n \leftarrow G_h \cdot q_z \cdot \frac{CaAa\_coax_n}{\left(z_{coax_n}\right)} \cdot SF_{coax_n} \\ p \end{array} \right. \qquad F_{coax} = (0.17) \cdot \frac{lbf}{ft}$$

Linear wind load on coax cables

Wind Load for Water Tank

From ANSI/AWWA D100-11 (table 2)

$C_{d\_flat} := 1.0$ — *Wind drag coefficient (flat)*

$C_{d\_cyl} := 0.6$ — *Wind drag coefficient (cylindrical or conical with apex angle <15 deg)*

$C_{d\_sphere} := 0.5$ — *Wind drag coefficient (double curved or conical with apex angle >15 deg)*

$G := 1$ — *Gust-effect factor (per ANSI/AWWA D100-11 Section 3.1.4)*

$I := 1.15$ — *Wind effect factor (per ANSI/AWWA D100-11 Section 3.1.4)*

Tank

Top dome

$h_{lower} := h_{tank} - (h_{top} + h_{main} + h_{bottom})$ $\quad h_{lower} = 98.92\ ft$ — *Elevation of lowest point of tank (point of connection of main riser)*

$L_{top} := \frac{1}{2h_{top}} \cdot \left(\frac{d_{tank}}{2}\right)^2 - \frac{1}{2}h_{top}$ $\quad L_{top} = 129.55\ ft$

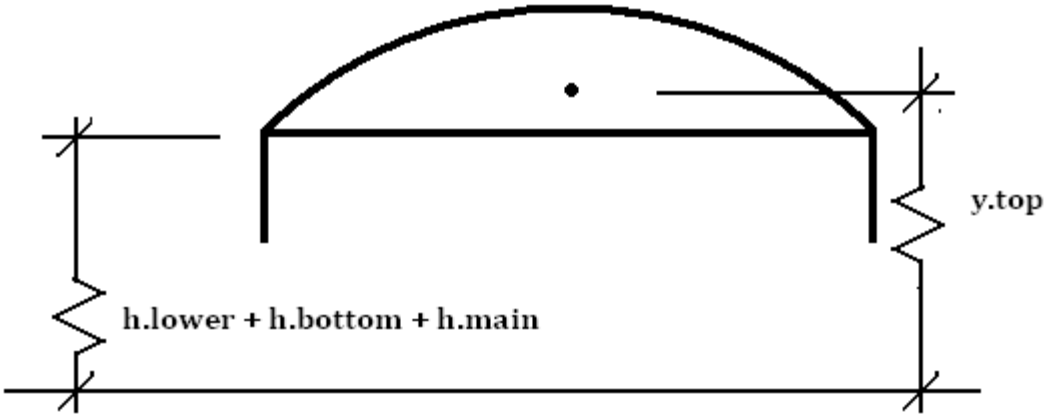
$R_{top} := \frac{1}{2h_{top}} \cdot \left(\frac{d_{tank}}{2}\right)^2 + \frac{1}{2}h_{top}$ $\quad R_{top} = 135.88\ ft$ — *Radius of curvature of top dome*

$\Theta_{top} := 2\,acos\left(\frac{L_{top}}{R_{top}}\right)$ $\quad \Theta_{top} = 35.12 \cdot deg$ — *Arc angle*

$A_{top} := \frac{\Theta_{top} \cdot R_{top}^2}{2} - \frac{1}{2}L_{top} \cdot d_{tank}$ $\quad A_{top} = 347.85\ ft^2$ — *Projected top dome area*

$Y_{top} := \frac{4R_{top} \cdot \sin\left(\frac{\Theta_{top}}{2}\right)^3}{3\left(\Theta_{top} - \sin(\Theta_{top})\right)} - L_{top}$ $\quad Y_{top} = 2.54\ ft$ — *Centroid of arc segment*

$y_{top} := h_{lower} + h_{bottom} + h_{main} + Y_{top}$ $\quad y_{top} = 118.88\ ft$ — *Centroid of top dome of tank*



Main body of tank

$A_{main} := d_{tank} \cdot h_{main}$ $A_{main} = 908.81\ ft^2$ *Projected area of main body*

$y_{main} := h_{lower} + h_{bottom} + \frac{1}{2} \cdot h_{main}$ $y_{main} = 110.8\ ft$ *Centroid of main body of tank*

Bottom dome

$L_{bottom} := \frac{1}{2h_{bottom}} \cdot \left(\frac{d_{tank}}{2}\right)^2 - \frac{1}{2} h_{bottom}$ $L_{bottom} = 129.55\ ft$

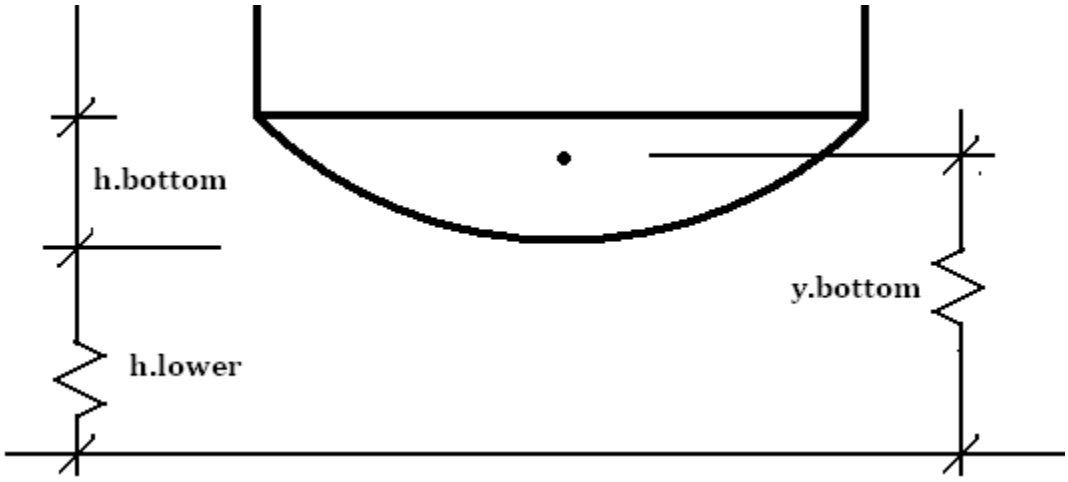
$R_{bottom} := \frac{1}{2h_{bottom}} \cdot \left(\frac{d_{tank}}{2}\right)^2 + \frac{1}{2} h_{bottom}$ $R_{bottom} = 135.88\ ft$ *Radius of curvature of bottom dome*

$\Theta_{bottom} := 2\,acos\left(\frac{L_{bottom}}{R_{bottom}}\right)$ $\Theta_{bottom} = 35.12 \cdot deg$ *Arc angle*

$A_{bottom} := \frac{\Theta_{bottom} \cdot R_{bottom}^2}{2} - \frac{1}{2} L_{bottom} \cdot d_{tank}$ $A_{bottom} = 347.85\ ft^2$ *Projected bottom dome area*

$Y_{bot} := R_{bottom} - \frac{4R_{bottom} \cdot \sin\left(\frac{\Theta_{bottom}}{2}\right)^3}{3\left(\Theta_{bottom} - \sin\left(\Theta_{bottom}\right)\right)}$ $Y_{bot} = 3.79\ ft$ *Centroid of arc segment (measured from curved side)*

$y_{bot} := h_{lower} + Y_{bot}$ $y_{bot} = 102.72\ ft$ *Centroid of bottom dome of tank*



Diagonal bracing and horizontal struts and rods

$D := Dist_{col}$

$h_{leg} := h_{balcony}$

$\alpha := \frac{360deg}{n_{legs}}$

$\alpha = 90 \cdot deg$

$\Theta := \frac{180deg - \alpha}{2}$

$\Theta = 45 \cdot deg$

$r_{bottom} := D \cdot \frac{\sin(\Theta)}{\sin(\alpha)}$

$r_{bottom} = 17.15\ ft$

$r_{tank} := \frac{d_{tank}}{2}$

$r_{tank} = 41\ ft$

$d := r_{tank} \cdot \frac{\sin(\alpha)}{\sin(\Theta)}$

$d = 57.98\ ft$

$g := \sqrt{h_{leg}^{2} + (r_{bottom} - r_{tank})^{2}}$

$g = 110.6\ ft$

$$Z := \left| \begin{array}{l} Z_1 \leftarrow d \\ \text{for } n \in 2 .. n_{bays} \\ \quad Z_n \leftarrow d + \frac{n-1}{n_{bays}} \cdot (D - d) \\ Z_{n_{bays}+1} \leftarrow D \\ Z \end{array} \right.$$

$$Z = \begin{pmatrix} 57.98 \\ 46.74 \\ 35.49 \\ 24.25 \end{pmatrix} ft$$

Length of horizontal members per elevation. Note: the first and last members of the matrix do not physically exist, they are there for computations sake.

$$b := \left| \begin{array}{l} \text{for } n \in 1 .. n_{bays} \\ \quad b_n \leftarrow \sqrt{\left(\frac{1}{n_{bays}} \cdot g\right)^2 + Z_n \cdot Z_{n+1}} \\ b \end{array} \right.$$

$$b = \begin{pmatrix} 63.79 \\ 54.94 \\ 47.12 \end{pmatrix} ft$$

Length of diagonal rods per each bay

$$R := \left| \begin{array}{l} \text{for } n \in 1 .. n_{bays} - 1 \\ \quad r_n \leftarrow r_{tank} + \frac{n \cdot (r_{bottom} - r_{tank})}{n_{bays}} \\ r \end{array} \right.$$

$$R = \begin{pmatrix} 33.05 \\ 25.1 \end{pmatrix} ft$$

$$H := \left| \begin{array}{l} \text{for } n \in 1 .. n_{bays} - 1 \\ \quad h_n \leftarrow R_n - \left(\frac{d_{col}}{2} + \frac{d_{riser}}{2}\right) \\ h \end{array} \right.$$

$$H = \begin{pmatrix} 30.79 \\ 22.84 \end{pmatrix} ft$$

Length of each horizontal rod per elevation

Wind on members

Diagonal rods

$$y_b := \left| \begin{array}{l} \text{for } n \in 1 .. n_{bays} \\ \quad y_n \leftarrow h_{leg} \cdot \left(\frac{n_{bays} - n}{n_{bays}} \right) + \frac{h_{leg}}{2 n_{bays}} \\ y \end{array} \right. \qquad y_b = \begin{pmatrix} 90 \\ 54 \\ 18 \end{pmatrix} \text{ft}$$

Centroid of each rod level

$$A_b := \left| \begin{array}{l} \text{for } n \in 1 .. n_{bays} \\ \quad a_n \leftarrow 2 \cdot d_{rod} \cdot b_n \\ a \end{array} \right. \qquad A_b = \begin{pmatrix} 13.29 \\ 11.45 \\ 9.82 \end{pmatrix} \text{ft}^2$$

Projected area of each diagonal rod per elevation

Horizontal struts

$$y_Z := \left| \begin{array}{l} \text{for } n \in 1 .. n_{bays} - 1 \\ \quad y_n \leftarrow \left(\frac{n_{bays} - n}{n_{bays}} \right) \cdot h_{leg} \\ y \end{array} \right. \qquad y_Z = \begin{pmatrix} 72 \\ 36 \end{pmatrix} \text{ft}$$

Centroid of each strut level

$$A_Z := \left| \begin{array}{l} \text{for } n \in 1 .. n_{bays} - 1 \\ \quad A_n \leftarrow Z_{n+1} \cdot H_{strut} \\ A \end{array} \right. \qquad A_Z = \begin{pmatrix} 31.16 \\ 23.66 \end{pmatrix} \text{ft}^2$$

Projected area of each horizontal strut per elevation

Horizontal rods

$$y_H := \left| \begin{array}{l} \text{for } n \in 1 .. n_{bays} - 1 \\ \quad y_n \leftarrow \left(\frac{n_{bays} - n}{n_{bays}} \right) \cdot h_{leg} \\ y \end{array} \right. \qquad y_H = \begin{pmatrix} 72 \\ 36 \end{pmatrix} \text{ft}$$

Centroid of each rod level

$$A_H := \left| \begin{array}{l} \text{for } n \in 1 .. n_{bays} - 1 \\ \quad A_n \leftarrow H_n \cdot d_{Hrod} \\ A \end{array} \right. \qquad A_H = \begin{pmatrix} 2.57 \\ 1.9 \end{pmatrix} \text{ft}^2$$

Projected area of each horizontal rod per elevation

Columns

$A_{col} := d_{col} \cdot g$ $\quad A_{col} = 157.61\ ft^2$ *Projected area of one column*

$y_{col} := h_{leg} \cdot 0.5$ $\quad y_{col} = 54\ ft$ *The elevation of the centroids of the columns*

Center Riser

$H_{riser} := h_{lower}$

$A_{riser} := d_{riser} \cdot H_{riser}$ $\quad A_{riser} = 306.66\ ft^2$ *Projected area of riser*

$y_{riser} := H_{riser} \cdot 0.5$ $\quad y_{riser} = 49.46\ ft$ *The elevation of the centroid of the riser*

Balcony

$A_{balcony} := \left(d_{tank} + 2 \cdot 30in\right) \cdot 36in$ $\quad A_{balcony} = 261\ ft^2$ *Projected area of balcony*

Wind Load Determination

As per ANSI/AWWA D100-11, the wind loading is to be determined by the height of the individual centroid of each element.

$$KZ := \begin{pmatrix} y_{top} \\ y_{main} \\ y_{bot} \\ y_{col} \\ y_{riser} \\ h_{balcony} \end{pmatrix} \qquad KZ = \begin{pmatrix} 118.88 \\ 110.8 \\ 102.72 \\ 54 \\ 49.46 \\ 108 \end{pmatrix} \text{ ft}$$

$$K_Z := \left| \begin{array}{l} \text{for } n \in 1 .. 6 \\ \quad K_n \leftarrow \left| \begin{array}{l} 1.09 \text{ if } 0\text{ft} < KZ_n \le 50\text{ft} \\ 0.0036\left(KZ_n - 50\text{ft}\right)\cdot\frac{1}{\text{ft}} + 1.09 \text{ if } 50\text{ft} < KZ_n \le 100\text{ft} \\ 0.0022\left(KZ_n - 100\text{ft}\right)\cdot\frac{1}{\text{ft}} + 1.27 \text{ if } 100\text{ft} < KZ_n \le 150\text{ft} \\ 0.0016\left(KZ_n - 150\text{ft}\right)\cdot\frac{1}{\text{ft}} + 1.38 \text{ if } 150\text{ft} < KZ_n \le 200\text{ft} \\ 0.0014\left(KZ_n - 200\text{ft}\right)\cdot\frac{1}{\text{ft}} + 1.46 \text{ if } 200\text{ft} < KZ_n \le 250\text{ft} \\ 0.0014\left(KZ_n - 250\text{ft}\right)\cdot\frac{1}{\text{ft}} + 1.53 \text{ if } 250\text{ft} < KZ_n \le 300\text{ft} \\ 0.0010\left(KZ_n - 300\text{ft}\right)\cdot\frac{1}{\text{ft}} + 1.60 \text{ if } 300\text{ft} < KZ_n \le 350\text{ft} \end{array} \right. \\ K \end{array} \right. \qquad K_Z = \begin{pmatrix} 1.31 \\ 1.29 \\ 1.28 \\ 1.1 \\ 1.09 \\ 1.29 \end{pmatrix}$$

$$q_z := 0.00256 K_Z \cdot I \cdot V_{3sec.gust}{}^2 \cdot \text{psf} \qquad q_z = \begin{pmatrix} 51.96 \\ 51.25 \\ 50.55 \\ 43.75 \\ 43.18 \\ 51.01 \end{pmatrix} \cdot \text{psf}$$

$F_{top} := \max\left(q_{z_1}\cdot G\cdot C_{d\_sphere}, 30\text{psf}\cdot C_{d\_sphere}\right)\cdot A_{top}$ $\quad F_{top} = 9.04\cdot\text{kip}$ *Total wind loading on top dome of tank*

$F_{main} := \max\left(q_{z_2}\cdot G\cdot C_{d\_cyl}, 30\text{psf}\cdot C_{d\_cyl}\right)\cdot A_{main}$ $\quad F_{main} = 27.95\cdot\text{kip}$ *Total wind loading on main body of tank*

$F_{bottom} := \max\left(q_{z_3}\cdot G\cdot C_{d\_sphere}, 30\text{psf}\cdot C_{d\_sphere}\right)\cdot A_{bottom}$ $\quad F_{bottom} = 8.79\cdot\text{kip}$ *Total wind loading on bottom dome of tank*

$F_{col} := \max\left(q_{z_4}\cdot G\cdot C_{d\_cyl}, 30\text{psf}\cdot C_{d\_flat}\right)\cdot n_{legs}\cdot A_{col}$ $\quad F_{col} = 18.91\cdot\text{kips}$ *Total wind loads on the columns*

$F_{riser} := \max\left(q_{z_5}\cdot G\cdot C_{d\_cyl}, 30\text{psf}\cdot C_{d\_cyl}\right)\cdot A_{riser}$ $\quad F_{riser} = 7.94\cdot\text{kips}$ *Wind load on the riser*

$F_{balcony} := \max\left(q_{z_6}\cdot G\cdot C_{d\_flat}, 30\text{psf}\cdot C_{d\_flat}\right)\cdot A_{balcony}$ $\quad F_{balcony} = 13.31\cdot\text{kips}$ *Wind load on the balcony*

Diagonals, Struts, and Horizontal Rods

Diagonal Rods

$$K_{Z.b} := \left| \begin{array}{l} \text{for } n \in 1 .. n_{bays} - 1 \\ K_n \leftarrow \left| \begin{array}{l} 1.09 \text{ if } 0\text{ft} < y_{b_n} \le 50\text{ft} \\ 0.0036\left(y_{b_n} - 50\text{ft}\right)\cdot\frac{1}{\text{ft}} + 1.09 \text{ if } 50\text{ft} < y_{b_n} \le 100\text{ft} \\ 0.0022\left(y_{b_n} - 100\text{ft}\right)\cdot\frac{1}{\text{ft}} + 1.27 \text{ if } 100\text{ft} < y_{b_n} \le 150\text{ft} \\ 0.0016\left(y_{b_n} - 150\text{ft}\right)\cdot\frac{1}{\text{ft}} + 1.38 \text{ if } 150\text{ft} < y_{b_n} \le 200\text{ft} \\ 0.0014\left(y_{b_n} - 200\text{ft}\right)\cdot\frac{1}{\text{ft}} + 1.46 \text{ if } 200\text{ft} < y_{b_n} \le 250\text{ft} \\ 0.0014\left(y_{b_n} - 250\text{ft}\right)\cdot\frac{1}{\text{ft}} + 1.53 \text{ if } 250\text{ft} < y_{b_n} \le 300\text{ft} \\ 0.0010\left(y_{b_n} - 300\text{ft}\right)\cdot\frac{1}{\text{ft}} + 1.60 \text{ if } 300\text{ft} < y_{b_n} \le 350\text{ft} \end{array} \right. \\ K \end{array} \right.$$

$$K_{Z.b} = \begin{pmatrix} 1.23 \\ 1.1 \end{pmatrix}$$

$$q_{z.b} := 0.00256 K_{Z.b}\cdot\left(I\cdot V_{3sec.gust}{}^2\right)\cdot\text{psf}$$

$$q_{z.b} = \begin{pmatrix} 48.88 \\ 43.75 \end{pmatrix}\cdot\text{psf}$$

$$P_b := \left| \begin{array}{l} \text{for } n \in 1 .. n_{bays} \\ p_n \leftarrow \max\left(q_{z.b}\cdot G\cdot C_{d\_cyl}, 30\text{psf}\cdot C_{d\_cyl}\right)\cdot n_{legs}\cdot A_{b_n} \\ p \end{array} \right. \qquad P_b = \begin{pmatrix} 1559.18 \\ 1342.8 \\ 1151.62 \end{pmatrix}\text{lbf}$$

Wind loading on all the horizontal rods per elevation

$$F_{brace} := \sum_{i=1}^{n_{bays}} \left(P_{b_i}\right) \qquad F_{brace} = 4053.6\,\text{lbf}$$

Total wind force on diagonal rods (shielding is not considered)

$$M_B := \left| \begin{array}{l} \text{for } n \in 1 .. n_{bays} \\ m_n \leftarrow P_{b_n}\cdot y_{b_n} \\ m \end{array} \right. \qquad M_B = \begin{pmatrix} 140.33 \\ 72.51 \\ 20.73 \end{pmatrix}\cdot\text{kip}\cdot\text{ft}$$

Overturning moment for diagonal rods per elevation

$$M_{brace} := \sum_{n=n_{bays}}^{1} M_{B_n} \qquad M_{brace} = 233.57\cdot\text{kip}\cdot\text{ft}$$

Total overturning moment due to diagonal rods

Horizontal struts

$$K_{Z.Z} := \left| \begin{array}{l} \text{for } n \in 1 .. n_{bays} - 1 \\ \quad K_n \leftarrow \left| \begin{array}{l} 1.09 \text{ if } 0\text{ft} < y_{Z_n} \le 50\text{ft} \\ 0.0036\left(y_{Z_n} - 50\text{ft}\right)\cdot\frac{1}{\text{ft}} + 1.09 \text{ if } 50\text{ft} < y_{Z_n} \le 100\text{ft} \\ 0.0022\left(y_{Z_n} - 100\text{ft}\right)\cdot\frac{1}{\text{ft}} + 1.27 \text{ if } 100\text{ft} < y_{Z_n} \le 150\text{ft} \\ 0.0016\left(y_{Z_n} - 150\text{ft}\right)\cdot\frac{1}{\text{ft}} + 1.38 \text{ if } 150\text{ft} < y_{Z_n} \le 200\text{ft} \\ 0.0014\left(y_{Z_n} - 200\text{ft}\right)\cdot\frac{1}{\text{ft}} + 1.46 \text{ if } 200\text{ft} < y_{Z_n} \le 250\text{ft} \\ 0.0014\left(y_{Z_n} - 250\text{ft}\right)\cdot\frac{1}{\text{ft}} + 1.53 \text{ if } 250\text{ft} < y_{Z_n} \le 300\text{ft} \\ 0.0010\left(y_{Z_n} - 300\text{ft}\right)\cdot\frac{1}{\text{ft}} + 1.60 \text{ if } 300\text{ft} < y_{Z_n} \le 350\text{ft} \end{array} \right. \\ K \end{array} \right.$$

$$K_{Z.Z} = \begin{pmatrix} 1.17 \\ 1.09 \end{pmatrix}$$

$$q_{z.Z} := 0.00256 K_{Z.Z}\cdot\left(I\cdot V_{3sec.gust}^{\ 2}\right)\cdot\text{psf} \qquad q_{z.Z} = \begin{pmatrix} 46.32 \\ 43.18 \end{pmatrix}\cdot\text{psf}$$

$$P_Z := \left| \begin{array}{l} \text{for } n \in 1 .. n_{bays} - 1 \\ \quad P_n \leftarrow \max\left(q_{z.Z}\cdot G\cdot C_{d\_flat}, 30\text{psf}\cdot C_{d\_flat}\right)\cdot n_{legs}\cdot A_{H_n} \\ P \end{array} \right. \qquad P_Z = \begin{pmatrix} 475.32 \\ 352.56 \end{pmatrix}\text{lbf}$$

Wind loading on all of the rods per elevation

$$F_{strut} := \sum_{i=1}^{n_{bays}-1} \left(P_{Z_i}\right) \qquad F_{strut} = 827.88\,\text{lbf}$$

Total wind force on horizontal struts (shielding is not considered)

$$M_Z := \left| \begin{array}{l} \text{for } n \in 1 .. n_{bays} - 1 \\ \quad M_n \leftarrow P_{Z_n}\cdot y_{Z_n} \\ M \end{array} \right. \qquad M_Z = \begin{pmatrix} 34.22 \\ 12.69 \end{pmatrix}\cdot\text{kip}\cdot\text{ft}$$

Overturning moment for struts per elevation

$$M_{strut} := \sum_{n=n_{bays}-1}^{1} M_{Z_n} \qquad M_{strut} = 46.92\cdot\text{kip}\cdot\text{ft}$$

Total overturning moment due to horizontal struts

Horizontal rods

$$K_{Z.Hrod} := \left| \begin{array}{l} \text{for } n \in 1 .. n_{bays} - 1 \\ \quad K_n \leftarrow \left| \begin{array}{l} 1.09 \text{ if } 0ft < y_{H_n} \le 50ft \\ 0.0036\left(y_{H_n} - 50ft\right)\cdot\frac{1}{ft} + 1.09 \text{ if } 50ft < y_{H_n} \le 100ft \\ 0.0022\left(y_{H_n} - 100ft\right)\cdot\frac{1}{ft} + 1.27 \text{ if } 100ft < y_{H_n} \le 150ft \\ 0.0016\left(y_{H_n} - 150ft\right)\cdot\frac{1}{ft} + 1.38 \text{ if } 150ft < y_{H_n} \le 200ft \\ 0.0014\left(y_{H_n} - 200ft\right)\cdot\frac{1}{ft} + 1.46 \text{ if } 200ft < y_{H_n} \le 250ft \\ 0.0014\left(y_{H_n} - 250ft\right)\cdot\frac{1}{ft} + 1.53 \text{ if } 250ft < y_{H_n} \le 300ft \\ 0.0010\left(y_{H_n} - 300ft\right)\cdot\frac{1}{ft} + 1.60 \text{ if } 300ft < y_{H_n} \le 350ft \end{array} \right. \\ K \end{array} \right.$$

$$K_{Z.Hrod} = \begin{pmatrix} 1.17 \\ 1.09 \end{pmatrix}$$

$$q_{z.Hrod} := 0.00256 K_{Z.Hrod}\cdot\left(I\cdot V_{3sec.gust}^{\ 2}\right)\cdot psf \qquad q_{z.Hrod} = \begin{pmatrix} 46.32 \\ 43.18 \end{pmatrix}\cdot psf$$

$$P_H := \left| \begin{array}{l} \text{for } n \in 1 .. n_{bays} - 1 \\ \quad P_n \leftarrow \max\left(q_{z.Hrod}\cdot G\cdot C_{d\_flat}, 30psf\cdot C_{d\_flat}\right)\cdot n_{legs}\cdot A_{H_n} \\ P \end{array} \right. \qquad P_H = \begin{pmatrix} 475.32 \\ 352.56 \end{pmatrix} lbf$$

Wind loading on all of the rods per elevation

$$F_{Horiz.Rod} := \sum_{i=1}^{n_{bays}-1} \left(P_{H_i}\right) \qquad F_{Horiz.Rod} = 827.88\,lbf$$

Total wind force on horizontal rod (shielding is not considered)

$$M_h := \left| \begin{array}{l} \text{for } n \in 1 .. n_{bays} - 1 \\ \quad M_n \leftarrow P_{H_n}\cdot y_{H_n} \\ M \end{array} \right. \qquad M_h = \begin{pmatrix} 34.22 \\ 12.69 \end{pmatrix}\cdot kip\cdot ft$$

Overturning moment for rods per elevation

$$M_{Hrod} := \sum_{n=n_{bays}-1}^{1} M_{h_n} \qquad M_{Hrod} = 46.92\cdot kip\cdot ft$$

Total overturning moment due to horizontal rods

Overturning Review

Shear at base of tank from the existing structure

$$V_{exist.base} := F_{top} + F_{main} + F_{bottom} + F_{col} + F_{riser} \cdots + F_{balcony} + F_{brace} + F_{strut} + F_{Horiz.Rod}$$

$V_{exist.base} = 91.65 \cdot kip$

Total shear due to original water tower structures and members

Shear from the antennas

$$V_{new.base} := \sum_{i=1}^{N_{antenna}} F_{A_i} + \sum_{j=1}^{N_{pipe}} \left(F_{pipe_j}\right) + \sum_{j=1}^{N_{app}} \left(F_{app_j}\right)$$

$V_{new.base} = 7.15 \cdot kip$

Total shear due to appurtenances

$$V_{total.base} := V_{exist.base} + V_{new.base}$$

$V_{total.base} = 98.8 \cdot kip$

Total shear at base

The overturning moment about the base from the water tank

$$M_{ot} := F_{top} \cdot y_{top} + F_{main} \cdot y_{main} + F_{bottom} \cdot y_{bot} + F_{col} \cdot y_{col} \cdots + F_{riser} \cdot y_{riser} + F_{balcony} \cdot h_{balcony} + M_{brace} + M_{strut} \cdots + M_{Hrod}$$

$M_{ot} = 8253.01 \cdot kips \cdot ft$

Overturning moment from original water tower structures and members

The overturning moment about the base from the antennas

done to the current AWWA design specifications

$$M_{app} := \sum_{j=1}^{N_{antenna}} \left[\left(F_A\right)_j \cdot z_{ant_j}\right] + \sum_{j=1}^{N_{pipe}} \left[\left(F_{pipe}\right)_j \cdot z_{pipe_j}\right] + \left[\sum_{j=1}^{N_{app}} \left[\left(F_{app}\right)_j \cdot z_{app_j}\right]\right] + \sum_{j=1}^{N_{coax}} \left[\frac{F_{coax_j} \cdot \left(z_{coax_j}\right)^2}{8}\right]$$

$M_{app} = 786.53 \cdot kips \cdot ft$

Overturning moment from all appurtenances

$\frac{M_{app}}{M_{ot}} = 9.53 \cdot \%$

Note: The existing and proposed antennas have a 9.53 % increase on the overturning moment of the existing water tank. According to engineering judgment, the existing water tank will be adequate to support existing and proposed antennas.

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September 11, 2020

RE:	**AT&T LTE 3C/4C/4TXRX/5G NR/BWE**
Prepared For:	SMARTLINK/AT&T
Pace Number:	MRCTB047114/MRCTB047069/MRCTB047120/MRCTB047079/MRCTB047140
FA Code:	10035078
Site Number:	CTL02163
Site Name:	ESSEX CT
Site Address:	10 Main Street Essex, CT 06426

To Whom It May Concern,

This structural assessment is regarding to the adequacy of the existing catwalk handrail for the AT&T LTE 3C/4C/4TXRX/5G NR/BWE project. The analysis has been performed in accordance with the TIA-222-H Standard (Structural Standard for Antenna Supporting Structures, Antennas and Small Wind Turbine Support Structures). This analysis utilizes a basic wind speed of V= 124 mph as required by the latest adopted building code and local amendments. Exposure Category C and Risk Category II were used in this analysis.

Based on collected information via the tower mapping report by HighTower Solutions Inc. dated 7/29/2020, existing and proposed loading presented in the RFDS provided by AT&T dated 05/27/2020 Rev. 2.00, technical data of the proposed equipment and structural calculations, the existing catwalk handrail is **adequate to support the existing and proposed loading provided by the client, with a maximum catwalk handrail stress ratio of 99.9% provided that the following modifications are installed at each sector:**

- Removal of existing threaded rod connections at existing antenna mounting pipes.
- Addition of (2) sets of new water tower handrail antenna mounts (Perfect Vision P/N: PV-WT-HRM-U.)
- Addition of (2) new Pipes 2 ½ Std. x 9’-0”.
- Addition of (2) new horizontal midrail members L2x2x3/8 x 2’-11” (V.I.F.) bolted to existing rail members.
- Addition of (2) new horizontal connection angles L2x2x3/8 x 1’-5” (V.I.F.) bolted to new midrail members.

For details regarding the modifications, see attached sketch and construction drawings (latest version) prepared by Fullerton Engineering.

This PE certification completed by Fullerton Engineering Consultants, LLC is inclusive of the existing antenna mounting structures that will support the existing and proposed loading provided by the client.

This certification assumes that all structural members of the existing antenna mounting structures are in good condition and have not been altered from the manufacturer’s original design. Prior to installation of new equipment, contractor shall inspect the condition of all relevant members and connectors. The contractor shall be responsible for the means and methods of construction.

Respectfully,

Barbara T. Kotecki, P.E.

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Appurtenance Loading Schedule:

CARRIER	ELEVATION (FT)	QUANTITY	MANUFACTURER	MODEL	STATUS	POSITION	AZIMUTH	MOUNT
AT&T	108'-0"	2	Commscope	NNHH-65C-R4	Proposed	A3, B3	25°,150°	Existing Catwalk Handrail
		1	Commscope	NNHH-65A-R4		C3	275°	
		2	CCI	DMP65R-BU8DA		A4,B4	25°,150°	
		1	CCI	DMP65R-BU4DA		C4	275°	
		3	Ericsson	RRUS-4415 B30		A3,B3,C3	N/A	
		3	Ericsson	RRUS-8843 B2/B66A		A4,B4,C4	N/A	
		3	Ericsson	RRUS-4449 B5/B12		A4,B4,C4	N/A	
		3	Raycap	DC9-48-60-24-PC16-EV		A1,B1,C1	N/A	
		3	Powerwave	7770	Existing	A1,B1,C1	143°,263°,23°	
		6	Powerwave	LGP21401		A1,B1,C1	N/A	

Member Component Capacity Table:

Component	% Capacity	Pass / Fail
Face Horizontal	99.9%	Pass
Bracing Members	97.4%	Pass
Mounting Pipes	55.3%	Pass

Structural Rating (max from all components) =	**99.9%**

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Site Number: **CTL02163**
Site Name: Essex CT
Created By: JM
Checked By: RKM
Date: 9/11/2020
Code: ANSI/TIA-222-H

Base Structure Type	**Type**	Water Tower	
Structure Height Above Grade (ft)	**Ht**	122.67	
RAD Center (ft)	**z**	108.00	
Windspeed no ice (mph, 3-sec gust)	**V**	124.00	see wind maps
Windspeed with ice (mph, 3-sec gust)	**Vi**	50.00	see ice maps
Windspeed for maintenance (mph, 3-sec gust)	**Vm**	30.00	Section 16.6
Ice Thickness	**ti**	1.00	see ice maps
Exposure Category (B/C/D)	**Exposure**	C	Section 2.6.5.1.2
Topographic Category (1,2,3,4)	**Topo**	1.00	Section 2.6.6.1
Risk Category (I,II,III, IV)	**Cat**	II	Table 2-1
Crest Height	**H**	0.00	Section 2.6.6.2.1
Height above sea level	**Zs**	39.00	
Exposure Category Coefficient	**zg**	900.00	Table 2-4
Mid-Point of Structure	**Ht.mid**	61.34	
Min Velocity Pressure Coefficient	**Kzmin**	0.85	Table 2-4
Exposure Category Coefficient	**α'**	9.50	Table 2-4
Velocity Pressure Coefficient	**Kz**	1.29	Section 2.6.5.2
Topographic Coefficient	**Kt**	1.00	Table 2-5
Terrain Constant	**Kc**	1.00	Table 2-4
Ground Elevation Factor	**Ke**	1.00	Section 2.6.8
Topographic Category Coefficient	**f**	0.00	Table 2-5
Height Reduction Factor	**Kh**	1.00	Section 2.6.6.2.1
Topographic Factor	**Kzt**	1.00	Section 2.6.6.2.1
Ice Load Importance Factor	**Iti**	1.00	Table 2-3
Wind Direction Probability Factor	**Kd**	0.95	Table 2-2
Height Escalation Factor	**Kiz**	1.13	Section 2.6.10
Gust Effect Factor	**Gh**	1.00	Section 16.6
Design Ice Thickness	**tiz**	1.13	Section 2.6.10
Ice Density	**ρ.ice**	56.00	lbf/ft^3
Velocity Pressure for Maintenance	**qzm**	2.81	Section 2.6.11.6
Velocity Pressure With Ice	**qzi**	7.81	Section 2.6.11.6
Velocity Pressure No Ice	**qz**	48.03	Section 2.6.11.6

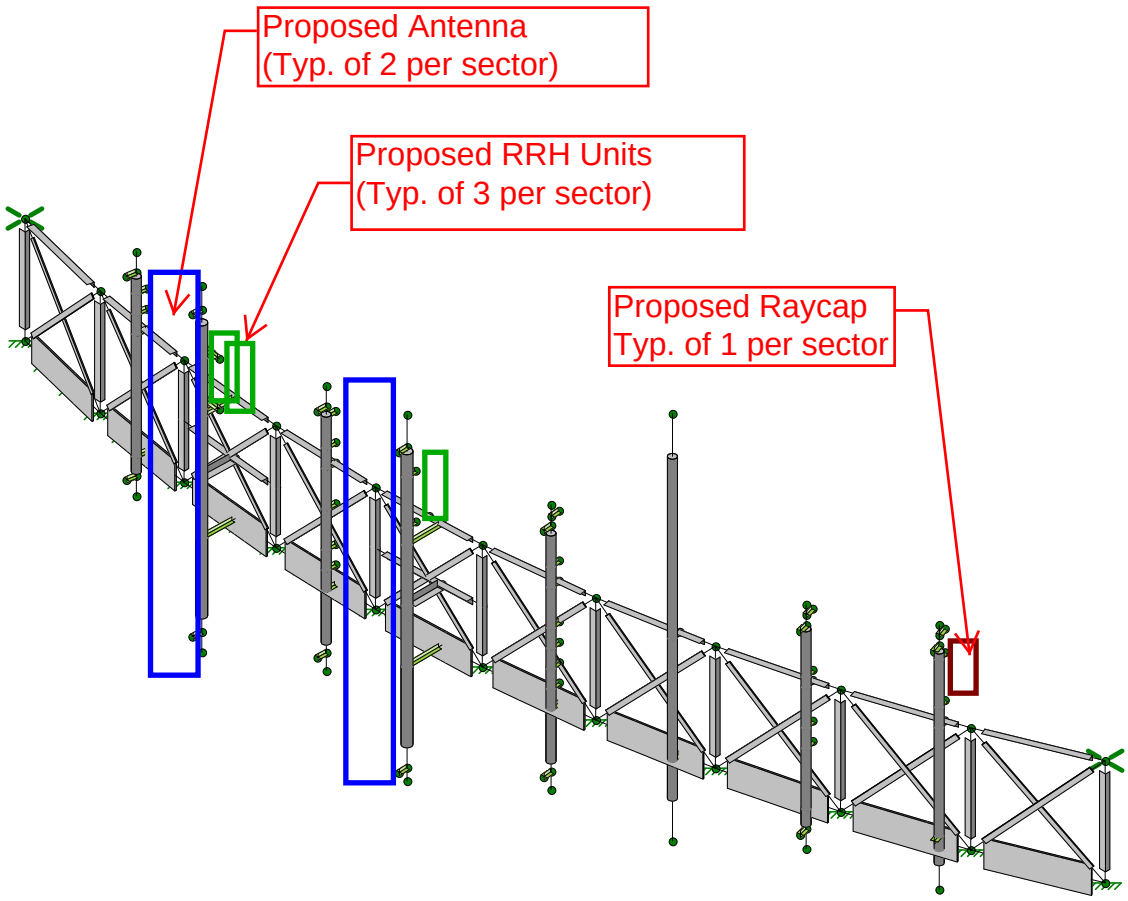
Ka=	0.9

Importance Factor (Earthquake)	I_e	1.00	Table 2-3
Site Class	**Class**	D - Stiff Soil	
Seismic Design Category	**Cat**	B	
MCE_R Ground Motion (period=0.2s)	S_S	0.207	
MCE_R Ground Motion (period=1.0s)	S_1	0.054	
Seismic Design Value at 0.2s	S_{DS}	0.22	
Long-Period Site Coefficient Fv	**Fv**	0.80	Table 2-12
Seismic Design Value at 1.0s	S_{D1}	0.044	Sec. 2.7.5
Long-period Transition Period (s)	T_L	6.000	

Sesimic Shear		
R	2.000	See 16.7
$C_{S\text{-calc}}$	0.111	See 2.7.7.1.1
$C_{S\text{-min}}$	0.010	See 2.7.7.1.1
C_S	0.111	See 2.7.7.1.1
A_S	1.000	See 16.7

Appurtenance Properties								Loads (force per connection)										
Manufacturer	**Model**	**R/F**	**L**	**W**	**D**	**Weight**	**# Conn**	**Wt**	**Ice Wt**	**F no ice**	**S no ice**	**F ice**	**S ice**	**Fm**	**Sm**	**Eh**	**Ev**	**EPA.F**
Powerwave	7770	Flat	56	11	5	39	2	19.5	24.2	122	65	24	15	7	4	2	1	6
Amphenol	LPA-80080-6CF	Flat	70.9	5.5	13.2	21	2	10.5	32.1	93	186	20	36	5	11	1	0.5	4
Commscope	SBNHH-1D65B	Flat	72.6	11.9	7.1	50.6	2	25.3	40.0	176	117	34	24	10	7	3	1	8
Commscope	NNHH-65C-R4	Flat	96	19.6	7.8	112.9	2	56.5	57.1	369	177	68	36	22	10	6	2	17
CCIAntennas	DMP65R-BU8DA	Flat	96	20.7	7.7	126.8	2	63.4	56.7	386	176	70	36	23	10	7	3	18
AlcatelLucent	B66A-RRH4x45	Flat	26.6	12	6.8	64	2	32.0	15.7	57	34	12	8	3	2	4	1	3
Ericsson	RRUS 4415 B30	Flat	14.96	13.19	5.39	46	2	23.0	9.2	36	15	8	4	2	1	3	1	2
AlcatelLucent	B25 RRH4x30	Flat	21.2	12	7.2	53	2	26.5	13.8	46	28	10	6	3	2	3	1	2
Ericsson	4449 B5/12	Flat	14.96	13.19	10.43	73	2	36.5	15.3	36	28	8	6	2	2	4	2	2
Ericsson	8843 B2/B66A	Flat	14.9	13.2	10.9	72	2	36.0	15.9	35	29	8	7	2	2	4	2	2
CCIAntennas	DMP65R-BU8DA	Flat	96	20.7	7.7	126.8	2	63.4	56.7	386	176	70	36	23	10	7	3	18
Powerwave	LGP-21401	Flat	14.4	9.2	2.6	14.1	2	7.1	5.1	24	8	6	2	1	0.4	1	0.3	1
RFS	TMA	Flat	4.5	6.25	1	10	2	5.0	1.6	5	1	2	1	0.3	0.1	1	0.2	0
Raycap	DC9-48-60-24-8C-EV	Round	31.41	10.24	10.24	26.2	1	26.2	16.3	49	49	10	10	3	3	3	1	1
Raycap	RRFDC-3315-PF-48	Flat	18	15	10	32	2	16.0	17.2	49	32	10	7	2.8	1.9	2	0.7	2

Shape Properties								Loads (force per connection)										
Shape Type	**Shape**	**R/F**	**L**	**W**	**D**	**Wt (plf)**	**# Conn**	**Wt**	**Ice Wt**	**F no ice**	**S no ice**	**F ice**	**S ice**	**Fm**	**Sm**	**Eh**	**Ev**	**EPA.F**
Angle	L2x1 1/2x1/4	Flat	35.144	2	1.5	2.77	2.92867	8.11	5.0	13	11	4	4	1	0.62	0.31	0.12	0.86
Plate	PL¼"x1½"	Flat	50.31	1.5	0.25	1.28	4.1925	5.35	3.6	11	2	4	3	1	0.11	0.14	0.06	1
Plate	PL7/16"x9"	Flat	35.144	9	0.4375	13.40	2.92867	39.24	13.9	41	3	9	3	2.40	0.18	1.48	0.6	2.77
Angle	L2x1 1/2x1/4	Flat	36	2	1.5	2.77	3	8.31	5.0	13	11	4	4	1	1	0.31	0.12	1
Pipe	Pipe 2 Std.	Round	72	2.38	2.38	3.66	6	21.96	4.8	10	10	3	3	1	1	0.40	0.16	1
Pipe	Pipe 2 Std.	Round	84	2.38	2.38	3.66	7	25.62	4.8	10	10	3	3	1	1	0.40	0.16	2
Pipe	Pipe 2 Std.	Round	126	2.38	2.38	3.66	10.5	38.43	4.8	10	10	3	3	1	1	0.40	0.16	2
Pipe	Pipe 2½ Std.	Round	120	2.88	2.88	5.80	10	58.00	5.5	12	12	4	4	1	1	0.64	0.26	3
Angle	L2X2X3/8	Flat	35.144	2	2	4.70	2.92867	13.76	5.4	13	13	4	4	1	0.74	0.52	0.21	0.86



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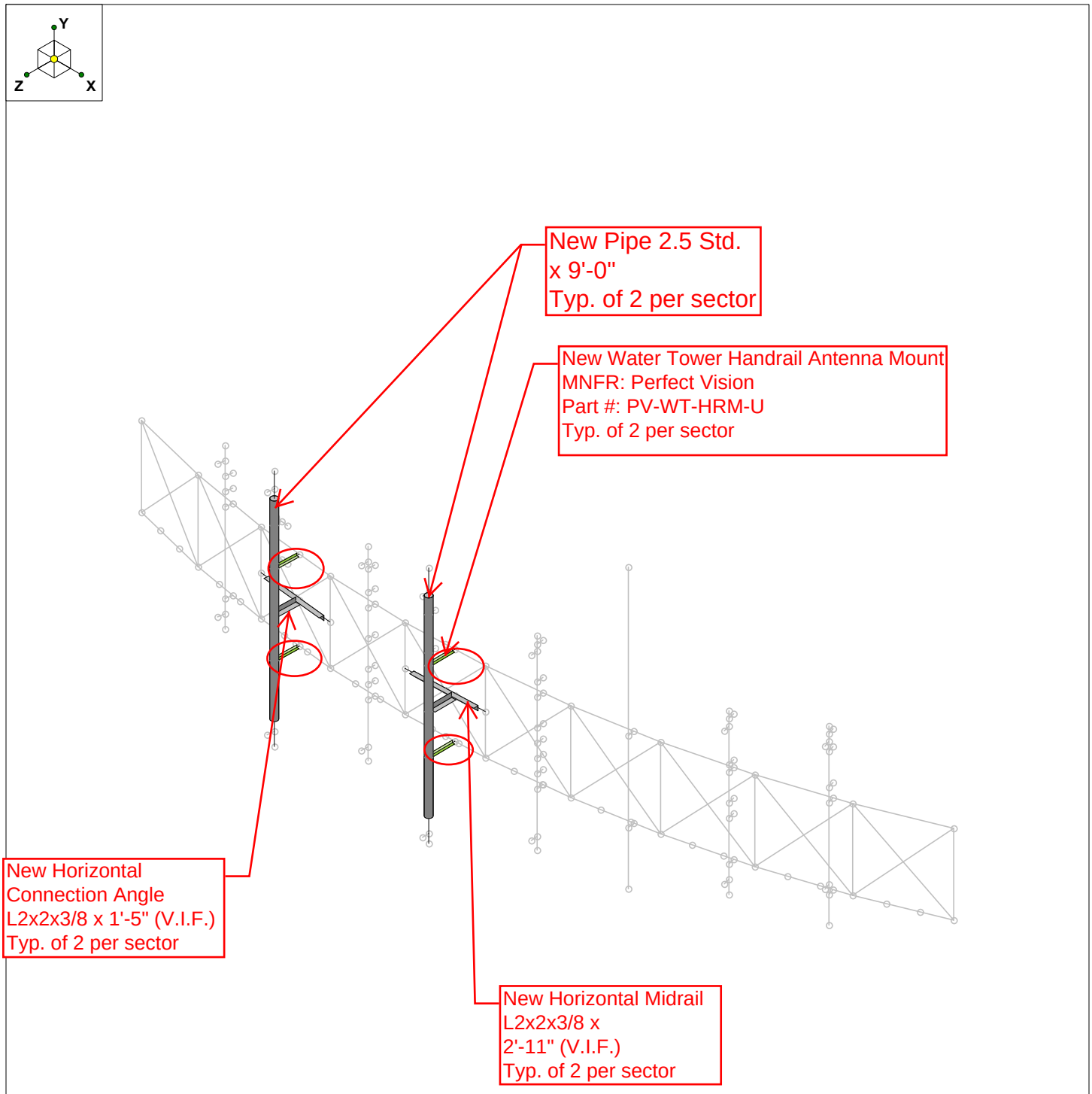
JM	Mount Analysis	Sept 11, 2020 at 1:27 PM
CTL02163	3D Render	CTL02163 - Mount Analysis.r3d



Loads: BLC 13, LM1
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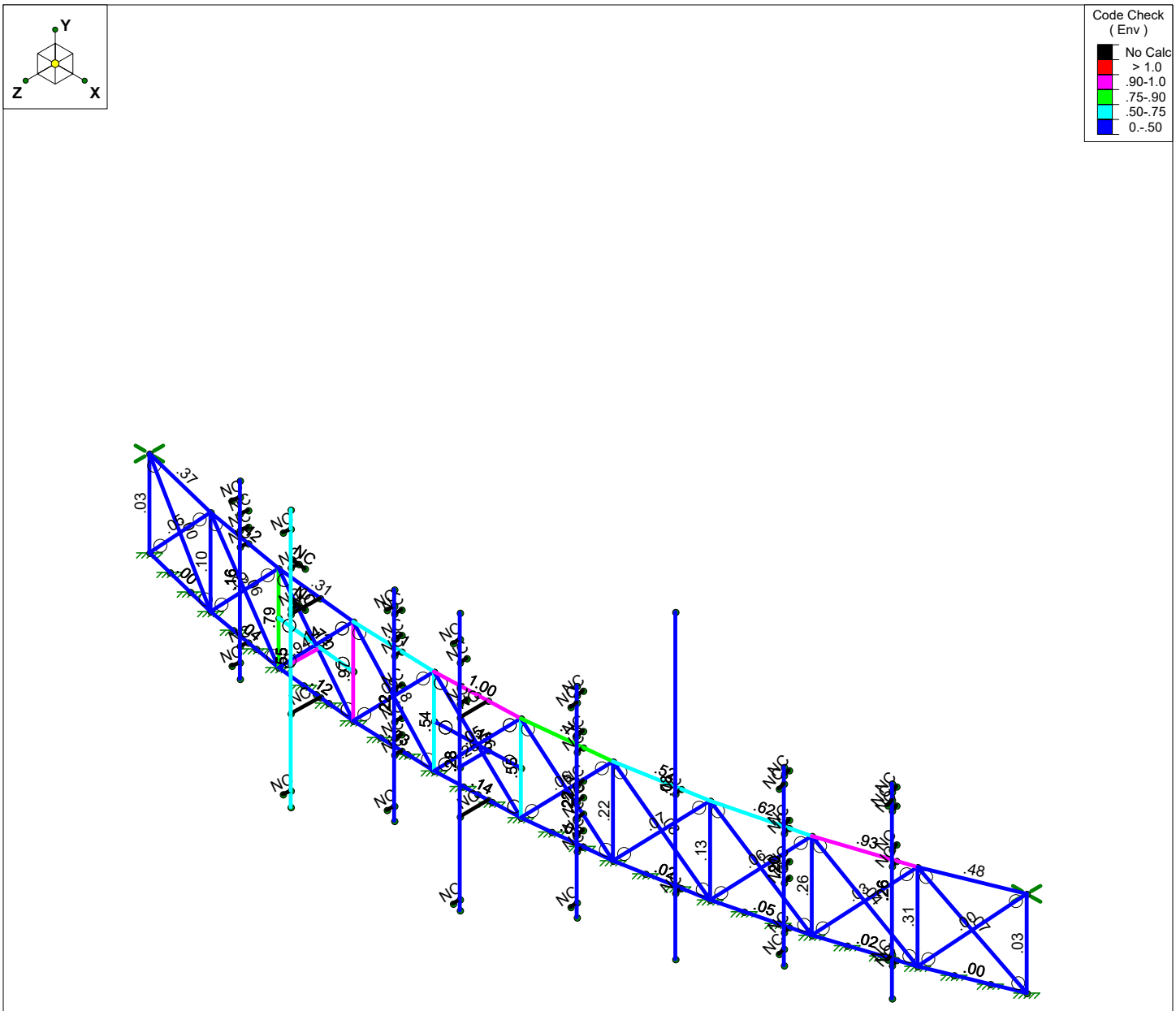
CTL02163	Modification	CTL02163 - Mount Analysis.r3d



Member Code Checks Displayed (Enveloped)
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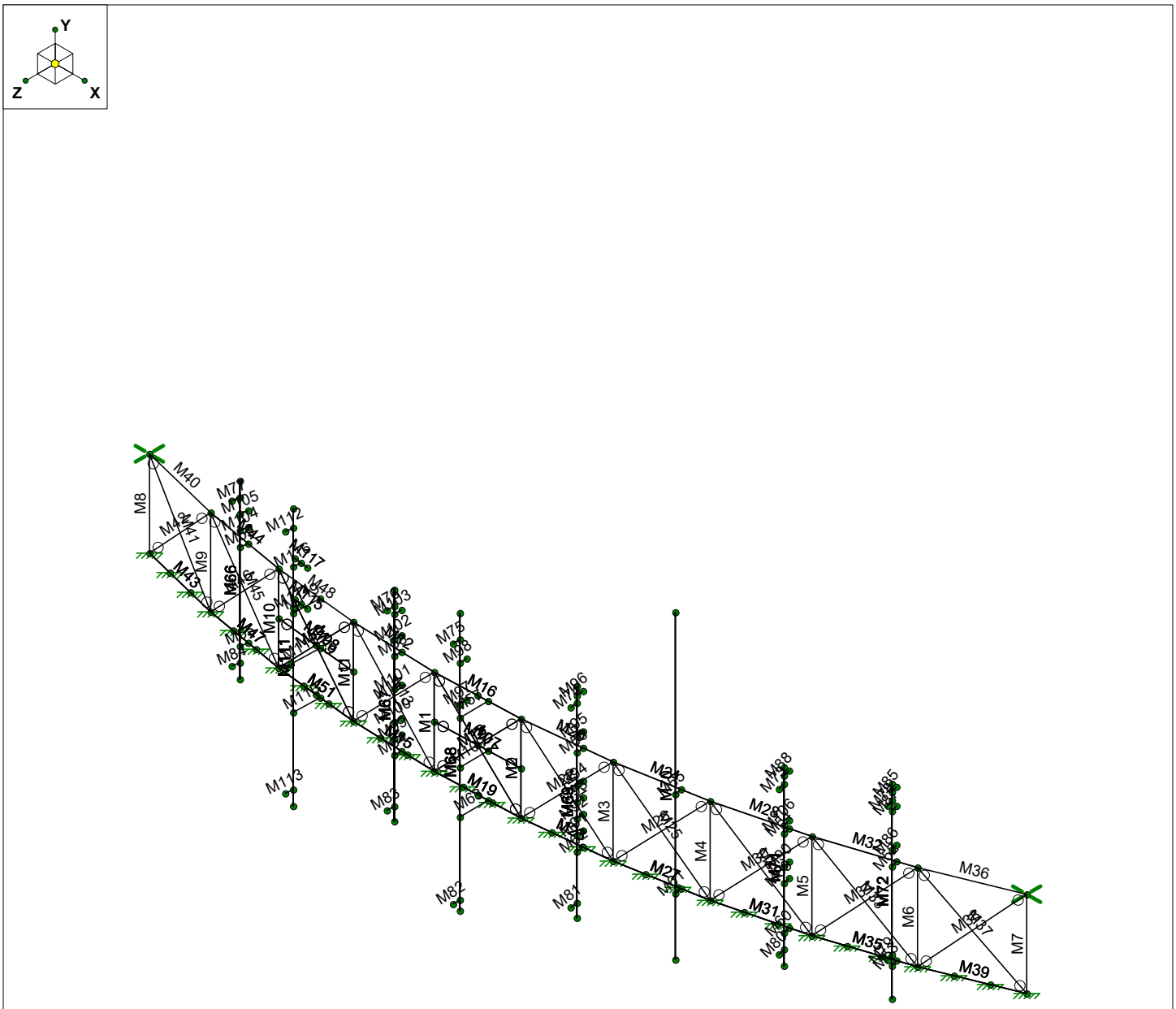
CTL02163	Unity Graphic	CTL02163 - Mount Analysis.r3d



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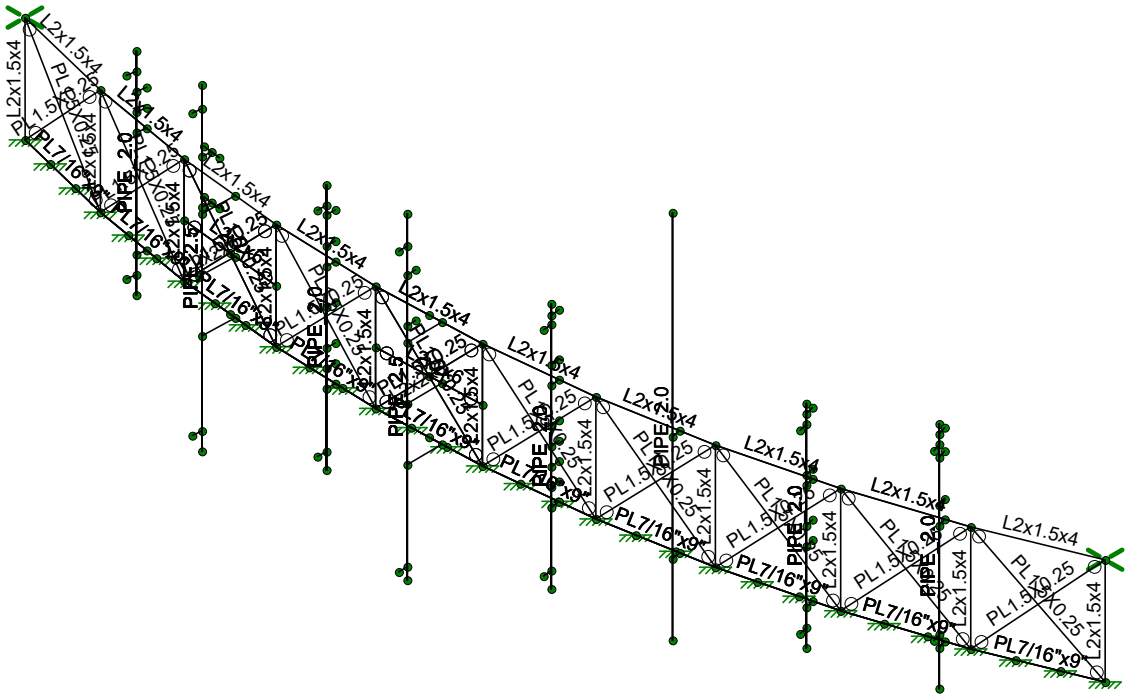
CTL02163	Member Label	CTL02163 - Mount Analysis.r3d



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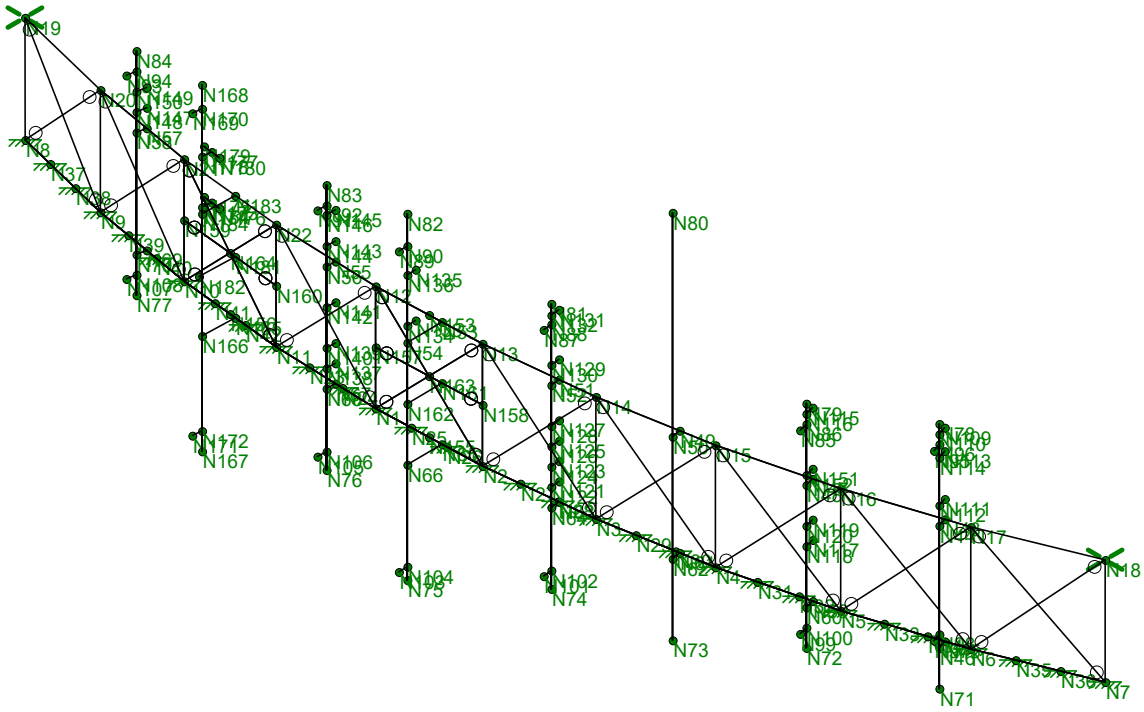

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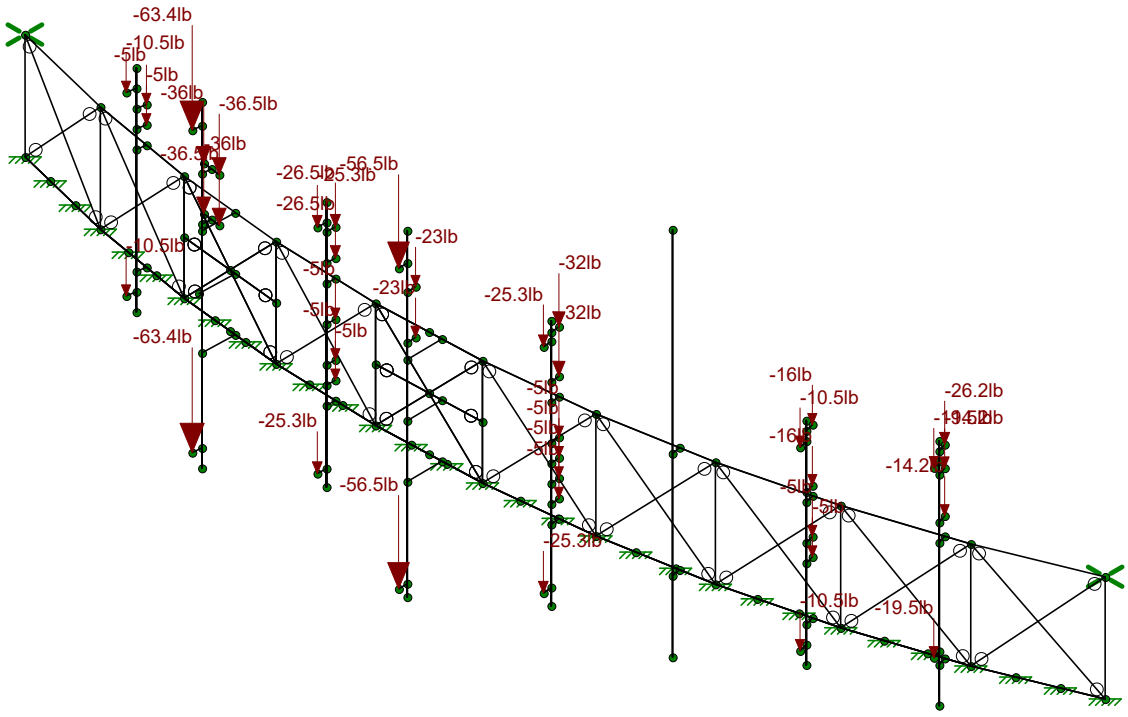

Loads: BLC 1, DL
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Fullerton Engineering Con...		SK - 6
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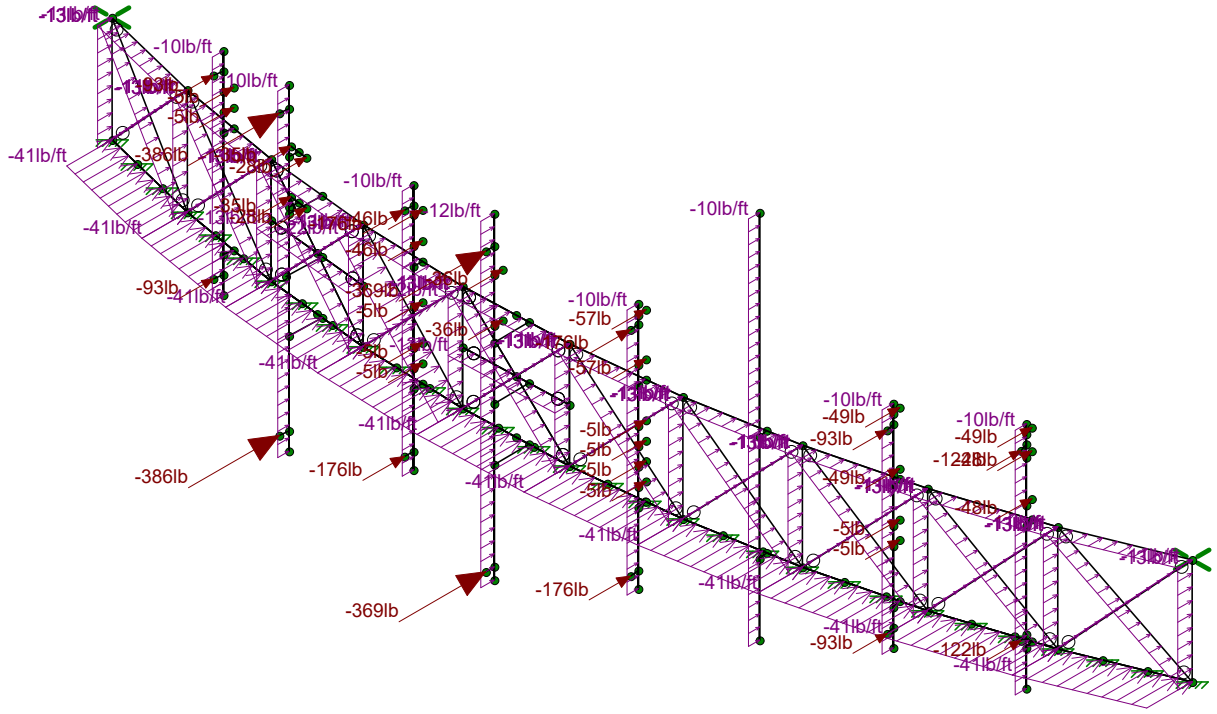

Loads: BLC 3, WL(0)
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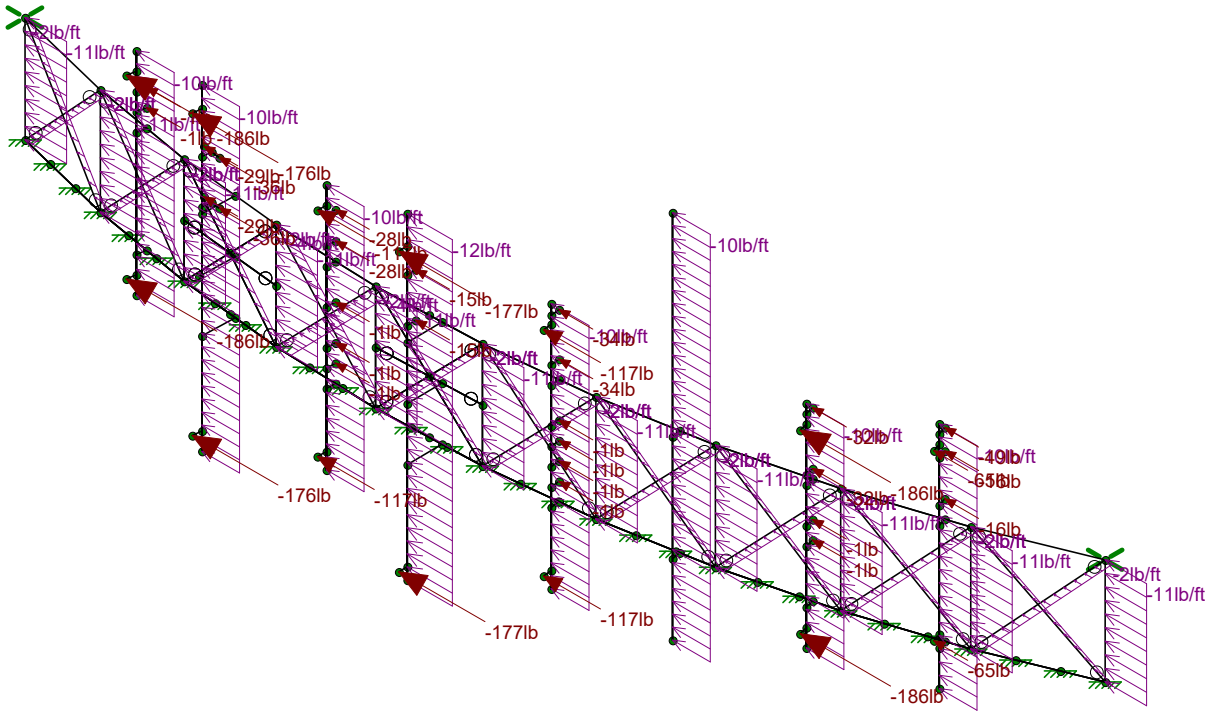
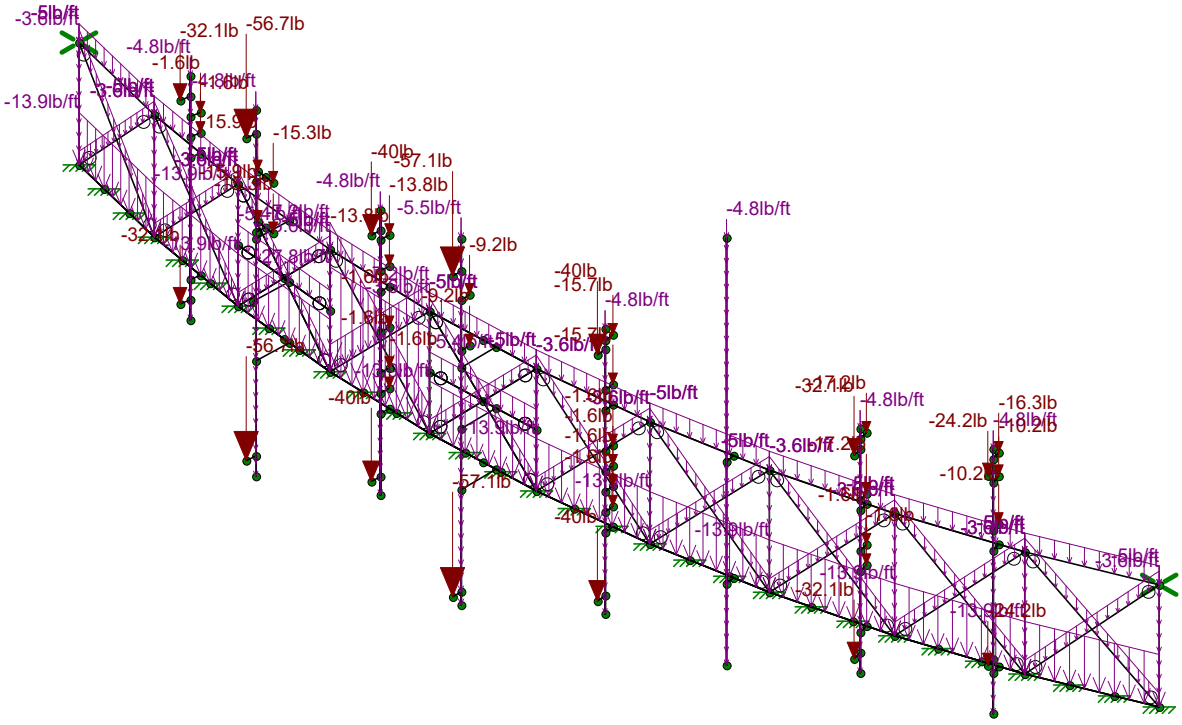
Fullerton Engineering Con...		SK - 7
JM	Mount Analysis	Sept 11, 2020 at 1:28 PM
CTL02163	Wind Load (Z-Direction)	CTL02163 - Mount Analysis.r3d



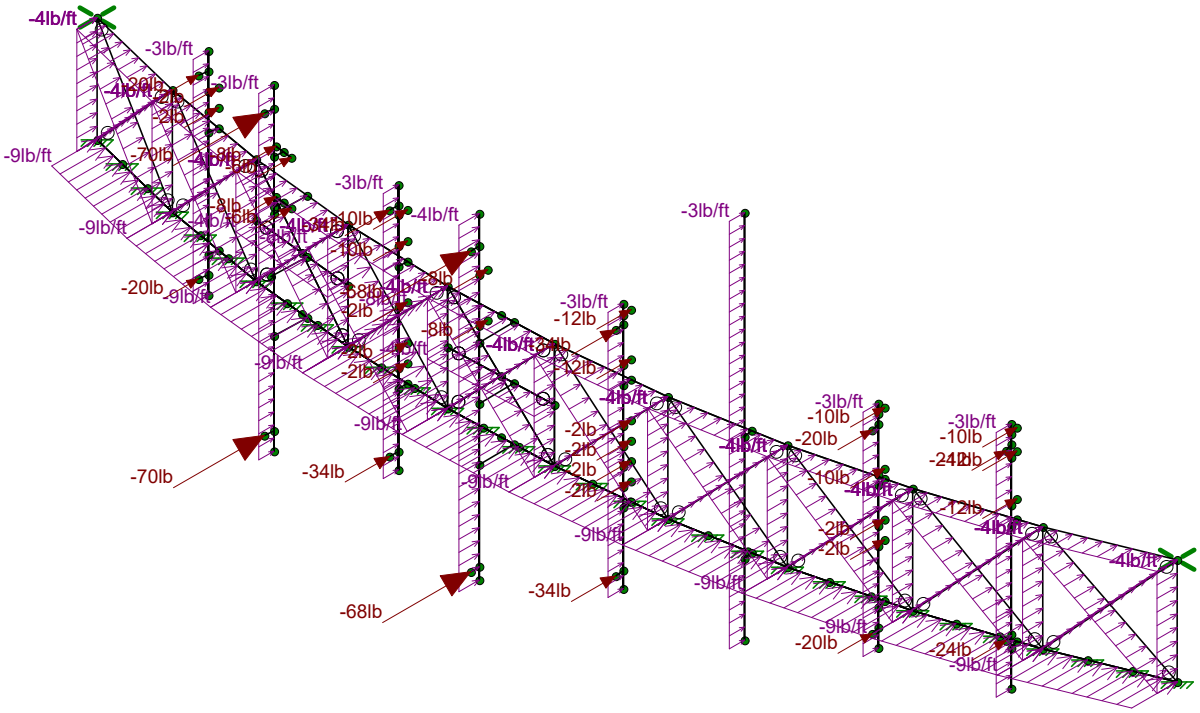
Loads: BLC 4, WL(90)
Envelope Only Solution

Fullerton Engineering Con...		SK - 8
JM	Mount Analysis	Sept 11, 2020 at 1:29 PM
CTL02163	Wind Load (X-Direction)	CTL02163 - Mount Analysis.r3d



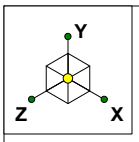
Loads: BLC 2, DLi
Envelope Only Solution

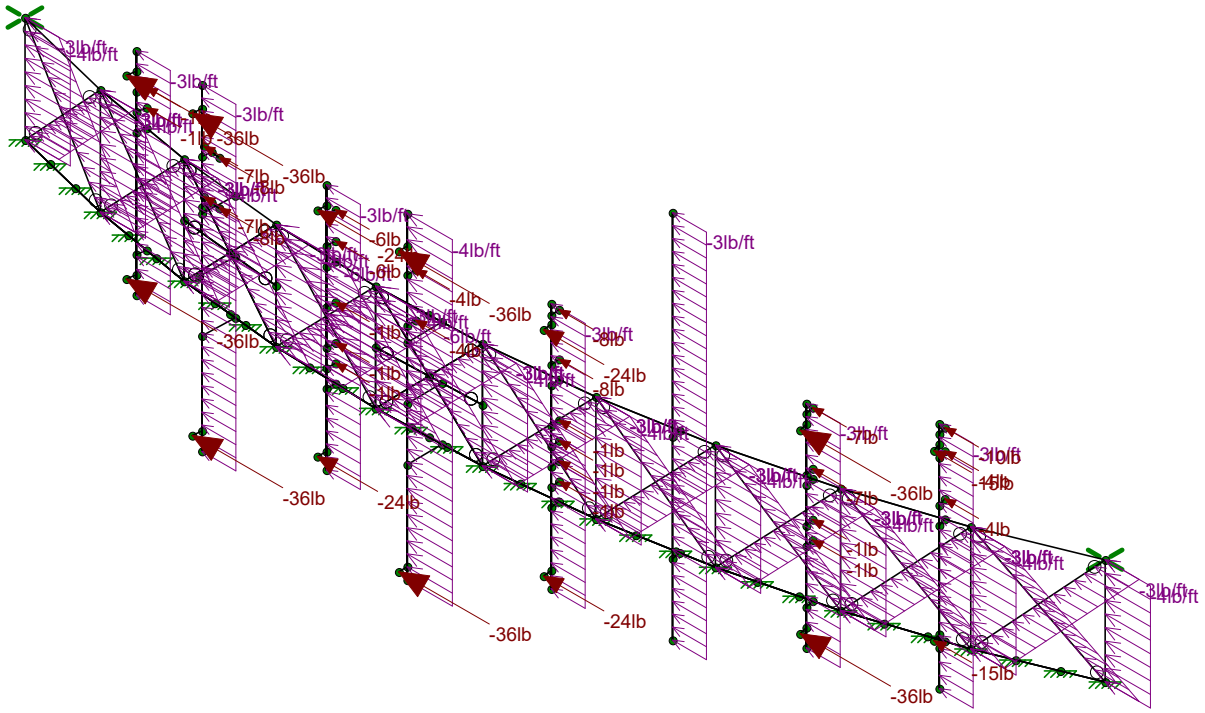
Fullerton Engineering Con...		SK - 9
JM	Mount Analysis	Sept 11, 2020 at 1:29 PM
CTL02163	Ice Load	CTL02163 - Mount Analysis.r3d



Loads: BLC 5, WL.i(0)
Envelope Only Solution

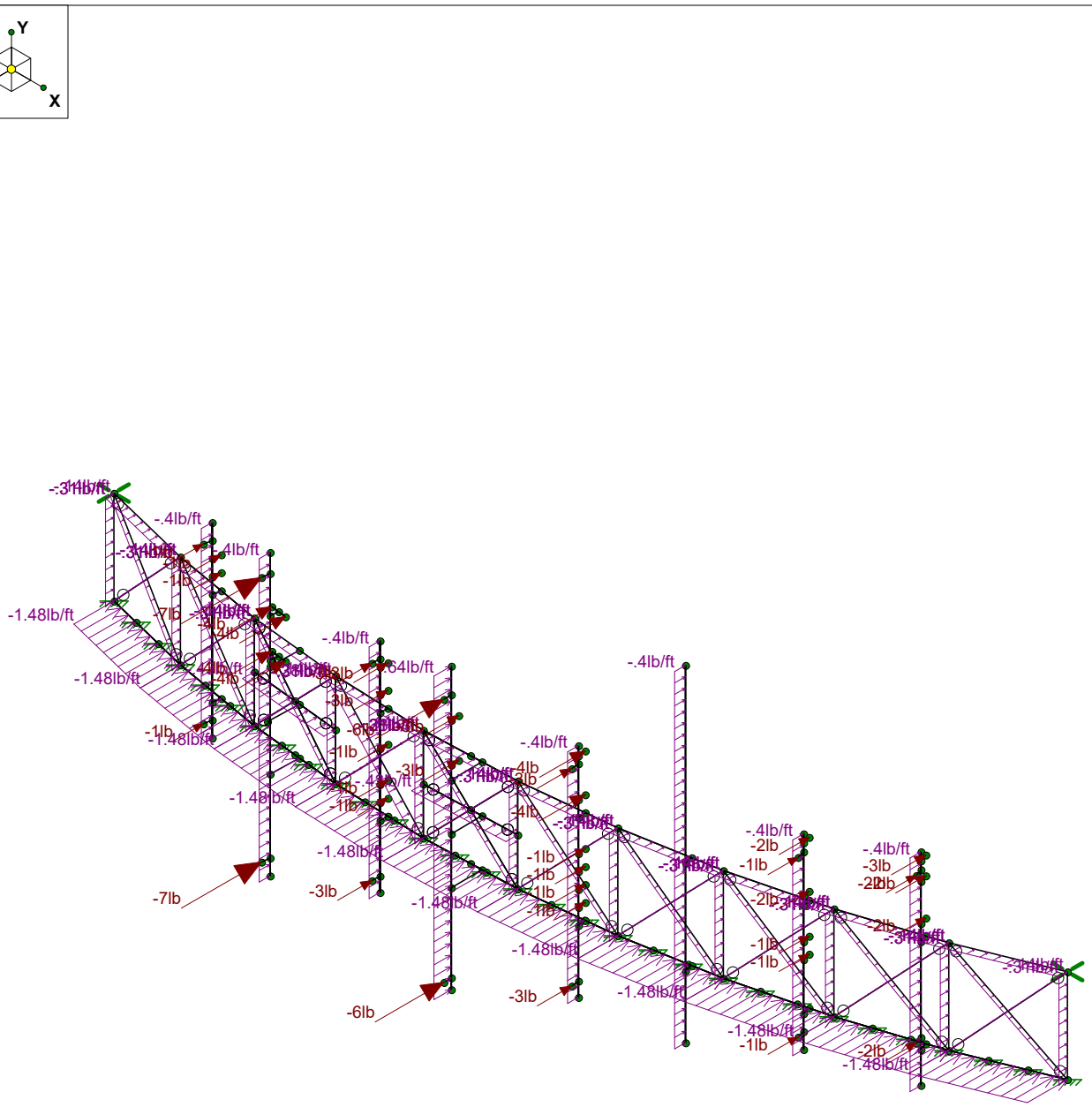
Fullerton Engineering Con...		SK - 10
JM	Mount Analysis	Sept 11, 2020 at 1:29 PM
CTL02163	Wind Load with Ice (Z-Direction)	CTL02163 - Mount Analysis.r3d





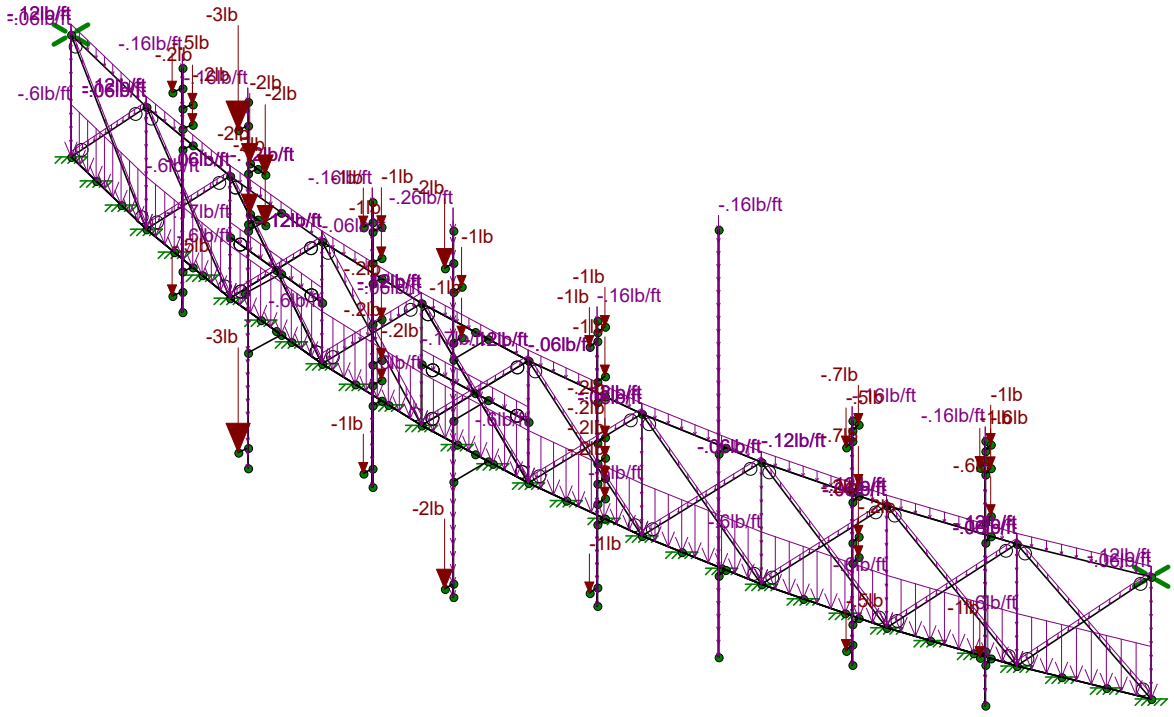
Loads: BLC 6, WL.i(90)
Envelope Only Solution

Fullerton Engineering Con...		SK - 11
JM	Mount Analysis	Sept 11, 2020 at 1:30 PM
CTL02163	Wind Load with Ice (X-Direction)	CTL02163 - Mount Analysis.r3d



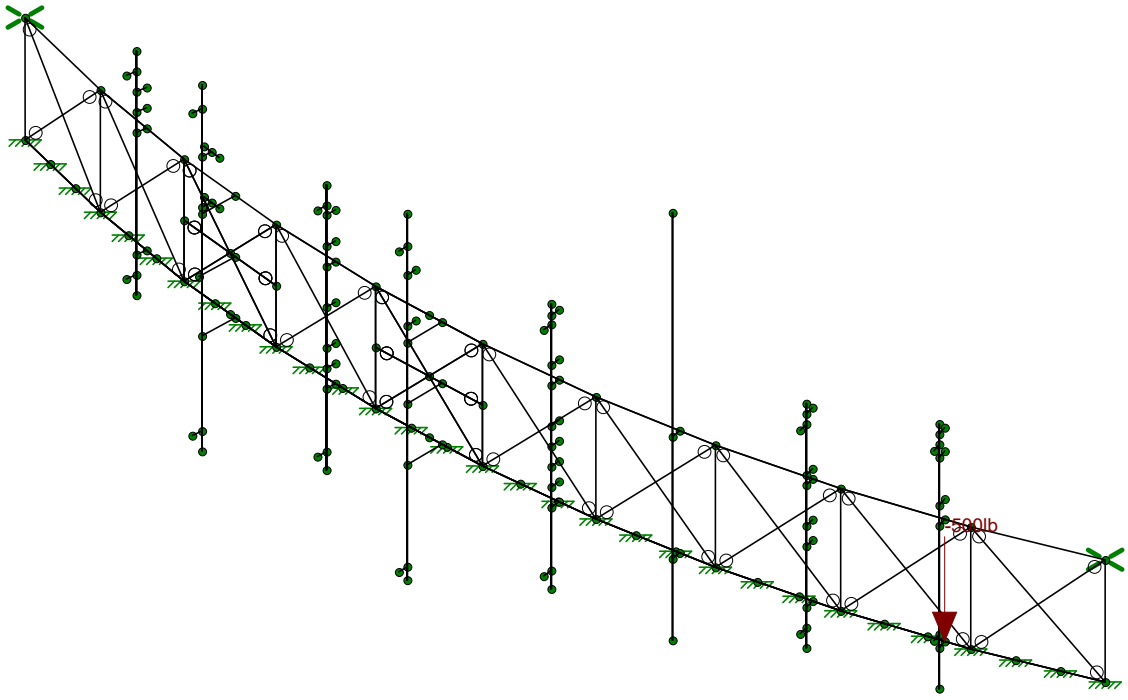
Loads: BLC 8, EH(0)
Envelope Only Solution

Fullerton Engineering Con...		SK - 12
JM	Mount Analysis	Sept 11, 2020 at 1:30 PM
CTL02163	Seismic Load (Horizontal)	CTL02163 - Mount Analysis.r3d



Loads: BLC 10, EV
Envelope Only Solution

Fullerton Engineering Con...		SK - 13
JM	Mount Analysis	Sept 11, 2020 at 1:30 PM
CTL02163	Seismic Load (Vertical)	CTL02163 - Mount Analysis.r3d



Loads: BLC 13, LM1
Envelope Only Solution

Fullerton Engineering Con...		SK - 14
JM	Mount Analysis	Sept 11, 2020 at 1:31 PM
CTL02163	500 Lb Live Load	CTL02163 - Mount Analysis.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (in/sec^2)	386.4
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Standard Skyline
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 15th(360-16): LRFD
Adjust Stiffness?	No
RISAConnection Code	AISC 15th(360-16): LRFD
Cold Formed Steel Code	None
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building
Stainless Steel Code	None

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (in)	Not Entered
Add Base Weight?	No
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Om Z	1
Om X	1
Rho Z	1
Rho X	1

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torq...	Kyy	Kzz	Cb	Function
1	M1	L2x1.5x4	36									Lateral
2	M2	L2x1.5x4	36									Lateral
3	M3	L2x1.5x4	36									Lateral
4	M4	L2x1.5x4	36									Lateral
5	M5	L2x1.5x4	36									Lateral
6	M6	L2x1.5x4	36									Lateral
7	M7	L2x1.5x4	36									Lateral
8	M8	L2x1.5x4	36									Lateral
9	M9	L2x1.5x4	36									Lateral
10	M10	L2x1.5x4	36									Lateral
11	M11	L2x1.5x4	36	18	18	18	18	18				Lateral
12	M12	L2x1.5x4	35.144	0	0	0	0	0				Lateral
13	M13	PL1.5X0.25	50.31									Lateral
14	M14	PL1.5X0.25	50.31									Lateral
15	M15	PL7/16"x9"	35.144			Lbyy						Lateral
16	M16	L2x1.5x4	35.144	0	0	0	0	0				Lateral
17	M17	PL1.5X0.25	50.31									Lateral
18	M18	PL1.5X0.25	50.31									Lateral
19	M19	PL7/16"x9"	35.144			Lbyy						Lateral
20	M20	L2x1.5x4	35.144			Lbyy						Lateral
21	M21	PL1.5X0.25	50.31									Lateral
22	M22	PL1.5X0.25	50.31									Lateral
23	M23	PL7/16"x9"	35.144			Lbyy						Lateral
24	M24	L2x1.5x4	35.144			Lbyy						Lateral
25	M25	PL1.5X0.25	50.31									Lateral
26	M26	PL1.5X0.25	50.31									Lateral
27	M27	PL7/16"x9"	35.144			Lbyy						Lateral
28	M28	L2x1.5x4	35.144			Lbyy						Lateral
29	M29	PL1.5X0.25	50.31									Lateral
30	M30	PL1.5X0.25	50.31									Lateral
31	M31	PL7/16"x9"	35.144			Lbyy						Lateral
32	M32	L2x1.5x4	35.144			Lbyy						Lateral
33	M33	PL1.5X0.25	50.31									Lateral
34	M34	PL1.5X0.25	50.31									Lateral
35	M35	PL7/16"x9"	35.144			Lbyy						Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torq...	Kyy	Kzz	Cb	Function
36	M36	L2x1.5x4	35.144			Lbyy						Lateral
37	M37	PL1.5X0.25	50.31									Lateral
38	M38	PL1.5X0.25	50.31									Lateral
39	M39	PL7/16"x9"	35.144			Lbyy						Lateral
40	M40	L2x1.5x4	35.144			Lbyy						Lateral
41	M41	PL1.5X0.25	50.31									Lateral
42	M42	PL1.5X0.25	50.31									Lateral
43	M43	PL7/16"x9"	35.144			Lbyy						Lateral
44	M44	L2x1.5x4	35.144			Lbyy						Lateral
45	M45	PL1.5X0.25	50.31									Lateral
46	M46	PL1.5X0.25	50.31									Lateral
47	M47	PL7/16"x9"	35.144			Lbyy						Lateral
48	M48	L2x1.5x4	35.144	0	0	0	0	0				Lateral
49	M49	PL1.5X0.25	50.31									Lateral
50	M50	PL1.5X0.25	50.31									Lateral
51	M51	PL7/16"x9"	35.144			Lbyy						Lateral
52	M66	PIPE_2.0	72			Lbyy						Lateral
53	M67	PIPE_2.0	84			Lbyy						Lateral
54	M68	PIPE_2.5	108			Lbyy						Lateral
55	M69	PIPE_2.0	84			Lbyy						Lateral
56	M70	PIPE_2.0	126			Lbyy						Lateral
57	M71	PIPE_2.0	72			Lbyy						Lateral
58	M72	PIPE_2.0	78			Lbyy						Lateral
59	M107	L2x2x6	35.144	17	17	17	17	17				Lateral
60	M108	L2x2x6	35.144	17	17	17	17	17				Lateral
61	M109	L2x2x6	11.998									Lateral
62	M111	PIPE_2.5	108			Lbyy						Lateral
63	M118	L2x2x6	11.989									Lateral

Material Takeoff

	Material	Size	Pieces	Length[in]	Weight[K]
1	General				
2	RIGID_1		53	186.1	0
3	RIGID		3	24	0
4	Total General		56	210	0
5					
6	Hot Rolled Steel				
7	A36 Gr.36	L2x1.5x4	21	747.4	.172
8	A36 Gr.36	L2x2x6	4	94.3	.037
9	A36 Gr.36	PL1.5X0.25	20	1006.2	.107
10	A36 Gr.36	PL7/16"x9"	10	351.4	.392
11	A53 Gr.B	PIPE_2.0	6	516	.149
12	A53 Gr.B	PIPE_2.5	2	216	.099
13	Total HR Steel		63	2931.3	.956

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface...
1	DL	None				42				
2	DLi	None				42		64		
3	WL(0)	None				42		63		
4	WL(90)	None				42		41		
5	WL.i(0)	None				42		63		
6	WL.i(90)	None				42		41		
7	T	None								

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface...
8	EH(0)	None				42		63		
9	EH(90)	None				42		63		
10	EV	None				42		63		
11	WM(0)	None				44		63		
12	WM(90)	None				44		41		
13	LM1	None				1				
14	LM2	None				1				
15	LM3	None				1				
16	LM4	None				1				
17	LM5	None				1				
18	LM6	None				1				
19	LM7	None				1				
20	LM8	None								
21	LM9	None								
22	LM10	None								
23	LM11	None								
24	LM12	None								
25	LV1	None								
26	LV2	None								
27	LV3	None								
28	LV4	None								
29	LV5	None								
30	LV6	None								
31	LV7	None								
32	LV8	None								
33	LV9	None								
34	LV10	None								
35	LV11	None								
36	LV12	None								
37	LV13	None								
38	LV14	None								
39	LV15	None								
40	LV16	None								
41	LV17	None								
42	LV18	None								
43	LV19	None								
44	LV20	None								
45	LV21	None								

Load Combinations

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4*DL	Y...	Y		1	1.4																				
2	1.2*DL + 1.0* WL(0)	Y...	Y		1	1.2	3	1																		
3	1.2*DL + 1.0* WL(30)	Y...	Y		1	1.2	3	.869	4	.5																
4	1.2*DL + 1.0* WL(60)	Y...	Y		1	1.2	3	.5	4	.869																
5	1.2*DL + 1.0*WL(90)	Y...	Y		1	1.2	4	1																		
6	1.2*DL + 1.0*WL(120)	Y...	Y		1	1.2	3	-.5	4	.869																
7	1.2*DL +1.0*WL(150)	Y...	Y		1	1.2	3	-.8...	4	.5																
8	1.2*DL + 1.0 * WL(180)	Y...	Y		1	1.2	3	-1																		
9	1.2*DL + 1.0* WL(210)	Y...	Y		1	1.2	3	-.8...	4	-.5																
10	1.2*DL + 1.0* WL(240)	Y...	Y		1	1.2	3	-.5	4	-.8...																
11	1.2*DL + 1.0*WL(270)	Y...	Y		1	1.2	4	-1																		
12	1.2*DL + 1.0*WL(300)	Y...	Y		1	1.2	3	.5	4	-.8...																
13	1.2*DL +1.0*WL(330)	Y...	Y		1	1.2	3	.869	4	-.5																
14	1.2*DL+1.0*DLi+1.0*WL.i(0)+1.0*T	Y...	Y		1	1.2	2	1	5	1	7	1														

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
15	1.2*DL+1.0*DLi+1.0*WL.i(30)+1.0*T	Y...	Y		1	1.2	2	1	5	.866	6	.5	7	1												
16	1.2*DL+1.0*DLi+1.0*WL.i(60)+1.0*T	Y...	Y		1	1.2	2	1	5	.5	6	.866	7	1												
17	1.2*DL+1.0*DLi+1.0*WL.i(90)+1.0*T	Y...	Y		1	1.2	2	1	6	1	7	1														
18	1.2*DL+1.0*DLi+1.0*WL.i(120)+1.0*T	Y...	Y		1	1.2	2	1	5	-.5	6	.866	7	1												
19	1.2*DL+1.0*DLi+1.0*WL.i(150)+1.0*T	Y...	Y		1	1.2	2	1	5	-.8...	6	.5	7	1												
20	1.2*DL+1.0*DLi+1.0*WL.i(180)+1.0*T	Y...	Y		1	1.2	2	1	5	-1	7	1														
21	1.2*DL+1.0*DLi+1.0*WL.i(210)+1.0*T	Y...	Y		1	1.2	2	1	5	-.8...	6	-.5	7	1												
22	1.2*DL+1.0*DLi+1.0*WL.i(240)+1.0*T	Y...	Y		1	1.2	2	1	5	-.5	6	-.8...	7	1												
23	1.2*DL+1.0*DLi+1.0*WL.i(270)+1.0*T	Y...	Y		1	1.2	2	1	6	-1	7	1														
24	1.2*DL+1.0*DLi+1.0*WL.i(300)+1.0*T	Y...	Y		1	1.2	2	1	5	.5	6	-.8...	7	1												
25	1.2*DL+1.0*DLi+1.0*WL.i(330)+1.0*T	Y...	Y		1	1.2	2	1	5	.866	6	-.5	7	1												
26	1.2*DL+1.0*EH(0)+1.0*EV(+)	Y...	Y		1	1.2	8	1	10	1																
27	1.2*DL+1.0*EH(0)+1.0*EV(-)	Y...	Y		1	1.2	8	1	10	-1																
28	1.2*DL+1.0*EH(90)+1.0*EV(+)	Y...	Y		1	1.2	9	1	10	1																
29	1.2*DL+1.0*EH(90)+1.0*EV(-)	Y...	Y		1	1.2	9	1	10	-1																
30	1.2*DL+1.0*EH(180)+1.0*EV(+)	Y...	Y		1	1.2	8	-1	10	1																
31	1.2*DL+1.0*EH(180)+1.0*EV(-)	Y...	Y		1	1.2	8	-1	10	-1																
32	1.2*DL+1.0*EH(270)+1.0*EV(+)	Y...	Y		1	1.2	9	-1	10	1																
33	1.2*DL+1.0*EH(270)+1.0*EV(-)	Y...	Y		1	1.2	9	-1	10	-1																
34	0.9*DL+1.0*EH(0)-1.0*EV(+)	Y...	Y		1	.9	8	1	10	-1																
35	0.9*DL+1.0*EH(0)-1.0*EV(-)	Y...	Y		1	.9	8	1	10	1																
36	0.9*DL+1.0*EH(90)-1.0*EV(+)	Y...	Y		1	.9	9	1	10	-1																
37	0.9*DL+1.0*EH(90)-1.0*EV(-)	Y...	Y		1	.9	9	1	10	1																
38	0.9*DL+1.0*EH(180)-1.0*EV(+)	Y...	Y		1	.9	8	-1	10	-1																
39	0.9*DL+1.0*EH(180)-1.0*EV(-)	Y...	Y		1	.9	8	-1	10	1																
40	0.9*DL+1.0*EH(270)-1.0*EV(+)	Y...	Y		1	.9	9	-1	10	-1																
41	0.9*DL+1.0*EH(270)-1.0*EV(-)	Y...	Y		1	.9	9	-1	10	1																
42	1.2*DL+1.5*LM1+1.0*WM(0)	Y...	Y		1	1.2	13	1.5	11	1																
43	1.2*DL+1.5*LM1+1.0*WM(30)	Y...	Y		1	1.2	13	1.5	11	.866	12	.5														
44	1.2*DL+1.5*LM1+1.0*WM(60)	Y...	Y		1	1.2	13	1.5	11	.5	12	.866														
45	1.2*DL+1.5*LM1+1.0*WM(90)	Y...	Y		1	1.2	13	1.5	12	1																
46	1.2*DL+1.5*LM1+1.0*WM(120)	Y...	Y		1	1.2	13	1.5	11	-.5	12	.866														
47	1.2*DL+1.5*LM1+1.0*WM(150)	Y...	Y		1	1.2	13	1.5	11	-.8...	12	.5														
48	1.2*DL+1.5*LM1+1.0*WM(180)	Y...	Y		1	1.2	13	1.5	11	-1																
49	1.2*DL+1.5*LM1+1.0*WM(210)	Y...	Y		1	1.2	13	1.5	11	-.8...	12	-.5														
50	1.2*DL+1.5*LM1+1.0*WM(240)	Y...	Y		1	1.2	13	1.5	11	-.5	12	-.8...														
51	1.2*DL+1.5*LM1+1.0*WM(270)	Y...	Y		1	1.2	13	1.5	12	-1																
52	1.2*DL+1.5*LM1+1.0*WM(300)	Y...	Y		1	1.2	13	1.5	11	.5	12	-.8...														
53	1.2*DL+1.5*LM1+1.0*WM(330)	Y...	Y		1	1.2	13	1.5	11	.866	12	-.5														
54	1.2*DL+1.5*LM2+1.0*WM(0)	Y...	Y		1	1.2	14	1.5	11	1																
55	1.2*DL+1.5*LM2+1.0*WM(30)	Y...	Y		1	1.2	14	1.5	11	.866	12	.5														
56	1.2*DL+1.5*LM2+1.0*WM(60)	Y...	Y		1	1.2	14	1.5	11	.5	12	.866														
57	1.2*DL+1.5*LM2+1.0*WM(90)	Y...	Y		1	1.2	14	1.5	12	1																
58	1.2*DL+1.5*LM2+1.0*WM(120)	Y...	Y		1	1.2	14	1.5	11	-.5	12	.866														
59	1.2*DL+1.5*LM2+1.0*WM(150)	Y...	Y		1	1.2	14	1.5	11	-.8...	12	.5														
60	1.2*DL+1.5*LM2+1.0*WM(180)	Y...	Y		1	1.2	14	1.5	11	-1																
61	1.2*DL+1.5*LM2+1.0*WM(210)	Y...	Y		1	1.2	14	1.5	11	-.8...	12	-.5														
62	1.2*DL+1.5*LM2+1.0*WM(240)	Y...	Y		1	1.2	14	1.5	11	-.5	12	-.8...														
63	1.2*DL+1.5*LM2+1.0*WM(270)	Y...	Y		1	1.2	14	1.5	12	-1																
64	1.2*DL+1.5*LM2+1.0*WM(300)	Y...	Y		1	1.2	14	1.5	11	.5	12	-.8...														
65	1.2*DL+1.5*LM2+1.0*WM(330)	Y...	Y		1	1.2	14	1.5	11	.866	12	-.5														
66	1.2*DL+1.5*LM3+1.0*WM(0)	Y...	Y		1	1.2	15	1.5	11	1																
67	1.2*DL+1.5*LM3+1.0*WM(30)	Y...	Y		1	1.2	15	1.5	11	.866	12	.5														
68	1.2*DL+1.5*LM3+1.0*WM(60)	Y...	Y		1	1.2	15	1.5	11	.5	12	.866														
69	1.2*DL+1.5*LM3+1.0*WM(90)	Y...	Y		1	1.2	15	1.5	12	1																
70	1.2*DL+1.5*LM3+1.0*WM(120)	Y...	Y		1	1.2	15	1.5	11	-.5	12	.866														
71	1.2*DL+1.5*LM3+1.0*WM(150)	Y...	Y		1	1.2	15	1.5	11	-.8...	12	.5														

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
72	1.2*DL+1.5*LM3+1.0*WM(180)	Y...	Y		1	1.2	15	1.5	11	-1																
73	1.2*DL+1.5*LM3+1.0*WM(210)	Y...	Y		1	1.2	15	1.5	11	-.8...	12	-.5														
74	1.2*DL+1.5*LM3+1.0*WM(240)	Y...	Y		1	1.2	15	1.5	11	-.5	12	-.8...														
75	1.2*DL+1.5*LM3+1.0*WM(270)	Y...	Y		1	1.2	15	1.5	12	-1																
76	1.2*DL+1.5*LM3+1.0*WM(300)	Y...	Y		1	1.2	15	1.5	11	.5	12	-.8...														
77	1.2*DL+1.5*LM3+1.0*WM(330)	Y...	Y		1	1.2	15	1.5	11	.866	12	-.5														
78	1.2*DL+1.5*LM4+1.0*WM(0)	Y...	Y		1	1.2	16	1.5	11	1																
79	1.2*DL+1.5*LM4+1.0*WM(30)	Y...	Y		1	1.2	16	1.5	11	.866	12	.5														
80	1.2*DL+1.5*LM4+1.0*WM(60)	Y...	Y		1	1.2	16	1.5	11	.5	12	.866														
81	1.2*DL+1.5*LM4+1.0*WM(90)	Y...	Y		1	1.2	16	1.5	12	1																
82	1.2*DL+1.5*LM4+1.0*WM(120)	Y...	Y		1	1.2	16	1.5	11	-.5	12	.866														
83	1.2*DL+1.5*LM4+1.0*WM(150)	Y...	Y		1	1.2	16	1.5	11	-.8...	12	.5														
84	1.2*DL+1.5*LM4+1.0*WM(180)	Y...	Y		1	1.2	16	1.5	11	-1																
85	1.2*DL+1.5*LM4+1.0*WM(210)	Y...	Y		1	1.2	16	1.5	11	-.8...	12	-.5														
86	1.2*DL+1.5*LM4+1.0*WM(240)	Y...	Y		1	1.2	16	1.5	11	-.5	12	-.8...														
87	1.2*DL+1.5*LM4+1.0*WM(270)	Y...	Y		1	1.2	16	1.5	12	-1																
88	1.2*DL+1.5*LM4+1.0*WM(300)	Y...	Y		1	1.2	16	1.5	11	.5	12	-.8...														
89	1.2*DL+1.5*LM4+1.0*WM(330)	Y...	Y		1	1.2	16	1.5	11	.866	12	-.5														
90	1.2*DL+1.5*LV1	Y...	Y		1	1.2	17	1.5																		
91	1.2*DL+1.5*LV2	Y...	Y		1	1.2	18	1.5																		
92	1.2*DL+1.5*LV3	Y...	Y		1	1.2	19	1.5																		
93	1.2*DL+1.5*LV4	Y...	Y		1	1.2	20	1.5																		
94	1.2*DL+1.5*LV5	Y...	Y		1	1.2	21	1.5																		
95	1.2*DL+1.5*LV6	Y...	Y		1	1.2	22	1.5																		
96	1.2*DL+1.5*LV7	Y...	Y		1	1.2	23	1.5																		
97	1.2*DL+1.5*LV8	Y...	Y		1	1.2	24	1.5																		
98	1.2*DL+1.5*LV9	Y...	Y		1	1.2	25	1.5																		
99	1.2*DL+1.5*LV10	Y...	Y		1	1.2	26	1.5																		
100	1.2*DL+1.5*LV11	Y...	Y		1	1.2	27	1.5																		
101	1.2*DL+1.5*LV12	Y...	Y		1	1.2	28	1.5																		

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N18	max	3717.208	8	0	101	1815.492	2	0	101	0	101	0	101
2		min	-4306.796	2	0	1	-1602.923	8	0	1	0	1	0	1
3	N1	max	654.316	4	528.758	13	252.224	2	.23	2	0	12	.178	2
4		min	-355.631	9	-353.388	4	-213.063	8	-.204	8	0	8	-.149	8
5	N2	max	565.303	7	887.523	2	240.609	13	.222	2	.001	2	.162	13
6		min	-608.316	12	-216.561	7	-231.982	8	-.202	8	0	10	-.141	8
7	N3	max	840.128	7	381.674	2	176.458	13	.085	2	.003	10	.094	13
8		min	-616.569	12	-564.121	8	-196.374	7	-.081	8	-.002	4	-.082	7
9	N4	max	688.661	6	494.195	13	101.534	2	.051	3	.006	6	.035	13
10		min	-429.006	10	-880.099	8	-162.75	7	-.049	9	-.006	13	-.031	7
11	N5	max	428.129	5	315.272	12	261.664	2	.162	3	.032	13	.06	2
12		min	-241.895	10	-167.402	6	-261.119	7	-.142	9	-.031	7	-.076	60
13	N6	max	354.152	8	377.773	2	168.674	2	.23	3	.008	12	.087	2
14		min	-63.062	2	-72.574	5	-247.041	8	-.21	8	-.007	5	-.098	8
15	N7	max	535.785	8	44.069	15	64.457	2	.012	2	.005	2	.012	10
16		min	-19.094	12	-598.995	8	-284.948	8	-.012	8	-.005	8	-.012	4
17	N8	max	22.684	5	45.07	24	66.653	2	.014	2	.003	8	.011	12
18		min	-397.627	8	-407.715	8	-166.644	8	-.013	8	-.003	2	-.011	6
19	N9	max	35.575	4	583.827	3	107.553	2	.027	12	0	8	.034	11
20		min	-788.82	8	-480.117	8	-252.791	8	-.026	7	0	13	-.036	4
21	N10	max	474.124	3	604.232	3	454.463	2	.276	2	0	5	.162	12
22		min	-1071.595	9	-637.486	8	-570.807	8	-.341	8	0	2	-.217	7

Envelope Joint Reactions (Continued)

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
23	N11	max	888.146	4	394.724	15	521.469	2	.382	2	0	9	.303	12
24		min	-720.531	10	-382.453	8	-560.681	8	-.439	8	-.002	2	-.377	7
25	N23	max	18.185	5	152.05	90	52.786	3	.032	2	.009	10	.055	90
26		min	-18.8	12	-77.305	4	-58.018	9	-.035	8	-.009	5	-.015	13
27	N24	max	74.717	5	725.344	90	297.944	2	.12	2	.026	3	.134	5
28		min	-79.479	12	-195.303	13	-270.61	8	-.128	8	-.027	9	-.174	10
29	N25	max	23.01	5	175.432	10	160.797	4	.064	2	.047	11	.053	8
30		min	-23.939	11	-135.63	4	-163.926	10	-.072	8	-.045	5	-.041	2
31	N26	max	113.247	5	1104.335	8	589.446	13	.429	2	.124	4	.355	5
32		min	-114.081	11	-847.957	2	-468.564	7	-.484	8	-.12	10	-.37	11
33	N27	max	1.445	37	13.569	25	40.025	2	0	101	0	101	0	101
34		min	-1.445	32	-.586	27	-40.025	8	0	1	0	1	0	1
35	N28	max	92.888	5	914.376	72	267.927	2	.078	13	.056	3	.24	5
36		min	-89.778	11	-311.084	2	-260.365	8	-.119	7	-.056	10	-.231	11
37	N29	max	1.445	37	13.569	25	40.025	2	0	101	0	101	0	101
38		min	-1.445	32	-.586	27	-40.025	8	0	1	0	1	0	1
39	N30	max	7.166	3	156.493	8	60.932	13	.075	4	.024	12	.034	7
40		min	-3.153	13	-135.007	2	-63.027	8	-.067	9	-.022	6	-.029	11
41	N31	max	1.445	37	13.569	25	40.025	2	0	101	0	101	0	101
42		min	-1.445	32	-.586	27	-40.025	8	0	1	0	1	0	1
43	N32	max	103.777	5	584.833	61	98.022	4	.106	3	.015	9	.101	59
44		min	-105.77	12	-244.576	3	-96.073	10	-.09	9	-.018	3	-.073	13
45	N33	max	1.445	37	13.569	25	40.025	2	0	101	0	101	0	101
46		min	-1.445	32	-.586	27	-40.025	8	0	1	0	1	0	1
47	N34	max	17.37	6	536.024	48	114.743	3	.121	3	.007	9	.133	8
48		min	-20.713	12	-343.837	2	-91.718	9	-.096	9	-.012	3	-.109	2
49	N35	max	1.445	37	13.569	25	40.025	2	0	101	0	101	0	101
50		min	-1.445	32	-.586	27	-40.025	8	0	1	0	1	0	1
51	N36	max	1.445	37	13.569	25	40.025	2	0	101	0	101	0	101
52		min	-1.445	32	-.586	27	-40.025	8	0	1	0	1	0	1
53	N37	max	1.445	37	13.569	25	40.025	2	0	101	0	101	0	101
54		min	-1.445	32	-.586	27	-40.025	8	0	1	0	1	0	1
55	N38	max	1.445	37	13.569	25	40.025	2	0	101	0	101	0	101
56		min	-1.445	32	-.586	27	-40.025	8	0	1	0	1	0	1
57	N39	max	28.704	4	252.434	92	117.556	5	.018	12	.024	12	.076	92
58		min	-28.994	10	-66.678	4	-105.523	11	-.023	7	-.026	5	-.017	13
59	N40	max	111.401	5	542.334	92	197.03	13	.037	12	.015	13	.052	5
60		min	-110.137	11	-113.268	13	-195.093	7	-.037	6	-.015	7	-.097	92
61	N41	max	96.948	13	280.861	91	336.53	4	.144	2	.078	11	.129	9
62		min	-85.926	7	-83.595	12	-318.295	11	-.241	8	-.083	5	-.068	2
63	N42	max	151.749	2	1052.286	8	447.4	12	.29	2	.033	15	.091	11
64		min	-141.274	8	-532.24	2	-206.194	5	-.463	8	.002	9	-.157	4
65	N19	max	3330.705	2	0	101	850.653	2	0	101	0	101	0	101
66		min	-2905.269	8	0	1	-750.778	8	0	1	0	1	0	1
67	Totals:	max	3663.233	5	3260.828	24	7260.947	2						
68		min	-3663.25	11	704.408	34	-7260.922	8						

Stress ratios are less than 1.0.
Therefore, adequate.

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

	Member	Shape	Code Check	Loc[...	LC	Shear...	Loc[in]	DirLC	phi*Pnc [lb]	phi*Pnt...	phi*Mn...	phi*Mn...	Cb	Eqn
1	M16	L2x1.5x4	.999	21.9...	13	.089	21.965	z 13	26325	26325	.565	.956	2...	H2-1
2	M11	L2x1.5x4	.974	36	8	.068	36	z 8	22275.909	26325	.443	1.134	1	H2-1
3	M118	L2x2x6	.945	11.9...	8	.124	0	y 11	42190.143	44388	.925	2.142	1...	H2-1
4	M32	L2x1.5x4	.928	28.1...	2	.095	32.947	z 2	13927.502	26325	.443	1.134	2...	H2-1
5	M10	L2x1.5x4	.795	36	8	.055	36	z 8	13496.981	26325	.443	1.134	1...	H2-1
6	M20	L2x1.5x4	.765	23.7...	13	.073	23.795	z 2	13927.502	26325	.443	1.134	2...	H2-1

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

	Member	Shape	Code Check	Loc[...	LC	Shear...	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt...	phi*Mn...	phi*Mn...	Cb	Eqn
7	M108	L2x2x6	.716	19.4...	9	.069	17.572	z	8	40079.197	44388	.925	2.142	1	H2-1
8	M28	L2x1.5x4	.617	27.4...	2	.058	27.456	z	2	13927.502	26325	.443	1.134	2...	H2-1
9	M12	L2x1.5x4	.607	21.2...	2	.060	0	y	2	26325	26325	.565	.956	1...	H2-1
10	M2	L2x1.5x4	.553	36	2	.026	36	z	2	13496.981	26325	.443	1.134	2...	H2-1
11	M111	PIPE_2.5	.553	55.1...	2	.136	56.25		13	26137.193	50715	3.596	3.596	4...	H1-1b
12	M1	L2x1.5x4	.544	36	2	.021	36	z	2	13496.981	26325	.443	1.134	2...	H2-1
13	M24	L2x1.5x4	.520	35.1...	2	.023	24.894	z	13	13927.502	26325	.443	1.134	1...	H2-1
14	M36	L2x1.5x4	.481	0	2	.030	35.144	y	3	13927.502	26325	.443	1.131	1...	H2-1
15	M44	L2x1.5x4	.424	35.1...	2	.040	19.768	z	8	13927.502	26325	.443	1.134	2...	H2-1
16	M40	L2x1.5x4	.372	35.1...	2	.007	35.144	y	3	13927.502	26325	.443	1.134	1...	H2-1
17	M6	L2x1.5x4	.312	36	3	.018	36	z	3	13496.981	26325	.443	1.134	2...	H2-1
18	M48	L2x1.5x4	.310	0	3	.017	0	z	4	26325	26325	.565	.956	1	H2-1
19	M68	PIPE_2.5	.275	37.1...	8	.055	38.25		10	26137.193	50715	3.596	3.596	3...	H1-1b
20	M5	L2x1.5x4	.265	36	3	.016	36	z	2	13496.981	26325	.443	1.134	2...	H2-1
21	M72	PIPE_2.0	.260	29.25	2	.031	29.25		2	19360.206	32130	1.872	1.872	1...	H1-1b
22	M109	L2x2x6	.252	11.9...	2	.025	0	z	9	42186.825	44388	.925	2.142	1...	H2-1
23	M69	PIPE_2.0	.224	23.6...	2	.051	24.5		2	17855.085	32130	1.872	1.872	2...	H1-1b
24	M3	L2x1.5x4	.217	36	13	.017	36	z	2	13496.981	26325	.443	1.134	2...	H2-1
25	M67	PIPE_2.0	.216	59.5	2	.033	23.625		9	17855.085	32130	1.872	1.872	3...	H1-1b
26	M71	PIPE_2.0	.197	24	5	.061	24		3	20866.733	32130	1.872	1.872	2...	H1-1b
27	M66	PIPE_2.0	.162	24	5	.049	24		11	20866.733	32130	1.872	1.872	2...	H1-1b
28	M107	L2x2x6	.150	21.9...	2	.033	17.572	z	8	40079.197	44388	.925	2.142	1	H2-1
29	M50	PL1.5X0.25	.141	50.31	9	.030	25.155	y	9	174.315	12150	.063	.38	1...	H1-1b*
30	M19	PL7/16"x9"	.139	21.9...	11	.557	21.965	y	8	11487.83	127575	1.163	23.92	3...	H1-1b
31	M4	L2x1.5x4	.135	36	3	.010	36	z	3	13496.981	26325	.443	1.134	1...	H2-1
32	M51	PL7/16"x9"	.118	19.4...	5	.535	19.768	y	8	11487.83	127575	1.163	23.92	2...	H1-1b
33	M9	L2x1.5x4	.098	36	3	.009	36	z	7	13496.981	26325	.443	1.134	2...	H2-1
34	M49	PL1.5X0.25	.095	50.31	3	.028	25.155	y	3	174.315	12150	.063	.38	1...	H1-1b*
35	M14	PL1.5X0.25	.094	50.31	9	.015	50.31	z	8	174.315	12150	.063	.319	1...	H1-1b*
36	M46	PL1.5X0.25	.094	50.31	8	.008	0	y	10	174.315	12150	.063	.319	1...	H1-1b*
37	M21	PL1.5X0.25	.093	50.31	7	.010	50.31	y	8	174.315	12150	.063	.319	1...	H1-1b*
38	M70	PIPE_2.0	.080	65.6...	13	.028	66.938		12	8922.084	32130	1.872	1.872	1...	H1-1b
39	M13	PL1.5X0.25	.080	50.31	4	.012	50.31	z	2	174.315	12150	.063	.319	1...	H1-1b*
40	M25	PL1.5X0.25	.080	50.31	7	.005	0	z	8	174.315	12150	.063	.319	1...	H1-1b*
41	M37	PL1.5X0.25	.069	50.31	8	.008	0	y	8	174.315	12150	.063	.319	1...	H1-1b*
42	M26	PL1.5X0.25	.066	50.31	12	.004	50.31	z	8	174.315	12150	.063	.319	1...	H1-1b*
43	M22	PL1.5X0.25	.062	50.31	12	.016	0	y	2	174.315	12150	.063	.319	1...	H1-1b*
44	M45	PL1.5X0.25	.057	50.31	3	.005	0	z	13	174.315	12150	.063	.319	1...	H1-1b*
45	M17	PL1.5X0.25	.057	50.31	7	.014	25.679	y	8	174.315	12150	.063	.38	1...	H1-1b*
46	M30	PL1.5X0.25	.056	0	9	.007	0	z	9	174.315	12150	.063	.319	1...	H1-1b*
47	M23	PL7/16"x9"	.055	23.4...	10	.162	23.429	y	7	11487.83	127575	1.163	23.92	4...	H1-1b
48	M18	PL1.5X0.25	.050	50.31	9	.017	0	y	8	174.315	12150	.063	.38	1...	H1-1b*
49	M42	PL1.5X0.25	.049	50.31	8	.005	0	z	8	174.315	12150	.063	.319	1...	H1-1b*
50	M31	PL7/16"x9"	.049	27.4...	13	.126	23.429	y	3	11487.83	127575	1.163	23.92	3...	H1-1b
51	M29	PL1.5X0.25	.047	50.31	4	.009	50.31	y	3	174.315	12150	.063	.319	1...	H1-1b*
52	M47	PL7/16"x9"	.044	19.7...	12	.042	19.768	y	7	11487.83	127575	1.163	23.92	2...	H1-1b
53	M33	PL1.5X0.25	.037	50.31	8	.014	50.31	y	8	174.315	12150	.063	.319	1...	H1-1b*
54	M7	L2x1.5x4	.033	36	9	.021	36	z	3	13496.981	26325	.443	1.134	2...	H2-1
55	M8	L2x1.5x4	.033	36	2	.006	36	z	3	13496.981	26325	.443	1.134	1...	H2-1
56	M34	PL1.5X0.25	.032	0	9	.016	50.31	y	8	174.315	12150	.063	.319	1...	H1-1b*
57	M15	PL7/16"x9"	.032	23.4...	9	.152	21.233	y	8	11487.83	127575	1.163	23.92	3...	H1-1b
58	M27	PL7/16"x9"	.022	24.5...	12	.085	23.429	y	3	11487.83	127575	1.163	23.92	3...	H1-1b
59	M35	PL7/16"x9"	.018	27.8...	4	.168	23.429	y	3	11487.83	127575	1.163	23.92	3...	H1-1b
60	M43	PL7/16"x9"	.003	35.1...	8	.000	0	z	8	11487.83	127575	1.163	14.77	1	H1-1b
61	M39	PL7/16"x9"	.003	23.4...	8	.000	35.144	z	8	11487.83	127575	1.163	14.77	1	H1-1b
62	M41	PL1.5X0.25	.001	50.31	2	.004	0	z	2	174.315	12150	.063	.319	1...	H1-1b*
63	M38	PL1.5X0.25	.000	50.31	33	.000	50.31	y	56	174.315	12150	.063	.319	1...	H1-1b*

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Smartlink on behalf of AT&T Mobility, LLC
Site FA – 10035078
Site ID – CTV2163
USID – 59413
Site Name – ESSEX (MRCTB047069-MRCTB047079-MRCTB047140)

10 Main Street
Essex, CT 06426

Latitude: N41-21-04.67
Longitude: W72-24-22.29
Structure Type: Water Tank

Report generated date: October 1, 2020
Report by: Nick Kutzke
Customer Contact: Kristina Cottone

AT&T Mobility, LLC is compliant based on the FCC Rules and Regulations.

Table of Contents

1 General Site Summary

1.1 Report Summary

AT&T Mobility, LLC	Summary
Max Cumulative Simulated RFE Level on the Water Tank	130.4% General Public Limit 1" behind AT&T Mobility, LLC's Beta Sector Antenna 5
Max Cumulative Simulated RFE Level on the Rooftop Walking Surface	130.4% General Public Limit 1" behind AT&T Mobility, LLC's Beta Sector Antenna 5
Max Cumulative Simulated RFE Level on the Ground	<1% General Public Limit
Compliant per FCC Rules and Regulations?	Yes
Compliant per AT&T Mobility, LLC's Policy?	No

The following documents were provided by the client and were utilized to create this report:

RFDS: NEW-ENGLAND_CONNECTICUT_CTV2163_2021-LTE-Next-Carrier_LTE_RX855W_2051A0V8BT_10035078_59413_03-09-2020_Preliminary-Approved_v2.00

CD's: 10035078_AE201_200922_REV1_CTL02163

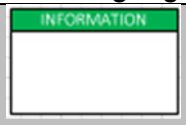
RF Powers Used: Max RRH Powers

1.2 Fall Arrest Anchor Point Summary

Fall Arrest Anchor & Parapet Info	Parapet Available (Y/N)	Parapet Height (inches)	Fall Arrest Anchor Available (Y/N)
Roof Safety Info	N	NA	N

1.3 Signage Summary

a. Pre-Site Visit AT&T Signage (Existing Signage)

AT&T Signage Locations									
	Information 1	Information 2	Notice	Notice 2	Caution	Caution 2	Warning	Warning 2	Barriers
Access Point(s)	**1**				**1**				
Alpha									
Beta									
Gamma									

Note: All existing signage was documented during a previous site visit on 8/7/2017.

b. Proposed AT&T Signage

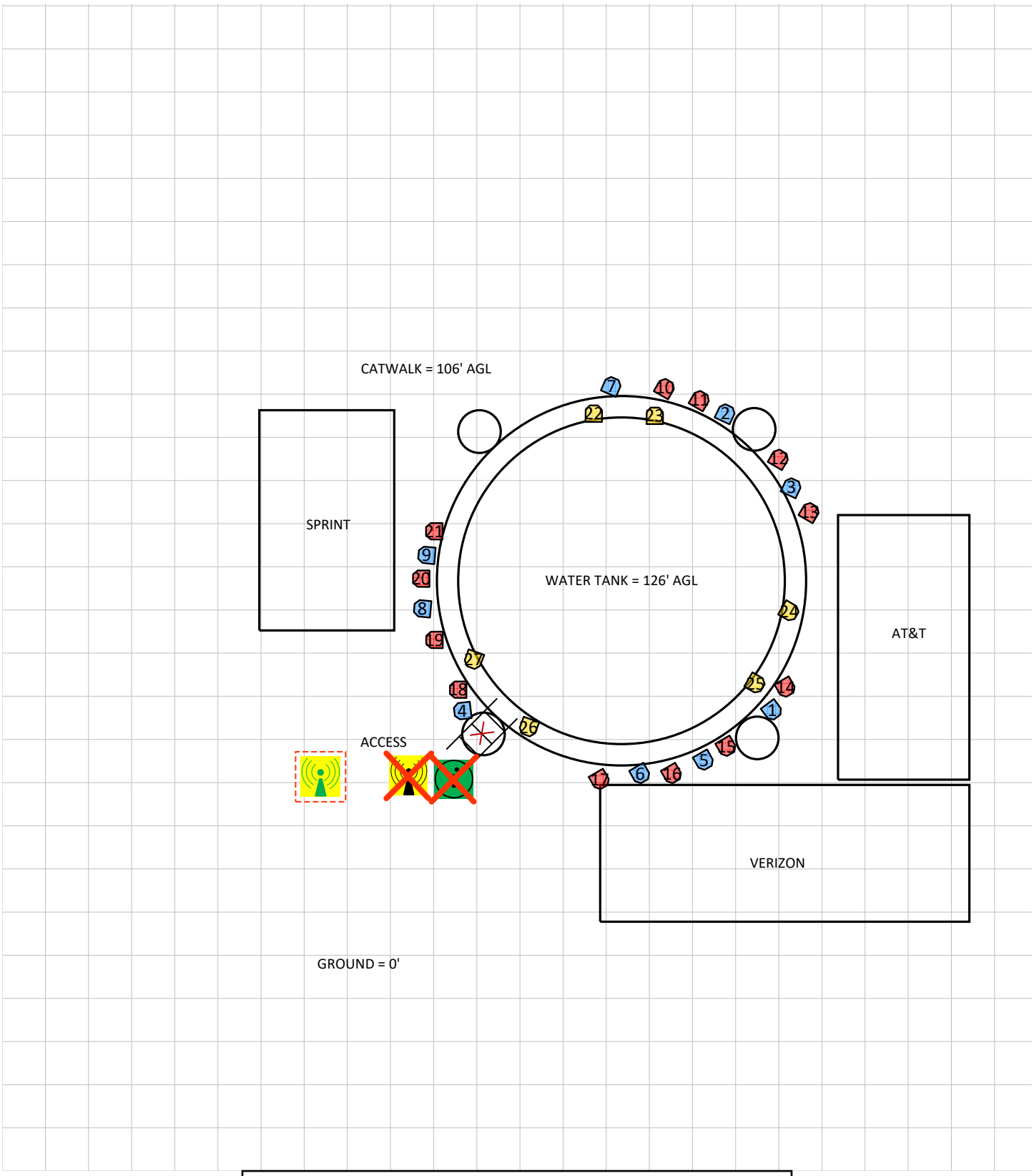
AT&T Signage Locations									
	Information 1	Information 2	Notice	Notice 2	Caution	Caution 2	Warning	Warning 2	Barriers
Access Point(s)						**1**			
Alpha									
Beta									
Gamma									

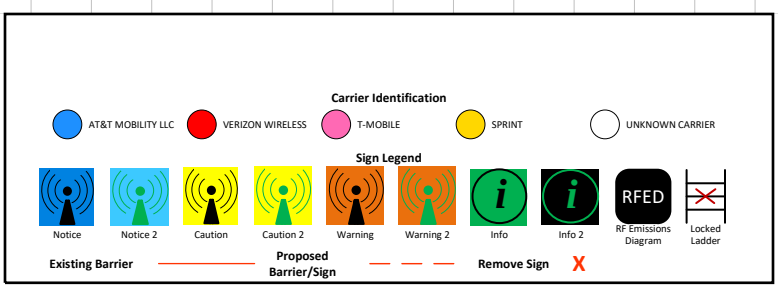
2 Scale Maps of Site

The following diagrams are included:

- Site Scale Map
- RF Exposure Diagram
- AT&T Mobility, LLC Contribution

Site Scale Map For: ESSEX





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3 Antenna Inventory

The following antenna inventory was obtained by the customer and was utilized to create the site model diagrams:

Ant ID	Operator	Antenna Make & Model	Type	TX Freq (MHz)	Technology	Az (Deg)	Hor BW (Deg)	Ant Len (ft)	Power	Power Type	Power Unit	Misc Loss	TX Count	Total ERP (Watts)	Ant Gain (dBd)	Z	MDT	EDT
1	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	UMTS	143	82.0	4.6	40	TPO	Watt	0	1	566.3	11.51	105.7'	0°	8°
2	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	2100	LTE	25	61.0	8	160	TPO	Watt	0	1	7330.3	16.61	104'	0°	3°
2	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	2300	LTE	25	59.0	8	100	TPO	Watt	0	1	4775.3	16.79	104'	0°	3°
3	AT&T MOBILITY LLC (Proposed)	Cci DMP65R-BU8D	Panel	737	LTE	25	70.6	8	160	TPO	Watt	0	1	2692.3	12.26	104'	0°	2°
3	AT&T MOBILITY LLC (Proposed)	Cci DMP65R-BU8D	Panel	850	LTE	25	71.4	8	80	TPO	Watt	0	1	1442.4	12.56	104'	0°	2°
3	AT&T MOBILITY LLC (Proposed)	Cci DMP65R-BU8D	Panel	1900	LTE	25	67.0	8	160	TPO	Watt	0	1	4169.8	14.16	104'	0°	3°
3	AT&T MOBILITY LLC (Proposed)	Cci DMP65R-BU8D	Panel	850	5G	25	71.4	8	80	TPO	Watt	0	1	1442.4	12.56	104'	0°	2°
4	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	UMTS	263	82.0	4.6	40	TPO	Watt	0	1	566.3	11.51	105.7'	0°	8°
5	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	2100	LTE	150	61.0	8	160	TPO	Watt	0	1	7330.3	16.61	104'	0°	3°
5	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65C-R4	Panel	2300	LTE	150	59.0	8	100	TPO	Watt	0	1	4775.3	16.79	104'	0°	3°
6	AT&T MOBILITY LLC (Proposed)	Cci DMP65R-BU8D	Panel	737	LTE	150	70.6	8	160	TPO	Watt	0	1	2692.3	12.26	104'	0°	2°
6	AT&T MOBILITY LLC (Proposed)	Cci DMP65R-BU8D	Panel	850	LTE	150	71.4	8	80	TPO	Watt	0	1	1442.4	12.56	104'	0°	2°
6	AT&T MOBILITY LLC (Proposed)	Cci DMP65R-BU8D	Panel	1900	LTE	150	67.0	8	160	TPO	Watt	0	1	4169.8	14.16	104'	0°	3°
6	AT&T MOBILITY LLC (Proposed)	Cci DMP65R-BU8D	Panel	850	5G	150	71.4	8	80	TPO	Watt	0	1	1442.4	12.56	104'	0°	2°
7	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	UMTS	23	82.0	4.6	40	TPO	Watt	0	1	566.3	11.51	105.7'	0°	6°
8	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65A-R4	Panel	2100	LTE	275	62.0	4.6	160	TPO	Watt	0	1	6167.7	15.86	105.7'	0°	2°
8	AT&T MOBILITY LLC (Proposed)	Commscope NNHH-65A-R4	Panel	2300	LTE	275	60.0	4.6	100	TPO	Watt	0	1	4130.5	16.16	105.7'	0°	3°
9	AT&T MOBILITY LLC (Proposed)	Cci DMP65R-BU4D	Panel	737	LTE	275	65.4	4	160	TPO	Watt	0	1	1581.7	9.95	106'	0°	2°
9	AT&T MOBILITY LLC (Proposed)	Cci DMP65R-BU4D	Panel	850	LTE	275	68.8	4	80	TPO	Watt	0	1	847.4	10.25	106'	0°	2°
9	AT&T MOBILITY LLC (Proposed)	Cci DMP65R-BU4D	Panel	1900	LTE	275	67.9	4	160	TPO	Watt	0	1	3541	13.45	106'	0°	2°

Ant ID	Operator	Antenna Make & Model	Type	TX Freq (MHz)	Technology	Az (Deg)	Hor BW (Deg)	Ant Len (ft)	Power	Power Type	Power Unit	Misc Loss	TX Count	Total ERP (Watts)	Ant Gain (dBd)	Z	MDT	EDT
9	AT&T MOBILITY LLC (Proposed)	Cci DMP65R-BU4D	Panel	850	5G	275	68.8	4	80	TPO	Watt	0	1	847.4	10.25	106'	0°	2°
10	VERIZON WIRELESS	Generic	Panel	850		30	65.0	6.3	20	TPO	Watt	0	1	1321.8	13.43	106.9'	0°	0°
11	VERIZON WIRELESS	Generic	Panel	750		30	65.0	6.3	60	TPO	Watt	0	1	1081.8	12.56	106.9'	0°	0°
12	VERIZON WIRELESS	Generic	Panel	1900		30	65.0	4.6	16	TPO	Watt	0	1	1675.9	15.43	107.7'	0°	0°
13	VERIZON WIRELESS	Generic	Panel	850		30	65.0	6.3	20	TPO	Watt	0	1	1321.8	13.43	106.9'	0°	0°
14	VERIZON WIRELESS	Generic	Panel	850		150	65.0	6.3	20	TPO	Watt	0	1	1321.8	13.43	106.9'	0°	0°
15	VERIZON WIRELESS	Generic	Panel	750		150	65.0	6.3	60	TPO	Watt	0	1	1081.8	12.56	106.9'	0°	0°
16	VERIZON WIRELESS	Generic	Panel	1900		150	65.0	4.6	16	TPO	Watt	0	1	1675.9	15.43	107.7'	0°	0°
17	VERIZON WIRELESS	Generic	Panel	850		150	65.0	6.3	20	TPO	Watt	0	1	1321.8	13.43	106.9'	0°	0°
18	VERIZON WIRELESS	Generic	Panel	850		270	65.0	6.3	20	TPO	Watt	0	1	1321.8	13.43	106.9'	0°	0°
19	VERIZON WIRELESS	Generic	Panel	750		270	65.0	6.3	60	TPO	Watt	0	1	1081.8	12.56	106.9'	0°	0°
20	VERIZON WIRELESS	Generic	Panel	1900		270	65.0	4.6	16	TPO	Watt	0	1	1675.9	15.43	107.7'	0°	0°
21	VERIZON WIRELESS	Generic	Panel	850		270	65.0	6.3	20	TPO	Watt	0	1	1321.8	13.43	106.9'	0°	0°
22	SPRINT	Generic	Panel	862		0	65.0	4.6	40	TPO	Watt	0	1	756.9	12.77	113.7'	0°	0°
23	SPRINT	Generic	Panel	1900		0	65.0	4.6	40	TPO	Watt	0	1	1396.6	15.43	113.7'	0°	0°
24	SPRINT	Generic	Panel	862		120	65.0	4.6	40	TPO	Watt	0	1	756.9	12.77	113.7'	0°	0°
25	SPRINT	Generic	Panel	1900		120	65.0	4.6	40	TPO	Watt	0	1	1396.6	15.43	113.7'	0°	0°
26	SPRINT	Generic	Panel	862		200	65.0	4.6	40	TPO	Watt	0	1	756.9	12.77	113.7'	0°	0°
27	SPRINT	Generic	Panel	1900		200	65.0	4.6	40	TPO	Watt	0	1	1396.6	15.43	113.7'	0°	0°

Note: The Z reference indicates the bottom of the antenna height **above ground level (AGL).** Effective Radiated Power (ERP) is provided by the operator or based on Sitesafe experience. The values used in the modeling may be greater than are currently deployed. For other operators at this site the use of "Generic" as an antenna model or "Unknown" for a wireless operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Other operator's equipment, antenna models and powers used for modeling are based on obtained information or Sitesafe experience. Proposed equipment is tagged as (Proposed) under Operator or Antenna Make & Model.

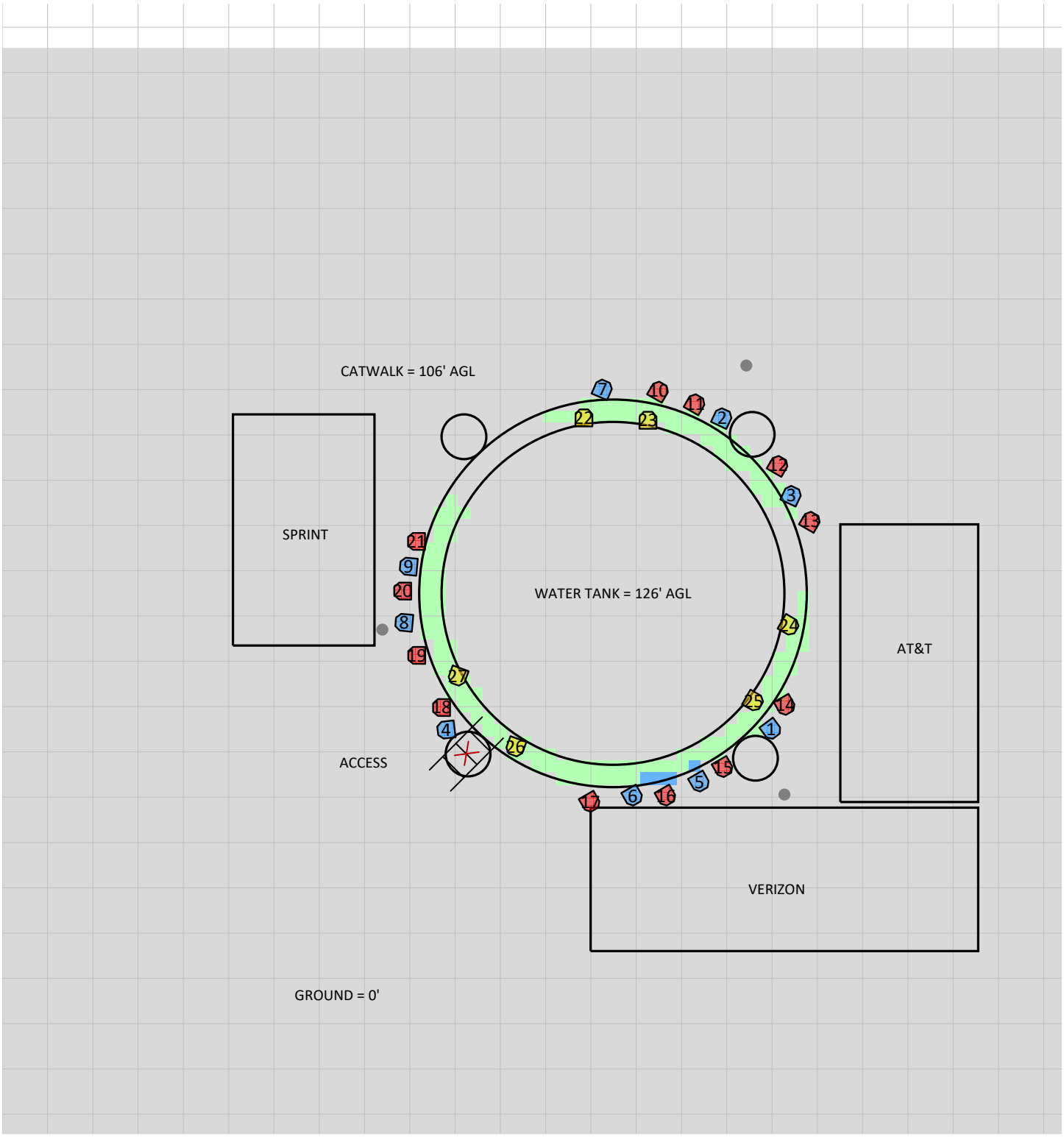
4 Emission Predictions

In the RF Exposure Simulations below, all heights are reflected with respect to ground level. Each different height area, rooftop, or platform level is labeled with its height relative to the main site level. Emissions are calculated appropriately based on the relative height and location of that area to all antennas. The total analyzed elevations in the below RF Exposure Simulations are listed below.

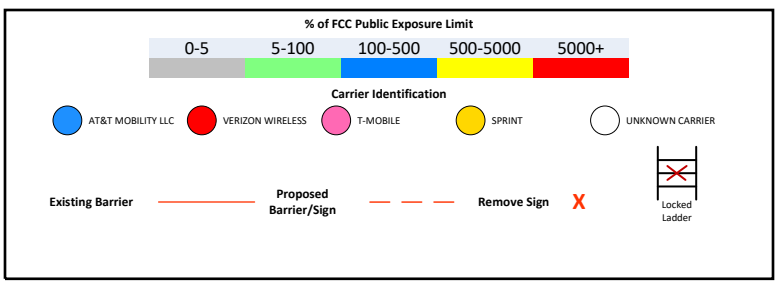
- GROUND = 0’
- WATER TANK = 126’
- CATWALK = 106’

The Antenna Inventory heights are referenced to the same level.

RF Exposure Simulation For: ESSEX
Composite Diagram



% of FCC Public Exposure Limit
Spatially Averaged



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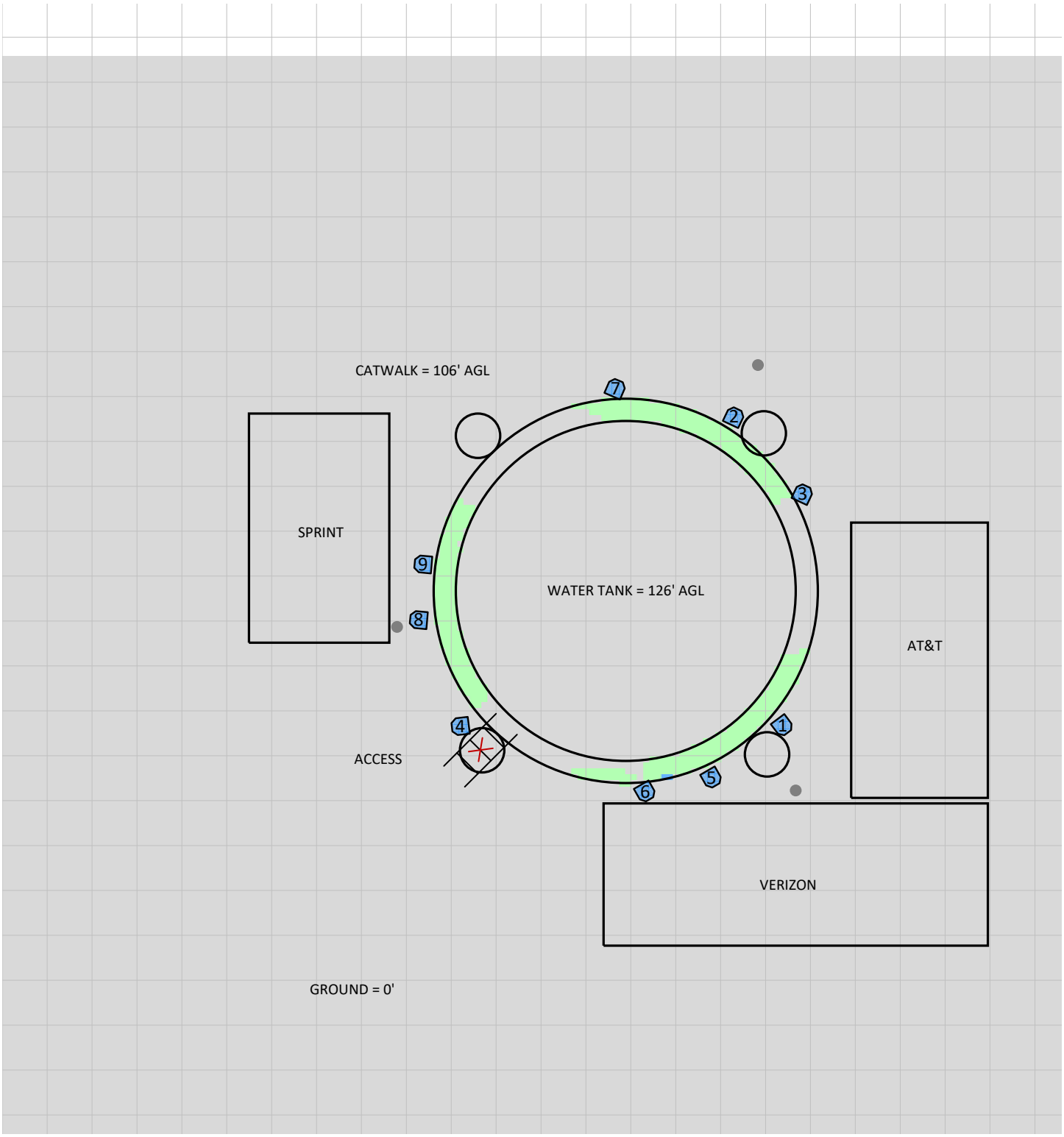
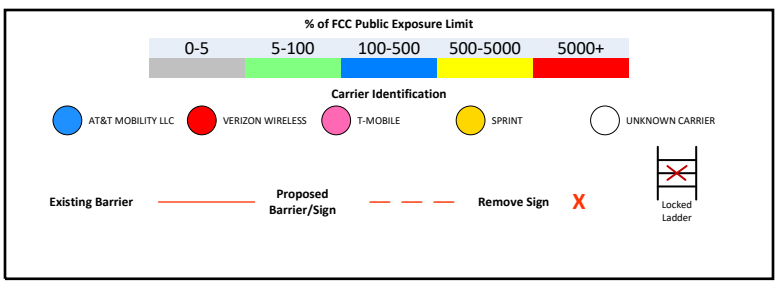
Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: ESSEX
AT&T Mobility, LLC Contribution



% of FCC Public Exposure Limit
Spatially Averaged



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Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

5 Site Compliance

5.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, RF hazard signage and antenna locations, Sitesafe has determined that:

AT&T Mobility, LLC is compliant with the FCC Rules and Regulations, as described in OET Bulletin 65.

The compliance determination is based on General Public RFE levels derived from theoretical modeling, RF signage placement, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the proposed AT&T Mobility, LLC deployment plan could result in the site being rendered non-compliant.

Modeling is used for determining compliance and the percentage of MPE contribution.

5.2 Actions for Site Compliance

Based on FCC regulations, common industry practice, and our understanding of AT&T Mobility, LLC's RF Safety Policy requirements, this section provides a statement of recommendations for site compliance. Recommendations have been proposed based on our understanding of existing access restrictions, signage, and an analysis of predicted RFE levels.

AT&T Mobility, LLC is compliant with the FCC Rules and Regulations.

Recommended per AT&T Mobility, LLC policy:

Site Access Location

Remove the existing Caution 1 and Information 1 signs.
Install (1) Caution 2 sign.

Notes:

- Any existing signage that conflicts with the proposed signage in this report should be removed per AT&T Signage Posting Rules.
- Ensure all existing signage documented in this report still exists on site unless otherwise indicated.

6 Reviewer Certification

The reviewer whose signature appears below hereby certifies and affirms:

That I am an employee of Site Safe, LLC, in Vienna, Virginia, at which place the staff and I provide RF compliance services to clients in the wireless communications industry; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission (FCC) as well as the regulations of the Occupational Safety and Health Administration (OSHA), both in general and specifically as they apply to the FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields; and

That I have thoroughly reviewed this Site Compliance Report and believe it to be true and accurate to the best of my knowledge as assembled by and attested to by Nick Kutzke.

October 2, 2020

Appendix A – Statement of Limiting Conditions

Sitesafe has provided computer generated model(s) in this Site Compliance Report to show approximate dimensions of the site, and the model is included to assist the reader of the compliance report to visualize the site area, and to provide supporting documentation for Sitesafe's recommendations.

Sitesafe may note in the Site Compliance Report any adverse physical conditions, such as needed repairs, that Sitesafe became aware of during the normal research involved in creating this report. Sitesafe will not be responsible for any such conditions that do exist or for any engineering or testing that might be required to discover whether such conditions exist. Because Sitesafe is not an expert in the field of mechanical engineering or building maintenance, the Site Compliance Report must not be considered a structural or physical engineering report.

Sitesafe obtained information used in this Site Compliance Report from sources that Sitesafe considers reliable and believes them to be true and correct. Sitesafe does not assume any responsibility for the accuracy of such items that were furnished by other parties. When conflicts in information occur between data collected by Sitesafe provided by a second party and data collected by Sitesafe, the data will be used.

Appendix B – Regulatory Background Information

FCC Rules and Regulations

In 1996, the Federal Communications Commission (FCC) adopted regulations for evaluating the effects of RF emissions in 47 CFR § 1.1307 and 1.1310. The guideline from the FCC Office of Engineering and Technology is Bulletin 65 ("OET Bulletin 65"), *Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields*, Edition 97-01, published August 1997. Since 1996, the FCC periodically reviews these rules and regulations as per their congressional mandate.

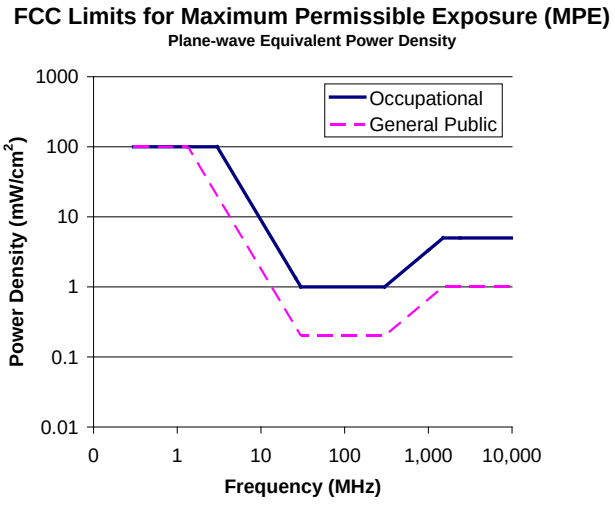
FCC regulations define two separate tiers of exposure limits: Occupational or "Controlled environment" and General Public or "Uncontrolled environment". The General Public limits are generally five times more conservative or restrictive than the Occupational limit. These limits apply to *accessible* areas where workers or the general public may be exposed to Radio Frequency (RF) electromagnetic fields.

Occupational or Controlled limits apply in situations in which persons are exposed as a consequence of their employment and where those persons exposed have been made fully aware of the potential for exposure and can exercise control over their exposure.

An area is considered a Controlled environment when access is limited to these aware personnel. Typical criteria are restricted access (i.e. locked or alarmed doors, barriers, etc.) to the areas where antennas are located coupled with proper RF warning signage. A site with Controlled environments is evaluated with Occupational limits.

All other areas are considered Uncontrolled environments. If a site has no access controls or no RF warning signage it is evaluated with General Public limits.

The theoretical modeling of the RF electromagnetic fields has been performed in accordance with OET Bulletin 65. The Maximum Permissible Exposure (MPE) limits utilized in this analysis are outlined in the following diagram:



Limits for Occupational/Controlled Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

Limits for General Population/Uncontrolled Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

f = frequency in MHz *Plane-wave equivalent power density

OSHA Statement

The General Duty clause of the OSHA Act (Section 5) outlines the occupational safety and health responsibilities of the employer and employee. The General Duty clause in Section 5 states:

(a) Each employer –

(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;
(2) shall comply with occupational safety and health standards promulgated under this Act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

OSHA has defined Radiofrequency and Microwave Radiation safety standards for workers who may enter hazardous RF areas. Regulation Standards 29 CFR § 1910.147 identify a generic Lockout/Tagout procedure aimed to control the unexpected energization or startup of machines when maintenance or service is being performed.

Appendix C – Safety Plan and Procedures

The following items are general safety recommendations that should be administered on a site by site basis as needed by the carrier.

General Maintenance Work: Any maintenance personnel required to work immediately in front of antennas and / or in areas indicated as above 100% of the Occupational MPE limits should coordinate with the wireless operators to disable transmitters during their work activities.

Training and Qualification Verification: All personnel accessing areas indicated as exceeding the General Population MPE limits should have a basic understanding of EME awareness and RF Safety procedures when working around transmitting antennas. Awareness training increases a worker's understanding to potential RF exposure scenarios. Awareness can be achieved in a number of ways (e.g. videos, formal classroom lecture or internet-based courses).

Physical Access Control: Access restrictions to transmitting antennas locations is the primary element in a site safety plan. Examples of access restrictions are as follows:

- Locked door or gate
- Alarmed door
- Locked ladder access
- Restrictive Barrier at antenna (e.g. Chain link with posted RF Sign)

RF Signage: Everyone should obey all posted signs at all times. RF signs play an important role in properly warning a worker prior to entering into a potential RF Exposure area.

Assume all antennas are active: Due to the nature of telecommunications transmissions, an antenna transmits intermittently. Always assume an antenna is transmitting. Never stop in front of an antenna. If you have to pass by an antenna, move through as quickly and safely as possible thereby reducing any exposure to a minimum.

Maintain a 3-foot clearance from all antennas: There is a direct correlation between the strength of an EME field and the distance from the transmitting antenna. The further away from an antenna, the lower the corresponding EME field is.

Site RF Emissions Diagram(s): Section 4 of this report contains RF Diagram(s) that outline various theoretical Maximum Permissible Exposure (MPE) areas at the site. The modeling is a worst-case scenario assuming a duty cycle of 100% for each transmitting antenna at full power. This analysis is based on one of two access control criteria: General Public criteria means the access to the site is uncontrolled and anyone can gain access. Occupational criteria means the access is restricted and only properly trained individuals can gain access to the antenna locations.

Appendix D – RF Emissions

The RF Emissions Simulation(s) in this report display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix E.

The key at the bottom of each RF Emissions Simulation indicates percentages displayed referenced to FCC General Public Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Areas indicated as Gray are predicted to be below 5% of the MPE limits. Gray represents areas more than 20 times below the most conservative exposure limit. **Gray areas are accessible to anyone**.
- Green represents areas are predicted to be between 5% and 100% of the MPE limits. **Green areas are accessible to anyone.**
- Blue represents areas predicted to exceed the General Public MPE limits but are less than Occupational limits. **Blue areas should be accessible only to RF trained workers**.
- Yellow represents areas predicted to exceed Occupational MPE limits. **Yellow areas should be accessible only to RF trained workers able to assess current exposure levels.**
- Red represents areas predicted to have exposure more than 10 times the Occupational MPE limits. **Red indicates that the RF levels must be reduced prior to access.** An RF Safety Plan is required which outlines how to reduce the RF energy in these areas prior to access.

If trained occupational personnel require access to areas that are delineated as above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the carriers to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

Appendix E – Assumptions and Definitions

General Model Assumptions

In this site compliance report, it is assumed that all antennas are operating at **full power at all times**. Software modeling was performed for all transmitting antennas located on the site. Sitesafe has further assumed a 100% duty cycle and maximum radiated power.

The modeling is based on recommendations from the FCC's OET-65 bulletin with the following variances per AT&T guidance. Reflection has not been considered in the modeling, i.e. the reflection factor is 1.0. The near / far field boundary has been set to 1.5 times the aperture height of the antenna and modeling beyond that point is the lesser of the near field cylindrical model and the far field model taking into account the gain of the antenna.

The site has been modeled with these assumptions to show the maximum RF energy density. Areas modeled with exposure greater than 100% of the General Public MPE level may not actually occur but are shown as a prediction that could be realized. Sitesafe believes these areas to be safe for entry by occupationally trained personnel utilizing appropriate personal protective equipment (in most cases, a personal monitor).

Use of Generic Antennas

For the purposes of this report, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information about a carrier, their FCC license and/or antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use our industry specific knowledge of equipment, antenna models, and transmit power to model the site. If more specific information can be obtained for the unknown measurement criteria, Sitesafe recommends remodeling of the site utilizing the more complete and accurate data. Information about similar facilities is used when the service is identified and associated with a particular antenna. If no information is available regarding the transmitting service associated with an unidentified antenna, using the antenna manufacturer's published data regarding the antenna's physical characteristics makes more conservative assumptions.

Where the frequency is unknown, Sitesafe uses the closest frequency in the antenna's range that corresponds to the highest Maximum Permissible Exposure (MPE), resulting in a conservative analysis.

Appendix F – Definitions

5% Rule – The rules adopted by the FCC specify that, in general, at multiple transmitter sites actions necessary to bring the area into compliance with the guidelines are the shared responsibility of all licensees whose transmitters produce field strengths or power density levels at the area in question in excess of 5% of the exposure limits. In other words, any wireless operator that contributes 5% or greater of the MPE limit in an area that is identified to be greater than 100% of the MPE limit is responsible for taking corrective actions to bring the site into compliance.

Compliance – The determination of whether a site complies with FCC standards with regards to Human Exposure to Radio Frequency Electromagnetic Fields from transmitting antennas.

Decibel (dB) – A unit for measuring power or strength of a signal.

Duty Cycle – The percent of pulse duration to the pulse period of a periodic pulse train. Also, may be a measure of the temporal transmission characteristic of an intermittently transmitting RF source such as a paging antenna by dividing average transmission duration by the average period for transmission. A duty cycle of 100% corresponds to continuous operation.

Effective (or Equivalent) Isotropic Radiated Power (EIRP) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna.

Effective Radiated Power (ERP) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to a half-wave dipole antenna.

Gain (of an antenna) – The ratio of the maximum power in a given direction to the maximum power in the same direction from an isotropic radiator. Gain is a measure of the relative efficiency of a directional antenna as compared to an omnidirectional antenna.

General Population/Uncontrolled Environment – Defined by the FCC as an area where RF exposure may occur to persons who are **unaware** of the potential for exposure and who have no control over their exposure. General Population is also referenced as General Public.

Generic Antenna – For the purposes of this report, the use of "Generic" as an antenna model means the antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use its industry specific knowledge of antenna models to select a worst-case scenario antenna to model the site.

Isotropic Antenna – An antenna that is completely non-directional. In other words, an antenna that radiates energy equally in all directions.

Maximum Measurement – This measurement represents the single largest measurement recorded when performing a spatial average measurement.

Maximum Permissible Exposure (MPE) – The rms and peak electric and magnetic field strength, their squares, or the plane-wave equivalent power densities associated with these fields to which a person may be exposed without harmful effect and with acceptable safety factor.

Occupational/Controlled Environment – Defined by the FCC as an area where RF exposure may occur to persons who are **aware** of the potential for exposure as a condition of employment or specific activity and can exercise control over their exposure.

OET Bulletin 65 – Technical guideline developed by the FCC's Office of Engineering and Technology to determine the impact of RF exposure on humans. The guideline was published in August 1997.

OSHA (Occupational Safety and Health Administration) – Under the Occupational Safety and Health Act of 1970, employers are responsible for providing a safe and healthy workplace for their employees. OSHA's role is to promote the safety and health of America's working men and women by setting and enforcing standards; providing training, outreach and education; establishing partnerships; and encouraging continual process improvement in workplace safety and health. For more information, visit www.osha.gov.

Radio Frequency Exposure or Electromagnetic Fields – Electromagnetic waves that are propagated from antennas through space.

Spatial Average Measurement – A technique used to average a minimum of ten (10) measurements taken in a ten (10) second interval from zero (0) to six (6) feet. This measurement is intended to model the average energy a 6-foot tall human body will absorb while present in an electromagnetic field of energy.

Transmitter Power Output (TPO) – The radio frequency output power of a transmitter's final radio frequency stage as measured at the output terminal while connected to a load.

Appendix G – References

The following references can be followed for further information about RF Health and Safety.

Site Safe, LLC
http://www.sitesafe.com
FCC Radio Frequency Safety
http://www.fcc.gov/encyclopedia/radio-frequency-safety
National Council on Radiation Protection and Measurements (NCRP)
http://www.ncrponline.org
Institute of Electrical and Electronics Engineers, Inc., (IEEE)
http://www.ieee.org
American National Standards Institute (ANSI)
http://www.ansi.org
Environmental Protection Agency (EPA)
http://www.epa.gov/radtown/wireless-tech.html
National Institutes of Health (NIH)
http://www.niehs.nih.gov/health/topics/agents/emf/
Occupational Safety and Health Agency (OSHA)
http://www.osha.gov/SLTC/radiofrequencyradiation/
International Commission on Non-Ionizing Radiation Protection (ICNIRP)
http://www.icnirp.org
World Health Organization (WHO)
http://www.who.int/peh-emf/en/
National Cancer Institute
http://www.cancer.gov/cancertopics/factsheet/Risk/cellphones
American Cancer Society (ACS)
http://www.cancer.org/docroot/PED/content/PED_1_3X_Cellular_Phone_Towers.asp?sitearea=PED
European Commission Scientific Committee on Emerging and Newly Identified Health Risks
http://ec.europa.eu/health/ph_risk/committees/04_scenihr/docs/scenihr_o_022.pdf
Fairfax County, Virginia Public School Survey
http://www.fcps.edu/fts/safety-security/RFEESurvey/
UK Health Protection Agency Advisory Group on Non-Ionizing Radiation
http://www.hpa.org.uk/webw/HPAweb&HPAwebStandard/HPAweb_C/1317133826368
Norwegian Institute of Public Health
http://www.fhi.no/dokumenter/545eea7147.pdf

Kristina Cottone

From: TrackingUpdates@fedex.com
Sent: Thursday, October 8, 2020 10:51 AM
To: Kristina Cottone
Subject: FedEx Shipment 771686268120: Your package has been delivered

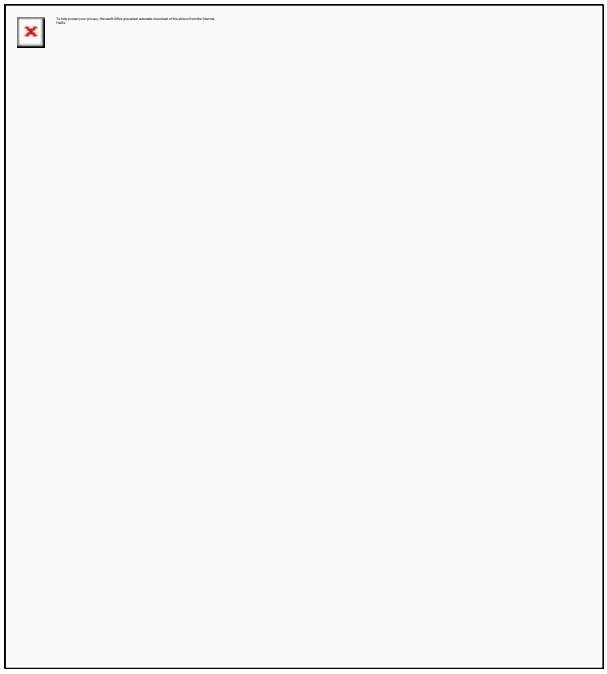
Hi. Your package was delivered Thu, 10/08/2020 at 10:50am.

Delivered to
Received by Signature Not Req

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER	771686268120
FROM	Smartlink LLC 85 Rangeway Road Building 3 Suite 102 NORTH BILLERICA, MA, US, 01862
TO	HT Partner ATTN: Peter Decker 6 Main Street

	Suite 312 CENTERBROOK, CT, US, 06409
REFERENCE	CTL02163 - Essex
SHIP DATE	Tue 10/06/2020 12:00 AM
PACKAGING TYPE	Package
ORIGIN	NORTH BILLERICA, MA, US, 01862
DESTINATION	CENTERBROOK, CT, US, 06409
NUMBER OF PIECES	1
TOTAL SHIPMENT WEIGHT	1.00 LB
SERVICE TYPE	FedEx Ground



Kristina Cottone

From: TrackingUpdates@fedex.com
Sent: Thursday, October 8, 2020 12:48 PM
To: Kristina Cottone
Subject: FedEx Shipment 771684569096: Your package has been delivered

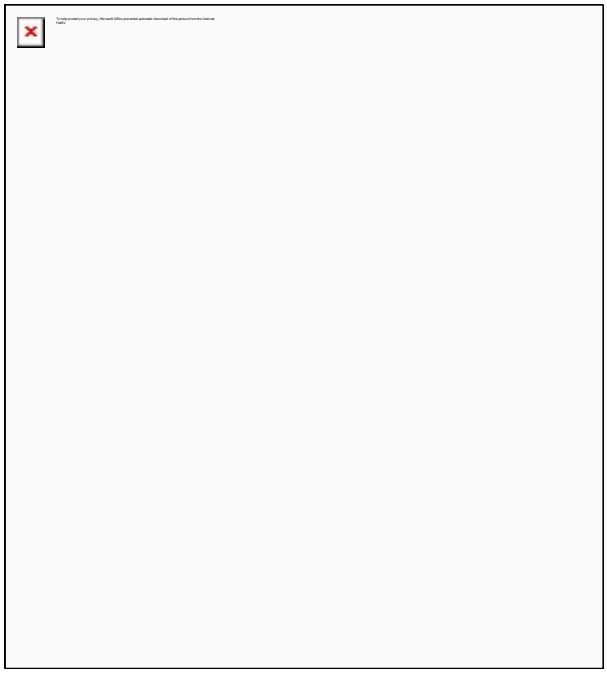
Hi. Your package was delivered Thu, 10/08/2020 at 12:46pm.

Delivered to 29 WEST AVE, Essex, CT 06426
Received by TLACHANCE

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER	771684569096
FROM	Smartlink LLC 85 Rangeway Road Building 3 Suite 102 NORTH BILLERICA, MA, US, 01862
TO	Town of Essesx ATTN: First Selectman Normal N.

	29 West Ave ESSEX, CT, US, 06426
REFERENCE	CTL02163 - Essex
SHIP DATE	Tue 10/06/2020 12:00 AM
PACKAGING TYPE	Package
ORIGIN	NORTH BILLERICA, MA, US, 01862
DESTINATION	ESSEX, CT, US, 06426
NUMBER OF PIECES	1
TOTAL SHIPMENT WEIGHT	1.00 LB
SERVICE TYPE	FedEx Ground



Please do not respond to this message. This email was sent from an unattended mailbox. This report was generated at approximately 11:47 AM CDT 10/08/2020.

All weights are estimated.

Kristina Cottone

From: TrackingUpdates@fedex.com
Sent: Thursday, October 8, 2020 12:47 PM
To: Kristina Cottone
Subject: FedEx Shipment 771684522709: Your package has been delivered

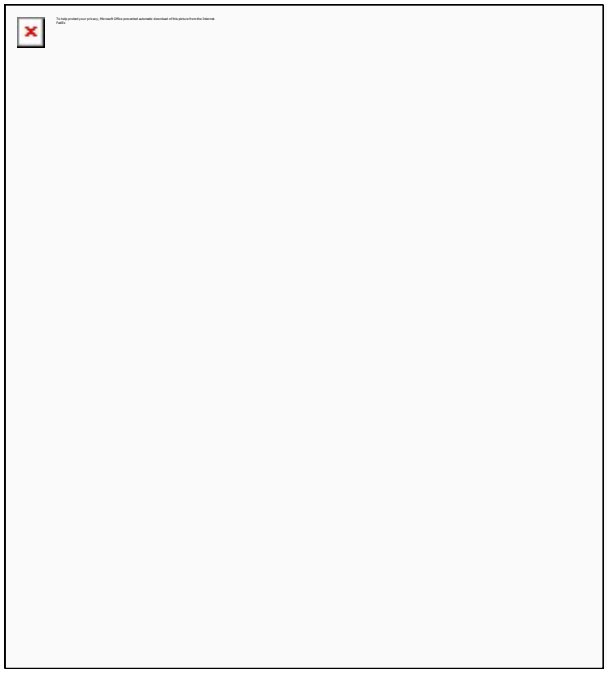
Hi. Your package was delivered Thu, 10/08/2020 at 12:46pm.

Delivered to 29 WEST AVE, Essex, CT 06426
Received by TLACHANCE

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER	771684522709
FROM	Smartlink LLC 85 Rangeway Road Building 3 Suite 102 NORTH BILLERICA, MA, US, 01862
TO	Town of Esses ATTN: Building Department

	29 West Ave ESSEX, CT, US, 06426
REFERENCE	CTL02163 - Essex
SHIP DATE	Tue 10/06/2020 12:00 AM
PACKAGING TYPE	Package
ORIGIN	NORTH BILLERICA, MA, US, 01862
DESTINATION	ESSEX, CT, US, 06426
NUMBER OF PIECES	1
TOTAL SHIPMENT WEIGHT	1.00 LB
SERVICE TYPE	FedEx Ground



Please do not respond to this message. This email was sent from an unattended mailbox. This report was generated at approximately 11:47 AM CDT 10/08/2020.

All weights are estimated.

PROJECT: LTE 3C/4C/4TX4RX/5G NR/BWE

SITE NUMBER: CTL02163

FA NUMBER: 10035078

PTN NUMBER: 2051A0V8BT/2051A0V8JD/2051A0V8Y0/2051A0V86K/2051A0VAEL

PACE NUMBER: MRCTB047114/MRCTB047069/MRCTB047120/MRCTB047079/MRCTB047140

SITE NAME: ESSEX CT

SITE ADDRESS: 10 MAIN STREET
ESSEX, CT 06426

at&t
550 COCHITUATE ROAD
SUITE 550 13 AND 14
FRAMINGHAM, MA 01701

smartlink
1362 MELLON ROAD
SUITE 140
HANOVER, MD 21076

FULLERTON ENGINEERING · DESIGN
1100 E. WOODFIELD ROAD, SUITE 500
SCHAUMBURG, ILLINOIS 60173
TEL: 847-908-8400
COA# PEC.0001899
www.FullertonEngineering.com

PROJECT INFORMATION

SITE NAME:	ESSEX CT
SITE NUMBER:	CTL02163
SITE ADDRESS:	10 MAIN STREET ESSEX, CT 06426
FA NUMBER:	10035078
PTN NUMBER:	2051A0V8BT/2051A0V8JD/2051A0V8Y0/2051A0V86K/2051A0VAEL
PACE NUMBER:	MRCTB047114/MRCTB047069/MRCTB047120/MRCTB047079/MRCTB047140
USID NUMBER:	59413
APPLICANT:	AT&T WIRELESS 550 COCHITUATE ROAD SUITE 550 13 AND 14 FRAMINGHAM, MA 01701
OWNER:	
JURISDICTION:	MIDDLESEX COUNTY
COUNTY:	MIDDLESEX
SITE COORDINATES FROM	(RFDS)
LATITUDE:	41.3512981° / 41° 21' 4.67316"
LONGITUDE:	-72.4061931° / -72° 24' 22.29516"
GROUND ELEV.:	38'
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
AT&T RF MANAGER:	DEEPAK RATHORE
PHONE:	(860) 965-3068
EMAIL:	dr701e@att.com

PROJECT CONSULTANTS

PROJECT MANAGER:	SMARTLINK
ADDRESS:	85 RANGEWAY ROAD, SUITE 102 NORTH BILLERICA, MA 01862
CONTACT:	SHARON KEEFE (978) 930-3918
EMAIL:	Sharon.Keefe@smartlinkllc.com
SITE AQUISITION:	SMARTLINK
ADDRESS:	85 RANGEWAY ROAD, SUITE 102 NORTH BILLERICA, MA 01862
CONTACT:	SHARON KEEFE (978) 930-3918
EMAIL:	Sharon.Keefe@smartlinkllc.com
ENGINEER/ARCHITECT:	FULLERTON ENGINEERING CONSULTANTS, PC
ADDRESS:	1100 E. WOODFIELD ROAD, SUITE 500 SCHAUMBURG, IL 60173
CONTACT:	MILEN DIMITROV (847) 908-8439
EMAIL:	MDimitrov@FullertonEngineering.com
CONSTRUCTION:	SMARTLINK
ADDRESS:	85 RANGEWAY ROAD, SUITE 102 NORTH BILLERICA, MA 01862
CONTACT:	MARK DONNELLY (617) 515-2080
EMAIL:	mark.donnelly@smartlinkllc.com

SCOPE OF WORK

LTE AWS/WCS/700/850/PCS WILL BE 3C/4C/4TX4RX/5G NR/BWE AT THE SITE WITH BRONZE CONFIGURATION. PROPOSED PROJECT SCOPE HEREIN BASED ON RFDS ID # 3719834, VERSION 4.00 LAST UPDATED 12/16/20.

- (6) EXISTING ANTENNAS TO BE REMOVED
- (6) EXISTING RRUS TO BE REMOVED, (3) EXISTING DC2 RAYCAP UNITS TO BE REMOVED
- (12) EXISTING DIPLEXERS TO BE REMOVED (6 @ TOWER TOP & 6 @ GRADE LEVEL)
- (2) NEW COMMSCOPE NNHH-65C-R4, (2) NEW COMMSCOPE DMP65R-BU8DA, (1) NEW COMMSCOPE DMP65R-BU4DA, (1) NEW COMMSCOPE NNHH-65A-R4
- (3) NEW RRUS-4415 B30, (3) NEW RRUS-4449 B5/B12, (3) NEW RRUS-8843 B2/B66A
- (3) NEW DC9 RAYCAP UNITS, (3) NEW FIBER CABLES, (9) NEW DC POWER CABLES
- (6) EXISTING COAX CABLES, (3) EXISTING FIBER CABLES & (3) POWER CABLES TO BE REMOVED
- (1) NEW RBS 6630, (1) NEW XMU CARD, INSTALL NEW IDLe CABLES
- (3) NEW UMTS HOME RUNS
- (2) NEW DC12 RAYCAP UNITS
- NEW MOUNT MODIFICATION (6) NEW 2.5 STD. PIPES
- CONTRACTOR SHALL FURNISH ALL MATERIAL WITH THE EXCEPTION OF AT&T SUPPLIED MATERIAL.
- ALL MATERIAL SHALL BE INSTALLED BY THE CONTRACTOR, UNLESS STATED OTHERWISE.

SITE LOCATION MAP

DIRECTIONS

SCAN QR CODE FOR LINK TO SITE LOCATION MAP

APPLICABLE BUILDING CODES AND STANDARDS

ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES.

BUILDING CODE: 2015 INTERNATIONAL BUILDING CODE
2018 CONNECTICUT STATE BUILDING CODE SUPPLEMENT

ELECTRICAL CODE: 2017 NATIONAL ELECTRIC CODE

- FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION.
- ADA ACCESS REQUIREMENTS ARE NOT REQUIRED.
- THIS FACILITY DOES NOT REQUIRE POTABLE WATER AND WILL NOT PRODUCE ANY SEWAGE

DRAWING INDEX

NOTE: DRAWING SCALES ARE FOR 11"x17" SHEETS UNLESS OTHERWISE NOTED

REV	DATE	DESCRIPTION	BY
0	08/05/20	90% REVIEW	KC
1	09/22/20	FOR PERMIT	KC
2	10/01/20	FOR PERMIT	KC
3	11/30/20	FOR CONSTRUCTION	KC
4	12/18/20	FOR CONSTRUCTION	KC

I HEREBY CERTIFY THAT THESE DRAWINGS WERE PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND CONTROL, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF COMPLY WITH THE REQUIREMENTS OF ALL APPLICABLE CODES.

SITE NAME
ESSEX CT

SITE NUMBER:
CTL02163

SITE ADDRESS
10 MAIN STREET
ESSEX, CT 06426

SHEET NAME
TITLE SHEET

SHEET NUMBER
T1

PROJECT# 2020.0032.0030

GENERAL CONSTRUCTION

1. FOR THE PURPOSE OF CONSTRUCTION DRAWINGS, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR/CM – SMARTLINK
   OWNER – AT&T WIRELESS
2. ALL SITE WORK SHALL BE COMPLETED AS INDICATED ON THE DRAWINGS AND AT&T PROJECT SPECIFICATIONS.
3. GENERAL CONTRACTOR SHALL VISIT THE SITE AND SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING THE PROPOSED WORK AND SHALL MAKE PROVISIONS. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS, DIMENSIONS, AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.
4. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. GENERAL CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF WORK.
5. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES, AND APPLICABLE REGULATIONS.
6. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
7. PLANS ARE NOT TO BE SCALED. THESE PLANS ARE INTENDED TO BE A DIAGRAMMATIC OUTLINE ONLY UNLESS OTHERWISE NOTED. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS OTHERWISE NOTED. SPACING BETWEEN EQUIPMENT IS THE MINIMUM REQUIRED CLEARANCE. THEREFORE, IT IS CRITICAL TO FIELD VERIFY DIMENSIONS, SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE ENGINEER PRIOR TO PROCEEDING WITH THE WORK. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF WORK AND PREPARED BY THE ENGINEER PRIOR TO PROCEEDING WITH WORK.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE ENGINEER PRIOR TO PROCEEDING.
10. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF WORK AREA, ADJACENT AREAS AND BUILDING OCCUPANTS THAT ARE LIKELY TO BE AFFECTED BY THE WORK UNDER THIS CONTRACT. WORK SHALL CONFIRM TO ALL OSHA REQUIREMENTS AND THE LOCAL JURISDICTION.
11. GENERAL CONTRACTOR SHALL COORDINATE WORK AND SCHEDULE WORK ACTIVITIES WITH OTHER DISCIPLINES.
12. ERECTION SHALL BE DONE IN A WORKMANLIKE MANNER BY COMPETENT EXPERIENCED WORKMAN IN ACCORDANCE WITH APPLICABLE CODES AND THE BEST ACCEPTED PRACTICE. ALL MEMBERS SHALL BE LAID PLUMB AND TRUE AS INDICATED ON THE DRAWINGS.
13. SEAL PENETRATIONS THROUGH FIRE RATED AREAS WITH UL LISTED MATERIALS APPROVED BY LOCAL JURISDICTION. CONTRACTOR SHALL KEEP AREA CLEAN, HAZARD FREE, AND DISPOSE OF ALL DEBRIS.
14. WORK PREVIOUSLY COMPLETED IS REPRESENTED BY LIGHT SHADED LINES AND NOTES. THE SCOPE OF WORK FOR THIS PROJECT IS REPRESENTED BY DARK SHADED LINES AND NOTES. CONTRACTOR SHALL NOTIFY THE GENERAL CONTRACTOR OF ANY EXISTING CONDITIONS THAT DEVIATE FROM THE DRAWINGS PRIOR TO BEGINNING CONSTRUCTION.
15. CONTRACTOR SHALL PROVIDE WRITTEN NOTICE TO THE CONSTRUCTION MANAGER 48 HOURS PRIOR TO COMMENCEMENT OF WORK.
16. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
17. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
18. GENERAL CONTRACTOR SHALL COORDINATE AND MAINTAIN ACCESS FOR ALL TRADES AND CONTRACTORS TO THE SITE AND/OR BUILDING.
19. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR SECURITY OF THE SITE FOR THE DURATION OF CONSTRUCTION UNTIL JOB COMPLETION.
20. THE GENERAL CONTRACTOR SHALL MAINTAIN IN GOOD CONDITION ONE COMPLETE SET OF PLANS WITH ALL REVISIONS, ADDENDA, AND CHANGE ORDERS ON THE PREMISES AT ALL TIMES.
21. THE GENERAL CONTRACTOR SHALL PROVIDE PORTABLE FIRE EXTINGUISHERS WITH A RATING OF NOT LESS THAN 2–A OT 2–A:10–B:C AND SHALL BE WITHIN 25 FEET OF TRAVEL DISTANCE TO ALL PORTIONS OF WHERE THE WORK IS BEING COMPLETED DURING CONSTRUCTION.
22. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY THE ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS SHALL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION, B) CONFINED SPACE, C) ELECTRICAL SAFETY, AND D) TRENCHING & EXCAVATION.
23. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED, CAPPED, PLUGGED OR OTHERWISE DISCONNECTED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, AS DIRECTED BY THE RESPONSIBLE ENGINEER, AND SUBJECT TO THE APPROVAL OF THE OWNER AND/OR LOCAL UTILITIES.
24. THE AREAS OF THE OWNER'S PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION.
25. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO THE EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE FEDERAL AND LOCAL JURISDICTION FOR EROSION AND SEDIMENT CONTROL.
26. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUNDING. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
27. THE SUBGRADE SHALL BE BROUGHT TO A SMOOTH UNIFORM GRADE AND COMPACTED TO 95 PERCENT STANDARD PROCTOR DENSITY UNDER PAVEMENT AND STRUCTURES AND 80 PERCENT STANDARD PROCTOR DENSITY IN OPEN SPACE. ALL TRENCHES IN PUBLIC RIGHT OF WAY SHALL BE BACKFILLED WITH FLOWABLE FILL OR OTHER MATERIAL PRE–APPROVED BY THE LOCAL JURISDICTION.
28. ALL NECESSARY RUBBISH, STUMPS, DEBRIS, STICKS, STONES, AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN A LAWFUL MANNER.
29. ALL BROCHURES, OPERATING AND MAINTENANCE MANUALS, CATALOGS, SHOP DRAWINGS, AND OTHER DOCUMENTS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR AT COMPLETION OF CONSTRUCTION AND PRIOR TO PAYMENT.
30. CONTRACTOR SHALL SUBMIT A COMPLETE SET OF AS–BUILT REDLINES TO THE GENERAL CONTRACTOR UPON COMPLETION OF PROJECT AND PRIOR TO FINAL PAYMENT.
31. CONTRACTOR SHALL LEAVE PREMISES IN A CLEAN CONDITION.
32. THE PROPOSED FACILITY WILL BE UNMANNED AND DOES NOT REQUIRE POTABLE WATER OR SEWER SERVICE, AND IS NOT FOR HUMAN HABITAT (NO HANDICAP ACCESS REQUIRED).
33. OCCUPANCY IS LIMITED TO PERIODIC MAINTENANCE AND INSPECTION, APPROXIMATELY 2 TIMES PER MONTH, BY AT&T TECHNICIANS.
34. NO OUTDOOR STORAGE OR SOLID WASTE CONTAINERS ARE PROPOSED.
35. ALL MATERIAL SHALL BE FURNISHED AND WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST REVISION AT&T MOBILITY GROUNDING STANDARD "TECHNICAL SPECIFICATION FOR CONSTRUCTION OF GSM/GPRS WIRELESS SITES" AND "TECHNICAL SPECIFICATION FOR FACILITY GROUNDING". IN CASE OF A CONFLICT BETWEEN THE CONSTRUCTION SPECIFICATION AND THE DRAWINGS, THE DRAWINGS SHALL GOVERN.
36. CONTRACTORS SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS REQUIRED FOR CONSTRUCTION. IF CONTRACTOR CANNOT OBTAIN A PERMIT, THEY MUST NOTIFY THE GENERAL CONTRACTOR IMMEDIATELY.
37. CONTRACTOR SHALL REMOVE ALL TRASH AND DEBRIS FROM THE SITE ON A DAILY BASIS.
38. INFORMATION SHOWN ON THESE DRAWINGS WAS OBTAINED FROM SITE VISITS AND/OR DRAWINGS PROVIDED BY THE SITE OWNER. CONTRACTORS SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
39. NO WHITE STROBE LIGHTS ARE PERMITTED. LIGHTING IF REQUIRED, WILL MEET FAA STANDARDS AND REQUIREMENTS.

ANTENNA MOUNTING

40. DESIGN AND CONSTRUCTION OF ANTENNA SUPPORTS SHALL CONFORM TO CURRENT ANSI/TIA–222 OR APPLICABLE LOCAL CODES.
41. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT–DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS NOTED OTHERWISE.
42. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC–COATING (HOT–DIP) ON IRON AND STEEL HARDWARE", UNLESS NOTED OTHERWISE.
43. DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY COLD GALVANIZING IN ACCORDANCE WITH ASTM A780.
44. ALL ANTENNA MOUNTS SHALL BE INSTALLED WITH LOCK NUTS, DOUBLE NUTS AND SHALL BE TORQUED TO MANUFACTURER'S RECOMMENDATIONS.
45. CONTRACTOR SHALL INSTALL ANTENNA PER MANUFACTURER'S RECOMMENDATION FOR INSTALLATION AND GROUNDING.
46. ALL UNUSED PORTS ON ANY ANTENNAS SHALL BE TERMINATED WITH A 50–OHM LOAD TO ENSURE ANTENNAS PERFORM AS DESIGNED.
47. PRIOR TO SETTING ANTENNA AZIMUTHS AND DOWNTILTS, ANTENNA CONTRACTOR SHALL CHECK THE ANTENNA MOUNT FOR TIGHTNESS AND ENSURE THAT THEY ARE PLUMB. ANTENNA AZIMUTHS SHALL BE SET FROM TRUE NORTH AND BE ORIENTED WITHIN +/– 5% AS DEFINED BY THE RFDS. ANTENNA DOWNTILTS SHALL BE WITHIN +/– 0.5% AS DEFINED BY THE RFDS. REFER TO ND–00246.
48. JUMPERS FROM THE TMA'S MUST TERMINATE TO OPPOSITE POLARIZATION'S IN EACH SECTOR.
49. CONTRACTOR SHALL RECORD THE SERIAL #, SECTOR, AND POSITION OF EACH ACTUATOR INSTALLED AT THE ANTENNAS AND PROVIDE THE INFORMATION TO AT&T.
50. TMA'S SHALL BE MOUNTED ON PIPE DIRECTLY BEHIND ANTENNAS AS CLOSE TO ANTENNA AS FEASIBLE IN A VERTICAL POSITION.

TORQUE REQUIREMENTS

51. ALL RF CONNECTIONS SHALL BE TIGHTENED BY A TORQUE WRENCH.
52. ALL RF CONNECTIONS, GROUNDING HARDWARE AND ANTENNA HARDWARE SHALL HAVE A TORQUE MARK INSTALLED IN A CONTINUOUS STRAIGHT LINE FROM BOTH SIDES OF THE CONNECTION.
    A. RF CONNECTION BOTH SIDES OF THE CONNECTOR.
    B. GROUNDING AND ANTENNA HARDWARE ON THE NUT SIDE STARTING FROM THE THREADS TO THE SOLID SURFACE. EXAMPLE OF SOLID SURFACE: GROUND BAR, ANTENNA BRACKET METAL.

FIBER & POWER CABLE MOUNTING

53. THE FIBER OPTIC TRUNK CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY. WHEN INSTALLING FIBER OPTIC TRUNK CABLES INTO A CABLE TRAY SYSTEM, THEY SHALL BE INSTALLED INTO AN INTER DUCT AND A PARTITION BARRIER SHALL BE INSTALLED BETWEEN THE 600 VOLT CABLES AND THE INTER DUCT IN ORDER TO SEGREGATE CABLE TYPES. OPTIC FIBER TRUNK CABLES SHALL HAVE APPROVED CABLE RESTRAINTS EVERY (60) SIXTY FEET AND SECURELY FASTENED TO THE CABLE TRAY SYSTEM. NFPA 70 (NEC) ARTICLE 770 RULES SHALL APPLY.
54. THE TYPE TC–ER CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY AND SHALL BE SECURED AT INTERVALS NOT EXCEEDING (6) SIX FEET. AN EXCEPTION; WHERE TYPE TC–ER CABLES ARE NOT SUBJECT TO PHYSICAL DAMAGE, CABLES SHALL BE PERMITTED TO MAKE A TRANSITION BETWEEN CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY WHICH ARE SERVING UTILIZATION EQUIPMENT OR DEVICES, A DISTANCE (6) SIX FEET SHALL NOT BE EXCEEDED WITHOUT CONTINUOUS SUPPORTING. NFPA 70 (NEC) ARTICLES 336 AND 392 RULES SHALL APPLY.
55. WHEN INSTALLING OPTIC FIBER TRUNK CABLES OR TYPE TC–ER CABLES INTO CONDUITS, NFPA 70 (NEC) ARTICLE 300 RULES SHALL APPLY.

COAXIAL CABLE NOTES

62. TYPES AND SIZES OF THE ANTENNA CABLE ARE BASED ON ESTIMATED LENGTHS. PRIOR TO

    ORDERING CABLE, CONTRACTOR SHALL VERIFY ACTUAL LENGTH BASED ON CONSTRUCTION LAYOUT AND NOTIFY THE PROJECT MANAGER IF ACTUAL LENGTHS EXCEED ESTIMATED LENGTHS.
63. CONTRACTOR SHALL VERIFY THE DOWN–TILT OF EACH ANTENNA WITH A DIGITAL LEVEL.
64. CONTRACTOR SHALL CONFIRM COAX COLOR CODING PRIOR TO CONSTRUCTION.
65. ALL JUMPERS TO THE ANTENNAS FROM THE MAIN TRANSMISSION LINE SHALL BE 1/2" DIA. LDF AND SHALL NOT EXCEED 6'–0".
66. ALL COAXIAL CABLE SHALL BE SECURED TO THE DESIGNED SUPPORT STRUCTURE, IN AN APPROVED MANNER, AT DISTANCES NOT TO EXCEED 4'–0" OC.
67. CONTRACTOR SHALL FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS REGARDING BOTH THE INSTALLATION AND GROUNDING OF ALL COAXIAL CABLES, CONNECTORS, ANTENNAS, AND ALL OTHER EQUIPMENT.
68. CONTRACTOR SHALL GROUND ALL EQUIPMENT. INCLUDING ANTENNAS, RET MOTORS, TMA'S, COAX CABLES, AND RET CONTROL CABLES AS A COMPLETE SYSTEM. GROUNDING SHALL BE EXECUTED BY QUALIFIED WIREMEN IN COMPLIANCE WITH MANUFACTURER'S SPECIFICATION AND RECOMMENDATION.
69. CONTRACTOR SHALL PROVIDE STRAIN–RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES, COAX CABLES, AND RET CONTROL CABLES. CABLE STRAIN–RELIEFS AND CABLE SUPPORTS SHALL BE APPROVED FOR THE PURPOSE. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
70. CONTRACTOR TO VERIFY THAT EXISTING COAX HANGERS ARE STACKABLE SNAP IN HANGERS. IF EXISTING HANGERS ARE NOT STACKABLE SNAP IN HANGERS THE CONTRACTOR SHALL REPLACE EXISTING HANGERS WITH NEW SNAP IN HANGERS IF APPLICABLE.

GENERAL CABLE AND EQUIPMENT NOTES

71. CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY ANTENNA, TMAS, DIPLEXERS, AND COAX CONFIGURATION, MAKE AND MODELS PRIOR TO INSTALLATION.
72. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S RECOMMENDATIONS.
73. CONTRACTOR SHALL REFERENCE THE TOWER STRUCTURAL ANALYSIS/DESIGN DRAWINGS FOR DIRECTIONS ON CABLE DISTRIBUTION/ROUTING.
74. ALL OUTDOOR RF CONNECTORS/CONNECTIONS SHALL BE WEATHERPROOFED, EXCEPT THE RET CONNECTORS, USING BUTYL TAPE AFTER INSTALLATION AND FINAL CONNECTIONS ARE MADE. BUTYL TAPE SHALL HAVE A MINIMUM OF ONE–HALF TAPE WIDTH OVERLAP ON EACH TURN AND EACH LAYER SHALL BE WRAPPED THREE TIMES. WEATHERPROOFING SHALL BE SMOOTH WITHOUT BUCKLING. BUTYL BLEEDING IS NOT ALLOWED.
75. IF REQUIRED TO PAINT ANTENNAS AND/OR COAX:
    A. TEMPERATURE SHALL BE ABOVE 50° F.
    B. PAINT COLOR MUST BE APPROVED BY BUILDING OWNER/LANDLORD.
    C. FOR REGULATED TOWERS, FAA/FCC APPROVED PAINT IS REQUIRED.
    D. DO NOT PAINT OVER COLOR CODING OR ON EQUIPMENT MODEL NUMBERS
76. ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUND KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
    A. GROUNDING AT THE ANTENNA LEVEL.
    B. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200'–0", ADDITIONAL CABLE GROUNDING REQUIRED.
    C. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
    D. GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
    E. GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
77. ALL PROPOSED GROUND BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUND BAR DOWNLEADS A MINIMUM DISTANCE OF 4'–0" BELOW GROUND BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.

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STATE OF CONNECTICUT · HENRY M. BELLAGAMBA · 25358 · PROFESSIONAL ENGINEER

SITE NAME
ESSEX CT

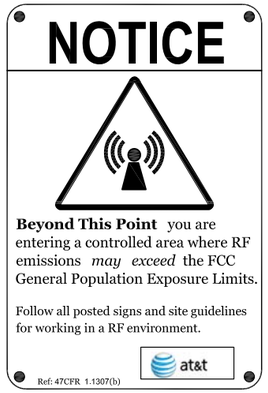
SITE NUMBER:
CTL02163

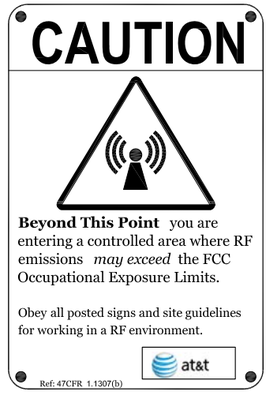
SITE ADDRESS
10 MAIN STREET
ESSEX, CT 06426

SHEET NAME
NOTES AND SPECIFICATIONS

SHEET NUMBER
SP1

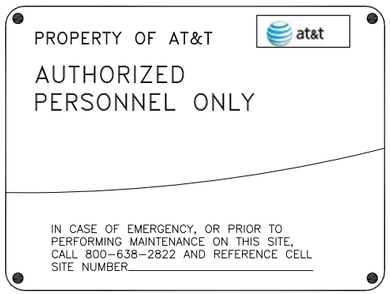
PROJECT# 2020.0032.0030





ALERTING SIGNS

ALERTING SIGN



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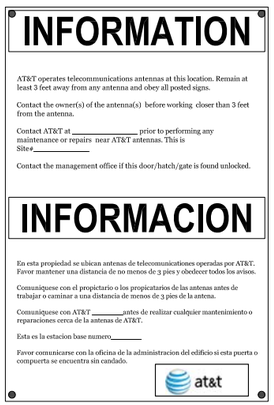

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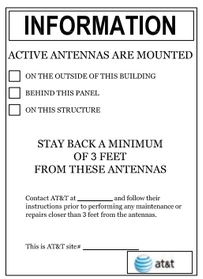

INFO SIGN #2

INFO SIGN #3

ALERTING SIGN
(FOR CELL SITE BATTERIES)

ALERTING SIGN
(FOR DIESEL FUEL)

ALERTING SIGN
(FOR PROPANE)

GENERAL SIGNAGE GUIDELINES

STRUCTURE TYPE	INFO SIGN #1	INFO SIGN #2	INFO SIGN #3	INFO SIGN #4	STRIPING	NOTICE SIGN	CAUTION SIGN
TOWERS							
MONOPOLE/MONOPINE/MONOPALM	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS	CLIMBING SIDE OF THE TOWER	ON BACKSIDE OF ANTENNAS	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS			AT THE HEIGHT OF THE FIRST CLIMBING STEP, MIN 9 FT ABOVE GROUND
SEC TOWERS/TOWERS WITH HIGH VOLTAGE	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS	CLIMBING SIDE OF THE TOWER	ON BACKSIDE OF ANTENNAS	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS			
LIGHT POLES/FLAG POLES	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS	ON THE POLE, NO LESS THAN 3FT BELOW THE ANTENNA AND LESS THAN 9FT ABOVE GROUND	ON BACKSIDE OF ANTENNAS	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS			
UTILITY WOOD POLES (JPA)	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS	ON THE POLE, NO LESS THAN 3FT BELOW THE ANTENNA AND LESS THAN 9FT ABOVE GROUND	ON BACKSIDE OF ANTENNAS	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS		IF GP MAX VALUE OF MPE AT ANTENNA LEVEL IS: 0-99%; NOTICE SIGN; OVER 99%: CAUTION SIGN AT NO LESS THAN 3FT BELOW ANTENNA AND 9FT ABOVE GROUND	
MICROCELLS MOUNTED ON NON-JPA POLES	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS	ON THE POLE, NO LESS THAN 3FT BELOW THE ANTENNA AND LESS THAN 9FT ABOVE GROUND	ON BACKSIDE OF ANTENNAS	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS		NOTICE OR CAUTION SIGN AT NO LESS THAN 9FT ABOVE GROUND: ONLY IF THE EXPOSURE EXCEEDS 90% OF THE GENERAL PUBLIC EXPOSURE AT EXPOSURE AT 6FT ABOVE GROUND OR AT OUTSIDE OF SURFACE OF ADJACENT BUILDING	
TOWERS							
AT ALL ACCESS POINTS TO THE ROOF	X			X			
ON ANTENNAS	X		X	X			
CONCEALED ANTENNAS	X	X		X			
ANTENNAS MOUNTED FACING OUTSIDE THE BUILDING	X	X		X			
ANTENNAS ON SUPPORT STRUCTURE	X	X		X			
ROOFVIEW GRAPH							
RADIATION AREA IS WITHIN 3FT FROM ANTENNA	X	ADJACENT TO EACH ANTENNA		X		EITHER NOTICE OR CAUTION SIGN (BASED ON ROOFVIEW RESULTS) AT ANTENNA /BARRIER	
RADIATION AREA IS BEYOND 3FT FROM ANTENNA	X	ADJACENT TO EACH ANTENNA		X	DIAGONAL, YELLOW STRIPING AS TO ROOFVIEW GRAPH		
CHURCH STEEPLES	ACCESS TO STEEPLE	ADJACENT TO ANTENNAS IF ANTENNAS ARE CONCEALED	ON BACKSIDE OF ANTENNAS	ACCESS TO STEEPLE			CAUTION SIGN AT THE ANTENNAS
WATER STATIONS	ACCESS TO LADDER	ADJACENT TO ANTENNAS IF ANTENNAS ARE CONCEALED	ON BACKSIDE OF ANTENNAS	ACCESS TO LADDER			CAUTION SIGN BESIDE INFO SIGN #1, MIN. 9FT ABOVE GROUND

NOTES FOR ROOFTOP SITES:

1. EITHER NOTICE OR CAUTION SIGNS NEED TO BE POSTED AT EACH SECTOR AS CLOSE AS POSSIBLE TO: THE OUTER EDGE OF THE STRIPED OFF AREA OR THE OUTER ANTENNAS OF THE SECTOR
2. IF ROOFVIEWS SHOWS: ONLY BLUE = NOTICE SIGN, BLUE AND YELLOW = CAUTION SIGN, ONLY YELLOW = CAUTION SIGN TO BE INSTALLED
3. SHOULD THE REQUIRED STRIPING AREAS INTERFERE WITH ANY STRUCTURE OR EQUIPMENT (A/C, VENTS, ROOF HATCH, DOORS, OTHER ANTENNAS, DISHES, ETC.). PLEASE NOTIFY AT&T TO MODIFY THE STRIPING AREA, PRIOR TO STARTING THE WORK.

SIGNAGE GUIDELINES CHART

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SHEET NAME
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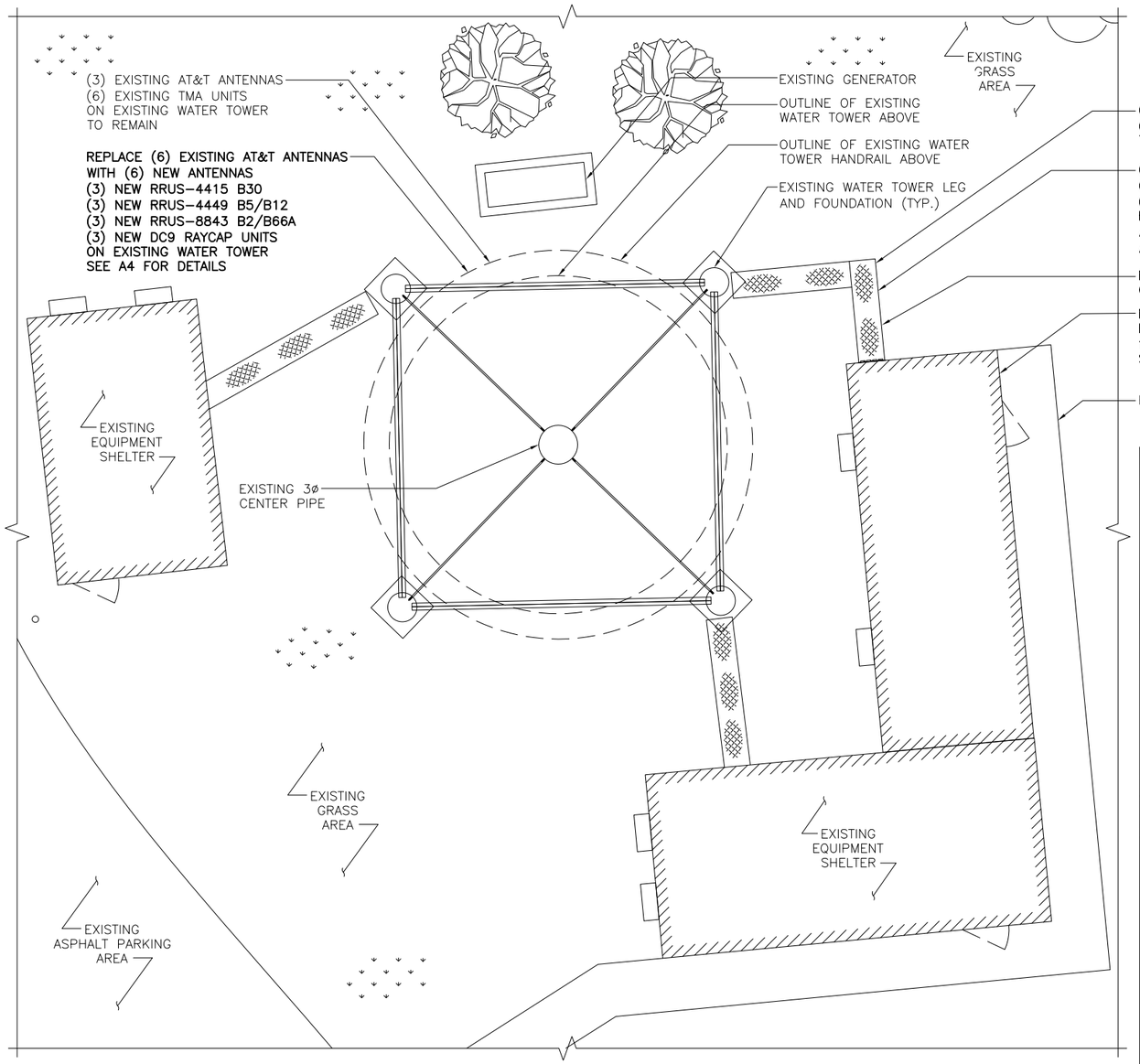
PROJECT# 2020.0032.0030

ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
AGL	ABOVE GRADE LEVEL
AMSL	ABOVE MEAN SEA LEVEL
APPROX	APPROXIMATE
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BLDG	BUILDING
BTS	BASE TRANSMISSION STATION
℄	CENTERLINE
CLR	CLEAR
COL	COLUMN
CONC	CONCRETE
CND	CONDUIT
DWG	DRAWING
FT	FOOT(FEET)
EGB	EQUIPMENT GROUND BAR
ELEC	ELECTRICAL
EMT	ELECTRICAL METALLIC TUBING
ELEV	ELEVATION
EQUIP	EQUIPMENT
(E)	EXISTING
EXT	EXTERIOR
FND	FOUNDATION
F	FIBER
FIF	FACILITY INTERFACE FRAME
GA	GAUGE
GALV	GALVANIZED
GPS	GLOBAL POSITIONING SYSTEM
GND	GROUND
GSM	GLOBAL SYSTEM FOR MOBILE COMMUNICATION
LTE	LONG TERM EVOLUTION
MAX	MAXIMUM
MCPA	MULTI-CARRIER POWER AMPLIFIER
MFR	MANUFACTURER
MGB	MASTER GROUND BAR
MIN	MINIMUM
MTS	MANUAL TRANSFER SWITCH
N.T.S.	NOT TO SCALE
O.C.	ON CENTER
OE/OT	OVERHEAD ELECTRIC/TELCO
PPC	POWER PROTECTION CABINET
PL	PROPERY LINE
RBS	RADIO BASED STATION
RET	REMOTE ELECTRIC TILT
RRU	REMOTE RADIO UNIT
RGS	RIGID GALVANIZED STEEL
IN	INCH(ES)
INT	INTERIOR
LB(S), #	POUND(S)
SF	SQUARE FOOT
STL	STEEL
TMA	TOWER MOUNTED AMPLIFIER
TYP	TYPICAL
UE/UT	UNDERGROUND ELECTRIC/TELCO
UNO	UNLESS NOTED OTHERWISE
UMTS	UNIVERSAL MOBILE TELE-COMMUNICATION SYSTEM
VIF	VERIFY IN FIELD
W/	WITH
XFMR	TRANSFORMER

SYMBOLS

- REVISION
- WORK POINT
- UTILITY POLE
- COMPRESSED STONE
- BRICK
- CONCRETE
- EARTH
- GRAVEL
- MASONRY
- STEEL
- CENTERLINE
- PROPERTY LINE
- LEASE LINE
- EASEMENT LINE
- CHAIN LINK FENCE
- WOOD FENCE
- UE — BELOW GRADE ELECTRIC
- UT — BELOW GRADE TELEPHONE
- OE/OT — OVERHEAD ELECTRIC/TELEPHONE
- SECTION REFERENCE (A / S-1)



COMPOUND PLAN — SCALE: 3/32" = 1'-0" (0, 2', 4', 8', 16') — 1

SITE PHOTO 1 — SCALE: N.T.S. — 2

SITE PHOTO 2 — SCALE: N.T.S. — 3

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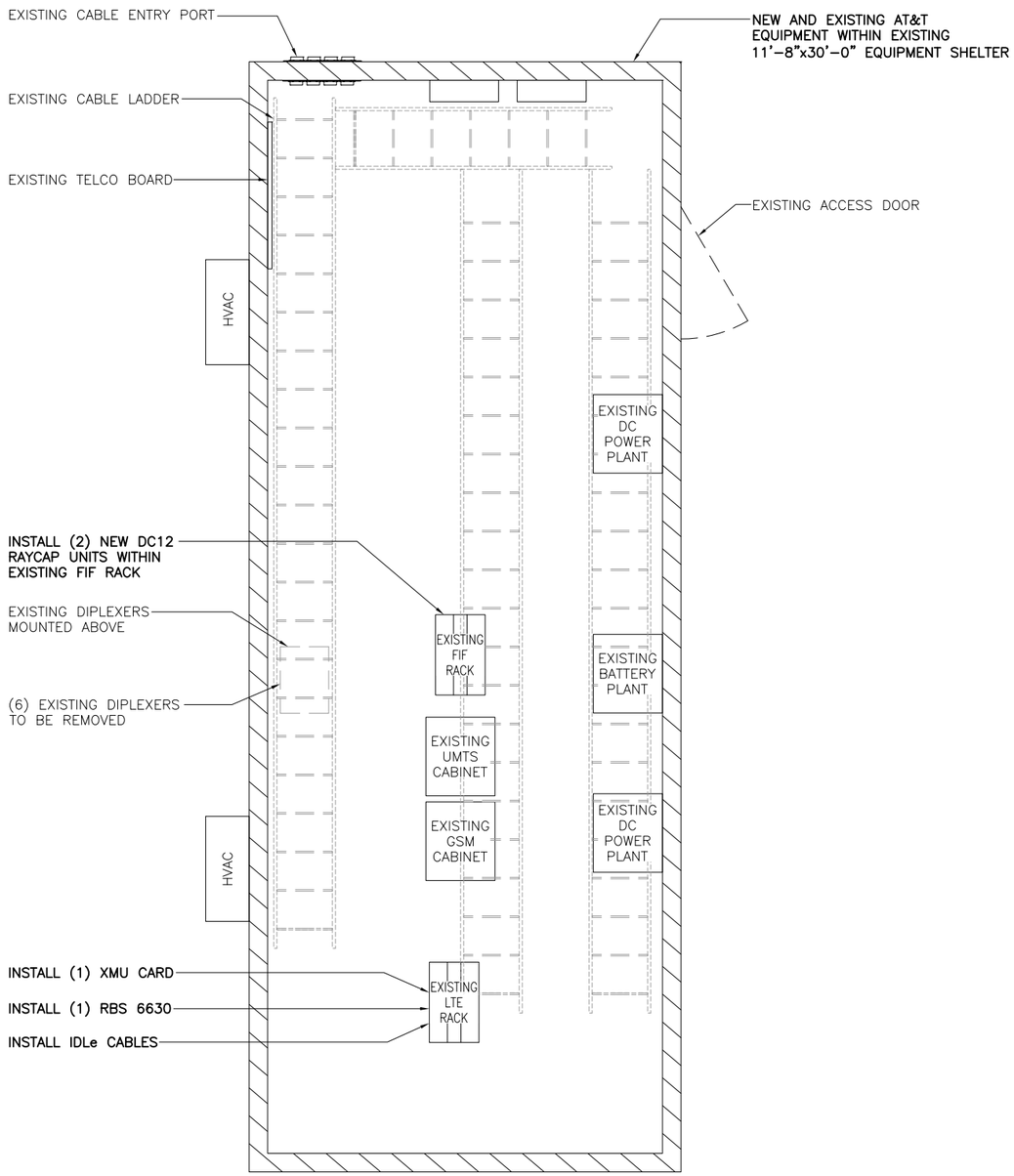
SHEET NAME
COMPOUND PLAN

SHEET NUMBER
A1

PROJECT# 2020.0032.0030



EQUIPMENT PLAN

0 1' 2' 4' 6'

SCALE: 1/4" = 1'-0"

1

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SHEET NAME

EQUIPMENT PLAN

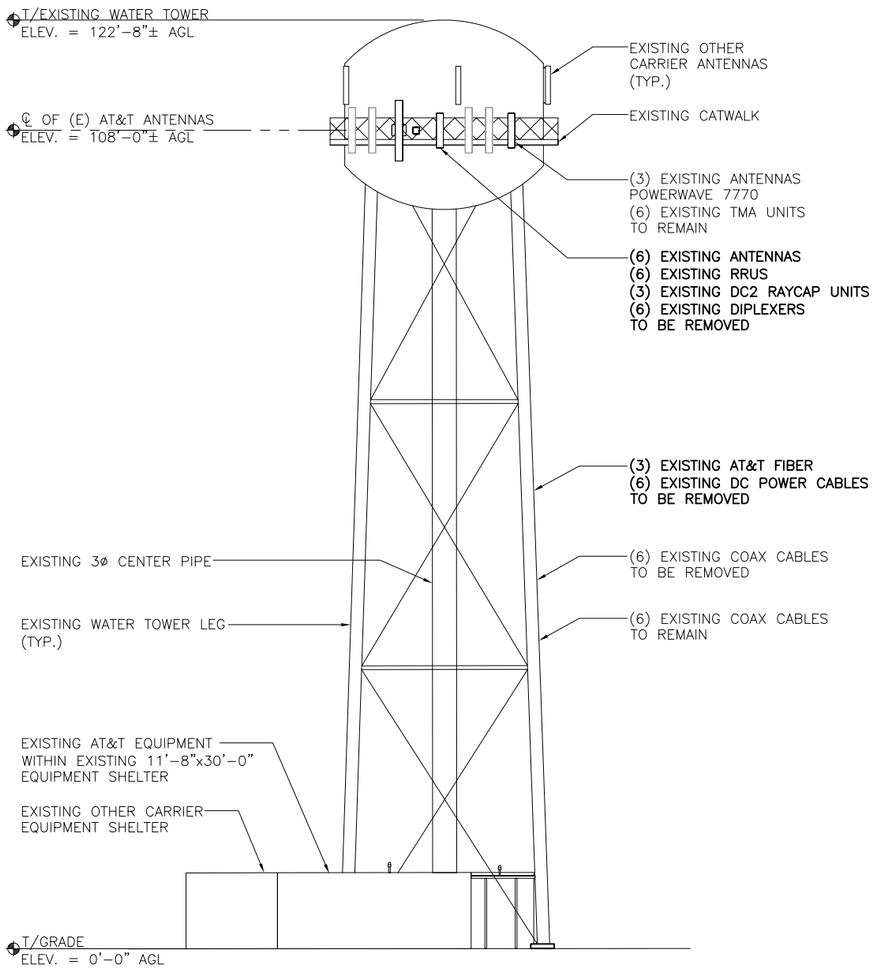
SHEET NUMBER

A2

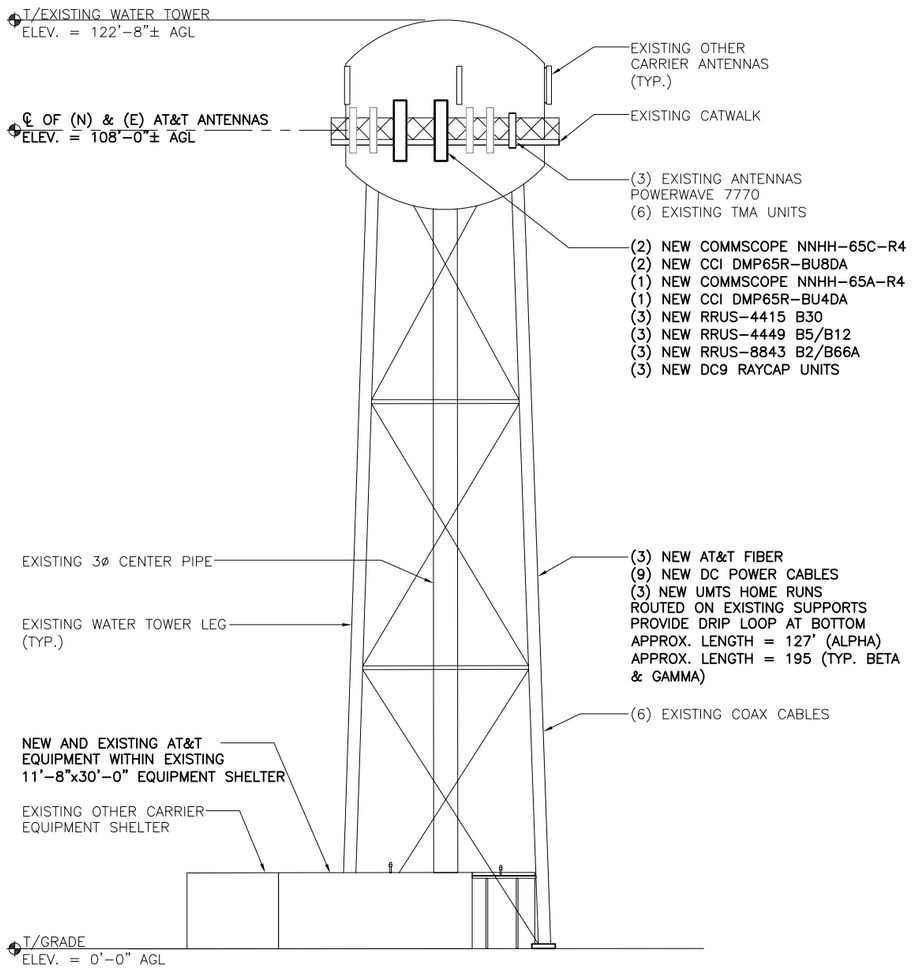
PROJECT# 2020.0032.0030

NOTES:

1. CALCULATIONS FOR THE STRUCTURE WERE PREPARED BY OTHERS AND THOSE CALCULATIONS CERTIFY THE CAPACITY OF THE STRUCTURE TO SUPPORT THE NEW EQUIPMENT
2. CALCULATIONS FOR THE ANTENNA MOUNTS WERE PREPARED BY FULLERTON AND THOSE CALCULATIONS CERTIFY THE CAPACITY OF THE STRUCTURE TO SUPPORT THE NEW EQUIPMENT
3. CABLES NOT SHOWN FOR CLARITY



EXISTING ELEVATION — SCALE: 1" = 20'-0" — 1



NEW ELEVATION — SCALE: 1" = 20'-0" — 2

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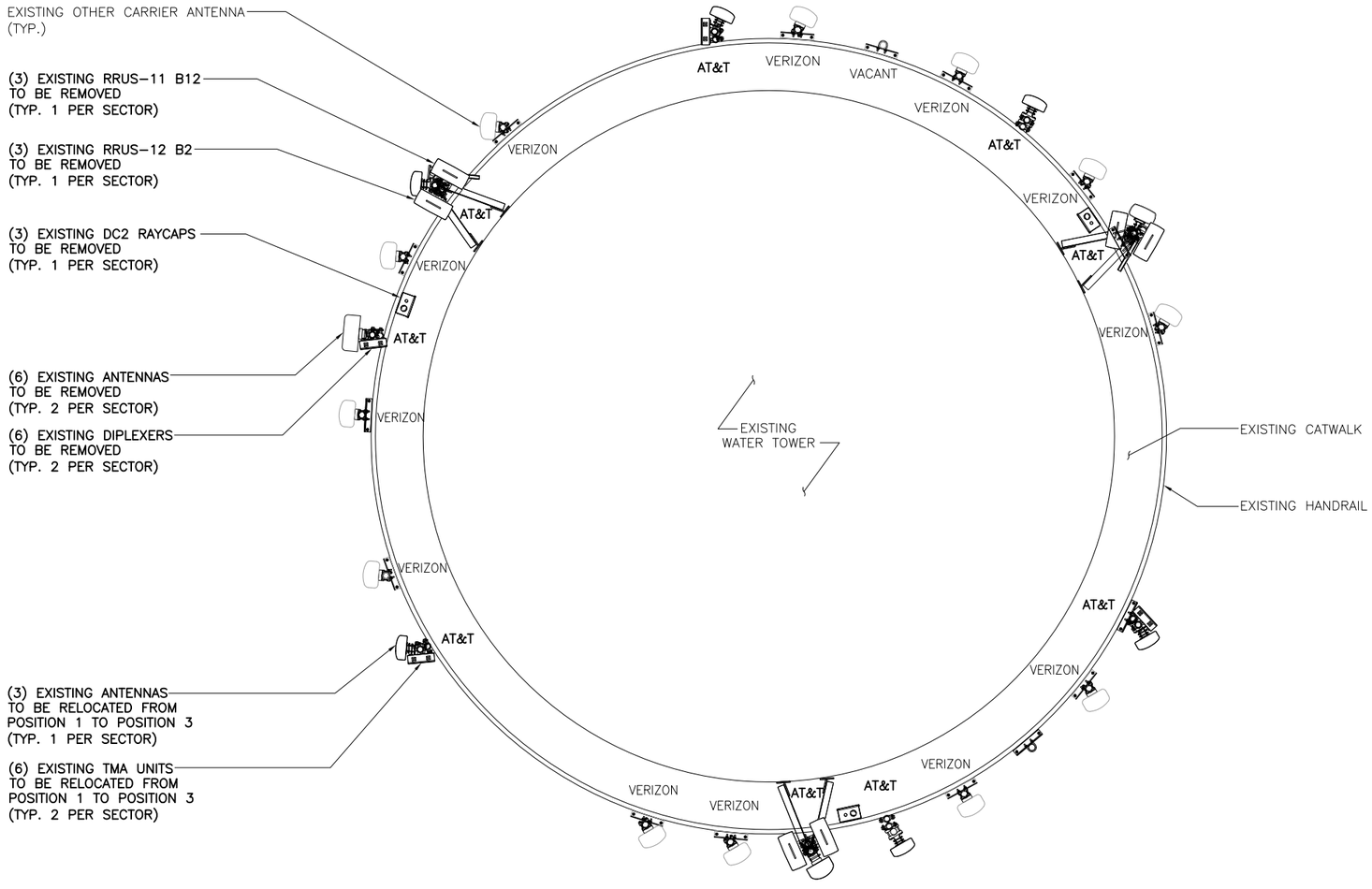
ELEVATIONS

SHEET NUMBER
A3

PROJECT# 2020.0032.0030



EXISTING ANTENNA PLAN

0 1' 2' 4' 8'

SCALE: 3/16" = 1'-0"

1

at&t

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SUITE 550 13 AND 14
FRAMINGHAM, MA 01701

smartlink

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SUITE 140
HANOVER, MD 21076

FULLERTON ENGINEERING · DESIGN

1100 E. WOODFIELD ROAD, SUITE 500
SCHAUMBURG, ILLINOIS 60173
TEL: 847-908-8400
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REV	DATE	DESCRIPTION	BY
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2	10/01/20	FOR PERMIT	KC
3	11/30/20	FOR CONSTRUCTION	KC
4	12/18/20	FOR CONSTRUCTION	KC

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SITE NAME

ESSEX CT

SITE NUMBER:

CTL02163

SITE ADDRESS

10 MAIN STREET
ESSEX, CT 06426

SHEET NAME

EXISTING ANTENNA PLAN

SHEET NUMBER

A4

PROJECT# 2020.0032.0030

NOTES:
1. 3 FEET MINIMUM SEPARATION BETWEEN LTE ANTENNAS
2. 6 FEET MINIMUM SEPARATION BETWEEN 700DE & 700BC

SECTOR: GAMMA
AZIMUTH: 25°–UMTS

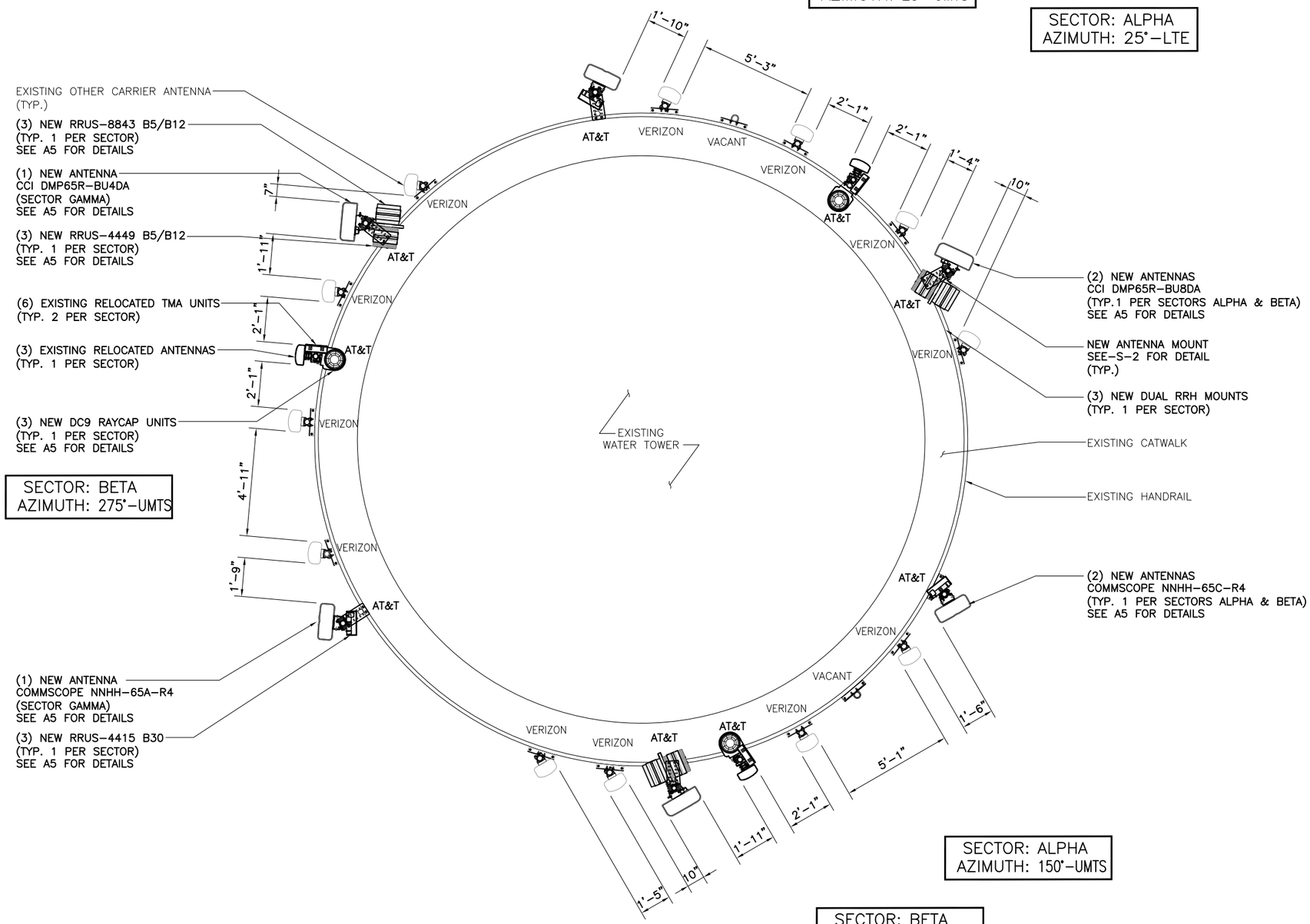
SECTOR: ALPHA
AZIMUTH: 25°–LTE

SECTOR: GAMMA
AZIMUTH: 275°–LTE

SECTOR: BETA
AZIMUTH: 275°–UMTS

SECTOR: ALPHA
AZIMUTH: 150°–UMTS

SECTOR: BETA
AZIMUTH: 150°–LTE



FINAL ANTENNA PLAN

0 1' 2' 4' 8'

SCALE: 3/16" = 1'–0"

1

PROJECT# 2020.0032.0030

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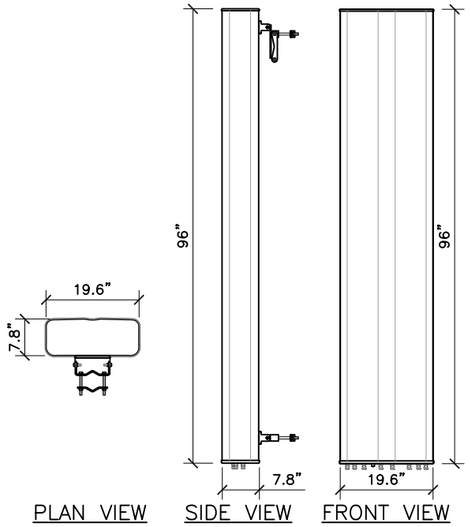
ESSEX, CT 06426

SHEET NAME
FINAL ANTENNA PLAN

SHEET NUMBER
A4A



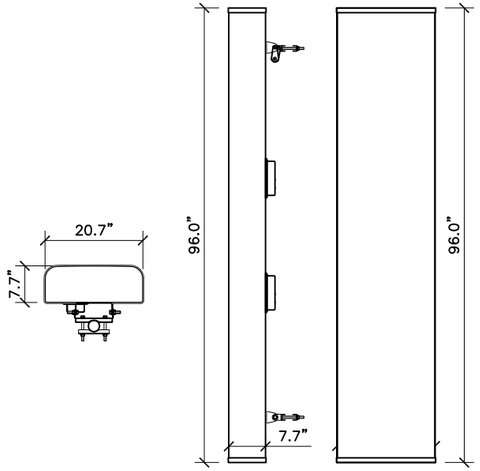
PLAN VIEW SIDE VIEW FRONT VIEW

COMMSCOPE – NNHH-65C-R4

8-PORT SECTOR ANTENNA

FREQUENCY RANGE	4 x 698–896 MHz 4 x 1695–2360 MHz
ANTENNA	99.2 Lbs
BRACKET	13.7 Lbs
TOTAL WEIGHT	112.9 Lbs

ANTENNA SPEC SCALE: N.T.S. 1



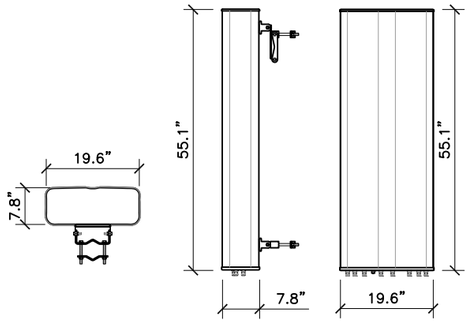
PLAN VIEW SIDE VIEW FRONT VIEW

CCI – DMP65R-BU8DA

DIPLEXED MULTI-BAND ANTENNA

FREQUENCY RANGE	4 LOW x 698–896 MHz 4 HIGH 1695–2400 MHz
ANTENNA	95.7 Lbs
(3) RETS	15 Lbs
BRACKET	16.1 Lbs
TOTAL WEIGHT	126.8 Lbs

ANTENNA SPEC SCALE: N.T.S. 2



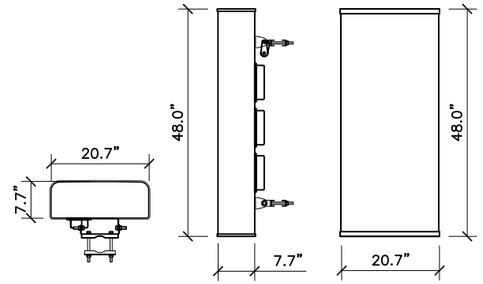
PLAN VIEW SIDE VIEW FRONT VIEW

COMMSCOPE – NNHH-65A-R4

8-PORT SECTOR ANTENNA

FREQUENCY RANGE	4 x 698–896 MHz 4 x 1695–2360 MHz
ANTENNA	67.2 Lbs
BRACKET	13.7 Lbs
TOTAL WEIGHT	80.9 Lbs

ANTENNA SPEC SCALE: N.T.S. 3



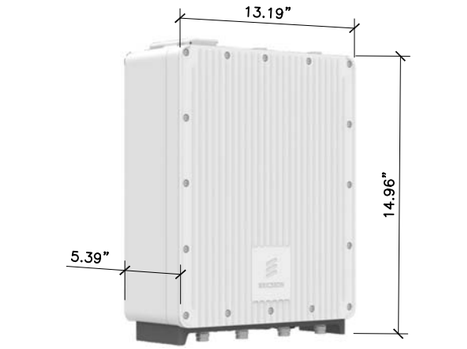
PLAN VIEW SIDE VIEW FRONT VIEW

CCI – DMP65R-BU4D

8-PORT DIPLEXED MULTI-BAND ANTENNA

FREQUENCY RANGE	4 x 698–86 MHz 4 x 1695–2400 MHz
ANTENNA (INCLUDES 3 RET)	67.9 Lbs
BRACKET	8.6 Lbs
TOTAL WEIGHT	76.5 Lbs

ANTENNA SPEC SCALE: N.T.S. 4

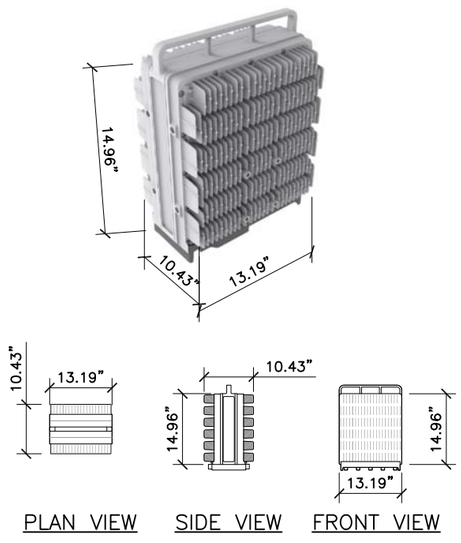


PLAN VIEW SIDE VIEW FRONT VIEW

ERICSSON – RRUS 4415 B30

FREQUENCY RANGE	TX = 2350–2360 MHz RX = 2305–2315 MHz
TOTAL WEIGHT	46.0 Lbs

RRU SPEC SCALE: N.T.S. 5



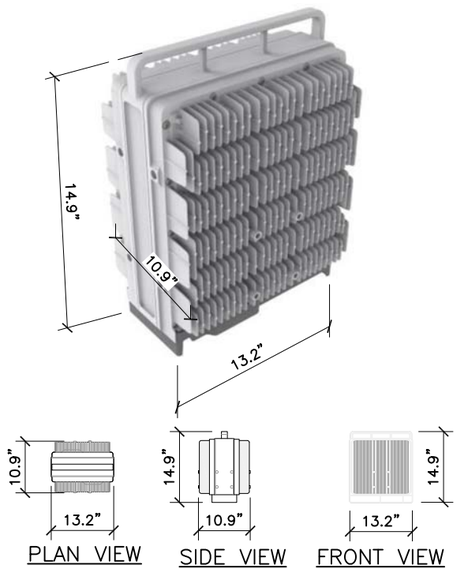
PLAN VIEW SIDE VIEW FRONT VIEW

ERICSSON
RADIO 4449 DUAL B5 & B12

AISG TMA & RET SUPPORT
4TX/4RX PER BAND (B5 & B12)

WEIGHT	~73 Lbs

RRU SPEC SCALE: N.T.S. 6



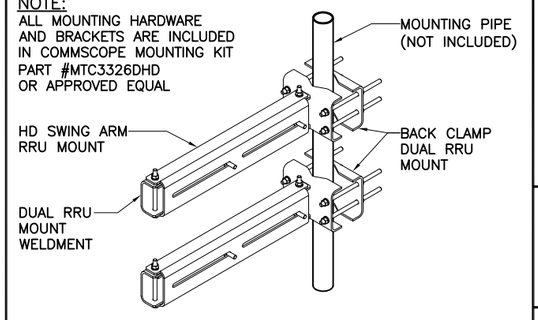
PLAN VIEW SIDE VIEW FRONT VIEW

ERICSSON – RRUS 8843 B2\B66

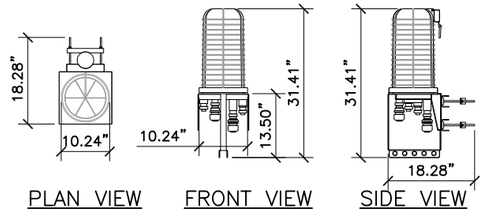
FREQUENCY RANGE	B2 TX=1930–1990 MHz B2 RX=1850–1910 MHz B66A TX=2110–2180 MHz B66A RX=1710–1780 MHz
TOTAL WEIGHT	72 Lbs

RRU SPEC SCALE: N.T.S. 7

NOTE:
ALL MOUNTING HARDWARE AND BRACKETS ARE INCLUDED IN COMMSCOPE MOUNTING KIT PART #MTC3326DHD OR APPROVED EQUAL



RRH MOUNT DETAIL SCALE: N.T.S. 8



PLAN VIEW FRONT VIEW SIDE VIEW

RAYCAP – DC9-48-60-24-8C-EV

SYSTEM WEIGHT	16.0 Lbs
MOUNT WEIGHT	10.2 Lbs
TOTAL WEIGHT	26.2 Lbs
DIMENSIONS (LxWxH)	18.28"x10.24"x31.4"

RAYCAP SPEC SCALE: N.T.S. 9

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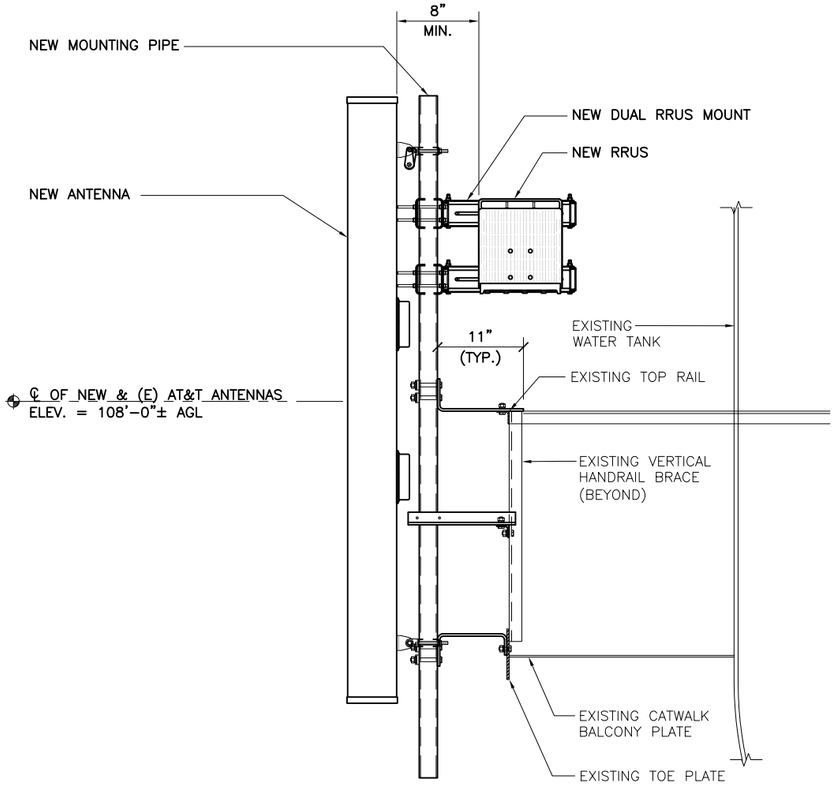
SITE ADDRESS
10 MAIN STREET
ESSEX, CT 06426

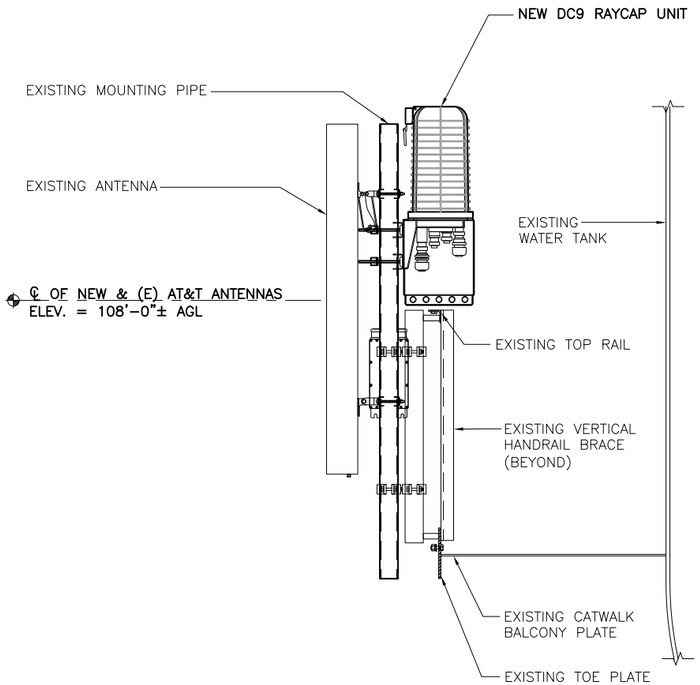
SHEET NAME
EQUIPMENT DETAILS

SHEET NUMBER
A5

PROJECT# 2020.0032.0030



RRU MOUNTING DETAIL SCALE: N.T.S. 1



RRU MOUNTING DETAIL SCALE: N.T.S. 2

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SHEET NAME
EQUIPMENT DETAILS

SHEET NUMBER
A5A

PROJECT# 2020.0032.0030

FINAL ANTENNA CONFIGURATION AND CABLE SCHEDULE
SUPPLIED BY AT&T WIRELESS, FROM RF CONFIG. DATED (12/16/20)

SECTOR	ANTENNA NUMBER	ANTENNA STATUS & TYPE	ANTENNA MODEL NUMBER	ANTENNA VENDOR	TMA/RRU UNIT	AZIMUTH	ANTENNA CL FROM GROUND	CABLE FEEDER		RAYCAP UNIT
								TYPE	LENGTH	
ALPHA	A-1	(N) LTE AWS/WCS ANTENNA	NNHH-65C-R4	COMMSCOPE	(1) NEW RRUS-4415 B30	25°	108'-0"	(1) NEW FIBER CABLE	160'-0"	(1) (N) DC9-48-60-24-PC16-EV
								(3) NEW DC POWER CABLES	160'-0"	
	A-2	-	-	-	-	-	-	-		
	A-3	(E) UMTS 850 ANTENNA	7770	POWERWAVE	(2) EXISTING TMA UNITS	150°	108'-0"	1-5/8"ø LDF7-50A	160'-0"	
								1-5/8"ø LDF7-50A	160'-0"	
	A-4	(N) LTE 700/850/ 1900/5G 850 ANTENNA	DMP65R-BU8DA	CCI	(1) NEW RRUS-4449 B5/B12 (1) NEW RRUS-8843 B2/B66A	25°	108'-0"	SEE ANTENNA A-3 FOR CABLE TYPE AND LENGTH		
BETA	B-1	(N) LTE AWS/WCS ANTENNA	NNHH-65C-R4	COMMSCOPE	(1) NEW RRUS-4415 B30	150°	108'-0"	(1) NEW FIBER CABLE	195'-0"	(1) (N) DC9-48-60-24-PC16-EV
								(3) NEW DC POWER CABLES	195'-0"	
	B-2	-	-	-	-	-	-	-		
	B-3	(E) UMTS 850 ANTENNA	7770	POWERWAVE	(2) EXISTING TMA UNITS	275°	108'-0"	1-5/8"ø LDF7-50A	195'-0"	
								1-5/8"ø LDF7-50A	195'-0"	
	B-4	(N) LTE 700/850/ 1900/5G 850 ANTENNA	DMP65R-BU8DA	CCI	(1) NEW RRUS-4449 B5/B12 (1) NEW RRUS-8843 B2/B66A	150°	108'-0"	SEE ANTENNA A-3 FOR CABLE TYPE AND LENGTH		
GAMMA	C-1	(N) LTE AWS/WCS ANTENNA	NNHH-65A-R4	COMMSCOPE	(1) NEW RRUS-4415 B30	275°	108'-0"	(1) NEW FIBER CABLE	195'-0"	(1) (N) DC9-48-60-24-PC16-EV
								(3) NEW DC POWER CABLES	195'-0"	
	C-2	-	-	-	-	-	-	-		
	C-3	(E) UMTS 850 ANTENNA	7770	POWERWAVE	(2) EXISTING TMA UNITS	25°	108'-0"	1-5/8"ø LDF7-50A	195'-0"	
								1-5/8"ø LDF7-50A	195'-0"	
	C-4	(N) LTE 700/850/ 1900/5G 850 ANTENNA	DMP65R-BU4DA	CCI	(1) NEW RRUS-4449 B5/B12 (1) NEW RRUS-8843 B2/B66A	275°	108'-0"	SEE ANTENNA A-3 FOR CABLE TYPE AND LENGTH		

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SITE NAME
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SITE NUMBER:
CTL02163

SITE ADDRESS
10 MAIN STREET
ESSEX, CT 06426

SHEET NAME
ANTENNA & CABLE CONFIGURATION

SHEET NUMBER
A6

1. CONTRACTOR IS TO REFER TO AT&T'S MOST CURRENT RADIO FREQUENCY DATA SHEET (RFDS) PRIOR TO CONSTRUCTION.
2. THE SIZE, HEIGHT, AND DIRECTION OF THE ANTENNAS SHALL BE ADJUSTED TO ACHIEVE THE AZIMUTHS SPECIFIED AND LIMIT SHADOWING AND TO MEET THE SYSTEM REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY THE HEIGHT OF THE ANTENNA WITH THE AT&T WIRELESS PROJECT MANAGER.
4. VERIFY TYPE AND SIZE OF TOWER LEG PRIOR TO ORDERING ANY ANTENNA MOUNT.
5. UNLESS NOTED OTHERWISE THE CONTRACTOR MUST PROVIDE ALL MATERIAL NECESSARY.
6. ANTENNA AZIMUTHS ARE DEGREES OFF OF TRUE NORTH, BEARING CLOCKWISE, IN WHICH ANTENNA FACE IS DIRECTED. ALL ANTENNAS (AND SUPPORTING STRUCTURES AS PRACTICAL) SHALL BE ACCURATELY ORIENTED IN THE SPECIFIED DIRECTION.
7. CONTRACTOR SHALL VERIFY ALL RF INFORMATION PRIOR TO CONSTRUCTION.
8. SWEEP TEST SHALL BE PERFORMED BY GENERAL CONTRACTOR AND SUBMITTED TO AT&T WIRELESS CONSTRUCTION SPECIALIST. TEST SHALL BE PERFORMED PER AT&T WIRELESS STANDARDS.
9. CABLE LENGTHS WERE DETERMINED BASED ON THE DESIGN DRAWING. CONTRACTOR TO VERIFY ACTUAL LENGTH DURING PRE-CONSTRUCTION WALK.
10. CONTRACTOR TO USE ROSENBERGER FIBER LINE HANGER COMPONENTS (OR ENGINEER APPROVED EQUAL).

ANTENNA AND CABLING NOTES

SCALE: N.T.S. | 1

RF, DC, & COAX CABLE MARKING LOCATIONS TABLE	
NO	LOCATIONS
1	EACH TOP-JUMPER SHALL BE COLOR CODED WITH (1) SET OF 3" WIDE BANDS.
2	EACH MAIN COAX SHALL BE COLOR CODED WITH (1) SET OF 3" WIDE BANDS NEAR THE TOP-JUMPER CONNECTION AND WITH (1) SET OF 3/4" WIDE COLOR BANDS JUST PRIOR TO ENTERING THE BTS OR TRANSMITTER BUILDING.
3	CABLE ENTRY PORT ON THE INTERIOR OF THE SHELTER.
4	ALL BOTTOM JUMPERS SHALL BE COLOR CODED WITH (1) SET OF 3/4" WIDE BANDS ON EACH END OF THE BOTTOM JUMPER.
5	ALL BOTTOM JUMPERS SHALL BE COLOR CODED WITH (1) SET OF 3/4" WIDE BANDS ON EACH END OF THE BOTTOM JUMPER.

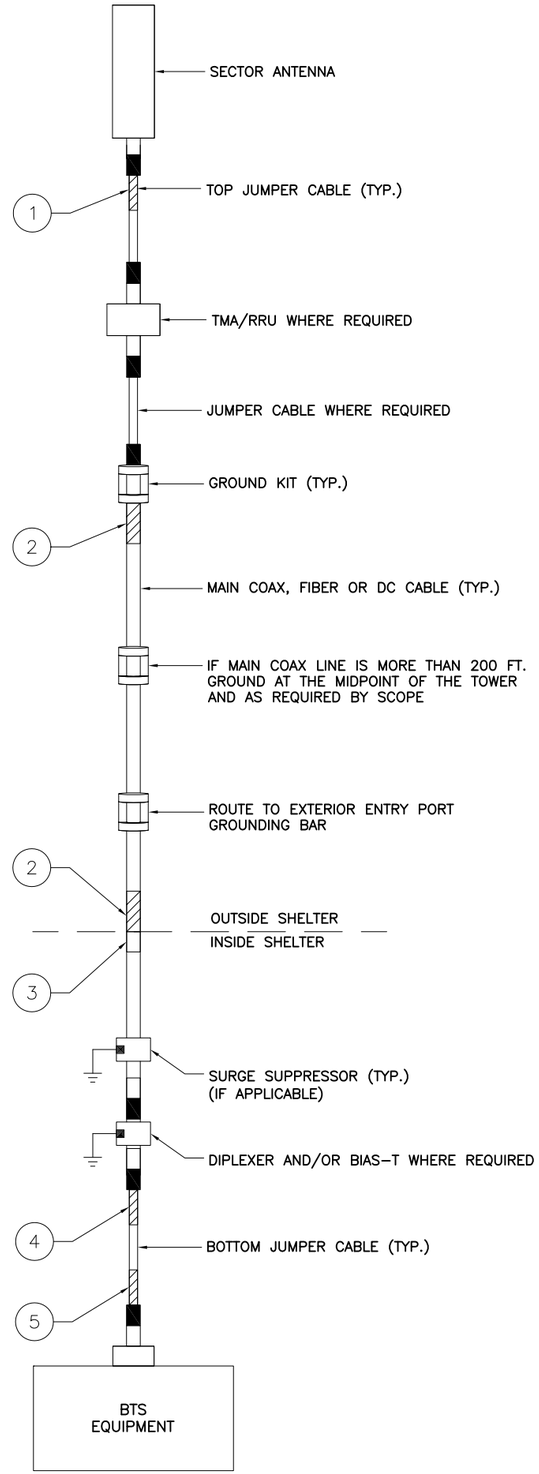
CABLE MARKING DIAGRAM

SCALE: N.T.S. | 2

1. THE ANTENNA SYSTEM COAX SHALL BE LABELED WITH VINYL TAPE.
2. THE STANDARD IS BASED ON EIGHT COLORED TAPES-RED, BLUE, GREEN, YELLOW, ORANGE, BROWN, WHITE, AND VIOLET. THESE TAPES MUST BE 3/4" WIDE & UV RESISTANT SUCH AS SCOTCH 35 VINYL ELECTRICAL COLOR CODING TAPE AND SHOULD BE READILY AVAILABLE TO THE ELECTRICIAN OR CONTRACTOR ON SITE.
3. USING COLOR BANDS ON THE CABLES, MARK ALL RF CABLE BY SECTOR AND CABLE NUMBER AS SHOWN ON "CABLE COLOR CHART".
4. WHEN AN EXISTING COAXIAL LINE THAT IS INTENDED TO BE A SHARED LINE BETWEEN TECHNOLOGIES IS ENCOUNTERED, THE CONTRACTOR SHALL REMOVE THE EXISTING COLOR CODING SCHEME AND REPLACE IT WITH THE COLOR CODING STANDARD. IN THE ABSENCE OF AN EXISTING COLOR CODING AND TAGGING SCHEME, OR WHEN INSTALLING PROPOSED COAXIAL CABLES, THIS GUIDELINE SHALL BE IMPLEMENTED AT THAT SITE REGARDLESS OF TECHNOLOGY.
5. ALL COLOR CODE TAPE SHALL BE 3M-35 AND SHALL BE INSTALLED USING A MINIMUM OF (3) THREE WRAPS OF TAPE AND SHALL BE NEATLY TRIMMED AND SMOOTHED OUT SO AS TO AVOID UNRAVELING.
6. ALL COLOR BANDS INSTALLED AT THE TOP OF THE TOWER SHALL BE A MINIMUM OF 3" WIDE, AND SHALL HAVE A MINIMUM OF 3/4" OF SPACE BETWEEN EACH COLOR.
7. ALL COLOR CODES SHALL BE INSTALLED SO AS TO ALIGN NEATLY WITH ONE ANOTHER FROM SIDE-TO-SIDE.
8. IF EXISTING CABLES AT THE SITE ALREADY HAVE A COLOR CODING SCHEME AND THEY ARE NOT INTENDED TO BE REUSED OR SHARED WITH THE NEW TECHNOLOGY, THE EXISTING COLOR CODING SCHEME SHALL REMAIN UNTOUCHED.

CABLE MARKING NOTES

SCALE: N.T.S. | 3



CABLE COLOR CODING DIAGRAM

SCALE: N.T.S. | 4

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SHEET NAME
CABLE NOTES AND COLOR CODING

SHEET NUMBER
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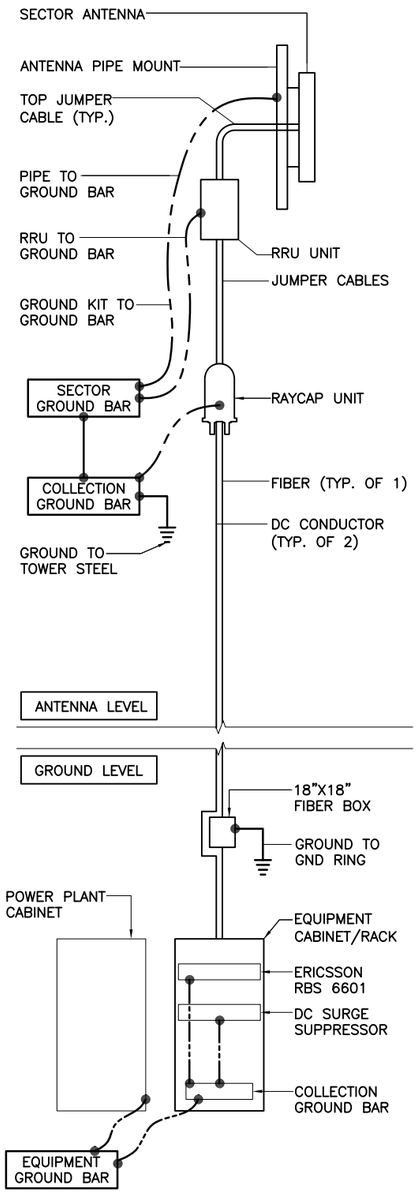
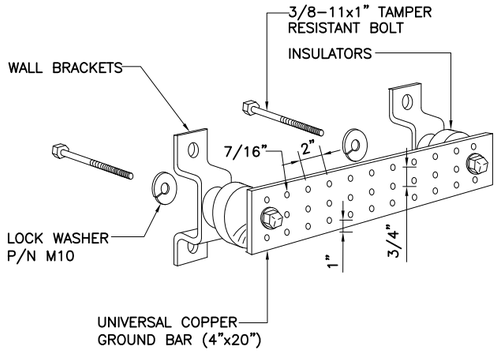
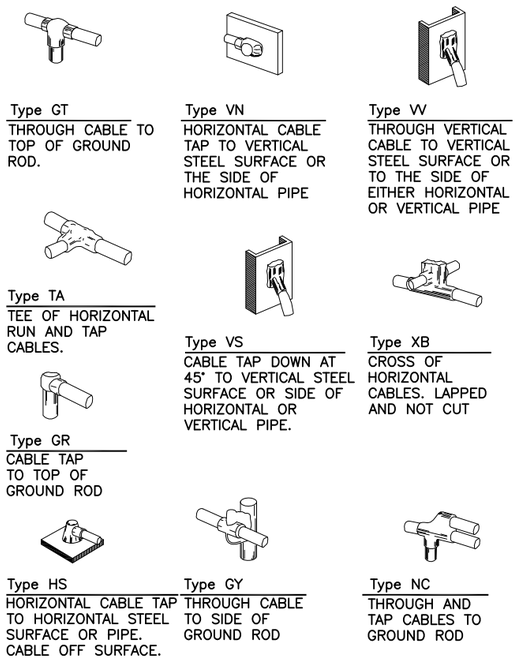
PROJECT# 2020.0032.0030



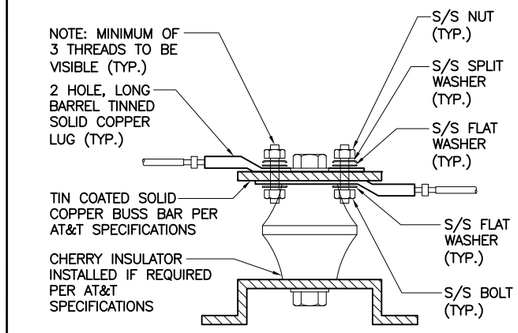
GROUNDING SCHEMATIC SCALE: N.T.S. 1



GROUND BAR DETAIL SCALE: N.T.S. 2



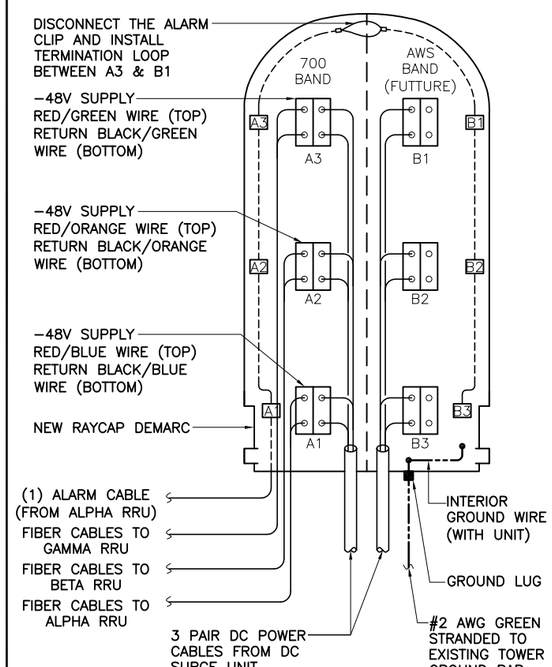
EXOTHERMIC WELD DETAILS SCALE: N.T.S. 4



NOTES:

1. ALL HARDWARE 18–8 STAINLESS STEEL INCLUDING SPLIT WASHERS.
2. COAT WIRE END WITH ANTI–OXIDATION COMPOUND PRIOR TO INSERTION INTO LUG BARREL AND CRIMPING.
3. APPLY ANTI–OXIDATION COMPOUND BETWEEN ALL LUGS AND BUSS BARS PRIOR TO MATING AND BOLTING.

LUG DETAIL SCALE: N.T.S. 3



RAYCAP DC POWER AND ALARM DET. SCALE: N.T.S. 5

NOT USED SCALE: N.T.S. 6

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SITE NAME
ESSEX CT

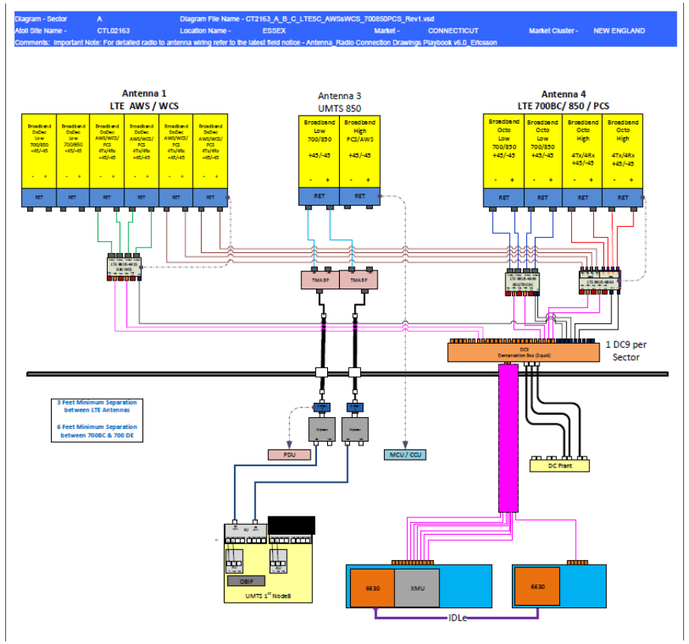
SITE NUMBER:
CTL02163

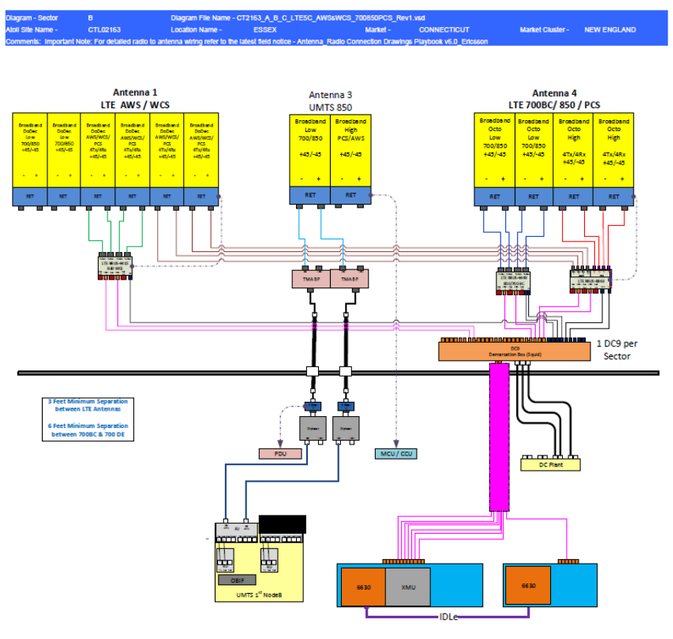
SITE ADDRESS
10 MAIN STREET
ESSEX, CT 06426

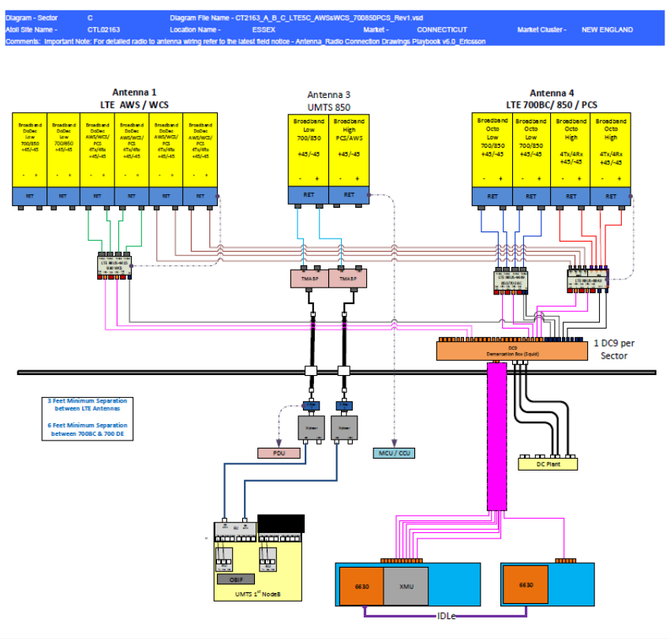
SHEET NAME
GROUNDING DETAILS

SHEET NUMBER
A8

PROJECT# 2020.0032.0030







*BASED ON RFDS V4.0, DATED (12/16/20)

PLUMBING DIAGRAMS

SCALE: N.T.S. | 1

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STATE OF CONNECTICUT · HENRY M. BELLAGAMBA · 25358 · LICENSED PROFESSIONAL ENGINEER

SITE NAME

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CTL02163

SITE ADDRESS

10 MAIN STREET
ESSEX, CT 06426

SHEET NAME

PLUMBING DIAGRAMS

SHEET NUMBER

A9

PROJECT# 2020.0032.0030

STRUCTURAL NOTES:

APPLICABLE CODES:

1. DESIGN & CONSTRUCTION OF ALL WORK SHALL CONFORM TO THE FOLLOWING CODES:

   2018 CONNECTICUT BUILDING CODE
   (2015 INTERNATIONAL BUILDING CODE W/AMENDMENTS)
   TIA–222–H

DESIGN LOADS:

WIND LOAD:

124 MPH BASIC DESIGN WIND SPEED

GENERAL NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FOLLOWING ALL LAWS, REGULATIONS, AND RULES SET FORTH BY FEDERAL, STATE, AND LOCAL AUTHORITIES WITH JURISDICTION OVER THE PROJECT. THIS RESPONSIBILITY IS IN EFFECT REGARDLESS OF WHETHER THE LAW, ORDINANCE, REGULATION OR RULE IS MENTIONED IN THESE SPECIFICATIONS.
2. ALL WORK SHALL BE COMPLETED AS INDICATED ON THE DRAWINGS, PROJECT SPECIFICATIONS, AND THE CONSTRUCTION CONTRACT DOCUMENTS.
3. THE CONTRACTOR SHALL HAVE AND MAINTAIN A VALID CONTRACTOR'S LICENSE FOR THE LOCATION IN WHICH THE WORK IS TO BE PERFORMED. FOR JURISDICTIONS THAT LICENSE INDIVIDUAL TRADES, THE TRADESMAN OR SUBCONTRACTOR PERFORMING THOSE TRADES SHALL BE LICENSED.
4. FOLLOW ALL APPLICABLE RULES AND REGULATIONS OF THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) AND STATE LAW AS DEFINED IN THE FEDERAL OCCUPATIONAL SAFETY AND HEALTH ACT.
5. PRIOR TO THE SUBMISSION OF THE BID, THE CONTRACTOR SHALL VISIT THE JOB SITE, VERIFY ALL DIMENSIONS AND BECOME FAMILIAR WITH THE FIELD CONDITIONS. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE PROJECT MANAGER.
6. DRAWING PLANS SHALL NOT BE SCALED.
7. THE CONTRACTOR SHALL NOT PROCEED WITH ANY WORK NOT CLEARLY IDENTIFIED ON THE DRAWINGS WITHOUT THE PRIOR WRITTEN APPROVAL OF THE PROJECT MANAGER.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS UNLESS SPECIFICALLY OTHERWISE NOTED.
9. ALL MEANS AND METHODS OF CONSTRUCTION DEALING WITH TOWER CONSTRUCTION AND SAFETY, STEEL ERECTION, EXCAVATIONS, TRENCHING, SCAFFOLDING, FORMWORK, ELECTRICAL, AND WORK IN CONFINED SPACES ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK.
11. THE CONTRACTOR SHALL BE EXPERIENCED IN THE PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED HEREIN. BY ACCEPTANCE OF THIS ASSIGNMENT, THE CONTRACTOR IS ATTESTING THAT HE DOES HAVE SUFFICIENT EXPERIENCE AND ABILITY AND THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED.
12. THE CONTRACTOR SHALL PROVIDE SUFFICIENT TEMPORARY BRACING AND/OR SHORING OF ALL STRUCTURAL AND NON–STRUCTURAL ELEMENTS DURING CONSTRUCTION UNTIL ALL STRUCTURAL ELEMENTS HAVE BEEN PROPERLY INSTALLED.
13. INCORRECTLY FABRICATED, DAMAGED, OR OTHERWISE MISFITTING OR NONCONFORMING MATERIALS SHALL BE REPORTED TO THE PROJECT MANAGER AND ENGINEER, AND SHALL REQUIRE APPROVAL PRIOR TO PERFORMING ANY REMEDIAL OR CORRECTIVE ACTION.

STRUCTURAL STEEL NOTES:

1. STRUCTURAL STEEL MATERIALS CONFORM TO THE LATEST EDITION OF APPLICABLE STANDARDS AND TO ALL APPLICABLE CODES AND REQUIREMENTS OF LOCAL AUTHORITIES HAVING JURISDICTION, WHICHEVER IS MORE STRINGENT. ALL STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH THE LATEST APPLICABLE REQUIREMENTS OF AISC, ASTM, ACI, CRSI, AWS AND ALL OTHER APPLICABLE STANDARDS
2. ALL NEW STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING, UNLESS NOTED OTHERWISE ON THE DRAWINGS:
   ASTM A36 (Fy = 36 KSI) M–SHAPES, S–SHAPES, ANGLES, PLATES (U.N.O.)
   ASTM A992 (Fy = 50 KSI) W–SHAPES, CHANNELS (U.N.O.)
   ASTM A500 Gr C (Fy = 50 KSI) ROUND AND SQUARE HSS
3. STEEL PIPE SHALL COMPLY WITH ASTM A53 GRADE B. MAY BE SUBSTITUTED WITH ASTM 500 GRADE C (ROUND HSS)
4. ALL STRUCTURAL STEEL SHALL BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A153 AND A123, INCLUDING CONNECTION HARDWARE (BOLTS, WASHERS, NUTS, AND PINS), PLATES, SPACERS, AND FILLERS.
5. CONNECTIONS:
   A. CONTRACTOR SHALL PROVIDE ALL HARDWARE REQUIRED TO COMPLETE FIELD ERECTION OF STRUCTURE AS INDICATED BY CONTRACT DOCUMENTS OR THESE SPECIFICATIONS.
   B. HIGH STRENGTH THREADED FASTENERS SHALL BE INSTALLED IN ACCORDANCE WITH AISC SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A–325 BOLTS. USE A–325N BEARING–TYPE CONNECTION BOLTS UNLESS NOTED OTHERWISE.
   C. GRATING AND PLATES SHALL BE FASTENED WITH SADDLE CLIPS. THE NECESSARY HOLES TO COMPLETE ALL PHASES OF CONSTRUCTION SHALL BE PROVIDED AND CALLED OUT ON THE APPROVED SHOP DRAWINGS. ALL HOLES SHALL BE DRILLED OR PUNCHED PERPENDICULAR TO METAL SURFACES, FLAME CUT OR BURNED HOLES WILL NOT BE PERMITTED.
   D. ALL UNFINISHED THREADED FASTENERS SHALL COMPLY WITH ASTM A–307, GRADE A, REGULAR LOW–CARBON STEEL BOLTS AND NUTS WITH HEXAGONAL HEADS.
   E. ALL HIGH STRENGTH THREADED FASTENERS SHALL BE HEAVY HEXAGONAL BOLTS AND NUTS WITH HARDENED WASHERS, ALL FROM QUENCHED AND TEMPERED MEDIUM CARBON STEEL COMPLYING WITH ASTM A–325.

WATER TOWER NOTES:

HEALTH AND SAFETY

1. CONTRACTOR SHALL PROVIDE ALL SAFETY EQUIPMENT AND FALL PROTECTION TO ENSURE THE SAFETY OF ON SITE PERSONNEL DURING CONSTRUCTION.
2. ACCESS TO THE TANK INTERIOR WATER COMPARTMENT SHALL NOT BE PERMITTED WITHOUT THE APPROVAL OF THE WATER DEPARTMENT SUPERVISOR. PRECAUTIONS SHALL BE TAKEN TO PREVENT WATER CONTAMINATION.
3. THE PAINT SYSTEM SHALL BE CHECKED FOR HAZARDOUS METALS. WHERE HAZARDOUS METALS ARE FOUND IN THE PAINT SYSTEM, THE ENVIRONMENT AND WORKERS MUST BE PROTECTED FROM CONTAMINATION.

ADDITIONAL WATER TOWER GENERAL NOTES

1. ALL STEEL ANTENNA INSTALLATION COMPONENTS MUST BE PAINTED TO MATCH EXISTING PAINT SYSTEMS ON THE EXTERIOR AND DRY INTERIOR.
2. NO COMPONENTS CAN REMAIN GALVANIZED OR STAINLESS STEEL. THE SPECIFIED PAINT SYSTEMS WILL NOT HAVE GOOD ADHESION ON GALVANIZED OR STAINLESS STEEL SURFACES.
3. CONTACT WATER TOWER PAINT MANUFACTURER TNEMEC OR EQUAL TO OBTAIN A SUITABLE SURFACE PREPARATION SYSTEM FOR GALVANIZED AND STAINLESS STEEL SURFACES. THE SYSTEM MUST MAKE PREVIOUSLY GALVANIZED AND STAINLESS STEEL SURFACES COMPATIBLE WITH THE SPECIFIED PAINT SYSTEMS THAT WILL BE APPLIED.
4. IF APPLICABLE, PAINT ALL NEW STEEL IN A SHOP SETTING, PRIOR TO DELIVERY TO THE SITE.
5. FOLLOW ALL PAINT MANUFACTURERS' RECOMMENDATIONS WHEN USING THEIR PRODUCTS.
6. CONTRACTOR SHALL REPAIR ALL DAMAGED PAINT AREAS OF TANK DUE TO CUTTING, WELDING AND GRINDING. DUE TO THE GENERATION OF METAL FILINGS WHICH WILL RUST STAIN THE TANK SURFACES IF NOT CLEANED OFF IN A TIMELY MANNER, CONTRACTOR SHALL REMOVE ALL METAL FILINGS IMMEDIATELY. DAMAGED PAINT SURFACES SHOULD BE REPAIRED PER WATER TANK OWNER SPECIFICATIONS. CONTRACTOR SHALL COORDINATE ALL PAINT MATERIALS & METHODS WITH TANK OWNER PRIOR TO WORK BEING DONE.

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STATE OF CONNECTICUT · BARBARA T. KOTECKI · 33711 · LICENSED PROFESSIONAL ENGINEER

SITE NAME
ESSEX CT

SITE NUMBER:
CTL02163

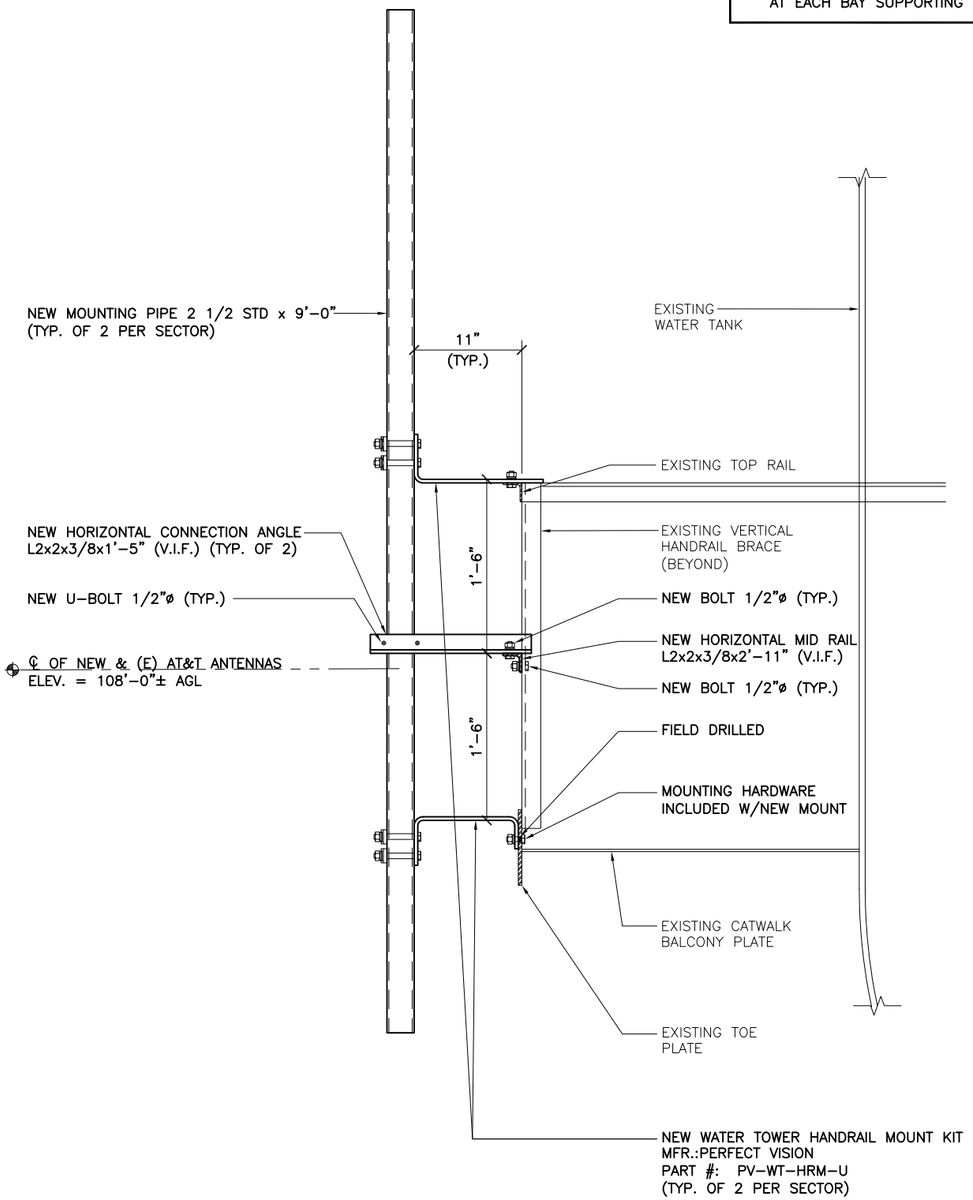
SITE ADDRESS
10 MAIN STREET
ESSEX, CT 06426

SHEET NAME
STRUCTURAL NOTES

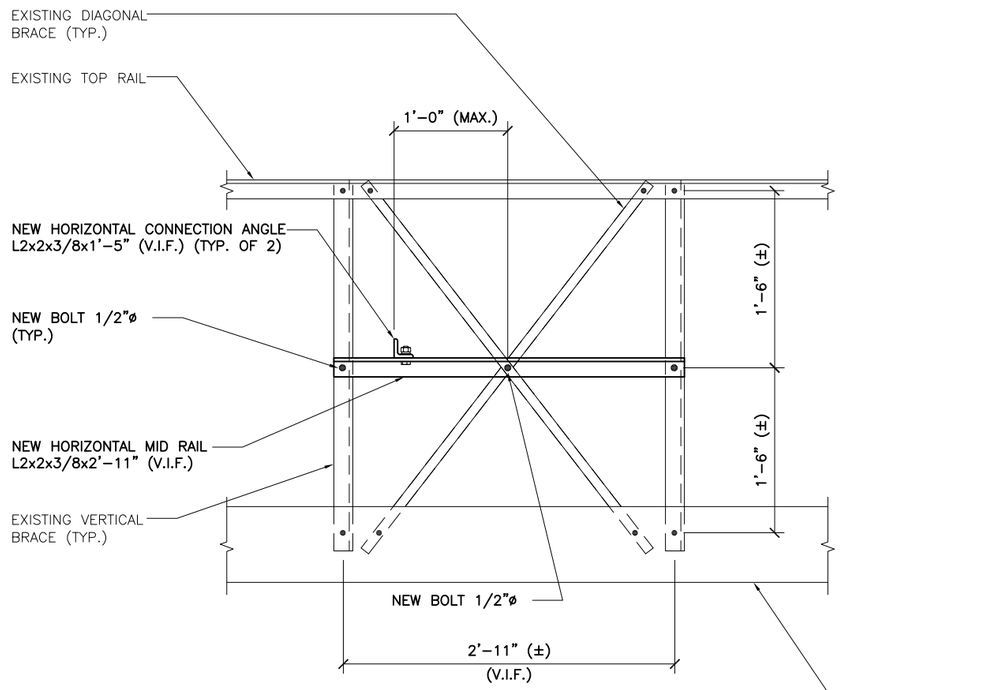
SHEET NUMBER
S1

PROJECT# 2020.0032.0030

NOTES:
1. ANTENNA NOT SHOWN FOR CLARITY
2. VERIFY LENGTH OF NEW MIDRAIL L2x2x3/8 PRIOR TO INSTALLATION
3. SHIM NEW MIDRAIL TO ALL EXISTING RAIL MEMBERS AS NEEDED
4. EXISTING HANDRAIL TO BE MODIFIED WITH NEW MIDRAIL AND CONNECTION ANGLE AT EACH BAY SUPPORTING NEW ANTENNAS (TOTAL OF 6)



HANDRAIL ANTENNA MOUNT DETAIL - TYP @ EACH NEW ANTENNA SCALE: 3/4" = 1'-0" 1



HANDRAIL MODIFICATION TYP. @ EACH BAY SUPPORTING NEW MOUNTS SCALE: 3/4" = 1'-0" 2

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10 MAIN STREET
ESSEX, CT 06426

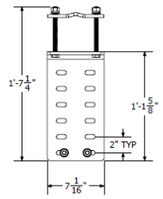
SHEET NAME
MODIFICATION DETAILS

SHEET NUMBER
S2

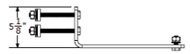
PROJECT# 2020.0032.0030

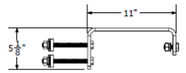
PV-WT-HRM-U
WATER TOWER HANDRAIL ANTENNA MOUNT
NOTE: ANTENNA PIPE NOT INCLUDED

PV-WT-HRM-U
WEIGHT: 34.84 LBS



TOP VIEW
CLAMP COMPATIBLE WITH 2 3/8" TO 4 1/2" OD PIPE





SIDE VIEW
10" STANDOFF

PERFECTVISION MANUFACTURING
16101 La Grande Dr.
Little Rock, AR 72223
(630)-201-4012

STAMP:

REVISIONS:

NO.	DATE	DESCRIPTION	BY	CHK	APP
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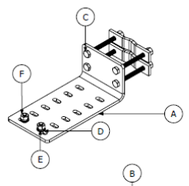
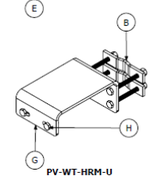
WATER TOWER HANDRAIL ANTENNA MOUNT

ENGINEERING DETAIL

E-1 | 0





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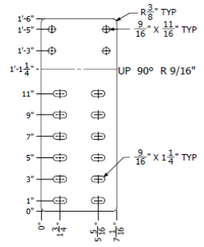
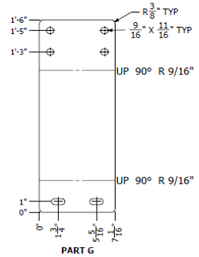
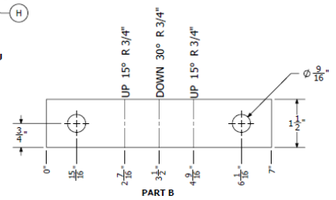


PART A



PART G



PART B

PART	SHAPE	LENGTH	GRADE	NOTES
A	PL 3/8" - 7 1/16"	18"	A36	BENT - BEND RADIUS 9/16"
B	PL 3/8" - 1 1/2"	7"	A36	BENT - BEND RADIUS 3/4"
C	1/2" - 13	6"	SAE GR.5	BOLT
D	1/2" DIA		F436	FLAT WASHER
E	1/2" DIA			LOCK WASHER
F	1/2" - 13		A563DH	NUT
G	PL 3/8" - 7 1/16"	18"	A36	BENT - BEND RADIUS 9/16"
H	1/2" - 13	1 1/2"	A325	BOLT

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WATER TOWER HANDRAIL ANTENNA MOUNT

ENGINEERING DETAIL

E-2 | 0

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SHEET NAME
MOUNTING SPECIFICATIONS

SHEET NUMBER
S3

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