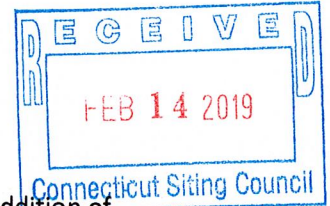




EM-AT&T-103-190214

January 22, 2019

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



Regarding: Notice of Exempt Modification – Swap of 3 Antennas and addition of radios and triplexers
Property Address: 10 Willard Road, Norwalk, CT (the “Property”)
Applicant: AT&T Mobility (“AT&T”, AT&T Site CT2132)

ORIGINAL

Dear Ms. Bachman:

AT&T currently maintains a wireless telecommunications facility on an existing 350 foot Lattice tower (“tower”) at the above-referenced address, latitude 41.12827, longitude -73.3901661. AT&T’s facility consists of nine (9) wireless telecommunications antennas at 347 feet. The tower is controlled and owned by Fuller Development, LLC. Assessor’s information is attached hereto.

AT&T desires to modify its existing telecommunications facility by swapping three (3) antennas and adding (3) remote radios and (6) triplexers. The centerline height of said antennas is and will remain at 347 feet.

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). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the Mayor of the City of Norwalk, The Building Director of the City of Norwalk and the Planning and Zoning Director of the City of Norwalk. A copy of this letter is also being sent to Fuller Development, LLC, the owner of the structure that AT&T is located.

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 planned modifications will not result in an increase in the height of the existing structure. AT&T’s antennas and associated lines will be installed at 347 foot level of the 350 foot Lattice tower.
2. The proposed modifications will not involve any changes to ground-mounted equipment and, therefore will not require an extension of the site boundary.
3. The proposed modification will not increase the noise level at the facility by six decibel 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. An RF emissions calculation is attached.
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. (Please see attached Structural analysis completed by Malouf Engineering Intl., Inc.

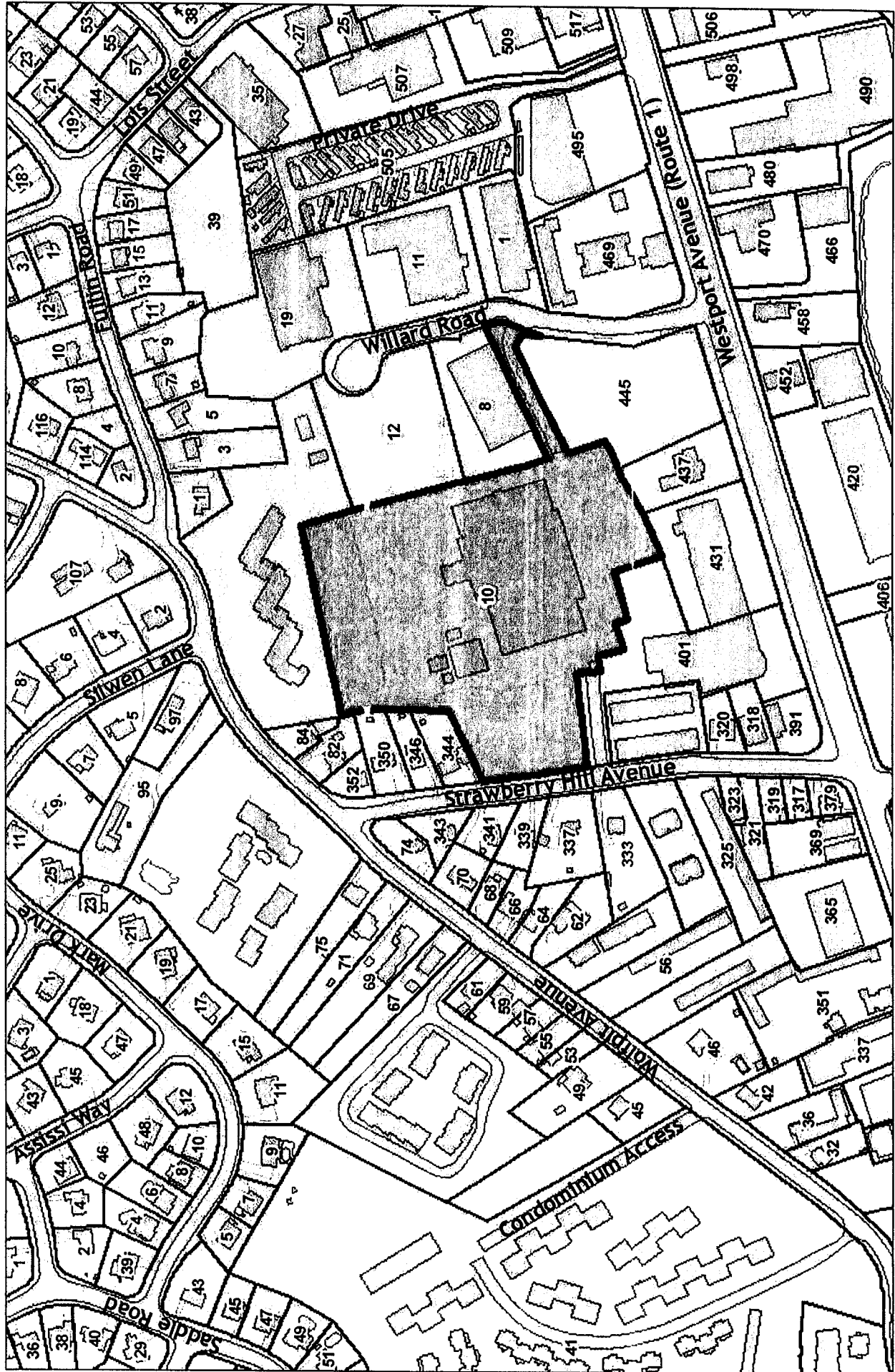
For the foregoing reasons AT&T respectfully requests that the proposed swap of 3 antennas and addition of 3 radios and 6 triplexers be allowed within the exempt modifications under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

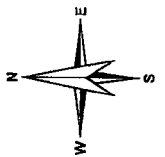
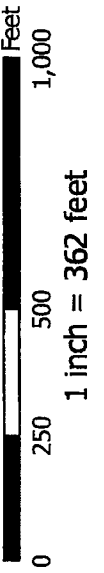
Nora Oliver
Site Acquisition Specialist
Empire Telecom

CC: The Honorable Harry Rilling, Mayor, City of Norwalk
William Ireland, Chief Building Official, City of Norwalk
Michael E. Wrinn, Director of Planning and Zoning, City of Norwalk
Fuller Development, LLC, c/o Samuel B. Fuller

16 Esquire Road, Billerica, MA 01862 Phone 978-808-2111 Email: noliver@empiretelecomm.com



Norwalk, CT



10 WILLARD RD

Location 10 WILLARD RD

Mblu 5/ 17/ 2/ 0/

Acct# 11273

Owner SOUTHERN NEW ENG TEL CO

Assessment \$3,967,780

Appraisal \$5,668,250

PID 11273

Building Count 3

Assessing Distr...

Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2015	\$1,175,000	\$4,493,250	\$5,668,250
Assessment			
Valuation Year	Improvements	Land	Total
2015	\$822,500	\$3,145,280	\$3,967,780

Owner of Record

Owner SOUTHERN NEW ENG TEL CO
Co-Owner PROPERTY TAX ADMIN
Address ONE SBC CENTER RM 36-M-01
 ST LOUIS, MO 63101

Sale Price \$0
Certificate
Book & Page 401/370
Sale Date 03/10/1954

Ownership History

Ownership History				
Owner	Sale Price	Certificate	Book & Page	Sale Date
SOUTHERN NEW ENG TEL CO	\$0		401/370	03/10/1954

Building Information

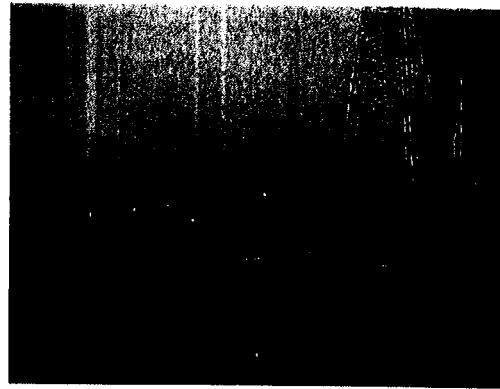
Building 1 : Section 1

Year Built: 1956
Living Area: 46,692
Replacement Cost: \$2,157,385
Building Percent 43
Good:
Replacement Cost
Less Depreciation: \$927,680

Building Photo

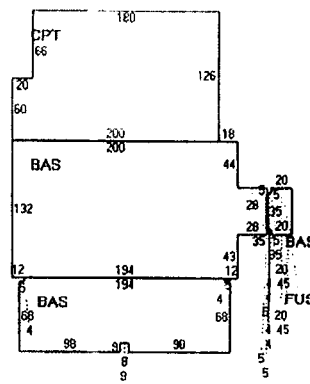
Building Attributes	
Field	Description
STYLE	Warehouse

MODEL	Industrial
Stories:	1.00
Occupancy	2.00
Exterior Wall 1	Brick Veneer
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Rolled Compos
Interior Wall 1	Drywall
Interior Wall 2	Minimum
Interior Floor 1	Concrete
Interior Floor 2	Vinyl
Heating Fuel	Oil
Heating Type	Forced Air
AC Percent	35
Heat Percent	100
Bldg Use	Utility
Total Rooms	0
Bedrooms	0
FBM Area	
Heat/AC	Heat/AC Split
Frame	Steel
Plumbing	Average
Foundation	Slab
Partitions	Average
Wall Height	12.00
% Sprinkler	65.00



(http://images.vgsi.com/photos/NorwalkCTPhotos/00\00\31\78.jpg)

Building Layout



Building Sub-Areas (sq ft)		Legend	
Code	Description	Gross Area	Living Area
BAS	First Floor	45,652	45,652
FUS	Finished Upper Story	1,040	1,040
CPT	Carport	23,880	0
		70,572	46,692

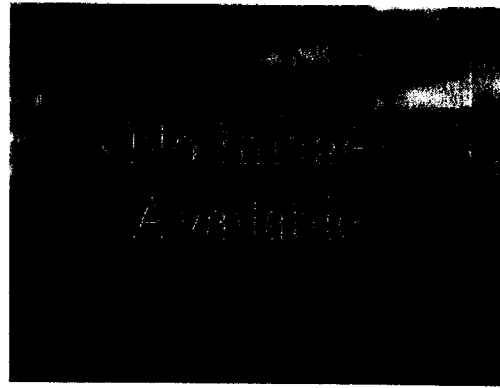
Building 2 : Section 1

Year Built: 1972
Living Area: 988
Replacement Cost: \$91,686
Building Percent Good: 47
Replacement Cost Less Depreciation: \$43,090

Building Attributes : Bldg 2 of 3	
Field	Description
STYLE	Commercial

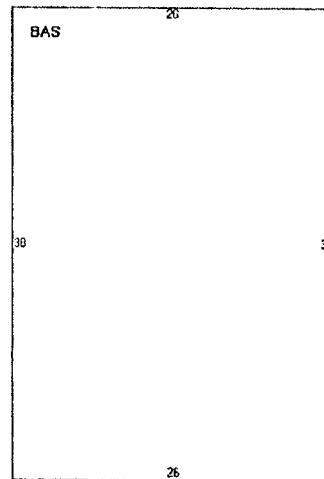
Building Photo

MODEL	Industrial
Stories:	1.00
Occupancy	1.00
Exterior Wall 1	Concrete
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Tar and Gravel
Interior Wall 1	Minimum
Interior Wall 2	
Interior Floor 1	Vinyl
Interior Floor 2	
Heating Fuel	None
Heating Type	None
AC Percent	100
Heat Percent	100
Bldg Use	Utility
Total Rooms	0
Bedrooms	0
FBM Area	
Heat/AC	None
Frame	Typical
Plumbing	Average
Foundation	Slab
Partitions	Light
Wall Height	12.00
% Sprinkler	0.00



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

Building Layout



Building Sub-Areas (sq ft)		Legend	
Code	Description	Gross Area	Living Area
BAS	First Floor	988	988
		988	988

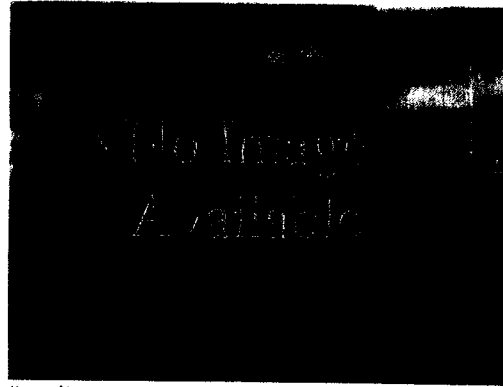
Building 3 : Section 1

Year Built: 1988
Living Area: 560
Replacement Cost: \$36,019
Building Percent Good: 55
Replacement Cost Less Depreciation: \$19,810

Building Attributes : Bldg 3 of 3	
Field	Description
STYLE	Telephone Bldg
MODEL	Industrial
Stories:	1.00
Occupancy	1.00

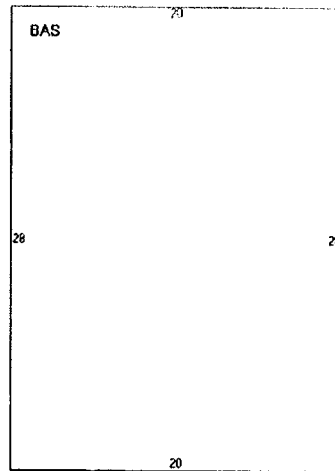
Building Photo

Exterior Wall 1	Precast Panel
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Rolled Compos
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Vinyl
Interior Floor 2	
Heating Fuel	None
Heating Type	None
AC Percent	100
Heat Percent	100
Bldg Use	Utility
Total Rooms	0
Bedrooms	0
FBM Area	
Heat/AC	None
Frame	Typical
Plumbing	Average
Foundation	Slab
Partitions	Average
Wall Height	
% Sprinkler	0.00



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

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	560	560
		560	560

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code 401
 Description Utility
 Zone B2
 Neighborhood C330

Land Line Valuation

Size (Acres) 8.29
 Frontage
 Depth
 Assessed Value \$3,145,280
 Appraised Value \$4,493,250

Outbuildings

Outbuildings						Legend
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
PAV1	Paving Asph.			12000.00 S.F.	\$12,600	1
PAV1	Paving Asph.			60300.00 S.F.	\$63,320	1
FN6	Fence 6'			3000.00 L.F.	\$21,000	1
TNK1	Tank Under Grm			10000.00 GALS	\$7,500	1
CEL1	Cell Tower			1.00 UNITS	\$80,000	1

Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2014	\$1,175,000	\$4,493,250	\$5,668,250
2013	\$1,175,000	\$4,493,250	\$5,668,250
2012	\$1,703,300	\$4,289,700	\$5,993,000

Assessment			
Valuation Year	Improvements	Land	Total
2014	\$822,500	\$3,145,280	\$3,967,780
2013	\$822,500	\$3,145,280	\$3,967,780
2012	\$1,192,310	\$3,002,790	\$4,195,100

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Rigorous Structural Analysis Report



AT&T | Norwalk East – Willard Rd #CT2132 | FA #10034993
Owner: Fuller Development LLC | Norwalk Site
Norwalk, Connecticut

February 7, 2019

MEI PROJECT ID: CT04761S-19V0

MALOUF ENGINEERING INTL., INC.



STRUCTURAL CONSULTANTS

17950 PRESTON ROAD, SUITE 720 ■ DALLAS, TEXAS 75252 ■ TEL. 972-783-2578 FAX 972-783-2583
www.maloufengineering.com





February 7, 2019

Mr. David Cooper
Empire Telecom
 Billerica, MA 01862

RIGOROUS STRUCTURAL ANALYSIS

Structure/Make/Model:	351.67 ft Self-Supporting Tower	Not Known / Not Known	
Client/Site Name/#:	Empire Telecom / AT&T	Norwalk East-Willard Rd #CT2132 FA #10034993	
Owner/Site Name/#:	Fuller Development LLC	Norwalk	
MEI Project ID:	CT04761S-19V0		
Location:	10 Willard Rd Norwalk, Connecticut 06851	Fairfield County FCC #1046320	
	LAT 41-07-41.8 N	LON	73-23-24.9 W

EXECUTIVE SUMMARY:

Malouf Engineering Int'l (MEI), as requested, has performed a rigorous structural analysis of the above-mentioned structure to assess the impact of the changed condition as noted in Table 1.

Based on the stress analysis performed, the existing structure **is in conformance** with the Int'l Building Code (IBC) / ANSI/TIA-222-G Standard for the loading considered under the criteria listed and referenced in the report sections – tower rated at 96.8% - Sub Bracing.

The installation of the proposed changed condition as noted in Table 1 is structurally acceptable. Please refer to Appendix 1 for Schematic Lines Layout.

MEI appreciates the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance on this or other projects, please contact us.

Respectfully submitted,

MALOUF ENGINEERING INT'L, INC.

Analysis performed by:

Krishna Manda, PE
 Sr. Project Engineer

Reviewed & Approved by:

E. Mark Malouf, PE
 Connecticut #17715
 972-783-2578 ext. 106
 mmalouf@maloufengineering.com



2/7/2019

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1. INTRODUCTION & SCOPE

A rigorous structural analysis was performed by Malouf Engineering Int'l (MEI), as requested and authorized by Mr. David Cooper, Empire Telecom, on behalf of AT&T, to determine the acceptance of the proposed changed conditions in conformance with the IBC / ANSI/TIA-222-G Standard, "Structural Standard for Antenna Supporting Structures and Antennas".

The scope of this independent analysis is to determine the overall stability and the adequacy of structural members, foundations, and member connections, as available and stated. This analysis considers the structure to have been properly installed and maintained with no structural defects. Installation procedures and related loading are not within the scope of this analysis and should be performed and evaluated by a competent person of the erection contractor.

The different report sections detail the applicable information used in this evaluation, relating to the tower data, the appurtenances configuration and the wind and ice loading considered.

2. SOURCE OF DATA

The following information has been used in this evaluation as source data that accurately represent the existing structure and the related appurtenances:

	Source	Information	Reference
STRUCTURE			
Tower	MEI Records	Previous Structural Analysis	ID CT04761S-18V1 Dated 09/06/2018
Foundation	MEI Records	Previous Structural Analysis	ID CT04761S-18V1 Dated 09/06/2018
Material Grade	As per supplied documents (GPD Analysis included specific material grades for the different components) - Refer to Appendix		
CURRENT APPURTENANCES			
	MEI Records	Previous Structural Analysis	ID CT04761S-18V1 Dated 09/06/2018
CHANGED CONDITION			
	Empire Telecomm Mr. Dave Cooper	E-Mail Instructions	Dated 01/22/2019
		Infinigy Analysis Report & CD Drawings	Dated 05/16/2018

Background Information:

Based on available information, the following is known regarding this structure:

DESIGNER / FABRICATOR	Not Known / Not Known
ORIGINAL DESIGN CRITERIA	TIA/EIA 222-Unknown
PRIOR STRUCTURAL MODIFICATIONS	As per GPD modification design Job #2012766.02 dated 06/27/2012; MEI Drawings ID CT04761S-16V0-R1 dated 08/11/2016 are considered properly installed and maintained.

3. ANALYSIS CRITERIA

The structural analysis performed used the following criteria:

CODE / STANDARD	2018 CT Building Code / 2015 Int'l Building Code / ANSI/TIA-222-G-4 Standard	
LOADING CASES	Full Wind:	120 Mph ultimate gust [equiv. 93 Mph (3-sec gust)] w/No Radial Ice**
	Iced Case:	50 Mph + 0.75" Radial Ice
	Service:	60 Mph
	Seismic:	S _s = 0.230 / S ₁ = 0.067 / Site Class: D – Stiff Soil
STRUCTURE CRITERIA	Risk Category (Structural Class): Class II	
	Exposure Category: 'C' – Topographic Category: 1	

Appurtenances Configuration

The following appurtenances configuration is denoted by the summation of Tables 1 & 2:

Table 1: Tenant with Changed Condition Appurtenances Configuration

Elev (ft)	Tenant	Ant #	Ant Qty	Appurtenance Model / Description	Mount Description	Line #	Line Qty	Line size & Location
347	AT&T		3	SBNHH-1D65A Panel Antennas				
			6	TPX-070821 Triplexer Boxes				
			3	RRUS-32 B2 Boxes				
Current Appurtenances To Remain								
347	AT&T		3	7770.00 Panel Antennas	(3) Sector Mounts w/V-Stabilizer (Commscope MTC3615 AD A)	49-60	12	1-5/8" 3/4" DC Power [Existing/New] 5/8" Fiber-(FZ) [Existing/New]
			3	RRUS-11 Boxes				
			6	LGP21401 TMAs		48	2	
			3	DC6-48-60-18-8F Suppressors				
			3	OPA-65R-LCUU-H4 Panel Antennas				
			3	RRUS-32 Boxes				
344.5		6	7020 RET Motors					
Appurtenances to be Removed								
347	AT&T	23	3	AM-X-CD-65-00T-RET Panel Antennas				
			3	RRUS-11 Boxes				

Table 2: Remaining Tenants Current and Reserved/Future Appurtenances

Elev (ft)	Tenant	Ant #	Ant Qty	Appurtenance Model / Description	Mount Description	Line #	Line Qty	Line size & Location
365		40	1	12ft Whip Antenna + TMA	10ft Pipe Mount	25	1	7/8"-(FZ)
369.5		38	1	Whip Antenna	15ft Pipe Mount w/ Guys	34	1	1/2"-(FZ)
357	[Dead]	39	1	15ft Whip Antenna	4ft Pipe Mount	-	-	-
362		42	1	4ft Lightning Rod	14ft Mount	-	1	Grounding
			41	1				
355.5		31	1	4ft Whip Antenna	8ft Pipe Mount	38	1	1-5/8"-(FZ)
354.5		32	1	15ft Whip Antenna	8ft Pipe Mount	39	1	1-5/8"-(FZ)
354.5		30	1	10ft 4-Element Dipole Antenna	8ft Pipe Mount	24	1	7/8"-(FZ)
352			1	Top Stub Tower				
350.5		35			3ft Empty Sidearm Mount			
					Top Platform w/ Rails			
350	[Dead]					35-36	2	0.25" Cables
350	[Dead]					44	1	0.8" SO Cord
349.75		34	1	8ft Whip Antenna	Railing Mounted	32	1	7/8"-(FZ)
349.5		36	1	21ft Whip Antenna	Railing Mounted	37	1	7/8"-(FZ)
349		37			8ft Empty Pipe Mount			
348.25		29	1	20ft 4-Element Dipole Antenna	6ft Pipe Mount	21	1	7/8"-(FZ)

(Appurtenances continue on next page.)

Table 2: Remaining Tenants Current and Reserved/Future Appurtenances – Cont'd

Elev (ft)	Tenant	Ant #	Ant Qty	Appurtenance Model / Description	Mount Description	Line #	Line Qty	Line size & Location
343.67		27	1	3ft 3-Elem Yagi Antenna	8ft Pipe Mount on Sector Mount	30	1	1/2"-(FZ)
343.25		33	3	TA-2335-DAB Panel Antennas	8ft Pipe Mount	19	1	EW4.75"x2.5"-(FZ)
339.5					4-Way Walkway Platform w/ Rails			
338	[Dead]					45	1	3/4" R.C. – (FZ)
325					(4) Face Frames			
306		21			(4) 14ft Empty Pipe Mounts			
299	[Dead]					23	1	1-1/4"-(FZ)
269.25		20	2	OB Lights		40	1	0.6" SO Cord
262	T-Mobile [Final] [New]	-	3	AIR-3246 B66 Panel Antennas	(3) 13ft T-Frame Mounts	-	3	HCS 6x12 Hybrid Cable 1-5/8" [6 Reserve] – (FZ)
			3	APXVAARR24_43-U-NA20				
			3	AIR32 B66a/B2a Panel Antennas				
			3	KRY 112 144/2 TMA's				
			3	Radio 4449 - B71 + B12 Boxes				
255.5		17	1	12in Square Panel Antenna	Pipe Mount	1	1	7/8"-(FZ)
253		16			(2) 25ft Rest Platform w/ Rails			
244	Sprint [New]	14	3	APXVSP18-C-A20 Panel Antennas	(3) Sector Mounts	26-28	3	HB114-1 1 1/4" Hybrid Cables LDF4-50A (1/2" FOAM) 1.55" Hybrid Cable – (FZ)
		-	3	Nokia AAHC Boxes				
			3	ALU 1900MHz RRH Boxes				
			6	ALU 800 MHz 2x50W RRH Boxes				
208.5		12	1	7ft 5-Elem Yagi Antenna	5ft Pipe Mount	31	1	1/2"-(FZ)
191.5		11			(4) Corner Rest Platforms			
186		10	2	Beacon Ice Shield	Leg Mounted			
182.5		9	2	Beacon / Strobe		41-42	2	0.6" SO Cords
140	VzW [New]	-	3	JAHH-65B-R3B Panel Antennas	(3) D&D Welding 12ft Arch Boom Mounts + (2) BSAMNT-SBS-2-2 Side-By-Side Mounting Kit + (1) BSAMNT-SBS-2-3 Side-By-Side Mounting Kit	-	3	1-5/8" Hybrid Cables – (FZ)
			6	JAHH-45B-R3B Panel Antennas				
			3	B13 RRH4x30 Boxes				
			3	B66A RRH4x45W Boxes				
			3	B25 RRH4x30W Boxes				
			3	B5 RRH4x40W - LOC Boxes				
			3	RVZDC-6627-PF-48 OVP Boxes				
125	[Dead]					22	1	0.95"-(FZ)
		8			(2) 41ft Rest Platform w/ Rails			
100		7			4ft Rest Platform w/ Rails			
93		6	2	OB Lights		40		[Shared]
50.25		5			4ft Rest Platform w/ Rails			
47.5		4	1	3ft Dia. Dish (Az. 220°±)	4ft Sidearm Mount-NW Leg	20	1	7/8"-(FZ)
31		1	1	4ft Dia. Dish (Az. 200°±)	10ft Pipe Mount/Standoff-S Face	33	1	1/2"-(FZ)
26		2	1	GPS Antenna	Pipe Mount	29	1	1/2"-(FZ)
25		3			(4) Corner Rest Platforms			
16.67					(4) Face Frames			

Notes:

- **As per 2015 IBC for ultimate 3-sec gust wind speed converted to nominal 3-sec gust wind speed as per Sect. 1609.3.1 as required to be used in ANSI/TIA-222-G Standard per exception 5 of Sect. 1609.1.1.
- All elevations are measured from tower base.
- Please note appurtenances not listed above are to be removed/not present as per data supplied.
- (I) = Internal; (E) = External; (FZ) = Within Face Zone; (OFZ) = Outside Face Zone - as per TIA-222-G.
- The above appurtenances represent MEI's understanding of the appurtenances configuration. If different than above, the analysis is invalid. Please contact MEI if any discrepancies are found.



4. ANALYSIS PROCEDURE

The subject structure is analyzed for feasibility of the installation of the proposed changed condition previously noted. The data records furnished were reviewed and a computer stress analysis was performed in accordance with the TIA-222 Standard provisions and with the agreed scope of work terms and the results of this analysis are reported.

Analysis Program

The computer program used to model the structure is a rigorous Finite Element Analysis program, tnxTower (ver. 8.05), (formerly RISATower), a commercially available program by Tower Numerics Inc. and the second is STAADPro v8i FEA program, a structural finite element program by Bentley Systems, Carlsbad, CA. The structure members are modeled using beam/truss members. The structural parameters and geometry of the members are included in the model. The dead and temperature loads and the wind loads are internally calculated by the programs for the different loading directions and then applied as external loads on the structure. This analysis comprised of the two different analytical models with combination of the above noted 2 software programs in order to evaluate the different portions of the tower accounting for the geometrical limitation in the tnxTower software. Any applicable exemptions, as per Section 15.6 of the TIA-222-G Standard for existing structures originally designed in accordance with a previous revision of the TIA-222 Standard, have been taken.

Assumptions

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

- This existing tower is assumed, for the purpose of this analysis, to have been properly maintained and to be in good condition with no structural defects and with no deterioration to its member capacities ('as-new' condition).
- The tower member sizes and configuration are considered accurate as supplied. The material grade is as per data supplied and/or as assumed and as stated.
- The appurtenances configuration is as supplied and/or as stated in the report. It is assumed to be complete and accurate. All antennas, mounts, coax and waveguides are assumed to be properly installed and supported as per manufacturer requirements.
- Some assumptions are made regarding antennas and mounts sizes and their projected areas based on best interpretation of data supplied and of best knowledge of antenna type & industry practice.
- Mounts/Platforms are considered adequate to support the loading. No actual analysis of the platform/mount itself is performed, with the analysis being limited to analyzing the structure.
- The soil parameters are as per data supplied or as assumed and stated in the calculations. Refer to the Appendix. If no data is available, the foundation system is assumed to support the structure with its new reactions.
- 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 data supplied/available, and to have been properly installed and to be fully effective.

If any of the above assumptions are not valid or have been made in error, this analysis results may be invalidated, MEI should be contacted to review any contradictory information to determine its effect.

5. ANALYSIS RESULTS

The results of the structural stress analysis based on data available and with the previous listed criteria, indicated the following:

Note: The Wind loading controls over the Seismic loading as per TIA Section 2.7.

Table 3: Stress Analysis Results

Component Type	Maximum Stress Ratio	Controlling Elev. (ft) / Component	Pass/Fail	Comment
LEGS	93.9%	25 - 0	Pass	
DIAGONALS	88.3%	125 - 100	Pass	
HORIZONTALS	92.8%	150 - 125	Pass	Bolts Control
SUB BRACING	96.8%	50 - 25	Pass	
FOUNDATION	65.5%	Uplift	Pass	Geotechnical report not available. Based on soil parameters in supplied calcs in prev. SA.

Table 4: Serviceability Requirements

	Maximum Value	TIA Requirement (10dB)	Pass/Fail	Comment
TWIST/SWAY	0.013 Deg.	1.7125 Deg.	Pass	4ft Dish Elev. 31.00ft
	0.019 Deg.	2.35 Deg.	Pass	3ft Dish Elev. 47.50ft
	0.084 Deg.	4 Deg. from Vert. or Horiz. Axis	Pass	
HORIZONTAL DISPLACEMENT	4.367 In./ 0.105% of Ht.	3.0% of Height	Pass	

Notes:

1. Please note that the analysis results noted above are based on the combined analytical models using the 2 noted FEA programs.
2. The Maximum Stress Ratio is the percentage that the maximum load in the member is relative to the allowable load as determined by Code requirements.
3. Refer to the Appendix 1 for more details on the member loads.
4. A maximum stress ratio between 100% and 105% may be considered as Acceptable according to industry standard practice.

6. FINDINGS & RECOMMENDATIONS

- Based on the rigorous stress analysis results, the subject structure is **rated at 96.8%** of its support capacity (controlling component: Sub Bracing) with the proposed changed condition considered. Please refer to Table 3 and to Appendix 1 for more details of the analysis results.
- Based on the stress analysis performed, the existing structure **is in conformance** with the IBC / ANSI/TIA **222-G** Standard for the loading considered under the criteria listed and referenced in the report sections.
- Please note that no geotechnical data is available. However, based on soil parameters included in supplied data, the foundation is considered acceptable.
- Please note that this analysis study considers all of the recent changes by the different tenants, mainly AT&T, T-Mobile, Verizon and Sprint, as per the latest information available,
- **The installation of the proposed changed condition as noted in Table 1 is structurally acceptable.**
- This structure is near its maximum support capacity for the appurtenances and loading criteria considered. Therefore, no changes to the configuration considered should be made without performing a new proper evaluation.

Rigging and temporary supports required for the erection/modification shall be determined, documented, furnished and installed by the erector/contractor accounting for the loads imposed on the structure due to the proposed construction method.

7. REPORT DISCLAIMER

The engineering services rendered by Malouf Engineering International, Inc. ('MEI') in connection with this Structural Analysis are limited to a computer analysis of the tower structure, size and capacity of its members. MEI does not analyze the fabrication, including welding and connection capacities, except as included in this Report.

The analysis performed, and the conclusions contained herein are based on the assumption that the tower has been properly installed and maintained, including, but not limited to the following:

1. Proper alignment and plumbness.
2. Correct guy tensions, as applicable.
3. Correct bolt tightness or slip jacking of sleeved connections.
4. No significant deterioration or damage to any structural component.

Furthermore, the information and conclusions contained in this Report were determined by application of the current "state-of-the-art" engineering and analysis procedures and formulae. MALOUF ENGINEERING INTERNATIONAL, INC. assumes no obligation to revise any of the information or conclusions contained in this Report in the event that such engineering and analysis procedures and formulae are hereafter modified or revised. In addition, under no circumstances will MALOUF ENGINEERING INTERNATIONAL, INC. have any obligation or responsibility whatsoever for or on account of consequential or incidental damages sustained by any person, firm or organization as a result of any information or conclusions contained in the Report, and the maximum liability of MALOUF ENGINEERING INTERNATIONAL, INC., if any, pursuant to this Report shall be limited to the total funds actually received by MALOUF ENGINEERING INTERNATIONAL, INC. for preparation of this Report.

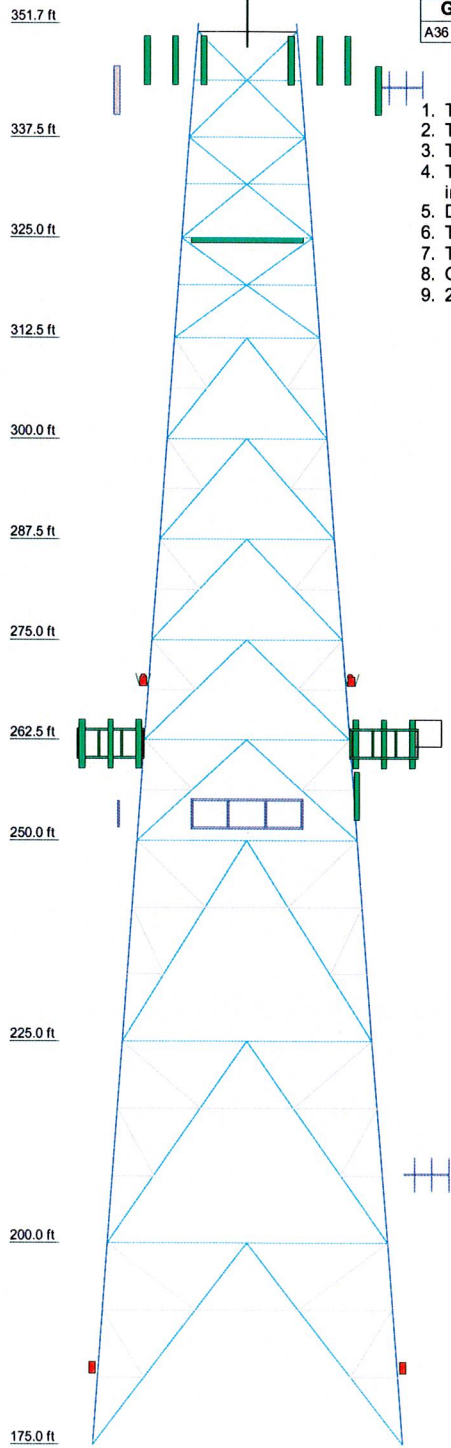
Customer has requested MALOUF ENGINEERING INTERNATIONAL, INC. to prepare and submit to Customer an engineering analysis with respect to the Subject Tower and has further requested MALOUF ENGINEERING INTERNATIONAL, INC. to make appropriate recommendations regarding suggested structural modifications and changes to the Subject Tower. In making such request of MALOUF ENGINEERING INTERNATIONAL, INC., Customer has informed MALOUF ENGINEERING INTERNATIONAL, INC. that Customer will make a determination as to whether or not to implement any of the changes or modifications which may be suggested by MALOUF ENGINEERING INTERNATIONAL, INC. and that Customer will have any such changes or modifications made by riggers, erectors and other subcontractors of Customer's choice. MALOUF ENGINEERING INTERNATIONAL, INC. shall have the right to rely upon the accuracy of the information supplied by the customer and shall not be held responsible for the Customer's misrepresentation or omission of relevant fact whether intentional or otherwise.

Customer hereby agrees and acknowledges that MALOUF ENGINEERING INTERNATIONAL, INC. shall have no liability whatsoever to Customer or to others for any work or services performed by any persons other than MALOUF ENGINEERING INTERNATIONAL, INC. in connection with the implementation of services including but not limited to any services rendered for Customer or for others by riggers, erectors or other subcontractors. Customer acknowledges and agrees that any riggers, erectors or subcontractors retained or employed by Customer shall be solely responsible to Customer and to others for the quality of work performed by them and that MALOUF ENGINEERING INTERNATIONAL, INC. shall have no liability or responsibility whatsoever as a result of any negligence or breach of contract by any such rigger, erector or subcontractor and that Customer and rigger, erector, or subcontractor will provide MALOUF ENGINEERING INTERNATIONAL, INC. with a Certificate of Insurance naming MALOUF ENGINEERING INTERNATIONAL, INC. as additional insured.

APPENDIX 1 - ANALYSIS PRINTOUT & GRAPHICS



Section	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	L8x8x1 1/8	L8x8x7/8	L8x8x3/4	L6x6x7/8	L6x6x3/8	L6x6x3/8	L6x6x3/8	L6x6x3/8	L6x6x3/8	L6x6x3/8	L6x6x3/8
Leg Grade	A500-46	A36	A36	A36	A36	A36	A36	A36	A36	A36	A36
Diagonals	2L2.5x3.5x5/16 + 2L3x3.5x3/8	2L2.5x3x5/16 + 2L3x3x3/8	2L2.5x3x5/16 + 2L3x3x3/8	2L2.5x3x5/16 + 2L3x3x3/8	2L2.5x3x5/16 + 2L3x3x3/8	2L2.5x3x5/16 + 2L3x3x3/8	2L2.5x3x5/16 + 2L3x3x3/8	2L2.5x3x5/16 + 2L3x3x3/8	2L2.5x3x5/16 + 2L3x3x3/8	2L2.5x3x5/16 + 2L3x3x3/8	2L2.5x3x5/16 + 2L3x3x3/8
Diagonal Grade	A500-46	A36	A36	A36	A36	A36	A36	A36	A36	A36	A36
Top Girts	2L3.1/2x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8
Horizontals	2L3.1/2x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8
Sec. Horizontals	2L1.3/4x1.3/4x3/16	2L1.3/4x1.3/4x3/16	2L1.3/4x1.3/4x3/16	2L1.3/4x1.3/4x3/16	2L1.3/4x1.3/4x3/16	2L1.3/4x1.3/4x3/16	2L1.3/4x1.3/4x3/16	2L1.3/4x1.3/4x3/16	2L1.3/4x1.3/4x3/16	2L1.3/4x1.3/4x3/16	2L1.3/4x1.3/4x3/16
Red. Horizontals	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16
Red. Diagonals	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8
Red. Sub-Horiz	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8
Red. Hips	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8
Inner Bracing	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8
Face Width (ft)	38.6645	34.938	31.2115	27.485	23.7584	21.8952	20.0319	18.1887	16.3054	14.4422	12.33
# Panels @ (ft)	21.9	19.7	17.7	15.5	13.5	11.5	9.5	7.5	5.5	3.5	1.5
Weight (K)	100.9	80.9	60.9	40.9	20.9	10.9	5.9	3.9	2.9	1.9	0.9



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	2L2 1/2x2 1/2x1/4x3/8	B	L2 1/2x2 1/2x3/16

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A36	36 ksi	58 ksi	A500-46	46 ksi	62 ksi

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. OWNER - FULLER DEVELOPMENT LLC - NORWALK SITE
9. 2018 CT SBC / 2015 IBC / ASCE 7-10 / 120 MPH ULT - RISK CAT. 2

 <p>Malouf Engineering Int'l Inc. 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583</p>	<p>Job: 350ft SST / Norwalk East - Willard RD Site #CTU2132</p>		
	<p>Project: CT04761S-19V0 - Top Tower</p>		
	<p>Client: EMPIRE TELECOM / AT&T</p>	<p>Drawn by: KM</p>	<p>App'd:</p>
	<p>Code: TIA-222-G</p>	<p>Date: 02/07/19</p>	<p>Scale: NTS</p>
	<p>Path:</p>	<p>Dwg No. E-1</p>	<p></p>



Malouf Engineering International Inc.
 17950 Preston Rd. Suite 720
 Dallas, Texas. 75252 / p (972)-783-2578
 maloufengineering.com

Job No
CT04761S-19V

Sheet No

1

Rev
 0

Software licensed to Microsoft

Part 0 TO 175FT OF TOWER

Job Title 351.7ft Self Supporting Tower

Ref

By KM

Date 6-Feb-19

Chd HML

Client EMPIRE TELECOM / AT&T

File CT04761S-19V0.std

Date/Time 07-Feb-2019 10:31

175ft

150ft

125ft

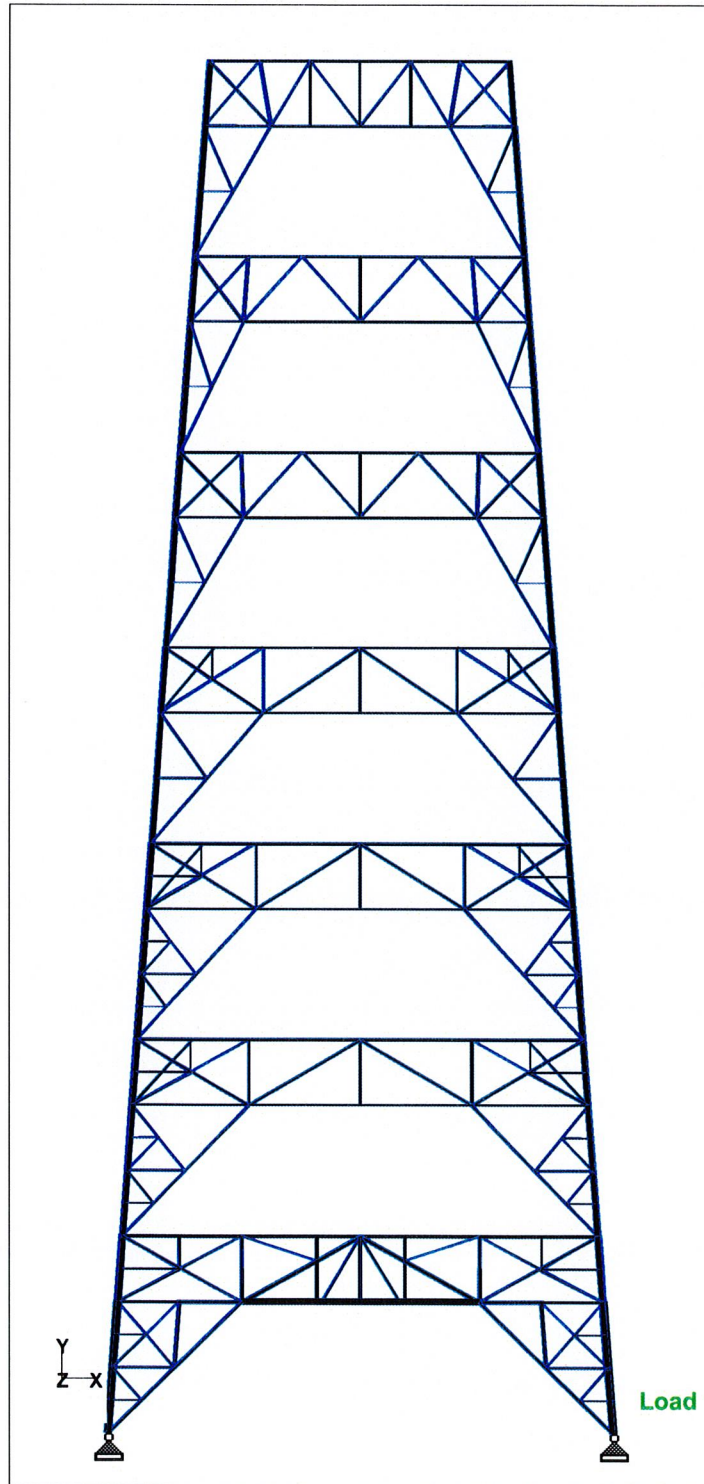
100ft

75ft

50ft

25ft

0ft



Tower Elevation 0 - 175ft

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No.	QTY.	DESCRIPTION	ELEV.	TENANT
1	1	Conduit Shield	35'	E
2	1	Unused Codult Supports	320'	E / WG "G"
3	1	Unused Wavegulde Brackets	200'	E / WG "H"
4	1	7/8"	255'	E / #1
5	12	1 5/8" (RE-WORK/BUNDLE COAXES IN TWO ROWS)	262'	T-Mobile / E / #2-10, #12-14
6	3	HCS 6x12 Hybrid Cable	262'	T-Mobile / NEW
7	-	-	-	-
8	-	-	-	-
9	1	Feedline Ladder (Af)	265'	T-Mobile / E / WG "A"
10	1	EW 4.75" x 2.5"	343'	E / #19
11	1	7/8"	47'	E / #20
12	1	7/8"	348'	E / #21
13	1	0.95" Dead Cable	125'	E / #22
14	1	1 1/4" Dead Cable	299'	E / #23
15	2	7/8"	350'	E / #24, 25
16	1	Feedline Ladder (Af)	345'	E / WG "B"
17	3	HB114-1 1 1/4" Hybrld Cable	244'	Sprint / E / #26-28
18	1	LDF4-50A (1/2 FOAM)	26'	E / #29
19	1	Feedline Ladder (Af)	241'	Sprint / E / WG "C"
20	1	1/2"	343'	E / #30
21	1	1/2"	208'	E / #31
22	1	7/8"	349'	E / #32

23	2	1/2"	31'	E / #33, 34
24	1	1/2"	350'	E / #34
25	2	0.25" Dead Cables	350'	E / #35, 36
26	1	7/8"	349'	E / #37
27	2	1 5/8"	350'	E / #38, 39
28	1	Wavegulde Brackets	348'	E / WG "D"
29	1	Climbing Ladder	350'	E
30	4	0.6" SO Cords	182'	E / #40-43
31	2	0.6" SO Cords	269'	E / #40,43
32	1	0.6" SO Cord	350'	E / #43
33	1	0.8" Dead SO Cord	350'	E / #44
34	1	3/4" Rlgld Conduit Unused	338'	E / #45
35	1	Conduit Shield	35'	E
36	1	Unused Codult Supports	320'	E / WG "E"
37	1	Grounding Cable	350'	E
38	4	3/4" DC Power Cable	347'	ATT / E / NEW
39	12	1 5/8"	347'	ATT / E / #49-60
40	1	5/8" Fiber Cable	347'	ATT / E / NEW
41	2	3/4" DC POWER CABLE	345'	ATT / E
42	1	5/8" FIBER CABLE	347'	ATT / E
43	1	Feedline Ladder (Af)	347'	ATT / E / WG "F"
44	3	1 5/8" Hybrld Cable	140'	VzW / NEW
45	1	LDF4-50A (1/2 FOAM)	244'	SPRINT / E / F
46	1	1.55" Hybrld Cable	244'	SPRINT / NEW

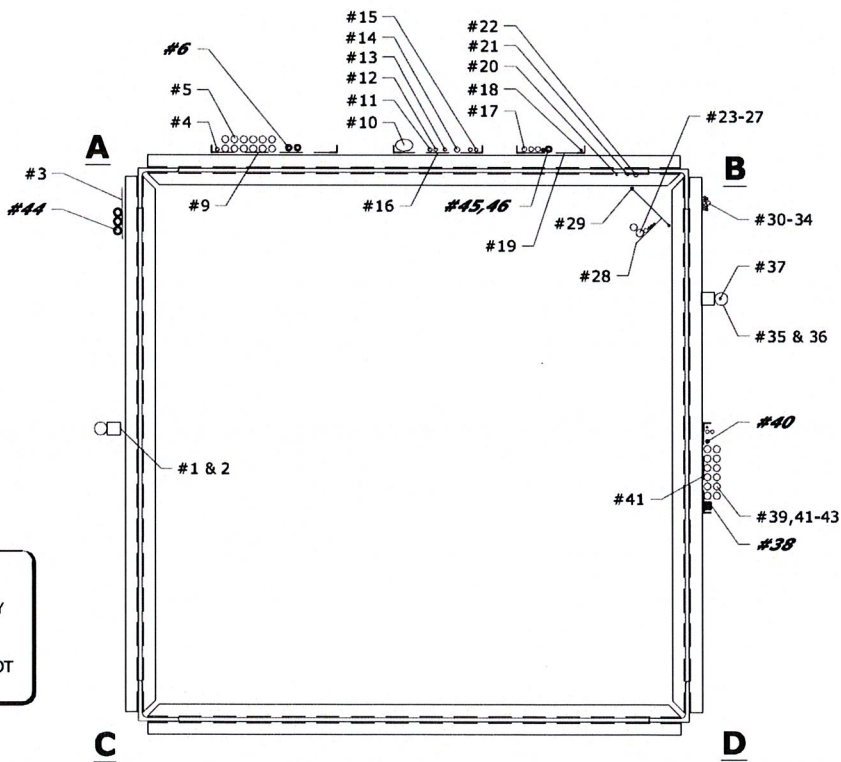
CONTACT MEI IF LINE LAYOUT IS DIFFERENT FROM WHAT IS SHOWN BELOW.

LEGEND:

- E = EXISTING ○ — #X
- P = PROPOSED ○ — #X
- F = FUTURE ○ — #X
- R = REMOVE ⊗ — #X
- TO RELOCATE ○ — #X

NOTES:

- 1) TX-LINE LAYOUT INCLUDED ALL PREVIOUS CHANGES PROPOSED BY VERIZON WIRELESS, SPRINT, T-MOBILE AND AT&T.
- 2) REMOVE ALL OTHER COAXES NOT LISTED ABOVE.



101 PLAN: SCHEMATIC Tx-LINE LAYOUT
SCALE: NOT TO SCALE

- NOTES:**
1. Tx LINE LAYOUT IS SCHEMATIC ONLY, BASED UPON MEI MAPPING (SUB: HTS) DATED 11/30/15 .
 2. NEW BRACKET SUPPORT SPECIFICATION BY OTHERS.



02/07/2019

MALOUF ENGINEERING INTERNATIONAL, INC.

 STRUCTURAL CONSULTANTS

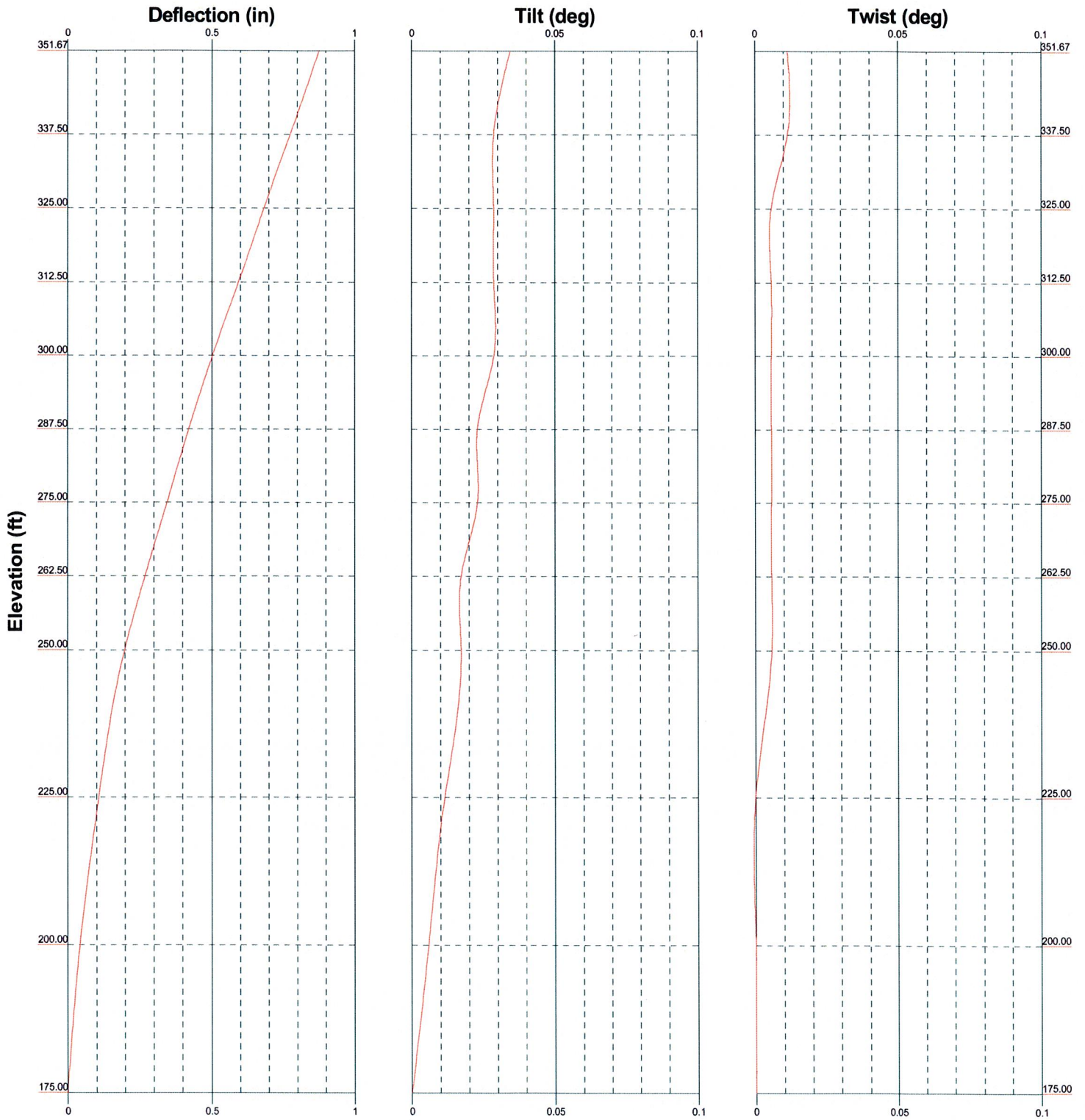
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 DALLAS, TEXAS 75252-5635
 972-783-2578 (fax: 2583)
 www.maloufengineering.com
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350FT SST/NORWALK EAST - WILLARD RD SITE #CTU2132

TOWER TxLINE LAYOUT

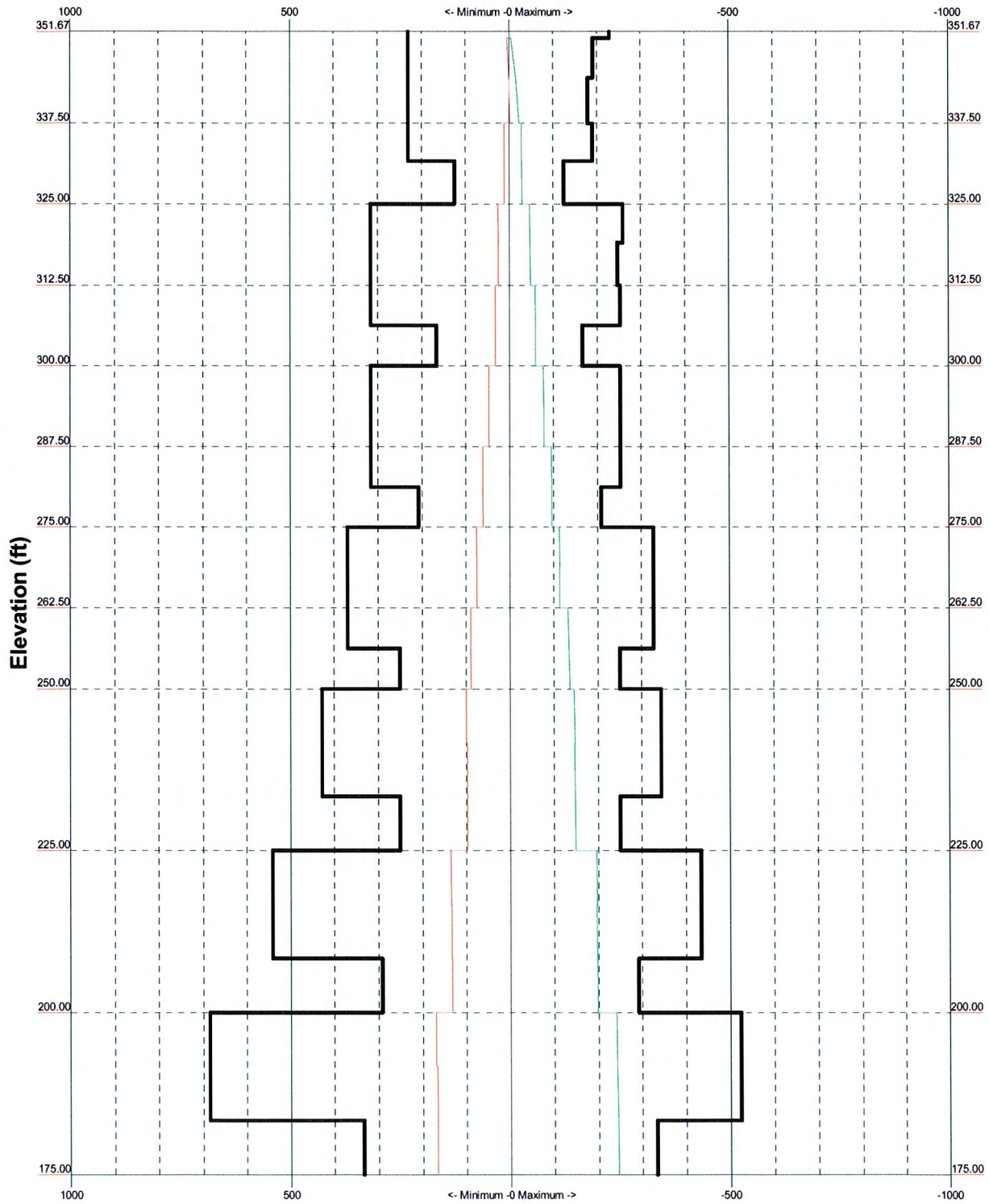
MEI PROJECT ID	SHEET NUMBER	REV.
CT04761S-19V0	L01	0



 MALOUF ENGINEERING INT'L, INC. STRUCTURAL CONSULTANTS maloufengineering.com	Malouf Engineering Int'l Inc. 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583		Job: 350ft SST / Norwalk East - Willard RD Site #CTU2132		
	Project: CT04761S-19V0 - Top Tower			Drawn by: KM	App'd:
	Client: EMPIRE TELECOM / AT&T		Date: 02/07/19	Scale: NTS	
	Code: TIA-222-G		Dwg No. E-5		
	Path:		<small>C:\K\Drawings\2019\02\07\19\190207_19V0_RIB_AT&T_Norwalk_Tower2132\Drawings\TIA-222-G\TIA-222-G.dwg</small>		

TIA-222-G - 93 mph/50 mph 0.7500 in Ice Exposure C

Leg Capacity ——— Leg Compression (K)



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	<p>Project: CT04761S-19V0 - Top Tower</p>		
	<p>Client: EMPIRE TELECOM / AT&T</p>	<p>Drawn by: KM</p>	<p>App'd:</p>
	<p>Code: TIA-222-G</p>	<p>Date: 02/07/19</p>	<p>Scale: NTS</p>
	<p>Path:</p>	<p>Dwg No. E-3</p>	

tnxTower Malouf Engineering Int'l Inc. 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583	Job 350ft SST / Norwalk East - Willard RD Site #CTU2132	Page 1 of 17
	Project CT04761S-19V0	Date 09:37:41 02/07/19
	Client EMPIRE TELECOM / AT&T	Designed by KM

Tower Input Data

The main tower is a 4x free standing tower with an overall height of 351.67 ft above the ground line.

The base of the tower is set at an elevation of 0.00 ft above the ground line.

The face width of the tower is 12.33 ft at the top and 64.75 ft at the base.

This tower is designed using the TIA-222-G standard.

The following design criteria apply:

Tower is located in Fairfield County, Connecticut.

ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).

Basic wind speed of 93 mph.

Structure Class II.

Exposure Category C.

Topographic Category 1.

Crest Height 0.00 ft.

Nominal ice thickness of 0.7500 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 50 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

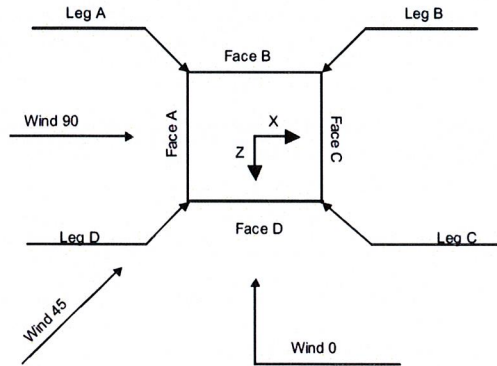
OWNER - FULLER DEVELOPMENT LLC - NORWALK SITE.

2018 CT SBC / 2015 IBC / ASCE 7-10 / 120 MPH ULT - RISK CAT. 2.

Pressures are calculated at each section.

Stress ratio used in tower member design is 1.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.



Square Tower

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Placement	#	Weight
	ft		plf
Conduit Shield (E)	35.00 - 12.00	1	18.50
Unused Conduit Supports (E / WG "G")	320.00 - 37.00	1	9.56
1-5/8" (6x12) Hybrid	140.00 - 6.00	3	1.78

Description	Placement	#	Weight
	ft		plf
(HFT1206-24 SV2-xx) or Equiv. (VzW / New)	200.00 - 27.00	1	1.25
Unused Waveguide Brackets			

tnxTower Malouf Engineering Int'l Inc. 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583	Job 350ft SST / Norwalk East - Willard RD Site #CTU2132	Page 2 of 17
	Project CT04761S-19V0	Date 09:37:41 02/07/19
	Client EMPIRE TELECOM / AT&T	Designed by KM

Description	Placement	#	Weight
	ft		plf
(E / WG "H")			
7/8	255.50 -	1	0.54
(E / #1)	6.00		
1 5/8	262.00 -	12	1.04
(Rework - Bundle / T-Mobile / E / #2-10, #12-14)	6.00		
HCS 6x12 Hybrid Fiber Cable	262.00 -	3	2.40
(T-Mobile / New) Feedline	6.00		
Ladder (Af)	265.00 -	1	8.40
(T-Mobile / E / WG "A")	8.50		
EW 4.75" x 2.5"	343.25 -	1	1.85
(E / #19)	6.00		
7/8	47.50 - 6.00	1	0.54
(E / #20)			
7/8	348.25 -	1	0.54
(E / #21)	6.00		
0.95" Dead Cable	125.00 -	1	0.49
(E / #22)	6.00		
1 1/4 Dead Cable	299.00 -	1	0.66
(E / #23)	6.00		
7/8	350.00 -	2	0.54
(E / #24, 25)	6.00		
Feedline	345.00 -	1	8.50
Ladder (Af)	8.50		
(E / WG "B")			
HB114-1 1/4" Hybrid Cable	244.00 -	3	1.08
(Sprint / E / #26-28)	0.00		
LDF4-50A (1/2 FOAM)	244.00 -	1	0.15
(Sprint / E)	0.00		
1.55" Hybrid Cable	244.00 -	1	1.25
(Sprint / New)	0.00		
LDF4-50A (1/2 FOAM)	26.00 - 0.00	1	0.15
(E / #29)			
Feedline	241.00 -	1	8.45
Ladder (Af)	2.00		
(Sprint / E / WG "C")			
1/2	343.67 -	1	0.25
(E / #30)	6.00		
1/2	208.50 -	1	0.25
(E / #31)	6.00		
7/8	349.75 -	1	0.54
(E / #32)	6.00		
1/2	31.00 - 6.00	2	0.25

Description	Placement	#	Weight
	ft		plf
(E / #33, 34)			
1/2	350.00 -	1	0.25
(E / #34)	6.00		
0.25" Dead Cables	350.00 -	2	0.26
(E / #35, 36)	6.00		
7/8	349.50 -	1	0.54
(E / #37)	6.00		
1 5/8	350.00 -	2	1.04
(E / #38, 39)	6.00		
Waveguide Brackets	348.00 -	1	1.15
(E / WG "D")	15.00		
Climbing Ladder (E)	350.00 -	1	9.50
Safety Rail (E)	0.50		
0.6" SO Cords (E / #40-43)	350.00 -	1	2.75
0.6" SO Cords (E / #40,43)	182.50 -	4	0.35
0.6" SO Cord (E / #43)	0.00		
0.8" Dead SO Cord	269.25 -	2	0.35
(E / #44)	182.50		
3/4" Rigid Conduit Unused (E / #45)	350.00 -	1	0.40
Conduit Shield (E)	14.00		
Unused Conduit Supports (E / WG "E")	338.00 -	1	1.13
Grounding Cable (E)	0.00		
3/4" DC Power Cable (ATT / New / E / #46,47)	35.00 -	1	18.50
1 5/8 (ATT / E / #49-60)	12.00		
5/8" Fiber Cable (ATT / New / E / #48)	320.00 -	1	9.56
Feedline Ladder (Af)	37.00		
(ATT / E / WG "F")	350.00 -	1	0.25
3/4" DC Power Cable (ATT / New / E / #46,47)	0.00		
1 5/8 (ATT / E / #49-60)	347.00 -	6	0.80
5/8" Fiber Cable (ATT / New / E / #48)	6.00		
Feedline Ladder (Af)	347.00 -	12	1.04
(ATT / E / WG "F")	6.00		
5/8" Fiber Cable (ATT / New / E / #48)	347.00 -	2	0.50
Feedline Ladder (Af)	6.00		
(ATT / E / WG "F")	345.00 -	1	13.50
14.50			

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Discrete Tower Loads

Description	Placement	Weight	Description	Placement	Weight
	<i>ft</i>	<i>K</i>		<i>ft</i>	<i>K</i>
4ft Lightning Rod (E / #42)	364.00	0.01	8ft Pipe Mount (E / #32)	351.00	0.04
		0.01			0.05
Beacon / Strobe (E / #41)	363.00	0.04	4ft Whip Antenna (E / #31)	355.50	0.01
		0.07			0.02
14ft Mount (E / #41 / 42)	355.00	0.09	8ft Pipe Mount (E / #31)	351.00	0.03
		0.17			0.04
12ft Whip Antenna (E / #40)	371.00	0.25	10ft 4-Element Dipole (E / #30)	354.50	0.05
		0.33			0.06
TMA (E / #40)	353.00	0.02	8ft Pipe Mount (E / #30)	351.00	0.03
		0.04			0.04
10ft Pipe Mount (E / #40)	360.00	0.05	20ft 4-Element Dipole (E / #29)	348.25	0.07
		0.07			0.04
15ft Whip Antenna (E / #39)	364.50	0.08	6ft Pipe Mount (E / #29)	351.00	0.09
		0.03			0.13
4ft Pipe Mount (E / #39)	356.25	0.05	Top Platform w/ Rails (E)	350.50	0.04
		0.08			0.05
Top Stub Tower (E)	352.00	0.02	3ft 3-Elem Yagi (Unknown / E / #27)	343.67	0.06
		0.66			17.00
Whip (E / #38)	369.50	0.86	8ft Pipe Mount on Sector Mount (Unknown / E / #27)	341.00	21.25
		1.06			25.50
15ft Pipe Mount w/ Guys (E / #38)	355.50	0.02	Raycap DC6-48-60-18-8F SUPPRESSOR (ATT / E)	347.00	0.02
		0.07			0.03
8ft Empty Pipe Mount (E / #37)	349.00	0.13	Raycap DC6-48-60-18-8F SUPPRESSOR (ATT / E)	347.00	0.03
		0.17			0.05
21ft Whip Antenna (E / #36)	349.50	0.21	Raycap DC6-48-60-18-8F SUPPRESSOR (ATT / E)	347.00	0.08
		0.04			0.03
3ft Empty Side Arm Mount (E / #35)	350.50	0.06	RRUS-11 (ATT / E / #25)	347.00	0.05
		0.11			0.08
8ft Whip Antenna (E / #34)	349.75	0.24	RRUS-11 (ATT / E / #25)	347.00	0.05
		0.30			0.07
TA-2335-DAB Panel w/ Pipe Mount (E / #33)	343.25	0.02	RRUS-11 (ATT / E / #25)	347.00	0.10
		0.03			0.05
TA-2335-DAB Panel w/ Pipe Mount (E / #33)	343.25	0.04	7770.00 Panels w/ Pipe Mount (ATT / E / #24)	347.00	0.07
		0.06			0.10
TA-2335-DAB Panel w/ Pipe Mount (E / #33)	343.25	0.11	7770.00 Panels w/ Pipe Mount (ATT / E / #24)	347.00	0.04
		0.17			0.09
15ft Whip Antenna (E / #32)	354.50	0.06	7770.00 Panels w/ Pipe	347.00	0.15
		0.11			0.15
		0.17			0.09
		0.03			0.15
		0.05			0.04

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Description	Placement	Weight	Description	Placement	Weight
	ft	K		ft	K
Mount		0.09	RRUS-32 B2	347.00	0.05
(ATT / E / #24)		0.15	(ATT / P)		0.07
(2) LGP21401 TMA'S	347.00	0.02			0.10
(ATT / E / #24)		0.03	RRUS-32 B2	347.00	0.05
		0.04	(ATT / P)		0.07
(2) LGP21401 TMA'S	347.00	0.02			0.10
(ATT / E / #24)		0.03	Sector Mount w V-Stabilizer	347.00	0.72
		0.04	(Commscope MTC3615 AD		0.95
(2) LGP21401 TMA'S	347.00	0.02	A)		1.19
(ATT / E / #24)		0.03	(ATT / E)		
		0.04	Sector Mount w V-Stabilizer	347.00	0.72
(2) 7020 RET Motor	344.50	0.00	(Commscope MTC3615 AD		0.95
(ATT / E)		0.00	A)		1.19
		0.00	(ATT / E)		
(2) 7020 RET Motor	344.50	0.00	Sector Mount w V-Stabilizer	347.00	0.72
(ATT / E)		0.00	(Commscope MTC3615 AD		0.95
		0.00	A)		1.19
(2) 7020 RET Motor	344.50	0.00	(ATT / E)		
(ATT / E)		0.00	4-Way Walkway Platform w/	339.00	10.25
		0.00	Rails		13.32
SBNHH-1D65A w/ pipe	347.00	0.06	(E)		16.40
mount		0.12	Corner Ladder	350.00 - 339.00	0.45
(ATT / P)		0.18	(E)		0.59
SBNHH-1D65A w/ pipe	347.00	0.06			0.74
mount		0.12	4-Way Face Frame	325.00	3.00
(ATT / P)		0.18	(E)		3.90
SBNHH-1D65A w/ pipe	347.00	0.06			4.79
mount		0.12	(4) 14ft Empty Pipe Mounts	306.00	0.06
(ATT / P)		0.18	(E / #21)		0.09
(2) TPX-070821 Triplexer	347.00	0.01			0.13
(ATT / P)		0.01	OB Light	269.25	0.01
		0.02	(E / #20)		0.01
(2) TPX-070821 Triplexer	347.00	0.01			0.02
(ATT / P)		0.01	OB Light	269.25	0.01
		0.02	(E / #20)		0.01
(2) TPX-070821 Triplexer	347.00	0.01			0.02
(ATT / P)		0.01	AIR-3246 B66 Panel w/ Pipe	262.00	0.22
		0.02	Mount		0.29
OPA-65R-LCUU-H4 w/ Pipe	347.00	0.08	(T-Mobile / New)		0.37
Mounts		0.13	AIR-3246 B66 Panel w/ Pipe	262.00	0.22
(ATT / E)		0.20	Mount		0.29
OPA-65R-LCUU-H4 w/ Pipe	347.00	0.08	(T-Mobile / New)		0.37
Mounts		0.13	AIR-3246 B66 Panel w/ Pipe	262.00	0.22
(ATT / E)		0.20	Mount		0.29
OPA-65R-LCUU-H4 w/ Pipe	347.00	0.08	(T-Mobile / New)		0.37
Mounts		0.13	APXVAARR24_43-U-NA20	262.00	0.18
(ATT / E)		0.20	w/ Pipe Mount		0.32
RRUS-32	347.00	0.08	(T-Mobile / New)		0.46
(ATT / E)		0.10	APXVAARR24_43-U-NA20	262.00	0.18
		0.14	w/ Pipe Mount		0.32
RRUS-32	347.00	0.08	(T-Mobile / New)		0.46
(ATT / E)		0.10	APXVAARR24_43-U-NA20	262.00	0.18
		0.14	w/ Pipe Mount		0.32
RRUS-32	347.00	0.08	(T-Mobile / New)		0.46
(ATT / E)		0.10	AIR32 B66a/B2a Panel w/	262.00	0.15
		0.14	Pipe Mount		0.22
RRUS-32 B2	347.00	0.05	(T-Mobile / New)		0.28
(ATT / P)		0.07	AIR32 B66a/B2a Panel w/	262.00	0.15
		0.10	Pipe Mount		0.22

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Description	Placement	Weight	Description	Placement	Weight
	ft	K		ft	K
(T-Mobile / New)		0.28	(Sprint / New)		0.14
AIR32 B66a/B2a Panel w/	262.00	0.15			0.18
Pipe Mount		0.22	AAHC	244.00	0.11
(T-Mobile / New)		0.28	(Sprint / New)		0.14
KRY 112 144/2 TMA	262.00	0.01			0.18
(T-Mobile / New)		0.02	AAHC	244.00	0.11
		0.02	(Sprint / New)		0.14
KRY 112 144/2 TMA	262.00	0.01			0.18
(T-Mobile / New)		0.02	(2) 800 MHz 2x50W RRH	244.00	0.06
		0.02	(Sprint / New)		0.09
KRY 112 144/2 TMA	262.00	0.01			0.11
(T-Mobile / New)		0.02	(2) 800 MHz 2x50W RRH	244.00	0.06
		0.02	(Sprint / New)		0.09
RADIO 4449 - B71 + B12	262.00	0.07			0.11
(T-Mobile / New)		0.09	(2) 800 MHz 2x50W RRH	244.00	0.06
		0.11	(Sprint / New)		0.09
RADIO 4449 - B71 + B12	262.00	0.07			0.11
(T-Mobile / New)		0.09	13ft Sector Mount	244.25 - 241.50	0.57
		0.11	(Sprint / E / #13-15)		0.78
RADIO 4449 - B71 + B12	262.00	0.07			0.98
(T-Mobile / New)		0.09	13ft Sector Mount	244.25 - 241.50	0.57
		0.11	(Sprint / E / #13-15)		0.78
13ft T-Frame Mount	262.00	0.35			0.98
(T-Mobile / E)		0.48	13ft Sector Mount	244.25 - 241.50	0.57
		0.60	(Sprint / E / #13-15)		0.78
13ft T-Frame Mount	262.00	0.35			0.98
(T-Mobile / E)		0.48	7ft 5-Elem Yagi	208.50	0.01
		0.60	(E / #12)		0.02
13ft T-Frame Mount	262.00	0.35			0.03
(T-Mobile / E)		0.48	5ft Pipe Mount	204.50	0.03
		0.60	(E / #12)		0.03
12" Square Panel w/ Pipe	255.50	0.01			0.04
Mount		0.02	Corner Rest Platform	191.50	0.75
(E / #17)		0.03	(E / #11)		1.01
25ft Rest Platform w/ Rails	251.50	2.65			1.27
(E / #16)		3.58	Corner Rest Platform	191.50	0.75
		4.50	(E / #11)		1.01
25ft Rest Platform w/ Rails	251.50	2.65			1.27
(E / #16)		3.58	Corner Rest Platform	191.50	0.75
		4.50	(E / #11)		1.01
APXVSPP18-C-A20 w/ Pipe	244.00	0.09			1.27
Mount		0.16	Corner Rest Platform	191.50	0.75
(Sprint / E / #14)		0.24	(E / #11)		1.01
APXVSPP18-C-A20 w/ Pipe	244.00	0.09			1.27
Mount		0.16	Beacon Ice Shield	186.00	0.10
(Sprint / E / #14)		0.24	(E / #10)		0.14
APXVSPP18-C-A20 w/ Pipe	244.00	0.09			0.17
Mount		0.16	Beacon Ice Shield	186.00	0.10
(Sprint / E / #14)		0.24	(E / #10)		0.14
1900MHz RRH	244.00	0.06			0.17
(Sprint / E)		0.08	Beacon / Strobe	182.50	0.14
		0.11	(E / #9)		0.18
1900MHz RRH	244.00	0.06			0.22
(Sprint / E)		0.08	Beacon / Strobe	182.50	0.14
		0.11	(E / #9)		0.18
1900MHz RRH	244.00	0.06			0.22
(Sprint / E)		0.08	41ft Rest Platform w/ Rails	125.00	3.75
		0.11	(E / #8)		5.50
AAHC	244.00	0.11			7.25

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Description	Placement	Weight		Description	Placement	Weight	
		ft	K			ft	K
41ft Rest Platform w/ Rails (E / #8)	125.00	3.75	5.50	(VzW / New)		0.07	
		7.25		B13 RRH4x30 (VzW / New)	140.00	0.06	0.08
4ft Rest Platform w/ Rails (E / #7)	100.00	0.45	0.61			0.10	
		0.77		B13 RRH4x30 (VzW / New)	140.00	0.06	0.08
OB Light (E / #6)	93.00	0.01	0.01			0.10	
		0.02		B13 RRH4x30 (VzW / New)	140.00	0.06	0.08
OB Light (E / #6)	93.00	0.01	0.01			0.10	
		0.02		B66A RRH4x45W (VzW / New)	140.00	0.06	0.08
4ft Rest Platform w/ Rails (E / #5)	50.25	0.45	0.61			0.11	
		0.77		B66A RRH4x45W (VzW / New)	140.00	0.06	0.08
4ft Side Arm (E / #4)	46.50	0.55	0.78			0.11	
		1.00		B66A RRH4x45W (VzW / New)	140.00	0.06	0.08
Corner Rest Platform (E / #3)	26.00	0.75	1.01			0.11	
		1.27		B25 RRH4x30W (VzW / New)	140.00	0.06	0.08
Corner Rest Platform (E / #3)	26.00	0.75	1.01			0.10	
		1.27		B25 RRH4x30W (VzW / New)	140.00	0.06	0.08
Corner Rest Platform (E / #3)	26.00	0.75	1.01			0.10	
		1.27		B25 RRH4x30W (VzW / New)	140.00	0.06	0.08
Corner Rest Platform (E / #3)	26.00	0.75	1.01			0.10	
		1.27		B5 RRH4x40W - LOC (VzW / F)	140.00	0.05	0.06
GPS w/ Pipe Mount (E / #2)	26.00	0.01	0.01			0.08	
		0.01		B5 RRH4x40W - LOC (VzW / F)	140.00	0.05	0.06
10ft Pipe Mount w/ Standoff (E / #1)	34.00 - 24.00	0.12	0.16			0.08	
		0.19		B5 RRH4x40W - LOC (VzW / F)	140.00	0.05	0.06
Face Frame w/ Knee Braces (E)	25.00 - 16.67	8.50	11.05			0.08	
		13.60		RVZDC-6627-PF-48 OVP Box w/ Bracket (VzW / New)	140.00	0.03	0.07
(3) JAHH-65B-R3B w/ Pipe Mount (VzW / New / F)	140.00	0.11	0.19			0.11	
		0.27		RVZDC-6627-PF-48 OVP Box w/ Bracket (VzW / New)	140.00	0.03	0.07
(3) JAHH-45B-R3B w/ pipe mount (VzW / New / F)	140.00	0.14	0.22			0.11	
		0.32		RVZDC-6627-PF-48 OVP Box w/ Bracket (VzW / New)	140.00	0.03	0.07
(3) JAHH-45B-R3B w/ pipe mount (VzW / New / F)	140.00	0.14	0.22			0.11	
		0.32		D&D Welding 12ft Arch Boom Mount (VzW / New)	140.00	0.38	0.50
BSAMNT-SBS-2-3	140.00	0.11	0.12			0.63	
Side-By-Side Mounting Kit (VzW / New)		0.12	0.12	D&D Welding 12ft Arch Boom Mount (VzW / New)	140.00	0.38	0.50
		0.07				0.63	
BSAMNT-SBS-2-2	140.00	0.07	0.07	D&D Welding 12ft Arch Boom Mount (VzW / New)	140.00	0.38	0.50
Side-By-Side Mounting Kit (VzW / New)		0.07	0.07			0.50	
		0.07		BSAMNT-SBS-2-2 Side-By-Side Mounting Kit		0.07	0.07

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Dishes

Description	Elevation ft	Weight K
3ft Dish (E / #4)	47.50	0.09 0.13 0.17
4ft Dish (E / #1)	31.00	0.10 0.17 0.24

Load Combinations

Comb. No.	Description	Comb. No.	Description
1	Dead Only	19	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
2	1.2 Dead+1.6 Wind 0 deg - No Ice	20	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
3	0.9 Dead+1.6 Wind 0 deg - No Ice	21	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
4	1.2 Dead+1.6 Wind 45 deg - No Ice	22	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
5	0.9 Dead+1.6 Wind 45 deg - No Ice	23	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
6	1.2 Dead+1.6 Wind 90 deg - No Ice	24	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
7	0.9 Dead+1.6 Wind 90 deg - No Ice	25	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
8	1.2 Dead+1.6 Wind 135 deg - No Ice	26	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
9	0.9 Dead+1.6 Wind 135 deg - No Ice	27	Dead+Wind 0 deg - Service
10	1.2 Dead+1.6 Wind 180 deg - No Ice	28	Dead+Wind 45 deg - Service
11	0.9 Dead+1.6 Wind 180 deg - No Ice	29	Dead+Wind 90 deg - Service
12	1.2 Dead+1.6 Wind 225 deg - No Ice	30	Dead+Wind 135 deg - Service
13	0.9 Dead+1.6 Wind 225 deg - No Ice	31	Dead+Wind 180 deg - Service
14	1.2 Dead+1.6 Wind 270 deg - No Ice	32	Dead+Wind 225 deg - Service
15	0.9 Dead+1.6 Wind 270 deg - No Ice	33	Dead+Wind 270 deg - Service
16	1.2 Dead+1.6 Wind 315 deg - No Ice	34	Dead+Wind 315 deg - Service
17	0.9 Dead+1.6 Wind 315 deg - No Ice		
18	1.2 Dead+1.0 Ice+1.0 Temp		

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	351.67 - 337.5	0.876	28	0.0318	0.0092
T2	337.5 - 325	0.775	28	0.0315	0.0088
T3	325 - 312.5	0.683	28	0.0303	0.0083
T4	312.5 - 300	0.594	28	0.0288	0.0079
T5	300 - 287.5	0.503	28	0.0271	0.0070
T6	287.5 - 275	0.421	28	0.0247	0.0062
T7	275 - 262.5	0.344	28	0.0219	0.0055
T8	262.5 - 250	0.270	28	0.0193	0.0046
T9	250 - 225	0.199	28	0.0164	0.0036
T10	225 - 200	0.108	30	0.0108	0.0024
T11	200 - 175	0.042	32	0.0057	0.0011

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
371.00	12ft Whip Antenna	28	0.876	0.0318	0.0092	765684
369.50	Whip	28	0.876	0.0318	0.0092	765684
364.50	15ft Whip Antenna	28	0.876	0.0318	0.0092	765684

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Elevation	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
364.00	4ft Lightning Rod	28	0.876	0.0318	0.0092	765684
363.00	Beacon / Strobe	28	0.876	0.0318	0.0092	765684
360.00	10ft Pipe Mount	28	0.876	0.0318	0.0092	765684
356.25	4ft Pipe Mount	28	0.876	0.0318	0.0092	765684
355.50	15ft Pipe Mount w/ Guys	28	0.876	0.0318	0.0092	765684
355.00	14ft Mount	28	0.876	0.0318	0.0092	765684
354.50	15ft Whip Antenna	28	0.876	0.0318	0.0092	765684
353.00	TMA	28	0.876	0.0318	0.0092	765684
352.00	Top Stub Tower	28	0.876	0.0318	0.0092	765684
351.00	8ft Pipe Mount	28	0.872	0.0318	0.0092	765684
350.50	3ft Empty Side Arm Mount	28	0.868	0.0318	0.0092	765684
350.00	Corner Ladder	28	0.865	0.0318	0.0091	765684
349.75	8ft Whip Antenna	28	0.863	0.0318	0.0091	765684
349.50	21ft Whip Antenna	28	0.861	0.0318	0.0091	765684
349.00	8ft Empty Pipe Mount	28	0.857	0.0318	0.0091	765684
348.25	20ft 4-Element Dipole	28	0.852	0.0318	0.0091	765684
347.00	Raycap DC6-48-60-18-8F SUPRESSOR	28	0.843	0.0318	0.0091	765684
344.50	(2) 7020 RET Motor	28	0.826	0.0318	0.0090	533949
343.67	3ft 3-Elem Yagi	28	0.820	0.0317	0.0090	478553
343.25	TA-2335-DAB Panel w/ Pipe Mount	28	0.817	0.0317	0.0090	454682
341.00	8ft Pipe Mount on Sector Mount	28	0.801	0.0317	0.0089	361226
339.00	4-Way Walkway Platform w/ Rails	28	0.786	0.0316	0.0088	325531
325.00	4-Way Face Frame	28	0.683	0.0303	0.0083	367261
306.00	(4) 14ft Empty Pipe Mounts	28	0.546	0.0280	0.0074	549479
269.25	OB Light	28	0.310	0.0207	0.0051	Inf
262.00	AIR-3246 B66 Panel w/ Pipe Mount	28	0.267	0.0192	0.0046	Inf
255.50	12" Square Panel w/ Pipe Mount	28	0.229	0.0177	0.0040	138136
251.50	25ft Rest Platform w/ Rails	28	0.207	0.0167	0.0037	88065
244.25	13ft Sector Mount	28	0.173	0.0150	0.0032	95736
244.00	APXVSP18-C-A20 w / Pipe Mount	28	0.172	0.0150	0.0032	97055
242.88	13ft Sector Mount	28	0.168	0.0147	0.0032	103470
241.50	13ft Sector Mount	28	0.162	0.0144	0.0031	112565
208.50	7ft 5-Elem Yagi	32	0.063	0.0075	0.0016	265734
204.50	5ft Pipe Mount	32	0.053	0.0067	0.0014	212082
191.50	Corner Rest Platform	32	0.025	0.0038	0.0007	261821
186.00	Beacon Ice Shield	32	0.016	0.0026	0.0005	392731
182.50	Beacon / Strobe	32	0.011	0.0018	0.0003	576003

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	351.67 - 337.5	3.251	4	0.1150	0.0353
T2	337.5 - 325	2.884	4	0.1141	0.0338
T3	325 - 312.5	2.547	4	0.1097	0.0320
T4	312.5 - 300	2.219	4	0.1043	0.0302
T5	300 - 287.5	1.885	4	0.0983	0.0269
T6	287.5 - 275	1.581	4	0.0897	0.0240
T7	275 - 262.5	1.299	4	0.0794	0.0210
T8	262.5 - 250	1.023	4	0.0700	0.0177
T9	250 - 225	0.758	4	0.0594	0.0136
T10	225 - 200	0.416	8	0.0394	0.0089
T11	200 - 175	0.159	12	0.0208	0.0043

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Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	351.67 - 337.5	Leg	L6x6x5/8	3	-23.63	179.77	13.1	Pass
		Diagonal	L3 1/2x3 1/2x5/16	14	-7.77	20.67	37.6	Pass
		Secondary Horizontal	L3x3x1/4	18	-1.89	15.87	11.9	Pass
		Top Girt	C8x11.5	7	-0.20	54.59	0.7	Pass
T2	337.5 - 325	Leg	L6x6x5/8	23	-30.51	180.87	16.9	Pass
		Diagonal	L3 1/2x3 1/2x5/16	34	-10.47	19.20	54.6	Pass
		Horizontal	C7x9.8	27	3.66	87.64	4.2	Pass
		Secondary Horizontal	L3x2 1/2x1/4	38	-0.46	8.46	5.4	Pass
T3	325 - 312.5	Leg	L6x6x7/8	43	-49.58	247.24	20.1	Pass
		Diagonal	L3 1/2x4x5/16	59	-11.64	20.13	57.8	Pass
		Horizontal	2L2 1/2x2 1/2x1/4x3/8	47	6.17	63.37	9.7	Pass
		Secondary Horizontal	L3x2 1/2x1/4	63	-0.75	7.02	10.6	Pass
T4	312.5 - 300	Inner Bracing	2L2x2 1/2x1/4x3/8	53	0.01	69.01	0.8	Pass
		Leg	L6x6x7/8	68	-61.42	253.32	24.2	Pass
		Diagonal	2L2 1/2x2 1/2x1/4x3/8	88	-14.69	21.60	68.0	Pass
		Horizontal	2L2 1/2x2 1/2x1/4x3/8	84	-8.25	31.81	25.9	Pass
T5	300 - 287.5	Redund Horz 1 Bracing	L2 1/2x2 1/2x3/16	82	-0.92	15.09	6.1	Pass
		Redund Diag 1 Bracing	L2 1/2x2x3/16	83	-0.76	4.69	16.2	Pass
		Inner Bracing	2L2x2 1/2x1/4x3/8	102	-0.02	3.55	0.9	Pass
		Leg	L6x6x7/8	105	-79.14	253.32	31.2	Pass
T6	287.5 - 275	Diagonal	2L2 1/2x2 1/2x5/16x3/8	125	-15.49	25.05	61.8	Pass
		Horizontal	2L2 1/2x2 1/2x1/4x3/8	121	-9.94	26.71	37.2	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	123	-1.19	18.49	6.4	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	120	-0.92	8.41	10.9	Pass
T7	275 - 262.5	Inner Bracing	2L2 1/2x2 1/2x1/4x3/8	139	-0.02	5.50	1.1	Pass
		Leg	L6x6x7/8	142	-97.14	253.32	38.3	Pass
		Diagonal	2L2 1/2x2 1/2x5/16x3/8	162	-16.09	23.23	69.3	Pass
		Horizontal	2L2 1/2x2 1/2x1/4x3/8	158	-10.72	22.98	46.6	Pass
T8	262.5 - 250	Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	160	-1.46	16.35	8.9	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	157	-1.07	7.74	13.8	Pass
		Inner Bracing	2L2 1/2x2 1/2x1/4x3/8	176	-0.02	4.61	1.2	Pass
		Leg	L8x8x3/4	179	-115.32	327.61	35.2	Pass
T9	250 - 237.5	Diagonal	2L2 1/2x2 1/2x1/4x3/8	201	-16.77	30.68	54.7	Pass
		Horizontal	2L2 1/2x2 1/2x1/4x3/8	197	-11.60	19.98	58.1	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x3/16	199	-1.73	11.03	15.7	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x3/16	194	-1.21	5.50	22.1	Pass
T10	237.5 - 225	Redund Hip 1 Bracing	L3x3x1/4	195	-0.05	11.22	0.6	Pass
		Redund Hip Diagonal 1 Bracing	2L2 1/2x2 1/2x1/4x3/8	196	-0.11	9.97	1.1	Pass
		Inner Bracing	2L2 1/2x2 1/2x3/16x3/8	221	-0.02	3.03	1.6	Pass
		Leg	L8x8x3/4	224	-137.30	327.61	41.9	Pass
T11	225 - 212.5	Diagonal	2L2 1/2x2 1/2x1/4x3/8	246	-19.30	28.93	66.7	Pass
		Horizontal	2L2 1/2x2 1/2x1/4x3/8	242	-13.91	17.73	78.4	Pass

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Section No.	Elevation ft	Component Type	Size	Critical Element	P K	σP_{allow} K	% Capacity	Pass Fail
T9	250 - 225	Redund Horz 1 Bracing	L2 1/2x2 1/2x3/16	238	-2.07	9.40	22.0	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x3/16	239	-1.39	5.22	26.7	Pass
		Redund Hip 1 Bracing	L3x3x1/4	260	-0.05	9.65	0.6	Pass
		Redund Hip Diagonal 1 Bracing	2L2 1/2x2 1/2x1/4x3/8	241	-0.11	8.81	1.2	Pass
		Inner Bracing Leg	2L2 1/2x2 1/2x3/16x3/8 L8x8x7/8	266 269	-0.02 -149.41	2.60 344.61	1.7 43.4	Pass Pass
		Diagonal	2L2.5x3x5/16 + 2L3x3x3/8	303	-36.71	58.63	59.6 (b) 62.6	Pass
		Horizontal	2L3x2 1/2x1/4x3/8	297	-16.06	24.69	65.0	Pass
		Redund Horz 1 Bracing	2L1 3/4x1 3/4x3/16	290	-2.25	18.90	11.9	Pass
		Redund Horz 2 Bracing	2L2 1/2x2 1/2x1/4x3/8	291	-2.25	28.33	7.9	Pass
		Redund Diag 1 Bracing	2L2x2x3/16	292	-2.27	11.88	19.1	Pass
		Redund Diag 2 Bracing	2L2 1/2x2x3/16x3/8	307	-8.26	12.12	68.1	Pass
		Redund Hip 2 Bracing	L3 1/2x3 1/2x5/16	325	-0.18	9.30	1.9	Pass
		Redund Hip Diagonal 2 Bracing	2L2 1/2x2 1/2x1/4x3/8	296	-0.14	6.33	2.3	Pass
		Redund Sub Horz Bracing	2L2 1/2x2 1/2x1/4x3/8	294	-9.67	20.40	47.4	Pass
T10	225 - 200	Inner Bracing Leg	2L2 1/2x2 1/2x1/4x3/8 L8x8x1 1/8	331 334	-0.03 -198.84	11.69 434.78	1.5 45.7	Pass Pass
		Diagonal	2L2.5x3x5/16 + 2L3x3x3/8	368	-37.92	51.39	73.8	Pass
		Horizontal	2L3x2 1/2x1/4x3/8	348	-18.48	51.94	35.6	Pass
		Redund Horz 1 Bracing	2L1 3/4x1 3/4x3/16	355	-2.99	17.87	16.7	Pass
		Redund Horz 2 Bracing	2L2 1/2x2 1/2x1/4x3/8	356	-2.99	21.77	13.7	Pass
		Redund Diag 1 Bracing	2L2x2x3/16	357	-2.74	10.92	25.1	Pass
		Redund Diag 2 Bracing	2L2 1/2x2x3/16x3/8	353	-5.84	10.35	56.5	Pass
		Redund Hip 2 Bracing	L4x4x3/8	390	-0.20	12.87	1.5	Pass
		Redund Hip Diagonal 2 Bracing	2L2 1/2x2 1/2x1/4x3/8	361	-0.14	5.15	2.8	Pass
		Redund Sub Horz Bracing	2L2 1/2x2 1/2x1/4x3/8	359	-7.37	16.28	45.3	Pass
		Inner Bracing Leg	L3x3x1/4 L8x8x1 1/8	396 399	-0.02 -246.03	3.25 522.80	2.1 47.1	Pass Pass
		Diagonal	2L2.5x3.5x5/16 + 2L3x3.5x3/8	433	-42.18	70.20	73.7 (b) 60.1	Pass
		Horizontal	2L3 1/2x2 1/2x1/4x3/8	413	-21.58	53.17	40.6	Pass
		Redund Horz 1 Bracing	2L1 3/4x1 3/4x3/16	420	-3.70	16.78	22.1	Pass
T11	200 - 175	Redund Horz 2 Bracing	2L2 1/2x2 1/2x1/4x3/8	421	-3.70	17.25	21.4	Pass
		Redund Diag 1 Bracing	2L2x2x3/16	422	-3.13	10.05	31.1	Pass
		Redund Diag 2	2L2 1/2x2x3/16x3/8	418	-7.91	8.88	89.1	Pass

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Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
		Bracing						
		Redund Hip 2	L4x4x3/8	455	-0.20	10.27	2.0	Pass
		Bracing						
		Redund Hip Diagonal	2L2 1/2x2 1/2x1/4x3/8	426	-0.15	4.26	3.5	Pass
		2 Bracing						
		Redund Sub Horz	2L2 1/2x3x1/4x3/8	424	-10.67	14.08	75.8	Pass
		Bracing						
		Inner Bracing	2L3x2 1/2x1/4x3/8	461	-0.04	12.07	2.1	Pass

*Elev. 175-351.67ft – Modelled in TnxTower.

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Section No.	Elevation ft	Component Type	Member Size	P kips	Pallow kips	% Cap. Member	% Cap. Bolt	Pass Fail
T12	175 - 150	*Legs - A	ST L808018	267.83	522.8	51.23	90.21	Pass
		*Diagonals - B / Bolt Replacement One End Only	2L2.5x3x5/16 + 2L3x3x3/8	61.5	101.93	60.34	64.45	Pass
		*Horizontals - O / Added Redundant Braces	LD L35255 SP 0.4375	38.86	65	59.78	61.08	Pass
		*Red Horiz 1 - C (LLV)	ST L25203	1.31	13.41	9.77	8.24	Pass
		*Red Diag 1 - D	ST L30303	1.44	8.13	17.72	9.05	Pass
		*Red Horiz 2 - E	LD L25254 SP 0.375	1.85	53.8	3.44	5.82	Pass
		*Red Diag 2 - L	LD L30306 SP 0.4375	26.26	37.98	69.14	41.28	Pass
		*Red Sub Diagonal - M / New Reinforcement	2L3x2.5x1/4 + L3.5x2.5x3/8	40.79	59.54	68.51	42.75	Pass
		*Red Vertical - N	ST L30304	0.02	11.34	0.18	0.13	Pass
		*Red Sub Horizontal - F / Bolt Replacement	LD L30304 SP 0.4375	31.71	46.52	68.16	39.88	Pass
		*Hip Horizontal 2 - G	LD L40304 SP 0.375	3.49	89.16	3.91	10.97	Pass
		*Hip Diagonal 2 - K	LD L25254 SP 0.375	6.2	16.99	36.5	19.49	Pass
		*Hip Horz 2 Sub Braces - H (LLV)	ST L30254	0.24	17.78	1.35	1.51	Pass
		*Level 1 Internal Sub Diagonals - J	ST L30304	2.28	13.17	17.31	14.34	Pass
		*Level 1 Internal Horizontal - I	LD L40304 SP 0.375	5.02	71.54	7.02	15.78	Pass
		*Level 2 Internal Corner Diagonals - Q	ST L30304	2.31	9.62	24.02	14.52	Pass
		*Level 2 Internal Middle Diagonals - S	ST L30304	2.31	9.42	24.53	14.52	Pass
		*Level 2 Internal Corner Diagonals Sub Braces - P	ST L30254	2.19	12.19	17.97	13.77	Pass
		*Level 2 Internal Horizontal - R	LD L40304 SP 0.375	2.12	46.83	4.53	6.66	Pass
T13	150 - 125	*Legs - A	ST L808018	277.66	522.39	53.15	78.53	Pass
		*Diagonals - B / Reinforcement / Bolt Replacement	2L3x3.5x3/8 + 2L3x3.5x3/8	90.23	105.63	85.42	81.05	Pass
		*Horizontals - K / Added Redundant Braces	LD L35305 SP 0.4375	59.03	80.3	73.51	92.79	Pass
		*Red Horiz 1 - C (LLV)	ST L25204	1.76	22.08	7.97	11.07	Pass
		*Red Diag 1 - D	ST L30303	2.36	8.65	27.28	14.84	Pass
		*Red Horiz 2 - E	SD L25203 SP 0.375	5.93	16.82	35.26	18.64	Pass
		*Red Diag 2 - I / Replace Existing	LD L35356 SP 0.4375	56.4	71.18	79.24	88.66	Pass
		*Red Sub Diagonal - J / New Reinf. - Replace Bolts	2L3x2.5x1/4 + L3.5x2.5x3/8	46.53	55.38	84.02	39.01	Pass
		*Red Sub Horizontal - F / Add Kicker Internal	LD L40406 SP 0.5	41.82	55.51	75.34	65.74	Pass
		*Hip Horizontal 2 - G	SD L30254 SP 0.375	0	23.37	0	0	Pass
		*Hip Diagonal 2 - H	LD L25254 SP 0.375	0.01	16.35	0.06	0.03	Pass
		*Internal Corner Diagonals - M (LLH)	ST L35304	1.75	10.39	16.84	11	Pass
		*Internal Middle Diagonals - N (LLV)	ST L35304	1.53	9.45	16.2	9.62	Pass
		*Internal Corner Diagonals Sub Braces - L (LLV)	ST L30254	4.85	10.42	46.57	30.49	Pass

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Section No.	Elevation ft	Component Type	Member Size	P kips	Pallow kips	% Cap. Member	% Cap. Bolt	Pass Fail
		*Internal Horizontal - O (LLV)	LD L40304 SP 0.375	3.76	39.7	9.47	11.82	Pass
T14	125 - 100	*Legs - A / Replace Bolts @ 103.5ft Approx.	ST L808016	354.06	497.74	71.13	46.73	Pass
		*Diagonals - B / Bolt Replacement One End Only	2L3x3.5x3/8 + 2L3x3.5x3/8	82.13	92.98	88.33	51.64	Pass
		*Horizontals - K / Added Redundant Braces	LD L40355 SP 0.4375	60.34	92.83	65	75.88	Pass
		*Red Horiz 1 - C (LLV)	ST L25203	1.5	12.93	11.6	9.43	Pass
		*Red Diag 1 - D	ST L30303	1.68	8.03	20.93	10.56	Pass
		*Red Horiz 2 - E	LD L25254 SP 0.4375	2.05	26.66	7.69	6.44	Pass
		*Red Diag 2 - I	LD L35356 SP 0.4375	49	63.66	76.97	77.02	Pass
		*Red Sub Diagonal - J / New Reinforcement	2L3x3x3/8 + L3.5x3x3/8	48.53	102.21	47.48	50.86	Pass
		*Red Sub Horizontal - F / Add Kicker Internal	LD L40406 SP 0.5	45.61	56.75	80.37	47.8	Pass
		*Hip Horizontal 2 - G	SD L30254 SP 0.375	0.01	14.86	0.07	0.03	Pass
		*Hip Diagonal 2 - H	LD L25254 SP 0.375	0	15.07	0	0	Pass
		*Internal Corner Diagonals - M	ST L35354	3.05	10.55	28.91	19.18	Pass
		*Internal Middle Diagonals - N	ST L35354	2.71	10.93	24.78	17.04	Pass
		*Internal Corner Diagonals Sub Braces - L	ST L35354	6.46	17.07	37.85	40.62	Pass
		*Internal Horizontal - O	LD L40354 SP 0.375	5.24	37.75	13.88	16.47	Pass
T15	100 - 75	*Legs - A / Replace Bolts @ 78.5ft Approx.	ST L808016	461.2	497.74	92.66	53.26	Pass
		*Diagonals - B	2L3x3.5x3/8 + 2L3x3.5x3/8	63.19	139	45.46	79.46	Pass
		*Horizontals - Q / New Reinforcement	2L3.5x3x5/16 + L4x3.5x3/8	49.49	97.93	50.54	77.79	Pass
		*Red Horiz 1 - C	ST L25253	1.45	9.37	15.47	9.12	Pass
		*Red Diag 1 - D	LD L25253 SP 0.375	1.19	15.4	7.73	3.74	Pass
		*Red Horiz 2 - E	LD L25254 SP 0.5	1.82	40.09	4.54	5.72	Pass
		*Red Diag 2 - M / Replace Existing Member	LD L35356 SP 0.4375	25.24	38	66.41	39.67	Pass
		*Red Sub Diagonal - O	LD L40408 SP 0.4375	63.22	75.65	83.57	39.75	Pass
		*Red Sub Horizontal - F / Add Kicker Internal	SD L35304 SP 0.5	17.71	24.98	70.89	55.68	Pass
		*Red Vertical Outside - N	ST L25254	0.05	6.48	0.77	0.31	Pass
		*Red Vertical Center - P	ST L25254	0	6.48	0	0	Pass
		*Hip Horizontal 1 - CC	ST L30303	0.07	7.1	0.99	0.44	Pass
		*Hip Horizontal 2 - G	LD L35254 SP 0.375	0.05	49.46	0.1	0.16	Pass
		*Hip Diagonal 2 - J	LD L25254 SP 0.375	0.01	33.01	0.03	0.03	Pass
		*Hip SubDiagonal 2 - K	ST L25253	0	6.63	0	0	Pass
		*Hip SubVertical 2 - L	ST L25253	0	17.13	0	0	Pass
		*Hip SubInternal 2 - I	ST L30303	0	7.1	0	0	Pass

tnxTower Malouf Engineering Int'l Inc. 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583	Job 350ft SST / Norwalk East - Willard RD Site #CTU2132	Page 14 of 17
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	Client EMPIRE TELECOM / AT&T	Designed by KM

Section No.	Elevation ft	Component Type	Member Size	P kips	Pallow kips	% Cap. Member	% Cap. Bolt	Pass Fail
		*Hip SubInternal 2 - H	ST L25253	0	8.1	0	0	Pass
		*Internal Corner Horizontal 1 - V	ST L30303	0.07	10.18	0.69	0.44	Pass
		*Internal Corner Diagonal 1 - U	ST L25253	0.05	8.8	0.57	0.31	Pass
		*Internal Corner Horizontal 2 - T	LD L30254 SP 0.375	4.21	40.08	10.5	13.24	Pass
		*Internal Corner Diagonal 2 - S	SD L30254 SP 0.375	2.37	43.73	5.42	7.45	Pass
		*Internal Corner Diagonal 2 - W	ST L30303	3.88	7.82	49.59	24.4	Pass
		*Internal Corner Horizontal 3 - R	LD L35254 SP 0.4375	5.9	53.92	10.94	18.55	Pass
		*Internal Corner Diagonal 3 - X	LD L30304 SP 0.375	5.5	47.01	11.7	17.29	Pass
T16	75 - 50	*Legs - A / Add Redundants / Replace Bolts	ST L808016	521.42	625.5	83.36	53.53	Pass
		*Diagonals - B	2L3x3.5x3/8 + 2L3x3.5x3/8	64.72	140.71	46	81.39	Pass
		*Horizontals - Q / New Reinforcement	2L4x3x1/4 + L4x3.5x3/8	52.67	76.37	68.97	66.23	Pass
		*Red Horiz 1 - C	ST L25253	1.14	8.72	13.07	7.17	Pass
		*Red Diag 1 - D	LD L25254 SP 0.375	5.02	38.59	13.01	15.78	Pass
		*Red Horiz 2 - E	LD L30254 SP 0.5	2.26	51.49	4.39	7.1	Pass
		*Red Diag 2 - M	LD L35356 SP 0.4375	27.46	70.68	38.85	62.16	Pass
		*Red Sub Diagonal - O / New Reinforcement	2L4x4x1/2 + L4x4x3/8	65.71	163.61	40.16	41.32	Pass
		*Red Sub Horizontal - F / Add Kicker Internal	SD L35304 SP 0.5	18.7	21.93	85.25	58.79	Pass
		*Red Vertical Outside - N	ST L25254	0.06	6.48	0.93	0.38	Pass
		*Red Vertical Center - P	ST L25254	0	6.48	0	0	Pass
		*Hip Horizontal 1 - CC	ST L30303	0.1	6.19	1.62	0.63	Pass
		*Hip Horizontal 2 - G	LD L35254 SP 0.375	0.06	46.3	0.13	0.19	Pass
		*Hip Diagonal 2 - J	LD L25254	0.03	29.89	0.1	0.09	Pass
		*Hip SubDiagonal 2 - K	ST L25253	0.01	5.97	0.17	0.06	Pass
		*Hip SubVertical 2 - L	ST L25253	0	17.13	0	0	Pass
		*Hip SubInternal 2 - I	ST L30303	0	6.19	0	0	Pass
		*Hip SubInternal 2 - H	ST L25253	0	7.06	0	0	Pass
		*Internal Corner Horizontal 1 - V	ST L30303	0.06	12.27	0.49	0.38	Pass
		*Internal Corner Diagonal 1 - U	ST L25253	0.05	7.25	0.69	0.31	Pass
		*Internal Corner Horizontal 2 - T	LD L30254 SP 0.375	5	37.03	13.5	15.72	Pass
		*Internal Corner Diagonal 2 - S	SD L30254 SP 0.375	2.87	40.52	7.08	9.02	Pass
		*Internal Corner Diagonal 2 - W	ST L30303	4.91	6.77	72.49	30.87	Pass
		*Internal Corner Horizontal 3 - R	LD L40356 SP 0.375	5.87	106.7	5.5	18.45	Pass
		*Internal Corner Diagonal 3 - X	LD L30304 SP 0.375	6.97	43.03	16.2	21.91	Pass
T17	50 - 25	*Legs - A / Replace Bolts @ 28.5ft Approx.	ST L808016	586	625.11	93.74	60.16	Pass
		*Diagonals - B	2L3x4x3/8 + 2L3x4x3/8	68.93	129.59	53.19	86.68	Pass

tnxTower Malouf Engineering Int'l Inc. 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583	Job 350ft SST / Norwalk East - Willard RD Site #CTU2132	Page 15 of 17
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Section No.	Elevation ft	Component Type	Member Size	P kips	Pallow kips	% Cap. Member	% Cap. Bolt	Pass Fail
		*Horizontals - X / New Reinforcement	2L4x3x5/16 + L4x3.5x3/8	57.2	79.09	72.32	71.93	Pass
		*Red Horiz 1 - E	ST L25254	1.35	9.95	13.56	8.49	Pass
		*Red Diag 1 - G	LD L25253 SP 0.4375	5.17	36.86	14.02	16.25	Pass
		*Red Horiz 2 - M	LD L25254 SP 0.5	3.43	33.58	10.21	10.78	Pass
		*Red Diag 2 - T	LD L35356 SP 0.4375	30.35	92.25	32.9	47.71	Pass
		*Red Sub Horiz 1 - C	ST L25254	2.64	24.86	10.62	16.6	Pass
		*Red Sub Diag 1 - D	ST L25254	2.83	15.38	18.41	25.62	Pass
		*Red Sub Diag 2 - F	ST L25254	5	13.28	37.64	45.27	Pass
		*Red Sub Horiz 2 - H	ST L25254	4.66	24.85	18.75	42.19	Pass
		*Red Sub Diag 3 - R	ST L25254	2.17	5.78	37.57	19.65	Pass
		*Red Sub Horiz 3 - S	ST L25254	2.89	8.06	35.85	26.17	Pass
		*Red Sub Diagonal - V / New Reinforcement	2L4x4x1/2 + L4x4x3/8	70.22	151.83	46.25	44.15	Pass
		*Red Sub Horizontal - N / Add Kicker Internal	SD L40304 SP 0.5	20.74	21.43	96.8	65.2	Pass
		*Red Vertical Outside - U	ST L25254	0.06	6.48	0.93	0.38	Pass
		*Red Vertical Center - W	ST L25254	0	6.48	0	0	Pass
		*Hip Horizontal 1 - I	ST L40406	0.09	24.95	0.36	0.57	Pass
		*Hip Horizontal 2 - J	LD L35255 SP 0.375	0.07	52.43	0.13	0.22	Pass
		*Hip Diagonal 2 - O	LD L25254 SP 0.375	0.01	27.15	0.04	0.03	Pass
		*Hip SubDiagonal 2 - Q	ST L25253	0.01	5.4	0.19	0.06	Pass
		*Hip SubVertical 2 - P	ST L25253	0	17.13	0	0	Pass
		*Hip SubInternal 2 - K	ST L30304	0	7.09	0	0	Pass
		*Hip SubInternal 2 - L	ST L25253	0	6.21	0	0	Pass
		*Internal Corner Horizontal 1 - C1	ST L30304	0.05	12.37	0.4	0.31	Pass
		*Internal Corner Diagonal 1 - B1	ST L30304	0.04	14.78	0.27	0.25	Pass
		*Internal Corner Horizontal 2 - A1	LD L30254 SP 0.375	5.01	32.65	15.34	15.75	Pass
		*Internal Corner Diagonal 2 - Z	LD L25254 SP 0.375	2.91	34.24	8.5	9.15	Pass
		*Internal Corner Diagonal 2 - D1	LD L25253 SP 0.375	4.91	15.55	31.57	15.44	Pass
		*Internal Corner Horizontal 3 - Y	LD L35255 SP 0.4375	5.66	56.66	9.99	17.79	Pass
		*Internal Corner Diagonal 3 - E1	LD L30304 SP 0.4375	6.95	39.65	17.53	21.85	Pass
T18	25 - 0	*Legs - A / Replace Splice Bolts @ 3.5ft Approx.	ST L808018	653.76	696.49	93.86	60.4	Pass
		*Diagonals - B	SD L60406 SP 0.5	68.75	102.1	67.34	74.1	Pass
		*Horizontals - L1	LD L50356 SP 0.4375	57.7	94.96	60.76	72.56	Pass
		*Red Horiz 1 - E	ST L25254	1.43	9.94	14.39	8.99	Pass
		*Red Diag 1 - G	LD L25254 SP 0.5	4.94	46.82	10.55	15.53	Pass
		*Red Horiz 2 - O	LD L35256 SP 0.4375	5.93	66.02	8.98	18.64	Pass

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Section No.	Elevation ft	Component Type	Member Size	P kips	Pallow kips	% Cap. Member	% Cap. Bolt	Pass Fail
		*Red Diag 2 - T	LD L35356 SP 0.4375	30.44	89.22	34.12	31.9	Pass
		*Red Sub Horiz 1 - C	ST L25254	2.87	23.56	12.18	25.99	Pass
		*Red Sub Diag 1 - D	ST L25254	3.25	14.67	22.16	29.43	Pass
		*Red Sub Diag 2 - F	ST L25254	4.73	12.57	37.62	42.83	Pass
		*Red Sub Horiz 2 - H	ST L25254	4.48	23.56	19.02	40.56	Pass
		*Red Sub Diag 3 - R	ST L25254	1.84	5.31	34.64	16.66	Pass
		*Red Sub Horiz 3 - S	ST L25254	2.36	7.18	32.86	21.37	Pass
		*Red Sub Diagonal - V	LD L50506 SP 0.4375	61.13	155.95	39.2	28.24	Pass
		*Red Sub Horizontal - Q	ST C9X13	26.88	28.94	92.88	10.56	Pass
		*Red Vertical Outside - U	ST L25254	5.87	6.45	91	36.91	Pass
		*Red Vertical Center - Z	LD L30254 SP 0.5	0.03	43.37	0.07	0.09	Pass
		*Red Vertical Inner 1 - X	LD L25254 SP 0.375	15.12	51.22	29.52	47.53	Pass
		*Red Vertical Inner 2 - Y / Reinforcement DBL L	LD L30304 SP 0.5	18.9	37.02	51.06	59.42	Pass
		*Red Vertical Sub Diagonal - W	LD L25254 SP 0.5	18.41	20.49	89.83	57.88	Pass
		*Hip Horizontal 1 - I	ST L40406	0.12	22.23	0.54	0.75	Pass
		*Hip Diagonal 1 - J	LD L25254 SP 0.5	0.11	14.43	0.76	0.35	Pass
		*Hip Horizontal 2 - L	LD L35354 SP 0.4375	2.65	46.21	5.73	8.33	Pass
		*Hip Diagonal 2 - A1	LD L25254 SP 0.375	1.8	24.81	7.26	5.66	Pass
		*Hip SubDiagonal 2 - C1	ST L25253	0	4.86	0	0	Pass
		*Hip SubVertical 2 - B1	ST L25253	0	17.08	0	0	Pass
		*Hip SubInternal 2-1 - KK	LD L25253 SP 0.4375	3.57	24.2	14.75	11.22	Pass
		*Hip SubInternal 2-2 - K / Reinforcement DBL L	LD L25253 SP 0.4375	6.02	22.07	27.28	18.93	Pass
		*Internal-1 Sub Braces - N	ST L30304	1.98	8.94	22.14	12.45	Pass
		*Internal-1 Inner Horiz - M	LD L60355 SP 0.375	7.93	85.5	9.28	24.93	Pass
		*Internal-2 Corner Horizontal 1 - H1	LD L25253 SP 0.4375	0.11	27.08	0.41	0.35	Pass
		*Internal-2 Corner Diagonal 1 - G1	ST L25254	0.07	7.05	0.99	0.44	Pass
		*Internal-2 Corner Horizontal 2 - F1	LD L30254 SP 0.375	3.68	28.87	12.75	11.57	Pass
		*Internal-2 Corner Diagonal 2-1 - E1	LD L25254 SP 0.375	1.97	30.15	6.53	6.19	Pass
		*Internal-2 Corner Diagonal 2-2 - I1	LD L25253 SP 0.4375	3.05	13.74	22.2	9.59	Pass
		*Internal-2 Corner Horizontal 3 - D1	LD L35255 SP 0.4375	4.53	51.65	8.77	14.24	Pass
		*Internal-2 Corner Diagonal 3 - K2	LD L30254 SP 0.5	4.27	48.03	8.89	13.42	Pass
		*Internal-2 Corner Diagonal 3 - Sub1 - J1	ST L30304	0.17	12.76	1.33	1.07	Pass
		*Internal-2 Corner Diagonal 3 - Sub2 - K1	LD L30304 SP 0.5	0.01	53.07	0.02	0.03	Pass
T12	175-150	Reinforcement / Redundant Vertical / RV12	ST L25254	0.12	6.27	1.92	1.09	Pass
		Reinforcement / Internal / RI12	ST L25254	0.88	10.93	8.05	7.97	Pass

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Section No.	Elevation ft	Component Type	Member Size	P kips	Pallow kips	% Cap. Member	% Cap. Bolt	Pass Fail
T13	150-125	Reinforcement / Redundant Vertical / RV13	ST L25254	0.21	6.44	3.26	1.9	Pass
		Reinforcement / Internal / RI13	ST L25254	1.24	9.6	12.92	11.23	Pass
		Reinforcement / Internal Kicker / RK13	ST L30304	0.01	6.34	0.16	0.06	Pass
T14	100-125	Reinforcement / Redundant Vertical / RV14	ST L30304	0.18	11.39	1.58	1.13	Pass
		Reinforcement / Internal / RI14	ST L30304	1.1	13.08	8.41	6.92	Pass
		Reinforcement / Internal Kicker / RK14	ST L30304	0.01	5.67	0.18	0.06	Pass
T15	75-100	Reinforcement / Internal Kicker / RK15	ST L30304	0.01	6.83	0.15	0.06	Pass
T16	50-75	Reinforcement / Internal Kicker / RK16	ST L30304	0.01	6.46	0.15	0.06	Pass
		*Reinforcement / Red Sub Horiz 1 - C16	ST L25254	2.13	26.21	8.13	13.39	Pass
		*Reinforcement / Red Sub Diag 1 - D16	ST L25254	2.64	16.14	16.36	16.6	Pass
		*Reinforcement / Red Sub Diag 2 - F16	ST L25254	4.8	14.04	34.19	30.18	Pass
		*Reinforcement / Red Sub Horiz 2 - H16	ST L25254	4.14	26.21	15.79	26.03	Pass
		*Reinforcement / Red Sub Diag 3 - R16	ST L25254	1.83	6.35	28.83	11.51	Pass
		*Reinforcement / Red Sub Horiz 3 - S16	ST L25254	2.09	9.17	22.8	13.14	Pass
T17	25-50	*Reinforcement / Internal Kicker / RK17	ST L30304	0.01	6.11	0.16	0.06	Pass
T9	250-225	Red Horiz 1 - C	ST L25203	2.22	12.37	17.95	13.96	Pass
		Red Diag 1 - D	ST L30303	2.24	8.45	26.52	14.08	Pass
T10	225-200	Red Horiz 1 - C	ST L25204	2.84	12.61	22.53	17.86	Pass
		Red Diag 1 - D	ST L30303	2.6	7.77	33.45	16.35	Pass
T11	200-175	Red Horiz 1 - C	ST L25253	3.52	11.5	30.6	22.13	Pass
		Red Diag 1 - D	ST L30304	2.98	9.31	32	18.74	Pass

*Elev. 0-175ft – Tower modelled in Staad. Tower Members were considered as truss members and Loads are from Staad Analysis.

 Malouf Engineering International Inc. 17950 Preston Rd. Suite 720 Dallas, Texas. 75252 / p (972)-783-2578 maloufengineering.com	Job No CT04761S-19V	Sheet No 1	Rev 0
	Part 0 TO 175FT OF TOWER		
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Job Title 351.7ft Self Supporting Tower	By KM	Date 6-Feb-19	Chd HML
Client EMPIRE TELECOM / AT&T	File CT04761S-19V0.std	Date/Time 07-Feb-2019 10:31	

Job Information

	Engineer	Checked	Approved
Name:	KM	HML	MM
Date:	6-Feb-19	7-Feb-19	7-Feb-19

Project ID	
Project Name	

Comments

SPRINT APPURTENANCE CHANGES - ELEV. 244FT
 2018 CT SBC / 2015 IBC / ANSI/TIA-222-G
 Vult=120MPH / Vasd=93MPH / 50MPH + 3/4" ICE / Vservice=60MPH
 EXPOSURE 'C' / CLASS 'II' / TOPO 1
 0 to 175ft of Tower Modelled

Structure Type | SPACE FRAME

Number of Nodes	804	Highest Node	820
Number of Elements	2008	Highest Beam	2024

Number of Basic Load Cases	-2
Number of Combination Load Cases	0

Included in this printout are data for:

All	The Whole Structure
-----	---------------------

Included in this printout are results for load cases:

Type	L/C	Name
Primary	1	DEAD ONLY
Primary	2	1.2 DEAD+1.6 WIND 0 DEG - NO ICE
Primary	3	0.9 DEAD+1.6 WIND 0 DEG - NO ICE
Primary	4	1.2 DEAD+1.6 WIND 45 DEG - NO ICE
Primary	5	0.9 DEAD+1.6 WIND 45 DEG - NO ICE
Primary	6	1.2 DEAD+1.6 WIND 90 DEG - NO ICE
Primary	7	0.9 DEAD+1.6 WIND 90 DEG - NO ICE
Primary	8	1.2 DEAD+1.6 WIND 135 DEG - NO ICE
Primary	9	0.9 DEAD+1.6 WIND 135 DEG - NO ICE
Primary	10	1.2 DEAD+1.6 WIND 180 DEG - NO ICE
Primary	11	0.9 DEAD+1.6 WIND 180 DEG - NO ICE
Primary	12	1.2 DEAD+1.6 WIND 225 DEG - NO ICE
Primary	13	0.9 DEAD+1.6 WIND 225 DEG - NO ICE
Primary	14	1.2 DEAD+1.6 WIND 270 DEG - NO ICE
Primary	15	0.9 DEAD+1.6 WIND 270 DEG - NO ICE
Primary	16	1.2 DEAD+1.6 WIND 315 DEG - NO ICE
Primary	17	0.9 DEAD+1.6 WIND 315 DEG - NO ICE
Primary	18	1.2 DEAD+1.0 ICE+1.0 TEMP
Primary	19	1.2 DEAD+1.0 WIND 0 DEG+1.0 ICE+1.0



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 Dallas, Texas. 75252 / p (972)-783-2578
 maloufengineering.com

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Part 0 TO 175FT OF TOWER		
Ref		
By KM	Date 6-Feb-19	Chd HML
Client EMPIRE TELECOM / AT&T	File CT04761S-19V0.std	Date/Time 07-Feb-2019 10:31

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Job Title 351.7ft Self Supporting Tower

Client EMPIRE TELECOM / AT&T

Job Information Cont...

Type	L/C	Name
Primary	23	1.2 DEAD+1.0 WIND 180 DEG+1.0 ICE+1
Primary	24	1.2 DEAD+1.0 WIND 225 DEG+1.0 ICE+1
Primary	25	1.2 DEAD+1.0 WIND 270 DEG+1.0 ICE+1
Primary	26	1.2 DEAD+1.0 WIND 315 DEG+1.0 ICE+1
Primary	27	DEAD+WIND 0 DEG - SERVICE
Primary	28	DEAD+WIND 45 DEG - SERVICE
Primary	29	DEAD+WIND 90 DEG - SERVICE
Primary	30	DEAD+WIND 135 DEG - SERVICE
Primary	31	DEAD+WIND 180 DEG - SERVICE
Primary	32	DEAD+WIND 225 DEG - SERVICE
Primary	33	DEAD+WIND 270 DEG - SERVICE
Primary	34	DEAD+WIND 315 DEG - SERVICE

Node Displacement Summary

	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)	rX (rad)	rY (rad)	rZ (rad)
Max X	476	6:1.2 DEAD+1.	6.545	-1.029	0.065	6.626	-0.000	-0.001	-0.004
Min X	478	15:0.9 DEAD+.	-6.528	-0.918	0.078	6.593	-0.000	0.001	0.004
Max Y	423	5:0.9 DEAD+1.	2.766	0.745	-2.834	4.030	-0.003	-0.000	-0.003
Min Y	476	4:1.2 DEAD+1.	4.926	-1.338	-4.843	7.037	-0.003	-0.000	-0.003
Max Z	474	11:0.9 DEAD+.	-0.026	-0.902	6.515	6.577	0.004	-0.001	-0.000
Min Z	476	2:1.2 DEAD+1.	-0.014	-1.023	-6.547	6.626	-0.004	0.001	-0.000
Max rX	798	8:1.2 DEAD+1.	0.845	-0.733	1.003	1.502	0.015	0.016	-0.004
Min rX	798	17:0.9 DEAD+.	-0.895	0.424	-1.023	1.424	-0.011	-0.010	0.003
Max rY	798	8:1.2 DEAD+1.	0.845	-0.733	1.003	1.502	0.015	0.016	-0.004
Min rY	795	12:1.2 DEAD+.	-0.887	-0.723	0.977	1.504	0.015	-0.016	0.004
Max rZ	462	14:1.2 DEAD+.	-4.408	0.287	-0.093	4.419	-0.000	0.001	0.006
Min rZ	467	6:1.2 DEAD+1.	4.406	0.302	-0.090	4.417	-0.000	-0.001	-0.006
Max Rst	476	16:1.2 DEAD+.	-4.975	-0.405	-5.024	7.082	-0.003	0.001	0.002



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Dallas, Texas. 75252 / p (972)-783-2578
maloufengineering.com

Job No CT04761S-19V	Sheet No 3	Rev 0
Part 0 TO 175FT OF TOWER		
Ref		
By KM	Date 6-Feb-19	Chd HML
Client EMPIRE TELECOM / AT&T	File CT04761S-19V0.std	Date/Time 07-Feb-2019 10:31

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Job Title 351.7ft Self Supporting Tower

Reactions

Node	L/C	Horizontal		Vertical	Moment		
		FX (kip)	FY (kip)	FZ (kip)	MX (kip'in)	MY (kip'in)	MZ (kip'in)
224	1:DEAD ONLY	10.031	108.405	-10.183	0.000	0.000	0.000
	2:1.2 DEAD+1.	-25.137	-266.411	60.339	0.000	0.000	0.000
	3:0.9 DEAD+1.	-28.138	-298.841	63.388	0.000	0.000	0.000
	4:1.2 DEAD+1.	-69.590	-464.754	70.531	0.000	0.000	0.000
	5:0.9 DEAD+1.	-72.592	-497.161	73.576	0.000	0.000	0.000
	6:1.2 DEAD+1.	-59.279	-264.559	25.350	0.000	0.000	0.000
	7:0.9 DEAD+1.	-62.284	-296.986	28.394	0.000	0.000	0.000
	8:1.2 DEAD+1.	-13.589	130.180	-37.930	0.000	0.000	0.000
	9:0.9 DEAD+1.	-16.598	97.712	-34.884	0.000	0.000	0.000
	10:1.2 DEAD+1.	49.143	526.059	-84.697	0.000	0.000	0.000
	11:0.9 DEAD+1.	46.133	493.552	-81.648	0.000	0.000	0.000
	12:1.2 DEAD+1.	93.674	724.367	-94.821	0.000	0.000	0.000
	13:0.9 DEAD+1.	90.665	691.838	-91.769	0.000	0.000	0.000
	14:1.2 DEAD+1.	83.295	524.385	-49.804	0.000	0.000	0.000
	15:0.9 DEAD+1.	80.290	491.877	-46.751	0.000	0.000	0.000
	16:1.2 DEAD+1.	37.574	129.501	13.593	0.000	0.000	0.000
	17:0.9 DEAD+1.	34.572	97.033	16.645	0.000	0.000	0.000
	18:1.2 DEAD+1.	23.159	249.762	-23.426	0.000	0.000	0.000
	19:1.2 DEAD+1.	11.555	128.459	-2.087	0.000	0.000	0.000
	20:1.2 DEAD+1.	-1.377	67.720	1.454	0.000	0.000	0.000
	21:1.2 DEAD+1.	2.224	129.322	-11.726	0.000	0.000	0.000
	22:1.2 DEAD+1.	16.046	249.887	-30.585	0.000	0.000	0.000
	23:1.2 DEAD+1.	34.743	371.039	-44.769	0.000	0.000	0.000
	24:1.2 DEAD+1.	47.704	431.778	-48.285	0.000	0.000	0.000
	25:1.2 DEAD+1.	44.083	370.216	-35.145	0.000	0.000	0.000
	26:1.2 DEAD+1.	30.252	249.604	-16.259	0.000	0.000	0.000
	27:DEAD+WIN	0.405	5.557	8.612	0.000	0.000	0.000
	28:DEAD+WIN	-11.070	-45.604	11.204	0.000	0.000	0.000
	29:DEAD+WIN	-8.413	6.124	-0.456	0.000	0.000	0.000
	30:DEAD+WIN	3.380	107.978	-16.741	0.000	0.000	0.000
	31:DEAD+WIN	19.580	210.213	-28.789	0.000	0.000	0.000
	32:DEAD+WIN	31.090	261.383	-31.353	0.000	0.000	0.000
	33:DEAD+WIN	28.409	209.699	-19.743	0.000	0.000	0.000
	34:DEAD+WIN	16.603	107.784	-3.425	0.000	0.000	0.000
227	1:DEAD ONLY	-9.993	109.955	-10.362	0.000	0.000	0.000
	2:1.2 DEAD+1.	24.220	-266.437	61.355	0.000	0.000	0.000
	3:0.9 DEAD+1.	27.211	-299.363	64.461	0.000	0.000	0.000
	4:1.2 DEAD+1.	-38.485	129.758	14.592	0.000	0.000	0.000
	5:0.9 DEAD+1.	-35.494	96.793	17.701	0.000	0.000	0.000
	6:1.2 DEAD+1.	-83.270	526.249	-50.025	0.000	0.000	0.000
	7:0.9 DEAD+1.	-80.275	493.243	-46.915	0.000	0.000	0.000
	8:1.2 DEAD+1.	-92.660	727.831	-96.269	0.000	0.000	0.000
	9:0.9 DEAD+1.	-89.662	694.806	-93.159	0.000	0.000	0.000
	10:1.2 DEAD+1.	-48.223	530.302	-86.208	0.000	0.000	0.000



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Part 0 TO 175FT OF TOWER		
Ref		
By KM	Date 6-Feb-19	Chd HML
Client EMPIRE TELECOM / AT&T	File CT04761S-19V0.std	Date/Time 07-Feb-2019 10:31

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Job Title 351.7ft Self Supporting Tower

Client EMPIRE TELECOM / AT&T

Reactions Cont...

Node	L/C	Horizontal		Vertical	Moment		
		FX (kip)	FY (kip)	FZ (kip)	MX (kip'in)	MY (kip'in)	MZ (kip'in)
	11:0.9 DEAD+	-45.224	497.298	-83.102	0.000	0.000	0.000
	12:1.2 DEAD+	14.575	133.904	-39.375	0.000	0.000	0.000
	13:0.9 DEAD+	17.573	100.940	-36.273	0.000	0.000	0.000
	14:1.2 DEAD+	59.264	-262.325	25.131	0.000	0.000	0.000
	15:0.9 DEAD+	62.259	-295.250	28.232	0.000	0.000	0.000
	16:1.2 DEAD+	68.647	-464.184	71.508	0.000	0.000	0.000
	17:0.9 DEAD+	71.639	-497.089	74.610	0.000	0.000	0.000
	18:1.2 DEAD+	-23.044	258.459	-24.401	0.000	0.000	0.000
	19:1.2 DEAD+	-12.067	136.312	-2.281	0.000	0.000	0.000
	20:1.2 DEAD+	-30.631	257.781	-16.659	0.000	0.000	0.000
	21:1.2 DEAD+	-43.995	379.095	-36.157	0.000	0.000	0.000
	22:1.2 DEAD+	-47.124	441.246	-49.892	0.000	0.000	0.000
	23:1.2 DEAD+	-34.041	380.630	-46.513	0.000	0.000	0.000
	24:1.2 DEAD+	-15.445	259.109	-32.129	0.000	0.000	0.000
	25:1.2 DEAD+	-2.107	137.860	-12.652	0.000	0.000	0.000
	26:1.2 DEAD+	1.017	75.664	1.112	0.000	0.000	0.000
	27:DEAD+WIN	-0.592	6.683	8.757	0.000	0.000	0.000
	28:DEAD+WIN	-16.797	109.135	-3.323	0.000	0.000	0.000
	29:DEAD+WIN	-28.383	211.610	-19.980	0.000	0.000	0.000
	30:DEAD+WIN	-30.822	263.772	-31.919	0.000	0.000	0.000
	31:DEAD+WIN	-19.345	212.728	-29.340	0.000	0.000	0.000
	32:DEAD+WIN	-3.100	110.209	-17.253	0.000	0.000	0.000
	33:DEAD+WIN	8.455	7.820	-0.622	0.000	0.000	0.000
	34:DEAD+WIN	10.886	-44.390	11.349	0.000	0.000	0.000
230	1:DEAD ONLY	-10.552	115.289	10.400	0.000	0.000	0.000
	2:1.2 DEAD+1.	-48.893	536.763	86.266	0.000	0.000	0.000
	3:0.9 DEAD+1.	-45.729	502.189	83.149	0.000	0.000	0.000
	4:1.2 DEAD+1.	-95.438	736.063	94.517	0.000	0.000	0.000
	5:0.9 DEAD+1.	-92.275	701.467	91.398	0.000	0.000	0.000
	6:1.2 DEAD+1.	-86.341	534.732	47.948	0.000	0.000	0.000
	7:0.9 DEAD+1.	-83.181	500.158	44.827	0.000	0.000	0.000
	8:1.2 DEAD+1.	-41.338	137.845	-16.354	0.000	0.000	0.000
	9:0.9 DEAD+1.	-38.181	103.309	-19.473	0.000	0.000	0.000
	10:1.2 DEAD+	23.548	-260.344	-61.323	0.000	0.000	0.000
	11:0.9 DEAD+	26.704	-294.841	-64.439	0.000	0.000	0.000
	12:1.2 DEAD+	70.176	-459.771	-69.527	0.000	0.000	0.000
	13:0.9 DEAD+	73.333	-494.247	-72.641	0.000	0.000	0.000
	14:1.2 DEAD+	61.056	-258.490	-23.053	0.000	0.000	0.000
	15:0.9 DEAD+	64.215	-292.987	-26.165	0.000	0.000	0.000
	16:1.2 DEAD+	16.012	138.744	41.383	0.000	0.000	0.000
	17:0.9 DEAD+	19.174	104.208	38.270	0.000	0.000	0.000
	18:1.2 DEAD+	-24.782	275.050	24.516	0.000	0.000	0.000
	19:1.2 DEAD+	-35.729	397.052	46.621	0.000	0.000	0.000
	20:1.2 DEAD+	-49.693	458.127	49.181	0.000	0.000	0.000



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Part 0 TO 175FT OF TOWER		
Ref		
By KM	Date 6-Feb-19	Chd HML
Client EMPIRE TELECOM / AT&T	File CT04761S-19V0.std	Date/Time 07-Feb-2019 10:31

Software licensed to Microsoft

Job Title 351.7ft Self Supporting Tower

Client EMPIRE TELECOM / AT&T

Reactions Cont...

Node	L/C	Horizontal		Vertical	Moment		
		FX (kip)	FY (kip)		FZ (kip)	MX (kip'in)	MY (kip'in)
	21:1.2 DEAD+	-46.840	396.176	35.199	0.000	0.000	0.000
	22:1.2 DEAD+	-33.279	274.932	15.973	0.000	0.000	0.000
	23:1.2 DEAD+	-13.841	153.076	2.423	0.000	0.000	0.000
	24:1.2 DEAD+	0.132	91.979	-0.136	0.000	0.000	0.000
	25:1.2 DEAD+	-2.720	153.908	13.829	0.000	0.000	0.000
	26:1.2 DEAD+	-16.292	275.222	33.083	0.000	0.000	0.000
	27:DEAD+WIN	-19.773	217.190	29.391	0.000	0.000	0.000
	28:DEAD+WIN	-31.741	268.634	31.533	0.000	0.000	0.000
	29:DEAD+WIN	-29.369	216.613	19.543	0.000	0.000	0.000
	30:DEAD+WIN	-17.790	114.186	2.955	0.000	0.000	0.000
	31:DEAD+WIN	-1.091	11.360	-8.685	0.000	0.000	0.000
	32:DEAD+WIN	10.888	-40.110	-10.827	0.000	0.000	0.000
	33:DEAD+WIN	8.517	11.877	1.141	0.000	0.000	0.000
	34:DEAD+WIN	-3.075	114.384	17.763	0.000	0.000	0.000
233	1:DEAD ONLY	10.514	112.788	10.145	0.000	0.000	0.000
	2:1.2 DEAD+1.	49.708	531.143	84.658	0.000	0.000	0.000
	3:0.9 DEAD+1.	46.554	497.325	81.620	0.000	0.000	0.000
	4:1.2 DEAD+1.	-15.090	133.989	39.837	0.000	0.000	0.000
	5:0.9 DEAD+1.	-18.243	100.210	36.801	0.000	0.000	0.000
	6:1.2 DEAD+1.	-61.090	-261.367	-23.379	0.000	0.000	0.000
	7:0.9 DEAD+1.	-64.240	-295.105	-26.413	0.000	0.000	0.000
	8:1.2 DEAD+1.	-71.166	-460.799	-68.593	0.000	0.000	0.000
	9:0.9 DEAD+1.	-74.312	-494.519	-71.628	0.000	0.000	0.000
	10:1.2 DEAD+	-24.574	-260.961	-60.326	0.000	0.000	0.000
	11:0.9 DEAD+	-27.719	-294.700	-63.364	0.000	0.000	0.000
	12:1.2 DEAD+	40.322	136.557	-15.417	0.000	0.000	0.000
	13:0.9 DEAD+	37.176	102.778	-18.459	0.000	0.000	0.000
	14:1.2 DEAD+	86.269	531.488	47.624	0.000	0.000	0.000
	15:0.9 DEAD+	83.119	497.669	44.581	0.000	0.000	0.000
	16:1.2 DEAD+	96.328	730.996	92.949	0.000	0.000	0.000
	17:0.9 DEAD+	93.175	697.158	89.908	0.000	0.000	0.000
	18:1.2 DEAD+	24.667	263.434	23.311	0.000	0.000	0.000
	19:1.2 DEAD+	36.301	384.883	44.661	0.000	0.000	0.000
	20:1.2 DEAD+	16.704	263.078	31.265	0.000	0.000	0.000
	21:1.2 DEAD+	2.593	142.113	12.573	0.000	0.000	0.000
	22:1.2 DEAD+	-0.796	80.641	-0.793	0.000	0.000	0.000
	23:1.2 DEAD+	13.028	141.960	1.954	0.000	0.000	0.000
	24:1.2 DEAD+	32.636	263.839	15.379	0.000	0.000	0.000
	25:1.2 DEAD+	46.742	384.721	34.028	0.000	0.000	0.000
	26:1.2 DEAD+	50.126	446.216	47.421	0.000	0.000	0.000
	27:DEAD+WIN	20.001	213.682	28.745	0.000	0.000	0.000
	28:DEAD+WIN	3.302	110.947	17.115	0.000	0.000	0.000
	29:DEAD+WIN	-8.569	8.764	0.792	0.000	0.000	0.000
	30:DEAD+WIN	-11.221	-42.823	-10.841	0.000	0.000	0.000



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CT04761S-19V

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Rev
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Part **0 TO 175FT OF TOWER**

Job Title **351.7ft Self Supporting Tower**

Ref

By **KM**

Date **6-Feb-19**

Chd **HML**

Client **EMPIRE TELECOM / AT&T**

File **CT04761S-19V0.std**

Date/Time **07-Feb-2019 10:31**

Reactions Cont...

Node	L/C	Horizontal	Vertical	Horizontal	Moment		
		FX (kip)	FY (kip)	FZ (kip)	MX (kip'in)	MY (kip'in)	MZ (kip'in)
	31:DEAD+WIND	0.755	8.811	-8.669	0.000	0.000	0.000
	32:DEAD+WIND	17.469	111.630	2.994	0.000	0.000	0.000
	33:DEAD+WIND	29.333	213.716	19.265	0.000	0.000	0.000
	34:DEAD+WIND	31.978	265.335	30.928	0.000	0.000	0.000



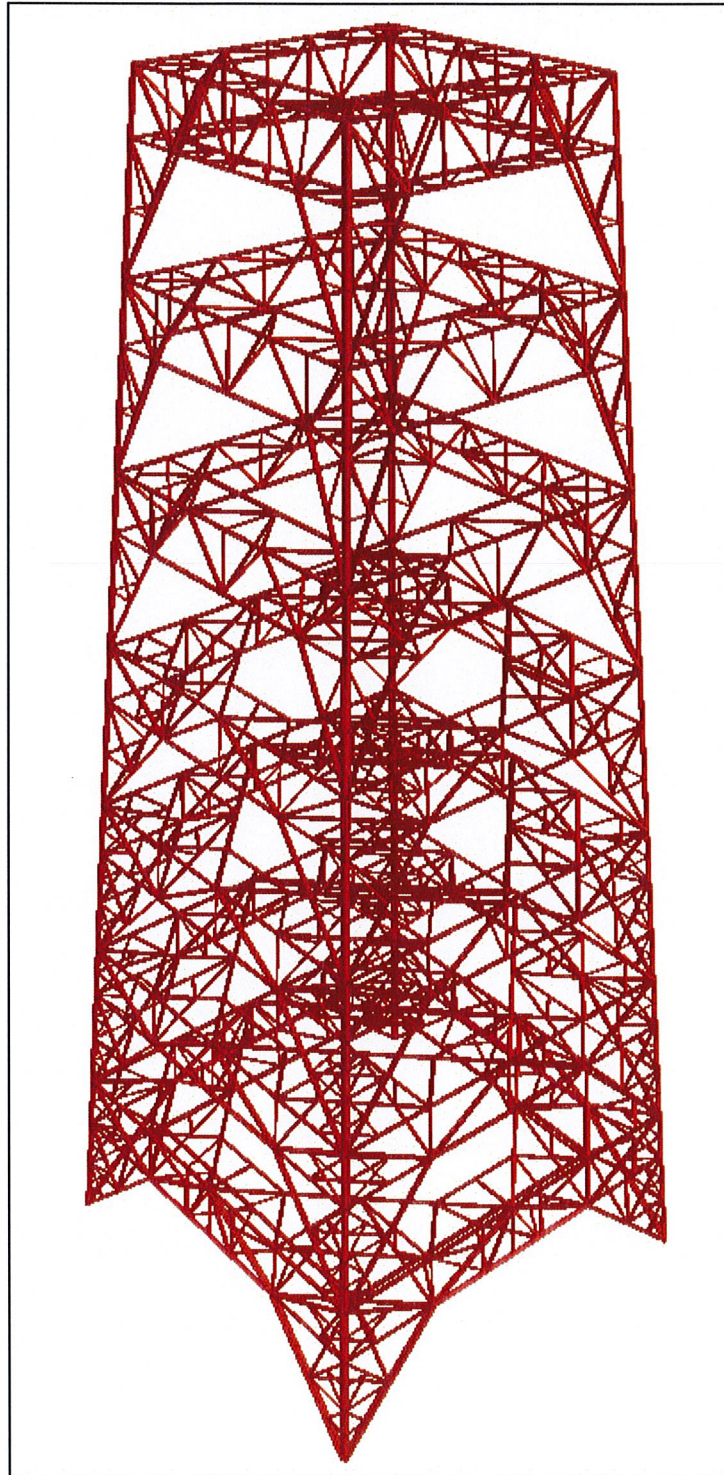
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Job No	Sheet No	Rev
CT04761S-19V	7	0
Part 0 TO 175FT OF TOWER		
Ref		
By KM	Date 6-Feb-19	Chd HML
Client	File	Date/Time
EMPIRE TELECOM / AT&T	CT04761S-19V0.std	07-Feb-2019 10:31

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Structure 0-175ft (3D Rendered View)



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Job No CT04761S-19V	Sheet No 8	Rev 0
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Part 0 TO 175FT OF TOWER

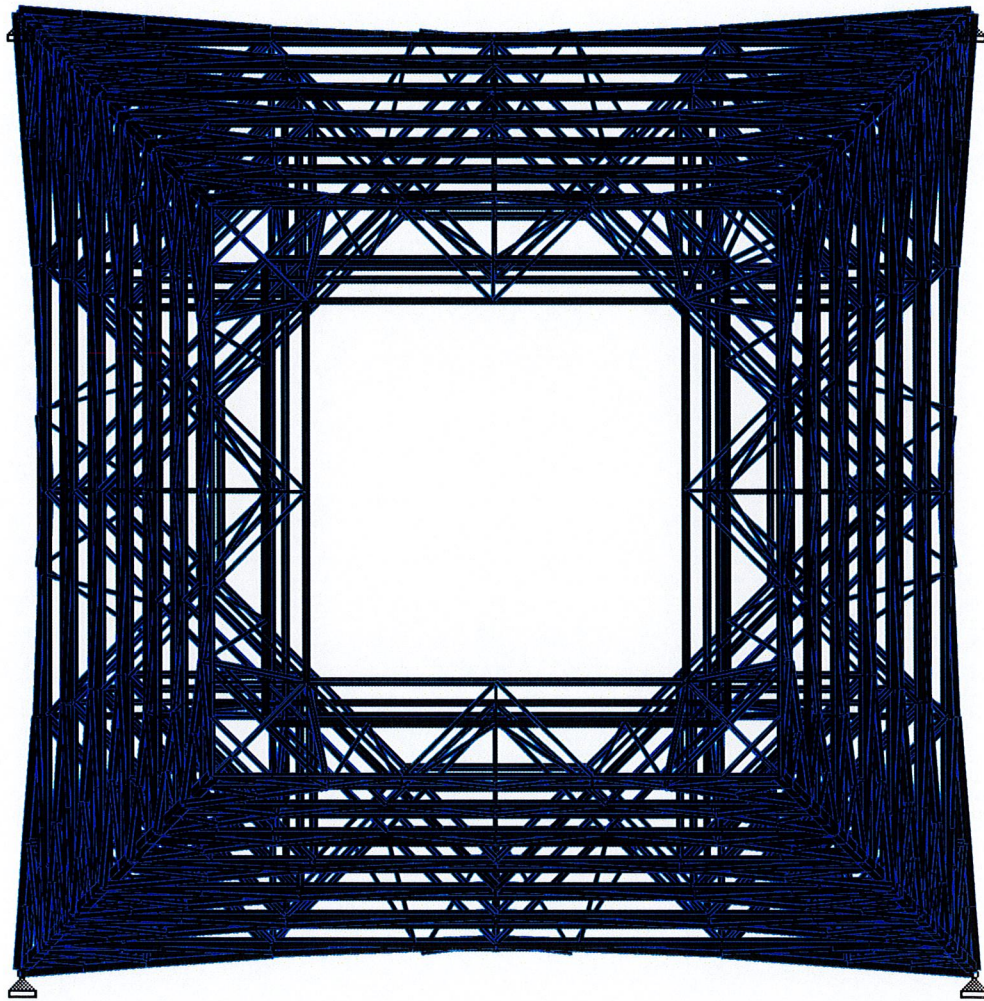
Job Title 351.7ft Self Supporting Tower

Ref

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Load 1

Structure 0-175ft (PLAN VIEW)



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Part 0 TO 175FT OF TOWER

Job Title **351.7ft Self Supporting Tower**

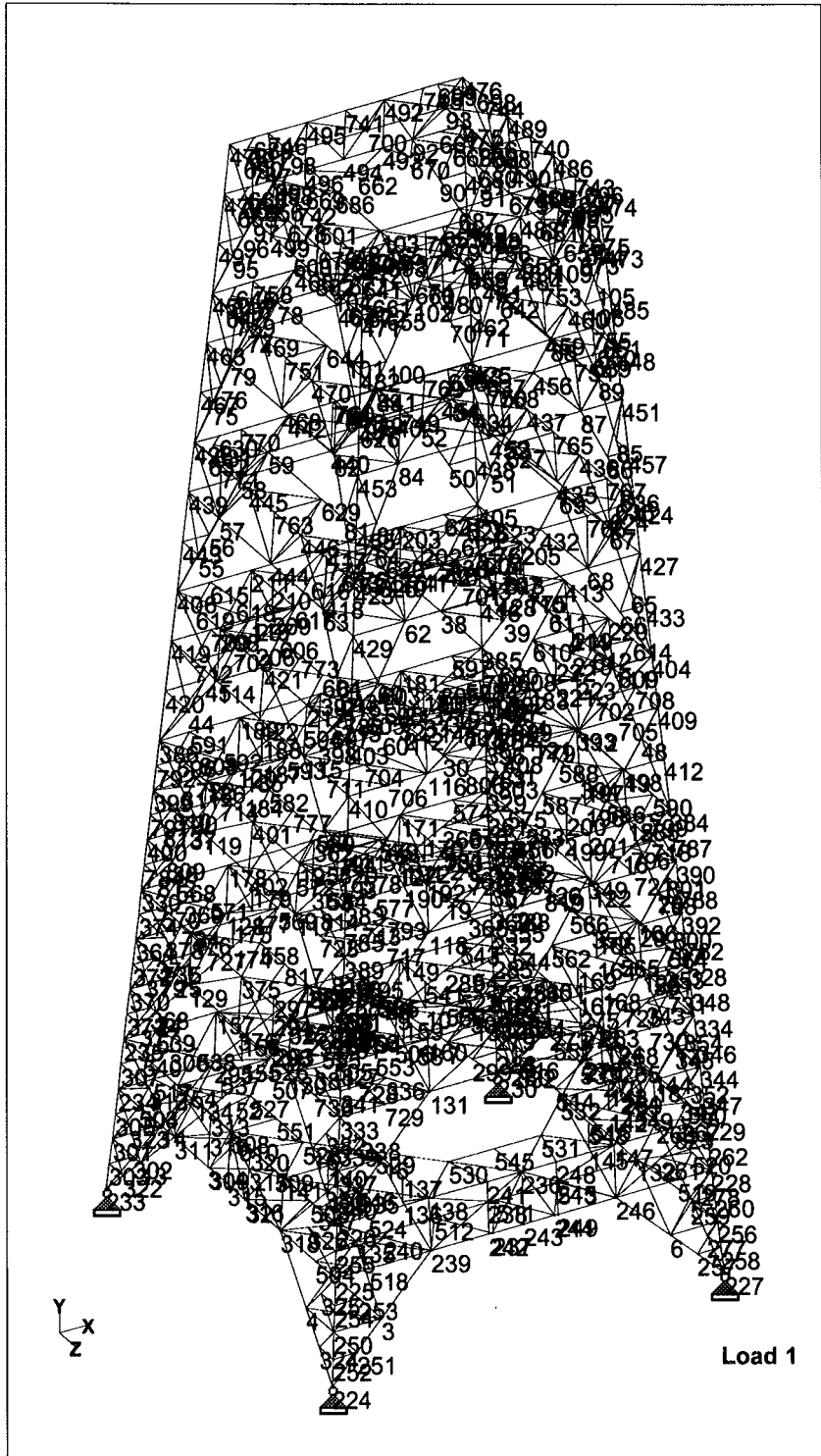
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Structure 0-175ft (Node Numbers)



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Part 0 TO 175FT OF TOWER

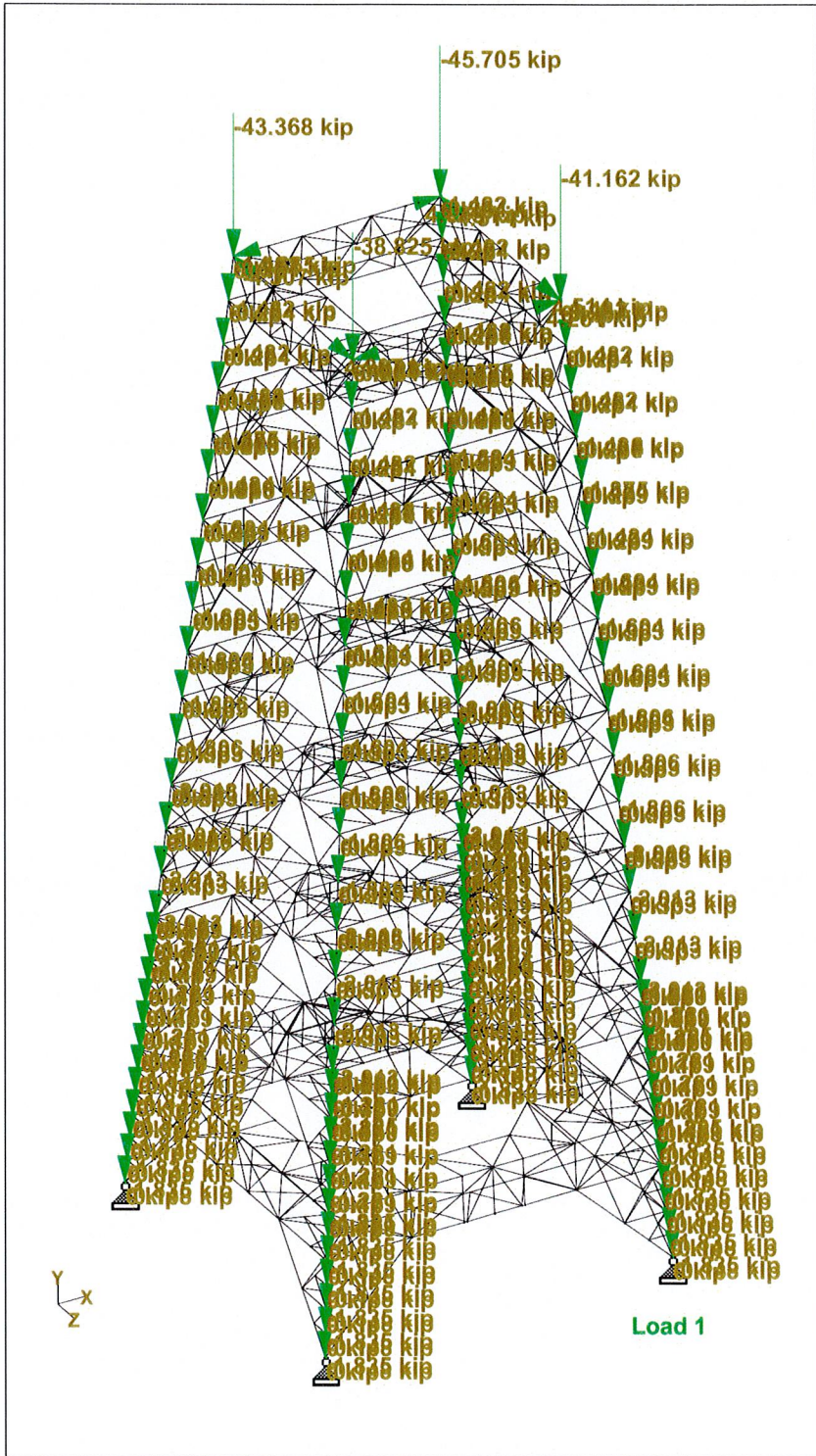
Job Title 351.7ft Self Supporting Tower

Ref

By KM Date 6-Feb-19 Chd HML

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Whole Structure Loads 0.135877kip:1in 1 DEAD ONLY



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Part 0 TO 175FT OF TOWER

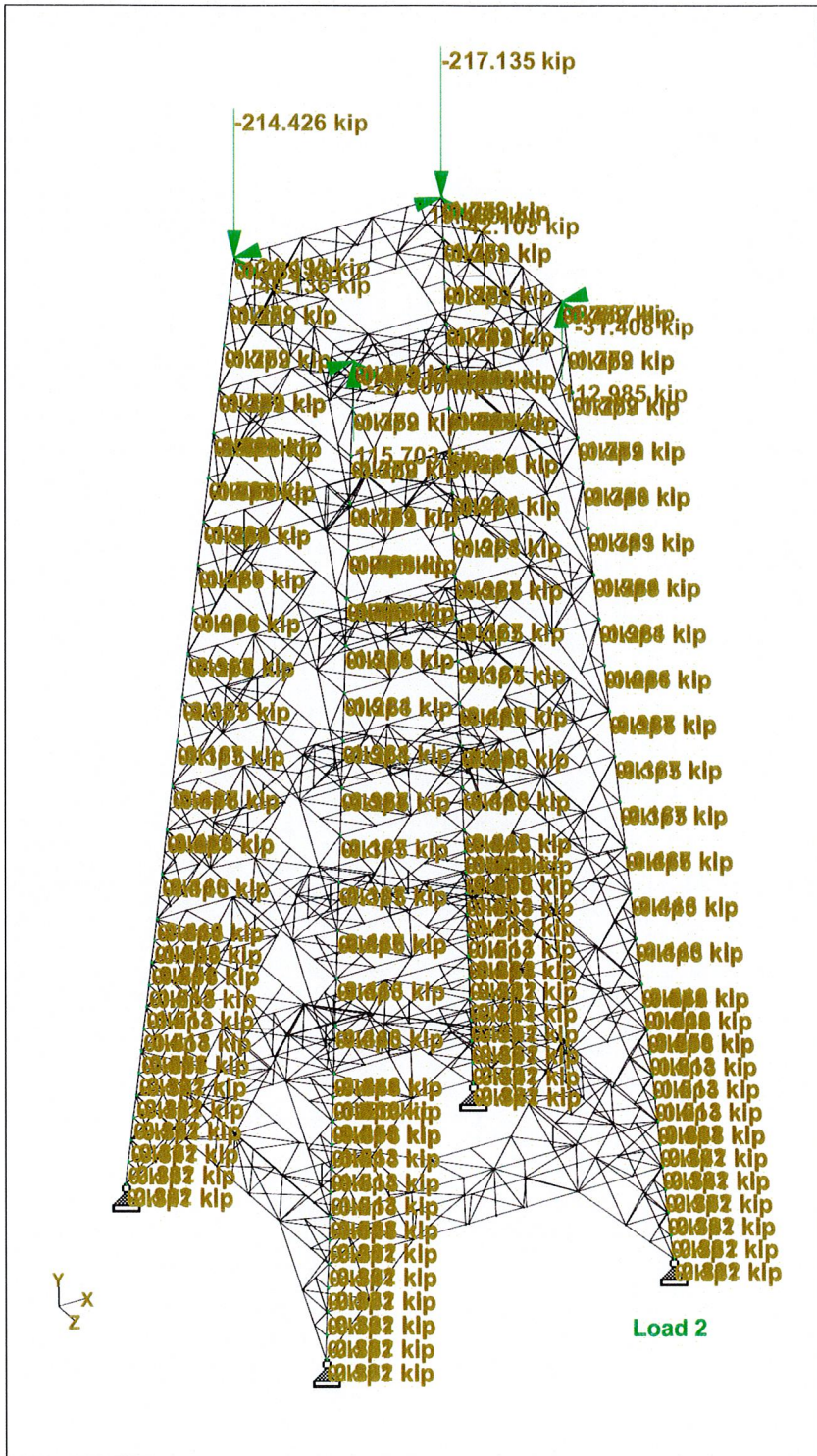
Job Title 351.7ft Self Supporting Tower

Ref

By KM Date 6-Feb-19 Chd HML

Client EMPIRE TELECOM / AT&T

File CT04761S-19V0.std Date/Time 07-Feb-2019 10:31



Whole Structure Loads 0.645527kip:1in 2 1.2 DEAD+1.6 WIND 0 DEG - NO ICE



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Part 0 TO 175FT OF TOWER

Job Title 351.7ft Self Supporting Tower

Ref

By KM

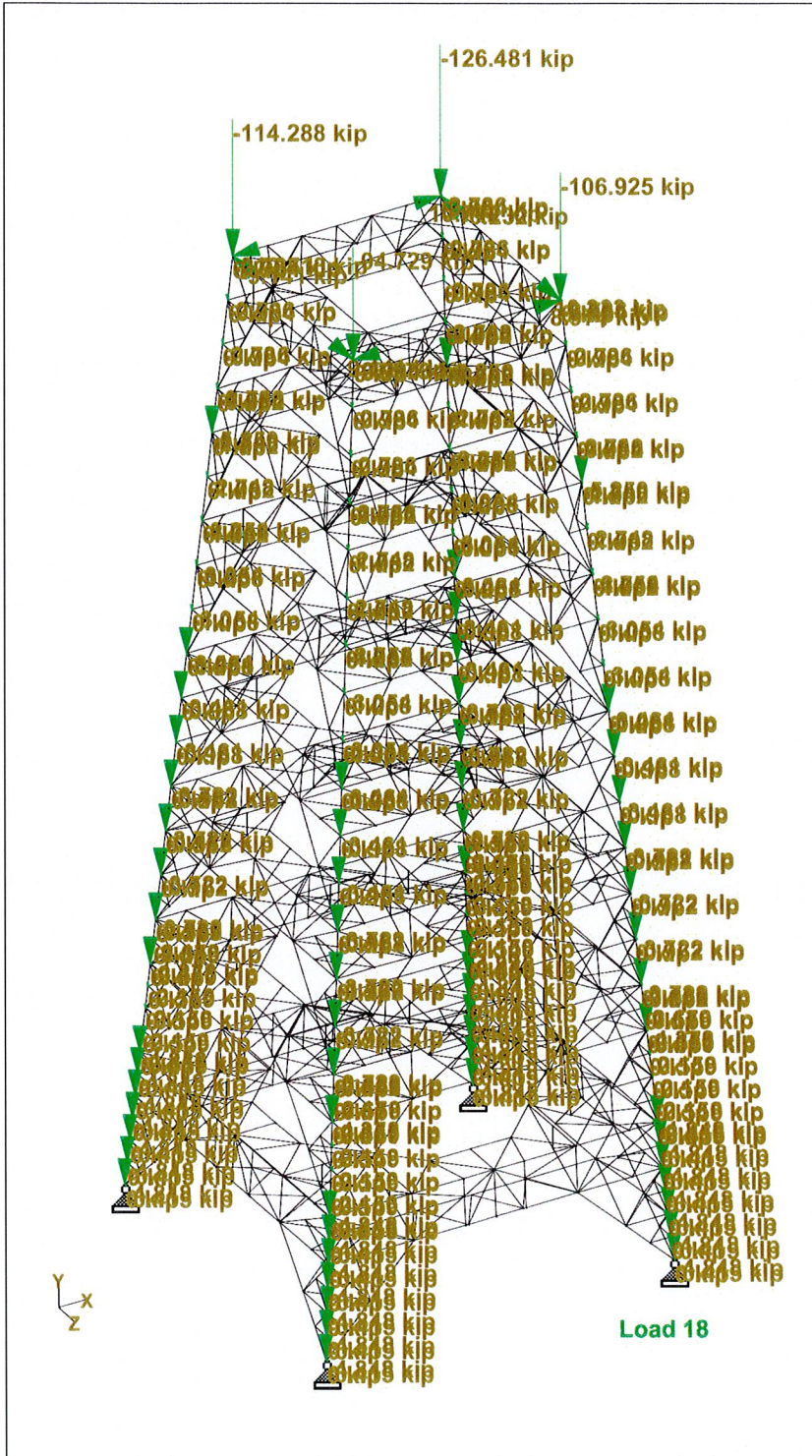
Date 6-Feb-19

Chd HML

Client EMPIRE TELECOM / AT&T

File CT04761S-19V0.std

Date/Time 07-Feb-2019 10:31



Whole Structure Loads 0.376019kip:1in 18 1.2 DEAD+1.0 ICE+1.0 TEMP



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Part 0 TO 175FT OF TOWER

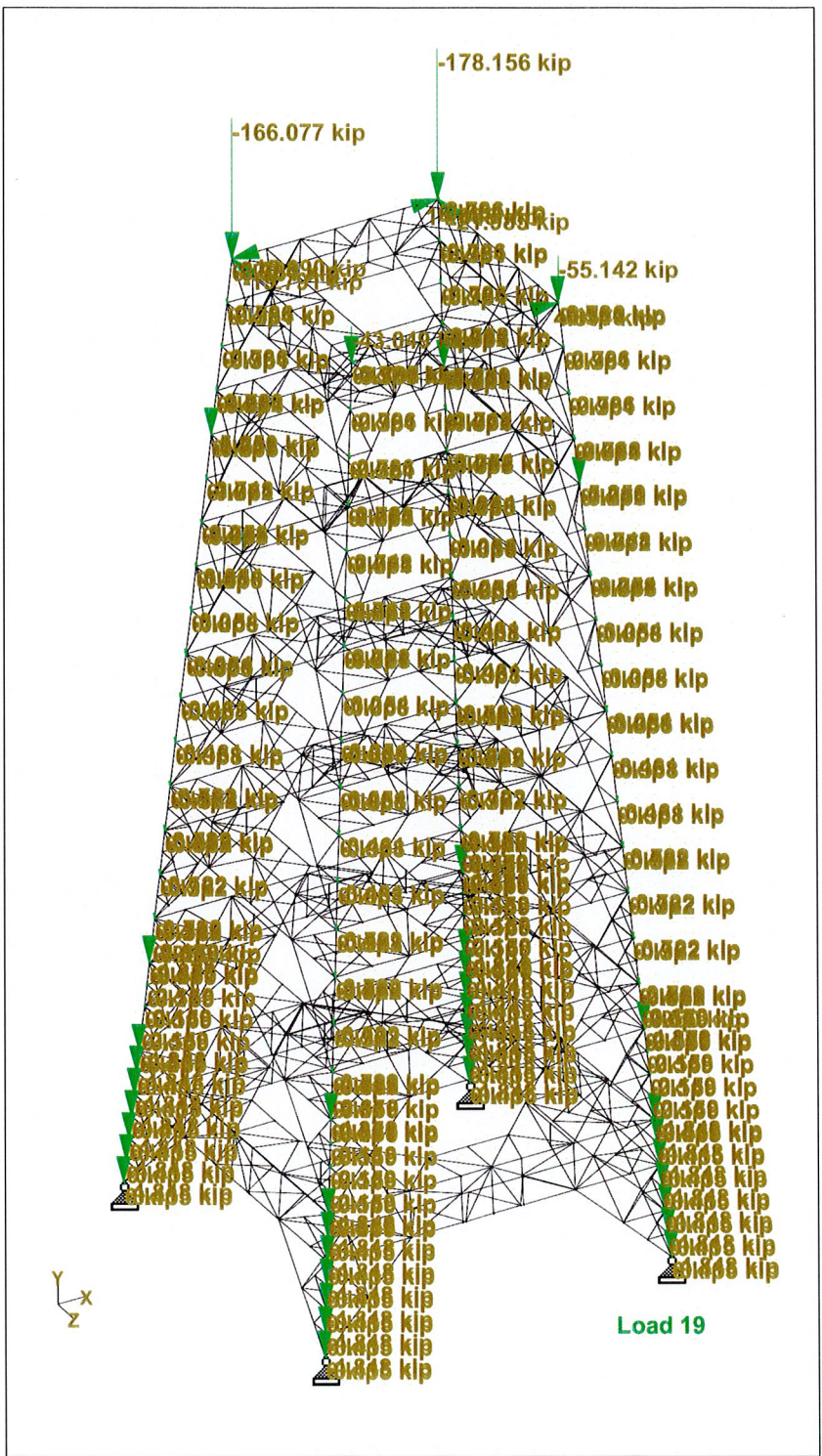
Job Title 351.7ft Self Supporting Tower

Ref

By KM Date 6-Feb-19 Chd HML

Client EMPIRE TELECOM / AT&T

File CT04761S-19V0.std Date/Time 07-Feb-2019 10:31



Whole Structure Loads 0.529646kip:1in 19 1.2 DEAD+1.0 WIND 0 DEG+1.0 ICE+1.0 TEMP



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Part 0 TO 175FT OF TOWER

Job Title 351.7ft Self Supporting Tower

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By KM

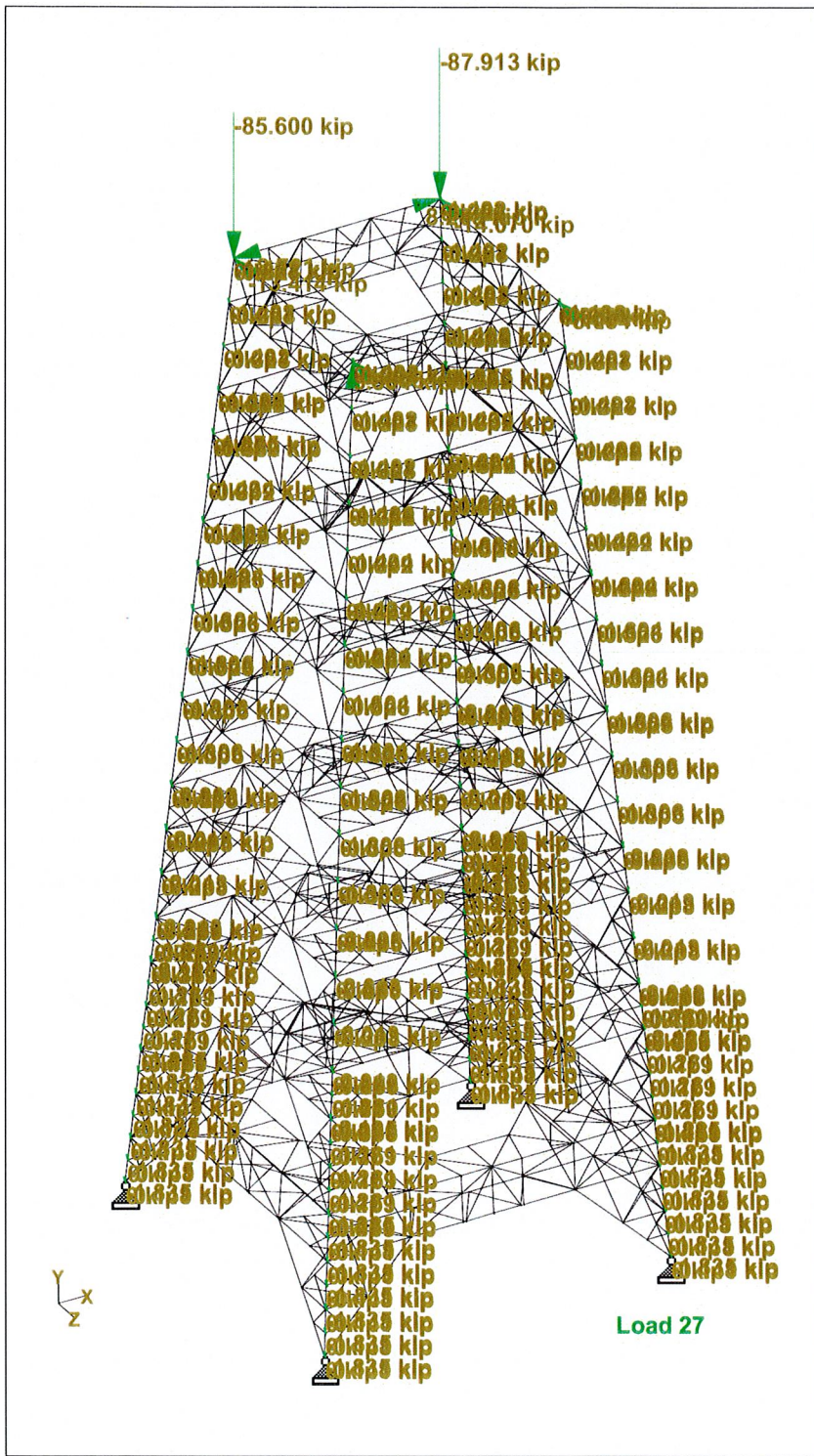
Date 6-Feb-19

Chd HML

Client EMPIRE TELECOM / AT&T

File CT04761S-19V0.std

Date/Time 07-Feb-2019 10:31



Whole Structure Loads 0.261361kip:1in 27 DEAD+WIND 0 DEG - SERVICE



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Part 0 TO 175FT OF TOWER

Job Title 351.7ft Self Supporting Tower

Ref

By KM

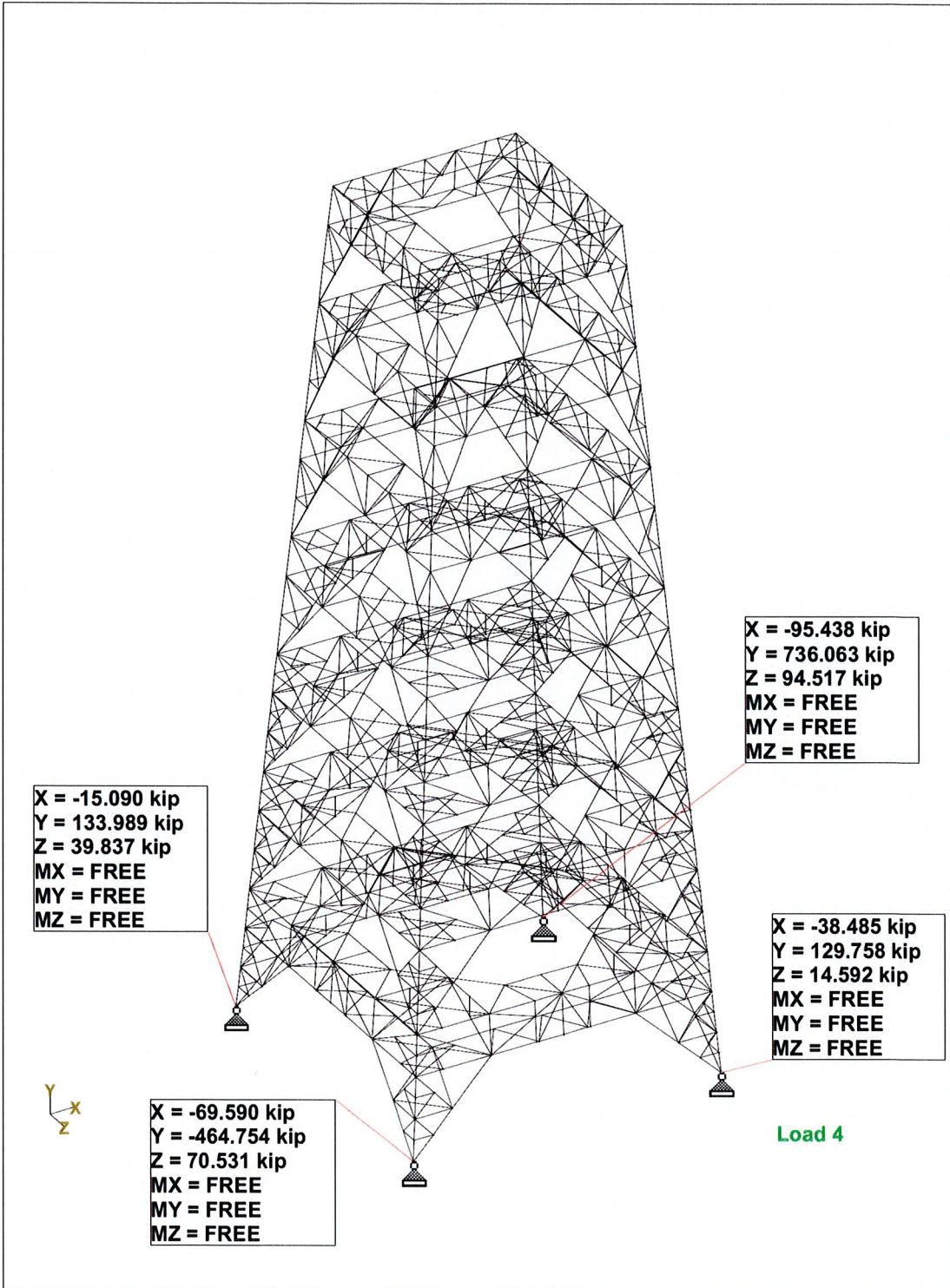
Date 6-Feb-19

Chd HML

Client EMPIRE TELECOM / AT&T

File CT04761S-19V0.std

Date/Time 07-Feb-2019 10:31



X = -15.090 kip
Y = 133.989 kip
Z = 39.837 kip
MX = FREE
MY = FREE
MZ = FREE

X = -95.438 kip
Y = 736.063 kip
Z = 94.517 kip
MX = FREE
MY = FREE
MZ = FREE

X = -38.485 kip
Y = 129.758 kip
Z = 14.592 kip
MX = FREE
MY = FREE
MZ = FREE

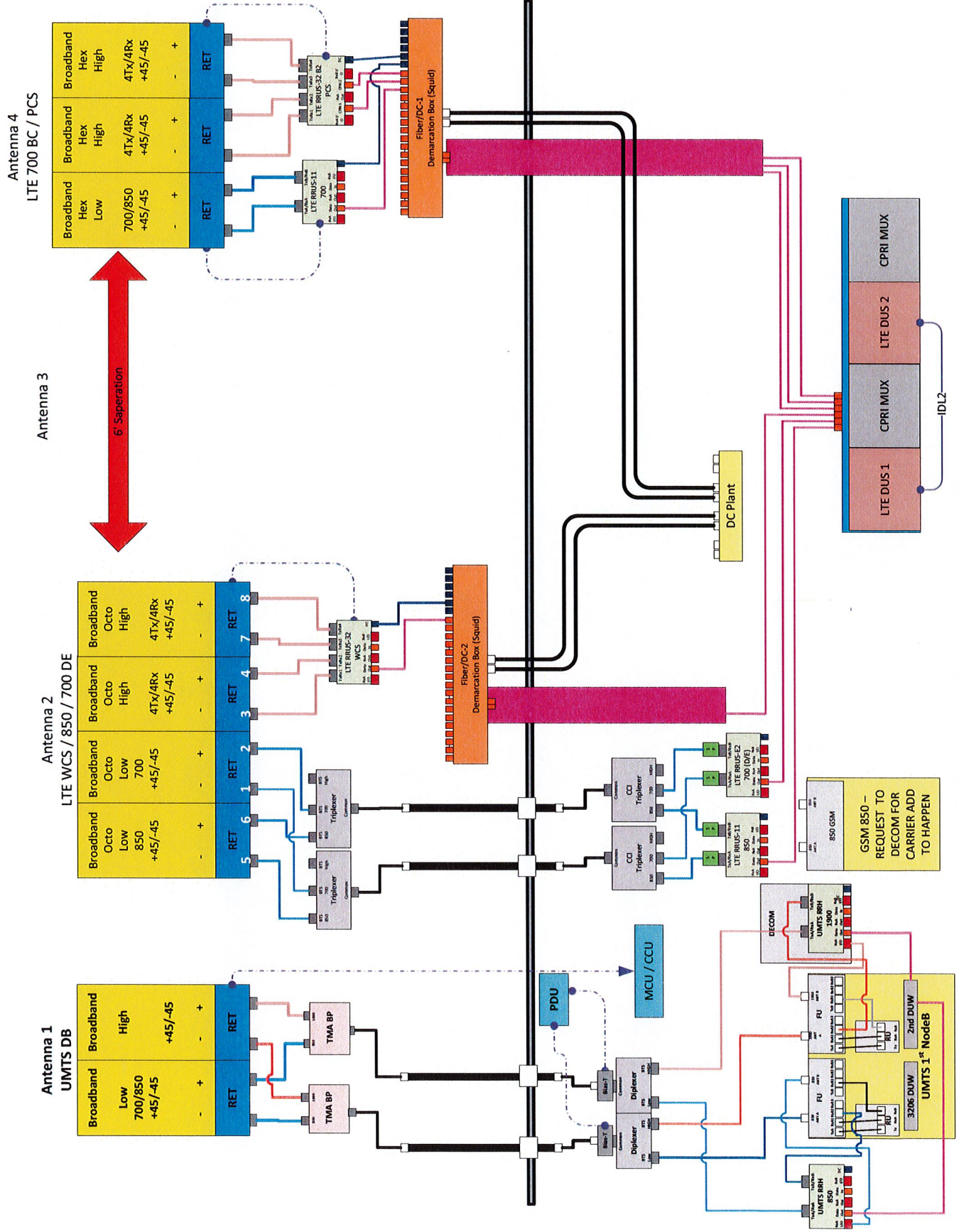
X = -69.590 kip
Y = -464.754 kip
Z = 70.531 kip
MX = FREE
MY = FREE
MZ = FREE

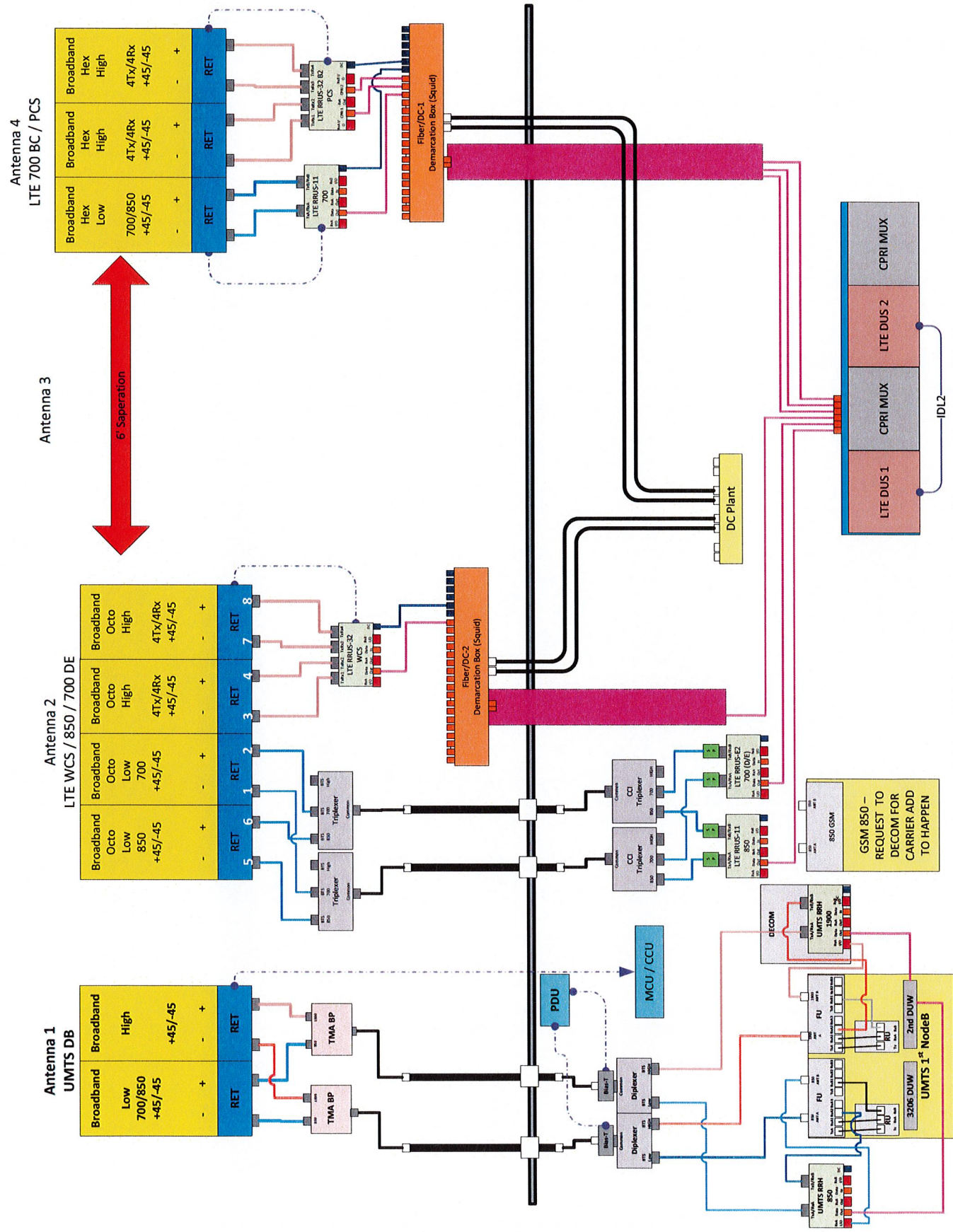
Load 4

Reactions

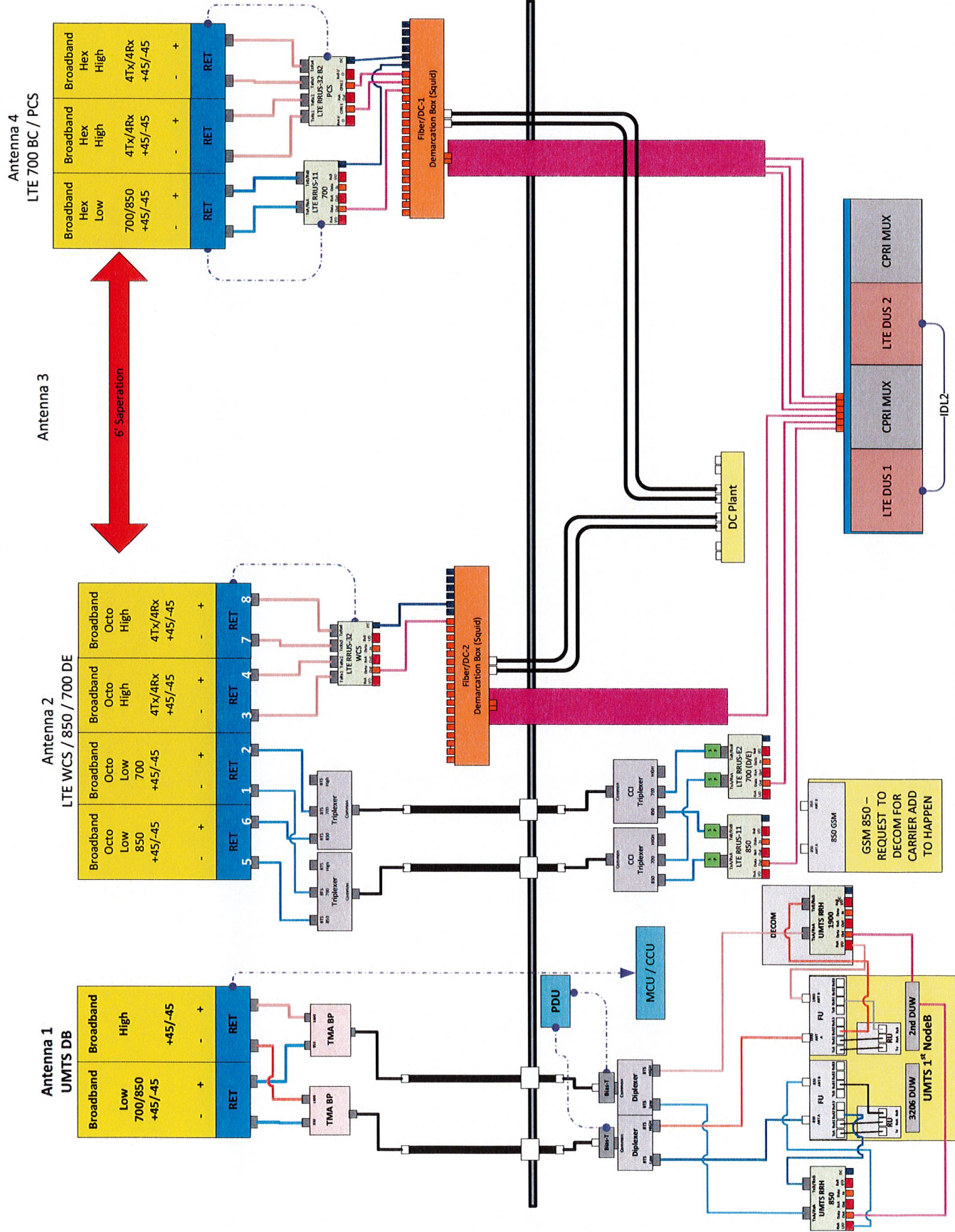
APPENDIX 2 – SOURCE / CHANGED CONDITION







Comments:

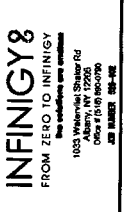


PLANS PREPARED FOR:

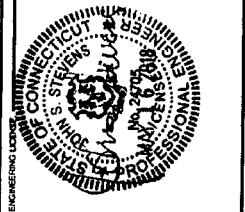


6550 Sprint Parkway
Overland Park, Kansas 66261

PLANS PREPARED BY:



FROM ZERO TO INFINIGY
1033 Westwind Shaker Rd
Albany, NY 12205
JOHN MARRIOTT, P.E.
JOE MARTEL, P.E.



CONTRACT NO. 2479
DATE: 06/16/09
PROJECT: 2.5 EQUIPMENT DEPLOYMENT
SHEET NO. T-1

REV	DESCRIPTION	DATE	BY
1	ISSUED FOR PERMIT	06/16/09	JSM
2	ISSUED FOR PERMIT	06/16/09	JSM

SITE NAME:
SNET

SITE CASCADE:
CT03XC377

SITE ADDRESS:
10 WILLARD RD
NORWALK, CT 06851

SHEET DESCRIPTION:
TITLE SHEET
& PROJECT DATA

SHEET NUMBER:
T-1

PROJECT: 2.5 EQUIPMENT DEPLOYMENT
SITE NAME: SNET
SITE CASCADE: CT03XC377
SITE ADDRESS: 10 WILLARD RD
NORWALK, CT 06851
SITE TYPE: SELF SUPPORT TOWER
MARKET: SOUTHERN CONNECTICUT

DRAWING INDEX

SHEET NO.	TITLE SHEET & PROJECT DATA	REV
T-1	TITLE SHEET & PROJECT DATA	2
SP-1	SPRINT SPECIFICATIONS	2
SP-2	SPRINT SPECIFICATIONS	2
SP-3	SPRINT SPECIFICATIONS	2
A-1	SITE PLAN	2
A-2	TOWER ELEVATION & CABLE PLAN	2
A-3	ANTENNA LAYOUT & MOUNTING DETAILS	2
A-4	COLOR COORDS & NOTES	2
A-5	CONCRETE & MOUNTING DETAILS	2
A-6	PLUMBING DIAGRAM	2
E-1	ELECTRICAL & GROUNDING PLAN	2
E-2	ELECTRICAL & GROUNDING DETAILS	2

PROJECT DESCRIPTION

SPRINT PROPRIETORS TO VERIFY AN EXISTING UNMANNED TELECOMMUNICATIONS FACILITY.

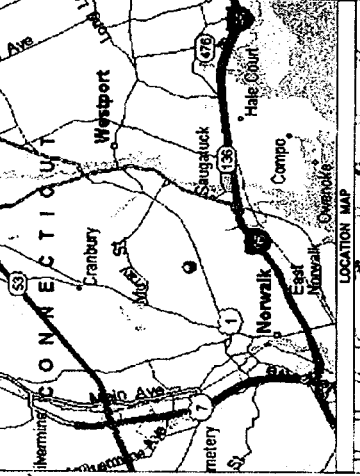
- INSTALL (3) PANEL ANTENNAS
- INSTALL (3) BRVS TO TOWER
- INSTALL (27) JUMPER CABLES
- INSTALL (1) HYBRID CABLE
- INSTALL (8) ANTENNAS IN EXISTING BRU CABINET

THESE PLANS HAVE BEEN DEVELOPED FOR THE MODIFICATION OF AN EXISTING TOWER TO BE USED FOR THE DEPLOYMENT OF SPRINT EQUIPMENT. THE SCOPE OF WORK PROVIDED BY THESE PLANS IS LIMITED TO THE INSTALLATION OF THE ABOVE LISTED ITEMS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL, STATE AND FEDERAL AUTHORITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL, STATE AND FEDERAL AUTHORITIES.

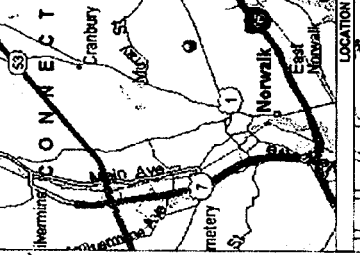
APPLICABLE CODES

- INTERNATIONAL BUILDING CODE (2012 IBC)
- INTERNATIONAL ELECTRICAL CODE (2011 IEC)
- ANY OTHER NATIONAL OR LOCAL APPLICABLE CODES.
- CT BUILDING CODE
- CT ELECTRICAL CODE
- CITY/COUNTY ORDINANCES

AREA MAP



LOCATION MAP



SITE INFORMATION

TOWER OWNER:
THE SOUTHERN NEW ENGLAND TELEPHONE COMPANY
1000 MAIN ST
NEW HAVEN, CT 06510

LATITUDE (MAORS):
41° 7' 41.7884" N
41.128206°

LONGITUDE (MAORS):
-73° 30' 17.16114" W
-73.501717°

COUNTY:
FAIRFIELD

ZONING JURISDICTION:
CITY OF NORWALK

ZONING DISTRICT:
EC-BUSINESS

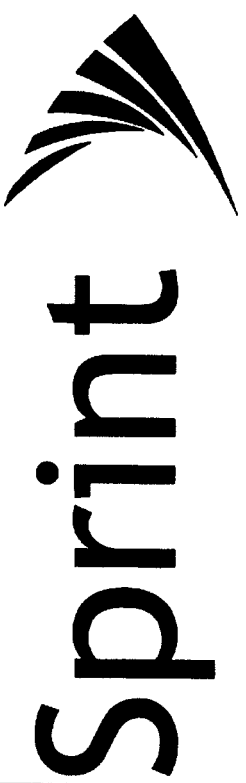
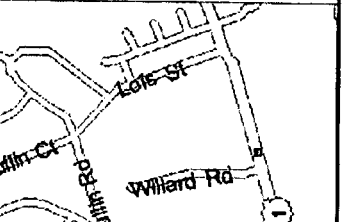
POWER COMPANY:
CONNECTICUT LIGHT AND POWER
(800) 288-2000

AAV PROVIDER:
SNET
(860) 246-2020

SPRINT C&I:
DARY WOOD
1000 MAIN ST
NEW HAVEN, CT 06510
PH: (860) 846-9188
WWW.SPRINT.COM

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALL IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS APPLICABLE TO THE PROJECT. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES.

- INTERNATIONAL BUILDING CODE (2012 IBC)
- INTERNATIONAL ELECTRICAL CODE (2011 IEC)
- ANY OTHER NATIONAL OR LOCAL APPLICABLE CODES.
- CT BUILDING CODE
- CT ELECTRICAL CODE
- CITY/COUNTY ORDINANCES




PLANS PREPARED FOR:



6980 Sprint Parkway
Overland Park, Kansas 66251

PLANS PREPARED BY:



FROM ZERO TO INFINIGY
1033 Woodside Station Rd
Albany, NY 12205
Tel: 518-869-1800
Fax: 518-869-1814




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REVISIONS	DESCRIPTION	DATE	BY	CHKD

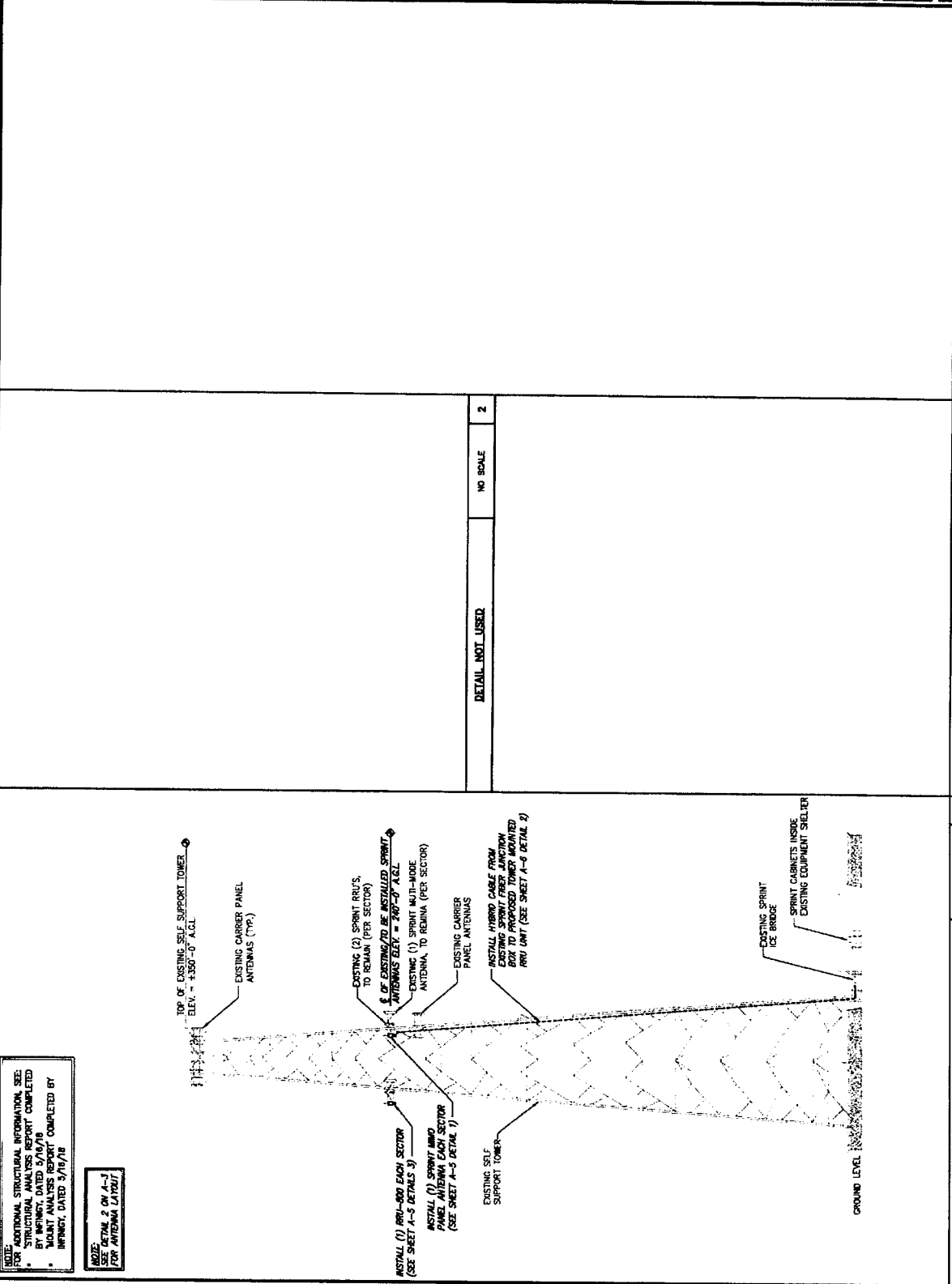
BITT NAME: SNET

SITE CALLSIGN: CT03XC377

SITE ADDRESS: 10 WILLARD RD
NORWALK, CT 06851

SHEET DESCRIPTION: TOWER ELEVATION & CABLE PLAN

SHEET NUMBER: A-2



NOTE:
FOR ADDITIONAL STRUCTURAL INFORMATION, SEE:
• STRUCTURAL ANALYSIS REPORT COMPLETED BY INFINIGY, DATED 3/18/18
• TOWER ANALYSIS REPORT COMPLETED BY INFINIGY, DATED 3/18/18

NOTE:
SEE DETAIL 2 ON A-3 FOR ANTENNA LAYOUT

DETAIL NOT USED

NO SCALE

2

DETAIL NOT USED

NO SCALE

3

TOWER ELEVATION

NO SCALE

1

DETAIL NOT USED

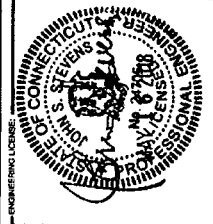
NO SCALE

4

PLANS PREPARED FOR:



PLANS PREPARED BY:
INFINIGY8
 FROM ZERO TO INFINIGY
 THE SOLUTIONS ONE COMPANY
 1033 Woodwind Shaker Rd
 Albany, NY 12205
 TEL: 518-435-2000
 FAX: 518-435-2002



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REVISIONS	DESCRIPTION	DATE	BY
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2	REVISED & ISSUED FOR PERMIT	06/27/18	1
3	ISSUED FOR PERMIT	07/20/18	0

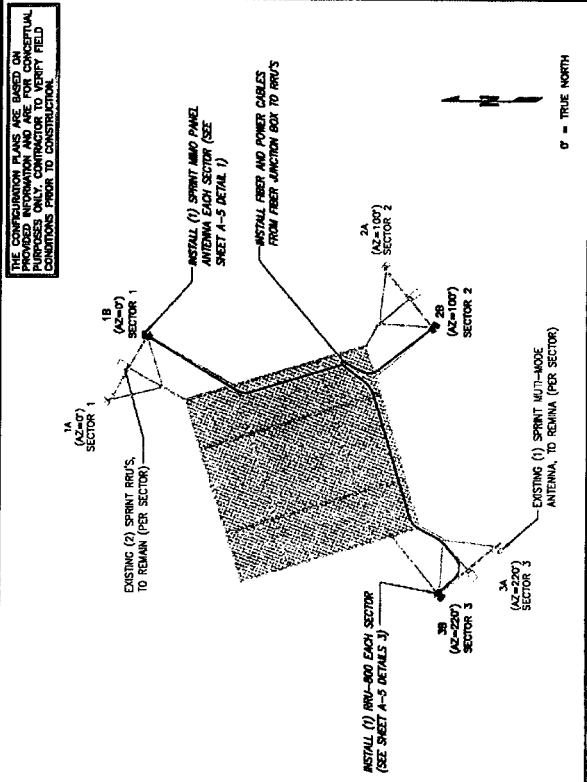
SITE NAME:
SNET

SITE CALLSIGN:
CT03XC377

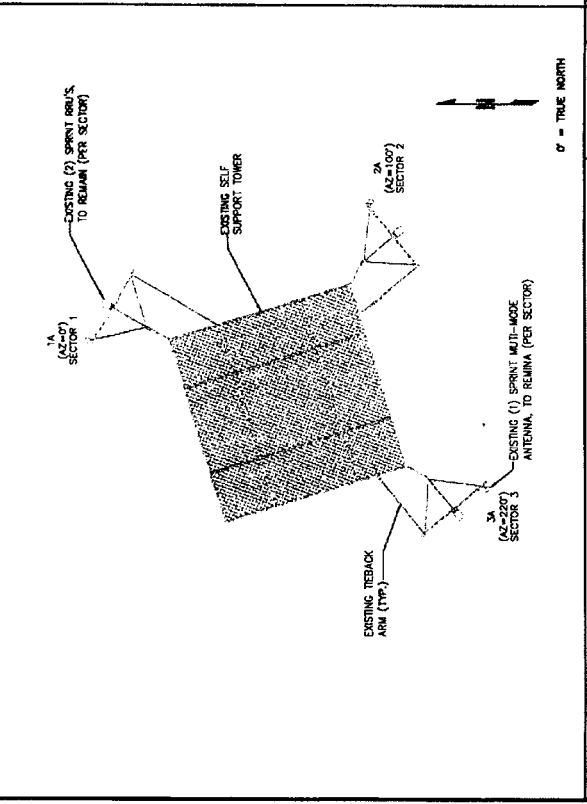
SITE ADDRESS:
**10 WILLARD RD
 NORWALK, CT 06851**

SHEET DESCRIPTION:
**ANTENNA LAYOUT
 & MOUNTING DETAILS**

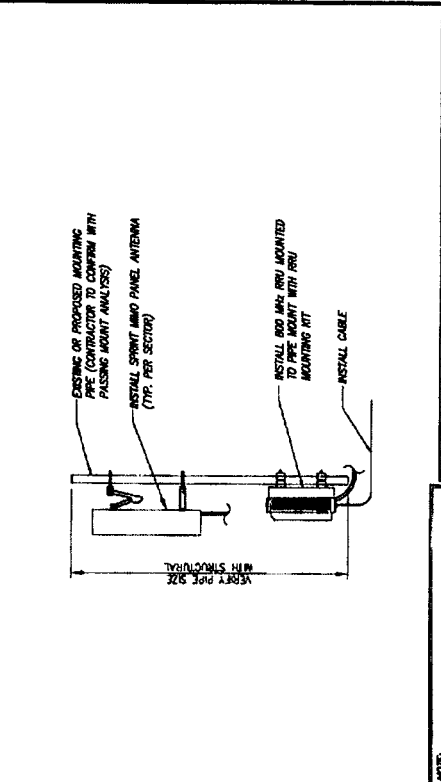
SHEET NUMBER:
A-3



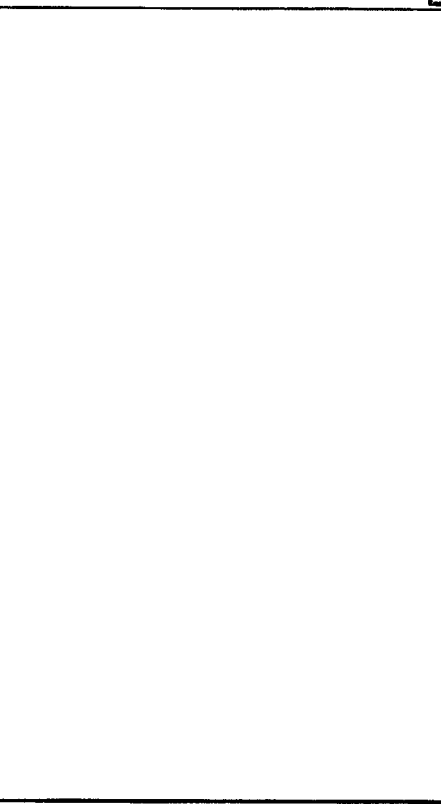
FINAL ANTENNA LAYOUT
 NO SCALE 2



EXISTING ANTENNA & RRU LAYOUT
 NO SCALE 1



TYPICAL MIMO ANTENNA & RRU MOUNTING DETAILS
 NO SCALE 4



DETAIL NOT USED
 NO SCALE 3

NOTE: SOME DC CABLES ARE COILED UP ON HV RRUS AT SPRINT ARRAY. THESE ARE TO BE USED TO POWER UP THE 2.5 RRUS AND TIED INTO EXISTING DC BREAKERS INSIDE THE FIBER JUNCTION BOX LOCATED AT EQUIPMENT. (SEE SHEET 1 - RRU MOUNTING MANIPULATOR)

NOTE: THE DIAGRAM IS FOR CONCEPTUAL PURPOSES ONLY. CONTRACTOR IS TO REFER TO FILING STRUCTURAL ANALYSIS FOR ANTENNA AND RRU MOUNTING DETAILS.

May 16, 2018

Final Configuration

Mount Height (ft)	Qty.	Appurtenance	Mount Type	Coax & Lines	Carrier
355.0	3	Omni 10'x3"	Platform	(1) 5/8" (1) 1 5/8" (1) 1/2"	--
	1	Light 18"x10"			
350.0	1	Omni 20'x3"	Platform	(1) 1 1/2" (3) 7/8" (1) 2 1/4" (1) 1 5/8" (1) 7/8"	--
	3	Omni 10'x3"			
	1	Dipole 10'x2"			
	1	Dipole 20'x3"			
	1	Omni 8"x2.5"			
	3	Panels 20"x38"x3"			
336.8	6	Powerwave RA21.7770.00	Sector Frames	(1) 1/2" (12) 1 5/8" (1) 1/2" (1) 1"	AT&T
	6	Ericsson 19.5"x17"x17"			
	3	KMW AM-X-CD-16-55-00T-RET			
	12	Powerwave 14.5"x9"x2.75"			
	1	Yagi 42"x37.5"			
	3	Strikesorb 10"x10"x6"			
265.2	6	Kahrein 81010022R2A	Sector Frames	(1) 1 1/4" (13) 1 5/8" (3) 3/4"	--
	3	Ericsson 6"x3"x3"			
244.0	3	RFS APXVSPP-18	Sector Frames	(3) 1 1/4" (1) 1/2" (1) Hybrid	Sprint
	3	Nokia AAHC			
	3	Alcatel Lucent RRH 1900 MHz			
	6	Alcatel Lucent RRH 800 MHz 2x50W			
210.0	1	Yagi 3'x6'	Pipe Mount	(1) 1/2"	--
48.1	1	4'x4' Dish	Direct Mount	(2) 1/2"	--
31.2	1	2'x2' Dish	Direct Mount	(1) 1"	--

PROJECT INFORMATION

SCOPE OF WORK:

- AT&T ANTENNAS: (1) NEW ANTENNAS PER SECTOR, FOR A TOTAL OF (3); (1) EXISTING ANTENNAS PER SECTOR, TO BE REMOVED FOR A TOTAL OF (3); (1) AT&T RRUS; (1) NEW RRUS PER SECTOR, FOR A TOTAL OF (3); (2) EXISTING RRUS PER SECTOR TO REMAIN, FOR A TOTAL OF (6); (1) EXISTING RRUS PER SECTOR TO BE REMOVED, FOR A TOTAL OF (3) SECTORS, FOR A TOTAL OF (6); (1) AT&T RRUS PER SECTOR, FOR A TOTAL OF (3); (1) NEW RRUS PER SECTOR, FOR A TOTAL OF (3); (1) EXISTING RRUS PER SECTOR TO REMAIN, FOR A TOTAL OF (3); (1) EXISTING RRUS PER SECTOR TO REMAIN, FOR A TOTAL OF (3).

SITE ADDRESS:
WILLARD ROAD
NORWALK, CT 06851

LATITUDE: 41° 07' 41.77"N
LONGITUDE: -73.3901661
USID: 60415

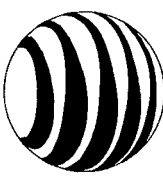
TOWER OWNER: TBD

TYPE OF SITE: SELF-SUPPORT TOWER/OUTDOOR EQUIPMENT

TOWER HEIGHT: 350-07.5

RAD CENTER: 347'-0".5

CURRENT USE: UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY
PROPOSED USE: UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY



FA CODE: 10034993
SITE NUMBER: CTU2132
SITE NAME: NORWALK EAST -
WILLARD RD

DRAWING INDEX

TITLE SHEET	REV.
T-1	1
GN-1	1
A-1	1
A-2	1
A-3	1
A-4	1
A-5	1
G-1	1

APPROVALS

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE SUBCONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND MAY IMPOSE CHANGES OR SITE MODIFICATIONS.

DISCIPLINE	NAME	DATE
SITE ACQUISITION:		
CONSTRUCTION MANAGER:		
AT&T PROJECT MANAGER:		

COM-Ex
Consultants
115 NORTH AVENUE 4
SOUTH BRITAIN, VT 05494
PHONE: 802-286-2494
FAX: 802-286-1207

SITE NUMBER: CTU2132
SITE NAME: NORWALK EAST -
WILLARD RD
88 PARSONAGE HILL ROAD
NORWALK, CT 06472
NEW HAVEN COUNTY

at&t
MOBILITY
550 COCHILUATE ROAD
FRAMINGHAM, MA 01701

PROJECT TEAM

CLIENT REPRESENTATIVE
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD
BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617-839-4908
EMAIL: dcooper@empiretelecom.com

SITE ACQUISITION
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD
BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617-839-4908
EMAIL: dcooper@empiretelecom.com

ZONING
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD
BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617-839-4908
EMAIL: dcooper@empiretelecom.com

ENGINEERING
COMPANY: CON-EX CONSULTANTS, LLC
ADDRESS: 115 ROUTE 46
SUITE 239
WILLIAMSDALE, MA 01906
CONTACT: NICHOLAS D. BARILLE, P.E.
PHONE: 862-209-4300
EMAIL: nbarille@conexconsultants.com

RF ENGINEER
COMPANY: AT&T MOBILITY - NEW ENGLAND
ADDRESS: 550 COCHILUATE ROAD
SUITE 550 13 & 14
FRAMINGHAM, MA 01701
CONTACT: DAVID COOPER
PHONE: 508-594-7146
EMAIL: cc6970@att.com

CONSTRUCTION MANAGEMENT
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD
BILLERICA, MA 01821
CONTACT: GRZEGORZ "GREG" DORMAN
PHONE: 484-683-1750
EMAIL: gdorman@empiretelecom.com

GENERAL NOTES

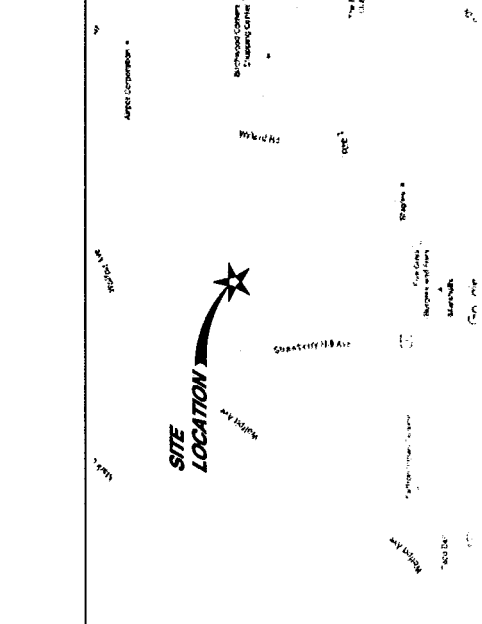
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2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSIBLE TO PERSONNEL EMPLOYED BY AT&T OR AN AUTHORIZED SERVICE PROVIDER. VISITORS NOT REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.



CONNECTICUT LAW REQUIRES TWO WORKING DAYS NOTICE PRIOR TO COMMENCING WORK ON A PROJECT. CALLING 800-822-4455 OR DIAL 811

VICINITY MAP

FROM ROCKY HILL, HEAD SOUTHWEST ON CONGRIB LN, TURN LEFT ONTO SOLD DR, TURN RIGHT ONTO WESTON RD, MERGE ONTO CT 57 WESTON RD, TAKE EXIT 42 FOR CT-57 TOWARD WESTPORT WESTON, TURN RIGHT ONTO CT-57/WESTON RD, SLIGHT RIGHT ONTO MAIN ST, TURN RIGHT CANAL ST, CONTINUE ONTO KINGS HWY N, SLIGHT RIGHT ONTO POST RD, CONTINUE ONTO WESTPORT AVE, TURN RIGHT ONTO WILLARD RD, TURN LEFT PAST CVS, DRIVE THROUGH PARKING LOT, SITE WILL BE ON RIGHT.



AT&T			
TITLE SHEET			
DATE:	16050-EMP	DRAWING NUMBER:	T-1
JOB NUMBER:			
DRAWING TITLE:			
SCALE:			
ISSUED AS FINAL	MAILED FOR	DESIGNED BY:	NAM
ISSUED AS FINAL	MAILED FOR	DRAWN BY:	JW
REVISIONS	NO. AND DATE	CHECKED BY:	NAM
SCALE: AS SHOWN			

GROUNDING NOTES:

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTNING PROTECTION STANDARD AND THE SUBCONTRACTOR SHALL REPORT ANY DISCREPANCIES OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GESS) SHALL BE BONDED TOGETHER, IN ACCORDANCE WITH THE NEC.
3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 100 AND 81) FOR ALL GROUND ELECTRODE SYSTEMS. TESTS SHALL BE PERFORMED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS. TESTS SHALL BE PERFORMED IN ACCORDANCE WITH 254711-000-3P5-EG00-0001, DESIGN & TESTING OF FACILITY GROUNDING FOR CELL SITES.
4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION SHALL BE USED IN ACCORDANCE WITH THE NEC. ALL CONDUITS SHALL BE INSTALLED WITH THE POWER CIRCUITS TO BVS EQUIPMENT.
5. EACH BVS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND STRANDED COPPER FOR OUTDOOR BVS.
6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
7. APPROVED ANTI-OXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
8. USE BRIDGE BOLTING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED WITH STAINLESS STEEL HARDWARE TO THE BRIDGE AND THE TOWER GROUND BAR.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
11. METAL CONDUIT AND TRAY SHALL BE GROUNDING AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE CONDUIT JOINTS.
12. CONDUIT CLAMPS.
13. ALL TOWER CONDUITORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS OR THROUGH METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE, E.G., CONDUIT SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
14. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE PERIMETER SHALL BE BONDED TO THE GROUND RING. ALL EXISTING STRUCTURES MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID TINNED COPPER GROUND WIRE. PER NEC 250.50.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
CONTRACTOR - EMPIRE TELECOM
SUBCONTRACTOR - GENERAL CONTRACTOR (CONSTRUCTION)
OWNER - AT&T MOBILITY
OEM - ORIGINAL EQUIPMENT MANUFACTURER
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF THE CONTRACTOR.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND SPECIFICATIONS. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE MOST RECENT EDITIONS OF ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
7. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
8. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR. ROUTING OF TRENCHING SHALL BE APPROVED BY CONTRACTOR.
9. SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
10. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
11. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
12. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.
13. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS UNLESS OTHERWISE SPECIFIED. ALL CONCRETING WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
14. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE AISC CODE REQUIREMENTS. ALL STEEL SHALL BE HOT DIPPED GALVANIZED TOG UP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
15. CONSTRUCTION SHALL COMPLY WITH SPECIFICATION 257411-000-3495-0002-00002, "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."
16. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS SHALL BE VERIFIED BY THE SUBCONTRACTOR. ANY DISCREPANCIES OR ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
17. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY THE SUBCONTRACTOR SHALL BE SCHEDULED TO OCCUR DURING HOURS OF NORMAL BUSINESS. ALL EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK MAY NEED TO BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
18. SINCE THE CELL SITE MAY BE ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUT DOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGEROUS PERSONAL RF EXPOSURE MONITORS ARE REQUIRED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

19. SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.
 - INTERNATIONAL BUILDING CODE, IBC 2009 WITH LOCAL & COUNTY AMENDMENTS
 - NATIONAL ELECTRICAL CODE, NEC 2011 WITH LOCAL & COUNTY AMENDMENTS
 - FIRE/LIFE SAFETY CODE, NFPA-101: 2009 WITH LOCAL & COUNTY AMENDMENTS
20. SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:
 - AMERICAN CONCRETE INSTITUTE (ACI) 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
 - AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), MANUAL OF STEEL CONSTRUCTION, THIRTEENTH EDITION
 - AMERICAN SOCIETY OF TESTING OF MATERIALS, ASTM
 - TELECOMMUNICATIONS INDUSTRY ASSOCIATION (ANSI/TIA-222-G-1), STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES
 - TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS
 - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, OSHA
 - INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVITY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND GROUNDING OF ELECTRONIC EQUIPMENT
 - TELCORDIA GR-1503, COAXIAL CABLE CONNECTIONS
21. FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE MATERIAL, METHOD, OR STANDARD SHALL GOVERN. THE SPECIFIC REQUIREMENT SHALL GOVERN. REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.
23. INFORMATION SHOWN ON THIS SET OF PLANS TAKEN FROM DRAWINGS PREPARED BY COM-EX CONSULTANTS FOR A RECENT UPGRADE DATED 08/04/2013. CONTRACTOR TO NOTIFY DESIGN ENGINEER OF ANY DISCREPANCIES PRIOR TO COMMENCEMENT OF CONSTRUCTION.

COM-EX
Consultants
1150 W. 12th St.
Billerica, MA 01821
PHONE: 978.264.1200
FAX: 978.269.1200

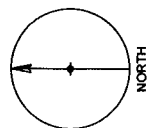
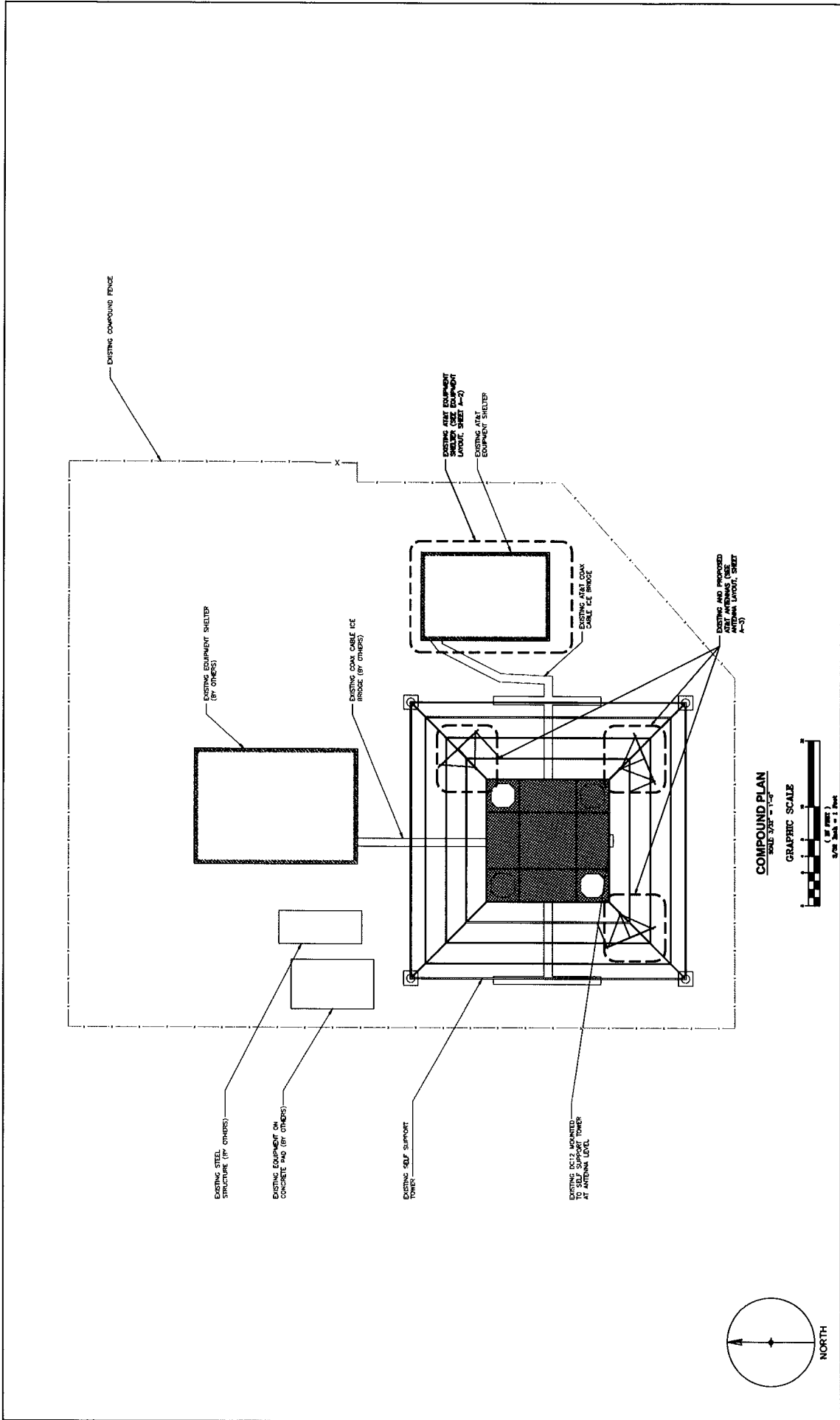
EMPIRE
telecom
110 ESCOPE ROAD
BILERICA, MA 01821

SITE NUMBER: CTL192
SITE NAME: NORWALK EAST -
WILLARD RD
88 PARSONAGE HILL ROAD
NORWALK, CT 06472
NEW HAVEN COUNTY

at&t
MOBILITY
550 COMMUTATE ROAD
FRAMINGHAM, MA 01701

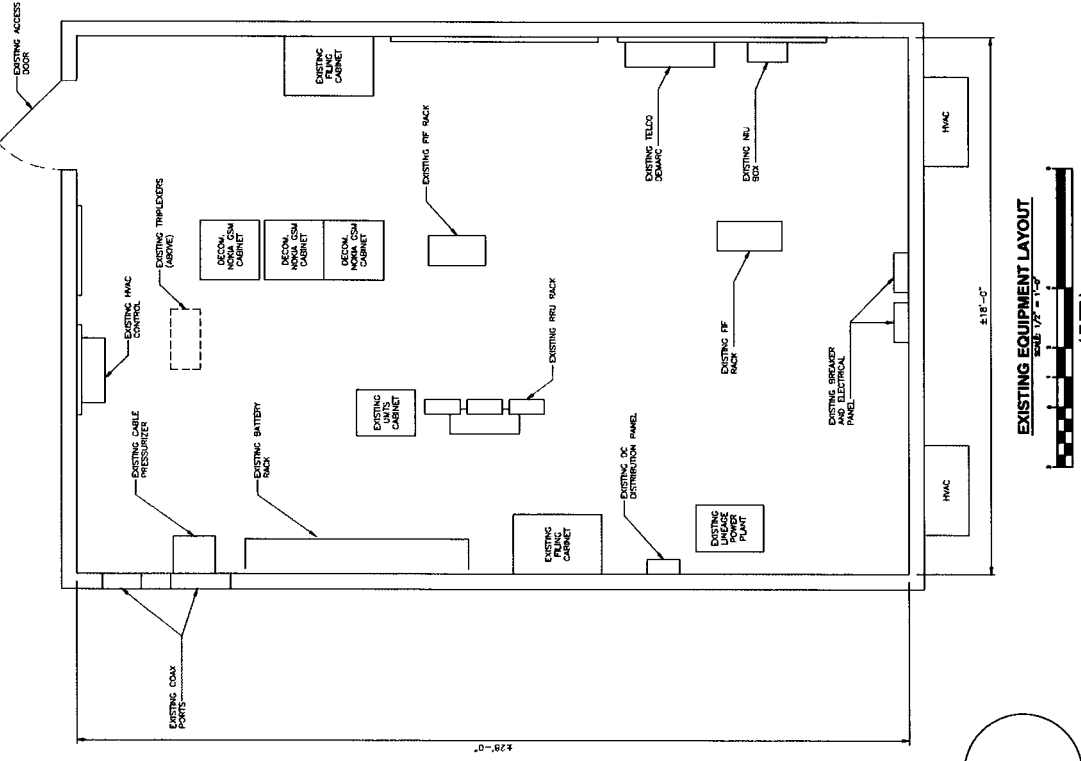


DRAWING TITLE		AT&T	
GROUNDING NOTES & GENERAL NOTES		16050-EVP	
ISSUED AS FINAL	DATE	ISSUED AS FINAL	DATE
1 08/22/17	AM	1 08/22/17	AM
0 08/16/17	AM	0 08/16/17	AM
NO. OF REVISIONS	BY	NO. OF REVISIONS	BY
DESIGNED BY: AM	CHK: JPT	DESIGNED BY: AM	CHK: JPT
SCALE: AS SHOWN		SCALE: AS SHOWN	
DRAWN BY: AM		DRAWN BY: AM	
DATE: 08/16/17		DATE: 08/16/17	
PROJECT NO.: 16050-EVP		PROJECT NO.: 16050-EVP	
JOB NUMBER: 16050-EVP		JOB NUMBER: 16050-EVP	
DRAWING NUMBER: GN-1		DRAWING NUMBER: GN-1	
SHEET NO.: 1		SHEET NO.: 1	

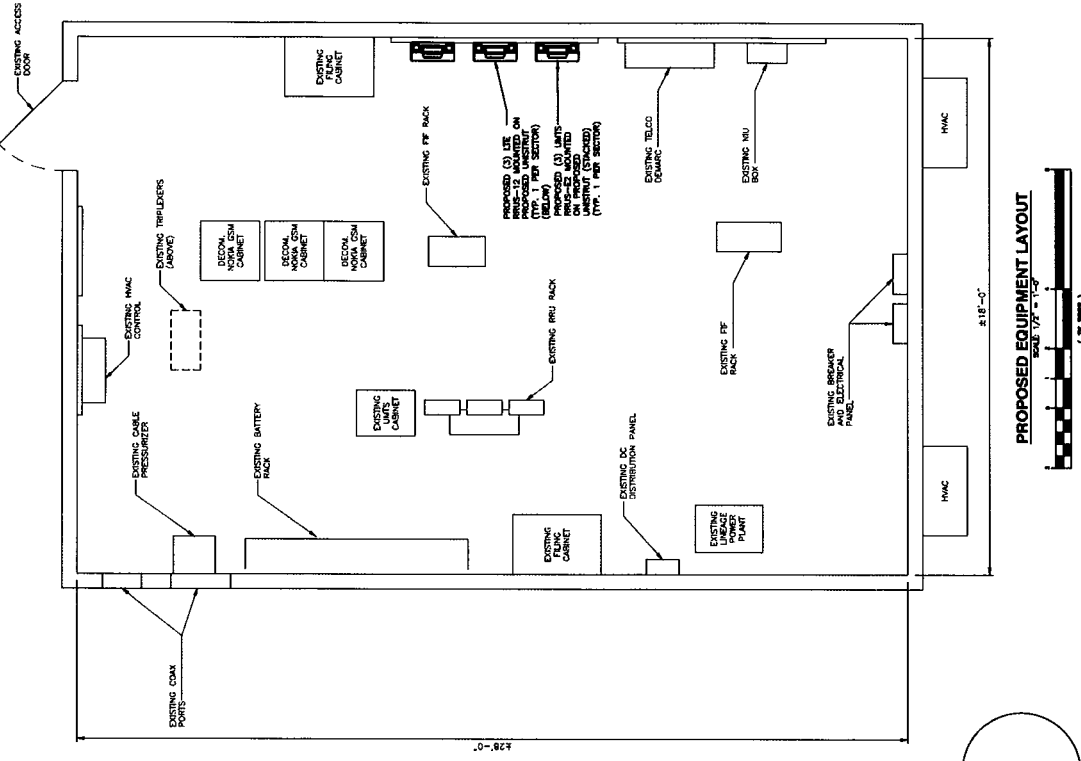


COMPOUND PLAN
 SCALE 1/8" = 1'-0"
 GRAPHIC SCALE
 1/8" Inch = 1' Feet

<p>COM-EX Consultants 115 STATE ST. #4 WESTFIELD, MASSACHUSETTS 01096 PHONE: 413.234.1200 FAX: 413.234.1201</p>		<p>EMPIRE telecom 10 ESCURIE ROAD BILLERICA, MA 01821</p>		<p>SITE NUMBER: CTL2132 SITE NAME: NORWALK EAST - WILLARD RD 88 PARSONAGE HILL ROAD NORTHFORD, CT 06472 NEW HAVEN COUNTY</p>		<p>550 COCHITUATE ROAD FRAMINGHAM, MA 01701</p>				<p>AT&T DRAWING TITLE: COMPOUND LAYOUT JOB NUMBER: 16050-EMP DRAWING NUMBER: A-1 SHEET: 1</p>	
NO.	DATE	REVISIONS	DESIGNED BY	DRAWN BY	CHKD BY	APP'D BY					
1	08/22/17	ISSUED AS FINAL	NAW	NOS	NOS						
0	08/16/17	ISSUED AS FINAL	NAW	NOS	NOS						
SCALE: AS SHOWN							SCALE: AS SHOWN				

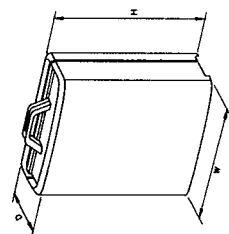


EXISTING EQUIPMENT LAYOUT
 SCALE: 1/8" = 1'-0"
 (SEE PLAN)
 1/8" = 1'-0"



PROPOSED EQUIPMENT LAYOUT
 SCALE: 1/8" = 1'-0"
 (SEE PLAN)
 1/8" = 1'-0"

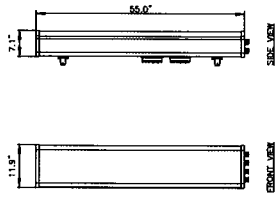
COM-EX Consultants 115 SITE ST. #2 BURLINGTON, MASSACHUSETTS 01804 PHONE: (978) 259-2500 FAX: (978) 259-2501	EMPIRE telecom 115 ESCORT ROAD BURLINGTON, MA 01821	550 COCHITUATE ROAD FRAMINGHAM, MA 01701	SITE NUMBER: CTL2132 SITE NAME: NORWALK EAST - WILLARD RD 88 PARSONAGE HILL ROAD NORFOLK, CT 06472 NEW HAVEN COUNTY	PROJECT TITLE: EQUIPMENT LAYOUTS DRAWN BY: NJM CHECKED BY: CT DESIGNED BY: AW REVISIONS: NO. DATE REVISIONS BY:	SEAL: [Signature] SCALE AS SHOWN DATE: 08/16/17 ISSUED AS FINAL: N/A N/A HOS HOS N/A HOS HOS N/A HOS HOS N/A HOS HOS	DRAWING NUMBER: A-2 PROJECT NUMBER: 16050-EMP
	NORTH 		NORTH 	ATR&T	1 08/22/17 0 08/16/17	1 A-2



MODEL	L x W x H	WEIGHT
RRUS-11	19.7" x 16.9" x 7.2"	50.7 LBS
RRUS-32	29.9" x 13.3" x 9.5"	77 LBS
RRUS-32 B2	29.9" x 13.3" x 9.5"	77 LBS

* DIMENSIONS EXISTING

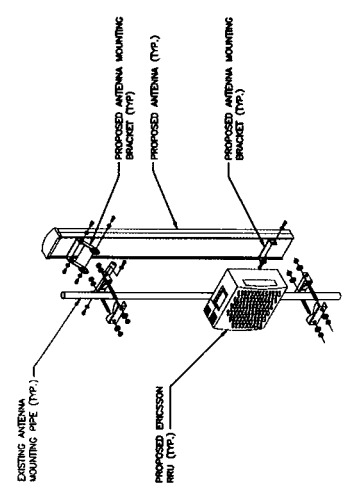
RRU DETAIL
SEE KIT



MANUFACTURER	MODEL	WEIGHT
ANDREW	SRHH-1065A	33.5 LBS



ANTENNA DETAIL
SEE KIT



ANTENNA AND RRU MOUNTING DETAIL
SEE KIT

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	POWERWAVE	7770	55" x 11" x 5"
	A2	CCI	OPA-65R-LCUU-H4	48" x 14.4" x 7.3"
	A3	-	-	-
	A4	KMW	AM-X-CD-65-00T-RET	48" x 11.8" x 5.9"
BETA	B1	POWERWAVE	7770	55" x 11" x 5"
	B2	CCI	OPA-65R-LCUU-H4	48" x 14.4" x 7.3"
	B3	-	-	-
	B4	KMW	AM-X-CD-65-00T-RET	48" x 11.8" x 5.9"
GAMMA	G1	POWERWAVE	7770	55" x 11" x 5"
	G2	CCI	OPA-65R-LCUU-H4	48" x 14.4" x 7.3"
	G3	-	-	-
	G4	KMW	AM-X-CD-65-00T-RET	48" x 11.8" x 5.9"

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	POWERWAVE	7770	55" x 11" x 5"
	A2	CCI	OPA-65R-LCUU-H4	48" x 14.4" x 7.3"
	A3	-	-	-
	A4	ANDREW	SRHH-1065A	55" x 11.9" x 7.1"
BETA	B1	POWERWAVE	7770	55" x 11" x 5"
	B2	CCI	OPA-65R-LCUU-H4	48" x 14.4" x 7.3"
	B3	-	-	-
	B4	ANDREW	SRHH-1065A	55" x 11.9" x 7.1"
GAMMA	G1	POWERWAVE	7770	55" x 11" x 5"
	G2	CCI	OPA-65R-LCUU-H4	48" x 14.4" x 7.3"
	G3	-	-	-
	G4	ANDREW	SRHH-1065A	55" x 11.9" x 7.1"

SECTOR	MAKE	MODEL	SIZE (INCHES)	ADDITIONAL COMMENT	SIZE (INCHES)
ALPHA	ERICSSON	RRUS-11 (EXISTING)	19.7" x 16.9" x 7.2"		
	ERICSSON	RRUS-32 (EXISTING)	29.9" x 13.3" x 9.5"		
	ERICSSON	RRUS-32 B2	29.9" x 13.3" x 9.5"		
BETA	ERICSSON	RRUS-11 (EXISTING)	19.7" x 16.9" x 7.2"		
	ERICSSON	RRUS-32 (EXISTING)	29.9" x 13.3" x 9.5"		
	ERICSSON	RRUS-32 B2	29.9" x 13.3" x 9.5"		
GAMMA	ERICSSON	RRUS-11 (EXISTING)	19.7" x 16.9" x 7.2"		
	ERICSSON	RRUS-32 (EXISTING)	29.9" x 13.3" x 9.5"		
	ERICSSON	RRUS-32 B2	29.9" x 13.3" x 9.5"		

CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND INSURANCE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND INSURANCE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND INSURANCE.

PROJECT OWNER IS RESPONSIBLE FOR PROVIDING A STRUCTURAL STABILITY ANALYSIS TO DETERMINE THE CAPACITY AND SUITABILITY OF THE EXISTING ANTENNA SUPPORT STRUCTURE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL NECESSARY PERMITS AND INSURANCE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INCORPORATING ANY REQUIRED STRUCTURAL MODIFICATIONS INTO THEIR SCOPE OF WORK.

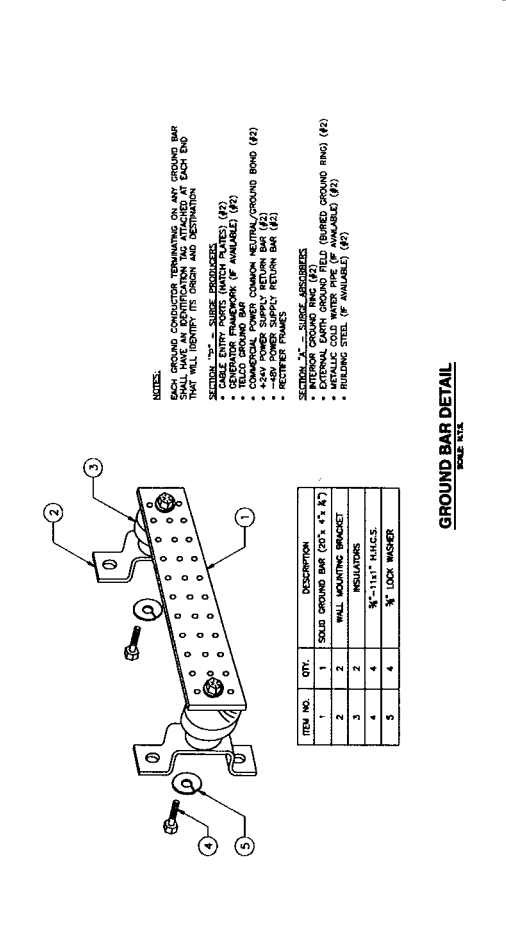
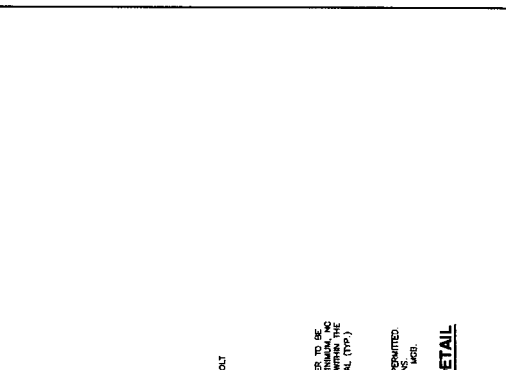
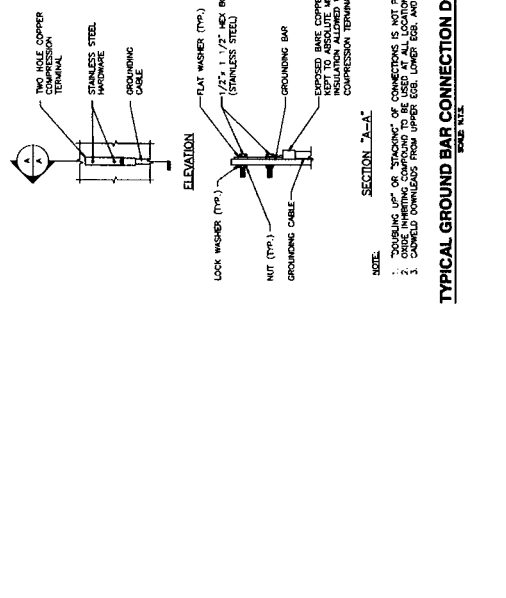
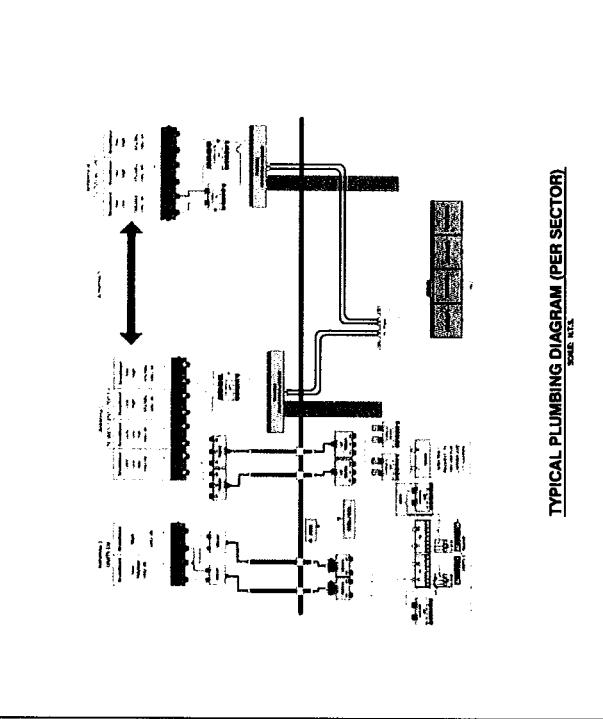
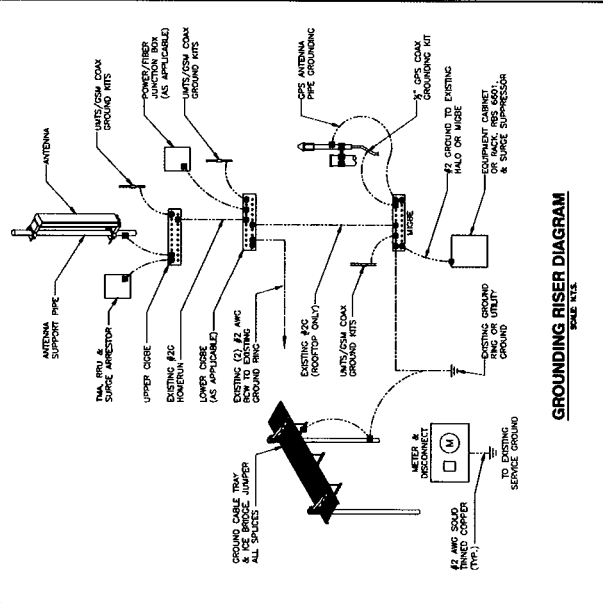
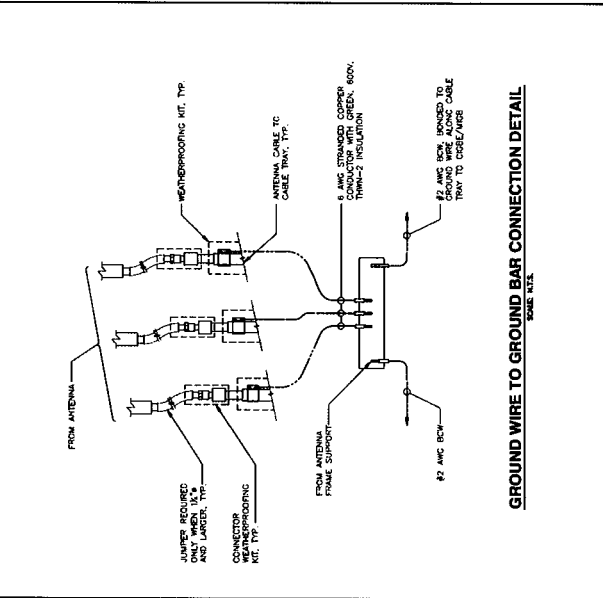
COM-EX
Consultants
115 ROUTE 44
WILMINGTON, MA 01897
TEL: 978-261-9301

EMPIRE
telecom
10 ESQUIRE ROAD
BILLENICA, MA 01821

SITE NUMBER: CTL2132
SITE NAME: NORWALK EAST -
WILLARD RD
88 PARSONAGE HILL ROAD
NORTHFORD, CT 06472
NEW HAVEN COUNTY

at&t
MOBILITY
550 COCHITUATE ROAD
FRAMMINGHAM, MA 01701

AT&T
DRAWING TITLE: DETAILS
JOB NUMBER: 16050-EMP
DRAWING NUMBER: A-5



COM-EX CONSULTANTS
15 ROUTE 48
MOUNTAIN VIEW, NJ 07094
TEL: 908.291.3351

EMPIRE telecom

19 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CTL2132
SITE NAME: NORWALK EAST -
WILLARD RD
88 PARSONAGE HILL ROAD
NORFORD, CT 06472
NEW HAVEN COUNTY

550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

DRAWING TITLE		AT&T	
JOB NUMBER		GROUNDING DETAILS	
SCALE: AS SHOWN	DESIGNED BY: NM	DRAWN BY: AT	DATE: 16050-EWP



Radio Frequency Emissions Analysis Report

AT&T Existing Facility

Site ID: CT2132

Norwalk East - Willard Rd
Willard Road
Norwalk, CT 6851

August 30, 2017

Centerline Communications Project Number: 950006-068

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	8.36 %



August 30, 2017

AT&T Mobility – New England
Attn: John Benedetto, RF Manager
550 Cochituate Road
Suite 550 – 13&14
Framingham, MA 06040

Emissions Analysis for Site: CT2132 – Norwalk East - Willard Rd

Centerline Communications, LLC (“Centerline”) was directed to analyze the proposed AT&T facility located at **Willard Road, Norwalk, CT**, for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The number of $\mu\text{W}/\text{cm}^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general population may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general population would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The general population exposure limits for the 700 and 850 MHz Bands are approximately $467 \mu\text{W}/\text{cm}^2$ and $567 \mu\text{W}/\text{cm}^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) bands is $1000 \mu\text{W}/\text{cm}^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.



Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.



CALCULATIONS

Calculations were performed for the proposed AT&T Wireless antenna facility located at **Willard Road, Norwalk, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

All emissions values for additional carriers were taken from the Connecticut Siting Council (CSC) active MPE database. Values in this database are provided by the individual carriers themselves

For each sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
UMTS	850 MHz	2	30
UMTS	1900 MHz (PCS)	2	30
LTE	700 MHz	4	60
LTE	850 MHz	2	60
LTE	2300 MHz (WCS)	2	60
LTE	1900 MHz (PCS)	2	60

Table 1: Channel Data Table



The following antennas listed in *Table 2* were used in the modeling for transmission in the 700 MHz, 850 MHz, 1900 MHz (PCS) and 2300 MHz (WCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Powerwave 7770	347
A	2	CCI OPA-65R-LCUU-H4	347
A	3	Commscope SBNHH-1D65A	347
B	1	Powerwave 7770	347
B	2	CCI OPA-65R-LCUU-H4	347
B	3	Commscope SBNHH-1D65A	347
C	1	Powerwave 7770	347
C	2	CCI OPA-65R-LCUU-H4	347
C	3	Commscope SBNHH-1D65A	347

Table 2: Antenna Data

All calculations were done with respect to uncontrolled / general population threshold limits.



RESULTS

Per the calculations completed for the proposed AT&T configurations *Table 3* shows resulting emissions power levels and percentages of the FCC's allowable general population limit.

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.09
Antenna A2	CCI OPA-65R-LCUU-H4	700 MHz / 850 MHz / 2300 MHz (WCS)	10.55 / 11.15 / 14.65	6	360	6,426.73	0.28
Antenna A3	Commscope SBNHH-1D65A	700 MHz / 1900 MHz (PCS)	10.85 / 14.55	4	240	4,880.65	0.20
Sector A Composite MPE%							0.57
Antenna B1	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.09
Antenna B2	CCI OPA-65R-LCUU-H4	700 MHz / 850 MHz / 2300 MHz (WCS)	10.55 / 11.15 / 14.65	6	360	6,426.73	0.28
Antenna B3	Commscope SBNHH-1D65A	700 MHz / 1900 MHz (PCS)	10.85 / 14.55	4	240	4,880.65	0.20
Sector B Composite MPE%							0.57
Antenna C1	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.09
Antenna C2	CCI OPA-65R-LCUU-H4	700 MHz / 850 MHz / 2300 MHz (WCS)	10.55 / 11.15 / 14.65	6	360	6,426.73	0.28
Antenna C3	Commscope SBNHH-1D65A	700 MHz / 1900 MHz (PCS)	10.85 / 14.55	4	240	4,880.65	0.20
Sector C Composite MPE%							0.57

Table 3: AT&T Emissions Levels



The Following table (table 4) shows all additional carriers on site and their MPE% as recorded in the CSC active MPE database for this facility along with the newly calculated maximum AT&T MPE contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, all three sectors have the same configuration yielding the same results on all three sectors. Table 5 below shows a summary for each AT&T Sector as well as the composite MPE value for the site.

Site Composite MPE%	
Carrier	MPE%
AT&T – Max Sector Value	0.57 %
PageNet	0.05 %
SNET TMRS	0.06 %
SkyTel	0.11 %
RAM Mobile Data	0.01 %
PageNet 900 MHz	0.97 %
	0.25 %
Clearwire	0.06 %
Sprint	0.93 %
MediaFLO	3.87 %
XM Sat Radio	0.02 %
American Mobile Com.	0.01 %
GNARC	0.01 %
WSHU-AM	1.00 %
MetroPCS	0.44 %
Site Total MPE %:	8.36 %

Table 4: All Carrier MPE Contributions

AT&T Sector A Total:	0.57 %
AT&T Sector B Total:	0.57 %
AT&T Sector C Total:	0.57 %
Site Total:	8.36 %

Table 5: Site MPE Summary



FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated AT&T sector(s). For this site, all three sectors have the same configuration yielding the same results on all three sectors.

AT&T Frequency Band / Technology (Sectors)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
AT&T 850 MHz UMTS	2	414.12	347	0.26	850 MHz	567	0.05%
AT&T 1900 MHz (PCS) UMTS	2	656.33	347	0.41	1900 MHz (PCS)	1000	0.04%
AT&T 700 MHz LTE	2	681.01	347	0.42	700 MHz	467	0.09%
AT&T 850 MHz LTE	2	781.90	347	0.48	850 MHz	567	0.09%
AT&T 2300 MHz (WCS) LTE	2	1,750.46	347	1.08	2300 MHz (WCS)	1000	0.11%
AT&T 700 MHz LTE	2	729.71	347	0.45	700 MHz	467	0.10%
AT&T 1900 MHz (PCS) LTE	2	1,710.61	347	1.06	1900 MHz (PCS)	1000	0.11%
						Total:	0.57%

Table 6: AT&T Maximum Sector MPE Power Values



Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general population exposure to RF Emissions.

The anticipated maximum composite contributions from the AT&T facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

AT&T Sector	Power Density Value (%)
Sector A:	0.57 %
Sector B:	0.57 %
Sector C:	0.57 %
AT&T Maximum Total (per sector):	0.57 %
Site Total:	8.36 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **8.36 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

A handwritten signature in black ink, appearing to read "Scott Heffernan", is positioned above the contact information.

Scott Heffernan
RF Engineering Director
Centerline Communications, LLC
95 Ryan Drive, Suite 1
Raynham, MA 02767

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Create Label	Preferences	Shipping History	Address Book										
<h3>Label Details</h3> <p>Label Number: 9405503699300395288945</p> <p>SCAN® Form: 9475703699300301410630</p> <p>Terms Acceptance Cutoff: 01/22/2019 4:30 PM Acceptance Time: 02/08/2019 6:39 PM Scheduled Date: 01/24/2019 11:59 PM Delivery Status: Delivered, To Agent 2019-02-11 08:01:00.0</p> <p>Label Actions</p> <p>USPS Tracking® Ship Again</p> <p>Need help</p> <p>File an insurance claim Request A Service Refund</p>			<p>Return Address: KRISTEN WHITE EMPIRE TELECOM 16 ESQUIRE RD N BILLERICA, MA 01862-2527 ne_sa_deliverable@empiretelecomm.com</p> <p>Delivery Address: STEVEN KLEPPIN DIRECTOR PLANNING AND ZONING 125 EAST AVE RM 223 NORWALK, CT 06851-5702</p>	<p>Package: Ship Date: 01/22/19 Value: \$50.00 Weight: 3 lbs 0 oz From: 01862 Label Type: Batch</p> <p>Service: Priority Mail® 2-Day Flat Rate Envelope USPS Tracking®</p>	<p>Account # 161958927</p>								
		<p>Transaction Number: 454888811</p> <p>Transaction Type: Label</p> <p>Payment Method: AMEX-1004</p> <p>Payment Status: Account Charged</p>	<p>Postage Cost: \$6.70 USPS Tracking®: Free</p> <p>Label Total: \$6.70</p> <p>Order Total: \$26.80</p>										
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<p>Back to Shipping History</p>													

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Create Label	Preferences	Shipping History	Address Book										
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Label Details													
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	Transaction Number: 454888811 Transaction Type: Label Payment Method: AMEX-1004 Payment Status: Account Charged	Postage Cost: \$6.70 USPS Tracking® Free Label Total: \$6.70 Order Total: \$26.80											
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			Account # 161958927										
Label Details													
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		Package: Ship Date: 01/22/19 Value: \$50.00 Weight: 3 lbs 0 oz From: 01862 Label Type: Batch Service: Priority Mail® 2-Day Flat Rate Envelope USPS Tracking® Postage Cost \$6.70 USPS Tracking® Free Label Total: \$6.70 Order Total: \$26.80											
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