Rigorous Structural Analysis Report

Louisiana Public Broadcasting - KLTS-TV Tower Site

Owner: LA Educational TV Authority (KLTS-TV) - KLTS-TV Tower Site

Shreveport, Louisiana

September 19, 2017

MEI PROJECT ID: LA05103G-17V1

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

PROFESSIONAL MEMBER

ACEC MEMBER

MALOUF ENGINEERING INTL., INC.

STRUCTURAL CONSULTANTS

September 19, 2017

Mr. Clarence Copeland
Louisiana Public Broadcasting
Baton Rouge, LA 70810

RIGOROUS STRUCTURAL ANALYSIS

Structure/Make/Model:	1006 ft **Guyed Tower**		Stainless Inc. / G-7.0	
Client/Site Name/#:	**Louisiana Public Broadcasting**		**KLTS-TV Tower**	
Owner/Site Name/#:	LA Educational TV Authority (KLTS-TV)		KLTS-TV Tower	
MEI Project ID:	**LA05103G-17V1**			
Location:	2.2 Miles ESE of Mooringsport Shreveport, LA 71060		Caddo Parish FCC #1020314	
	LAT	32-40-40.1 N	LON	93-55-30.7 W

EXECUTIVE SUMMARY:

Malouf Engineering Int'l (MEI), as requested, has performed a rigorous structural analysis and modification design 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 **after proper installation of the recommended structural strengthening modifications outlined** – tower rated at 98.4% - Legs.

The addition of the proposed changed condition as noted in Table 1 is structurally acceptable after proper installation of the proposed strengthening modifications and all maintenance work is performed. Please refer to modification drawings for details.

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:

Helder Lopez, PE
Sr. Project Engineer

Reviewed & Approved by:

Luan Nguyen
9/19/17

Luan Nguyen, PE
Louisiana #30149
972-783-2578 ext. 104
lnguyen@maloufengineering.com

STATE OF LOUISIANA
LUAN K. NGUYEN
License No. 30149
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING

9/19/2017

TABLE OF CONTENTS

1. INTRODUCTION & SCOPE

A rigorous structural analysis and modification design were performed by Malouf Engineering Int'l (MEI), as requested and authorized by Mr. Clarence Copeland, Louisiana Public Broadcasting, 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 / Mods	ID LA05103G-17V0 Dated 08/21/2017
Foundation	MEI Records	Previous Structural Analysis / Mods	ID LA05103G-17V0 Dated 08/21/2017
Material Grade	Available from supplied documents noted above-refer to Appendix		
CURRENT APPURTENANCES			
	MEI Records	Previous Structural Analysis / Mods	ID LA05103G-17V0 Dated 08/21/2017
CHANGED CONDITION			
	LA Public Broadcasting Mr. Clarence Copeland	E-mail Instructions	Dated 08/21/2017

Background Information:

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

DESIGNER / FABRICATOR	Stainless Inc. / G-7.0
ORIGINAL DESIGN CRITERIA	EIA-RS-222-C– 50 Psf + 0" Ice
PRIOR STRUCTURAL MODIFICATIONS	As per MEI Records ID 00-1115 dated 11/13/2000 – considered properly installed. Guy wire replacement as recorded in Coast to Coast inspection dated 06/18/2008

3. ANALYSIS CRITERIA

The structural analysis performed used the following criteria:

CODE / STANDARD	2012 Int'l Building Code / ANSI/TIA-222-G-2 Standard	
LOADING CASES	*Full Wind*:	115 Mph ultimate gust [equiv. 90 Mph (3-sec gust)] w/No Radial Ice**
	Iced Case:	30 Mph + 3/4" Radial Ice
	Service:	60 Mph
	Seismic:	S_S = 0.129 / S_1 = 0.071 / Site Class: D – Stiff Soil
STRUCTURE CRITERIA	*Risk Category (Structural Class)*: 2	
	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	Ants Qty	Appurtenance Model / Description	Mount Description	Lines Qty	Line size & Location
1005.8 Base	KLTS-TV	1	Alive ATC-BCE428O-V0-17 KLTS Top Antenna (Main)	Top Mounted	1	6-1/8"-(FZ) [Exist/Reuse]
803 cl.		1	Alive ATC-BCSE16CS1-U1 Auxiliary Antenna	Side Mounted	1	5" Flex. -(FZ) [NEW]
Current Appurtenances To Be Removed						
1005.8	KLTS-TV	1	RCA-Pylon TFU-42J TV Antenna	Top Mounted		
803 cl		1	Dielectric TLP-8D TV Antenna	Leg / Side Mounted	1	4-1/16"-(FZ)

Table 2: Remaining Tenants Current and Reserved/Future Appurtenances

Elev (ft)	Tenant	Ants Qty	Appurtenance Model / Description	Mount Description	Lines Qty	Line size & Location
1005.83					1	2" R.C.
990				External Transfer Platform	1	3/4" R.C.
835-960	KDAQ-FM	1	12 Bay FM Antenna - RCA BFC-12	Leg/ Side Mounted	1	3"-(FZ)
948		1	O.B Light(s)			
810		1	Beacon			
765	KDAQ-FM	1	12-Elem. Yagi Antenna	Leg Mounted	1	7/8"-(FZ)
758.75	KDAQ-FM	1	QUAD YAGI Antenna	Leg Mounted	1	7/8"-(FZ)
757	[Dead]				2	7/8"-(FZ)
675		1	O.B Light(s)			
540		1	Beacon			
405		1	O.B Light(s)			
352.5	KDAQ-FM	1	8ft Dia. Grid Dish (STL)	Dish Pipe Mount	1	1/2"-(FZ)
313			*Dead Lines*		2	3/8"-(FZ)
			Dead Lines		1	1/4"-(FZ)
302.5		1	6ftT Omni Antenna	Standoff Mount	2	CAT 5-(FZ)
		1	TMA			
271.25		2	2ft Dia. Satellite Dish Antenna	(2) Dish Standoff Pipe Mounts	2	CAT 5-(FZ)
270		1	Beacon			
246.25	KDAQ-FM	1	6-Elem. Yagi Antenna	Leg Mounted	1	1/2"-(FZ)
135		1	O.B Light(s)			

Notes:

1. **As per 2012 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.
2. All elevations are measured from tower base.
3. Please note appurtenances not listed above are to be removed/not present as per data supplied.
4. (I) = Internal; (E) = External; (FZ) = Within Face Zone; (OFZ) = Outside Face Zone - as per TIA-222-G.
5. 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. 7.07), a commercially available program by Tower Numerics Inc. The latticed structures members are modeled using beam/truss and cable members and the pole members using tubular beam elements. 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 program for the different wind directions and then applied as external loads on the structure. 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.
- Top antenna spine stiffness assumed based on limited data available.
- All guy cable assemblies, as applicable, are assumed to develop the rated breaking strength of the wire.
- 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 invalided, MEI should be contacted to review any contradictory information to determine its effect.

5. ANALYSIS RESULTS

The structure will require structural strengthening as follows: (Refer to the attached drawings for details.)

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

STRUCTURAL STRENGTHENING REQUIRED	
1	Add **new Split Pipe leg reinforcement** bolted onto legs from elevation: 358.75'-458.75' (4 sections).
2	Add **new Angle mid-braces** bolted onto legs from elevation: 777.5'-840', 708.75'-721.25', 508.75'-608.75' and 283.75'-333.75' (36 bays total).
3	**Replace** existing diagonal members with **new higher strength members** from elevation: 621.25'-633.75' (2 bays).
4	**Replace** existing horizontal pipes with **new horizontal double angle members** from elevation: 827.5'-840', 815', 658.75'-665', 633.75-646.5' and 302.5'-308.75' (11 levels total).
5	**Reinforce tower base foundation** *as shown in modification drawings.*
6	*Provide temporary bracing as required for stability of structure during replacement and reinforcement of members as required. All safety measures and precautions shall be taken as required by code.*
7	Plumb mast and tension guy wires as per optimized **New guy tensions table**. ***Note: The adjusted initial tensions are integral part of the overall tower performance; therefore a laminated copy of the new Guy Tensions Table should be left in plain sight inside shelter for future reference.***
8	**Perform all Maintenance work as required & applicable to bring the structure into good operational condition. Refer to MEI repair drawings dated 04/12/2017.**
9	*Field determination/verification before any fabrication and installation is strongly recommended.*

Prior to implementation of the changed conditions and modifications, the data designated on the design documents requiring field verification shall be validated. 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.

Table 3: Stress Analysis Results– AFTER PROPER INSTALLATION OF MODS

Component Type	Maximum Stress Ratio	Controlling Elev. (ft) / Component	Pass/Fail	Comment
GUYS	74.6%	483.75	**Pass**	
LEGS	**98.4%**	**777.5 - 771.25**	**Pass**	
DIAGONALS	93.6%	858.75 - 846.25	**Pass**	
HORIZONTALS	94.6%	846.25 - 840	**Pass**	
TOP GUY PULL-OFF	61.5%	821.25 - 815	**Pass**	Bolts Control
TORQUE ARM TOP	32.3%	483.75 - 477.5	**Pass**	Bolts Control
BASE FDN	95.8%	Concrete Shear	**Pass**	Punching Check
GUYANCHORS	95.8%	Anchor shaft	**Pass**	

Table 4: Serviceability Requirements

	Maximum Value	TIA Requirement (10dB)	Pass/Fail	Comment
TWIST/SWAY	0.1482 Deg.	N/A	-	2' Dia. Satellite Dish Elev. 271.250ft
	0.1738 Deg.	2.618 Deg.	**Pass**	8' Dia. Grid Dish (STL) Elev. 352.500ft
	1.2962 Deg.	4 Deg. from Vert. or Horiz. Axis	**Pass**	
HORIZONTAL DISPLACEMENT	14.935 In./ 0.12% of Ht.	3.0% of Height	**Pass**	

Notes:
1. 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.
2. Refer to the Appendix 2 for more details on the member loads.
3. A maximum stress ratio between 100% and 105% may be considered as *Acceptable* according to industry standard practice.

6. FINDINGS & RECOMMENDATIONS

- Based on the stress analysis results, the subject structure is **rated at 98.4%** of its support capacity (controlling component: Legs) with the proposed changed condition considered after strengthening. 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 **after proper installation of the recommended structural strengthening modifications outlined *and all maintenance work is performed***.
- ***The addition of the proposed changed condition as noted in Table 1 is structurally acceptable after proper installation of the proposed strengthening modifications.*** Please refer to modification drawings for details.
- This structure would have limited additional support capacity for the appurtenances and loading criteria considered, after its modification. 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 **M**alouf **E**ngineering **I**nternational, 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.

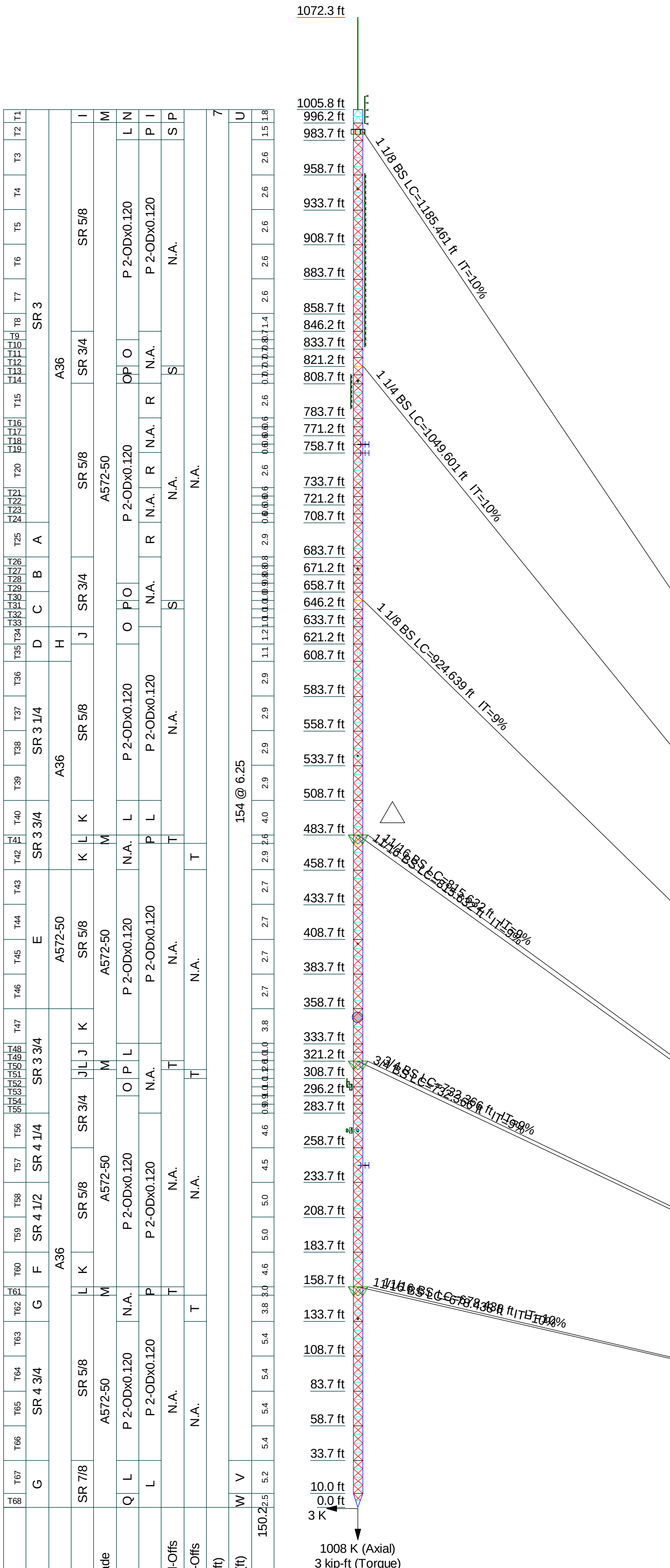
Furthermore, the information and conclusions contained in this Report were determined by application of the current "state-of-the-art" engineering and analysis procedures and formulae. MALOUF ENGINEERING INTERNATIONAL, INC. assumes no obligation to revise any of the information or conclusions contained 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.

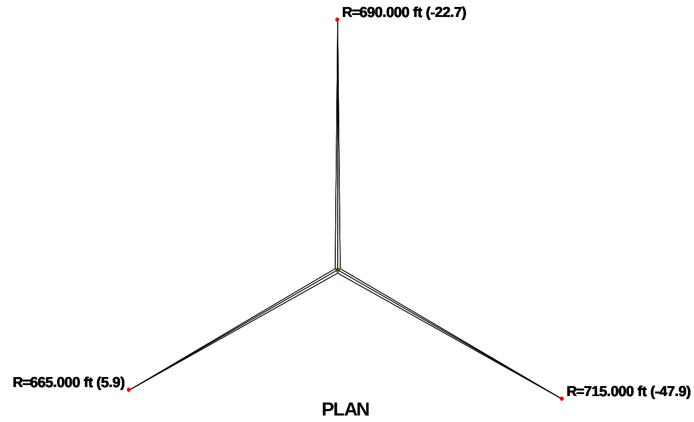
Customer has requested MALOUF ENGINEERING INTERNATIONAL, INC. to prepare and submit to Customer an engineering analysis with respect to the Subject Tower and has further requested MALOUF ENGINEERING INTERNATIONAL, INC. to make appropriate recommendations regarding suggested structural modifications and 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 – TOWER DRAWING

AFTER NOTED MODIFICATIONS





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
ATC-BCE428O-V0-17 KLTS Top Antenna (KLTS-TV / P)	1005.75	(3) O.B Light(s) (E)	405
Top Plate (E)	1005.75	DISH PIPE MOUNT (4'x4.5"OD) (KDAQ-FM / E)	352.5
External Transfer Platform (E)	990	8' Dia. Grid Dish (STL) (KDAQ-FM / E)	352.5
12 Bay FM Antenna - RCA BFC-12 (KDAQ-FM / E)	960 - 835	TMA (E)	302.5
		Standoff Mount (E)	302.5
(3) O.B Light(s) (E)	948	6' Omni Antenna (E)	302.5
ATC-BCSE16CS1-U1 Side Mounted Antenna (KLTS-TV / P)	815.5 - 790.5	Dish Standoff Pipe Mount (E)	271.25
		Dish Standoff Pipe Mount (E)	271.25
Beacon (E)	810	2' Dia. Satellite Dish Antenna (E)	271.25
12-Elem. Yagi Antenna (KDAQ-FM / E)	765	2' Dia. Satellite Dish Antenna (E)	271.25
QUAD YAGI Antenna (KDAQ-FM / E)	758.75	Beacon (E)	270
(3) O.B Light(s) (E)	675	6-Elem. Yagi Antenna (KDAQ-FM / E)	246.25
Beacon (E)	540	(3) O.B Light(s) (E)	135

SYMBOL LIST

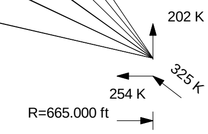
MARK	SIZE	MARK	SIZE
A	SR 3 1/4	M	A36
B	SR 3 1/2	N	C8x11.5
C	SR 3 3/4	O	2L2x2x3/16x1/2
D	P 5-ODx0.375	P	N.A.
E	P-5 ODx0.375 w/ 5.563x0.258 HP	Q	2L4x4x3/8x1/2
F	SR 4 1/4	R	P 2-ODx0.120
G	SR 4 1/2	S	2L2 1/2x2x3/16x1/2
H	A572-50	T	2L3x2 1/2x3/16x3/8
I	2L2 1/2x2 1/2x3/16x3/8	U	2 @ 4.79167
J	SR 7/8	V	4 @ 5.9375
K	SR 3/4	W	2 @ 4.99984
L	2L2 1/2x2x3/16x3/8		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A36	36 ksi	58 ksi	A572-50	50 ksi	65 ksi

TOWER DESIGN NOTES

1. Tower is located in Caddo Parish, Louisiana.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 90 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 30 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 0.000 ft
8. 65.000 ft ATC-BCE428O-V0-17 KLTS Top Antenna is included for load transfer only.
9. TOWER RATING: 98.4%



ALL REACTIONS ARE FACTORED

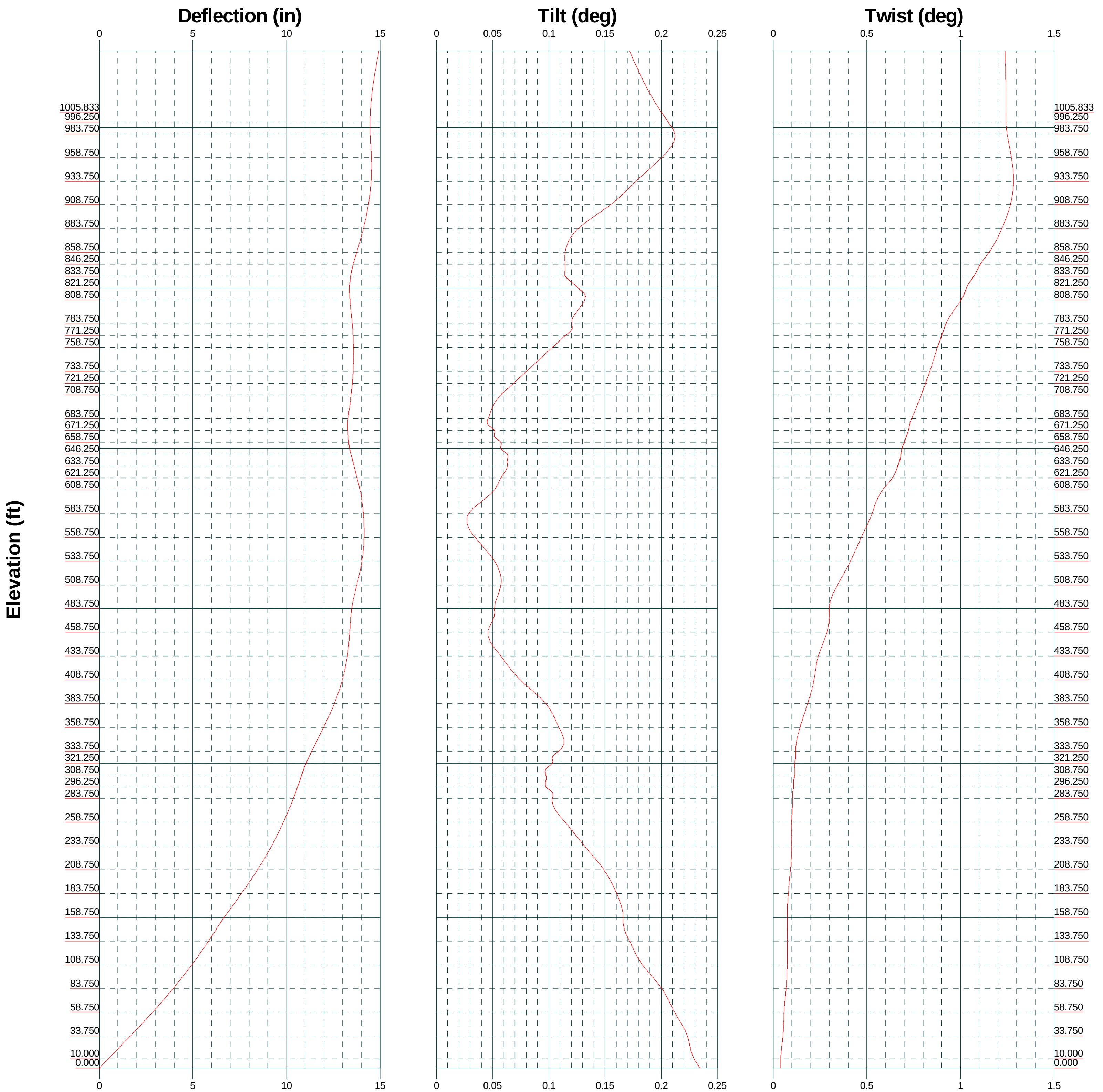
MALOUF ENGINEERING INT'L. INC.
17950 PRESTON RD. SUITE 720
DALLAS, TEXAS - 75252
Phone: (972) 783-2578
FAX: (972) 783-2583
maloufengineering.com

Job: *1006 ft. GT / KLTS-TV Tower Site*			
Project: *LA05103G-17V1*			
Client: LA Public Broadcasting	Drawn by: HLopez	App'd:	
Code: TIA-222-G	Date: 09/18/17	Scale: NTS	
Path: C:\MEIProjects\17files\GT\LA05103G-17V1\LA05103G-17V1_Final.eri		Dwg No. E-1	

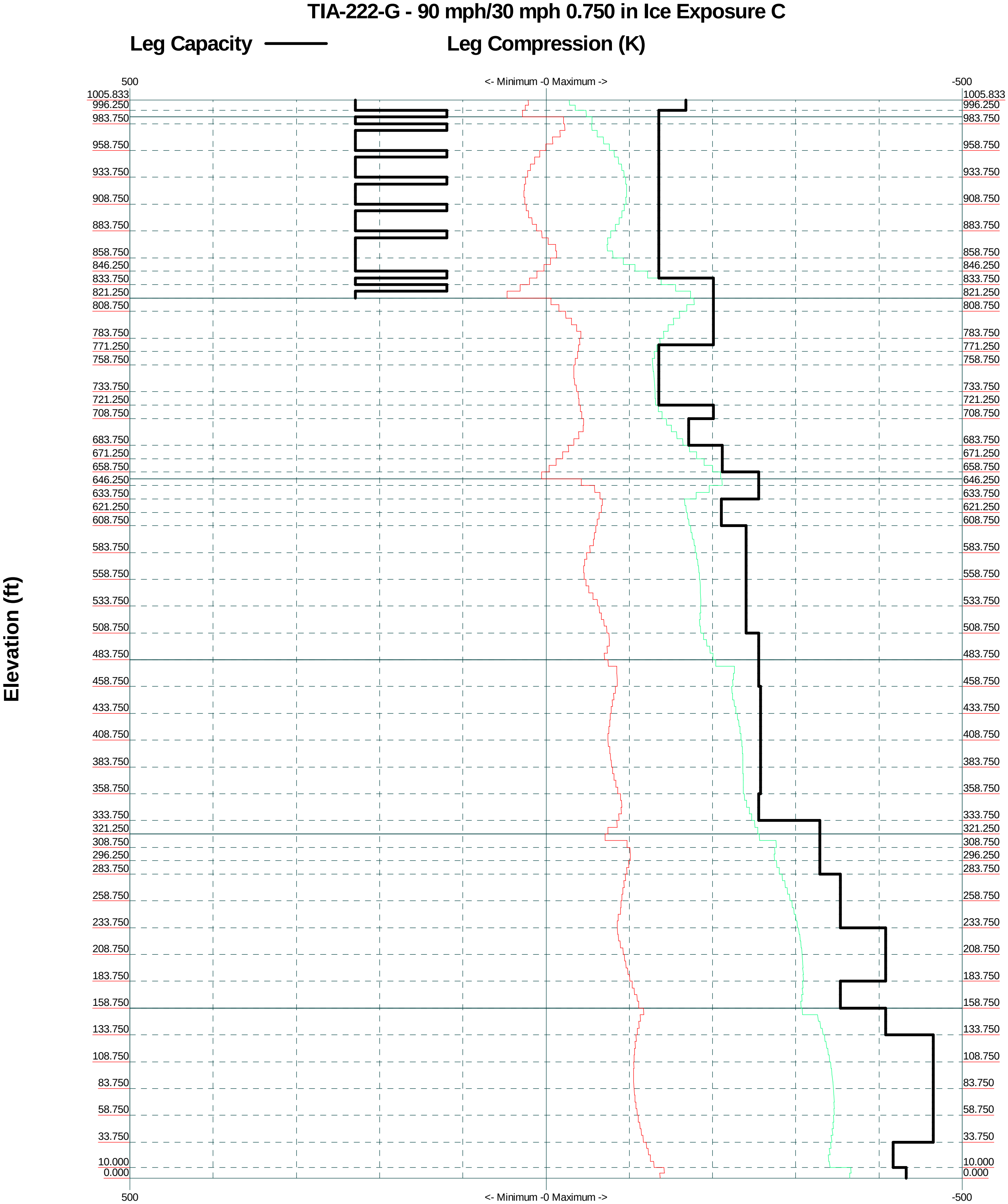
APPENDIX 2 - ANALYSIS PRINTOUT & GRAPHICS

TIA-222-G - Service - 60 mph

Maximum Values



MALOUF ENGINEERING INTL., INC. STRUCTURAL CONSULTANTS maloufengineering.com	***MALOUF ENGINEERING INT'L. INC.*** 17950 PRESTON RD. SUITE 720 DALLAS, TEXAS - 75252 Phone: (972) 783-2578 FAX: (972) 783-2583	Job: ***1006 ft. GT / KLTS-TV Tower Site***		
		Project: ***LA05103G-17V1***		
		Client: LA Public Broadcasting	Drawn by: HLopez	App'd:
		Code: TIA-222-G	Date: 09/18/17	Scale: NTS
		Path: C:\MEIProjects\17files\GT\LA05103G-17V1\LA05103G-17V1_Final.eri		Dwg No. E-5



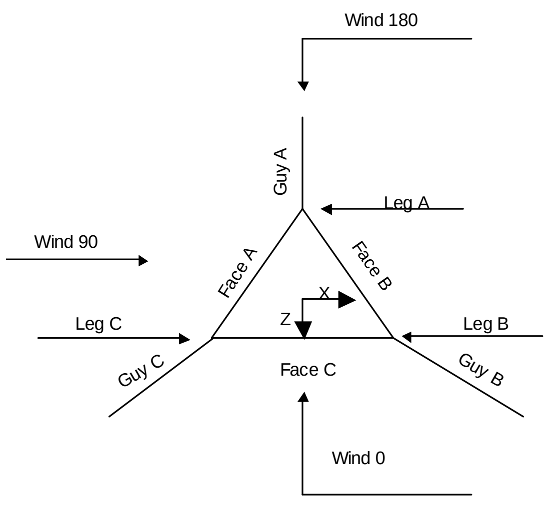
MALOUF ENGINEERING INT'L. INC.	Job: 1006 ft. GT / KLTS-TV Tower Site		
17950 PRESTON RD. SUITE 720	Project: LA05103G-17V1		
DALLAS, TEXAS - 75252	Client: LA Public Broadcasting	Drawn by: HLopez	App'd:
Phone: (972) 783-2578	Code: TIA-222-G	Date: 09/18/17	Scale: NTS
FAX: (972) 783-2583	Path: C:\MEIProjects\17files\GT\LA05103G-17V1\LA05103G-17V1_Final.eri		Dwg No. E-3

maloufengineering.com

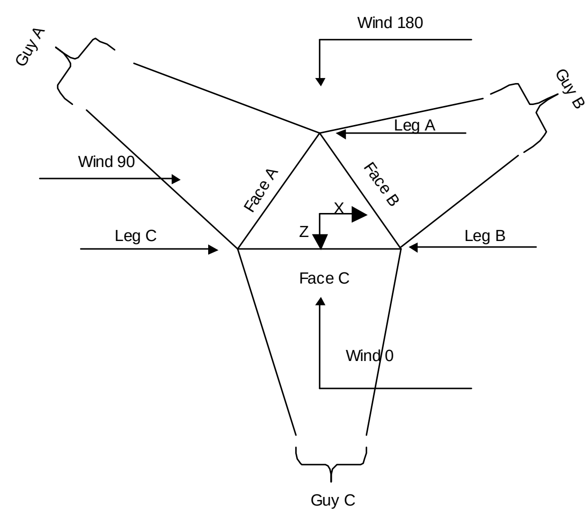
Tower Input Data

The main tower is a 3x guyed tower with an overall height of 1005.833 ft above the ground line.
The base of the tower is set at an elevation of 0.000 ft above the ground line.
The face width of the tower is 7.000 ft at the top and tapered at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

- Tower is located in Caddo Parish, Louisiana.
- Basic wind speed of 90 mph.
- Structure Class II.
- Exposure Category C.
- Topographic Category 1.
- Crest Height 0.000 ft.
- Nominal ice thickness of 0.750 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 30 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- Tension only take-up is 0.031 in.
- Pressures are calculated at each section.
- Safety factor used in guy design is 1.
- 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.



Corner & Starmount Guyed Tower



Face Guyed

Guy Data

Guy Elevation *ft*	*Guy Grade*		*Guy Size*	*Initial Tension* *K*	*%*	*Guy Modulus* *ksi*	*Guy Weight* *plf*	L_u *ft*	*Anchor Radius* *ft*	*Anchor Azimuth Adj.* *°*	*Anchor Elevation* *ft*	*End Fitting Efficiency* *%*
158.75	BS	A	11/16	5.800	10%	24000.000	0.990	709.367	690.000	0.0000	-22.700	100%
		B	11/16	5.800	10%	24000.000	0.990	740.215	715.000	0.0000	-47.900	100%
		C	11/16	5.800	10%	24000.000	0.990	678.205	665.000	0.0000	5.900	100%
321.25	BS	A	3/4	6.120	9%	24000.000	1.180	767.320	690.000	0.0000	-22.700	100%
		B	3/4	6.120	9%	24000.000	1.180	801.075	715.000	0.0000	-47.900	100%
		C	3/4	6.120	9%	24000.000	1.180	732.266	665.000	0.0000	5.900	100%
483.75	BS	A	11/16	5.220	9%	24000.000	0.990	852.552	690.000	0.0000	-22.700	100%
		B	11/16	5.220	9%	24000.000	0.990	887.681	715.000	0.0000	-47.900	100%
		C	11/16	5.220	9%	24000.000	0.990	815.471	665.000	0.0000	5.900	100%
652.5	BS	A	1 1/8	14.040	9%	24000.000	2.660	962.326	690.000	0.0000	-22.700	100%
		B	1 1/8	14.040	9%	24000.000	2.660	997.856	715.000	0.0000	-47.900	100%
		C	1 1/8	14.040	9%	24000.000	2.660	924.421	665.000	0.0000	5.900	100%
821.25	BS	A	1 1/4	19.200	10%	24000.000	3.280	1087.112	690.000	0.0000	-22.700	100%
		B	1 1/4	19.200	10%	24000.000	3.280	1122.464	715.000	0.0000	-47.900	100%
		C	1 1/4	19.200	10%	24000.000	3.280	1049.133	665.000	0.0000	5.900	100%
990	BS	A	1 1/8	15.600	10%	24000.000	2.660	1222.610	690.000	0.0000	-22.700	100%
		B	1 1/8	15.600	10%	24000.000	2.660	1257.537	715.000	0.0000	-47.900	100%
		C	1 1/8	15.600	10%	24000.000	2.660	1184.900	665.000	0.0000	5.900	100%

Guy-Tensioning Information

				Temperature At Time Of Tensioning													
				0 F		*20 F*		*40 F*		*60 F*		*80 F*		*100 F*		*120 F*	
Guy Elevation *ft*		*H* *ft*	*V* *ft*	*Initial Tension* *K*	*Intercept* *ft*	*Initial Tension* *K*	*Intercept* *ft*	*Initial Tension* *K*	*Intercept* *ft*	*Initial Tension* *K*	*Intercept* *ft*	*Initial Tension* *K*	*Intercept* *ft*	*Initial Tension* *K*	*Intercept* *ft*	*Initial Tension* *K*	*Intercept* *ft*
158.75	A	685.99	181.45	7.063	34.86	6.601	37.28	6.181	39.79	5.800	42.38	5.457	45.01	5.148	47.68	4.871	50.36
	B	710.99	206.65	6.997	38.25	6.560	40.77	6.162	43.38	5.800	46.05	5.473	48.76	5.179	51.50	4.913	54.25
	C	661.00	152.85	7.134	31.61	6.646	33.92	6.202	36.33	5.800	38.82	5.439	41.38	5.115	43.98	4.820	46.65
321.25	A	685.99	343.95	7.172	47.16	6.790	49.76	6.440	52.39	6.120	55.06	5.829	57.74	5.556	60.49	5.321	63.09
	B	710.99	369.15	7.111	51.73	6.751	54.42	6.422	57.14	6.120	59.88	5.843	62.63	5.593	65.36	5.362	68.08
	C	661.00	315.35	7.244	42.63	6.834	45.13	6.460	47.69	6.120	50.27	5.811	52.88	5.527	55.54	5.269	58.17
483.75	A	685.99	506.45	5.973	57.89	5.708	60.47	5.462	63.10	5.220	65.91	5.011	68.55	4.822	71.12	4.640	73.79
	B	710.99	531.65	5.931	63.06	5.680	65.74	5.434	68.60	5.220	71.30	5.020	74.02	4.830	76.80	4.663	79.44
	C	661.00	477.85	6.001	52.84	5.721	55.33	5.461	57.88	5.220	60.45	4.983	63.21	4.780	65.79	4.599	68.28
652.5	A	685.96	675.20	15.589	74.82	15.043	77.39	14.527	80.00	14.040	82.63	13.580	85.28	13.146	87.94	12.728	90.66
	B	710.96	700.40	15.526	80.59	15.003	83.26	14.508	85.95	14.040	88.66	13.598	91.38	13.180	94.11	12.787	96.83
	C	660.96	646.60	15.663	68.88	15.091	71.37	14.550	73.89	14.040	76.44	13.559	79.01	13.106	81.59	12.679	84.19
821.25	A	685.96	843.95	20.971	86.82	20.356	89.29	19.766	91.81	19.200	94.35	18.657	96.93	18.138	99.53	17.641	102.15
	B	710.96	869.15	20.924	92.59	20.326	95.16	19.751	97.76	19.200	100.39	18.672	103.05	18.167	105.74	17.683	108.44
	C	660.96	815.35	21.027	80.82	20.393	83.20	19.784	85.61	19.200	88.07	18.640	90.56	18.104	93.07	17.592	95.61
990	A	685.96	1012.70	16.746	110.04	16.352	112.52	15.970	115.02	15.600	117.55	15.243	120.11	14.897	122.69	14.563	125.29
	B	710.96	1037.90	16.725	116.35	16.338	118.91	15.963	121.51	15.600	124.13	15.249	126.77	14.911	129.43	14.583	132.11
	C	660.96	984.10	16.772	103.42	16.369	105.80	15.978	108.21	15.600	110.65	15.234	113.12	14.881	115.61	14.539	118.13

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	*Face or Leg*	*Placement ft*	*#*
Safety Line 3/8 (E)	A	1005.833 - 0.000	1
Climbing Ladder (E)	A	1005.833 - 0.000	1
2" Rigid Conduit (E)	B	1005.833 - 0.000	1
3/4" Rigid Conduit (E)	C	1005.833 - 0.000	1
6 1/8 (KLTS-TV / E/P)	B	1005.833 - 0.000	1
3 (KDAQ-FM / E)	C	835.000 - 0.000	1
5" AIR (HJ9-50) (KLTS-TV / P)	C	790.500 - 0.000	1
7/8 (E)	C	765.000 - 0.000	1
7/8 (E)	C	758.750 - 0.000	1
1/2 (E)	C	352.500 - 0.000	1
3/8 (E)	A	313.000 - 0.000	2
1/4 (Control Cable) (E)	C	313.000 - 0.000	1
CAT 5 (E)	A	302.500 - 0.000	2
CAT 5 (E)	A	271.250 - 0.000	2
1/2 (E)	C	246.250 - 0.000	1
7/8 (DEAD LINES)	C	757.000 - 0.000	2

Antenna Pole Forces *ATC-BCE428O-V0-17 KLTS Top Antenna*

Length of Pole *ft*	*Ix* *in⁴*	*Iy* *in⁴*	*Modulus E* *ksi*		*Antenna Pole C_AA_A* *ft²/ft*	*Antenna Pole Weight* *klf*	*Length of Beacon* *ft*	*Beacon C_AA_A* *ft²*	*Beacon Weight* *K*
65.000	9000.000	9000.000	29000.000	No Ice	1.446	0.141	1.500	1.900	0.050
				With Ice	1.758	0.289		2.150	0.080

Discrete Tower Loads

Description	*Face or Leg*	*Placement* *ft*
ATC-BCE428O-V0-17 KLTS Top Antenna (KLTS-TV / P)	C	1005.750
Top Plate (E)	B	1005.750
External Transfer Platform (E)	C	990.000
(3) O.B Light(s) (E)	A	948.000
12 Bay FM Antenna - RCA BFC-12 (KDAQ-FM / E)	B	960.000 - 835.000
Beacon (E)	C	810.000
ATC-BCSE16CS1-U1 Side Mounted Antenna (KLTS-TV / P)	C	815.500 - 790.500
12-Elem. Yagi Antenna (KDAQ-FM / E)	A	765.000
QUAD YAGI Antenna (KDAQ-FM / E)	A	758.750
(3) O.B Light(s) (E)	A	675.000
Beacon (E)	A	540.000
(3) O.B Light(s) (E)	A	405.000
DISH PIPE MOUNT (4'x4.5"OD) (KDAQ-FM / E)	A	352.500
6' Omni Antenna (E)	C	302.500
TMA (E)	C	302.500
Standoff Mount (E)	C	302.500
Dish Standoff Pipe Mount (E)	A	271.250
Dish Standoff Pipe Mount (E)	C	271.250
Beacon (E)	A	270.000
6-Elem. Yagi Antenna (KDAQ-FM / E)	A	246.250
(3) O.B Light(s) (E)	A	135.000

Dishes

Description	Face or Leg	Dish Type	Offset Type	Elevation ft	Outside Diameter ft
8' Dia. Grid Dish (STL) (KDAQ-FM / E)	A	Grid	From Leg	352.500	8.208
2' Dia. Satellite Dish Antenna (E)	A	Paraboloid w/Shroud (HP)	From Leg	271.250	2.167
2' Dia. Satellite Dish Antenna (E)	C	Paraboloid w/Shroud (HP)	From Leg	271.250	2.167

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
1005.750	ATC-BCE428O-V0-17 KLTS Top Antenna	57	14.478	0.2001	1.2405	45083
990.000	External Transfer Platform	57	14.461	0.2078	1.2429	52323
990.000	Guy	57	14.461	0.2078	1.2429	52322
960.000	12 Bay FM Antenna - RCA BFC-12	57	14.531	0.2027	1.2724	53680
955.000	12 Bay FM Antenna - RCA BFC-12	57	14.540	0.1992	1.2767	47181
950.000	12 Bay FM Antenna - RCA BFC-12	57	14.542	0.1953	1.2800	47259
948.000	(3) O.B Light(s)	57	14.542	0.1937	1.2810	47309
945.000	12 Bay FM Antenna - RCA BFC-12	57	14.540	0.1911	1.2823	47385
940.000	12 Bay FM Antenna - RCA BFC-12	57	14.533	0.1865	1.2835	47511
935.000	12 Bay FM Antenna - RCA BFC-12	57	14.520	0.1817	1.2837	47526
930.000	12 Bay FM Antenna - RCA BFC-12	57	14.503	0.1766	1.2828	46582
925.000	12 Bay FM Antenna - RCA BFC-12	57	14.481	0.1712	1.2808	45214
920.000	12 Bay FM Antenna - RCA BFC-12	57	14.453	0.1658	1.2777	43799
915.000	12 Bay FM Antenna - RCA BFC-12	57	14.420	0.1602	1.2735	42331
910.000	12 Bay FM Antenna - RCA BFC-12	57	14.382	0.1547	1.2681	41225
905.000	12 Bay FM Antenna - RCA BFC-12	57	14.338	0.1493	1.2616	42520
900.000	12 Bay FM Antenna - RCA BFC-12	57	14.290	0.1440	1.2540	45217
895.000	12 Bay FM Antenna - RCA BFC-12	57	14.236	0.1389	1.2453	47834
890.000	12 Bay FM Antenna - RCA BFC-12	57	14.179	0.1340	1.2357	50772
885.000	12 Bay FM Antenna - RCA BFC-12	57	14.117	0.1295	1.2252	54078
880.000	12 Bay FM Antenna - RCA BFC-12	57	14.053	0.1254	1.2138	57634
875.000	12 Bay FM Antenna - RCA BFC-12	57	13.986	0.1217	1.2014	57679
870.000	12 Bay FM Antenna - RCA BFC-12	57	13.916	0.1185	1.1878	57712
865.000	12 Bay FM Antenna - RCA BFC-12	57	13.843	0.1159	1.1726	57745
860.000	12 Bay FM Antenna - RCA BFC-12	57	13.767	0.1139	1.1557	61730
855.000	12 Bay FM Antenna - RCA BFC-12	57	13.689	0.1127	1.1370	184058
850.000	12 Bay FM Antenna - RCA BFC-12	57	13.611	0.1122	1.1182	47196
845.000	12 Bay FM Antenna - RCA BFC-12	57	13.540	0.1125	1.1018	39552
840.000	12 Bay FM Antenna - RCA BFC-12	61	13.483	0.1136	1.0878	100059
835.000	12 Bay FM Antenna - RCA BFC-12	61	13.441	0.1158	1.0729	55685
821.250	Guy	61	13.352	0.1273	1.0306	8444
815.500	ATC-BCSE16CS1-U1 Side Mounted Antenna	61	13.366	0.1300	1.0191	44491
810.500	ATC-BCSE16CS1-U1 Side Mounted Antenna	61	13.383	0.1311	1.0062	99656
810.000	Beacon	61	13.385	0.1312	1.0047	85804
805.500	ATC-BCSE16CS1-U1 Side	61	13.403	0.1314	0.9903	58503

Elevation *ft*	*Appurtenance*	*Gov. Load Comb.*	*Deflection* *in*	*Tilt* *°*	*Twist* *°*	*Radius of Curvature* *ft*
	Mounted Antenna					
800.500	ATC-BCSE16CS1-U1 Side Mounted Antenna	61	13.426	0.1307	0.9735	105007
795.500	ATC-BCSE16CS1-U1 Side Mounted Antenna	61	13.451	0.1292	0.9569	104971
790.500	ATC-BCSE16CS1-U1 Side Mounted Antenna	61	13.477	0.1269	0.9414	60372
765.000	12-Elem. Yagi Antenna	61	13.570	0.1087	0.8890	46568
758.750	QUAD YAGI Antenna	61	13.580	0.1029	0.8773	42248
675.000	(3) O.B Light(s)	55	13.252	0.0487	0.7251	183944
652.500	Guy	55	13.365	0.0596	0.6897	9504
540.000	Beacon	51	14.069	0.0466	0.4274	41232
483.750	Guy	51	13.483	0.0527	0.2986	26693
405.000	(3) O.B Light(s)	51	12.928	0.0796	0.2119	48207
352.500	8' Dia. Grid Dish (STL)	51	11.819	0.1080 (10 dB) 2.618	0.1362 (10 dB) 2.618	213772
321.250	Guy	59	11.050	0.1020	0.1160	15623
302.500	6' Omni Antenna	59	10.706	0.0978	0.1108	131004
271.250	2' Dia. Satellite Dish Antenna	59	10.107	0.1091	0.1003	83147
270.000	Beacon	59	10.081	0.1097	0.1003	82653
246.250	6-Elem. Yagi Antenna	59	9.529	0.1243	0.0989	65909
158.750	Guy	59	6.671	0.1675	0.0733	55161
135.000	(3) O.B Light(s)	59	5.877	0.1734	0.0745	69659

Section Capacity Table

Section No.	*Elevation* *ft*	*Component Type*	*Size*	*Critical Element*	*P* *K*	*$øP_{allow}$* *K*	*%* *Capacity*	*Pass* *Fail*
T1	1005.83 - 996.25	Leg	3	3	-34.990	168.071	20.8	Pass
T2	996.25 - 983.75	Leg	3	23	-55.159	135.284	40.8	Pass
T3	983.75 - 958.75	Leg	3	44	-75.953	135.284	56.1	Pass
T4	958.75 - 933.75	Leg	3	83	-93.679	135.284	69.2	Pass
T5	933.75 - 908.75	Leg	3	122	-96.996	135.284	71.7	Pass
T6	908.75 - 883.75	Leg	3	162	-94.157	135.284	69.6	Pass
T7	883.75 - 858.75	Leg	3	201	-80.273	135.284	59.3	Pass
T8	858.75 - 846.25	Leg	3	240	-106.973	135.284	79.1	Pass
T9	846.25 - 840	Leg	3	261	-122.050	135.284	90.2	Pass
T10	840 - 833.75	Leg	3	273	-138.274	200.780	68.9	Pass
T11	833.75 - 827.5	Leg	3	285	-155.696	200.780	77.5	Pass
T12	827.5 - 821.25	Leg	3	297	-173.572	200.780	86.4	Pass
T13	821.25 - 815	Leg	3	309	-177.775	200.780	88.5	Pass
T14	815 - 808.75	Leg	3	321	-169.068	200.780	84.2	Pass
T15	808.75 - 783.75	Leg	3	333	-160.559	200.780	80.0	Pass
T16	783.75 - 777.5	Leg	3	372	-136.936	200.780	68.2	Pass
T17	777.5 - 771.25	Leg	3	384	-133.184	135.284	98.4	Pass
T18	771.25 - 765	Leg	3	396	-130.171	135.284	96.2	Pass
T19	765 - 758.75	Leg	3	408	-127.861	135.284	94.5	Pass
T20	758.75 - 733.75	Leg	3	420	-130.870	135.284	96.7	Pass
T21	733.75 - 727.5	Leg	3	459	-131.202	135.284	97.0	Pass
T22	727.5 - 721.25	Leg	3	471	-131.588	135.284	97.3	Pass
T23	721.25 - 715	Leg	3	483	-135.106	200.780	67.3	Pass
T24	715 - 708.75	Leg	3	495	-139.537	200.780	69.5	Pass
T25	708.75 - 683.75	Leg	3 1/4	507	-164.462	171.629	95.8	Pass
T26	683.75 - 677.5	Leg	3 1/2	546	-172.406	211.737	81.4	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$øP_{allow}$ K	% Capacity	Pass Fail
T27	677.5 - 671.25	Leg	3 1/2	558	-180.956	211.737	85.5	Pass
T28	671.25 - 665	Leg	3 1/2	570	-190.148	211.737	89.8	Pass
T29	665 - 658.75	Leg	3 1/2	582	-200.148	211.737	94.5	Pass
T30	658.75 - 652.5	Leg	3 3/4	594	-209.795	255.489	82.1	Pass
T31	652.5 - 646.25	Leg	3 3/4	606	-211.673	255.489	82.9	Pass
T32	646.25 - 640	Leg	3 3/4	618	-196.152	255.489	76.8	Pass
T33	640 - 633.75	Leg	3 3/4	630	-180.500	255.489	70.6	Pass
T34	633.75 - 621.25	Leg	P 5-ODx0.375	642	-168.588	210.445	80.1	Pass
T35	621.25 - 608.75	Leg	P 5-ODx0.375	663	-172.120	210.445	81.8	Pass
T36	608.75 - 583.75	Leg	3 1/4	683	-179.437	240.270	74.7	Pass
T37	583.75 - 558.75	Leg	3 1/4	722	-184.309	240.270	76.7	Pass
T38	558.75 - 533.75	Leg	3 1/4	761	-186.022	240.270	77.4	Pass
T39	533.75 - 508.75	Leg	3 1/4	800	-185.842	240.270	77.3	Pass
T40	508.75 - 483.75	Leg	3 3/4	839	-200.743	255.489	78.6	Pass
T41	483.75 - 477.5	Leg	3 3/4	878	-204.140	255.489	79.9	Pass
T42	477.5 - 458.75	Leg	3 3/4	890	-226.471	255.489	88.6	Pass
T43	458.75 - 433.75	Leg	P-5 ODx0.375 w/ 5.563x0.258 HP	920	-228.128	257.741	88.5	Pass
T44	433.75 - 408.75	Leg	P-5 ODx0.375 w/ 5.563x0.258 HP	961	-234.392	257.741	90.9	Pass
T45	408.75 - 383.75	Leg	P-5 ODx0.375 w/ 5.563x0.258 HP	1000	-236.479	257.741	91.8	Pass
T46	383.75 - 358.75	Leg	P-5 ODx0.375 w/ 5.563x0.258 HP	1039	-237.020	257.741	92.0	Pass
T47	358.75 - 333.75	Leg	3 3/4	1078	-247.311	255.489	96.8	Pass
T48	333.75 - 327.5	Leg	3 3/4	1116	-250.890	328.940	76.3	Pass
T49	327.5 - 321.25	Leg	3 3/4	1128	-254.586	328.940	77.4	Pass
T50	321.25 - 315	Leg	3 3/4	1140	-256.412	328.940	78.0	Pass
T51	315 - 308.75	Leg	3 3/4	1152	-277.044	328.940	84.2	Pass
T52	308.75 - 302.5	Leg	3 3/4	1164	-274.994	328.940	83.6	Pass
T53	302.5 - 296.25	Leg	3 3/4	1176	-274.342	328.940	83.4	Pass
T54	296.25 - 290	Leg	3 3/4	1188	-277.247	328.940	84.3	Pass
T55	290 - 283.75	Leg	3 3/4	1200	-280.449	328.940	85.3	Pass
T56	283.75 - 258.75	Leg	4 1/4	1212	-293.181	353.584	82.9	Pass
T57	258.75 - 233.75	Leg	4 1/4	1251	-302.032	353.584	85.4	Pass
T58	233.75 - 208.75	Leg	4 1/2	1290	-307.647	407.799	75.4	Pass
T59	208.75 - 183.75	Leg	4 1/2	1329	-309.229	407.799	75.8	Pass
T60	183.75 - 158.75	Leg	4 1/4	1368	-308.990	353.584	87.4	Pass
T61	158.75 - 152.5	Leg	4 1/2	1407	-308.353	407.799	75.6	Pass
T62	152.5 - 133.75	Leg	4 1/2	1419	-332.659	407.799	81.6	Pass
T63	133.75 - 108.75	Leg	4 3/4	1449	-340.880	465.396	73.2	Pass
T64	108.75 - 83.7497	Leg	4 3/4	1488	-345.338	465.396	74.2	Pass
T65	83.7497 - 58.7497	Leg	4 3/4	1527	-346.378	465.396	74.4	Pass
T66	58.7497 - 33.7497	Leg	4 3/4	1566	-345.903	465.396	74.3	Pass
T67	33.7497 - 9.99967	Leg	4 1/2	1605	-342.244	417.209	82.0	Pass
T68	9.99967 - 0	Leg	4 1/2	1644	-366.606	432.922	84.7	Pass
T1	1005.83 - 996.25	Diagonal	2L2 1/2x2 1/2x3/16x3/8	18	-5.295	41.064	12.9	Pass
T2	996.25 - 983.75	Diagonal	5/8	29	10.096	13.806	73.1	Pass
T3	983.75 - 958.75	Diagonal	5/8	77	9.842	13.806	71.3	Pass
T4	958.75 - 933.75	Diagonal	5/8	116	6.683	13.806	48.4	Pass
T5	933.75 - 908.75	Diagonal	5/8	155	2.907	13.806	21.1	Pass
T6	908.75 - 883.75	Diagonal	5/8	169	6.566	13.806	47.6	Pass
T7	883.75 - 858.75	Diagonal	5/8	208	10.794	13.806	78.2	Pass
T8	858.75 - 846.25	Diagonal	5/8	247	12.928	13.806	93.6	Pass
T9	846.25 - 840	Diagonal	3/4	268	14.123	19.880	71.0	Pass
T10	840 - 833.75	Diagonal	3/4	280	15.194	19.880	76.4	Pass
T11	833.75 - 827.5	Diagonal	3/4	292	16.270	19.880	81.8	Pass
T12	827.5 - 821.25	Diagonal	3/4	304	16.571	19.880	83.4	Pass

Section No.	*Elevation ft*	*Component Type*	*Size*	*Critical Element*	*P K*	*øP$_{allow}$ K*	*% Capacity*	*Pass Fail*
T13	821.25 - 815	Diagonal	3/4	319	14.365	19.880	72.3	Pass
T14	815 - 808.75	Diagonal	3/4	331	13.618	19.880	68.5	Pass
T15	808.75 - 783.75	Diagonal	5/8	370	11.826	13.806	85.7	Pass
T16	783.75 - 777.5	Diagonal	5/8	379	7.113	13.806	51.5	Pass
T17	777.5 - 771.25	Diagonal	5/8	391	6.215	13.806	45.0	Pass
T18	771.25 - 765	Diagonal	5/8	403	5.379	13.806	39.0	Pass
T19	765 - 758.75	Diagonal	5/8	415	4.320	13.806	31.3	Pass
T20	758.75 - 733.75	Diagonal	5/8	454	2.665	13.806	19.3	Pass
T21	733.75 - 727.5	Diagonal	5/8	465	3.419	13.806	24.8	Pass
T22	727.5 - 721.25	Diagonal	5/8	477	4.333	13.806	31.4	Pass
T23	721.25 - 715	Diagonal	5/8	488	5.334	13.806	38.6	Pass
T24	715 - 708.75	Diagonal	5/8	500	6.456	13.806	46.8	Pass
T25	708.75 - 683.75	Diagonal	5/8	512	10.179	13.806	73.7	Pass
T26	683.75 - 677.5	Diagonal	3/4	551	11.204	19.880	56.4	Pass
T27	677.5 - 671.25	Diagonal	3/4	563	11.970	19.880	60.2	Pass
T28	671.25 - 665	Diagonal	3/4	576	12.875	19.880	64.8	Pass
T29	665 - 658.75	Diagonal	3/4	588	13.897	19.880	69.9	Pass
T30	658.75 - 652.5	Diagonal	3/4	600	13.560	19.880	68.2	Pass
T31	652.5 - 646.25	Diagonal	3/4	616	14.048	19.880	70.7	Pass
T32	646.25 - 640	Diagonal	3/4	628	14.159	19.880	71.2	Pass
T33	640 - 633.75	Diagonal	3/4	640	13.230	19.880	66.6	Pass
T34	633.75 - 621.25	Diagonal	7/8	661	12.453	27.059	46.0	Pass
							50.1 (b)	
T35	621.25 - 608.75	Diagonal	5/8	682	10.743	13.806	77.8	Pass
T36	608.75 - 583.75	Diagonal	5/8	721	9.444	13.806	68.4	Pass
T37	583.75 - 558.75	Diagonal	5/8	760	5.219	13.806	37.8	Pass
T38	558.75 - 533.75	Diagonal	5/8	768	5.991	13.806	43.4	Pass
T39	533.75 - 508.75	Diagonal	5/8	807	10.298	13.806	74.6	Pass
T40	508.75 - 483.75	Diagonal	3/4	855	13.341	19.880	67.1	Pass
T41	483.75 - 477.5	Diagonal	2L2 1/2x2x3/16x3/8	889	9.342	43.677	21.4	Pass
							31.8 (b)	
T42	477.5 - 458.75	Diagonal	3/4	914	9.234	19.880	46.4	Pass
T43	458.75 - 433.75	Diagonal	5/8	956	6.774	13.806	49.1	Pass
T44	433.75 - 408.75	Diagonal	5/8	997	3.564	13.806	25.8	Pass
T45	408.75 - 383.75	Diagonal	5/8	1005	5.319	13.806	38.5	Pass
T46	383.75 - 358.75	Diagonal	5/8	1044	9.085	13.806	65.8	Pass
T47	358.75 - 333.75	Diagonal	3/4	1084	12.890	19.880	64.8	Pass
T48	333.75 - 327.5	Diagonal	7/8	1123	14.037	27.059	51.9	Pass
T49	327.5 - 321.25	Diagonal	7/8	1135	13.820	27.059	51.1	Pass
T50	321.25 - 315	Diagonal	2L2 1/2x2x3/16x3/8	1145	8.607	43.677	19.7	Pass
							29.3 (b)	
T51	315 - 308.75	Diagonal	7/8	1157	13.582	27.059	50.2	Pass
T52	308.75 - 302.5	Diagonal	3/4	1170	12.994	19.880	65.4	Pass
T53	302.5 - 296.25	Diagonal	3/4	1182	11.778	19.880	59.2	Pass
T54	296.25 - 290	Diagonal	3/4	1194	10.761	19.880	54.1	Pass
T55	290 - 283.75	Diagonal	3/4	1206	9.746	19.880	49.0	Pass
T56	283.75 - 258.75	Diagonal	3/4	1245	8.774	19.880	44.1	Pass
T57	258.75 - 233.75	Diagonal	5/8	1284	4.652	13.806	33.7	Pass
T58	233.75 - 208.75	Diagonal	5/8	1296	2.575	13.806	18.6	Pass
T59	208.75 - 183.75	Diagonal	5/8	1335	6.289	13.806	45.5	Pass
T60	183.75 - 158.75	Diagonal	3/4	1383	9.155	19.880	46.0	Pass
T61	158.75 - 152.5	Diagonal	2L2 1/2x2x3/16x3/8	1417	8.193	43.677	18.8	Pass
							27.9 (b)	
T62	152.5 - 133.75	Diagonal	5/8	1434	9.203	13.806	66.7	Pass
T63	133.75 - 108.75	Diagonal	5/8	1482	7.192	13.806	52.1	Pass
T64	108.75 - 83.7497	Diagonal	5/8	1521	3.336	13.806	24.2	Pass
T65	83.7497 - 58.7497	Diagonal	5/8	1533	3.320	13.806	24.0	Pass
T66	58.7497 - 33.7497	Diagonal	5/8	1572	6.069	13.806	44.0	Pass
T67	33.7497 -	Diagonal	7/8	1611	8.490	27.059	31.4	Pass

MALOUF ENGINEERING INT'L. INC.
17950 PRESTON RD. SUITE 720
DALLAS, TEXAS - 75252
Phone: (972) 783-2578
FAX: (972) 783-2583

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
	9.99967							
T68	9.99967 - 0	Diagonal	7/8	1654	4.238	27.059	15.7	Pass
T1	1005.83 - 996.25	Horizontal	2L2 1/2x2 1/2x3/16x3/8	8	3.137	49.549	6.3	Pass
							10.7 (b)	
T3	983.75 - 958.75	Horizontal	P 2-ODx0.120	74	-7.065	10.801	65.4	Pass
T4	958.75 - 933.75	Horizontal	P 2-ODx0.120	113	-4.591	10.801	42.5	Pass
T5	933.75 - 908.75	Horizontal	P 2-ODx0.120	154	-3.115	10.801	28.8	Pass
T6	908.75 - 883.75	Horizontal	P 2-ODx0.120	174	-4.601	10.801	42.6	Pass
T7	883.75 - 858.75	Horizontal	P 2-ODx0.120	213	-7.734	10.801	71.6	Pass
T8	858.75 - 846.25	Horizontal	P 2-ODx0.120	252	-9.351	10.801	86.6	Pass
T15	808.75 - 783.75	Horizontal	P 2-ODx0.120	364	-8.253	10.801	76.4	Pass
T20	758.75 - 733.75	Horizontal	P 2-ODx0.120	440	-2.267	10.801	21.0	Pass
T25	708.75 - 683.75	Horizontal	P 2-ODx0.120	518	-7.303	10.862	67.2	Pass
T34	633.75 - 621.25	Horizontal	P 2-ODx0.120	655	-9.081	11.290	80.4	Pass
T35	621.25 - 608.75	Horizontal	P 2-ODx0.120	676	-7.873	11.290	69.7	Pass
T36	608.75 - 583.75	Horizontal	P 2-ODx0.120	715	-6.631	10.862	61.1	Pass
T37	583.75 - 558.75	Horizontal	P 2-ODx0.120	754	-3.539	10.862	32.6	Pass
T38	558.75 - 533.75	Horizontal	P 2-ODx0.120	773	-4.194	10.862	38.6	Pass
T39	533.75 - 508.75	Horizontal	P 2-ODx0.120	812	-7.336	10.862	67.5	Pass
T40	508.75 - 483.75	Horizontal	2L2 1/2x2x3/16x3/8	851	-9.893	24.518	40.3	Pass
T42	477.5 - 458.75	Horizontal	P 2-ODx0.120	911	-6.623	10.983	60.3	Pass
T43	458.75 - 433.75	Horizontal	P 2-ODx0.120	952	-4.921	11.290	43.6	Pass
T44	433.75 - 408.75	Horizontal	P 2-ODx0.120	972	-4.060	11.290	36.0	Pass
T45	408.75 - 383.75	Horizontal	P 2-ODx0.120	1011	-4.096	11.290	36.3	Pass
T46	383.75 - 358.75	Horizontal	P 2-ODx0.120	1049	-6.542	11.290	57.9	Pass
T47	358.75 - 333.75	Horizontal	P 2-ODx0.120	1089	-9.402	10.983	85.6	Pass
T56	283.75 - 258.75	Horizontal	P 2-ODx0.120	1241	-6.180	11.106	55.6	Pass
T57	258.75 - 233.75	Horizontal	P 2-ODx0.120	1271	-5.231	11.106	47.1	Pass
T58	233.75 - 208.75	Horizontal	P 2-ODx0.120	1310	-5.329	11.167	47.7	Pass
T59	208.75 - 183.75	Horizontal	P 2-ODx0.120	1349	-5.356	11.167	48.0	Pass
T60	183.75 - 158.75	Horizontal	P 2-ODx0.120	1379	-6.742	11.106	60.7	Pass
T62	152.5 - 133.75	Horizontal	P 2-ODx0.120	1439	-6.665	11.167	59.7	Pass
T63	133.75 - 108.75	Horizontal	P 2-ODx0.120	1460	-5.904	11.229	52.6	Pass
T64	108.75 - 83.7497	Horizontal	P 2-ODx0.120	1508	-5.981	11.229	53.3	Pass
T65	83.7497 - 58.7497	Horizontal	P 2-ODx0.120	1538	-5.999	11.229	53.4	Pass
T66	58.7497 - 33.7497	Horizontal	P 2-ODx0.120	1577	-5.991	11.229	53.4	Pass
T67	33.7497 - 9.99967	Horizontal	2L2 1/2x2x3/16x3/8	1616	-6.029	24.890	24.2	Pass
T68	9.99967 - 0	Horizontal	2L2 1/2x2x3/16x3/8	1649	-6.713	43.474	15.4	Pass
T1	1005.83 - 996.25	Top Girt	C8x11.5	6	-0.000	66.597	3.5	Pass
T2	996.25 - 983.75	Top Girt	2L2 1/2x2x3/16x3/8	28	-2.583	24.148	10.7	Pass
T3	983.75 - 958.75	Top Girt	P 2-ODx0.120	47	-7.381	10.801	68.3	Pass
T4	958.75 - 933.75	Top Girt	P 2-ODx0.120	86	-5.356	10.801	49.6	Pass
T5	933.75 - 908.75	Top Girt	P 2-ODx0.120	127	-3.107	10.801	28.8	Pass
T6	908.75 - 883.75	Top Girt	P 2-ODx0.120	166	-3.076	10.801	28.5	Pass
T7	883.75 - 858.75	Top Girt	P 2-ODx0.120	204	-5.387	10.801	49.9	Pass
T8	858.75 - 846.25	Top Girt	P 2-ODx0.120	243	-8.555	10.801	79.2	Pass
T9	846.25 - 840	Top Girt	P 2-ODx0.120	264	-10.217	10.801	94.6	Pass
T10	840 - 833.75	Top Girt	2L2x2x3/16x1/2	276	-11.039	21.148	52.2	Pass
T11	833.75 - 827.5	Top Girt	2L2x2x3/16x1/2	288	-11.840	21.148	56.0	Pass
T12	827.5 - 821.25	Top Girt	2L2x2x3/16x1/2	300	-12.321	21.148	58.3	Pass
T14	815 - 808.75	Top Girt	2L2x2x3/16x1/2	325	-10.424	21.148	49.3	Pass
T15	808.75 - 783.75	Top Girt	P 2-ODx0.120	337	-9.493	10.801	87.9	Pass
T16	783.75 - 777.5	Top Girt	P 2-ODx0.120	375	-5.646	10.801	52.3	Pass
T17	777.5 - 771.25	Top Girt	P 2-ODx0.120	387	-4.962	10.801	45.9	Pass
T18	771.25 - 765	Top Girt	P 2-ODx0.120	399	-4.321	10.801	40.0	Pass
T19	765 - 758.75	Top Girt	P 2-ODx0.120	411	-3.624	10.801	33.6	Pass
T20	758.75 - 733.75	Top Girt	P 2-ODx0.120	423	-2.649	10.801	24.5	Pass
T21	733.75 - 727.5	Top Girt	P 2-ODx0.120	461	-2.338	10.801	21.6	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$øP_{allow}$ K	% Capacity	Pass Fail
T22	727.5 - 721.25	Top Girt	P 2-ODx0.120	473	-3.011	10.801	27.9	Pass
T23	721.25 - 715	Top Girt	P 2-ODx0.120	485	-3.717	10.801	34.4	Pass
T24	715 - 708.75	Top Girt	P 2-ODx0.120	497	-4.456	10.801	41.3	Pass
T25	708.75 - 683.75	Top Girt	P 2-ODx0.120	509	-5.211	10.801	48.2	Pass
T26	683.75 - 677.5	Top Girt	P 2-ODx0.120	548	-7.971	10.862	73.4	Pass
T27	677.5 - 671.25	Top Girt	P 2-ODx0.120	560	-8.647	10.922	79.2	Pass
T28	671.25 - 665	Top Girt	P 2-ODx0.120	572	-9.226	10.922	84.5	Pass
T29	665 - 658.75	Top Girt	2L2x2x3/16x1/2	584	-10.033	21.284	47.1	Pass
T30	658.75 - 652.5	Top Girt	2L2x2x3/16x1/2	596	-10.176	21.284	47.8	Pass
T32	646.25 - 640	Top Girt	2L2x2x3/16x1/2	622	-10.475	21.352	49.1	Pass
T33	640 - 633.75	Top Girt	2L2x2x3/16x1/2	634	-10.197	21.352	47.8	Pass
T34	633.75 - 621.25	Top Girt	2L2x2x3/16x1/2	646	-9.592	21.352	44.9	Pass
T35	621.25 - 608.75	Top Girt	P 2-ODx0.120	667	-8.522	11.290	75.5	Pass
T36	608.75 - 583.75	Top Girt	P 2-ODx0.120	688	-7.400	11.290	65.5	Pass
T37	583.75 - 558.75	Top Girt	P 2-ODx0.120	727	-4.301	11.290	38.1	Pass
T38	558.75 - 533.75	Top Girt	P 2-ODx0.120	766	-1.881	11.290	16.7	Pass
T39	533.75 - 508.75	Top Girt	P 2-ODx0.120	803	-4.987	11.290	44.2	Pass
T40	508.75 - 483.75	Top Girt	2L2 1/2x2x3/16x3/8	842	-8.091	24.271	33.3	Pass
T43	458.75 - 433.75	Top Girt	P 2-ODx0.120	924	-5.586	10.983	50.9	Pass
T44	433.75 - 408.75	Top Girt	P 2-ODx0.120	964	-3.126	10.983	28.5	Pass
T45	408.75 - 383.75	Top Girt	P 2-ODx0.120	1001	-1.154	10.983	10.5	Pass
T46	383.75 - 358.75	Top Girt	P 2-ODx0.120	1040	-4.365	10.983	39.7	Pass
T47	358.75 - 333.75	Top Girt	P 2-ODx0.120	1079	-7.206	11.290	63.8	Pass
T48	333.75 - 327.5	Top Girt	2L2 1/2x2x3/16x3/8	1119	-10.081	24.518	41.1	Pass
T49	327.5 - 321.25	Top Girt	2L2 1/2x2x3/16x3/8	1131	-10.367	24.518	42.3	Pass
T52	308.75 - 302.5	Top Girt	2L2x2x3/16x1/2	1166	-9.887	21.352	46.3	Pass
T53	302.5 - 296.25	Top Girt	2L2x2x3/16x1/2	1178	-9.259	21.352	43.4	Pass
T54	296.25 - 290	Top Girt	P 2-ODx0.120	1190	-8.366	10.983	76.2	Pass
T55	290 - 283.75	Top Girt	P 2-ODx0.120	1202	-7.654	10.983	69.7	Pass
T56	283.75 - 258.75	Top Girt	P 2-ODx0.120	1214	-6.889	10.983	62.7	Pass
T57	258.75 - 233.75	Top Girt	P 2-ODx0.120	1253	-3.873	11.106	34.9	Pass
T58	233.75 - 208.75	Top Girt	P 2-ODx0.120	1294	-2.040	11.106	18.4	Pass
T59	208.75 - 183.75	Top Girt	P 2-ODx0.120	1331	-2.385	11.106	21.5	Pass
T60	183.75 - 158.75	Top Girt	P 2-ODx0.120	1370	-5.115	11.167	45.8	Pass
T63	133.75 - 108.75	Top Girt	P 2-ODx0.120	1451	-5.719	11.167	51.2	Pass
T64	108.75 - 83.7497	Top Girt	P 2-ODx0.120	1490	-2.870	11.167	25.7	Pass
T65	83.7497 - 58.7497	Top Girt	P 2-ODx0.120	1531	-2.131	11.167	19.1	Pass
T66	58.7497 - 33.7497	Top Girt	P 2-ODx0.120	1568	-2.890	11.167	25.9	Pass
T67	33.7497 - 9.99967	Top Girt	2L2 1/2x2x3/16x3/8	1607	-5.006	25.015	20.0	Pass
T68	9.99967 - 0	Top Girt	2L4x4x3/8x1/2	1646	75.499	185.288	40.7	Pass
T2	996.25 - 983.75	Guy A@990	1 1/8	1720	67.022	93.600	71.6	Pass
T13	821.25 - 815	Guy A@821.25	1 1/4	1717	78.195	115.200	67.9	Pass
T31	652.5 - 646.25	Guy A@652.5	1 1/8	1714	62.871	93.600	67.2	Pass
T41	483.75 - 477.5	Guy A@483.75	11/16	1706	25.846	34.800	74.3	Pass
T50	321.25 - 315	Guy A@321.25	3/4	1688	26.825	40.800	65.7	Pass
T61	158.75 - 152.5	Guy A@158.75	11/16	1670	19.695	34.800	56.6	Pass
T2	996.25 - 983.75	Guy B@990	1 1/8	1719	65.974	93.600	70.5	Pass
T13	821.25 - 815	Guy B@821.25	1 1/4	1716	77.460	115.200	67.2	Pass
T31	652.5 - 646.25	Guy B@652.5	1 1/8	1713	62.599	93.600	66.9	Pass
T41	483.75 - 477.5	Guy B@483.75	11/16	1700	25.758	34.800	74.0	Pass
T50	321.25 - 315	Guy B@321.25	3/4	1682	26.811	40.800	65.7	Pass
T61	158.75 - 152.5	Guy B@158.75	11/16	1664	19.857	34.800	57.1	Pass
T2	996.25 - 983.75	Guy C@990	1 1/8	1718	67.685	93.600	72.3	Pass
T13	821.25 - 815	Guy C@821.25	1 1/4	1715	78.853	115.200	68.4	Pass
T31	652.5 - 646.25	Guy C@652.5	1 1/8	1712	63.071	93.600	67.4	Pass
T41	483.75 - 477.5	Guy C@483.75	11/16	1695	25.965	34.800	74.6	Pass
T50	321.25 - 315	Guy C@321.25	3/4	1677	26.680	40.800	65.4	Pass
T61	158.75 - 152.5	Guy C@158.75	11/16	1659	19.443	34.800	55.9	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$øP_{allow}$ K	% Capacity	Pass Fail
T2	996.25 - 983.75	Top Guy Pull-Off@990	2L2 1/2x2x3/16x1/2	37	14.851	52.397	28.3 50.6 (b)	Pass
T13	821.25 - 815	Top Guy Pull-Off@821.25	2L2 1/2x2x3/16x1/2	311	18.066	52.397	34.5 61.5 (b)	Pass
T31	652.5 - 646.25	Top Guy Pull-Off@652.5	2L2 1/2x2x3/16x1/2	609	16.370	52.397	31.2 55.8 (b)	Pass
T41	483.75 - 477.5	Top Guy Pull-Off@483.75	2L3x2 1/2x3/16x3/8	882	-18.480	35.962	51.4	Pass
T50	321.25 - 315	Top Guy Pull-Off@321.25	2L3x2 1/2x3/16x3/8	1142	-18.126	35.962	50.4	Pass
T61	158.75 - 152.5	Top Guy Pull-Off@158.75	2L3x2 1/2x3/16x3/8	1410	-12.044	36.209	33.3	Pass
T42	477.5 - 458.75	Bottom Guy Pull-Off@483.75	2L3x2 1/2x3/16x3/8	895	-6.682	35.962	18.6	Pass
T51	315 - 308.75	Bottom Guy Pull-Off@321.25	2L3x2 1/2x3/16x3/8	1154	-9.018	35.962	25.1	Pass
T62	152.5 - 133.75	Bottom Guy Pull-Off@158.75	2L3x2 1/2x3/16x3/8	1421	-7.103	36.332	19.6	Pass
T41	483.75 - 477.5	Torque Arm Top@483.75	2L4x4x1/4x1/2	1708	26.183	125.550	20.9 32.3 (b)	Pass
T50	321.25 - 315	Torque Arm Top@321.25	2L4x4x1/4x1/2	1690	24.876	125.550	19.8 30.7 (b)	Pass
T61	158.75 - 152.5	Torque Arm Top@158.75	2L4x4x1/4x1/2	1672	18.631	125.550	14.8 23.0 (b)	Pass
T41	483.75 - 477.5	Torque Arm Bottom@483.75	2L4x4x1/4x1/2	1711	-25.296	81.880	30.9	Pass
T50	321.25 - 315	Torque Arm Bottom@321.25	2L4x4x1/4x1/2	1687	-23.991	81.880	29.3	Pass
T61	158.75 - 152.5	Torque Arm Bottom@158.75	2L4x4x1/4x1/2	1669	-13.624	82.174	16.6	Pass
							Summary	
						Leg (T17)	98.4	Pass
						Diagonal (T8)	93.6	Pass
						Horizontal (T8)	86.6	Pass
						Top Girt (T9)	94.6	Pass
						Guy A (T41)	74.3	Pass
						Guy B (T41)	74.0	Pass
						Guy C (T41)	74.6	Pass
						Top Guy Pull-Off (T13)	61.5	Pass
						Bottom Guy Pull-Off (T51)	25.1	Pass
						Torque Arm Top (T41)	32.3	Pass
						Torque Arm Bottom (T41)	30.9	Pass
						Bolt Checks	66.7	Pass
						RATING =	**98.4**	**Pass**

APPENDIX 3 – SOURCE / CHANGED CONDITION

ΛIIVΞ Telecom

E-POL UHF Top Mount KLTS		NO ICE		120 MPH	
Antenna Model	=	ATC-BCH428O-17			
Number of Antenna Sections	=	1			
Size	=	19.812	m	0.464	m
Area	=	9.193	m2		
Aspect ratio		42.70			
C = [(I)(kzt)(kz)]^0.5 * (V)(D)		34.15			
Ca (With respect to aspect ratio), **Consider Flat Surface.** In order for a structural component to be considered as a round structure component the component must have a round profile on the windward and leeward sides of the component (TIA 222g - 2.6.9.1.1 Notes). Linear interpolation has been made for Ca value.		0.95			
Total Effective Projected Area of Appurtenances					
ΣEPA (CaAa)	=	8.733	Sq.m		
Structure Height H	=	300	m		
Structure Base Elevation @ AGL	=	1	m		
Antenna Elevation z	=	291.094	m		
Velocity Pressure qz	=	2823.03	Pa		
where qz=0.613 (kz) (kzt) (kd) (V2)(I)	=				
Exposure Coefficient Kz	=	1.883	Table 2.4 (TIA 222G)		
Topographic Factor Kzt	=	1	TIA 222G, Cl 2.6.6.4		
Wind Direction Probability Factor Kd	=	0.85	Table 2.2 (TIA 222G)		
Gust Response Factor Gh	=	0.85	TIA 222G, Cl 2.6.7.1		
Velocity V, Kph	=	193.1208	kph		
Velocity V, m/s		53.64	m/s		
Importance Factor I	=	1			
Wind load Factor	=	1			
where antenna wind force,					
F=qz(Gh)(ΣEPA)(wind load factor)	=				
Antenna Wind Force	=	**20956**	**N**		
		4709.162896	**lb-f**		

E-POL UHF Top Mount KLTS 0.5" ICE 40 MPH

Antenna Model	=	ATC-BCH428O-17				
Number of Antenna Sections	=	1				
Size	=	19.812	m	0.49	m	
Area	=	9.688	m2			
Aspect ratio		40.52				
C = [(I)(kzt)(kz)]^0.5 * (V)(D)		11.98				

Ca (With respect to aspect ratio), **Consider Flat Surface.** In order for a structural component to be considered as a round structure component the component must have a round profile on the windward and leeward sides of the component (TIA 222g - 2.6.9.1.1 Notes). Linear interpolation has been made for Ca value. 0.95

Total Effective Projected Area of Appurtenances			
ΣEPA (CaAa)	=	9.182	Sq.m
Structure Height H	=	300	m
Structure Base Elevation @ AGL	=	1	m
Antenna Elevation z	=	291.094	m
Velocity Pressure qz	=	312.76	Pa
where qz=0.613 (kz) (kzt) (kd) (V2)(I)	=		
Exposure Coefficient Kz	=	1.883	Table 2.4 (TIA 222G)
Topographic Factor Kzt	=	1	TIA 222G, Cl 2.6.6.4
Wind Direction Probability Factor Kd	=	0.85	Table 2.2 (TIA 222G)
Gust Response Factor Gh	=	0.85	TIA 222G, Cl 2.6.7.1
Velocity V, Kph	=	64.28	kph
Velocity V, m/s		17.86	m/s
Importance Factor I	=	1	
Wind load Factor	=	1	
where antenna wind force,			
F=qz(Gh)(ΣEPA)(wind load factor)	=		
Antenna Wind Force	=	**2441**	**N**
		548.5502073	**lb-f**