SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

The Honorable Enzo Faienza
Mayor, Town of Cromwell
41 West Street
Cromwell, CT 06416

9590 9402 1864 6104 9533 15

2. Article Number (Transfer from service label)

7016 1370 0000 4741 2227

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Gloria Prendergast ☐ Agent ☒ Addressee

B. Received by (Printed Name): Gloria Prendergast

C. Date of Delivery: 10-23-17

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

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SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Anthony J. Salvatore
Town Manager, Town of Cromwell
41 West Street
Cromwell, CT 06416

9590 9402 1864 6104 9533 08

2. Article Number (Transfer from service label)

7016 1370 0000 4741 2234

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Gloria Prendergast ☐ Agent ☒ Addressee

B. Received by (Printed Name): Gloria Prendergast

C. Date of Delivery: 10-23-17

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
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☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

---

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Stuart B. Popper, AICP
Director of Planning and Development
Town of Cromwell
41 West Street
Cromwell, CT 06416

9590 9402 1864 6104 9532 92

2. Article Number (Transfer from service label)

7016 1370 0000 4741 2241

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Gloria Prendergast ☐ Agent ☐ Addressee

B. Received by (Printed Name): Gloria Prendergast

C. Date of Delivery: 10-23-17

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

100 Berlin Holdings LLC
12 Tidewater Drive
Ormond Beach, FL 32174

9590 9402 1864 6104 9532 85

2. Article Number *(Transfer from service label)*

7016 1370 0000 4741 2258

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X [signature] ☐ Agent ☒ Addressee

B. Received by *(Printed Name)*

C. Date of Delivery 10-20

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☒ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

---

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Emily Iannotti
Account Project Manager
American Tower Corporation
10 Presidential Way
Woburn, MA 01801

9590 9402 1864 6104 9532 78

2. Article Number *(Transfer from service label)*

7016 1370 0000 4741 2265

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Amari ☒ Agent ☐ Addressee

B. Received by *(Printed Name)* Amari

C. Date of Delivery 10-23

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
Mail
Mail Restricted Delivery
00)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Return Receipt for Merchandise
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2015 PSN 7530-02-000-9053 Domestic Return Receipt

EMPIRE telecom

October 17, 2017

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

Regarding:	Notice of Exempt Modification – Swap of Antennas and Remote Radio Heads ("RRUs")
Property Address:	Christian Hill Road (a/k/a 100 Berlin Road,) Cromwell, CT
AT&T Site:	CT5144/FA# 10070987

Dear Ms. Bachman:

AT&T currently maintains a wireless telecommunications facility on an existing 82-foot Sign Structure with a 111-foot pipe mast at the above-referenced address, latitude 41.606210, longitude -72.701206. Said structure is owned by American Tower Corporation. The existing equipment shelter is 16 feet by 8 feet, totaling 128 square feet.

AT&T desires to modify its existing telecommunications facility by swapping three (3) antennas and three (3) RRUs. The centerline height of said antennas is and will remain at 98 feet. Antennas are mounted utilizing a low-profile platform with handrails.

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 Honorable Enzo Faienza, Mayor of the Town of Cromwell, Anthony J. Salvatore, Town Manager of the Town of Cromwell, Stuart B. Popper, AICP, Director of Planning and Development of the Town of Cromwell. A copy of this letter is also being sent to the property owner, 100 Berlin Holdings, LLC and the tower owner, American Tower Corporation. Please note that this application is a re-submission as our initial request was denied on July 18, 2017 due to the structural analysis being run in Rev-F.

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). Specifically:

1. The planned modification will not result in an increase in the height of the existing structure. The antennas to be swapped will be installed at the existing height of 98 feet on the 111-foot 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 Federal Communications Commission (FCC) safety standard. An RF emissions calculation (attached) for AT&T's modified facility is herein provided.

5. The proposed modifications will not case 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 Centek Engineering dated August 8, 2017).

For the foregoing reasons, AT&T respectfully requests that the proposed antenna and RRU swap be allowed within the exempt modifications under R.C.S.A. §16-50j-72 (b)(2).

Sincerely,

Jennifer Iliades

Jennifer Iliades
Site Acquisition Specialist

Enclosures: Exhibit 1 – Property Card and GIS Map
Exhibit 2 – Construction Drawings
Exhibit 3 – Structural Analysis
Exhibit 4 – RF Emissions Analysis Report Evaluation

cc: The Honorable Enzo Faienza, Mayor, Town of Cromwell
Anthony J. Salvatore, Town Manager, Town of Cromwell
Stuart B. Popper, AICP, Director of Planning and Development, Town of Cromwell
100 Berlin Holdings, LLC (property owner)
American Tower Corporation (tower owner)

Exhibit 1

Property Location: 100 BERLIN ROAD | MAP ID: 07/ 5/ 21/ / | Bldg Name: | State Use: 201

Vision ID: 4324 | Account # 00459100 | Bldg #: 1 of 1 | Sec #: 1 of 1 | Card 1 of 2 | Print Date: 09/26/2016 12:59

CURRENT OWNER	TOPO.		UTILITIES		STRT./ROAD		LOCATION	
100 BERLIN HOLDINGS LLC			2	Public Water	1(	None		
12 TIDEWATER DRIVE			3	Public Sewer				
ORMOND BEACH, FL 32174								
Additional Owners:								

SUPPLEMENTAL DATA

Other ID:		DV Lot #	
Prior Zoning	BUS	I&E Penalty	
Census Tr.	5701	BAA	15K;12K,08K;07K
Color		Callback	
100 Yr Flood	Yes	Prior Value	10347830
DV Map #			
GIS ID:	00459100	ASSOC PID#	

CURRENT ASSESSMENT

Description	Code	Appraised Value	Assessed Value
COM LAND	2-1	2,035,080	1,424,560
COM BLDG	2-2	8,364,210	5,854,950
COM OUTBL	2-5	632,930	443,050
	Total	11,032,220	7,722,560

6033
CROMWELL, CT

VISION

RECORD OF OWNERSHIP

RECORD OF OWNERSHIP	BK-VOL/PAGE	SALE DATE	q/u	v/i	SALE PRICE	V.C.
100 BERLIN HOLDINGS LLC	1520/ 134	04/07/2015	Q	I	7,500,000	
SHANER SPE ASSOCIATES LIMITED PARTNERSHI	1114/ 112	09/26/2005	U	V		29
SHANER HOTEL GROUP PROPERTIES LTD.	623/ 284	12/06/1996			0	

PREVIOUS ASSESSMENTS (HISTORY)

Yr.	Code	Assessed Value	Yr.	Code	Assessed Value	Yr.	Code	Assessed Value
2015	2-1	1,424,560	2014	2-1	1,424,560	2013	2-1	1,424,560
2015	2-2	5,854,950	2014	2-2	5,854,950	2013	2-2	5,854,950
2015	2-5	443,050	2014	2-5	443,050	2013	2-5	443,050
	Total:	7,722,560		Total:	7,722,560		Total:	7,722,560

EXEMPTIONS

Year	Type	Description	Amount
		Total:	

OTHER ASSESSMENTS

Code	Description	Number	Amount	Comm. Int.

This signature acknowledges a visit by a Data Collector or Assessor

APPRAISED VALUE SUMMARY

Appraised Bldg. Value (Card)	8,309,970
Appraised XF (B) Value (Bldg)	57,600
Appraised OB (L) Value (Bldg)	632,930
Appraised Land Value (Bldg)	2,035,080
Special Land Value	0
Total Appraised Parcel Value	11,032,220
Valuation Method:	C
Adjustment:	0
Net Total Appraised Parcel Value	11,032,220

ASSESSING NEIGHBORHOOD

NBHD/ SUB	NBHD Name	Street Index Name	Tracing	Batch
0001/A				

NOTES

CROWNE PLAZA/(1) 117 SF FREEZER
FUNC-OBSOL
50/50 SPLIT BETWEEN DOUBLE/SINGLE ROOMS
POOL/JACUZZI/FITNESS CENTER/BIZ CENTER
RESTAURANT = 104 PERSON CAPACITY
LOUNGE = 32 PERSON CAPACITY
21 FUNCTION ROOMS = 2420 PERSON CAPACITY
2 STORY PARKING GARAGE
(4) 2100 LB ELEVATORS, (800) PARK SPACES
(3) WALK-IN CO0LERS - 99 , 117 , 130
CELL TOWER ON ACCT #00459110

BUILDING PERMIT RECORD

Permit ID	Issue Date	Type	Description	Amount	Insp. Date	% Comp.	Date Comp.	Comments
24262	08/31/2016	OT	Other	19,000	08/31/2016	99		Alterations to Existing Ra
24228	08/09/2016	EL	Electric	26,528	08/09/2016	99		Replace Fire Alarm Contr
24042	05/20/2016	SN	Sign	19,995	05/20/2016	99		Replace Existing Signs
18460	06/29/2009	EL	Electric	3,500	06/24/2009	101		
18397	06/01/2009	OT	Other	26,000	01/27/2010	101	01/27/2010	swap antennas on existing
18203	03/02/2009	EL	Electric	15,000	02/03/2009	101		
16551	11/16/2006	CB	Bath Conver	0	11/16/2006	101	09/22/2008	instl toilet, lav, tub/showe

VISIT/ CHANGE HISTORY

Date	Type	IS	ID	Cd.	Purpose/Result
11/29/2012			JQ	46	Change - Value Change Co
11/14/2006			TH	00	Meas. and List
11/06/1997			CN	00	Meas. and List

LAND LINE VALUATION SECTION

B #	Use Code	Use Description	Zone	D	Front	Depth	Units		Unit Price	I. Factor	S.A.	Acre Disc	C. Factor	ST. Idx	Adj.	Notes- Adj	Special Pricing	S Adj Fact	Adj. Unit Price	Land Value
1	201	Commercial Improv	HB				43,560	SF	1.73	3.0000	L	1.0000	1.00	1500	1.00			1.00		226,080
630(	ercial I	201	201	HB				8.04	AC	75,000.00	000	Disc		1.00			site			

Total Card Land Units:	9.04	AC	Parcel Total Land Area: 9.04 AC	Total Land Value:	2,035,080

Property Location: 100 BERLIN ROAD **MAP ID: 07/ 5/ 21/ /** **Bldg Name:** **State Use: 201**

Vision ID: 4324 **Account # 00459100** **Bldg #: 1 of 1** **Sec #: 1 of 1** **Card 1 of 2** **Print Date: 09/26/2016 12:59**

CONSTRUCTION DETAIL

Element	Cd.	Ch.	Description
Style	66		Hotel - FS
Model	94		Commercial
Grade	08		C
Stories	5		
Occupancy	1		
Exterior Wall 1	15		Concrete
Exterior Wall 2	20		Brick/Masonry
Roof Structure	01		Flat
Roof Cover	04		T&G/Rubber
Interior Wall 1	05		Drywall
Interior Wall 2			
Interior Floor 1	14		Carpet
Interior Floor 2	11		Ceram Clay Til
Heating Fuel	03		Gas
Heating Type	04		Forced Air
AC Type	03		Central
Bldg Use	201		Commercial Improv
Sprinkler Type	W		Wet
Sprinkler %	100		
Mezzanine Fin.	2184		
Mezanine Unf.			
Heat/AC	01		Heat/AC Pkg
Frame Type	03		Masonry
Baths/Plumbing	02		Average
Ceiling/Walls	06		Ceil & Wall
Rooms/Prtns	02		Average
Wall Height	10		
% Comn Wall			

CONSTRUCTION DETAIL (CONTINUED)

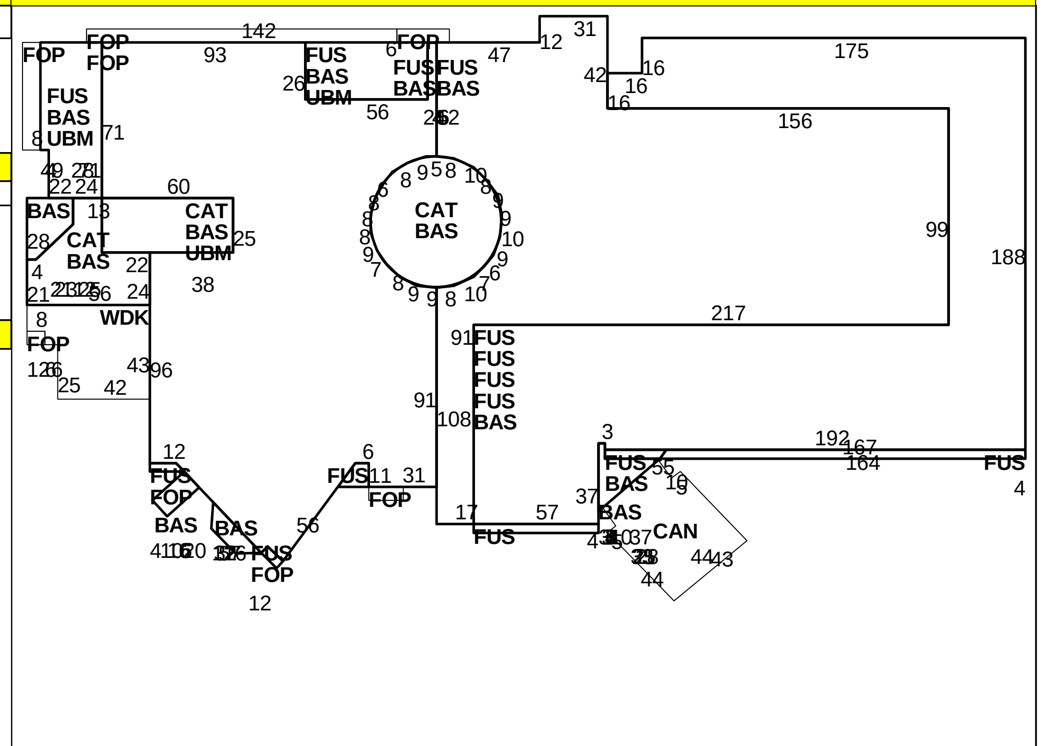
Element	Cd.	Ch.	Description

MIXED USE

Code	Description	Percentage
201	Commercial Improv	100

COST/MARKET VALUATION

Adj. Base Rate:	76.44
Net Other Adj:	810,938.00
AYB	1968
Dep Code	F
Remodel Rating	
Year Remodeled	
Dep %	38
Functional Obslnc	10
External Obslnc	10
Cost Trend Factor	
Condition	
% Complete	
Overall % Cond	42
Apprais Val	8,309,970
Dep % Ovr	0
Dep Ovr Comment	
Misc Imp Ovr	0
Misc Imp Ovr Comment	
Cost to Cure Ovr	0
Cost to Cure Ovr Comment	



OB-OUTBUILDING & YARD ITEMS(L) / XF-BUILDING EXTRA FEATURES(B)

Code	Description	Sub	Sub Descript	L/B	Units	Unit Price	Yr	Gde	Dp Rt	Cnd	%Cnd	Apr Value
PAV1	Paving Asph.			L	63,40(	2.10	1983				50	66,570
PAV1	Paving Asph.			L	30,00(	2.10	1983				50	31,500
SPL1	InGround Pool	CR	Concrete	L	920	30.00	1983				60	16,560
LT1	Light 1			L	20	1,000.00	2006		0		50	10,000
LT2	Light 2			L	4	1,500.00	2006		0		50	3,000
LT3	Light 3			L	2	2,100.00	2006		0		50	2,100
LT4	Light 4			L	4	2,700.00	2006		0		60	6,480
SHD1	Shed	CB	CindBk/Frame	L	320	18.00	2006		0		60	3,460
LNT	Lean-To	FR	Frame	L	390	10.00	2006		0		60	2,340

BUILDING SUB-AREA SUMMARY SECTION

Code	Description	Living Area	Gross Area	Eff. Area	Unit Cost	Undeprec. Value
BAS	First Floor	87,577	87,577			
CAN	Canopy	0	2,223			
CAT	Cath Ceil	0	6,069			
FOP	Framed Open Porch	0	2,482			
FUS	Finished Upper Story	158,229	158,229			
UBM	Basement	0	4,856			
WDK	Wood Deck	0	2,010			
Ttl. Gross Liv/Lease Area:		245,806	263,446			

Property Location: 100 BERLIN ROAD **MAP ID:** 07/ 5/ 21/ / **Bldg Name:** **State Use:** 201

Vision ID: 4324 **Bldg #:** 1 of 1 **Sec #:** 1 of 1 **Card** 2 of 2 **Print Date:** 09/26/2016 12:59

CURRENT OWNER	TOPO.	UTILITIES	STRT./ROAD	LOCATION
100 BERLIN HOLDINGS LLC 12 TIDEWATER DRIVE ORMOND BEACH, FL 32174 Additional Owners:				

SUPPLEMENTAL DATA

Other ID:

GIS ID: 00459100 ASSOC PID#

CURRENT ASSESSMENT

Description	Code	Appraised Value	Assessed Value
	Total	11,032,220	7,722,560

6033
CROMWELL, CT

VISION

RECORD OF OWNERSHIP	BK-VOL/PAGE	SALE DATE	q/u	v/i	SALE PRICE	V.C.

PREVIOUS ASSESSMENTS (HISTORY)

Yr.	Code	Assessed Value	Yr.	Code	Assessed Value	Yr.	Code	Assessed Value
	Total:			Total:			Total:	

EXEMPTIONS

Year	Type	Description	Amount
		Total:	

OTHER ASSESSMENTS

Code	Description	Number	Amount	Comm. Int.

This signature acknowledges a visit by a Data Collector or Assessor

APPRAISED VALUE SUMMARY

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Appraised OB (L) Value (Bldg)	632,930
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Total Appraised Parcel Value	11,032,220
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Adjustment:	0
Net Total Appraised Parcel Value	**11,032,220**

ASSESSING NEIGHBORHOOD

NBHD/ SUB	NBHD Name	Street Index Name	Tracing	Batch
0001/A				

NOTES

BUILDING PERMIT RECORD

Permit ID	Issue Date	Type	Description	Amount	Insp. Date	% Comp.	Date Comp.	Comments

VISIT/ CHANGE HISTORY

Date	Type	IS	ID	Cd.	Purpose/Result

LAND LINE VALUATION SECTION

B #	Use Code	Use Description	Zone	D	Front	Depth	Units	Unit Price	I. Factor	S.A.	C. Factor	ST. Idx	Adj.	Notes- Adj	Special Pricing	S Adj Fact	Adj. Unit Price	Land Value

Total Card Land Units: 0.00 AC **Parcel Total Land Area:** 9.04 AC **Total Land Value:** 0

CONSTRUCTION DETAIL

Element	Cd.	Ch.	Description

CONSTRUCTION DETAIL (CONTINUED)

Element	Cd.	Ch.	Description

MIXED USE

Code	Description	Percentage
201	Commercial Improv	100

COST/MARKET VALUATION

Cost Trend Factor

OB-OUTBUILDING & YARD ITEMS(L) / XF-BUILDING EXTRA FEATURES(B)

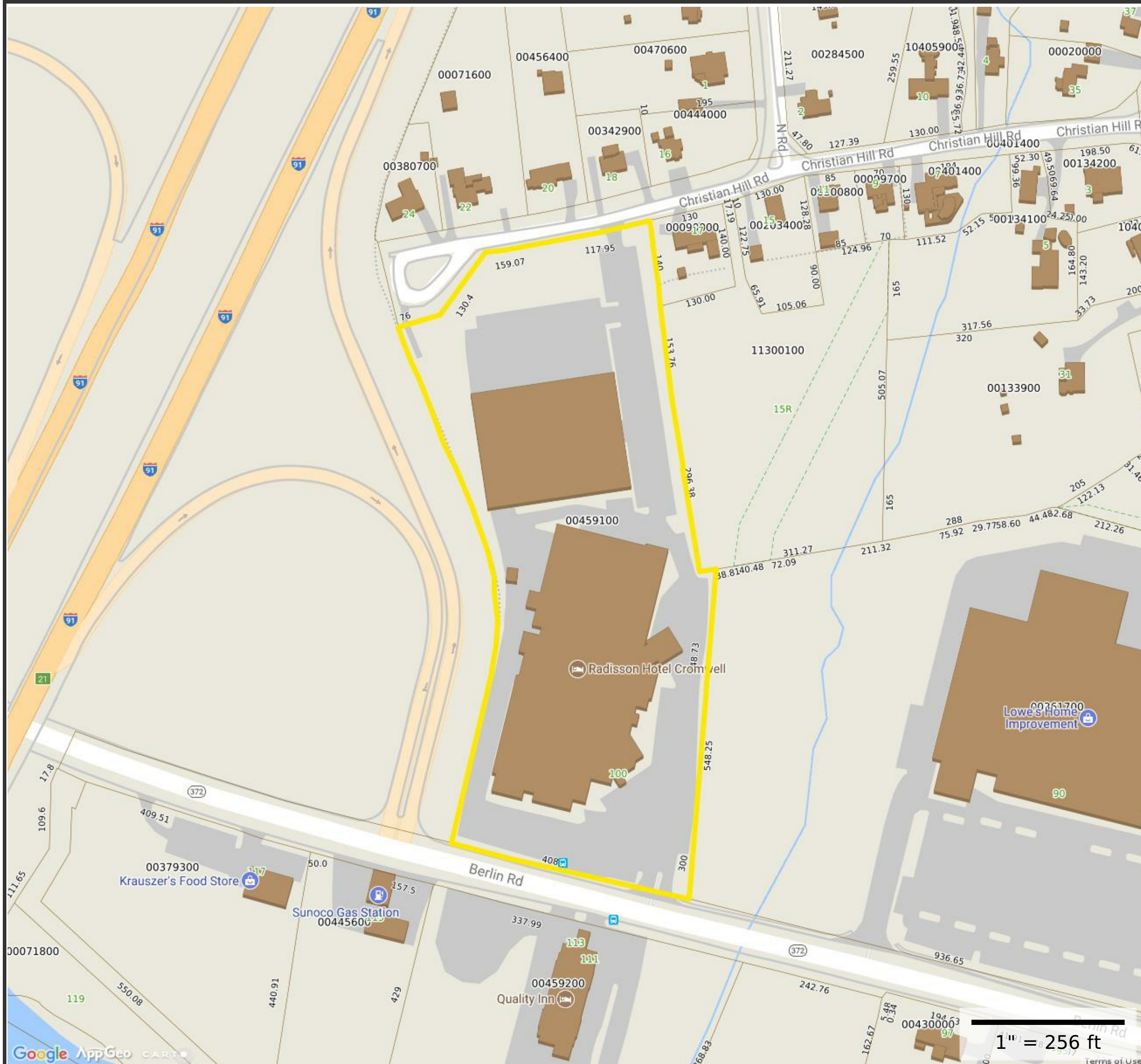
Code	Description	Sub	Sub Descript	L/B	Units	Unit Price	Yr	Gde	Dp Rt	Cnd	%Cnd	Apr Value
PGAR	Parking Garage			L	46,75	35.00	1983		0		30	490,920
ELEV	Elevator			B	4	5,000.00	1984		1		100	14,400
ELEV	Elevator			B	4	5,000.00	1984		1		100	14,400
ELEV	Elevator			B	4	5,000.00	1984		1		100	14,400
ELEV	Elevator			B	4	5,000.00	1984		1		100	14,400

BUILDING SUB-AREA SUMMARY SECTION

Code	Description	Living Area	Gross Area	Eff. Area	Unit Cost	Undeprec. Value
	Ttl. Gross Liv/Lease Area:	0	0			

No Photo On Record

Town of Cromwell, CT August 22, 2017



Property Information

Property ID	00459100
Location	100 BERLIN ROAD
Owner	100 BERLIN HOLDINGS LLC

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town of Cromwell, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Parcels updated 10/1/2016
Properties updated daily

Exhibit 2

WIRELESS COMMUNICATIONS FACILITY
CT5144- LTE BWE
CROMWELL SOUTH
AMERICAN TOWER CORPORATION SITE : 411261
100 CHRISTIAN HILL ROAD (AKA 100 BERLIN ROAD)
CROMWELL, CT 06416

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE, INCLUDING THE TIA–222 REVISION "G" STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES, 2016 CONNECTICUT FIRE SAFETY CODE AND, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. THE COMPOUND, TOWER, PRIMARY GROUND RING, ELECTRICAL SERVICE TO THE METER BANK AND TELEPHONE SERVICE TO THE DEMARCATION POINT ARE PROVIDED BY SITE OWNER. AS BUILT FIELD CONDITIONS REGARDING THESE ITEMS SHALL BE CONFIRMED BY THE CONTRACTOR. SHOULD ANY FIELD CONDITIONS PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH ANY AFFECTED WORK.
3. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
4. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD–OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
5. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
6. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
7. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS–BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
8. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING BUILDING'S/PROPERTY'S OPERATIONS, COORDINATE WORK WITH BUILDING/PROPERTY OWNER.
10. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
11. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
12. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
13. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE AT&T CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON–SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
15. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
16. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
17. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
18. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB–CONTRACTORS FOR ANY CONDITION PER THE MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
19. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
20. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1–800–922–4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED PRIOR TO ANY EXCAVATION WORK. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
21. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

FROM: 500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT

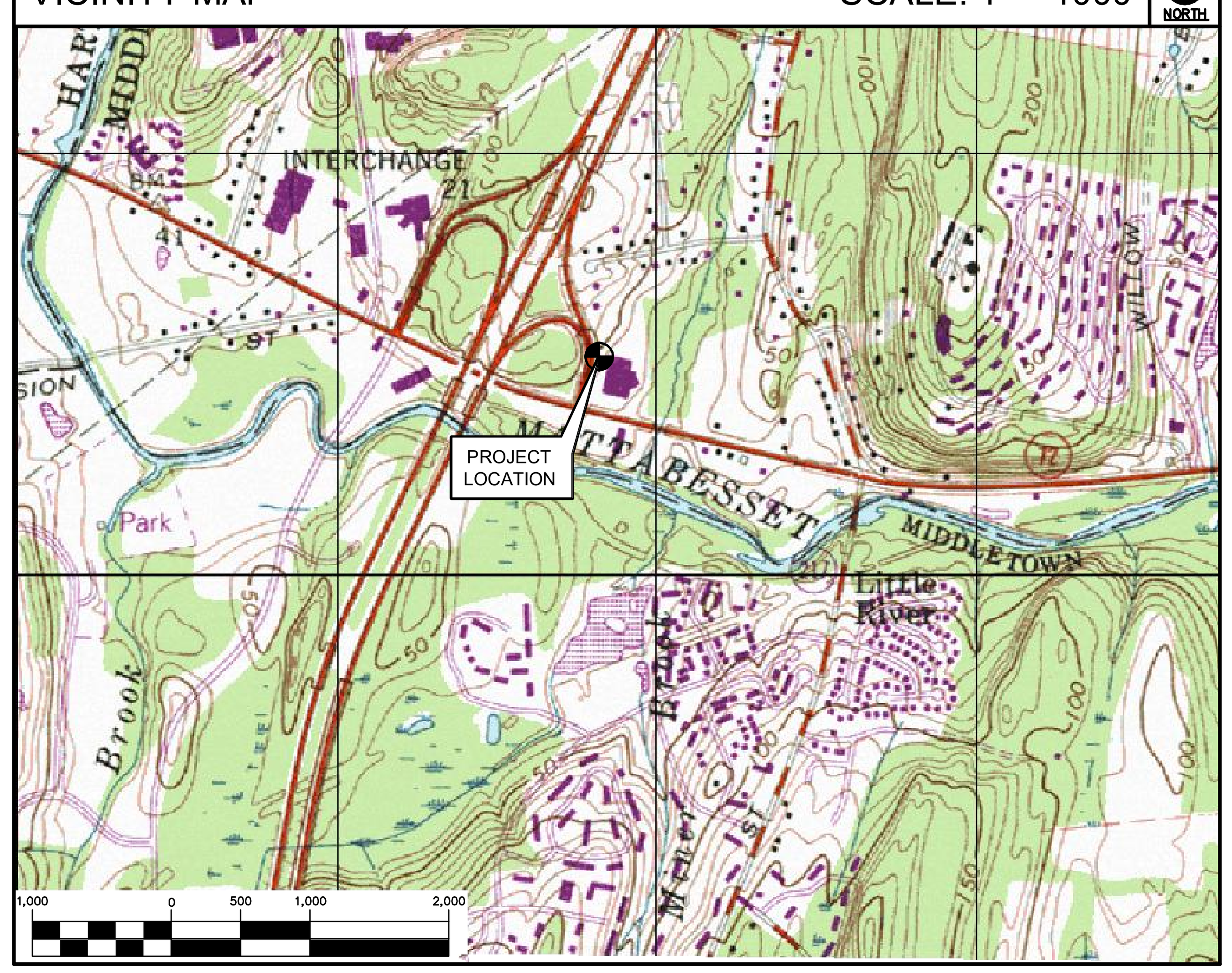
TO: 100 CHRISTIAN HILL ROAD
CROMWELL, CONNECTICUT

1. TAKE BROOK ST TO CT–3 S	1.5 MI
2. HEAD NORTHEAST ON ENTERPRISE DR TOWARD CAPITAL BLVD	0.3 MI
3. TURN RIGHT ONTO CAPITAL BLVD	0.2 MI
4. TURN RIGHT ONTO HENKEL WAY	0.2 MI
5. TURN RIGHT ONTO BROOK ST	0.8 MI
6. TAKE COLES RD TO CHRISTIAN HILL RD IN CROMWELL	3.0 MI
7. TURN LEFT ONTO CT–3 S	1.1 MI
8. TURN RIGHT ONTO COLES RD	1.9 MI
9. DRIVE TO CHRISTIAN HILL RD	0.2 MI
10. TURN RIGHT ONTO CHRISTIAN HILL RD	0.2 MI
11. TURN LEFT TO STAY ON CHRISTIAN HILL RD	10 FT
12. ARRIVE AT 100 CHRISTIAN HILL ROAD	

VICINITY MAP

SCALE: 1" = 1000'

NORTH



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:
   A. REMOVE AND REPLACE EXISTING LTE ANTENNA FOR PROPOSED LTE (12) PORT ANTENNA, (1) PER SECTOR.
   B. REMOVE AND REPLACE (3) EXISTING RRUS–11 AND INSTALL (3) PROPOSED RRUS–32 B2 BEHIND EXISTING ANTENNAS.

PROJECT INFORMATION

AT&T SITE NUMBER:	CT5144
AT&T SITE NAME:	CROMWELL SOUTH
SITE ADDRESS:	AMERICAN TOWER CORP. SITE NO.: 411261 100 CHRISTIAN HILL ROAD CROMWELL, CT 06416
LESSEE/APPLICANT:	AT&T MOBILITY 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067
ENGINEER:	CENTEK ENGINEERING, INC. 63–2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°–36'–20.13" N LONGITUDE: 72°–42'–06.84" W GROUND ELEVATION: ±72' AMSL GROUND ELEVATION REFERENCED FROM GOOGLE EARTH. COORDINATES REFERENCED FROM RFDS DOCUMENTS.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
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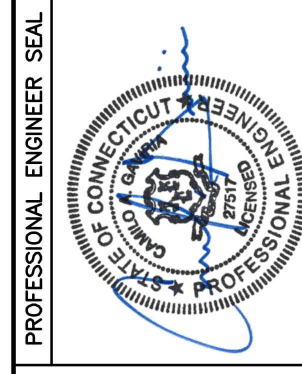
C–1	PLANS AND ELEVATION	1
C–2	LTE BWE EQUIPMENT DETAILS	1
E–1	ELECTRICAL DETAILS AND NOTES	1

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	8/25/17	TJL	CAG	ISSUED FOR CONSTRUCTION
0	11/29/16	HMR	CAG	CONSTRUCTION DOCUMENTS – ISSUED FOR CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL



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CROMWELL SOUTH
CT5144 - LTE BWE
100 CHRISTIAN HILL ROAD
CROMWELL, CT 06416

DATE: 11/15/16
SCALE: AS NOTED
JOB NO. 16071.68

TITLE SHEET

T–1

Sheet No. 1 of 5

NOTES AND SPECIFICATIONS

DESIGN BASIS:

GOVERNING CODE: 2012 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2016 CT STATE BUILDING CODE AND AMENDMENTS.

1. DESIGN CRITERIA:

- WIND LOAD: PER TIA 222 G (ANTENNA MOUNTS): 100–120 MPH (3 SECOND GUST)
- RISK CATEGORY: II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 97 MPH (Vasd) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7–10) PER 2012 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE.
- SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7–10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
2. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
3. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
4. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST EXISTING FIELD CONDITIONS.
5. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
6. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS, ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
7. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
8. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, AND BARRICADES AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH NORTHEAST UTILITIES
10. THE STRUCTURE IS DESIGNED TO BE SELF–SUPPORTING AND STABLE AFTER FOUNDATION REMEDIATION WORK IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.
11. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
12. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE OWNER FOR REVIEW BEFORE FABRICATION AND/OR INSTALLATION IS MADE. SHOP DRAWINGS SHALL INCLUDE ERECTION DRAWINGS AND COMPLETE DETAILS OF CONNECTIONS AS WELL AS MANUFACTURER'S SPECIFICATION DATA WHERE APPROPRIATE. SHOP DRAWINGS SHALL BE CHECKED BY THE CONTRACTOR AND BEAR THE CHECKER'S INITIALS BEFORE BEING SUBMITTED FOR REVIEW.
13. NO DRILLING WELDING OR TAPING ON CL&P OWNED EQUIPMENT.
14. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)

   A. STRUCTURAL STEEL (W SHAPES)–––ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)–––ASTM A36 (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)–––ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)–––ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE–––ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS–––ASTM A325–N
   G. U–BOLTS–––ASTM A36
   H. ANCHOR RODS–––ASTM F 1554
   I. WELDING ELECTRODE–––ASTM E 70XX

2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON–GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT–DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

PAINT NOTES

PAINTING SCHEDULE:

1. ANTENNA PANELS:
   A. SHERWIN WILLIAMS POLANE–B
   B. COLOR TO BE MATCHED WITH EXISTING TOWER STRUCTURE.
2. COAXIAL CABLES:
   A. ONE COAT OF DTM BONDING PRIMER (2–5 MILS. DRY FINISH)
   B. TWO COATS OF DTM ACRYLIC PRIMER/FINISH (2.5–5 MILS. DRY FINISH)
   C. COLOR TO BE FIELD MATCHED WITH EXISTING STRUCTURE.

EXAMINATION AND PREPARATION:

1. DO NOT APPLY PAINT IN SNOW, RAIN, FOG OR MIST OR WHEN RELATIVE HUMIDITY EXCEEDS 85%. DO NOT APPLY PAINT TO DAMP OR WET SURFACES.
2. VERIFY THAT SUBSTRATE CONDITIONS ARE READY TO RECEIVE WORK. EXAMINE SURFACE SCHEDULED TO BE FINISHED PRIOR TO COMMENCEMENT OF WORK. REPORT ANY CONDITION THAT MAY POTENTIALLY AFFECT PROPER APPLICATION.
3. TEST SHOP APPLIED PRIMER FOR COMPATIBILITY WITH SUBSEQUENT COVER MATERIALS.
4. PERFORM PREPARATION AND CLEANING PROCEDURE IN STRICT ACCORDANCE WITH COATING MANUFACTURER'S INSTRUCTIONS FOR EACH SUBSTRATE CONDITION.
5. CORRECT DEFECTS AND CLEAN SURFACES WHICH AFFECT WORK OF THIS SECTION. REMOVE EXISTING COATINGS THAT EXHIBIT LOOSE SURFACE DEFECTS.
6. IMPERVIOUS SURFACE: REMOVE MILDEW BY SCRUBBING WITH SOLUTION OF TRI–SODIUM PHOSPHATE AND BLEACH. RINSE WITH CLEAN WATER AND ALLOW SURFACE TO DRY.
7. ALUMINUM SURFACE SCHEDULED FOR PAINT FINISH: REMOVE SURFACE CONTAMINATION BY STEAM OR HIGH–PRESSURE WATER. REMOVE OXIDATION WITH ACID ETCH AND SOLVENT WASHING. APPLY ETCHING PRIMER IMMEDIATELY FOLLOWING CLEANING.
8. FERROUS METALS: CLEAN UNGALVANIZED FERROUS METAL SURFACES THAT HAVE NOT BEEN SHOP COATED; REMOVE OIL, GREASE, DIRT, LOOSE MILL SCALE, AND OTHER FOREIGN SUBSTANCES. USE SOLVENT OR MECHANICAL CLEANING METHODS THAT COMPLY WITH THE STEEL STRUCTURES PAINTING COUNCIL'S (SSPC) RECOMMENDATIONS. TOUCH UP BARE AREAS AND SHOP APPLIED PRIME COATS THAT HAVE BEEN DAMAGED. WIRE BRUSH, CLEAN WITH SOLVENTS RECOMMENDED BY PAINT MANUFACTURER, AND TOUCH UP WITH THE SAME PRIMER AS THE SHOP COAT.
9. GALVANIZED SURFACES: CLEAN GALVANIZED SURFACES WITH NON–PETROLEUM–BASED SOLVENTS SO SURFACE IS FREE OF OIL AND SURFACE CONTAMINANTS. REMOVE PRETREATMENT FROM GALVANIZED SHEET METAL FABRICATED FROM COIL STOCK BY MECHANICAL METHODS.
10. ANTENNA PANELS: REMOVE ALL OIL, DUST, GREASE, DIRT, AND OTHER FOREIGN MATERIAL TO ENSURE ADEQUATE ADHESION. PANELS MUST BE WIPED WITH METHYL ETHYL KETONE (MEK).
11. COAXIAL CABLES: REMOVE ALL OIL, DUST, GREASE. DIRT, AND OTHER FOREIGN MATERIAL TO ENSURE ADEQUATE ADHESION.

CLEANING:

1. COLLECT WASTE MATERIAL, WHICH MAY CONSTITUTE A FIRE HAZARD, PLACE IN CLOSED METAL CONTAINERS AND REMOVE DAILY FROM SITE.

APPLICATION:

1. APPLY PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
2. DO NOT APPLY FINISHES TO SURFACES THAT ARE NOT DRY.
3. APPLY EACH COAT TO UNIFORM FINISH.
4. APPLY EACH COAT OF PAINT SLIGHTLY DARKER THAN PRECEDING COAT UNLESS OTHERWISE APPROVED.
5. SAND METAL LIGHTLY BETWEEN COATS TO ACHIEVE REQUIRED FINISH.
6. VACUUM CLEAN SURFACES FREE OF LOOSE PARTICLES. USE TACK CLOTH JUST PRIOR TO APPLYING NEXT COAT.
7. ALLOW APPLIED COAT TO DRY BEFORE NEXT COAT IS APPLIED.

COMPLETED WORK:

1. SAMPLES: PREPARE 24" X 24" SAMPLE AREA FOR REVIEW.
2. MATCH APPROVED SAMPLES FOR COLOR, TEXTURE AND COVERAGE. REMOVE REFINISH OR REPAINT WORK NOT IN COMPLIANCE WITH SPECIFIED REQUIREMENTS.

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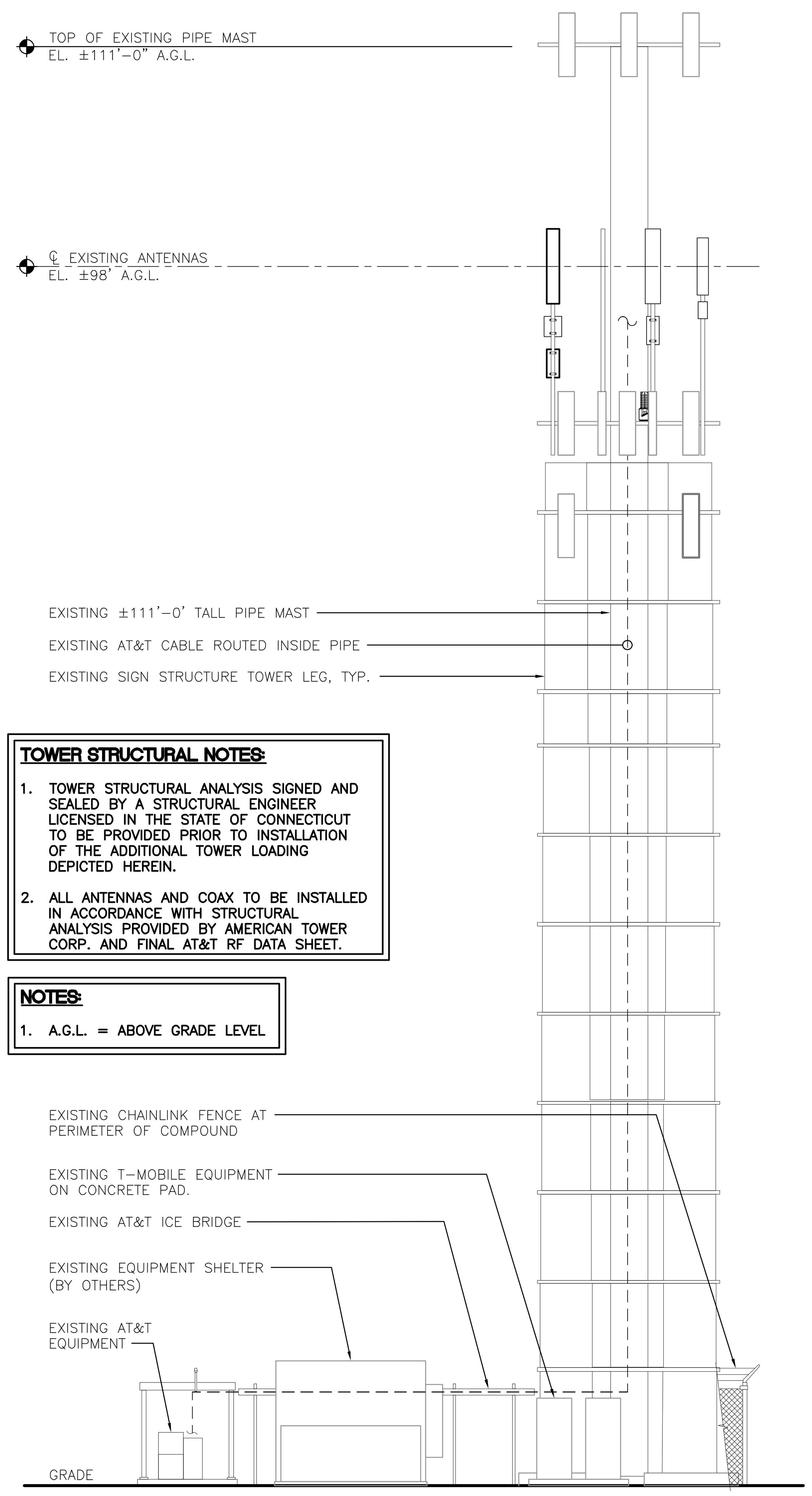
100 CHRISTIAN HILL ROAD
CROMWELL, CT 06416

DATE: 11/15/16
SCALE: AS NOTED
JOB NO. 16071.68

NOTES AND SPECIFICATIONS

N-1

Sheet No. 2 of 5



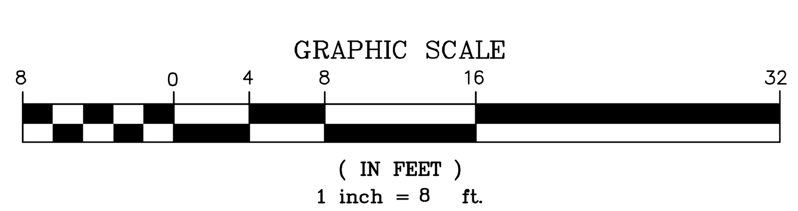
TOWER STRUCTURAL NOTES:

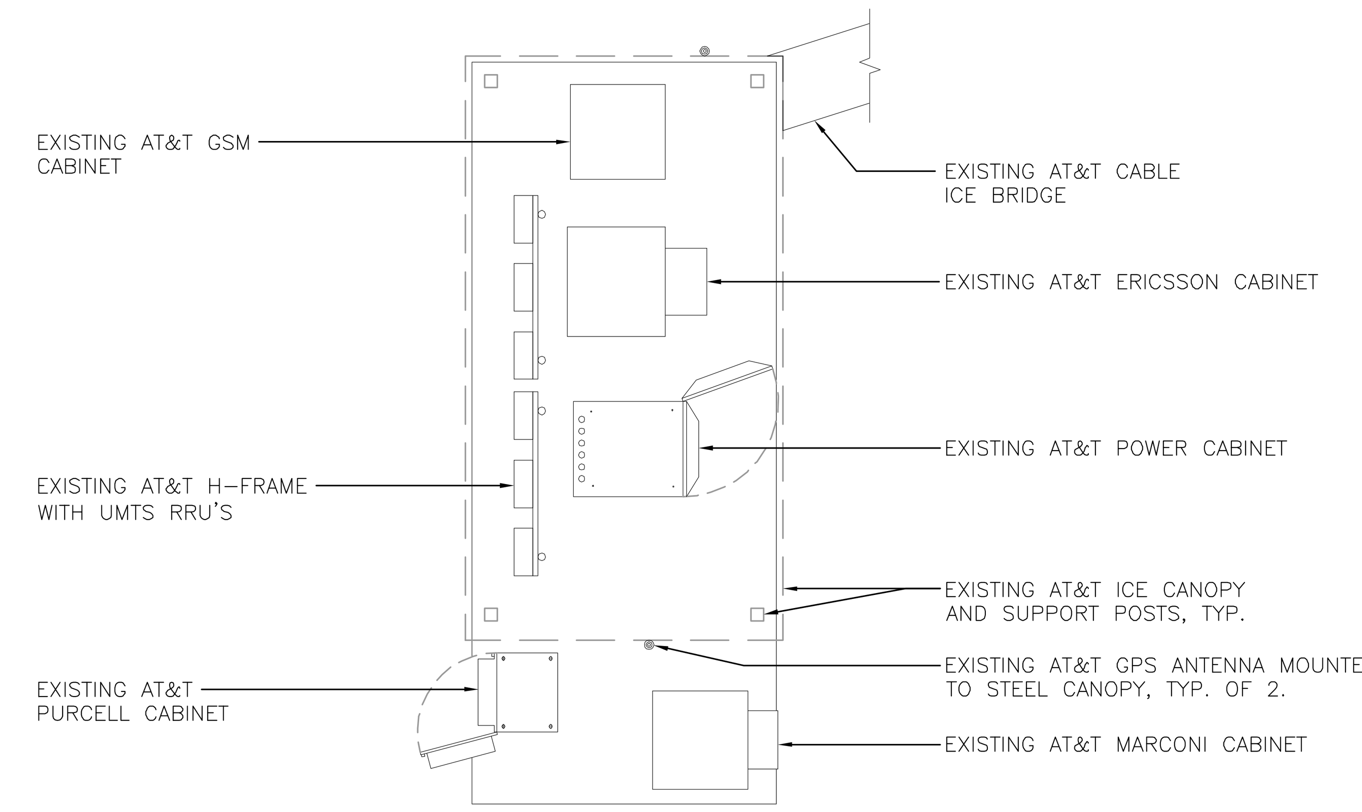
1. TOWER STRUCTURAL ANALYSIS SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT TO BE PROVIDED PRIOR TO INSTALLATION OF THE ADDITIONAL TOWER LOADING DEPICTED HEREIN.
2. ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY AMERICAN TOWER CORP. AND FINAL AT&T RF DATA SHEET.

NOTES:

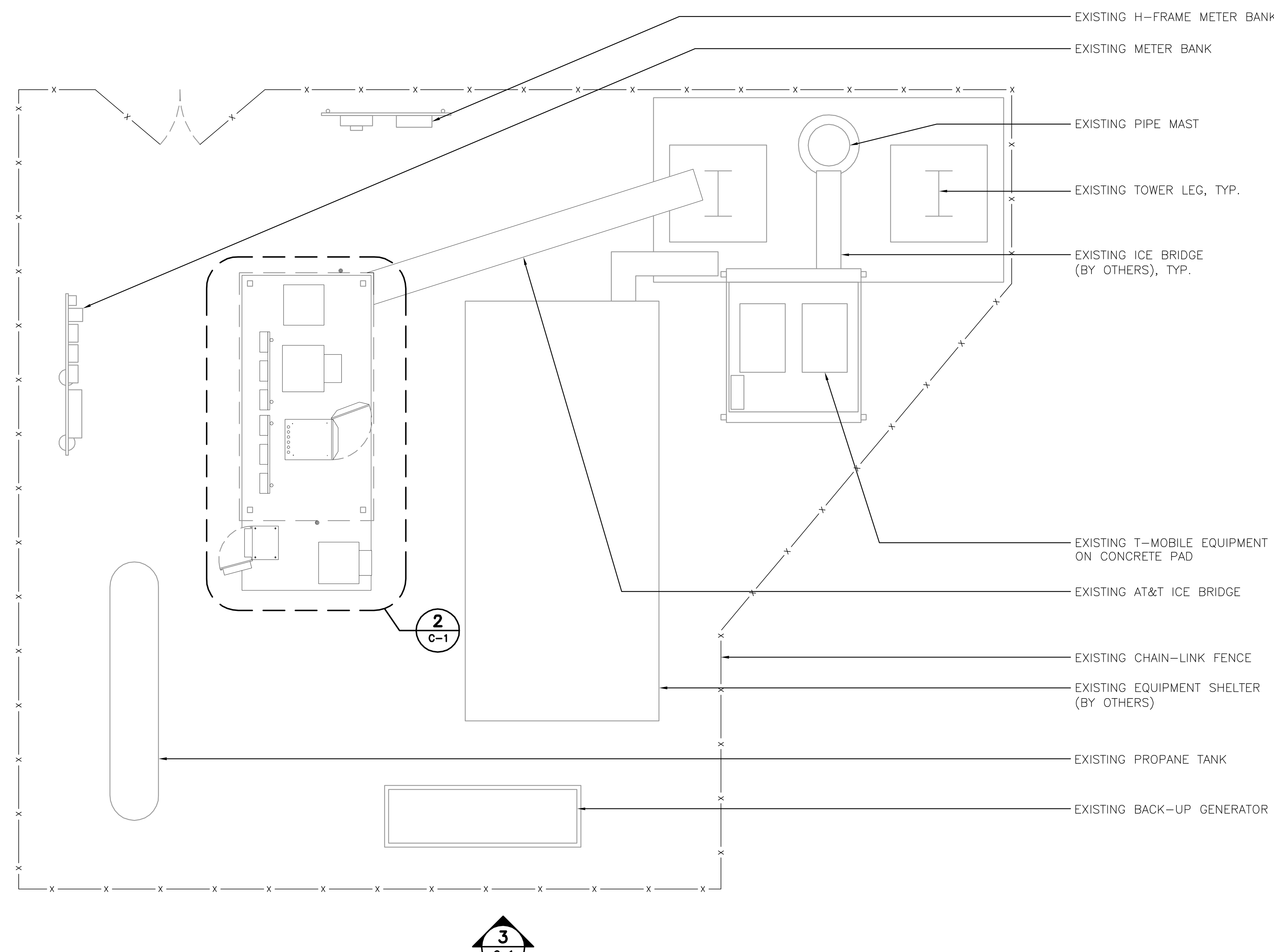
1. A.G.L. = ABOVE GRADE LEVEL

3 / C-1 **TOWER ELEVATION**
SCALE: 1/8" = 1'-0"





2 / C-1 **EQUIPMENT LAYOUT PLAN**
SCALE: 1/4" = 1'-0"
TRUE NORTH



1 / C-1 **COMPOUND PLAN**
SCALE: 3/16" = 1'-0"
TRUE NORTH

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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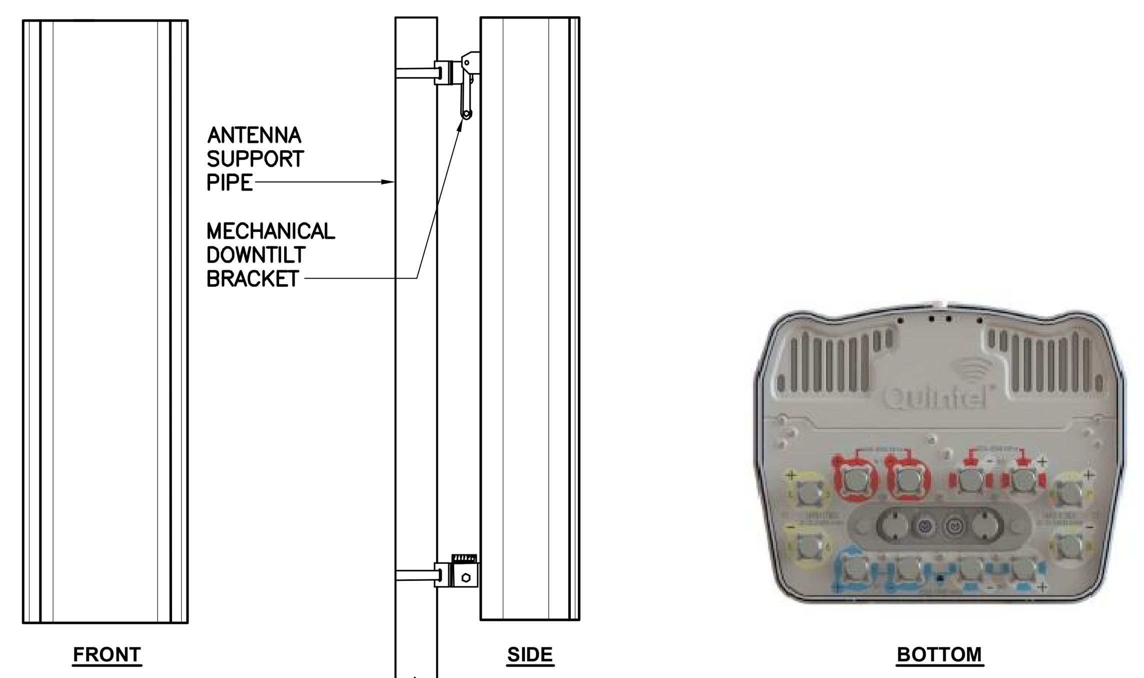
PLANS AND ELEVATION

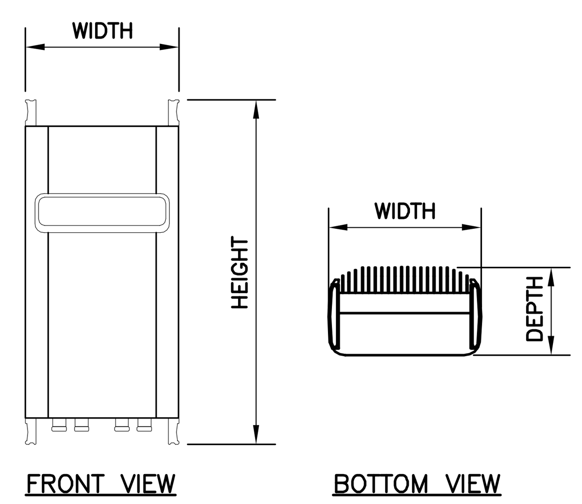
C-1

Sheet No. 3 of 5



ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: QUINTEL MODEL: QS66512-2	72.0"L x 12.0"W x 9.6"D	111 LBS.

5 (C-2) PROPOSED ANTENNA DETAIL
SCALE: 1/2" = 1'-0"

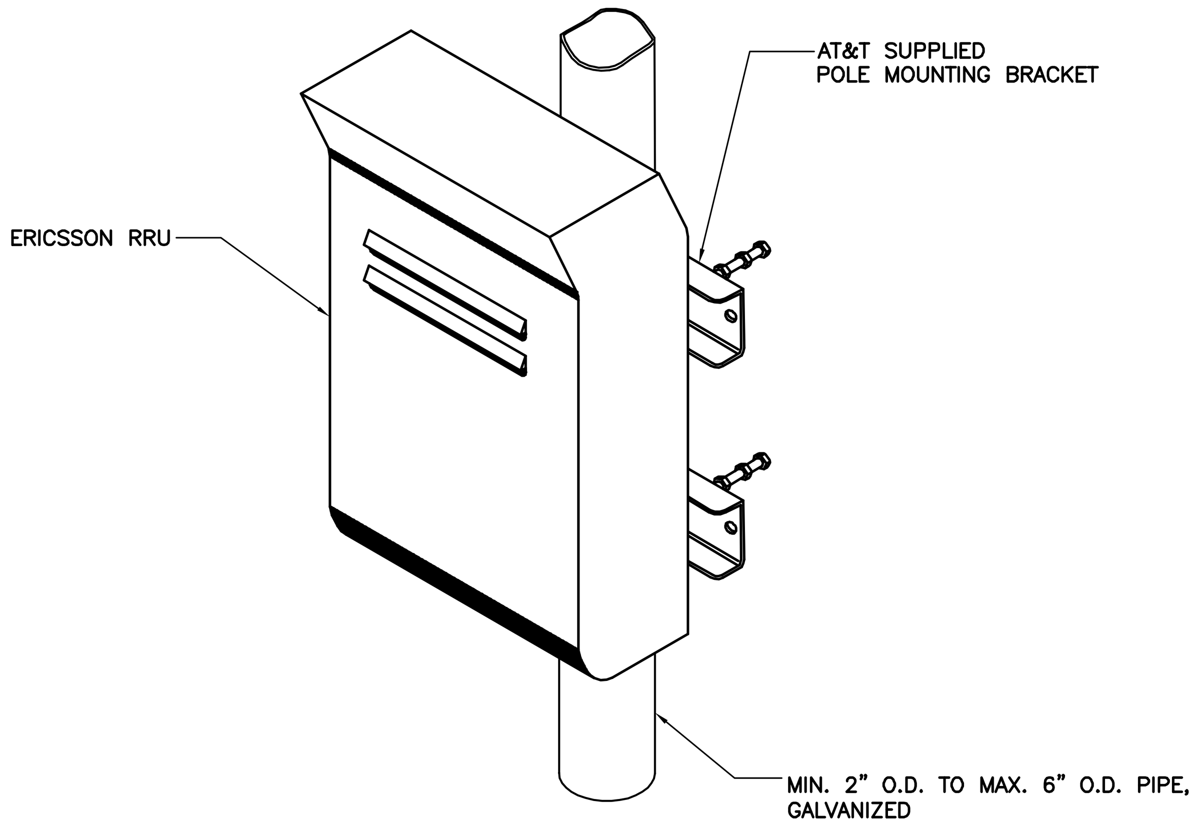


RRUS-32 B2

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS-32 B2	27.17"L x 12.05"W x 7.01"D	52.91 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.

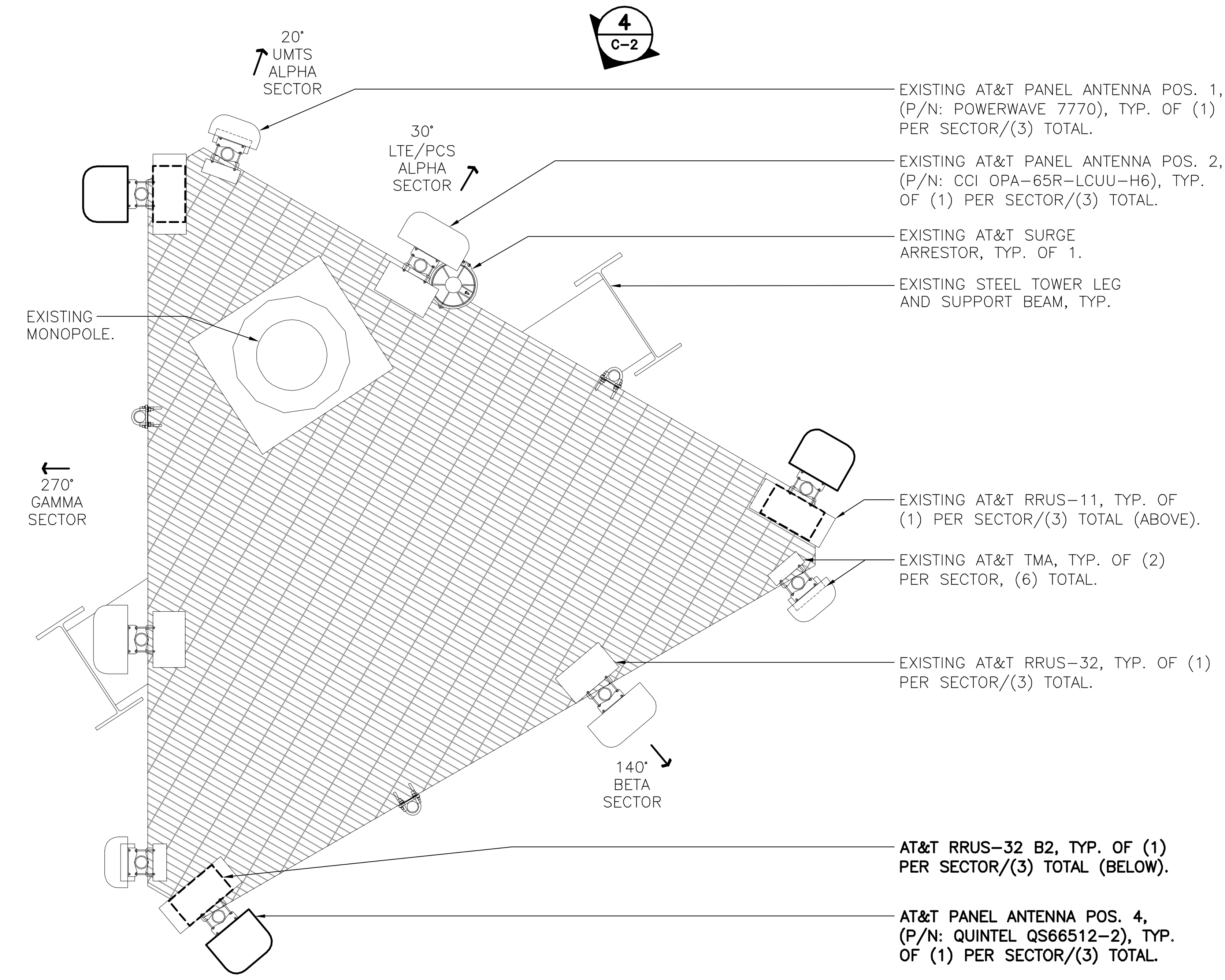
6 (C-2) ERICSSON RRUS-32 B2 DETAIL
SCALE: 1" = 1'-0"



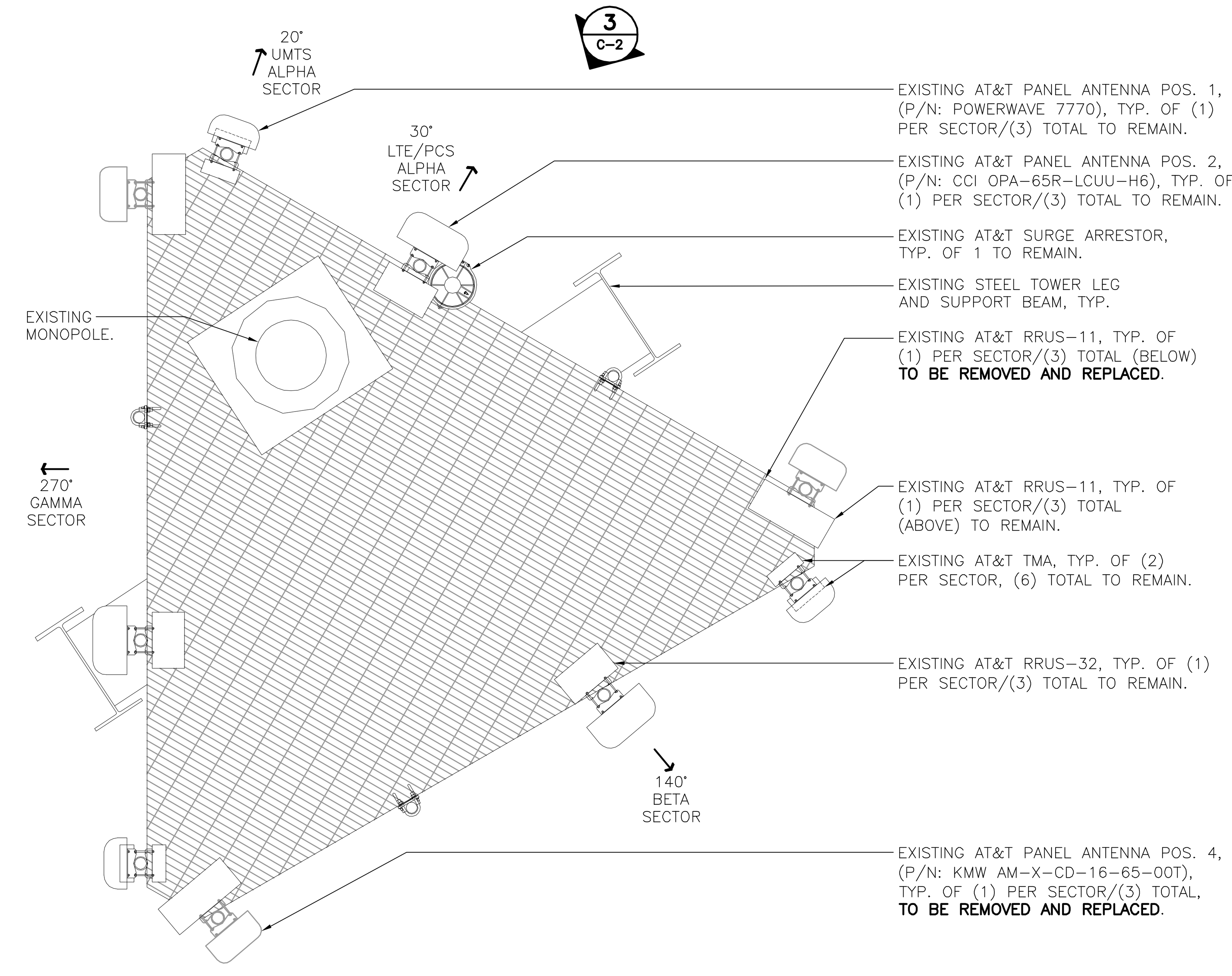
ISOMETRIC VIEW

NOTES:
1. AT&T SHALL SUPPLY RRU, AND RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL INSTALLS RRU AND MAKES CABLE TERMINATIONS.
2. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

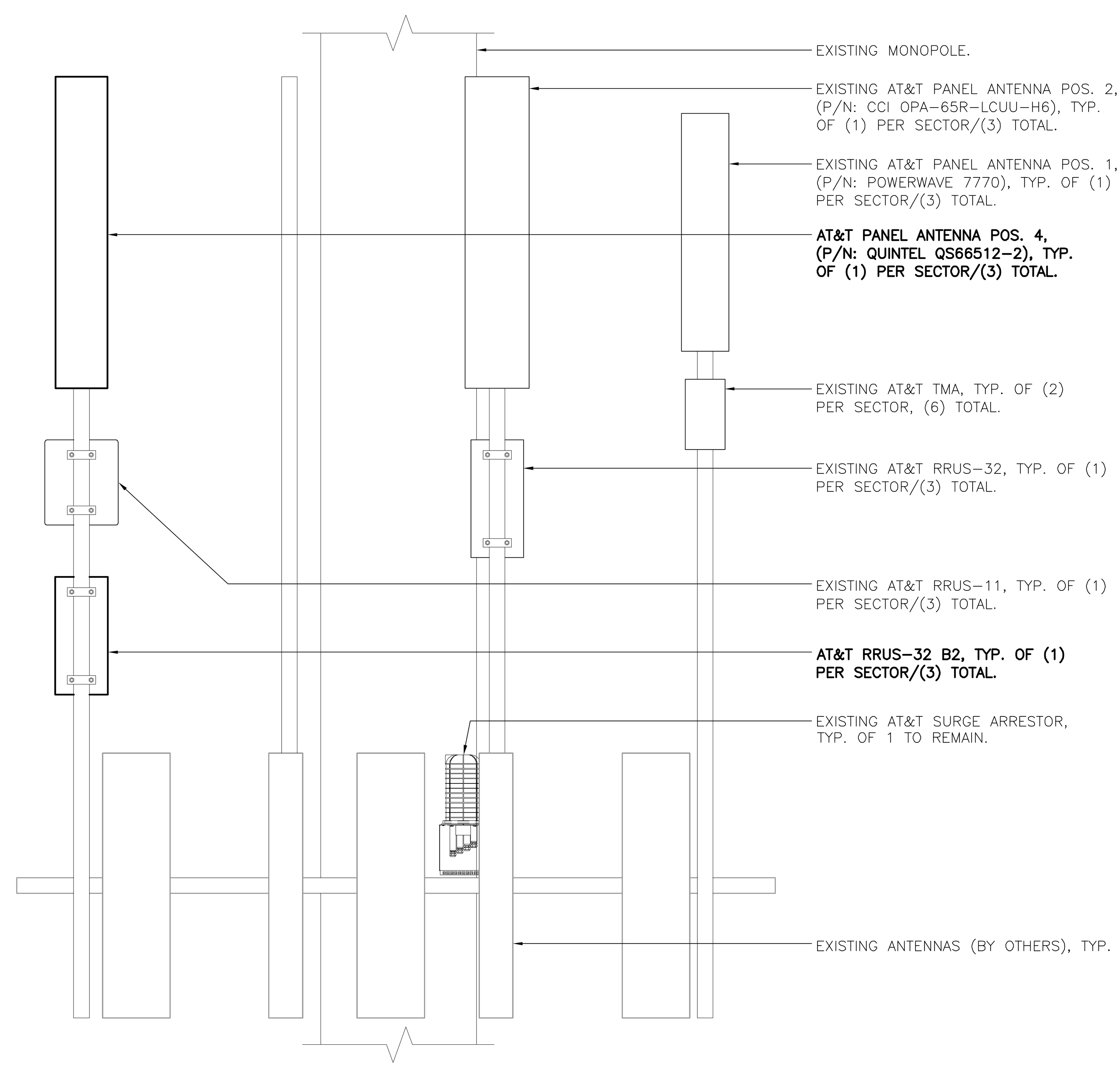
7 (C-2) TYPICAL RRUS MOUNTING DETAILS
SCALE: NTS



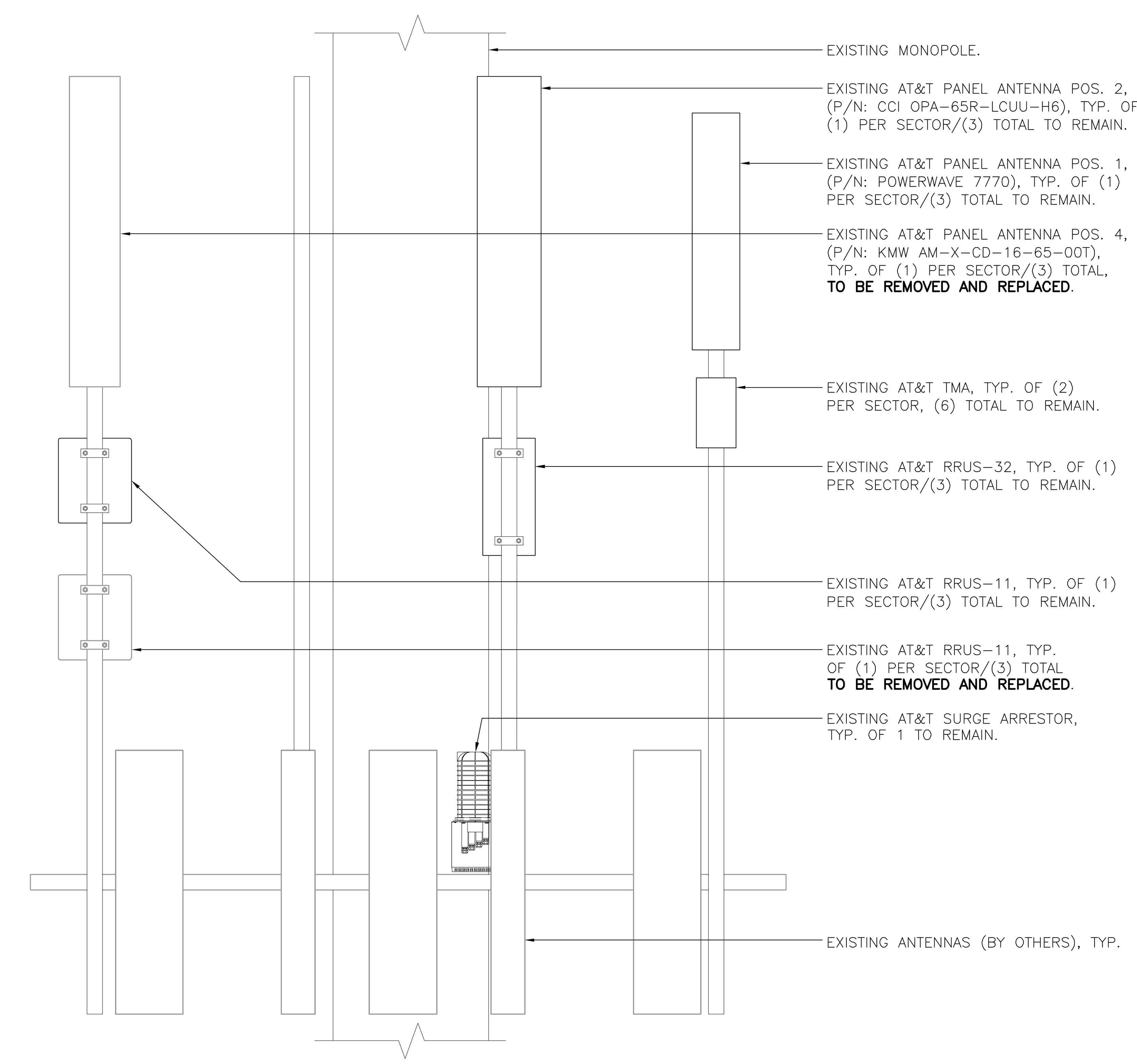
2 (C-2) PROPOSED ANTENNA PLAN
SCALE: 1/2" = 1'-0"



1 (C-2) EXISTING ANTENNA PLAN
SCALE: 1/2" = 1'-0"



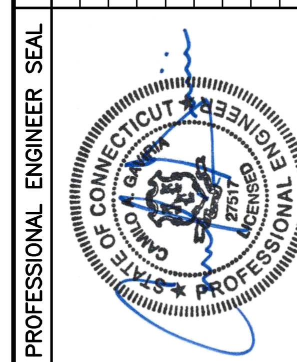
4 (C-2) PROPOSED ANTENNA ELEVATION
SCALE: 1/2" = 1'-0"



3 (C-2) EXISTING ANTENNA ELEVATION
SCALE: 1/2" = 1'-0"

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	8/25/17	TJL	CAG	ISSUED FOR CONSTRUCTION
0	11/29/16	HMR	CAG	CONSTRUCTION DOCUMENTS – ISSUED FOR CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL



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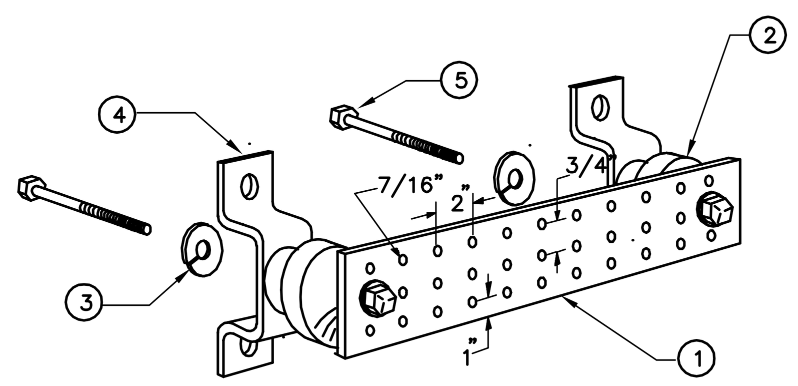
CROMWELL SOUTH
CT5144 - LTE BWE
100 CHRISTIAN HILL ROAD
CROMWELL, CT 06416

DATE: 11/15/16
SCALE: AS NOTED
JOB NO. 16071.68

LTE BWE EQUIPMENT DETAILS

C-2

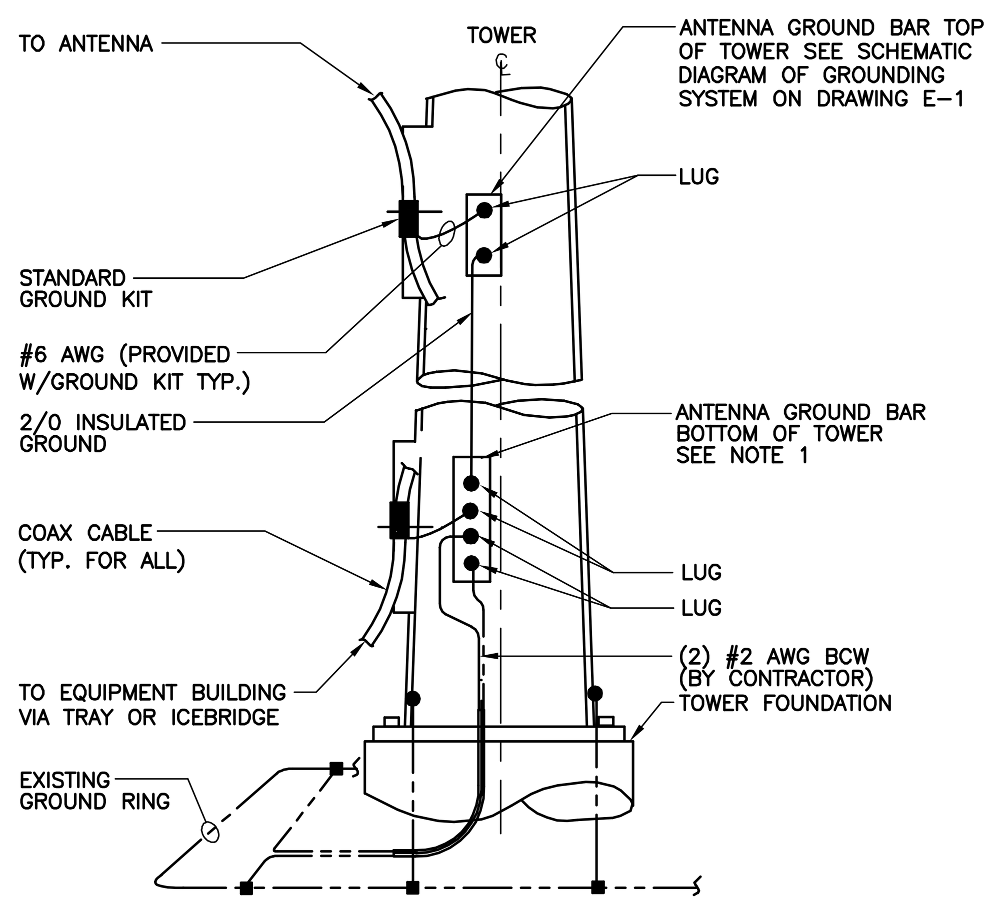
Sheet No. 4 of 5



LEGEND

1. TINNED COPPER GROUND BAR, 1/4"x 4"x 20", NEWTON INSTRUMENT CO. HOLE CENTERS TO MATCH NEMA DOUBLE LUG .
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 2. 3061-4.
3. 3. 5/8" LOCK WASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8.
4. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. 4. CAT NO. A-6056.
5. STAINLESS STEEL SECURITY SCREWS.

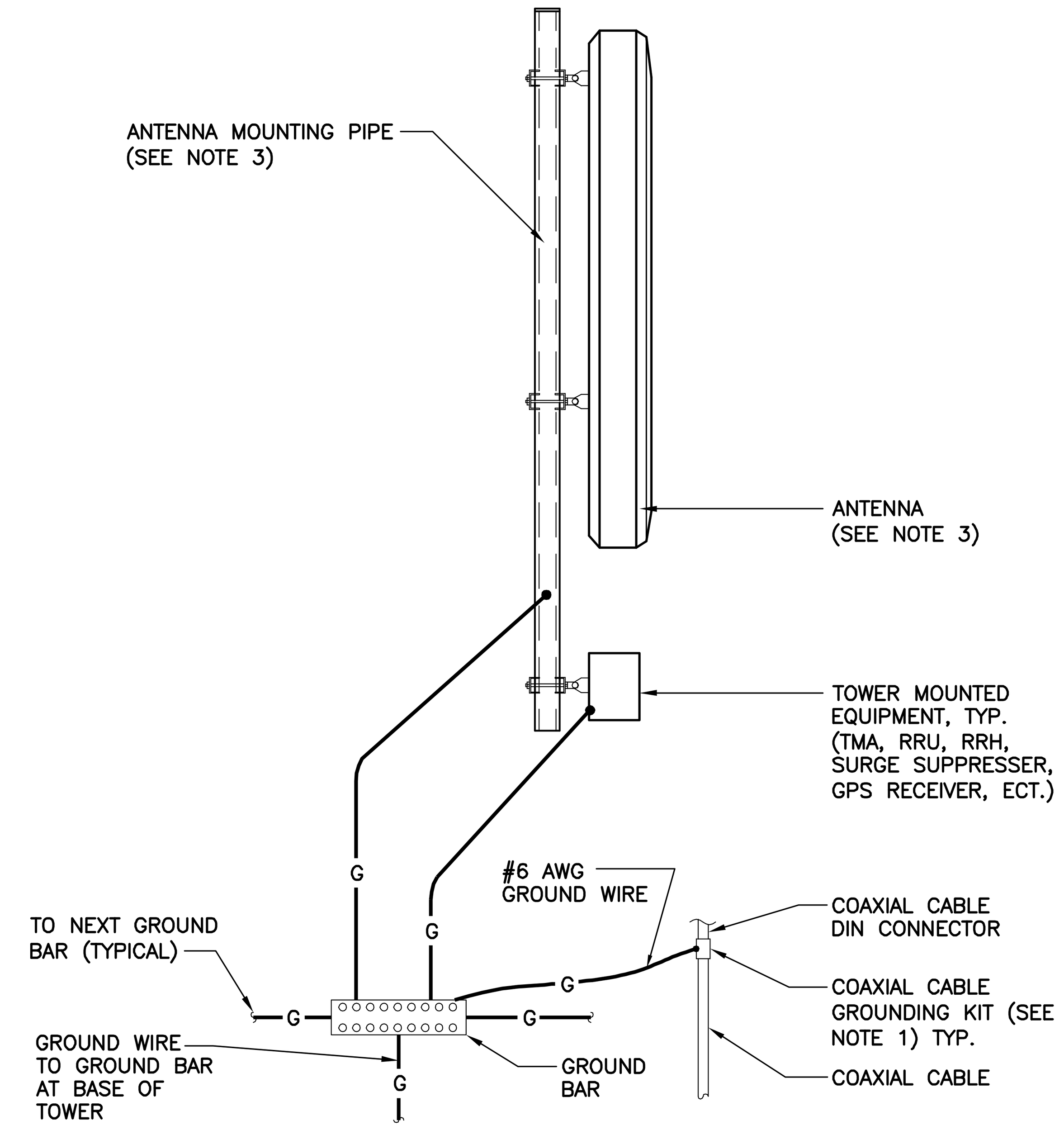
3 (E-1) GROUND BAR DETAIL
NOT TO SCALE



NOTES:

1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.
2. A SEPARATE GROUND BAR TO BE USED FOR GPS ANTENNA IF REQUIRED.

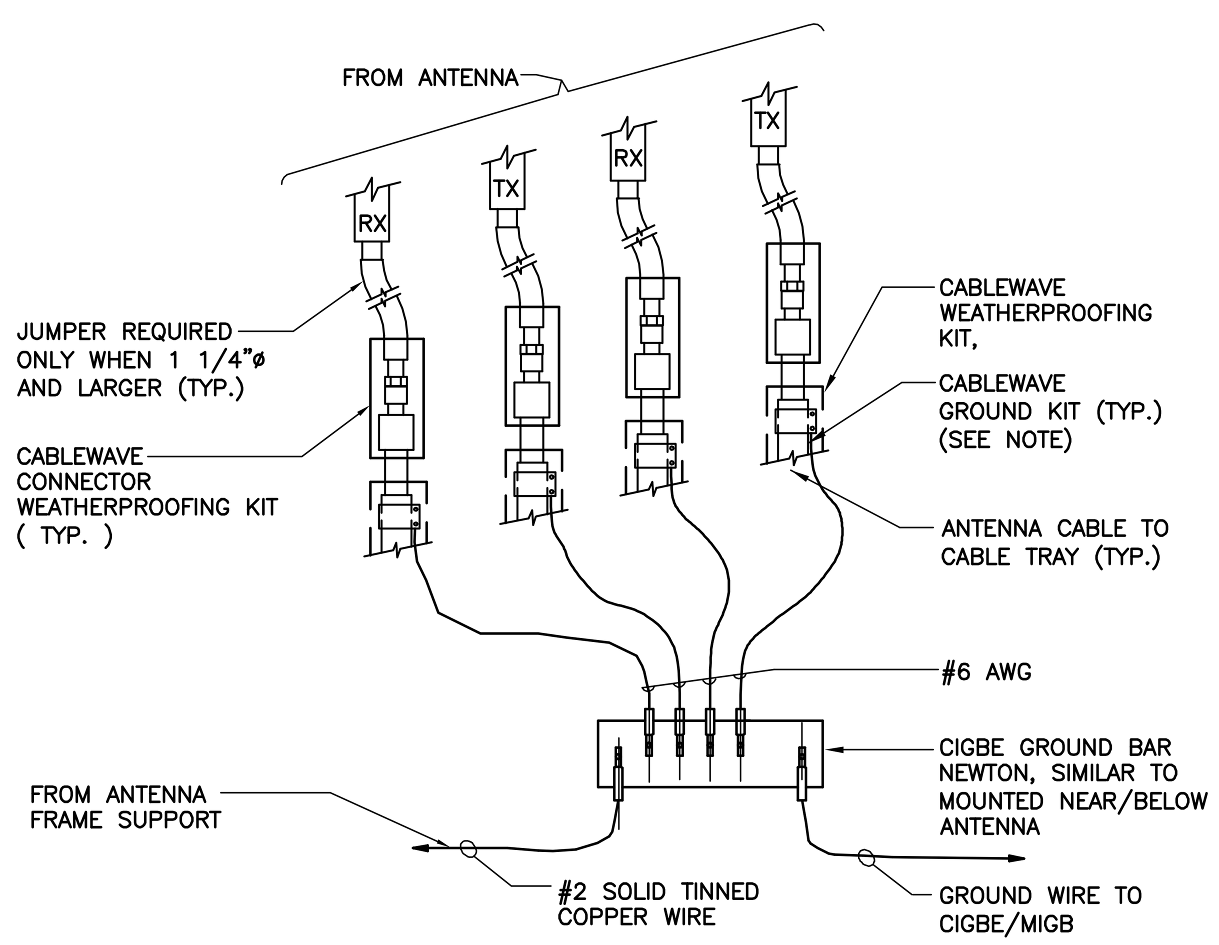
2 (E-1) ANTENNA CABLE GROUNDING - TOWER
NOT TO SCALE



NOTES:

1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

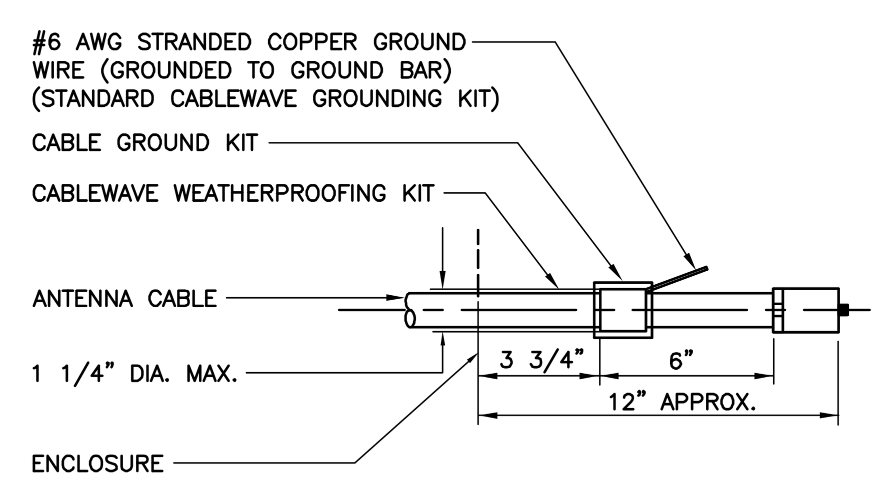
1 (E-1) TYPICAL ANTENNA GROUNDING DETAIL
NOT TO SCALE



NOTE:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE

5 (E-1) CONNECTION OF GROUND WIRES TO GROUND BAR
NOT TO SCALE



NOTE:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

4 (E-1) ANTENNA CABLE GROUNDING DETAIL
NOT TO SCALE

ELECTRICAL NOTES

1. PRIOR TO START OF CONSTRUCTION CONTRACTOR SHALL COORDINATE WITH OWNER FOR ALL CONSTRUCTION STANDARDS AND SPECIFICATIONS, AND ALL MANUFACTURER DOCUMENTATION FOR ALL EQUIPMENT TO BE INSTALLED.
2. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH LOCAL BUILDING CODE, NATIONAL ELECTRIC CODE, OWNER AND MANUFACTURER'S SPECIFICATIONS.
3. CONNECT ALL NEW EQUIPMENT TO EXISTING TELCO AS REQUIRED BY MANUFACTURER.
4. MAINTAIN ALL CLEARANCES REQUIRED BY NEC AND EQUIPMENT MANUFACTURER.
5. PRIOR TO INSTALLATION CONTRACTOR SHALL MEASURE EXISTING ELECTRICAL LOAD AND VERIFY EXISTING AVAILABLE CAPACITY FOR PROPOSED INSTALLATION. IF INADEQUATE CAPACITY IS AVAILABLE, CONTRACTOR SHALL COORDINATE WITH LOCAL ELECTRIC UTILITY COMPANY TO UPGRADE EXISTING ELECTRIC SERVICE.
6. CONTRACTOR SHALL INSPECT EXISTING GROUNDING AND LIGHTNING PROTECTION SYSTEM AND ENSURE THAT IT IS IN COMPLIANCE WITH NEC, AND SITE OWNER'S SPECIFICATIONS. THE RESULTS OF THIS INSPECTION SHALL BE PRESENTED TO OWNERS REPRESENTATIVE, AND ANY DEFICIENCIES SHALL BE CORRECTED.
7. ALL TRANSMISSION TOWER SITES CONTAIN AN EXTENSIVE BURIED GROUNDING SYSTEM. ALL GROUNDING WORK MUST BE COORDINATED WITH, AND APPROVED BY, THE TOWER OWNER'S SITE REPRESENTATIVE. ALL OF THE TOWER OWNER'S SPECIFICATIONS MUST BE STRICTLY FOLLOWED.
8. PROVIDE AND INSTALL GROUND KITS FOR ALL NEW COAXIAL CABLES AND BOND TO EXISTING OWNERS GROUNDING SYSTEM PER OWNERS SPECIFICATIONS AND NEC.
9. ALL CONDUCTORS SHALL BE TYPE THWN (INT. APPLICATION) AND XHHW (EXT. APPLICATION), 75 DEGREE C, 600 VOLT INSULATION, SOFT ANNEALED STRANDED COPPER. #10 AWG AND SMALLER SHALL BE SPLICED USING ACCEPTABLE SOLDERLESS PRESSURE CONNECTORS. #8 AWG AND LARGER SHALL BE SPLICED USING COMPRESSION SPLIT-BOLT TYPE CONNECTORS, #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR FOR LINE VOLTAGE BRANCH CIRCUITS. REFER TO PANEL SCHEDULE FOR BRANCH CIRCUIT CONDUCTOR SIZE(S). CONDUCTORS SHALL BE COLOR CODED FOR CONSISTENT PHASE IDENTIFICATION:
10. MINIMUM BENDING RADIUS FOR CONDUCTORS SHALL BE 12 TIMES THE LARGEST DIAMETER OF BRANCH CIRCUIT CONDUCTOR.
11. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE MADE IN STRICT ACCORDANCE WITH ALL LOCAL, STATE AND NATIONAL CODES AND REGULATIONS WHICH MAY APPLY AND NOTHING IN THE DRAWINGS OR SPECIFICATIONS SHALL BE INTERPRETED AS AN INFRINGEMENT OF SUCH CODES OR REGULATIONS.
12. THE ELECTRICAL CONTRACTOR IS TO BE RESPONSIBLE FOR THE COMPLETE INSTALLATION AND COORDINATION OF THE ENTIRE ELECTRICAL SERVICE. ALL ACTIVITIES TO BE COORDINATED THROUGH OWNER'S REPRESENTATIVE, DESIGN ENGINEER AND OTHER AUTHORITIES HAVING JURISDICTION OF TRADES.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND PAY ALL FEES AS MAY BE REQUIRED FOR THE ELECTRICAL WORK AND FOR SCHEDULING OF ALL INSPECTIONS AS MAY BE REQUIRED BY THE LOCAL AUTHORITY.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE SITE AND/OR BUILDING OWNER FOR NEW AND/OR DEMOLITION WORK INVOLVED.
15. THE CONTRACTOR SHALL GUARANTEE ALL NEW WORK FOR A PERIOD OF ONE YEAR FROM THE ACCEPTANCE DATE BY THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING WARRANTIES FROM ALL EQUIPMENT MANUFACTURERS FOR SUBMISSION TO THE OWNER.
16. DRAWINGS INDICATE GENERAL ARRANGEMENT OF WORK INCLUDED IN CONTRACT. CONTRACTOR SHALL WITHOUT EXTRA CHARGE, MAKE MODIFICATIONS TO THE LAYOUT OF THE WORK TO PREVENT CONFLICT WITH WORK OF OTHER TRADES AND FOR THE PROPER INSTALLATION OF WORK. CHECK ALL DRAWINGS AND VISIT JOB SITE TO VERIFY SPACE AND TYPE OF EXISTING CONDITIONS IN WHICH WORK WILL BE DONE, PRIOR TO SUBMITTAL OF BID.
17. ALL NON-CURRENT CARRYING PARTS OF THE ELECTRICAL AND TELEPHONE CONDUIT SYSTEMS SHALL BE MECHANICALLY AND ELECTRICALLY CONNECTED TO PROVIDE AN INDEPENDENT RETURN PATH TO THE EQUIPMENT GROUNDING SOURCES.
18. GROUNDING SYSTEM WILL BE IN ACCORDANCE WITH THE LATEST ACCEPTABLE EDITION OF THE NATIONAL ELECTRICAL CODE AND REQUIREMENTS PER LOCAL INSPECTOR HAVING JURISDICTION.
19. EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250-122. (MIN. #12 AWG).
20. CONTRACTOR SHALL PROVIDE A CELLULAR GROUNDING SYSTEM WITH THE MAXIMUM AC RESISTANCE TO GROUND OF 5 OHM BETWEEN ANY POINT ON THE GROUNDING SYSTEM AS MEASURED BY 3-POINT GROUNDING TEST. (REFER TO SECTION 16960).

TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

A. CONTRACTOR SHALL RETAIN THE SERVICES OF A LOCAL INDEPENDENT ELECTRICAL TESTING FIRM (WITH MINIMUM 5 YEARS COMMERCIAL EXPERIENCE IN THE ELECTRICAL TESTING INDUSTRY) AS SPECIFIED BY OWNER TO PERFORM:

   TEST 1: RESISTANCE TO GROUND TEST ON THE CELLULAR GROUNDING SYSTEM.

   THE TESTING FIRM SHALL INCLUDE THE FOLLOWING INFORMATION WITH THE REPORT:

   1. TESTING PROCEDURE INCLUDING THE MAKE AND MODEL OF TEST EQUIPMENT.
   2. CERTIFICATION OF TESTING EQUIPMENT CALIBRATION WITHIN SIX (6) MONTHS OF DATE OF TESTING. INCLUDE CERTIFICATION LAB ADDRESS AND TELEPHONE NUMBER.
   3. GRAPHICAL DESCRIPTION OF TESTING METHOD ACTUALLY IMPLEMENTED.

B. TESTING SHALL BE PERFORMED IN THE PRESENCE AND TO THE SATISFACTION OF OWNERS CONSTRUCTION REPRESENTATIVE. TESTING DATA SHALL BE INITIALED AND DATED BY THE CONSTRUCTION AND INCLUDED WITH THE WRITTEN REPORT/ANALYSIS.

C. THE CONTRACTOR SHALL FORWARD SIX (6) COPIES OF THE INDEPENDENT ELECTRICAL TESTING FIRM REPORT/ANALYSIS TO ENGINEER A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO THE JOB TURNOVER.

D. CONTRACTOR TO PROVIDE A MINIMUM OF ONE (1) WEEK NOTICE TO OWNER AND ENGINEER FOR ALL TESTS REQUIRING WITNESSING.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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0	11/29/16	HMR	CAG	CONSTRUCTION DOCUMENTS – ISSUED FOR CLIENT REVIEW

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CT5144 - LTE BWE
100 CHRISTIAN HILL ROAD
CROMWELL, CT 06416

DATE: 11/15/16
SCALE: AS NOTED
JOB NO. 16071.68

ELECTRICAL DETAILS AND NOTES

E-1

Sheet No. 5 of 5

Exhibit 3

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

82' Sign Structure w/ 111' Pipe Mast

AT&T Mobility – LTE BWE

AT&T Site Ref: CT5144
Cromwell South

100 Berlin Road
Cromwell, CT

Centek Project No. 17004.35

Date: August 8, 2017

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
LICENSED
PROFESSIONAL ENGINEER

Prepared for:

AT&T Mobility
500 Enterprise Drive, Suite 3A
Rocky Hill, CT 06067

Table of Contents

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna installation proposed by AT&T on the existing 82-ft sign structure owned and operated by ATC, located in Cromwell, Connecticut.

The host structure is a 82-ft sign structure with a 111-ft pipe mast. The existing structure geometry, member sizes and foundation system were obtained from a previous structural design report prepared by Centek job no. 14033.019 dated October 31, 2014.

Antenna and appurtenance information were obtained from a previous structural design report prepared by American Tower Corp job no. 411261 May 22, 2017 dated May 22, 2017 and a AT&T RF data sheet.

The structure is made up of two (2) W24x68 vertical steel legs, one (1) HSS18x0.5 steel pipe mast, L5x5x5/16 horizontal and diagonal steel bracing and WT6x15 steel bracing.

Antenna and Appurtenance Summary

The existing structure was designed to support several communication antennas. The existing, proposed and future loads considered in this analysis consist of the following:

- T-MOBILE: (Existing to Remain)
  Antennas: Three (3) Ericsson AIR 21 B2A/B4P panel antennas, three (3) Ericsson AIR B4A/B12P-8 panel antennas, three (3) Ericsson RRUS-11 remote radio heads and three (3) Ericsson KRY-112 TMA's mounted on a low profile platform mounted with a RAD center elevation of 108-ft AGL.
  Coax Cables: Nineteen (19) 1-5/8" Ø coax cables, ten (10) within existing 111-ft pipe mast and nine (9) on the exterior of the pipe mast.
- Verizon (Existing):
  Antennas: Two (2) Antel LPA-80080-6CF panel antennas, three (3) Antel BXA-70063-6CF panel antennas, six (6) BXA-171085-12BF panel antennas, four (4) Decibel DB846F65ZAXY panel antennas, three (3) RRH's and one (1) main distribution box mounted on a low profile platform with a RAD center elevation of 83-ft AGL.
  Coax Cables: Eighteen (18) 1-5/8" Ø coax cables and one (1) 1-1/4" fiber cable run on the exterior of the existing sign structure.
- MetroPCS (Existing)
  Antennas: Three (3) RFS APXV18-206517S-C panel antennas mounted to the steel flanges (legs) of the existing sign structure with a RAD center elevation of 77-ft AGL.
  Coax Cable: Six (6) 1-5/8" ∅ coaxial cables vertically supported on the existing legs of the sign structure.
- T-MOBILE (Existing/Reserved)
  Antennas: One (1) VIC-100 GPS antenna on a side arm mounted to the leg of the sign structure with a RAD center elevation of 50-ft AGL.
  Coax Cables: One (1) 1/2" Ø coax cable run on the exterior of the existing sign structure.

- AT&T: (Existing to Remain)
  Antennas: Three (3) Powerwave 7770.00 panel antennas, three (3) CCI OPA-65R-LCUU-H6 panel antennas, twelve (12) Powerwave LPG21401 TMA's, three (3) Ericsson RRUS-11, three (3) Ericsson RRUS-32 and two (2) Raycap DC6-48-60-18-8F surge arrestors mounted on pipe mounts to the existing Verizon Wireless low profile platform with a RAD center elevation of 98-ft AGL.
  Coax Cables: Twelve (12) 1-5/8" Ø coax cables, two (2) fiber cable and four (4) dc control cables run on the exterior of existing sign structure.
- AT&T: (Existing to Remove)
  Antennas: Three (3) KMW AM-X-CD-16-65-00T panel antennas and three (3) Ericsson RRUS-11 mounted on pipe mounts to the existing Verizon Wireless low profile platform with a RAD center elevation of 98-ft AGL.
- **AT&T: (Proposed)**
  Antennas: Three (3) Quintel QS66512-2 panel antennas, three (3) Powerwave 7020 RETs and three (3) Ericsson RRUS-32 remote radio heads mounted on pipe mounts to the existing Verizon Wireless low profile platform with a RAD center elevation of 98-ft AGL.

Primary Assumptions Used in the Analysis

- The structure's theoretical capacity not including any assessment of the condition of the tower.
- The structure carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Structure is properly installed and maintained.
- Structure is in plumb condition.
- Structure loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original structure design documents or reinforcement drawings.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All structure members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.

Analysis

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower, and the model assumes that the tower members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (3-second gust) with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of TIA-222-G-2005 entitled "Structural Standard for Antenna Support Structures and Antennas", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC[1] and the wind speed data available in the TIA-222-G-2005 Standard.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 1.00" radial ice on the tower structure and its components.

Basic Wind Speed:	Cromwell; v = 97 mph	*[Appendix N of the 2016 CT Building Code]*
Load Cases:	Load Case 1; 97 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2016 CT Building Code]*
	Load Case 2; 50 mph wind speed w/ 0.75" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-G-2005]*

[1] The 2012 International Building Code as amended by the 2016 Connecticut State Building Code (CSBC).

Structure Capacity

Calculated stresses were found to be within allowable limits. In Load Case 4, per RISA-3D "Steel Code Checks", this structure was found to be at **84.0%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg 1	0'	84.0%	**PASS**

Foundation and Anchors

The existing foundation consists of an 55-ft long (approx) x 8.5-ft wide x 3-ft deep reinforced concrete strip footing with concrete column pedestals. The sub-grade conditions used in the analysis of the existing foundation were based on normal soil values as permitted by EIA/TIA-222-F Section 7.1.3. The base of the sign structure is connected to the foundation by means of (20) 1"∅, (assumed ASTM A-615-75) anchor bolts embedded into the existing concrete foundation. The base of the communications pipe structure is connected to the foundation by means of (10) 1.75"∅, ASTM A615-75 anchor bolts embedded into the existing concrete foundation.

- The foundation was found to be within allowable limits.

Foundation	Design Limit	Allowable Limit/FS	Proposed Loading	Result
Reinf. Conc. Pad w/ Pedestals	OTM	1.0	3.2	**PASS**

Note: *Minimum required Factor of Safety (FS) of 1.0 required per TIA-222-G section 9.4*

- The structure anchor bolts, base plate and flange plates were found to be within allowable limits.

Structure Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts (Mast)	Tension	9.3%	**PASS**
Base Plate (Mast)	Bending	8.2%	**PASS**
Flange Bolts	Tension	19.4%	**PASS**
Flange Plate	Bending	16.3%	**PASS**
Anchor Bolts (Leg)	Tension	61.9%	**PASS**

Conclusion

This analysis shows that the subject tower **is adequate** to support the proposed modified antenna configuration.

The analysis is based, in part, on the information provided to this office by AT&T. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the "as new" condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly ERITower and RISATower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

Development of Design Heights, Exposure Coefficients, and Velocity Pressures Per TIA-222-G

Wind Speeds

Basic Wind Speed	$V := 97$	mph	(User Input - 2016 CSBC Appendix N)
Basic Wind Speed with Ice	$V_i := 50$	mph	(User Input per Annex B of TIA-222-G)

Input

Structure Type =	Structure_Type := Pole		(User Input)	
Structure Category =	SC := II		(User Input)	
Exposure Category =	Exp := C		(User Input)	
Structure Height =	$h := 111$	ft	(User Input)	
Height to Center of T-Mo Antennas =	$z_{TMo} := 108$	ft	(User Input)	
Height to Center of AT&T Antennas =	$z_{ATT} := 98$	ft	(User Input)	
Height to Center of VZ Antennas =	$z_{VZ} := 83$	ft	(User Input)	
Height to Center of Metro Antennas =	$z_{Metro} := 77$	ft	(User Input)	
Height to Center of Mast =	$z_{Mast6} := 105$	ft	(User Input)	Mast Based on Max 20-ft Section per 2.6.9.1.3
Height to Center of Mast =	$z_{Mast5} := 90$	ft	(User Input)	
Height to Center of Mast =	$z_{Mast4} := 70$	ft	(User Input)	
Height to Center of Mast =	$z_{Mast3} := 50$	ft	(User Input)	
Height to Center of Mast =	$z_{Mast2} := 30$	ft	(User Input)	
Height to Center of Mast =	$z_{Mast1} := 10$	ft	(User Input)	
Radial Ice Thickness =	$t_i := 0.75$	in	(User Input per Annex B of TIA-222-G)	
Radial Ice Density =	$Id := 56.00$	pcf	(User Input)	
Topograpic Factor =	$K_{zt} := 1.0$		(User Input)	
	$K_a := 1.0$		(User Input)	
Gust Response Factor =	$G_H := 0.85$		(User Input)	

Output

Wind Direction Probability Factor =

$$K_d := \begin{cases} 0.95 & \text{if } Structure\_Type = Pole \\ 0.85 & \text{if } Structure\_Type = Lattice \end{cases} = 0.95$$

(Per Table 2-2 of TIA-222-G)

Importance Factors =

$$I_{Wind} := \begin{cases} 0.87 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.15 & \text{if } SC = 3 \end{cases} = 1$$

(Per Table 2-3 of TIA-222-G)

$$I_{Wind\_w\_Ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.00 & \text{if } SC = 3 \end{cases} = 1$$

$$I_{ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.25 & \text{if } SC = 3 \end{cases} = 1$$

$K_{iz} := \left(\frac{z_{TMo}}{33}\right)^{0.1} = 1.126$ $\quad t_{izTMo} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.689$

Velocity Pressure Coefficient Antennas = $Kz_{TMo} := 2.01\left(\left(\frac{z_{TMo}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.286$

Velocity Pressure w/o Ice Antennas = $qz_{TMo} := 0.00256 \cdot K_d \cdot Kz_{TMo} \cdot V^2 \cdot I_{Wind} = 29.434$

Velocity Pressure with Ice Antennas = $qz_{ice.TMo} := 0.00256 \cdot K_d \cdot Kz_{TMo} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 7.821$

$K_{iz} := \left(\frac{z_{ATT}}{33}\right)^{0.1} = 1.115$ $\quad t_{izATT} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.672$

Velocity Pressure Coefficient Antennas = $Kz_{ATT} := 2.01\left(\left(\frac{z_{ATT}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.26$

Velocity Pressure w/o Ice Antennas = $qz_{ATT} := 0.00256 \cdot K_d \cdot Kz_{ATT} \cdot V^2 \cdot I_{Wind} = 28.838$

Velocity Pressure with Ice Antennas = $qz_{ice.ATT} := 0.00256 \cdot K_d \cdot Kz_{ATT} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 7.662$

$K_{iz} := \left(\frac{z_{VZ}}{33}\right)^{0.1} = 1.097$ $\quad t_{izVZ} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.645$

Velocity Pressure Coefficient Antennas = $Kz_{VZ} := 2.01\left(\left(\frac{z_{VZ}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.217$

Velocity Pressure w/o Ice Antennas = $qz_{VZ} := 0.00256 \cdot K_d \cdot Kz_{VZ} \cdot V^2 \cdot I_{Wind} = 27.847$

Velocity Pressure with Ice Antennas = $qz_{ice.VZ} := 0.00256 \cdot K_d \cdot Kz_{VZ} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 7.399$

$K_{iz} := \left(\frac{z_{Metro}}{33}\right)^{0.1} = 1.088$ $\quad t_{izMetro} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.633$

Velocity Pressure Coefficient Antennas = $Kz_{Metro} := 2.01\left(\left(\frac{z_{Metro}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.198$

Velocity Pressure w/o Ice Antennas = $qz_{Metro} := 0.00256 \cdot K_d \cdot Kz_{Metro} \cdot V^2 \cdot I_{Wind} = 27.41$

Velocity Pressure with Ice Antennas = $qz_{ice.Metro} := 0.00256 \cdot K_d \cdot Kz_{Metro} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 7.283$

$K_{izMast6} := \left(\frac{z_{Mast6}}{33}\right)^{0.1} = 1.123$ $\quad t_{izMast6} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{izMast6} \cdot K_{zt}^{0.35} = 1.684$

Velocity Pressure Coefficient Mast = $Kz_{Mast6} := 2.01\left(\left(\frac{z_{Mast6}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.279$

Velocity Pressure w/o Ice Mast = $qz_{Mast6} := 0.00256 \cdot K_d \cdot Kz_{Mast6} \cdot V^2 \cdot I_{Wind} = 29.26$

Velocity Pressure with Ice Mast = $qz_{ice.Mast6} := 0.00256 \cdot K_d \cdot Kz_{Mast6} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 7.774$

$K_{izMast5} := \left(\frac{z_{Mast5}}{33}\right)^{0.1} = 1.106$ $t_{izMast5} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{izMast5} \cdot K_{zt}^{0.35} = 1.658$

Velocity Pressure Coefficient Mast = $Kz_{Mast5} := 2.01\left(\left(\frac{z_{Mast5}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.238$

Velocity Pressure w/o Ice Mast= $qz_{Mast5} := 0.00256 \cdot K_d \cdot Kz_{Mast5} \cdot V^2 \cdot I_{Wind} = 28.325$

Velocity Pressure with Ice Mast = $qz_{ice.Mast5} := 0.00256 \cdot K_d \cdot Kz_{Mast5} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 7.526$

$K_{izMast4} := \left(\frac{z_{Mast4}}{33}\right)^{0.1} = 1.078$ $t_{izMast4} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{izMast4} \cdot K_{zt}^{0.35} = 1.617$

Velocity Pressure Coefficient Mast = $Kz_{Mast4} := 2.01\left(\left(\frac{z_{Mast4}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.174$

Velocity Pressure w/o Ice Mast= $qz_{Mast4} := 0.00256 \cdot K_d \cdot Kz_{Mast4} \cdot V^2 \cdot I_{Wind} = 26.866$

Velocity Pressure with Ice Mast = $qz_{ice.Mast4} := 0.00256 \cdot K_d \cdot Kz_{Mast4} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 7.138$

$K_{izMast3} := \left(\frac{z_{Mast3}}{33}\right)^{0.1} = 1.042$ $t_{izMast3} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{izMast3} \cdot K_{zt}^{0.35} = 1.564$

Velocity Pressure Coefficient Mast = $Kz_{Mast3} := 2.01\left(\left(\frac{z_{Mast3}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.094$

Velocity Pressure w/o Ice Mast= $qz_{Mast3} := 0.00256 \cdot K_d \cdot Kz_{Mast3} \cdot V^2 \cdot I_{Wind} = 25.029$

Velocity Pressure with Ice Mast = $qz_{ice.Mast3} := 0.00256 \cdot K_d \cdot Kz_{Mast3} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 6.65$

$K_{izMast2} := \left(\frac{z_{Mast2}}{33}\right)^{0.1} = 0.991$ $t_{izMast2} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{izMast2} \cdot K_{zt}^{0.35} = 1.486$

Velocity Pressure Coefficient Mast = $Kz_{Mast2} := 2.01\left(\left(\frac{z_{Mast2}}{zg}\right)\right)^{\frac{2}{\alpha}} = 0.982$

Velocity Pressure w/o Ice Mast= $qz_{Mast2} := 0.00256 \cdot K_d \cdot Kz_{Mast2} \cdot V^2 \cdot I_{Wind} = 22.477$

Velocity Pressure with Ice Mast = $qz_{ice.Mast2} := 0.00256 \cdot K_d \cdot Kz_{Mast2} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 5.972$

$K_{izMast1} := \left(\frac{z_{Mast1}}{33}\right)^{0.1} = 0.887$ $t_{izMast1} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{izMast1} \cdot K_{zt}^{0.35} = 1.331$

Velocity Pressure Coefficient Mast = $Kz_{Mast1} := 2.01\left(\left(\frac{z_{Mast1}}{zg}\right)\right)^{\frac{2}{\alpha}} = 0.779$

Velocity Pressure w/o Ice Mast= $qz_{Mast1} := 0.00256 \cdot K_d \cdot Kz_{Mast1} \cdot V^2 \cdot I_{Wind} = 17.835$

Velocity Pressure with Ice Mast = $qz_{ice.Mast1} := 0.00256 \cdot K_d \cdot Kz_{Mast1} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 4.739$

Development of Wind & Ice Load on Mast

Mast Data: (HSS18x0.5) (User Input)

Mast Shape = Round (User Input)

Mast Diameter = $D_{mast} := 18$ in (User Input)

Mast Length = $L_{mast} := 111$ ft (User Input)

Mast Thickness = $t_{mast} := 0.465$ in (User Input)

Velocity Coefficient = $C := \sqrt{I \cdot Kz_{Mast1}} \cdot V \cdot \frac{D_{mast}}{12} = 128$

Mast Force Coefficient = $CF_{mast} = 0.6$

Wind Load (without ice)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 1.5$ sf/ft

Total Mast Wind Force = $qz_{Mast6} \cdot G_H \cdot CF_{mast} \cdot A_{mast} = 22$ plf

Total Mast Wind Force = $qz_{Mast5} \cdot G_H \cdot CF_{mast} \cdot A_{mast} = 22$ plf

Total Mast Wind Force = $qz_{Mast4} \cdot G_H \cdot CF_{mast} \cdot A_{mast} = 21$ plf

Total Mast Wind Force = $qz_{Mast3} \cdot G_H \cdot CF_{mast} \cdot A_{mast} = 19$ plf

Total Mast Wind Force = $qz_{Mast2} \cdot G_H \cdot CF_{mast} \cdot A_{mast} = 17$ plf

Total Mast Wind Force = $qz_{Mast1} \cdot G_H \cdot CF_{mast} \cdot A_{mast} = 14$ plf

Wind Load (with ice)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{izMast6})}{12} = 1.781$ sf/ft

Total Mast Wind Force w/ Ice = $qz_{ice.Mast6} \cdot G_H \cdot CF_{mast} \cdot AICE_{mast} = 7$ plf

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{izMast5})}{12} = 1.776$ sf/ft

Total Mast Wind Force w/ Ice = $qz_{ice.Mast5} \cdot G_H \cdot CF_{mast} \cdot AICE_{mast} = 7$ plf

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{izMast4})}{12} = 1.77$ sf/ft

Total Mast Wind Force w/ Ice = $qz_{ice.Mast4} \cdot G_H \cdot CF_{mast} \cdot AICE_{mast} = 6$ plf

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{izMast3})}{12} = 1.761$ sf/ft

Total Mast Wind Force w/ Ice = $qz_{ice.Mast3} \cdot G_H \cdot CF_{mast} \cdot AICE_{mast} = 6$ plf

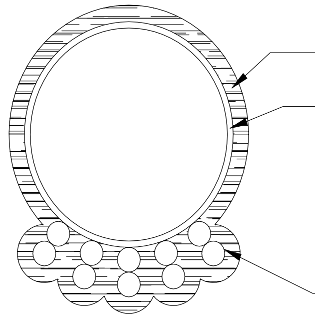
Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{izMast2})}{12} = 1.748$ sf/ft

Total Mast Wind Force w/ Ice = $qz_{ice.Mast2} \cdot G_H \cdot CF_{mast} \cdot AICE_{mast} = 5$ plf

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{izMast1})}{12} = 1.722$ sf/ft

Total Mast Wind Force w/ Ice = $qz_{ice.Mast1} \cdot G_H \cdot CF_{mast} \cdot AICE_{mast} = 4$ plf

Gravity Loads (ice only)



Ice Area per Linear Foot =	$Ai_{mast} := 151$	sq in
Weight of Ice on Mast =	$W_{ICEmast6} := Id \cdot \frac{Ai_{mast}}{144} = 59$	plf
Ice Area per Linear Foot =	$Ai_{mast} := 149$	sq in
Weight of Ice on Mast =	$W_{ICEmast5} := Id \cdot \frac{Ai_{mast}}{144} = 58$	plf
Ice Area per Linear Foot =	$Ai_{mast} := 146$	sq in
Weight of Ice on Mast =	$W_{ICEmast4} := Id \cdot \frac{Ai_{mast}}{144} = 57$	plf
Ice Area per Linear Foot =	$Ai_{mast} := 141$	sq in
Weight of Ice on Mast =	$W_{ICEmast3} := Id \cdot \frac{Ai_{mast}}{144} = 55$	plf
Ice Area per Linear Foot =	$Ai_{mast} := 136$	sq in
Weight of Ice on Mast =	$W_{ICEmast2} := Id \cdot \frac{Ai_{mast}}{144} = 53$	plf
Ice Area per Linear Foot =	$Ai_{mast} := 123$	sq in
Weight of Ice on Mast =	$W_{ICEmast1} := Id \cdot \frac{Ai_{mast}}{144} = 48$	plf

Development of Wind & Ice Load on Coax Cables

Coax Cable Data:

Coax Type =	HELIAX 1-5/8"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)
Coax Cable Length =	$L_{coax} := 110$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 19$		(User Input)
Total Number of Exterior Coax =	$Ne_{coax} := 10$		(User Input)
No. of Coax Projecting Outside Face of Mast =	$NP_{coax} := 2$		(User Input)

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 666.7$

Coax Cable Force Factor Coefficient = $Ca_{coax} = 1.2$

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 20$ plf

Wind Load (without ice)

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} D_{coax})}{12} = 0.3$ sf/ft

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast6} \cdot G_H \cdot A_{coax} = 10$ plf

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast5} \cdot G_H \cdot A_{coax} = 10$ plf

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast4} \cdot G_H \cdot A_{coax} = 9$ plf

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast3} \cdot G_H \cdot A_{coax} = 8$ plf

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast2} \cdot G_H \cdot A_{coax} = 8$ plf

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast1} \cdot G_H \cdot A_{coax} = 6$ plf

Wind Load (with ice)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast6})}{12} = 0.6$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast6} \cdot G_H \cdot AICE_{coax} = 5$ plf

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast5})}{12} = 0.6$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast5} \cdot G_H \cdot AICE_{coax} = 5$ plf

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast4})}{12} = 0.6$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast4} \cdot G_H \cdot AICE_{coax} = 4$ plf

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast3})}{12} = 0.6$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast3} \cdot G_H \cdot AICE_{coax} = 4$ plf

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast2})}{12} = 0.6$ sf/ft

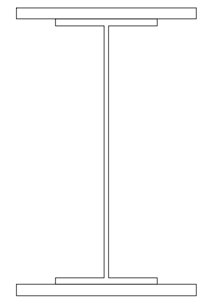
Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast2} \cdot G_H \cdot AICE_{coax} = 4$ plf

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast1})}{12} = 0.6$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast1} \cdot G_H \cdot AICE_{coax} = 3$ plf

Development of Wind & Ice Load on W24x68 w/ Plate Leg 1

W24x68 w/ Plate Data:



Shape =	Flat	
Depth =	$d := 25.75$	in
Length =	$L := 20$	ft
Flange Width =	$b_f := 16$	in
Flange Thickness =	$t_f := 1.585$	in
Web Thickness =	$t_w := .415$	in
Member Cross Sectional Area =	$A_{member} := 52.1$	in^2
Mast Force Coefficient =	$CF_{mem} := 1.4$	

Wind Load (without ice)

Wind Perpendicular to Flange:

Projected Surface Area =	$A_{Leg} := \frac{b_f}{12} = 1.333$	sf/ft
Total Leg Wind Force =	$qz_{Mast1} \cdot G_H \cdot CF_{mem} \cdot A_{Leg} = 28$	plf

Wind Perpendicular to Web:

Projected Surface Area =	$A_{Leg} := \frac{d}{12} = 2.146$	sf/ft
Total Leg Wind Force =	$qz_{Mast1} \cdot G_H \cdot CF_{mem} \cdot A_{Leg} = 46$	plf

Wind Load (with ice)

Wind Perpendicular to Flange:

Mast Projected Surface Area w/ Ice =	$AICE_{Leg} := \frac{\left(b_f + 2 \cdot t_{izMast1}\right)}{12} = 1.555$	sf/ft
Total Mast Wind Force w/ Ice =	$qz_{ice.Mast1} \cdot G_H \cdot CF_{mem} \cdot AICE_{Leg} = 9$	plf

Wind Perpendicular to Web:

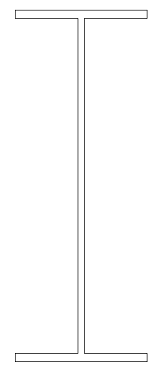
Mast Projected Surface Area w/ Ice =	$AICE_{Leg} := \frac{\left(d + 2 \cdot t_{izMast1}\right)}{12} = 2.368$	sf/ft
Total Mast Wind Force w/ Ice =	$qz_{ice.Mast1} \cdot G_H \cdot CF_{mem} \cdot AICE_{Leg} = 13$	plf

Gravity Loads (ice only)

Ice Area per Linear Foot =	$Ai_{Leg} := 343$	sq in
Weight of Ice on Leg =	$W_{ICELeg1} := Id \cdot \frac{Ai_{Leg}}{144} = 133$	plf

Development of Wind & Ice Load on W24x68 Leg 1

W24x68 Data:



Shape = Flat

Depth = $d := 23.75$ in

Length = $L := 20$ ft

Flange Width = $b_f := 9$ in

Flange Thickness = $t_f := 0.585$ in

Web Thickness= $t_w := .415$ in

Member Cross Sectional Area = $A_{member} := 20.1$ in^2

Mast Force Coefficient = $CF_{mem} := 1.4$

Wind Load (without ice)

Wind Perpendicular to Flange:

Projected Surface Area = $A_{Leg} := \frac{b_f}{12} = 0.75$ sf/ft

Total Leg Wind Force = $qz_{Mast4} \cdot G_H \cdot CF_{mem} \cdot A_{Leg} = 24$ plf

Total Leg Wind Force = $qz_{Mast3} \cdot G_H \cdot CF_{mem} \cdot A_{Leg} = 22$ plf

Total Leg Wind Force = $qz_{Mast2} \cdot G_H \cdot CF_{mem} \cdot A_{Leg} = 20$ plf

Wind Perpendicular to Web:

Projected Surface Area = $A_{Leg} := \frac{d}{12} = 1.979$ sf/ft

Total Leg Wind Force = $qz_{Mast4} \cdot G_H \cdot CF_{mem} \cdot A_{Leg} = 63$ plf plf

Total Leg Wind Force = $qz_{Mast3} \cdot G_H \cdot CF_{mem} \cdot A_{Leg} = 59$ plf

Total Leg Wind Force = $qz_{Mast2} \cdot G_H \cdot CF_{mem} \cdot A_{Leg} = 53$ plf

Wind Load (with ice)

Wind Perpendicular to Flange:

Mast Projected Surface Area w/ Ice = $AICE_{Leg} := \frac{\left(b_f + 2 \cdot t_{izMast4}\right)}{12} = 1.02$ sf/ft

Total Mast Wind Force w/ Ice = $qz_{ice.Mast4} \cdot G_H \cdot CF_{mem} \cdot AICE_{Leg} = 9$ plf

Mast Projected Surface Area w/ Ice = $AICE_{Leg} := \frac{\left(b_f + 2 \cdot t_{izMast3}\right)}{12} = 1.011$ sf/ft

Total Mast Wind Force w/ Ice = $qz_{ice.Mast3} \cdot G_H \cdot CF_{mem} \cdot AICE_{Leg} = 8$ plf

Mast Projected Surface Area w/ Ice = $AICE_{Leg} := \frac{\left(b_f + 2 \cdot t_{izMast2}\right)}{12} = 0.998$ sf/ft

Total Mast Wind Force w/ Ice = $qz_{ice.Mast2} \cdot G_H \cdot CF_{mem} \cdot AICE_{Leg} = 7$ plf

Wind Perpendicular to Web:

Mast Projected Surface Area w/ Ice =	$AICE_{Leg} := \frac{(d + 2 \cdot t_{izMast4})}{12} = 2.249$	sf/ft
Total Mast Wind Force w/ Ice =	$qz_{ice.Mast4} \cdot G_H \cdot CF_{mem} \cdot AICE_{Leg} = 19$	plf
Mast Projected Surface Area w/ Ice =	$AICE_{Leg} := \frac{(d + 2 \cdot t_{izMast3})}{12} = 2.24$	sf/ft
Total Mast Wind Force w/ Ice =	$qz_{ice.Mast3} \cdot G_H \cdot CF_{mem} \cdot AICE_{Leg} = 18$	plf
Mast Projected Surface Area w/ Ice =	$AICE_{Leg} := \frac{(d + 2 \cdot t_{izMast2})}{12} = 2.227$	sf/ft
Total Mast Wind Force w/ Ice =	$qz_{ice.Mast2} \cdot G_H \cdot CF_{mem} \cdot AICE_{Leg} = 16$	plf

Gravity Loads (ice only)

Ice Area per Linear Foot =	$Ai_{Leg} := 402$	sq in
Weight of Ice on Leg =	$W_{ICELeg4} := Id \cdot \frac{Ai_{Leg}}{144} = 156$	plf
Ice Area per Linear Foot =	$Ai_{Ai.Legmast} := 396$	sq in
Weight of Ice on Leg =	$W_{ICELeg3} := Id \cdot \frac{Ai_{Leg}}{144} = 156$	plf
Ice Area per Linear Foot =	$Ai_{Leg} := 390$	sq in
Weight of Ice on Leg =	$W_{ICELeg2} := Id \cdot \frac{Ai_{Leg}}{144} = 152$	plf

Development of Wind & Ice Load on Coax Cables

Coax Cable Data:

Coax Type =	HELIAX 1-5/8"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)
Coax Cable Length =	$L_{coax} := 80$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 33$		(User Input)
Total Number of Exterior Coax =	$Ne_{coax} := 33$		(User Input)
No. of Coax Projecting Prep to Flange =	$NPF_{coax} := 5$		(User Input)
No. of Coax Projecting Prep to Web =	$NPW_{coax} := 2$		(User Input)

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 484.8$

Coax Cable Force Factor Coefficient = $Ca_{coax} = 1.2$

Gravity Loads (without ice)

Weight of all cables w/o ice: $WT_{coax} := Wt_{coax} \cdot N_{coax} = 34$ plf

Wind Load (without ice)

Wind Perpendicular to Flange:

Coax projected surface area = $A_{coax} := \frac{(NPF_{coax} D_{coax})}{12} = 0.8$ sf/ft

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast4} \cdot G_H \cdot A_{coax} = 23$ plf

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast3} \cdot G_H \cdot A_{coax} = 21$ plf

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast2} \cdot G_H \cdot A_{coax} = 19$ plf

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast1} \cdot G_H \cdot A_{coax} = 15$ plf

Wind Perpendicular to Web:

Coax projected surface area = $A_{coax} := \frac{(NPW_{coax} D_{coax})}{12} = 0.3$ sf/ft

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast4} \cdot G_H \cdot A_{coax} = 9$ plf

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast3} \cdot G_H \cdot A_{coax} = 8$ plf

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast2} \cdot G_H \cdot A_{coax} = 8$ plf

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast1} \cdot G_H \cdot A_{coax} = 6$ plf

Wind Load (with ice)

Wind Perpendicular to Flange:

Coax projected surface area w/ Ice =	$AICE_{coax} := \frac{(NPF_{coax} \cdot D_{coax} + 2 \cdot t_{izMast4})}{12} = 1.1$	sf/ft
Total Coax Wind Force w/ Ice =	$Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast4} \cdot G_H \cdot AICE_{coax} = 8$	plf
Coax projected surface area w/ Ice =	$AICE_{coax} := \frac{(NPF_{coax} \cdot D_{coax} + 2 \cdot t_{izMast3})}{12} = 1.1$	sf/ft
Total Coax Wind Force w/ Ice =	$Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast3} \cdot G_H \cdot AICE_{coax} = 7$	plf
Coax projected surface area w/ Ice =	$AICE_{coax} := \frac{(NPF_{coax} \cdot D_{coax} + 2 \cdot t_{izMast2})}{12} = 1.1$	sf/ft
Total Coax Wind Force w/ Ice =	$Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast2} \cdot G_H \cdot AICE_{coax} = 7$	plf
Coax projected surface area w/ Ice =	$AICE_{coax} := \frac{(NPF_{coax} \cdot D_{coax} + 2 \cdot t_{izMast1})}{12} = 1$	sf/ft
Total Coax Wind Force w/ Ice =	$Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast1} \cdot G_H \cdot AICE_{coax} = 5$	plf

Wind Perpendicular to Web:

Coax projected surface area w/ Ice =	$AICE_{coax} := \frac{(NPW_{coax} \cdot D_{coax} + 2 \cdot t_{izMast4})}{12} = 0.6$	sf/ft
Total Coax Wind Force w/ Ice =	$Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast4} \cdot G_H \cdot AICE_{coax} = 4$	plf
Coax projected surface area w/ Ice =	$AICE_{coax} := \frac{(NPW_{coax} \cdot D_{coax} + 2 \cdot t_{izMast3})}{12} = 0.6$	sf/ft
Total Coax Wind Force w/ Ice =	$Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast3} \cdot G_H \cdot AICE_{coax} = 4$	plf
Coax projected surface area w/ Ice =	$AICE_{coax} := \frac{(NPW_{coax} \cdot D_{coax} + 2 \cdot t_{izMast2})}{12} = 0.6$	sf/ft
Total Coax Wind Force w/ Ice =	$Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast2} \cdot G_H \cdot AICE_{coax} = 4$	plf
Coax projected surface area w/ Ice =	$AICE_{coax} := \frac{(NPW_{coax} \cdot D_{coax} + 2 \cdot t_{izMast1})}{12} = 0.6$	sf/ft
Total Coax Wind Force w/ Ice =	$Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast1} \cdot G_H \cdot AICE_{coax} = 3$	plf

Development of Wind & Ice Load on Coax Cables Leg 2

Coax Cable Data:

Coax Type =	HELIAX 1-5/8"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)
Coax Cable Length =	$L_{coax} := 80$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 4$		(User Input)
Total Number of Exterior Coax =	$Ne_{coax} := 4$		(User Input)
No. of Coax Projecting Prep to Flange =	$NPF_{coax} := 0$		(User Input)
No. of Coax Projecting Prep to Web =	$NPW_{coax} := 0$		(User Input)

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 484.8$

Coax Cable Force Factor Coefficient = $Ca_{coax} = 1.2$

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 4$ plf

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{Leg} := 166$ sq in

Weight of Ice on Leg = $W_{ICELeg4} := Id \cdot \frac{Ai_{Leg}}{144} = 65$ plf

Ice Area per Linear Foot = $Ai_{Leg} := 160$ sq in

Weight of Ice on Leg = $W_{ICELeg3} := Id \cdot \frac{Ai_{Leg}}{144} = 62$ plf

Ice Area per Linear Foot = $Ai_{Leg} := 153$ sq in

Weight of Ice on Leg = $W_{ICELeg2} := Id \cdot \frac{Ai_{Leg}}{144} = 60$ plf

Ice Area per Linear Foot = $Ai_{Leg} := 179$ sq in

Weight of Ice on Leg = $W_{ICELeg1} := Id \cdot \frac{Ai_{Leg}}{144} = 70$ plf

Development of Wind & Ice Load on WT 6x15

Data:

Shape =	Flat	
Depth =	$d := 6.17$	in
Length =	$L := 10$	ft
Flange Width =	$b_f := 6.52$	in
Flange Thickness =	$t_f := 0.44$	in
Web Thickness =	$t_w := 0.26$	in
Member Cross Sectional Area =	$A_{member} := 4.4$	in^2
Force Coefficient =	$CF_{mem} := 2$	

Wind Load (without ice)

Projected Surface Area = $A_{mem} := \frac{b_f}{12} = 0.543$ sf/ft

Total Wind Force = $qz_{Mast3} \cdot G_H \cdot CF_{mem} \cdot A_{mem} = 23$ plf

Wind Load (with ice)

Projected Surface Area w/ Ice = $AICE_{mem} := \frac{(b_f + 2 \cdot t_{izMast3})}{12} = 0.804$ sf/ft

Total Wind Force w/ Ice = $qz_{ice.Mast3} \cdot G_H \cdot CF_{mem} \cdot AICE_{mem} = 9$ plf

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mem} := 49.2$ sq in

Weight of Ice = $W_{ICEmem} := Id \cdot \frac{Ai_{mem}}{144} = 19$ plf

Development of Wind & Ice Load on L5x5x5/16

Data:

Shape =	Flat	
Length =	$L := 32$	ft
Width =	$b_f := 5$	in
Thickness =	$t_f := 0.3125$	in
Member Cross Sectional Area =	$A_{member} := 3.03$	in^2
Force Coefficient =	$CF_{mem} := 2$	

Wind Load (without ice)

Projected Surface Area =	$A_{mem} := \frac{b_f}{12} = 0.417$	sf/ft
Total Wind Force =	$qz_{Mast3} \cdot G_H \cdot CF_{mem} \cdot A_{mem} = 18$	plf

Wind Load (with ice)

Projected Surface Area w/ Ice =	$AICE_{mem} := \frac{(b_f + 2 \cdot t_{izMast3})}{12} = 0.677$	sf/ft
Total Wind Force w/ Ice =	$qz_{ice.Mast3} \cdot G_H \cdot CF_{mem} \cdot AICE_{mem} = 8$	plf

Gravity Loads (ice only)

Ice Area per Linear Foot =	$Ai_{mem} := 40.9$	sq in
Weight of Ice =	$W_{ICEmem} := Id \cdot \frac{Ai_{mem}}{144} = 16$	plf

Development of Wind & Ice Load on L3.5x3.5x5/16

Data:

Shape =	Flat	
Length =	$L := 20$	ft
Width =	$b_f := 3.5$	in
Thickness =	$t_f := 0.3125$	in
Member Cross Sectional Area =	$A_{member} := 2.09$	in^2
Force Coefficient =	$CF_{mem} := 2$	

Wind Load (without ice)

Projected Surface Area =	$A_{mem} := \frac{b_f}{12} = 0.292$	sf/ft
Total Wind Force =	$qz_{Mast3} \cdot G_H \cdot CF_{mem} \cdot A_{mem} = 12$	plf

Wind Load (with ice)

Projected Surface Area w/ Ice =	$AICE_{mem} := \frac{\left(b_f + 2 \cdot t_{izMast3}\right)}{12} = 0.552$	sf/ft
Total Wind Force w/ Ice =	$qz_{ice.Mast3} \cdot G_H \cdot CF_{mem} \cdot AICE_{mem} = 6$	plf

Gravity Loads (ice only)

Ice Area per Linear Foot =	$Ai_{mem} := 31.5$	sq in
Weight of Ice =	$W_{ICEmem} := Id \cdot \frac{Ai_{mem}}{144} = 12$	plf

Development of Wind & Ice Load on Antennas — T-Mobile

Antenna Data:

Antenna Model =	Ericsson AIR21 B4A/B12P-8	
Antenna Shape =	Flat	
Antenna Height =	$L_{ant} := 96$	in
Antenna Width =	$W_{ant} := 12.1$	in
Antenna Thickness =	$T_{ant} := 8.7$	in
Antenna Weight =	$WT_{ant} := 126$	lbs
Number of Antennas =	$N_{ant} := 3$	
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 7.9$	
Antenna Force Coefficient =	$Ca_{ant} = 1.43$	

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 8.1$	sf
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 24.2$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{TMo} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 866$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izTMo}) \cdot (W_{ant} + 2 \cdot t_{izTMo})}{144} = 10.7$	sf
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 32$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.TMo} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 305$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 378$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1 \times 10^4$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{izTMo})(W_{ant} + 2 \cdot t_{izTMo}) \cdot (T_{ant} + 2 \cdot t_{izTMo}) - V_{ant} = 8471$	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 275$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 824$	lbs

Development of Wind & Ice Load on Antennas T-Mobile

Antenna Data:

Antenna Model =	Ericsson AIR 21 B2A/B4P	
Antenna Shape =	Flat	
Antenna Height =	$L_{ant} := 56$	in
Antenna Width =	$W_{ant} := 12$	in
Antenna Thickness =	$T_{ant} := 7.9$	in
Antenna Weight =	$WT_{ant} := 95$	lbs
Number of Antennas =	$N_{ant} := 3$	
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.7$	
Antenna Force Coefficient =	$Ca_{ant} = 1.3$	

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.7$	sf
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 14$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{TMo} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 454$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izTMo}) \cdot (W_{ant} + 2 \cdot t_{izTMo})}{144} = 6.3$	sf
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 19$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.TMo} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 164$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 285$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5309$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{izTMo})(W_{ant} + 2 \cdot t_{izTMo}) \cdot (T_{ant} + 2 \cdot t_{izTMo}) - V_{ant} = 4989$	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 162$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 485$	lbs

Development of Wind & Ice Load on RRU T-Mobile

RRU Data:

RRU Model = Ericsson RRUS-11

RRU Shape = Flat

RRU Height = $L_{RRU} := 17.8$ in

RRU Width = $W_{RRU} := 17.3$ in

RRU Thickness = $T_{RRU} := 7.2$ in

RRU Weight = $WT_{RRU} := 50$ lbs

Number of RRU's = $N_{RRU} := 3$

RRU Aspect Ratio = $Ar_{RRU} := \frac{L_{RRU}}{W_{RRU}} = 1.0$

RRU Force Coefficient = $Ca_{RRU} = 1.2$

Wind Load (without ice)

Surface Area for One RRU = $SA_{RRU} := \frac{L_{RRU} \cdot W_{RRU}}{144} = 2.1$ sf

RRU Projected Surface Area = $A_{RRU} := SA_{RRU} \cdot N_{RRU} = 6.4$ sf

Total RRU Wind Force = $F_{RRU} := qz_{TMo} \cdot G_H \cdot Ca_{RRU} \cdot K_a \cdot A_{RRU} = 193$ lbs

Wind Load (with ice)

Surface Area for One RRU w/ Ice = $SA_{ICERRU} := \frac{\left(L_{RRU} + 2 \cdot t_{izTMo}\right) \cdot \left(W_{RRU} + 2 \cdot t_{izTMo}\right)}{144} = 3$ sf

RRU Projected Surface Area w/ Ice = $A_{ICERRU} := SA_{ICERRU} \cdot N_{RRU} = 9.1$ sf

Total RRU Wind Force w/ Ice = $Fi_{RRU} := qz_{ice.TMo} \cdot G_H \cdot Ca_{RRU} \cdot K_a \cdot A_{ICERRU} = 73$ lbs

Gravity Load (without ice)

Weight of All RRUs = $WT_{RRU} \cdot N_{RRU} = 150$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each RRU = $V_{RRU} := L_{RRU} \cdot W_{RRU} \cdot T_{RRU} = 2217$ cu in

Volume of Ice on Each RRU = $V_{ice} := \left(L_{RRU} + 2 \cdot t_{izTMo}\right)\left(W_{RRU} + 2 \cdot t_{izTMo}\right) \cdot \left(T_{RRU} + 2 \cdot t_{izTMo}\right) - V_{RRU} = 2415$

Weight of Ice on Each RRU = $W_{ICERRU} := \frac{V_{ice}}{1728} \cdot Id = 78$ lbs

Weight of Ice on All RRUs = $W_{ICERRU} \cdot N_{RRU} = 235$ lbs

Development of Wind & Ice Load on TMA T-Mobile

TMA Data:

TMA Model = Ericsson KRY112-71

TMA Shape = Flat

TMA Height = $L_{TMA} := 12.5$ in

TMA Width = $W_{TMA} := 5.6$ in

TMA Thickness = $T_{TMA} := 3.7$ in

TMA Weight = $WT_{TMA} := 13$ lbs

Number of TMA's = $N_{TMA} := 3$

TMA Aspect Ratio = $Ar_{TMA} := \frac{L_{TMA}}{W_{TMA}} = 2.2$

TMA Force Coefficient = $Ca_{TMA} = 1.2$

Wind Load (without ice)

Surface Area for One TMA = $SA_{TMA} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 0.5$ sf

TMA Projected Surface Area = $A_{TMA} := SA_{TMA} \cdot N_{TMA} = 1.5$ sf

Total TMA Wind Force = $F_{TMA} := qz_{TMo} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot A_{TMA} = 44$ lbs

Wind Load (with ice)

Surface Area for One TMA w/ Ice = $SA_{ICETMA} := \frac{(L_{TMA} + 2 \cdot t_{izTMo}) \cdot (W_{TMA} + 2 \cdot t_{izTMo})}{144} = 1$ sf

TMA Projected Surface Area w/ Ice = $A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 3$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA} := qz_{ice.TMo} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot A_{ICETMA} = 24$ lbs

Gravity Load (without ice)

Weight of All TMAs = $WT_{TMA} \cdot N_{TMA} = 39$ lbs

Gravity Loads (ice only)

Volume of Each TMA = $V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 259$ cu in

Volume of Ice on Each TMA = $V_{ice} := (L_{TMA} + 2 \cdot t_{izTMo})(W_{TMA} + 2 \cdot t_{izTMo}) \cdot (T_{TMA} + 2 \cdot t_{izTMo}) - V_{TMA} = 750$

Weight of Ice on Each TMA = $W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 24$ lbs

Weight of Ice on All TMAs = $W_{ICETMA} \cdot N_{TMA} = 73$ lbs

Development of Wind & Ice Load on Antenna Mounts

T-Mobile

Mount Data:

Mount Type:	13' Low Profile Platform		
Mount Shape =	Flat		(User Input)
Mount Projected Surface Area =	$CaAa := 15.7$	sf	(User Input)
Mount Projected Surface Area w/ Ice =	$CaAa_{ice} := 20.1$	sf	(User Input)
Mount Weight =	$WT_{mnt} := 1300$	lbs	(User Input)
Mount Weight w/ Ice =	$WT_{mnt.ice} := 1900$	lbs	

Wind Load (without ice)

Total Mount Wind Force = $F_{mnt} := qz_{TMo} \cdot G_H \cdot CaAa = 393$ lbs

Wind Load (with ice)

Total Mount Wind Force = $Fi_{mnt} := qz_{ice.TMo} \cdot G_H \cdot CaAa_{ice} = 134$ lbs

Gravity Loads (without ice)

Weight of All Mounts = $WT_{mnt} = 1300$ lbs

Gravity Loads (ice only)

Weight of Ice on All Mounts = $WT_{mnt.ice} - WT_{mnt} = 600$ lbs

Development of Wind & Ice Load on Antennas

AT&T

Antenna Data:

Antenna Model = Powerwave 7770

Antenna Shape = Flat

Antenna Height = $L_{ant} := 55$ in

Antenna Width = $W_{ant} := 11$ in

Antenna Thickness = $T_{ant} := 5$ in

Antenna Weight = $WT_{ant} := 35$ lbs

Number of Antennas = $N_{ant} := 3$

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 5.0$

Antenna Force Coefficient = $Ca_{ant} = 1.31$

Wind Load (without ice)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.2$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 12.6$ sf

Total Antenna Wind Force = $F_{ant} := qz_{ATT} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 405$ lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izATT}) \cdot (W_{ant} + 2 \cdot t_{izATT})}{144} = 5.8$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 17.4$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.ATT} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 149$ lbs

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 105$ lbs

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 3025$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{izATT})(W_{ant} + 2 \cdot t_{izATT}) \cdot (T_{ant} + 2 \cdot t_{izATT}) - V_{ant} = 3959$

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 128$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 385$ lbs

Development of Wind & Ice Load on Antennas AT&T

Antenna Data:

Antenna Model =	CCI OPA-65R-LCUU-H6	
Antenna Shape =	Flat	
Antenna Height =	$L_{ant} := 72$	in
Antenna Width =	$W_{ant} := 14.8$	in
Antenna Thickness =	$T_{ant} := 7.4$	in
Antenna Weight =	$WT_{ant} := 73$	lbs
Number of Antennas =	$N_{ant} := 3$	
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.9$	
Antenna Force Coefficient =	$Ca_{ant} = 1.31$	

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 7.4$	sf
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 22.2$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{ATT} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 710$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izATT}) \cdot (W_{ant} + 2 \cdot t_{izATT})}{144} = 9.5$	sf
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 28.5$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.ATT} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 242$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 219$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 7885$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{izATT})(W_{ant} + 2 \cdot t_{izATT}) \cdot (T_{ant} + 2 \cdot t_{izATT}) - V_{ant} = 6804$	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 221$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 662$	lbs

Development of Wind & Ice Load on Antennas AT&T

Antenna Data:

Antenna Model = Quintel QS66512-2

Antenna Shape = Flat

Antenna Height = $L_{ant} := 72$ in

Antenna Width = $W_{ant} := 12$ in

Antenna Thickness = $T_{ant} := 9.6$ in

Antenna Weight = $WT_{ant} := 111$ lbs

Number of Antennas = $N_{ant} := 3$

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 6.0$

Antenna Force Coefficient = $Ca_{ant} = 1.36$

Wind Load (without ice)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 6$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 18$ sf

Total Antenna Wind Force = $F_{ant} := qz_{ATT} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 598$ lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izATT}) \cdot (W_{ant} + 2 \cdot t_{izATT})}{144} = 8$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 24.1$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.ATT} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 213$ lbs

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 333$ lbs

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 8294$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{izATT})(W_{ant} + 2 \cdot t_{izATT}) \cdot (T_{ant} + 2 \cdot t_{izATT}) - V_{ant} = 6672$

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 216$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 649$ lbs

Development of Wind & Ice Load on TMA AT&T

TMA Data:

TMA Model = Powerwave LGP214

TMA Shape = Flat

TMA Height = $L_{TMA} := 14.4$ in

TMA Width = $W_{TMA} := 9.2$ in

TMA Thickness = $T_{TMA} := 2.6$ in

TMA Weight = $WT_{TMA} := 14.1$ lbs

Number of TMA's = $N_{TMA} := 12$

TMA Aspect Ratio = $Ar_{TMA} := \frac{L_{TMA}}{W_{TMA}} = 1.6$

TMA Force Coefficient = $Ca_{TMA} = 1.2$

Wind Load (without ice)

Surface Area for One TMA = $SA_{TMA} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 0.9$ sf

TMA Projected Surface Area = $A_{TMA} := SA_{TMA} \cdot N_{TMA} = 11$ sf

Total TMA Wind Force = $F_{TMA} := qz_{ATT} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot A_{TMA} = 325$ lbs

Wind Load (with ice)

Surface Area for One TMA w/ Ice = $SA_{ICETMA} := \frac{(L_{TMA} + 2 \cdot t_{izATT}) \cdot (W_{TMA} + 2 \cdot t_{izATT})}{144} = 1.5$ sf

TMA Projected Surface Area w/ Ice = $A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 18.6$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA} := qz_{ice.ATT} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot A_{ICETMA} = 145$ lbs

Gravity Load (without ice)

Weight of All TMAs = $WT_{TMA} \cdot N_{TMA} = 169$ lbs

Gravity Loads (ice only)

Volume of Each TMA = $V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 344$ cu in

Volume of Ice on Each TMA = $V_{ice} := (L_{TMA} + 2 \cdot t_{izATT})(W_{TMA} + 2 \cdot t_{izATT}) \cdot (T_{TMA} + 2 \cdot t_{izATT}) - V_{TMA} = 979$

Weight of Ice on Each TMA = $W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 32$ lbs

Weight of Ice on All TMAs = $W_{ICETMA} \cdot N_{TMA} = 381$ lbs

Development of Wind & Ice Load on RRU

AT&T

RRU Data:

RRU Model =	Ericsson RRUS-11	
RRU Shape =	Flat	
RRU Height =	$L_{RRU} := 17.8$	in
RRU Width =	$W_{RRU} := 17.3$	in
RRU Thickness =	$T_{RRU} := 7.2$	in
RRU Weight =	$WT_{RRU} := 50$	lbs
Number of RRU's =	$N_{RRU} := 3$	
RRU Aspect Ratio =	$Ar_{RRU} := \frac{L_{RRU}}{W_{RRU}} = 1.0$	
RRU Force Coefficient =	$Ca_{RRU} = 1.2$	

Wind Load (without ice)

Surface Area for One RRU =	$SA_{RRU} := \frac{L_{RRU} \cdot W_{RRU}}{144} = 2.1$	sf
RRU Projected Surface Area =	$A_{RRU} := SA_{RRU} \cdot N_{RRU} = 6.4$	sf
Total RRU Wind Force =	$F_{RRU} := qz_{ATT} \cdot G_H \cdot Ca_{RRU} \cdot K_a \cdot A_{RRU} = 189$	lbs

Wind Load (with ice)

Surface Area for One RRU w/ Ice =	$SA_{ICERRU} := \frac{(L_{RRU} + 2 \cdot t_{izATT}) \cdot (W_{RRU} + 2 \cdot t_{izATT})}{144} = 3$	sf
RRU Projected Surface Area w/ Ice =	$A_{ICERRU} := SA_{ICERRU} \cdot N_{RRU} = 9.1$	sf
Total RRU Wind Force w/ Ice =	$Fi_{RRU} := qz_{ice.ATT} \cdot G_H \cdot Ca_{RRU} \cdot K_a \cdot A_{ICERRU} = 71$	lbs

Gravity Load (without ice)

Weight of All RRUs =	$WT_{RRU} \cdot N_{RRU} = 150$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each RRU =	$V_{RRU} := L_{RRU} \cdot W_{RRU} \cdot T_{RRU} = 2217$	cu in
Volume of Ice on Each RRU =	$V_{ice} := (L_{RRU} + 2 \cdot t_{izATT})(W_{RRU} + 2 \cdot t_{izATT}) \cdot (T_{RRU} + 2 \cdot t_{izATT}) - V_{RRU} = 2386$	
Weight of Ice on Each RRU =	$W_{ICERRU} := \frac{V_{ice}}{1728} \cdot Id = 77$	lbs
Weight of Ice on All RRUs =	$W_{ICERRU} \cdot N_{RRU} = 232$	lbs

Development of Wind & Ice Load on RRU AT&T

RRU Data:

RRU Model = Ericsson RRUS-32

RRU Shape = Flat

RRU Height = $L_{RRU} := 26.7$ in

RRU Width = $W_{RRU} := 12.1$ in

RRU Thickness = $T_{RRU} := 6.7$ in

RRU Weight = $WT_{RRU} := 60$ lbs

Number of RRU's = $N_{RRU} := 6$

RRU Aspect Ratio = $Ar_{RRU} := \frac{L_{RRU}}{W_{RRU}} = 2.2$

RRU Force Coefficient = $Ca_{RRU} = 1.2$

Wind Load (without ice)

Surface Area for One RRU = $SA_{RRU} := \frac{L_{RRU} \cdot W_{RRU}}{144} = 2.2$ sf

RRU Projected Surface Area = $A_{RRU} := SA_{RRU} \cdot N_{RRU} = 13.5$ sf

Total RRU Wind Force = $F_{RRU} := qz_{ATT} \cdot G_H \cdot Ca_{RRU} \cdot K_a \cdot A_{RRU} = 396$ lbs

Wind Load (with ice)

Surface Area for One RRU w/ Ice = $SA_{ICERRU} := \frac{(L_{RRU} + 2 \cdot t_{izATT}) \cdot (W_{RRU} + 2 \cdot t_{izATT})}{144} = 3.2$ sf

RRU Projected Surface Area w/ Ice = $A_{ICERRU} := SA_{ICERRU} \cdot N_{RRU} = 19.3$ sf

Total RRU Wind Force w/ Ice = $Fi_{RRU} := qz_{ice.ATT} \cdot G_H \cdot Ca_{RRU} \cdot K_a \cdot A_{ICERRU} = 151$ lbs

Gravity Load (without ice)

Weight of All RRUs = $WT_{RRU} \cdot N_{RRU} = 360$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each RRU = $V_{RRU} := L_{RRU} \cdot W_{RRU} \cdot T_{RRU} = 2165$ cu in

Volume of Ice on Each RRU = $V_{ice} := (L_{RRU} + 2 \cdot t_{izATT})(W_{RRU} + 2 \cdot t_{izATT}) \cdot (T_{RRU} + 2 \cdot t_{izATT}) - V_{RRU} = 2497$

Weight of Ice on Each RRU = $W_{ICERRU} := \frac{V_{ice}}{1728} \cdot Id = 81$ lbs

Weight of Ice on All RRUs = $W_{ICERRU} \cdot N_{RRU} = 485$ lbs

Development of Wind & Ice Load on Antenna Mounts

AT&T

Mount Data:

Mount Type:	4" Φ Pipes	
Mount Shape =	Round	
Pipe Mount Length =	$L_{mnt} := 120$	in
Exposed Pipe Mount Length =	$L_{exp.mnt} := 65$	(Antennas shield top 55" of pipe)
4 inch Pipe Mount Linear Weight =	$W_{mnt} := 10.8$	plf
Pipe Mount Outside Diameter =	$D_{mnt} := 4.5$	in
Number of Mounting Pipes =	$N_{mnt} := 12$	
Mount Aspect Ratio =	$Ar_{mnt} := \frac{L_{mnt}}{D_{mnt}} = 27$	
Mount Force Factor =	$Ca_{mnt} = 1.2$	

Wind Load (without ice)

Surface Area for One Mount =	$SA_{mnt} := \frac{D_{mnt} \cdot L_{exp.mnt}}{144} = 2.031$	sf
Mount Projected Surface Area =	$A_{mnt} := SA_{mnt} \cdot N_{mnt} = 24.375$	sf
Total Mount Wind Force =	$F_{mnt} := qz_{ATT} \cdot G_H \cdot CaAa = 385$	lbs

Wind Load (with ice)

Surface Area for One Mount w/ Ice =	$SA_{ICEmnt} := \frac{(D_{mnt} + 2 \cdot t_{izATT}) \cdot L_{exp.mnt}}{144} = 3.541$	sf
Mount Projected Surface Area w/ Ice =	$A_{ICEmnt} := SA_{ICEmnt} \cdot N_{mnt} = 42.494$	sf
Total Mount Wind Force =	$Fi_{mnt} := qz_{ice.ATT} \cdot G_H \cdot CaAa_{ice} = 131$	lbs

Gravity Loads (without ice)

Weight Each Pipe Mount =	$WT_{mnt} := W_{mnt} \cdot \frac{L_{mnt}}{12} = 108$	lbs
Weight of All Mounts =	$WT_{mnt} = 108$	lbs

Gravity Loads (ice only)

Volume of Each Pipe =	$V_{mnt} := \frac{\pi}{4} \cdot D_{mnt}^{2} \cdot L_{mnt} = 1909$	cu in
Volume of Ice on Each Pipe =	$V_{ice} := \left[\frac{\pi}{4} \cdot \left[(D_{mnt} + t_{izATT})^2\right] \cdot (L_{mnt} + t_{izATT})\right] - V_{mnt} = 2 \times 10^3$	
Weight of Ice each mount (incl, hardware) =	$W_{ICEmnt} := \frac{V_{ice}}{1728} \cdot Id = 56$	lbs
Weight of Ice on All Mounts =	$WT_{mnt.ice} - WT_{mnt} = 1792$	lbs

Development of Wind & Ice Load on Antennas Verizon

Antenna Data:

Antenna Model =	Antel BXA-70063/6CF	
Antenna Shape =	Flat	
Antenna Height =	$L_{ant} := 71.0$	in
Antenna Width =	$W_{ant} := 11.2$	in
Antenna Thickness =	$T_{ant} := 4.5$	in
Antenna Weight =	$WT_{ant} := 17.0$	lbs
Number of Antennas =	$N_{ant} := 3$	
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 6.3$	
Antenna Force Coefficient =	$Ca_{ant} = 1.37$	

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5.5$	sf
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 16.6$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 537$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ})}{144} = 7.5$	sf
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 22.4$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 193$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 51$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 3578$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{izVZ})(W_{ant} + 2 \cdot t_{izVZ}) \cdot (T_{ant} + 2 \cdot t_{izVZ}) - V_{ant} = 4807$	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 156$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 467$	lbs

Development of Wind & Ice Load on Antennas Verizon

Antenna Data:

Antenna Model =	Antel BXA-171085-12BF	
Antenna Shape =	Flat	
Antenna Height =	$L_{ant} := 71.7$	in
Antenna Width =	$W_{ant} := 6.1$	in
Antenna Thickness =	$T_{ant} := 4.1$	in
Antenna Weight =	$WT_{ant} := 15$	lbs
Number of Antennas =	$N_{ant} := 6$	
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 11.8$	
Antenna Force Coefficient =	$Ca_{ant} = 1.56$	

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 3$	sf
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 18.2$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 672$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ})}{144} = 4.9$	sf
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 29.3$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 288$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 90$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1793$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{izVZ})(W_{ant} + 2 \cdot t_{izVZ}) \cdot (T_{ant} + 2 \cdot t_{izVZ}) - V_{ant} = 3410$	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 111$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 663$	lbs

Development of Wind & Ice Load on Antennas Verizon

Antenna Data:

Antenna Model = Antel LPA-80080-6CF

Antenna Shape = Flat

Antenna Height = $L_{ant} := 70.9$ in

Antenna Width = $W_{ant} := 5.5$ in

Antenna Thickness = $T_{ant} := 13.2$ in

Antenna Weight = $WT_{ant} := 21$ lbs

Number of Antennas = $N_{ant} := 2$

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 12.9$

Antenna Force Coefficient = $Ca_{ant} = 1.6$

Wind Load (without ice)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 2.7$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 5.4$ sf

Total Antenna Wind Force = $F_{ant} := qz_{VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 205$ lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ})}{144} = 4.5$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 9.1$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 91$ lbs

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 42$ lbs

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5147$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{izVZ})(W_{ant} + 2 \cdot t_{izVZ}) \cdot (T_{ant} + 2 \cdot t_{izVZ}) - V_{ant} = 5606$

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 182$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 363$ lbs

Development of Wind & Ice Load on Antennas Verizon

Antenna Data:

Antenna Model = Decibel DB846F65ZAXY

Antenna Shape = Flat

Antenna Height = $L_{ant} := 72$ in

Antenna Width = $W_{ant} := 10$ in

Antenna Thickness = $T_{ant} := 8.5$ in

Antenna Weight = $WT_{ant} := 21$ lbs

Number of Antennas = $N_{ant} := 4$

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 7.2$

Antenna Force Coefficient = $Ca_{ant} = 1.41$

Wind Load (without ice)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 20$ sf

Total Antenna Wind Force = $F_{ant} := qz_{VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 666$ lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ})}{144} = 6.9$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 27.8$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 246$ lbs

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 84$ lbs

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6120$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{izVZ})(W_{ant} + 2 \cdot t_{izVZ}) \cdot (T_{ant} + 2 \cdot t_{izVZ}) - V_{ant} = 5677$

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 184$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 736$ lbs

Development of Wind & Ice Load on RRU

Verizon

RRU Data:

RRU Model = Alcatel-Lucent RRH2x40 AWS

RRU Shape = Flat

RRU Height = $L_{RRU} := 24.4$ in

RRU Width = $W_{RRU} := 10.63$ in

RRU Thickness = $T_{RRU} := 6.7$ in

RRU Weight = $WT_{RRU} := 44$ lbs

Number of RRU's = $N_{RRU} := 3$

RRU Aspect Ratio = $Ar_{RRU} := \frac{L_{RRU}}{W_{RRU}} = 2.3$

RRU Force Coefficient = $Ca_{RRU} = 1.2$

Wind Load (without ice)

Surface Area for One RRU = $SA_{RRU} := \frac{L_{RRU} \cdot W_{RRU}}{144} = 1.8$ sf

RRU Projected Surface Area = $A_{RRU} := SA_{RRU} \cdot N_{RRU} = 5.4$ sf

Total RRU Wind Force = $F_{RRU} := qz_{ATT} \cdot G_H \cdot Ca_{RRU} \cdot K_a \cdot A_{RRU} = 159$ lbs

Wind Load (with ice)

Surface Area for One RRU w/ Ice = $SA_{ICERRU} := \frac{(L_{RRU} + 2 \cdot t_{izATT}) \cdot (W_{RRU} + 2 \cdot t_{izATT})}{144} = 2.7$ sf

RRU Projected Surface Area w/ Ice = $A_{ICERRU} := SA_{ICERRU} \cdot N_{RRU} = 8.1$ sf

Total RRU Wind Force w/ Ice = $Fi_{RRU} := qz_{ice.ATT} \cdot G_H \cdot Ca_{RRU} \cdot K_a \cdot A_{ICERRU} = 63$ lbs

Gravity Load (without ice)

Weight of All RRUs = $WT_{RRU} \cdot N_{RRU} = 132$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each RRU = $V_{RRU} := L_{RRU} \cdot W_{RRU} \cdot T_{RRU} = 1738$ cu in

Volume of Ice on Each RRU = $V_{ice} := (L_{RRU} + 2 \cdot t_{izATT})(W_{RRU} + 2 \cdot t_{izATT}) \cdot (T_{RRU} + 2 \cdot t_{izATT}) - V_{RRU} = 2157$

Weight of Ice on Each RRU = $W_{ICERRU} := \frac{V_{ice}}{1728} \cdot Id = 70$ lbs

Weight of Ice on All RRUs = $W_{ICERRU} \cdot N_{RRU} = 210$ lbs

Development of Wind & Ice Load on Antenna Mounts

Verizon

Mount Data:

Mount Type: 13' Platform w_ Handrails

Mount Shape =	Flat		(User Input)
Mount Projected Surface Area =	$CaAa := 31$	sf	(User Input)
Mount Projected Surface Area w/ Ice =	$CaAa_{ice} := 37$	sf	(User Input)
Mount Weight =	$WT_{mnt} := 1850$	lbs	(User Input)
Mount Weight w/ Ice =	$WT_{mnt.ice} := 2700$	lbs	

Wind Load (without ice)

Total Mount Wind Force = $F_{mnt} := qz_{VZ} \cdot G_H \cdot CaAa = 734$ lbs

Wind Load (with ice)

Total Mount Wind Force = $Fi_{mnt} := qz_{ice.VZ} \cdot G_H \cdot CaAa_{ice} = 233$ lbs

Gravity Loads (without ice)

Weight of All Mounts = $WT_{mnt} = 1850$ lbs

Gravity Loads (ice only)

Weight of Ice on All Mounts = $WT_{mnt.ice} - WT_{mnt} = 850$ lbs

Development of Wind & Ice Load on Antennas

MetroPCS

Antenna Data:

Antenna Model = RFS APXV18-206517

Antenna Shape = Flat

Antenna Height = $L_{ant} := 72$ in

Antenna Width = $W_{ant} := 6.8$ in

Antenna Thickness = $T_{ant} := 3.15$ in

Antenna Weight = $WT_{ant} := 32.5$ lbs

Number of Antennas = $N_{ant} := 3$

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 10.6$

Antenna Force Coefficient = $Ca_{ant} = 1.52$

Wind Load (without ice)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 3.4$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 10.2$ sf

Total Antenna Wind Force = $F_{ant} := qz_{Metro} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 361$ lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izMetro}) \cdot (W_{ant} + 2 \cdot t_{izMetro})}{144} = 5.3$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 15.8$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.Metro} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 148$ lbs

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 98$ lbs

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1542$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{izMetro})(W_{ant} + 2 \cdot t_{izMetro}) \cdot (T_{ant} + 2 \cdot t_{izMetro}) - V_{ant} = 3318$

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 108$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 323$ lbs

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-91/97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-05: ASD
Aluminum Code	AA ADM1-05: ASD - Building

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

(Global) Model Settings, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Om Z	1
Om X	1
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1.5
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	3.5
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E...	Density[k/ft...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	W24x68	W24x68	Beam	Wide Flange	A992	Typical	20.1	70.4	1830	1.87
2	L5x5x5/16	L5x5x5	Beam	Wide Flange	A36 Gr.36	Typical	3.07	7.44	7.44	.108
3	L3.5x3.5x...	L3.5x3.5x5	Beam	Wide Flange	A36 Gr.36	Typical	2.1	2.44	2.44	.073

Hot Rolled Steel Section Sets (Continued)

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
4	Tube8x4x...	TU8X4X5	Beam	Wide Flange	A500 Gr.46	Typical	6.86	18.1	53.9	45.2
5	HSS18x0.5	HSS18X0.5	Beam	Wide Flange	A500 Gr.42	Typical	25.6	985	985	1970
6	WT6x15	WT6x15	Beam	W_Tee	A572 Gr.50	Typical	4.4	10.2	13.5	.228
7	W24x68 ...	new	Beam	Wide Flange	A992	Typical	52.1	753.067	6733.167	10

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	CROSSDIA...	L5x5x5/16	15.207	7.5	7.5	Lbyy		7.5				Lateral
2	CROSSDIA...	L5x5x5/16	15.207	7.5	7.5	Lbyy		7.5				Lateral
3	CROSSDIA...	L5x5x5/16	15.207	7.5	7.5	Lbyy		7.5				Lateral
4	CROSSDIA...	L5x5x5/16	15.207	7.5	7.5	Lbyy		7.5				Lateral
5	CROSSDIA...	L3.5x3.5x5/...	18.916	8	8	8	8	8				Lateral
6	CROSSDIA...	L3.5x3.5x5/...	18.916	8	8	8	8	8				Lateral
7	CROSSDIA...	L5x5x5/16	33.126			Lbyy						Lateral
8	CROSSDIA...	L5x5x5/16	33.126			Lbyy						Lateral
9	HORZ1	L5x5x5/16	13.509	7	7	Lbyy		7				Lateral
10	HORZ2	L5x5x5/16	13.509	7	7	Lbyy		7				Lateral
11	HORZ3	L5x5x5/16	13.509	7	7	Lbyy		7				Lateral
12	HORZ4	L5x5x5/16	13.509	7	7	Lbyy		7				Lateral
13	HORZ5	L5x5x5/16	13.509	7	7	Lbyy		7				Lateral
14	HORZ6	L5x5x5/16	13.509	7	7	Lbyy		7				Lateral
15	HORZ7	L5x5x5/16	13.509	7	7	Lbyy		7				Lateral
16	HORZ8	L5x5x5/16	13.509	7	7	Lbyy		7				Lateral
17	HORZ9	L5x5x5/16	13.509	7	7	Lbyy		7				Lateral
18	HORZ10	L5x5x5/16	13.509	7	7	Lbyy		7				Lateral
19	HORZ11	Tube8x4x5/...	13.5	1	1	1	1					Lateral
20	LEG1	W24x68	60	Segment	Segment	20	14					Lateral
21	LEG2	W24x68	60	Segment	Segment	20	13.5	Segme...				Lateral
22	LEG_W_PL...	W24x68 w/ pl	20.5	Segment	Segment	20.5						Lateral
23	LEG_W_PL...	W24x68 w/ pl	20.5	Segment	Segment	20.5						Lateral
24	WT1	WT6x15	10.091			Lbyy						Lateral
25	WT2	WT6x15	10.091			Lbyy						Lateral
26	WT3	WT6x15	10.091			Lbyy						Lateral
27	WT4	WT6x15	10.091			Lbyy						Lateral
28	WT5	WT6x15	10.091			Lbyy						Lateral
29	WT6	WT6x15	10.091			Lbyy						Lateral
30	WT7	WT6x15	10.091			Lbyy						Lateral
31	WT8	WT6x15	10.091			Lbyy						Lateral
32	WT9	WT6x15	10.091			Lbyy						Lateral
33	WT10	WT6x15	10.091			Lbyy						Lateral
34	WT11	WT6x15	10.091			Lbyy						Lateral
35	WT12	WT6x15	10.091			Lbyy						Lateral
36	WT13	WT6x15	10.091			Lbyy						Lateral
37	WT14	WT6x15	10.091			Lbyy						Lateral
38	WT15	WT6x15	10.091			Lbyy						Lateral
39	WT16	WT6x15	10.091			Lbyy						Lateral
40	WT17	WT6x15	10.091			Lbyy						Lateral
41	WT18	WT6x15	10.091			Lbyy						Lateral
42	WT19	WT6x15	10.091			Lbyy						Lateral
43	WT20	WT6x15	10.091			Lbyy						Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
44	MAST1	HSS18x0.5	111	Segment	Segment	Lbyy						Lateral
45	Horz 12	Tube8x4x5/...	13.5	1	1	1	1					Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	CROSSDIAG1	5	10			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
2	CROSSDIAG2	9	6			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
3	CROSSDIAG3	9	12			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
4	CROSSDIAG4	11	10			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
5	CROSSDIAG5	13	18			L3.5x3.5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
6	CROSSDIAG6	17	14			L3.5x3.5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
7	CROSSDIAG7	19	TOPLEG2			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
8	CROSSDIAG8	TOPLEG1	20			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
9	HORZ1	3	6			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
10	HORZ2	5	4			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
11	HORZ3	11	14			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
12	HORZ4	13	12			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
13	HORZ5	17	20			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
14	HORZ6	19	18			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
15	HORZ7	23	26			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
16	HORZ8	25	24			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
17	HORZ9	29	32			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
18	HORZ10	31	30			L5x5x5/16	Beam	Wide Flange	A36 Gr.36	Typical
19	HORZ11	TOPLEG1	TOPLEG2			Tube8x4x5/16	Beam	Wide Flange	A500 Gr.46	Typical
20	LEG1	TOPPLT1	TOPLEG1		90	W24x68	Beam	Wide Flange	A992	Typical
21	LEG2	TOPPLT2	TOPLEG2		90	W24x68	Beam	Wide Flange	A992	Typical
22	LEG_W_PLT1	BOTLEG1	TOPPLT1		90	W24x68 w/ pl	Beam	Wide Flange	A992	Typical
23	LEG_W_PLT2	BOTLEG2	TOPPLT2		90	W24x68 w/ pl	Beam	Wide Flange	A992	Typical
24	WT1	1	MC1		270	WT6x15	Beam	W_Tee	A572 Gr.50	Typical
25	WT2	MC1	2		270	WT6x15	Beam	W_Tee	A572 Gr.50	Typical
26	WT3	MC1	7		90	WT6x15	Beam	W_Tee	A572 Gr.50	Typical
27	WT4	MC1	8		270	WT6x15	Beam	W_Tee	A572 Gr.50	Typical
28	WT5	MC2	7		90	WT6x15	Beam	W_Tee	A572 Gr.50	Typical
29	WT6	MC2	8		270	WT6x15	Beam	W_Tee	A572 Gr.50	Typical
30	WT7	MC2	15		90	WT6x15	Beam	W_Tee	A572 Gr.50	Typical
31	WT8	MC2	16		270	WT6x15	Beam	W_Tee	A572 Gr.50	Typical
32	WT9	16	MC3		90	WT6x15	Beam	W_Tee	A572 Gr.50	Typical
33	WT10	15	MC3		270	WT6x15	Beam	W_Tee	A572 Gr.50	Typical
34	WT11	21	MC3		270	WT6x15	Beam	W_Tee	A572 Gr.50	Typical
35	WT12	MC3	22		270	WT6x15	Beam	W_Tee	A572 Gr.50	Typical
36	WT13	21	MC4		270	WT6x15	Beam	W_Tee	A572 Gr.50	Typical
37	WT14	22	MC4		90	WT6x15	Beam	W_Tee	A572 Gr.50	Typical
38	WT15	MC4	27		90	WT6x15	Beam	W_Tee	A572 Gr.50	Typical
39	WT16	MC4	28		270	WT6x15	Beam	W_Tee	A572 Gr.50	Typical
40	WT17	MC5	27		90	WT6x15	Beam	W_Tee	A572 Gr.50	Typical
41	WT18	MC5	28		270	WT6x15	Beam	W_Tee	A572 Gr.50	Typical
42	WT19	MC5	33		90	WT6x15	Beam	W_Tee	A572 Gr.50	Typical
43	WT20	MC5	34		270	WT6x15	Beam	W_Tee	A572 Gr.50	Typical
44	MAST1	BOTMAST	TOPMAST			HSS18x0.5	Beam	Wide Flange	A500 Gr.42	Typical
45	Horz 12	TOPLEG1	TOPLEG2			Tube8x4x5/16	Beam	Wide Flange	A500 Gr.46	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	1	0	12	0	0	
2	2	13.5	12	0	0	
3	3	0	23	0	0	
4	4	13.5	23	0	0	
5	5	0	23.5	0	0	
6	6	13.5	23.5	0	0	
7	7	0	25.75	0	0	
8	8	13.5	25.75	0	0	
9	9	0	30.5	0	0	
10	10	13.5	30.5	0	0	
11	11	0	37.5	0	0	
12	12	13.5	37.5	0	0	
13	13	0	38	0	0	
14	14	13.5	38	0	0	
15	15	0	39.5	0	0	
16	16	13.5	39.5	0	0	
17	17	0	51.25	0	0	
18	18	13.5	51.25	0	0	
19	19	0	51.75	0	0	
20	20	13.5	51.75	0	0	
21	21	0	53.25	0	0	
22	22	13.5	53.25	0	0	
23	23	0	55.25	0	0	
24	24	13.5	55.25	0	0	
25	25	0	55.75	0	0	
26	26	13.5	55.75	0	0	
27	27	0	67	0	0	
28	28	13.5	67	0	0	
29	29	0	75.5	0	0	
30	30	13.5	75.5	0	0	
31	31	0	76	0	0	
32	32	13.5	76	0	0	
33	33	0	80.75	0	0	
34	34	13.5	80.75	0	0	
35	BOTLEG1	0	1.5	0	0	
36	BOTLEG2	13.5	1.5	0	0	
37	BOTMAST	6.75	0	3	0	
38	MC1	6.75	18.875	3	0	
39	MC2	6.75	32.625	3	0	
40	MC3	6.75	46.375	3	0	
41	MC4	6.75	60.125	3	0	
42	MC5	6.75	73.875	3	0	
43	TOPLEG1	0	82	0	0	
44	TOPLEG2	13.5	82	0	0	
45	TOPMAST	6.75	111	3	0	
46	TOPPLT1	0	22	0	0	
47	TOPPLT2	13.5	22	0	0	
48	T_MOBILE	6.75	107.5	3	0	
49	METRO	0	77	0	0	
50	METRO2	13.5	77	0	0	
51	FC1	6.75	29	3	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
52	FC2	6.75	56.5	3	0	
53	FC3	6.75	84	3	0	
54	GPS	0	50	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	BOTLEG1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	BOTMAST	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	BOTLEG2	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
4	TOPLEG1						
5	TOPLEG2						
6	FC3						
7	FC2						
8	FC1						

Member Point Loads

Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
No Data to Print ...			

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	MAST1	Y	-.02	-.02	0	0
2	LEG1	Y	-.034	-.034	0	0
3	LEG_W_PLT1	Y	-.034	-.034	0	0
4	LEG2	Y	-.004	-.004	0	0
5	LEG_W_PLT2	Y	-.004	-.004	0	0

Member Distributed Loads (BLC 3 : Weight of Ice Only)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	MAST1	Y	-.048	-.048	0	20
2	MAST1	Y	-.053	-.053	20	40
3	MAST1	Y	-.055	-.055	40	60
4	MAST1	Y	-.057	-.057	60	80
5	MAST1	Y	-.058	-.058	80	100
6	MAST1	Y	-.059	-.059	100	0
7	LEG_W_PLT1	Y	-.133	-.133	0	0
8	LEG_W_PLT2	Y	-.07	-.07	0	0
9	LEG1	Y	-.152	-.152	0	20
10	LEG2	Y	-.06	-.06	0	20
11	LEG1	Y	-.156	-.156	20	0
12	LEG2	Y	-.062	-.062	20	40
13	LEG2	Y	-.065	-.065	40	0
14	WT1	Y	-.019	-.019	0	0
15	WT2	Y	-.019	-.019	0	0
16	WT3	Y	-.019	-.019	0	0
17	WT4	Y	-.019	-.019	0	0
18	WT5	Y	-.019	-.019	0	0

Member Distributed Loads (BLC 3 : Weight of Ice Only) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
19	WT6	Y	-.019	-.019	0	0
20	WT7	Y	-.019	-.019	0	0
21	WT8	Y	-.019	-.019	0	0
22	WT9	Y	-.019	-.019	0	0
23	WT10	Y	-.019	-.019	0	0
24	WT11	Y	-.019	-.019	0	0
25	WT12	Y	-.019	-.019	0	0
26	WT13	Y	-.019	-.019	0	0
27	WT14	Y	-.019	-.019	0	0
28	WT15	Y	-.019	-.019	0	0
29	WT16	Y	-.019	-.019	0	0
30	WT17	Y	-.019	-.019	0	0
31	WT18	Y	-.019	-.019	0	0
32	WT19	Y	-.019	-.019	0	0
33	WT20	Y	-.019	-.019	0	0
34	CROSSDIAG1	Y	-.016	-.016	0	0
35	CROSSDIAG2	Y	-.016	-.016	0	0
36	CROSSDIAG3	Y	-.016	-.016	0	0
37	CROSSDIAG4	Y	-.016	-.016	0	0
38	CROSSDIAG7	Y	-.016	-.016	0	0
39	CROSSDIAG8	Y	-.016	-.016	0	0
40	HORZ1	Y	-.016	-.016	0	0
41	HORZ2	Y	-.016	-.016	0	0
42	HORZ3	Y	-.016	-.016	0	0
43	HORZ4	Y	-.016	-.016	0	0
44	HORZ5	Y	-.016	-.016	0	0
45	HORZ6	Y	-.016	-.016	0	0
46	HORZ7	Y	-.016	-.016	0	0
47	HORZ8	Y	-.016	-.016	0	0
48	CROSSDIAG5	Y	-.012	-.012	0	0
49	CROSSDIAG6	Y	-.012	-.012	0	0

Member Distributed Loads (BLC 4 : (x) TIA Wind with Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	MAST1	X	.004	.004	0	20
2	MAST1	X	.005	.005	20	40
3	MAST1	X	.006	.006	40	80
4	MAST1	X	.007	.007	80	0
5	MAST1	X	.003	.003	0	20
6	MAST1	X	.004	.004	20	80
7	MAST1	X	.005	.005	80	0
8	LEG_W_PLT1	X	.013	.013	0	0
9	LEG_W_PLT2	X	.013	.013	0	0
10	LEG1	X	.016	.016	0	20
11	LEG2	X	.016	.016	0	20
12	LEG1	X	.018	.018	20	40
13	LEG2	X	.018	.018	20	40
14	LEG1	X	.019	.019	40	0
15	LEG2	X	.019	.019	40	0
16	LEG_W_PLT1	X	.003	.003	0	0
17	LEG1	X	.004	.004	0	0

Member Distributed Loads (BLC 4 : (x) TIA Wind with Ice) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
18	WT1	X	.009	.009	0	0
19	WT2	X	.009	.009	0	0
20	WT3	X	.009	.009	0	0
21	WT4	X	.009	.009	0	0
22	WT5	X	.009	.009	0	0
23	WT6	X	.009	.009	0	0
24	WT7	X	.009	.009	0	0
25	WT8	X	.009	.009	0	0
26	WT9	X	.009	.009	0	0
27	WT10	X	.009	.009	0	0
28	WT11	X	.009	.009	0	0
29	WT12	X	.009	.009	0	0
30	WT13	X	.009	.009	0	0
31	WT14	X	.009	.009	0	0
32	WT15	X	.009	.009	0	0
33	WT16	X	.009	.009	0	0
34	WT17	X	.009	.009	0	0
35	WT18	X	.009	.009	0	0
36	WT19	X	.009	.009	0	0
37	WT20	X	.009	.009	0	0

Member Distributed Loads (BLC 5 : (x) TIA Wind)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	MAST1	X	.014	.014	0	20
2	MAST1	X	.017	.017	20	40
3	MAST1	X	.019	.019	40	60
4	MAST1	X	.021	.021	60	80
5	MAST1	X	.022	.022	80	0
6	MAST1	X	.006	.006	0	20
7	MAST1	X	.008	.008	20	60
8	MAST1	X	.009	.009	60	80
9	MAST1	X	.01	.01	80	0
10	LEG_W_PLT1	X	.046	.046	0	0
11	LEG_W_PLT2	X	.046	.046	0	0
12	LEG1	X	.053	.053	0	20
13	LEG2	X	.053	.053	0	20
14	LEG1	X	.059	.059	20	40
15	LEG2	X	.059	.059	20	40
16	LEG1	X	.063	.063	40	0
17	LEG2	X	.063	.063	40	0
18	LEG_W_PLT1	X	.006	.006	0	0
19	LEG1	X	.008	.008	0	40
20	LEG1	X	.009	.009	40	0
21	WT1	X	.023	.023	0	0
22	WT2	X	.023	.023	0	0
23	WT3	X	.023	.023	0	0
24	WT4	X	.023	.023	0	0
25	WT5	X	.023	.023	0	0
26	WT6	X	.023	.023	0	0
27	WT7	X	.023	.023	0	0
28	WT8	X	.023	.023	0	0

Member Distributed Loads (BLC 5 : (x) TIA Wind) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
29	WT9	X	.023	.023	0	0
30	WT10	X	.023	.023	0	0
31	WT11	X	.023	.023	0	0
32	WT12	X	.023	.023	0	0
33	WT13	X	.023	.023	0	0
34	WT14	X	.023	.023	0	0
35	WT15	X	.023	.023	0	0
36	WT16	X	.023	.023	0	0
37	WT17	X	.023	.023	0	0
38	WT18	X	.023	.023	0	0
39	WT19	X	.023	.023	0	0
40	WT20	X	.023	.023	0	0

Member Distributed Loads (BLC 6 : (z) TIA Wind with Ice)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	MAST1	Z	.004	.004	0	20
2	MAST1	Z	.005	.005	20	40
3	MAST1	Z	.006	.006	40	80
4	MAST1	Z	.007	.007	80	0
5	MAST1	Z	.003	.003	0	20
6	MAST1	Z	.004	.004	20	80
7	MAST1	Z	.005	.005	80	0
8	LEG_W_PLT1	Z	.009	.009	0	0
9	LEG_W_PLT2	Z	.009	.009	0	0
10	LEG1	Z	.007	.007	0	20
11	LEG2	Z	.007	.007	0	20
12	LEG1	Z	.008	.008	20	40
13	LEG2	Z	.008	.008	20	40
14	LEG1	Z	.009	.009	40	0
15	LEG2	Z	.009	.009	40	0
16	LEG_W_PLT1	Z	.005	.005	0	0
17	LEG1	Z	.007	.007	0	40
18	LEG1	Z	.008	.008	40	0
19	WT1	Z	.009	.009	0	0
20	WT2	Z	.009	.009	0	0
21	WT3	Z	.009	.009	0	0
22	WT4	Z	.009	.009	0	0
23	WT5	Z	.009	.009	0	0
24	WT6	Z	.009	.009	0	0
25	WT7	Z	.009	.009	0	0
26	WT8	Z	.009	.009	0	0
27	WT9	Z	.009	.009	0	0
28	WT10	Z	.009	.009	0	0
29	WT11	Z	.009	.009	0	0
30	WT12	Z	.009	.009	0	0
31	WT13	Z	.009	.009	0	0
32	WT14	Z	.009	.009	0	0
33	WT15	Z	.009	.009	0	0
34	WT16	Z	.009	.009	0	0
35	WT17	Z	.009	.009	0	0
36	WT18	Z	.009	.009	0	0

Member Distributed Loads (BLC 6 : (z) TIA Wind with Ice) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
37	WT19	Z	.009	.009	0	0
38	WT20	Z	.009	.009	0	0
39	CROSSDIAG1	Z	.008	.008	0	0
40	CROSSDIAG2	Z	.008	.008	0	0
41	CROSSDIAG3	Z	.008	.008	0	0
42	CROSSDIAG4	Z	.008	.008	0	0
43	CROSSDIAG7	Z	.008	.008	0	0
44	CROSSDIAG8	Z	.008	.008	0	0
45	HORZ1	Z	.008	.008	0	0
46	HORZ2	Z	.008	.008	0	0
47	HORZ3	Z	.008	.008	0	0
48	HORZ4	Z	.008	.008	0	0
49	HORZ5	Z	.008	.008	0	0
50	HORZ6	Z	.008	.008	0	0
51	HORZ7	Z	.008	.008	0	0
52	HORZ8	Z	.008	.008	0	0
53	CROSSDIAG5	Z	.006	.006	0	0
54	CROSSDIAG6	Z	.006	.006	0	0

Member Distributed Loads (BLC 7 : (z) TIA Wind)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	MAST1	Z	.014	.014	0	20
2	MAST1	Z	.017	.017	20	40
3	MAST1	Z	.019	.019	40	60
4	MAST1	Z	.021	.021	60	80
5	MAST1	Z	.022	.022	80	0
6	MAST1	Z	.006	.006	0	20
7	MAST1	Z	.008	.008	20	60
8	MAST1	Z	.009	.009	60	80
9	MAST1	Z	.01	.01	80	0
10	LEG_W_PLT1	Z	.028	.028	0	0
11	LEG_W_PLT2	Z	.028	.028	0	0
12	LEG1	Z	.02	.02	0	20
13	LEG2	Z	.02	.02	0	20
14	LEG1	Z	.022	.022	20	40
15	LEG2	Z	.022	.022	20	40
16	LEG1	Z	.024	.024	40	0
17	LEG2	Z	.024	.024	40	0
18	LEG_W_PLT1	Z	.015	.015	0	0
19	LEG1	Z	.019	.019	0	20
20	LEG1	Z	.021	.021	20	40
21	LEG1	Z	.023	.023	40	0
22	WT1	Z	.023	.023	0	0
23	WT2	Z	.023	.023	0	0
24	WT3	Z	.023	.023	0	0
25	WT4	Z	.023	.023	0	0
26	WT5	Z	.023	.023	0	0
27	WT6	Z	.023	.023	0	0
28	WT7	Z	.023	.023	0	0
29	WT8	Z	.023	.023	0	0
30	WT9	Z	.023	.023	0	0

Member Distributed Loads (BLC 7 : (z) TIA Wind) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
31	WT10	Z	.023	.023	0	0
32	WT11	Z	.023	.023	0	0
33	WT12	Z	.023	.023	0	0
34	WT13	Z	.023	.023	0	0
35	WT14	Z	.023	.023	0	0
36	WT15	Z	.023	.023	0	0
37	WT16	Z	.023	.023	0	0
38	WT17	Z	.023	.023	0	0
39	WT18	Z	.023	.023	0	0
40	WT19	Z	.023	.023	0	0
41	WT20	Z	.023	.023	0	0
42	CROSSDIAG1	Z	.018	.018	0	0
43	CROSSDIAG2	Z	.018	.018	0	0
44	CROSSDIAG3	Z	.018	.018	0	0
45	CROSSDIAG4	Z	.018	.018	0	0
46	CROSSDIAG7	Z	.018	.018	0	0
47	CROSSDIAG8	Z	.018	.018	0	0
48	HORZ1	Z	.018	.018	0	0
49	HORZ2	Z	.018	.018	0	0
50	HORZ3	Z	.018	.018	0	0
51	HORZ4	Z	.018	.018	0	0
52	HORZ5	Z	.018	.018	0	0
53	HORZ6	Z	.018	.018	0	0
54	HORZ7	Z	.018	.018	0	0
55	HORZ8	Z	.018	.018	0	0
56	CROSSDIAG5	Z	.012	.012	0	0
57	CROSSDIAG6	Z	.012	.012	0	0

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
1	Self Weight	DL		-1						
2	Weight of Appurtenances	DL				33		5		
3	Weight of Ice Only	DL				33		49		
4	(x) TIA Wind with Ice	WLX				35		37		
5	(x) TIA Wind	WLX				35		40		
6	(z) TIA Wind with Ice	WLZ				35		54		
7	(z) TIA Wind	WLZ				35		57		

Load Combinations

	Description	So...	P...	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
1	1.2D + 1.6W (X-dire...	Yes	Y		1	1.2	2	1.2	5	1.6														
2	0.9D + 1.6W (X-dire...	Yes	Y		1	.9	2	.9	5	1.6														
3	1.2D + 1.0Di + 1.0...	Yes	Y		1	1.2	2	1.2	3	1	4	1												
4	1.2D + 1.6W (Z-dire...	Yes	Y		1	1.2	2	1.2	7	1.6														
5	0.9D + 1.6W (Z-dire...	Yes	Y		1	.9	2	.9	7	1.6														
6	1.2D + 1.0Di + 1.0...	Yes	Y		1	1.2	2	1.2	3	1	6	1												

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	BOTLEG1	max	-.944	6	2.062	3	-.318	3	78.362	2	.038	1	134.539	2
2		min	-17.944	2	-207.189	5	-21.77	4	-595.89	4	-.015	4	4.778	6
3	BOTMAST	max	.029	5	460.805	4	.005	3	-.638	3	.112	1	70.553	1
4		min	-5.909	2	12.251	2	-.455	6	-81.034	4	-.014	4	-.201	4
5	BOTLEG2	max	4.068	5	176.813	1	1.31	1	-20.46	3	.037	1	135.393	1
6		min	-16.948	1	-209.007	5	-19.44	4	-549.127	4	.001	6	-23.083	5
7	Totals:	max	0	5	93.366	6	0	1						
8		min	-40.769	1	38.731	2	-41.623	5						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
1	1	max	.423	2	.022	5	.328	4	4.701e-03	4	1.207e-04	4	1.846e-05	4
2		min	.009	6	0	3	-.05	2	-8.267e-04	2	-3.016e-04	1	-3.849e-03	1
3	2	max	.426	1	.022	5	.303	4	4.361e-03	4	-1.168e-05	6	1.902e-04	5
4		min	-.054	5	-.018	1	.013	3	2.136e-04	3	-2.964e-04	1	-3.864e-03	1
5	3	max	.716	1	.047	5	1.173	4	8.139e-03	4	2.902e-04	4	-2.195e-05	3
6		min	-.019	4	0	3	-.208	2	-1.419e-03	2	-8.092e-04	1	-4.52e-04	4
7	4	max	.716	1	.047	5	1.091	4	7.633e-03	4	-2.251e-05	6	5.536e-04	4
8		min	-.027	4	-.038	1	.054	3	3.74e-04	3	-7.948e-04	1	-2.418e-05	2
9	5	max	.714	1	.05	5	1.224	4	8.474e-03	4	3.249e-04	4	4.472e-04	2
10		min	-.015	4	0	3	-.217	2	-1.442e-03	2	-9.134e-04	1	-9.786e-04	4
11	6	max	.715	1	.05	5	1.138	4	7.959e-03	4	-2.471e-05	6	9.905e-04	4
12		min	-.032	4	-.04	1	.056	3	3.818e-04	3	-8.971e-04	1	1.349e-04	3
13	7	max	.692	1	.062	5	1.475	4	9.83e-03	4	4.732e-04	4	8.74e-05	1
14		min	.005	6	0	3	-.258	2	-1.471e-03	2	-1.387e-03	1	-9.149e-04	4
15	8	max	.691	1	.062	5	1.375	4	9.289e-03	4	-3.218e-05	6	8.956e-04	4
16		min	-.068	4	-.048	1	.067	3	3.994e-04	3	-1.362e-03	1	2.014e-05	3
17	9	max	.791	1	.082	5	2.108	4	1.216e-02	4	7.122e-04	4	1.05e-03	4
18		min	-.011	4	0	3	-.341	2	-1.436e-03	2	-2.455e-03	1	-2.03e-03	2
19	10	max	.792	1	.083	5	1.976	4	1.16e-02	4	-2.735e-05	6	-2.468e-04	6
20		min	-.043	4	-.063	1	.09	3	4.08e-04	3	-2.41e-03	1	-2.079e-03	1
21	11	max	.905	1	.112	5	3.248	4	1.47e-02	4	1.02e-03	4	-1.725e-04	6
22		min	-.032	4	0	3	-.462	2	-1.488e-03	2	-4.029e-03	1	-1.744e-03	1
23	12	max	.905	1	.114	5	3.07	4	1.415e-02	4	-9.127e-06	6	7.881e-04	4
24		min	-.034	4	-.082	1	.125	3	4.291e-04	3	-3.954e-03	1	-1.705e-03	2
25	13	max	.916	1	.115	5	3.337	4	1.485e-02	4	1.04e-03	4	-1.986e-04	6
26		min	-.028	4	0	3	-.471	2	-1.497e-03	2	-4.14e-03	1	-1.856e-03	1
27	14	max	.917	1	.116	5	3.155	4	1.43e-02	4	-7.58e-06	6	8.923e-04	4
28		min	-.039	4	-.083	1	.128	3	4.309e-04	3	-4.064e-03	1	-1.808e-03	2
29	15	max	.949	1	.121	5	3.609	4	1.526e-02	4	1.1e-03	4	-1.757e-04	6
30		min	-.017	4	0	3	-.498	2	-1.526e-03	2	-4.474e-03	1	-1.764e-03	1
31	16	max	.948	1	.122	5	3.417	4	1.471e-02	4	-2.405e-06	6	7.896e-04	4
32		min	-.056	4	-.086	1	.136	3	4.37e-04	3	-4.39e-03	1	-1.704e-03	2
33	17	max	1.194	1	.157	5	5.953	4	1.775e-02	4	1.46e-03	4	5.888e-04	4
34		min	-.042	4	-.002	3	-.734	2	-1.857e-03	2	-7.517e-03	1	-3.108e-03	1
35	18	max	1.189	1	.158	5	5.688	4	1.728e-02	4	3.674e-04	4	-1.677e-05	6
36		min	-.05	4	-.11	1	.202	3	5.07e-04	3	-7.374e-03	1	-2.98e-03	1
37	19	max	1.214	1	.159	5	6.06	4	1.783e-02	4	1.474e-03	4	5.771e-04	4
38		min	-.045	4	-.002	3	-.745	2	-1.875e-03	2	-7.647e-03	1	-3.31e-03	1

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
39	20	max	1.207	1	.16	5	5.792	4	1.737e-02	4	3.843e-04	4	3.691e-06	6
40		min	-.048	4	-.111	1	.205	3	5.11e-04	3	-7.501e-03	1	-3.224e-03	1
41	21	max	1.276	1	.163	5	6.383	4	1.807e-02	4	1.514e-03	4	3.041e-04	4
42		min	-.054	4	-.002	3	-.779	2	-1.931e-03	2	-8.02e-03	1	-3.345e-03	1
43	22	max	1.27	1	.165	5	6.107	4	1.762e-02	4	4.351e-04	4	9.515e-05	4
44		min	-.047	4	-.114	1	.214	3	5.232e-04	3	-7.881e-03	1	-3.494e-03	1
45	23	max	1.351	1	.167	5	6.821	4	1.838e-02	4	1.576e-03	4	2.651e-05	6
46		min	-.056	4	-.002	3	-.827	2	-2.001e-03	2	-8.656e-03	1	-2.958e-03	1
47	24	max	1.35	1	.168	5	6.535	4	1.795e-02	4	5.257e-04	4	2.944e-04	4
48		min	-.053	4	-.117	1	.227	3	5.387e-04	3	-8.527e-03	1	-3.129e-03	1
49	25	max	1.369	1	.168	5	6.931	4	1.846e-02	4	1.592e-03	4	2.664e-05	6
50		min	-.056	4	-.003	3	-.839	2	-2.017e-03	2	-8.815e-03	1	-2.901e-03	1
51	26	max	1.368	1	.169	5	6.643	4	1.803e-02	4	5.484e-04	4	2.788e-04	4
52		min	-.055	4	-.117	1	.23	3	5.422e-04	3	-8.688e-03	1	-3.034e-03	1
53	27	max	1.69	1	.19	5	9.527	4	1.994e-02	4	1.944e-03	4	1.185e-05	6
54		min	-.048	4	-.005	3	-1.128	2	-2.192e-03	2	-1.239e-02	1	-2.03e-03	1
55	28	max	1.682	1	.191	5	9.191	4	1.967e-02	4	1.058e-03	4	1.981e-04	4
56		min	-.079	4	-.135	1	.307	3	5.817e-04	3	-1.232e-02	1	-2.005e-03	1
57	29	max	1.908	1	.191	5	11.615	4	2.101e-02	4	2.119e-03	4	8.397e-04	4
58		min	-.069	4	-.007	3	-1.351	2	-2.175e-03	2	-1.592e-02	1	-2.306e-03	2
59	30	max	1.908	1	.193	5	11.256	4	2.084e-02	4	1.752e-03	4	-1.566e-04	6
60		min	-.07	4	-.143	1	.366	3	5.776e-04	3	-1.588e-02	1	-2.414e-03	1
61	31	max	1.922	1	.191	5	11.741	4	2.108e-02	4	2.129e-03	4	9.398e-04	4
62		min	-.074	4	-.007	3	-1.364	2	-2.173e-03	2	-1.612e-02	1	-2.398e-03	2
63	32	max	1.922	1	.193	5	11.382	4	2.091e-02	4	1.793e-03	4	-1.887e-04	6
64		min	-.065	4	-.143	1	.37	3	5.771e-04	3	-1.609e-02	1	-2.494e-03	1
65	33	max	2.107	1	.192	5	12.961	4	2.176e-02	4	2.227e-03	4	-2.721e-04	6
66		min	-.097	4	-.008	3	-1.487	2	-2.147e-03	2	-1.809e-02	1	-4.497e-03	1
67	34	max	2.107	1	.194	5	12.593	4	2.161e-02	4	2.181e-03	4	1.1e-03	4
68		min	-.043	4	-.148	1	.402	3	5.699e-04	3	-1.808e-02	1	-4.35e-03	2
69	BOTLEG1	max	0	2	0	5	0	4	0	4	0	4	0	6
70		min	0	6	0	3	0	3	0	2	0	1	0	2
71	BOTLEG2	max	0	1	0	5	0	4	0	4	0	6	0	5
72		min	0	5	0	1	0	1	0	3	0	1	0	1
73	BOTMAST	max	0	2	0	2	0	6	0	4	0	4	0	4
74		min	0	5	0	4	0	3	0	3	0	1	0	1
75	MC1	max	.468	1	-.004	2	.915	4	7.317e-03	4	1.756e-06	4	6.892e-06	6
76		min	0	6	-.175	4	.007	2	5.413e-05	2	-1.384e-05	1	-1.952e-03	1
77	MC2	max	.632	1	-.007	2	2.483	4	1.2e-02	4	3.013e-06	4	1.323e-05	6
78		min	-.003	6	-.292	4	.017	2	5.47e-05	2	-2.353e-05	1	-7.123e-04	2
79	MC3	max	.809	2	-.009	2	4.853	4	1.635e-02	4	4.174e-06	4	2.637e-05	6
80		min	-.006	6	-.381	4	.025	2	5.218e-05	2	-3.25e-05	1	-1.471e-03	2
81	MC4	max	1.032	2	-.011	2	7.747	4	1.821e-02	4	5.113e-06	4	3.723e-05	6
82		min	-.011	6	-.442	4	.03	2	-3.405e-05	2	-3.982e-05	1	-6.365e-04	2
83	MC5	max	1.322	2	-.013	2	11.107	4	2.47e-02	4	5.669e-06	4	4.124e-05	6
84		min	-.018	6	-.472	4	.014	2	-1.273e-04	2	-4.412e-05	1	-5.517e-03	1
85	TOPLEG1	max	2.182	1	.192	5	13.289	4	2.194e-02	4	2.283e-03	4	-4.288e-04	6
86		min	-.071	4	-.008	3	-1.519	2	-2.139e-03	2	-1.87e-02	1	-5.467e-03	1
87	TOPLEG2	max	2.178	1	.194	5	12.919	4	2.179e-02	4	2.275e-03	4	1.581e-03	4
88		min	-.066	4	-.149	1	.411	3	5.676e-04	3	-1.87e-02	1	-5.231e-03	2
89	TOPMAST	max	8.253	1	-.016	2	26.689	4	3.918e-02	4	5.669e-06	4	4.244e-05	6
90		min	-.036	6	-.476	4	-.044	2	-1.29e-04	2	-4.412e-05	1	-1.966e-02	1

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
91	TOPPLT1	max	.708	1	.042	5	1.078	4	7.43e-03	4	2.207e-04	4	5.12e-04	5
92		min	-.019	4	0	3	-.191	2	-1.355e-03	2	-6.011e-04	1	-1.334e-03	1
93	TOPPLT2	max	.709	1	.042	5	1.001	4	6.947e-03	4	-1.807e-05	6	-4.173e-05	6
94		min	-.026	4	-.034	1	.049	3	3.539e-04	3	-5.905e-04	1	-1.304e-03	2
95	T_MOBILE	max	7.427	1	-.016	2	25.043	4	3.917e-02	4	5.669e-06	4	4.244e-05	6
96		min	-.035	6	-.476	4	-.038	2	-1.289e-04	2	-4.412e-05	1	-1.966e-02	1
97	METRO	max	1.952	1	.191	5	11.994	4	2.122e-02	4	2.15e-03	4	9.815e-04	4
98		min	-.087	4	-.007	3	-1.39	2	-2.169e-03	2	-1.654e-02	1	-2.674e-03	2
99	METRO2	max	1.953	1	.193	5	11.633	4	2.105e-02	4	1.874e-03	4	-2.097e-04	6
100		min	-.054	4	-.144	1	.377	3	5.758e-04	3	-1.651e-02	1	-2.735e-03	1
101	FC1	max	.604	1	-.006	2	1.992	4	1.06e-02	4	2.681e-06	4	1.053e-05	6
102		min	-.002	6	-.261	4	.014	2	5.809e-05	2	-2.098e-05	1	-6.615e-04	2
103	FC2	max	.991	2	-.011	2	6.958	4	1.799e-02	4	4.865e-06	4	3.512e-05	6
104		min	-.01	6	-.426	4	.03	2	7.876e-06	2	-3.789e-05	1	-1.176e-03	2
105	FC3	max	2.484	1	-.014	2	14.612	4	3.239e-02	4	5.669e-06	4	4.187e-05	6
106		min	-.023	6	-.474	4	-.002	2	-1.282e-04	2	-4.412e-05	1	-1.304e-02	1
107	GPS	max	1.153	1	.153	5	5.688	4	1.753e-02	4	1.421e-03	4	5.582e-04	4
108		min	-.033	4	-.001	3	-.706	2	-1.814e-03	2	-7.193e-03	1	-2.472e-03	1

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear...	Loc[ft]	Dir	LC	phi*Pnc...	phi*Pnt...	phi*Mn ...	phi*Mn ...	Cb	Eqn
1	CROSSDI...	L5x5x5	.216	7.603	5	.009	15.2...	z	4	60.986	99.468	6.383	8.677	1	H2-1
2	CROSSDI...	L5x5x5	.226	7.603	1	.010	15.2...	z	4	60.986	99.468	6.383	8.677	1	H2-1
3	CROSSDI...	L5x5x5	.222	7.603	1	.008	15.2...	z	4	60.986	99.468	6.383	8.677	1	H2-1
4	CROSSDI...	L5x5x5	.323	7.603	1	.009	15.2...	z	4	60.986	99.468	6.383	8.677	1	H2-1
5	CROSSDI...	L3.5x3.5x5	.353	9.458	5	.009	0	z	4	24.154	68.04	2.882	5.256	1	H2-1
6	CROSSDI...	L3.5x3.5x5	.794	9.655	1	.009	18.9...	z	4	24.154	68.04	2.882	5.256	1	H2-1
7	CROSSDI...	L5x5x5	.317	33.1...	1	.017	0	z	4	4.302	99.468	6.383	5.51	1...	H2-1*
8	CROSSDI...	L5x5x5	.070	0	5	.016	0	z	4	4.302	99.468	6.383	5.51	1...	H2-1*
9	HORZ1	L5x5x5	.199	6.755	5	.007	13.5...	y	3	64.184	99.468	6.383	9.179	1	H2-1
10	HORZ2	L5x5x5	.197	6.755	5	.007	13.5...	z	4	64.184	99.468	6.383	9.179	1	H2-1
11	HORZ3	L5x5x5	.167	6.755	5	.007	0	y	3	64.184	99.468	6.383	9.179	1	H2-1
12	HORZ4	L5x5x5	.156	6.755	5	.007	13.5...	z	4	64.184	99.468	6.383	9.179	1	H2-1
13	HORZ5	L5x5x5	.161	6.755	5	.007	13.5...	y	3	64.184	99.468	6.383	9.179	1	H2-1
14	HORZ6	L5x5x5	.177	6.755	1	.007	0	y	3	64.184	99.468	6.383	9.179	1	H2-1
15	HORZ7	L5x5x5	.132	6.755	3	.007	13.5...	y	3	64.184	99.468	6.383	9.179	1	H2-1
16	HORZ8	L5x5x5	.140	6.755	3	.007	0	y	3	64.184	99.468	6.383	9.179	1	H2-1
17	HORZ9	L5x5x5	.077	6.755	1	.007	13.5...	y	1	64.184	99.468	6.383	9.179	1	H2-1
18	HORZ10	L5x5x5	.090	6.755	1	.007	13.5...	y	1	64.184	99.468	6.383	9.179	1	H2-1
19	HORZ11	TU8X4X5	.258	13.5	1	.050	13.5	y	1	282.963	284.004	36.225	58.995	1	H1-1b
20	LEG1	W24x68	.840	0	4	.053	0	y	4	786.378	904.5	91.875	365.154	1	H1-1a
21	LEG2	W24x68	.810	0	4	.050	3.75	z	1	786.378	904.5	91.875	365.154	1	H1-1a
22	LEG_W_P...	new	.342	0	5	.080	0	y	4	2073.039	2344.5	764.445	2198.339	1	H1-1b
23	LEG_W_P...	new	.324	0	5	.071	0	y	4	2073.039	2344.5	764.445	2198.339	1	H1-1b
24	WT1	WT6x15	.122	5.045	1	.006	10.0...	y	4	96.434	198	17.925	7.614	1...	H1-1b
25	WT2	WT6x15	.310	5.256	2	.006	0	y	4	96.434	198	17.925	16.531	1...	H1-1a
26	WT3	WT6x15	.381	4.94	2	.005	10.0...	y	4	96.434	198	17.925	7.614	1...	H1-1a
27	WT4	WT6x15	.183	0	5	.005	10.0...	y	4	96.434	198	17.925	16.531	1...	H1-1b*
28	WT5	WT6x15	.141	5.045	4	.006	0	y	4	96.434	198	17.925	16.531	1...	H1-1b
29	WT6	WT6x15	.131	5.045	4	.006	10.0...	y	4	96.434	198	17.925	16.531	1...	H1-1b

Envelope AISC 14th(360-10): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[ft]	LC	Shear...	Loc[ft]	Dir	LC	phi*Pnc...	phi*Pnt...	phi*Mn ...	phi*Mn ...	Cb	Eqn
30	WT7	WT6x15	.384	4.94	4	.006	10.0...	y	4	96.434	198	17.925	16.531	1...	H1-1a
31	WT8	WT6x15	.342	4.94	4	.006	10.0...	y	4	96.434	198	17.925	16.531	1...	H1-1a
32	WT9	WT6x15	.132	5.045	4	.007	10.0...	y	1	96.434	198	17.925	16.531	1...	H1-1b
33	WT10	WT6x15	.140	5.045	4	.008	0	z	1	96.434	198	17.925	16.531	1...	H1-1b
34	WT11	WT6x15	.405	5.151	4	.006	10.0...	y	1	96.434	198	17.925	16.531	1...	H1-1a
35	WT12	WT6x15	.373	4.94	4	.007	10.0...	z	1	96.434	198	17.925	16.531	1...	H1-1a
36	WT13	WT6x15	.123	5.045	4	.012	10.0...	z	1	96.434	198	17.925	16.531	1...	H1-1b
37	WT14	WT6x15	.119	5.045	4	.011	10.0...	y	1	96.434	198	17.925	16.531	1...	H1-1b
38	WT15	WT6x15	.558	4.94	4	.010	0	y	1	96.434	198	17.925	16.531	1...	H1-1a
39	WT16	WT6x15	.544	4.94	4	.011	0	z	1	96.434	198	17.925	16.531	1...	H1-1a
40	WT17	WT6x15	.295	5.045	4	.013	0	z	1	96.434	198	17.925	16.531	1...	H1-1a
41	WT18	WT6x15	.288	5.045	4	.013	10.0...	y	1	96.434	198	17.925	16.531	1...	H1-1a
42	WT19	WT6x15	.267	4.94	4	.016	0	y	1	96.434	198	17.925	16.531	1...	H1-1a
43	WT20	WT6x15	.251	4.94	4	.016	10.0...	z	1	96.434	198	17.925	16.531	1...	H1-1a
44	MAST1	HSS18X0.5	.677	0	4	.044	72.8...		1	891.593	967.68	450.45	450.45	2...	H1-1a
45	Horz 12	TU8X4X5	.258	13.5	1	.050	13.5	y	1	282.963	284.004	36.225	58.995	1	H1-1b

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	BOTLEG1	-17.914	-141.606	-1.29	77.761	.038	134.479
2	1	BOTMAST	-5.907	16.435	-.02	-.786	.112	70.553
3	1	BOTLEG2	-16.948	176.813	1.31	-84.725	.037	135.393
4	1	Totals:	-40.769	51.642	0			
5	1	COG (ft):	X: 6.376	Y: 50.664	Z: 1.084			

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	BOTLEG1	-17.944	-146.216	-1.283	78.362	.038	134.539
2	2	BOTMAST	-5.909	12.251	-.025	-.693	.111	70.492
3	2	BOTLEG2	-16.916	172.696	1.308	-83.958	.037	135.094
4	2	Totals:	-40.769	38.731	0			
5	2	COG (ft):	X: 6.376	Y: 50.664	Z: 1.084			

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	BOTLEG1	-3.664	2.062	-.318	14.603	.009	28.612
2	3	BOTMAST	-1.302	26.761	.005	-.638	.027	15.538
3	3	BOTLEG2	-3.971	64.544	.313	-20.46	.009	30.718
4	3	Totals:	-8.937	93.366	0			
5	3	COG (ft):	X: 6.057	Y: 53.294	Z: .928			

Joint Reactions

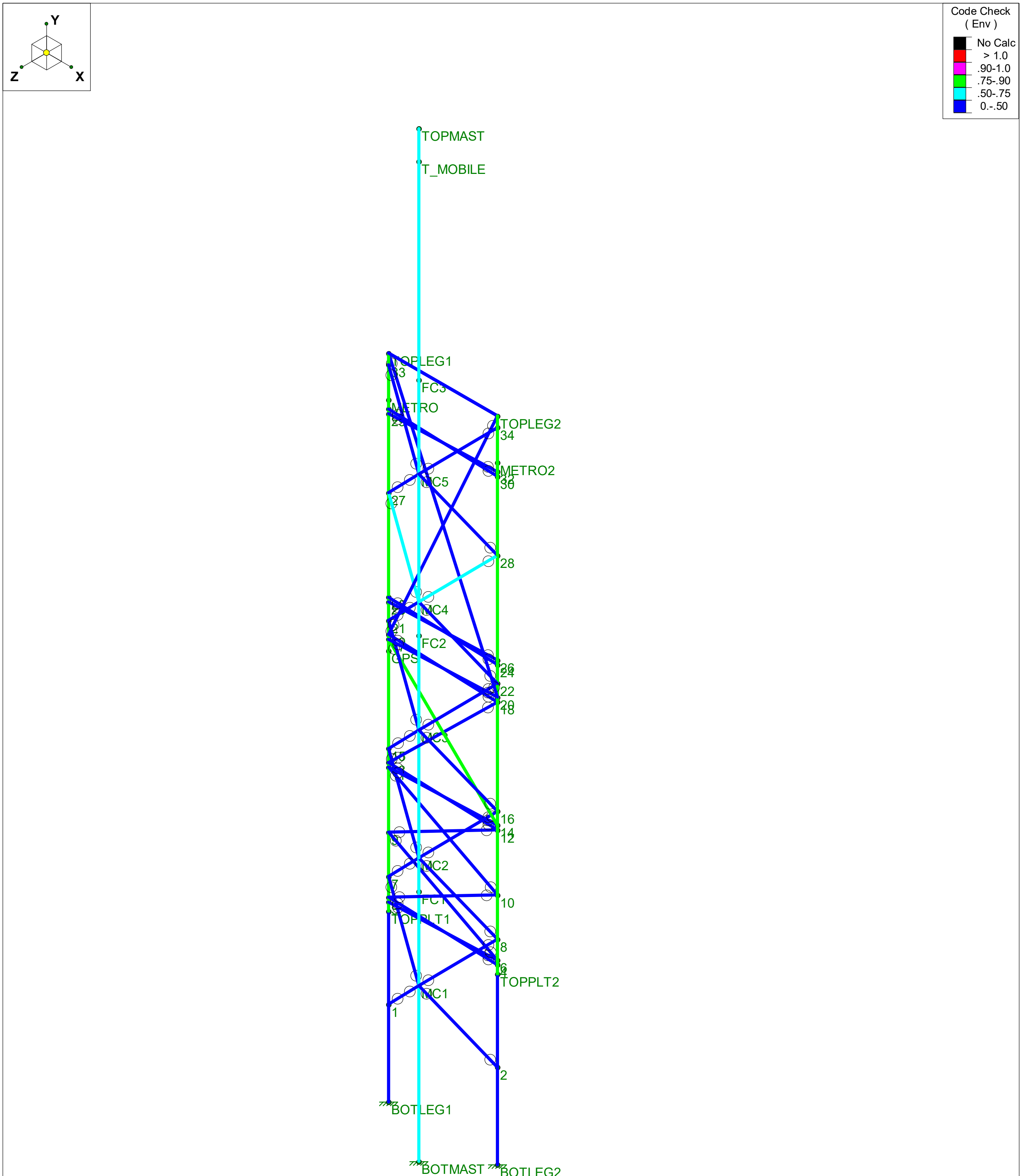
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	4	BOTLEG1	-4.058	-203.316	-21.77	-595.89	-.015	20.742
2	4	BOTMAST	.029	460.805	-.412	-81.034	-.014	-.201
3	4	BOTLEG2	4.029	-205.848	-19.44	-549.127	.006	-22.876
4	4	Totals:	0	51.642	-41.623			
5	4	COG (ft):	X: 6.376	Y: 50.664	Z: 1.084			

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	5	BOTLEG1	-4.098	-207.189	-21.749	-593.719	-.015	20.969
2	5	BOTMAST	.029	454.927	-.454	-80.818	-.014	-.195
3	5	BOTLEG2	4.068	-209.007	-19.419	-547.064	.006	-23.083
4	5	Totals:	0	38.731	-41.623			
5	5	COG (ft):	X: 6.376	Y: 50.664	Z: 1.084			

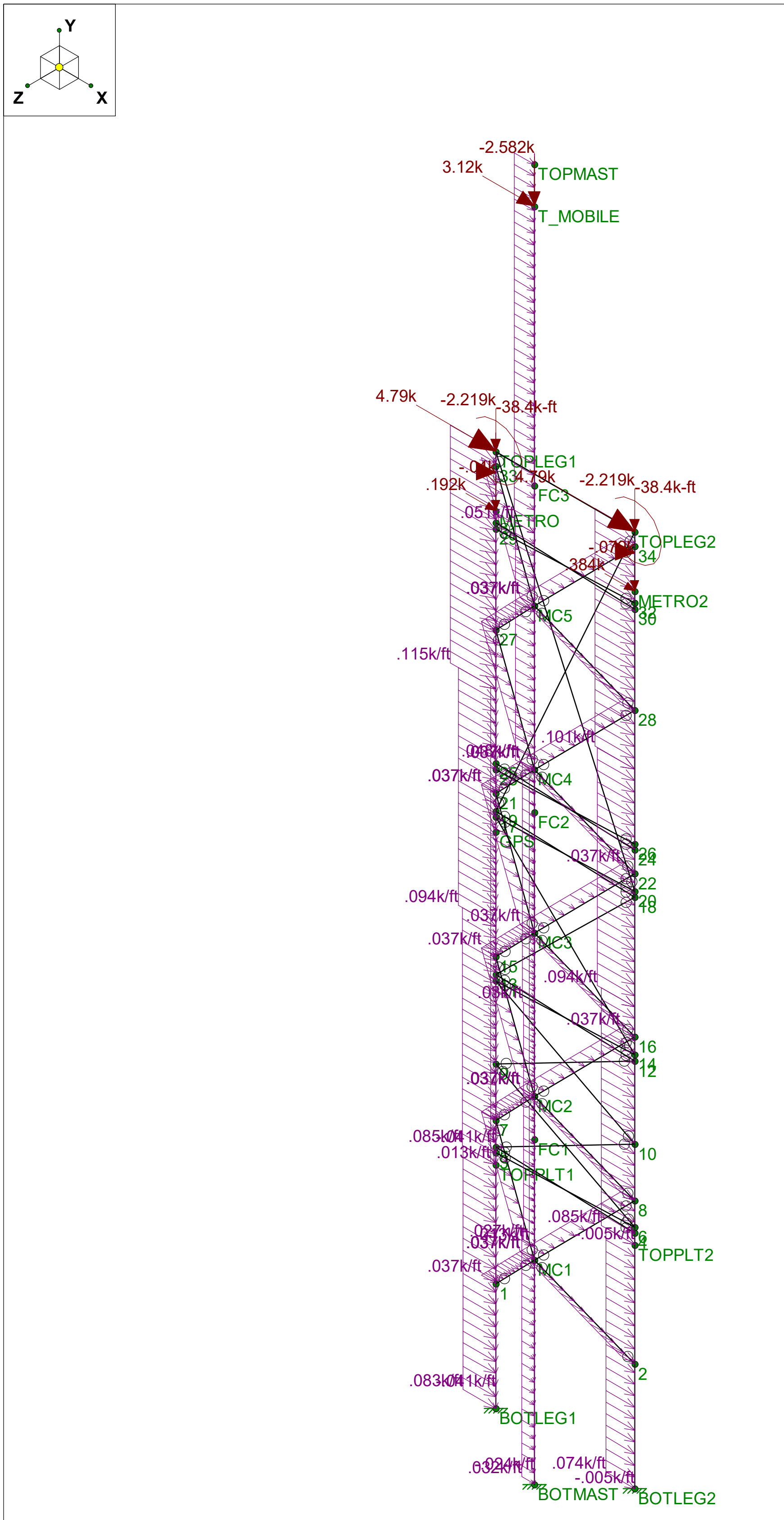
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	6	BOTLEG1	-.944	-15.553	-5.001	-144.933	-.004	4.778
2	6	BOTMAST	.004	133.961	-.455	-20.737	-.003	-.105
3	6	BOTLEG2	.939	-25.042	-4.506	-134.414	.001	-5.461
4	6	Totals:	0	93.366	-9.962			
5	6	COG (ft):	X: 6.057	Y: 53.294	Z: .928			



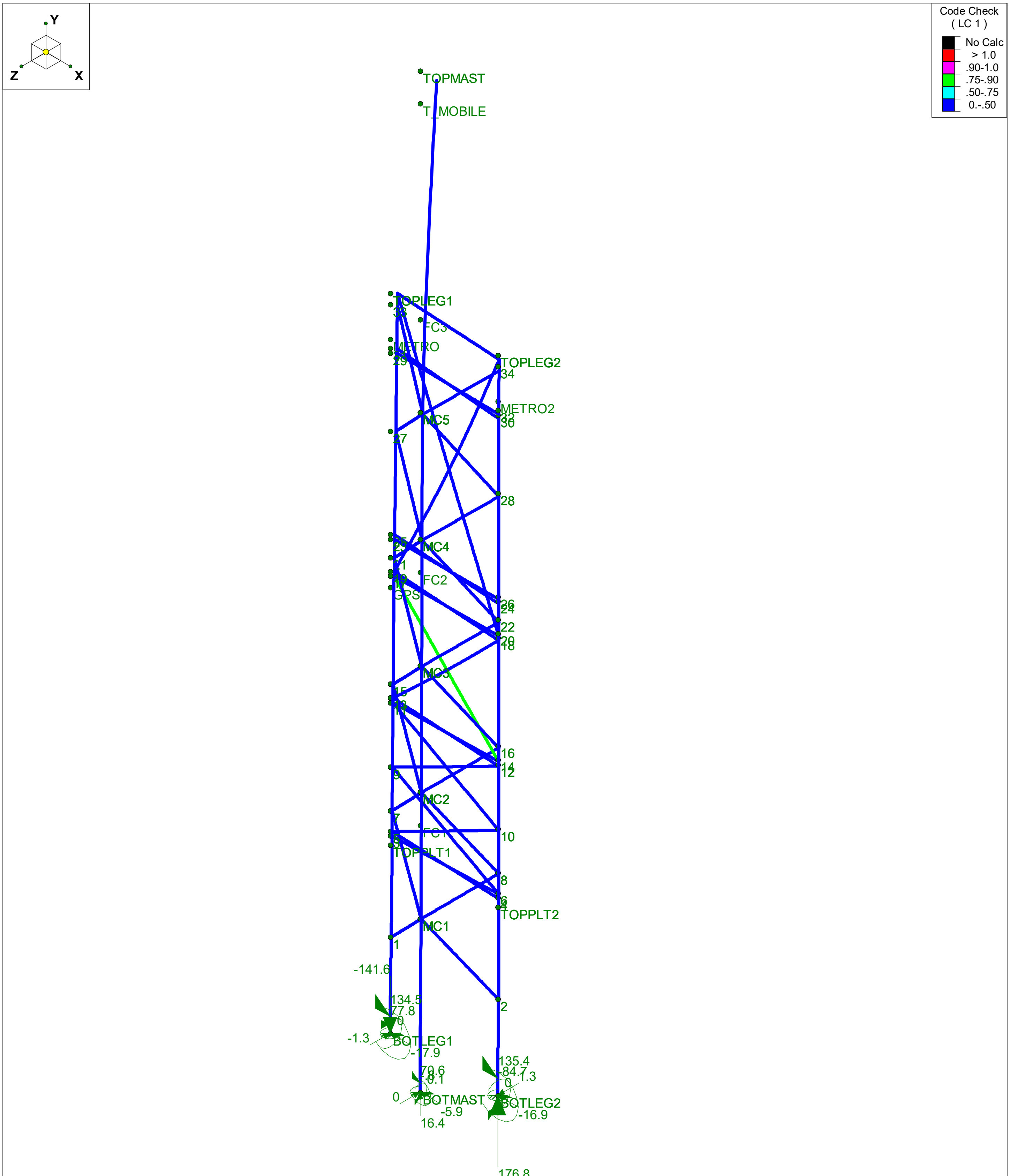
Envelope Only Solution

Centek Engineering		
TJL	82' Sign Structure with 111' Pipe Mast	Aug 8, 2017 at 8:44 AM
17004.35	Unity Check	82' Sign Structure.r3d



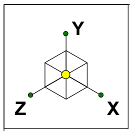
Loads: LC 1, 1.2D + 1.6W (X-direction)
Envelope Only Solution

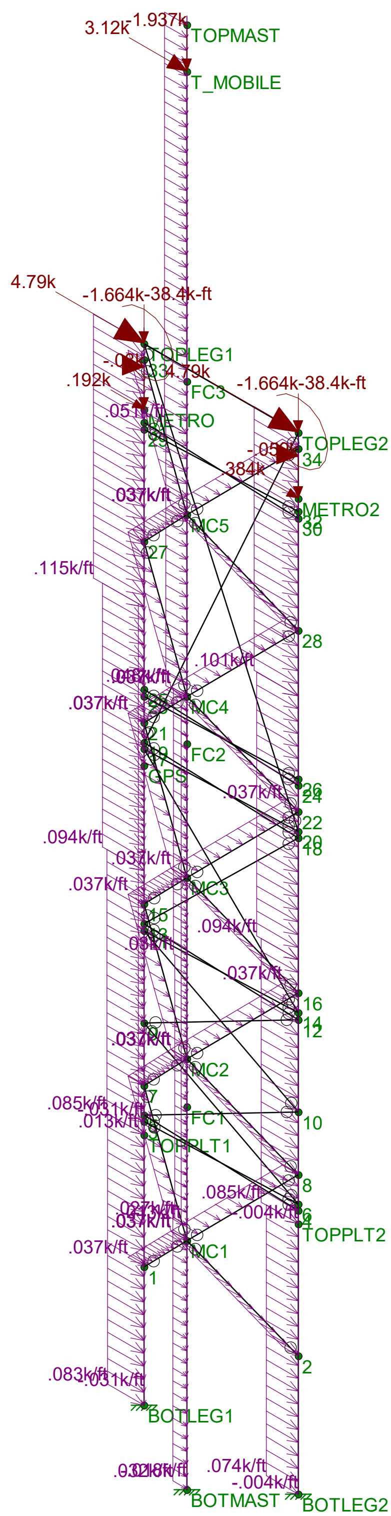
Centek Engineering	82' Sign Structure with 111' Pipe Mast	
TJL		Aug 8, 2017 at 8:42 AM
17004.35	LC #1 Loads	82' Sign Structure.r3d



Results for LC 1, 1.2D + 1.6W (X-direction)
Reaction and Moment Units are k and k-ft

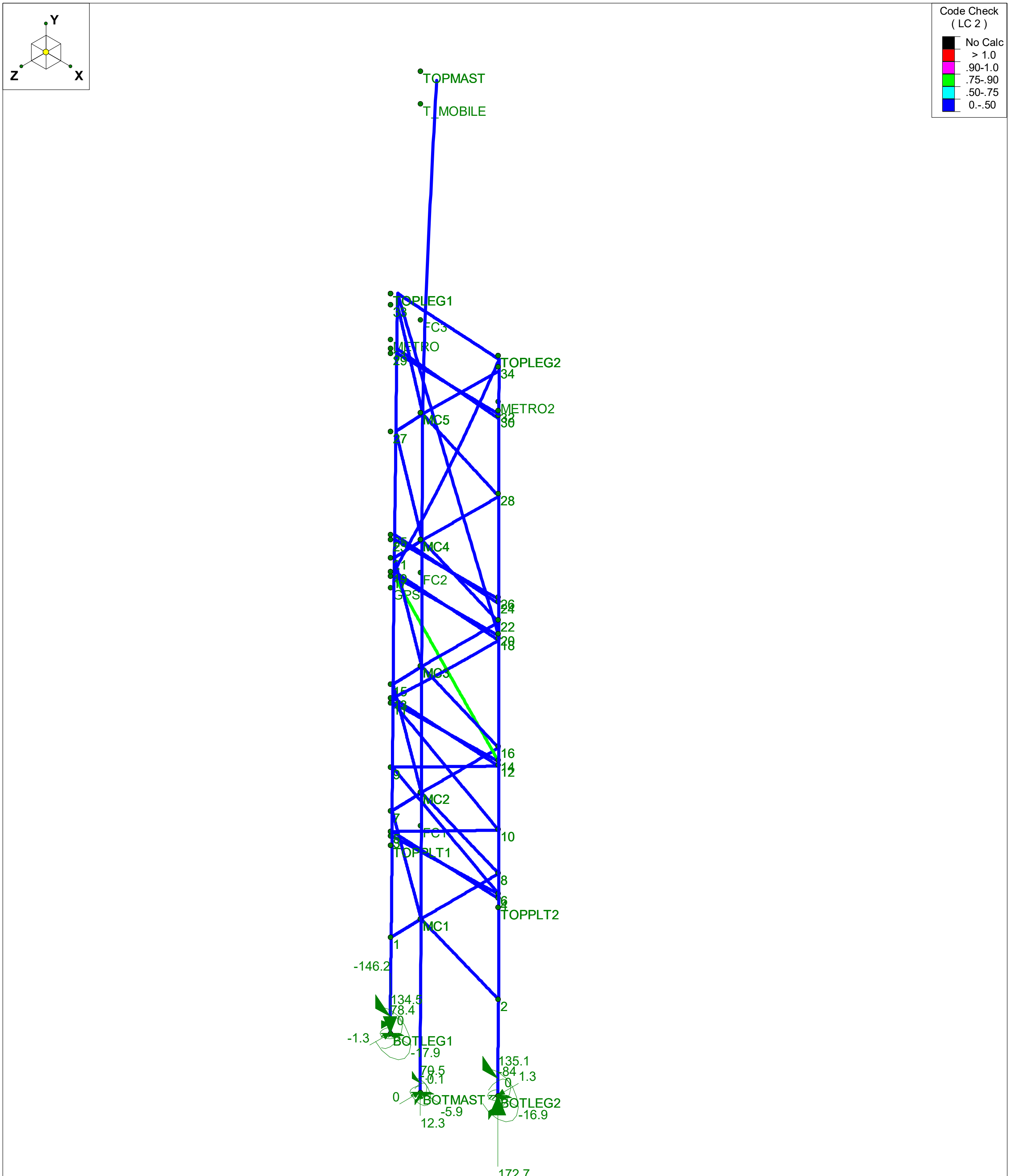
Centek Engineering	82' Sign Structure with 111' Pipe Mast	
TJL		Aug 8, 2017 at 8:45 AM
17004.35	LC #1 Reactions and Deflected Shape	82' Sign Structure.r3d





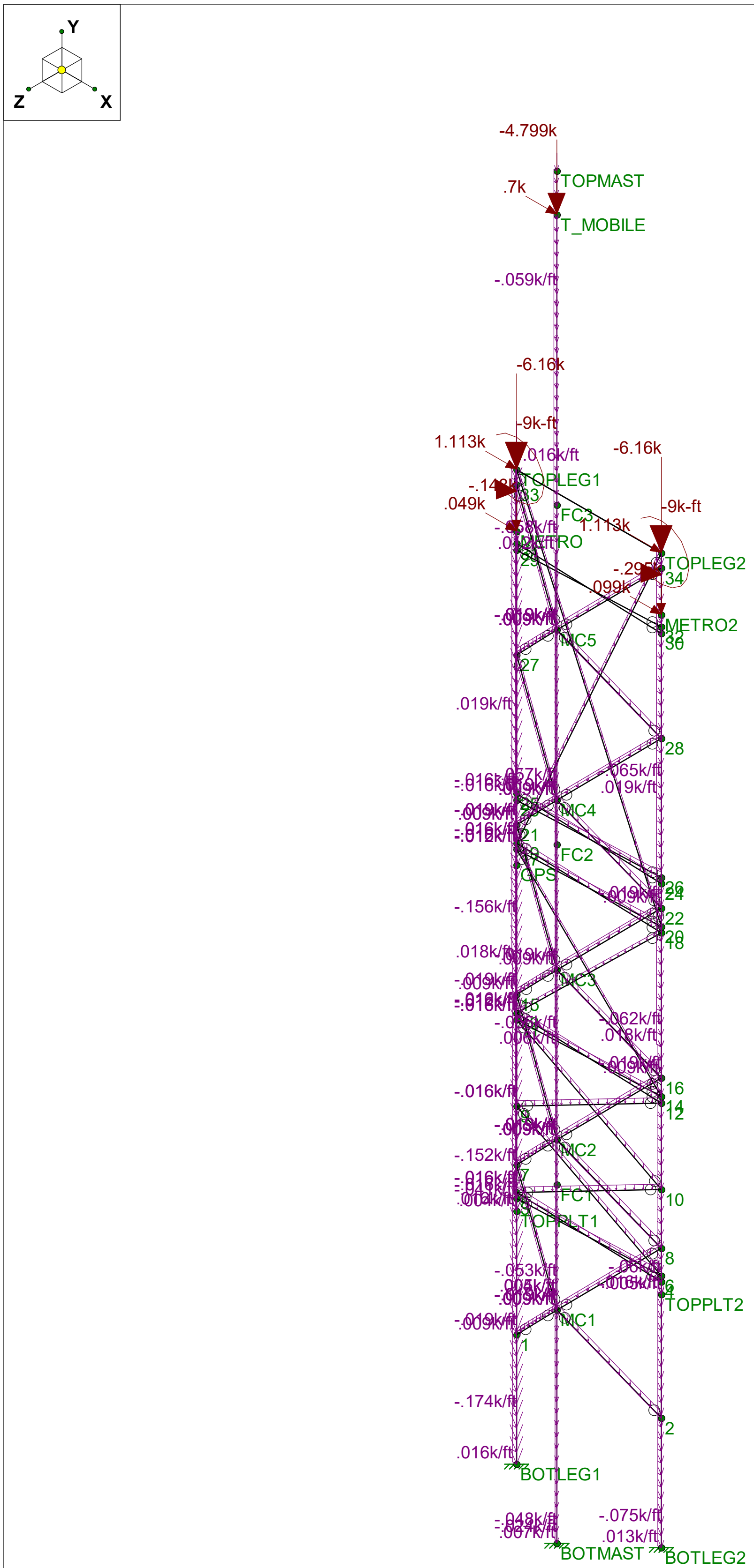
Loads: LC 2, 0.9D + 1.6W (X-direction)
Envelope Only Solution

Centek Engineering		
TJL	82' Sign Structure with 111' Pipe Mast	Aug 8, 2017 at 8:42 AM
17004.35	LC #2 Loads	82' Sign Structure.r3d



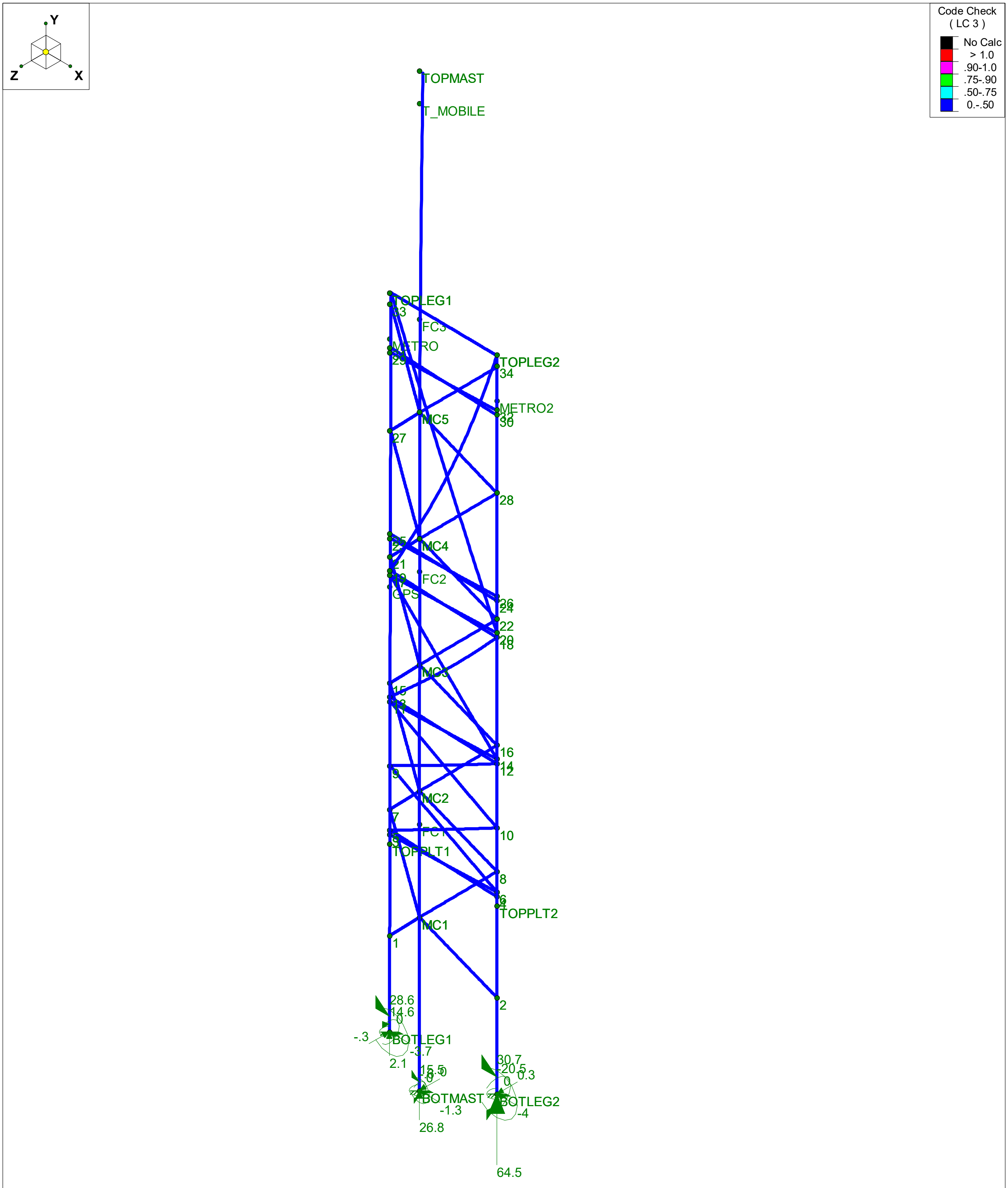
Results for LC 2, 0.9D + 1.6W (X-direction)
Reaction and Moment Units are k and k-ft

Centek Engineering	82' Sign Structure with 111' Pipe Mast	
TJL		Aug 8, 2017 at 8:46 AM
17004.35	LC #2 Reactions and Deflected Shape	82' Sign Structure.r3d



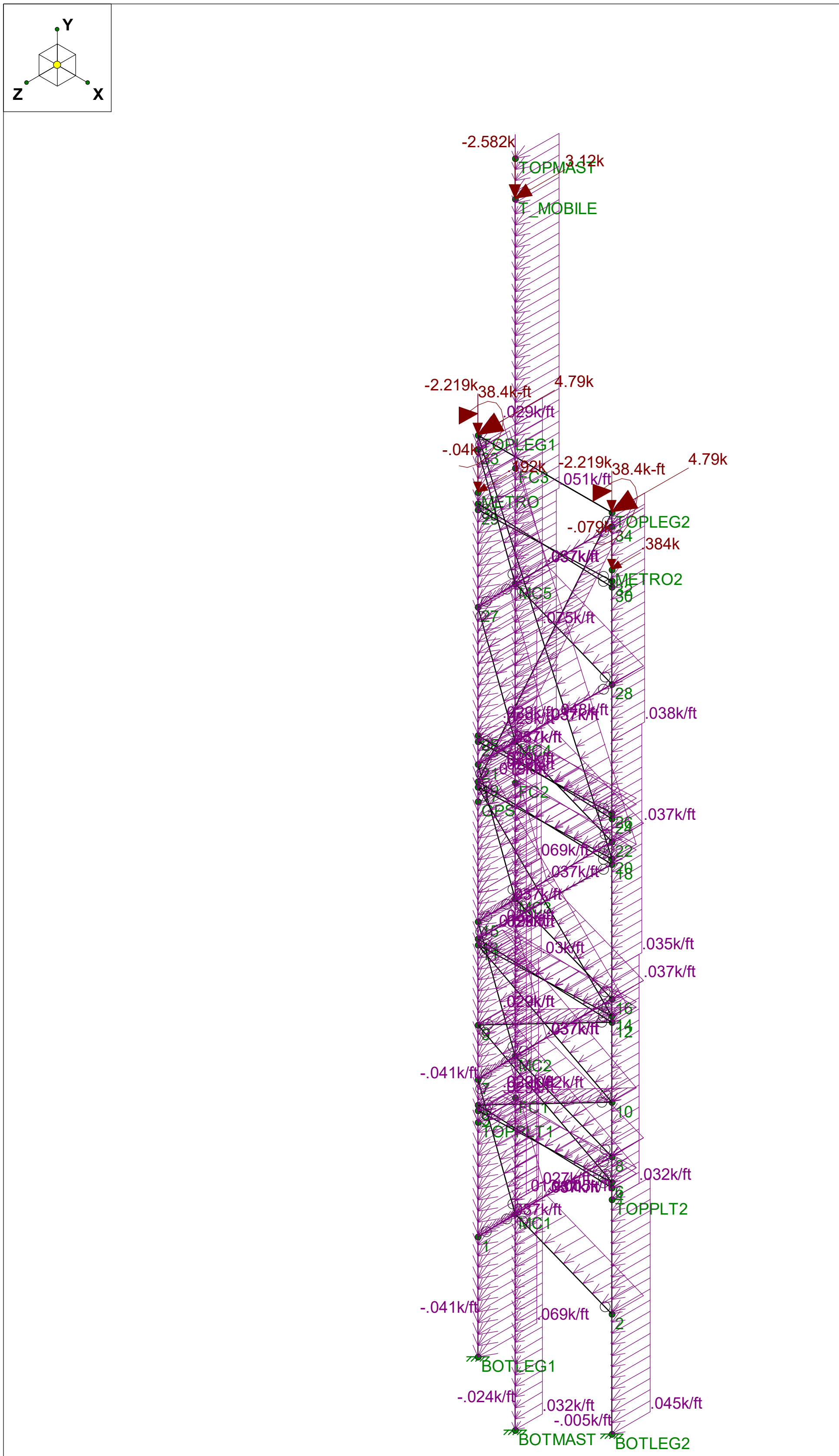
Loads: LC 3, 1.2D + 1.0Di + 1.0Wi (X-direction)
Envelope Only Solution

Centek Engineering	82' Sign Structure with 111' Pipe Mast	
TJL		Aug 8, 2017 at 8:42 AM
17004.35	LC #3 Loads	82' Sign Structure.r3d



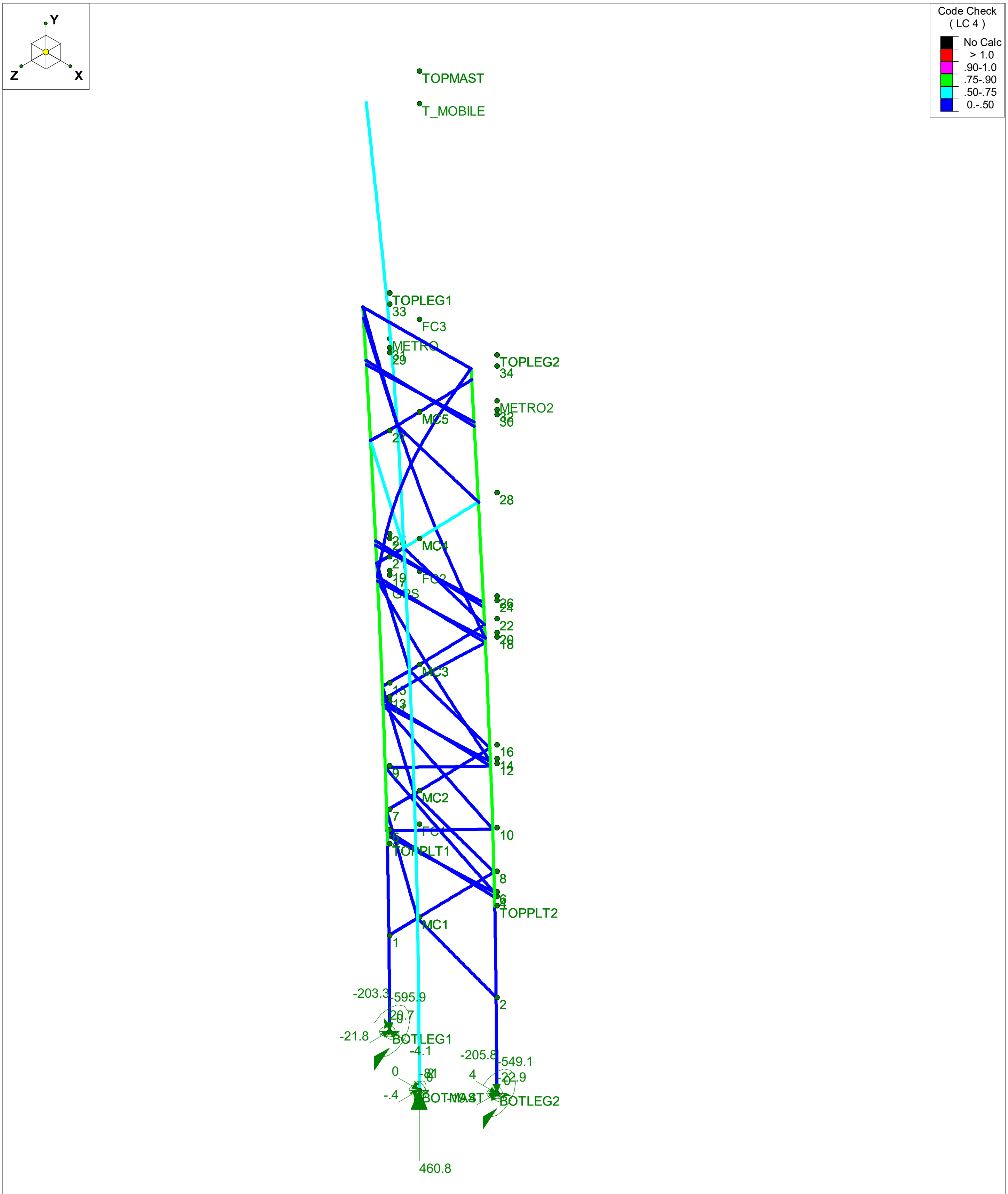
Results for LC 3, 1.2D + 1.0Di + 1.0Wi (X-direction)
Reaction and Moment Units are k and k-ft

Centek Engineering		
TJL	82' Sign Structure with 111' Pipe Mast	Aug 8, 2017 at 8:46 AM
17004.35	LC #3 Reactions and Deflected Shape	82' Sign Structure.r3d



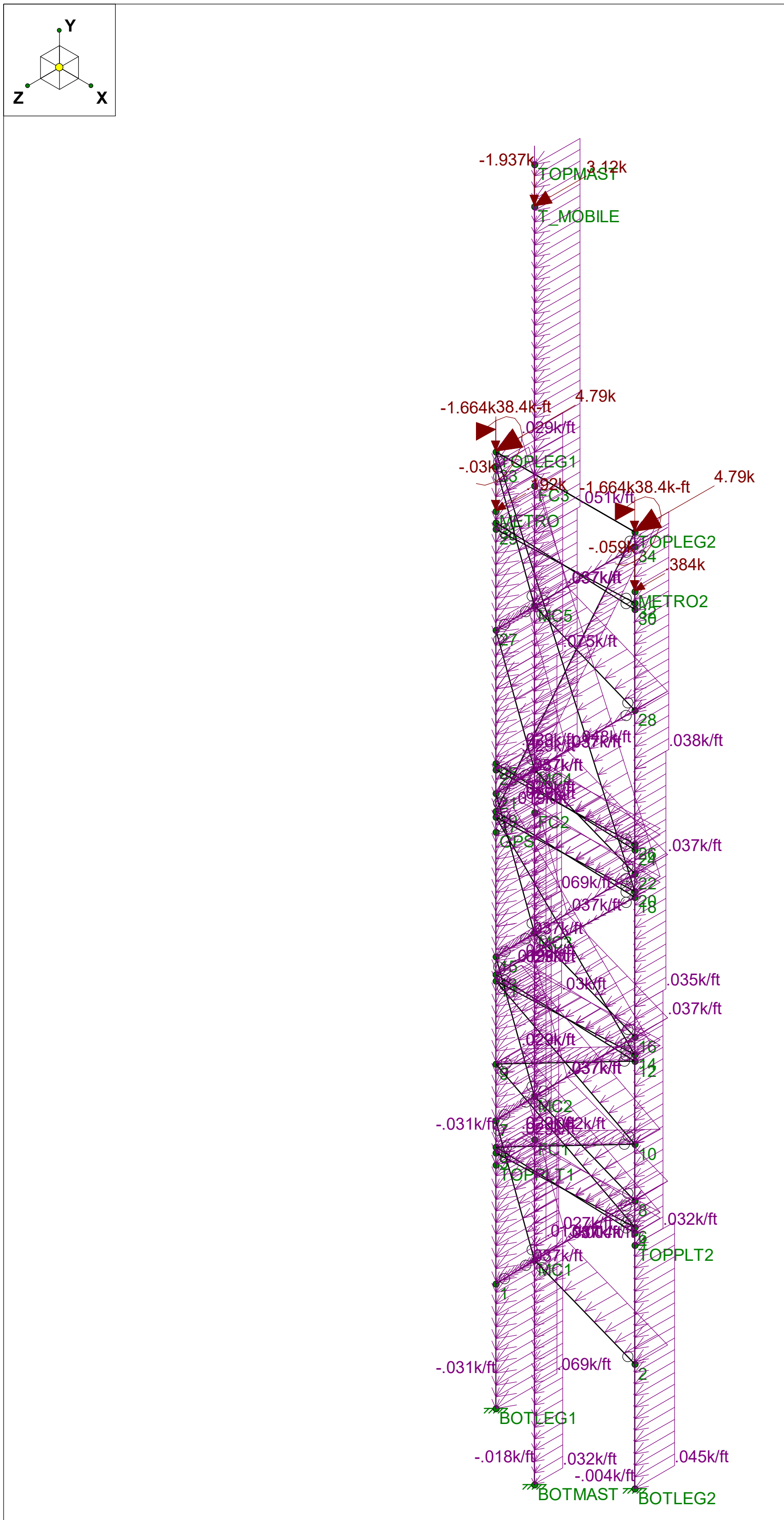
Loads: LC 4, 1.2D + 1.6W (Z-direction)
Envelope Only Solution

Centek Engineering	82' Sign Structure with 111' Pipe Mast	
TJL		Aug 8, 2017 at 8:43 AM
17004.35	LC #4 Loads	82' Sign Structure.r3d



Results for LC 4, 1.2D + 1.6W (Z-direction)
Reaction and Moment Units are k and k-ft

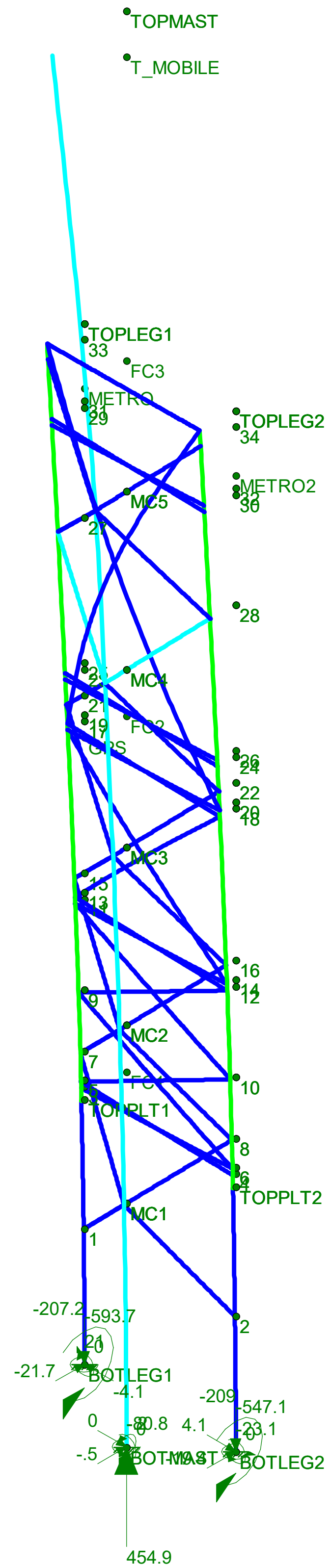
Centek Engineering		
TJL	82' Sign Structure with 111' Pipe Mast	Aug 8, 2017 at 8:46 AM
17004.35	LC #4 Reactions and Deflected Shape	82' Sign Structure.r3d



Loads: LC 5, 0.9D + 1.6W (Z-direction)
Envelope Only Solution

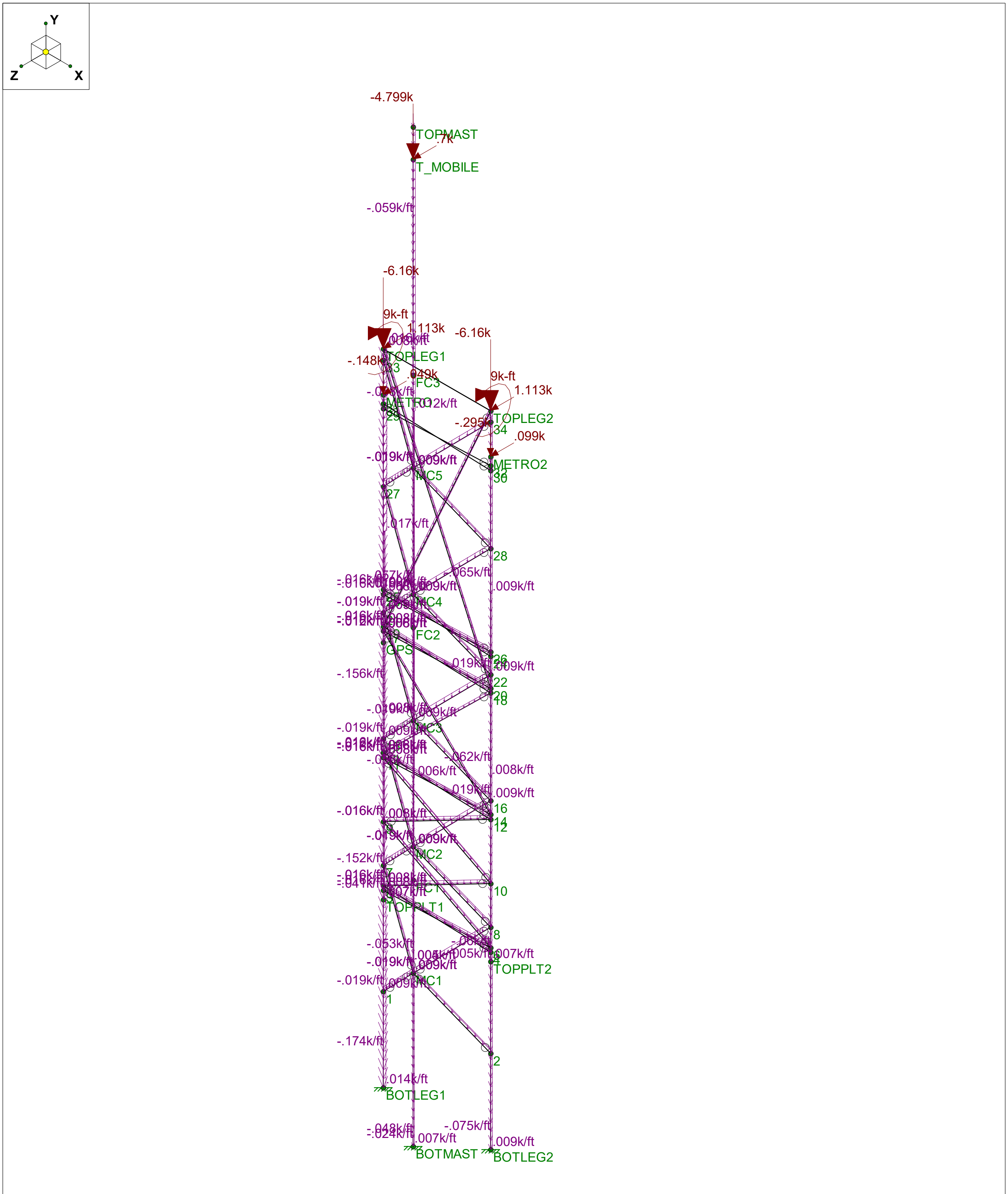
Centek Engineering	82' Sign Structure with 111' Pipe Mast	
TJL		Aug 8, 2017 at 8:43 AM
17004.35	LC #5 Loads	82' Sign Structure.r3d

Code Check (LC 5)	
No Calc	Black
> 1.0	Red
.90-1.0	Magenta
.75-.90	Green
.50-.75	Cyan
0.-.50	Blue



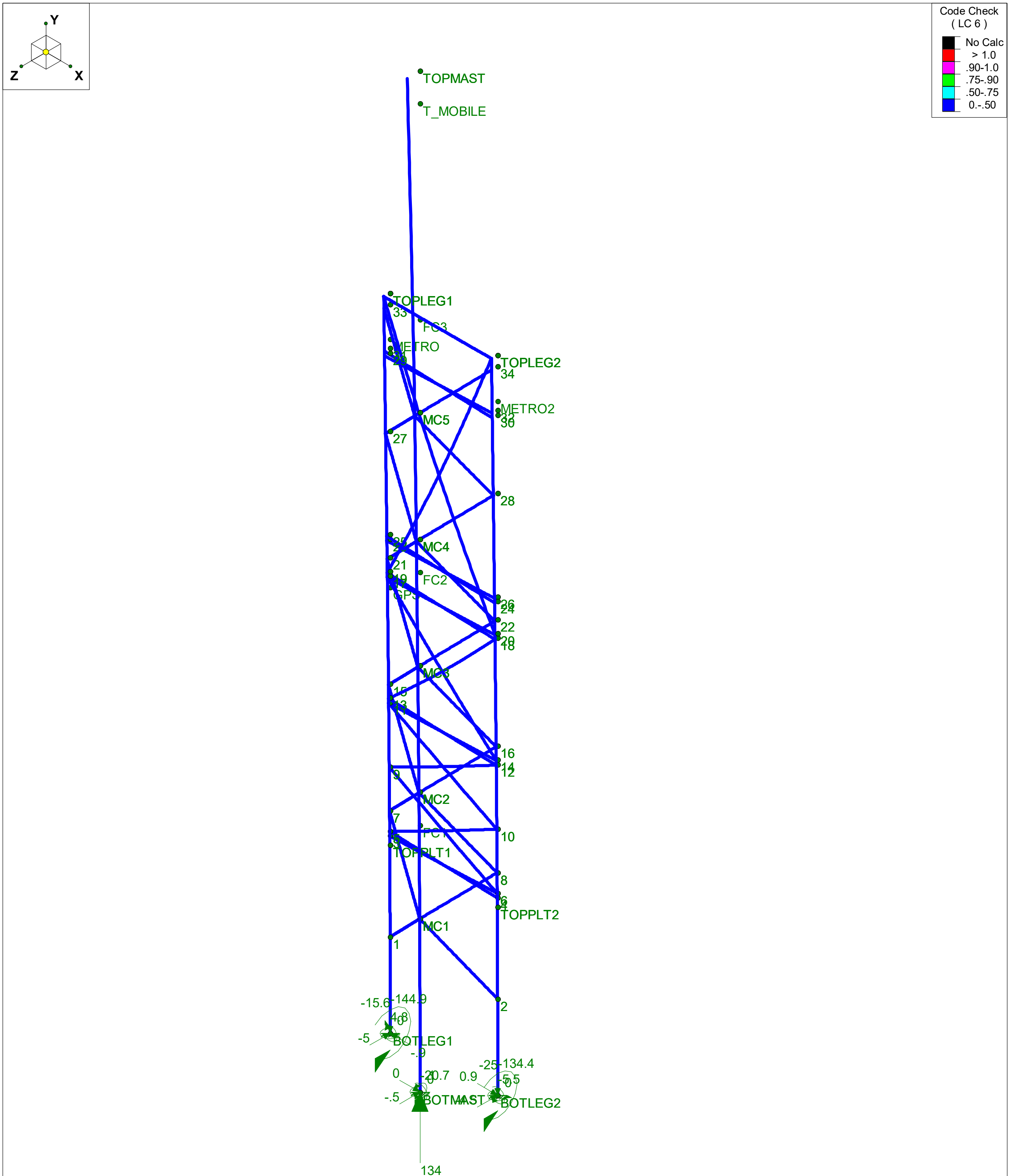
Results for LC 5, 0.9D + 1.6W (Z-direction)
Reaction and Moment Units are k and k-ft

Centek Engineering		
TJL	82' Sign Structure with 111' Pipe Mast	Aug 8, 2017 at 8:47 AM
17004.35	LC #5 Reactions and Deflected Shape	82' Sign Structure.r3d



Loads: LC 6, 1.2D + 1.0Di + 1.0Wi (Z-direction)
Envelope Only Solution

Centek Engineering	82' Sign Structure with 111' Pipe Mast	
TJL		Aug 8, 2017 at 8:43 AM
17004.35	LC #6 Loads	82' Sign Structure.r3d



Results for LC 6, 1.2D + 1.0Di + 1.0Wi (Z-direction)
Reaction and Moment Units are k and k-ft

Centek Engineering	82' Sign Structure with 111' Pipe Mast	
TJL		Aug 8, 2017 at 8:48 AM
17004.35	LC #6 Reactions and Deflected Shape	82' Sign Structure.r3d

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$OM := 71 \cdot ft \cdot kips$	(User Input)
Shear Force =	$Shear := 6 \cdot kips$	(User Input)
Axial Force =	$Axial := 12 \cdot kips$	(User Input)

Anchor Bolt Data:

ASTMA615 Grade 75

Number of Anchor Bolts =	$N := 10$	(User Input)
Diameter of Bolt Circle =	$D_{bc} := 24 \cdot in$	(User Input)
Bolt "Column" Distance =	$l := 0 \cdot in$	(User Input)
Bolt Ultimate Strength =	$F_u := 100 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 75 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Anchor Bolts =	$D := 1.75 \cdot in$	(User Input)
Threads per Inch =	$n := 5$	(User Input)
Top of Concrete to Bot Leveling Nut =	$l_{ar} := 0 \cdot in$	(User Input)

Base Plate Data:

Use ASTM A572 Grade 50

Plate Yield Strength =	$Fy_{bp} := 50 \cdot ksi$	(User Input)
Base Plate Thickness =	$t_{bp} := 2.0 \cdot in$	(User Input)
Base Plate Diameter =	$D_{bp} := 30 \cdot in$	(User Input)
Outer Pole Diameter =	$D_{pole} := 18 \cdot in$	(User Input)

$\eta := 0.55$

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 12 \cdot in$

Distance to Bolts = $i := 1..N$

$$d_i := \left| \begin{array}{l} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N}\right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{array} \right.$$

$d_1 = 7.05 \cdot in$

$d_2 = 11.41 \cdot in$

$d_3 = 11.41 \cdot in$

$d_4 = 7.05 \cdot in$

$d_5 = 0.00 \cdot in$

$d_6 = -7.05 \cdot in$

$d_7 = -11.41 \cdot in$

$d_8 = -11.41 \cdot in$

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 9 \cdot in$

Moment Arms of Bolts about Neutral Axis = $MA_i := if\left(d_i \geq R_{pole}, d_i - R_{pole}, 0in\right)$

$MA_1 = 0.00 \cdot in$

$MA_2 = 2.41 \cdot in$

$MA_3 = 2.41 \cdot in$

$MA_4 = 0.00 \cdot in$

$MA_5 = 0.00 \cdot in$

$MA_6 = 0.00 \cdot in$

$MA_7 = 0.00 \cdot in$

$MA_8 = 0.00 \cdot in$

Effective Width of Baseplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 19.2 \cdot in$

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i (d_i)^2 = 720 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 2.405 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 1.899 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 1.555 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.389 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^{\ 3}}{32} = 0.369 \cdot in^3$

Tensile Root Diameter = $d_{rt} := D - \frac{0.9743 \cdot in}{n} = 1.555 \cdot in$

Plastic Section Modulus = $Z := \frac{d_{rt}^{\ 3}}{6} = 0.627 \cdot in^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 13 \cdot kips$

Maximum Compressive Force = $P_u := OM \cdot \frac{R_{bc}}{I_p} + \frac{Axial}{N} = 15.4 \cdot kips$

Maximum Shear Force = $V_u := \frac{Shear}{N} = 0.6 \cdot kips$

Design Tensile Strength = $\Phi R_{nt} := 0.8 \cdot F_u \cdot A_n = 151.956 \cdot k$

Bolt % of Capacity = $\frac{\left(T_{Max} + \frac{V_u}{\eta}\right)}{\Phi R_{nt}} \cdot 100 = 9.3$

Condition1 = $Condition1 := if\left[\frac{\left(T_{Max} + \frac{V_u}{\eta}\right)}{\Phi R_{nt}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right]$

Condition1 = "OK"

Base Plate Analysis:

Force from Bolts = $C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$

$C_1 = 9.5 \cdot kips$

$C_2 = 14.7 \cdot kips$

$C_3 = 14.7 \cdot kips$

$C_4 = 9.5 \cdot kips$

$C_5 = 1.2 \cdot kips$

$C_6 = -7.1 \cdot kips$

$C_7 = -12.3 \cdot kips$

$C_8 = -12.3 \cdot kips$

Maximum Bending Stress in Plate = $f_{bp} := \sum_i \frac{4 \cdot C_i \cdot MA_i}{\left(B_{eff} t_{bp}^{\ 2}\right)} = 3.7 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := 0.9 \cdot Fy_{bp} = 45 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 8.2 \cdot \%$

Condition2 = Condition2 := if$\left(\frac{f_{bp}}{F_{bp}} < 1.00, \text{"Ok"}, \text{"Overstressed"}\right)$

Condition2 = "Ok"

Flange Bolt and Flange Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$OM := 92 \cdot ft \cdot kips$	(User Input)
Shear Force =	$Shear := 5 \cdot kips$	(User Input)
Axial Force =	$Axial := 5 \cdot kips$	(User Input)

Flange Bolt Data:

Use ASTM A325

Number of Flange Bolts =	$N := 20$	(User Input)
Diameter of Bolt Circle =	$D_{bc} := 21 \cdot in$	(User Input)
Bolt Minimum Tensile Strength =	$F_{ub} := 120 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Flange Bolts =	$D := 1.00 \cdot in$	(User Input)
Threads per Inch =	$n := 8$	(User Input)

Flange Plate Data:

Use ASTM A572 Grade 50

Plate Yield Strength =	$Fy_{bp} := 50 \cdot ksi$	(User Input)
Flange Plate Thickness =	$t_{bp} := 1.25 \cdot in$	(User Input)
Flange Plate Diameter =	$D_{bp} := 24 \cdot in$	(User Input)
Outer Pole Diameter =	$D_{pole} := 18 \cdot in$	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 10.5 \cdot in$

Distance to Bolts = $i := 1..N$

$$d_i := \begin{vmatrix} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N}\right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{vmatrix}$$

$d_1 = 3.24 \cdot in$	$d_7 = 8.49 \cdot in$
$d_2 = 6.17 \cdot in$	$d_8 = 6.17 \cdot in$
$d_3 = 8.49 \cdot in$	$d_9 = 3.24 \cdot in$
$d_4 = 9.99 \cdot in$	$d_{10} = 0.00 \cdot in$
$d_5 = 10.50 \cdot in$	$d_{11} = -3.24 \cdot in$
$d_6 = 9.99 \cdot in$	$d_{12} = -6.17 \cdot in$

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 9 \cdot in$

Moment Arms of Bolts about Neutral Axis = $MA_i := if\left(d_i \geq R_{pole}, d_i - R_{pole}, 0in\right)$

$MA_1 = 0.00 \cdot in$	$MA_7 = 0.00 \cdot in$
$MA_2 = 0.00 \cdot in$	$MA_8 = 0.00 \cdot in$
$MA_3 = 0.00 \cdot in$	$MA_9 = 0.00 \cdot in$
$MA_4 = 0.99 \cdot in$	$MA_{10} = 0.00 \cdot in$
$MA_5 = 1.50 \cdot in$	$MA_{11} = 0.00 \cdot in$
$MA_6 = 0.99 \cdot in$	$MA_{12} = 0.00 \cdot in$

Effective Width of Flangeplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 12.7 \cdot in$

Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i (d_i)^2 = 1.102 \times 10^3 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 0.785 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 0.606 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 0.878 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.22 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^{\;3}}{32} = 0.066 \cdot in^3$

Check Flange Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 10.3 \cdot kips$

Maximum Shear Force = $V_{Max} := \frac{Shear}{N} = 0.3 \cdot kips$

Design Tensile Strength = $\Phi R_{nt} := (0.75 \cdot F_{ub} \cdot 0.75 \cdot A_g) = 53 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{\Phi R_{nt}} = 19.36 \cdot \%$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{\Phi R_{nt}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

Condition1 = "OK"

Design Shear Strength = $\Phi R_{nv} := (0.75 \cdot 0.45 \cdot F_{ub} \cdot A_g) = 31.8 \cdot kips$

Condition2 = $Condition2 := if\left[\left(\frac{V_{Max}}{\Phi R_{nv}}\right)^2 + \left(\frac{T_{Max}}{\Phi R_{nt}}\right)^2 \le 1.00, \text{"OK"}, \text{"Overstressed"}\right]$

Condition2 = "OK"

Flange Plate Analysis:

Force from Bolts =

$$C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$$

$C_1 = 3.5 \cdot kips$

$C_2 = 6.4 \cdot kips$

$C_3 = 8.8 \cdot kips$

$C_4 = 10.2 \cdot kips$

$C_5 = 10.8 \cdot kips$

$C_6 = 10.2 \cdot kips$

$C_7 = 8.8 \cdot kips$

$C_8 = 6.4 \cdot kips$

$C_9 = 3.5 \cdot kips$

$C_{10} = 0.3 \cdot kips$

$C_{11} = -3.0 \cdot kips$

$C_{12} = -5.9 \cdot kips$

Maximum Bending Stress in Plate =

$$f_{bp} := \sum_i \frac{4 \cdot C_i \cdot MA_i}{\left(B_{eff} \cdot t_{bp}^{\ 2}\right)} = 7.3 \cdot ksi$$

Allowable Bending Stress in Plate =

$$F_{bp} := 0.9 \cdot Fy_{bp} = 45 \cdot ksi$$

Plate Bending Stress % of Capacity =

$$\frac{f_{bp}}{F_{bp}} = 16.3 \cdot \%$$

Condition3 =

$$Condition3 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, \text{"Ok"}, \text{"Overstressed"}\right)$$

Condition3 = "Ok"

Anchor Bolt Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$OM := 596 \cdot ft \cdot kips$	(Input From Risa-3D)
Shear Force =	$Shear := 5 \cdot kips$	(Input From Risa-3D)
Axial Force =	$Axial := -204 \cdot kips$	(Input From Risa-3D)

Anchor Bolt Data:

Use ASTM A36

Number of Anchor Bolts =	$N := 20$	(User Input)
Bolt Ultimate Strenght =	$F_u := 58 \cdot ksi$	(User Input)
Bolt Yeild Strenght =	$F_y := 36 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Anchor Bolts =	$D_b := 1.5 \cdot in$	(User Input)
Threads per Inch =	$n_b := 6$	(User Input)

Base Plate Data:

Use AST M36

Plate Yield Strength =	$Fy_{bp} := 36 \cdot ksi$	(User Input)
Base Plate Thickness =	$t_{bp} := 1.5 \cdot in$	(User Input)
	$\eta := 0.55$	

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

$d_1 := 17.125in$ (User Input)

$d_2 := 11.25in$ (User Input)

$d_3 := 4.9375in$ (User Input)

Number of Bolts at Distance:

$N_1 := 12$

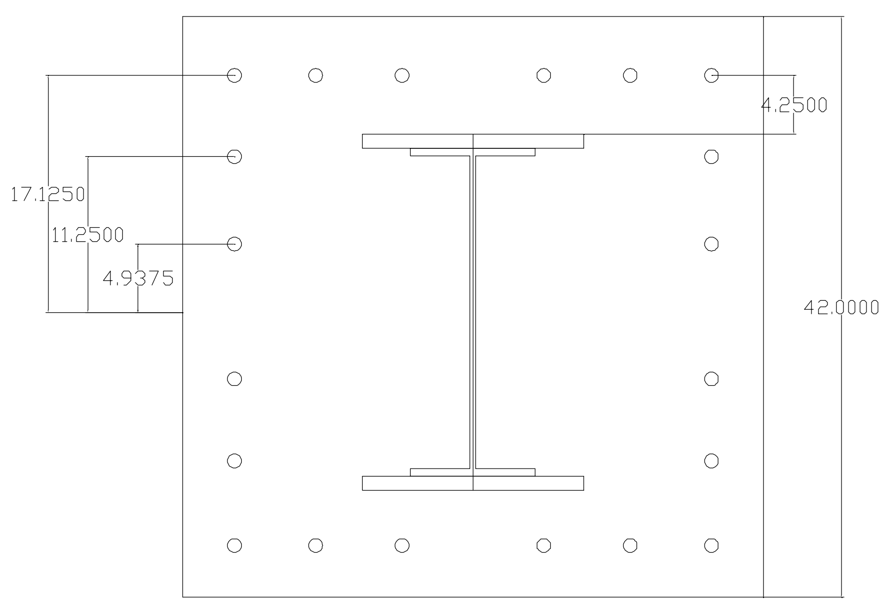
$N_2 := 4$

$N_3 := 4$

Critical Distances For Bending in Plate:

$ma_1 := 4.25in$ (User Input)

Effective Width of Baseplate for Bending = $B_{eff} := 42in$ (User Input)



ANCHOR BOLT AND PLATE GEOMETRY

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \left[(d_1)^2 \cdot N_1 + (d_2)^2 \cdot N_2 + (d_3)^2 \cdot N_3\right] = 4123 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D_b^{\,2} = 1.767 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D_b - \frac{0.9743 \cdot in}{n_b}\right)^2 = 1.405 \cdot in^2$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := \frac{OM \cdot d_1}{I_p} - \frac{Axial}{N} = 39.9 \cdot kips$

Maximum Shear Force = $V_u := \frac{Shear}{N} = 0.3 \cdot kips$

Design Tensile Strength = $\Phi R_{nt} := 0.8 \cdot F_u \cdot A_n = 65.204 \cdot k$

Bolt % of Capacity = $\frac{\left(T_{Max} + \frac{V_u}{\eta}\right)}{\Phi R_{nt}} \cdot 100 = 61.9$

Condition1 = $Condition1 := \text{if}\left[\frac{\left(T_{Max} + \frac{V_u}{\eta}\right)}{\Phi R_{nt}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right]$

Condition1 = "OK"

Foundation Check

Base Reactions:

$OM_1 := 596 \cdot kip \cdot ft$

$Axial_1 := -203 \cdot kips$

$Shear_1 := 22 \cdot kips$

$OM_2 := 549 \cdot kip \cdot ft$

$Axial_2 := -206 \cdot kips$

$Shear_2 := 20 \cdot kips$

$OM_m := 81 \cdot kip \cdot ft$

$Axial_m := 461 \cdot kips$

$Shear_m := 1 \cdot kips$

Foundation Data:

$D1 := 1.29 \cdot ft$

$D2 := 2 \cdot ft$

$D3 := 3 \cdot ft$

$D4 := 3 \cdot ft$

$D_{tot} := 7.17 \cdot ft$

$W1 := 6 \cdot ft$

$W2 := 21.5 \cdot ft$

$W3 := 26.5 \cdot ft$

$W4 := 55 \cdot ft$

$L1 := 6 \cdot ft$

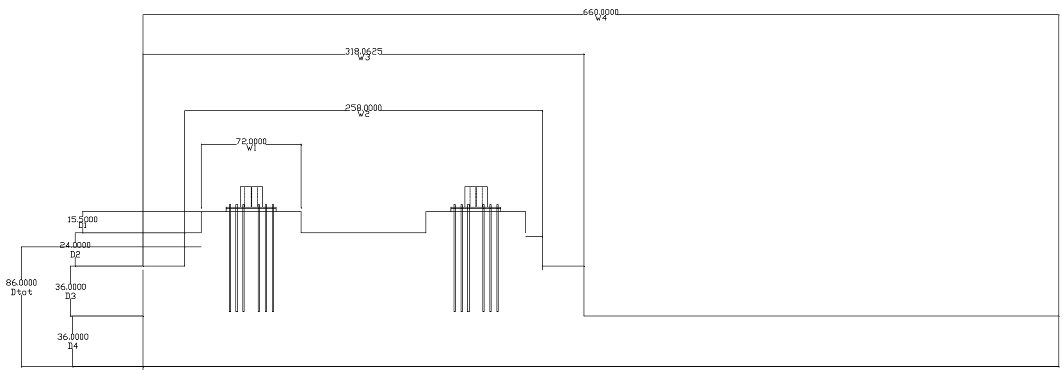
$L2 := 11 \cdot ft$

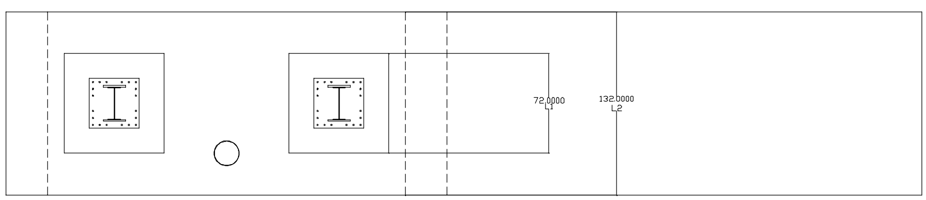
Material Data;

$\gamma_{conc} := 150 \cdot pcf$

$\gamma_{soil} := 100 \cdot pcf$

$\Phi_s := 30 \cdot deg$





Volume of Concrete = $V_c := (D1 \cdot W1 \cdot L1) + (D2 \cdot W2 + D3 \cdot W3 + D4 \cdot W4) \cdot L2 = 3209 \cdot ft^3$

Volume of Soil Above Footing = $V_{s1} := [(D2 - 10 \cdot in) \cdot (W3 - W2) + [(D2 - 10 \cdot in) + D3] \cdot (W4 - W3)] \cdot L2 = 1370 \cdot ft^3$

Volume of Soil Wedge at Back Face = $V_{s2} := D_{tot}^{\ 2} \cdot W4 \cdot \tan(\Phi_s) = 1632 \cdot ft^3$

Volume of Soil Wedge at Back Face Corners = $V_{s3} := 2 \cdot \left[\left(D_{tot}\right)^3 \cdot \frac{\tan(\Phi_s)}{3} \right] = 142 \cdot ft^3$

Weight of Concrete = $W_c := V_c \cdot \gamma_{conc} = 481 \cdot kips$

Weight of Soil Above Footing = $W_{s1} := V_{s1} \cdot \gamma_{soil} = 137 \cdot kips$

Weight of Soil Wedge at Back Face = $W_{s2} := V_{s2} \cdot \gamma_{soil} = 163 \cdot kips$

Weight of Soil Wedge at Back Face Corners = $W_{s3} := V_{s3} \cdot \gamma_{soil} = 14 \cdot kips$

$$M_r := \left(0.9W_c + 0.75W_{s1} + Axial_1 + Axial_2 + Axial_m\right)\cdot\frac{L2}{2} + \left(0.75W_{s2} + 0.75W_{s3}\right)\left(L2 + \frac{D_{tot}\cdot\tan\left(\Phi_s\right)}{2}\right) =$$

$$M_{ot} := OM_1 + OM_2 + OM_m + \left(Shear_1 + Shear_2 + Shear_m\right)\cdot D_{tot} = 1534\cdot kip\cdot ft$$

$$FS := \frac{M_r}{M_{ot}} = 3.2$$

$$Condition1 := if\left(\frac{M_r}{M_{ot}} > 1, \text{"OK"}, \text{"Overstressed"}\right)$$

Condition1 = "OK"

Section 1 - RFDS GENERAL INFORMATION

RFDS NAME:	CTU5144	DATE:	08/25/2016	RF DESIGN ENG:	Parminder Singh
ISSUE:	1xXMU RRH ADD	Approved? (Y/N):	Yes	RF DESIGN PHONE:	508-271-8355
REVISION:	Preliminary	RF MANAGER:	John Benendetto	RF DESIGN EMAIL:	SP656B@ATT.COM
INITIATIVE /PROJECT:	LTE 1900 A3-A4 & E - 1xXMU RRH ADD				

RF PERF ENG:		RFDS PROGRAM TYPE:	2017 LTE Extended Carrier
RF PERF PHONE:		RFDS TECHNOLOGY:	1xXMU RRH ADD
RF PERF EMAIL:		State:	Final
TRIDENT:		Status:	RF Approval
GSM FREQUENCY:		RFDS ID:	1365947
UMTS FREQUENCY:	850, 1900	RFDS Version:	1.00
LTE FREQUENCY:	700, 1900, WCS	Created By:	sp656b
		Date Created:	8/25/2016 4:41:26 PM
		Date Updated:	9/1/2016 3:16:08 PM
		Updated By:	sp656b
I-PLAN JOB # 1:	NER-RCTB-16-03117	IPLAN PRD GRP || SUB GRP #1:	LTE Extended Carrier || 1xXMU RRH ADD
I-PLAN JOB # 2:		IPLAN PRD GRP || SUB GRP #2:	
I-PLAN JOB # 3:		IPLAN PRD GRP || SUB GRP #3:	
I-PLAN JOB # 4:		IPLAN PRD GRP || SUB GRP #4:	

Section 2 - LOCATION INFORMATION

USID:	14490	FA LOCATION CODE:	10070987	LOCATION NAME:	CROMWELLSOUTH
REGION:	NORTHEAST	MARKET CLUSTER:	NEW ENGLAND	MARKET:	CONNECTICUT
ADDRESS:	100 CHRISTIAN HILL ROAD	CITY:	CROMWELL	STATE:	CT
ZIP CODE:	06416	COUNTY:	MIDDLESEX	MSA / RSA:	
LATITUDE (D-M-S):	41d 36m 20.13084s	LONGITUDE (D-M-S):	-72d -42m -6.83604s	LAT (DEC. DEG.):	41.6055919
DIRECTIONS, ACCESS AND EQUIPMENT LOCATION:	UPDATED 4/04CROMWELL SOUTH CT-144FROM I-95 NORTH (NEW ENGLAND THRUWAY). IN NEW HAVEN GET OFF EXIT 48 THIS WILL BE A LEFT-HAND EXIT THAT WILL PUT YOU ON I-91 NORTH. GET OFF AT EXIT 21 ,AT THE END OF THE EXIT ATHE LIGHT TAKE A LEFT ONTO ROUTE 3-72. FOLLOW 3-72 FOR ABOUT 7/10THS OF A MILE AND TAKE A LEFT ONTO COLES RD.,FOLLOW THIS UNTIL YOU GET TO CHRISTIAN HILL RD,FOLLOW THIS TO OUR CELL SITE AT THE TOP OF THE HILL.ADDRESS:100 CHRISTIAN HILL ROAD,CROMWELL,CT.06416ACCESS: 24/7 SESAMEE COMBO 8899CONTACT: SECURITY: NONEPOWER COMPANY:NORTHEAST UTILITIES.FIRE: (860) 342-2326 POLICE: (860) 347-6941T-1 CIRCUIT NUMBERS HCGS :681899,HCGS:681898 SNET: (800) 448-1008 AND (203) 420-3131 (24-HR REPAIR)METER:03-007-958.				

ORACLE PTN # 1:		PACE JOB # 1:	MRCTB019754
ORACLE PTN # 2:		PACE JOB # 2:	
ORACLE PTN # 3:		PACE JOB # 3:	
ORACLE PTN # 4:		PACE JOB # 4:	
SEARCH RING NAME:			
SEARCH RING ID:		CASPR INITIATIVE # 1:	
BTA:		CASPR INITIATIVE # 2:	
LONG (DEC. DEG.):	-72.7018989	CASPR INITIATIVE # 3:	
BORDER CELL WITH CONTOUR COORD:		CASPR INITIATIVE # 4:	
AM STUDY REQ'D (Y/N):	No		
FREQ COORD:			

Section 3 - LICENSE COVERAGE/FILING INFORMATION

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

CGSA CALL SIGNS:	

Section 4 - TOWER/REGULATORY INFORMATION

STRUCTURE AT&T OWNED?:	Yes	GROUND ELEVATION (ft):	0	STRUCTURE TYPE:	BILLBOARD-SIGN
ADDITIONAL REGULATORY?:	Yes	HEIGHT OVERALL (ft):	0.00	FCC ASR NUMBER:	NR
SUB-LEASE RIGHTS?:	Yes	STRUCTURE HEIGHT (ft):	0.00		
LIGHTING TYPE:	NOT REQUIRED				

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

Section 5 - E-911 INFORMATION - existing

	PSAP NAME:	PSAP ID:	E911 PHASE:	MPC SVC PROVIDER:	LMU REQUIRED:	ESRN:	DATE LIVE PH1:	DATE LIVE PH2:
SECTOR A E-911	CONNECTICUT STATE POLICE-H TROOP	1320		INTRADO_MIAMI				
SECTOR B	CONNECTICUT STATE POLICE-H TROOP	1320		INTRADO_MIAMI				
SECTOR C	CONNECTICUT STATE POLICE-H TROOP	1320		INTRADO_MIAMI				
SECTOR D	CONNECTICUT STATE POLICE-H TROOP	1320		INTRADO				
SECTOR E	CONNECTICUT STATE POLICE-H TROOP	1320		INTRADO				
SECTOR F	CONNECTICUT STATE POLICE-H TROOP	1320		INTRADO				
OMNI								

Section 5 - E-911 INFORMATION - final

	PSAP NAME:	PSAP ID:	E911 PHASE:	MPC SVC PROVIDER:	LMU REQUIRED:	ESRN:	DATE LIVE PH1:	DATE LIVE PH2:
SECTOR A E-911	CONNECTICUT STATE POLICE-H TROOP	1320		INTRADO_MIAMI				
SECTOR B	CONNECTICUT STATE POLICE-H TROOP	1320		INTRADO_MIAMI				
SECTOR C	CONNECTICUT STATE POLICE-H TROOP	1320		INTRADO_MIAMI				
SECTOR D	CONNECTICUT STATE POLICE-H TROOP	1320		INTRADO				
SECTOR E	CONNECTICUT STATE POLICE-H TROOP	1320		INTRADO				
SECTOR F	CONNECTICUT STATE POLICE-H TROOP	1320		INTRADO				
OMNI								

Section 6 - RBS GENERAL INFORMATION - existing

	GSM 1ST RBS	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS									
RBS ID:	43666	172458	246931	367054									
CTS COMMON ID:	184P5144	CTU5144	CTV5144	CTL05144									
CELL ID / BCF:	NYNYCT0144	CTU5144	CTU5144	CTL05144									
BTA/TID:	184P	184V	184U	184L									
4-DIGIT SITE ID:	5144	5144	5144	5144									
COW OR TOY?:	No	No	No	No									
CELL SITE TYPE:													
SITE TYPE:													
BTS LOCATION ID:													
ORIGINATING CO:													
CELLULAR NETWORK:													
OPS DISTRICT:	CT SOUTH-EAST	CT SOUTH-EAST	CT SOUTH-EAST	CT-SOUTH									
RF DISTRICT:													
OPS ZONE:	NE_CT_S_MDSX_N_CS			NE_CT_S_MDSX_N_CS									
RF ZONE:													
BASE STATION TYPE:													
EQUIPMENT NAME:	GSM-CROMWELL-SOUTH	CROMWELLSOUTH	CROMWELL - SOUTH	CROMWELLSOUTH									
DISASTER PRIORITY:													

Section 6 - RBS GENERAL INFORMATION - final

	GSM 1ST RBS	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS									
RBS ID:		172458	246931	367054									
CTS COMMON ID:		CTU5144	CTV5144	CTL05144									
CELL ID / BCF:		CTU5144	CTU5144	CTL05144									
BTA/TID:		184V	184U	184L									
4-DIGIT SITE ID:		5144	5144	5144									
COW OR TOY?:		No	No	No									
CELL SITE TYPE:		SECTORIZED	SECTORIZED	SECTORIZED									
SITE TYPE:		MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL									
BTS LOCATION ID:		INTERNAL	GROUND	INTERNAL									
ORIGINATING CO:		CINGULAR	CINGULAR	CINGULAR									
CELLULAR NETWORK:		GOLD	GOLD	GOLD									
OPS DISTRICT:				CT-South									
RF DISTRICT:		NPO Triage	Middletown	NPO Triage									
OPS ZONE:				NE_CT_S_MDSX_N_CS									
RF ZONE:		Hotseat	BCT08	Hotseat									
BASE STATION TYPE:		BASE	OVERLAY	BASE									
EQUIPMENT NAME:		CROMWELLSOUTH	CROMWELL - SOUTH	CROMWELLSOUTH									
DISASTER PRIORITY:		1	1	3									

Section 7 - RBS SPECIFIC INFORMATION - existing

	GSM 1ST RBS	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS								
MSC:												
BSC/RNC/MME POOL ID:	BCT08	MDTWCTNICRBR06	MDTWCTNICRBR06	FF01								
LAC:	05008	05986	05986									
RAC:												
EQUIPMENT VENDOR:												
EQUIPMENT TYPE:	ULTRASITE											
BASEBAND CONFIGURATION:												
LOCATION:												
CABINET LOCATION:												
MARKET STATE CODE:												
AGPS:	Yes	Yes	Yes	Yes								
NODE B NUMBER:		0	0	5144								
PARENT NAME:	BCT08	MDTWCTNICRBR06	MDTWCTNICRBR06	FF01								

Section 7 - RBS SPECIFIC INFORMATION - final

	GSM 1ST RBS	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS								
MSC:												
BSC/RNC/MME POOL ID:		MDTWCTNICRBR06	MDTWCTNICRBR06	FF01								
LAC:		05986	05986									
RAC:												
EQUIPMENT VENDOR:		ERICSSON	ERICSSON	ERICSSON								
EQUIPMENT TYPE:		3206 INDOOR	3106 OUTDOOR	6601 INDOOR MU								
BASEBAND CONFIGURATION:				2x6601 / 2xDUS41(IDL) / 1xXMU03								
LOCATION:												
CABINET LOCATION:												
MARKET STATE CODE:				CT								
AGPS:		Yes	Yes	Yes								
NODE B NUMBER:		0	0	5144								
PARENT NAME:		MIDDLETOWN RNC06	MIDDLETOWN RNC06									

Section 8 - RBS/SECTOR ASSOCIATION - existing

	GSM 1ST RBS	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS																	
CTS Common ID	184P5144	CTU5144	CTV5144	CTL05144																	
Soft Sector IDs	184P51441	CTU51444	CTV51441	CTL05144_3A_1																	
	184P51442	CTU51445	CTV51442	CTL05144_3B_1																	
	184P51443	CTU51446	CTV51443	CTL05144_3C_1																	
		CTU51447	CTV5144A	CTL05144_7A_1																	
		CTU51448	CTV5144B	CTL05144_7B_1																	
		CTU51449	CTV5144C	CTL05144_7C_1																	
				CTL05144_9A_1																	
				CTL05144_9B_1																	
				CTL05144_9C_1																	

Section 8 - RBS/SECTOR ASSOCIATION - final

	GSM 1ST RBS	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS																	
CTS Common ID		CTU5144	CTV5144	CTL05144																	
Soft Sector IDs		CTU51444	CTV51441	CTL05144_3A_1																	
		CTU51445	CTV51442	CTL05144_3B_1																	
		CTU51446	CTV51443	CTL05144_3C_1																	
		CTU51447	CTV5144A	CTL05144_7A_1																	
		CTU51448	CTV5144B	CTL05144_7B_1																	
		CTU51449	CTV5144C	CTL05144_7C_1																	
				CTL05144_9A_1																	
				CTL05144_9B_1																	
				CTL05144_9C_1																	

Section 9 - SOFT SECTOR ID - existing

	GSM 1ST 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS																		
USEID (excluding Hard Sector)	14490.1900.25G.1	14490.850.3G.1	14490.1900.3G.1	14490.850.3G.2	14490.1900.3G.2																					
SECTOR A SOFT SECTOR ID	184P51441	CTV51441	CTU51447	CTV5144A	CTU51444	CTL05144_7A_1	CTL05144_9A_1	CTL05144_3A_1																		
SECTOR B	184P51442	CTV51442	CTU51448	CTV5144B	CTU51445	CTL05144_7B_1	CTL05144_9B_1	CTL05144_3B_1																		
SECTOR C	184P51443	CTV51443	CTU51449	CTV5144C	CTU51446	CTL05144_7C_1	CTL05144_9C_1	CTL05144_3C_1																		
SECTOR D																										
SECTOR E																										
SECTOR F																										
OMNI																										

Section 9 - SOFT SECTOR ID - final

	GSM 1ST 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS																		
USEID (excluding Hard Sector)		14490.850.3G.1	14490.1900.3G.1	14490.850.3G.2	14490.1900.3G.2																					
SECTOR A SOFT SECTOR ID		CTV51441	CTU51447	CTV5144A	CTU51444	CTL05144_7A_1	CTL05144_9A_1	CTL05144_3A_1																		
SECTOR B		CTV51442	CTU51448	CTV5144B	CTU51445	CTL05144_7B_1	CTL05144_9B_1	CTL05144_3B_1																		
SECTOR C		CTV51443	CTU51449	CTV5144C	CTU51446	CTL05144_7C_1	CTL05144_9C_1	CTL05144_3C_1																		
SECTOR D																										
SECTOR E																										
SECTOR F																										
OMNI																										

Section 9 - Cell Number - existing

	GSM 1ST 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS																		
USEID (excluding Hard Sector)	14490.1900.25G.1	14490.850.3G.1	14490.1900.3G.1	14490.850.3G.2	14490.1900.3G.2																					
SECTOR A CELL NUMBER		0	0	0	0	15	8	149																		
SECTOR B		0	0	0	0	16	9	150																		
SECTOR C		0	0	0	0	17	10	151																		
SECTOR D																										
SECTOR E																										
SECTOR F																										
OMNI																										

Section 9 - Cell Number - final

	GSM 1ST 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS																		
USEID (excluding Hard Sector)		14490.850.3G.1	14490.1900.3G.1	14490.850.3G.2	14490.1900.3G.2																					
SECTOR A CELL NUMBER		0	0	0	0	15	8	149																		
SECTOR B		0	0	0	0	16	9	150																		
SECTOR C		0	0	0	0	17	10	151																		
SECTOR D																										
SECTOR E																										
SECTOR F																										
OMNI																										

Section 10 - CID/SAC - existing

	GSM 1ST 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS																			
SECTOR A **CID/SAC**	51441	51441	51447	41441	51444																						
SECTOR B	51442	51442	51448	41442	51445																						
SECTOR C	51443	51443	51449	41443	51446																						
SECTOR D																											
SECTOR E																											
SECTOR F																											
OMNI																											

Section 10 - CID/SAC - final

	GSM 1ST 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS																			
SECTOR A **CID/SAC**		51441	51447	41441	51444																						
SECTOR B		51442	51448	41442	51445																						
SECTOR C		51443	51449	41443	51446																						
SECTOR D																											
SECTOR E																											
SECTOR F																											
OMNI																											

Section 15A - CURRENT SECTOR/CELL INFORMATION - SECTOR A (OR OMNI)

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	7770		OPA-65R-LCUU-H6				AM-X-CD-16-65-00T-RET							
ANTENNA VENDOR	Powerwave		CCI Products				KMW							
ANTENNA SIZE (H x W x D)	55X11X5		72X14.8X7.4				72X11.8X5.9							
ANTENNA WEIGHT	35		73				48.5							
AZIMUTH	20		30				30							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	98		98				98							
ANTENNA TIP HEIGHT	100		101				101							
MECHANICAL DOWNTILT	0		0				0							
FEEDER AMOUNT	2													
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)	2	Powerwave 7020 (DB)		Internal				Internal						
SURGE ARRESTOR (QTY/MODEL)			1	DC/Fiber Squid			1	DC/Fiber Squid						
DIPLEXER (QTY/MODEL)	2	KATHREIN 782-10250												
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Powerwave 7070		LTE RRH				LTE RRH						
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	Pwav LGP21401												
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860												
PDU FOR TMAS (QTY/MODEL)	1	LGP 12104												
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							1	RRUS-11						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)			1	RRUS-32										
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1														
Local Market Note 2														
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	14490.A.850.3G.1	14490.A.850.3G.1	CTV51441	CTV51441		UMTS 850	7770.00.850.04	13.5	20	4	None	Andrew 1-5/8 (850)	110.03						325.09			
	PORT 2	14490.A.850.3G.1,14490.A.850.3G.2	14490.A.850.3G.1	CTV51441	CTV5144A		UMTS 850	7770.00.850.04	13.5	20	4	Bottom	Andrew 1-5/8 (850)	110.03						325.09			
	PORT 3	14490.A.1900.3G.1	14490.A.1900.3G.1	CTU51447	CTU51447		UMTS 1900	7770.00.1900.02	15.5	20	2	None	Andrew 1-5/8 (1900)	110.03						389.05			
	PORT 4	14490.A.1900.3G.1,14490.A.1900.3G.2	14490.A.1900.3G.1	CTU51447	CTU51444		UMTS 1900	7770.00.1900.02	15.5	20	2	Bottom	Andrew 1-5/8 (1900)	110.03						676.08			
ANTENNA POSITION 2	PORT 3	14490.A.WCS.4G.1	14490.A.WCS.4G.1	CTL05144_3A_1	CTL05144_3A_1		LTE WCS	OPA-65R-LCUU-H6_2350MHz_03DT	17.5	30	3	Top	FIBER	0						1227.4392			
ANTENNA POSITION 4	PORT 1	14490.A.700.4G.1	14490.A.700.4G.1	CTL05144_7A_1	CTL05144_7A_1		LTE 700	AM-X-CD-16-65-00T-RET_725MHz_07DT	15.6	30	7	Top	FIBER	0						1119.4378			
	PORT 3	14490.A.1900.4G.1	14490.A.1900.4G.1	CTL05144_9A_1	CTL05144_9A_1		LTE 1900	AM-X-CD-16-65-00T-	15.6	30	3	Top	FIBER	0						2182.7299			

								RET_1930MHz_03DT															

Section 15B - CURRENT SECTOR/CELL INFORMATION - SECTOR B

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	7770		OPA-65R-LCUU-H6				AM-X-CD-16-65-00T-RET							
ANTENNA VENDOR	Powerwave		CCI Products				KMW							
ANTENNA SIZE (H x W x D)	55X11X5		72X14.8X7.4				72X11.8X5.9							
ANTENNA WEIGHT	35		73				48.5							
AZIMUTH	140		140				140							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	98		98				98							
ANTENNA TIP HEIGHT	100		101				101							
MECHANICAL DOWNTILT	0		0				0							
FEEDER AMOUNT	2													
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)	2	Powerwave 7020 (DB)		Internal				Internal						
SURGE ARRESTOR (QTY/MODEL)														
DIPLEXER (QTY/MODEL)	2	KATHREIN 782-10250												
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Powerwave 7070		LTE RRH				LTE RRH						
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	Pwav LGP21401												
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860												
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							1	RRUS-11						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)			1	RRUS-32										
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1														
Local Market Note 2														
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	14490.B.850.3G.1	14490.B.850.3G.1	CTV51442	CTV51442		UMTS 850	7770.00.850.08	13.5	140	8	None	Andrew 1-5/8 (850)	110.03						325.09			
	PORT 2	14490.B.850.3G.1,14490.B.850.3G.2	14490.B.850.3G.1	CTV51442	CTV5144B		UMTS 850	7770.00.850.08	13.5	140	8	Bottom	Andrew 1-5/8 (850)	110.03						325.09			
	PORT 3	14490.B.1900.3G.1	14490.B.1900.3G.1	CTU51448	CTU51448		UMTS 1900	7770.00.1900.00	15.5	140	0	None	Andrew 1-5/8 (1900)	110.03						389.05			
	PORT 4	14490.B.1900.3G.1,14490.B.1900.3G.2	14490.B.1900.3G.1	CTU51448	CTU51445		UMTS 1900	7770.00.1900.00	15.5	140	0	Bottom	Andrew 1-5/8 (1900)	110.03						676.08			
ANTENNA POSITION 2	PORT 3	14490.B.WCS.4G.1	14490.B.WCS.4G.1	CTL05144_3B_1	CTL05144_3B_1		LTE WCS	OPA-65R-LCUU-H6_2350MHz_02DT	17.4	140	2	Top	FIBER	0						1227.4392			
ANTENNA POSITION 4	PORT 1	14490.B.700.4G.1	14490.B.700.4G.1	CTL05144_7B_1	CTL05144_7B_1		LTE 700	AM-X-CD-16-65-00T-RET_725MHz_03DT	15.6	140	3	Top	FIBER	0						1119.4378			
	PORT 3	14490.B.1900.4G.1	14490.B.1900.4G.1	CTL05144_9B_1	CTL05144_9B_1		LTE 1900	AM-X-CD-16-65-00T-	15.6	140	2	Top	FIBER	0						2182.7299			

								RET_1930MHz_02DT															

Section 15C - CURRENT SECTOR/CELL INFORMATION - SECTOR C

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	7770		OPA-65R-LCUU-H6				AM-X-CD-16-65-00T-RET							
ANTENNA VENDOR	Powerwave		CCI Products				KMW							
ANTENNA SIZE (H x W x D)	55X11X5		72X14.8X7.4				72X11.8X5.9							
ANTENNA WEIGHT	35		73				48.5							
AZIMUTH	270		270				270							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	98		98				98							
ANTENNA TIP HEIGHT	100		101				101							
MECHANICAL DOWNTILT	0		0				0							
FEEDER AMOUNT	2													
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)	2	Powerwave 7020 (DB)		Internal				Internal						
SURGE ARRESTOR (QTY/MODEL)														
DIPLEXER (QTY/MODEL)	2	KATHREIN 782-10250												
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Powerwave 7070		LTE RRH				LTE RRH						
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	Pwav LGP21401												
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860												
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							1	RRUS-11						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)			1	RRUS-32										
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1														
Local Market Note 2														
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	14490.C.850.3G.1	14490.C.850.3G.1	CTV51443	CTV51443		UMTS 850	7770.00.850.01	13.5	270	1	None	Andrew 1-5/8 (850)	110.03						325.09			
	PORT 2	14490.C.850.3G.1,14490.C.850.3G.2	14490.C.850.3G.1	CTV51443	CTV5144C		UMTS 850	7770.00.850.01	13.5	270	1	Bottom	Andrew 1-5/8 (850)	110.03						325.09			
	PORT 3	14490.C.1900.3G.1	14490.C.1900.3G.1	CTU51449	CTU51449		UMTS 1900	7770.00.1900.02	15.5	270	2	None	Andrew 1-5/8 (1900)	110.03						389.05			
	PORT 4	14490.C.1900.3G.1,14490.C.1900.3G.2	14490.C.1900.3G.1	CTU51449	CTU51446		UMTS 1900	7770.00.1900.02	15.5	270	2	Bottom	Andrew 1-5/8 (1900)	110.03						676.08			
ANTENNA POSITION 2	PORT 3	14490.C.WCS.4G.1	14490.C.WCS.4G.1	CTL05144_3C_1	CTL05144_3C_1		LTE WCS	OPA-65R-LCUU-H6_2350MHz_06DT	17.8	270	4	Top	FIBER	0						1227.4392			
ANTENNA POSITION 4	PORT 1	14490.C.700.4G.1	14490.C.700.4G.1	CTL05144_7C_1	CTL05144_7C_1		LTE 700	AM-X-CD-16-65-00T-RET_725MHz_02DT	15.6	270	2	Top	FIBER	0						1119.4378			
	PORT 3	14490.C.1900.4G.1	14490.C.1900.4G.1	CTL05144_9C_1	CTL05144_9C_1		LTE 1900	AM-X-CD-16-65-00T-	15.6	270	4	Top	FIBER	0						2182.7299			

								RET_1930MHz_04DT															

Section 16A - NEW/PROPOSED SECTOR/CELL INFORMATION - SECTOR A (OR OMNI)

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
Existing Antenna?														
ANTENNA MAKE - MODEL							QS66512-2							
ANTENNA VENDOR							Quintel							
ANTENNA SIZE (H x W x D)							72X12X9.6							
ANTENNA WEIGHT							111							
AZIMUTH							30							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)							98							
ANTENNA TIP HEIGHT							101							
MECHANICAL DOWNTILT							0							
FEEDER AMOUNT														
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)								Internal						
SURGE ARRESTOR (QTY/MODEL)														
DIPLEXER (QTY/MODEL)														
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)								LTE RRH						
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)														
CURRENT INJECTORS FOR TMA (QTY/MODEL)														
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)														
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							1	RRUS-32 B2						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)														
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	Swap existing LTE 700/PCS antenna with 12 PORT antenna.Swap existing LTE PCS RRUS-11 with RRUS-32 B2 . Add 2nd DUS and IDL2.													
Local Market Note 2														
Local Market Note 3	Baseband Config - 2 DUS + XMU + IDL2DUS-1 - 7A:_:7C:X1P1:X1P2:I2D2 XMU-1 - PA:PA2A:WA:_:PC:PA2C:WC:_:_:_:_:_:_:_:D1E:D1D DUS-2 - 7B:WB:_:PB:PA2B:I2D1													

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 4	PORT 3	14490.A.1900.4G.1	14490.A.1900.4G.1	CTL05144_9A_1	CTL05144_9A_1		LTE 1900	QS66512-2_1950MHz_03DT	15.6	30	3	Top	FIBER	0						2182.7299		7	

Section 16B - NEW/PROPOSED SECTOR/CELL INFORMATION - SECTOR B

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
Existing Antenna?														
ANTENNA MAKE - MODEL							QS66512-2							
ANTENNA VENDOR							Quintel							
ANTENNA SIZE (H x W x D)							72X12X9.6							
ANTENNA WEIGHT							111							
AZIMUTH							140							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)							98							
ANTENNA TIP HEIGHT							101							
MECHANICAL DOWNTILT							0							
FEEDER AMOUNT														
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)								Internal						
SURGE ARRESTOR (QTY/MODEL)														
DIPLEXER (QTY/MODEL)														
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)								LTE RRH						
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)														
CURRENT INJECTORS FOR TMA (QTY/MODEL)														
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)														
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							1	RRUS-32 B2						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)														
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	Swap existing LTE 700/PCS antenna with 12 PORT antenna.Swap existing LTE PCS RRUS-11 with RRUS-32 B2 . Add 2nd DUS and IDL2.													
Local Market Note 2														
Local Market Note 3	Baseband Config - 2 DUS + XMU + IDL2DUS-1 - 7A:_:7C:X1P1:X1P2:I2D2 XMU-1 - PA:PA2A:WA:_:PC:PA2C:WC:_:_:_:_:_:_:_:D1E:D1D DUS-2 - 7B:WB:_:PB:PA2B:I2D1													

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 4	PORT 3	14490.B.1900.4G.1	14490.B.1900.4G.1	CTL05144_9B_1	CTL05144_9B_1		LTE 1900	QS66512-2_1950MHz_02DT	15.6	140	2	Top	FIBER	0						2182.7299		15	

Section 16C - NEW/PROPOSED SECTOR/CELL INFORMATION - SECTOR C

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
Existing Antenna?														
ANTENNA MAKE - MODEL							QS66512-2							
ANTENNA VENDOR							Quintel							
ANTENNA SIZE (H x W x D)							72X12X9.6							
ANTENNA WEIGHT							111							
AZIMUTH							270							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)							98							
ANTENNA TIP HEIGHT							101							
MECHANICAL DOWNTILT							0							
FEEDER AMOUNT														
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)								Internal						
SURGE ARRESTOR (QTY/MODEL)														
DIPLEXER (QTY/MODEL)														
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)								LTE RRH						
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)														
CURRENT INJECTORS FOR TMA (QTY/MODEL)														
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)														
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							1	RRUS-32 B2						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)														
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	Swap existing LTE 700/PCS antenna with 12 PORT antenna.Swap existing LTE PCS RRUS-11 with RRUS-32 B2 . Add 2nd DUS and IDL2.													
Local Market Note 2														
Local Market Note 3	Baseband Config - 2 DUS + XMU + IDL2DUS-1 - 7A:_:7C:X1P1:X1P2:I2D2 XMU-1 - PA:PA2A:WA:_:PC:PA2C:WC:_:_:_:_:_:_:_:D1E:D1D DUS-2 - 7B:WB:_:PB:PA2B:I2D1													

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 4	PORT 1	14490.A.1900.4G.1	4490.C.1900.4G.1	CTL05144_9C_1	CTL05144_9C_1		LTE 1900	QS66512-2_1950MHz_04DT	15.6	270	4	Top	FIBER	0						2182.7299	23		

Section 17A - FINAL SECTOR/CELL INFORMATION - SECTOR A (OR OMNI)

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	7770		OPA-65R-LCUU-H6				QS66512-2							
ANTENNA VENDOR	Powerwave		CCI Products				Quintel							
ANTENNA SIZE (H x W x D)	55X11X5		72X14.8X7.4				72X12X9.6							
ANTENNA WEIGHT	35		73				111							
AZIMUTH	20		30				30							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	98		98				98							
ANTENNA TIP HEIGHT	100		101				101							
MECHANICAL DOWNTILT	0		0				0							
FEEDER AMOUNT	2													
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)	2	Powerwave 7020 (DB)		Internal				Internal						
SURGE ARRESTOR (QTY/MODEL)			1	DC/Fiber Squid			1	DC/Fiber Squid						
DIPLEXER (QTY/MODEL)	2	KATHREIN 782-10250												
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Powerwave 7070		LTE RRH				LTE RRH						
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	Pwav LGP21401												
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860												
PDU FOR TMAS (QTY/MODEL)	1	LGP 12104												
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							1	RRUS-32 B2						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)			1	RRUS-32										
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	Swap existing LTE 700/PCS antenna with 12 PORT antenna.Swap existing LTE PCS RRUS-11 with RRUS-32 B2 . Add 2nd DUS and IDL2.													
Local Market Note 2														
Local Market Note 3	Baseband Config - 2 DUS + XMU + IDL2DUS-1 - 7A:_:7C:X1P1:X1P2:I2D2 XMU-1 - PA:PA2A:WA:_:PC:PA2C:WC:_:_:_:_:_:_:_:D1E:D1D DUS-2 - 7B:WB:_:PB:PA2B:I2D1													

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	14490.A.850.3G.1	14490.A.850.3G.1	CTV51441	CTV51441		UMTS 850	7770.00.850.04	13.5	20	4	None	Andrew 1-5/8 (850)	110.03						325.09		1	
	PORT 2	14490.A.850.3G.1,14490.A.850.3G.2	14490.A.850.3G.1	CTV51441	CTV5144A		UMTS 850	7770.00.850.04	13.5	20	4	Bottom	Andrew 1-5/8 (850)	110.03						325.09		1	
	PORT 3	14490.A.1900.3G.1	14490.A.1900.3G.1	CTU51447	CTU51447		UMTS 1900	7770.00.1900.02	15.5	20	2	None	Andrew 1-5/8 (1900)	110.03						389.05		2	
	PORT 4	14490.A.1900.3G.1,14490.A.1900.3G.2	14490.A.1900.3G.1	CTU51447	CTU51444		UMTS 1900	7770.00.1900.02	15.5	20	2	Bottom	Andrew 1-5/8 (1900)	110.03						676.08		2	
ANTENNA POSITION 2	PORT 3	14490.A.WCS.4G.1	14490.A.WCS.4G.1	CTL05144_3A_1	CTL05144_3A_1		LTE WCS	OPA-65R-LCUU-H6_2350MHz_03DT	17.5	30	3	Top	FIBER	0						1227.4392		3	
ANTENNA POSITION 4	PORT 1	14490.A.700.4G.1	14490.A.700.4G.1	CTL05144_7A_1	CTL05144_7A_1		LTE 700	QS66512-2_722MHz_07DT	15.6	30	7	Top	FIBER	0						1119.4378		7	
	PORT 3	14490.A.1900.4G.1	14490.A.1900.4G.1	CTL05144_9A_1	CTL05144_9A_1		LTE 1900	QS66512-	15.6	30	3	Top	FIBER	0						2182.7299		7	

								2_1950MHz_03DT															

Section 17B - FINAL SECTOR/CELL INFORMATION - SECTOR B

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	7770		OPA-65R-LCUU-H6				QS66512-2							
ANTENNA VENDOR	Powerwave		CCI Products				Quintel							
ANTENNA SIZE (H x W x D)	55X11X5		72X14.8X7.4				72X12X9.6							
ANTENNA WEIGHT	35		73				111							
AZIMUTH	140		140				140							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	98		98				98							
ANTENNA TIP HEIGHT	100		101				101							
MECHANICAL DOWNTILT	0		0				0							
FEEDER AMOUNT	2													
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)	2	Powerwave 7020 (DB)		Internal				Internal						
SURGE ARRESTOR (QTY/MODEL)														
DIPLEXER (QTY/MODEL)	2	KATHREIN 782-10250												
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Powerwave 7070		LTE RRH				LTE RRH						
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	Pwav LGP21401												
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860												
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							1	RRUS-32 B2						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)			1	RRUS-32										
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	Swap existing LTE 700/PCS antenna with 12 PORT antenna.Swap existing LTE PCS RRUS-11 with RRUS-32 B2 . Add 2nd DUS and IDL2.													
Local Market Note 2														
Local Market Note 3	Baseband Config - 2 DUS + XMU + IDL2DUS-1 - 7A:_:7C:X1P1:X1P2:I2D2 XMU-1 - PA:PA2A:WA:_:PC:PA2C:WC:_:_:_:_:_:_:_:D1E:D1D DUS-2 - 7B:WB:_:PB:PA2B:I2D1													

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	14490.B.850.3G.1	14490.B.850.3G.1	CTV51442	CTV51442		UMTS 850	7770.00.850.08	13.5	140	8	None	Andrew 1-5/8 (850)	110.03						325.09		9	
	PORT 2	14490.B.850.3G.1,14490.B.850.3G.2	14490.B.850.3G.1	CTV51442	CTV5144B		UMTS 850	7770.00.850.08	13.5	140	8	Bottom	Andrew 1-5/8 (850)	110.03						325.09		9	
	PORT 3	14490.B.1900.3G.1	14490.B.1900.3G.1	CTU51448	CTU51448		UMTS 1900	7770.00.1900.00	15.5	140	0	None	Andrew 1-5/8 (1900)	110.03						389.05		10	
	PORT 4	14490.B.1900.3G.1,14490.B.1900.3G.2	14490.B.1900.3G.1	CTU51448	CTU51445		UMTS 1900	7770.00.1900.00	15.5	140	0	Bottom	Andrew 1-5/8 (1900)	110.03						676.08		10	
ANTENNA POSITION 2	PORT 3	14490.B.WCS.4G.1	14490.B.WCS.4G.1	CTL05144_3B_1	CTL05144_3B_1		LTE WCS	OPA-65R-LCUU-H6_2350MHz_02DT	17.4	140	2	Top	FIBER	0						1227.4392		11	
ANTENNA POSITION 4	PORT 1	14490.B.700.4G.1	14490.B.700.4G.1	CTL05144_7B_1	CTL05144_7B_1		LTE 700	QS66512-2_722MHz_03DT	15.6	140	3	Top	FIBER	0						1119.4378		15	
	PORT 3	14490.B.1900.4G.1	14490.B.1900.4G.1	CTL05144_9B_1	CTL05144_9B_1		LTE 1900	QS66512-	15.6	140	2	Top	FIBER	0						2182.7299		15	

								2_1950MHz_02DT														

Section 17C - FINAL SECTOR/CELL INFORMATION - SECTOR C

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	7770		OPA-65R-LCUU-H6				QS66512-2							
ANTENNA VENDOR	Powerwave		CCI Products				Quintel							
ANTENNA SIZE (H x W x D)	55X11X5		72X14.8X7.4				72X12X9.6							
ANTENNA WEIGHT	35		73				111							
AZIMUTH	270		270				270							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	98		98				98							
ANTENNA TIP HEIGHT	100		101				101							
MECHANICAL DOWNTILT	0		0				0							
FEEDER AMOUNT	2													
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)	2	Powerwave 7020 (DB)		Internal				Internal						
SURGE ARRESTOR (QTY/MODEL)														
DIPLEXER (QTY/MODEL)	2	KATHREIN 782-10250												
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Powerwave 7070		LTE RRH				LTE RRH						
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	Pwav LGP21401												
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860												
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							1	RRUS-32 B2						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)			1	RRUS-32										
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	Swap existing LTE 700/PCS antenna with 12 PORT antenna.Swap existing LTE PCS RRUS-11 with RRUS-32 B2 . Add 2nd DUS and IDL2.													
Local Market Note 2														
Local Market Note 3	Baseband Config - 2 DUS + XMU + IDL2DUS-1 - 7A:_:7C:X1P1:X1P2:I2D2 XMU-1 - PA:PA2A:WA:_:PC:PA2C:WC:_:_:_:_:_:_:_:D1E:D1D DUS-2 - 7B:WB:_:PB:PA2B:I2D1													

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	**PORT 1**	14490.C.850.3G.1	14490.C.850.3G.1	CTV51443	CTV51443		UMTS 850	7770.00.850.01	13.5	270	1	None	Andrew 1-5/8 (850)	110.03						325.09		17	
	PORT 2	14490.C.850.3G.1,14490.C.850.3G.2	14490.C.850.3G.1	CTV51443	CTV5144C		UMTS 850	7770.00.850.01	13.5	270	1	Bottom	Andrew 1-5/8 (850)	110.03						325.09		17	
	PORT 3	14490.C.1900.3G.1	14490.C.1900.3G.1	CTU51449	CTU51449		UMTS 1900	7770.00.1900.02	15.5	270	2	None	Andrew 1-5/8 (1900)	110.03						389.05		18	
	PORT 4	14490.C.1900.3G.1,14490.C.1900.3G.2	14490.C.1900.3G.1	CTU51449	CTU51446		UMTS 1900	7770.00.1900.02	15.5	270	2	Bottom	Andrew 1-5/8 (1900)	110.03						676.08		18	
ANTENNA POSITION 2	**PORT 3**	14490.C.WCS.4G.1	14490.C.WCS.4G.1	CTL05144_3C_1	CTL05144_3C_1		LTE WCS	OPA-65R-LCUU-H6_2350MHz_06DT	17.8	270	4	Top	FIBER	0						1227.4392		19	
ANTENNA POSITION 4	**PORT 1**	14490.C.700.4G.1	14490.C.700.4G.1	CTL05144_7C_1	CTL05144_7C_1		LTE 700	QS66512-2_722MHz_02DT	15.6	270	2	Top	FIBER	0						1119.4378		23	
	PORT 3	14490.C.1900.4G.1	14490.C.1900.4G.1	CTL05144_9C_1	CTL05144_9C_1		LTE 1900	QS66512-	15.6	270	4	Top	FIBER	0						2182.7299		23	

								2_1950MHz_04DT															

Diagram - Sector A Diagram File Name - CT5144_ABC_RRH ADD.vsd

Atoll Site Name - CTU5144 Location Name - CROMWELLSOUTH Market - CONNECTICUT Market Cluster - NEW ENGLAND

Comments:

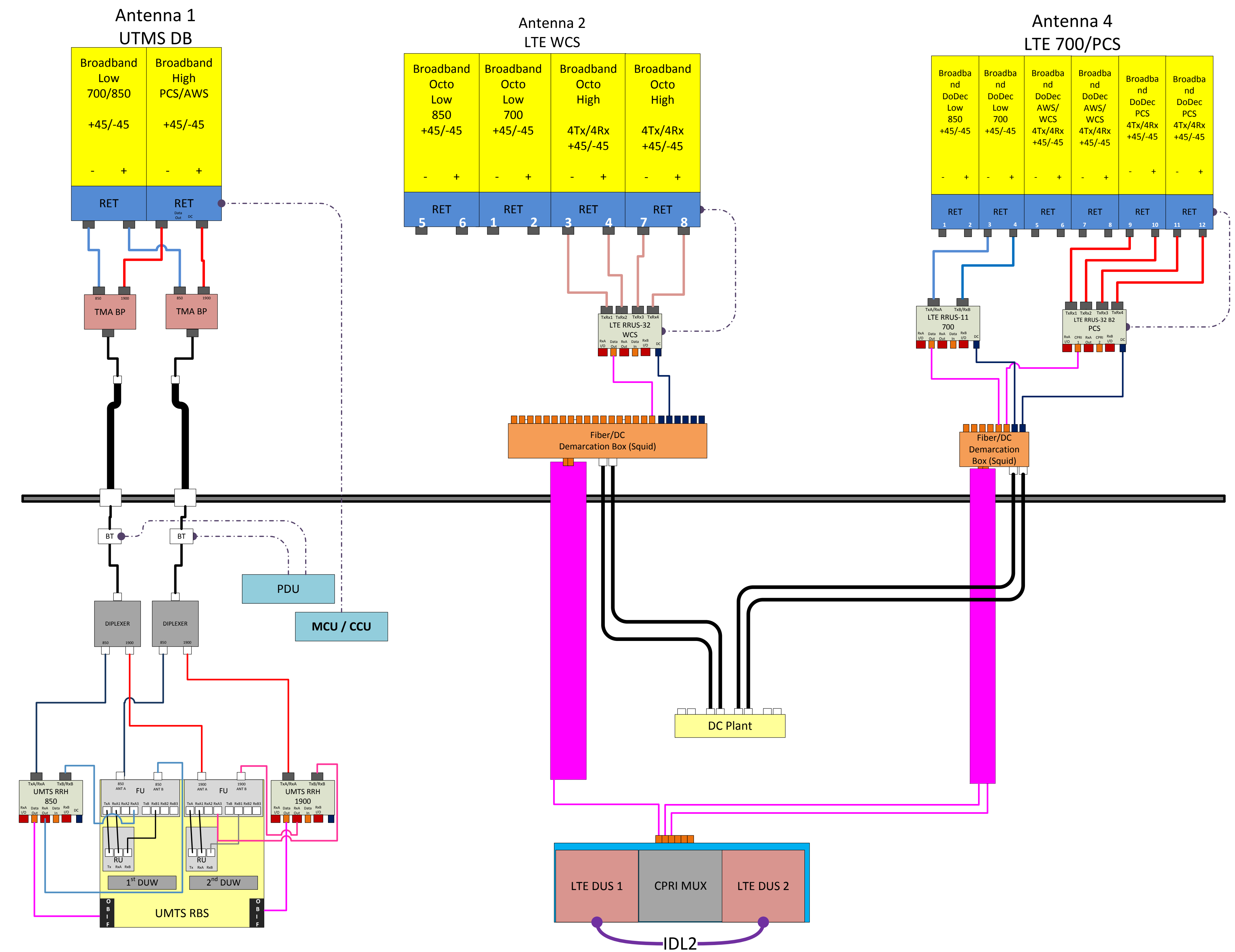


Diagram - Sector B Diagram File Name - CT5144_ABC_RRH ADD.vsd

Atoll Site Name - CTU5144 Location Name - CROMWELLSOUTH Market - CONNECTICUT Market Cluster - NEW ENGLAND

Comments:

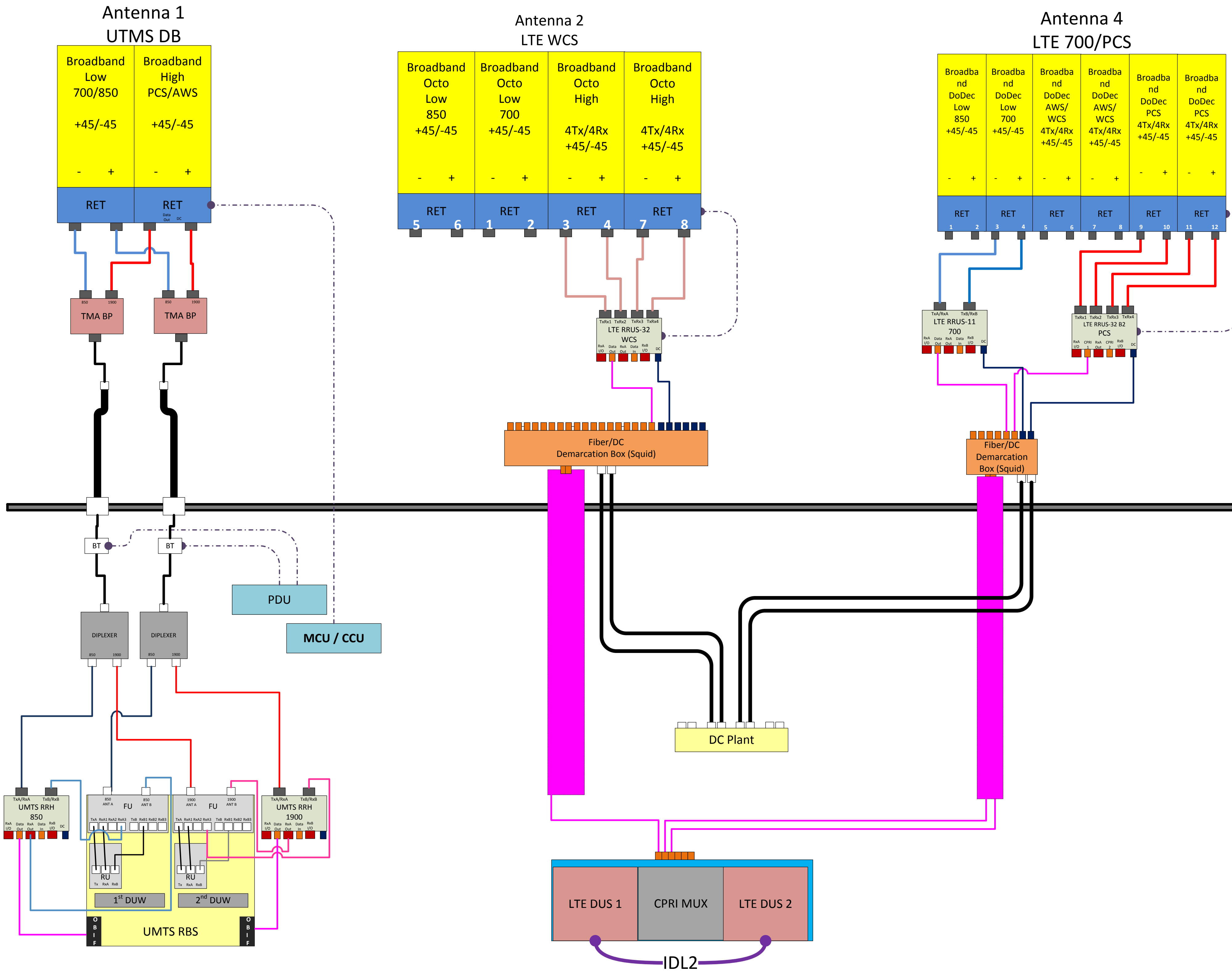
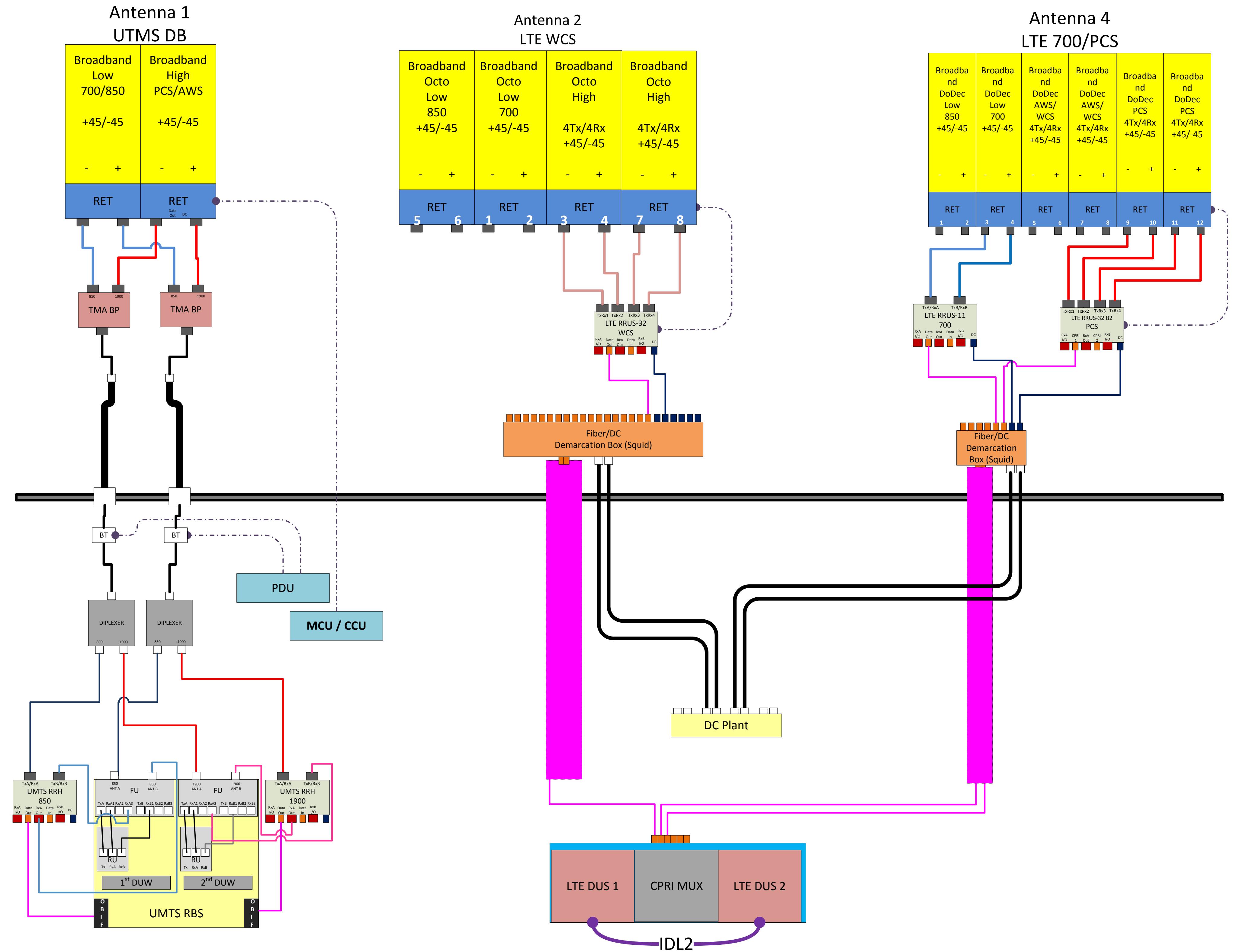


Diagram - Sector C Diagram File Name - CT5144_ABC_RRH ADD.vsd

Atoll Site Name - CTU5144 Location Name - CROMWELLSOUTH Market - CONNECTICUT Market Cluster - NEW ENGLAND

Comments:



WORKFLOW SUMMARY						
Date	FROM State / Status	FROM ATTUID	TO State / Status	TO ATTUID	Operation	Comments
09/02/2016	Preliminary / In Progress	sp656b	Preliminary / Submitted for Approval	RC475S	Promote	Prelim RFDS
09/12/2016	Preliminary / Submitted for Approval	RC475S	Preliminary / Approved	BG144B	Promote	
10/24/2016	Preliminary / Approved	BG144B	Final / RF Approval	OM636A	Promote	Needs Final

Exhibit 4

Radio Frequency Emissions Analysis Report

AT&T Existing Facility

Site ID: CT5144

Cromwell South
100 Christian Hill Road
Cromwell, CT 6416

June 12, 2017

Centerline Communications Project Number: 950006-056

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**25.31 %**

June 12, 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: **CT5144 – Cromwell South**

Centerline Communications, LLC ("Centerline") was directed to analyze the proposed AT&T facility located at **100 Christian Hill Road, Cromwell, 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 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ 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.

<u>General population/uncontrolled exposure</u> 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 ($\mu W/cm^2$). The general population exposure limits for the 700 and 850 MHz Bands are approximately 467 $\mu W/cm^2$ and 567 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) bands is 1000 $\mu W/cm^2$. 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 **100 Christian Hill Road, Cromwell, 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	2300 MHz (WCS)	2	60
LTE	700 MHz	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	98
A	2	CCI OPA-65R-LCUU-H6	98
A	3	Quintel QS66512-2	98
B	1	Powerwave 7770	98
B	2	CCI OPA-65R-LCUU-H6	98
B	3	Quintel QS66512-2	98
C	1	Powerwave 7770	98
C	2	CCI OPA-65R-LCUU-H6	98
C	3	Quintel QS66512-2	98

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	1.18
Antenna A2	CCI OPA-65R-LCUU-H6	2300 MHz (WCS)	15.45	2	120	4,209.02	1.79
Antenna A3	Quintel QS66512-2	700 MHz / 1900 MHz (PCS)	10.85 / 13.85	4	240	4,371.36	2.56
						Sector A Composite MPE%	**5.53**
Antenna B1	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	1.18
Antenna B2	CCI OPA-65R-LCUU-H6	2300 MHz (WCS)	15.45	2	120	4,209.02	1.79
Antenna B3	Quintel QS66512-2	700 MHz / 1900 MHz (PCS)	10.85 / 13.85	4	240	4,371.36	2.56
						Sector B Composite MPE%	**5.53**
Antenna C1	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	1.18
Antenna C2	CCI OPA-65R-LCUU-H6	2300 MHz (WCS)	15.45	2	120	4,209.02	1.79
Antenna C3	Quintel QS66512-2	700 MHz / 1900 MHz (PCS)	10.85 / 13.85	4	240	4,371.36	2.56
						Sector C Composite MPE%	**5.53**

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	**5.53 %**
MetroPCS	2.41 %
T-Mobile	2.36 %
Verizon Wireless	15.01 %
Site Total MPE %:	**25.31 %**

Table 4: All Carrier MPE Contributions

AT&T Sector A Total:	5.53 %
AT&T Sector B Total:	5.53 %
AT&T Sector C Total:	5.53 %
Site Total:	25.31 %

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 (All Sectors)	**# Channels**	**Watts ERP (Per Channel)**	**Height (feet)**	**Total Power Density ($\mu W/cm^2$)**	**Frequency (MHz)**	**Allowable MPE ($\mu W/cm^2$)**	**Calculated % MPE**
AT&T 850 MHz UMTS	2	414.12	98	3.52	850 MHz	567	0.62%
AT&T 1900 MHz (PCS) UMTS	2	656.33	98	5.58	1900 MHz (PCS)	1000	0.56%
AT&T 2300 MHz (WCS) LTE	2	2,104.51	98	17.88	2300 MHz (WCS)	1000	1.79%
AT&T 700 MHz LTE	2	729.71	98	6.20	700 MHz	467	1.33%
AT&T 1900 MHz (PCS) LTE	2	1,455.97	98	12.37	1900 MHz (PCS)	1000	1.24%
						Total:	**5.53%**

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:	5.53 %
Sector B:	5.53 %
Sector C:	5.53 %
AT&T Maximum Total (per sector):	5.53 %
Site Total:	25.31 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **25.31 %** 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.

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