Transcend Wireless

10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

June 22, 2016

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

Notice of Exempt Modification
467 South Quaker Lane, West Hartford, CT 06110
Latitude- 41.74882000
Longitude- -72.3132000

Dear Ms. Bachman,

T-Mobile currently maintains (9) existing antennas at the 120' level of the existing 119' monopole at 467 South Quaker Lane in West Hartford, CT (also known as 457 South Quaker Lane and 471 South Quaker Lane). The tower is owned by Crown Castle. The property is owned by Church of St. Mark the Evangelist Corp. T-Mobile now intends to replace (3) existing antennas (3) new 1900 MHz antennas. These antennas would be installed at the same 120' level of the tower. T-Mobile also intends to install (1) new hybrid fiber cable.

This facility was approved by the Town of West Hartford on March 31, 2000. This approval came with conditions that would not be violated by this modification. Enclosed is a copy of the original approval.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. 16-50j-72(b)(2). In accordance with R.C.S.A. 16-50j-73, a copy of this letter is being sent to Shari Cantor, Mayor of the Town of West Hartford, as well as the tower owner and property owner.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. 16-50j-72(b)(2).

1. The proposed modification will not result in an increase in the height of the existing structure

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

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

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

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

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

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

Sincerely,

Kyle Richers

Kyle Richers
Transcend Wireless
10 Industrial Ave., Suite 3
Mahwah, New Jersey 07430
908-447-4716
krichers@transcendwireless.com

cc: Shari Cantor- as elected official
Crown Castle- as tower owner
Church of St. Mark- as property owner

TOWN PLAN AND ZONING COMMISSION

CERTIFIED MAIL

March 10, 2000

Dennis Brown
Ominipoint Communications, Inc.
100 Filley Street
Bloomfield, CT 06002

SUBJECT: 457 South Quaker Lane – SUP #893

Dear Mr. Brown:

At its regular meeting of March 6, 2000 the West Hartford Town Plan and Zoning Commission gave consideration to the following item:

> **457 South Quaker Lane – St. Mark's Church** – Application (SUP #893) of the Archdiocese of Hartford, R.O., Omnipoint Communications, Inc., Dennis Brown of Omnipoint and Agent for Special Use Permit application. Omnipoint Communications, Inc. proposes to erect a 120 foot tall telecommunications monopole behind St. Mark's Rectory and abutting the right-of-way for Interstate 84. The 120 foot monopole would provide location for Omnipoint antenna and co-location for two other carriers. At the base of the monopole would be an equipment box the size of two filing cabinets. The site would be surrounded by a chain link fenced area, 50' x 50', with security gate and landscape buffering. (Submitted for TPZ receipt on February 7, 2000. Suggest required public hearing be scheduled for March 6, 2000. Required TPZ public hearing scheduled for March 6, 2000.)
> **R-6 ZONE**

After a review of the application and its related exhibits and after consideration of staff technical comments and the public hearing record, the TPZ acted by **majority vote** (Motion/Kearns; Second/Kappes) (Kappes seated for Wirth) to **CONDITIONALLY APPROVE** the subject application. During its discussions and deliberations on this matter, the Commission made the following findings:

1. **The landscape plan shall be revised to substitute the proposed hemlocks with Austrian Pines. The landscape plan shall provide the number, type and size of all proposed plantings.**
2. **As required by Section 177.16.7D(4) Telecommunication towers and antennas of the West Hartford Code of Ordinances the applicant shall make payment to the "Town Abandonment Fund". The applicant shall provide to the Town of West Hartford a statement setting forth the estimated cost of construction for the approved antennas, ancillary facilities and supporting structure, together with a payment equal to 5% of the estimated cost of the**

construction. The payment shall be deposited to the Tower Abandonment Fund.

3. **The proposed Special Use Permit will comply with the finding requirements of Section 177-42A(5a & 5b) of the West Hartford Code of Ordinances.**

You should now contact the Planning Staff to discuss the submission requirements for your plans. A ten dollar ($10) filing fee is required to file a notice of approval on the West Hartford Land Records. My staff will happy to assist you in completing these requirements. The TPZ approval is not final until the legal requirements for filing are completed. The effective date of approval is March 31, 2000.

If you have questions, please feel free to call the Planning Staff at 523-3123.

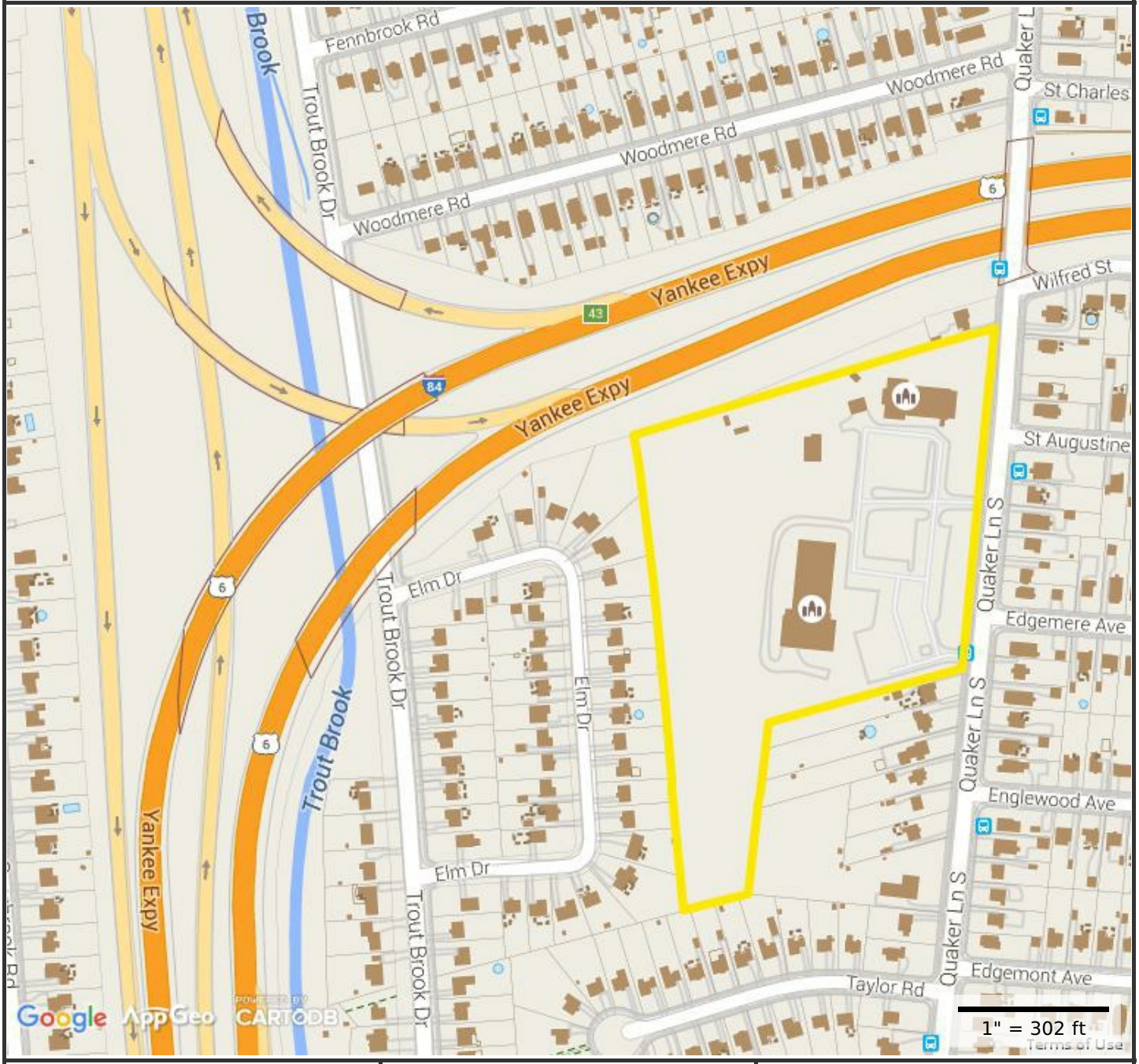
Very truly yours,

Donald R. Foster
Town Planner

C: Ronald Van Winkle, Director of Community
Kevin O'Connor, Corporation Counsel
Norma Cronin, Town Clerk
William Farrell, Town Engineer
Subject TPZ File

457Soqkr-Mar00

CT111178 parcel map



Property Information

Property ID	5096 1 471 0002
Location	471 SOUTH QUAKER LANE
Owner	CHURCH OF ST MARK THE EVANGELIST CORP

TOWN OF WEST HARTFORD

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town of West Hartford, 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 5/22/2015
Properties updated Daily

Property Location: 471 SOUTH QUAKER LANE **MAP ID:** G11/ 5096/ 471/ / **Bldg Name:** **State Use:** 901

Vision ID: 18998 **Account #** 5096 1 471 0001 **Bldg #:** 1 of 3 **Sec #:** 1 of 1 **Card** 1 of 3 **Print Date:** 04/20/2016 21:41

CURRENT OWNER	TOPO.	UTILITIES	STRT./ROAD	LOCATION
CHURCH OF ST MARK THE EVANGI	4 Rolling	2 Yes	5 Not Heavy	2 Typical
	1 No	2 Yes		1 No
455 QUAKER LANE SOUTH				1 No
WEST HARTFORD, CT 06110				
Additional Owners:				

SUPPLEMENTAL DATA

Other ID:	509614710001	Tax/Exempt	Exempt
Map #	D28+29/	Nbhd	914900.00
Census #	4968	Data Mailer	
PP CANVAS	Exempt		
District	041	Lot Size	8.16
Zoning	R-6		
GIS ID:		ASSOC PID#	

CURRENT ASSESSMENT

Description	Code	Appraised Value	Assessed Value
EX RES LN	11	1,835,700	1,284,990
EX RS DWL	13	277,400	194,180
EX RS OTB	14	13,500	9,450
EX COM BL	22	3,776,800	2,643,760
	Total	5,903,400	4,132,380

6155
WEST HARTFORD, CT

VISION

RECORD OF OWNERSHIP

RECORD OF OWNERSHIP	BK-VOL/PAGE	SALE DATE	q/u	v/i	SALE PRICE	V.C.
CHURCH OF ST MARK THE EVANGELIST CORP	215/ 42		U	I	0	U

PREVIOUS ASSESSMENTS (HISTORY)

Yr.	Code	Assessed Value	Yr.	Code	Assessed Value	Yr.	Code	Assessed Value
2015	11	1,284,990	2014	11	1,284,990	2013	11	1,284,990
2015	13	194,180	2014	13	194,180	2013	13	194,180
2015	14	9,450	2014	14	9,450	2013	14	9,450
2015	22	2,643,760	2014	22	2,643,760	2013	22	2,643,760
	Total:	4,132,380		Total:	4,132,380		Total:	4,132,380

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)	276,000
Appraised XF (B) Value (Bldg)	1,400
Appraised OB (L) Value (Bldg)	13,500
Appraised Land Value (Bldg)	1,835,700
Special Land Value	0
Total Appraised Parcel Value	5,903,400
Valuation Method:	C
Adjustment:	0
Net Total Appraised Parcel Value	5,903,400

ASSESSING NEIGHBORHOOD

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

NOTES

CHURCHSCHOOL AND AUDITORIUM.ROOF HEIGHT
ISAVERAGE. A/N 2460SURVEY 6387, FILED
9/25/00 SHOWS PADSITE AND EASEMENT AREA
FOR FUTURE TELE- COMMUNICATIONS TOWER.
10/20030002 PARCEL FOR PAD SITE

BUILDING PERMIT RECORD

Permit ID	Issue Date	Type	Description	Amount	Insp. Date	% Comp.	Date Comp.	Comments
150004320	09/27/2015	BP	Permit	15,000		0		Replacing existing anten
0150002720	07/13/2015	BP	Permit	19,000		0		Structural modifications
140005472	12/22/2014	BP	Permit	15,000		100	10/01/2015	Remove and replace 3 an
110000479	01/01/2014	BP	Permit	5,400		100	10/01/2014	(aka 467)installation of s
130004836	12/13/2013	BP	Permit	29,800		100	10/01/2014	Conversion from oil to g
130004837	12/13/2013	BP	Permit	71,000		100	10/01/2014	Replacement of oil fired
130004835	12/13/2013	BP	Permit	14,800		100	10/01/2014	Conversion of warm air

VISIT/ CHANGE HISTORY

Date	Type	IS	ID	Cd.	Purpose/Result
10/17/2001			TJC	3B	EXTERIOR PARTIAL P

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 Spec Use	Special Pricing Spec Calc	S Adj Fact	Adj. Unit Price	Land Value
1	901	Exempt Res	R-6				8.16	AC	224,963.00	1.0000	0		1.00		0.00				1.00		1,835,700

Total Card Land Units:	8.16	AC	Parcel Total Land Area:	8.16 AC	Total Land Value:	1,835,700

Property Location: 471 SOUTH QUAKER LANE **MAP ID:** G11/ 5096/ 471/ / **Bldg Name:** **State Use:** 901

Vision ID: 18998 **Account #** 5096 1 471 0001 **Bldg #:** 1 of 3 **Sec #:** 1 of 1 **Card** 1 of 3 **Print Date:** 04/20/2016 21:41

CONSTRUCTION DETAIL

Element	Cd.	Ch.	Description
Style	05		Colonial
Model	01		Residential
Grade	C05		C 1.10
Stories	2.0		
Occupancy	1		
Exterior Wall 1	20		Brick
Exterior Wall 2			
Roof Structure	0		Typical
Roof Cover	0		Typical
Interior Wall 1	08		Typical
Interior Wall 2			
Interior Flr 1	25		Typical
Interior Flr 2			
Heat Fuel	03		Oil
Heat Type	03		Forced Air
AC Type	2		Yes
# of Bedrooms	3		
Full Bthrms	4		
Half Baths	0		
Extra Fixtures	0		
Total Rooms	12		
Bath Style	02		Typical
Kitchen Style	02		Typical
Extra Kitchens			
Fireplaces	1		
Prefab Fpl(s)			
Bsmt Egress			
Foundation	PF		Conc Per Piers
Bsmt Garage(s)	0		None
Fin Bsmt/RRm			
Bsmt Rec Rm			

CONSTRUCTION DETAIL (CONTINUED)

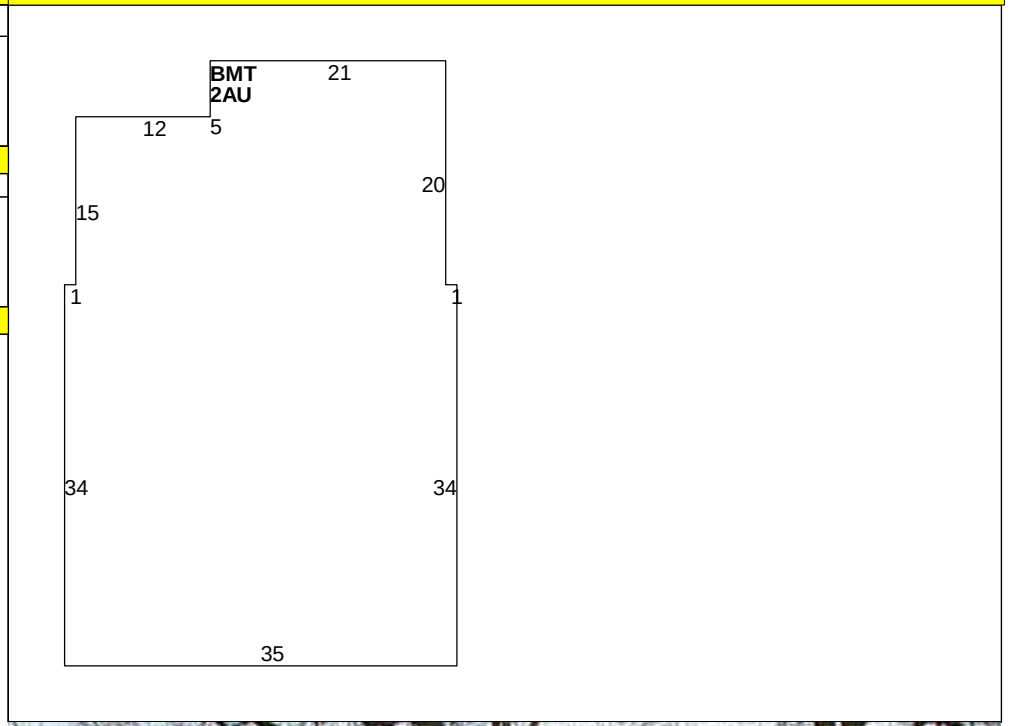
Element	Cd.	Ch.	Description
FBLA			
Int Condition	03		Typical
Attic Access	03		
Dormer LF			

MIXED USE

Code	Description	Percentage
901	Exempt Res	100

COST/MARKET VALUATION

Adj. Base Rate:	92.17
AYB	1945
Dep Code	A
Remodel Rating	
Year Remodeled	1945
Dep %	25
Functional Obslnc	
External Obslnc	
Cost Trend Factor	1
Condition	
% Complete	
Overall % Cond	75
Apprais Val	276,000
Dep % Ovr	0
Dep Ovr Comment	
Misc Imp Ovr	0
Misc Imp Ovr Comment	
Cost to Cure Ovr	0
Cost to Cure Ovr Comment	

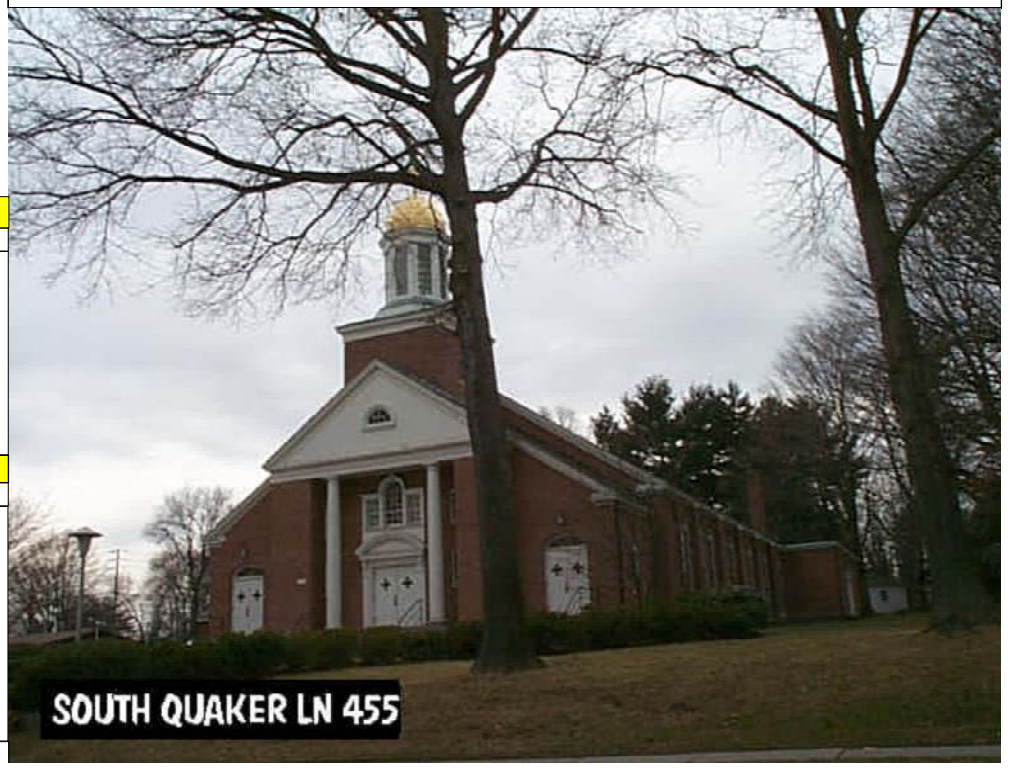


OB-OUTBUILDING & YARD ITEMS(L) / XF-BUILDING EXTRA FEATURES(B)

Code	Description	Sub	Sub Descript	L/B	Units	Unit Price	Yr	Gde	Dp Rt	Cnd	%Cnd	Apr Value
CCP9	Canopy-wood			L	56	6.75	1970	C		7A	50	100
CRG4	Garage - 1.0 St			L	918	26.14	1945	C		A5	64	9,600
CRG4	Garage - 1.0 St			L	247	26.14	1945	C		A5	64	3,800
RP4	Enclosed Porch			B	30	52.87	1986	C	1		83	1,400

BUILDING SUB-AREA SUMMARY SECTION

Code	Description	Living Area	Gross Area	Eff. Area	Unit Cost	Undeprec. Value
2AU	2 STORY U UNFIN ATT	3,580	1,790			
BMT	BSMT UNFIN RES	0	1,790			
	Ttl. Gross Liv/Lease Area:	3,580	3,580			



Property Location: 471 SOUTH QUAKER LANE **MAP ID:** G11/ 5096/ 471/ / **Bldg Name:** **State Use:** 901

Vision ID: 18998 **Account #** 5096 1 471 0001 **Bldg #:** 2 of 3 **Sec #:** 1 of 1 **Card** 2 of 3 **Print Date:** 04/20/2016 21:41

CURRENT OWNER	TOPO.	UTILITIES	STRT./ROAD	LOCATION
CHURCH OF ST MARK THE EVANGE	4 Rolling	2 Yes	5 Not Heavy	2 Typical
	1 No	2 Yes		1 No
455 QUAKER LANE SOUTH				1 No
WEST HARTFORD, CT 06110				
Additional Owners:				

SUPPLEMENTAL DATA

Other ID:	509614710001	Tax/Exempt	Exempt
Map #	D28+29/	Nbhd	914900.00
Census #	4968	Data Mailer	
PP CANVAS	Exempt		
District	041	Lot Size	8.16
Zoning	R-6		
GIS ID:		ASSOC PID#	

CURRENT ASSESSMENT

Description	Code	Appraised Value	Assessed Value
EX RES LN	11	1,835,700	1,284,990
EX RS DWL	13	277,400	194,180
EX RS OTB	14	13,500	9,450
EX COM BL	22	3,776,800	2,643,760
	Total	5,903,400	4,132,380

6155
WEST HARTFORD, CT

VISION

RECORD OF OWNERSHIP

	BK-VOL/PAGE	SALE DATE	q/u	v/i	SALE PRICE	V.C.
CHURCH OF ST MARK THE EVANGELIST CORP	215/ 42		U	I	0	U

PREVIOUS ASSESSMENTS (HISTORY)

Yr.	Code	Assessed Value	Yr.	Code	Assessed Value	Yr.	Code	Assessed Value
2015	11	1,284,990	2014	11	1,284,990	2013	11	1,284,990
2015	13	194,180	2014	13	194,180	2013	13	194,180
2015	14	9,450	2014	14	9,450	2013	14	9,450
2015	22	2,643,760	2014	22	2,643,760	2013	22	2,643,760
	Total:	4,132,380		Total:	4,132,380		Total:	4,132,380

EXEMPTIONS

Year	Type	Description	Amount
		Total:	

OTHER ASSESSMENTS

Code	Description	Number	Amount	Comm. Int.

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APPRAISED VALUE SUMMARY

Appraised Bldg. Value (Card)	2,043,400
Appraised XF (B) Value (Bldg)	0
Appraised OB (L) Value (Bldg)	0
Appraised Land Value (Bldg)	0
Special Land Value	0
Total Appraised Parcel Value	5,903,400
Valuation Method:	C
Adjustment:	0
Net Total Appraised Parcel Value	5,903,400

ASSESSING NEIGHBORHOOD

NBHD/ SUB	NBHD Name	Street Index Name	Tracing	Batch
914/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
10/17/2001			TJC	3B	EXTERIOR PARTIAL P

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 Spec Use		Special Pricing Spec Calc		S Adj Fact	Adj. Unit Price	Land Value
2	902	Exempt Commercial	R-6				0	SF	0.00	1.0000	0		1.00		0.00				TR1	TR1	.00		0

Total Card Land Units:	0.00	AC	Parcel Total Land Area:	8.16 AC	Total Land Value: 0

Property Location: 471 SOUTH QUAKER LANE **MAP ID:** G11/ 5096/ 471/ / **Bldg Name:** **State Use:** 901

Vision ID: 18998 **Account #** 5096 1 471 0001 **Bldg #:** 2 of 3 **Sec #:** 1 of 1 **Card** 2 of 3 **Print Date:** 04/20/2016 21:41

CONSTRUCTION DETAIL

Element	Cd.	Ch.	Description
Style	CHUI		Church
Model	94		Comm/Ind
Grade	B06		B 0.90
Stories	2		
Occupancy			
Exterior Wall 1	PRE		Precast Panel
Exterior Wall 2			
Roof Structure	GBL		Gable
Roof Cover	CMP		Comp - Shingle
Interior Wall 1	00		Typical
Interior Wall 2			
Floor Type	WF		Wood
Floor Cover	CPT		Carpet
Heating Fuel	00		Typical
Heating Type	05		Steam Boiler
AC Type	2		Central - Zone
As Built Use	CHUI		
Bldg Use	902		Exempt Commercial
# of Bedrooms			
Total Baths			
Type	01		
Wet Sprinkler			
Frame Type	RST		Rigid Steel
Group	CTA		
Wall Height	17		
Adjustment			

CONSTRUCTION DETAIL (CONTINUED)

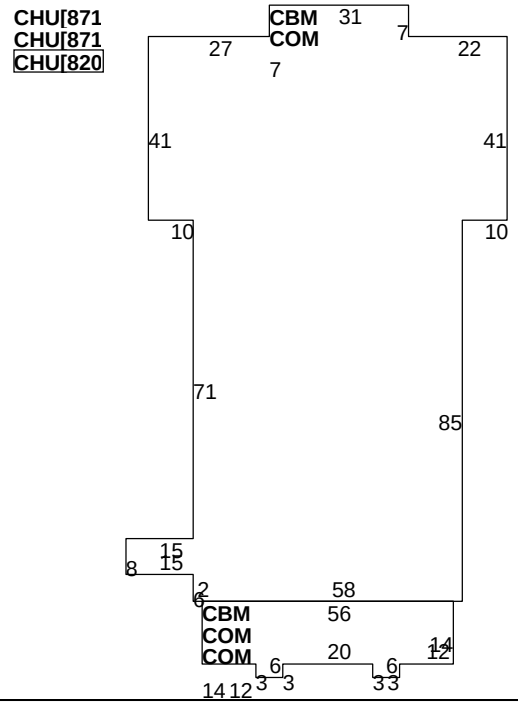
Element	Cd.	Ch.	Description

MIXED USE

Code	Description	Percentage
902	Exempt Commercial	100

COST/MARKET VALUATION

Adj. Base Rate:	143.37
AYB	1945
Dep Code	A
Remodel Rating	
Year Remodeled	
Dep %	36
Functional Obslnc	
External Obslnc	
Cost Trend Factor	
Condition	
% Complete	
Overall % Cond	64
Apprais Val	2,043,400
Dep % Ovr	0
Dep Ovr Comment	
Misc Imp Ovr	0
Misc Imp Ovr Comment	
Cost to Cure Ovr	0
Cost to Cure Ovr Comment	



No Photo On Record

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

BUILDING SUB-AREA SUMMARY SECTION

Code	Description	Living Area	Gross Area	Eff. Area	Unit Cost	Undeprec. Value
CBM	BSMT COMM - NV	0	9,537			
CHU	CHURCH	18,254	18,254			
COM	COMMERCIAL - NV	0	10,357			
	Ttl. Gross Liv/Lease Area:	18,254	38,148			

Property Location: 471 SOUTH QUAKER LANE **MAP ID:** G11/ 5096/ 471/ / **Bldg Name:** **State Use:** 901

Vision ID: 18998 **Account #** 5096 1 471 0001 **Bldg #:** 3 of 3 **Sec #:** 1 of 1 **Card** 3 of 3 **Print Date:** 04/20/2016 21:41

CURRENT OWNER	TOPO.	UTILITIES	STRT./ROAD	LOCATION
CHURCH OF ST MARK THE EVANGE	4 Rolling	2 Yes	5 Not Heavy	2 Typical
	1 No	2 Yes		1 No
455 QUAKER LANE SOUTH				1 No
WEST HARTFORD, CT 06110				
Additional Owners:				

SUPPLEMENTAL DATA

Other ID:	509614710001	Tax/Exempt	Exempt
Map #	D28+29/	Nbhd	914900.00
Census #	4968	Data Mailer	
PP CANVAS	Exempt		
District	041	Lot Size	8.16
Zoning	R-6		
GIS ID:		ASSOC PID#	

CURRENT ASSESSMENT

Description	Code	Appraised Value	Assessed Value
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EX RS DWL	13	277,400	194,180
EX RS OTB	14	13,500	9,450
EX COM BL	22	3,776,800	2,643,760
	Total	5,903,400	4,132,380

6155
WEST HARTFORD, CT

VISION

RECORD OF OWNERSHIP

	BK-VOL/PAGE	SALE DATE	q/u	v/i	SALE PRICE	V.C.
CHURCH OF ST MARK THE EVANGELIST CORP	215/ 42		U	I	0	U

PREVIOUS ASSESSMENTS (HISTORY)

Yr.	Code	Assessed Value	Yr.	Code	Assessed Value	Yr.	Code	Assessed Value
2015	11	1,284,990	2014	11	1,284,990	2013	11	1,284,990
2015	13	194,180	2014	13	194,180	2013	13	194,180
2015	14	9,450	2014	14	9,450	2013	14	9,450
2015	22	2,643,760	2014	22	2,643,760	2013	22	2,643,760
	Total:	4,132,380		Total:	4,132,380		Total:	4,132,380

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)	1,733,400
Appraised XF (B) Value (Bldg)	0
Appraised OB (L) Value (Bldg)	0
Appraised Land Value (Bldg)	0
Special Land Value	0
Total Appraised Parcel Value	5,903,400
Valuation Method:	C
Adjustment:	0
Net Total Appraised Parcel Value	5,903,400

ASSESSING NEIGHBORHOOD

NBHD/ SUB	NBHD Name	Street Index Name	Tracing	Batch
914/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
10/17/2001			TJC	3B	EXTERIOR PARTIAL P

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
3	902	Exempt Commercial	R-6				0	SF	0.00	1.0000	0		1.00		0.00		TR1	.00		0

Total Card Land Units: 0.00 AC Parcel Total Land Area: 8.16 AC Total Land Value: 0

Property Location: 471 SOUTH QUAKER LANE **MAP ID:** G11/ 5096/ 471/ / **Bldg Name:** **State Use:** 901

Vision ID: 18998 **Account #** 5096 1 471 0001 **Bldg #:** 3 of 3 **Sec #:** 1 of 1 **Card** 3 of 3 **Print Date:** 04/20/2016 21:41

CONSTRUCTION DETAIL

Element	Cd.	Ch.	Description
Style	RCLS		Classroom
Model	94		Comm/Ind
Grade	C10		C 1.10
Stories	1		
Occupancy			
Exterior Wall 1	PRE		Precast Panel
Exterior Wall 2			
Roof Structure	GBL		Gable
Roof Cover	CMP		Comp - Shingle
Interior Wall 1	00		Typical
Interior Wall 2			
Floor Type	CS		Concrete Slab
Floor Cover	NO		None
Heating Fuel	00		Typical
Heating Type	12		None
AC Type	8		None
As Built Use	RCLS		
Bldg Use	902		Exempt Commercial
# of Bedrooms			
Total Baths			
Type	01		
Wet Sprinkler			
Dry Sprinkler			
Class	C		Class C
Frame Type	MS		Masonry
Plumbing	01		LIGHT
Ceiling	3		Not Applicable
Group	CTA		
Wall Height	10		
Adjustment			

CONSTRUCTION DETAIL (CONTINUED)

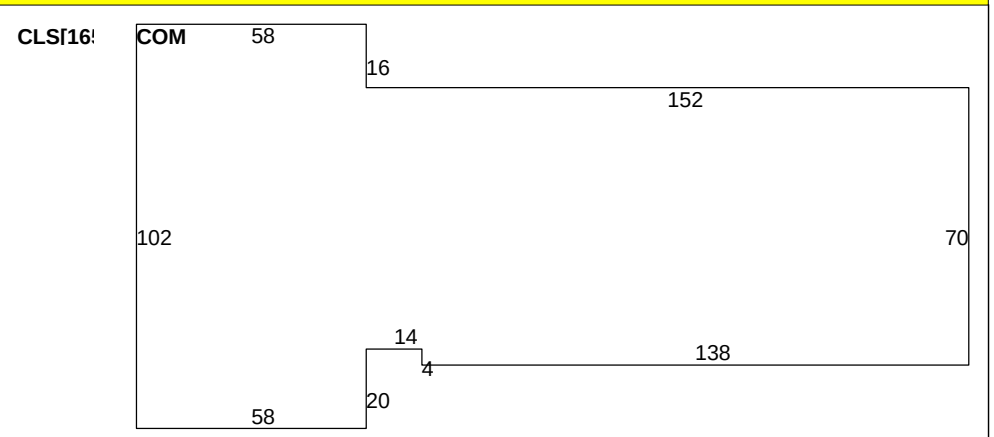
Element	Cd.	Ch.	Description

MIXED USE

Code	Description	Percentage
902	Exempt Commercial	100

COST/MARKET VALUATION

Adj. Base Rate:	129.80
AYB	1970
Dep Code	A
Remodel Rating	
Year Remodeled	
Dep %	26
Functional Obslnc	
External Obslnc	
Cost Trend Factor	
Condition	
% Complete	
Overall % Cond	74
Apprais Val	1,733,400
Dep % Ovr	0
Dep Ovr Comment	
Misc Imp Ovr	0
Misc Imp Ovr Comment	
Cost to Cure Ovr	0
Cost to Cure Ovr Comment	



No Photo On Record

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

BUILDING SUB-AREA SUMMARY SECTION

Code	Description	Living Area	Gross Area	Eff. Area	Unit Cost	Undeprec. Value
CLS	CLASS ROOM BLDG	16,556	16,556			
COM	COMMERCIAL - NV	0	16,500			
	Ttl. Gross Liv/Lease Area:	16,556	33,056			

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RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CT11178D

West Hartford/I-84/X43
467 South Quaker Lane (Church
West Hartford, CT 06110

June 2, 2016

EBI Project Number: 6216002647

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	73.50 %

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EBI Consulting
environmental | engineering | due diligence

June 2, 2016

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CT11178D – West Hartford/I-84/X43**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **467 South Quaker Lane (Church, West Hartford, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile 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.

General population/uncontrolled exposure limits apply to situations in which the general public 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 public 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.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the 700 MHz Band is approximately 467 $\mu W/cm^2$, and the general population exposure limit for the PCS and AWS 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 done for the proposed T-Mobile Wireless antenna facility located at **467 South Quaker Lane (Church, West Hartford, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile 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.

For all calculations, all equipment was calculated using the following assumptions:

1) 2 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

6) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

7) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. 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. This is rarely the case, and if so, is never continuous.

8) For the following calculations the sample point was the top of a six-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antennas used in this modeling are the **Ericsson AIR32 B66Aa/B2A** & **Ericsson AIR21 B2A/B4P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR32 B66Aa/B2A** & **Ericsson AIR21 B2A/B4P** have a maximum gain of **15.9 dBd** at their main lobe at 1900 MHz & 2100 MHz. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe at 700 MHz. 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.

10) The antenna mounting height centerline of the proposed antennas is **120 feet** above ground level (AGL).

11) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

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T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR32 B66Aa/B2A	Make / Model:	Ericsson AIR32 B66Aa/B2A	Make / Model:	Ericsson AIR32 B66Aa/B2A
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	120	Height (AGL):	120	Height (AGL):	120
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	9,337.08	ERP (W):	9,337.08	ERP (W):	9,337.08
Antenna A1 MPE%	2.58	Antenna B1 MPE%	2.58	Antenna C1 MPE%	2.58
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	120	Height (AGL):	120	Height (AGL):	120
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	6	Channel Count	6	Channel Count	6
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	7,002.81	ERP (W):	7,002.81	ERP (W):	7,002.81
Antenna A2 MPE%	1.94	Antenna B2 MPE%	1.94	Antenna C2 MPE%	1.94
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	120	Height (AGL):	120	Height (AGL):	120
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power(W):	30	Total TX Power(W):	30	Total TX Power(W):	30
ERP (W):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A3 MPE%	0.51	Antenna B3 MPE%	0.51	Antenna C3 MPE%	0.51

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**5.03 %**
AT&T	26.95 %
Clearwire	2.90 %
Verizon Wireless	38.62 %
Site Total MPE %:	**73.50 %**

T-Mobile Sector 1 Total:	5.03 %
T-Mobile Sector 2 Total:	5.03 %
T-Mobile Sector 3 Total:	5.03 %
Site Total:	73.50 %

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile 1900 MHz (PCS) LTE	**2**	**2334.27**	**120**	**12.91**	**1900**	**1000**	**1.29 %**
T-Mobile 2100 MHz (AWS) LTE	**2**	**2334.27**	**120**	**12.91**	**2100**	**1000**	**1.29 %**
T-Mobile 1900 MHz (PCS) GSM	**2**	**1167.14**	**120**	**6.46**	**1900**	**1000**	**0.65 %**
T-Mobile 1900 MHz (PCS) UMTS	**2**	**1167.14**	**120**	**6.46**	**1900**	**1000**	**0.65 %**
T-Mobile 2100 MHz (AWS) UMTS	**2**	**1167.14**	**120**	**6.46**	**2100**	**1000**	**0.65 %**
T-Mobile 700 MHz LTE	**1**	**865.21**	**120**	**2.39**	**700**	**467**	**0.51 %**
						Total:	**5.03 %**

Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector 1:	5.03 %
Sector 2:	5.03 %
Sector 3:	5.03 %
T-Mobile Per Sector Maximum:	5.03 %
Site Total:	73.50 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **73.50%** of the allowable FCC established general public 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.

Date: **May 16, 2016**

Sean Dempsey
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6565

Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
(919) 661-6351
crown@tepgroup.net

Subject: Structural Analysis Report

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11178D
	Carrier Site Name:	N/A
Crown Castle Designation:	**Crown Castle BU Number:**	829013
	Crown Castle Site Name:	West Hartford/I-84/X43
	Crown Castle JDE Job Number:	375964
	Crown Castle Work Order Number:	1235982
	Crown Castle Application Number:	344059 Rev. 2
Engineering Firm Designation:	**TEP Project Number:**	25680.49018
Site Data:	**467 South Quaker Lane (Church of St. Mark)** **West Hartford, Hartford County, CT 06110** **Latitude *41° 44' 55.59"*, Longitude *-72° 43' 52.86"*** **119 Foot - Monopole Tower**	

Dear Sean Dempsey,

Tower Engineering Professionals is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 903100, in accordance with application 344059, revision 2.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and the 2005 Connecticut State Building Code with 2013 Amendments (2003 International Building Code) based upon a wind speed of 80 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the appurtenances listed in Tables 1 and 2 and the attached drawing for the determined available structural capacity to be effective.

We at *Tower Engineering Professionals* appreciate the opportunity of providing our continuing professional services to you and *Crown Castle*. If you have any questions or need further assistance on this or any other projects please give us a call.

Structural analysis prepared by: Travis L. Infante, E.I. / KFO

Respectfully submitted by:

William H. Martin, P.E., S.E.

5/16/16

STATE OF CONNECTICUT
WILLIAM H. MARTIN
0029484
LICENSED
PROFESSIONAL ENGINEER

Electronic Copy

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 119-ft monopole tower designed by Pirod, Inc. in May of 2000. The tower was originally designed for a wind speed of 80 mph per EIA/TIA-222-F for the appurtenances listed in Table 3. The tower has been modified multiple times to accommodate additional loading. TEP visited the site on July of 2014 to perform a Rebar Mapping. All information provided to TEP was assumed to be accurate and complete.

2) ANALYSIS CRITERIA

The analysis has been performed in accordance with the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and ASCE 7-05 Minimum Design Loads for Buildings and Other Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1.0 inch escalating ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
120.0	120.0	3	Ericsson	AIR -32 B2A/B66AA w/ Mount Pipe	1	7/8	1

Notes:
1) See "Appendix B – Base Level Drawing" for assumed feed line configuration.

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
120.0	120.0	3	Ericsson	AIR 21 B4A B2P w/ Mount Pipe	-	-	1
		2	RFS Celwave	APXV18-206517S-C w/ Mount Pipe			
		3	Commscope	LNX-6515DS-VTM w/ Mount Pipe	13	1-5/8	2
		3	Ericsson	AIR 21 B2A B4P w/ Mount Pipe			
		3	Ericsson	KRY 112 144/1			
		3	Ericsson	RRUS 11 B12			
		1	Tower Mounts	Platform Mount [LP 403-1]			
115.0	115.0	1	Andrew	VHLP2-18	-	-	2
		1	Tower Mounts	Side Arm Mount [SO 102-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
110.0	110.0	1	CCI Antennas	TPA-65R-LCUUUU-H8 w/ Mount Pipe	1 2	3/8 3/4	3
		3	Ericsson	RRUS 32			
		2	Quintel Technology	QS66512-3 w/ Mount Pipe			
		6	CCI Antennas	TPX-070821			
		2	Raycap	DC6-48-60-18-8F			
		1	Hand Rail Kit	Miscellaneous [NA 507-1]			
		1	Andrew	SBNH-1D6565C w/ Mount Pipe	1 2 12	3/8 7/16 1-5/8	2
		6	Ericsson	RRUS 11			
		2	KMW Communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		3	Powerwave Technologies	7770.00 w/ Mount Pipe			
		1	Raycap	DC6-48-60-18-8F			
		1	Tower Mounts	Platform Mount [LP 712-1]			
100.0	100.0	3	Alcatel Lucent	RRH2X60-PCS	2	1-5/8	3
		3	Alcatel Lucent	RRH2x60-700			
		3	Alcatel Lucent	RRH2x60-AWS			
		6	Commscope	SBNHH-1D65B w/ Mount Pipe			
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			
		3	Amphenol	BXA-80063-4BF-EDIN-X w/ Mount Pipe	12	1-5/8	2
		2	Andrew	LNX-6514DS-T4M w/ Mount Pipe			
		1	Antel	BXA-70063-6CF-EDIN-0 w/ Mount Pipe			
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			
		1	Tower Mounts	Platform Mount [LP 403-1]			
90.0	90.0	3	Kathrein	742 213 w/ Mount Pipe	6	1-5/8	2
80.0	83.0	1	Andrew	VHLP2-23	3 1 3 1	1/4 5/16 5/8 1/2	2
		1	Clearwire	CW Junction BOX			
	81.0	3	Argus Technologies	LLPX310R w/ Mount Pipe			
		3	Samsung Telecommunications	WIMAX DAP Head			
	80.0	1	Tower Mounts	Side Arm Mount [SO 101-3]			

Notes:
1) Existing equipment to be removed; not considered in this analysis
2) Existing equipment
3) Reserved equipment

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
120.0	120.0	12	Generic	1'x4' Panels	12	1-5/8
110.0	110.0	12	Generic	1'x4' Panels	12	1-5/8
100.0	100.0	12	Generic	1'x4' Panels	12	1-5/8

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Supplemental Geotechnical Report	Tower Engineering Professionals / Dr. Clarence Welti, P.E., P.C.	3636697	CCISites
Tower Foundation Drawings	Pirod, Inc.	3636698	CCISites
Rebar Mapping	Tower Engineering Professionals	3636698	CCISites
Tower Manufacturer Drawings	Pirod, Inc.	3525378	CCISites
Tower Reinforcement Drawings	Natcomm Consulting Engineers, Inc.	3525386	CCISites
Post Modification Inspection	Natcomm Consulting Engineers, Inc.	3974228	CCISites
Tower Reinforcement Drawings	Tower Engineering Professionals	5650111	CCISites
Post Modification Inspection	Sinnott Gering and Schmitt Towers, Inc.	5852136	CCISites

3.1) Analysis Method

tnxTower (version 7.0.5.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

RISA-3D (version 13.0.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower foundation. Selected output from the analysis is included in Appendix C.

3.2) Assumptions

1) The tower and foundation were built in accordance with the manufacturer's specifications.
2) The tower and foundation have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2, and "Appendix B – Base Level Drawing".
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by the standard.
5) All tower components are in sufficient condition to carry their full design capacity.
6) Serviceability with respect to antenna twist, tilt, roll, or lateral translation, is not checked and is left to the carrier or tower owner to ensure conformance. See Table 7.
7) All antenna mounts and mounting hardware are structurally sufficient to carry the full design capacity requirements of appurtenance wind area and weight as provided by the original manufacturer specifications. It is the carrier's responsibility to ensure compliance to the structural limitations of the existing and/or proposed antenna mounts. TEP did not perform a site visit to verify the size, condition or capacity of the antenna mounts and did not analyze antennas supporting mounts as part of this structural analysis report.

This analysis may be affected if any assumptions are not valid or have been made in error. Tower Engineering Professionals should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_{allow} (lb)	% Capacity	Pass / Fail
L1	119.083 - 101.083	Pole	TP26x21.61x0.25	1	-6444	1032887	21.6	Pass
L2	101.083 - 66.5	Pole	TP34.063x24.789x0.313	2	-14771	1691417	62.3	Pass
L3	66.5 - 32.8333	Pole	TP41.75x32.49x0.375	3	-21931	2488871	69.5	Pass
L4	32.8333 - 0	Pole	TP49.063x39.848x0.375	4	-31725	3012660	77.7	Pass
							Summary	
						Pole (L4)	77.7	Pass
						RATING =	**77.7**	**Pass**

Table 6 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	-	75.7	Pass
1	Base Plate	-	64.8	Pass
1	Base Foundation Soil Interaction	-	69.9	Pass
1	Base Foundation Structural	-	59.3	Pass
1	Rock Anchors	-	86.3	Pass

Structure Rating (max from all components) =	**86.3%**

Notes:
1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.

Table 7 - Dish Twist/Sway Results for 50 mph Service Wind Speed

Elevation (ft)	Dish Model	Beam Deflection		
		Deflection (in)	Tilt (deg)	Twist (deg)
115.0	Andrew VHLP2-18	20.768	1.554	0.021

4.1) Recommendations

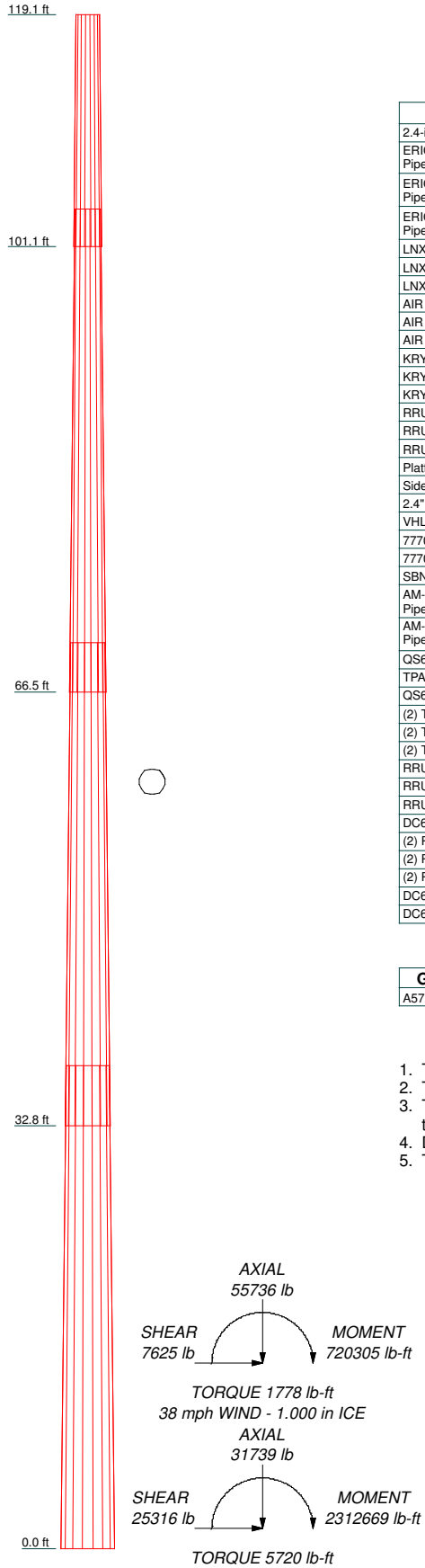
1) If the load differs from that described in Tables 1 and 2 of this report, "Appendix B – Base Level Drawing" or the provisions of this analysis are found to be invalid, another structural analysis should be performed.
2) The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

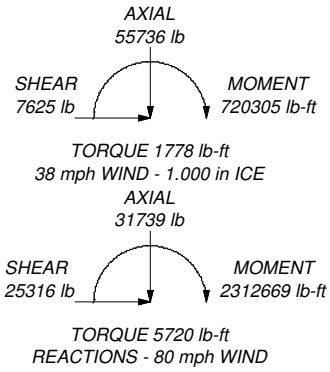
APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4
Length (ft)	18.000	37.500	37.500	37.500
Number of Sides	18	18	18	18
Thickness (in)	0.250	0.313	0.375	0.375
Socket Length (ft)	2.917	3.833	4.667	
Top Dia (in)	21.610	24.789	32.490	39.848
Bot Dia (in)	26.000	34.063	41.750	49.063
Grade			A572-65	
Weight (lb)	1144.8	3684.8	5580.8	6694.9

17105.4





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
2.4-in x 6-ft Mount Pipe	123	2.4" Dia. x 6' Mount Pipe	110
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	120	2.4" Dia. x 6' Mount Pipe	110
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	120	2.4" Dia. x 6' Mount Pipe	110
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	120	Miscellaneous [NA 507-1]	110
LNX-6515DS-VTM w/ Mount Pipe	120	Platform Mount [LP 712-1]	110
LNX-6515DS-VTM w/ Mount Pipe	120	7770.00 w/ Mount Pipe	110
LNX-6515DS-VTM w/ Mount Pipe	120	LNX-6514DS-T4M w/ Mount Pipe	100
AIR -32 B2A/B66AA w/ Mount Pipe	120	BXA-70063-6CF-EDIN-0 w/ Mount Pipe	100
AIR -32 B2A/B66AA w/ Mount Pipe	120	BXA-80063-4BF-EDIN-X w/ Mount Pipe	100
AIR -32 B2A/B66AA w/ Mount Pipe	120	BXA-80063-4BF-EDIN-X w/ Mount Pipe	100
KRY 112 144/1	120	BXA-80063-4BF-EDIN-X w/ Mount Pipe	100
KRY 112 144/1	120	(2) SBNHH-1D65B w/ Mount Pipe	100
KRY 112 144/1	120	(2) SBNHH-1D65B w/ Mount Pipe	100
RRUS 11 B12	120	(2) SBNHH-1D65B w/ Mount Pipe	100
RRUS 11 B12	120	RRH2x60-700	100
RRUS 11 B12	120	RRH2x60-700	100
Platform Mount [LP 403-1]	120	RRH2x60-700	100
Side Arm Mount [SO 102-3]	115	RRH2x60-AWS	100
2.4" Dia. x 6' Mount Pipe	115	RRH2x60-AWS	100
VHLP2-18	115	RRH2x60-AWS	100
7770.00 w/ Mount Pipe	110	RRH2X60-PCS	100
7770.00 w/ Mount Pipe	110	RRH2X60-PCS	100
SBNH-1D6565C w/ Mount Pipe	110	RRH2X60-PCS	100
AM-X-CD-16-65-00T-RET w/ Mount Pipe	110	DB-T1-6Z-8AB-0Z	100
AM-X-CD-16-65-00T-RET w/ Mount Pipe	110	DB-T1-6Z-8AB-0Z	100
		Platform Mount [LP 403-1]	100
		LNX-6514DS-T4M w/ Mount Pipe	100
		2'x3' Ice Shield	97
		2'x3' Ice Shield	95
QS66512-3 w/ Mount Pipe	110	742 213 w/ Mount Pipe	90
TPA-65R-LCUUUU-H8 w/ Mount Pipe	110	742 213 w/ Mount Pipe	90
QS66512-3 w/ Mount Pipe	110	742 213 w/ Mount Pipe	90
(2) TPX-070821	110	LLPX310R w/ Mount Pipe	80
(2) TPX-070821	110	LLPX310R w/ Mount Pipe	80
(2) TPX-070821	110	WIMAX DAP HEAD	80
RRUS 32	110	WIMAX DAP HEAD	80
RRUS 32	110	WIMAX DAP HEAD	80
RRUS 32	110	CW JUNCTION BOX	80
DC6-48-60-18-8F	110	2.4" Dia. x 6' Mount Pipe	80
(2) RRUS 11	110	2.4" Dia. x 6' Mount Pipe	80
(2) RRUS 11	110	2.4" Dia. x 6' Mount Pipe	80
(2) RRUS 11	110	Side Arm Mount [SO 101-3]	80
DC6-48-60-18-8F	110	LLPX310R w/ Mount Pipe	80
DC6-48-60-18-8F	110	VHLP2-23	80

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 77.7%

Tower Engineering Professionals

Tower Engineering Professionals
326 Tryon Road
Raleigh, NC
Phone: (919) 661-6351
FAX: (919) 661-6350

Job: ***West Hartford/I-84/X43 (BU 829013)***			
Project: ***TEP No. 25680.49018***			
Client: Crown Castle	Drawn by: TLI	App'd:	
Code: TIA/EIA-222-F	Date: 05/13/16	Scale: NTS	
Path: C:\Users\tlinfante\Desktop\25680.49018 WEST HARTFORD\I-84X43\tnxTower\829013_LC7.eri		Dwg No. E-1	

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Hartford County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
√	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component	√	Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric				

Tapered Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Splice Length* *ft*	*Number of Sides*	*Top Diameter* *in*	*Bottom Diameter* *in*	*Wall Thickness* *in*	*Bend Radius* *in*	*Pole Grade*
L1	119.083-101.083	18.000	2.917	18	21.610	26.000	0.250	1.000	A572-65 (65 ksi)
L2	101.083-66.500	37.500	3.833	18	24.789	34.063	0.313	1.250	A572-65 (65 ksi)
L3	66.500-32.833	37.500	4.667	18	32.490	41.750	0.375	1.500	A572-65 (65 ksi)
L4	32.833-0.000	37.500		18	39.848	49.063	0.375	1.500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	21.943	16.949	976.986	7.583	10.978	88.996	1955.257	8.476	3.363	13.453
	26.401	20.433	1711.654	9.141	13.208	129.592	3425.561	10.218	4.136	16.544
L2	25.903	24.277	1837.486	8.689	12.593	145.918	3677.390	12.141	3.813	12.201
	34.588	33.476	4817.433	11.981	17.304	278.404	9641.206	16.741	5.445	17.424
L3	33.952	38.224	4980.574	11.401	16.505	301.768	9967.702	19.116	5.058	13.488
	42.394	49.247	10650.982	14.688	21.209	502.192	21315.979	24.628	6.688	17.835
L4	41.627	46.982	9248.308	14.013	20.243	456.874	18508.785	23.496	6.353	16.942
	49.819	57.950	17355.138	17.284	24.924	696.329	34733.112	28.981	7.975	21.267

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 119.083-101.083				1	1	1			
L2 101.083-66.500				1	1	1			
L3 66.500-32.833				1	1	1			
L4 32.833-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
***										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
Safety Line 3/8	A	No	CaAa (Out Of Face)	119.000 - 0.000	1	No Ice	0.037	0.220
						1/2" Ice	0.137	0.750
						1" Ice	0.238	1.280
						2" Ice	0.437	2.340
						4" Ice	0.838	4.460
PiRod Ladder	A	No	CaAa (Out Of Face)	119.000 - 0.000	1	No Ice	0.054	2.000
						1/2" Ice	0.154	2.635
						1" Ice	0.254	3.881
						2" Ice	0.454	8.206
						4" Ice	0.854	24.187
120 LDF7-50A(1-5/8")	A	No	Inside Pole	119.083 - 0.000	10	No Ice	0.000	0.820

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1/2" Ice	0.000	0.820
						1" Ice	0.000	0.820
						2" Ice	0.000	0.820
						4" Ice	0.000	0.820
LDF7-50A(1-5/8")	A	No	CaAa (Out Of Face)	119.083 - 0.000	1	No Ice	0.198	0.820
						1/2" Ice	0.298	2.335
						1" Ice	0.398	4.461
						2" Ice	0.598	10.545
						4" Ice	0.998	30.044
LDF7-50A(1-5/8")	A	No	CaAa (Out Of Face)	119.083 - 0.000	2	No Ice	0.000	0.820
						1/2" Ice	0.000	2.335
						1" Ice	0.000	4.461
						2" Ice	0.000	10.545
						4" Ice	0.000	30.044
MLC Hybrid 6/6(7/8")	A	No	CaAa (Out Of Face)	119.083 - 0.000	1	No Ice	0.000	1.820
						1/2" Ice	0.000	2.785
						1" Ice	0.000	4.361
						2" Ice	0.000	9.346
						4" Ice	0.000	26.646
110								
LDF7-50A(1-5/8")	C	No	Inside Pole	110.000 - 0.000	12	No Ice	0.000	0.820
						1/2" Ice	0.000	0.820
						1" Ice	0.000	0.820
						2" Ice	0.000	0.820
						4" Ice	0.000	0.820
WR-VG102ST-BRDA(7/16")	C	No	Inside Pole	110.000 - 0.000	2	No Ice	0.000	0.201
						1/2" Ice	0.000	0.201
						1" Ice	0.000	0.201
						2" Ice	0.000	0.201
						4" Ice	0.000	0.201
WR-VG122ST-BRDA(3/8) ((1)E+(1)P)	C	No	Inside Pole	110.000 - 0.000	2	No Ice	0.000	0.200
						1/2" Ice	0.000	0.200
						1" Ice	0.000	0.200
						2" Ice	0.000	0.200
						4" Ice	0.000	0.200
WR-VG86ST-BRD(3/4")	C	No	Inside Pole	110.000 - 0.000	2	No Ice	0.000	0.584
						1/2" Ice	0.000	0.584
						1" Ice	0.000	0.584
						2" Ice	0.000	0.584
						4" Ice	0.000	0.584
3" Flexible Conduit	C	No	Inside Pole	110.000 - 0.000	1	No Ice	0.000	1.040
						1/2" Ice	0.000	1.040
						1" Ice	0.000	1.040
						2" Ice	0.000	1.040
						4" Ice	0.000	1.040
100								
LDF7-50A(1-5/8")	B	No	Inside Pole	100.000 - 0.000	11	No Ice	0.000	0.820
						1/2" Ice	0.000	0.820
						1" Ice	0.000	0.820
						2" Ice	0.000	0.820
						4" Ice	0.000	0.820
LDF7-50A(1-5/8")	B	No	CaAa (Out Of Face)	80.000 - 0.000	3	No Ice	0.000	0.820
						1/2" Ice	0.000	2.335
						1" Ice	0.000	4.461
						2" Ice	0.000	10.545
						4" Ice	0.000	30.044
LDF7-50A(1-5/8")	B	No	CaAa (Out Of Face)	100.000 - 80.000	2	No Ice	0.000	0.820
						1/2" Ice	0.000	2.335
						1" Ice	0.000	4.461
						2" Ice	0.000	10.545
						4" Ice	0.000	30.044

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF7-50A(1-5/8")	B	No	CaAa (Out Of Face)	100.000 - 80.000	1	No Ice	0.198	0.820
						1/2" Ice	0.298	2.335
						1" Ice	0.398	4.461
						2" Ice	0.598	10.545
						4" Ice	0.998	30.044
90								
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	90.000 - 0.000	6	No Ice	0.000	0.820
						1/2" Ice	0.000	2.335
						1" Ice	0.000	4.461
						2" Ice	0.000	10.545
						4" Ice	0.000	30.044
80								
FSJ1-50A(1/4")	A	No	Inside Pole	80.000 - 0.000	3	No Ice	0.000	0.045
						1/2" Ice	0.000	0.045
						1" Ice	0.000	0.045
						2" Ice	0.000	0.045
						4" Ice	0.000	0.045
HJ4.5-50(5/8")	A	No	Inside Pole	80.000 - 0.000	3	No Ice	0.000	0.400
						1/2" Ice	0.000	0.400
						1" Ice	0.000	0.400
						2" Ice	0.000	0.400
						4" Ice	0.000	0.400
9207(5/16")	A	No	Inside Pole	80.000 - 0.000	1	No Ice	0.000	0.600
						1/2" Ice	0.000	0.600
						1" Ice	0.000	0.600
						2" Ice	0.000	0.600
						4" Ice	0.000	0.600
2" Flexible Conduit	A	No	CaAa (Out Of Face)	80.000 - 0.000	1	No Ice	0.000	0.340
						1/2" Ice	0.000	1.867
						1" Ice	0.000	4.005
						2" Ice	0.000	10.114
						4" Ice	0.000	29.662
2" Flexible Conduit	A	No	CaAa (Out Of Face)	80.000 - 0.000	1	No Ice	0.200	0.340
						1/2" Ice	0.300	1.867
						1" Ice	0.400	4.005
						2" Ice	0.600	10.114
						4" Ice	1.000	29.662
FSJ4-50B(1/2")	A	No	CaAa (Out Of Face)	80.000 - 0.000	4	No Ice	0.000	0.140
						1/2" Ice	0.000	0.763
						1" Ice	0.000	1.997
						2" Ice	0.000	6.298
						4" Ice	0.000	22.229
***								
***								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	119.083-101.083	A	0.000	0.000	0.000	5.203	264
		B	0.000	0.000	0.000	0.000	0
		C	0.000	0.000	0.000	0.000	115
L2	101.083-66.500	A	0.000	0.000	0.000	12.712	551
		B	0.000	0.000	0.000	3.960	385
		C	0.000	0.000	0.000	0.000	560
L3	66.500-32.833	A	0.000	0.000	0.000	16.480	602
		B	0.000	0.000	0.000	0.000	386

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
		C	0.000	0.000	0.000	0.000	598
L4	32.833-0.000	A	0.000	0.000	0.000	16.072	587
		B	0.000	0.000	0.000	0.000	377
		C	0.000	0.000	0.000	0.000	583

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	119.083-101.083	A	1.155	0.000	0.000	0.000	17.641	639
		B		0.000	0.000	0.000	0.000	0
		C		0.000	0.000	0.000	0.000	115
L2	101.083-66.500	A	1.117	0.000	0.000	0.000	39.801	1533
		B		0.000	0.000	0.000	8.581	845
		C		0.000	0.000	0.000	0.000	1206
L3	66.500-32.833	A	1.050	0.000	0.000	0.000	46.575	1880
		B		0.000	0.000	0.000	0.000	826
		C		0.000	0.000	0.000	0.000	1478
L4	32.833-0.000	A	1.000	0.000	0.000	0.000	43.646	1705
		B		0.000	0.000	0.000	0.000	765
		C		0.000	0.000	0.000	0.000	1360

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	119.083-101.083	0.000	-0.379	0.000	-0.924
L2	101.083-66.500	0.118	-0.402	0.186	-0.958
L3	66.500-32.833	0.000	-0.635	0.000	-1.382
L4	32.833-0.000	0.000	-0.650	0.000	-1.423

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
2.4-in x 6-ft Mount Pipe	C	None		0.000	123.000	No Ice	1.440	1.440	22
						1/2" Ice	1.933	1.933	33
						1" Ice	2.302	2.302	48
						2" Ice	3.068	3.068	91
						4" Ice	4.711	4.711	232
120									
ERICSSON AIR 21 B2A	A	From	4.000	30.000	120.000	No Ice	6.825	5.642	112

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
B4P w/ Mount Pipe		Centroid-Face	-7.000 0.000			1/2" Ice 1" Ice 2" Ice 4" Ice	7.347 7.863 8.926 11.175	6.480 7.257 8.864 12.293	169 233 383 807
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Centroid-Face	4.000 -7.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.825 7.347 7.863 8.926 11.175	5.642 6.480 7.257 8.864 12.293	112 169 233 383 807
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Centroid-Face	4.000 -7.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.825 7.347 7.863 8.926 11.175	5.642 6.480 7.257 8.864 12.293	112 169 233 383 807
LNX-6515DS-VTM w/ Mount Pipe	A	From Centroid-Face	4.000 7.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.683 12.404 13.135 14.601 17.875	9.842 11.366 12.914 15.267 20.139	83 173 273 506 1151
LNX-6515DS-VTM w/ Mount Pipe	B	From Centroid-Face	4.000 -3.750 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.683 12.404 13.135 14.601 17.875	9.842 11.366 12.914 15.267 20.139	83 173 273 506 1151
LNX-6515DS-VTM w/ Mount Pipe	C	From Centroid-Face	4.000 -3.750 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.683 12.404 13.135 14.601 17.875	9.842 11.366 12.914 15.267 20.139	83 173 273 506 1151
AIR -32 B2A/B66AA w/ Mount Pipe	A	From Centroid-Face	4.000 3.500 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.336 7.868 8.393 9.474 11.759	6.145 7.014 7.803 9.434 12.912	153 214 282 441 885
AIR -32 B2A/B66AA w/ Mount Pipe	B	From Centroid-Face	4.000 3.500 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.336 7.868 8.393 9.474 11.759	6.145 7.014 7.803 9.434 12.912	153 214 282 441 885
AIR -32 B2A/B66AA w/ Mount Pipe	C	From Centroid-Face	4.000 7.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.336 7.868 8.393 9.474 11.759	6.145 7.014 7.803 9.434 12.912	153 214 282 441 885
KRY 112 144/1	A	From Centroid-Face	4.000 -7.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.411 0.500 0.597 0.818 1.363	0.189 0.256 0.332 0.510 0.970	11 14 18 32 81
KRY 112 144/1	B	From Centroid-Face	4.000 -7.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.411 0.500 0.597 0.818 1.363	0.189 0.256 0.332 0.510 0.970	11 14 18 32 81
KRY 112 144/1	C	From Centroid-Face	4.000 -7.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice	0.411 0.500 0.597	0.189 0.256 0.332	11 14 18

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						2" Ice	0.818	0.510	32
						4" Ice	1.363	0.970	81
RRUS 11 B12	A	From Centroid-Face	4.000 7.000 0.000	30.000	120.000	No Ice	3.306	1.361	51
						1/2" Ice	3.550	1.540	72
						1" Ice	3.802	1.728	95
						2" Ice	4.334	2.130	153
						4" Ice	5.501	3.038	314
RRUS 11 B12	B	From Centroid-Face	4.000 -3.750 0.000	30.000	120.000	No Ice	3.306	1.361	51
						1/2" Ice	3.550	1.540	72
						1" Ice	3.802	1.728	95
						2" Ice	4.334	2.130	153
						4" Ice	5.501	3.038	314
RRUS 11 B12	C	From Centroid-Face	4.000 -3.750 0.000	30.000	120.000	No Ice	3.306	1.361	51
						1/2" Ice	3.550	1.540	72
						1" Ice	3.802	1.728	95
						2" Ice	4.334	2.130	153
						4" Ice	5.501	3.038	314
Platform Mount [LP 403-1]	C	None		0.000	120.000	No Ice	18.850	18.850	1500
						1/2" Ice	24.300	24.300	1797
						1" Ice	29.750	29.750	2093
						2" Ice	40.650	40.650	2686
						4" Ice	62.450	62.450	3872
115									
Side Arm Mount [SO 102-3]	C	None		0.000	115.000	No Ice	3.000	3.000	81
						1/2" Ice	3.480	3.480	111
						1" Ice	3.960	3.960	141
						2" Ice	4.920	4.920	201
						4" Ice	6.840	6.840	321
2.4" Dia. x 6' Mount Pipe	C	From Leg	0.500 0.000 0.000	0.000	115.000	No Ice	1.425	1.425	22
						1/2" Ice	1.931	1.931	38
						1" Ice	2.316	2.316	56
						2" Ice	3.149	3.149	100
						4" Ice	5.058	5.058	252
110									
7770.00 w/ Mount Pipe	A	From Centroid-Face	4.000 -6.000 0.000	30.000	110.000	No Ice	6.119	4.254	55
						1/2" Ice	6.626	5.014	103
						1" Ice	7.128	5.711	157
						2" Ice	8.164	7.155	287
						4" Ice	10.360	10.412	665
7770.00 w/ Mount Pipe	B	From Centroid-Face	4.000 -6.000 0.000	20.000	110.000	No Ice	6.119	4.254	55
						1/2" Ice	6.626	5.014	103
						1" Ice	7.128	5.711	157
						2" Ice	8.164	7.155	287
						4" Ice	10.360	10.412	665
7770.00 w/ Mount Pipe	C	From Centroid-Face	4.000 -6.000 0.000	30.000	110.000	No Ice	6.119	4.254	55
						1/2" Ice	6.626	5.014	103
						1" Ice	7.128	5.711	157
						2" Ice	8.164	7.155	287
						4" Ice	10.360	10.412	665
SBNH-1D6565C w/ Mount Pipe	B	From Centroid-Face	4.000 -2.000 0.000	20.000	110.000	No Ice	11.695	9.854	99
						1/2" Ice	12.421	11.383	189
						1" Ice	13.157	12.936	289
						2" Ice	14.630	15.305	523
						4" Ice	17.917	20.189	1169
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Centroid-Face	4.000 -2.000 0.000	30.000	110.000	No Ice	8.498	6.304	74
						1/2" Ice	9.149	7.479	139
						1" Ice	9.767	8.368	212

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						2" Ice	11.031	10.179	385
						4" Ice	13.679	14.024	874
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Centroid-Face	4.000 -2.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.304 7.479 8.368 10.179 14.024	74 139 212 385 874
QS66512-3 w/ Mount Pipe	A	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.637 9.290 9.910 11.176 13.829	8.463 9.657 10.620 12.610 16.805	131 206 290 486 1023
TPA-65R-LCUUUU-H8 w/ Mount Pipe	B	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	13.678 14.501 15.334 16.942 20.270	10.960 12.486 14.037 16.391 21.279	114 218 331 593 1296
QS66512-3 w/ Mount Pipe	C	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.637 9.290 9.910 11.176 13.829	8.463 9.657 10.620 12.610 16.805	131 206 290 486 1023
(2) TPX-070821	A	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.547 0.652 0.765 1.017 1.626	0.116 0.172 0.236 0.390 0.801	8 11 16 30 83
(2) TPX-070821	B	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.547 0.652 0.765 1.017 1.626	0.116 0.172 0.236 0.390 0.801	8 11 16 30 83
(2) TPX-070821	C	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.547 0.652 0.765 1.017 1.626	0.116 0.172 0.236 0.390 0.801	8 11 16 30 83
RRUS 32	A	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.333 3.597 3.869 4.439 5.684	1.983 2.214 2.453 2.958 4.072	55 77 103 165 336
RRUS 32	B	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.333 3.597 3.869 4.439 5.684	1.983 2.214 2.453 2.958 4.072	55 77 103 165 336
RRUS 32	C	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.333 3.597 3.869 4.439 5.684	1.983 2.214 2.453 2.958 4.072	55 77 103 165 336
DC6-48-60-18-8F	B	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.467 1.667 1.878 2.333 3.378	1.467 1.667 1.878 2.333 3.378	19 37 57 105 239

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(2) RRUS 11	A	From Centroid-Face	4.000 -4.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.256 3.498 3.749 4.277 5.435	1.379 1.558 1.745 2.146 3.050	51 72 95 153 314
(2) RRUS 11	B	From Centroid-Face	4.000 -4.000 0.000	20.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.256 3.498 3.749 4.277 5.435	1.379 1.558 1.745 2.146 3.050	51 72 95 153 314
(2) RRUS 11	C	From Centroid-Face	4.000 -4.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.256 3.498 3.749 4.277 5.435	1.379 1.558 1.745 2.146 3.050	51 72 95 153 314
DC6-48-60-18-8F	B	From Centroid-Face	4.000 -6.000 0.000	20.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.467 1.667 1.878 2.333 3.378	1.467 1.667 1.878 2.333 3.378	19 37 57 105 239
DC6-48-60-18-8F	B	From Centroid-Face	4.000 6.000 0.000	20.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.467 1.667 1.878 2.333 3.378	1.467 1.667 1.878 2.333 3.378	19 37 57 105 239
2.4" Dia. x 6' Mount Pipe	A	From Centroid-Face	4.000 2.000 0.000	0.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.931 2.316 3.149 5.058	1.425 1.931 2.316 3.149 5.058	22 38 56 100 252
2.4" Dia. x 6' Mount Pipe	B	From Centroid-Face	4.000 2.000 0.000	0.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.931 2.316 3.149 5.058	1.425 1.931 2.316 3.149 5.058	22 38 56 100 252
2.4" Dia. x 6' Mount Pipe	C	From Centroid-Face	4.000 2.000 0.000	0.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.931 2.316 3.149 5.058	1.425 1.931 2.316 3.149 5.058	22 38 56 100 252
Miscellaneous [NA 507-1]	C	None		0.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.800 6.700 8.600 12.400 20.000	4.800 6.700 8.600 12.400 20.000	245 294 343 441 637
Platform Mount [LP 712-1]	C	None		0.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	24.530 29.940 35.350 46.170 67.810	24.530 29.940 35.350 46.170 67.810	1335 1646 1956 2577 3820
100 LNX-6514DS-T4M w/ Mount Pipe	B	From Centroid-Face	4.000 -3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.682 9.312 9.931 11.198 13.852	7.418 8.452 9.345 11.181 15.216	79 152 233 420 938
LNX-6514DS-T4M w/	C	From	4.000	0.000	100.000	No Ice	8.682	7.418	79

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
Mount Pipe		Centroid-Face	-3.000 0.000			1/2" Ice 1" Ice 2" Ice 4" Ice	9.312 9.931 11.198 13.852	8.452 9.345 11.181 15.216	152 233 420 938
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	A	From Centroid-Face	4.000 -3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.969 8.609 9.216 10.459 13.066	5.801 6.953 7.819 9.601 13.366	42 103 171 335 804
BXA-80063-4BF-EDIN-X w/ Mount Pipe	A	From Centroid-Face	4.000 7.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.089 5.515 5.953 6.859 8.816	3.472 4.045 4.640 5.957 8.886	30 70 116 227 554
BXA-80063-4BF-EDIN-X w/ Mount Pipe	B	From Centroid-Face	4.000 7.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.089 5.515 5.953 6.859 8.816	3.472 4.045 4.640 5.957 8.886	30 70 116 227 554
BXA-80063-4BF-EDIN-X w/ Mount Pipe	C	From Centroid-Face	4.000 7.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.089 5.515 5.953 6.859 8.816	3.472 4.045 4.640 5.957 8.886	30 70 116 227 554
(2) SBNHH-1D65B w/ Mount Pipe	A	From Centroid-Face	4.000 -3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.533 9.184 9.803 11.067 13.716	7.004 8.185 9.081 10.905 14.926	76 145 221 401 906
(2) SBNHH-1D65B w/ Mount Pipe	B	From Centroid-Face	4.000 -3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.533 9.184 9.803 11.067 13.716	7.004 8.185 9.081 10.905 14.926	76 145 221 401 906
(2) SBNHH-1D65B w/ Mount Pipe	C	From Centroid-Face	4.000 -3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.533 9.184 9.803 11.067 13.716	7.004 8.185 9.081 10.905 14.926	76 145 221 401 906
RRH2x60-700	A	From Centroid-Face	4.000 -3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	60 83 109 173 354
RRH2x60-700	B	From Centroid-Face	4.000 -3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	60 83 109 173 354
RRH2x60-700	C	From Centroid-Face	4.000 -3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	60 83 109 173 354
RRH2x60-AWS	A	From Centroid-Face	4.000 3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice	3.957 4.272 4.596	1.816 2.075 2.360	60 83 109

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						2" Ice	5.271	2.957	173
						4" Ice	6.722	4.253	354
RRH2x60-AWS	B	From Centroid-Face	4.000 3.000 0.000	0.000	100.000	No Ice	3.957	1.816	60
						1/2" Ice	4.272	2.075	83
						1" Ice	4.596	2.360	109
						2" Ice	5.271	2.957	173
						4" Ice	6.722	4.253	354
RRH2x60-AWS	C	From Centroid-Face	4.000 3.000 0.000	0.000	100.000	No Ice	3.957	1.816	60
						1/2" Ice	4.272	2.075	83
						1" Ice	4.596	2.360	109
						2" Ice	5.271	2.957	173
						4" Ice	6.722	4.253	354
RRH2X60-PCS	A	From Centroid-Face	4.000 -7.000 0.000	0.000	100.000	No Ice	2.567	2.011	55
						1/2" Ice	2.791	2.218	75
						1" Ice	3.025	2.435	99
						2" Ice	3.517	2.894	155
						4" Ice	4.606	3.915	313
RRH2X60-PCS	B	From Centroid-Face	4.000 -7.000 0.000	0.000	100.000	No Ice	2.567	2.011	55
						1/2" Ice	2.791	2.218	75
						1" Ice	3.025	2.435	99
						2" Ice	3.517	2.894	155
						4" Ice	4.606	3.915	313
RRH2X60-PCS	C	From Centroid-Face	4.000 -7.000 0.000	0.000	100.000	No Ice	2.567	2.011	55
						1/2" Ice	2.791	2.218	75
						1" Ice	3.025	2.435	99
						2" Ice	3.517	2.894	155
						4" Ice	4.606	3.915	313
DB-T1-6Z-8AB-0Z	A	From Centroid-Face	4.000 -3.000 0.000	0.000	100.000	No Ice	5.600	2.333	44
						1/2" Ice	5.915	2.558	80
						1" Ice	6.240	2.791	120
						2" Ice	6.914	3.284	213
						4" Ice	8.365	4.373	455
DB-T1-6Z-8AB-0Z	C	From Centroid-Face	4.000 3.000 0.000	0.000	100.000	No Ice	5.600	2.333	44
						1/2" Ice	5.915	2.558	80
						1" Ice	6.240	2.791	120
						2" Ice	6.914	3.284	213
						4" Ice	8.365	4.373	455
Platform Mount [LP 403-1]	C	None		0.000	100.000	No Ice	18.850	18.850	1500
						1/2" Ice	24.300	24.300	1797
						1" Ice	29.750	29.750	2093
						2" Ice	40.650	40.650	2686
						4" Ice	62.450	62.450	3872
90									
742 213 w/ Mount Pipe	A	From Leg	0.500 0.000 0.000	30.000	90.000	No Ice	5.373	4.620	49
						1/2" Ice	5.950	6.000	94
						1" Ice	6.501	6.982	146
						2" Ice	7.611	8.852	277
						4" Ice	9.933	12.794	683
742 213 w/ Mount Pipe	B	From Leg	0.500 0.000 0.000	0.000	90.000	No Ice	5.373	4.620	49
						1/2" Ice	5.950	6.000	94
						1" Ice	6.501	6.982	146
						2" Ice	7.611	8.852	277
						4" Ice	9.933	12.794	683
742 213 w/ Mount Pipe	C	From Leg	0.500 0.000 0.000	-10.000	90.000	No Ice	5.373	4.620	49
						1/2" Ice	5.950	6.000	94
						1" Ice	6.501	6.982	146
						2" Ice	7.611	8.852	277

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						4" Ice	9.933	12.794	683
2'x3' Ice Shield	C	From Leg	0.500 0.000 0.000	-10.000	95.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.720 0.990 1.260 1.800 2.880	1.180 1.610 2.040 2.900 4.620	72 132 192 312 552
2'x3' Ice Shield	C	From Leg	0.500 0.000 0.000	-10.000	97.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.720 0.990 1.260 1.800 2.880	1.180 1.610 2.040 2.900 4.620	72 132 192 312 552
80									
LLPX310R w/ Mount Pipe	A	From Leg	1.000 -2.000 1.000	30.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.982 5.376 5.780 6.618 8.437	2.874 3.398 3.937 5.125 7.894	44 81 123 227 531
LLPX310R w/ Mount Pipe	B	From Leg	1.000 -2.000 1.000	30.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.982 5.376 5.780 6.618 8.437	2.874 3.398 3.937 5.125 7.894	44 81 123 227 531
LLPX310R w/ Mount Pipe	C	From Leg	1.000 -2.000 1.000	30.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.982 5.376 5.780 6.618 8.437	2.874 3.398 3.937 5.125 7.894	44 81 123 227 531
WIMAX DAP HEAD	A	From Leg	1.000 2.000 1.000	30.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.804 1.988 2.180 2.589 3.512	0.778 0.918 1.067 1.391 2.143	33 45 58 94 201
WIMAX DAP HEAD	B	From Leg	1.000 -2.000 1.000	30.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.804 1.988 2.180 2.589 3.512	0.778 0.918 1.067 1.391 2.143	33 45 58 94 201
WIMAX DAP HEAD	C	From Leg	1.000 -2.000 1.000	30.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.804 1.988 2.180 2.589 3.512	0.778 0.918 1.067 1.391 2.143	33 45 58 94 201
CW JUNCTION BOX	A	From Leg	1.000 2.000 3.000	30.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.400 1.560 1.728 2.091 2.921	0.700 0.821 0.951 1.236 1.910	0 10 23 55 153
2.4" Dia. x 6' Mount Pipe	A	From Leg	1.000 2.000 0.000	0.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.931 2.316 3.149 5.058	1.425 1.931 2.316 3.149 5.058	22 38 56 100 252
2.4" Dia. x 6' Mount Pipe	B	From Leg	1.000 2.000 0.000	0.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.931 2.316 3.149 5.058	1.425 1.931 2.316 3.149 5.058	22 38 56 100 252

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
2.4" Dia. x 6' Mount Pipe	C	From Leg	1.000 2.000 0.000	0.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.931 2.316 3.149 5.058	1.425 1.931 2.316 3.149 5.058	22 38 56 100 252
Side Arm Mount [SO 101-3]	C	None		0.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.500 8.900 10.300 13.100 18.700	7.500 8.900 10.300 13.100 18.700	252 333 414 576 900
***									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight lb
115											
VHLP2-18	C	Paraboloid w/Shroud (HP)	From Leg	1.000 0.000 0.000	0.000		115.000	2.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.140 3.410 3.680 4.210 5.280	31 49 66 101 171
80											
VHLP2-23	A	Paraboloid w/Shroud (HP)	From Leg	1.000 2.000 3.000	-30.000		80.000	2.180	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.730 4.020 4.310 4.900 6.060	30 50 70 110 200
***											

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice

Comb. No.	Description
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L1	119.083 - 101.083	Pole	Max Tension	1	0	0	0
			Max. Compression	14	-13867	-2386	4458
			Max. Mx	5	-6444	-110219	2063
			Max. My	2	-6453	-1271	110443
			Max. Vy	5	10878	-110219	2063
			Max. Vx	2	-10763	-1271	110443
			Max. Torque	6			6090
L2	101.083 - 66.5	Pole	Max Tension	1	0	0	0
			Max. Compression	14	-30445	-1317	4737
			Max. Mx	5	-14770	-698751	2453
			Max. My	2	-14774	-3007	696999
			Max. Vy	5	20431	-698751	2453
			Max. Vx	8	20416	1428	-694220
			Max. Torque	6			6094
L3	66.5 - 32.8333	Pole	Max Tension	1	0	0	0
			Max. Compression	14	-41495	-691	5994
			Max. Mx	5	-21931	-1409736	1200
			Max. My	2	-21933	-3792	1406969
			Max. Vy	5	22832	-1409736	1200
			Max. Vx	8	22818	965	-1404621
			Max. Torque	6			5582
L4	32.8333 - 0	Pole	Max Tension	1	0	0	0
			Max. Compression	14	-55736	169	7411
			Max. Mx	5	-31724	-2312669	-269
			Max. My	2	-31725	-4564	2308846

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Vy	5	25323	-2312669	-269
			Max. Vx	8	25311	515	-2306921
			Max. Torque	6			5720

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	15	55736	4	7610
	Max. H_x	11	31739	25266	24
	Max. H_z	2	31739	-24	25266
	Max. M_x	2	2308846	-24	25266
	Max. M_z	5	2312669	-25305	-47
	Max. Torsion	6	5720	-21936	-12638
	Min. Vert	1	31739	0	0
	Min. H_x	5	31739	-25305	-47
	Min. H_z	8	31739	-16	-25293
	Min. M_x	8	-2306921	-16	-25293
	Min. M_z	11	-2308661	25266	24
	Min. Torsion	12	-5607	21891	12635

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	31739	0	0	-1914	149	0
Dead+Wind 0 deg - No Ice	31739	24	-25266	-2308846	-4563	3455
Dead+Wind 30 deg - No Ice	31739	12636	-21896	-2001615	-1156364	780
Dead+Wind 60 deg - No Ice	31739	21893	-12646	-1157505	-2001324	-2177
Dead+Wind 90 deg - No Ice	31739	25305	47	270	-2312669	-4656
Dead+Wind 120 deg - No Ice	31739	21936	12638	1149565	-2004557	-5720
Dead+Wind 150 deg - No Ice	31739	12649	21916	1998406	-1154337	-5244
Dead+Wind 180 deg - No Ice	31739	16	25293	2306921	515	-3538
Dead+Wind 210 deg - No Ice	31739	-12588	21897	1996974	1151836	-900
Dead+Wind 240 deg - No Ice	31739	-21881	12605	1149601	1999733	2262
Dead+Wind 270 deg - No Ice	31739	-25266	-24	-2582	2308661	4598
Dead+Wind 300 deg - No Ice	31739	-21891	-12635	-1153917	2000379	5607
Dead+Wind 330 deg - No Ice	31739	-12656	-21874	-1998283	1156058	5149
Dead+Ice+Temp	55736	0	0	-7411	169	1
Dead+Wind 0 deg+Ice+Temp	55736	-4	-7610	-720305	-28	954
Dead+Wind 30 deg+Ice+Temp	55736	3789	-6589	-624745	-355224	99
Dead+Wind 60 deg+Ice+Temp	55736	6574	-3799	-363512	-616016	-802
Dead+Wind 90 deg+Ice+Temp	55736	7604	23	-5828	-712437	-1515
Dead+Wind 120 deg+Ice+Temp	55736	6596	3815	349306	-617994	-1778
Dead+Wind 150 deg+Ice+Temp	55736	3810	6605	611034	-356562	-1562
Dead+Wind 180 deg+Ice+Temp	55736	15	7617	705826	-822	-973
Dead+Wind 210 deg+Ice+Temp	55736	-3776	6589	609530	354254	-128
Dead+Wind 240 deg+Ice+Temp	55736	-6571	3788	347436	615824	825
Dead+Wind 270 deg+Ice+Temp	55736	-7594	-17	-8760	711598	1500
Dead+Wind 300 deg+Ice+Temp	55736	-6585	-3814	-364447	617117	1749
Dead+Wind 330 deg+Ice+Temp	55736	-3812	-6594	-624953	357290	1539

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
Dead+Wind 0 deg - Service	31739	9	-9870	-903708	-1697	1357
Dead+Wind 30 deg - Service	31739	4936	-8553	-783616	-451923	307
Dead+Wind 60 deg - Service	31739	8552	-4940	-453665	-782209	-855
Dead+Wind 90 deg - Service	31739	9885	18	-1104	-903911	-1828
Dead+Wind 120 deg - Service	31739	8569	4937	448144	-783474	-2246
Dead+Wind 150 deg - Service	31739	4941	8561	779949	-451132	-2059
Dead+Wind 180 deg - Service	31739	6	9880	900546	290	-1389
Dead+Wind 210 deg - Service	31739	-4917	8553	779392	450332	-353
Dead+Wind 240 deg - Service	31739	-8547	4924	448162	781768	888
Dead+Wind 270 deg - Service	31739	-9870	-9	-2217	902525	1805
Dead+Wind 300 deg - Service	31739	-8551	-4935	-452263	782018	2201
Dead+Wind 330 deg - Service	31739	-4944	-8544	-782314	451977	2022

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	lb	lb	lb	lb	lb	lb	
1	0	-31739	0	0	31739	0	0.000%
2	24	-31739	-25266	-24	31739	25266	0.000%
3	12636	-31739	-21896	-12636	31739	21896	0.000%
4	21893	-31739	-12646	-21893	31739	12646	0.000%
5	25305	-31739	47	-25305	31739	-47	0.000%
6	21936	-31739	12638	-21936	31739	-12638	0.000%
7	12649	-31739	21916	-12649	31739	-21916	0.000%
8	16	-31739	25293	-16	31739	-25293	0.000%
9	-12588	-31739	21897	12588	31739	-21897	0.000%
10	-21881	-31739	12605	21881	31739	-12605	0.000%
11	-25266	-31739	-24	25266	31739	24	0.000%
12	-21891	-31739	-12635	21891	31739	12635	0.000%
13	-12656	-31739	-21874	12656	31739	21874	0.000%
14	0	-55736	0	0	55736	0	0.000%
15	-4	-55736	-7610	4	55736	7610	0.000%
16	3789	-55736	-6589	-3789	55736	6589	0.000%
17	6574	-55736	-3799	-6574	55736	3799	0.000%
18	7604	-55736	23	-7604	55736	-23	0.000%
19	6596	-55736	3815	-6596	55736	-3815	0.000%
20	3810	-55736	6605	-3810	55736	-6605	0.000%
21	15	-55736	7617	-15	55736	-7617	0.000%
22	-3776	-55736	6589	3776	55736	-6589	0.000%
23	-6571	-55736	3788	6571	55736	-3788	0.000%
24	-7594	-55736	-17	7594	55736	17	0.000%
25	-6585	-55736	-3814	6585	55736	3814	0.000%
26	-3812	-55736	-6594	3812	55736	6594	0.000%
27	9	-31739	-9870	-9	31739	9870	0.000%
28	4936	-31739	-8553	-4936	31739	8553	0.000%
29	8552	-31739	-4940	-8552	31739	4940	0.000%
30	9885	-31739	18	-9885	31739	-18	0.000%
31	8569	-31739	4937	-8569	31739	-4937	0.000%
32	4941	-31739	8561	-4941	31739	-8561	0.000%
33	6	-31739	9880	-6	31739	-9880	0.000%
34	-4917	-31739	8553	4917	31739	-8553	0.000%
35	-8547	-31739	4924	8547	31739	-4924	0.000%
36	-9870	-31739	-9	9870	31739	9	0.000%
37	-8551	-31739	-4935	8551	31739	4935	0.000%
38	-4944	-31739	-8544	4944	31739	8544	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00007853
3	Yes	5	0.00000001	0.00032103
4	Yes	5	0.00000001	0.00034001
5	Yes	5	0.00000001	0.00010220
6	Yes	5	0.00000001	0.00026607
7	Yes	5	0.00000001	0.00038358
8	Yes	5	0.00000001	0.00007610
9	Yes	5	0.00000001	0.00029795
10	Yes	5	0.00000001	0.00028524
11	Yes	5	0.00000001	0.00010117
12	Yes	5	0.00000001	0.00039264
13	Yes	5	0.00000001	0.00027058
14	Yes	4	0.00000001	0.00003761
15	Yes	5	0.00000001	0.00015978
16	Yes	5	0.00000001	0.00020404
17	Yes	5	0.00000001	0.00020911
18	Yes	5	0.00000001	0.00016339
19	Yes	5	0.00000001	0.00019645
20	Yes	5	0.00000001	0.00021144
21	Yes	5	0.00000001	0.00015466
22	Yes	5	0.00000001	0.00019251
23	Yes	5	0.00000001	0.00019088
24	Yes	5	0.00000001	0.00016216
25	Yes	5	0.00000001	0.00022043
26	Yes	5	0.00000001	0.00020136
27	Yes	4	0.00000001	0.00050197
28	Yes	4	0.00000001	0.00093527
29	Yes	5	0.00000001	0.00003780
30	Yes	4	0.00000001	0.00066336
31	Yes	4	0.00000001	0.00084452
32	Yes	5	0.00000001	0.00004898
33	Yes	4	0.00000001	0.00049440
34	Yes	4	0.00000001	0.00080261
35	Yes	4	0.00000001	0.00075351
36	Yes	4	0.00000001	0.00065620
37	Yes	5	0.00000001	0.00005130
38	Yes	4	0.00000001	0.00083262

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	119.083 - 101.083	22.105	28	1.565	0.024
L2	104 - 66.5	17.231	28	1.504	0.014
L3	70.3333 - 32.8333	7.938	28	1.061	0.006
L4	37.5 - 0	2.278	28	0.558	0.002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
123.000	2.4-in x 6-ft Mount Pipe	28	22.105	1.565	0.024	20332
120.000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	28	22.105	1.565	0.024	20332
115.000	VHLP2-18	28	20.768	1.554	0.021	20332
110.000	7770.00 w/ Mount Pipe	28	19.144	1.537	0.018	11192
100.000	LNX-6514DS-T4M w/ Mount Pipe	28	15.989	1.472	0.012	6146
97.000	2'x3' Ice Shield	28	15.078	1.442	0.011	5763
95.000	2'x3' Ice Shield	28	14.481	1.421	0.010	5533
90.000	742 213 w/ Mount Pipe	28	13.027	1.359	0.009	5033
83.000	VHLP2-23	28	11.093	1.260	0.007	4467
80.000	LLPX310R w/ Mount Pipe	28	10.303	1.214	0.007	4262

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	119.083 - 101.083	56.382	5	3.984	0.061
L2	104 - 66.5	43.980	5	3.837	0.035
L3	70.3333 - 32.8333	20.278	5	2.711	0.014
L4	37.5 - 0	5.822	5	1.426	0.006

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
123.000	2.4-in x 6-ft Mount Pipe	5	56.382	3.984	0.061	8175
120.000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	5	56.382	3.984	0.061	8175
115.000	VHLP2-18	5	52.982	3.958	0.054	8175
110.000	7770.00 w/ Mount Pipe	5	48.849	3.917	0.045	4499
100.000	LNX-6514DS-T4M w/ Mount Pipe	5	40.817	3.756	0.031	2461
97.000	2'x3' Ice Shield	5	38.495	3.682	0.027	2302
95.000	2'x3' Ice Shield	5	36.973	3.626	0.026	2207
90.000	742 213 w/ Mount Pipe	5	33.266	3.470	0.022	2001
83.000	VHLP2-23	5	28.332	3.217	0.018	1768
80.000	LLPX310R w/ Mount Pipe	5	26.317	3.101	0.017	1684

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
L1	119.083 - 101.083 (1)	TP26x21.61x0.25	18.000	0.000	0.0	39.000	19.868	-6444	774859	0.008
L2	101.083 - 66.5 (2)	TP34.063x24.789x0.313	37.500	0.000	0.0	39.000	32.535	-14771	1268880	0.012
L3	66.5 - 32.8333 (3)	TP41.75x32.49x0.375	37.500	0.000	0.0	39.000	47.875	-21931	1867120	0.012
L4	32.8333 - 0 (4)	TP49.063x39.848x0.375	37.500	0.000	0.0	39.000	57.950	-31725	2260060	0.014

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	119.083 - 101.083 (1)	TP26x21.61x0.25	111286	10.902	39.000	0.280	0	0.000	39.000	0.000
L2	101.083 - 66.5 (2)	TP34.063x24.789x0.313	699340	31.919	39.000	0.818	0	0.000	39.000	0.000
L3	66.5 - 32.8333 (3)	TP41.75x32.49x0.375	1409733	35.653	39.000	0.914	0	0.000	39.000	0.000
L4	32.8333 - 0 (4)	TP49.063x39.848x0.375	2312667	39.855	39.000	1.022	0	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V lb	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T lb-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	119.083 - 101.083 (1)	TP26x21.61x0.25	10872	0.547	26.000	0.042	1086	0.052	26.000	0.002
L2	101.083 - 66.5 (2)	TP34.063x24.789x0.313	20409	0.627	26.000	0.048	1929	0.043	26.000	0.002
L3	66.5 - 32.8333 (3)	TP41.75x32.49x0.375	22833	0.477	26.000	0.037	4496	0.055	26.000	0.002
L4	32.8333 - 0 (4)	TP49.063x39.848x0.375	25323	0.437	26.000	0.034	4656	0.039	26.000	0.002

Pole Interaction Design Data

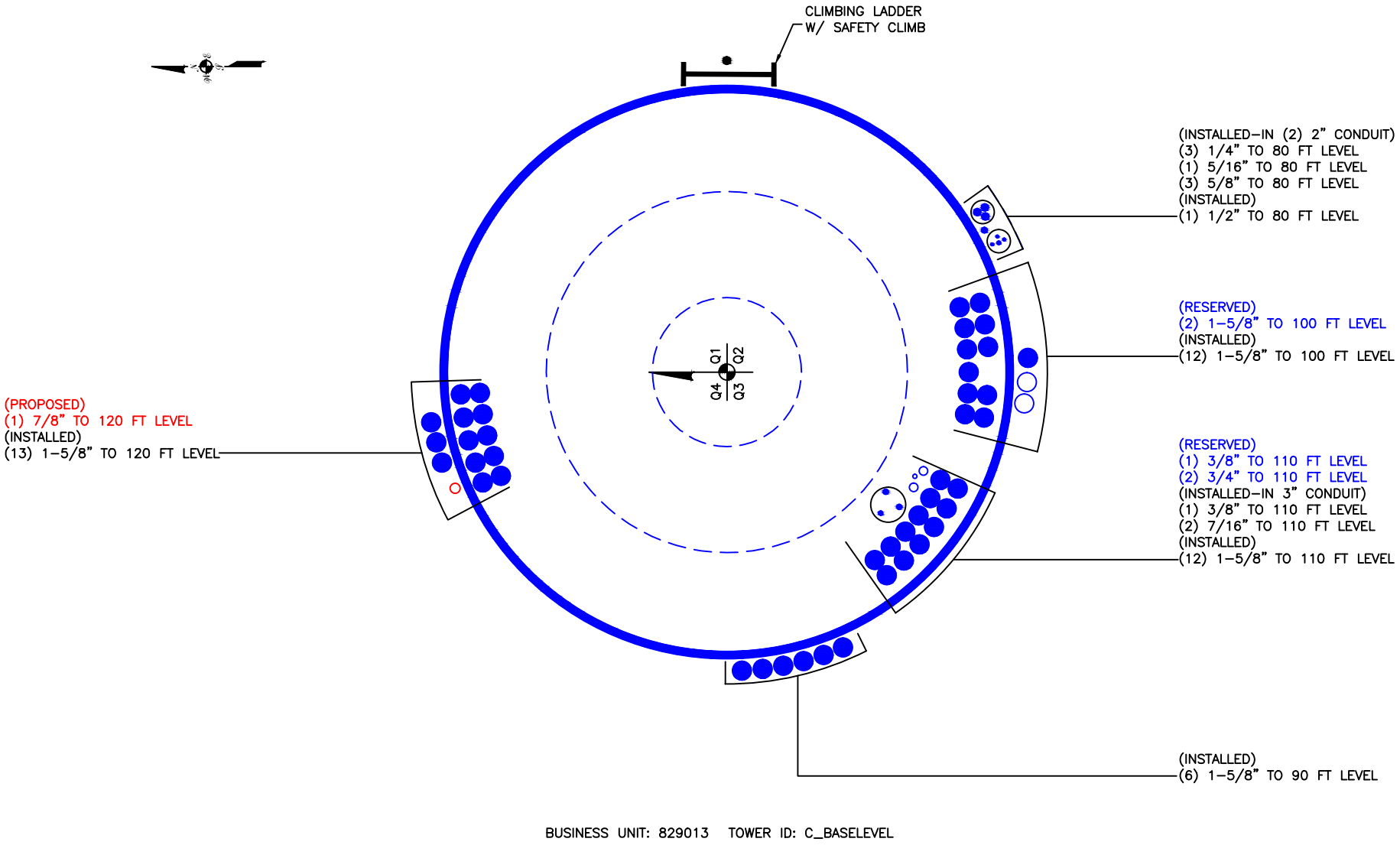
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	119.083 - 101.083 (1)	0.008	0.280	0.000	0.042	0.002	0.288	1.333	H1-3+VT
L2	101.083 - 66.5 (2)	0.012	0.818	0.000	0.048	0.002	0.831	1.333	H1-3+VT
L3	66.5 - 32.8333 (3)	0.012	0.914	0.000	0.037	0.002	0.926	1.333	H1-3+VT
L4	32.8333 - 0 (4)	0.014	1.022	0.000	0.034	0.002	1.036	1.333	H1-3+VT

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
L1	119.083 - 101.083	Pole	TP26x21.61x0.25	1	-6444	1032887	21.6	Pass
L2	101.083 - 66.5	Pole	TP34.063x24.789x0.313	2	-14771	1691417	62.3	Pass
L3	66.5 - 32.8333	Pole	TP41.75x32.49x0.375	3	-21931	2488871	69.5	Pass
L4	32.8333 - 0	Pole	TP49.063x39.848x0.375	4	-31725	3012660	77.7	Pass
							Summary	
						Pole (L4)	77.7	Pass
						RATING =	**77.7**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 829013 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

BU#:	*829013*
Site Name:	*West Hartford/I-84/X43*
App #:	*344059 Rev. 2*
Pole Manufacturer:	*Other*

Reactions		
Moment:	2312.669	ft-kips
Axial:	31.739	kips
Shear:	25.316	kips

Anchor Rod Data		
Qty:	33	
Diam:	1.25	in
Rod Material:	Other	
Strength (Fu):	150	ksi
Yield (Fy):	105	ksi
Bolt Circle:	54	in

Plate Data		
Diam:	58	in
Thick:	1.5	in
Grade:	50	ksi
Single-Rod B-eff:	4.72	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.5	in
Fillet V. Weld:	0.25	in
Width:	4	in
Height:	12	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	49.0625	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

If No stiffeners, Criteria:	AISC ASD	<-Only Applcable to Unstiffened Cases

Anchor Rod Results

		Stiffened
Maximum Rod Tension:	61.3 Kips	Service, ASD
Allowable Tension:	81.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	75.7% **Pass**	

Base Plate Results Flexural Check

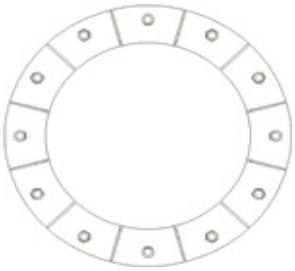
		Stiffened
Base Plate Stress:	32.4 ksi	Service, ASD
Allowable Plate Stress:	50.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	64.8% **Pass**	Y.L. Length: N/A, Roark

Stiffener Results

Horizontal Weld :	61.2% **Pass**
Vertical Weld:	40.8% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	14.9% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	59.2% **Pass**
Plate Comp. (AISC Bracket):	60.0% **Pass**

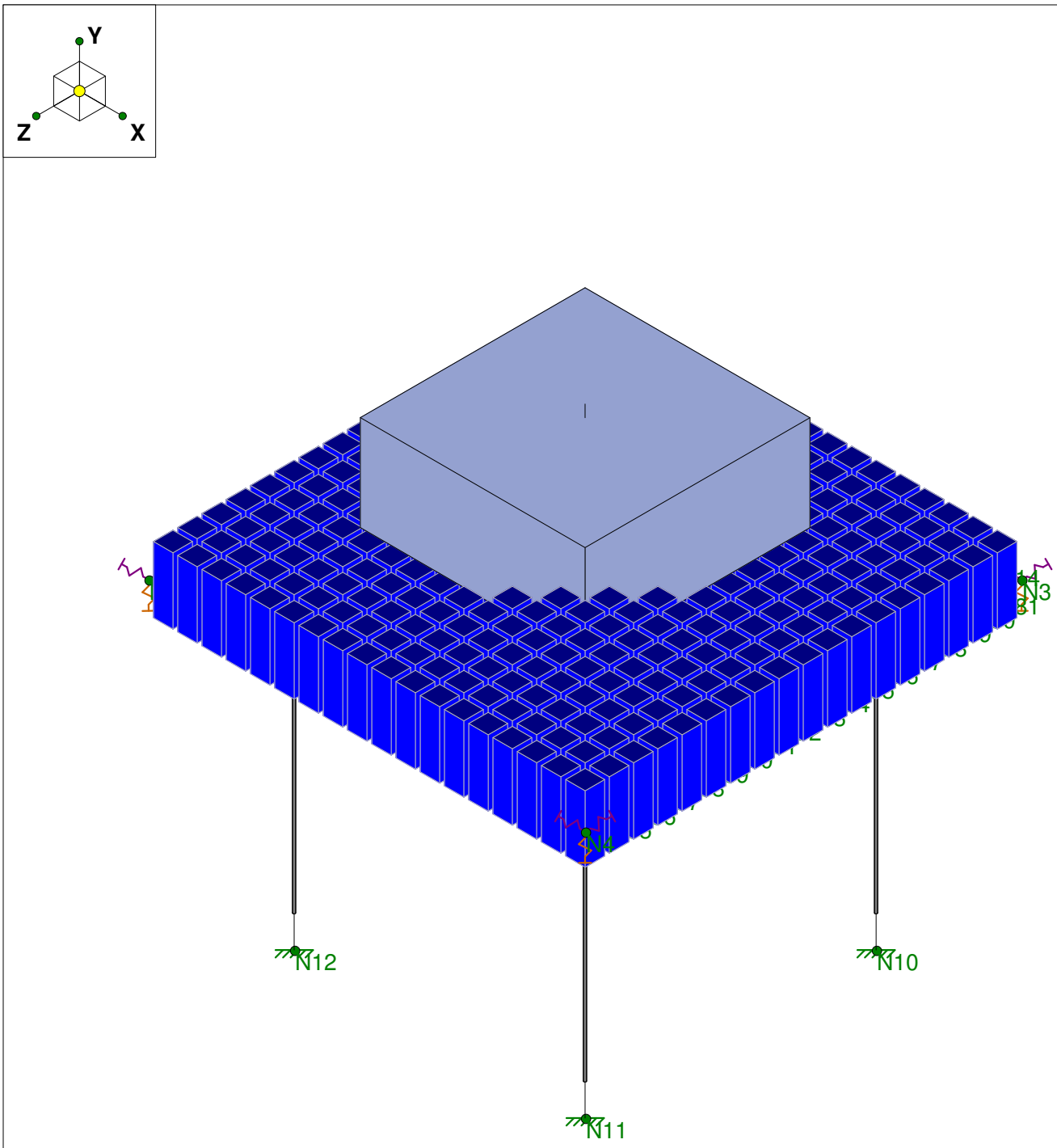
Pole Results

Pole Punching Shear Check:	7.4% **Pass**

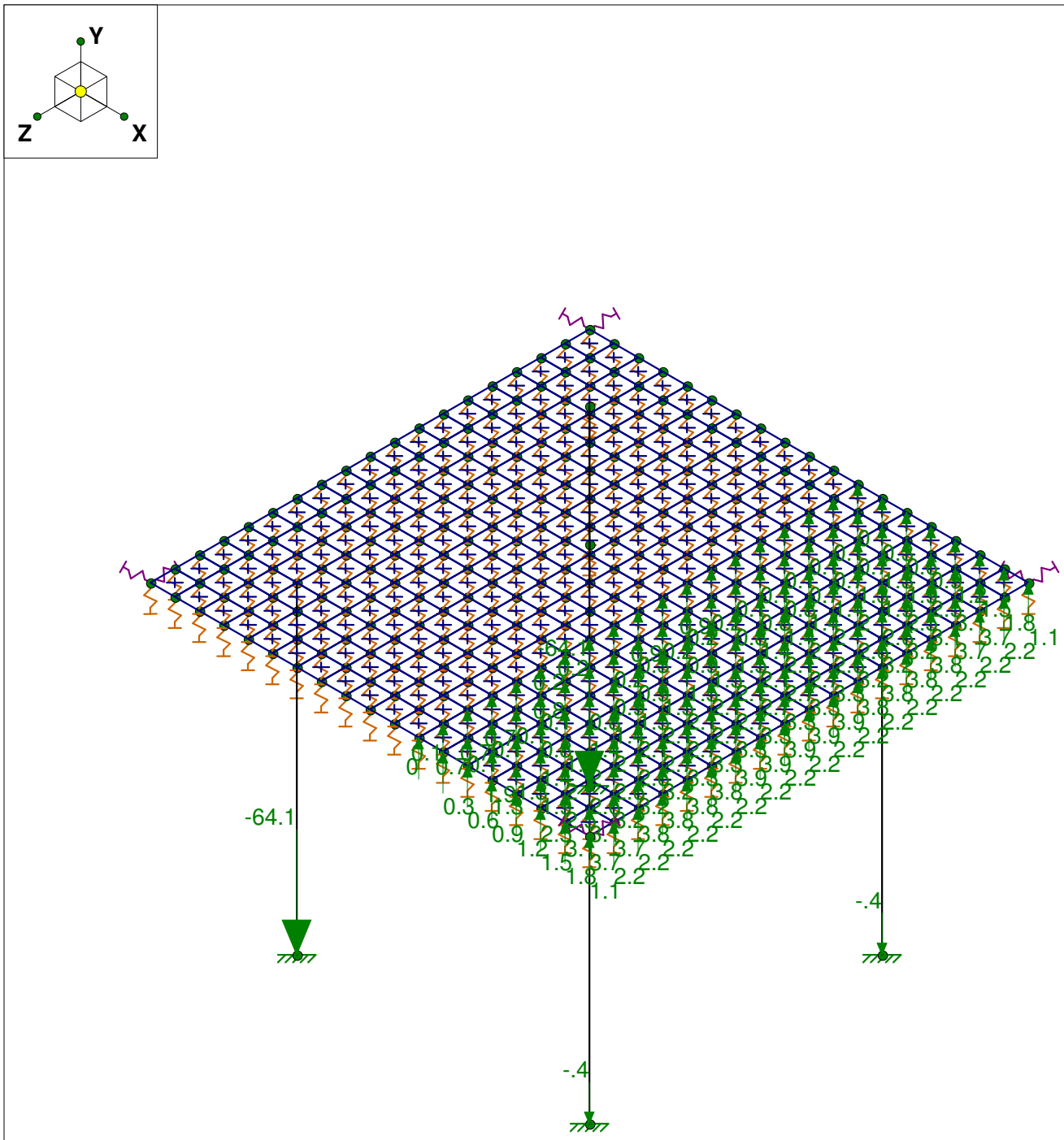


* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes



Crown Castle	West Hartford/I-84/X43 (BU 829013)	SK - 3
TLI		May 13, 2016 at 1:27 PM
TEP No. 25680.49018		829013.02S_Foundation.r3d



Results for LC 4, 0.6D+W0
Y-direction Reaction Units are k and k-ft

Crown Castle	West Hartford/I-84/X43 (BU 829013)	SK - 4
TLI		May 13, 2016 at 1:30 PM
TEP No. 25680.49018		829013.02S_Foundation.r3d

Concrete Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[lb...	f'c[ksi]	Lambda	Flex Steel...	Shear Ste...
1	Conc3000NW	3156	1372	.15	.6	145	3	1	60	60
2	Conc3500NW	3409	1482	.15	.6	145	3.5	1	60	60
3	Conc4000NW	3644	1584	.15	.6	145	4	1	60	60
4	Conc3000LW	2085	907	.15	.6	109.999	3	.75	60	60
5	Conc3500LW	2252	979	.15	.6	109.999	3.5	.75	60	60
6	Conc4000LW	2408	1047	.15	.6	109.999	4	.75	60	60

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Sh...	Type	Design List	Material	Design R...
1	M1	N8	N12			1" WF Rock	Column	None	A722	Typical
2	M2	N7	N11			1" WF Rock	Column	None	A722	Typical
3	M3	N6	N10			1" WF Rock	Column	None	A722	Typical
4	M4	N5	N9			1" WF Rock	Column	None	A722	Typical
5	M5	TL1	N367			CRECT102..	Column	Rectangular	Conc3000NW	Typical
6	M6	N367	TOWER			6' rigid offset	Column	None	RIGID	Typical

Joint Loads and Enforced Displacements (BLC 1 : Dead)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	TL1	L	Y	-31.7

Joint Loads and Enforced Displacements (BLC 2 : Wind 0)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	TL1	L	X	25.3
2	TL1	L	Mz	-2312.7

Joint Loads and Enforced Displacements (BLC 3 : Wind 90)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	TL1	L	Z	25.3
2	TL1	L	Mx	2312.7

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Dead	None		-1		1				324
2	Wind 0	None				2				
3	Wind 90	None				2				
4	Prestress	None						4		

Load Combinations

	Description	Solve	PDelta	SRSS	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
1	D+W0	Yes	Y		1	1	2	1	4	1																
2	D-W0	Yes	Y		1	1	2	-1	4	1																
3	Prestress	Yes	Y				4	1																		
4	0.6D+W0	Yes	Y		1	.6	2	1	4	1																
5	0.6D-W0	Yes	Y		1	.6	2	-1	4	1																
6	D+W90	Yes	Y		1	1	3	1	4	1																
7	D-W90	Yes	Y		1	1	3	-1	4	1																
8	0.6D+W90	Yes	Y		1	.6	3	1	4	1																
9	0.6D-W90	Yes	Y		1	.6	3	-1	4	1																
10	D+0.707(W0...	Yes	Y		1	1	2	.707	3	.707	4	1														

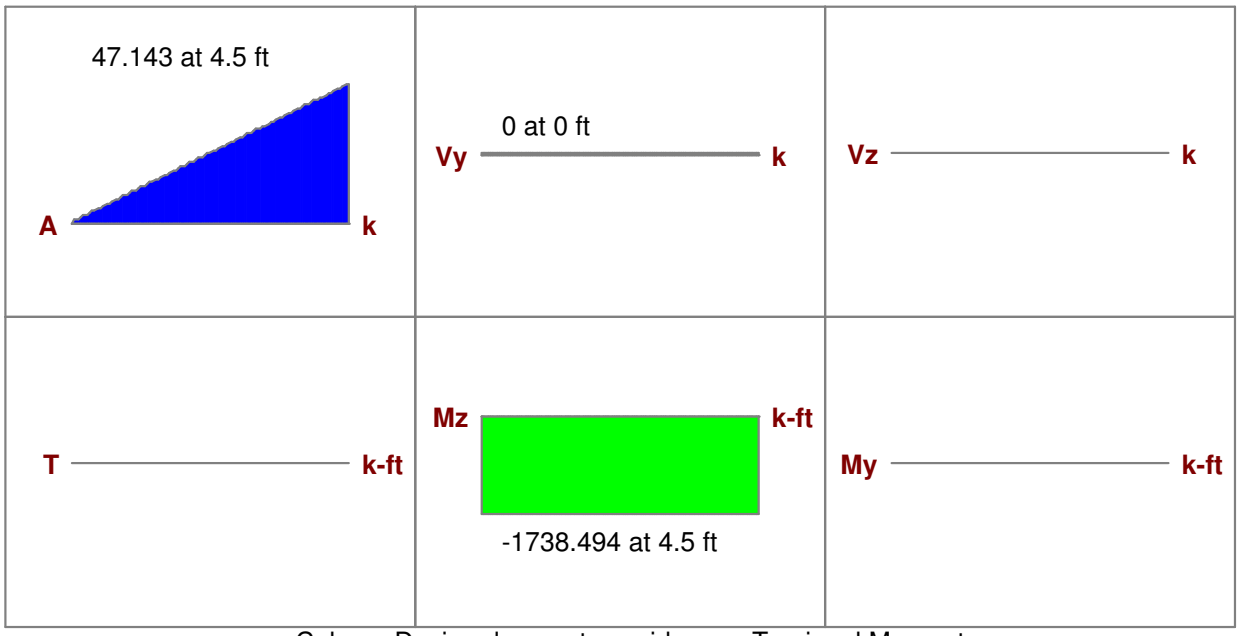
Load Combinations (Continued)

	Description	Solve	PDelta	SRSS	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
11	D+0.707(W0-...	Yes	Y		1	1	2	.707	3	-.707	4	1												
12	D-0.707(W0+...	Yes	Y		1	1	2	-.707	3	.707	4	1												
13	D+0.707(-W0...	Yes	Y		1	1	2	-.707	3	-.707	4	1												
14	0.6D+0.707(...	Yes	Y		1	.6	2	.707	3	.707	4	1												
15	0.6D+0.707(...	Yes	Y		1	.6	2	.707	3	-.707	4	1												
16	0.6D-0.707(...	Yes	Y		1	.6	2	-.707	3	.707	4	1												
17	0.6D+0.707(-...	Yes	Y		1	.6	2	-.707	3	-.707	4	1												

Column: ***M5***

Shape:	**CRECT102X102**	Concrete Stress Block:	**Rectangular**
Material:	**Conc3000NW**	Cracked Sections Used:	**Yes**
Length:	**4.5 ft**	Cracked 'I' Factor:	**.70**
I Joint:	**TL1**	Effective 'I':	**6.31419e+6 in^4**
J Joint:	**N367**	Biaxial Bending Solution:	**Exact Integration**

Code Check: **0.447 (bending)**
Report Based On 97 Sections



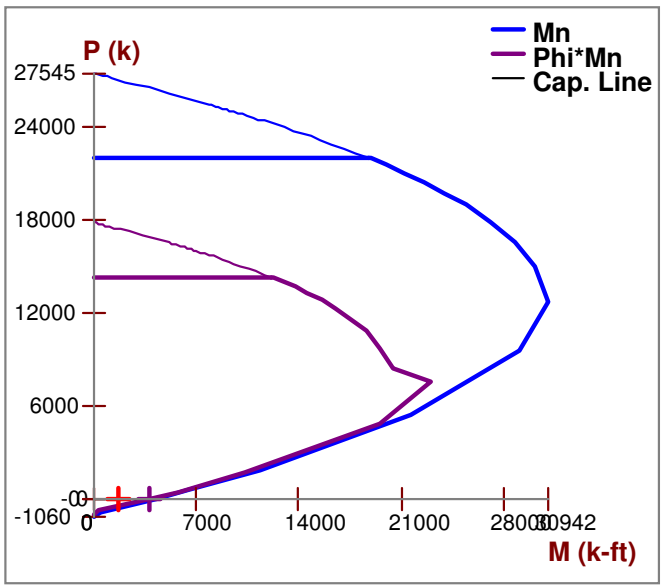
Column Design does not consider any Torsional Moments

Custom rebar layout does not meet min steel (As,min) per Global Parameters

ACI 318-05 Code Check

		Bending Check	**0.447**	Shear Check	**0.000 (y)**
Gov LC	**2**	Location	**4.5 ft**	Location	**0 ft**
Gov Pu	**0 k**	Gov Muy	**0 k-ft**	Gov Vuy	**0 k**
phi*Pn	**0 k**	Gov Muz	**-1738.494 k-ft**	Gov Vuz	**0 k**
Phi eff.	**.9**	phi*Mny		phi*Vny	**1111.305 k**
		phi*Mnz	**3887.631 k-ft**	phi*Vnz	**1111.305 k**
Tension Bar Fy	**60 ksi**	Concrete Weight	**145 lb/ft^3**		
Shear Bar Fy	**60 ksi**	Concrete Type	**Normal WT**	Sway yy	**No**
F'c	**3 ksi**	E_Concrete	**3156 ksi**	Sway zz	**No**
Flex. Rebar Set	**ASTM A615**	Shear Rebar Set	**ASTM A615**	Thres. Torsion	**917.543k-ft(LC:2)**
Flex. Bars	**9 #6 , 9 #6 , 11 #6 , 11 #6**				
Shear Bars	**#4 @6in**				

Column Interaction Diagram



Span Information

Span	Span Length (ft)	I-Face Dist. (in)	J-Face Dist. (in)
1	0 - 4.5	0	0

Column Steel

Span	Main Bars	UC Max	Gov LC	Loc (ft)	Pu (k)	Muy (k-ft)	Muz (k-ft)
1	40 #6	0.447	2	4.5 ft	0	0	-1738.494

Axial Span Results

Span	Phi_eff	Pn (k)	Po (k)	Rho Gross	As Prvd (in^2)
1	.9		27545.425	.0017	17.671

Bending Span Results

Span	ecc. y (ft)	ecc. z (ft)	NA y-y (ft)	NA z-z (ft)	Mny (k-ft)	Mnz (k-ft)	Mnoy (k-ft)	Mnoz (k-ft)
1	0	0	3.949			4319.59		

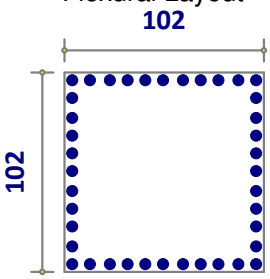
Slender Bending Span Results

Span	KL/r yy	KL/r zz	Cm yy	Cm zz	Lu yy (ft)	Lu zz (ft)	Mcy (k-ft)	Mcz (k-ft)
1	2	2	.6	1	4.5	4.5		

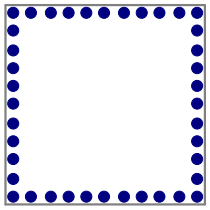
Rebar Detailing

Span	Region(ft)	Shear Steel
1	4.5 -	9 #4 @6in
	0 -	

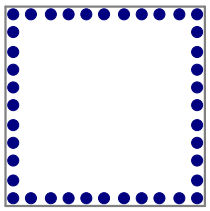
Flexural Layout



Total No. of Bars - Top : 4.5 ft
11#6 Top
9#6 Left
9#6 Right
11#6 Bottom



Total No. of Bars - Middle : 2.25 ft
11#6 Top
9#6 Left
9#6 Right
11#6 Bottom



Total No. of Bars - Bottom : 0 ft
11#6 Top
9#6 Left
9#6 Right
11#6 Bottom

Monopole on Mat Foundation with Rock Anchors - TIA-222-F

Site Data	
Site Name:	West Hartford/I-84/X43
CCI Number:	829013
TEP Job Number:	25680.49018

ASIF	1.333

Unfactored Reactions from TNX		
Axial	31.739	k
Shear	25.316	k
Moment	2312.669	k-ft

Soil Properties		
Allowable Bearing q_a	8.1	ksf
Mat Subgrade, ks	293	kcf
Wt Soil Above Mat	113	pcf

Mat and Pier Properties		
Mat Width	16.5	ft
Mat Length	16.5	ft
Mat Depth	2.5	ft
Pier Type	Square	
Pier Width/Diam.	8.5	ft
Pier Height	4.5	ft

Rock Anchor Properties		
Diameter	1	in
Net Area	0.85	in^2
Yield Stress	127.7	ksi

Rock Geotechnical Properties		
Wt of Rock	160	pcf
Angle of Rock Cone	30	deg
Steel/Grout Bond[1]	190	psi
Grout/Rock Bond[1]	50	psi
Drilled Shaft Diam.	3.75	in

[1]Allowable Bond Values

Mat Foundation Results

Bearing Stress	7.6	ksf
Allowable Bearing	10.8	ksf
% Capacity	69.9%	**Pass**

Mat Structural Results

Bending Moment	682.9	kft
Allowable Bending	1151.0	kft
% Capacity	59.3%	**Pass**

Rock Anchor Steel Results

Load Reaction	74.96	k
Allowable Design Load	86.84	k
% Capacity	86.3%	**Pass**

Rock Anchor Pullout Results

Req. Bond Length, ld	10.60	ft
Load Reaction	74.96	k
Allowable Pullout	99.58	k
% Capacity	75.3%	**Pass**

		PASS	PASS	West Hartford/I-84/X43 (BU 829013)	
	Results Summary:	LC1	LC2	TEP #:	25680.49018
	Soil Interaction:	N/A	N/A	Analysis: TLI	5/16/2016
Drilled Caisson Tool - Pier	Foundation Structural:	35.7%	10.8%	Check: KFO	5/16/2016

Code Revisions: TIA-222-F ACI 318-02

Tower Type: Monopole

	LC1	LC2	
Moment:	689.28	213.70	kip-ft
Axial (download):	31.38	55.25	kip
Shear:	25.58	7.75	kip
Axial (uplift):			kip

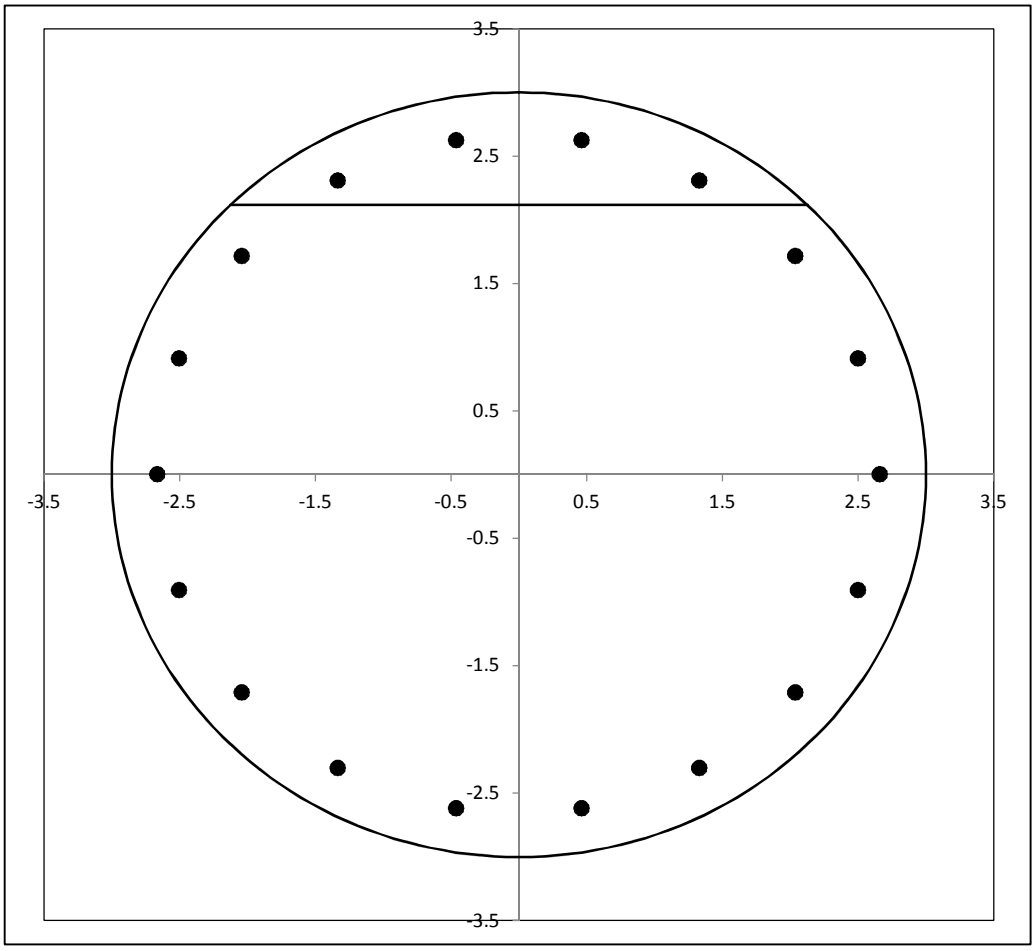
Shaft Information

Diameter:	6.00	ft
Projection:	0.50	ft
Caisson Length:	4.50	ft
f'c:	3.000	ksi
Max εc:	0.003	in/in

Cage 1 Reinforcement

Tie Bar Size:	4	*(fy = 60.0 ksi)*
Clear Cover to Tie:	3.00	*in (Cage Ø = 63.87in)*
Tie Bar Spacing:	6.00	in
Vertical Bar Size:	9	
Vertical Bar Quantity:	18	*(ρ =0.442%)*
fy:	60.0	ksi
E:	29,000	ksi

Reinforcement Capacity



		LC1	LC2	
	Vu =	33.3	10.1	kip
	Vc =	447.7	449.0	kip
fy,tie = 60.0	**Vs =**	269.8	269.8	kip
	ϕVn =	538.1	539.1	kip
	Capacity =	**6.2%**	**1.9%**	
		PASS	**PASS**	

	LC1	LC2	
Mu =	907.5	282.4	kip-ft
ϕMn =	2544.7	2612.6	kip-ft
Capacity =	**35.7%**	**10.8%**	
	PASS	**PASS**	

SITE NUMBER: CT11178D

467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110
HARTFORD COUNTY

SITE NAME: WEST HARTFORD /I-84/X43

RF DESIGN GUIDELINE: 792DB

T-MOBILE TECHNICIAN SITE SAFETY NOTES	
LOCATION	SPECIAL RESTRICTIONS
SECTOR A: ANTENNA/TMA/RRH	ACCESS NOT PERMITTED
SECTOR B: ANTENNA/TMA/RRH	ACCESS NOT PERMITTED
SECTOR C: ANTENNA/TMA/RRH	ACCESS NOT PERMITTED
GPS/LMU:	UNRESTRICTED
RADIO CABINETS:	UNRESTRICTED
PPC DISCONNECT:	UNRESTRICTED
MAIN CIRCUIT D/C:	UNRESTRICTED
NIU/T DEMARC:	UNRESTRICTED
OTHER/SPECIAL:	NONE

GENERAL NOTES

THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF T-MOBILE. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.

THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.

CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE T-MOBILE NORTHEAST, LLC REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

SPECIAL STRUCTURAL NOTES

TOWER OWNER SHALL PROVIDE GLOBAL STRUCTURAL STABILITY ANALYSIS OF EXISTING ANTENNA SUPPORT STRUCTURE. GENERAL CONTRACTOR SCOPE OF WORK SHALL INCLUDE ALL REQUIRED STRUCTURAL MODIFICATIONS, RE-BUNDLING OF COAXIAL CABLES OR OTHER SPECIAL MODIFICATIONS AS OUTLINED THEREIN.

STRUCTURAL DESIGNS AND DETAILS FOR ANTENNA MOUNTS COMPLETED BY HUDSON DESIGN ON BEHALF OF T-MOBILE ARE INCLUSIVE OF THE ENTIRE ANTENNA SUPPORT STRUCTURE (GLOBAL STRUCTURAL STABILITY ANALYSIS BY OTHERS), EXISTING TOWER PLATFORM, EXISTING ANTENNA MOUNTS AND ALL OTHER ASPECTS OF THE STRUCTURE THAT WILL SUPPORT THE T-MOBILE MODERNIZATION EQUIPMENT DEPLOYMENT AS DEPICTED HEREIN.

HUDSON DESIGN ASSUMES THAT THE TOWER IS PROPERLY CONSTRUCTED AND MAINTAINED. ALL STRUCTURAL MEMBERS AND THEIR CONNECTION ARE ASSUMED TO BE IN GOOD CONDITION AND ARE FREE FROM DEFECTS WITH NO DETERIORATION TO ITS MEMBER CAPACITIES

PROJECT SUMMARY

SCOPE OF WORK:	UNMANNED TELECOMMUNICATIONS FACILITY T-MOBILE EQUIPMENT INSTALLATION
ZONING JURISDICTION: (TOWN OF WEST HARTFORD)	BASED ON INFORMATION PROVIDED BY T-MOBILE, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS AN ELIGIBLE FACILITY UNDER THE TAX RELIEF ACT OF 2012, 47 USC 1455(A), AND IS SUBJECT TO AN EXPEDITED ELIGIBLE FACILITIES REQUEST/REVIEW AND ZONING PRE-EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW).
SITE ADDRESS:	467 SOUTH QUAKER LANE WEST HARTFORD, CT 06110
LATITUDE:	41° 44' 55.75" N
LONGITUDE:	72° 43' 52.75" W
JURISDICTION:	NATIONAL, STATE & LOCAL CODES OR ORDINANCES
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
TOWER OWNER:	CROWN CASTLE 500 CUMMINGS PARK DR # 3600 WOBURN, MA 0180
SITE ID:	829013
SITE NAME:	WEST HARTFORD/I-84/X43

APPROVALS

PROJECT MANAGER	DATE
CONSTRUCTION	DATE
RF ENGINEERING	DATE
ZONING / SITE ACQ.	DATE
OPERATIONS	DATE
TOWER OWNER	DATE

DRIVING DIRECTIONS:

HEAD NORTHEAST ON GRIFFIN ROAD SOUTH TOWARD WEST NEWBERRY ROAD. TURN RIGHT ON WEST NEWBERRY ROAD. TURN RIGHT ONTO WOODLAND AVENUE. TURN RIGHT ONTO WINTONBURY AVENUE. TURN LEFT ONTO CT-189 SOUTH. TURN RIGHT ONTO ALBANY AVENUE. TURN LEFT ONTO STEELE ROAD. TURN RIGHT ONTO ASYLUM AVENUE. TURN LEFT ONTO QUAKER LANE (CONTINUE ONTO QUAKER LANE SOUTH). DESTINATION WILL BE ON THE RIGHT.

ARRIVE AT 467 SOUTH QUAKER LANE, WEST HARTFORD, CT 06110.

CALL BEFORE YOU DIG
CALL TOLL FREE 1-800-922-4455 OR CALL 811
UNDERGROUND SERVICE ALERT

DRAWING INDEX

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A-1	COMPOUND PLAN & EQUIPMENT PLAN	1
A-2	ANTENNA LAYOUT & ELEVATION	1
A-3	DETAILS	1
E-1	GROUNDING DIAGRAM	1

T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 648-1116

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TRANSCEND WIRELESS
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MAHWAH, NJ 07430
TEL: (201) 684-0055
FAX:(201) 684-0066

Hudson Design Groupuc
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 3090
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

STATE OF CONNECTICUT
DEREK J. CREASER
18,295
LICENSED
PROFESSIONAL ENGINEER

CHECKED BY: DR

APPROVED BY: DPH

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	05/11/16	ISSUED FOR PERMITTING	VP
0	05/04/16	ISSUED FOR REVIEW	MC

SITE NUMBER:
CT11178D
CROWN CASTLE SITE ID:
829013
SITE NAME:
WEST HARTFORD
/I-84/X43
SITE ADDRESS:
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110
HARTFORD COUNTY

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

GROUNDING NOTES

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.

2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.

3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.

4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.

5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS 2 AWG STRANDED COPPER FOR OUTDOOR BTS.

6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.

7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.

8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO GROUND BAR.

9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.

10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.

11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWS COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:

   CONTRACTOR – TRANSCEND WIRELESS
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – T-MOBILE

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.

3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.

5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.

7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.

9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.

10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.

11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.

12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.

16. CONSTRUCTION SHALL COMPLY WITH SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF T-MOBILE SITES."

17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.

18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.

19. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

20. APPLICABLE BUILDING CODES:
    SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.
    BUILDING CODE: 2003 IBC WITH 2005 CT SUPPLEMENT, + 2009 & 2013 CT AMENDMENTS
    ELECTRICAL CODE: REFER TO ELECTRICAL DRAWINGS
    LIGHTENING CODE: REFER TO ELECTRICAL DRAWINGS

    SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

    AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;

    AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

    MANUAL OF STEEL CONSTRUCTION, ASD, FOURTEENTH EDITION;

    TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-F, STRUCTURAL STANDARDS FOR STEEL

    EQUIPMENT AND ANTENNA SUPPORTING STRUCTURES; REFER TO ELECTRICAL DRAWINGS FOR SPECIFIC ELECTRICAL STANDARDS.

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

ABBREVIATIONS

AGL	ABOVE GRADE LEVEL	EQ	EQUAL	REQ	REQUIRED
AWG	AMERICAN WIRE GAUGE	GC	GENERAL CONTRACTOR	RF	RADIO FREQUENCY
BBU	BATTERY BACKUP UNIT	GRC	GALVANIZED RIGID CONDUIT	TBD	TO BE DETERMINED
BTCW	BARE TINNED SOLID COPPER WIRE	MGB	MASTER GROUND BAR	TBR	TO BE REMOVED
BGR	BURIED GROUND RING	MIN	MINIMUM	TBRR	TO BE REMOVED AND REPLACED
BTS	BASE TRANSCEIVER STATION	P	PROPOSED	TYP	TYPICAL
E	EXISTING	NTS	NOT TO SCALE	UG	UNDER GROUND
EGB	EQUIPMENT GROUND BAR	RAD	RADIATION CENTER LINE (ANTENNA)	VIF	VERIFY IN FIELD
EGR	EQUIPMENT GROUND RING	REF	REFERENCE		

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STATE OF CONNECTICUT
DEREK J. CREASER
No. 23551
LICENSED
PROFESSIONAL ENGINEER

CHECKED BY: DR

APPROVED BY: DPH

SUBMITTALS

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/I-84/X43
SITE ADDRESS:
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110
HARTFORD COUNTY

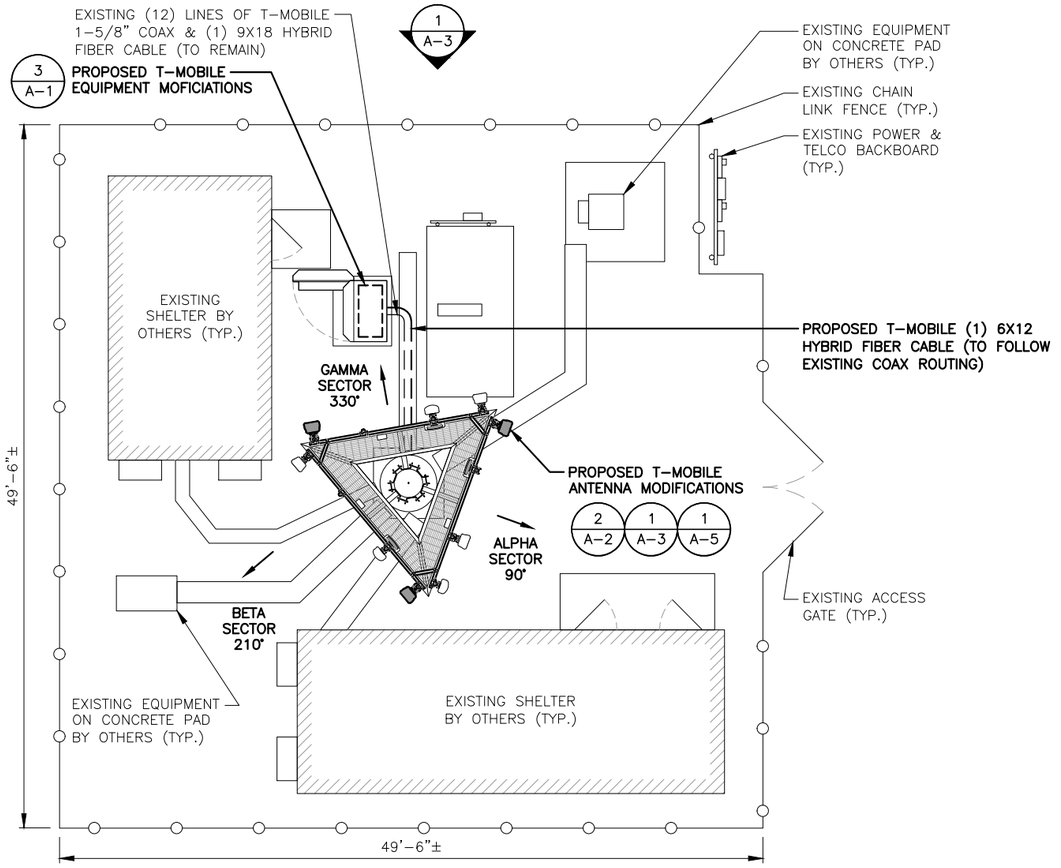
SHEET TITLE
GENERAL NOTES

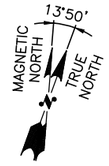
SHEET NUMBER
GN-1

STRUCTURAL NOTES:
PRIOR TO COMMENCING CONSTRUCTION, GC SHALL REFER TO STRUCTURAL ANALYSIS PROVIDED BY TOWER OWNER TO DETERMINE IF THERE ANY SUPPLEMENTAL OR SPECIAL INSTALLATION REQUIREMENTS, OR RELOCATION ARRANGEMENTS.

NOTE:

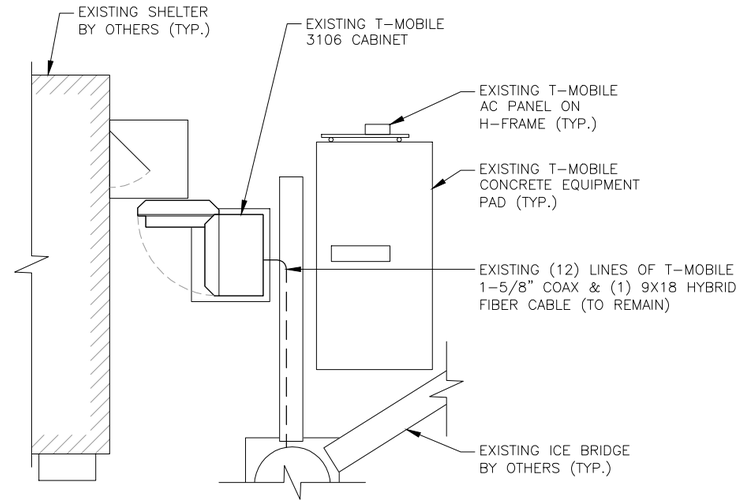
*RF DATA BASED ON PRELIMINARY INFORMATION. REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

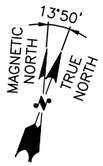




COMPOUND PLAN 1 A-1
22x34 SCALE: 3/16"=1'-0"
11x17 SCALE: 3/32"=1'-0"

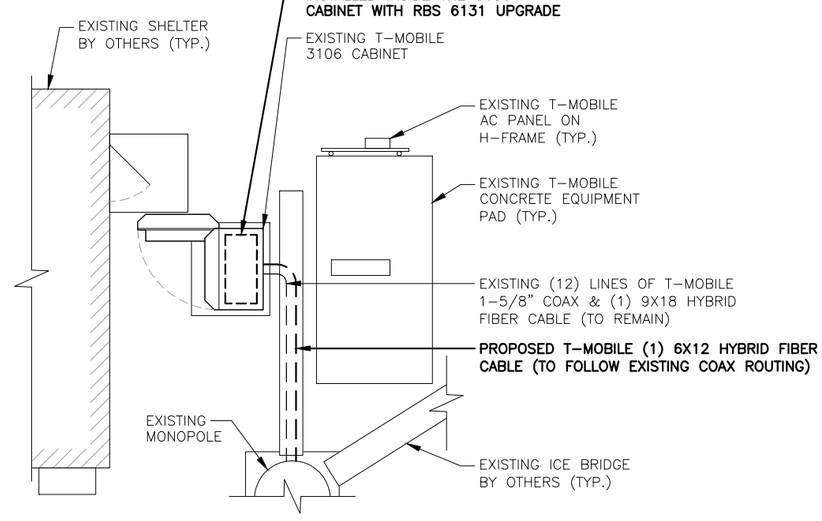
0 2'-8" 5'-4" 10'-8" 16'-0"





EXISTING EQUIPMENT PLAN 2 A-1
22x34 SCALE: 1/4"=1'-0"
11x17 SCALE: 1/8"=1'-0"

0 2'-0" 4'-0" 8'-0" 12'-0"



PROPOSED EQUIPMENT PLAN 3 A-1
22x34 SCALE: 1/4"=1'-0"
11x17 SCALE: 1/8"=1'-0"

0 2'-0" 4'-0" 8'-0" 12'-0"

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SHEET TITLE
COMPOUND & EQUIPMENT PLAN

SHEET NUMBER
A-1

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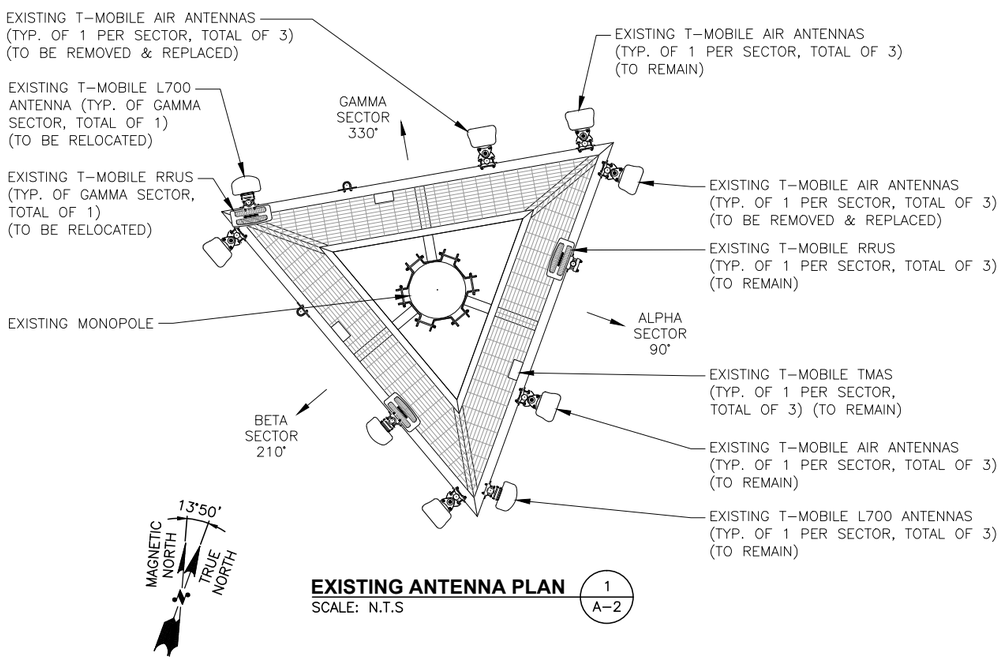
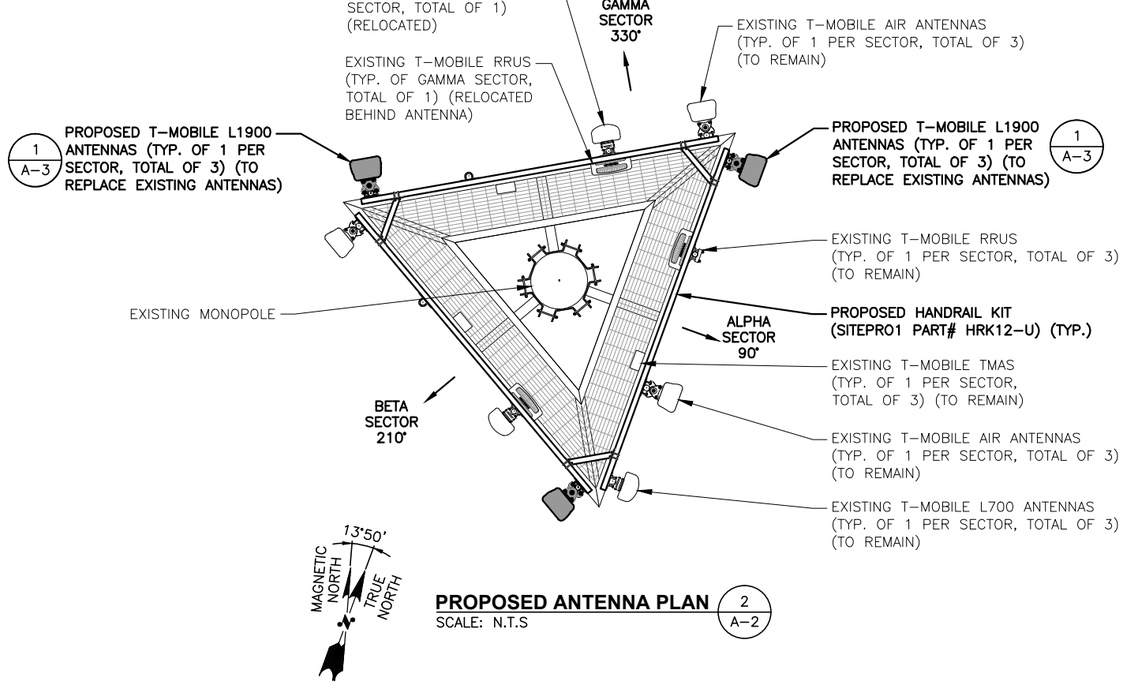
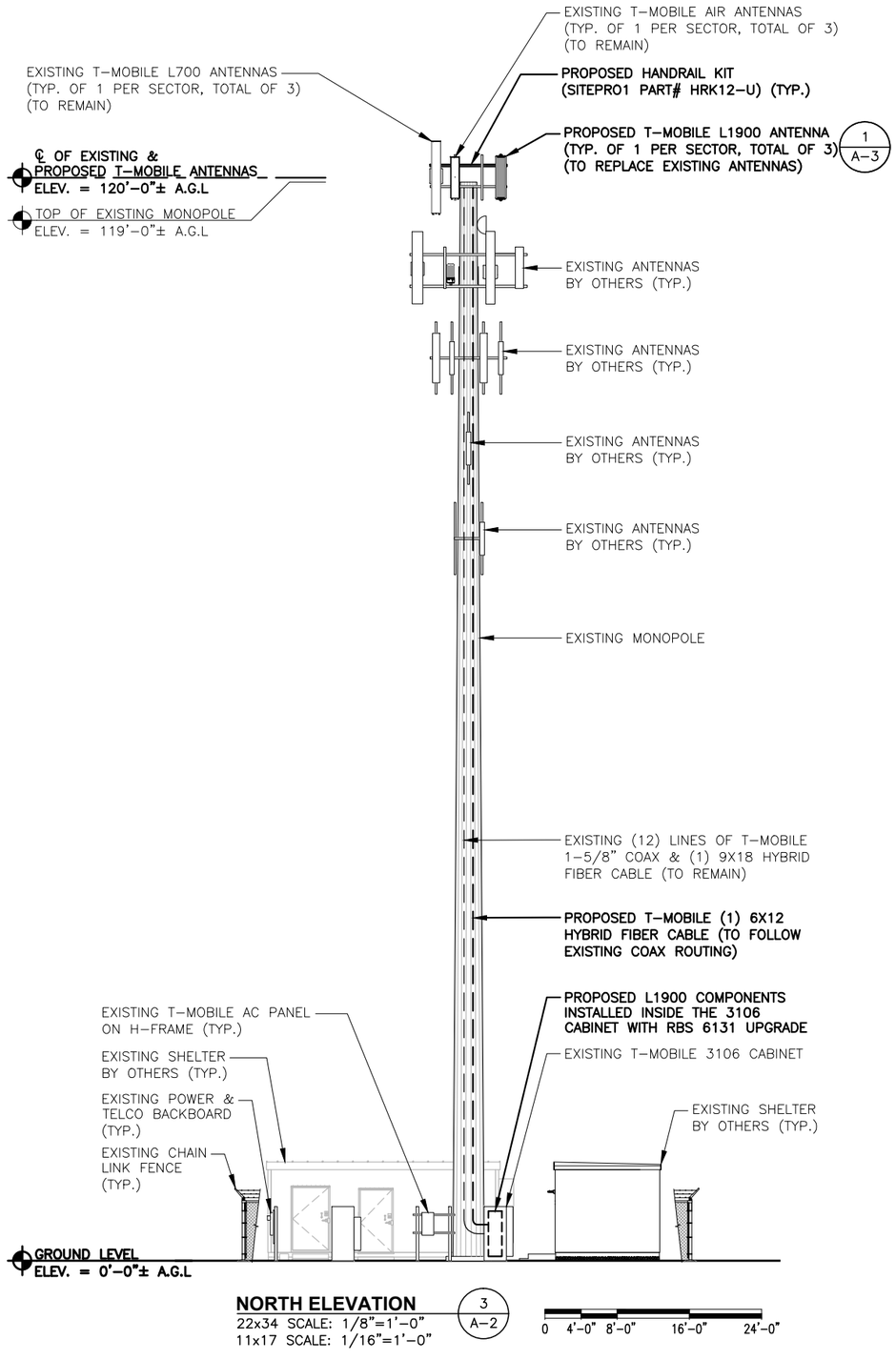


EXISTING ANTENNA PLAN (1 / A-2)
SCALE: N.T.S



PROPOSED ANTENNA PLAN (2 / A-2)
SCALE: N.T.S



NORTH ELEVATION (3 / A-2)
22x34 SCALE: 1/8"=1'-0"
11x17 SCALE: 1/16"=1'-0"

0 4'-0" 8'-0" 16'-0" 24'-0"

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SHEET TITLE
ANTENNA LAYOUT & ELEVATION

SHEET NUMBER
A-2

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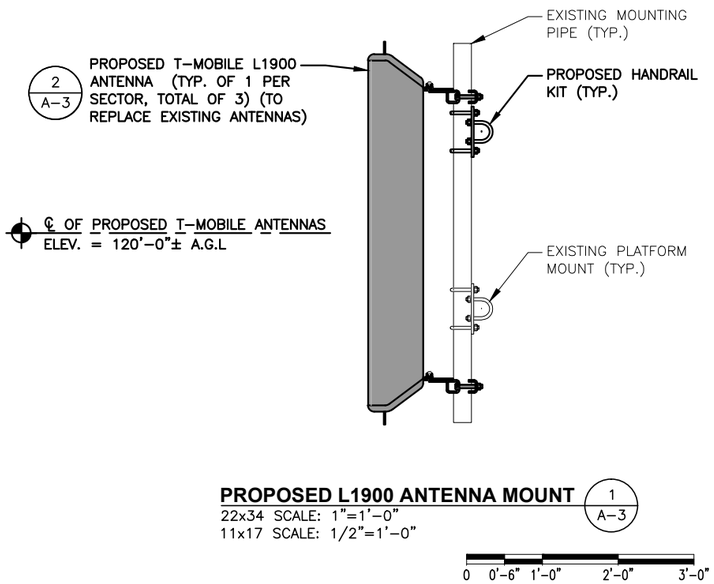
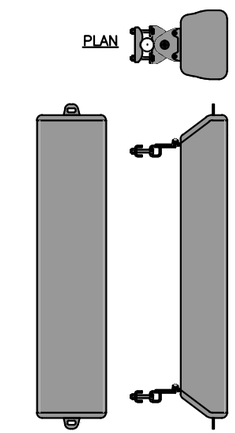


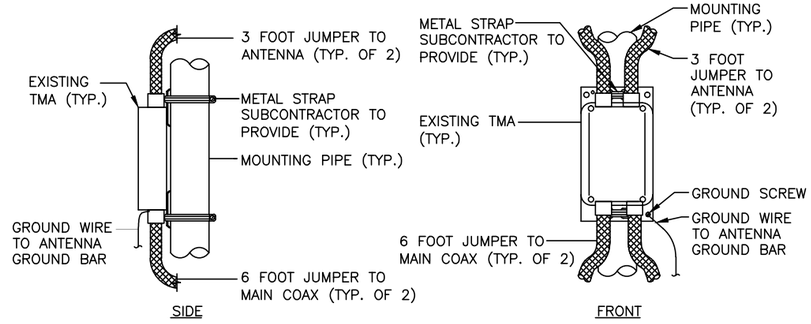
PROPOSED L1900 ANTENNA MOUNT (1 / A-3)
22x34 SCALE: 1"=1'-0"
11x17 SCALE: 1/2"=1'-0"

0 0'-6" 1'-0" 2'-0" 3'-0"

L1900 ANTENNA DIMENSIONS	
MODEL #	**AIR 32 B66Aa/B2a**
MANUF.	ERICSSON
WIDTH	12.9"
DEPTH	8.7"
HEIGHT	56.6"
WEIGHT	132.2 LBS



L1900 ANTENNA DETAIL (2 / A-3)
SCALE: N.T.S



TMA MOUNTING DETAIL (3 / A-3)
SCALE: N.T.S

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18,235
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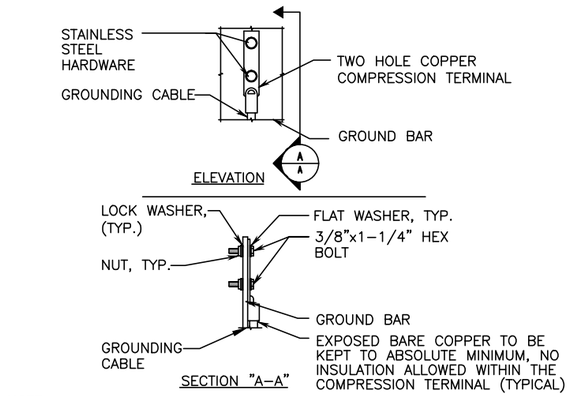
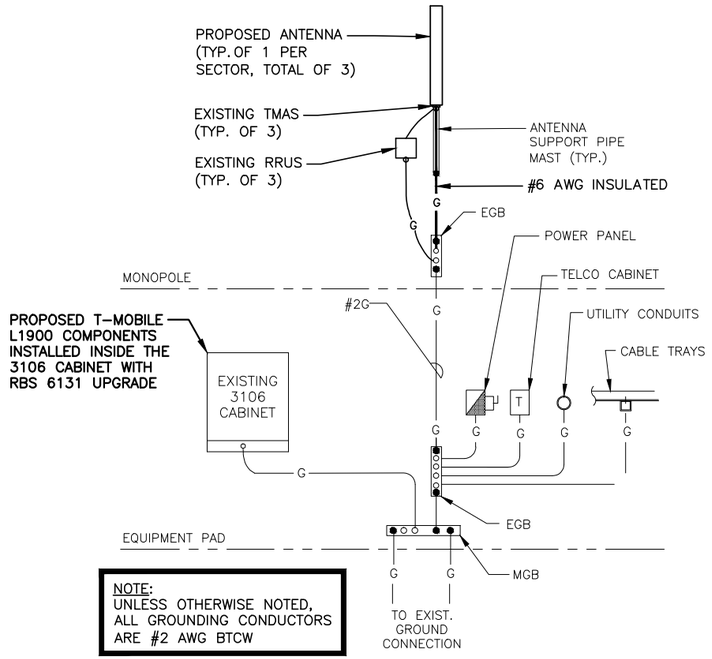
SHEET TITLE
DETAILS

SHEET NUMBER
A-3



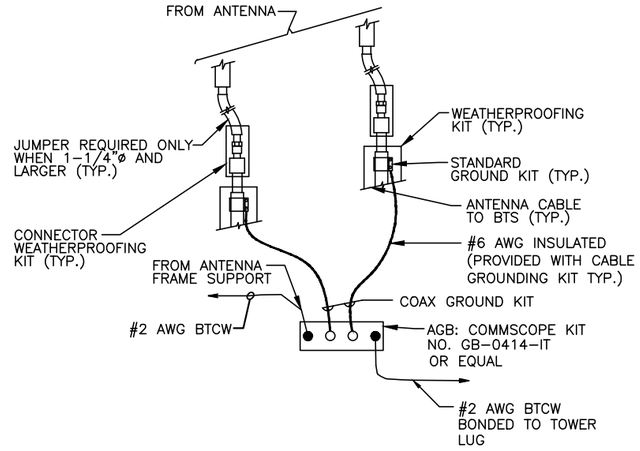
NOTE:
1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER AGB/EGB, LOWER EGB, AND MGB.

TYPICAL GROUND BAR CONNECTION DETAIL 1 / E-1
SCALE: N.T.S



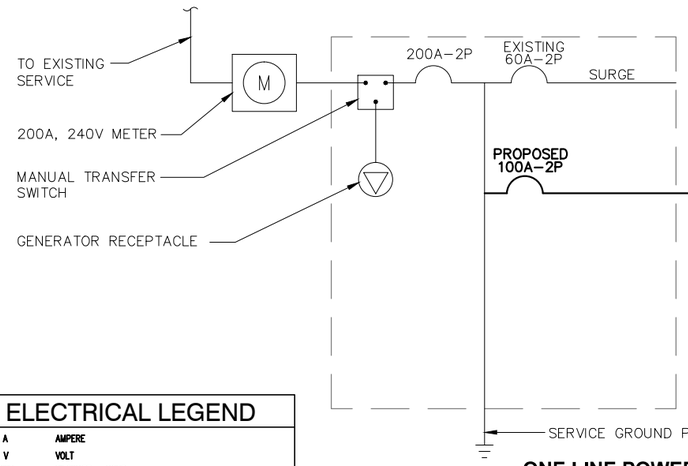
NOTE:
UNLESS OTHERWISE NOTED, ALL GROUNDING CONDUCTORS ARE #2 AWG BTCW

GROUNDING RISER DIAGRAM 2 / E-1
SCALE: N.T.S



NOTE:
INSTALL CABLE GROUND KIT ABOVE HORIZONTAL BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO AGB/EGB.

TOWER TOP CABLE GROUNDING DETAIL 3 / E-1
SCALE: N.T.S



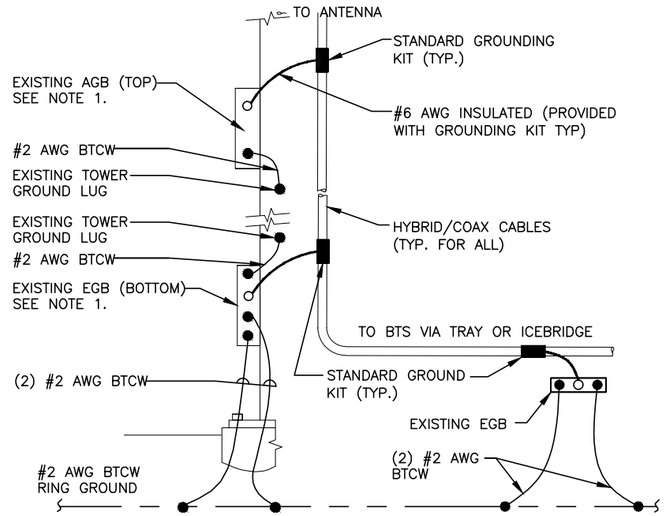
PROPOSED CONDUIT & CONDUCTORS UPGRADE EXISTING SERVICE AS REQUIRED TO ACCOMMODATE RBS 3106 POWER

EXISTING 3106 CABINET

PROPOSED T-MOBILE L1900 COMPONENTS INSTALLED INSIDE THE 3106 CABINET WITH RBS 6131 UPGRADE

NOTE:
G.C. TO VERIFY THAT THE EXISTING CONDUITS AND WIRE SIZES ARE ADEQUATE FOR THE PROPOSED LOADING AND INCLUDE ELECTRICAL UPGRADES IN THE SCOPE OF WORK AS REQUIRED.

ONE LINE POWER DIAGRAM 4 / E-1
SCALE: N.T.S



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

TOWER BOTTOM CABLE GROUNDING DETAIL 5 / E-1
SCALE: N.T.S

ELECTRICAL LEGEND

A	AMPERE
V	VOLT
KWH	KILOWATT - HOUR
C	CONDUIT
GRC	GALVANIZED RIGID CONDUIT
BTCW	BARE TINNED (SOLID) COPPER WIRE (#2 AWG, UNLESS NOTES OTHERWISE)
G	GROUND
	GROUND
MGB	MASTER GROUND BAR — ○ MECHANICAL CONNECTION ● CADWELD CONNECTION
AGB/EGB	EQUIPMENT GROUND BAR/ANTENNA GROUND BAR
G	GROUND COPPER WIRE, SIZE AS NOTED
	EXPOSED WIRING
	INSULATED GROUNDING CONDUCTOR(#6 AWG STRANDED, UNLESS NOTED OTHERWISE)
	5/8"x8' COPPER CLAD STAINLESS STEEL GROUND ROD
	● EXOTHERMIC (CAD WELD) OR ○ MECHANICAL (COMPRESSION TYPE) CONNECTION
PPC	POWER PROTECTION CABINET
	OMNI-DIRECTIONAL ELECTRONIC MARKER SYSTEM (EMS) BALL

ELECTRICAL & GROUNDING NOTES:

ELECTRICAL & GROUNDING NOTES

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
3. THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED BY DRAWINGS AND SPECIFICATION INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
4. GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
5. ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
6. RIGID STEEL CONDUITS SHALL BE GROUNDED AT BOTH ENDS.
7. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THIN INSULATION.
8. RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL ROOM AND PROPOSED CELL SITE POWER PEDESTAL AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
9. RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROPOSED CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON DRAWING A-1. PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
10. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.
11. GROUNDING SHALL COMPLY WITH NEC ART. 250.
12. GROUND COAXIAL CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURERS COAX CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.
13. USE #6 COPPER STRANDED WIRE WITH GREEN COLOR INSULATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE DRAWING.
14. ALL GROUND CONNECTIONS TO BE BURNDY HYGROUND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
15. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AT RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #6 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
16. CONNECTIONS TO MGB SHALL BE ARRANGED IN THREE MAIN GROUPS: SURGE PRODUCERS (COAXIAL CABLE GROUND KITS, TELCO AND POWER PANEL GROUND); (GROUNDING ELECTRODE RING OR BUILDING STEEL); NON-SURGING OBJECTS (EGB GROUND IN BTS UNIT).
17. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LUGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
18. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTIONS.
19. BOND ANTENNA MOUNTING BRACKETS, COAXIAL CABLE GROUND KITS, AND ALNA TO EGB PLACED NEAR THE ANTENNA LOCATION.
20. BOND ANTENNA EGB'S AND MGB TO WATER MAIN.
21. TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION.
22. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
23. VERIFY PROPOSED SERVICE UPGRADE WITH LOCAL UTILITY COMPANY PRIOR TO CONSTRUCTION.

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CT11178D
CROWN CASTLE SITE ID:
829013
SITE NAME:
WEST HARTFORD
/I-84/X43
SITE ADDRESS:
467 SOUTH QUAKER LANE
WEST HARTFORD, CT 06110
HARTFORD COUNTY

SHEET TITLE
GROUNDING DIAGRAM

SHEET NUMBER
E-1