



10 INDUSTRIAL AVE,  
SUITE 3  
MAHWAH NJ 07430

PHONE: 201.684.0055  
FAX: 201.684.0066

January 7, 2019

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

Notice of Exempt Modification  
60 Hosley Avenue, Branford, CT 06406  
Latitude- 41.2833250000  
Longitude- -72.8494000000

Dear Ms. Bachman,

T-Mobile currently maintains nine (9) existing antennas at the 148' and 150' level of the existing 150' monopole at 60 Hosley Ave, Branford, CT. The tower and property are owned by National Railroad Passenger Corporation (Amtrak). T-Mobile now intends to replace six (6) antennas with six (6) new 600/700 MHz antennas. These antennas would be installed at the same 148' and 150' level of the tower. T-Mobile also intends to install two (2) new fiber cables, and replace three (3) remote radio heads.

This facility was not originally approved by the Connecticut Siting Council. The Town of Branford has indicated they do not maintain a record of the original approval. A copy of the correspondence with the Town of Branford confirming this is enclosed in the submission.

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 James Cosgrove, First Selectman of the Town of Branford, Harry Smith, Town Planner of the Town of Branford, as well as the 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](mailto:krichers@transcendwireless.com)

cc: James Cosgrove- as elected official  
Harry Smith- as zoning official  
Amtrak- as owner

## Kyle Richers

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**From:** Harry Smith <hsmith@branford-ct.gov>  
**Sent:** Friday, January 4, 2019 2:44 PM  
**To:** Kyle Richers  
**Cc:** Michelle Martin  
**Subject:** RE: T-Mobile Connecticut Siting Council Filing at Hosley Avenue (Amtrak Tower) -- Original Approval (CT11024B)

Yes, please accept this email as confirmation of that.

### **Harry A. Smith, MCP AICP**

*Town Planner  
Town of Branford  
Branford, CT 06405  
203-488-1255*

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**From:** Kyle Richers [mailto:krichers@transcendwireless.com]  
**Sent:** Friday, January 4, 2019 1:53 PM  
**To:** Harry Smith  
**Subject:** RE: T-Mobile Connecticut Siting Council Filing at Hosley Avenue (Amtrak Tower) -- Original Approval (CT11024B)

Good Afternoon,

I spoke with the office yesterday on this and it was confirmed you were unable to find a record of the approval. Can you confirm this just for our records?

Thanks,

Kyle

**From:** Richers, Kyle <krichers@transcendwireless.com>  
**Sent:** Friday, December 21, 2018 10:50 AM  
**To:** p-z@branford-ct.gov  
**Subject:** Re: T-Mobile Connecticut Siting Council Filing at Hosley Avenue (Amtrak Tower) -- Original Approval (CT11024B)

Good Morning,

Just wanted to follow up on this. Are you able to look into this? Let me know if you can or can't find anything.

Thanks

On Mon, Dec 17, 2018 at 11:03 AM Kyle Richers <[krichers@transcendwireless.com](mailto:krichers@transcendwireless.com)> wrote:

Good Morning,

I am reaching out on behalf of T-Mobile in reference to their tower site located at 60 Hosley Avenue (also known as 80 Hosley Avenue). We are in the process of preparing a filing to the Connecticut Siting Council for an equipment modification at the site. This tower is on Amtrak property and they are the property owner. For our filing we need to include information on the original approval of the tower. Since this tower was not originally approved by the Siting Council based on their records, I believe the original approval would have stemmed from the Town of Branford. Would you be able to look into whether you have any information on the original approval (type of approval, date, conditions, etc.)? They require this information to be included. The approval would have been from around 1998/1999 and T-Mobile has no record of it. Let me know if you are unable to locate anything and I will note that in our filing that we were unable to locate any record of it.

Thank you for your help.

Kyle Richers

Transcend Wireless

10 Industrial Ave., Suite 3

Mahwah, New Jersey 07430

908-447-4716

[krichers@transcendwireless.com](mailto:krichers@transcendwireless.com)

--

Kyle Richers

Transcend Wireless

10 Industrial Ave., Suite 3

Mahwah, NJ 07430

908-447-4716

[krichers@transcendwireless.com](mailto:krichers@transcendwireless.com)

# 80 HOSLEY RD

**Location** 80 HOSLEY RD

**Mblu** B07/000 001/ 001.2/ /

**Acct#** 014552

**Owner** NATL RAILROAD PASSENGER  
CRP

**Assessment** \$244,800

**Appraisal** \$349,600

**PID** 12942

**Building Count** 1

## Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2014	\$250,500	\$99,100	\$349,600

Assessment			
Valuation Year	Improvements	Land	Total
2014	\$175,400	\$69,400	\$244,800

## Owner of Record

**Owner** NATL RAILROAD PASSENGER CRP  
**Co-Owner**  
**Address** 60 MASSACHUSETTS AVE N E  
WASHINGTON, DC 06475

**Sale Price** \$0  
**Certificate**  
**Book & Page** 0653/0488  
**Sale Date** 07/21/1998

## Ownership History

Ownership History				
Owner	Sale Price	Certificate	Book & Page	Sale Date
NATL RAILROAD PASSENGER CRP	\$0		0653/0488	07/21/1998
DELLACAMERA FREDERICK A +	\$0		0492/0178	

## Building Information

### Building 1 : Section 1

**Year Built:** 1991  
**Living Area:** 2,960  
**Replacement Cost:** \$302,606  
**Building Percent** 80  
**Good:**  
**Replacement Cost**  
**Less Depreciation:** \$242,100

### Building Attributes

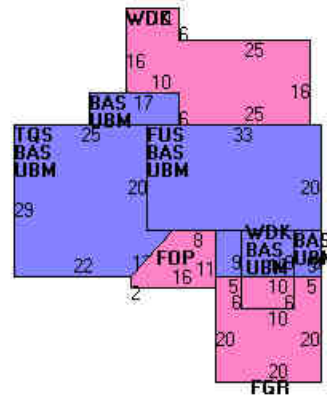
Field	Description
Style	Contemporary
Model	Residential
Grade:	C +
Stories:	2
Occupancy	1
Exterior Wall 1	Clapboard
Exterior Wall 2	
Roof Structure:	Gable/Hip
Roof Cover	Asphalt
Interior Wall 1	Drywall
Interior Wall 2	
Interior Flr 1	Hardwood
Interior Flr 2	
Heat Fuel	Oil
Heat Type:	Forced Air-Duc
AC Type:	None
Total Bedrooms:	3 Bedrooms
Total Bthrms:	2
Total Half Baths:	1
Total Xtra Fixtrs:	
Total Rooms:	7 Rooms
Bath Style:	Average
Kitchen Style:	Average
Cottage Cmplx	
Cottage Adj	

### Building Photo



(<http://images.vgsi.com/photos/BranfordCTPhotos/\00\00\85\4/>)

### Building Layout



Building Sub-Areas (sq ft)			Legend	
Code	Description	Gross Area	Living Area	
BAS	First Floor	1,676	1,676	
FUS	Upper Story, Finished	660	660	
TQS	Three Quarter Story	734	624	
FGR	Garage	400	0	
FOP	Porch, Open	140	0	
UBM	Basement, Unfinished	1,676	0	
WDK	Deck, Wood	710	0	
		5,996	2,960	

### Extra Features

Extra Features				Legend
Code	Description	Size	Value	Bldg #
FPL3	FIREPLACE 2 ST	1 UNITS	\$8,000	1

**Land****Land Use**

**Use Code** 921R  
**Description** PUB SRV RR MDL01  
**Zone** R5  
**Neighborhood** 0040  
**Alt Land Appr Category** No

**Land Line Valuation**

**Size (Acres)** 0.61  
**Frontage**  
**Depth**  
**Assessed Value** \$69,400  
**Appraised Value** \$99,100

**Outbuildings**

Outbuildings						Legend
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
WDK	WOOD DECK			128 S.F.	\$400	1

**Valuation History**

Appraisal			
Valuation Year	Improvements	Land	Total
2017	\$250,500	\$99,100	\$349,600
2016	\$250,500	\$99,100	\$349,600
2015	\$250,500	\$99,100	\$349,600

Assessment			
Valuation Year	Improvements	Land	Total
2017	\$175,400	\$69,400	\$244,800
2016	\$175,400	\$69,400	\$244,800
2015	\$175,400	\$69,400	\$244,800

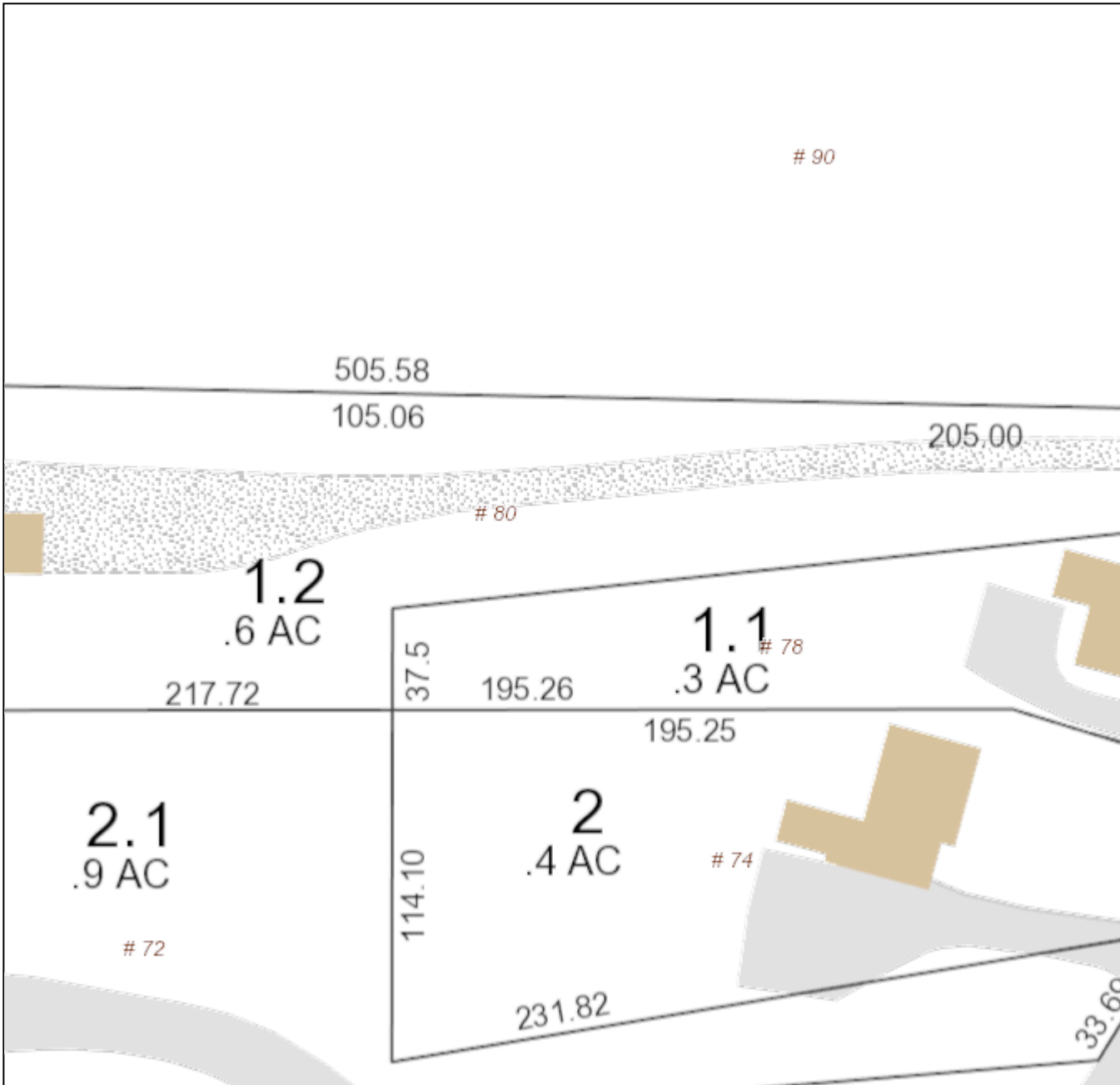
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# Town of Branford

Geographic Information System (GIS)

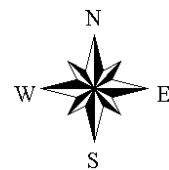


Date Printed: 12/17/2018



**MAP DISCLAIMER - NOTICE OF LIABILITY**

This map is for assessment purposes only. It is not for legal description or conveyances. All information is subject to verification by any user. The Town of Branford and its mapping contractors assume no legal responsibility for the information contained herein.







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

Top Mobile Existing Facility

Site ID CT11000D

Branford 900X300ct.  
60 Hosley Avenue  
Branford, CA 0600

Channel 201

EBI Project Number 62100002

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general population allowable limit:	<b>2.761 %</b>



January 4, 2019

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

Emissions Analysis for Site: **CT11024D – Branford/ I-95/ X53/ Jct.**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **60 Hosley Avenue, Branford, CA**, 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The number of  $\mu\text{W}/\text{cm}^2$  calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately  $400 \mu\text{W}/\text{cm}^2$  and  $467 \mu\text{W}/\text{cm}^2$  respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 5 GHz frequency bands is  $1000 \mu\text{W}/\text{cm}^2$ . Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.



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

Additional details can be found in FCC OET 65.

## CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **60 Hosley Avenue, Branford, CA**, 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 for directional panel and 20 dB for highly focused parabolic microwave dishes, 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) 1 GSM channels (PCS Band - 1900 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 15 Watts per Channel.
- 2) 1 UMTS channel (PCS Band - 1900 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.
- 3) 1 UMTS channel (AWS Band – 2100 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 40 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 40 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) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.



- 7) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.
- 8) 1 microwave backhaul channel (5 GHz) was considered for the proposed facility. This channel has a transmit power of 1 Watt.
- 9) Cable losses were factored in the calculations for this site. Since the 1900 MHz GSM & UMTS radios as well as the 2100 MHz UMTS radios are ground mounted the following cable loss values were used. For each ground mounted 1900 MHz (PCS) radio there was 1.95 dB of cable loss calculated into the system gains / losses for this site. For each ground mounted 2100 MHz (AWS) radio there was 2.06 dB of cable loss calculated into the system gains / losses for this site. These values were calculated based upon the manufacturers specifications for 160 feet of 1-1/4" coax.
- 10) 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.
- 11) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, 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.
- 12) 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, the **RFS APXVAARR24\_43-U-NA20** for 600 MHz and 700 MHz channels and the Gabriel DFPD1-52 microwave dish for 5 GHz backhaul. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, 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.



- 13) The antenna mounting height centerline of the proposed antennas is **150 feet** above ground level (AGL).
- 14) 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.
- 15) All calculations were done with respect to uncontrolled / general population threshold limits.



### T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	<b>1</b>	Antenna #:	<b>1</b>	Antenna #:	<b>1</b>
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):	150 feet	Height (AGL):	150 feet	Height (AGL):	150 feet
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	3	Channel Count	3	Channel Count	3
Total TX Power(W):	95	Total TX Power(W):	95	Total TX Power(W):	95
ERP (W):	2,334.13	ERP (W):	2,334.13	ERP (W):	2,334.13
Antenna A1 MPE%	<b>0.405</b>	Antenna B1 MPE%	<b>0.405</b>	Antenna C1 MPE%	<b>0.405</b>
Antenna #:	<b>2</b>	Antenna #:	<b>2</b>	Antenna #:	<b>2</b>
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):	150 feet	Height (AGL):	150 feet	Height (AGL):	150 feet
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):	200	Total TX Power(W):	200	Total TX Power(W):	200
ERP (W):	7,780.90	ERP (W):	7,780.90	ERP (W):	7,780.90
Antenna A2 MPE%	<b>1.349</b>	Antenna B2 MPE%	<b>1.349</b>	Antenna C2 MPE%	<b>1.349</b>
Antenna #:	<b>3</b>	Antenna #:	<b>3</b>	Antenna #:	<b>3</b>
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd
Height (AGL):	150 feet	Height (AGL):	150 feet	Height (AGL):	150 feet
Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz
Channel Count	5	Channel Count	5	Channel Count	5
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	2,443.03	ERP (W):	2,443.03	ERP (W):	2,443.03
Antenna A3 MPE%	<b>1.005</b>	Antenna B3 MPE%	<b>1.005</b>	Antenna C3 MPE%	<b>1.005</b>

### Microwave Backhaul Data

Make / Model:	Gain	Height (AGL):	Frequency Bands	Channel Count	Total TX Power(W)	ERP (W)	MPE %	Sector
Gabriel DFDP1-52	21.35 dBd	150	5 GHz	1	1	136.45	<b>0.002</b>	<b>A</b>



## Site Summary Tables

Site Composite MPE%	
Carrier	MPE%
T-Mobile (Sector A)	2.761 %
No Additional Carriers Per CSC Active Database	NA
<b>Site Total MPE %:</b>	<b>2.761 %</b>

T-Mobile Sector A Total:	2.761 %
T-Mobile Sector B Total:	2.759 %
T-Mobile Sector C Total:	2.759 %
<b>Site Total:</b>	
	2.761 %

## T-Mobile Maximum MPE Power Values (Sector A)

T-Mobile _Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ( $\mu\text{W}/\text{cm}^2$ )	Frequency (MHz)	Allowable MPE ( $\mu\text{W}/\text{cm}^2$ )	Calculated % MPE
T-Mobile PCS - 1900 MHz GSM	1	372.47	150	0.65	PCS - 1900 MHz	1000.00	0.065%
T-Mobile PCS - 1900 MHz UMTS	1	993.25	150	1.72	PCS - 1900 MHz	1000.00	0.172%
T-Mobile AWS - 2100 MHz UMTS	1	968.41	150	1.68	AWS - 2100 MHz	1000.00	0.168%
T-Mobile PCS - 1900 MHz LTE	2	1,556.18	150	5.40	PCS - 1900 MHz	1000.00	0.540%
T-Mobile AWS - 2100 MHz LTE	2	2,334.27	150	8.09	AWS - 2100 MHz	1000.00	0.809%
T-Mobile 600 MHz LTE	2	788.97	150	2.74	600 MHz	400.00	0.684%
T-Mobile 700 MHz LTE	2	432.54	150	1.50	700 MHz	467.00	0.321%
T-Mobile 5 GHz Microwave	1	136.46	150	0.02	5 GHz	1000.00	0.002%
						<b>Total:</b>	<b>2.761%</b>



## Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector A:	2.761%
Sector B:	2.759%
Sector C:	2.759%
T-Mobile Maximum MPE % (Sector A):	2.761%
Site Total:	2.761 %
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **2.761%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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



**STRUCTURAL ANALYSIS REPORT**

**T-MOBILE UPGRADE**

**EXISTING 150' MONOPOLE**

**SITE NAME: BRANFORD / I-95/ X53/ JCT.**

**60 HOSLEY AVENUE  
BRANFORD, CT 06405**

**AUGUST 23, 2018**

**TEC W.O. 7421.CT11024B**



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    ANALYSIS CRITERIA

    RESULTS AND CONCLUSION

    TNX TOWER OUTPUT

    FOUNDATION CALCULATIONS

    ADDITIONAL CALCULATIONS

### **APPENDICES**

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B. MONOPOLE AND FOUNDATION DRAWINGS (1999)

C. TOWER MAPPING REPORT (2015)

D. POST MODIFICATION INSPECTION REPORT (2017)

E. CONNECTICUT STATE WIND SPEED REQUIREMENT

### Project Information

W.O. Number:	7421.CT11024B [previously 6421.CT11024B]	Report Date:	8/23/2018
Client:	T-Mobile	Revision:	0
Site Name:	Branford/ I-95/ X53/ Jct.		
Owner:	AMTRAK		
Site Address:	60 Hosley Avenue	FCC Regulation Number:	--
City, State:	Branford, CT 06405	County:	New Haven

### Structure Information

Structure Type:	Monopole	Manufacturer:	PiRod
Structure Height:	150 ft.	Year Built:	1998
Original Drawings:	Structure: Yes	Foundation:	Yes

#### Documents provided:

Item	By	No.	Date
Geotechnical Report (10 pages)	French & Parrello Associates	98A012ER2	6/22/98
Original Pole & Foundation Drawings (17 sheets)	PiRod Inc.	A-114856	1/7/99
Tower Mapping Report (12 pages)	Vertical Solutions	141341	9/12/14
Structural Analysis Report - Rev 2 (67 pages)	Tectonic	6421.CT11024B	6/4/15
Post Modification Inspection Report (10 pages)	Tectonic	7421.CT11024B	5/22/17
RFDS - Version 2.1 - L600	T-Mobile	-	5/15/18

### Inspection

Type: Tower Mapping	Date:	1/12/2015
Visual Inspection from ground	Date:	4/26/2017
General Condition:		
Pole:	Good	Finish: Painted
Foundation:	Good	Condition: Intact
Observations: Tower reinforcement installed		

### Existing Appurtenances

Antennas:						
Height (ft.)	Carrier	Qty	Manuf.	Model	Mount	Comment
150	T-Mobile	3	Ericsson	AIR 21 B4A B2P	10' Low Profile Platform	To Be Removed
		3	Commscope	LNX-6515-A1M		
		3	Ericsson	RRUS 11 B12		
		3	Ericsson	AIR 21 B2A B4P		
		3	Ericsson	KRY 112 144/1 TMA		
150	Amtrak	1	-	6' x 1.5" dia Omni (inverted)	To Remain	
98 (base)	Amtrak	1	Celwave	PD220	(1) 6' Side Arm	To Remain
70 (base)	Amtrak	1	Celwave	PD220	(1) 6' Side Arm	To Remain
50 (base)	Amtrak	1	Celwave	PD220	(1) 6' Side Arm	To Remain
Cables:						
Height (ft.)	Carrier	Qty	Nom. Size	Location / Support	Comment	
150	T-Mobile	6	1-1/4"	Routed along the interior of the pole	To Remain	
150	T-Mobile	1	Hybriflex	Routed along the interior of the pole	To Remain	
150	Amtrak	1	1/2"	Routed along the interior of the pole	To Remain	
98.5	Amtrak	1	1/2"	Routed along the interior of the pole	To Remain	
70.5	Amtrak	1	1/2"	Routed along the interior of the pole	To Remain	

W.O. Number: 7421.CT11024B [previously 6421.CT11024B]  
 Client: T-Mobile  
 Site Name: Branford/ I-95/ X53/ Jct.

Report Date: 8/23/2018  
 Revision: 0

### Proposed Installation

T-Mobile is proposing to replace six (6) existing panel antennas and three (3) existing RRU's with newer models. The final T-Mobile configuration upon this installation will be as follows:

Antennas:

Height (ft.)	Carrier	Qty	Manuf.	Model	Mount
150	T-Mobile	3	Ericsson	AIR 21 B2A B4P	Existing 10' Low Profile Platform
		3	Ericsson	KRY 112 144/1 TMA	
		1	Gabriel Antenna	DFPD1-52	
		3	RFS Celwave	APXVAARR24 42-U-NA20	
		3	Ericsson	AIR 32 B66Aa B2a	
		3	Ericsson	Radio 4449 B12/B71 RRU	

Cables:

Height (ft.)	Qty	Nom. Size	Location / Support
150	6	1-1/4"	Existing routed along the interior of the pole to remain
150	1	Hybriflex Fiber Cable	Existing routed along the interior of the pole to remain
150	2	Hybriflex Fiber Cable	To be routed along the interior of the pole to remain

### Analysis Criteria

Design Standard: ANSI/TIA-222-G-2005

Building Code: 2016 Connecticut State Building Code

	<u>Capacity (no ice)</u>	<u>Capacity w/ ice</u>	<u>Service</u>
Wind Speed:	101 mph*	50 mph	60 mph
Basic Ice Thickness:	0 inch	0.75 inch	0 inch

\*Nominal 3-second gust wind speed per Appendix N of 2016 Connecticut Building Code

Structure Class: 2 Seismic: No  
 Exposure Category: C  
 Topo Category: 1

Assumptions:

1. The monopole was designed and constructed in accordance with the applicable codes and standards.
2. The foundation was designed and constructed based on site-specific geotechnical information.
3. Wind area and weight of the existing antenna platform has been estimated based on the site specific pictures.
4. The existing base plate and flange plate have been adequately designed to carry the full capacity of the unreinforced pole shaft. Therefore, the base plate and flange plate capacity is governed by the pole shaft and/or anchor capacity.
5. The existing appurtenance mounts have not been analyzed in conjunction with this analysis of the overall tower.

W.O. Number:	7421.CT11024B [previously 6421.CT11024B]	Report Date:	8/23/2018
Client:	T-Mobile	Revision:	0
Site Name:	Branford/ I-95/ X53/ Jct.		

### Analysis Results

Element	% Usage
Shaft	86%
Anchor Bolts	63%
Flange Connections	89%
Foundation	38%

Type	Service Load Deflections (Max)		
	At Top	Allowable	Percentage
Horizontal (inch):	20.57	54.00	38%
Twist & Sway (deg):	1.57	4.00	39%

For detailed information, see the attached tnxTower output and additional calculations.

#### Foundation Reactions (Envelope):

	Current Analysis <sup>1</sup>
Vertical	41 kips
Shear	17 kips
Moment	1695 kip-ft.

1. Existing foundation has been analyzed to verify its actual capacity. For detailed information, see "Foundation Calculations" section.

### Conclusions

Based on our analysis, the existing monopole and its foundation have adequate capacity to support the proposed T-Mobile upgrade as described herein in accordance with current code requirements.

No structural problems for the monopole or its foundation are anticipated, and no modifications are necessary.

This analysis is based on the information provided by the client and may be affected if any assumptions are not valid or have been made in error. Tectonic should be notified in this event to determine the effect on the structural integrity of the tower.

Any further changes to the antenna configuration or other appurtenances should be reviewed with respect to their effect on structural loads prior to implementation.

Prepared by: Veronica Elson  
Senior Engineer

Reviewed by: Vinod Ramesh  
Structural Engineer



Approved by:   
Antonio A. Gualtieri, P.E.  
Senior Vice President

Date: 8/23/18

**TNX TOWER SUMMARY REPORT**

**DESIGNED APPURTENANCE LOADING**

TYPE	ELEVATION	TYPE	ELEVATION
10' Low Profile Platform	150	RADIO 4449 B12/B71	150
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	150	RADIO 4449 B12/B71	150
		KRY 112 144/1	150
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	150	KRY 112 144/1	150
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	150	KRY 112 144/1	150
APXVAARR24_43-U-NA20 w/ Mount Pipe	150	6' x 1.5" Omni Antenna	150
		2" STD Pipe (2.375 OD)x6'-0"	150
APXVAARR24_43-U-NA20 w/ Mount Pipe	150	2" STD Pipe (2.375 OD)x6'-0"	150
		DFPD1-52 w/ Mount Pipe	150
APXVAARR24_43-U-NA20 w/ Mount Pipe	150	6' Side Arm	98
		PD220	98
AIR 32 B66Aa B2a w/ Mount Pipe	150	6' Side Arm	70
AIR 32 B66Aa B2a w/ Mount Pipe	150	PD220	70
AIR 32 B66Aa B2a w/ Mount Pipe	150	6' Side Arm	50
RADIO 4449 B12/B71	150	PD220	50

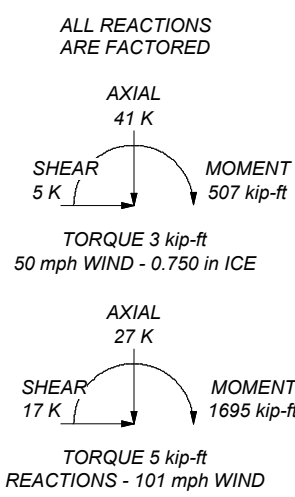
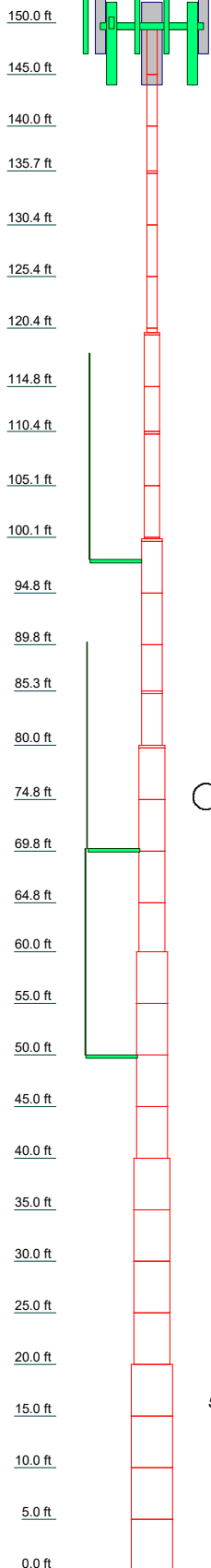
**MATERIAL STRENGTH**

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 ksi			


**TOWER DESIGN NOTES**

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 101 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TOWER RATING: 86.3%

Section	Size	Length (ft)	Grade	Weight (K)
1				0.2
2				0.2
3				0.2
4				0.2
5				0.4
6				0.4
7				0.4
8				0.4
9				0.4
10				0.4
11				0.3
12				0.3
13				0.3
14				0.5
15				0.5
16				0.5
17				0.5
18				0.5
19				0.4
20				0.4
21				0.6
22				0.6
23				0.6
24				0.6
25				0.6
26				0.6
27				0.7
28				0.7
29				0.7
30				0.7
31				0.8
32				0.8
33				0.8
34				0.8
35				1.0
36				1.0
37				1.0
38				1.0
			18.1	18.1



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	<p>Project: <b>Branford/ I-95/ X53/ Jct.</b></p>		<p>Client: T-Mobile</p>	
	<p>Code: TIA-222-G</p>		<p>Drawn by: Veronica Elson</p>	
	<p>Path:</p>		<p>Date: 08/22/18</p>	
	<p></p>		<p>App'd: _____ Scale: NTS Dwg No. E-1</p>	

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	<b>Client</b> T-Mobile	<b>Designed by</b> Veronica Elson

## Tower Input Data

The tower is a monopole.

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

The following design criteria apply:

Tower is located in New Haven County, Connecticut.

Basic wind speed of 101 mph.

Structure Class II.

Exposure Category C.

Topographic Category 1.

Crest Height 0.000 ft.

Nominal ice thickness of 0.750 in.

Ice thickness is considered to increase with height.

Ice density of 56.000 pcf.

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

Temperature drop of 50.000 °F.

Deflections calculated using a wind speed of 60 mph.

TOWER RATING: 86.1%.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.

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

## Options

- |  |   |   |
|--|---|---|
| <ul style="list-style-type: none"> <li>Consider Moments - Legs</li> <li>Consider Moments - Horizontals</li> <li>Consider Moments - Diagonals</li> <li>Use Moment Magnification</li> <li>√ Use Code Stress Ratios</li> <li>√ Use Code Safety Factors - Guys</li> <li>Escalate Ice</li> <li>Always Use Max Kz</li> <li>Use Special Wind Profile</li> <li>Include Bolts In Member Capacity</li> <li>Leg Bolts Are At Top Of Section</li> <li>Secondary Horizontal Braces Leg</li> <li>Use Diamond Inner Bracing (4 Sided)</li> <li>SR Members Have Cut Ends</li> <li>SR Members Are Concentric</li> </ul> | <ul style="list-style-type: none"> <li>Distribute Leg Loads As Uniform</li> <li>Assume Legs Pinned</li> <li>√ Assume Rigid Index Plate</li> <li>√ Use Clear Spans For Wind Area</li> <li>√ Use Clear Spans For KL/r</li> <li>Retention Guys To Initial Tension</li> <li>√ Bypass Mast Stability Checks</li> <li>√ Use Azimuth Dish Coefficients</li> <li>√ Project Wind Area of Appurt.</li> <li>Autocalc Torque Arm Areas</li> <li>Add IBC .6D+W Combination</li> <li>√ Sort Capacity Reports By Component</li> <li>Triangulate Diamond Inner Bracing</li> <li>Treat Feed Line Bundles As Cylinder</li> <li>Ignore KL/ry For 60 Deg. Angle Legs</li> </ul> | <ul style="list-style-type: none"> <li>Use ASCE 10 X-Brace Ly Rules</li> <li>Calculate Redundant Bracing Forces</li> <li>Ignore Redundant Members in FEA</li> <li>SR Leg Bolts Resist Compression</li> <li>All Leg Panels Have Same Allowable</li> <li>Offset Girt At Foundation</li> <li>√ Consider Feed Line Torque</li> <li>Include Angle Block Shear Check</li> <li>Use TIA-222-G Bracing Resist. Exemption</li> <li>Use TIA-222-G Tension Splice Exemption</li> <li style="text-align: center;">Poles</li> <li>√ Include Shear-Torsion Interaction</li> <li>Always Use Sub-Critical Flow</li> <li>Use Top Mounted Sockets</li> <li>Pole Without Linear Attachments</li> <li>Pole With Shroud Or No Appurtenances</li> <li>Outside and Inside Corner Radii Are Known</li> </ul> |
|--|---|---|

## Pole Section Geometry

Section	Elevation	Section Length	Pole Size	Pole Grade	Socket Length
	ft	ft			ft






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<b>Job</b>	7421.CT11024B - 150' Monpole	<b>Page</b>	2 of 29
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<b>Client</b>	T-Mobile	<b>Designed by</b>	Veronica Elson


Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L1	150.000-145.000	5.000	P12.75x0.375	A53-B-42 (42 ksi)	
L2	145.000-140.000	5.000	P12.75x0.375	A53-B-42 (42 ksi)	
L3	140.000-135.667	4.333	P12.75x0.375	A53-B-42 (42 ksi)	
L4	135.667-135.417	0.250	P12.75x0.725	A53-B-42 (42 ksi)	
L5	135.417-130.417	5.000	P12.75x0.725	A53-B-42 (42 ksi)	
L6	130.417-125.417	5.000	P12.75x0.725	A53-B-42 (42 ksi)	
L7	125.417-120.417	5.000	P12.75x0.725	A53-B-42 (42 ksi)	
L8	120.417-120.000	0.417	P12.75x0.725	A53-B-42 (42 ksi)	
L9	120.000-119.750	0.250	P18x0.375	A53-B-42 (42 ksi)	
L10	119.750-114.750	5.000	P18x0.375	A53-B-42 (42 ksi)	
L11	114.750-110.375	4.375	P18x0.375	A53-B-42 (42 ksi)	
L12	110.375-110.125	0.250	P18x0.5875	A53-B-42 (42 ksi)	
L13	110.125-105.125	5.000	P18x0.5875	A53-B-42 (42 ksi)	
L14	105.125-100.125	5.000	P18x0.5875	A53-B-42 (42 ksi)	
L15	100.125-100.000	0.125	P18x0.5875	A53-B-42 (42 ksi)	
L16	100.000-99.750	0.250	P24x0.375	A53-B-42 (42 ksi)	
L17	99.750-94.750	5.000	P24x0.375	A53-B-42 (42 ksi)	
L18	94.750-89.750	5.000	P24x0.375	A53-B-42 (42 ksi)	
L19	89.750-85.250	4.500	P24x0.375	A53-B-42 (42 ksi)	
L20	85.250-85.000	0.250	P24x0.51875	A53-B-42 (42 ksi)	
L21	85.000-80.000	5.000	P24x0.51875	A53-B-42 (42 ksi)	
L22	80.000-79.750	0.250	P30x0.375	A53-B-42 (42 ksi)	
L23	79.750-74.750	5.000	P30x0.375	A53-B-42 (42 ksi)	
L24	74.750-69.750	5.000	P30x0.375	A53-B-42 (42 ksi)	
L25	69.750-64.750	5.000	P30x0.375	A53-B-42 (42 ksi)	
L26	64.750-60.000	4.750	P30x0.375	A53-B-42 (42 ksi)	
L27	60.000-55.000	5.000	P36x0.375	A53-B-42 (42 ksi)	
L28	55.000-50.000	5.000	P36x0.375	A53-B-42 (42 ksi)	
L29	50.000-45.000	5.000	P36x0.375	A53-B-42 (42 ksi)	
L30	45.000-40.000	5.000	P36x0.375	A53-B-42 (42 ksi)	
L31	40.000-35.000	5.000	P42x0.375	A53-B-42	

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	<b>Client</b>	T-Mobile	<b>Designed by</b>	Veronica Elson

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L32	35.000-30.000	5.000	P42x0.375	(42 ksi) A53-B-42	
L33	30.000-25.000	5.000	P42x0.375	(42 ksi) A53-B-42	
L34	25.000-20.000	5.000	P42x0.375	(42 ksi) A53-B-42	
L35	20.000-15.000	5.000	P48x0.375	(42 ksi) A53-B-42	
L36	15.000-10.000	5.000	P48x0.375	(42 ksi) A53-B-42	
L37	10.000-5.000	5.000	P48x0.375	(42 ksi) A53-B-42	
L38	5.000-0.000	5.000	P48x0.375	(42 ksi) A53-B-42	

Tower Elevation ft	Gusset Area (per face) ft <sup>2</sup>	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>f</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 150.000-145.000				1	1	1			
L2 145.000-140.000				1	1	1			
L3 140.000-135.67				1	1	1			
L4 135.667-135.417				1	1	0.852135			
L5 135.417-130.417				1	1	0.852135			
L6 130.417-125.417				1	1	0.852135			
L7 125.417-120.417				1	1	0.852135			
L8 120.417-120.000				1	1	0.852135			
L9 120.000-119.750				1	1	1			
L10 119.750-114.750				1	1	1			
L11 114.750-110.375				1	1	1			
L12 110.375-110.125				1	1	0.918662			
L13				1	1	0.918662			



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### Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C <sub>AA</sub> ft <sup>2</sup> /ft	Weight plf
LDF6-50(1-1/4")	C	No	No	Inside Pole	150.000 - 0.000	6	No Ice	0.000	0.660
							1/2" Ice	0.000	0.660
							1" Ice	0.000	0.660
HB158-1-13U6-S6F 18(1-5/8)	C	No	No	Inside Pole	150.000 - 0.000	3	No Ice	0.000	1.900
							1/2" Ice	0.000	1.900
							1" Ice	0.000	1.900
***									
LDF4-50A(1/2")	C	No	No	Inside Pole	150.000 - 0.000	1	No Ice	0.000	0.150
							1/2" Ice	0.000	0.150
							1" Ice	0.000	0.150
LDF4-50A(1/2")	C	No	No	Inside Pole	98.000 - 0.000	1	No Ice	0.000	0.150
							1/2" Ice	0.000	0.150
							1" Ice	0.000	0.150
LDF4-50A(1/2")	C	No	No	Inside Pole	70.000 - 0.000	1	No Ice	0.000	0.150
							1/2" Ice	0.000	0.150
							1" Ice	0.000	0.150
LDF4-50A(1/2")	C	No	No	Inside Pole	50.000 - 0.000	1	No Ice	0.000	0.150
							1/2" Ice	0.000	0.150
							1" Ice	0.000	0.150

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight K
L1	150.000-145.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.049
L2	145.000-140.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.049
L3	140.000-135.667	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.043
L4	135.667-135.417	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.002
L5	135.417-130.417	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.049
L6	130.417-125.417	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.049
L7	125.417-120.417	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.049
L8	120.417-120.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.004
L9	120.000-119.750	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000



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<b>Client</b>	T-Mobile	<b>Designed by</b>	Veronica Elson

Tower Section	Tower Elevation ft	Face	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight K
L10	119.750-114.750	C	0.000	0.000	0.000	0.000	0.002
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L11	114.750-110.375	C	0.000	0.000	0.000	0.000	0.049
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L12	110.375-110.125	C	0.000	0.000	0.000	0.000	0.043
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L13	110.125-105.125	C	0.000	0.000	0.000	0.000	0.002
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L14	105.125-100.125	C	0.000	0.000	0.000	0.000	0.049
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L15	100.125-100.000	C	0.000	0.000	0.000	0.000	0.049
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L16	100.000-99.750	C	0.000	0.000	0.000	0.000	0.001
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L17	99.750-94.750	C	0.000	0.000	0.000	0.000	0.002
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L18	94.750-89.750	C	0.000	0.000	0.000	0.000	0.050
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L19	89.750-85.250	C	0.000	0.000	0.000	0.000	0.050
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L20	85.250-85.000	C	0.000	0.000	0.000	0.000	0.045
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L21	85.000-80.000	C	0.000	0.000	0.000	0.000	0.002
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L22	80.000-79.750	C	0.000	0.000	0.000	0.000	0.050
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L23	79.750-74.750	C	0.000	0.000	0.000	0.000	0.002
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L24	74.750-69.750	C	0.000	0.000	0.000	0.000	0.050
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L25	69.750-64.750	C	0.000	0.000	0.000	0.000	0.050
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L26	64.750-60.000	C	0.000	0.000	0.000	0.000	0.051
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L27	60.000-55.000	C	0.000	0.000	0.000	0.000	0.048
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L28	55.000-50.000	C	0.000	0.000	0.000	0.000	0.051
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
L29	50.000-45.000	C	0.000	0.000	0.000	0.000	0.051
		A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000



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<b>Job</b>	7421.CT11024B - 150' Monpole	<b>Page</b>	7 of 29
<b>Project</b>	Branford/ I-95/ X53/ Jct.	<b>Date</b>	16:42:47 08/22/18
<b>Client</b>	T-Mobile	<b>Designed by</b>	Veronica Elson

Tower Section	Tower Elevation ft	Face	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight K
L30	45.000-40.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.051
L31	40.000-35.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.051
L32	35.000-30.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.051
L33	30.000-25.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.051
L34	25.000-20.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.051
L35	20.000-15.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.051
L36	15.000-10.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.051
L37	10.000-5.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.051
L38	5.000-0.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.051

### Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight K
L1	150.000-145.000	A	1.742	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.049
L2	145.000-140.000	A	1.736	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.049
L3	140.000-135.667	A	1.731	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.043
L4	135.667-135.417	A	1.728	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.002
L5	135.417-130.417	A	1.724	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.049
L6	130.417-125.417	A	1.718	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.049
L7	125.417-120.417	A	1.711	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.049
L8	120.417-120.000	A	1.707	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.004
L9	120.000-119.750	A	1.707	0.000	0.000	0.000	0.000	0.000



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<b>Job</b>	7421.CT11024B - 150' Monpole	<b>Page</b>	8 of 29
<b>Project</b>	Branford/ I-95/ X53/ Jct.	<b>Date</b>	16:42:47 08/22/18
<b>Client</b>	T-Mobile	<b>Designed by</b>	Veronica Elson

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_A A_A$ In Face ft <sup>2</sup>	$C_A A_A$ Out Face ft <sup>2</sup>	Weight K
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.002
L10	119.750-114.750	A	1.703	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.049
L11	114.750-110.375	A	1.696	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.043
L12	110.375-110.125	A	1.692	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.002
L13	110.125-105.125	A	1.688	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.049
L14	105.125-100.125	A	1.680	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.049
L15	100.125-100.000	A	1.676	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.001
L16	100.000-99.750	A	1.676	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.002
L17	99.750-94.750	A	1.671	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.050
L18	94.750-89.750	A	1.662	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.050
L19	89.750-85.250	A	1.654	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.045
L20	85.250-85.000	A	1.649	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.002
L21	85.000-80.000	A	1.644	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.050
L22	80.000-79.750	A	1.639	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.002
L23	79.750-74.750	A	1.633	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.050
L24	74.750-69.750	A	1.622	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.050
L25	69.750-64.750	A	1.611	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.051
L26	64.750-60.000	A	1.599	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.048
L27	60.000-55.000	A	1.586	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.051
L28	55.000-50.000	A	1.571	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.051
L29	50.000-45.000	A	1.556	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000



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<b>Job</b>	7421.CT11024B - 150' Monpole	<b>Page</b>	9 of 29
<b>Project</b>	Branford/ I-95/ X53/ Jct.	<b>Date</b>	16:42:47 08/22/18
<b>Client</b>	T-Mobile	<b>Designed by</b>	Veronica Elson

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_A A_A$ In Face ft <sup>2</sup>	$C_A A_A$ Out Face ft <sup>2</sup>	Weight K
L30	45.000-40.000	C		0.000	0.000	0.000	0.000	0.051
		A	1.538	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.051
L31	40.000-35.000	A	1.519	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.051
L32	35.000-30.000	A	1.498	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.051
L33	30.000-25.000	A	1.473	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.051
L34	25.000-20.000	A	1.444	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.051
L35	20.000-15.000	A	1.408	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.051
L36	15.000-10.000	A	1.361	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.051
L37	10.000-5.000	A	1.293	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.051
L38	5.000-0.000	A	1.159	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.051

### Feed Line Center of Pressure

Section	Elevation ft	$CP_x$ in	$CP_z$ in	$CP_x$ Ice in	$CP_z$ Ice in
L1	150.000-145.000	0.000	0.000	0.000	0.000
L2	145.000-140.000	0.000	0.000	0.000	0.000
L3	140.000-135.667	0.000	0.000	0.000	0.000
L4	135.667-135.417	0.000	0.000	0.000	0.000
L5	135.417-130.417	0.000	0.000	0.000	0.000
L6	130.417-125.417	0.000	0.000	0.000	0.000
L7	125.417-120.417	0.000	0.000	0.000	0.000
L8	120.417-120.000	0.000	0.000	0.000	0.000
L9	120.000-119.750	0.000	0.000	0.000	0.000
L10	119.750-114.750	0.000	0.000	0.000	0.000
L11	114.750-110.375	0.000	0.000	0.000	0.000
L12	110.375-110.125	0.000	0.000	0.000	0.000
L13	110.125-105.125	0.000	0.000	0.000	0.000
L14	105.125-100.125	0.000	0.000	0.000	0.000
L15	100.125-100.000	0.000	0.000	0.000	0.000
L16	100.000-99.750	0.000	0.000	0.000	0.000
L17	99.750-94.750	0.000	0.000	0.000	0.000
L18	94.750-89.750	0.000	0.000	0.000	0.000
L19	89.750-85.250	0.000	0.000	0.000	0.000
L20	85.250-85.000	0.000	0.000	0.000	0.000
L21	85.000-80.000	0.000	0.000	0.000	0.000
L22	80.000-79.750	0.000	0.000	0.000	0.000
L23	79.750-74.750	0.000	0.000	0.000	0.000



 <p><b>Tectonic</b> PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.</p> <p><b>Tectonic</b> 1279 Route 300 Newburgh, NY 12550 Phone: (845) 567-6656 FAX: (845) 567-8703</p>	<b>Job</b> 7421.CT11024B - 150' Monpole	<b>Page</b> 10 of 29
	<b>Project</b> Branford/ I-95/ X53/ Jct.	<b>Date</b> 16:42:47 08/22/18
	<b>Client</b> T-Mobile	<b>Designed by</b> Veronica Elson

Section	Elevation	CP <sub>x</sub>	CP <sub>z</sub>	CP <sub>x</sub>	CP <sub>z</sub>
	ft	in	in	Ice in	Ice in
L24	74.750-69.750	0.000	0.000	0.000	0.000
L25	69.750-64.750	0.000	0.000	0.000	0.000
L26	64.750-60.000	0.000	0.000	0.000	0.000
L27	60.000-55.000	0.000	0.000	0.000	0.000
L28	55.000-50.000	0.000	0.000	0.000	0.000
L29	50.000-45.000	0.000	0.000	0.000	0.000
L30	45.000-40.000	0.000	0.000	0.000	0.000
L31	40.000-35.000	0.000	0.000	0.000	0.000
L32	35.000-30.000	0.000	0.000	0.000	0.000
L33	30.000-25.000	0.000	0.000	0.000	0.000
L34	25.000-20.000	0.000	0.000	0.000	0.000
L35	20.000-15.000	0.000	0.000	0.000	0.000
L36	15.000-10.000	0.000	0.000	0.000	0.000
L37	10.000-5.000	0.000	0.000	0.000	0.000
L38	5.000-0.000	0.000	0.000	0.000	0.000


Note: For pole sections, center of pressure calculations do not consider feed line shielding.

### Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
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### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz Lateral	Vert						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
10' Low Profile Platform	C	None			0.000	150.000	No Ice	14.660	14.660	1.250
							1/2" Ice	18.870	18.870	1.481
							1" Ice	23.080	23.080	1.713
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	150.000	No Ice	6.329	5.642	0.112
			0.000	0.000			1/2" Ice	6.775	6.426	0.169
			0.000	0.000			1" Ice	7.214	7.131	0.233
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	150.000	No Ice	6.329	5.642	0.112
			0.000	0.000			1/2" Ice	6.775	6.426	0.169
			0.000	0.000			1" Ice	7.214	7.131	0.233
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	150.000	No Ice	6.329	5.642	0.112
			0.000	0.000			1/2" Ice	6.775	6.426	0.169
			0.000	0.000			1" Ice	7.214	7.131	0.233
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	150.000	No Ice	20.480	11.024	0.161
			0.000	0.000			1/2" Ice	21.231	12.550	0.297
			-2.000	0.000			1" Ice	21.990	14.099	0.444
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	150.000	No Ice	20.480	11.024	0.161
			0.000	0.000			1/2" Ice	21.231	12.550	0.297
			-2.000	0.000			1" Ice	21.990	14.099	0.444
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	150.000	No Ice	20.480	11.024	0.161
			0.000	0.000			1/2" Ice	21.231	12.550	0.297

 <p><b>Tectonic</b> PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.</p> <p><b>Tectonic</b> 1279 Route 300 Newburgh, NY 12550 Phone: (845) 567-6656 FAX: (845) 567-8703</p>	<b>Job</b>	7421.CT11024B - 150' Monpole	<b>Page</b>	11 of 29
	<b>Project</b>	Branford/ I-95/ X53/ Jct.	<b>Date</b>	16:42:47 08/22/18
	<b>Client</b>	T-Mobile	<b>Designed by</b>	Veronica Elson

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Vert						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
AIR 32 B66Aa B2a w/ Mount Pipe	A	From Leg	-2.000		0.000	150.000	1" Ice	21.990	14.099	0.444
			4.000				No Ice	6.815	6.137	0.154
			0.000				1/2" Ice	7.299	6.993	0.216
AIR 32 B66Aa B2a w/ Mount Pipe	B	From Leg	0.000		0.000	150.000	1" Ice	7.762	7.725	0.284
			4.000				No Ice	6.815	6.137	0.154
			0.000				1/2" Ice	7.299	6.993	0.216
AIR 32 B66Aa B2a w/ Mount Pipe	C	From Leg	0.000		0.000	150.000	1" Ice	7.762	7.725	0.284
			4.000				No Ice	6.815	6.137	0.154
			0.000				1/2" Ice	7.299	6.993	0.216
RADIO 4449 B12/B71	A	From Leg	0.000		0.000	150.000	1" Ice	7.762	7.725	0.284
			4.000				No Ice	1.650	1.163	0.074
			0.000				1/2" Ice	1.810	1.301	0.090
RADIO 4449 B12/B71	B	From Leg	0.000		0.000	150.000	1" Ice	1.978	1.447	0.109
			4.000				No Ice	1.650	1.163	0.074
			0.000				1/2" Ice	1.810	1.301	0.090
RADIO 4449 B12/B71	C	From Leg	0.000		0.000	150.000	1" Ice	1.978	1.447	0.109
			4.000				No Ice	1.650	1.163	0.074
			0.000				1/2" Ice	1.810	1.301	0.090
KRY 112 144/1	A	From Leg	0.000		0.000	150.000	1" Ice	1.978	1.447	0.109
			4.000				No Ice	0.351	0.142	0.011
			0.000				1/2" Ice	0.427	0.195	0.014
KRY 112 144/1	B	From Leg	0.000		0.000	150.000	1" Ice	0.510	0.256	0.018
			4.000				No Ice	0.351	0.142	0.011
			0.000				1/2" Ice	0.427	0.195	0.014
KRY 112 144/1	C	From Leg	0.000		0.000	150.000	1" Ice	0.510	0.256	0.018
			4.000				No Ice	0.351	0.142	0.011
			0.000				1/2" Ice	0.427	0.195	0.014
6' x 1.5" Omni Antenna	B	From Leg	0.000		0.000	150.000	1" Ice	0.510	0.256	0.018
			4.000				No Ice	0.900	0.900	0.020
			0.000				1/2" Ice	1.521	1.521	0.027
2" STD Pipe (2.375 OD)x6'-0"	A	From Leg	-3.000		0.000	150.000	1" Ice	2.004	2.004	0.039
			4.000				No Ice	1.425	1.425	0.022
			0.000				1/2" Ice	1.925	1.925	0.033
2" STD Pipe (2.375 OD)x6'-0"	B	From Leg	0.000		0.000	150.000	1" Ice	2.294	2.294	0.048
			4.000				No Ice	1.425	1.425	0.022
			0.000				1/2" Ice	1.925	1.925	0.033
2" STD Pipe (2.375 OD)x6'-0"	C	From Leg	0.000		0.000	150.000	1" Ice	2.294	2.294	0.048
			4.000				No Ice	1.425	1.425	0.022
			0.000				1/2" Ice	1.925	1.925	0.033
DFPD1-52 w/ Mount Pipe	C	From Leg	0.000		0.000	150.000	1" Ice	2.294	2.294	0.048
			4.000				No Ice	1.626	0.929	0.022
			0.000				1/2" Ice	1.841	1.168	0.038
*** 6' Side Arm	C	From Leg	0.000		0.000	98.000	1" Ice	2.068	1.426	0.058
			3.000				No Ice	1.000	1.430	0.027
			0.000				1/2" Ice	1.250	2.050	0.038
PD220	C	From Leg	0.000		0.000	98.000	1" Ice	1.500	2.670	0.049
			6.000				No Ice	3.560	3.560	0.023
			0.000				1/2" Ice	7.130	7.130	0.046
*** 6' Side Arm	C	From Leg	10.000		0.000	70.000	1" Ice	10.700	10.700	0.069
			3.000				No Ice	1.000	1.430	0.027
			0.000				1/2" Ice	1.250	2.050	0.038
PD220	C	From Leg	0.000		0.000	70.000	1" Ice	1.500	2.670	0.049
			6.000				No Ice	3.560	3.560	0.023
			0.000				1/2" Ice	7.130	7.130	0.046
			10.000				1" Ice	10.700	10.700	0.069



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<b>Job</b>	7421.CT11024B - 150' Monpole	<b>Page</b>	12 of 29
<b>Project</b>	Branford/ I-95/ X53/ Jct.	<b>Date</b>	16:42:47 08/22/18
<b>Client</b>	T-Mobile	<b>Designed by</b>	Veronica Elson

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
***								
6' Side Arm	C	From Leg	3.000	0.000	50.000	No Ice	1.000	0.027
			0.000			1/2" Ice	1.250	0.038
			0.000			1" Ice	1.500	0.049
PD220	C	From Leg	6.000	0.000	50.000	No Ice	3.560	0.023
			0.000			1/2" Ice	7.130	0.046
			10.000			1" Ice	10.700	0.069

## Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service



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<b>Client</b>	T-Mobile	<b>Designed by</b>	Veronica Elson

Comb. No.	Description
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

### Maximum Member Forces


Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	150 - 145	Pole	Max Tension	26	0.000	-0.000	0.000
			Max. Compression	26	-8.380	0.134	-0.399
			Max. Mx	20	-2.917	28.231	-0.184
			Max. My	14	-2.922	0.112	-28.228
			Max. Vy	20	-6.816	28.231	-0.184
			Max. Vx	14	6.794	0.112	-28.228
			Max. Torque	20			0.264
L2	145 - 140	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-8.890	0.145	-0.413
			Max. Mx	20	-3.270	62.871	-0.292
			Max. My	14	-3.275	0.219	-62.759
			Max. Vy	20	-7.041	62.871	-0.292
			Max. Vx	14	7.019	0.219	-62.759
			Max. Torque	20			0.264
L3	140 - 135.667	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-9.332	0.154	-0.424
			Max. Mx	20	-3.596	93.768	-0.385
			Max. My	14	-3.600	0.311	-93.562
			Max. Vy	20	-7.224	93.768	-0.385
			Max. Vx	14	7.202	0.311	-93.562
			Max. Torque	20			0.264
L4	135.667 - 135.417	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-9.366	0.155	-0.425
			Max. Mx	20	-3.628	95.575	-0.390
			Max. My	14	-3.633	0.317	-95.363
			Max. Vy	20	-7.233	95.575	-0.390
			Max. Vx	14	7.211	0.317	-95.363
			Max. Torque	20			0.263
L5	135.417 - 130.417	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-10.054	0.165	-0.436
			Max. Mx	20	-4.174	132.317	-0.497
			Max. My	14	-4.178	0.424	-131.996
			Max. Vy	20	-7.465	132.317	-0.497
			Max. Vx	14	7.443	0.424	-131.996
			Max. Torque	20			0.263
L6	130.417 - 125.417	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-10.741	0.176	-0.448
			Max. Mx	20	-4.739	170.170	-0.603
			Max. My	14	-4.743	0.533	-169.739




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<b>Project</b>	Branford/ I-95/ X53/ Jct.	<b>Date</b>	16:42:47 08/22/18
<b>Client</b>	T-Mobile	<b>Designed by</b>	Veronica Elson


Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft			
L7	125.417 - 120.417	Pole	Max. Vy	20	-7.680	170.170	-0.603			
			Max. Vx	14	7.658	0.533	-169.739			
			Max. Torque	20			0.263			
			Max Tension	1	0.000	0.000	0.000			
			Max. Compression	26	-11.428	0.188	-0.459			
			Max. Mx	20	-5.323	209.044	-0.710			
			Max. My	14	-5.327	0.641	-208.503			
			Max. Vy	20	-7.875	209.044	-0.710			
			Max. Vx	14	7.853	0.641	-208.503			
			Max. Torque	20			0.262			
L8	120.417 - 120	Pole	Max Tension	1	0.000	0.000	0.000			
			Max. Compression	26	-11.485	0.189	-0.460			
			Max. Mx	20	-5.377	212.329	-0.718			
			Max. My	14	-5.381	0.650	-211.779			
			Max. Vy	20	-7.888	212.329	-0.718			
			Max. Vx	14	7.865	0.650	-211.779			
			Max. Torque	20			0.262			
			Max Tension	1	0.000	0.000	0.000			
			Max. Compression	26	-11.519	0.190	-0.461			
			Max. Mx	20	-5.405	214.302	-0.724			
L9	120 - 119.75	Pole	Max. My	14	-5.409	0.656	-213.746			
			Max. Vy	20	-7.900	214.302	-0.724			
			Max. Vx	14	7.878	0.656	-213.746			
			Max. Torque	20			0.261			
			Max Tension	1	0.000	0.000	0.000			
			Max. Compression	26	-12.207	0.201	-0.471			
			Max. Mx	20	-5.912	254.460	-0.830			
			Max. My	14	-5.916	0.765	-253.794			
			Max. Vy	20	-8.167	254.460	-0.830			
			Max. Vx	14	8.145	0.765	-253.794			
L10	119.75 - 114.75	Pole	Max. Torque	20			0.261			
			Max Tension	1	0.000	0.000	0.000			
			Max. Compression	26	-12.808	0.211	-0.481			
			Max. Mx	20	-6.371	290.646	-0.922			
			Max. My	14	-6.375	0.860	-289.884			
			Max. Vy	20	-8.385	290.646	-0.922			
			Max. Vx	14	8.362	0.860	-289.884			
			Max. Torque	20			0.261			
			Max Tension	1	0.000	0.000	0.000			
			Max. Compression	26	-12.851	0.212	-0.482			
L11	114.75 - 110.375	Pole	Max. Mx	20	-6.412	292.743	-0.928			
			Max. My	14	-6.416	0.866	-291.975			
			Max. Vy	20	-8.393	292.743	-0.928			
			Max. Vx	14	8.371	0.866	-291.975			
			Max. Torque	20			0.260			
			Max Tension	1	0.000	0.000	0.000			
			Max. Compression	26	-13.716	0.224	-0.492			
			Max. Mx	20	-7.100	335.372	-1.033			
			Max. My	14	-7.103	0.975	-334.494			
			Max. Vy	20	-8.662	335.372	-1.033			
L12	110.375 - 110.125	Pole	Max. Vx	14	8.640	0.975	-334.494			
			Max. Torque	20			0.260			
			Max Tension	1	0.000	0.000	0.000			
			Max. Compression	26	-14.580	0.237	-0.502			
			Max. Mx	20	-7.803	379.283	-1.139			
			L13	110.125 - 105.125	Pole	Max. Vy	20	-7.103	0.975	-334.494
						Max. Vx	14	8.640	0.975	-334.494
						Max. Torque	20			0.260
						Max Tension	1	0.000	0.000	0.000
						Max. Compression	26	-14.580	0.237	-0.502
L14	105.125 - 100.125	Pole				Max. Mx	20	-7.803	379.283	-1.139

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	<b>Project</b>	Branford/ I-95/ X53/ Jct.	<b>Date</b>	16:42:47 08/22/18
	<b>Client</b>	T-Mobile	<b>Designed by</b>	Veronica Elson

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L15	100.125 - 100	Pole	Max. My	14	-7.805	1.085	-378.295
			Max. Vy	20	-8.910	379.283	-1.139
			Max. Vx	14	8.888	1.085	-378.295
			Max. Torque	20			0.259
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-14.601	0.238	-0.503
			Max. Mx	20	-7.826	380.396	-1.141
			Max. My	14	-7.829	1.088	-379.405
			Max. Vy	20	-8.911	380.396	-1.141
			Max. Vx	14	8.889	1.088	-379.405
L16	100 - 99.75	Pole	Max. Torque	20			0.258
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-14.646	0.239	-0.504
			Max. Mx	20	-7.858	382.626	-1.147
			Max. My	14	-7.861	1.094	-381.629
			Max. Vy	20	-8.928	382.626	-1.147
			Max. Vx	14	8.906	1.094	-381.629
			Max. Torque	20			0.258
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-15.710	1.129	-1.020
L17	99.75 - 94.75	Pole	Max. Mx	20	-8.545	431.229	-1.317
			Max. My	14	-8.547	1.342	-430.043
			Max. Vy	20	-9.528	431.229	-1.317
			Max. Vx	14	9.518	1.342	-430.043
			Max. Torque	24			1.837
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-16.599	1.142	-1.030
			Max. Mx	20	-9.206	479.640	-1.370
			Max. My	14	-9.207	1.398	-478.403
			Max. Vy	20	-9.845	479.640	-1.370
L18	94.75 - 89.75	Pole	Max. Vx	14	9.834	1.398	-478.403
			Max. Torque	24			1.836
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-17.397	1.153	-1.039
			Max. Mx	20	-9.808	524.525	-1.416
			Max. My	14	-9.810	1.447	-523.242
			Max. Vy	20	-10.115	524.525	-1.416
			Max. Vx	14	10.105	1.447	-523.242
			Max. Torque	24			1.834
			Max Tension	1	0.000	0.000	0.000
L19	89.75 - 85.25	Pole	Max. Compression	26	-17.450	1.154	-1.040
			Max. Mx	20	-9.856	527.054	-1.418
			Max. My	14	-9.858	1.450	-525.769
			Max. Vy	20	-10.125	527.054	-1.418
			Max. Vx	14	10.115	1.450	-525.769
			Max. Torque	24			1.832
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-18.515	1.166	-1.048
			Max. Mx	20	-10.693	578.452	-1.469
			Max. My	14	-10.695	1.504	-577.117
L20	85.25 - 85	Pole	Max. Vy	20	-10.439	578.452	-1.469
			Max. Vx	14	10.429	1.504	-577.117
			Max. Torque	24			1.832
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-18.569	1.167	-1.050
			Max. Mx	20	-10.738	581.063	-1.471
			Max. My	14	-10.739	1.507	-579.725
			Max. Vy	20	-10.454	581.063	-1.471
			Max. Vx	14	10.444	1.507	-579.725
			Max. Torque	24			1.831
L21	85 - 80	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-18.569	1.167	-1.050
L22	80 - 79.75	Pole	Max. Mx	20	-10.738	581.063	-1.471
			Max. My	14	-10.739	1.507	-579.725
			Max. Vy	20	-10.454	581.063	-1.471
			Max. Vx	14	10.444	1.507	-579.725
			Max. Torque	24			1.831
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-18.569	1.167	-1.050
			Max. Mx	20	-10.738	581.063	-1.471
			Max. My	14	-10.739	1.507	-579.725
			Max. Vy	20	-10.454	581.063	-1.471
L23	79.75 - 74.75	Pole	Max. Vx	14	10.444	1.507	-579.725
			Max. Torque	24			1.831

 <p><b>Tectonic</b> PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.</p> <p><b>Tectonic</b> 1279 Route 300 Newburgh, NY 12550 Phone: (845) 567-6656 FAX: (845) 567-8703</p>	<b>Job</b>	7421.CT11024B - 150' Monpole	<b>Page</b>	16 of 29
	<b>Project</b>	Branford/ I-95/ X53/ Jct.	<b>Date</b>	16:42:47 08/22/18
	<b>Client</b>	T-Mobile	<b>Designed by</b>	Veronica Elson

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L24	74.75 - 69.75	Pole	Max. Compression	26	-19.657	1.178	-1.057
			Max. Mx	20	-11.528	634.299	-1.522
			Max. My	14	-11.529	1.561	-632.911
			Max. Vy	20	-10.845	634.299	-1.522
			Max. Vx	14	10.835	1.561	-632.911
			Max. Torque	24			1.830
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-20.914	2.087	-1.584
			Max. Mx	20	-12.377	691.661	-1.701
			Max. My	14	-12.377	1.841	-690.103
L25	69.75 - 64.75	Pole	Max. Vy	20	-11.464	691.661	-1.701
			Max. Vx	14	11.465	1.841	-690.103
			Max. Torque	24			3.497
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-21.998	2.098	-1.592
			Max. Mx	20	-13.187	749.842	-1.702
			Max. My	14	-13.188	1.845	-748.289
			Max. Vy	20	-11.818	749.842	-1.702
			Max. Vx	14	11.819	1.845	-748.289
			Max. Torque	24			3.497
L26	64.75 - 60	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-23.026	2.108	-1.599
			Max. Mx	20	-13.964	806.709	-1.701
			Max. My	14	-13.964	1.847	-805.162
			Max. Vy	20	-12.139	806.709	-1.701
			Max. Vx	14	12.140	1.847	-805.162
			Max. Torque	24			3.495
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-24.307	2.114	-1.603
			Max. Mx	20	-14.908	868.435	-1.700
L27	60 - 55	Pole	Max. My	14	-14.908	1.848	-866.894
			Max. Vy	20	-12.563	868.435	-1.700
			Max. Vx	14	12.564	1.848	-866.894
			Max. Torque	24			3.494
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-25.585	2.113	-1.603
			Max. Mx	20	-15.854	932.255	-1.699
			Max. My	14	-15.855	1.849	-930.721
			Max. Vy	20	-12.974	932.255	-1.699
			Max. Vx	14	12.975	1.849	-930.721
L28	55 - 50	Pole	Max. Torque	24			3.493
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-27.028	3.029	-2.131
			Max. Mx	20	-16.862	1001.305	-1.805
			Max. My	14	-16.862	2.069	-999.699
			Max. Vy	20	-13.596	1001.305	-1.805
			Max. Vx	14	13.608	2.069	-999.699
			Max. Torque	24			5.133
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-28.300	3.029	-2.131
L29	50 - 45	Pole	Max. Mx	20	-17.824	1070.181	-1.756
			Max. My	14	-17.824	2.021	-1068.635
			Max. Vy	20	-13.966	1070.181	-1.756
			Max. Vx	14	13.978	2.021	-1068.635
			Max. Torque	24			5.132
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-29.766	3.029	-2.131
			Max. Mx	20	-18.915	1141.093	-1.706
			Max. My	14	-18.915	1.973	-1139.605
			Max. Vy	20	-14.409	1141.093	-1.706
L30	45 - 40	Pole	Max. Vx	14	14.421	1.973	-1139.605
			Max. Torque	24			5.132
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-29.766	3.029	-2.131
			Max. Mx	20	-18.915	1141.093	-1.706
L31	40 - 35	Pole	Max. My	14	-18.915	1.973	-1139.605
			Max. Vy	20	-14.409	1141.093	-1.706
			Max. Vx	14	14.421	1.973	-1139.605
			Max. Torque	24			5.132
			Max Tension	1	0.000	0.000	0.000


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	<b>Client</b>	T-Mobile	<b>Designed by</b>	Veronica Elson

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L32	35 - 30	Pole	Max. Torque	24			5.131
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-31.227	3.029	-2.131
			Max. Mx	20	-20.010	1214.174	-1.657
			Max. My	14	-20.010	1.924	-1212.745
			Max. Vy	20	-14.832	1214.174	-1.657
			Max. Vx	14	14.844	1.924	-1212.745
			Max. Torque	24			5.131
L33	30 - 25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-32.681	3.029	-2.131
			Max. Mx	20	-21.110	1289.303	-1.606
			Max. My	14	-21.110	1.874	-1287.934
			Max. Vy	20	-15.230	1289.303	-1.606
			Max. Vx	14	15.242	1.874	-1287.934
			Max. Torque	24			5.130
			Max Tension	1	0.000	0.000	0.000
L34	25 - 20	Pole	Max. Compression	26	-34.127	3.029	-2.131
			Max. Mx	20	-22.216	1366.346	-1.554
			Max. My	14	-22.216	1.822	-1365.037
			Max. Vy	20	-15.599	1366.346	-1.554
			Max. Vx	14	15.611	1.822	-1365.037
			Max. Torque	24			5.130
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-35.759	3.029	-2.131
L35	20 - 15	Pole	Max. Mx	20	-23.455	1445.358	-1.502
			Max. My	14	-23.455	1.770	-1444.108
			Max. Vy	20	-16.017	1445.358	-1.502
			Max. Vx	14	16.029	1.770	-1444.108
			Max. Torque	24			5.130
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-37.376	3.029	-2.131
			Max. Mx	20	-24.696	1526.411	-1.449
L36	15 - 10	Pole	Max. My	14	-24.696	1.717	-1525.222
			Max. Vy	20	-16.414	1526.411	-1.449
			Max. Vx	14	16.426	1.717	-1525.222
			Max. Torque	24			5.129
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-38.973	3.029	-2.131
			Max. Mx	20	-25.942	1609.427	-1.396
			Max. My	14	-25.942	1.663	-1608.298
L37	10 - 5	Pole	Max. Vy	20	-16.803	1609.427	-1.396
			Max. Vx	14	16.815	1.663	-1608.298
			Max. Torque	24			5.129
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-40.528	3.029	-2.131
			Max. Mx	20	-27.192	1694.360	-1.342
			Max. My	14	-27.192	1.607	-1693.291
			Max. Vy	20	-17.182	1694.360	-1.342
L38	5 - 0	Pole	Max. Vx	14	17.194	1.607	-1693.291
			Max. Torque	24			5.129
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-40.528	3.029	-2.131
			Max. Mx	20	-27.192	1694.360	-1.342
			Max. My	14	-27.192	1.607	-1693.291
			Max. Vy	20	-17.182	1694.360	-1.342
			Max. Vx	14	17.194	1.607	-1693.291

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	40.528	0.000	-0.000




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	<b>Client</b>	T-Mobile	<b>Designed by</b>	Veronica Elson

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. H <sub>x</sub>	21	20.397	17.175	0.011
	Max. H <sub>z</sub>	2	27.197	0.011	17.187
	Max. M <sub>x</sub>	2	1691.980	0.011	17.187
	Max. M <sub>z</sub>	8	1692.506	-17.175	-0.011
	Max. Torsion	24	5.129	8.597	14.890
	Min. Vert	7	20.397	-14.869	8.584
	Min. H <sub>x</sub>	8	27.197	-17.175	-0.011
	Min. H <sub>z</sub>	14	27.197	-0.011	-17.187
	Min. M <sub>x</sub>	14	-1693.291	-0.011	-17.187
	Min. M <sub>z</sub>	20	-1694.360	17.175	0.011
	Min. Torsion	12	-5.129	-8.597	-14.890

### Tower Mast Reaction Summary

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	22.664	0.000	0.000	0.517	0.739	0.000
1.2 Dead+1.6 Wind 0 deg - No Ice	27.197	-0.011	-17.187	-1691.980	0.203	-4.330
0.9 Dead+1.6 Wind 0 deg - No Ice	20.397	-0.011	-17.187	-1673.512	-0.006	-4.330
1.2 Dead+1.6 Wind 30 deg - No Ice	27.197	8.578	-14.879	-1465.544	-846.407	-2.373
0.9 Dead+1.6 Wind 30 deg - No Ice	20.397	8.578	-14.879	-1449.562	-837.288	-2.374
1.2 Dead+1.6 Wind 60 deg - No Ice	27.197	14.869	-8.584	-846.263	-1465.973	0.220
0.9 Dead+1.6 Wind 60 deg - No Ice	20.397	14.869	-8.584	-837.092	-1450.034	0.216
1.2 Dead+1.6 Wind 90 deg - No Ice	27.197	17.175	0.011	-0.063	-1692.506	2.753
0.9 Dead+1.6 Wind 90 deg - No Ice	20.397	17.175	0.011	-0.204	-1674.078	2.749
1.2 Dead+1.6 Wind 120 deg - No Ice	27.197	14.879	8.603	846.344	-1465.302	4.550
0.9 Dead+1.6 Wind 120 deg - No Ice	20.397	14.879	8.603	836.881	-1449.384	4.546
1.2 Dead+1.6 Wind 150 deg - No Ice	27.197	8.597	14.890	1466.162	-845.215	5.129
0.9 Dead+1.6 Wind 150 deg - No Ice	20.397	8.597	14.890	1449.865	-836.136	5.126
1.2 Dead+1.6 Wind 180 deg - No Ice	27.197	0.011	17.187	1693.291	1.607	4.334
0.9 Dead+1.6 Wind 180 deg - No Ice	20.397	0.011	17.187	1674.480	1.347	4.333
1.2 Dead+1.6 Wind 210 deg - No Ice	27.197	-8.578	14.879	1466.866	848.242	2.376
0.9 Dead+1.6 Wind 210 deg - No Ice	20.397	-8.578	14.879	1450.538	838.647	2.377
1.2 Dead+1.6 Wind 240 deg - No Ice	27.197	-14.869	8.584	847.569	1467.829	-0.220
0.9 Dead+1.6 Wind 240 deg - No Ice	20.397	-14.869	8.584	838.057	1451.409	-0.216
1.2 Dead+1.6 Wind 270 deg - No Ice	27.197	-17.175	-0.011	1.341	1694.360	-2.756
0.9 Dead+1.6 Wind 270 deg - No Ice	20.397	-17.175	-0.011	1.149	1675.451	-2.752

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	<b>Client</b> T-Mobile	<b>Designed by</b> Veronica Elson

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
No Ice						
1.2 Dead+1.6 Wind 300 deg - No Ice	27.197	-14.879	-8.603	-845.076	1467.131	-4.553
0.9 Dead+1.6 Wind 300 deg - No Ice	20.397	-14.879	-8.603	-835.944	1450.739	-4.549
1.2 Dead+1.6 Wind 330 deg - No Ice	27.197	-8.597	-14.890	-1464.878	847.022	-5.129
0.9 Dead+1.6 Wind 330 deg - No Ice	20.397	-8.597	-14.890	-1448.916	837.476	-5.126
1.2 Dead+1.0 Ice+1.0 Temp	40.528	-0.000	0.000	2.131	3.029	-0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	40.528	-0.014	-5.324	-502.349	3.982	-2.605
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	40.528	2.641	-4.603	-434.303	-247.874	-1.445
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	40.528	4.589	-2.650	-249.307	-432.487	0.103
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	40.528	5.307	0.014	3.069	-500.392	1.623
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	40.528	4.603	2.674	255.207	-433.394	2.708
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	40.528	2.666	4.618	439.546	-249.443	3.067
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	40.528	0.014	5.324	506.692	2.176	2.605
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	40.528	-2.641	4.603	438.649	254.039	1.445
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	40.528	-4.589	2.650	253.649	438.659	-0.103
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	40.528	-5.307	-0.014	1.263	506.564	-1.623
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	40.528	-4.603	-2.674	-250.878	439.558	-2.708
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	40.528	-2.666	-4.618	-435.212	255.599	-3.067
Dead+Wind 0 deg - Service	22.664	-0.002	-3.392	-331.629	0.633	-0.860
Dead+Wind 30 deg - Service	22.664	1.693	-2.936	-287.194	-165.514	-0.471
Dead+Wind 60 deg - Service	22.664	2.934	-1.694	-165.661	-287.105	0.044
Dead+Wind 90 deg - Service	22.664	3.389	0.002	0.407	-331.561	0.547
Dead+Wind 120 deg - Service	22.664	2.936	1.698	166.512	-286.969	0.904
Dead+Wind 150 deg - Service	22.664	1.697	2.938	288.146	-165.278	1.018
Dead+Wind 180 deg - Service	22.664	0.002	3.392	332.717	0.905	0.860
Dead+Wind 210 deg - Service	22.664	-1.693	2.936	288.283	167.053	0.471
Dead+Wind 240 deg - Service	22.664	-2.934	1.694	166.749	288.645	-0.044
Dead+Wind 270 deg - Service	22.664	-3.389	-0.002	0.680	333.100	-0.547
Dead+Wind 300 deg - Service	22.664	-2.936	-1.698	-165.425	288.508	-0.904
Dead+Wind 330 deg - Service	22.664	-1.697	-2.938	-287.059	166.816	-1.018

## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.000	-22.664	0.000	0.000	22.664	0.000	0.000%
2	-0.011	-27.197	-17.187	0.011	27.197	17.187	0.000%
3	-0.011	-20.397	-17.187	0.011	20.397	17.187	0.000%
4	8.578	-27.197	-14.879	-8.578	27.197	14.879	0.000%
5	8.578	-20.397	-14.879	-8.578	20.397	14.879	0.000%
6	14.869	-27.197	-8.584	-14.869	27.197	8.584	0.000%



**Tectonic**  
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<b>Client</b>	T-Mobile	<b>Designed by</b>	Veronica Elson

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
7	14.869	-20.397	-8.584	-14.869	20.397	8.584	0.000%
8	17.175	-27.197	0.011	-17.175	27.197	-0.011	0.000%
9	17.175	-20.397	0.011	-17.175	20.397	-0.011	0.000%
10	14.879	-27.197	8.603	-14.879	27.197	-8.603	0.000%
11	14.879	-20.397	8.603	-14.879	20.397	-8.603	0.000%
12	8.597	-27.197	14.890	-8.597	27.197	-14.890	0.000%
13	8.597	-20.397	14.890	-8.597	20.397	-14.890	0.000%
14	0.011	-27.197	17.187	-0.011	27.197	-17.187	0.000%
15	0.011	-20.397	17.187	-0.011	20.397	-17.187	0.000%
16	-8.578	-27.197	14.879	8.578	27.197	-14.879	0.000%
17	-8.578	-20.397	14.879	8.578	20.397	-14.879	0.000%
18	-14.869	-27.197	8.584	14.869	27.197	-8.584	0.000%
19	-14.869	-20.397	8.584	14.869	20.397	-8.584	0.000%
20	-17.175	-27.197	-0.011	17.175	27.197	0.011	0.000%
21	-17.175	-20.397	-0.011	17.175	20.397	0.011	0.000%
22	-14.879	-27.197	-8.603	14.879	27.197	8.603	0.000%
23	-14.879	-20.397	-8.603	14.879	20.397	8.603	0.000%
24	-8.597	-27.197	-14.890	8.597	27.197	14.890	0.000%
25	-8.597	-20.397	-14.890	8.597	20.397	14.890	0.000%
26	0.000	-40.528	0.000	0.000	40.528	-0.000	0.000%
27	-0.014	-40.528	-5.324	0.014	40.528	5.324	0.000%
28	2.641	-40.528	-4.603	-2.641	40.528	4.603	0.000%
29	4.589	-40.528	-2.650	-4.589	40.528	2.650	0.000%
30	5.307	-40.528	0.014	-5.307	40.528	-0.014	0.000%
31	4.603	-40.528	2.674	-4.603	40.528	-2.674	0.000%
32	2.666	-40.528	4.618	-2.666	40.528	-4.618	0.000%
33	0.014	-40.528	5.324	-0.014	40.528	-5.324	0.000%
34	-2.641	-40.528	4.603	2.641	40.528	-4.603	0.000%
35	-4.589	-40.528	2.650	4.589	40.528	-2.650	0.000%
36	-5.307	-40.528	-0.014	5.307	40.528	0.014	0.000%
37	-4.603	-40.528	-2.674	4.603	40.528	2.674	0.000%
38	-2.666	-40.528	-4.618	2.666	40.528	4.618	0.000%
39	-0.002	-22.664	-3.392	0.002	22.664	3.392	0.000%
40	1.693	-22.664	-2.936	-1.693	22.664	2.936	0.000%
41	2.934	-22.664	-1.694	-2.934	22.664	1.694	0.000%
42	3.389	-22.664	0.002	-3.389	22.664	-0.002	0.000%
43	2.936	-22.664	1.698	-2.936	22.664	-1.698	0.000%
44	1.697	-22.664	2.938	-1.697	22.664	-2.938	0.000%
45	0.002	-22.664	3.392	-0.002	22.664	-3.392	0.000%
46	-1.693	-22.664	2.936	1.693	22.664	-2.936	0.000%
47	-2.934	-22.664	1.694	2.934	22.664	-1.694	0.000%
48	-3.389	-22.664	-0.002	3.389	22.664	0.002	0.000%
49	-2.936	-22.664	-1.698	2.936	22.664	1.698	0.000%
50	-1.697	-22.664	-2.938	1.697	22.664	2.938	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	6	0.00000001	0.00027686
3	Yes	6	0.00000001	0.00009085
4	Yes	7	0.00000001	0.00011169
5	Yes	6	0.00000001	0.00060101
6	Yes	7	0.00000001	0.00011532
7	Yes	6	0.00000001	0.00062168



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<b>Client</b>	T-Mobile	<b>Designed by</b>	Veronica Elson

8	Yes	6	0.0000001	0.00019138
9	Yes	6	0.0000001	0.00006252
10	Yes	7	0.0000001	0.00012850
11	Yes	6	0.0000001	0.00069674
12	Yes	7	0.0000001	0.00010572
13	Yes	6	0.0000001	0.00056764
14	Yes	6	0.0000001	0.00029030
15	Yes	6	0.0000001	0.00009505
16	Yes	7	0.0000001	0.00012198
17	Yes	6	0.0000001	0.00065903
18	Yes	7	0.0000001	0.00011807
19	Yes	6	0.0000001	0.00063648
20	Yes	6	0.0000001	0.00020523
21	Yes	6	0.0000001	0.00006686
22	Yes	7	0.0000001	0.00010650
23	Yes	6	0.0000001	0.00057201
24	Yes	7	0.0000001	0.00012960
25	Yes	6	0.0000001	0.00070307
26	Yes	4	0.0000001	0.00072417
27	Yes	7	0.0000001	0.00017085
28	Yes	7	0.0000001	0.00022399
29	Yes	7	0.0000001	0.00022672
30	Yes	7	0.0000001	0.00016016
31	Yes	7	0.0000001	0.00026227
32	Yes	7	0.0000001	0.00023301
33	Yes	7	0.0000001	0.00017307
34	Yes	7	0.0000001	0.00024798
35	Yes	7	0.0000001	0.00023791
36	Yes	7	0.0000001	0.00016232
37	Yes	7	0.0000001	0.00023132
38	Yes	7	0.0000001	0.00026736
39	Yes	5	0.0000001	0.00021675
40	Yes	5	0.0000001	0.00035047
41	Yes	5	0.0000001	0.00037395
42	Yes	5	0.0000001	0.00015315
43	Yes	5	0.0000001	0.00053555
44	Yes	5	0.0000001	0.00035356
45	Yes	5	0.0000001	0.00021975
46	Yes	5	0.0000001	0.00045220
47	Yes	5	0.0000001	0.00040471
48	Yes	5	0.0000001	0.00015589
49	Yes	5	0.0000001	0.00034747
50	Yes	5	0.0000001	0.0005248

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 145	20.574	47	1.568	0.006
L2	145 - 140	18.935	47	1.557	0.005
L3	140 - 135.667	17.326	47	1.511	0.005
L4	135.667 - 135.417	15.984	47	1.443	0.005
L5	135.417 - 130.417	15.909	47	1.440	0.005
L6	130.417 - 125.417	14.433	47	1.376	0.005
L7	125.417 - 120.417	13.035	47	1.291	0.005
L8	120.417 - 120	11.738	47	1.184	0.005
L9	120 - 119.75	11.635	47	1.174	0.005
L10	119.75 - 114.75	11.574	47	1.170	0.005
L11	114.75 - 110.375	10.390	47	1.089	0.004



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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L12	110.375 - 110.125	9.429	47	1.006	0.004
L13	110.125 - 105.125	9.376	47	1.003	0.004
L14	105.125 - 100.125	8.363	47	0.931	0.004
L15	100.125 - 100	7.430	47	0.849	0.004
L16	100 - 99.75	7.408	47	0.847	0.004
L17	99.75 - 94.75	7.363	47	0.844	0.004
L18	94.75 - 89.75	6.509	47	0.786	0.004
L19	89.75 - 85.25	5.720	47	0.720	0.004
L20	85.25 - 85	5.071	47	0.655	0.003
L21	85 - 80	5.037	47	0.653	0.003
L22	80 - 79.75	4.384	47	0.594	0.003
L23	79.75 - 74.75	4.353	47	0.592	0.003
L24	74.75 - 69.75	3.756	47	0.548	0.003
L25	69.75 - 64.75	3.207	47	0.499	0.003
L26	64.75 - 60	2.712	47	0.447	0.002
L27	60 - 55	2.294	47	0.393	0.002
L28	55 - 50	1.901	47	0.358	0.002
L29	50 - 45	1.546	47	0.320	0.002
L30	45 - 40	1.232	47	0.279	0.001
L31	40 - 35	0.963	47	0.236	0.001
L32	35 - 30	0.731	47	0.206	0.001
L33	30 - 25	0.531	47	0.175	0.001
L34	25 - 20	0.364	47	0.142	0.001
L35	20 - 15	0.233	47	0.107	0.000
L36	15 - 10	0.133	47	0.083	0.000
L37	10 - 5	0.060	47	0.057	0.000
L38	5 - 0	0.015	47	0.029	0.000

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.000	10' Low Profile Platform	47	20.574	1.568	0.006	9977
98.000	6' Side Arm	47	7.057	0.826	0.004	4538
70.000	6' Side Arm	47	3.234	0.502	0.003	5712
50.000	6' Side Arm	47	1.546	0.320	0.002	7306

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 145	104.491	20	7.985	0.028
L2	145 - 140	96.184	20	7.927	0.027
L3	140 - 135.667	88.032	18	7.695	0.025
L4	135.667 - 135.417	81.230	18	7.349	0.024
L5	135.417 - 130.417	80.848	18	7.335	0.024
L6	130.417 - 125.417	73.363	18	7.008	0.024
L7	125.417 - 120.417	66.270	18	6.575	0.023
L8	120.417 - 120	59.684	18	6.031	0.023
L9	120 - 119.75	59.161	18	5.981	0.023

 <p><b>Tectonic</b> PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.</p> <p><b>Tectonic</b> 1279 Route 300 Newburgh, NY 12550 Phone: (845) 567-6656 FAX: (845) 567-8703</p>	<b>Job</b>	7421.CT11024B - 150' Monpole	<b>Page</b>	23 of 29
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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L10	119.75 - 114.75	58.849	18	5.962	0.023
L11	114.75 - 110.375	52.834	18	5.548	0.022
L12	110.375 - 110.125	47.952	18	5.127	0.022
L13	110.125 - 105.125	47.685	18	5.110	0.022
L14	105.125 - 100.125	42.533	18	4.743	0.022
L15	100.125 - 100	37.789	18	4.325	0.022
L16	100 - 99.75	37.676	18	4.314	0.022
L17	99.75 - 94.75	37.451	18	4.300	0.022
L18	94.75 - 89.75	33.107	18	4.002	0.020
L19	89.75 - 85.25	29.094	18	3.668	0.019
L20	85.25 - 85	25.794	18	3.336	0.017
L21	85 - 80	25.620	18	3.322	0.017
L22	80 - 79.75	22.298	18	3.024	0.016
L23	79.75 - 74.75	22.140	18	3.013	0.016
L24	74.75 - 69.75	19.104	18	2.787	0.015
L25	69.75 - 64.75	16.314	18	2.541	0.014
L26	64.75 - 60	13.793	18	2.273	0.012
L27	60 - 55	11.667	18	1.998	0.011
L28	55 - 50	9.668	18	1.819	0.010
L29	50 - 45	7.863	18	1.627	0.009
L30	45 - 40	6.267	18	1.420	0.007
L31	40 - 35	4.895	18	1.198	0.006
L32	35 - 30	3.718	18	1.050	0.005
L33	30 - 25	2.700	18	0.892	0.004
L34	25 - 20	1.852	18	0.725	0.003
L35	20 - 15	1.186	18	0.547	0.002
L36	15 - 10	0.679	18	0.421	0.002
L37	10 - 5	0.307	18	0.288	0.001
L38	5 - 0	0.078	18	0.148	0.001


### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.000	10' Low Profile Platform	20	104.491	7.985	0.028	2061
98.000	6' Side Arm	18	35.895	4.208	0.021	901
70.000	6' Side Arm	18	16.447	2.554	0.014	1126
50.000	6' Side Arm	18	7.863	1.627	0.009	1438

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio P <sub>u</sub> / φP <sub>n</sub>
L1	150 - 145 (1)	P12.75x0.375	5.000	0.000	0.0	14.579	-2.914	551.084	0.005
L2	145 - 140 (2)	P12.75x0.375	5.000	0.000	0.0	14.579	-3.268	551.084	0.006
L3	140 - 135.667	P12.75x0.375	4.333	0.000	0.0	14.579	-3.593	551.084	0.007

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Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
	(3)								
L4	135.667 - 135.417 (4)	P12.75x0.725	0.250	0.000	0.0	27.389	-3.626	1035.300	0.004
L5	135.417 - 130.417 (5)	P12.75x0.725	5.000	0.000	0.0	27.389	-4.171	1035.300	0.004
L6	130.417 - 125.417 (6)	P12.75x0.725	5.000	0.000	0.0	27.389	-4.737	1035.300	0.005
L7	125.417 - 120.417 (7)	P12.75x0.725	5.000	0.000	0.0	27.389	-5.321	1035.300	0.005
L8	120.417 - 120 (8)	P12.75x0.725	0.417	0.000	0.0	27.389	-5.375	1035.300	0.005
L9	120 - 119.75 (9)	P18x0.375	0.250	0.000	0.0	20.764	-5.403	784.878	0.007
L10	119.75 - 114.75 (10)	P18x0.375	5.000	0.000	0.0	20.764	-5.910	784.878	0.008
L11	114.75 - 110.375 (11)	P18x0.375	4.375	0.000	0.0	20.764	-6.369	784.878	0.008
L12	110.375 - 110.125 (12)	P18x0.5875	0.250	0.000	0.0	32.138	-6.411	1214.820	0.005
L13	110.125 - 105.125 (13)	P18x0.5875	5.000	0.000	0.0	32.138	-7.098	1214.820	0.006
L14	105.125 - 100.125 (14)	P18x0.5875	5.000	0.000	0.0	32.138	-7.801	1214.820	0.006
L15	100.125 - 100 (15)	P18x0.5875	0.125	0.000	0.0	32.138	-7.825	1214.820	0.006
L16	100 - 99.75 (16)	P24x0.375	0.250	0.000	0.0	27.833	-7.857	1052.070	0.007
L17	99.75 - 94.75 (17)	P24x0.375	5.000	0.000	0.0	27.833	-8.544	1052.070	0.008
L18	94.75 - 89.75 (18)	P24x0.375	5.000	0.000	0.0	27.833	-9.205	1052.070	0.009
L19	89.75 - 85.25 (19)	P24x0.375	4.500	0.000	0.0	27.833	-9.807	1052.070	0.009
L20	85.25 - 85 (20)	P24x0.51875	0.250	0.000	0.0	38.267	-9.856	1446.510	0.007
L21	85 - 80 (21)	P24x0.51875	5.000	0.000	0.0	38.267	-10.693	1446.510	0.007
L22	80 - 79.75 (22)	P30x0.375	0.250	0.000	0.0	34.901	-10.737	1311.060	0.008
L23	79.75 - 74.75 (23)	P30x0.375	5.000	0.000	0.0	34.901	-11.527	1311.060	0.009
L24	74.75 - 69.75 (24)	P30x0.375	5.000	0.000	0.0	34.901	-12.377	1311.060	0.009
L25	69.75 - 64.75 (25)	P30x0.375	5.000	0.000	0.0	34.901	-13.187	1311.060	0.010
L26	64.75 - 60 (26)	P30x0.375	4.750	0.000	0.0	34.901	-13.963	1311.060	0.011
L27	60 - 55 (27)	P36x0.375	5.000	0.000	0.0	41.970	-14.908	1490.100	0.010
L28	55 - 50 (28)	P36x0.375	5.000	0.000	0.0	41.970	-15.854	1490.100	0.011
L29	50 - 45 (29)	P36x0.375	5.000	0.000	0.0	41.970	-16.862	1490.100	0.011
L30	45 - 40 (30)	P36x0.375	5.000	0.000	0.0	41.970	-17.824	1490.100	0.012
L31	40 - 35 (31)	P42x0.375	5.000	0.000	0.0	49.038	-18.915	1668.870	0.011
L32	35 - 30 (32)	P42x0.375	5.000	0.000	0.0	49.038	-20.010	1668.870	0.012
L33	30 - 25 (33)	P42x0.375	5.000	0.000	0.0	49.038	-21.110	1668.870	0.013
L34	25 - 20 (34)	P42x0.375	5.000	0.000	0.0	49.038	-22.215	1668.870	0.013
L35	20 - 15 (35)	P48x0.375	5.000	0.000	0.0	56.107	-23.455	1847.490	0.013
L36	15 - 10 (36)	P48x0.375	5.000	0.000	0.0	56.107	-24.696	1847.490	0.013
L37	10 - 5 (37)	P48x0.375	5.000	0.000	0.0	56.107	-25.942	1847.490	0.014
L38	5 - 0 (38)	P48x0.375	5.000	0.000	0.0	56.107	-27.192	1847.490	0.015

**Pole Bending Design Data**



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Section No.	Elevation ft	Size	$M_{ux}$	$\phi M_{rx}$	Ratio	$M_{uy}$	$\phi M_{ry}$	Ratio
			kip-ft	kip-ft	$\frac{M_{ux}}{\phi M_{rx}}$	kip-ft	kip-ft	$\frac{M_{uy}}{\phi M_{ry}}$
L1	150 - 145 (1)	P12.75x0.375	28.342	180.952	0.157	0.000	180.952	0.000
L2	145 - 140 (2)	P12.75x0.375	63.037	180.952	0.348	0.000	180.952	0.000
L3	140 - 135.667 (3)	P12.75x0.375	93.982	180.952	0.519	0.000	180.952	0.000
L4	135.667 - 135.417 (4)	P12.75x0.725	95.791	330.632	0.290	0.000	330.632	0.000
L5	135.417 - 130.417 (5)	P12.75x0.725	132.588	330.632	0.401	0.000	330.632	0.000
L6	130.417 - 125.417 (6)	P12.75x0.725	170.498	330.632	0.516	0.000	330.632	0.000
L7	125.417 - 120.417 (7)	P12.75x0.725	209.427	330.632	0.633	0.000	330.632	0.000
L8	120.417 - 120 (8)	P12.75x0.725	212.717	330.632	0.643	0.000	330.632	0.000
L9	120 - 119.75 (9)	P18x0.375	214.693	367.000	0.585	0.000	367.000	0.000
L10	119.75 - 114.75 (10)	P18x0.375	254.906	367.000	0.695	0.000	367.000	0.000
L11	114.75 - 110.375 (11)	P18x0.375	291.142	367.000	0.793	0.000	367.000	0.000
L12	110.375 - 110.125 (12)	P18x0.5875	293.240	561.313	0.522	0.000	561.313	0.000
L13	110.125 - 105.125 (13)	P18x0.5875	335.925	561.313	0.598	0.000	561.313	0.000
L14	105.125 - 100.125 (14)	P18x0.5875	379.892	561.313	0.677	0.000	561.313	0.000
L15	100.125 - 100 (15)	P18x0.5875	381.007	561.313	0.679	0.000	561.313	0.000
L16	100 - 99.75 (16)	P24x0.375	383.239	623.717	0.614	0.000	623.717	0.000
L17	99.75 - 94.75 (17)	P24x0.375	431.921	623.717	0.692	0.000	623.717	0.000
L18	94.75 - 89.75 (18)	P24x0.375	480.358	623.717	0.770	0.000	623.717	0.000
L19	89.75 - 85.25 (19)	P24x0.375	525.266	623.717	0.842	0.000	623.717	0.000
L20	85.25 - 85 (20)	P24x0.51875	527.796	901.117	0.586	0.000	901.117	0.000
L21	85 - 80 (21)	P24x0.51875	579.220	901.117	0.643	0.000	901.117	0.000
L22	80 - 79.75 (22)	P30x0.375	581.832	947.858	0.614	0.000	947.858	0.000
L23	79.75 - 74.75 (23)	P30x0.375	635.093	947.858	0.670	0.000	947.858	0.000
L24	74.75 - 69.75 (24)	P30x0.375	692.524	947.858	0.731	0.000	947.858	0.000
L25	69.75 - 64.75 (25)	P30x0.375	750.702	947.858	0.792	0.000	947.858	0.000
L26	64.75 - 60 (26)	P30x0.375	807.568	947.858	0.852	0.000	947.858	0.000
L27	60 - 55 (27)	P36x0.375	869.292	1338.808	0.649	0.000	1338.808	0.000
L28	55 - 50 (28)	P36x0.375	933.108	1338.808	0.697	0.000	1338.808	0.000
L29	50 - 45 (29)	P36x0.375	1002.175	1338.808	0.749	0.000	1338.808	0.000
L30	45 - 40 (30)	P36x0.375	1071.025	1338.808	0.800	0.000	1338.808	0.000
L31	40 - 35 (31)	P42x0.375	1141.908	1796.558	0.636	0.000	1796.558	0.000
L32	35 - 30 (32)	P42x0.375	1214.958	1796.558	0.676	0.000	1796.558	0.000
L33	30 - 25 (33)	P42x0.375	1290.058	1796.558	0.718	0.000	1796.558	0.000
L34	25 - 20 (34)	P42x0.375	1367.067	1796.558	0.761	0.000	1796.558	0.000
L35	20 - 15 (35)	P48x0.375	1446.050	2321.108	0.623	0.000	2321.108	0.000
L36	15 - 10 (36)	P48x0.375	1527.075	2321.108	0.658	0.000	2321.108	0.000
L37	10 - 5 (37)	P48x0.375	1610.058	2321.108	0.694	0.000	2321.108	0.000
L38	5 - 0 (38)	P48x0.375	1694.958	2321.108	0.730	0.000	2321.108	0.000





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<b>Job</b>	7421.CT11024B - 150' Monpole	<b>Page</b>	26 of 29
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<b>Client</b>	T-Mobile	<b>Designed by</b>	Veronica Elson

### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual $V_u$ K	$\phi V_n$ K	Ratio $\frac{V_u}{\phi V_n}$	Actual $T_u$ kip-ft	$\phi T_n$ kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	150 - 145 (1)	P12.75x0.375	6.827	275.542	0.025	0.223	276.048	0.001
L2	145 - 140 (2)	P12.75x0.375	7.052	275.542	0.026	0.223	276.048	0.001
L3	140 - 135.667 (3)	P12.75x0.375	7.235	275.542	0.026	0.223	276.048	0.001
L4	135.667 - 135.417 (4)	P12.75x0.725	7.244	517.648	0.014	0.223	491.009	0.000
L5	135.417 - 130.417 (5)	P12.75x0.725	7.476	517.648	0.014	0.222	491.009	0.000
L6	130.417 - 125.417 (6)	P12.75x0.725	7.691	517.648	0.015	0.222	491.009	0.000
L7	125.417 - 120.417 (7)	P12.75x0.725	7.887	517.648	0.015	0.222	491.009	0.000
L8	120.417 - 120 (8)	P12.75x0.725	7.899	517.648	0.015	0.222	491.009	0.000
L9	120 - 119.75 (9)	P18x0.375	7.911	392.439	0.020	0.222	564.642	0.000
L10	119.75 - 114.75 (10)	P18x0.375	8.178	392.439	0.021	0.221	564.642	0.000
L11	114.75 - 110.375 (11)	P18x0.375	8.396	392.439	0.021	0.221	564.642	0.000
L12	110.375 - 110.125 (12)	P18x0.5875	8.404	607.408	0.014	0.221	853.575	0.000
L13	110.125 - 105.125 (13)	P18x0.5875	8.673	607.408	0.014	0.221	853.575	0.000
L14	105.125 - 100.125 (14)	P18x0.5875	8.922	607.408	0.015	0.221	853.575	0.000
L15	100.125 - 100 (15)	P18x0.5875	8.923	607.408	0.015	0.221	853.575	0.000
L16	100 - 99.75 (16)	P24x0.375	8.940	526.035	0.017	0.221	1019.708	0.000
L17	99.75 - 94.75 (17)	P24x0.375	9.533	526.035	0.018	0.221	1019.708	0.000
L18	94.75 - 89.75 (18)	P24x0.375	9.850	526.035	0.019	0.221	1019.708	0.000
L19	89.75 - 85.25 (19)	P24x0.375	10.121	526.035	0.019	0.220	1019.708	0.000
L20	85.25 - 85 (20)	P24x0.51875	10.131	723.254	0.014	0.220	1385.325	0.000
L21	85 - 80 (21)	P24x0.51875	10.444	723.254	0.014	0.220	1385.325	0.000
L22	80 - 79.75 (22)	P30x0.375	10.459	655.528	0.016	0.220	1598.367	0.000
L23	79.75 - 74.75 (23)	P30x0.375	10.850	655.528	0.017	0.220	1598.367	0.000
L24	74.75 - 69.75 (24)	P30x0.375	11.463	655.528	0.017	0.220	1598.367	0.000
L25	69.75 - 64.75 (25)	P30x0.375	11.818	655.528	0.018	0.220	1598.367	0.000
L26	64.75 - 60 (26)	P30x0.375	12.138	655.528	0.019	0.220	1598.367	0.000
L27	60 - 55 (27)	P36x0.375	12.562	745.048	0.017	0.220	2189.067	0.000
L28	55 - 50 (28)	P36x0.375	12.973	745.048	0.017	0.220	2189.067	0.000
L29	50 - 45 (29)	P36x0.375	13.590	745.048	0.018	0.220	2189.067	0.000
L30	45 - 40 (30)	P36x0.375	13.960	745.048	0.019	0.220	2189.067	0.000
L31	40 - 35 (31)	P42x0.375	14.403	834.437	0.017	0.220	2868.842	0.000
L32	35 - 30 (32)	P42x0.375	14.826	834.437	0.018	0.220	2868.842	0.000
L33	30 - 25 (33)	P42x0.375	15.224	834.437	0.018	0.220	2868.842	0.000
L34	25 - 20 (34)	P42x0.375	15.593	834.437	0.019	0.220	2868.842	0.000
L35	20 - 15 (35)	P48x0.375	16.011	923.745	0.017	0.220	3637.700	0.000




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<b>Client</b>	T-Mobile	<b>Designed by</b>	Veronica Elson

Section No.	Elevation ft	Size	Actual $V_u$ K	$\phi V_n$ K	Ratio $\frac{V_u}{\phi V_n}$	Actual $T_u$ kip-ft	$\phi T_n$ kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L36	15 - 10 (36)	P48x0.375	16.408	923.745	0.018	0.220	3637.700	0.000
L37	10 - 5 (37)	P48x0.375	16.797	923.745	0.018	0.220	3637.700	0.000
L38	5 - 0 (38)	P48x0.375	17.176	923.745	0.019	0.220	3637.700	0.000

### Pole Interaction Design Data


Section No.	Elevation ft	Ratio $P_u$ $\phi P_n$	Ratio $M_{ux}$ $\phi M_{nx}$	Ratio $M_{uy}$ $\phi M_{ny}$	Ratio $V_u$ $\phi V_n$	Ratio $T_u$ $\phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	150 - 145 (1)	0.005	0.157	0.000	0.025	0.001	0.163	1.000	4.8.2 ✓
L2	145 - 140 (2)	0.006	0.348	0.000	0.026	0.001	0.355	1.000	4.8.2 ✓
L3	140 - 135.667 (3)	0.007	0.519	0.000	0.026	0.001	0.527	1.000	4.8.2 ✓
L4	135.667 - 135.417 (4)	0.004	0.290	0.000	0.014	0.000	0.293	1.000	4.8.2 ✓
L5	135.417 - 130.417 (5)	0.004	0.401	0.000	0.014	0.000	0.405	1.000	4.8.2 ✓
L6	130.417 - 125.417 (6)	0.005	0.516	0.000	0.015	0.000	0.520	1.000	4.8.2 ✓
L7	125.417 - 120.417 (7)	0.005	0.633	0.000	0.015	0.000	0.639	1.000	4.8.2 ✓
L8	120.417 - 120 (8)	0.005	0.643	0.000	0.015	0.000	0.649	1.000	4.8.2 ✓
L9	120 - 119.75 (9)	0.007	0.585	0.000	0.020	0.000	0.592	1.000	4.8.2 ✓
L10	119.75 - 114.75 (10)	0.008	0.695	0.000	0.021	0.000	0.703	1.000	4.8.2 ✓
L11	114.75 - 110.375 (11)	0.008	0.793	0.000	0.021	0.000	0.802	1.000	4.8.2 ✓
L12	110.375 - 110.125 (12)	0.005	0.522	0.000	0.014	0.000	0.528	1.000	4.8.2 ✓
L13	110.125 - 105.125 (13)	0.006	0.598	0.000	0.014	0.000	0.605	1.000	4.8.2 ✓
L14	105.125 - 100.125 (14)	0.006	0.677	0.000	0.015	0.000	0.683	1.000	4.8.2 ✓
L15	100.125 - 100 (15)	0.006	0.679	0.000	0.015	0.000	0.685	1.000	4.8.2 ✓
L16	100 - 99.75 (16)	0.007	0.614	0.000	0.017	0.000	0.622	1.000	4.8.2 ✓
L17	99.75 - 94.75 (17)	0.008	0.692	0.000	0.018	0.000	0.701	1.000	4.8.2 ✓
L18	94.75 - 89.75 (18)	0.009	0.770	0.000	0.019	0.000	0.779	1.000	4.8.2 ✓
L19	89.75 - 85.25 (19)	0.009	0.842	0.000	0.019	0.000	0.852	1.000	4.8.2 ✓
L20	85.25 - 85 (20)	0.007	0.586	0.000	0.014	0.000	0.593	1.000	4.8.2 ✓

 <p><b>Tectonic</b>  <small>PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.</small></p> <p><b>Tectonic</b>  1279 Route 300  Newburgh, NY 12550  Phone: (845) 567-6656  FAX: (845) 567-8703</p>	<b>Job</b> 7421.CT11024B - 150' Monpole	<b>Page</b> 28 of 29
	<b>Project</b> Branford/ I-95/ X53/ Jct.	<b>Date</b> 16:42:47 08/22/18
	<b>Client</b> T-Mobile	<b>Designed by</b> Veronica Elson

Section No.	Elevation ft	Ratio $P_u$ $\phi P_n$	Ratio $M_{ux}$ $\phi M_{nx}$	Ratio $M_{uy}$ $\phi M_{ny}$	Ratio $V_u$ $\phi V_n$	Ratio $T_u$ $\phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L21	85 - 80 (21)	0.007	0.643	0.000	0.014	0.000	0.650	1.000	4.8.2 ✓
L22	80 - 79.75 (22)	0.008	0.614	0.000	0.016	0.000	0.622	1.000	4.8.2 ✓
L23	79.75 - 74.75 (23)	0.009	0.670	0.000	0.017	0.000	0.679	1.000	4.8.2 ✓
L24	74.75 - 69.75 (24)	0.009	0.731	0.000	0.017	0.000	0.740	1.000	4.8.2 ✓
L25	69.75 - 64.75 (25)	0.010	0.792	0.000	0.018	0.000	0.802	1.000	4.8.2 ✓
L26	64.75 - 60 (26)	0.011	0.852	0.000	0.019	0.000	0.863	1.000	4.8.2 ✓
L27	60 - 55 (27)	0.010	0.649	0.000	0.017	0.000	0.660	1.000	4.8.2 ✓
L28	55 - 50 (28)	0.011	0.697	0.000	0.017	0.000	0.708	1.000	4.8.2 ✓
L29	50 - 45 (29)	0.011	0.749	0.000	0.018	0.000	0.760	1.000	4.8.2 ✓
L30	45 - 40 (30)	0.012	0.800	0.000	0.019	0.000	0.812	1.000	4.8.2 ✓
L31	40 - 35 (31)	0.011	0.636	0.000	0.017	0.000	0.647	1.000	4.8.2 ✓
L32	35 - 30 (32)	0.012	0.676	0.000	0.018	0.000	0.689	1.000	4.8.2 ✓
L33	30 - 25 (33)	0.013	0.718	0.000	0.018	0.000	0.731	1.000	4.8.2 ✓
L34	25 - 20 (34)	0.013	0.761	0.000	0.019	0.000	0.775	1.000	4.8.2 ✓
L35	20 - 15 (35)	0.013	0.623	0.000	0.017	0.000	0.636	1.000	4.8.2 ✓
L36	15 - 10 (36)	0.013	0.658	0.000	0.018	0.000	0.672	1.000	4.8.2 ✓
L37	10 - 5 (37)	0.014	0.694	0.000	0.018	0.000	0.708	1.000	4.8.2 ✓
L38	5 - 0 (38)	0.015	0.730	0.000	0.019	0.000	0.745	1.000	4.8.2 ✓

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail
L1	150 - 145	Pole	P12.75x0.375	1	-2.914	551.084	16.3	Pass
L2	145 - 140	Pole	P12.75x0.375	2	-3.268	551.084	35.5	Pass
L3	140 - 135.667	Pole	P12.75x0.375	3	-3.593	551.084	52.7	Pass
L4	135.667 - 135.417	Pole	P12.75x0.725	4	-3.626	1035.300	29.3	Pass
L5	135.417 - 130.417	Pole	P12.75x0.725	5	-4.171	1035.300	40.5	Pass

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Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail
L6	130.417 - 125.417	Pole	P12.75x0.725	6	-4.737	1035.300	52.0	Pass
L7	125.417 - 120.417	Pole	P12.75x0.725	7	-5.321	1035.300	63.9	Pass
L8	120.417 - 120	Pole	P12.75x0.725	8	-5.375	1035.300	64.9	Pass
L9	120 - 119.75	Pole	P18x0.375	9	-5.403	784.878	59.2	Pass
L10	119.75 - 114.75	Pole	P18x0.375	10	-5.910	784.878	70.3	Pass
L11	114.75 - 110.375	Pole	P18x0.375	11	-6.369	784.878	80.2	Pass
L12	110.375 - 110.125	Pole	P18x0.5875	12	-6.411	1214.820	52.8	Pass
L13	110.125 - 105.125	Pole	P18x0.5875	13	-7.098	1214.820	60.5	Pass
L14	105.125 - 100.125	Pole	P18x0.5875	14	-7.801	1214.820	68.3	Pass
L15	100.125 - 100	Pole	P18x0.5875	15	-7.825	1214.820	68.5	Pass
L16	100 - 99.75	Pole	P24x0.375	16	-7.857	1052.070	62.2	Pass
L17	99.75 - 94.75	Pole	P24x0.375	17	-8.544	1052.070	70.1	Pass
L18	94.75 - 89.75	Pole	P24x0.375	18	-9.205	1052.070	77.9	Pass
L19	89.75 - 85.25	Pole	P24x0.375	19	-9.807	1052.070	85.2	Pass
L20	85.25 - 85	Pole	P24x0.51875	20	-9.856	1446.510	59.3	Pass
L21	85 - 80	Pole	P24x0.51875	21	-10.693	1446.510	65.0	Pass
L22	80 - 79.75	Pole	P30x0.375	22	-10.737	1311.060	62.2	Pass
L23	79.75 - 74.75	Pole	P30x0.375	23	-11.527	1311.060	67.9	Pass
L24	74.75 - 69.75	Pole	P30x0.375	24	-12.377	1311.060	74.0	Pass
L25	69.75 - 64.75	Pole	P30x0.375	25	-13.187	1311.060	80.2	Pass
L26	64.75 - 60	Pole	P30x0.375	26	-13.963	1311.060	86.3	Pass
L27	60 - 55	Pole	P36x0.375	27	-14.908	1490.100	66.0	Pass
L28	55 - 50	Pole	P36x0.375	28	-15.854	1490.100	70.8	Pass
L29	50 - 45	Pole	P36x0.375	29	-16.862	1490.100	76.0	Pass
L30	45 - 40	Pole	P36x0.375	30	-17.824	1490.100	81.2	Pass
L31	40 - 35	Pole	P42x0.375	31	-18.915	1668.870	64.7	Pass
L32	35 - 30	Pole	P42x0.375	32	-20.010	1668.870	68.9	Pass
L33	30 - 25	Pole	P42x0.375	33	-21.110	1668.870	73.1	Pass
L34	25 - 20	Pole	P42x0.375	34	-22.215	1668.870	77.5	Pass
L35	20 - 15	Pole	P48x0.375	35	-23.455	1847.490	63.6	Pass
L36	15 - 10	Pole	P48x0.375	36	-24.696	1847.490	67.2	Pass
L37	10 - 5	Pole	P48x0.375	37	-25.942	1847.490	70.8	Pass
L38	5 - 0	Pole	P48x0.375	38	-27.192	1847.490	74.5	Pass
						Summary		
						Pole (L26)	86.3	Pass
						<b>RATING =</b>	<b>86.3</b>	<b>Pass</b>

**NOT Abo e stress ratios for reinforced sections are approximate. More exact calculations are presented in the additional calculations section**

**ADDITIONAL CALCULATIONS**





## TNX Section Forces

Increment		TN Opp		
5				
	Section Height (ft)	P <sub>u</sub> (K)	M <sub>ux</sub> (kip-ft)	V <sub>u</sub> (K)
1	150 - 145	2.91	28.34	6.83
2	145 - 140	3.27	63.04	7.05
3	140 - 135.667	3.59	93.98	7.23
4	135.667 - 135.417	3.63	95.79	7.24
5	135.417 - 130.417	4.17	132.59	7.48
6	130.417 - 125.417	4.74	170.50	7.69
7	125.417 - 120.417	5.32	209.43	7.89
8	120.417 - 120	5.38	212.72	7.90
9	120 - 119.75	5.40	214.69	7.91
10	119.75 - 114.75	5.91	254.91	8.18
11	114.75 - 110.375	6.37	291.14	8.40
12	110.375 - 110.125	6.41	293.24	8.40
13	110.125 - 105.125	7.10	335.93	8.67
14	105.125 - 100.125	7.80	379.89	8.92
15	100.125 - 100	7.82	381.01	8.92
16	100 - 99.75	7.86	383.24	8.94
17	99.75 - 94.75	8.54	431.92	9.53
18	94.75 - 89.75	9.20	480.36	9.85
19	89.75 - 85.25	9.81	525.27	10.12
20	85.25 - 85	9.86	527.80	10.13
21	85 - 80	10.69	579.22	10.44
22	80 - 79.75	10.74	581.83	10.46
23	79.75 - 74.75	11.53	635.09	10.85
24	74.75 - 69.75	12.38	692.52	11.46
25	69.75 - 64.75	13.19	750.70	11.82
26	64.75 - 60	13.96	807.57	12.14
27	60 - 55	14.91	869.29	12.56
28	55 - 50	15.85	933.11	12.97
29	50 - 45	16.86	1002.17	13.59
30	45 - 40	17.82	1071.02	13.96
31	40 - 35	18.92	1141.90	14.40
32	35 - 30	20.01	1214.96	14.83
33	30 - 25	21.11	1290.06	15.22
34	25 - 20	22.22	1367.07	15.59
35	20 - 15	23.45	1446.05	16.01
36	15 - 10	24.70	1527.07	16.41
37	10 - 5	25.94	1610.06	16.80
38	5 - 0	27.19	1694.96	17.18



# Analysis Results

Element ID	Component Type	Size	Critical Element	Capacity	Pass/Fail
10 01	Pole	TP1 1x1x0.3	Pole	16.3	Pass
10 010	Pole	TP1 1x1x0.3	Pole	3	Pass
10 13 6	Pole	TP1 1x1x0.3	Pole		Pass
13 6 13	Pole Reinf.	TP1 1x1x0.	Reinf. 3 Tension Rupture	33.	Pass
13 130	Pole Reinf.	TP1 1x1x0.	Reinf. 3 Tension Rupture		Pass
130 10 1	Pole Reinf.	TP1 1x1x0.	Reinf. 3 Tension Rupture	9	Pass
10 10 1	Pole Reinf.	TP1 1x1x0.	Reinf. 3 Tension Rupture	3	Pass
10 10 1	Pole Reinf.	TP1 1x1x0.	Reinf. 3 Tension Rupture	3.	Pass
10 119	Pole	TP1 1x1x0.3	Pole	9.	Pass
119 11	Pole	TP1 1x1x0.3	Pole	0.3	Pass
11 110.3	Pole	TP1 1x1x0.3	Pole	0.	Pass
110.3 110.13	Pole Reinf.	TP1 1x1x0.	Reinf. Tension Rupture	6.9	Pass
110.13 10 13	Pole Reinf.	TP1 1x1x0.	Reinf. Tension Rupture	6	Pass
10 13 100.13	Pole Reinf.	TP1 1x1x0.	Reinf. Tension Rupture	3.	Pass
100.13 100	Pole Reinf.	TP1 1x1x0.	Reinf. Tension Rupture	3.9	Pass
100 99	Pole	TP 1x1x0.3	Pole	6	Pass
99 9	Pole	TP 1x1x0.3	Pole	0.1	Pass
9 9	Pole	TP 1x1x0.3	Pole	9	Pass
9 9	Pole	TP 1x1x0.3	Pole		Pass
9 9	Pole Reinf.	TP 1x1x0.1	Pole	6.9	Pass
9 9	Pole Reinf.	TP 1x1x0.1	Pole	69.1	Pass
9 9	Pole	TP30x30x0.3	Pole	6	Pass
9 9	Pole	TP30x30x0.3	Pole	6.9	Pass
9 9	Pole	TP30x30x0.3	Pole	0	Pass
69 6	Pole	TP30x30x0.3	Pole	0.	Pass
6 60	Pole	TP30x30x0.3	Pole	6.3	Pass
60 60	Pole	TP36x36x0.3	Pole	66.0	Pass
60 60	Pole	TP36x36x0.3	Pole	0.	Pass
60 60	Pole	TP36x36x0.3	Pole	6.0	Pass
60 60	Pole	TP36x36x0.3	Pole	1.	Pass
60 3	Pole	TP 1x1x0.3	Pole	6	Pass
3 30	Pole	TP 1x1x0.3	Pole	6.9	Pass
30 30	Pole	TP 1x1x0.3	Pole	3.1	Pass
30 30	Pole	TP 1x1x0.3	Pole		Pass
30 1	Pole	TP 1x1x0.3	Pole	63.6	Pass
1 10	Pole	TP 1x1x0.3	Pole	6	Pass
10 10	Pole	TP 1x1x0.3	Pole	0.	Pass
10 10	Pole	TP 1x1x0.3	Pole		Pass
				Summary	
			Pole	6.3	Pass
			Reinforcement	3.9	Pass
			Overall	6.3	Pass

# Additional Calculations

Section Elevation (ft)	Moment of Inertia (in <sup>4</sup> )			Area (in <sup>2</sup> )			% Capacity			
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3
150 - 145	279	n/a	279	14.58	n/a	14.58	16			
145 - 140	279	n/a	279	14.58	n/a	14.58				
140 - 135.67	279	n/a	279	14.58	n/a	14.58	2			
135.67 - 135.42	279	215	495	14.58	8.76	23.34	0			2
135.42 - 130.42	279	215	495	14.58	8.76	23.34	1			
130.42 - 125.42	279	215	495	14.58	8.76	23.34				
125.42 - 120.42	279	215	495	14.58	8.76	23.34	6			2
120.42 - 120	279	215	495	14.58	8.76	23.34	66			
120 - 119.75	807	n/a	807	20.76	n/a	20.76	2			
119.75 - 114.75	807	n/a	807	20.76	n/a	20.76	0			
114.75 - 110.38	807	n/a	807	20.76	n/a	20.76	0			
110.38 - 110.13	807	406	1212	20.76	8.76	29.52			6	
110.13 - 105.13	807	406	1212	20.76	8.76	29.52	61		6	2
105.13 - 100.13	807	406	1212	20.76	8.76	29.52	6			
100.13 - 100	807	406	1212	20.76	8.76	29.52	6			
100 - 99.75	1942	n/a	1942	27.83	n/a	27.83	62			
99.75 - 94.75	1942	n/a	1942	27.83	n/a	27.83	0			
94.75 - 89.75	1942	n/a	1942	27.83	n/a	27.83				
89.75 - 85.25	1942	n/a	1942	27.83	n/a	27.83	2			
85.25 - 85	1942	697	2639	27.83	8.76	36.59	62	61		
85 - 80	1942	697	2639	27.83	8.76	36.59	6	6		
80 - 79.75	3829	n/a	3829	34.90	n/a	34.90	62			
79.75 - 74.75	3829	n/a	3829	34.90	n/a	34.90	6			
74.75 - 69.75	3829	n/a	3829	34.90	n/a	34.90	0			
69.75 - 64.75	3829	n/a	3829	34.90	n/a	34.90	0			
64.75 - 60	3829	n/a	3829	34.90	n/a	34.90	6			
60 - 55	6659	n/a	6659	41.97	n/a	41.97	66			
55 - 50	6659	n/a	6659	41.97	n/a	41.97	0			
50 - 45	6659	n/a	6659	41.97	n/a	41.97	6			
45 - 40	6659	n/a	6659	41.97	n/a	41.97	1			
40 - 35	10622	n/a	10622	49.04	n/a	49.04	6			
35 - 30	10622	n/a	10622	49.04	n/a	49.04	6			
30 - 25	10622	n/a	10622	49.04	n/a	49.04	1			
25 - 20	10622	n/a	10622	49.04	n/a	49.04				
20 - 15	15908	n/a	15908	56.11	n/a	56.11	6	6		
15 - 10	15908	n/a	15908	56.11	n/a	56.11	6	2		
10 - 5	15908	n/a	15908	56.11	n/a	56.11	0			
5 - 0	15908	n/a	15908	56.11	n/a	56.11				

Note: Section capacity checked in 5 degree increments.

W.O.	7421.CT11024B	Report Date:	8/23/2018
Client:	T-Mobile	Revision:	0
Site Name:	Branford/I-95/X53/JCT.	Prepared By:	VE
Owner:	Amtrak		
Site Address:	Hosley Avenue		
City, State:	Branford, CT		

**MOMENT DISTRIBUTION FOR FLANGE CONNECTION CHECK**

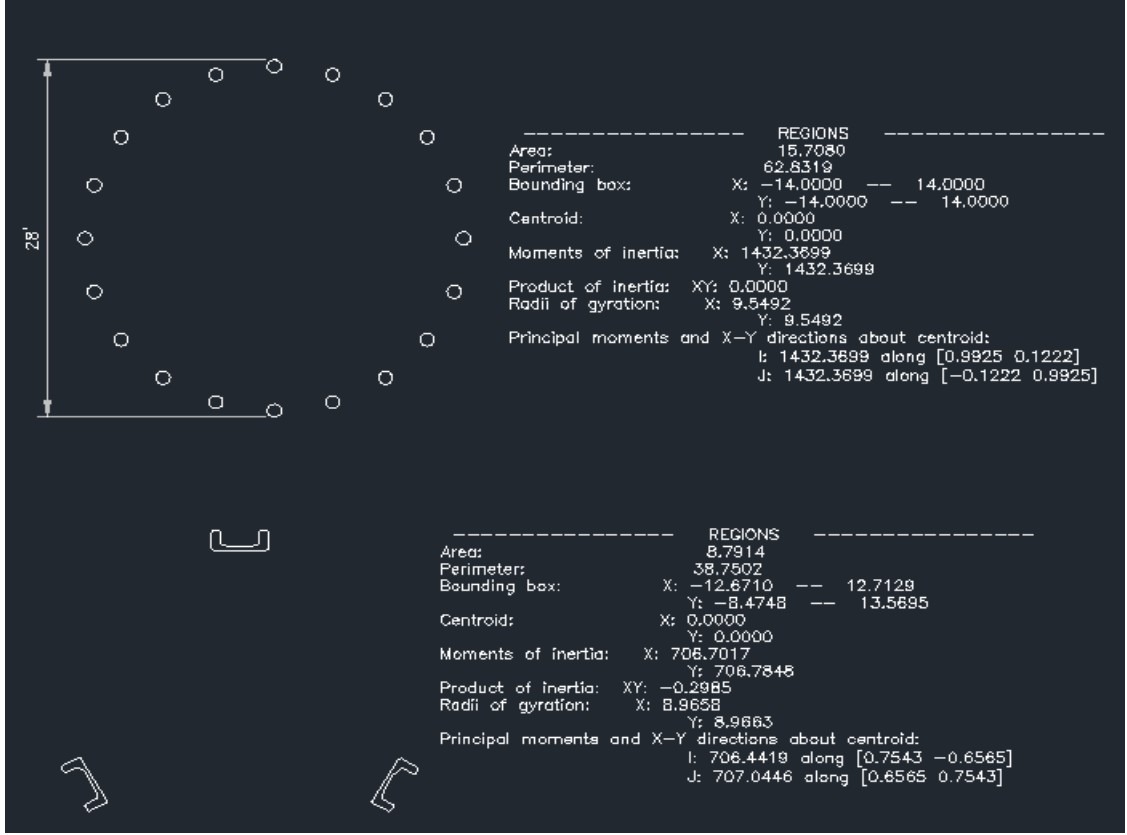
<b>SECTION</b>	80'		
Fy	42 ksi	Reinf. Channel	MP3-03
Moment @ Base	6950.64 kip-in	Area of Channel	2.92 in <sup>2</sup>
		Channel Capacity	144.7 kips (Rev G)
Y <sub>BOLT</sub> @ Bottom	14.00 in		
Y <sub>REINF</sub> @ Bottom	12.79 in		

POLE ELEVATION	Moment of Inertia (in <sup>4</sup> )		
	Bolts	w/Channel	Channel
Base	1432	2139	707

**Moment distribution within the flange connection bolts and the reinforcing Channels**

AT BASE	Ratios of the moments	Approx Moment Distribution (kip-in)	Axial Force in Channel (kips)
Flange connection	0.67	4654	
Reinforcing Channel	0.33	2296	121

Moment resisted by the bolts @ 80' level flange connection = 387.9 kip-ft



W.O.:	7421.CT11024B	Report Date:	8/23/2018
Client:	T-Mobile	Revision:	0
Site Name:	Branford/I-95/X53/JCT.	Prepared By:	VE
Owner:	Amtrak		
Site Address:	Hosley Avenue		
City, State:	Branford, CT		

**MOMENT DISTRIBUTION FOR FLANGE CONNECTION CHECK**

<b>SECTION</b>	100'		
Fy	42 ksi	Reinf. Channel	MP3-03
Moment @ Base	4572.12 kip-in	Area of Channel	2.92 in <sup>2</sup>
		Channel Capacity	144.7 kips (Rev G)
Y <sub>BOLT</sub> @ Bottom	11.00 in		
Y <sub>REINF</sub> @ Bottom	9.79 in		

POLE ELEVATION	Moment of Inertia (in <sup>4</sup> )		
	Bolts	w/Channel	Channel
Base	694	1108	415

**Moment distribution within the flange connection bolts and the reinforcing Channels**

AT BASE	Ratios of the moments	Approx Moment Distribution (kip-in)	Axial Force in Channel (kips)
Flange connection	0.63	2861	
Reinforcing Channel	0.37	1711	118

Moment resisted by the bolts @ 100' level flange connection = 238.4 kip-ft

```

----- REGIONS -----
Area: 12.5664
Perimeter: 50.2655
Bounding box: X: -11.0000 -- 11.0000
                Y: -11.0000 -- 11.0000
Centroid: X: 0.0000
            Y: 0.0000
Moments of inertia: X: 693.5066
                    Y: 693.5066
Product of inertia: XY: 0.0000
Radii of gyration: X: 7.4288
                  Y: 7.4288
Principal moments and X-Y directions about centroid:
I: 693.5066 along [0.7071 0.7071]
J: 693.5066 along [-0.7071 0.7071]
                    
```

```

----- REGIONS -----
Area: 8.7914
Perimeter: 38.7502
Bounding box: X: -10.0872 -- 10.0784
                Y: -6.9838 -- 10.5722
Centroid: X: 0.0000
            Y: 0.0000
Moments of inertia: X: 414.7330
                    Y: 414.3831
Product of inertia: XY: 0.4149
Radii of gyration: X: 6.8684
                  Y: 6.8655
Principal moments and X-Y directions about centroid:
I: 414.1077 along [0.5530 0.8332]
J: 415.0083 along [-0.8332 0.5530]
                    
```

W.O.:	7421.CT11024B	Report Date:	8/23/2018
Client:	T-Mobile	Revision:	0
Site Name:	Branford/I-95/X53/JCT.	Prepared By:	VE
Owner:	Amtrak		
Site Address:	Hosley Avenue		
City, State:	Branford, CT		

**MOMENT DISTRIBUTION FOR FLANGE CONNECTION CHECK**

<b>SECTION</b>	120'		
Fy	42 ksi	Reinf. Channel	MP3-03
Moment @ Base	2552.64 kip-in	Area of Channel	2.92 in <sup>2</sup>
		Channel Capacity	144.7 kips (Rev G)
Y <sub>BOLT</sub> @ Bottom	7.50 in		
Y <sub>REINF</sub> @ Bottom	7.16 in		

POLE ELEVATION	Moment of Inertia (in <sup>4</sup> )		
	Bolts	w/Channel	Channel
Base	221	445	223

**Moment distribution within the flange connection bolts and the reinforcing Channels**

AT BASE	Ratios of the moments	Approx Moment Distribution (kip-in)	Axial Force in Channel (kips)
Flange connection	0.50	1271	
Reinforcing Channel	0.50	1282	120

Moment resisted by the bolts @ 120' level flange connection = 105.9 kip-ft

```

----- REGIONS -----
Area: 7.8540
Perimeter: 31.4159
Bounding box: X: -7.6329 -- 7.6329
                Y: -8.0000 -- 8.0000
Centroid: X: 0.0000
            Y: 0.0000
Moments of inertia: X: 221.3841
                    Y: 221.3841
Product of inertia: XY: 0.0000
Radii of gyration: X: 5.3092
                  Y: 5.3092
Principal moments and X-Y directions about centroid:
I: 221.3841 along [0.2898 0.9571]
J: 221.3841 along [-0.9571 0.2898]

----- REGIONS -----
Area: 8.7914
Perimeter: 38.7502
Bounding box: X: -7.7809 -- 7.8137
                Y: -5.6629 -- 7.9359
Centroid: X: 0.0000
            Y: 0.0000
Moments of inertia: X: 223.2725
                    Y: 223.8313
Product of inertia: XY: -0.0869
Radii of gyration: X: 5.0395
                  Y: 5.0458
Principal moments and X-Y directions about centroid:
I: 223.2593 along [0.9887 -0.1502]
J: 223.8445 along [0.1502 0.9887]
    
```

# Stiffened or Unstiffened Exterior Flange Plate - An Bolt Material TIA Re G

## Site Data

WO 7421.CT11024B  
 Site Name Branford/ I-95/ X53/ Jct.  
 Site ID CT11024B

Pole Manufacturer Pirod

## Bolt Data

Qty 3  
 Diameter (in.) 1 Bolt Fu 100  
 Bolt Material A3 Bolt Fy 90  
 N/A 100 Disregard  
 N/A Disregard  
 Circle (in.)

## Plate Data

Diam 1 in  
 Thick t 1.0 in  
 Grade (Fy) 36 ksi  
 Strength, Fu 63 ksi  
 Single Rod Beff 1.1 in

## Stiffener Data (Welding at Both Sides)

Config 0  
 Weld Type  
 Groove Depth Disregard  
 Groove Angle Disregard  
 Fillet H. Weld in  
 Fillet V. Weld in  
 Width in  
 Height in  
 Thick in  
 Notch in  
 Grade ksi  
 Weld str. ksi

## Pole Data

Diam 1 in  
 Thick 0.3 in  
 Grade 36 ksi  
 # of Sides 0 "0" IF Round  
 Fu 63 ksi  
 Reinf. Fillet Weld 0 "0" if None

## Reactions

Mu 136.0 ft/ips  
 Axial, Pu 0 ips  
 Shear, Vu 1.09 ips  
 Elevation 0 feet

## Bolt Threads

Excluded  
 $\phi V_n = \phi(0.55 A_b F_u)$   
 $\phi = 0.75, \phi V_n$  (kips):  
 3.0

If No stiffeners, Criteria TIA G Only Applicable to Unstiffened Cases

## Flange Bolt Res

Bolt Tension Capacity,  $\phi T_n, B1$  0.00 ips  
 Adjusted  $\phi T_n$  (due to  $V_u = V_u / Q_t$ ),  $B1$  0.00 ips  
 Max Bolt directly applied  $T_u$  0.00 ips  
 Min. PL "tc" for B cap. w/o Pry 1.006 in  
 Min PL "tr" for actual T w/ Pr 0.691 in  
 Min PL "t1" for actual T w/ Pr 0.913 in  
 T allowable w/o Prying 0.00 ips  
 Prying Force, 0.00 ips  
 Total Bolt Tension  $T_u$  0.00 ips  
 Non-Prying Bolt Stress Ratio,  $T_u / B$  0.3 Pass

## Rigid

$\phi T_n$   
 $\phi T_n (1 - (V_u / \phi V_n)^2) \leq 0$

$\alpha' < 0$  case

## Exterior Flange Plate Res Flexural Chec

Compression Side Plate Stress Rohn Pirod O  
 Allowable Plate Stress 3.0 ksi  
 Compression Plate Stress Ratio Rohn Pirod O  
 No Pr in  
 Tension Side Stress Ratio,  $(t_r) / Rohn Pirod O$

## Rigid

TIA G  
 $\phi F_y$   
 Comp. Y.L. Length  
 16.16

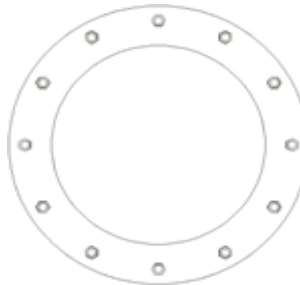
## na

## Stiffener Res

Horizontal Weld N/A  
 Vertical Weld N/A  
 Plate Flex Shear,  $f_b / F_b (f / F)$  N/A  
 Plate Tension Shear,  $f_t / F_t (f / F)$  N/A  
 Plate Comp. (AISC Bracket) N/A

## Pole Res

Pole Punching Shear Chec N/A



0 none, 1 every bolt, every bolts, 3 per bolt

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

# Stiffened or Unstiffened Exterior Flange Plate - An Bolt Material TIA Re G

## Site Data

WO 7421.CT11024B  
 Site Name Branford/ I-95/ X53/ Jct.  
 Site ID CT11024B

Pole Manufacturer Pirod

## Bolt Data

Diameter (in.) 1 Bolt Fu 110  
 Bolt Material A3 Bolt Fy 90  
 N/A 100 Disregard  
 N/A Disregard  
 Circle (in.) 39

## Plate Data

Diam 36 in  
 Thick t 1.0 in  
 Grade (Fy) 36 ksi  
 Strength, Fu 63 ksi  
 Single Rod Beff 0.0 in

## Stiffener Data (Welding at Both Sides)

Config 0  
 Weld Type  
 Groove Depth Disregard  
 Groove Angle Disregard  
 Fillet H. Weld in  
 Fillet V. Weld in  
 Width in  
 Height in  
 Thick in  
 Notch in  
 Grade ksi  
 Weld str. ksi

## Pole Data

Diam 36 in  
 Thick 0.3 in  
 Grade 36 ksi  
 # of Sides 0 "0" IF Round  
 Fu 63 ksi  
 Reinf. Fillet Weld 0 "0" if None

## Reactions

Mu 101.0 ft kips  
 Axial, Pu 1.0 kips  
 Shear, Vu 13.96 kips  
 Elevation 0 feet

## Bolt Threads

Xcluded  
 $\phi V_n = \phi(0.55 A_b F_u)$   
 $\phi = 0.75, \phi V_n$  (kips):  
 3.0

If No stiffeners, Criteria TIA G Only Applicable to Unstiffened Cases

## Flange Bolt Res

Bolt Tension Capacity,  $\phi^*T_n, B1$  6.0 kips  
 Adjusted  $\phi^*T_n$  (due to  $V_u = V_u/Q_t$ ),  $B$  6.0 kips  
 Max Bolt directly applied  $T_u$  6.0 kips  
 Min. PL "tc" for B cap. w/o Pry 1.01 in  
 Min PL "tre" for actual T w/ Pr 0.0 in  
 Min PL "t1" for actual T w/ Pr 0.93 in  
 T allowable w/o Prying 6.0 kips  
 Prying Force, 0.00 kips  
 Total Bolt Tension  $T_u$  6.0 kips  
 NonPrying Bolt Stress Ratio,  $T_u/B$  1.0 **Pass**

## Rigid

$\phi^*T_n$   
 $\phi T_n (1 - (V_u/\phi V_n)^2)^{0.5}$

$\alpha' < 0$  case

## Exterior Flange Plate Res Flexural Chec

Compression Side Plate Stress Rohn Pirod O  
 Allowable Plate Stress 36 ksi  
 Compression Plate Stress Ratio Rohn Pirod O  
**No Pr in**  
 Tension Side Stress Ratio,  $(t_e/t) Rohn Pirod O$

## Rigid

TIA G  
 $\phi^*F_y$   
 Comp. Y.L. Length  
 1.00

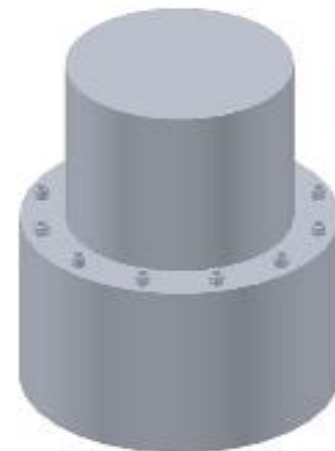
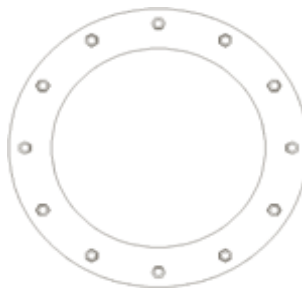
## na

## Stiffener Res

Horizontal Weld N/A  
 Vertical Weld N/A  
 Plate Flex Shear,  $f_b F_b (f F)$  N/A  
 Plate Tension Shear,  $f_t F_t (f F)$  N/A  
 Plate Comp. (AISC Bracket) N/A

## Pole Res

Pole Punching Shear Chec N/A



0 none, 1 every bolt, every bolts, 3 per bolt

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

# Stiffened or Unstiffened Exterior Flange Plate - Anode Material TIA Re G

## Site Data

WO 7421.CT11024B  
 Site Name Branford/ I-95/ X53/ Jct.  
 Site ID CT11024B

Pole Manufacturer Pirod

## Bolt Data

Diameter (in.) 1 Bolt Fu 100  
 Bolt Material A3 Bolt Fy 90  
 N/A 100 Disregard  
 N/A Disregard  
 Circle (in.) 33

## Plate Data

Diam 36 in  
 Thick t 1.00 in  
 Grade (Fy) 36 ksi  
 Strength, Fu 60 ksi  
 Single Rod B<sub>eff</sub> 3.93 in

## Stiffener Data (Welding at Both Sides)

Config 0  
 Weld Type  
 Groove Depth Disregard  
 Groove Angle Disregard  
 Fillet H. Weld in  
 Fillet V. Weld in  
 Width in  
 Height in  
 Thick in  
 Notch in  
 Grade ksi  
 Weld str. ksi

## Pole Data

Diam 30 in  
 Thick 0.30 in  
 Grade 60 ksi  
 No. of Sides 0 "0" IF Round  
 Fu 63 ksi  
 Reinf. Fillet Weld 0 "0" if None

## Reactions

Mu 0.00 ft-ips  
 Axial, Pu 13.96 ips  
 Shear, Vu 1.10 ips  
 Elevation 60 feet

## Bolt Threads

X Excluded  
 $\phi V_n = \phi(0.55 A_b F_u)$   
 $\phi = 0.75, \phi V_n$  (kips):  
 3.00

If No stiffeners, Criteria TIA G Only Applicable to Unstiffened Cases

## Flange Bolt Res

Bolt Tension Capacity,  $\phi^*T_n, B_1$  0.00 ips  
 Adjusted  $\phi^*T_n$  (due to  $V_u = V_u/Q_t$ ),  $B_1$  0.00 ips  
 Max Bolt directly applied  $T_u$  0.36 ips  
 Min. PL "tc" for B cap. w/o Pry 1.031 in  
 Min PL "tr" for actual T w/ Pr 0.33 in  
 Min PL "t1" for actual T w/ Pr 0.91 in  
 T allowable w/o Prying 0.00 ips  
 Prying Force, 0.00 ips  
 Total Bolt Tension  $T_u$  0.36 ips  
 Non-Prying Bolt Stress Ratio,  $T_u/B$  0.00 **Pass**

## Rigid

$\phi^*T_n$   
 $\phi T_n (1 - (V_u/\phi V_n)^2)^{0.5}$

$\alpha' < 0$  case

## Exterior Flange Plate Res

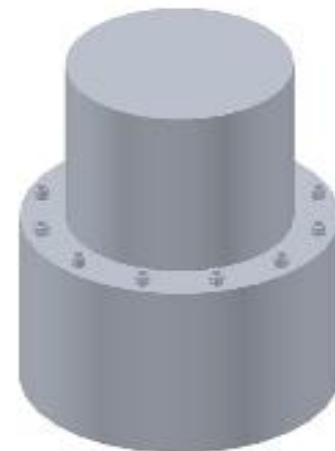
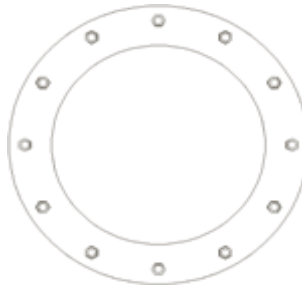
Flexural Check  
 Compression Side Plate Stress Rohn Pirod O  
 Allowable Plate Stress 3.00 ksi  
 Compression Plate Stress Ratio Rohn Pirod O  
 No Pr in  
 Tension Side Stress Ratio,  $(t_r/t) Rohn Pirod O$

## Rigid

TIA G  
 $\phi^*F_y$   
 Comp. Y.L. Length  
 13.00

## Stiffener Res

Horizontal Weld N/A  
 Vertical Weld N/A  
 Plate Flex Shear,  $f_b/F_b (f/F)$  N/A  
 Plate Tension Shear,  $f_t/F_t (f/F)$  N/A  
 Plate Comp. (AISC Bracket) N/A  
 Pole Res  
 Pole Punching Shear Check N/A



0 none, 1 every bolt, every bolts, 3 per bolt

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



# Stiffened or Unstiffened Exterior Flange Plate - An Bolt Material TIA Re G

## Site Data

WO 7421.CT11024B  
 Site Name Branford/ I-95/ X53/ Jct.  
 Site ID CT11024B

Pole Manufacturer Pirod

## Bolt Data

Qty 0  
 Diameter (in.) 1 Bolt Fu 100  
 Bolt Material A3 Bolt Fy 90  
 N/A 100 Disregard  
 N/A Disregard  
 Circle (in.)

## Plate Data

Diam 30 in  
 Thick t 1.0 in  
 Grade (Fy) 36 ksi  
 Strength, Fu ksi  
 Single Rod B eff 3.0 in

## Stiffener Data (Welding at Both Sides)

Config 0  
 Weld Type  
 Groove Depth Disregard  
 Groove Angle Disregard  
 Fillet H. Weld in  
 Fillet V. Weld in  
 Width in  
 Height in  
 Thick in  
 Notch in  
 Grade ksi  
 Weld str. ksi

## Pole Data

Diam in  
 Thick 0.3 in  
 Grade ksi  
 of Sides 0 "0" IF Round  
 Fu 63 ksi  
 Reinf. Fillet Weld 0 "0" if None

## Reactions

Mu 3.90 ft-ips  
 Axial, Pu 10.69 ips  
 Shear, Vu 10.0 ips  
 Elevation 0 feet

## Bolt Threads

Excluded  
 $\phi V_n = \phi(0.55 A_b F_u)$   
 $\phi = 0.75, \phi V_n$  (kips):  
 3.0

If No stiffeners, Criteria TIA G Only Applicable to Unstiffened Cases

## Flange Bolt Res

Bolt Tension Capacity,  $\phi^*T_n, B1$  ips  
 Adjusted  $\phi^*T_n$  (due to  $V_u = V_u/Q_t$ ),  $B$  ips  
 Max Bolt directly applied  $T_u$  33.9 ips  
 Min. PL "tc" for B cap. w/o Pry 1.0 in  
 Min PL "tre" for actual T w/ Pr 0.633 in  
 Min PL "t1" for actual T w/ Pr 0.30 in  
 T allowable w/o Prying ips  
 Prying Force, 0.00 ips  
 Total Bolt Tension  $T_u$  33.9 ips  
 Non-Prying Bolt Stress Ratio,  $T_u/B$  6.0 **Pass**

## Rigid

$\phi^*T_n$   
 $\phi T_n (1 - (V_u/\phi V_n)^2) \geq 0$

$\alpha' < 0$  case

## Exterior Flange Plate Res Flexural Chec

Compression Side Plate Stress Rohn Pirod O  
 Allowable Plate Stress 3.0 ksi  
 Compression Plate Stress Ratio Rohn Pirod O  
**No Pr in**  
 Tension Side Stress Ratio,  $(t_e/t) Rohn Pirod O$

## Rigid

TIA G  
 $\phi^*F_y$   
 Comp. Y.L. Length  
 1.3

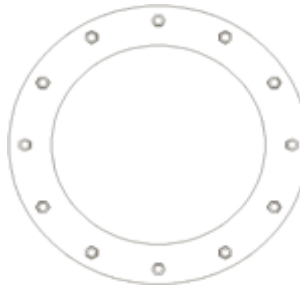
## na

## Stiffener Res

N/A for Rohn Pirod  
 Horizontal Weld N/A  
 Vertical Weld N/A  
 Plate Flex Shear,  $f_b/F_b (f/F)$  N/A  
 Plate Tension Shear,  $f_t/F_t (f/F)$  N/A  
 Plate Comp. (AISC Bracket) N/A

## Pole Res

Pole Punching Shear Chec N/A



0 none, 1 every bolt, every bolts, 3 per bolt

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

# Stiffened or Unstiffened Exterior Flange Plate - Anchor Bolt Material TIA Re G

## Site Data

WO 7421.CT11024B  
 Site Name Branford/ I-95/ X53/ Jct.  
 Site ID CT11024B

Pole Manufacturer Pirod

## Bolt Data

Qty 16  
 Diameter (in.) 1 Bolt Fu 110  
 Bolt Material A36 Bolt Fy 90  
 N/A 100 Disregard  
 N/A Disregard  
 Circle (in.) 1

## Plate Data

Diam 1 in  
 Thick t 1.0 in  
 Grade (Fy) 36 ksi  
 Strength, Fu 63 ksi  
 Single Rod Beff 3.3 in

## Stiffener Data (Welding at Both Sides)

Config 0  
 Weld Type  
 Groove Depth Disregard  
 Groove Angle Disregard  
 Fillet H. Weld in  
 Fillet V. Weld in  
 Width in  
 Height in  
 Thick in  
 Notch in  
 Grade ksi  
 Weld str. ksi

## Pole Data

Diam 1 in  
 Thick 0.3 in  
 Grade 36 ksi  
 # of Sides 0 "0" IF Round  
 Fu 63 ksi  
 Reinf. Fillet Weld 0 "0" if None

## Reactions

Mu 3.0 ft kips  
 Axial, Pu 0 kips  
 Shear, Vu 9 kips  
 Elevation 100 feet

## Bolt Threads

Excluded  
 $\phi V_n = \phi(0.55 A_b F_u)$   
 $\phi = 0.75, \phi V_n$  (kips):  
 3.0

If No stiffeners, Criteria TIA G Only Applicable to Unstiffened Cases

## Anchor Bolt Res

Bolt Tension Capacity,  $\phi T_n, B1$  33.0 kips  
 Adjusted  $\phi T_n$  (due to  $V_u = V_u / Q_t$ ),  $B1$  33.0 kips  
 Max Bolt directly applied  $T_u$  33.0 kips  
 Min. PL "tc" for B cap. w/o Pry 1.0 in  
 Min PL "tr" for actual T w/ Pr 0.6 in  
 Min PL "t1" for actual T w/ Pr 0.3 in  
 T allowable w/o Prying 33.0 kips  
 Prying Force, 0.00 kips  
 Total Bolt Tension  $T_u$  33.0 kips  
 Non-Prying Bolt Stress Ratio,  $T_u / B$  61.6 Pass

## Rigid

$\phi T_n$   
 $\phi T_n (1 - (V_u / \phi V_n)^2) \leq 0$

$\alpha' < 0$  case

## Exterior Flange Plate Res

Flexural Check  
 Compression Side Plate Stress Rohn Pirod O  
 Allowable Plate Stress 36 ksi  
 Compression Plate Stress Ratio Rohn Pirod O  
 No Pr in  
 Tension Side Stress Ratio,  $(t_e / t) \leq Rohn Pirod O$

## Rigid

TIA G  
 $\phi F_y$   
 Comp. Y.L. Length  
 10.0

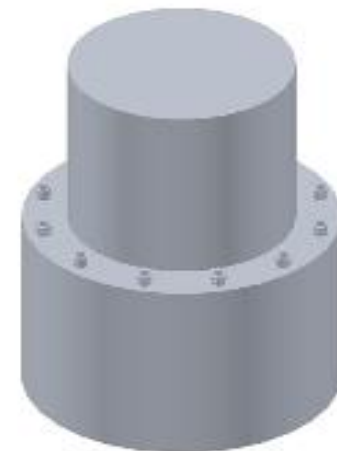
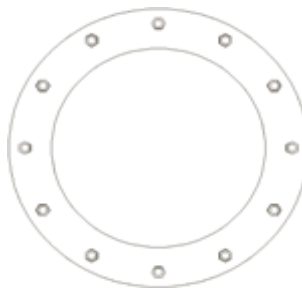
## na

## Stiffener Res

N/A for Rohn Pirod  
 Horizontal Weld N/A  
 Vertical Weld N/A  
 Plate Flex Shear,  $f_b / F_b (f / F)$  N/A  
 Plate Tension Shear,  $f_t / F_t (f / F)$  N/A  
 Plate Comp. (AISC Bracket) N/A

## Pole Res

Pole Punching Shear Check N/A



0 none, 1 every bolt, every bolts, 3 per bolt

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

# Stiffened or Unstiffened Exterior Flange Plate - Anchor Bolt Material TIA Re G

## Site Data

WO 7421.CT11024B  
 Site Name Branford/ I-95/ X53/ Jct.  
 Site ID CT11024B

Pole Manufacturer Pirod

## Bolt Data

Qty 10  
 Diameter (in.) 1 Bolt Fu 100  
 Bolt Material A3 Bolt Fy 90  
 N/A 100 Disregard  
 N/A Disregard  
 Circle (in.) 1

## Plate Data

Diam 1 in  
 Thick t 1.0 in  
 Grade (Fy) 36 ksi  
 Strength, Fu 60 ksi  
 Single Rod Beff 0.01 in

## Stiffener Data (Welding at Both Sides)

Config 0  
 Weld Type  
 Groove Depth Disregard  
 Groove Angle Disregard  
 Fillet H. Weld in  
 Fillet V. Weld in  
 Width in  
 Height in  
 Thick in  
 Notch in  
 Grade ksi  
 Weld str. ksi

## Pole Data

Diam 1.0 in  
 Thick 0.3 in  
 Grade 60 ksi  
 # of Sides 0 "0" IF Round  
 Fu 63 ksi  
 Reinf. Fillet Weld 0 "0" if None

## Reactions

Mu 10/90 ft/ips  
 Axial, Pu 3 ips  
 Shear, Vu 90 ips  
 Elevation 10 feet

## Bolt Threads

Excluded  
 $\phi V_n = \phi(0.55 A_b F_u)$   
 $\phi = 0.75, \phi V_n$  (kips):  
 3

If No stiffeners, Criteria TIA G Only Applicable to Unstiffened Cases

## Anchor Bolt Res

Bolt Tension Capacity,  $\phi T_n, B1$  33.3 ips  
 Adjusted  $\phi T_n$  (due to  $V_u = V_u / Q_t$ ),  $B$  33.3 ips  
 Max Bolt directly applied  $T_u$  33.3 ips  
 Min. PL "tc" for B cap. w/o Pry 0.0 in  
 Min PL "tr" for actual T w/ Pr 0.09 in  
 Min PL "t1" for actual T w/ Pr 0.631 in  
 T allowable w/o Prying 33.3 ips  
 Prying Force, 0.00 ips  
 Total Bolt Tension  $T_u$  33.3 ips  
 Non-Prying Bolt Stress Ratio,  $T_u / B$  61.0 Pass

## Rigid

$\phi T_n$   
 $\phi T_n (1 - (V_u / \phi V_n)^2) \leq 0$

$\alpha' < 0$  case

## Exterior Flange Plate Res

Flexural Check  
 Compression Side Plate Stress Rohn Pirod O  
 Allowable Plate Stress 30 ksi  
 Compression Plate Stress Ratio Rohn Pirod O  
 No Pr in  
 Tension Side Stress Ratio,  $(t_r / t) \leq Rohn Pirod O$

## Rigid

TIA G  
 $\phi F_y$   
 Comp. Y.L. Length  
 0.90

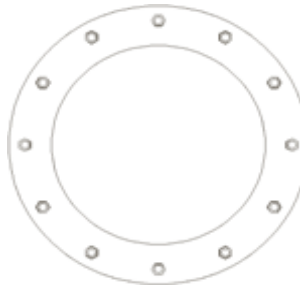
## na

## Stiffener Res

N/A for Rohn Pirod  
 Horizontal Weld N/A  
 Vertical Weld N/A  
 Plate Flex Shear,  $f_b / F_b (f / F)$  N/A  
 Plate Tension Shear,  $f_t / F_t (f / F)$  N/A  
 Plate Comp. (AISC Bracket) N/A

## Pole Res

Pole Punching Shear Check N/A



0 none, 1 every bolt, every bolts, 3 per bolt

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

## FOUNDATION CALCULATIONS

# Stiffened or Unstiffened Unrodded Circular Base Plate - Anchor Rod Material

**TIA Reg** Assumption: Clear space between bottom of leveling nut and top of concrete **no** exceeding (1) (Rod Diameter)

Site Data	
WO#	7421.CT11024B
Site Name	Branford/ I-95/ X53/ Jct.
Site ID	CT11024B
Pole Manufacturer	Pirod

Reactions		
Mu	169	ft/ips
Axial, Pu		ips
Shear, Vu	1	ips
Eta Factor, η	0.	TIA G (Fig. )

Anchor Rod Data	
ty	36
Diam	1 in
Rod Material	Other
Strength (Fu)	100 ksi
Yield (Fy)	100 ksi
Bolt Circle	1 in

If No stiffeners, Criteria **AISC LRFD** Only Applicable to Unstiffened Cases

**Anchor Rod Res**  
 Max Rod (Cu+ Vu/η): 6.0 ips  
 Allowable Axial, Φ\*Fu\*Anet: ips  
 Anchor Rod Stress Ratio: 63.3 **Pass**

Rigid
AISC LRFD
φ*Tn

Plate Data	
Diam	in
Thic	1. in
Grade	36 ksi
Single Rod Eff.	19 in

**Base Plate Res**  
 Base Plate Stress: Rohn Pirod, 0  
 Allowable Plate Stress: 30 ksi  
 Base Plate Stress Ratio: Rohn Pirod, 0

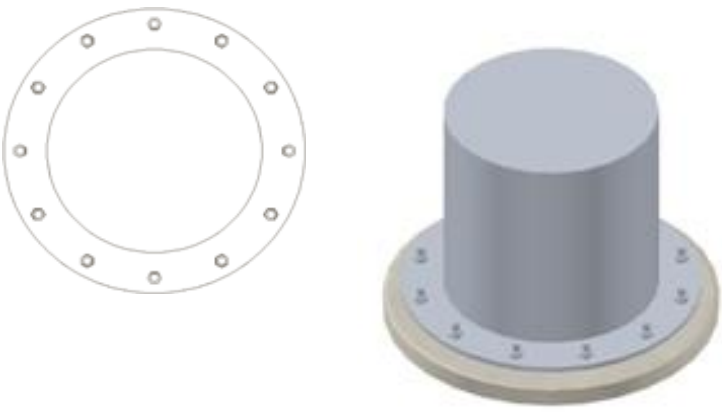
Rigid
AISC LRFD
φ*Fy
Y.L. Length
1/3

Stiffener Data (Welding at both sides)	
Config	0
Weld Type	
Groove Depth	Disregard
Groove Angle	Disregard
Fillet H. Weld	in
Fillet V. Weld	in
Width	in
Height	in
Thic	in
Notch	in
Grade	ksi
Weld str.	ksi

**Stiffener Res** N/A for Rohn Pirod  
 Horizontal Weld: N/A  
 Vertical Weld: N/A  
 Plate Flex Shear, fb/Fb(f/F): N/A  
 Plate Tension Shear, ft/Ft(f/F): N/A  
 Plate Comp. (AISC Bracket): N/A

**Pole Res**  
 Pole Punching Shear Chec: N/A

Pole Data	
Diam	in
Thic	0.3 in
Grade	ksi
of Sides	0 "0" IF Round
Fu	63 ksi
Reinf. Fillet Weld	0 "0" if None



0 none, 1 every bolt, every bolts, 3 per bolt  
 Note: for complete joint penetration groove welds the groove depth must be exactly 1 the stiffener thickness for calculation purposes

## Drilled Pier Foundation

WO  7421.CT11024B  
 Site Name  Branford/I-95/X53/Jct.

TIA-222 Revision:  G  
 Tower Type:  Monopole

Applied Loads		
	Comp.	Uplift
Moment (kip-ft)	1695	
Axial Force (kips)	27	
Shear Force (kips)	17	

Material Properties		
Concrete Strength, f <sub>c</sub> :	4.5	ksi
Rebar Strength, F <sub>y</sub> :	60	ksi

Pier Design Data		
Depth	27.5	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
<i>From 0.5' above grade to 27.5' below grade</i>		
Pier Diameter	5.5	ft
Rebar Quantity	25	
Rebar Size	11	
Clear Cover to Ties	3	in
Tie Size	5	

Analysis Results		
Soil Lateral Capacity	Compression	Uplift
D <sub>v=0</sub> (ft from TOC)	4.79	-
Soil Safety Factor	6.67	-
Max Moment (kip-ft)	1777.86	-
Rating	19.9%	-
Soil Vertical Capacity	Compression	Uplift
Skin Friction (kips)	349.25	-
End Bearing (kips)	213.82	-
Weight of Concrete (kips)	88.61	-
Total Capacity (kips)	563.07	-
Axial (kips)	115.61	-
Rating	20.5%	-
Reinforced Concrete Capacity	Compression	Uplift
Critical Depth (ft from TOC)	4.77	-
Critical Moment (kip-ft)	1777.86	-
Critical Moment Capacity	4646.53	-
Rating	38.3%	-
<b>Soil Interaction Rating</b>		<b>20.5%</b>
<b>Structural Foundation Rating</b>		<b>38.3%</b>

Check Limitation	
N/A	<input checked="" type="checkbox"/>

Soil Profile			
Groundwater Depth	10	ft	# of Layers
			4

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ <sub>soil</sub> (pcf)	γ <sub>concrete</sub> (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	3	3		150			0.000	0.000					Cohesionless
2	3	10	7	125	150	2		1.100	1.100					Cohesive
3	10	17	7	65	87.6	2		1.100	1.100					Cohesive
4	17	27.5	10.5	65	87.6	2		1.100	1.100			12		Cohesive

**APPENDIX A**



June 10, 1998

Mr. Dave Weinpahl  
**ARCNET**  
670 N. Beers Street - Bldg. 2  
Holmdel, New Jersey 07733

LAURENCE E. FRENCH, P.E.  
ARGO T. PARRELLO, P.E.  
JAMES B. HELLER, P.E.  
JOSEPH M. EDWARDS, P.E.  
SCOTT D. WATKINS, P.E.

Re: Report of Subsurface Exploration  
and Geotechnical Evaluation  
**Amtrak - Branford**  
Arcnet No. A96.506-624A  
Hosley Avenue @ I-95 Milepost 79.4  
Branford, CT  
*FPA No. 98A012ER2* – Revised for 150 Ft. Monopole

Dear Mr. Weinpahl:

## INTRODUCTION

Pursuant to your authorization, we have performed a subsurface exploration and geotechnical engineering evaluation in connection with the proposed 150 foot monopole at the above referenced site. The project site is located in the Amtrak right of way at milepost 79.4 near the intersection of Hosley Avenue and I-95, Branford, Connecticut. A Regional Location Plan is presented on Drawing No. 1.

The purpose of our participation on the project at this time was to explore the subsurface conditions in the vicinity of the proposed monopole and to develop geotechnical engineering recommendations toward the design and construction of the pole foundation. Our scope of work has been performed in accordance with the scope of services dated May 6, 1998, and included the advancement of two test borings, engineering evaluation, and the generation of our recommendations.

## DESIGN CONSIDERATIONS

It is our understanding that the proposed steel monopole will be approximately 150 feet high. Based on preliminary planning, it is anticipated that the proposed monopole will be founded on a drilled shaft. Design loads for the pole foundation were unavailable at the time this report was prepared.





## **SUBSURFACE EXPLORATION**

French & Parrello Associates (FPA) performed two test borings on May 28, 1998 to characterize subsurface conditions in the vicinity of the proposed site, as shown on Drawing No. 2 "Site Layout". One boring was advanced to 12 feet in the vicinity of the proposed equipment cabinets and the second was advanced to a depth of 39 feet at the proposed monopole location. The field work was accomplished by a test boring subcontractor while under the full-time technical observation by a representative of FPA. The as-drilled boring locations are presented on Drawing No. 3, "Test Boring Location Plan."

Test boring B-1 was advanced to a depth of 39 feet below grade utilizing mud rotary drilling procedures. Test boring B-2 was advanced to 12 feet utilizing hollow stem auger procedures. Soil samples were obtained by advancing a standard 2-inch diameter split-spoon sampler in accordance with ASTM Test Method D-1586, The Standard Penetration Test. All soil samples were classified in the field using the Burmister Soil Classification System and were returned to our laboratory for further review. The samples will be stored for a period of 30 days from the date of this report. Details of the drilling procedures, as well as sample classifications, groundwater depths, and Standard Penetration Test results are presented on the attached boring logs.

## **SUBSURFACE CONDITIONS**

In general, the soils encountered consisted mainly of glacial till soil which contains varying amounts of silt and clay with varying fractions of sand and gravel to the terminating depth of the boring. The results of the standard penetration test indicates that the encountered soils are in very stiff, to hard state of consistency.

During our subsurface exploration perched water was encountered at a depth of 10 feet to 17 feet and groundwater was encountered at a depth of 35 feet. For a more detailed description of the subsurface soil and groundwater conditions encountered, please refer to the attached boring logs.

## **FOUNDATION RECOMMENDATIONS**

Based upon the results of our subsurface exploration and geotechnical engineering evaluation, it is our opinion that the proposed monopole may be supported on a drilled shaft foundation. Design of the foundation should be performed by an engineer licensed to practice in the State of Connecticut and should conform to all governing regulations. Since the proposed monopole will be supported on a sloped area, the foundation designer should take into account the existing topography when designing the monopole foundation. We recommend that the project specifications be written on a performance basis and that means and methods for installing the foundation be left to the discretion of the contractor. Responsibility for protecting any adjacent



structures during installation should be stipulated to be with the contractor. Due to the fact that the proposed monopole will be constructed adjacent to railroad tracks, we recommend utilizing temporary steel casing during installation.

To facilitate the design of the monopole foundation, we offer the following soil parameters:

	<u>0 - 40 feet</u>
• Total Unit Weight of Soil ( $\gamma$ )	125 pcf
• Buoyant Unit Weight of Soil ( $\gamma'$ )	65 pcf
• Angle of Internal Friction ( $\phi$ )	0
• Cohesion (c)	2,000 psf
• Allowable Bearing Pressure	6,000 psf

Care should be taken during construction to preclude disturbance to the adjacent railroad tracks and adjacent billboard.

## CLOSING

The recommendations contained herein are contingent upon subsurface conditions remaining consistent with those encountered during our subsurface exploration. It is understood that actual subsurface conditions may vary from those which are encountered at the locations of the test borings. French & Parrello will base interpretations and recommendations upon conditions inferred from the conditions encountered. It should be recognized that any future determination of conditions different than those which were encountered at the sampling locations may significantly impact the interpretation and recommendations provided by French & Parrello. Any such variation of conditions should be brought to the prompt attention of French & Parrello to assess the impact of the variations on the previously provided interpretations and recommendations. French & Parrello will take no responsibility for any interpretation or recommendation others may make based upon subsurface data provided by French & Parrello.

## LIMITATIONS

The scope of our work did not include an environmental assessment or investigation for the presence or absence of wetlands. Services performed by FPA for the project have been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions. No other representation, expressed or implied, and no warranty or guarantee is included or intended in the services provided.



Should you have any questions or comments, please do not hesitate to contact us.

Very truly yours,

**FRENCH & PARRELLO ASSOCIATES, P.A.**

R. Ray Mankbadi, P.E.

RRM/clt

R. Ray Mankbadi, P.E.  
CT Professional License No. 16547

FRENCH & PARRELLO ASSOCIATES, P.A.

670 North Beers Street, Building No. 3

Holmdel, New Jersey 07733

TEST BORING LOG

BRANFORD - AMTRAK  
(FPA No. 98A012CB1)

BORING NO: B-1  
SHEET 1 OF 1

DATE STARTED: 5-28-98  
DATE FINISHED: 5-28-98

DEPTH OF WATER: DRY  
LOCATION: SEE PLAN

GROUND ELEVATION: N/A  
GROUND WATER ELEV.: N/A

DRILLING TECHNIQUE: HOLLOW STEM AUGER

DEPTH FEET	SAMPLE DEPTH	SPT BLOW COUNTS (PER 6")	STRATA	DESCRIPTION OF SOIL
	S-1 0-2'	1 - 2 - 4 - 6		S-1 Topsoil - Brown mf SAND, some Silt with roots and wood chips.
--- 5'---	S-2 2-4'	6 - 6 - 9 - 12		S-2 Orange, Brown & Grey layered SILT & CLAY, trace <sup>+</sup> f Sand, with seams of mf Sand, trace <sup>+</sup> Silt.
	S-3 4-6'	10 - 13 - 17 - 22		S-3 Brown SILT & CLAY, with seams of Green mf Sand, trace Silt.
---10'---	S-4 6-8'	7 - 10 - 17 - 25		S-4 Grey CLAY & SILT.
	S-5 8-9'5"	11 - 22 - 50/5" - X		S-5 TOP 12": Same as S-4. BOT 12": Orange-Brown SILT & CLAY, little <sup>+</sup> mf Sand.
---15'---	S-6 10-11'6"	27 - 19 - 50/6" - X		S-6 Brown mf SAND, trace <sup>+</sup> Silt with layer of Grey Silt & Clay, trace <sup>+</sup> mf Sand.
---20'---				END OF TEST BORING @ 11'6" DRY
---25'---				
---30'---				
---35'---				
---40'---				

SOILS ENGINEER: R. MANKBADI, P.E.  
DRILLING INSPECTOR: C. HILL

CONTRACTOR: CRAIG TEST BORING COMPANY  
DRILLER: P. MULLINS

The information shown hereon indicates the subsurface conditions encountered at the specified boring location on the date(s) of drilling. Subsurface Conditions are likely to vary across the project site. Interpretation of the subsurface data shall be at the discretion of the user.

FRENCH & PARRELLO ASSOCIATES, P.A.

670 North Beers Street, Building No. 3

Holmdel, New Jersey 07733

TEST BORING LOG

BRANFORD - AMTRAK  
(FPA No. 98A012CB2)

BORING NO: B-2  
SHEET 1 OF 1

DATE STARTED: 5-28-98  
DATE FINISHED: 5-28-98

DEPTH OF WATER: 10.0' & 35.0'  
LOCATION: SEE PLAN

GROUND ELEVATION: N/A  
GROUND WATER ELEV.: N/A

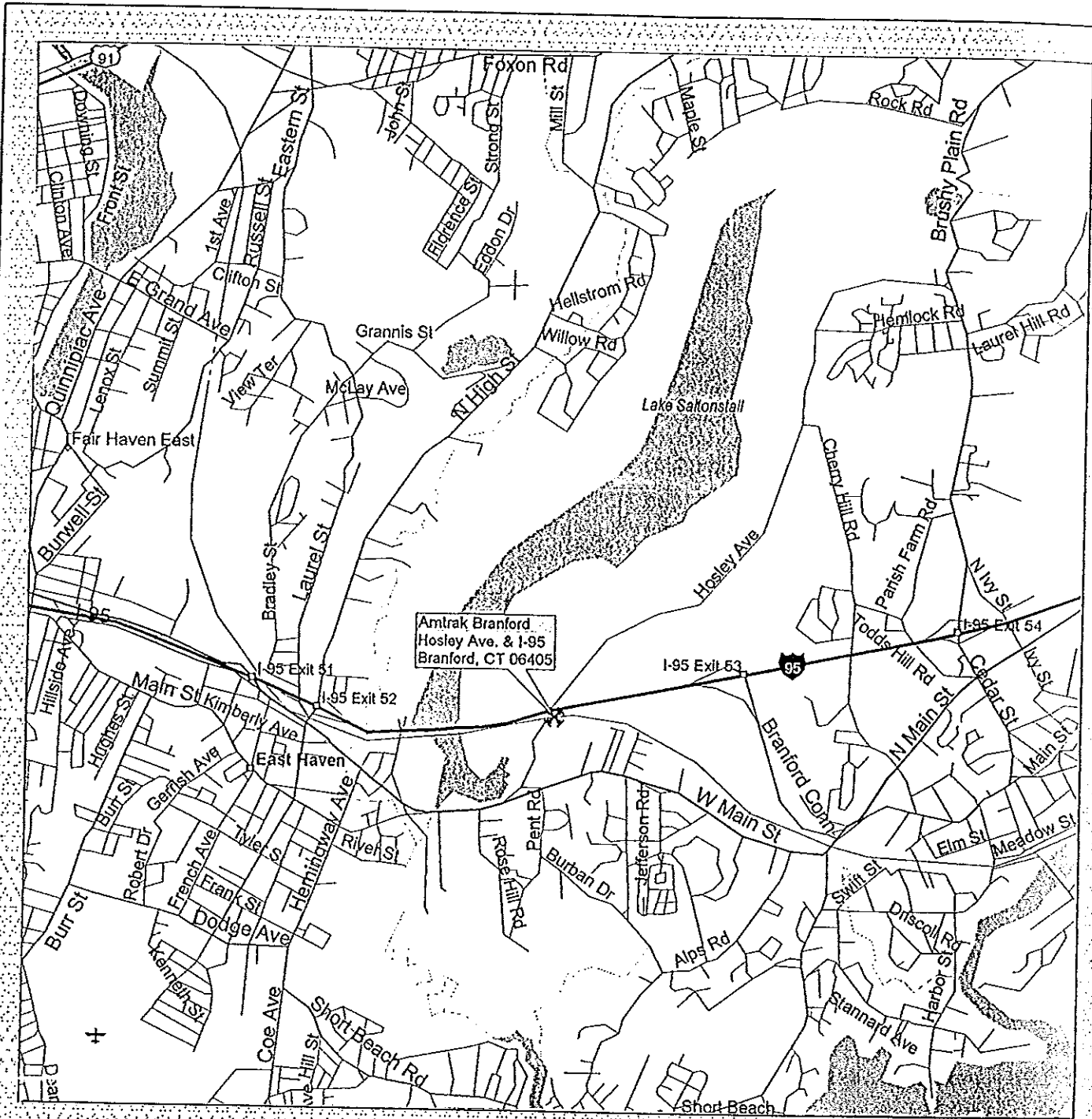
DRILLING TECHNIQUE: HOLLOW STEM AUGER

DEPTH FEET	SAMPLE DEPTH	SPT BLOW COUNTS (PER 6")	STRATA	DESCRIPTION OF SOIL
	S-1 0-2'	1 - 1 - 2 - 3		S-1 Topsoil - Brown mf SAND, some Silt & Clay with roots.
	S-2 2-4'	3 - 5 - 7 - 11		S-2 Brown & Grey SILT & CLAY, little mf Sand.
--- 5'---	S-3 4-4'11"	12 - 50/5" - X - X		S-3 Same as S-2.
	S-4 6-7'3"	12 - 15 - 50/3" - X		S-4 Brown cmf SAND, trace <sup>+</sup> Silt, trace <sup>+</sup> f Gravel.
---10'---	S-5 8-9'6"	12 - 44 - 50/6" - X		S-5 Brown c' mf SAND, trace <sup>+</sup> Silt, trace f Gravel.
	S-6 10-12'	16 - 39 - 44 - 29	perched water 10' to 17'	S-6 Greyish Brown mf SAND, little Silt.
---15'---	S-7 15-17'	6 - 13 - 21 - 29		S-7 Reddish Brown SILT & CLAY, trace <sup>+</sup> f Sand.
---20'---	S-8 20-22'	10 - 30 - 36 - 38		S-8 Reddish Brown SILT & CLAY, little mf Gravel, little mf Sand.
---25'---	S-9 25-27'	11 - 23 - 26 - 31		S-9 Dark Brown CLAYEY SILT.
---30'---	S-10 30-30'11"	26 - 50/5" - X - X		S-10 Reddish Brown SILT & CLAY, little mf Sand, trace f Gravel.
---35'---	S-11 35-35'11"	44 - 65/5" - X - X		S-11 Same as S-10. (BOT 6" wet)
---40'---	S-12 38 - 38'11"	45 - 50/5" - X - X	ground water @ 35'	S-12 <u>Brown mf SAND, little Silt</u> END OF TEST BORING @ 38'11" Water Table @ 35'

SOILS ENGINEER: R. MANKBADI, P.E.  
DRILLING INSPECTOR: C. HILL

CONTRACTOR: CRAIG TEST BORING COMPANY  
DRILLER: P. MULLINS

The information shown hereon indicates the subsurface conditions encountered at the specified boring location on the date(s) of drilling. Subsurface Conditions are likely to vary across the project site. Interpretation of the subsurface data shall be at the discretion of the user.



### REGIONAL LOCATION PLAN



**FRENCH & PARRELLO**  
ASSOCIATES, P.A.  
**CONSULTING ENGINEERS**

670 NORTH BEERS STREET BLDG. #3    HIGHLAND, NEW JERSEY 07733  
 TEL: (732) 886-7700    FAX: (732) 886-7622

PROJECT:

**AMTRAK - BRANFORD**  
**HOSLEY AVENUE @ I-95**  
**BRANFORD, CT**

DRAWN BY:  
**K.G.**

CHECKED BY:  
**J.C.**

SCALE:  
**N.T.S.**

DATE:  
**6/3/98**

JOB NO.:  
**98A012E**

DRAWING NO.:  
**1**

NORTH

HOSLEY AVENUE

EXISTING "EXIT 53  
CONN. HOSPICE"  
SIGN

EXISTING GUIDE RAIL  
(TYPICAL)

LOCATION OF  
AMTRAK RIGHT OF  
WAY LINE.

EXISTING ACCESS  
DRIVE

I-95

PROPOSED  
UTILITY POLE

EXISTING  
UTILITY POLE #53

EXISTING  
BILLBOARD

EXISTING CULVERT

PROPOSED  
NORTEL 98000  
EQUIPMENT  
CABINET.

EXISTING UTILITY  
POLE #44692

EXISTING OVERHEAD  
LINES (TYPICAL)

PROPOSED 150'  
MONOPOLE.

EXISTING RAIL  
ROAD TRACKS  
(TYPICAL)

AMTRAK RIGHT  
OF WAY LINE.

MILE POST  
MARKER 79.4

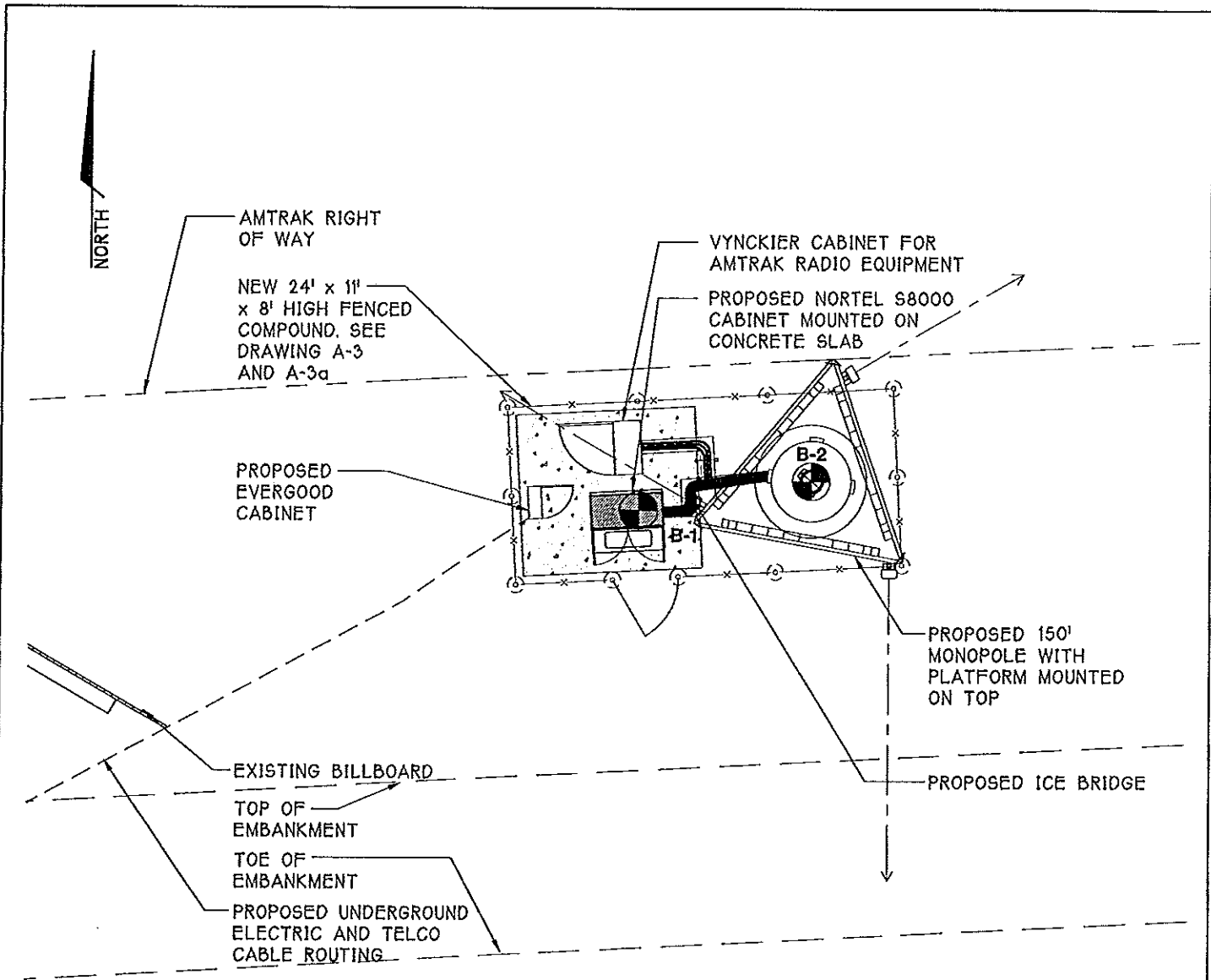
OVERPASS

### SITE LAYOUT

**FRENCH & PARRELLO**  
 ASSOCIATES, P.A.  
 CONSULTING ENGINEERS  
 670 NORTH BEERS STREET BLDG. #3 HOUNDEL, NEW JERSEY 07733  
 TEL: (732) 868-7700 FAX: (732) 868-7622

PROJECT: AMTRAK - BRANFORD  
 HOSLEY AVENUE @ I-95  
 BRANFORD, CT

DRAWN BY: K.G.	CHECKED BY: J.C.	SCALE: 1"=100'-0"	DATE: 6/3/98	JOB NO.:	DRAWING NO.:
				98A012E	2



KEY



APPROXIMATE BORING LOCATION

**TEST BORING LOCATION PLAN**



**FRENCH & PARRELLO**  
ASSOCIATES, P.A.  
CONSULTING ENGINEERS

670 NORTH BEERS STREET BLDG. #3  
TEL: (732) 888-7700

HOLMDEL, NEW JERSEY 07733  
FAX: (732) 888-7622

PROJECT:

AMTRAK - BRANFORD  
HOSLEY AVENUE @ I-95  
BRANFORD, CT

DRAWN BY:  
K.G.

CHECKED BY:  
J.C.

SCALE:  
1" = 10'-0"

DATE:  
6/3/98

JOB NO.:  
98A012E

DRAWING NO.:  
3



# BURMISTER SOIL CLASSIFICATION SYSTEM

## A. Cohesionless Soils: Particle Size Definitions

<u>Soil</u>	<u>Fraction</u>	<u>U.S. Standard Sieve</u>	<u>Actual Size</u>
Gravel	course	3 in. to 1 in.	76 mm to 25 mm
	medium	1 in. to 3/8 in.	25 mm to 9.5 mm
	fine	3/8 in. to No. 10	9.5 mm to 2.0 mm
Sand	course	No. 10 to No. 30	2.0 mm to 0.6 mm
	medium	No. 30 to No. 60	0.6 mm to 0.25 mm
	fine	No. 60 to No. 200	0.25 mm to .075 mm
Silt		< No. 200	< 0.075 mm

## B. Terms Describing Gradation of Cohesionless Soils

<u>Written Designation</u>	<u>Symbol/ Designation</u>	<u>Defining Proportions</u>
coarse, medium to fine	cmf	all fractions > 10%
coarse to medium	cm	< 10% fine
medium to fine	mf	< 10% coarse
coarse	c	< 10% medium and fine
medium	m	< 10% coarse and fine
fine	f	< 10% coarse and medium

Note: Use (+) for upper limit and (-) for lower limit.

## C. Cohesive Soils: Terms Describing Plasticity

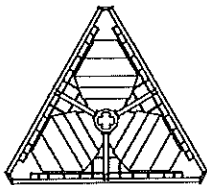
<u>Soil</u>	<u>Plasticity Index</u>	<u>Workability</u>	<u>Plasticity Description</u>
SILT	0	--	Non-Plastic
Clayey SILT	1 to 5	1/4 in. thread	Slightly Plastic
SILT & CLAY	5 to 10	1/8 in. thread	Low Plasticity
CLAY & SILT	10 to 20	1/16 in. thread	Medium Plasticity
Silty CLAY	20 to 40	1/32 in. thread	High Plasticity
CLAY	>40	1/64 in. thread	Very High Plasticity

## D. Terms Describing Overall Composition of Soil

<u>Written Proportion</u>	<u>Proportion Symbol</u>	<u>Proportion Percent by Weight</u>
and	a	35 to 50
some	s	20 to 35
little	l	10 to 20
trace	t	1 to 10

Note: Use (+) for upper limit and (-) for lower limit.

**APPENDIX B**



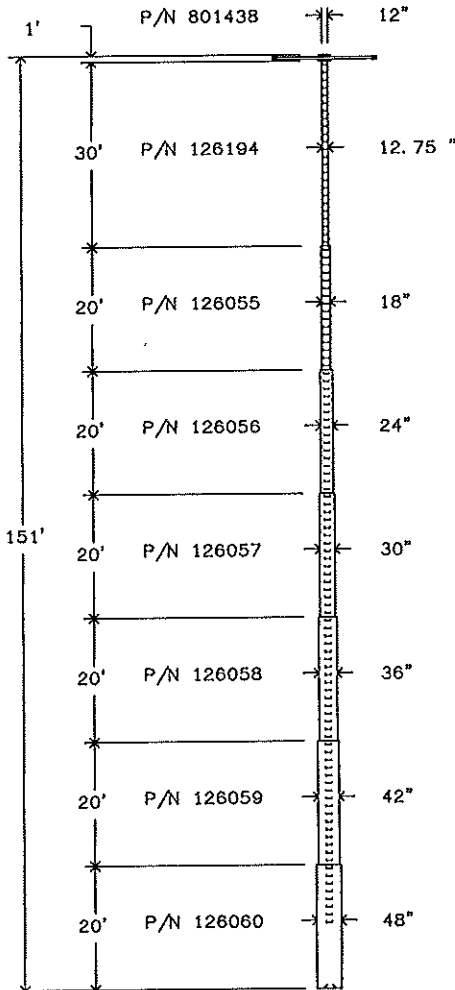
ROTATABLE TOP - TOP VIEW

MONOPOLE SECTION DATA

(ALL BOLTS ARE FOR BOTTOM OF SECTION)

SECTION					CONNECT BOLT			PILOT BOLT		
LENGTH	PART#	SIZE	WALL	WT. *	DIAM	LENGTH	#	DIAM	LENGTH	#
1'	801438	12"	N/A	1020#	1"	4-1/2"	5			
30'	126194	12.75"	0.375"	1739#	1"	4-1/2"	7	1"	5"	3
20'	126055	18"	0.375"	1662#	1"	4-1/2"	13	1"	5"	3
20'	126056	24"	0.375"	2204#	1"	4-1/2"	17	1"	5"	3
20'	126057	30"	0.375"	2747#	1"	4-1/2"	21	1"	5"	3
20'	126058	36"	0.375"	3290#	1"	4-1/2"	25	1"	5"	3
20'	126059	42"	0.375"	3833#	1"	4-1/2"	29	1"	5"	3
20'	126060	48"	0.375"	4376#						

\*THE WEIGHTS LISTED ARE THEORETICAL. THE ACTUAL WEIGHTS WILL VARY. ALL WEIGHTS SHOULD BE CONFIRMED IN THE FIELD PRIOR TO ERECTION.



TOP 1' CONSISTS OF ROTATABLE TOP ASSEMBLY. SEE DWG # 127799-B FOR INSTALLATION DETAILS. JAM NUTS NOT REQUIRED.

ALL CONNECTIONS ARE A-325 BOLTS SEE TABLE ABOVE FOR SIZE & QTY.



TYPICAL FLUSH FLANGE CONNECTION VIEW A

SEE PAGE 2 OF THIS DRAWING FOR OPENING INFORMATION.

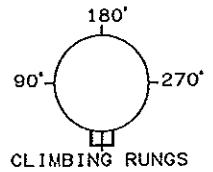
SEE PAGE 4 OF THIS DRAWING FOR CONNECTION BOLT TIGHTENING SPECIFICATIONS.

SEE PAGE 9 OF THIS DRAWING FOR BASE SECTION INSTALL.

REMOVABLE CLIMBING RUNGS.

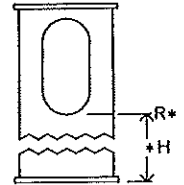
				AMTRAK AMTRAK-BRANFORD, CT MP48 X 150' ASSEMBLY DRAWING			
APPROVED/ENG.		KWD		7/23/1998		1545 Pidco Dr. Plymouth, IN 46563-0128 219-936-4221	
APPROVED/FOUND.		N/A					
COPYRIGHT 2015							
REV	DESCRIPTION OF REVISIONS	INI	DATE	DRAWN BY	TSD	ENG. FILE NO. A-114856- ARCHIVE Q-76241	
From: 70241.DFT - 08/30/98 15:17 Printed from 204007_010A.DWG * 07/23/1998 09:30 @ 02/18/2015 17:25				DRAWING NO.		204007-B	
				PAGE		1 OF 9	

OPENINGS & BRACKETS WELDED TO POLE				
HEIGHT *H	TYP	DESCRIPTION	ANGL	ASSEMBLY DRAWING#
148' -11"	13	SAFETY CLIMB BRACKET	0°	
148' -6"	9	4" X 6" PORTHOLE EXITING UP	80°	
148' -6"	9	4" X 6" PORTHOLE EXITING UP	200°	
148' -6"	9	4" X 6" PORTHOLE EXITING UP	320°	
147' -6"	9	4" X 6" PORTHOLE EXITING UP	80°	
147' -6"	9	4" X 6" PORTHOLE EXITING UP	200°	
147' -6"	9	4" X 6" PORTHOLE EXITING UP	320°	
127' -9"	9	4" X 6" PORTHOLE EXITING UP	80°	
127' -9"	9	4" X 6" PORTHOLE EXITING UP	200°	
127' -9"	9	4" X 6" PORTHOLE EXITING UP	320°	
126' -9"	9	4" X 6" PORTHOLE EXITING UP	80°	
126' -9"	9	4" X 6" PORTHOLE EXITING UP	200°	
126' -9"	9	4" X 6" PORTHOLE EXITING UP	320°	
125' -9"	19	PAD EYES FOR FUTURE PLATFORM	SEE>	121975-B
107' -9"	9	4" X 6" PORTHOLE EXITING UP	80°	
107' -9"	9	4" X 6" PORTHOLE EXITING UP	200°	
107' -9"	9	4" X 6" PORTHOLE EXITING UP	320°	
106' -9"	9	4" X 6" PORTHOLE EXITING UP	80°	
106' -9"	9	4" X 6" PORTHOLE EXITING UP	200°	
106' -9"	9	4" X 6" PORTHOLE EXITING UP	320°	
105' -9"	19	PAD EYES FOR FUTURE PLATFORM	SEE>	121975-B
97' -6"	9	4" X 6" PORTHOLE EXITING UP	170°	
69'	9	4" X 6" PORTHOLE EXITING UP	170°	
49'	9	4" X 6" PORTHOLE EXITING UP	170°	
10'	8	TRANS. LINE BRIDGE ATTACH BRACKET	30°	
9' -6"	13	SAFETY CLIMB BRACKET	0°	
7' -6"	2	10" X 25" OVAL PORTHOLE	30°	
6' -11"	7	GROUNDING PLATE	30°	
4'	8	TRANS. LINE BRIDGE ATTACH BRACKET	120°	
4'	8	TRANS. LINE BRIDGE ATTACH BRACKET	210°	
1' -6"	2	10" X 25" OVAL PORTHOLE	120°	
1' -6"	2	10" X 25" OVAL PORTHOLE	210°	
1'	7	GROUNDING PLATE	120°	
1'	7	GROUNDING PLATE	210°	
1'	18	GROUNDING ANGLES (3)	SEE>	131093-B

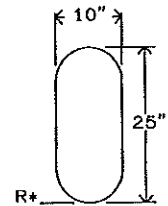


CLIMBING RUNGS

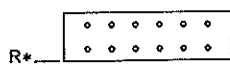
THE ANGLE TO THE OPENING IS MEASURED CLOCKWISE FROM THE CENTER-LINE OF THE CLIMBING RUNGS WHEN LOOKING DOWN.



\* THE HEIGHT IN THE TABLE IS THE DISTANCE FROM THE BASE OF THE BOTTOM SECTION OF THE POLE TO THE OPENING REFERENCE (R+) AS SHOWN ON PAGES 2 - 3 OF THIS DRAWING.



TYPE 2  
OPENING

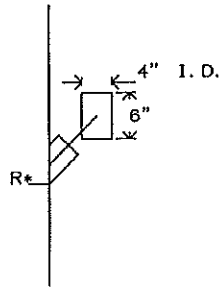


GROUNDING  
PLATE

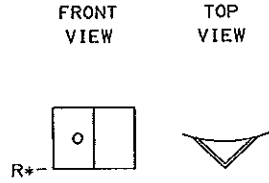



LINE BRIDGE  
BRACKET

<p>AMTRAK AMTRAK-BRANFORD, CT MP48 X 150' OPENINGS</p>			
		<p>1545 Pidco Dr. Plymouth, IN 46563-0128 219-936-4221</p>	
APPROVED/ENG.	KWD	7/23/1998	<p>From: 76241.DFT - 08/30/98 15:17 Printed from 204007_0200.DWG - 08/30/1998 15:25 @ 02/18/2015 17:25</p>
APPROVED/FOUND.	N/A		
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TYPE 9  
OPENING



		AMTRAK AMTRAK-BRANFORD, CT MP48 X 150' OPENINGS			
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### GENERAL NOTES

1. TOWER DESIGN CONFORMS TO STANDARD EIA/TIA-222-F FOR 85 MPH BASIC WIND SPEED WITH NO ICE.  
TOWER DESIGN CONFORMS TO STANDARD EIA/TIA-222-F FOR 85 MPH BASIC WIND SPEED WITH 0.50" RADIAL ICE WITH LOAD DUE TO WIND REDUCED BY 25% WHEN CONSIDERED SIMULTANEOUSLY WITH ICE.
2. MATERIAL: (A) SOLID RODS CONFORM TO ASTM A-572 GRADE 50 REQUIREMENTS.  
(B) ANGLES CONFORM TO ASTM A-36 REQUIREMENTS.  
(C) PIPE CONFORMS TO ASTM A-53 TYPE E, GRADE B REQUIREMENTS. (MIN YIELD STRENGTH=42 KSI)  
(D) ALL STEEL PLATES CONFORM TO ASTM A-36 REQUIREMENTS.
3. BASE REACTIONS PER EIA/TIA-222-F FOR 85 MPH BASIC WIND SPEED WITH NO ICE.  
TOTAL WEIGHT= 25.9 KIPS.  
MOMENT= 1489.9 KIP-FT.  
MAXIMUM SHEAR= 15.3 KIPS TOTAL.
4. BASE REACTIONS PER EIA/TIA-222-F FOR 85 MPH BASIC WIND SPEED WITH 0.50" RADIAL ICE:  
TOTAL WEIGHT= 28.7 KIPS.  
MOMENT= 1173.5 KIP-FT.  
MAXIMUM SHEAR= 12.0 KIPS TOTAL.
5. FINISH: HOT DIPPED GALVANIZED AFTER FABRICATION.
6. ANTENNAS: TOP (6) EMSFR65-17-XXDP ANTENNAS MOUNTED ON A LOW PROFILE TOP USING 1-5/8" LINES.  
130' (6) EMSFR65-17-XXDP ANTENNAS MOUNTED ON A LOW PROFILE CLAMP-ON ROTATABLE PLATFORM USING 1-5/8" LINES.  
110' (6) EMSFR65-17-XXDP ANTENNAS MOUNTED ON A LOW PROFILE CLAMP-ON ROTATABLE PLATFORM USING 1-5/8" LINES.  
100' (1) PD220 ANTENNA MOUNTED ON A 4' - 6" SIDE ARM USING 1-5/8" LINE.  
70' (1) PD220 ANTENNA MOUNTED ON A 4' - 6" SIDE ARM USING 1-5/8" LINE.  
50' (1) PD220 ANTENNA MOUNTED ON A 4' - 6" SIDE ARM USING 1-5/8" LINE.
7. INSTALL BASE SECTION WITH MINIMUM OF 2" CLEARANCE ABOVE CONCRETE.
8. MIN. WELDS 5/16" UNLESS OTHERWISE SPECIFIED. ALL WELDING TO CONFORM TO AWS SPECIFICATIONS.
9. ALL BOLTS MUST BE IN PLACE WITH JAM NUTS PRIOR TO ERECTION OF THE STRUCTURE. ALL BOLTS AND NUTS MUST BE IN PLACE AND TIGHTENED BEFORE THE ADJOINING SECTION(S) ARE PLACED.
10. ALL A-325 BOLTS SHALL BE PRE-TENSIONED PER AISC SPECIFICATIONS. REFER TO DRAWING # 123107-A ("BOLT PRE-TENSIONING REQUIREMENTS".)
11. EIA GROUNDING FOR TOWER.
12. OUTSIDE CLIMB RUNGS WITH SAFETY CLIMB.
13. MONOPOLE TO BE PAINTED SLATE GRAY.
14. MONOPOLE REACTIONS WERE NOT RUN WITH A LIGHTNING ROD EXTENDER.
15. ALL ANCHOR BOLTS TO CONFORM TO ASTM - A687 SPECIFICATIONS.

				AMTRAK AMTRAK-BRANFORD, CT MP48 X 150' NOTES		 1545 Pidco Dr. Plymouth, IN 46563-0128 219-936-4221	
				APPROVED/ENG.	KWD		7/23/1998
				APPROVED/FOUND.	N/A		
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REV	DESCRIPTION OF REVISIONS	INI	DATE	DRAWN BY	TSD		
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				ARCHIVE	Q-76241	PAGE	4 OF 9

FOUNDATION NOTES

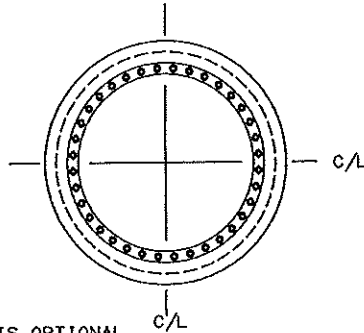
1. SOIL AS PER REPORT BY FRENCH & PARRELLO ASSOCIATES, P. A. , DATED: 6/10/98 (98A012ER2)
2. CONCRETE TO BE 4500 PSI @ 28 DAYS. REINFORCING BAR TO CONFORM TO ASTM A615 GRADE 60 SPECIFICATIONS. CONCRETE INSTALLATION TO CONFORM TO ACI-318 BUILDING REQUIREMENTS FOR REINFORCED CONCRETE. ALL CONCRETE TO BE PLACED AGAINST UNDISTURBED EARTH FREE OF WATER AND ALL FOREIGN OBJECTS AND MATERIALS. A MINIMUM OF THREE' INCHES OF CONCRETE SHALL COVER ALL REINFORCEMENT. WELDING OF REBAR NOT PERMITTED.
3. A COLD JOINT IS PERMISSIBLE UPON CONSULTATION WITH PIROD. ALL COLD JOINTS SHALL BE COATED WITH BONDING AGENTS PRIOR TO SECOND POUR.
4. ALL REINFORCING STEEL TO BE FORMED INTO A CAGE PRIOR TO SETTING INTO POSITION IN THE EXCAVATED PIER.
5. PERMANENT STEEL CASING SHALL NOT BE USED WITHOUT CONSENT FROM FOUNDATION DESIGNERS.
6. GROUTING OF MONOPOLE BASE IS OPTIONAL. IF GROUT IS 'USED, DRAINAGE MUST BE PROVIDED FROM THE INTERIOR OF THE POLE. REFER TO DRAWING # 118492-B FOR BASE SECTION INSTALLATION.
7. CROWN TOP OF FOUNDATION FOR PROPER DRAINAGE.
8. A TEMPORARY STEEL CASING MAY BE REQUIRED DURING INSTALLATION.

		AMTRAK AMTRAK-BRANFORD, CT MP48 X 150' NOTES		 1545 Pidco Dr. Plymouth, IN 46563-0128 219-936-4221
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TOP VIEW

TOP AND SIDE VIEWS ARE  
DRAWN TO DIFFERENT SCALE

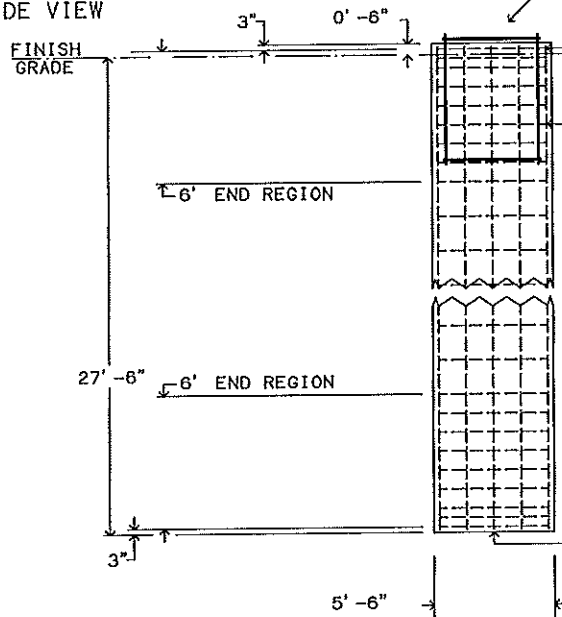
BASE FLANGE MUST BE CENTERED IN PIER  
WITHIN +/- 10% OF PIER DIAMETER



GROUTING OF MONOPOLE BASE IS OPTIONAL.  
IF GROUT IS USED, DRAINAGE MUST BE  
PROVIDED FROM THE INTERIOR OF POLE.  
CROWN TOP OF FOUNDATION TO  
FACILITATE DRAINAGE.

FOR ANCHOR STEEL IDENTIFICATION AND  
PLACEMENT INFORMATION, SEE PAGE 8.  
FOR BASE SECTION INSTALLATION, SEE PAGE 9.

SIDE VIEW



FOR DETAIL VIEW OF REBAR CAGE  
END AREA, SEE PAGE 7. (E)


# 5 HORIZONTAL TIES - SEE (B) ON PAGE 7.  
28 PIECES REQUIRED.  
PLACE RINGS AT 0'-11" NOMINAL  
SPACING WITHIN END REGIONS,  
AND 1'-6" NOMINAL SPACING IN  
REMAINDER OF PIER.

#11 VERTICAL REBAR - SEE (A) ON PAGE 7.  
25 PIECES REQUIRED, EQUALLY SPACED,  
TO BE PLACED INSIDE TIES.

TOWER FOUNDATION

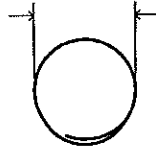
24.6 CUBIC YARDS CONCRETE REQUIRED

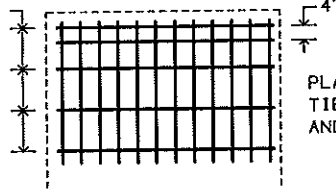
FOR INSTALLATION SPECIFICATIONS AND  
ADDITIONAL INFORMATION, SEE PAGE 5  
OF THIS DRAWING.

		AMTRAK AMTRAK-BRANFORD, CT MP48 X 150' FOUNDATION	
APPROVED/ENG.	KWD	7/23/1998	 1545 Pidco Dr. Plymouth, IN 46563-0128 219-936-4221
APPROVED/FOUND.	DDA	7/23/1998	
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Ⓐ  27'-6" #11 REBAR - 25 PIECES REQ. TOTAL  
APPROX WT = 146.1# EACH, 3653# TOTAL

Ⓑ  5'  
# 5 REBAR - 28 PIECES REQUIRED TOTAL  
APPROX UNBENT LENGTH = 17'-6-3/8"  
APPROX WT = 18.3# EACH, 512# TOTAL  
LAP DIMENSION: 1'-9-7/8"  
PLACE REBAR RINGS SO THAT LAPS ON  
ADJACENT RINGS ARE 180 DEGREES APART.  
SEE PAGE 6 FOR RING PLACEMENT.

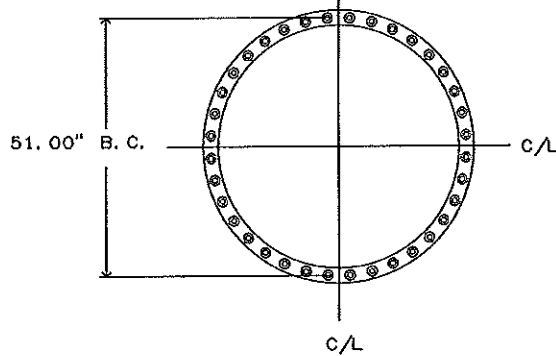
0'-11"  4"  
PLACE 8 CIRCULAR TIES WITHIN  
EACH END REGION (TOP AND BOTTOM).  
PLACE FIRST TIE AT END OF VERTICAL  
BARS AND CONTINUE SPACING AS SHOWN.  
SEE PAGE 6 FOR REGION DEFINITION.  
PLACE AN ADDITIONAL CIRCULAR  
TIE 4" FROM THE END TIE (TOP  
AND BOTTOM) AS SHOWN.  
DETAIL OF REBAR CAGE END  
Ⓔ

REBAR DETAIL

TOTAL APPROX REBAR WEIGHT = 4165#  
REINFORCING BAR TO CONFORM TO  
ASTM A615 GRADE 60 SPECIFICATIONS.

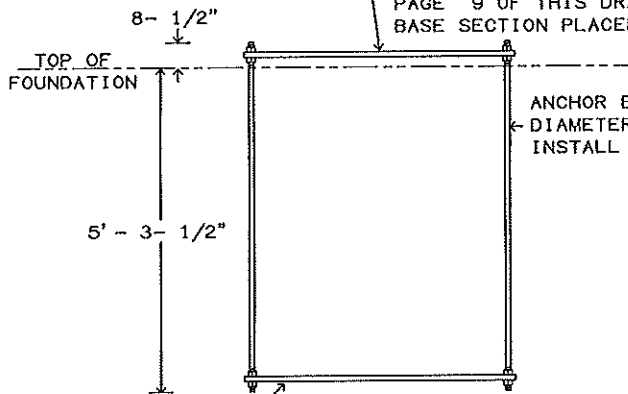
		AMTRAK AMTRAK-BRANFORD, CT MP48 X 150' REBAR DETAIL	
APPROVED/ENG.	KWD	7/23/1998	 1545 Pidco Dr. Plymouth, IN 46563-0128 219-936-4221
APPROVED/FOUND.	DDA	7/23/1998	
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From: 76241.DFT - 06/30/98 15:17		ENG. FILE NO. A-114856-	DRAWING NO. 204007-B
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BASE FLANGE MUST BE CENTERED IN PIER  
WITHIN +/- 10% OF PIER DIAMETER.



GROUTING OF MONOPOLE BASE IS OPTIONAL.  
IF GROUT IS USED, DRAINAGE MUST BE  
PROVIDED FROM THE INTERIOR OF POLE.


PERMANENT FOUNDATION PLATE P/N 118489 MUST BE  
SECURELY DOUBLE-NUTTED TO ANCHOR BOLTS DURING  
CONCRETE INSTALLATION AND MUST BE LEVEL +/- 1/8\"/>



ANCHOR BOLT P/N 123653 - 36 REQUIRED  
DIAMETER= 1.00\"/>

PLATE P/N 118489 SECURELY DOUBLE-NUTTED TO ANCHOR  
BOLTS USED AS EMBEDMENT PLATE IN CONCRETE.

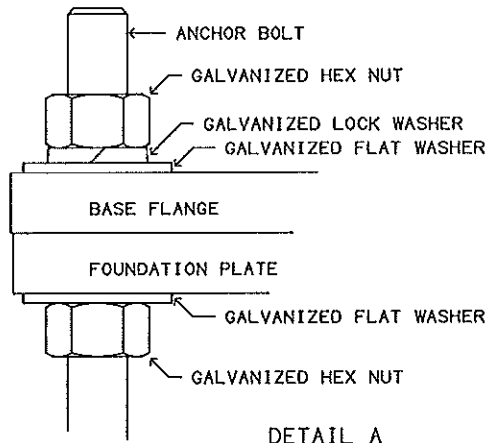
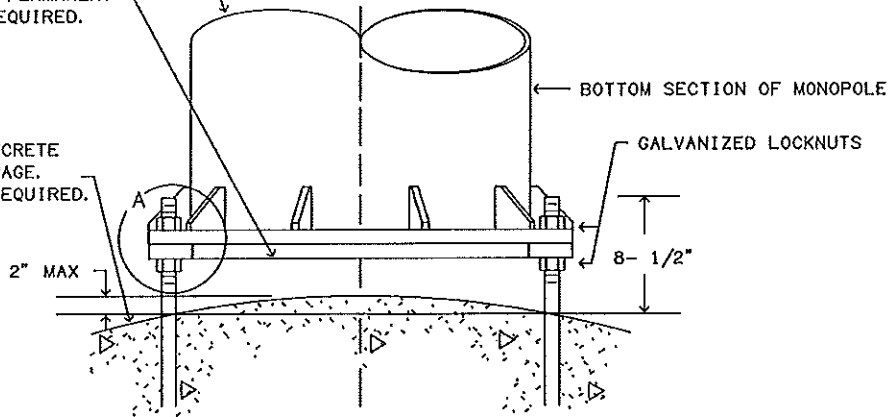
TOWER ANCHOR STEEL PLACEMENT

		AMTRAK AMTRAK-BRANFORD, CT MP48 X 150' ANCHOR STEEL		
APPROVED/ENG.	KWD	7/23/1998	 1545 Pidoa Dr. Plymouth, IN 46563-0128 219-936-4221	
APPROVED/FOUND.	DDA	7/23/1998		
COPYRIGHT 2015				
DRAWN BY	TSD			
From: 76241.DFT - 06/30/98 15:17	ENG. FILE NO.	A-114856-	DRAWING NO.	204007-B
Printed from 204007_0800.DWG - 06/30/1998 15:25 @ 02/18/2015 17:26	ARCHIVE	Q-76241	PAGE	8 OF 9


FOUNDATION PLATE (POLE  
TEMPLATE) P/N 118489.  
DO NOT REMOVE. PERMANENT  
PLACEMENT IS REQUIRED.

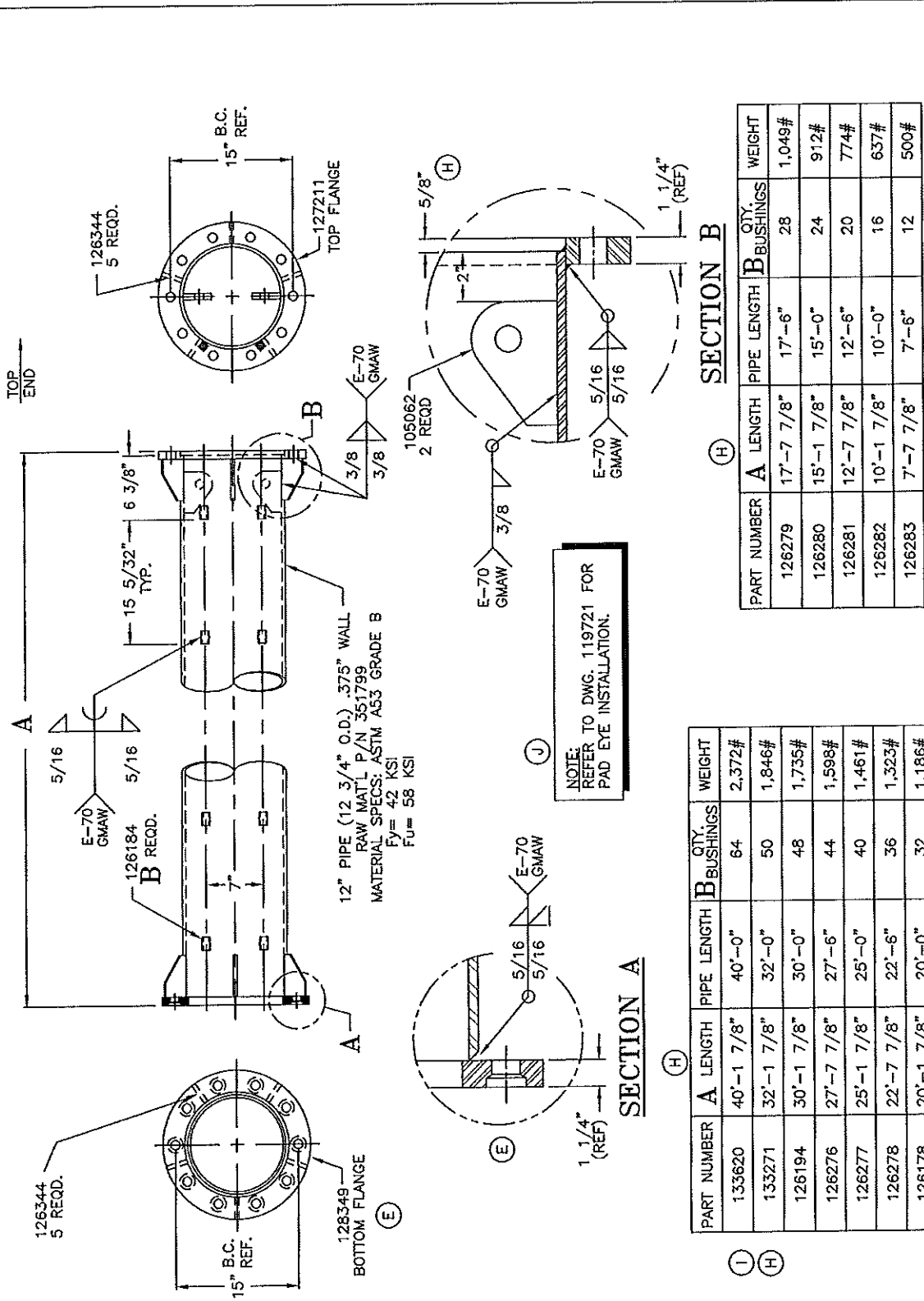
LEVEL AND PLUMB BASE SECTION  
PRIOR TO ERECTING REMAINDER OF POLE.

CROWN TOP OF CONCRETE  
FOR PROPER DRAINAGE.  
NO GROUTING IS REQUIRED.



TOWER BASE SECTION PLACEMENT

		AMTRAK AMTRAK-BRANFORD, CT MP48 X 150' BASE SECTION PLACEMENT	
		 1545 Pidco Dr. Plymouth, IN 46563-0128 219-936-4221	
APPROVED/ENG.	KWD	7/23/1998	
APPROVED/FOUND.	DDA	7/23/1998	
COPYRIGHT	2015		
DRAWN BY	TSD		
From 76241.DFT - 06/30/98 15:17		ENG. FILE NO. A-114856-	DRAWING NO. 204007-B
Printed from 204007_D900.DWG - 06/30/1998 15:25 @ 02/18/2015 17:26 ARCHIVE		Q-76241	PAGE 9 OF 9



NOTE:  
REFER TO DWG. 119721 FOR  
PAD EYE INSTALLATION.

SECTION B

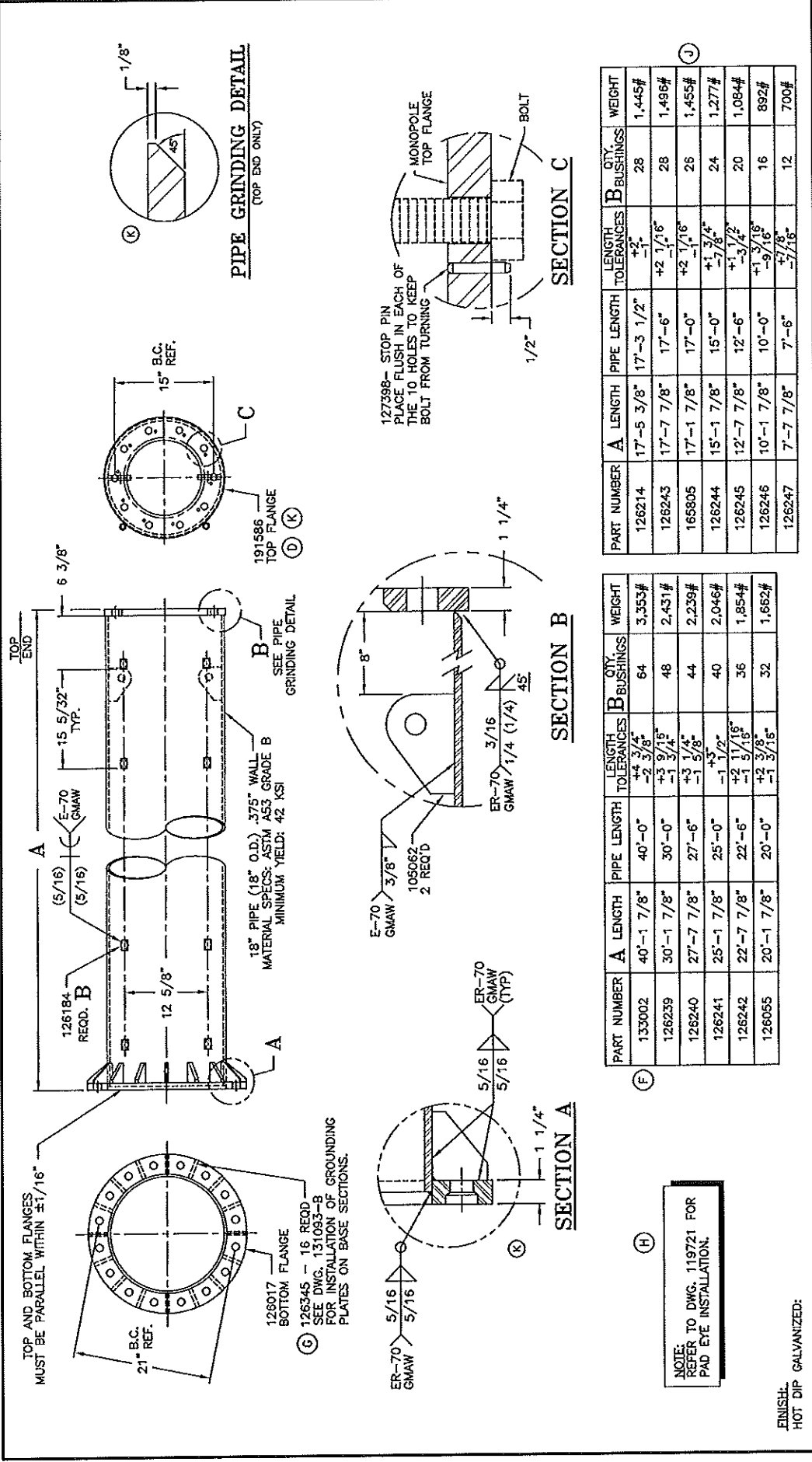
PART NUMBER	A LENGTH	PIPE LENGTH	B BUSHINGS	QTY.	WEIGHT
126279	17'-7 7/8"	17'-6"	28	28	1,049#
126280	15'-1 7/8"	15'-0"	24	24	912#
126281	12'-7 7/8"	12'-6"	20	20	774#
126282	10'-1 7/8"	10'-0"	16	16	637#
126283	7'-7 7/8"	7'-6"	12	12	500#

SECTION A

PART NUMBER	A LENGTH	PIPE LENGTH	B BUSHINGS	QTY.	WEIGHT
133620	40'-1 7/8"	40'-0"	64	64	2,372#
133271	32'-1 7/8"	32'-0"	50	50	1,846#
126194	30'-1 7/8"	30'-0"	48	48	1,735#
126276	27'-7 7/8"	27'-6"	44	44	1,598#
126277	25'-1 7/8"	25'-0"	40	40	1,461#
126278	22'-7 7/8"	22'-6"	36	36	1,325#
126178	20'-1 7/8"	20'-0"	32	32	1,186#

DESCRIPTION OF REVISIONS				APPROVED/ PROD.		DR BY DATE		SCALE		PART NO.	
J	ADDED REF. NOTE	DMF	01/12/99	APPROVED/ ENG.		DR BY DATE		SCALE		PART NO.	
I	ADDED P/N 133620, DIMENSION CHANGE	CJD	4/30/98	WBR 01/12/99		CJD 8/11/95		1" = 12"		126178-B	
H	ADDED P/N 133271 REVISED DIMENSIONS	DMF	01/29/98	APPROVED/ PROD.		SCALE		1" = 12"		PART NO.	
G	REVISED P/N 127345 TO P/N 105062	RCH	4/29/97	KWD 01/12/99						126178-B	
F	REMOVED PAGES 2 AND 3	CJD	04/02/97								
E	BOTTOM FLANGE CHANGE	CJD	4/23/96								
CHG	LEFT	BY	DATE								

**PIROD INC.**  
1545 Pidco Dr.  
Plymouth, IN 46563-0128  
219-936-4221



REV.	DESCRIPTION	DATE	BY	CPD	REVISIONS
K	REVISED WELD SYMBOL TOP FLANGE WAS 128350	04/13/2005	TNS		
J	ADDED P/N 165805 & UPDATED BORDER	05/14/2002	KWD		
I	NEW BORDER AND REVISED WELD NOTE	4/10/01	TRS		
H	ADDED REF. NOTE	1/12/99	DMF		
G	REVISED GUSSETS	5/8/98	RCH		
F	ADDED P/N 133002	12/16/97	RCH		
E	REVISED P/N 127345 TO P/N 105082	4/29/97	RCH		
D	TOP FLANGE PART NUMBER CHANGE	2/13/96	CJD		
C	DESCRIPTION OF REVISIONS				

DESCRIPTION	DR BY	CPD NO.	DRAWING USAGE
18" FLUSH MOUNT MONOPOLE SECTION INTERNAL FLANGE WITH REMOVABLE RUNGS	CJD	08/09/1995	SHOP

PROPRIETARY NOTE:	TOLEANCE NOTE:
THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.	TOLERANCES ON DIMENSIONS UNLESS OTHERWISE NOTED ARE (PLUS OR MINUS) MACHINING 0.030" AND STRUCTURAL 0.060". BENDS ARE (+ OR -) 1/2 DEGREE.

FINISH:	HOT DIP GALVANIZED:

NOTE:
REFER TO DWG. 119721 FOR PAD EYE INSTALLATION.

DESCRIPTION	QTY.	WEIGHT
126214	28	1,445#
126243	28	1,486#
165805	26	1,455#
126244	24	1,277#
126245	20	1,084#
126246	16	892#
126247	12	700#

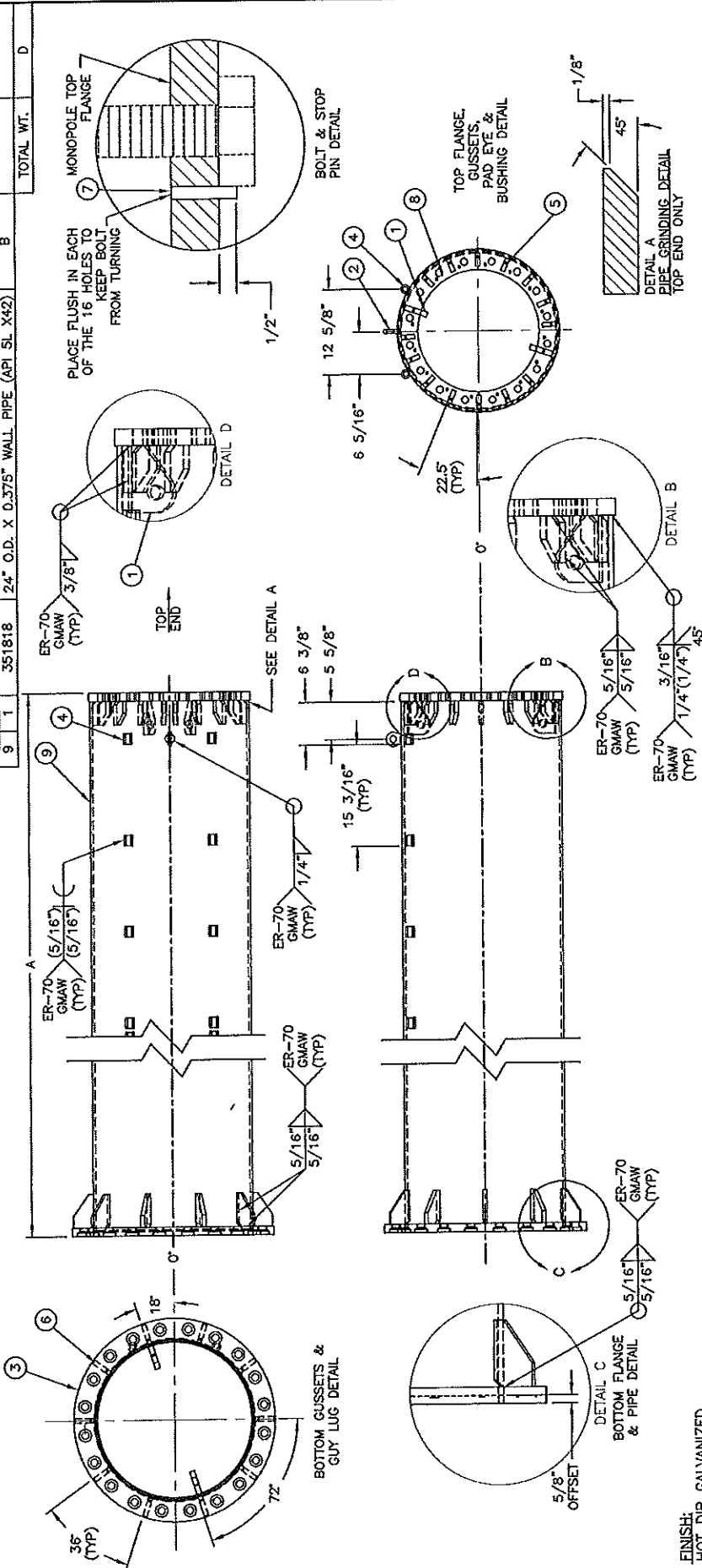
**valmont**  
 1-877-467-4763 Plymouth, IN  
 1-888-880-8191 Salem, OR

PART NO. 126055  
 DWG. NO. 126055

ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	2	105062	GUY LUG (1 1/16" DIA. HOLE)	5"	2.71#	5.42#
2	4	119730	#4 PADEYE	2 3/8"	0.51#	2.04#
3	1	126018	24" FLUSH BOTTOM FLANGE FINISHED	30 3/8" DIA	81.85#	81.85#
4	C	126184	SLEEVE REMOVABLE STEP MOUNTING	1 9/16"	0.44#	
5	14	126342	5/8" THICK MONOPOLE GUSSET	3 1/2"	0.71#	9.94#
6	10	126345	5/8" THICK MONOPOLE GUSSET	5"	1.61#	16.10#
7	16	127398	3/8" STOP PIN FOR MONOPOLE FLANGE	1 3/4"	0.25#	4.00#
8	1	191587	24" MP FLUSH MOUNT TOP FLANGE	24 3/8" DIA.	66.90#	66.90#
9	1	351818	24" O.D. X 0.375" WALL PIPE (API 5L X42)	B		D
TOTAL WT.						

NOTE:  
REFER TO DWG. 119721  
ITEM 5 AT TOP OF MP.  
3) SEE DWG. 131093-B  
FOR INSTALLATION OF GROUNDING  
PLATES ON BASE SECTION.

HEAVY STAMP  
PART NUMBER



FINISH:  
HOT DIP GALVANIZED.

**valmont**  
1-877-467-4763 Plymouth, IN  
1-888-890-9191 Salem, OR

DESCRIPTION: 24" MONOPOLE SECTION INTERNAL FLANGE WITH REMOVABLE RUNGS

DR BY: CJD 05/24/2000  
ENG. APPROVAL: TBC 11/15/2006

DWG. NO.: 126056

PART NO.: SEE TABLE

DRAWING USAGE: SHOP

CHECKED BY: KWD 11/15/2006

PAGE OF: 2

PROPRIETARY NOTE:  
THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

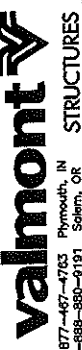
TOLERANCE NOTE:  
DIMENSIONS UNLESS OTHERWISE NOTED ARE TOLERANCES ON DIMENSIONS MACHINING 0.030" AND STRUCTURAL 0.060". BENDS ARE (+ OR -) 1/2 DEGREE.

REV.	DESCRIPTION OF REVISIONS	SPD	BY	DATE
M	ROTATED BOTTOM GUSSETS, ADDED FLANGE DETAIL	3840	BTJ	11/14/2006
L	REDRAWN, UPDATED, ADDED P/N 196935	3810	BTJ	10/19/2005
K	REVISED WELD, ADDED CHAMFER, TOP FL WAS 126009	3741	TNS	04/04/2005
J	ADDED SLEEVE DIMENSION	2724	TRS	08/24/2001
I	ADDED P/N 14-1114		DLK	05/23/2000
H	ADDED REF. NOTE		DMF	07/12/1999
G	ADDED P/N 136181		RCH	07/12/1999

HEAVY STAMP  
PART NUMBER

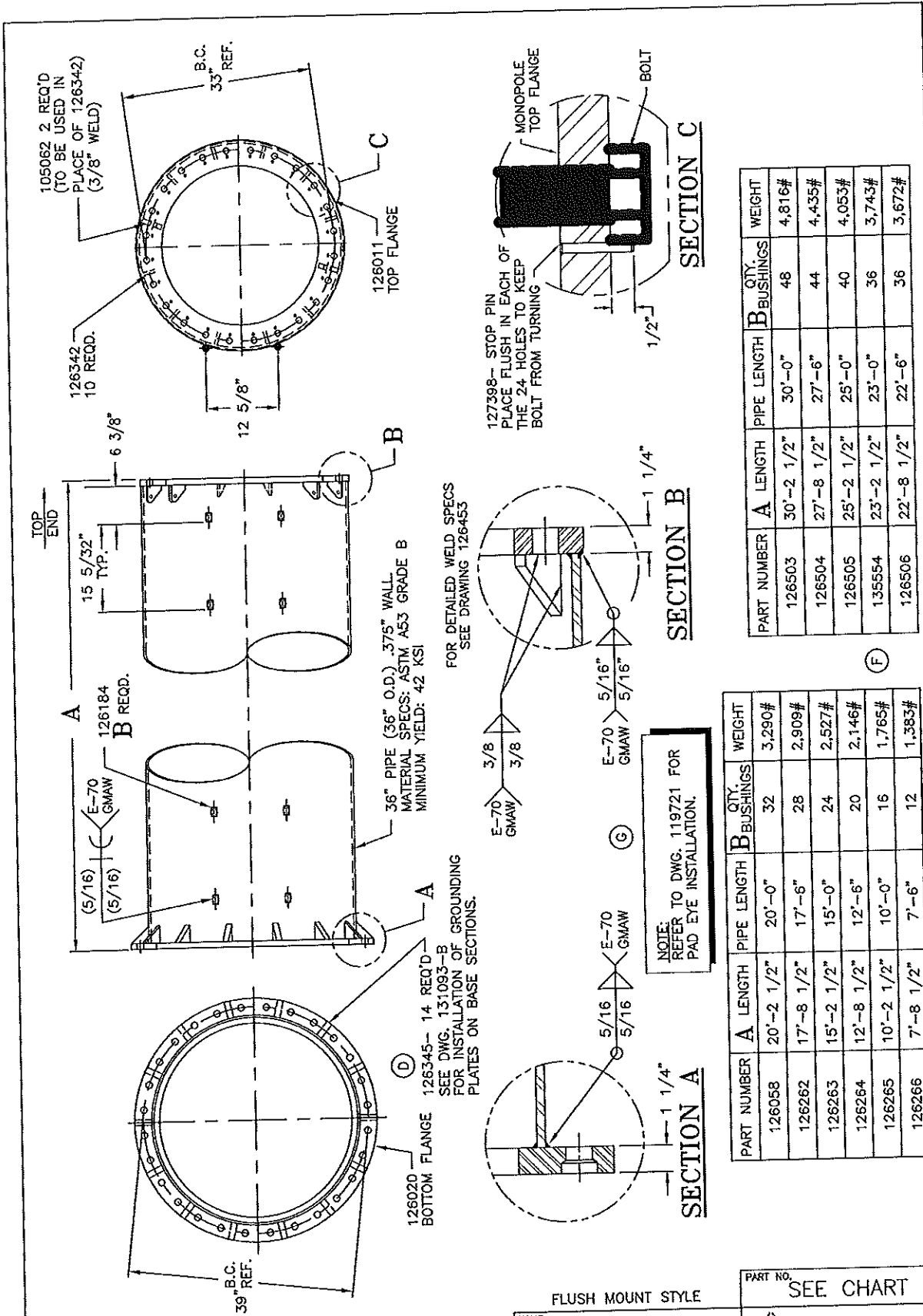
PART NUMBER	A LENGTH	B PIPE LENGTH	LENGTH TOLERANCES	C QTY. BUSHINGS	D GALVANIZED WT.
132676	40'-1 7/8"	40'-0"	+4 3/4" -2 3/8"	84	4199.17#
195935	38'-1 7/8"	38'-0"	+4 15/32" -2 15/64"	60	3998.62#
135298	35'-1 7/8"	35'-0"	+4 3/16" -2 3/32"	56	3698.72#
126248	30'-1 7/8"	30'-0"	+3 9/16" -1 3/4"	48	3198.27#
126249	27'-7 7/8"	27'-6"	+3 1/4" -1 5/8"	44	2948.04#
126250	25'-1 7/8"	25'-0"	+3 -1 1/2"	40	2697.82#
126251	22'-7 7/8"	22'-6"	+2 11/16" -1 5/16"	36	2447.98#
126056	20'-1 7/8"	20'-0"	+2 3/8" -1 3/16"	32	2197.57#
126252	17'-7 7/8"	17'-6"	+2" -1"	28	1947.14#
126253	15'-1 7/8"	15'-0"	+1 3/4" -7/8"	24	1696.92#
126254	12'-7 7/8"	12'-6"	+1 1/2" -3/4"	20	1446.68#
126255	10'-1 7/8"	10'-0"	+1 3/16" -9/16"	16	1196.48#
126256	7'-7 7/8"	7'-6"	+7/8" -7/16"	12	946.24#
136181	6'-1 7/8"	6'-0"	+7/8" -7/16"	10	796.29#
141114	2'-7 7/8"	2'-5"	+9/16" -5/32"	4	445.79#

FINISH:  
HOT DIP GALVANIZED.

 <p>1-877-467-4763 Plymouth, IN 1-888-880-9191 Salem, OR</p>		<p>DESCRIPTION 24" MONOPOLE SECTION INTERNAL FLANGE WITH REMOVABLE RUNGS</p>		<p>PART NO. SEE CHART DWG. NO. 126056</p>	
<p>PROPRIETARY NOTE: THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE THE PROPERTY OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.</p>		<p>DR BY: CJD 05/24/2000 ENG. APPROVAL: TBC 11/15/2006 CHECKED BY: KWD 11/15/2006</p>		<p>DRAWING USAGE: SHOP CPD NO. 05/24/2000</p>	
<p>TOLERANCE NOTE: TOLERANCES ON DIMENSIONS UNLESS OTHERWISE NOTED ARE (PLUS OR MINUS) MACHINING 0.030" AND STRUCTURAL 0.060". BENDS ARE (+ OR -) 1/2 DEGREE.</p>		<p>REV. DESCRIPTION OF REVISIONS</p>		<p>CPD BY DATE</p>	
M	ROTATED BOTTOM GUSSETS, ADDED FLANGE DETAIL	3840	BTJ	11/14/2006	
L	REDRAWN, UPDATED, ADDED P/N 195935	3810	BTJ	10/19/2005	
K	REVISED WELD, ADDED CHAMFER, TOP FL WAS 126008	3741	TNS	04/04/2003	
J	ADDED SLEEVE DIMENSION	2724	TRS	08/24/2001	
I	ADDED P/N 141114		DLK	05/23/2000	
H	ADDED REF. NOTE		DMF	01/12/1999	
G	ADDED P/N 136181		RCH	01/12/1998	







REV	DESCRIPTION OF REVISIONS	BY	DATE
G	ADDED REF. NOTE	DMF	01/12/99
F	ADDED P/N 135554	RCH	12/15/98
E	REVISED GUSSET ORIENTATION	RCH	09/24/98
D	REVISED GUSSET ORIENTATION	RCH	09/24/98
C	REVISED P/N 127345 TO P/N 105062	RCH	04/29/97
B	WELD / SPRING PIN CHANGES	CJD	02/26/96

NAME	36" MONOPOLE SECTION INTERNAL FLANGE WITH REMOVABLE RUNGS	
APPROVED/ ENG.	DR BY	DATE
WBR 01/12/99	CJD	8/9/95
APPROVED/ PROD.	SCALE	
KWD 01/12/99	3/4" = 12"	

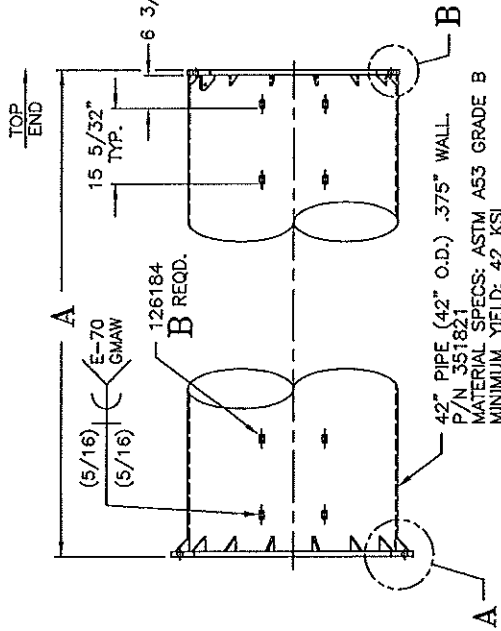
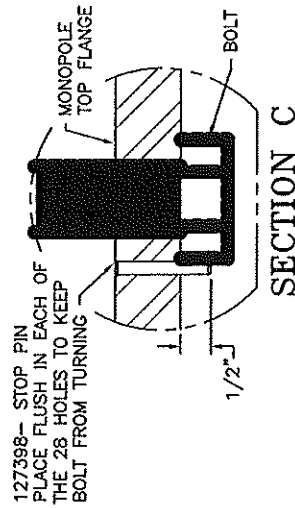
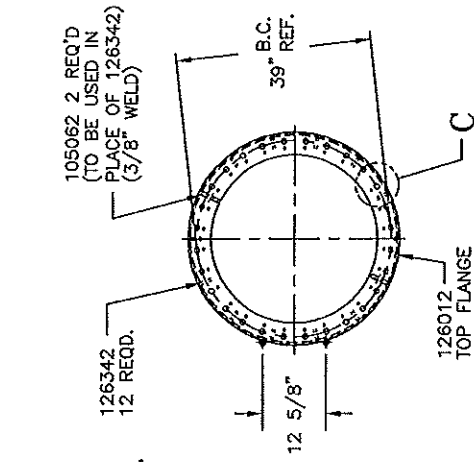
PART NO. SEE CHART

1545 Pidco Dr.  
Plymouth, IN 46563-0128  
219-936-4221

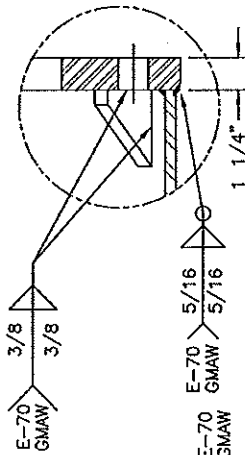
DWG. NO. 126058-B

PART NUMBER	A LENGTH	PIPE LENGTH	B BUSHINGS	QTY.	WEIGHT
126503	30'-2 1/2"	30'-0"	48	48	4,816#
126504	27'-8 1/2"	27'-6"	44	44	4,435#
126505	25'-2 1/2"	25'-0"	40	40	4,053#
135554	23'-2 1/2"	23'-0"	36	36	3,743#
126506	22'-8 1/2"	22'-6"	36	36	3,672#

PART NUMBER	A LENGTH	PIPE LENGTH	B BUSHINGS	QTY.	WEIGHT
126058	20'-2 1/2"	20'-0"	32	32	3,290#
126262	17'-8 1/2"	17'-6"	28	28	2,909#
126263	15'-2 1/2"	15'-0"	24	24	2,527#
126264	12'-8 1/2"	12'-6"	20	20	2,146#
126265	10'-2 1/2"	10'-0"	16	16	1,765#
126266	7'-8 1/2"	7'-6"	12	12	1,383#

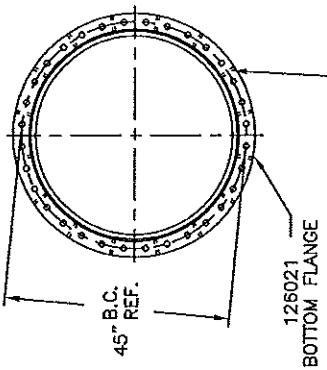


FOR DETAILED WELD SPECS  
SEE DRAWING 126453

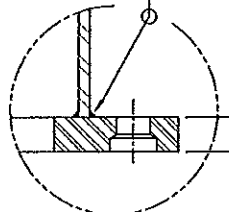


**SECTION B**

PART NUMBER	A LENGTH	PIPE LENGTH	QTY BUSHINGS	WEIGHT
128862	30'-2 1/2"	30'-0"	48	5,456#
135909	27'-8 1/2"	27'-6"	44	5,038#
135912	25'-2 1/2"	25'-0"	40	4,620#
126059	20'-2 1/2"	20'-0"	32	3,783#
126267	15'-2 1/2"	15'-0"	24	2,947#
126268	10'-2 1/2"	10'-0"	16	2,110#



126345- 16 REQ'D  
SEE DWG. 131093-B  
FOR INSTALLATION OF  
PLATES ON BASE SECTIONS.



**SECTION A**

NOTE:  
REFER TO DWG. 119721 FOR  
PAD EYE INSTALLATION.

REV	DESCRIPTION OF REVISIONS	BY	DATE	APPROVED/ ENG.	DR BY	DATE
G	ADDED REF. NOTE	DMF	01/12/99			
F	ADDED P/N'S 135909 AND 135912	RCH	10/12/98			
E	REVISED GUSSET ORIENTATION	RCH	09/24/98			
D	REVISED GUSSETS	RCH	5/08/98			
C	REVISED P/N 127345 TO P/N 105062	RCH	04/29/97			
B	ADDED P/N 128862	CDP	6/13/96	WBR	01/12/99	CJD 8/9/95
A	WELD / SPRING PIN CHANGES	CJD	02/28/96			

FLUSH MOUNT STYLE  
42" MONOPOLE SECTION  
INTERNAL FLANGE WITH  
REMOVABLE RUNGS

PART NO. SEE CHART

1545 Pidco Dr.  
Plymouth, IN 46563-0128  
219-936-4221

DWG. NO. 126059-B

WRITE P/N IN YELLOW

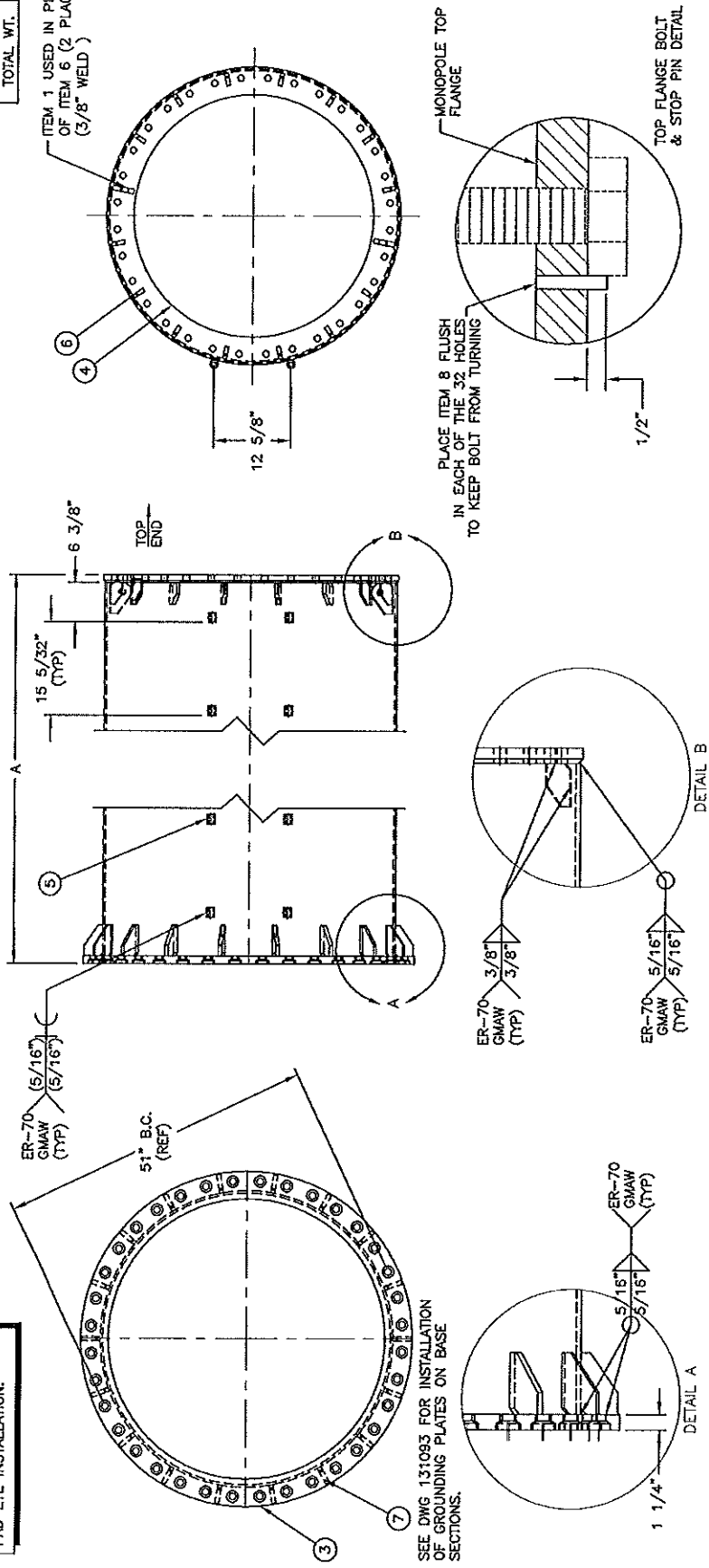
PART NUMBER	A LENGTH	B PIPE LENGTH	C QTY. BUSHINGS	D GALV. WEIGHT
150441	30'-2 1/2"	30'-0"	48	5.17#
163534	27'-2 1/2"	27'-0"	44	5.14#
126060	20'-2 1/2"	20'-0"	32	4.507#
126269	15'-2 1/2"	15'-0"	24	3.502#
126270	10'-2 1/2"	10'-0"	16	2.497#

Parts List

ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	2	105062	GUY LUG (1 1/16" HOLE)	5"	2.71#	5.42#
2	10	119730	#4 PAD EYE	2 3/8"	0.51#	5.10#
3	1	126013	48" M.P. FLUSH TOP FLANGE	48 3/8"	208.00	208.00#
4	1	126022	48" FLUSH BOTTOM FLANGE FINISHED	54 3/8"	223.00	223.00#
5	C	126184	BUSHING- REMOVABLE STEP MOUNTING	1 9/16"	0.44	
6	14	126342	2" X 3 1/2" X 5/8" M/P GUSSET	3 1/2"	0.71	9.94#
7	18	126345	3" X 5" X 5/8" M/P GUSSET	5"	1.61	28.98#
8	32	127398	3/8" SPRING PIN	1 3/4"	0.25	8.00#
9	1	351822	48" O.D. x .375" WALL PIPE (API 5L X42)	B		
					TOTAL WT.	D

ITEM 2 INFORMATION

NOTE: REFER TO DWG. 119721 FOR PAD EYE INSTALLATION.



**valmont** STRUCTURES  
 1-877-487-4763 Plymouth, IN  
 1-888-886-9191 Salem, OR

DESCRIPTION  
**48" MONOPOLE SECTION - INTERNAL FLANGE, REMOVABLE RUNGS - FLUSH MOUNT STYLE**

DR BY: CJD 08/09/1995  
 ENG. APPROVAL: TBC 12/12/2006  
 DRAWING USAGE: SHOP  
 CHECKED BY: MVC 12/12/2006  
 PART NO.: 126060

REV.	DESCRIPTION OF REVISIONS	CPD	DATE
H	REDRAWN, ADDED GUSSET TO DETAIL A	3840	BTJ 12/08/2006
G	ADDED P/N 163534	3023	KWD 03/21/2002
F	ADDED P/N 150441	2229	DLK 07/11/2000
E	ADDED REF. NOTE		DMF 01/12/1999
D	REVISED GUSSET ORIENTATION		RCH 09/24/1998
C	REVISED GUSSETS		RCH 05/08/1998
B	REVISED P/N 127345 TO P/N 105062		RCH 04/29/1997
A	WELD/ SPRING PIN CHANGES		CJD 02/28/1996



**TOWER ELEVATION PHOTO**

PROJECT INFORMATION:

**150'  
SELF-SUPPORTING  
POLE STRUCTURE**

**TOWER MAPPING**

PROJECT NAME:

**AMTRAK-BRANFORD**

SITE NUMBER:

**CT11024B**

**Hosley Ave  
Branford, CT 06406  
(New Haven County)**

MAPPING DATE:

01/13/2015

LATITUDE: N 41° 17' 0.06" N 41.283349°

LONGITUDE: W 72° 50' 57.72" W 72.849368°

GROUND ELEVATION (AMSL): 55-FT

TOWER MANUFACTURER: Pirod

TOWER MODEL OR SERIAL #: -

STRUCTURE HEIGHT: 151'-10"

FCC REGISTRATION: -

TABLE OF CONTENTS

PAGE #	DESCRIPTION
1	Title Sheet
2	Compound Plan Sketch
3	Base Plate / Top of Foundation Details
4	Ladder
5-6	Hand Hole Rims
7	Tower Elevation
8	Feedlines
9-12	Appurtenances & Mounts

FIELD AGENTS:

**Robert J. Danze**

**Will C. Hinkle**

PLANS PREPARED FOR:

36 British American Blvd  
Suite 101  
Latham, NY 12110  
Phone: (518) 783-1630  
Fax: (518) 783-1544

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**vertical  
solutions**  
\*execute & deliver\*

REV	DATE:	Issued For:
0	1/21/15	Tower Mapping Final Report

SIGNATURE OF CREW LEADER:

*Will Hinkle*

VSI #: 141341

DRAWN BY: HLM

CHECKED BY: MRM

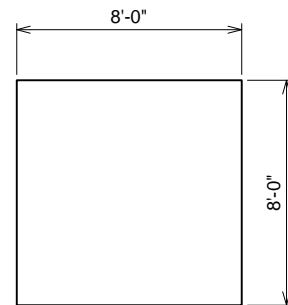
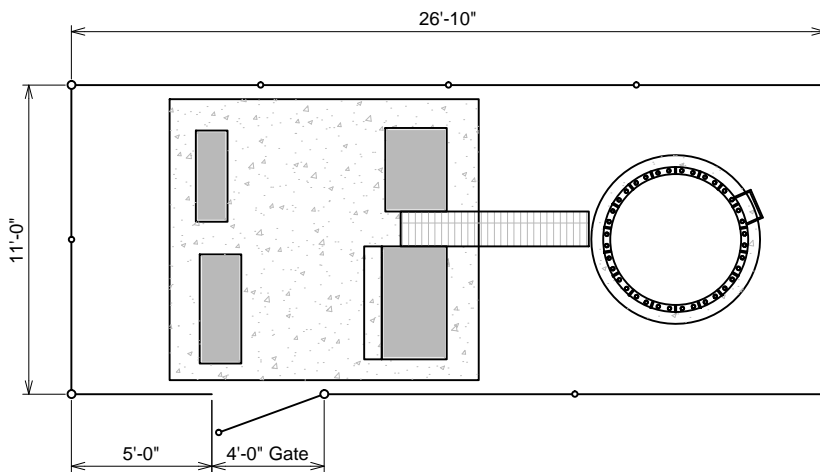


113 Edinburgh S. Dr. Suite 130  
 Cary, NC 27511  
 o) 888-321-6167  
 f) 919-321-1768  
 www.verticalsolutions-inc.com

# TOWER MAPPING REPORT

Site Name Amtrak-Branford  
 VSI # 141341  
 Client# CT11024B  
 Date 1/21/2015  
 Page 2 of 12

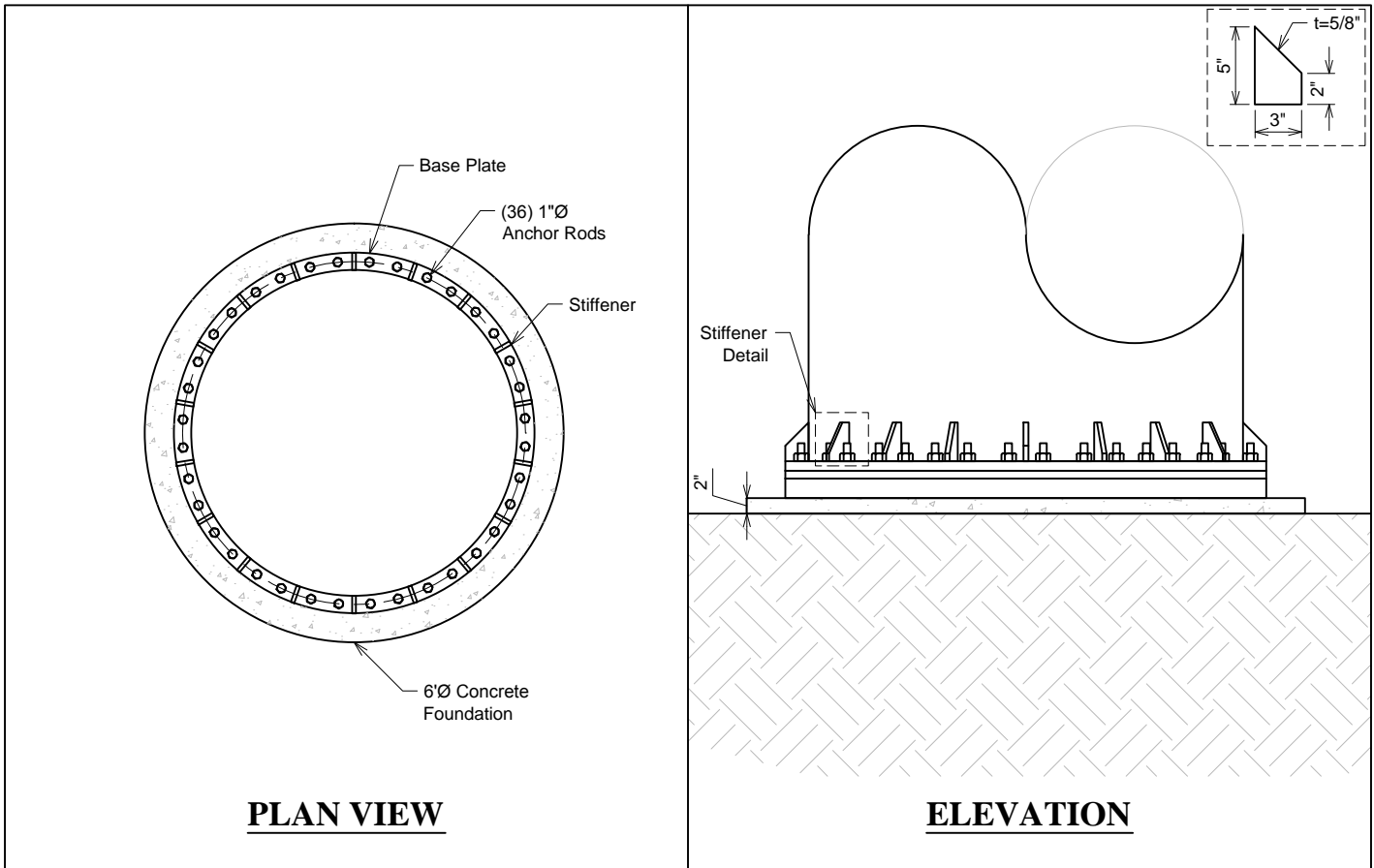
## COMPOUND PLAN SKETCH



Gate Combo	Key
Pedestal # & Location	-
Telephone Company	-
Power Company	-

Carrier	Site ID	Meter #
T-Mobile	CT11024B	26 439 590
-	-	13 992 246
-	-	24 766 2--

**BASE PLATE / TOP OF FOUNDATION DETAILS**



**Anchor Rod Information**

Qty.	Size	Bolt Circle
36	1"	51"

**Base Plate Information**

**Stiffener**

Dimensions	Thickness	Qty	Dimensions
54"	1 1/4"	18	See Above

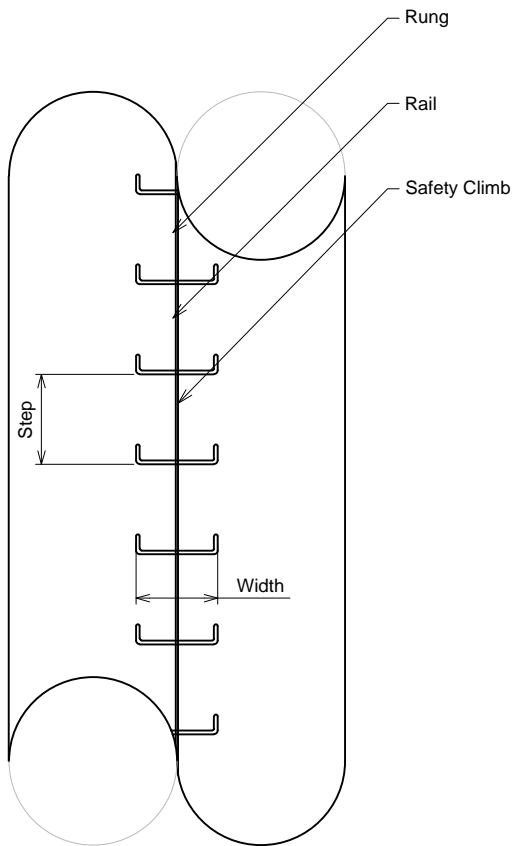
**Foundation Information**

Dimensions	Projection Above Ground
6'Ø	2"

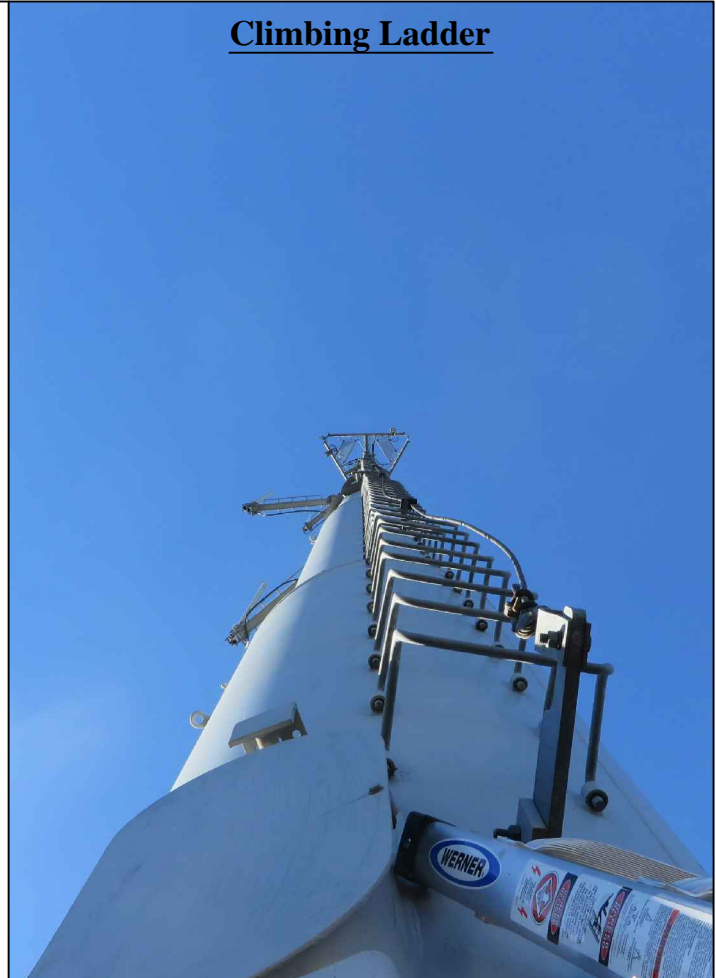
**APPENDIX C**

**LADDER AND WAVEGUIDE**

**Climbing Ladder Sketch**



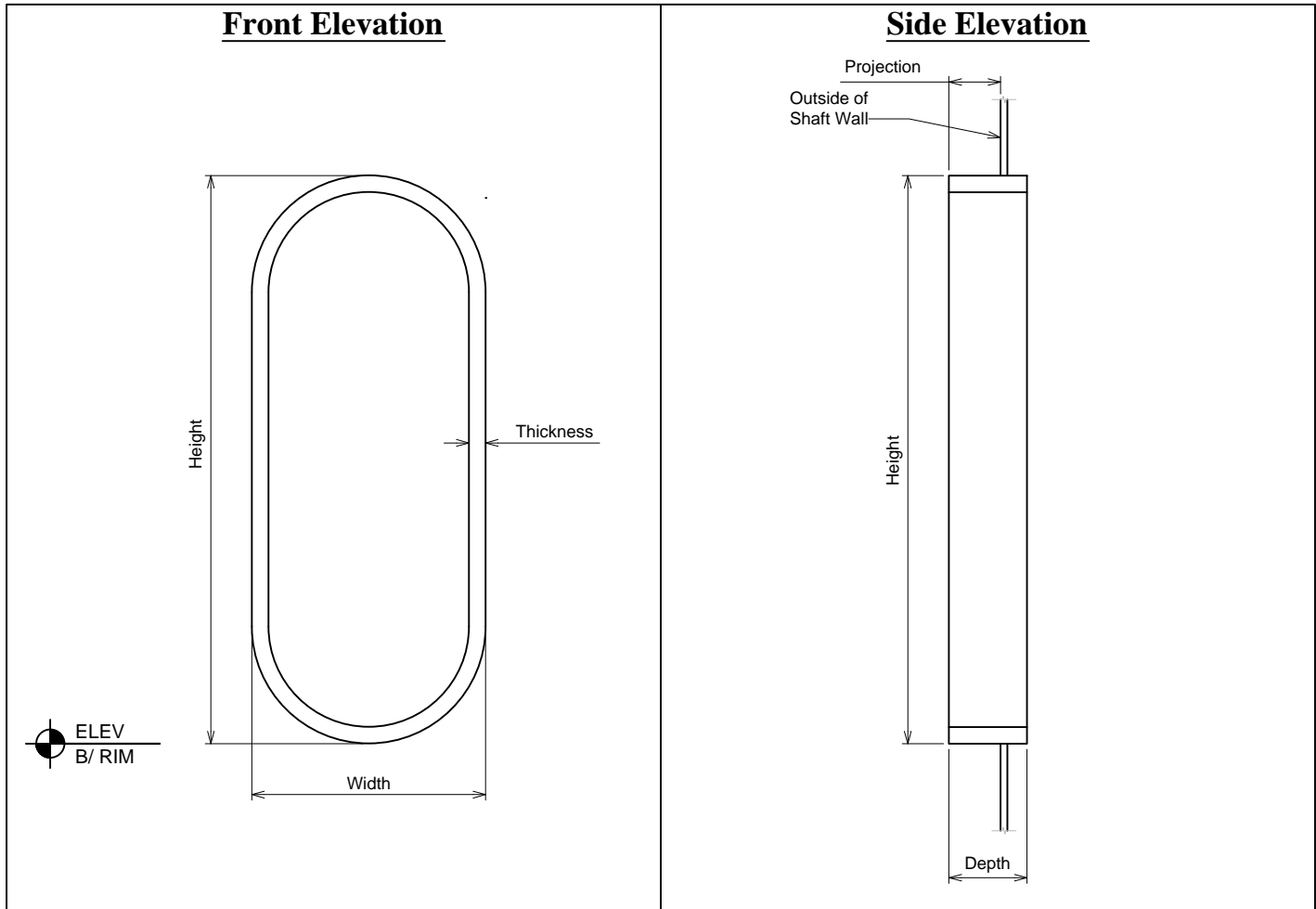
**Climbing Ladder**



Ladder #	Flats #	Height	Width	Step	Rung	Safety Wire
1	-	11'	13"	15"	SR 20/32"Ø	3/8"Ø Stranded



**HAND HOLE RIMS**



#	Elevation	Width	Height	Thickness	Depth	Projection	Cardinal Direction	Description
1	16"	13'	26"	1"	6"	4"	S	4'-6" From SC
2	16"	13'	26"	1"	6"	4'-4"	-	7'-0" From SC
3	8'-6"	13'	26"	1"	6"	4'-4"	N	6" From SC
4	50'	4"	10"	1/4"	3"/8"	1"/5"	NE, SE, SW	4'-6" From SC
5	70'	4"	9"	1/4"	3"/8"	1"/5"	NE, SE, SW	3'-6" From SC
6	90'	4"	9"	1/4"	3"/8"	1"/5"	NE, SE, SW	3'-0" From SC



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# TOWER MAPPING REPORT

Site Name Amtrak-Branford

VSI # 141341

Client# CT11024B

Date 1/21/2015

Page 6 of 12

## HAND HOLE RIMS CONTINUED



#	Elevation	Width	Height	Thickness	Depth	Projection	Cardinal Direction	Description
7-9	106'-9"	4"	6"/9"	1/4"	3"/8"	1"/5"	NE, SE, SW	3'-0" From SC
10-12	107'-9"	4"	6"/9"	1/4"	3"/8"	1"/5"	NE, SE, SW	3'-0" From SC
13-15	126'-9"	4"	6"/9"	1/4"	3"/8"	1"/5"	NE, SE, SW	3'-0" From SC
16-18	127'-9"	4"	6"/9"	1/4"	3"/8"	1"/5"	NE, SE, SW	3'-0" From SC
19-21	147'-7"	4"	6"/9"	1/4"	3"/8"	1"/5"	NE, SE, SW	10'-3/4" From SC
22-24	148'-7"	4"	6"/9"	1/4"	3"/8"	1"/5"	NE, SE, SW	10'-3/4" From SC

# STRUCTURE

SECTION	01	02	03	04	05	06	07
LENGTH		20'					30'
PROD PN		126059		126057	126056	126055	
NUMBER OF SIDES				ROUND			
DIAMETER	48"	42"	36"	30"	24"	18"	12"
THICKNESS	0.375"	0.375"	0.375"	0.375"	0.375"	0.375"	0.375"
FLANGE BOLTS	(32) 1"Ø	(32) 1"Ø	(28) 1"Ø	(24) 1"Ø	(20) 1"Ø	(16) 1"Ø	(10) 1"Ø
ANCHOR RODS	(36) 1"Ø	-	-	-	-	-	-

0.0' (Ref)  
T/ Base Plate

20.0'  
B/ Section

40.0'  
B/ Section

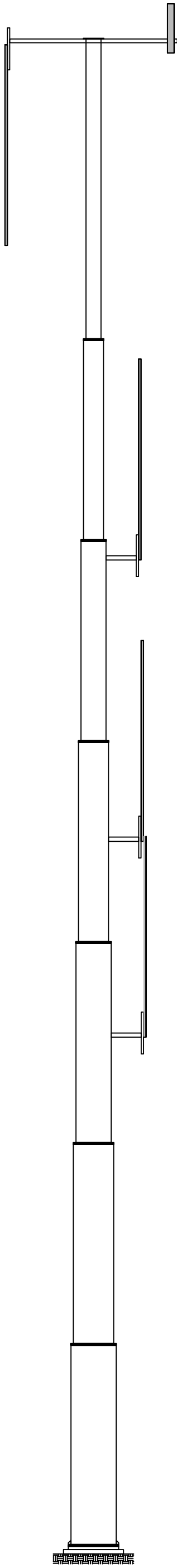
60.0'  
B/ Section

80.0'  
B/ Section

100.0'  
B/ Section

120.0'  
B/ Section

150.0'  
T/ Tower



50'  
P. 9

70'  
P. 10

98'  
P. 11

151'  
P. 12



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## TOWER MAPPING REPORT

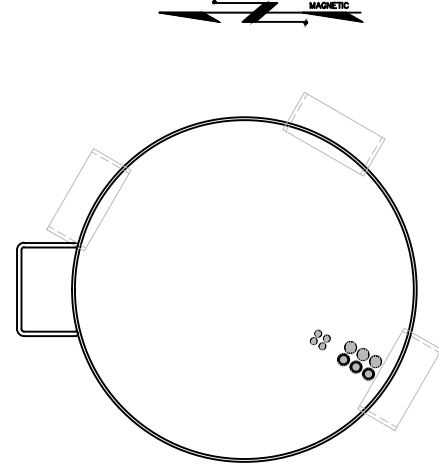
Site Name Amtrak-Branford

VSI # 141341

Client# CT11024B

Date 1/21/2015

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PLAN VIEW  
SCALE: N.T.S

ELEV.	CARRIER	MOUNT	EQUIPMENT		FEEDLINES		
			ANTENNA TYPE	DIMENSIONS	AZIMUTH (±)	QTY.	SIZE
151'	T-Mobile	10'-6" Low Profile Platform	EMS / RR901702DP	59" x 8" x 2.8"	30°, 150°, 270°	6	1 1/4"
	Amtrak		Wireless / TMA	12" x 6" x 4"			1/2"
	Amtrak		Inverted Omni	6'			
98'	Amtrak	6' Side Arm	Panel	12" x 12" x 3"	N/A	1	1/2"
70'	Amtrak	6' Side Arm	Omni	20'	N/A	1	1/2"
50'	Amtrak	6' Side Arm	Omni	20'	N/A	1	1/2"

NOTES:  
1. X DENOTES APPURTENANCE HEIGHT IN FT. (REF. BASE PLATE)  
Y DENOTES PAGE NUMBER OF MAPPING REPORT TO REFER FOR MORE DETAIL.



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# TOWER MAPPING REPORT

Site Name Amtrak-Branford

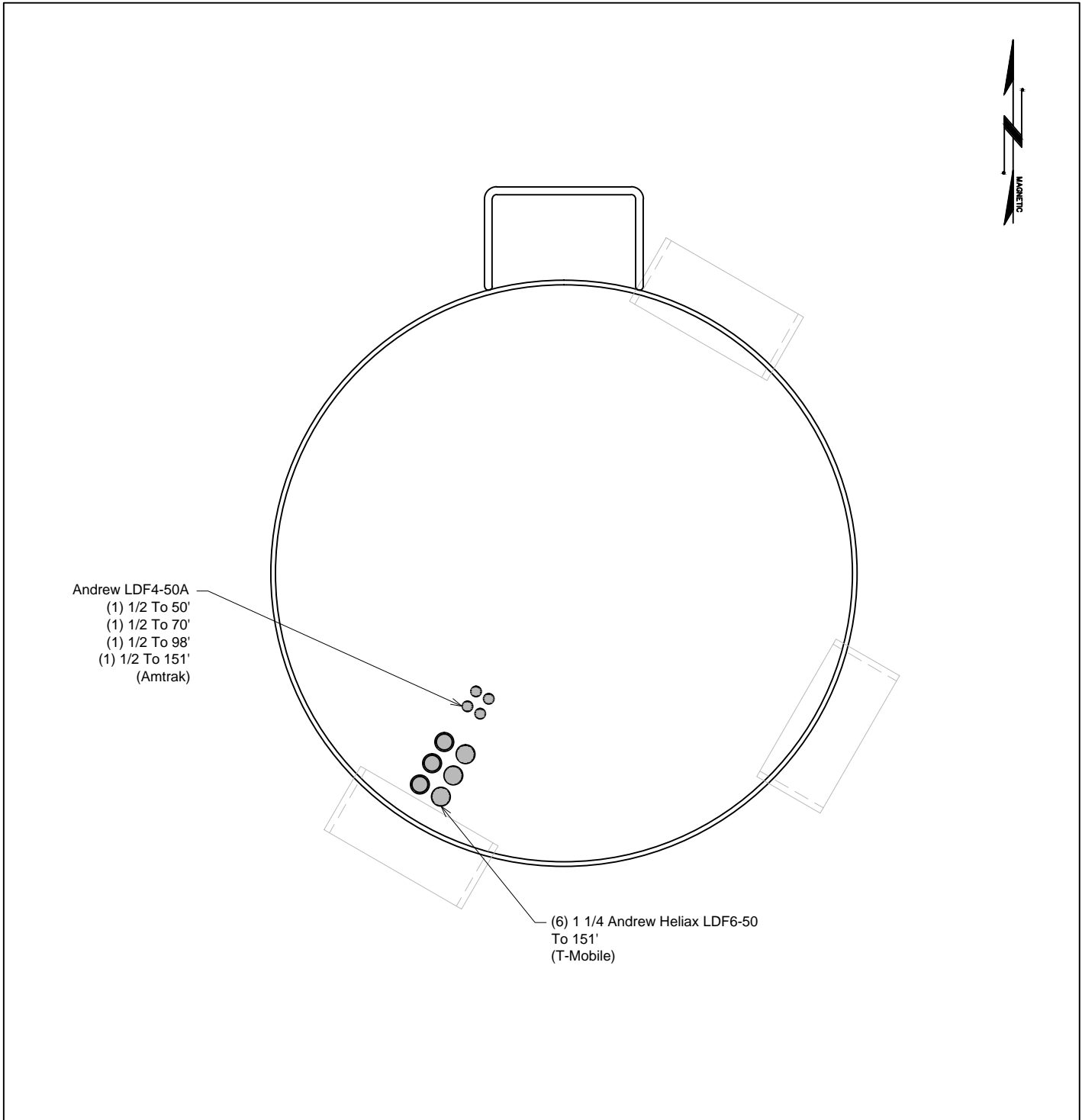
VSI # 141341

Client# CT11024B

Date 1/21/2015

Page 8 of 12

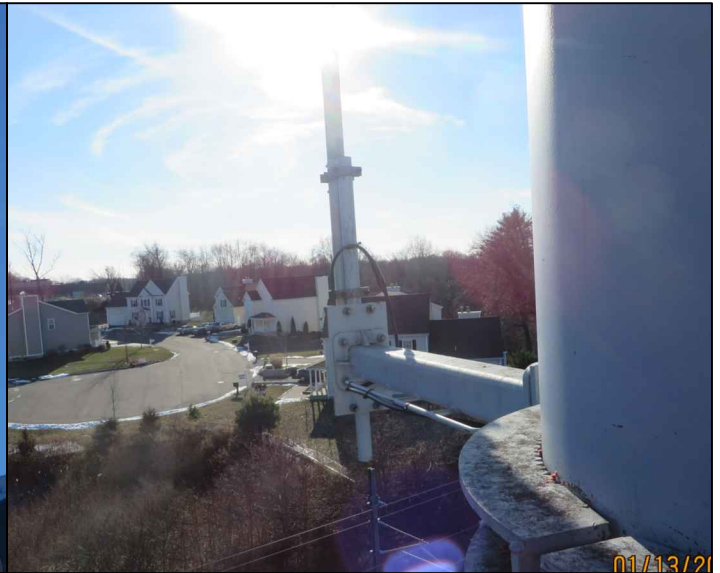
## FEEDLINES



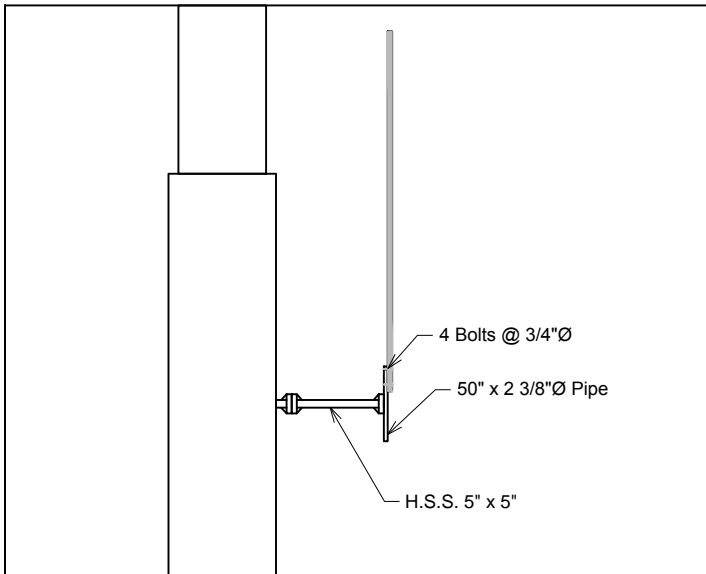
**ANTENNA AND MOUNT**



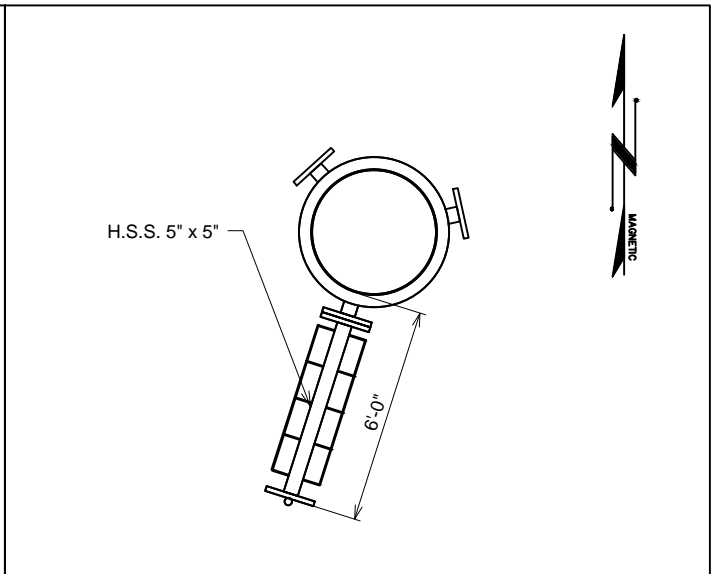
**Photo From Ground**



**Photo From Tower**



**Elevation View**



**Plan View**

Elevation	Carrier	Mount Type	Leg
50'	Amtrak	6' Side Arm	-
Appurtenances		Feedlines	
Type	Dimensions	Azimuth ±	Quantity
Omni	20'		1
			Size
			1/2

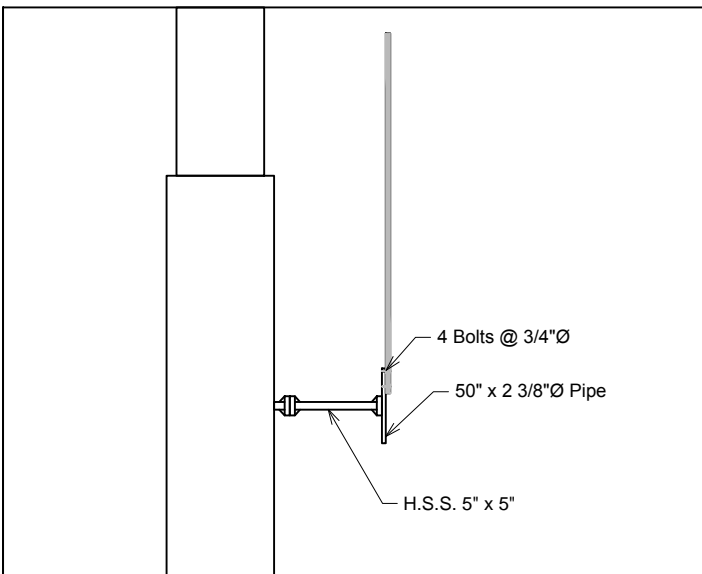
**ANTENNA AND MOUNT**



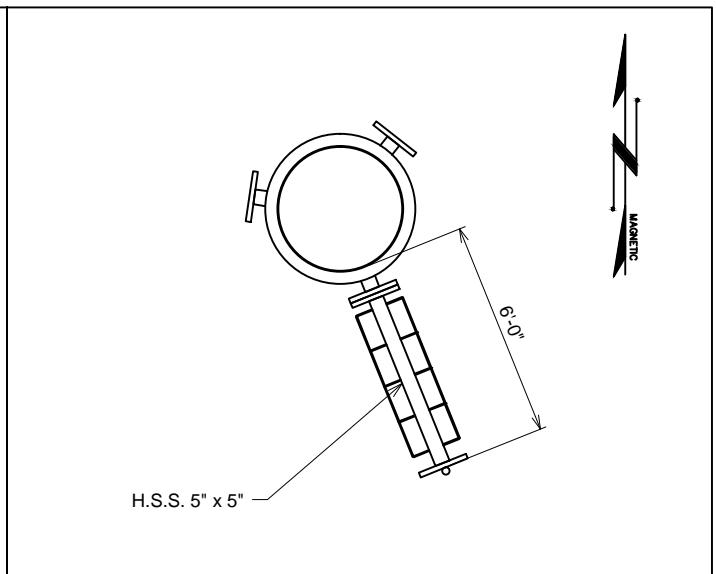
**Photo From Ground**



**Photo From Tower**



**Elevation View**



**Plan View**

Elevation	Carrier	Mount Type	Leg
70'	Amtrak	6' Side Arm	-
Appurtenances			Feedlines
Type	Dimensions	Azimuth ±	Quantity
Omni	20'		1
			Size
			1/2



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# TOWER MAPPING REPORT

Site Name Amtrak-Branford  
 VSI # 141341  
 Client# CT11024B  
 Date 1/21/2015  
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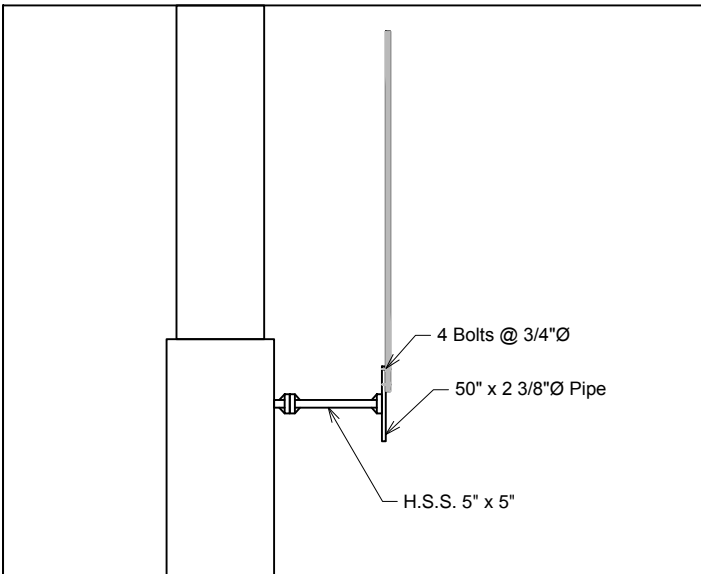
## ANTENNA AND MOUNT



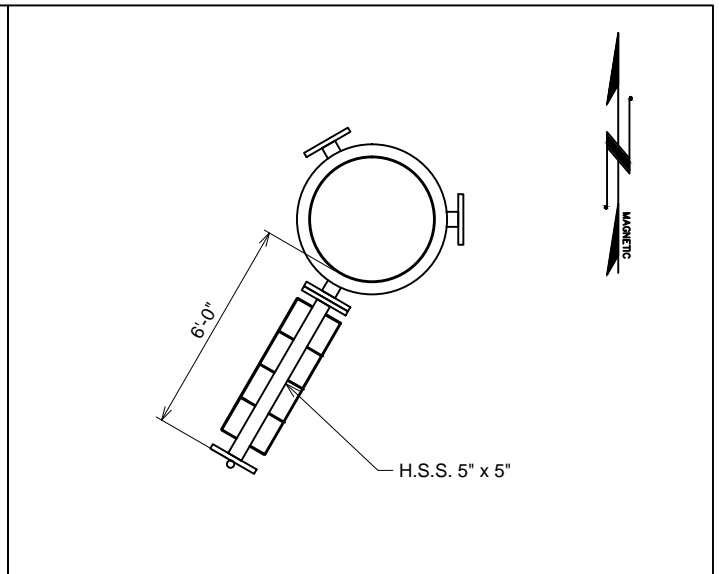
**Photo From Ground**



**Photo From Tower**



**Elevation View**



**Plan View**

Elevation	Carrier	Mount Type	Leg
98'	Amtrak	6' Side Arm	-
Appurtenances			Feedlines
Type	Dimensions	Azimuth ±	Quantity
Omni	20'		1
			Size
			1/2



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# TOWER MAPPING REPORT

Site Name Amtrak-Branford  
 VSI # 141341  
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 Date 1/21/2015  
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## ANTENNA AND MOUNT



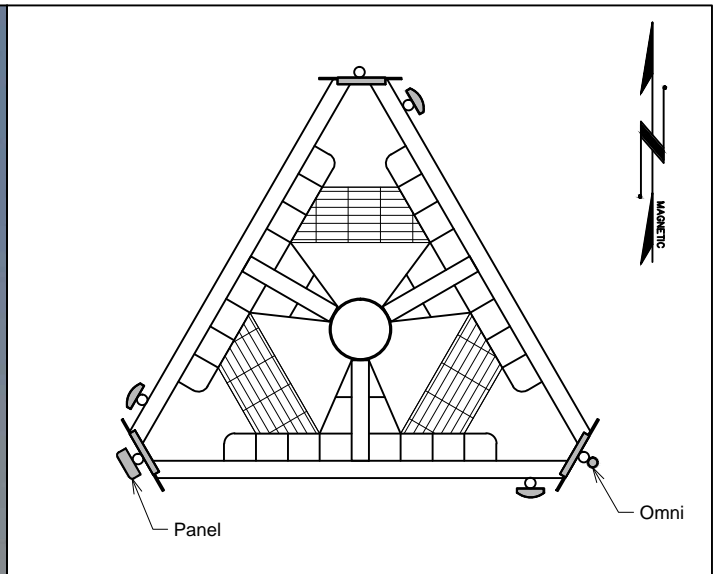
**Photo From Ground**



**Photo From Tower**



**Antenna Label**



**Plan View**

Elevation	Carrier	Mount Type	Leg
151'	T-Mobile	10'-6" Low Profile Platform	-
Appurtenances		Feedlines	
Type	Dimensions	Azimuth ±	Quantity
(3) EMS Wireless/RR901700DP	59" x 8" x 2.8"	30°, 150°, 270°	6
(3) Wireless TMA	12" x 6" x 4"		
Inverted Omni	6'		
Panel	12" x 12" x 3"		1
			1 1/4
			1/2



**APPENDIX D**

Practical Solutions, Exceptional Service

Andrew Strock  
Project Manager – T-Mobile  
4 Sylvan Way  
Parsippany, NJ 07054

May 22, 2017

**RE: TEC. W.O. NO.: 7421.CT11024B  
60 HOSLEY AVENUE  
BRANFORD, CT 06405  
POST MODIFICATION INSPECTION REPORT**

Dear Mr. Strock,

At the request of T-Mobile, Tectonic Engineering and Surveying Consultants, P.C. (TECTONIC) is pleased to submit this "Post Modification Inspection Report" for the modification/reinforcement to the subject structure located at the address noted above. The purpose of the report is to confirm that the modifications as installed are in accordance with the documents listed below.

- Structural Analysis Report – Rev 2 (Reinforcement Design) prepared by TECTONIC, W.O#: 6421.CT11024B, dated June 4, 2015.
- Shop drawing "Approved as Noted" – Rev 1, prepared by Aero Solutions Inc., Project #: 589-15-0002, dated February 21, 2017.

A certified inspector from TECTONIC performed a climbing inspection to verify the modification installation on April 26, 2017. A Daily Field Report listing our findings was prepared and attached to this document. Based on our inspection, no deficiencies were noted upon the inspection.

TECTONIC was not present during the construction phase for this project. However, the modifications to the tower are in compliance with the above referenced documents.

Our professional services have been performed using that degree of care and skill ordinarily exercised under similar circumstances by reputable engineers practicing in this or similar situations. The interpretation of the field data is based on sound judgment and experience. However, concealed conditions cannot be

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F. (845) 567-8703

**CORPORATE OFFICE**  
P.O. Box 37  
70 Pleasant Hill Road  
Mountainville, NY 10953  
T. (800) 829-6531

EQUAL OPPORTUNITY EMPLOYER

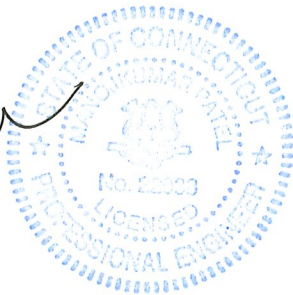
verified beyond the specific points of actual observation, sampling and testing. No other warranty, expressed or implied, is made as to the professional advice included in this report.

Digital Photographs were taken during our inspection, and copies are enclosed herewith for your reference.

Should you have questions, please do not hesitate to contact us.

Sincerely,

**TECTONIC**



Manojkumar Patel, P.E.  
Sr. Project Manager





# G-01: Daily Field Report

<b>Office Location</b>	<input type="checkbox"/> 70 Pleasant Hill Road Mountainville, NY 10953 P: (845) 534-5959 F: (845) 534-5999	<input type="checkbox"/> 29-16 40th Avenue Long Island City, NY 11101 P: (718) 391-9200 F: (718) 391-0607	<input type="checkbox"/> 1344 Silas Deane Highway, Suite 500 Rocky Hill, CT 06067 P: (860) 563-2341 F: (860) 257-4882	<input checked="" type="checkbox"/> 280 Little Britain Road Newburgh, NY 12550 P: (845) 563-9081 F: (845) 563-9085
	<input type="checkbox"/> 36 British American Blvd. Suite 101 Latham, NY 12110 P: (518) 783-1630 F: (518) 783-1544	<input type="checkbox"/> 1279 Route 300 Newburgh, NY 12550 P: (845) 567-6656 F: (845) 567-8703	<input type="checkbox"/> 8639 Mayland Drive, Suite 102 Richmond, VA 23294 P: (804) 217-8504 F: (804) 270-0593	<input type="checkbox"/> 6700 Old Collamer Road, Suite 104 East Syracuse, NY 13057 P: (315) 463-5020 F: (315) 463-5194

<b>Project Name:</b>	T-Mobile AMTRAK-Branford (CT11024B)	<b>Date:</b> 26 APR 17	<b>Non-Conformance Items</b>
<b>Location:</b>	Branford CT	<b>W.O.#:</b> 7421.CT11024	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

<b>Client:</b> T-Mobile	<b>Tectonic Project Manager:</b> Brian Wilson
<b>Owner:</b> AMTRAK	<b>Tectonic Field Representative:</b> Frank A. Morey Jr
<b>Specialty Contractor:</b> <input type="checkbox"/> Earth <input type="checkbox"/> Concrete <input type="checkbox"/> Steel <input type="checkbox"/> Other	<b>General Contractor:</b>
	<b>General Contractor's Representative:</b>

<b>Contractor Equipment Observed in use:</b>	<b>Plan and Specifications</b> By Tectonic Date 13 May 2015 REV 3 Plans & Specs (available)? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
--	---

<b>Visitors:</b> <b>Representing:</b> <b>Apr.</b> <b>Dpt.</b>	<b>Shop Drawings</b> Type _____ App. By _____
---	---

<b>Weather:</b> showers pre-climb, cloudy <b>Temp. (°F)</b> 50's	<b>Samples</b> Type _____ Qty. _____ Photos <input type="checkbox"/> Qty. _____
<b>Forms Attached:</b> <input type="checkbox"/> Special/ Progress Inspection Category	

**Construction Activities:** *Indicate Activities Monitored*

On site per client request to perform Ajax bolted connection inspection for connecting the reinforcement channels to an existing monopole, observed the following:

o Meet with Brian Wilson of Tectonic on site with AMTRAK flagman. Received safety brief, discussed scope of work for todays climb. While actively climbing, contractor representative arrived to obtain results of inspection. Brian performed the photo log update. Bolted connections found to be wrench tight with all plies found to be in full contact; contractor stated final tensioning of bolts performed by Turn-of-nut-method.

<b>Follow-up from Prior report:</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> <b>Date of Prior Report:</b>	<b>Notice</b> The field representative is on site solely to observe operations of the contractor identified, observe conformance with contract documents, and report those operations to the client. The presence and activities of the field representative does not relieve the contractor's obligation to meet contractual requirements. The contractor retains sole responsibility for site safety and the methods and sequences of construction.
<b>Non-Conformance Corrected:</b>	
<b>What, in particular, should be observed, checked, or tested during the next visit?</b>	

This DFR is Preliminary                      This preliminary report is provided solely as evidence that field observation was performed. Observation and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

This DFR is Final                      A final report is the instrument of service. Any conclusions drawn from this report should be discussed with and evaluated by the owner's engineer.

<b>Field Representative:</b> Frank A. Morey Jr	<b>Date:</b> 26 APR 17
<b>Reviewed By:</b>	<b>Date:</b>



# G-01: Daily Field Report

Office Location	<input type="checkbox"/> 70 Pleasant Hill Road Mountairville, NY 10953 P: (845) 534-5959 F: (845) 534-5999	<input type="checkbox"/> 29-16 40th Avenue Long Island City, NY 11101 P: (718) 391-9200 F: (718) 391-0607	<input type="checkbox"/> 1344 Silas Deane Highway, Suite 500 Rocky Hill, CT 06067 P: (860) 563-2341 F: (860) 257-4882	<input checked="" type="checkbox"/> 280 Little Britain Road Newburgh, NY 12550 P: (845) 563-9081 F: (845) 563-9085
	<input type="checkbox"/> 36 British American Blvd, Suite 101 Latham, NY 12110 P: (518) 783-1630 F: (518) 783-1544	<input type="checkbox"/> 1279 Route 300 Newburgh, NY 12550 P: (845) 567-6656 F: (845) 567-8703	<input type="checkbox"/> 8639 Mayland Drive, Suite 102 Richmond, VA 23294 P: (804) 217-8504 F: (804) 270-0593	<input type="checkbox"/> 6700 Old Collamer Road, Suite 104 East Syracuse, NY 13057 P: (315) 463-5020 F: (315) 463-5194

Project Name:	T-Mobile AMTRAK-Branford (CT11024B)	Date:	26 APR 17
Location:	Branford CT	W.O.#:	7421.CT11024

Client: T-Mobile	Tectonic Project Manager: Brian Wilson
Owner: AMTRAK	Tectonic Field Representative: Frank A. Morey Jr

Construction Activities: *Indicate Activities Monitored* [CONTINUED]

o ELEV 78'-2" +/- to 85'-7" +/- : Lower elevation bolts at the bridge splice have three thread projection beyond face of nut, with upper level bolts projection of an inch +/-

o All higher elevations: Bolt projection was flush with face of bolt with additional washers added as needed to ensure all plies in full contact.

Reinforcement height is 78'-2" to 136'-10" +/-, reinforcement bolted connections assessed full height as accessible from the climbing rungs / Cable fall protection. As built condition is in compliance with applicable drawings.

This DFR is Preliminary This preliminary report is provided solely as evidence that field observation was performed. Observation and/or conclusions and/or recommendations conveyed in the final report may vary from and shall take precedence over those indicated in a preliminary report.

This DFR is Final A final report is the instrument of service. Any conclusions drawn from this report should be discussed with and evaluated by the owner's engineer.

Field Representative:	Frank A. Morey Jr	Date:	26 APR 17
Reviewed By:		Date:	

- \*NOTE:**
1. ALL ELEVATIONS ARE RECORDED FROM THE TOP OF THE BASE PLATE.
  2. ALL PORT HOLE ELEVATIONS ARE RECORDED UP TO BOTTOM OF PORT HOLES.
  3. FIELD DRILL ALL FOOTPADS USED FOR ANCHOR ROD BRACKET.
  4. TRIM SHIMS TO FIT WHERE REQUIRED.
  5. A FIELD LAYOUT IS REQUIRED TO ASSURE THE FITMENT OF REINFORCEMENT PRIOR TO ANY WORK ON TOWER AND WRITTEN NOTICE THAT THE PARTS FIT PER THE REINFORCEMENT DRAWINGS MUST BE RECEIVED BY AERO SOLUTIONS WITHIN 24 HOURS OF MATERIAL DELIVERY.
  6. THIS IS A SUPPLEMENTAL ASSEMBLY DRAWING IN ADDITION TO PERMIT DRAWINGS. FULL SCOPE OF WORK MAY EXCEED THAN SHOWN IN THIS DRAWING.

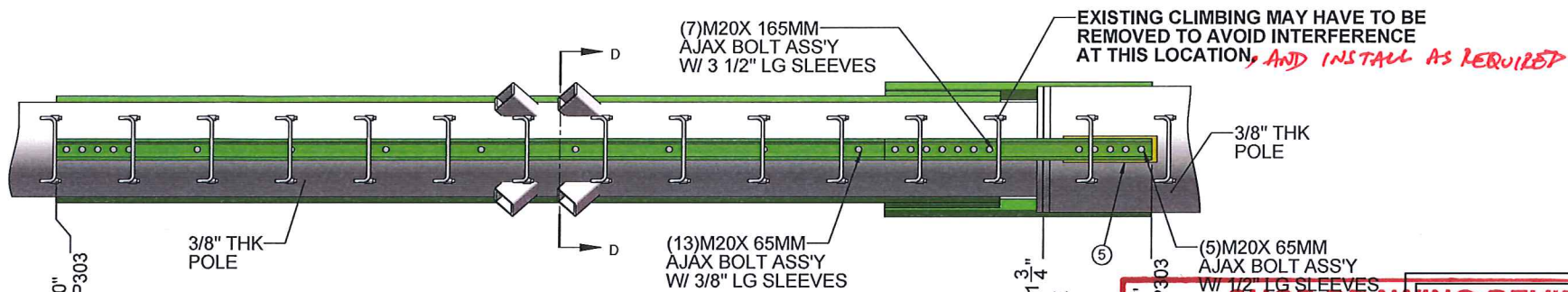
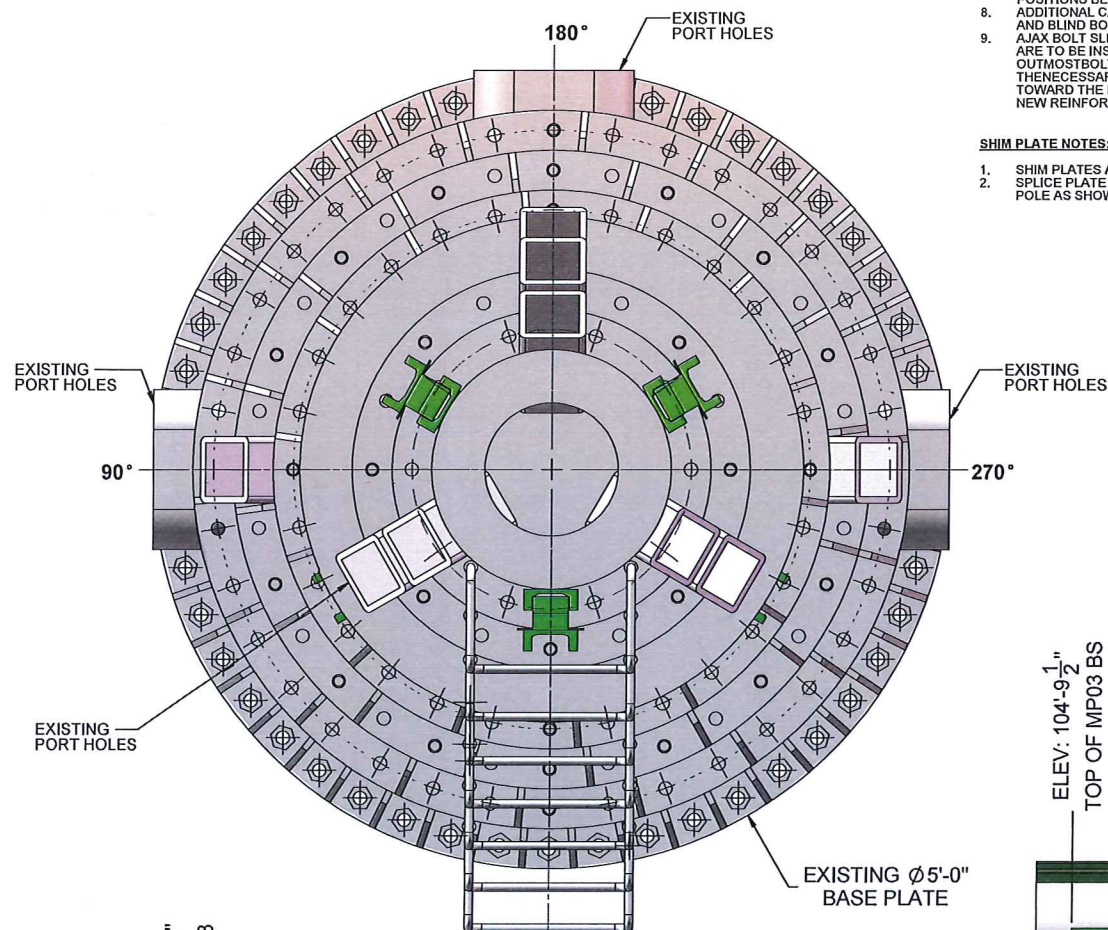
**AJAX NOTES FOR MP3 SERIES:**

1. INSTALL POLE-MAX CHANNEL SYSTEM AT (3) LOCATIONS PER PLAN VIEW.
2. USE AJAX BOLT SIZE NOTED W/ CORRECT SLEEVE LENGTHS PER NOTES IN ELEVATION VIEW.
3. ALL HOLES DRILLED IN POLE TO BE 1/16" DIA AND SOLVENT CLEANED AND TOUCHED UP W/ ZRC ZINC RICH PAINT.
4. SLIP-JOINTS TO BE JACKED TOGETHER USING 6 TON COME-A-LONGS PRIOR TO MOUNTING CHANNELS.
5. AJAX BOLTS SHALL BE PRETENSIONED USING TURN-OF-NUT METHOD IN ACCORDANCE WITH "SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH STRENGTH BOLTS," DATED DECEMBER 31, 2009, BY RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS. MATCH MARKING OF THE CONNECTIONS IS REQUIRED FOR FINAL INSPECTION. REFERENCE QAP-45 AERO SOLUTIONS AJAX INSTALLATION.
6. APPLY A NON-OIL BASED LUBRICANT TO EACH AJAX NUT BEFORE INSTALLING TO PREVENT SEIZING AND GALLING OF THREADS.
7. ALL CHANNELS AND CHANNEL WELDMENTS ARE STAMPED WITH PART NUMBER NEAR ONE END, CAREFULLY NOTE POSITIONS BEFORE MOUNTING.
8. ADDITIONAL CARE MUST BE USED AT SPLICE CONNECTIONS TO INSURE ALIGNMENT OF SPLICE PLATES AND BLIND BOLTS IN CHANNELS.
9. AJAX BOLT SLEEVES HAVE BEEN SIZED TO ENGAGE THE POLE SHAFT AND NEW REINFORCEMENT. THE SLEEVES ARE TO BE INSERTED FIRMLY AGAINST SPLIT WASHER INSIDE POLE AND HAVE A 1/8" TO 1/4" GAP BETWEEN THE OUTMOST BOLTING SURFACE AND THE OUTERMOST SURFACE OF THE SLEEVE. THE CONTRACTOR SHALL INCORPORATE THE NECESSARY MEASURES TO INSURE THAT THE SLEEVES DO NOT SLIDE FORWARD AND THEY REMAIN POSITIONED TOWARD THE BACKSIDE OF THE HOLE ENGAGING BOTH SIDES OF THE SHEAR PLANE BETWEEN THE POLE SHAFT AND THE NEW REINFORCEMENT.

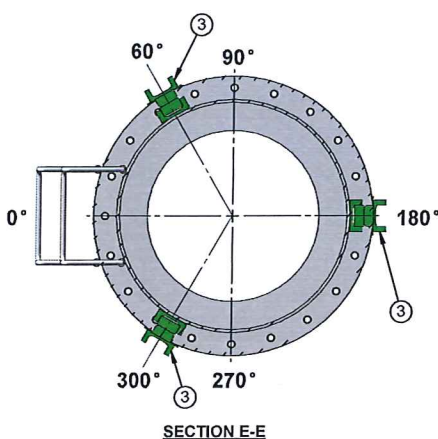
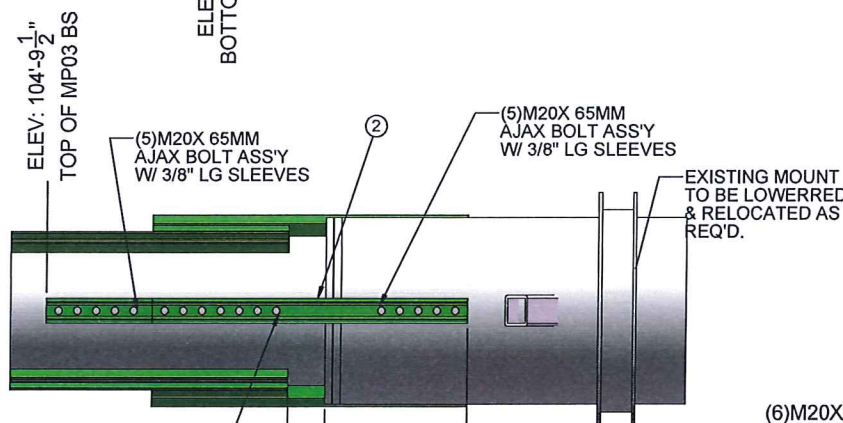
**SHIM PLATE NOTES:**

1. SHIM PLATES ARE TO BE USED BELOW SPLICE-JOINTS AS NOTED IN ELEVATION VIEW.
2. SPLICE PLATE SHIMS ARE TO BE USED IN LOWER HALF OF SPLICE CONNECTION TO KEEP CHANNEL FLUSH WITH POLE AS SHOWN IN TYPICAL SPLICE SECTION DETAIL.

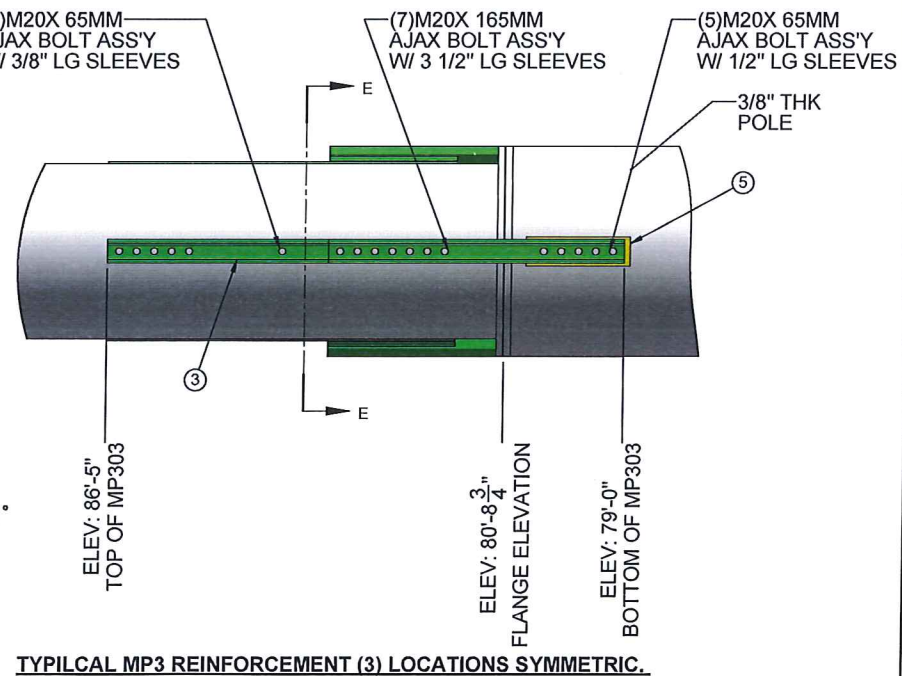
ITEM NO	QTY.	PART NUMBER	DESCRIPTION	MATERIAL	WT EA.	EXT. WT.
1	3	MP303-10NSI	MP303 NO SPLICE INDEPENDENT X 10' 0" LG	A572-GR65	98	294
2	3	MP303-BS-NSI	MP303 BRIDGE STIFFENER NSI	A572-GR.65	110	330
3	3	MP303- MP303-05 BS-NSI	MP303-MP303 BRIDGE STIFFENER NSI 5' LG	A 572 GR65	127	381
4	3	MP303-MP303-15 BS-NSI	MP303-MP303 BRIDGE STIFFENER NSI 15' LG	A 572 GR65	228	684
5	6	MP303NSI-SSP-12	NSI STD SHIM PLATE 1/8" THK X 5" X 1'-6" LG	A36	3.03	18.18
6	132	M20 X 65MM	AJAX BOLT ASSEMBLY 65 MM LONG	GALV.	1	132
7	42	M20 X 165MM	AJAX BOLT ASSEMBLY 165 MM LONG	GALV.	1	42
8	102	PC8.8-380	SLEEVE 1.14" O.D. X .80 I.D. X 3/8" LG	A519 (GALVILITE)	0.06	6.12
9	30	PC8.8-500	SLEEVE 1.14" O.D. X .80 I.D. X 1/2" LG	A519 (GALVILITE)	0.07	2.1
10	42	PC8.8-350	SLEEVE 1.14" O.D. X .80 I.D. X 3 1/2" LG	A519 (GALVILITE)	0.52	21.84
					TOTAL WT.	1911.24



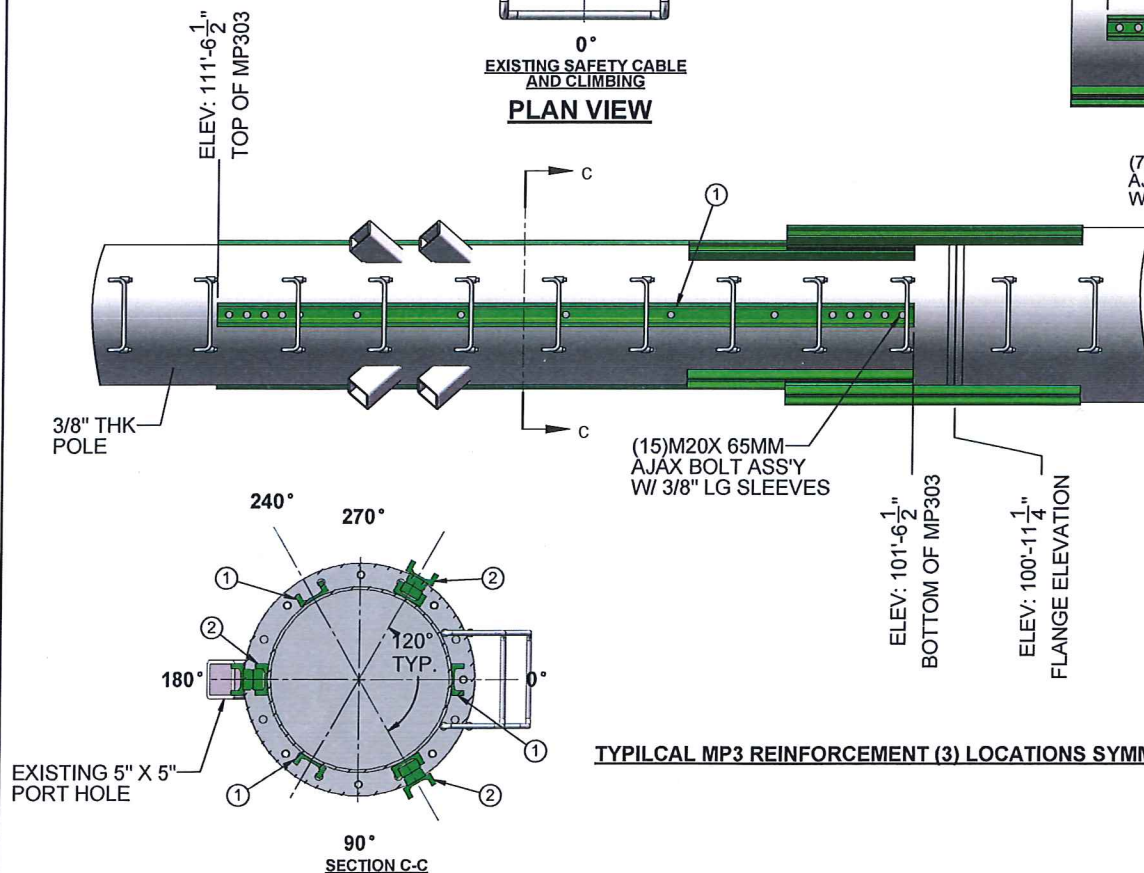
**TYPICAL MP3 REINFORCEMENT (3) LOCATIONS SYMMETRIC.**



**TYPICAL MP3 REINFORCEMENT (3) LOCATIONS SYMMETRIC.**



**TYPICAL MP3 REINFORCEMENT (3) LOCATIONS SYMMETRIC.**



**SECTION C-C**

**SHOP DRAWING REVIEW**

**Aero Solutions LLC**  
 Optimizing Your Tower Infrastructure  
 Aero Solutions LLC  
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Approved  
 Approved as Noted  
 Revise & Resubmit

Approval is only for general conformance with the design concept of the Project and the information given in the Contract Documents. Contractor is responsible for dimensions to be confirmed and coordinated at the job site; information that pertains solely to the fabricator's processes, means and methods of construction; coordination of the work of all trades; and performing all work in a safe and satisfactory manner. This approval does not modify Contractor's duty to comply with the Contract Documents.

Reviewed by: VINOD RAMESH  
 Date: 02/22/17 W.O.#: 6421-CT11024B  
**TECTONIC Engineering Consultants P.C.**

AERO PROJECT#	589-15-0002
DATE	1/18/2016
DRAWN BY	AS
CHECKED BY	AERO

**PROJECT INFORMATION**

**CT11024B**  
**AMTRACK BRANFORD**  
 60 HOUSLEY AVE  
 BRANFORD, CT 06405



REVISIONS				
REV.	DESCRIPTION	DATE	REV BY	APPR BY
00	INITIAL RELEASE	1/18/2016	AS	TECTONIC
01	WELDED BS REPLACED WITH BOLTED BS	2/21/2017	AS	TECTONIC

SHEET NUMBER  
**S-2**

CT11024B REINFORCEMENT – PMI



*Photo 1: Partial Monopole Elevation*





*Photo 2: Reinforcement Channel w/Bridge Stiffeners from approximately 121' to 136'*



*Photo 3: Reinforcement Channel w/Bridge Stiffeners from approximately 99' to 111'*



*Photo 4: Reinforcement Channel w/Bridge Stiffeners from approximately 79' to 86'*

**APPENDIX E**

# 2016 CONNECTICUT BUILDING CODE - CHAPTER 16

(Amd) 1609.3 **Basic wind speed.** The ultimate design wind speed,  $V_{ult}$ , in mph, for the determination of the wind loads shall be determined by Appendix N.

<b>(APPENDIX N) MUNICIPALITY - SPECIFIC STRUCTURAL DESIGN PARAMETERS</b>												
Municipality	Ground Snow Load	<i>Wind Design Parameters</i>										
		MCE Spectral Accelerations (%g)		Ultimate Design Wind Speeds, $V_{ult}$ (mph)			Nominal Design Wind Speeds, $V_{asd}$ (mph)			Wind-Borne Debris Regions <sup>1</sup>		Hurricane-Prone Regions
		$S_s$	$S_1$	Risk Cat. I	Risk Cat. II	Risk Cat III-IV	Risk Cat. I	Risk Cat. II	Risk Cat. III-IV	Risk Cat. II & III except Occup I-2	Risk Cat III Occup I-2 & Risk Cat. IV	
Andover	30	0.176	0.063	120	130	140	93	101	108			Yes
Ansonia	30	0.195	0.064	115	125	135	89	97	105			Yes
Ashford	35	0.173	0.063	120	130	140	93	101	108			Yes
Avon	35	0.181	0.064	110	120	130	85	93	101			Yes
Barkhamsted	40	0.177	0.065	110	120	125	85	93	97			Yes
Beacon Falls	30	0.192	0.064	115	125	135	89	97	105			Yes
Berlin	30	0.183	0.063	115	125	135	89	97	105			Yes
Bethany	30	0.189	0.063	115	125	135	89	97	105			Yes
Bethel	30	0.215	0.066	110	120	125	85	93	97			Yes
Bethlehem	35	0.190	0.065	110	120	125	85	93	97			Yes
Bloomfield	35	0.180	0.064	115	125	130	89	97	101			Yes
Bolton	30	0.177	0.063	115	125	135	89	97	105			Yes
Bozrah	30	0.170	0.061	120	135	145	93	105	112		Type A	Yes
<b>Branford</b>	<b>30</b>	<b>0.180</b>	<b>0.061</b>	<b>120</b>	<b>130</b>	<b>140</b>	<b>93</b>	<b>101</b>	<b>108</b>		<b>Type B</b>	<b>Yes</b>
Bridgeport	30	0.209	0.064	115	125	135	89	97	105		Type B	Yes
Bridgewater	35	0.201	0.066	110	120	125	85	93	97			Yes
Bristol	35	0.185	0.064	110	120	130	85	93	101			Yes
Brookfield	35	0.208	0.066	110	120	125	85	93	97			Yes
Brooklyn	35	0.171	0.062	120	130	140	93	101	108			Yes
Burlington	35	0.182	0.064	110	120	130	85	93	101			Yes
Canaan	40	0.173	0.065	105	115	120	81	89	93			
Canterbury	35	0.171	0.061	120	130	140	93	101	108		Type A	Yes
Canton	35	0.180	0.064	110	120	130	85	93	101			Yes
Chaplin	35	0.173	0.062	120	130	140	93	101	108			Yes
Cheshire	30	0.186	0.063	115	125	135	89	97	105			Yes
Chester	30	0.172	0.060	120	130	140	93	101	108		Type A	Yes
Clinton	30	0.169	0.059	120	135	140	93	105	108	Type B	Type A	Yes
Colchester	30	0.174	0.061	120	130	140	93	101	108			Yes
Colebrook	40	0.174	0.065	105	115	125	81	89	97			
Columbia	30	0.175	0.062	120	130	140	93	101	108			Yes
Cornwall	40	0.180	0.065	105	115	120	81	89	93			
Coventry	30	0.176	0.063	120	130	140	93	101	108			Yes
Cromwell	30	0.181	0.063	115	125	135	89	97	105			Yes
Danbury	30	0.217	0.067	110	120	125	85	93	97			Yes
Darien	30	0.242	0.068	110	120	130	85	93	101			Yes
Deep River	30	0.170	0.060	120	130	140	93	101	108		Type A	Yes
Derby	30	0.195	0.064	115	125	135	89	97	105			Yes
Durham	30	0.179	0.062	115	130	140	89	101	108			Yes
Eastford	40	0.172	0.063	120	130	140	93	101	108			Yes

# ..T..Mobile..

NORTHEAST LLC.

SITE NAME: **AMTRAK - BRANFORD**

SITE ID NUMBER: **CT11024B**

SITE ADDRESS: **HOSLEY AVENUE  
BRANFORD, CT 06406**

AMTRAK FILE NO: 626.33

WORK CATEGORY: **RRU & ANTENNA REPLACEMENT, FIBER ADDITION (67D92BD)**

## Tectonic

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Newburgh, NY 12550 (800) 829-6531  
www.tectonicengineering.com

### ..T..Mobile..

4 SYLVAN WAY  
PARSIPPANY, NJ 07054

### PROJECT SUMMARY

SITE NUMBER: CT11024B  
AMTRAK FILE #: 626.33  
MILEPOST: 79.29  
SITE NAME: AMTRAK-BRANFORD  
SITE ADDRESS: 60 HOSLEY AVENUE  
BRANFORD, CT 06406  
COUNTY: MIDDLESEX  
PROPERTY OWNER: AMTRAK (NATIONAL RAILROAD  
PASSENGER CORPORATION)  
APPLICANT: T-MOBILE NORTHEAST, LLC.  
4 SYLVAN WAY  
PARSIPPANY, NJ 07054  
(914) 696-5243  
CONTACT: ANDREW STROCK  
PHONE: (215) 917-9950  
ENGINEER/  
SURVEYOR/  
STRUCTURAL ENG: TECTONIC ENGINEERING &  
SURVEYING CONSULTANTS P.C.  
1279 ROUTE 300  
NEWBURGH, NY 12550  
CONTACT: MIKE PATEL  
PHONE: (845) 567-6656 EXT. 2808  
LATITUDE: (NAD 83) 41.283325  
LONGITUDE: (NAD 83) -72.8494

### SITE DIRECTIONS

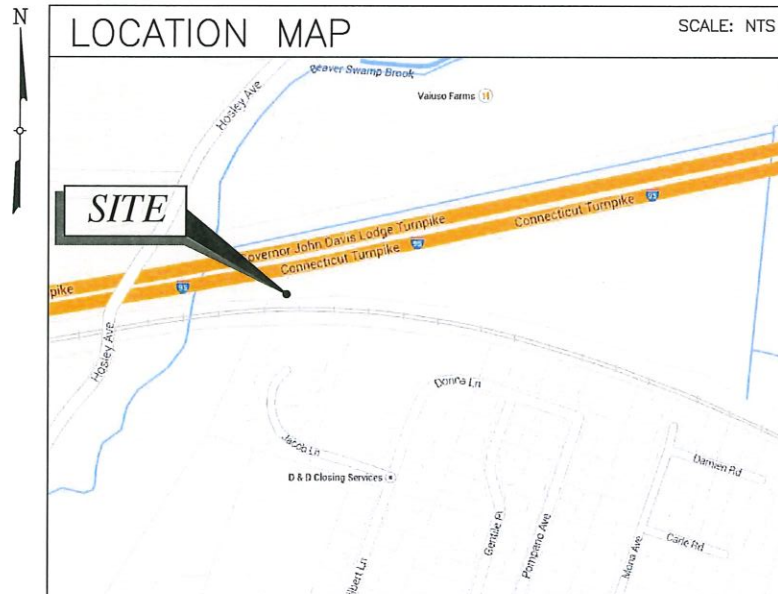
HEAD NORTHWEST ON SYLVAN WAY THEN TURN RIGHT ONTO US-202 N AND CONTINUE ONTO LITTLETON RD. TAKE THE RAMP ONTO I-287 N. TAKE THE I-87 S/I-287/NY THRUWAY EXIT TOWARD TAPPAN ZEE BRIDGE/NYC. MERGE ONTO I-287 E/I-87 S. KEEP LEFT AT THE FORK CONTINUING ON I-287 E. MERGE ONTO I-95 N THEN TAKE EXIT 51 TO MERGE ONTO U.S. 1 TOWARD EAST HAVEN/ FRONTAGE RD. TURN LEFT ONTO HOSLEY AVE, DESTINATION WILL BE ON THE LEFT.

### SHEET INDEX

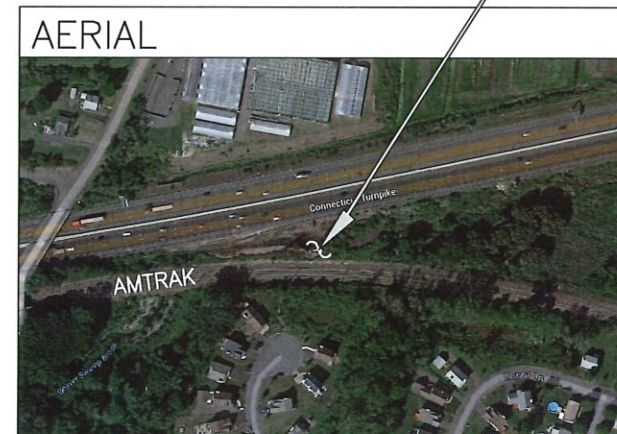
SHEET NO	DESCRIPTION	REV NO
T-1	TITLE SHEET	2
T-2	NOTES	2
A-1	SITE PLAN	2
A-2	EQUIPMENT PLAN & PHOTO	2
A-3	ELEVATION & PHOTO	2
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A-6	SPECIFICATIONS	2

### LOCATION MAP

SCALE: NTS



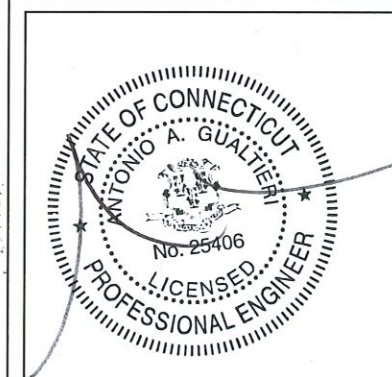
### AERIAL



APPROXIMATE  
LOCATION OF EXIST  
T-MOBILE SITE

PROJECT NUMBER	DESIGNED BY		
7421.CT11024B	MP		
REV	DATE	REVISION	DRAWN BY
0	7/9/18	FOR APPROVAL	JT
1	8/24/18	FOR APPROVAL	BW
2	10/23/18	PER COMMENTS	JT

ISSUED BY DATE



SITE INFORMATION

CT11024B  
AMTRAK-BRANFORD  
HOSLEY AVENUE  
BRANFORD, CT 06406

SHEET TITLE

TITLE SHEET

SHEET NUMBER

T-1



**GENERAL NOTES**

- ALL APPLICABLE PERMITS MUST BE OBTAINED AND INSURANCE REQUIREMENTS MUST BE MET PRIOR TO CONSTRUCTION.
- THESE PROJECT DRAWINGS ARE IN ACCORDANCE WITH AMTRAK STANDARDS AND ENGINEERING PRACTICES. PRIOR TO ENTERING AMTRAK'S PROPERTY, THE CONTRACTOR MUST NOTIFY PAUL MARTIN (203) 948-9039.
- T-MOBILE IS RESPONSIBLE FOR ALL COSTS AND EXPENSES INCURRED BY ANY PARTY IN ASSOCIATION WITH THIS PROJECT. ALL WORK ASSOCIATED WITH THIS PROJECT WILL BE PERFORMED AT T-MOBILE'S SOLE EXPENSE. THIS INCLUDES 1.) AMTRAK'S SAFETY ORIENTATION CLASS, 2.) WIRE AND TRACK OUTAGES DURING CONSTRUCTION, 3.) MODIFICATIONS TO THE CATENARY AND TRANSMISSION SYSTEMS IF REQUIRED, 4.) MODIFICATIONS TO CATENARY POLE GUY WIRE ANCHORS IF REQUIRED.
- UPGRADE OF EXISTING T-MOBILE TELECOMMUNICATIONS FACILITY. THIS PROJECT INVOLVES THE REPLACEMENT OF SIX (6) OF THE EXISTING ANTENNAS WITH NEW ANTENNAS, THE REPLACEMENT OF THE THREE (3) EXISTING RRUS, THE ADDITION OF TWO (2) PROPOSED FIBER CABLES, AND THE REPLACEMENT OF EXISTING EQUIPMENT CABINET WITH PROPOSED CABINET. NO DIGGING OR SOIL DISTURBANCE WILL OCCUR DURING THE PROJECT. NO MODIFICATIONS TO THE CATENARY AND TRANSMISSION SYSTEMS ARE REQUIRED TO ACCOMMODATE THIS PROJECT.
- IF MODIFICATIONS TO THE CATENARY AND TRANSMISSION SYSTEMS ARE REQUIRED TO ACCOMMODATE THIS PROJECT, THEN: 1.) A QUALIFIED ELECTRICAL CONSULTANT MUST BE RETAINED (BY T-MOBILE) TO DESIGN OF THE MODIFICATIONS; AND 2.) THE REQUIRED MODIFICATIONS WILL BE PERFORMED AT T-MOBILE'S EXPENSE. UNLESS OTHERWISE DIRECTED BY AMTRAK IN WRITING, ANY SUCH REQUIRED MODIFICATIONS (WHICH SHALL BE PERFORMED AT T-MOBILE'S COST EXPENSE) WILL BE PERFORMED BY AMTRAK'S ELECTRIC TRACTION FORCES.
- THESE PROJECT DRAWINGS ARE IN COMPLIANCE WITH AED-1; AED-2; CE-4; EP3005-02081A & EP3014-01141A.
- ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE AMTRAK-APPROVED PROJECT DRAWINGS, STATEMENTS OF WORK, PLANS AND SCHEDULES, AND ALL OTHER AMTRAK REQUIREMENTS.
- NO WORK MAY BE PERFORMED UNTIL AMTRAK ENGINEERING HAS APPROVED T-MOBILE'S SITE/JOB SPECIFIC SAFETY WORK PLAN (SSSWP) AND HAZARD ASSESSMENT FOR THE PROJECT.
- ONCE AMTRAK APPROVES AN APPLICATION AND THE LICENSE AGREEMENT ISSUED, NO VARIANCE FROM THE PLANS, SPECIFICATIONS, METHODS OF CONSTRUCTION, ETC WILL BE CONSIDERED OR PERMITTED WITHOUT RESUBMISSION OF PLANS TO AND RECEIPT OF APPROVAL FROM AMTRAK

**CONTRACTOR OPERATIONS AND SAFETY COORDINATION NOTES**

- BEFORE ENTRY OF PERMITTEE AND/OR CONTRACTORS ONTO RAILROAD'S PROPERTY, A PRE-ENTRY MEETING SHALL BE HELD WITH THE AMTRAK RAILROAD PROTECTION PERSONNEL.
- CONTRACTORS SHALL CONDUCT THEIR OPERATIONS IN COMPLIANCE WITH ALL RULES, REGULATIONS, AND REQUIREMENTS OF RAILROAD WITH RESPECT TO ANY WORK PERFORMED ON, OVER, UNDER, WITHIN OR ADJACENT TO RAILROAD'S PROPERTY. CONTRACTORS SHALL BE RESPONSIBLE FOR ACQUAINTING THEMSELVES WITH SUCH RULES, REGULATIONS AND REQUIREMENTS. ANY VIOLATION OF RAILROAD'S SAFETY RULES, REGULATIONS, OR REQUIREMENTS SHALL BE GROUNDS FOR THE IMMEDIATE SUSPENSION OF THE CONTRACTOR WORK, AND THE RE-TRAINING OF ALL PERSONNEL, AT THE CONTRACTOR'S EXPENSE.
- CONTRACTOR SHALL KEEP RAILROAD'S PROPERTY CLEAR OF ALL REFUSE AND DEBRIS FROM ITS OPERATIONS. UPON COMPLETION OF THE WORK, THE CONTRACTOR MUST REMOVE ALL MACHINERY, EQUIPMENT, SURPLUS MATERIALS, FALSE WORK, RUBBISH, TEMPORARY STRUCTURES, AND OTHER ITEMS BELONGING TO THE CONTRACTOR FROM RAILROAD'S PROPERTY.
- IF TRACKS OR OTHER PROPERTY OF RAILROAD ARE ENDANGERED DURING THE WORK, THE CONTRACTOR SHALL IMMEDIATELY TAKE SUCH STEPS AS MAY BE DIRECTED BY RAILROAD TO RESTORE SAFE CONDITIONS, AND UPON FAILURE OF THE CONTRACTOR TO IMMEDIATELY CARRY OUT SUCH DIRECTION, RAILROAD MAY TAKE WHATEVER STEPS ARE REASONABLY NECESSARY TO RESTORE SAFE CONDITIONS. ALL COSTS AND EXPENSES OF RESTORING SAFE CONDITIONS, AND OF REPAIRING ANY DAMAGE TO RAILROAD'S TRAINS, TRACKS, RIGHT-OF-WAY OR OTHER PROPERTY CAUSED BY THE OPERATIONS OF CONTRACTORS, SHALL BE PAID BY CONTRACTOR.
- WHENEVER WORK IS PERFORMED IN THE VICINITY OF ELECTRIFIED TRACKS AND/OR HIGH VOLTAGE WIRES, PARTICULAR CARE MUST BE EXERCISED, AND RAILROAD'S REQUIREMENTS REGARDING CLEARANCE TO BE MAINTAINED BETWEEN EQUIPMENT AND TRACKS AND/OR ENERGIZED WIRES, AND OTHERWISE REGARDING WORK IN THE VICINITY OF ELECTRIFIED TRACKS, MUST BE STRICTLY OBSERVED. NO EMPLOYEES OR EQUIPMENT WILL BE PERMITTED TO WORK NEAR OVERHEAD WIRES, EXCEPT WHEN PROTECTED BY A CLASS "A" EMPLOYEE OF THE RAILROAD. THE CONTRACTORS MUST SUPPLY AN ADEQUATE LENGTH OF GROUNDING CABLE (4/0 COPPER WITH APPROVED CLAMPS) FOR EACH PIECE OF EQUIPMENT WORKING NEAR OR ADJACENT TO ANY OVERHEAD WIRE.
- NO WORK WILL BE PERMITTED WITHIN TWENTY-FIVE (25) FEET OF THE CENTERLINE OF TRACK OR THE ENERGIZED WIRE OR HAVE POTENTIAL OF GETTING WITHIN TWENTY-FIVE (25) FEET OF TRACK WIRE WITHOUT THE APPROVAL OF THE CHIEF ENGINEER'S REPRESENTATIVE. CONTRACTORS SHALL CONDUCT THEIR WORK SO THAT NO PART OF ANY EQUIPMENT OR MATERIAL SHALL FOUL AN ACTIVE TRACK OR OVERHEAD WIRE WITHOUT THE WRITTEN PERMISSION OF THE CHIEF ENGINEER'S REPRESENTATIVE. ANY EQUIPMENT SHALL BE CONSIDERED TO BE FOULING A TRACK OR OVERHEAD WIRE WHEN LOCATED (A) WITHIN FIFTEEN (15) FEET FROM THE CENTERLINE OF THE TRACK OR WITHIN FIFTEEN (15) FEET FROM THE WIRE, OR (B) IN SUCH A POSITION THAT FAILURE

OF SAME, WITH OR WITHOUT A LOAD, WOULD BRING IT WITHIN FIFTEEN (15) FEET FROM THE CENTERLINE OF THE TRACK OR WITHIN FIFTEEN (15) FEET FROM THE WIRE AND REQUIRES THE PRESENCE OF THE PROPER RAILROAD PROTECTION PERSONNEL.

- DURING CONSTRUCTION, JACKING, BORING OR TUNNELING, TRENCHES SHALL BE FENCED, LIGHTED AND OTHERWISE PROTECTED AS DIRECTED BY AMTRAK DESIGNATED FIELD REPRESENTATIVE.
- CONTRACTORS SHALL SCHEDULE ALL WORK TO BE PERFORMED IN SUCH A MANNER AS NOT TO INTERFERE WITH RAILROAD OPERATIONS. CONTRACTORS SHALL USE ALL NECESSARY CARE AND PRECAUTION TO AVOID ACCIDENTS, DELAY OR INTERFERENCE WITH RAILROAD'S PROPERTY.
- THROUGHOUT ALL PHASES OF THE PROJECT (INCLUDING DURING PREPARATION FOR CONSTRUCTION OR INSTALLATION ACTIVITIES, DURING CONSTRUCTION OR INSTALLATION ACTIVITIES, AND, DURING CLEAN UP) ACCESS ROADS, ROUTES OR PATHS TO OR ALONG AMTRAK'S RIGHTS-OF-WAY SHALL REMAIN UNOBSTRUCTED AND IF ANY OBSTRUCTION EXISTS IT SHALL NOT BE EXACERBATED.
- ALL EQUIPMENT TO BE USED IN THE VICINITY OF OPERATING TRACKS SHALL BE IN "CERTIFIED" FIRST-CLASS CONDITION SO AS TO PREVENT FAILURES THAT MIGHT CAUSE DAMAGE TO RAILROAD'S PROPERTY. NO EQUIPMENT SHALL BE PLACED OR PUT INTO OPERATION NEAR OR ADJACENT TO OPERATING TRACKS AND UNDER NO CIRCUMSTANCES SHALL ANY EQUIPMENT OR MATERIALS BE PLACED OR STORED WITHIN TWENTY-FIVE (25) FEET FROM THE CENTERLINE OF AN OUTSIDE TRACK, EXCEPT AS APPROVED BY THE SITE SPECIFIC SAFETY WORK PLAN. TO INSURE COMPLIANCE WITH THIS REQUIREMENT, CONTRACTORS MUST ESTABLISH A TWENTY-FIVE (25) FOOT FOUL LINE PRIOR TO THE START OF WORK BY TAPING OFF THE AREA.
- NO MATERIAL OR EQUIPMENT SHALL BE STORED ON RAILROAD'S PROPERTY UNLESS APPROVED BY THE SITE SPECIFIC SAFETY WORK PLAN. ANY SUCH STORAGE WILL BE ON THE CONDITION THAT RAILROAD WILL NOT BE LIABLE FOR LOSS OF OR DAMAGE TO SUCH MATERIALS OR EQUIPMENT FROM ANY CAUSE.
- PRIOR TO ENTERING ONTO AMTRAK'S PROPERTY, EACH EMPLOYEE OF T-MOBILE AND/OR ITS CONTRACTORS THAT IS TO ENTER ONTO AMTRAK'S PROPERTY WITHIN THE 12 MONTH PERIOD PRIOR TO ENTERING ONTO AMTRAK'S PROPERTY, EACH SHALL HAVE COMPLETED AMTRAK'S SAFETY ORIENTATION CLASS. WHILE ON AMTRAK'S PROPERTY, EACH SHALL BE IN POSSESSION OF A VALID, CURRENT AMTRAK SAFETY TRAINING BADGE AND WHILE ON AMTRAK'S PROPERTY, EACH SHALL FOLLOW ALL SAFETY RULES AND PROCEDURES AS DIRECTED BY AMTRAK (INCLUDING AMTRAK'S ON-SITE REPRESENTATIVE).
- PRIOR TO COMMENCING WORK, T-MOBILE AND/OR ITS CONTRACTORS WILL LOCATE UNDERGROUND UTILITIES AND ANY OTHER FACILITIES (BELONGING TO AMTRAK AND/OR ANY OTHER PARTY. THROUGHOUT THE ENTIRE PROJECT, INCLUDING ALL PHASES OF CONSTRUCTION, EXCAVATION, TRENCHING, AND/OR BORING ACTIVITIES; T-MOBILE AND/OR ITS CONTRACTOR WILL PROTECT ALL SUCH UNDERGROUND UTILITIES AND OTHER FACILITIES. AMTRAK IS NOT A PART OF THE ONE-CALL SYSTEM AND, THEREFORE, T-MOBILE AND/OR ITS CONTRACTORS MUST WORK DIRECTLY WITH AMTRAK TO IDENTIFY AMTRAK'S BURIED UTILITIES AND FACILITIES.
- T-MOBILE AND/OR ITS CONTRACTOR IS RESPONSIBLE FOR MAKING THE ONE-CALL. AMTRAK IS NOT PART OF THE ONE-CALL SYSTEM AND THEREFORE AMTRAK UTILITIES AND FACILITIES WILL NOT BE LOCATED OR PROTECTED THROUGH THE ONE-CALL SYSTEM. INSTEAD, T-MOBILE AND/OR ITS CONTRACTOR MUST WORK WITH AMTRAK TO IDENTIFY AND PROTECT ALL BURIED UTILITIES AND FACILITIES. T-MOBILE AND/OR ITS CONTRACTOR MUST IDENTIFY AND PROTECT ALL BURIED UTILITIES AND FACILITIES THROUGHOUT THE ENTIRE PROJECT, INCLUDING ALL PHASES OF CONSTRUCTION, EXCAVATION, TRENCHING AND/OR BORING ACTIVITIES.
- NO CONSTRUCTION, EXCAVATION, TRENCHING AND/OR BORING ACTIVITIES MAY BE PERFORMED IN CLOSE PROXIMITY TO THE AMTRAK DUCT LINE UNLESS MONITORED BY ON-SITE AMTRAK COMMUNICATIONS AND SIGNAL DEPARTMENT PERSONNEL. HAND DIGGING MAY BE REQUIRED, AS DIRECTED BY AMTRAK THROUGH THE ON-SITE AMTRAK COMMUNICATIONS AND SIGNAL SUPPORT PERSONNEL OR OTHERWISE.
- EQUIPMENT OR PERSONNEL WORKING CLOSER THAN 15 FEET TO THE CENTERLINE OF AN ADJACENT TRACK SHALL BE CONSIDERED AS FOULING THAT TRACK. INSOFAR AS POSSIBLE, ALL OPERATIONS SHALL BE CONDUCTED NO LESS THAN THIS DISTANCE. OPERATIONS CLOSER THAN 15' TO THE CENTERLINE OF A TRACK SHALL BE CONDUCTED ONLY WITH THE PERMISSION OF, AND AS DIRECTED BY A DULY QUALIFIED AMTRAK EMPLOYEE PRESENT AT THE WORKSITE. SPECIAL ARRANGEMENTS MUST BE MADE AT LEAST 21 WORKING DAYS IN ADVANCE OF THE WORK, WHERE FOULING OF TRACK OR STRUCTURES IS REQUIRED FOR ACCESS. THESE OPERATIONS REQUIRE THE PRIOR APPROVAL OF AMTRAK. CROSSING OF TRACKS AT GRADE BY EQUIPMENT AND PERSONNEL IS PROHIBITED, EXCEPT BY PRIOR ARRANGEMENT WITH, AND AS DIRECTED BY AMTRAK.
- IF ASBESTOS OR OTHER HAZARDOUS MATERIAL IS ENCOUNTERED T-MOBILE SHALL IMMEDIATELY NOTIFY AMTRAK AND ALL WORK UNDER THIS PROJECT SHALL CEASE UNTIL AMTRAK HAS APPROVED (IN WRITING) A PLAN FOR T-MOBILE TO ADDRESS (AT T-MOBILE'S OWN COSTS AND EXPENSE) THE MATERIAL THROUGH THE SERVICES OF AN AMTRAK-APPROVED, LICENSED INSPECTOR/MONITORING CONTRACTOR.

**LIFT NOTES:**

- THE LIFT PLANS AND THE SOW OUTLINE A COMPLETE PROCEDURE, TIME SCHEDULE, THE ORDER OF LIFTS AND A MANEUVERING ENVELOPE REFLECTING THE AREA ALLOWED FOR THE EQUIPMENT TO REPOSITION IF DESIRED IS INCLUDED.
- THIS LIFT PLAN IS IN COMPLIANCE WITH SECTION 01142A OF EP-3014 AND THE DOCUMENT CAPTIONED "AMTRAK ELECTRIFIED TERRITORY EQUIPMENT BONDING AND GROUNDING", ATTACHED TO THE SOW. THE CONTRACTOR AND THE OPERATOR ARE RESPONSIBLE FOR ADHERENCE TO ALL BONDING AND GROUNDING REQUIREMENTS. SUBSTITUTIONS TO THE MATERIALS LISTED ARE PROHIBITED
- UNLESS OTHERWISE APPROVED BY AMTRAK IN WRITING, THE EQUIPMENT SHALL BE

POSITIONED SO THAT THE BOOM IS NOT PERPENDICULAR TO THE TRACK, WHILE ALSO MAINTAINING ALL OTHER SAFETY REQUIREMENTS (INCLUDING CLEARANCES, ETC.), AND THE BOOM SHALL BE MECHANICALLY RESTRICTED TO PREVENT IT FROM ENCROACHING UPON AMTRAK'S INFRASTRUCTURE (WHICH INCLUDES, WITHOUT LIMITATION, ANY TRACK AND/OR CATENARY STRUCTURES) ANY MORE THAN WHAT IS ABSOLUTELY NECESSARY FOR THE IMPLEMENTATION OF THE WORK OUTLINED IN THESE PLANS. IDEALLY THE BOOM WILL BE RESTRICTED TO THE 180-DEGREE SEMI-CIRCLE AWAY FROM ALL TRACKS.

- FINAL EQUIPMENT LOCATION WILL BE WITHIN THE RESTRICTED MANEUVERING ENVELOPE AS OUTLINED IN THIS APPROVED LIFT PLAN.
- CONTRACTOR TO VERIFY ALL DIMENSIONS AND SITE CONDITIONS PRIOR TO COMMENCING WORK.
- THE NOTES HEREIN ARE OFFERED FOR INFORMATION AND GUIDANCE AND ARE NOT TO BE TAKEN TO INFER THE ENGINEER IS IN ANY WAY INVOLVED IN OR IS RESPONSIBLE FOR THE ACTUAL LIFT IN THE FIELD.
- DO NOT OPERATE IN WINDS OVER 20 MPH.
- OPERATIONS TO BE CONDUCTED IN ACCORDANCE WITH OSHA AND AMTRAK REGULATIONS AND ALL OTHER APPLICABLE RULES AND CODES.
- SWING PATH OF BOOM SHALL NOT BE OVER ADJACENT BUILDINGS, WORKERS OR OCCUPIED VEHICLES WHILE LIFTING LOADS.
- BARRICADES SHALL BE INSTALLED AROUND THE LIFT ZONE AND ANY SWING AREAS AS NECESSARY TO ENSURE OTHERS NOT INVOLVED IN THE LIFT PROCESS DO NOT ENTER INTO THOSE AREAS.
- THE TOTAL ESTIMATED DURATION OF LIFT ACTIVITIES ON SITE IS TWO EVENTS LASTING (8) EIGHT HOURS.
- CHECK ALL OF THE PARTS OF THE EQUIPMENT EACH NEW WORK SHIFT, INCLUDING ALL OF THE CABLES, EQUIPMENT PARTS AND ENGINE PARTS.
- THE EQUIPMENT OPERATOR MUST CONFIRM THE HAND SIGNALS THAT WILL BE USED DURING THE LIFT WITH THE SUPPORT GROUND CREW PRIOR TO THE START OF ANY LIFT.
- ALWAYS INSPECT THE AREA PRIOR TO LIFTING A LOAD TO MAKE SURE THERE ARE NO PEOPLE BELOW.
- NO SIDE PULLS ALLOWED WHEN PERFORMING A LIFT.
- EQUIPMENT OPERATOR TO KEEP THE GUY CABLES IN VIEW TO MAKE SURE THEY'RE NOT HIT IN ANY WAY. HIGH VISIBILITY RIBBON SHOULD BE INSTALLED TEMPORARILY TO ASSIST IN KEEPING TRACK OF THE GUY WIRE LOCATIONS.
- ALL EQUIPMENT TO BE USED IN THE VICINITY OF OPERATING TRACKS SHALL BE IN "CERTIFIED" FIRST-CLASS CONDITION SO AS TO PREVENT FAILURES THAT MIGHT CAUSE DELAY TO TRAINS OR DAMAGE TO RAILROAD'S PROPERTY. NO EQUIPMENT SHALL BE PLACED NEAR OR PUT INTO OPERATION NEAR OR ADJACENT TO OPERATING TRACKS WITHOUT FIRST OBTAINING PERMISSION FROM THE CHIEF ENGINEER'S REPRESENTATIVE. UNDER NO CIRCUMSTANCES SHALL ANY EQUIPMENT OR MATERIALS BE PLACED OR STORED WITHIN TWENTY-FIVE (25) FEET FROM THE CENTERLINE OF AN OUTSIDE TRACK, EXCEPT AS APPROVED BY THE SITE SPECIFIC SAFETY WORK PLAN.
- NO MATERIAL OR EQUIPMENT SHALL BE STORED ON RAILROAD'S PROPERTY WITHOUT FIRST HAVING OBTAINED PERMISSION FROM THE CHIEF ENGINEER. ANY SUCH STORAGE WILL BE ON THE CONDITION THAT RAILROAD WILL NOT BE LIABLE FOR LOSS OF OR DAMAGE TO SUCH MATERIALS OR EQUIPMENT FROM ANY CAUSE.
- PERMITTEE AND/OR CONTRACTORS SHALL KEEP RAILROAD'S PROPERTY CLEAR OF ALL REFUSE AND DEBRIS FROM ITS OPERATIONS, UPON COMPLETION OF THE WORK, PERMITTEE AND/OR CONTRACTORS SHALL REMOVE FROM RAILROAD'S PROPERTY ALL MACHINERY, EQUIPMENT, SURPLUS MATERIALS, FALSEWORK, RUBBISH, TEMPORARY STRUCTURES, AND OTHER PROPERTY OF THE PERMITTEE AND/OR CONTRACTORS AND SHALL LEAVE RAILROAD'S PROPERTY IN A CONDITION SATISFACTORY TO THE CHIEF ENGINEER.
- THIS LIFT PLAN INCLUDES THE DESIRED LOCATION OF THE EQUIPMENT, THE OPERATING RADII, AND STAGING/DISPOSAL AREAS. ALL ITEMS HAVE BEEN DIMENSIONED FOR LOCATING THE ELEMENTS IN THE FIELD.
- THE EQUIPMENT IS CAPABLE OF PICKING 150% OF THE LOAD, WHILE MAINTAINING NORMAL, RECOMMENDED FACTORS OF SAFETY. THE ADEQUACY OF THE EQUIPMENT FOR THE PROPOSED PICK SHALL BE DETERMINED BY USING THE MANUFACTURER'S PUBLISHED LOAD RATING CHARTS AND NOT THE MAXIMUM CAPACITY IF THE BOOM.
- THE LIFT PLAN OUTLINES THE EXISTING OBSTRUCTIONS AND THE PROPOSED SWING BEING USED FOR THE LIFT. "WALKING" OF LOAD USING TWO PIECES OF EQUIPMENT WILL NOT BE PERMITTED, RATHER, MULTIPLE PICKS AND REPOSITIONING OF THE EQUIPMENT MAY BE PERMITTED TO GET THE LOAD TO THE NEEDED LOCATION FOR THE FINAL PICK, IF NECESSARY.
- IF THERE ARE OVERHEAD POWER LINES PRESENT. ALL AERIAL WORK WILL BE PERFORMED WITH THE POWER LINES DE-ENERGIZED. NO WORK WILL BE PERFORMED AROUND OR NEAR THE POWER LINES WITHOUT AN AMTRAK E.T. LINEMAN'S AUTHORIZATION.

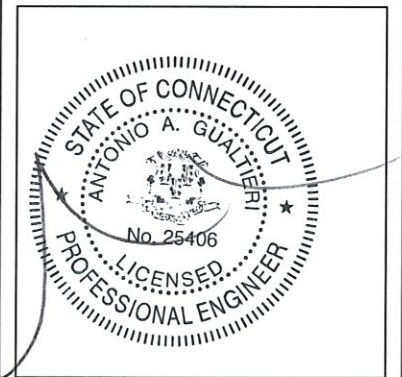


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 PARSIPPANY, NJ 07054

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△	7/9/18	FOR APPROVAL	JT
△	8/24/18	FOR APPROVAL	BW
△	10/23/18	PER COMMENTS	JT

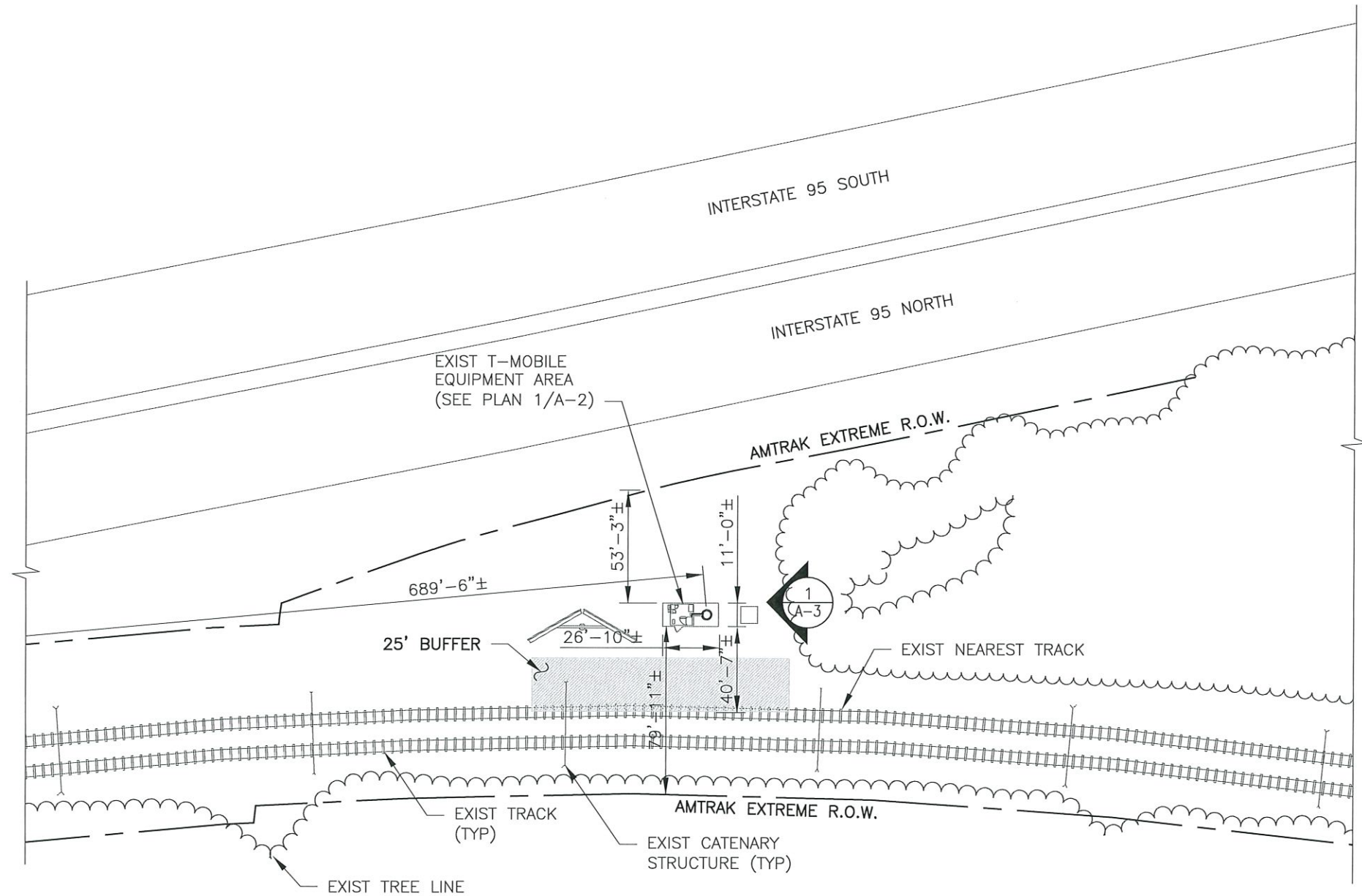
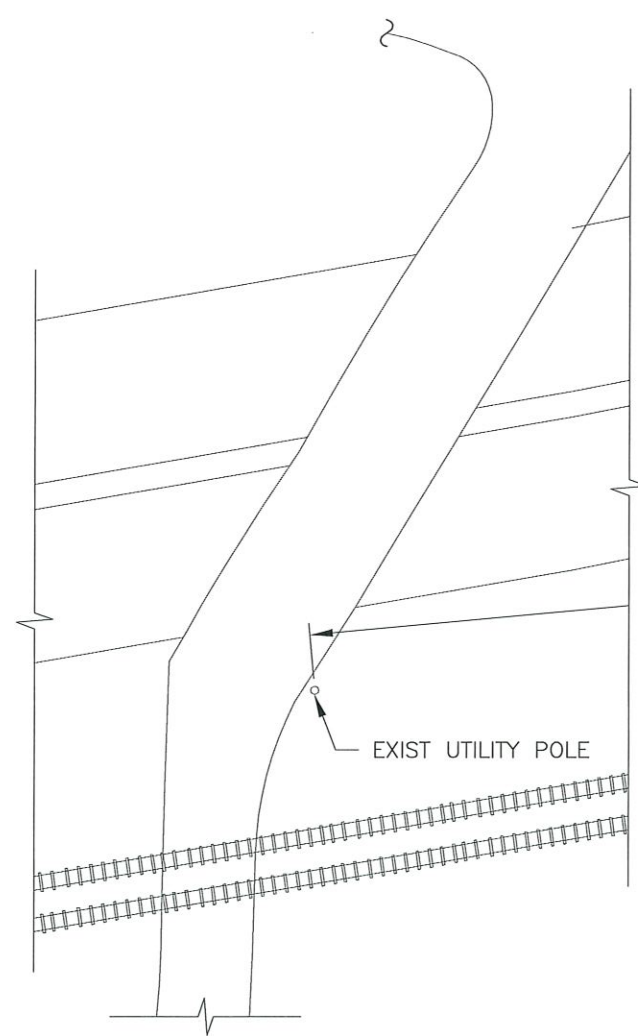
ISSUED BY	DATE



SITE INFORMATION  
 CT11024B  
 AMTRAK-BRANFORD  
 HOSLEY AVENUE  
 BRANFORD, CT 06406

SHEET TITLE  
 NOTES

SHEET NUMBER  
 T-2



1  
A-1

### SITE PLAN

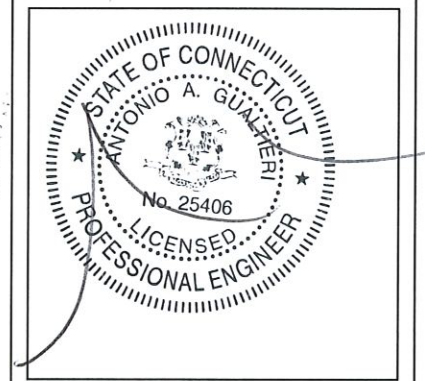
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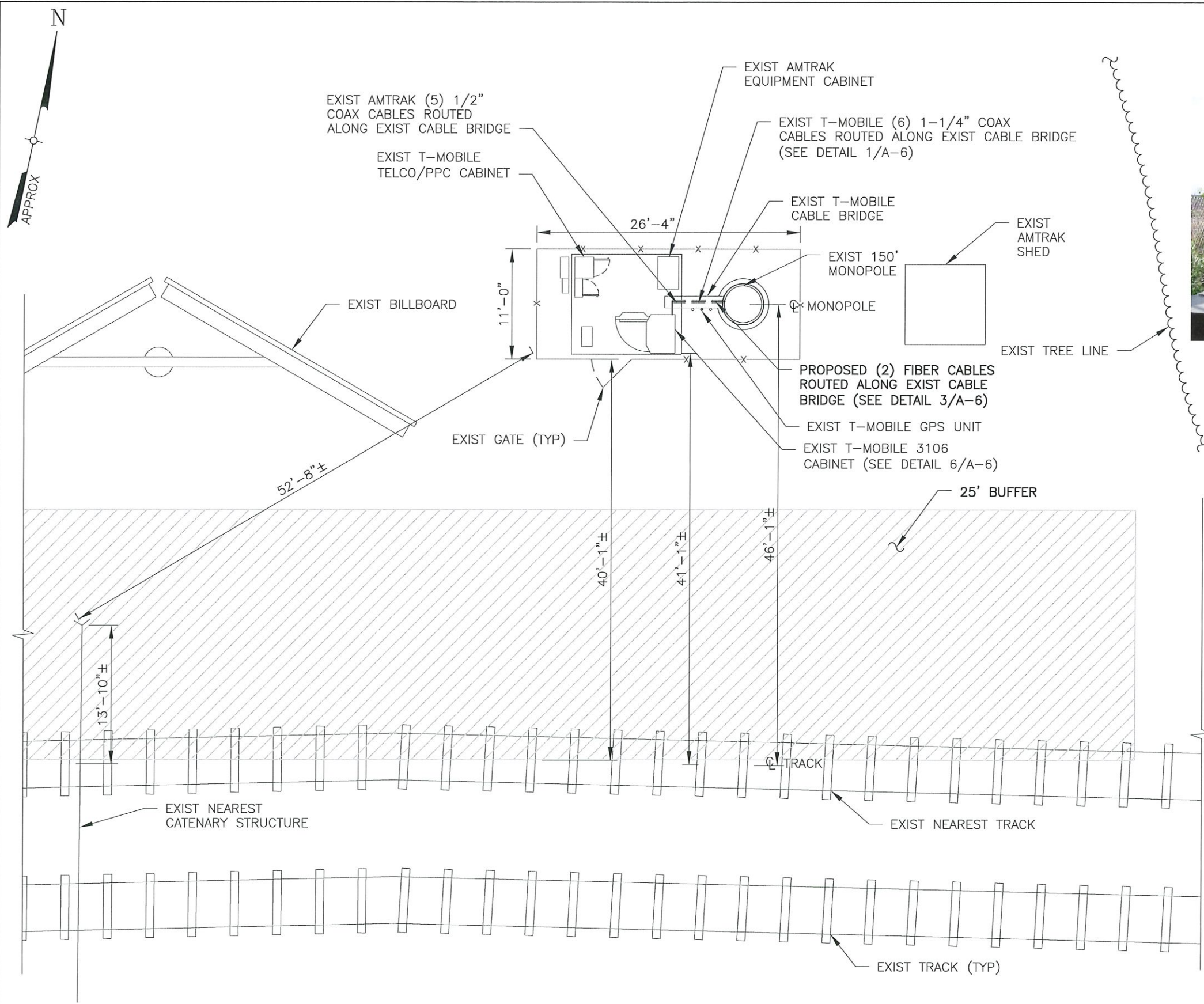


SITE INFORMATION  
 CT11024B  
 AMTRAK-BRANFORD  
 HOSLEY AVENUE  
 BRANFORD, CT 06406

SHEET TITLE  
 SITE PLAN

SHEET NUMBER  
 A-1





2 PHOTO  
A-2 SCALE: N.T.S.

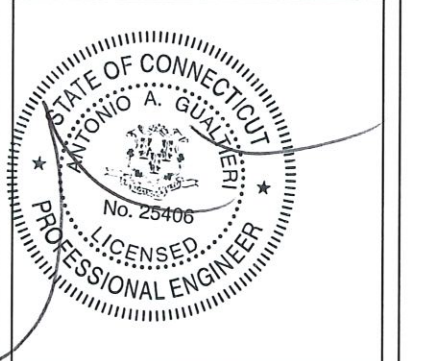
1 EQUIPMENT PLAN  
A-2 SCALE: 3/32" = 1'-0"



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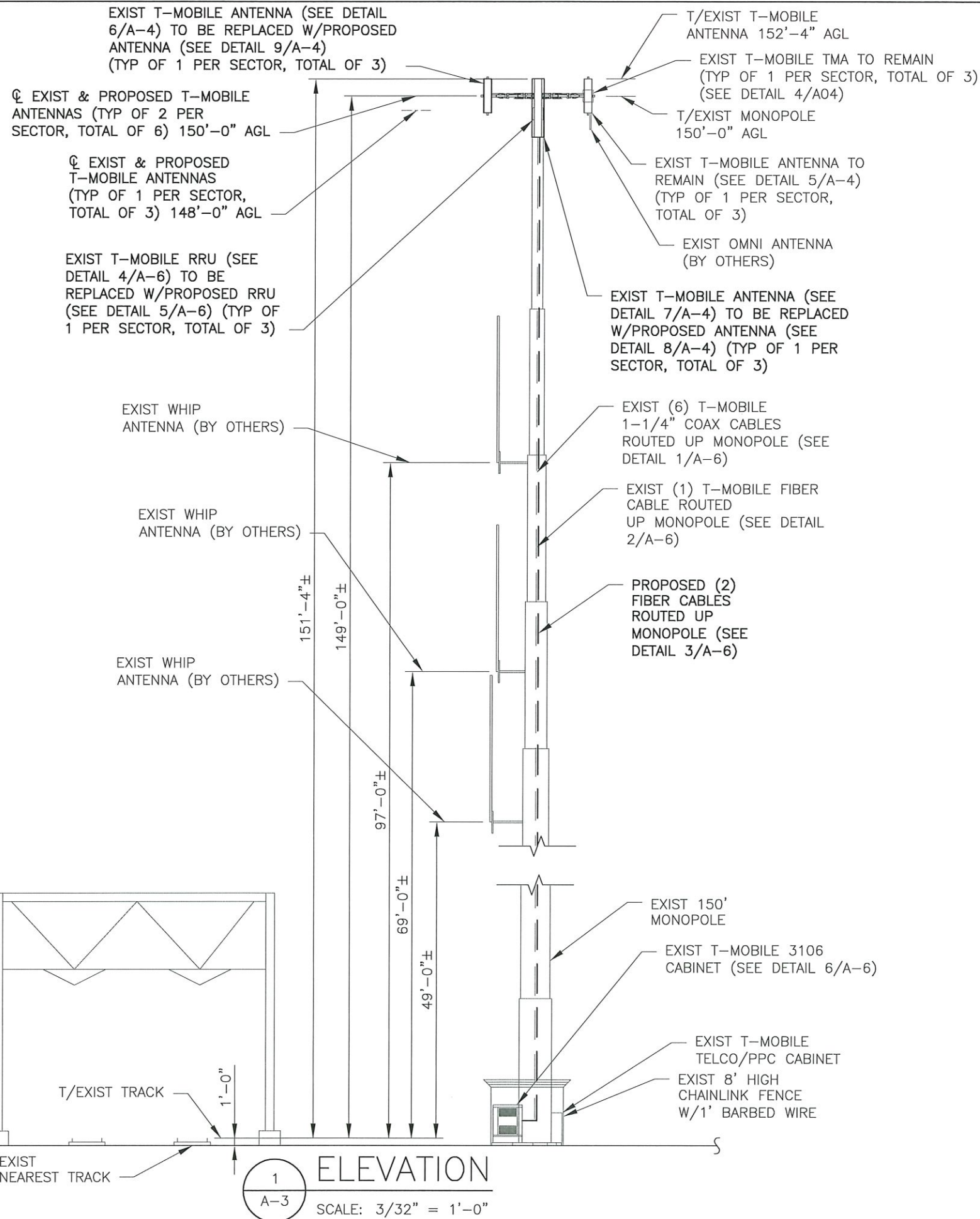
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SHEET TITLE  
EQUIPMENT PLAN  
& PHOTO

SHEET NUMBER  
A-2



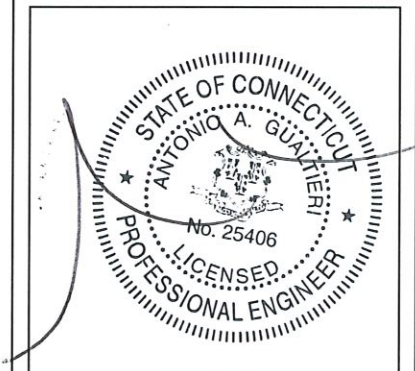
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A-3 SCALE: N.T.S.



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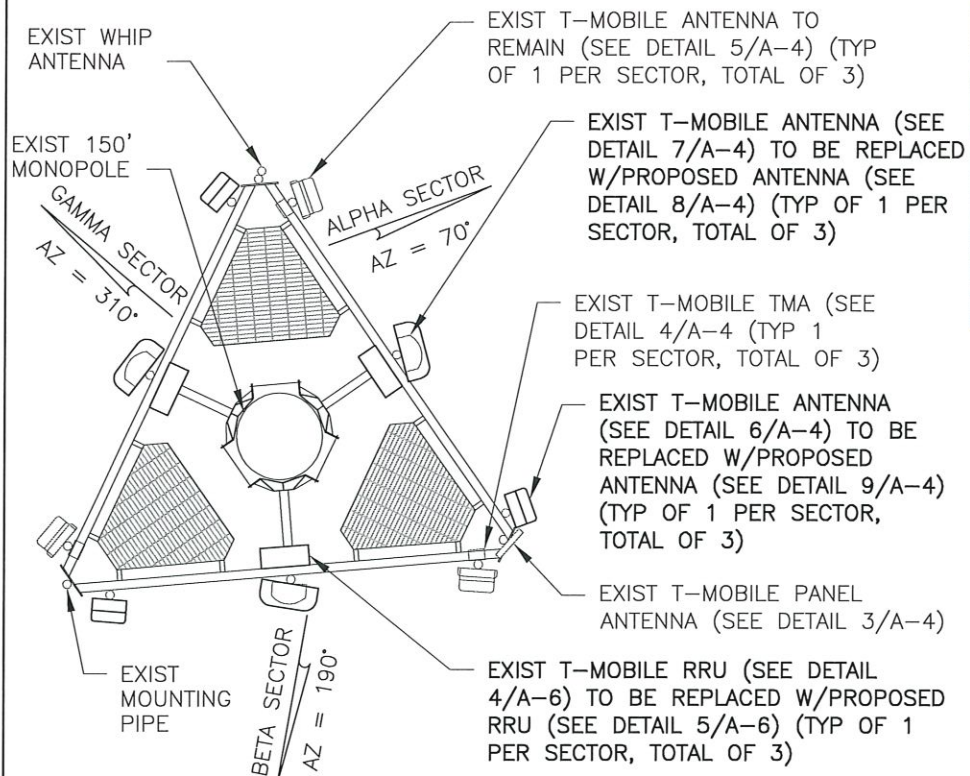
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SHEET TITLE  
ELEVATION & PHOTO

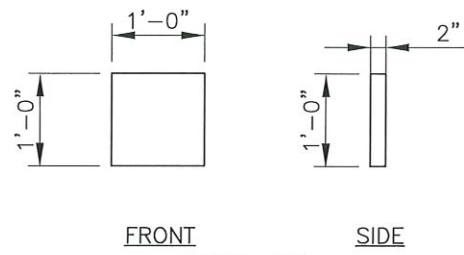
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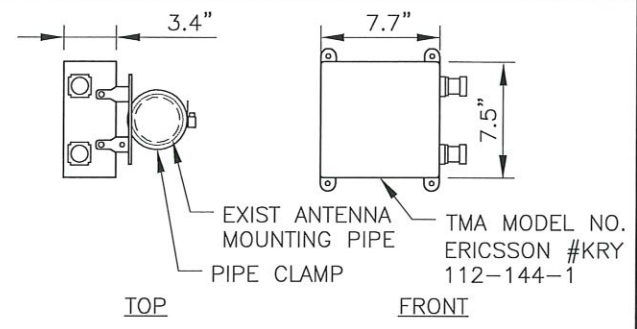
1 ANTENNA PLAN  
A-4 SCALE: 3/8" = 1'-0"



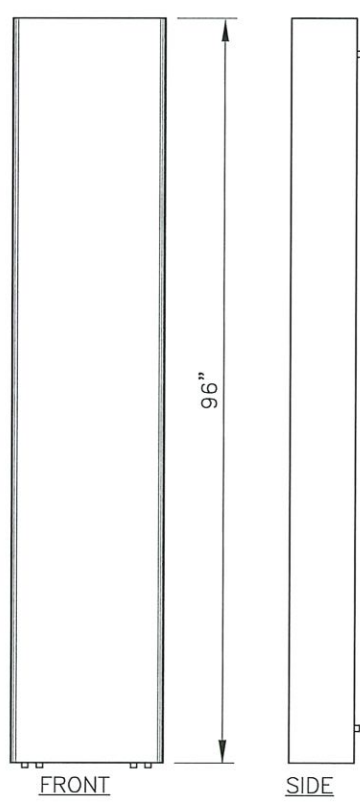
2 PHOTO  
A-4 SCALE: N.T.S.



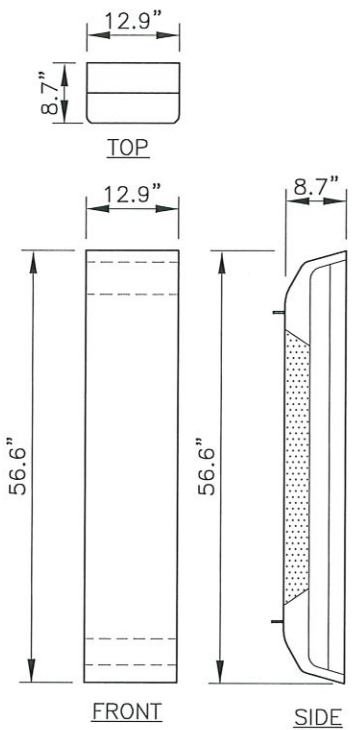
3 PANEL ANTENNA (EXIST)  
A-4 SCALE: 1/2" = 1'-0"



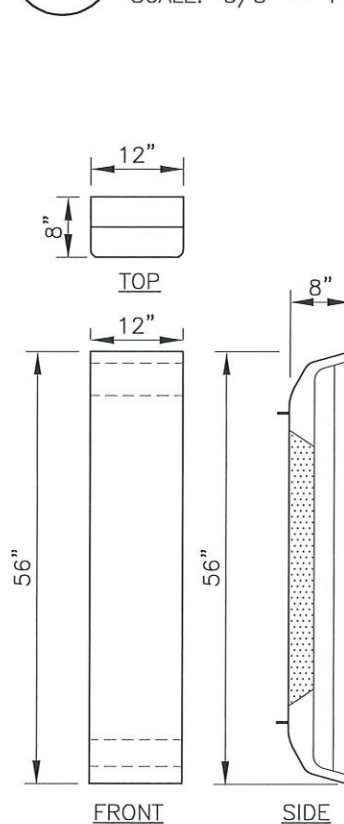
4 TMA (EXIST)  
A-4 SCALE: 1" = 1'-0"



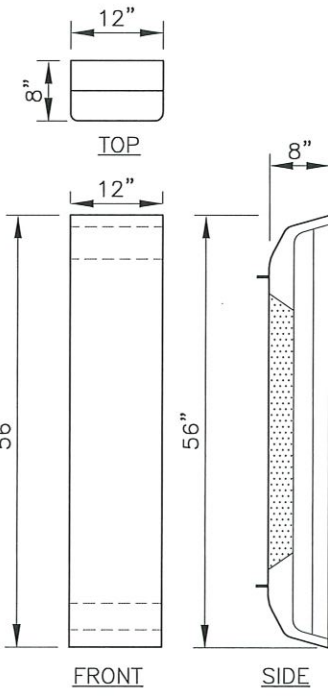
8 ANTENNA (PROPOSED)  
A-4 SCALE: 1/2" = 1'-0"



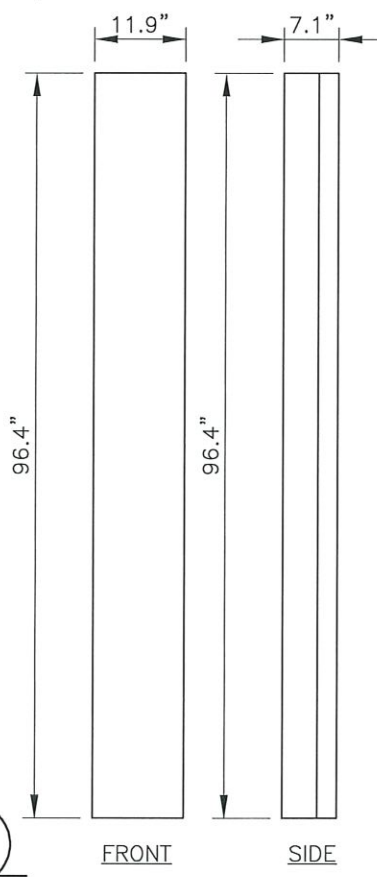
9 ANTENNA (PROPOSED)  
A-4 SCALE: 1/2" = 1'-0"



5 ANTENNA (EXIST)  
A-4 SCALE: 1/2" = 1'-0"



6 ANTENNA (EXIST)  
A-4 SCALE: 1/2" = 1'-0"

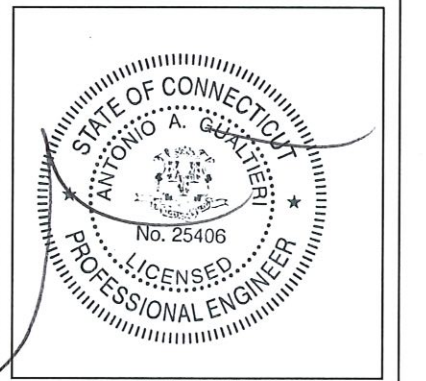


7 ANTENNA (EXIST)  
A-4 SCALE: 1/2" = 1'-0"

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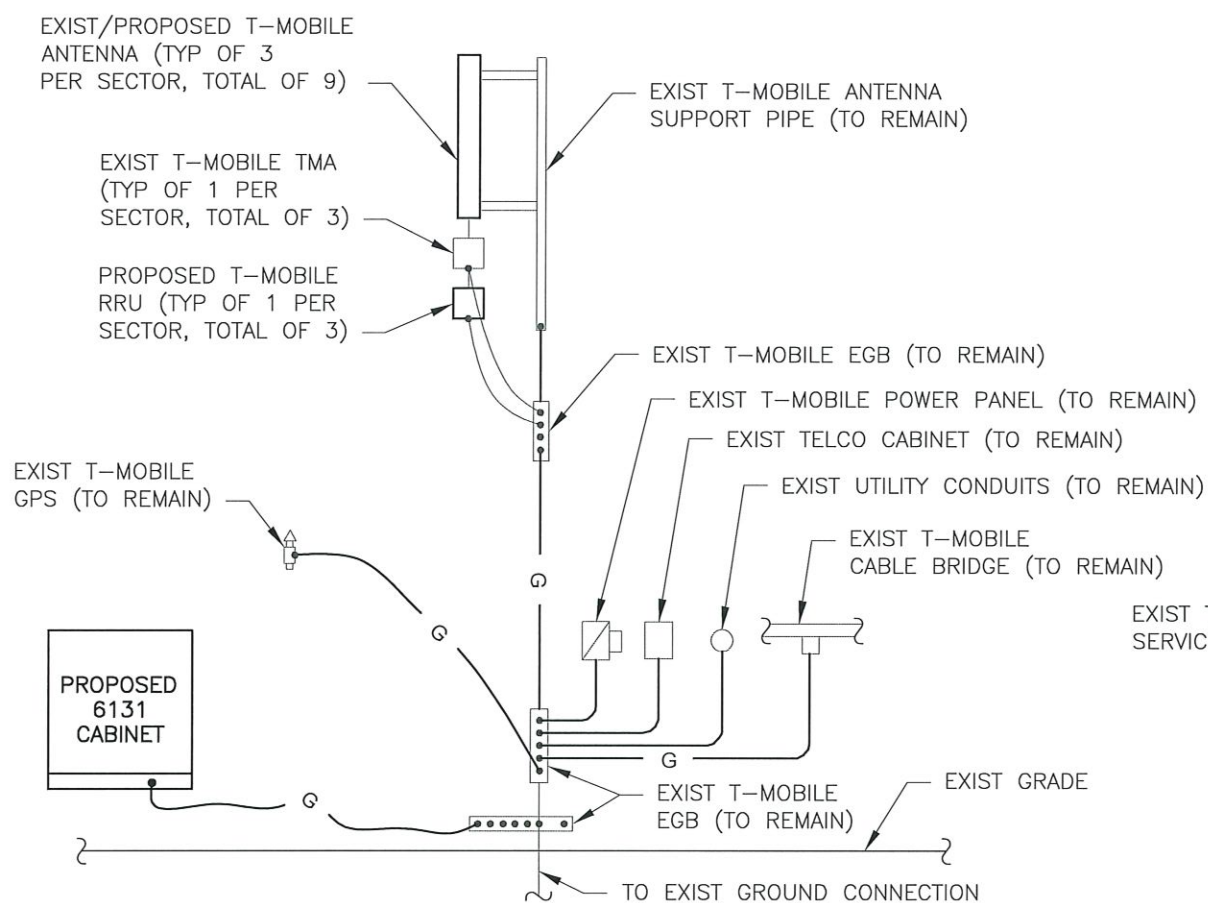


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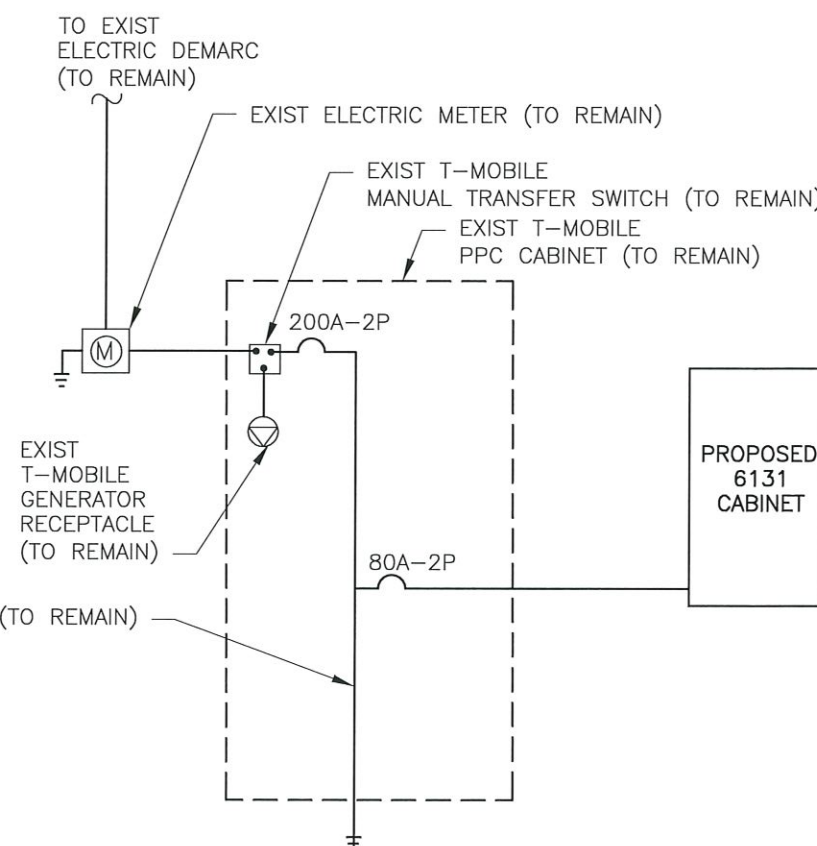
SHEET TITLE  
ANTENNA PLAN & DETAILS

SHEET NUMBER  
A-4





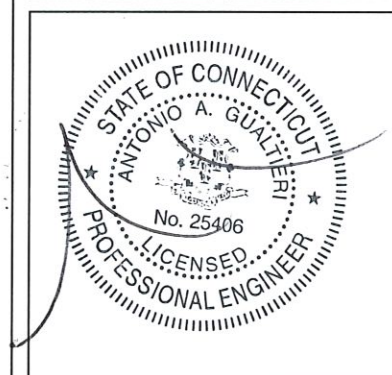
1 GROUNDING RISER DIAGRAM  
 A-5 SCALE: NTS



2 ONE-LINE POWER DIAGRAM  
 A-5 SCALE: NTS



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SHEET TITLE  
 WIRING DIAGRAM

SHEET NUMBER  
 A-5



1-1/4" Foam Dielectric,  
LDF Series - 50-ohm

**LDF6-50**

Description	Type No.
<b>Cable Ordering Information</b>	
Standard Cable	
1-1/4" Standard Cable, Standard Jacket	LDF6-50
Fire Retardant Cable	
1-1/4" Fire Retardant Jacket (CATVR)	LDF6RN-50
Low VSWR and Specialized Cables	
1-1/4" Low VSWR, specify operating band	LDF6P-50-(**)
** Insert suffix number from "Low VSWR Specifications" table, page 515	
<b>Characteristics</b>	
<b>Electrical</b>	
Impedance, ohms	50 ± 1
Maximum Frequency, GHz	3.3
Velocity, percent	89
Peak Power Rating, kW	205
dc Resistance, ohms/1000 ft (1000 m)	
Inner	0.22 (0.72)
Outer	0.19 (0.62)
dc Breakdown, volts	9000
Jacket Spark, volts RMS	10000
Capacitance, pF/ft (m)	22.9 (75.1)
Inductance, µH/ft (m)	0.056 (0.184)
<b>Mechanical</b>	
Outer Conductor	Copper
Inner Conductor	Copper
Diameter over Jacket, in (mm)	1.55 (39.4)
Diameter over Copper Outer Conductor, in (mm)	1.41 (35.8)
Diameter Inner Conductor, in (mm)	0.516 (13.1)
Nominal Inside Transverse Dimensions, cm	3.11
Minimum Bending Radius, in (mm)	15 (380)
Number of Bends, minimum (typical)	15 (40)
Bending Moment, lb-ft (N-m)	36 (49)
Cable Weight, lb/ft (kg/m)	0.63 (0.94)
Tensile Strength, lb (kg)	1300 (590)
Flat Plate Crush Strength, lb/in (kg/mm)	125 (2.2)

Frequency MHz	Attenuation		Average Power, kW
	Attenuation dB/100 ft	Attenuation dB/100 m	
0.5	0.017	0.056	175.0
1	0.024	0.079	123.0
1.5	0.030	0.097	101.0
2	0.034	0.112	87.1
10	0.077	0.253	38.6
20	0.110	0.361	27.1
30	0.135	0.444	22.0
50	0.176	0.579	16.9
88	0.237	0.778	12.6
100	0.254	0.832	11.7
108	0.264	0.867	11.3
150	0.314	1.03	9.47
174	0.340	1.12	8.75
200	0.367	1.20	8.12
300	0.457	1.50	6.52
400	0.535	1.76	5.57
450	0.571	1.87	5.22
500	0.606	1.99	4.92
512	0.614	2.01	4.86
600	0.671	2.20	4.44
700	0.732	2.40	4.07
800	0.789	2.59	3.78
824	0.803	2.63	3.71
894	0.841	2.76	3.54
950	0.876	2.87	3.40
1000	0.897	2.94	3.32
1250	1.02	3.35	2.92
1500	1.14	3.73	2.62
1700	1.22	4.02	2.43
1800	1.27	4.16	2.35
2000	1.35	4.43	2.21
2100	1.39	4.56	2.14
2200	1.43	4.69	2.08
2300	1.47	4.82	2.03
3000	1.73	5.68	1.72
3300	1.84	6.02	1.62

Standard Conditions:  
For Attenuation VSWR 1.0, ambient temperature 20°C (68°F).  
For Average Power, VSWR 1.0, ambient temperature 40°C (104°F), inner  
conductor temperature 100°C (212°F), no solar loading.

HELIX® Coaxial Cables

**Product Data Sheet HB158-1-13U6-56F18**

**HYBRIFLEX™ RRH Hybrid Feeder Cabling Solution, 1-5/8", Single-Mode Fiber**

**Product Description**  
RIS' HYBRIFLEX Remote Radio Head (RRH) hybrid feeder cabling solution combines optical fiber and DC power for RRHs in a single lightweight aluminum corrugated cable, making it the world's most innovative solution for RRH deployments.

**Features/Benefits**  
• Aluminum corrugated armor with outstanding bending characteristics - minimizes installation time and enables mechanical protection and shielding  
• Same accessories as 1-5/8" coaxial cable  
• Outer conductor grounding - Eliminates typical grounding requirements and saves on installation costs  
• Lightweight solution and compact design - Decreases tower loading  
• Robust cabling - Eliminates need for expensive cable trays and ducts  
• Installation of eight bundled fiber optic cable pairs directly to the RRH - Reduces CAPEX and wind load by eliminating need for interconnection  
• Optical fiber and power cables housed in single corrugated cable - Saves CAPEX by standardizing RRH cable installation and reducing installation requirements  
• UL-listed, flame-retardant jacket, 1M' protected assembly - Allows both indoor and outdoor applications

**Technical Specifications**

Parameter	Value
Outer Conductor Armor	Corrugated Aluminum
Inner Conductor	Thermoplastic Zero-Halogen
UL Protection	Individual and External Jacket
Mechanical Properties	
Weight (lb/ft)	2.6 (0.78)
Minimum Bending Radius, Single Bend	200 (61)
Minimum Bending Radius, Encased Bending	100 (30)
Recommended Maximum Comp. Spacing	107 (3.25) (4.0)
DC Resistance Outer Conductor Armor	1.25 (Ω/1000ft)
DC Resistance Inner Cable	1.37 (Ω/1000ft)
Fiber Optic Properties	
Version	Single-mode OM3
Wavelength	1310 nm
Attenuation (dB/km)	0.25
Dispersion (ps/nm-km)	17
Return Loss (dB)	20
Temperature Range	-40 to 125 °C (-40 to 257 °F)
Standards (Meets or Exceeds)	UL-94 V-0, UL-1666, RoHS Compliant
DC Power Cable Properties	
Size (mm)	13.7 (0.54)
Outer Diameter	13.7 (0.54)
Inner Diameter	13.7 (0.54)
Wall Thickness	0.1 (0.004)
Material	Aluminum
Standards (Meets or Exceeds)	UL-94 V-0, UL-1666, RoHS Compliant

**PRODUCT DATASHEET HB114-U6S12-120-LI**

**RADIO FREQUENCY SYSTEMS The Clear Choice®**

**HYBRIFLEX® RRH Hybrid Cable Solution 6x12, 6AWG Low-Inductance, 1-1/4", Single-Mode Fiber With DLC Connectors**

**Technical Features**

**STRUCTURE**

Parameter	Value
Cable Type	HYBRIFLEX Low Inductance
Size	1-1/4"
Flame Performance	Flame Retardant
Length	36.87 (1120)

**MECHANICAL SPECIFICATIONS**

Parameter	Value
Cable Diameter Nominal	mm (in)
Cable Weight	kg/m (lb/ft)
Minimum Bending Radius, Single Bend	mm (in)
Minimum Bending Radius, Multi Bends	mm (in)
Recommended Maximum Clamp Spacing	m (ft)

**DC POWER CABLE SPECIFICATIONS**

Parameter	Value
Number of DC Pairs	6
Maximum DC-Resistance Power Cable	Ω/km (Ω/1000ft)
Cross Section of Power Cable	mm² (AWG)
DC Wire Jacket Material	PVC/Nylon
DC Cable Jacket	PVC/Nylon
DC Standards (Meets or Exceeds)	For use in Type RHC per UL 2082, PFC/Nylon/UL94V-0/UL94V-0/UL94V-0/UL94V-0/UL94V-0/UL94V-0
Break-out length	mm (in)
DC Cable sealing method	UL 218
Alarm Wire	UL 218

**CABLE JACKET**

Parameter	Value
UV Protection Individual and External Jacket	Yes
Armor Type	Corrugated Aluminum
Maximum DC-Resistance of Armor	Ω/km (Ω/1000ft)
Diameter Corrugated Armor	mm (in)

**FIBER CABLE SPECIFICATIONS**

Parameter	Value
Fiber Type	Single-mode
Number of Fiber Pairs	12
Core/Clad	µm (in)
Bandwidth Protection Nominal	mm (in)
Single Bending Radius	mm (in)
Fiber Standards (Meets or Exceeds)	UL Listed Type OM3 (UL 1666), RoHS Compliant
Optical Loss	dB/km

**Fiber Termination End 1**  
Fiber Termination End 2  
Fiber Break-out length  
Cable sealing method

**TESTING AND ENVIRONMENTAL**

Parameter	Value
Storage Temperature	°C (°F)
Operation Temperature	°C (°F)
Installation Temperature	°C (°F)
Jacket specifications	UL 218 Type RHC, UL listed
Alarm Wire Standards (Meets or Exceeds)	UL Standard 1953, 1581 V0-V1, MFW Oil and Gasoline R E21 (DURLEX), Cable meets UL requirements, RoHS REACH Compliant



**Remote Radio Unit - RRUS11 B12**

Position	Description	Marking
A	Maintenance button	▲
B	Optical indicators	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
C	-48 V DC power supply	UMT
D		UMT
E	Optical cable 1	①-1
F	Optical cable 2	②-2
G	Antenna 1	A1
H	Antenna 2	A2
I	ALD (used for a RET unit for example)	ALD
J	External alarm	ALM
K (1)	Cross connect RXA	RXA I/O
L (1)	RXA co-site	RXA I/O
M (1)	Cross connect RXB	RXB I/O
N	Grounding	⚡

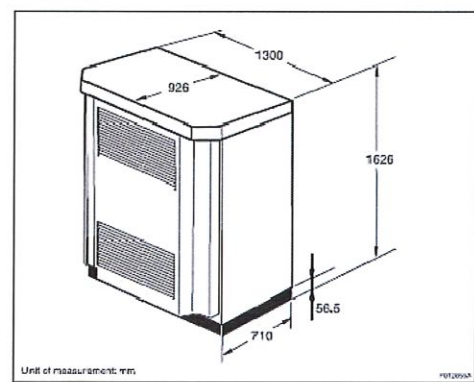
Unit	Output Power
RRUS 11 B1, B4	2x30W
	2x40W
RRUS 11 B2	2x30W
	2x40W
RRUS 11 B12	2x30W

**BUILDING PRACTICE CONCEPT**

Optimized for dual band  
Target size:  
• Volume: 30+L  
• 335mm width; 379.7mm height; 235+mm depth 13.19"  
• Weight: 74 lb +/- 4lb (33.6Kg +/- 1.8kg)  
• 58+mm fin height

Filter double-sided chassis in-between B12 and B71 Re

Unit	Dimensions (mm)
Height (including installation frame)	1626
Width	1300
Depth	710
Depth including door	926



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STATE OF CONNECTICUT  
ANTONIO A. GUALTIERI  
No. 25406  
LICENSED PROFESSIONAL ENGINEER

SITE INFORMATION  
CT11024B  
AMTRAK-BRANFORD  
HOSLEY AVENUE  
BRANFORD, CT 06406

SHEET TITLE  
SPECIFICATIONS

SHEET NUMBER

A-6

## Kyle Richers

---

**From:** UPS Quantum View <pkginfo@ups.com>  
**Sent:** Wednesday, January 9, 2019 8:45 AM  
**To:** krichers@transcendwireless.com  
**Subject:** UPS Ship Notification, Reference Number 1: CT11024B CSC owner



### You have a package coming.

**Scheduled Delivery Date:** Thursday, 01/10/2019

This message was sent to you at the request of TRANSCEND WIRELESS to notify you that the shipment information below has been transmitted to UPS. The physical package may or may not have actually been tendered to UPS for shipment. To verify the actual transit status of your shipment, click on the tracking link below.

## Shipment Details

---

**From:** TRANSCEND WIRELESS  
**Tracking Number:** [1ZV257424295294541](#)  
**Ship To:** National Railroad Passenger Corp.  
60 Massachusetts Ave.  
WASHINGTON, DC 200024285  
US  
**UPS Service:** UPS GROUND  
**Number of Packages:** 1  
**Scheduled Delivery:** 01/10/2019  
**Signature Required:** A signature is required for package delivery  
**Weight:** 1.0 LBS  
**Reference Number 1:** CT11024B CSC owner



[Download the UPS mobile app](#)

## Kyle Richers

---

**From:** UPS Quantum View <pkginfo@ups.com>  
**Sent:** Wednesday, January 9, 2019 8:48 AM  
**To:** krichers@transcendwireless.com  
**Subject:** UPS Ship Notification, Reference Number 1: CT11024B CSC FS



### You have a package coming.

**Scheduled Delivery Date:** Thursday, 01/10/2019

This message was sent to you at the request of TRANSCEND WIRELESS to notify you that the shipment information below has been transmitted to UPS. The physical package may or may not have actually been tendered to UPS for shipment. To verify the actual transit status of your shipment, click on the tracking link below.

## Shipment Details

---

**From:** TRANSCEND WIRELESS  
**Tracking Number:** [1ZV257424299404558](#)  
**Ship To:** James B. Cosgrove  
Town of Branford  
1019 Main Street  
BRANFORD, CT 064053731  
US  
**UPS Service:** UPS GROUND  
**Number of Packages:** 1  
**Scheduled Delivery:** 01/10/2019  
**Signature Required:** A signature is required for package delivery  
**Weight:** 1.0 LBS  
**Reference Number 1:** CT11024B CSC FS



[Download the UPS mobile app](#)

## Kyle Richers

---

**From:** UPS Quantum View <pkginfo@ups.com>  
**Sent:** Wednesday, January 9, 2019 8:49 AM  
**To:** krichers@transcendwireless.com  
**Subject:** UPS Ship Notification, Reference Number 1: CT11024B CSC ZO



### You have a package coming.

**Scheduled Delivery Date:** Thursday, 01/10/2019

This message was sent to you at the request of TRANSCEND WIRELESS to notify you that the shipment information below has been transmitted to UPS. The physical package may or may not have actually been tendered to UPS for shipment. To verify the actual transit status of your shipment, click on the tracking link below.

## Shipment Details

---

**From:** TRANSCEND WIRELESS

**Tracking Number:** [1ZV257424298534562](#)

**Ship To:** Harry Smith  
Town of Branford  
1019 Main Street  
BRANFORD, CT 064053731  
US

**UPS Service:** UPS GROUND

**Number of Packages:** 1

**Scheduled Delivery:** 01/10/2019

**Signature Required:** A signature is required for package delivery

**Weight:** 1.0 LBS

**Reference Number 1:** CT11024B CSC ZO



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