

6/14/2016

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

Notice of Exempt Modification
225 South Main Street (Amtrak Station), Windsor Locks, CT 06096
N 41.9133
W -72.626219

Dear Ms. Bachman:

T-Mobile currently maintains 3 antennas at the 148 foot level of the existing 150 foot monopole at 225 South Main Street (Amtrak Station), Windsor Locks, CT 06096. The tower is owned by SBA Properties, LLC. The property is owned by Amtrak. T-Mobile now intends to replace the 3 existing antennas with 3 new antennas and install three new antennas, for a total of 6 antennas. These antennas would be installed at the 148 foot level of the tower. T-Mobile also intends to add 6 new Remote Radio Units at the 148 foot level mounted behind the proposed antennas. The Structural Analysis is passing with a 32% Foundation Ratio, 53% Anchor Bolt Ratio, 90% Flange Connections Ratio, and 98% Shaft Ratio.

This facility was approved by the Town of Windsor Locks and, per the attached documents provided by town officials, the tower was exempt from their town zoning ordinance during the original build. This approval included the condition(s) that will be followed per the proposed modification. This modification complies with the aforementioned condition(s).

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. g 16-50j-73, a copy of this letter is being sent to Wayne Green, Building Official, for the Town of Stonington, as well as the property owner and the tower owner.

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

1. The proposed modifications 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 modifications 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-SOj-72(b)(2).

Sincerely,

Gregg Shappy
10 Industrial Ave.
Suite 3
Mahwah, NJ 07430
(845) 553-2045
gshappy@transcendwireless.com

Attachments

cc: J. Christopher Kervic – Town of Windsor Locks First Selectman
Michael Villa - SBA
Warren D. & Patricia L. Main

Town of Windsor Locks

Catherine Dorau
Assistant Zoning & Wetland Officer
Planning Coordinator



Building / Zoning &
Planning Department
Phone 860-627-1447
Fax 860-292-1121

September 28, 2000

Attorney Christopher R. Stone
Chadwick, Libbey, & Stone
555 Franklin Avenue
Hartford, CT 06114

Re: Amtrak Telecommunication Tower -- Antenna

Dear Chris:

The original installation of the Amtrak tower was determined to be exempt from compliance with the Windsor Locks Zoning Ordinances (see attached copy of your letter dated November 17, 1998).

I'm enclosing a copy of a letter from LCC International, Inc. indicated interest in adding an antenna to the existing tower. Please advise if any additional antennas to this tower would also be exempt from the site plan review process.

Thank you for your anticipated response to this matter.

Very truly yours,

Catherine Dorau
Assistant Zoning & Wetlands Officer

Enclosures

File:p/townatty/2000/amtraktower092800

**PER PHONE CALL W/ C. STONE – 10-11-2000,
Lcc international, Inc., should file for a site plan review before the PZC.
Advised Christine Belvin on October 12, 2000.**

C.D.

Mario L. Gatti Town Office Building / 50 Church Street / Windsor Locks, CT 06096

*original
attached*

Town of Windsor Locks

*Catherine Dorau
Assistant Zoning/Wetlands Officer
Planning Coordinator*



*Building / Zoning &
Planning Department
Phone 860-627-1447
Fax 860-292-1121*

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Assistant Zoning & Wetlands Officer

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File:\format\2000\amtrak\tower\092800

Mario L. Gatti Town Office Building / 50 Church Street / Windsor Locks, CT 06096

CHADWICK, LIBBEY, SZILAGYI & STONE

ATTORNEYS AT LAW
555 FRANKLIN AVENUE
HARTFORD, CONNECTICUT 06114
(860) 298-4500
FAX (860) 298-3838

BRISTOL OFFICE
124 MAIN STREET
SUITE 103
BRISTOL, CT 06010
(203) 568-9700

EAST HARTFORD OFFICE
111 FOUNDERS PLAZA
SUITE 1403
EAST HARTFORD, CT 06108
(860) 610-4300
FAX (860) 610-4504

November 17, 1998

REPLY TO EAST HARTFORD OFFICE

VIA FACSIMILE 292-1121

Douglas Glazier, First Selectman
Town of Windsor Locks
50 Church Street
Windsor Locks, CT 06096

**RE: Application of Omnipoint Communications Enterprises, Inc.
For Installation of Certain Wireless Communication Facilities
Within Amtrak Property in the Town of Windsor Locks**

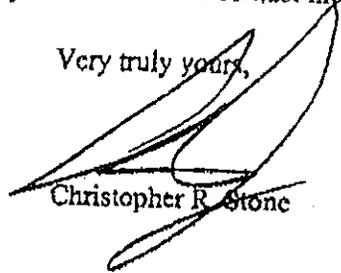
Dear First Selectman Glazier:

Please be advised that I have reviewed several letters from Attorney John Harrington representing Omnipoint and the relevant federal statutes regarding the above-referenced application. As you recall, Omnipoint is seeking permission for the installation of a monopole within Amtrak property and has requested a determination that such activity is exempt from our zoning process.

Pursuant to 49 U.S.C.A. Section 24902(j), no local building, zoning, subdivision, or similar related law shall apply in connection with the construction or operation of any improvement undertaken by or for the benefit of Amtrak within the Northeast Corridor Improvement Project. The proposed improvements are within this Project, and have been undertaken by Amtrak for its benefit. As such, it is the opinion of this office that this particular proposal is exempt from compliance with the Windsor Locks Zoning Ordinances.

If you have any comments or questions, please feel free to contact me.

Very truly yours,



Christopher R. Stone

RECEIVED

DEC 11 1998

BUILDING DEPARTMENT
WINDSOR LOCKS

CRS/mjg

LCC, International

1792 Main Street
East Hartford, CT 06108

September 14, 2000

Catherine C. Dorau
Planning Coordinator
Town of Windsor Locks
Town Hall
50 Church Street
Windsor Locks, CT 06096-2343

Dear Sir or Madam:

Thank you for taking the time to speak with my colleague Stephen Schadler and myself, Tuesday morning September 12, 2000. We are a telecommunications consulting company developing a network for XM Radio. We are interested in adding a 70" whip antenna to the top of the Amtrak tower located at the Amtrak Station on Rte. 159 and a 4' X 4' X 5' repeater box between the Amtrak shelter and the tower with a 26" diameter dish off the repeater (see attachment 1).

Attached, please find a brief description of LCC and XM Radio. I have also enclosed pictures of the existing tower and a photo simulation of the tower with our 70" antenna on top.

I am interested in properly zoning and building these proposed changes. We are currently working with Amtrak on a lease. We will have an Architecture and Engineering firm out to prepare official drawings for submission at a later date. I appreciate any and all procedural help you can provide.

If you have any questions or need more information please contact me at (860) 833-9039.

Sincerely,



Christine Belvin
Zoning Specialist

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

T-Mobile Existing Facility

Site ID: CT11064F

Windsor/I-91/X40_1
225 S Main Street/Amtrak Station
Windsor Locks, CT 06096

May 16, 2016

EBI Project Number: 6216002355

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	6.05 %

May 16, 2016

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

Emissions Analysis for Site: **CT11064F – Windsor/I-91/X40_1**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **225 S Main Street/Amtrak Stati, Windsor Locks, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 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 public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The general population exposure limit for the 700 MHz Band is approximately 467 $\mu\text{W}/\text{cm}^2$, and the general population exposure limit for the PCS and AWS 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 **225 S Main Street/Amtrak Stati, Windsor Locks, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

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

- 1) 2 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.
- 2) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 3) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.
- 4) 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.

- 5) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 6) The antennas used in this modeling are the **Ericsson AIR21 B4A/B2P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 B4A/B2P** has a maximum gain of **15.9 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe at 700 MHz. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 7) The antenna mounting height centerline of the proposed antennas is **150 feet** above ground level (AGL).
- 8) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	150	Height (AGL):	150	Height (AGL):	150
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	9,337.08	ERP (W):	9,337.08	ERP (W):	9,337.08
Antenna A1 MPE%	1.62	Antenna B1 MPE%	1.62	Antenna C1 MPE%	1.62
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	150	Height (AGL):	150	Height (AGL):	150
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power(W):	30	Total TX Power(W):	30	Total TX Power(W):	30
ERP (W):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A2 MPE%	0.32	Antenna B2 MPE%	0.32	Antenna C2 MPE%	0.32

Site Composite MPE%	
Carrier	MPE%
T-Mobile (Per Sector Max)	1.94 %
Amtrak	4.11 %
Site Total MPE %:	6.05 %

T-Mobile Sector 1 Total:	1.94 %
T-Mobile Sector 2 Total:	1.94 %
T-Mobile Sector 3 Total:	1.94 %
Site Total:	6.05 %

T-Mobile_Max per sector	# 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 2100 MHz (AWS) LTE	2	2334.27	150	8.09	2100	1000	0.81 %
T-Mobile 1900 MHz (PCS) LTE	2	2334.27	150	8.09	1900	1000	0.81 %
T-Mobile 700 MHz LTE	1	865.21	150	1.50	700	467	0.32 %
						Total:	1.94%

Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector 1:	1.94 %
Sector 2:	1.94 %
Sector 3 :	1.94 %
T-Mobile Per Sector Maximum:	1.94 %
Site Total:	6.05 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **6.05%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

..T..Mobile..

NORTHEAST LLC.

SITE NAME: **AMTRAK - WINDSOR LOCKS**

SITE ID NUMBER: **CT11064F**

SITE ADDRESS: **225 S MAIN STREET/AMTRAK STATION,
WINDSOR LOCKS, CT 06096**

AMTRAK FILE NO: **626.32**

WORK CATEGORY: **TMA REMOVAL, CABINET AND ANTENNA REPLACEMENT, AND
ANTENNA AND CABLE ADDITION**

TECTONIC

- PLANNING
- ENGINEERING
- SURVEYING
- CONSTRUCTION MANAGEMENT

TECTONIC Engineering & Surveying
Consultants P.C.

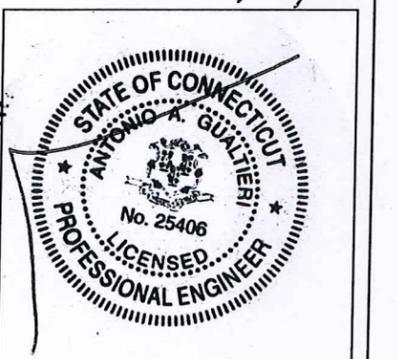
1279 ROUTE 300
NEWBURGH, NY 12550
Phone: (845) 567-6656
Fax: (845) 567-8703

..T..Mobile..

12050 BALTIMORE AVENUE
BELTSVILLE, MD 20705

PROJECT NUMBER		DESIGNED BY	
7421.CT11064F		MP	
REV	DATE	REVISION	DRAWN BY
△	3/21/16	FOR APPROVAL	KA
△	3/24/16	PER COMMENTS	KA

ISSUED BY: **BW** DATE: **3/24/16**



SITE INFORMATION
CT11064F
AMTRAK-WINDSOR LOCKS
**225 S MAIN STREET/
 AMTRAK STATION,
 WINDSOR LOCKS, CT
 06096**

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

PROJECT SUMMARY

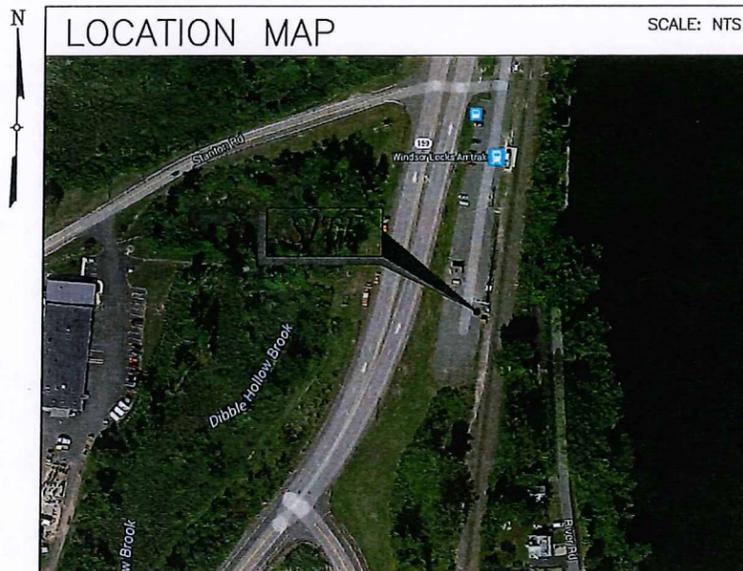
SITE NUMBER: CT11064F
 AMTRAK FILE #: 626.32
 MILEPOST: 47
 SITE NAME: AMTRAK-WINDSOR LOCKS
 SITE ADDRESS: 225 S MAIN STREET/AMTRAK STATION,
 WINDSOR LOCKS, CT 06096
 COUNTY: HARTFORD
 PROPERTY OWNER: AMTRAK (NATIONAL RAILROAD
 PASSENGER CORPORATION)
 APPLICANT: T-MOBILE NORTHEAST, LLC.
 4 SYLVAN WAY
 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) 41.9133
 LONGITUDE: (NAD 83) -72.626219

SITE DIRECTIONS

HEAD NORTHWEST ON SYLVAN WAY. TURN RIGHT ONTO
 US-202 N. CONTINUE ONTO LITTLETON ROAD AND TAKE THE
 RAMP ONTO I-287 N. TAKE THE I-87 S/I-287/NEW YORK
 THRUWAY EXIT TOWARD TAPPAN ZEE BR/NYC. MERGE ONTO
 I-287 E/I-87 S. KEEP LEFT AT THE FORK TO CONTINUE ON
 I-287 E AND FOLLOW SIGNS FOR WHITE PLAINS/RYE. TAKE
 EXIT 9N-9S FOR HUTCHINSON PKWY TOWARD WHITSTONE
 BRIDGE/ MERRITT PKWY. MERGE ONTO WESTCHESTER AVE.
 TAKE THE HUTCHINSON PKWY N RAMP TO MERRITT PKWY.
 KEEP RIGHT AT THE FORK TO STAY ON HUTCHINSON RIVER
 PKWY N. CONTINUE ONTO CT-15 N AND KEEP LEFT. TAKE
 EXIT 68 N-E TO MERGE ONTO I-91 N TOWARD CT-66
 E/HARTFORD/MIDDLETOWN. TAKE EXIT 42 FOR CT-159
 TOWARD WINDSOR LOCKS. TURN LEFT ONTO LAWNACRE ROAD
 THEN CONTINUE ONTO S MAIN ST. THE DESTINATION WILL BE
 ON THE RIGHT.

LOCATION MAP

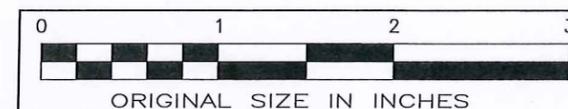
SCALE: NTS



SHEET INDEX

SHEET NO	DESCRIPTION	REV NO
T-1	TITLE SHEET	1
T-2	NOTES	1
A-1	KEY & SITE PLAN	1
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A-3	ELEVATION & PHOTO	1
A-4	ANTENNA PLANS, DETAILS & PHOTO	1
A-5	WIRING DIAGRAMS	1
A-6	SPECIFICATIONS	1
A-7	SPECIFICATIONS	1

AERIAL



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 DUBUQUE (401) 413-9681.
- 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. THE PROPOSED T-MOBILE PLANNED WORK INVOLVES THE REMOVAL OF ONE (1) EXIST S8000 CABINET, THE INSTALLATION OF ONE (1) PROPOSED 3106 CABINET, THE REMOVAL OF THREE (3) TMAs, THE REPLACEMENT OF THREE (3) ANTENNAS, THE ADDITION OF THREE (3) PROPOSED ANTENNAS ON THREE (3) PROPOSED PIPE MOUNTS, AND THE ADDITION OF ONE (1) FIBER CABLE ROUTED UP THE EXISTING MONOPOLE. THE EXISTING CIRCUIT BREAKER WILL BE UPGRADED TO A LARGER SIZE. 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 A QUALIFIED ELECTRICAL CONSULTANT MUST BE RETAINED TO PERFORM THIS DESIGN.
- 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.

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 30 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 ONE EVENT 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.

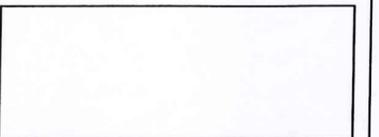
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BELTSVILLE, MD 20705



PROJECT NUMBER	DESIGNED BY
7421.CT11064F	MP

REV	DATE	REVISION	DRAWN BY
Δ	3/21/16	FOR APPROVAL	KA
Δ	3/24/16	PER COMMENTS	KA

ISSUED BY	DATE
BW	3/29/16

ISSUED BY	DATE
BW	3/29/16



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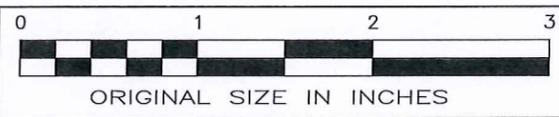
CT11064F
AMTRAK-WINDSOR LOCKS
225 S MAIN STREET/
AMTRAK STATION,
WINDSOR LOCKS, CT
06096

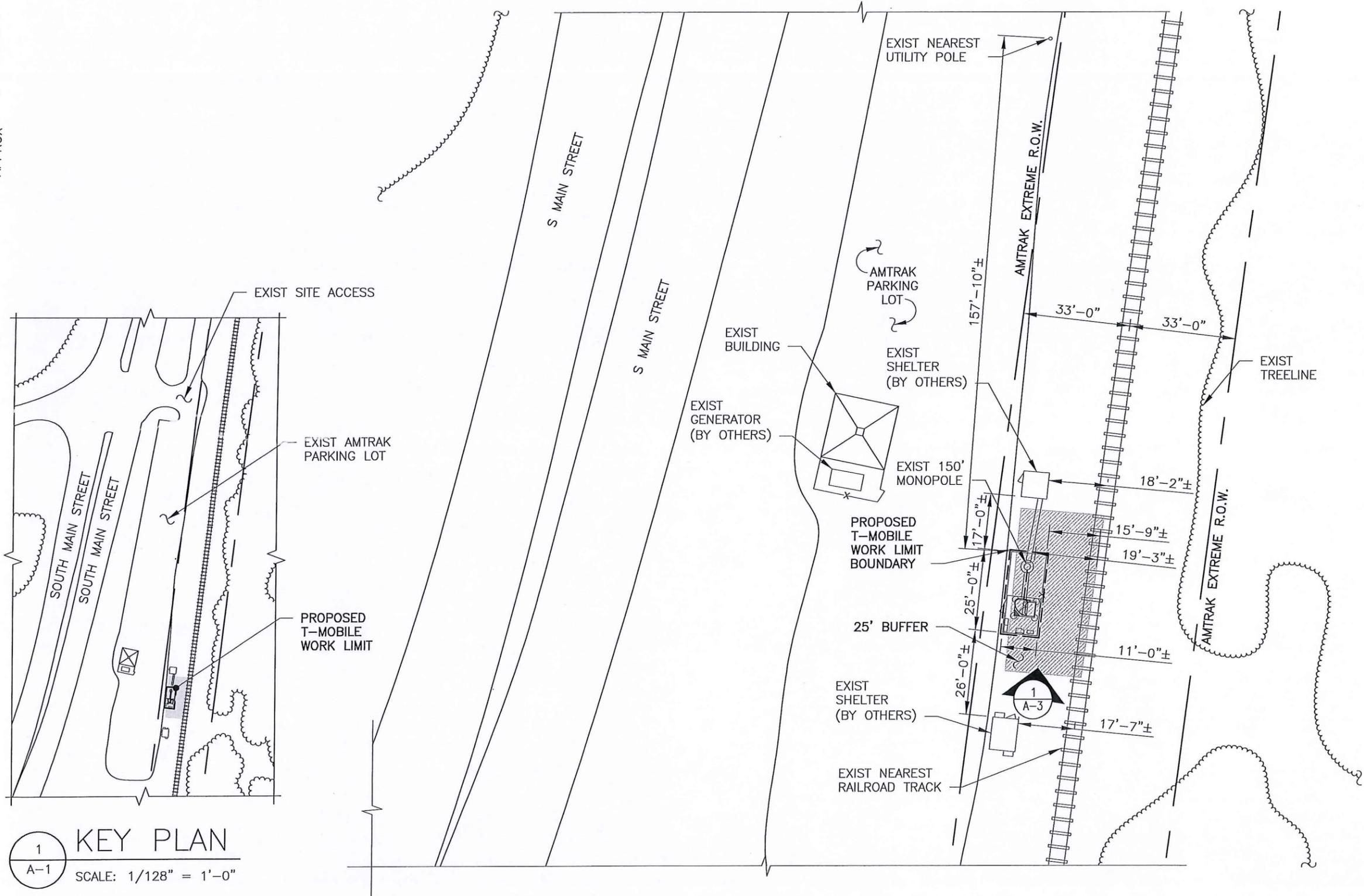
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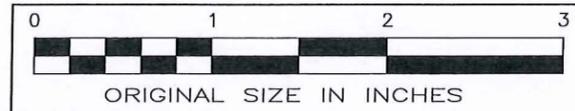
T-2





1
A-1
KEY PLAN
SCALE: 1/128" = 1'-0"

2
A-1
SITE PLAN
SCALE: 1/16" = 1'-0"



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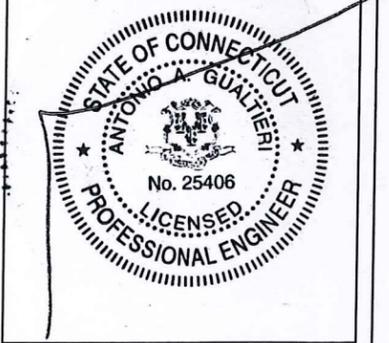
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BSW	3/24/16



SITE INFORMATION

CT11064F
AMTRAK-WINDSOR LOCKS
225 S MAIN STREET/
AMTRAK STATION,
WINDSOR LOCKS, CT
06096

SHEET TITLE

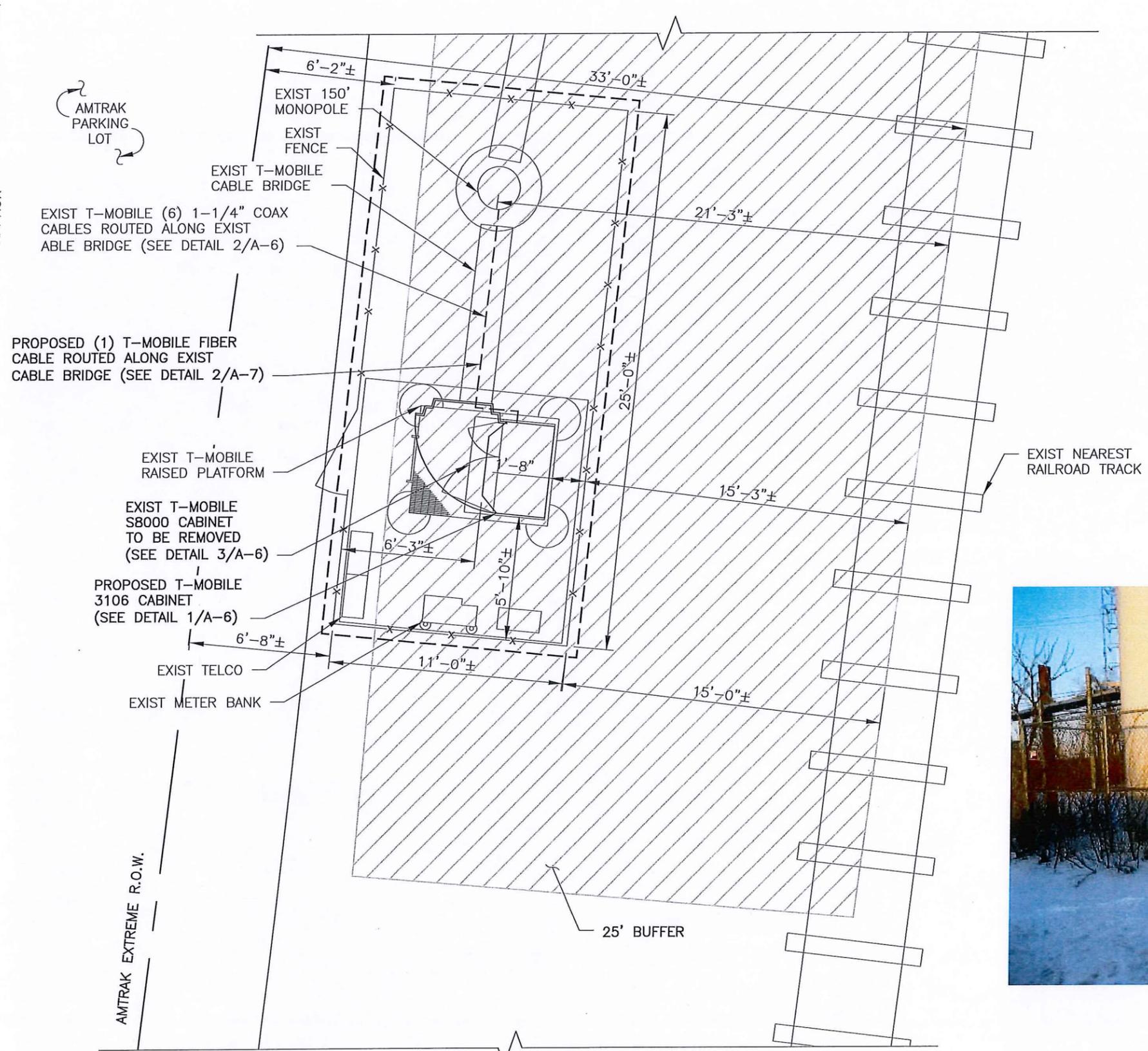
KEY & SITE PLAN

SHEET NUMBER

A-1



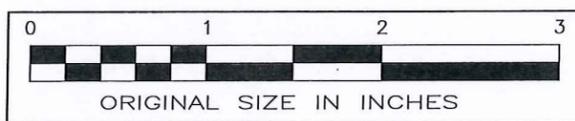
APPROX



1 EQUIPMENT PLAN
A-2 SCALE: 3/16" = 1'-0"



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



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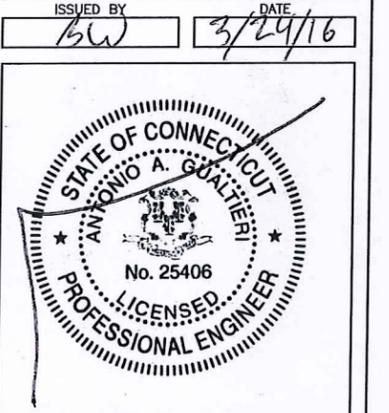
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SHEET TITLE
EQUIPMENT PLAN
& PHOTO

SHEET NUMBER
A-2

PROPOSED T-MOBILE ANTENNA ON PROPOSED PIPE MOUNT (TYP OF 1 PER SECTOR, TOTAL OF 3) (SEE PLAN 2/A-4)

REPLACEMENT T-MOBILE ANTENNAS (TYP OF 3) 148'-0" AGL

PROPOSED T-MOBILE RRU MOUNTED BEHIND ANTENNA (TYP OF 2 PER SECTOR, TOTAL OF 6) (SEE PLAN 2/A-4)

EXIST OMNI ANTENNA

PROPOSED (1) T-MOBILE FIBER CABLE ROUTED UP MONOPOLE (SEE DETAIL 6/A-4)

EXIST (6) T-MOBILE COAX CABLE ROUTED UP MONOPOLE (SEE DETAIL 6/A-4)

EXIST SHELTER (BEYOND) (BY OTHERS)

EXIST 8' CHAINLINK FENCE

EXIST TELCO T/GRADE

T/EXIST MONOPOLE 150'-0" AGL

REPLACEMENT T-MOBILE ANTENNAS (TYP OF 3) 150'-0" AGL

EXIST T-MOBILE TMA (BEHIND) TO BE REMOVED (TYP OF 1 PER SECTOR, TOTAL OF 3) (SEE PLAN 1/A-4)

EXIST T-MOBILE ANTENNA TO BE REPLACED WITH PROPOSED ANTENNA (TYP OF 1 PER SECTOR, TOTAL OF 3) (SEE PLAN 2/A-4)

EXIST WHIP ANTENNA (BY OTHERS) 98'-6" AGL

EXIST WHIP ANTENNA (BY OTHERS) 70'-6" AGL

EXIST T-MOBILE S8000 CABINET TO BE REMOVED (SEE DETAIL 3/A-6)
PROPOSED T-MOBILE 3106 CABINET (SEE DETAIL 1/A-6)

EXIST NEAREST RAILROAD TRACK

1 ELEVATION SCALE: 1/16" = 1'-0"



2 PHOTO SCALE: N.T.S.



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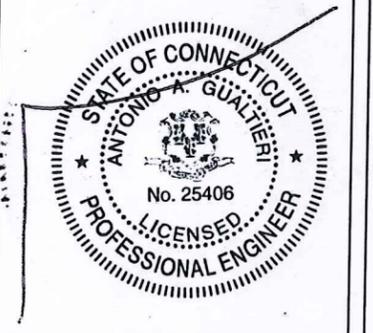
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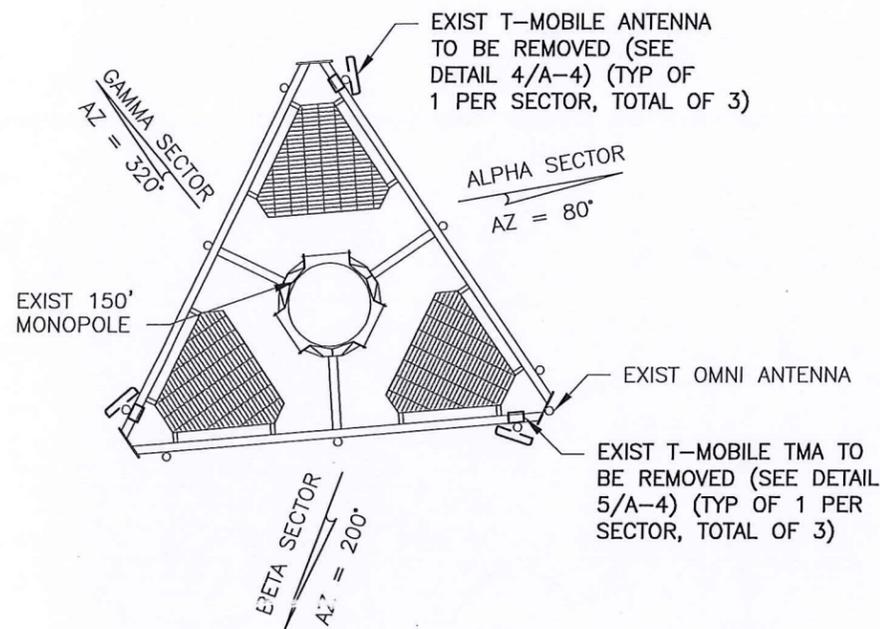
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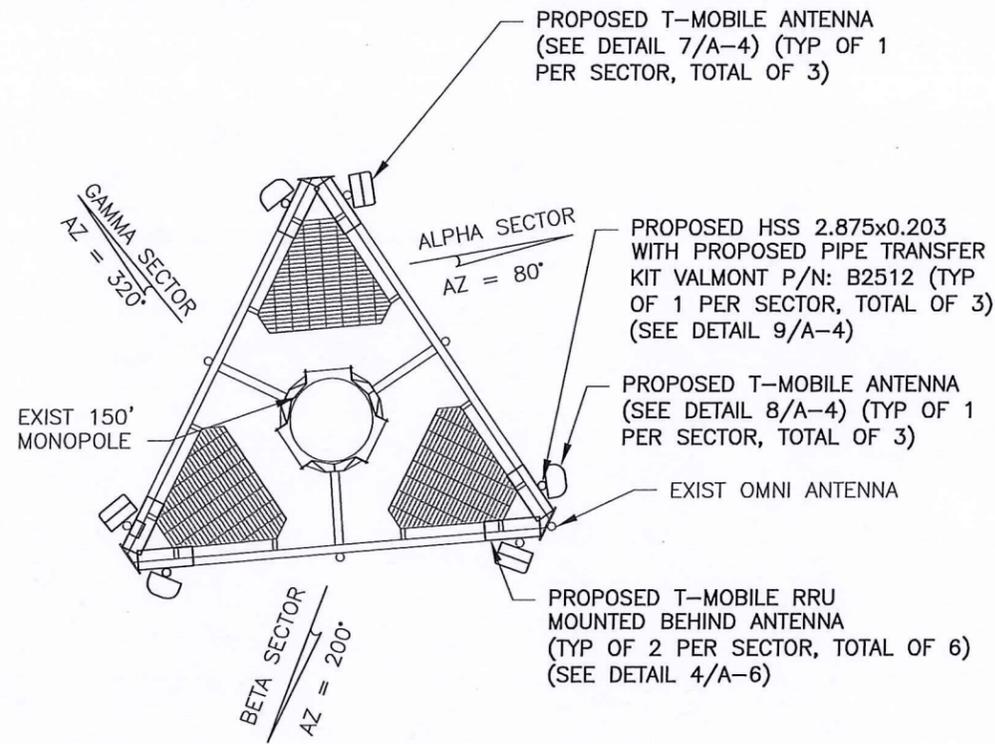
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CT11064F
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06096

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ELEVATION & PHOTO

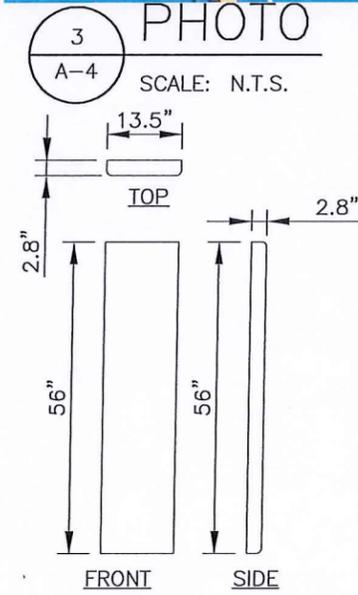
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A-3



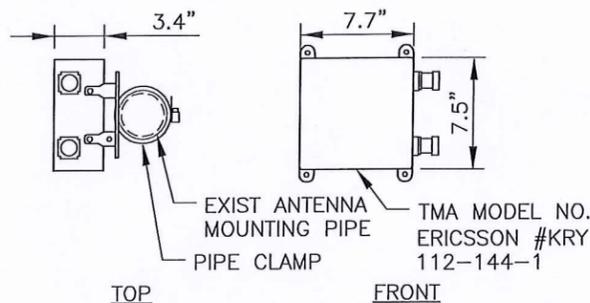
1 EXIST ANTENNA PLAN
A-4 SCALE: 3/8" = 1'-0"



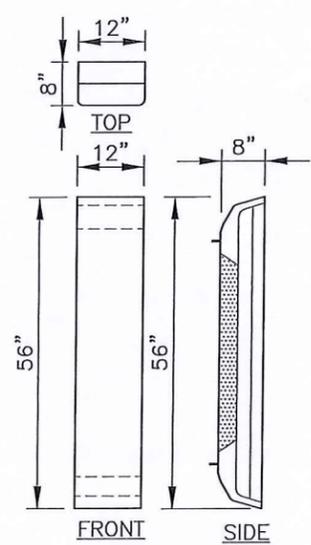
2 PROPOSED ANTENNA PLAN
A-4 SCALE: 3/8" = 1'-0"



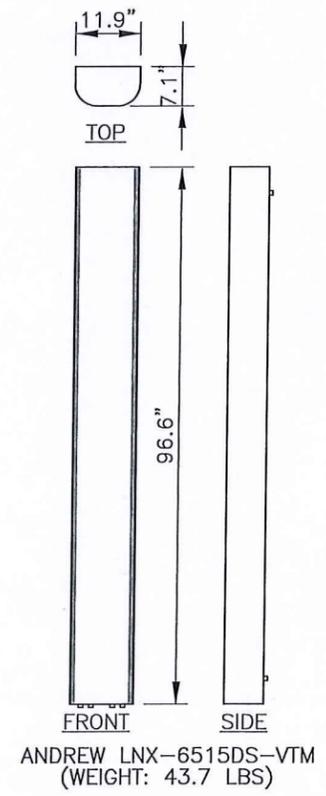
4 ANTENNA (EXIST)
A-4 SCALE: 3/8" = 1'-0"



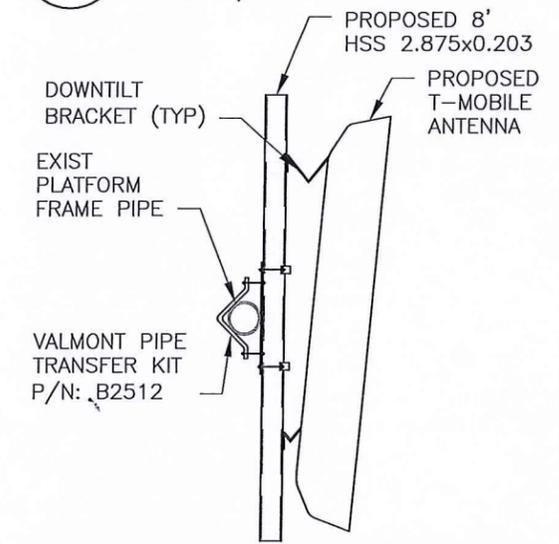
5 TMA (EXIST)
A-4 SCALE: 1" = 1'-0"



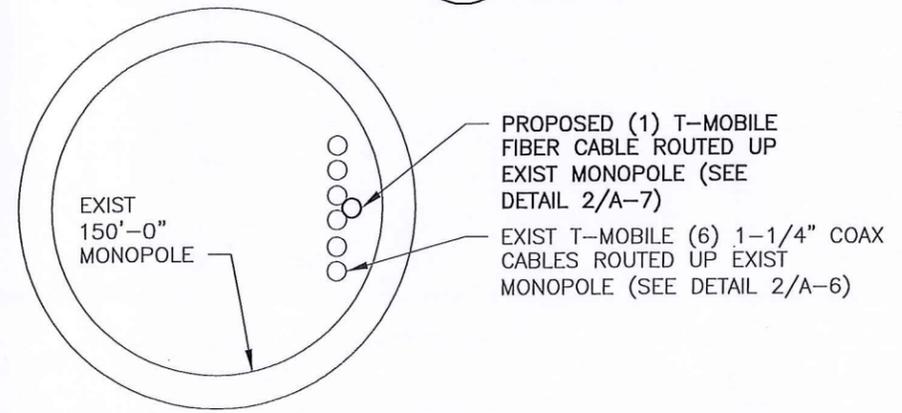
7 ANTENNA (NEW)
A-4 SCALE: 1/2" = 1'-0"



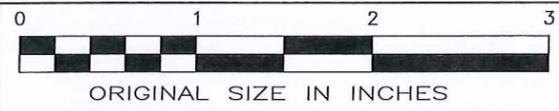
8 ANTENNA (NEW)
A-4 SCALE: 1/2" = 1'-0"



9 MOUNT DETAIL
A-4 SCALE: 1/2" = 1'-0"



6 CABLE MOUNTING DETAIL
A-4 SCALE: 1" = 1'-0"

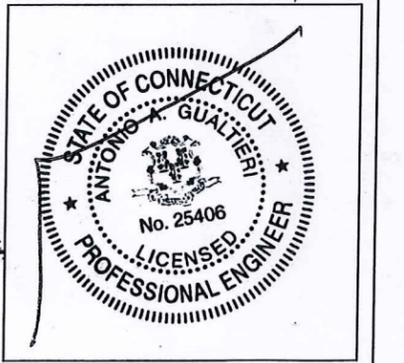


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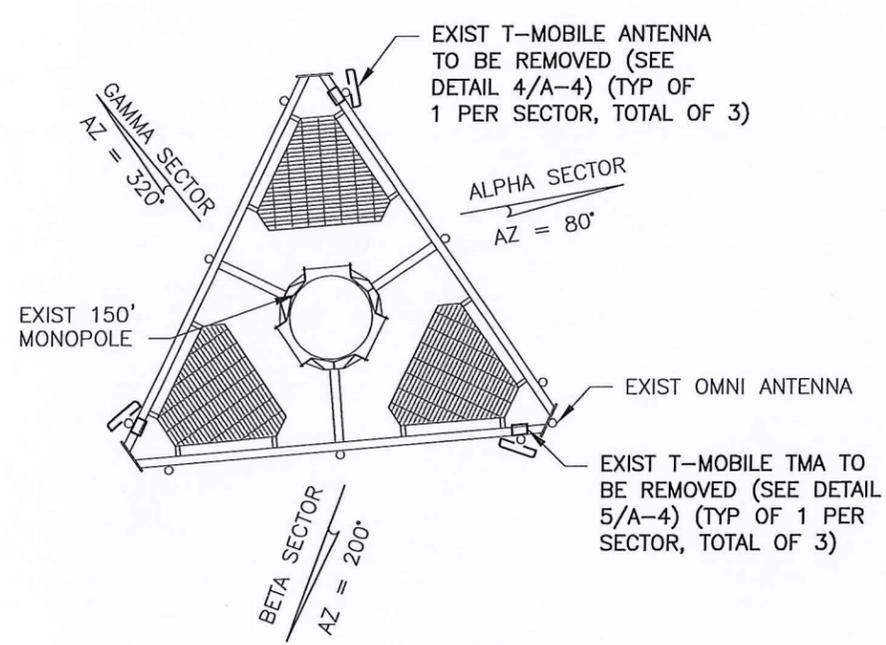
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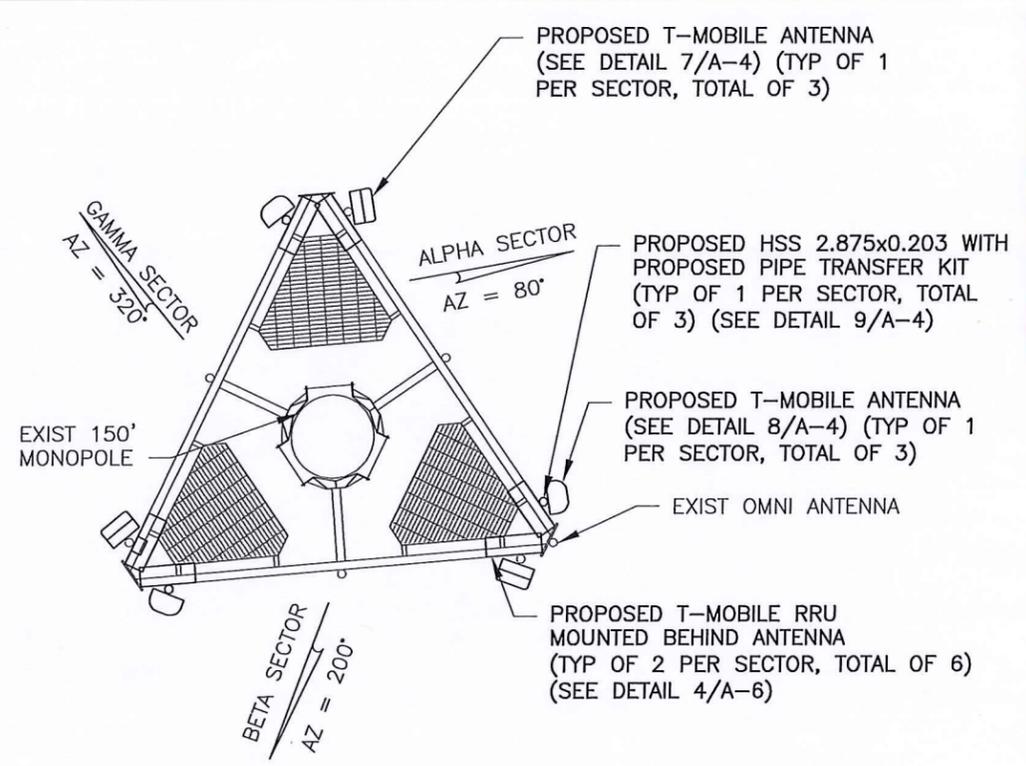
SITE INFORMATION
 CT11064F
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 225 S MAIN STREET/
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 WINDSOR LOCKS, CT
 06096

SHEET TITLE
 ANTENNA PLANS,
 DETAILS, & PHOTO

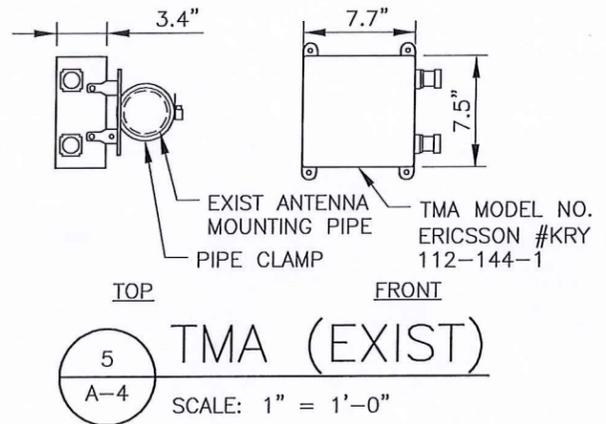
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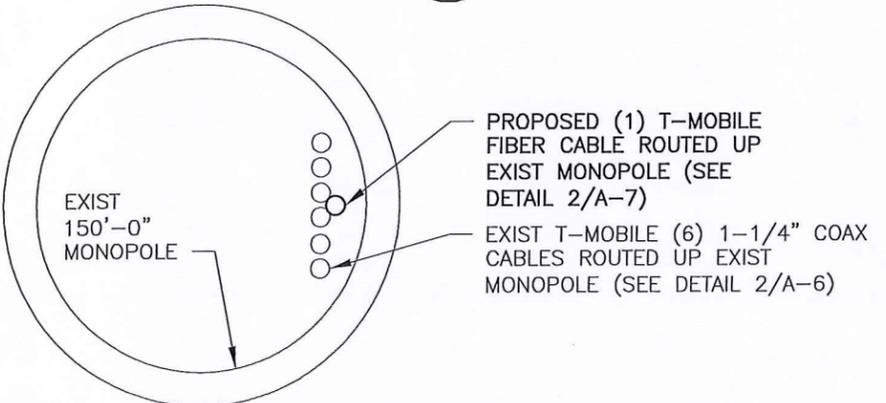
1 EXIST ANTENNA PLAN
A-4 SCALE: 3/8" = 1'-0"



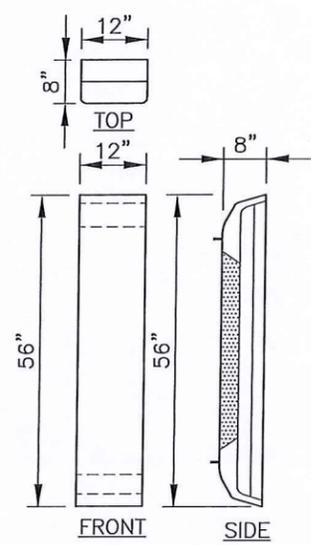
2 PROPOSED ANTENNA PLAN
A-4 SCALE: 3/8" = 1'-0"



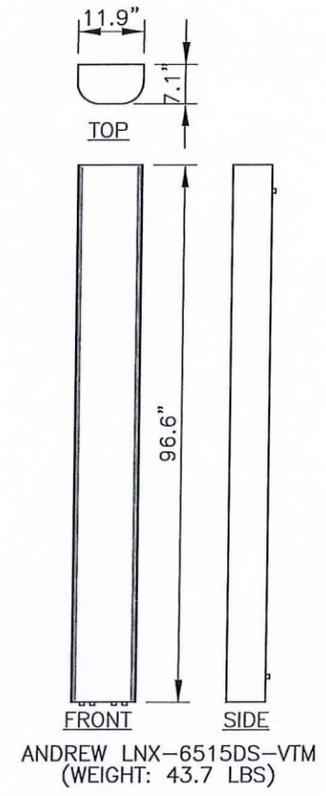
5 TMA (EXIST)
A-4 SCALE: 1" = 1'-0"



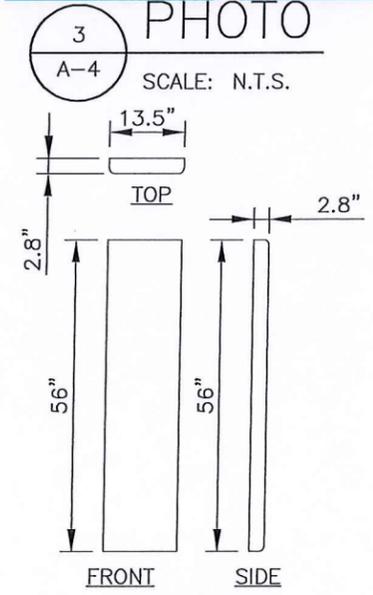
6 CABLE MOUNTING DETAIL
A-4 SCALE: 1" = 1'-0"



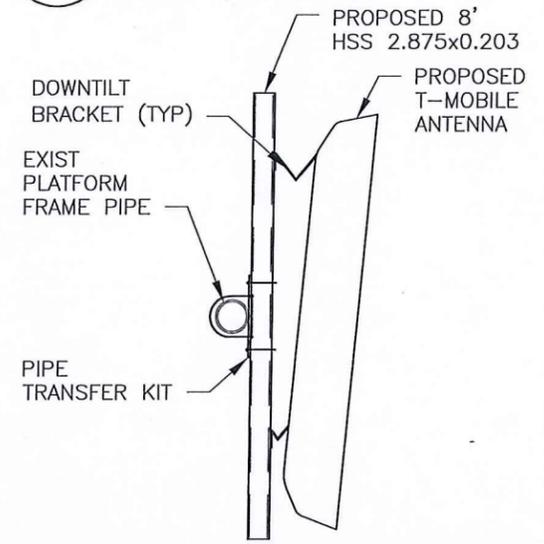
7 ANTENNA (NEW)
A-4 SCALE: 1/2" = 1'-0"



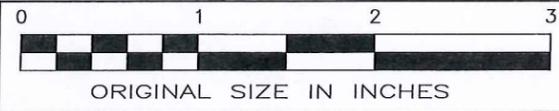
8 ANTENNA (NEW)
A-4 SCALE: 1/2" = 1'-0"



4 ANTENNA (EXIST)
A-4 SCALE: 3/8" = 1'-0"



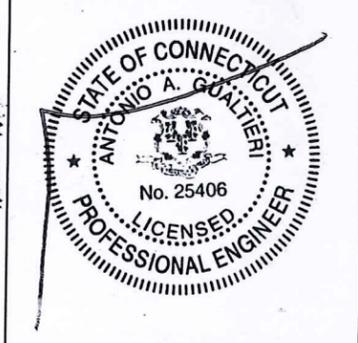
9 MOUNT DETAIL
A-4 SCALE: 1/2" = 1'-0"



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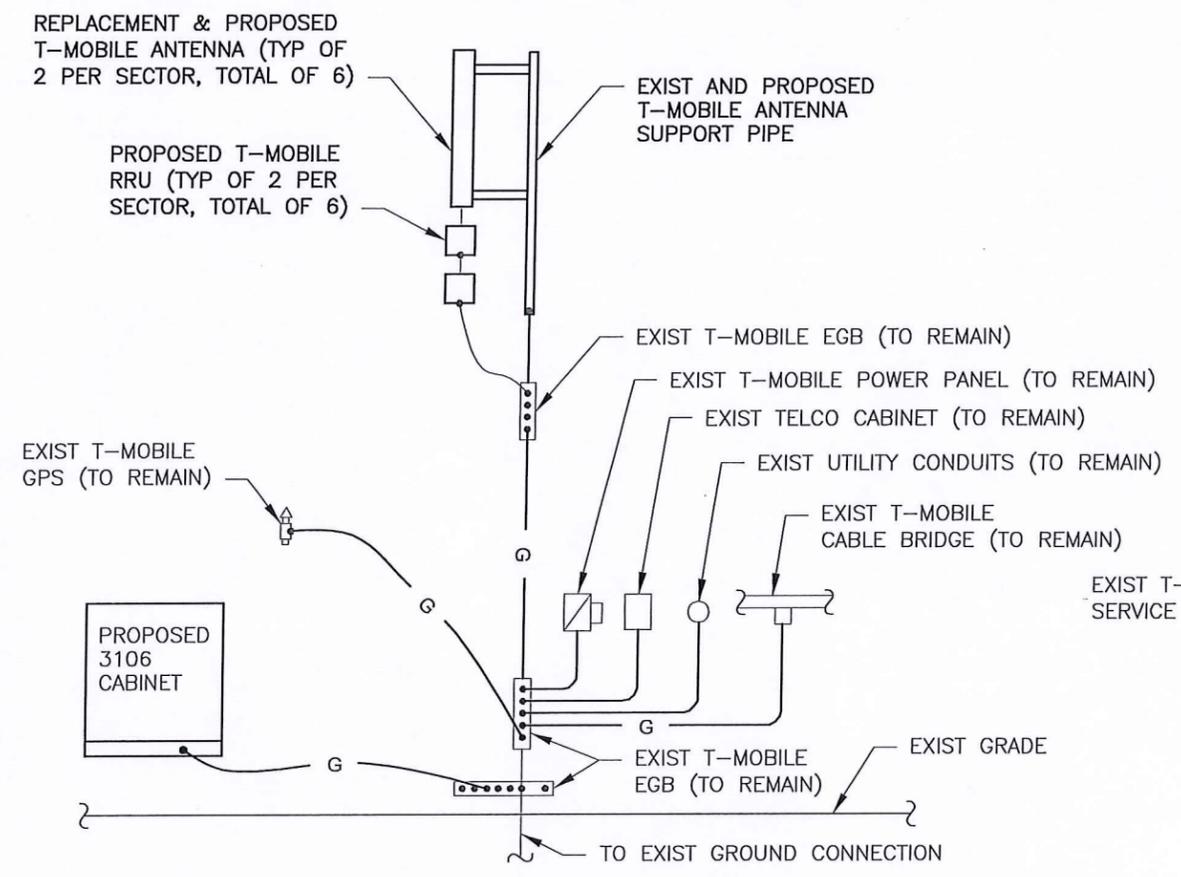
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ISSUED BY		DATE	
BLW		3/24/16	



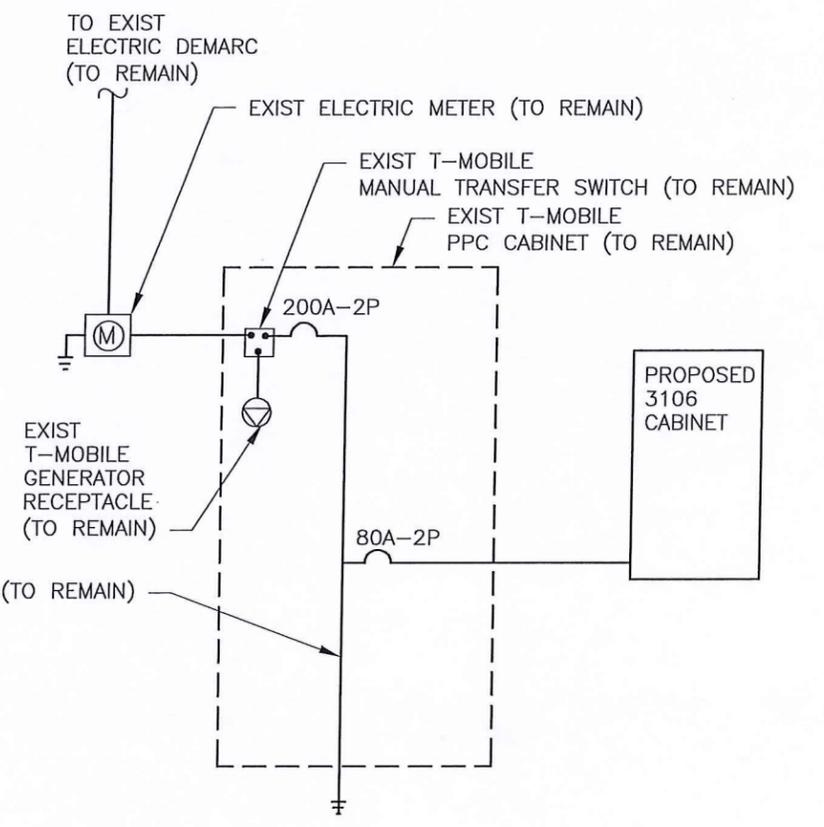
SITE INFORMATION
 CT11064F
 AMTRAK-WINDSOR LOCKS
 225 S MAIN STREET/
 AMTRAK STATION,
 WINDSOR LOCKS, CT
 06096

SHEET TITLE
 ANTENNA PLANS,
 DETAILS, & PHOTO

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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BW		3/29/16	



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06096

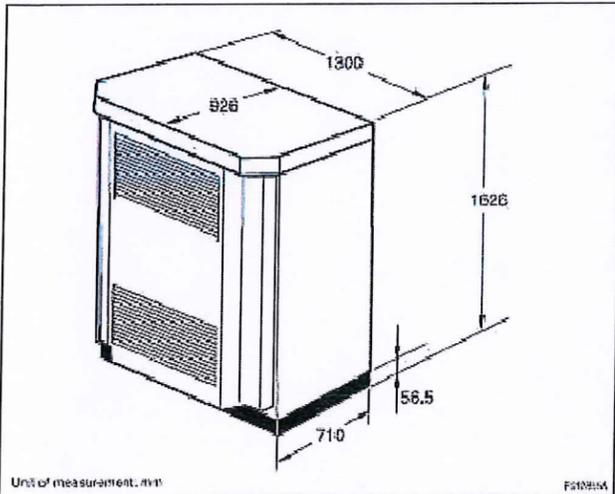
SHEET TITLE

WIRING DIAGRAMS

SHEET NUMBER

A-5

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



1 **3106 CABINET (PROPOSED)**
A-6 SCALE: NTS

Technical Specifications

Frequency range
Indoor: 850/1900 MHz GSM / 900 MHz EGSM / 900/1800 MHz GSM / 900 MHz GSM-R
Outdoor: GSM 850/ 1900/ E 900/ 900/ 1800

Receive sensitivity
without diversity: -110 dBm guaranteed (w/o TMA)
with diversity: -115 dBm guaranteed (w/o TMA)

Dimensions
Height: 1700 mm (Indoor) 1600 mm (Outdoor)
Width: 750 mm (Indoor) 1350 mm (Outdoor)
Depth: 450 mm (Indoor) 650 mm (Outdoor)

Weight
Fully Equipped: 250 kg (Indoor) 440 kg (Outdoor)

Capacity
Standard: 8 TRX per radio cabinet, up to 3 radio cabinets

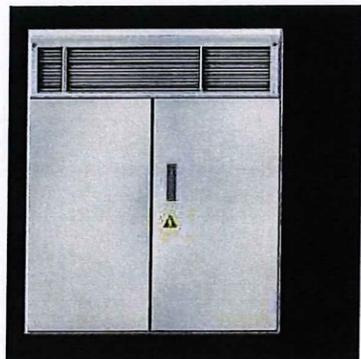
Configuration
Trisectorial: Up to 5888
Omnidirectional: up to O16

Amplifier Output Power
Standard: 30W (+/- 0.5 dB)
Optional: 60W (+/- 0.5 dB), frequency dependent

Power Control
Static: 6 steps of 2 dB
Dynamic: 15 steps of 2 dB

Supported Vocoders
Full Rate (FR), Enhanced Full Rate (EFR), Half Rate (AMR HR)

Power Supply
Indoor: Nominal -48V Rate Voltage Range -57V to -40.5V
Outdoor: 230V AC 50/60 Hz



3 **S8000 CABINET (EXIST)**
A-6 SCALE: NTS

Product Specifications

COMMSCOPE®

POWERED BY ANDREW



AVA6-50
AVA6-50, HELIAX® Andrew Virtual Air™ Coaxial Cable, corrugated copper, 1-1/4 in, black PE jacket

Construction Materials

Jacket Material	PE
Outer Conductor Material	Corrugated copper
Dielectric Material	Foam PE
Flexibility	Standard
Inner Conductor Material	Corrugated copper tube
Jacket Color	Black

Dimensions

Nominal Size	1-1/4 in
Cable Weight	0.46 lb/ft 0.68 kg/m
Diameter Over Dielectric	34.036 mm 1.340 in
Diameter Over Jacket	39.624 mm 1.560 in
Inner Conductor OD	14.0208 mm 0.5520 in
Outer Conductor OD	36.068 mm 1.420 in

Electrical Specifications

Cable Impedance	50 ohm ±1 ohm
Capacitance	22.0 pF/ft 72.0 pF/m
dc Resistance, Inner Conductor	0.530 ohms/kft 1.740 ohms/km
dc Resistance, Outer Conductor	0.230 ohms/kft 0.750 ohms/km
dc Test Voltage	8500 V
Inductance	0.057 µH/ft 0.187 µH/m
Insulation Resistance	100000 Mohms•km
Jacket Spark Test Voltage (rms)	10000 V
Operating Frequency Band	1 - 3700 MHz
Peak Power	180.0 kW
Velocity	92%

Environmental Specifications

Installation Temperature	-40 °C to +60 °C (-40 °F to +140 °F)
Operating Temperature	-55 °C to +85 °C (-67 °F to +185 °F)
Storage Temperature	-70 °C to +85 °C (-94 °F to +185 °F)

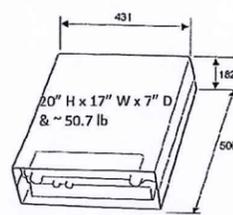
General Specifications

Brand HELIAX®

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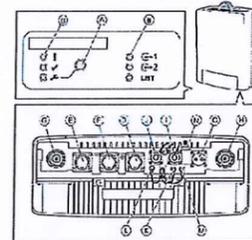
2 **COAX CABLE (EXIST)**
A-6 SCALE: NTS

Remote Radio Unit – RRUS11 B12



* RRUS 11 B12 is exactly the same size as RRUS 11 B2 or B4 that T-Mobile is currently using.

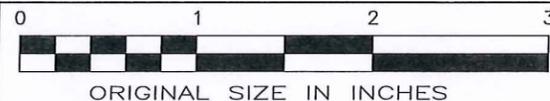
Dimensions with Solar Shield and Handle	
Height	600 mm
Width	431 mm
Depth	182 mm
Weight	
RRUS 11	23 kg
Color	
Qty	1 NCS S2302-R



Position Description	Marking
A Maintenance button	↕
B Optica indicators	1, 2, 3, 4
	Q-1, Q-2
	LMT
C -48 V DC power supply	
D -	LMT
E Optica cable 1	Q-1
F Optica cable 2	Q-2
G Antenna 1	AE1
H Antenna 2	BE2
I ALD (used for a RET unit for example)	ALD
J External alarm	Q
K(1) Cross connect RXA	RXA I/O
L(1) RXA co-sets	RXA OUT
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

4 **RRU (PROPOSED)**
A-6 SCALE: NTS



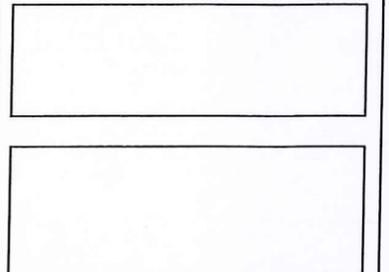
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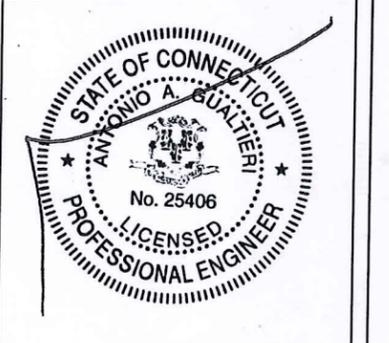
T-Mobile
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BELTSVILLE, MD 20705



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7421.CT11064F	MP

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△	3/24/16	PER COMMENTS	KA

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SITE INFORMATION
CT11064F
AMTRAK-WINDSOR LOCKS
225 S MAIN STREET/
AMTRAK STATION,
WINDSOR LOCKS, CT
06096

SHEET TITLE
SPECIFICATIONS

SHEET NUMBER
A-6

Product Specifications

COMMSCOPE®



ATCB-B01-060

Teletilt® AISG RET Control Cable, 60 m

- Feeds data and power to RET system components
- AISG and RoHS compliant



General Specifications

Product Type: AISG standard cable
Brand: Teletilt®

Electrical Specifications

EU Certification: CB | CE
Protocol: AISG 1.1 | AISG 2.0
Voltage, maximum: 300 V

Mechanical Specifications

AISG Connector A: 8-pin DIN Female
AISG Connector A Body Style: Straight
AISG Connector A Standard: IEC 60130-9
AISG Connector B: 8-pin DIN Male
AISG Connector B Body Style: Straight
AISG Connector B Standard: IEC 60130-9
Data Conductor Type: 0.20 mm² (24 AWG) twisted pair
Power Conductor Type: 0.82 mm² (18 AWG) stranded
Total Conductors, quantity: 6
Color: Black

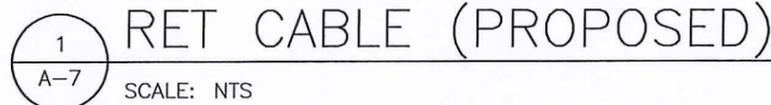
Environmental Specifications

Climatic Sequence Test Method: IEC 60068-2-14
Cold Exposure Test Method: IEC 60068-2-1
Damp Heat Exposure Test Method: IEC 60068-2-30, Test Condition Db
Heat Exposure Test Method: IEC 60068-2-2
Operating Temperature: -40 °C to +70 °C (-40 °F to +158 °F)
Rain Simulation Test Method: IEC 60068-2-18, Test Condition Ra, Method 1
Relative Humidity: Up to 100%
UV Resistance Test Method: IEC 60068-2-5, Test Condition B
Ingress Protection Test Method: IEC 60529:2001, IP67

Dimensions

Length: 60.0 m | 196.9 ft
Diameter Over Jacket: 8.000 mm | 0.315 in
Net Weight: 5.2 kg | 11.5 lb

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page 2 of 3
February 13, 2015

PRODUCT DATASHEET
HB114-05U9818-30M

RADIO FREQUENCY SYSTEMS
The clear choice! RFS

HYBRIFLEX® RRH Hybrid Feeder Cabling Solution 9x18, 10 AWG, 1-1/4", Single-Mode Fiber, 30m



FIG 1 HYBRIFLEX Product

RFS 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. It was developed to reduce installation complexity and costs at cellular sites.

HYBRIFLEX allows mobile operators deploying an RRH architecture to standardize the RRH installation process and eliminate the need for and cost of cable grounding. HYBRIFLEX combines optical fiber multi-mode or single-mode and power in a single corrugated cable, it eliminates the need for junction boxes and can connect multiple RRHs with a single feeder. Standard RFS CELLFLEX accessories can be used with HYBRIFLEX cable. Even pre-terminated one-one-one options are available.

FEATURES / BENEFITS

- Aluminum corrugated outer jacket provides superior protection and enables mechanical protection and bundling
- Same accessories as 1-1/4" coaxial cable
- Outer conductive grounding - Eliminates typical grounding requirements and saves on installation costs
- Lightweight solution and compact design - Decreases tower loading
- Round cabling - Eliminates need for separate cable trays and ducts
- Installation of terminated fiber optic cable pairs directly into RRH - Reduces CAPEX and OPEX cost by eliminating need for interconnection
- Central fiber and power cables reduce in single corrugated cable - Saves CAPEX by standardizing RRH cable installation and reducing installation requirements
- Durable, leak-free jacket - Ensures long-lasting cable protection

Technical Features	
STRUCTURE	
Cable Type	HYBRIFLEX
Size	1-1/4"
Length	30 (95)
MECHANICAL SPECIFICATIONS	
Outer 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	
Number of DC Pairs	6
Maximum DC Resistance Power Cable	Ω/km (Ω/1000')
Cross Section of Power Cable	mm ² (AWG)
DC Wire Jacket Material	PVC
DC Cable Diameter	mm (in)
DC Cable Jacket	PVC
DC Standards (Meets or Exceeds)	For use in UL 2023 PVC Nylon 6-6/66 REACH Compliant 66130-9 RoHS-REACH Compliant
DC Cable sealing method	Compression with adhesive
CABLE JACKET	
UV-Protection Individual and External Jacket	Yes
ARMOR SPECIFICATIONS	
Armor Type	Corrugated Aluminum
Maximum DC Resistance of Armor	Ω/km (Ω/1000')
Diameter Corrugated Armor	mm (in)
FIBER CABLE SPECIFICATIONS	
Fiber Cable Type	Single-mode
Number of Fiber Pairs	18
Core/Glass	3/125
Single Bending Radius	mm (in)
Fiber Standards (Meets or Exceeds)	UL Listed Type OFNR (UL1000) RoHS Compliant
Optical Loss	dB/km
Fiber Termination End 1	LC APC
Fiber Termination End 2	LC APC
Cable sealing method	Compression with adhesive
TESTING AND ENVIRONMENTAL	
Storage Temperature	°C (°F)
Operation Temperature	°C (°F)
Installation Temperature	°C (°F)
ASSEMBLY LOSS	
Optical Insertion Loss, Assembly or Jumper	dB (typical) (dB (max))
SYSTEM LOSS	
Optical Insertion Loss, Total Path	dB (typical) (dB (max))

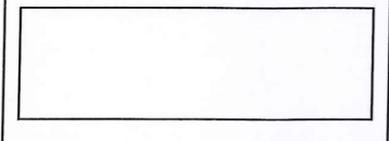


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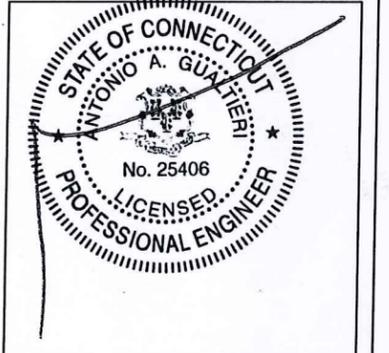
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△	3/24/16	PER COMMENTS	KA

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SITE INFORMATION
CT11064F
AMTRAK-WINDSOR LOCKS
225 S MAIN STREET/
AMTRAK STATION,
WINDSOR LOCKS, CT
06096

SHEET TITLE
SPECIFICATIONS

SHEET NUMBER
A-7

STRUCTURAL ANALYSIS REPORT

T-MOBILE UPGRADE

EXISTING 150' MONOPOLE

SITE NAME: WINDSOR / I-91/ X40_1

**225 S MAIN STREET/AMTRAK STATION,
WINDSOR LOCKS, CT 06096**

MARCH 4, 2016

TEC W.O. 7421.CT11064F

TECTONIC

Practical Solutions, Exceptional Service



STRUCTURAL ANALYSIS REPORT

Practical Solutions, Exceptional Service

Project Information

W.O. Number:	7421.CT11064F	Report Date:	3/4/2016
Client:	T-Mobile	Revision:	0
Site Name:	Windsor/ I-91/ X40_1		
Owner:	AMTRAK		
Site Address:	225 S Main Street/Amtrak Station	FCC Regulation Number:	--
City, State:	Windsor Locks, CT 06096	County:	Hartford

Structure Information

Structure Type: Monopole	Manufacturer: PiRod
Structure Height: 150 ft.	Year Built: 1999

Original Drawings: Structure: Yes Foundation: Yes

Documents provided:

<u>Item</u>	<u>By</u>	<u>No.</u>	<u>Date</u>
Geotechnical Evaluation (11 pages)	French & Parrello Associates	98A005ER2	6/22/98
Tower and Foundation Drawings (11 pages)	PiRod Inc.	203977-B	1/7/99
Tower Mapping Report (14 pages)	Vertical Solutions	141329	1/14/15
MDRN Lite via L700 RFDS (via e-mail)	T-Mobile	-	1/27/16

Inspection

Type: Tower Mapping Date: 1/14/2015

General Condition:
 Pole: Good
 Foundation: Good

Observations: Bird's nest at top of pole

Finish: Painted Condition: Intact

Existing Appurtenances

Antennas:

Height (ft.)	Carrier	Qty	Manuf.	Model	Mount
150	T-Mobile	3	EMS	RR90-17-02DP	Existing 10' Low Profile Platform
		3	Generic	dd B2 TMA	
98.5	AMTRAK	1	Celwave	PD220	
70.5		1	Celwave	PD220	Existing 6' Side Arm
50	-	-	-	-	Empty 6' Side Arm

Cables:

Height (ft.)	Qty	Nom. Size	Location / Support
150	6	1-1/4"	Routed along the interior of the pole
150	1	1/2"	Routed along the interior of the pole
98.5	1	1/2"	Routed along the interior of the pole
70.5	1	1/2"	Routed along the interior of the pole

Proposed Installation

T-Mobile is proposing to replace its three (3) existing panel antennas with newer model antennas. In addition, three (3) panel antennas and associated appurtenances are to be installed as part of this upgrade. The final T-Mobile configuration upon this upgrade will be as follows:

Antennas:

Height (ft.)	Carrier	Qty	Manuf.	Model	Mount
150	T-Mobile	3	Ericsson	AIR 21 B4A B2P	Existing 10' Low Profile Platform
		3	Commscope	LNx-6515DS-VTM	
		3	Ericsson	RRUS 11 B2	
		3	Ericsson	RRUS 11 B12	

Cables:

Height (ft.)	Qty	Nom. Size	Location / Support
150	6	1-1/4"	Routed along the interior of the pole
150	9	RET Cables	To be routed along the interior of the pole
150	1	Hybriflex Fiber Cable	To be routed along the interior of the pole

STRUCTURAL ANALYSIS REPORT (CONT.)

W.O. Number: 7421.CT11064F
 Client: T-Mobile
 Site Name: Windsor/ I-91/ X40_1

Report Date: 3/4/2016
 Revision: 0

Analysis Criteria

Design Standard: ANSI/TIA/EIA-222-F-1996

Building Code: 2005 Connecticut State Building Code Supplement (2003 IBC)

	<u>Capacity (no ice)</u>	<u>Capacity w/ ice</u>
Wind Speed:	80 mph	69 mph
Basic Ice Thickness:	0 inch	0.5 inch

- 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 flange plate has been designed by the manufacturer such that the pole shaft capacity governs.

Analysis Results

<u>Element</u>	<u>% Usage</u>
Shaft	98%
Anchor Bolts	53%
Flange Connections	90%
Foundation	32%

Foundation Reactions (Envelope):

	<u>Original Design Reactions</u>	<u>Current Analysis</u>	<u>Percentage</u>
Vertical	28.7 kips	24 kips	84%
Shear	15.3 kips	11 kips	72%
Moment	1489.9 kip-ft.	1067 kip-ft.	72%

Conclusions

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

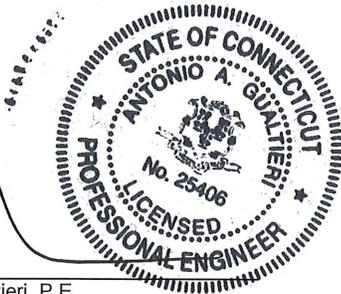
Based on the review of the foundation information provided, the existing foundation has adequate capacity to support the additional loads from the proposed upgrade.

If the existing conditions are not as represented in this report, the design engineer should be immediately notified prior to construction. 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, EIT
 Structural Engineer

Reviewed by: Ian Marinaccio, EIT
 Structural Engineer

Approved by:



(Signature)
 Antonio A. Gualtieri, P.E.
 Sr. Vice President

Date:

3/4/16



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 Fax: (845) 567-8703
 Web: www.tectonicengineering.com

TNX TOWER SUMMARY REPORT

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
4' Lightning Rod	150	RRUS 11 B2	150
10' Low Profile Platform	150	RRUS 11 B2	150
LNX-6515DS-VTM w/ Mount Pipe	150	2" STD Pipe (2.375 OD)x6'-0"	150
LNX-6515DS-VTM w/ Mount Pipe	150	2" STD Pipe (2.375 OD)x6'-0"	150
LNX-6515DS-VTM w/ Mount Pipe	150	PD220	150
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	150	2" STD Pipe (2.375 OD)x6'-0"	150
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	150	6' Side Arm	98.5
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	150	PD220	98.5
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	150	2" STD Pipe (2.375 OD)x4'-0"	98.5
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	150	6' Side Arm	70.5
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	150	PD220	70.5
RRUS 11 B12	150	2" STD Pipe (2.375 OD)x4'-0"	70.5
RRUS 11 B12	150	6' Side Arm	50
RRUS 11 B12	150	2" STD Pipe (2.375 OD)x4'-0"	50
RRUS 11 B2	150		

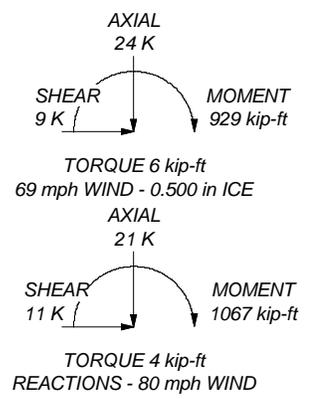
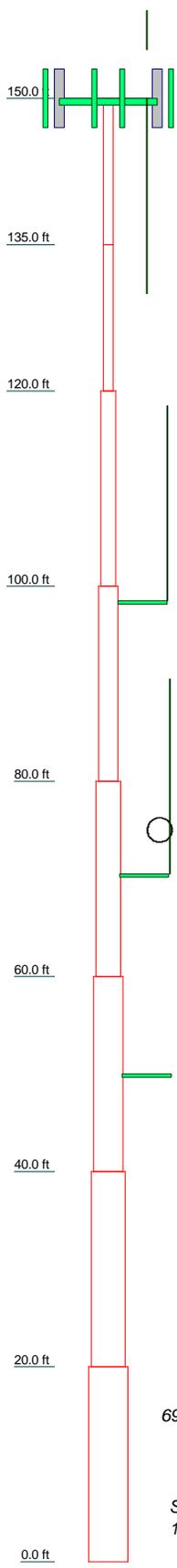
MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 97.8%

Section	Size	Length (ft)	Grade	Weight (K)
1	P12x0.375	15.000	A53-B-42	0.7
2	P12x0.375	15.000	A53-B-42	0.7
3	P18x0.375	20.000	A53-B-42	1.4
4	P24x0.375	20.000	A53-B-42	1.9
5	P30x0.375	20.000	A53-B-42	2.4
6	P36x0.375	20.000	A53-B-42	2.9
7	P42x0.375	20.000	A53-B-42	3.3
8	P48x0.375	20.000	A53-B-42	3.8
				17.2



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	Client: T-Mobile Code: TIA/EIA-222-F Path:	Drawn by: Ian Marinaccio Date: 03/03/16	App'd: Scale: NTS Dwg No. E-1

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Tower Input Data

There is a pole section.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

Tower is located in Hartford County, Connecticut.

Basic wind speed of 80 mph.

Nominal ice thickness of 0.500 in.

Ice density of 56.000 pcf.

A wind speed of 69 mph is used in combination with ice.

Temperature drop of 50.000 °F.

Deflections calculated using a wind speed of 50 mph.

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

Pressures are calculated at each section.

Stress ratio used in pole design is 1.333.

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

Options

<ul style="list-style-type: none"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification √ Use Code Stress Ratios √ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric 	<ul style="list-style-type: none"> Distribute Leg Loads As Uniform Assume Legs Pinned √ Assume Rigid Index Plate √ Use Clear Spans For Wind Area √ Use Clear Spans For KL/r Retension Guys To Initial Tension √ Bypass Mast Stability Checks Use Azimuth Dish Coefficients √ Project Wind Area of Appurt. Autocalc Torque Arm Areas Add IBC .6D+W Combination √ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder 	<ul style="list-style-type: none"> Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation √ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-G Bracing Resist. Exemption Use TIA-222-G Tension Splice Exemption <li style="text-align: center;">Poles √ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets
--	--	---

Pole Section Geometry

Section	Elevation <i>ft</i>	Section Length <i>ft</i>	Pole Size	Pole Grade	Socket Length <i>ft</i>
L1	150.000-135.000	15.000	P12x0.375	A53-B-42 (42 ksi)	
L2	135.000-120.000	15.000	P12x0.375	A53-B-42 (42 ksi)	
L3	120.000-100.000	20.000	P18x0.375	A53-B-42 (42 ksi)	
L4	100.000-80.000	20.000	P24x0.375	A53-B-42 (42 ksi)	
L5	80.000-60.000	20.000	P30x0.375	A53-B-42 (42 ksi)	

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Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L6	60.000-40.000	20.000	P36x0.375	A53-B-42 (42 ksi)	
L7	40.000-20.000	20.000	P42x0.375	A53-B-42 (42 ksi)	
L8	20.000-0.000	20.000	P48x0.375	A53-B-42 (42 ksi)	

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontal in	Double Angle Stitch Bolt Spacing Redundants in
L1 150.000-135.000				1	1	1			
L2 135.000-120.000				1	1	1			
L3 120.000-100.000				1	1	1			
L4 100.000-80.000				1	1	1			
L5 80.000-60.000				1	1	1			
L6 60.000-40.000				1	1	1			
L7 40.000-20.000				1	1	1			
L8 20.000-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _A A _A ft ² /ft	Weight klf
LDF4-50A(1/2")	C	No	Inside Pole	150.000 - 0.000	1	No Ice 1/2" Ice	0.000 0.000
LDF4-50A(1/2")	C	No	Inside Pole	98.500 - 0.000	1	No Ice 1/2" Ice	0.000 0.000
LDF4-50A(1/2")	C	No	Inside Pole	70.500 - 0.000	1	No Ice 1/2" Ice	0.000 0.000
LDF6-50(1-1/4")	C	No	Inside Pole	150.000 - 0.000	6	No Ice 1/2" Ice	0.000 0.001
ATCB-B01-050(5/16)	C	No	Inside Pole	150.000 - 0.000	9	No Ice 1/2" Ice	0.000 0.000
HB158-1-13U6-S6F18(1-5/8)	C	No	Inside Pole	150.000 - 0.000	1	No Ice 1/2" Ice	0.000 0.002

Feed Line/Linear Appurtenances Section Areas

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<i>Tower Section</i>	<i>Tower Elevation</i> <i>ft</i>	<i>Face</i>	<i>A_R</i> <i>ft²</i>	<i>A_F</i> <i>ft²</i>	<i>C_{AA}</i> <i>In Face</i> <i>ft²</i>	<i>C_{AA}</i> <i>Out Face</i> <i>ft²</i>	<i>Weight</i> <i>K</i>
L1	150.000-135.000	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	0.100
L2	135.000-120.000	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	0.100
L3	120.000-100.000	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	0.134
L4	100.000-80.000	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	0.136
L5	80.000-60.000	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	0.138
L6	60.000-40.000	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	0.140
L7	40.000-20.000	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	0.140
L8	20.000-0.000	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	0.140

Feed Line/Linear Appurtenances Section Areas - With Ice

<i>Tower Section</i>	<i>Tower Elevation</i> <i>ft</i>	<i>Face or Leg</i>	<i>Ice Thickness</i> <i>in</i>	<i>A_R</i> <i>ft²</i>	<i>A_F</i> <i>ft²</i>	<i>C_{AA}</i> <i>In Face</i> <i>ft²</i>	<i>C_{AA}</i> <i>Out Face</i> <i>ft²</i>	<i>Weight</i> <i>K</i>
L1	150.000-135.000	A	0.500	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	0.100
L2	135.000-120.000	A	0.500	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	0.100
L3	120.000-100.000	A	0.500	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	0.134
L4	100.000-80.000	A	0.500	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	0.136
L5	80.000-60.000	A	0.500	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	0.138
L6	60.000-40.000	A	0.500	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	0.140
L7	40.000-20.000	A	0.500	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	0.140
L8	20.000-0.000	A	0.500	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	0.140



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Feed Line Center of Pressure

Section	Elevation	CP _x	CP _z	CP _x Ice	CP _z Ice
	ft	in	in	in	in
L1	150.000-135.000	0.000	0.000	0.000	0.000
L2	135.000-120.000	0.000	0.000	0.000	0.000
L3	120.000-100.000	0.000	0.000	0.000	0.000
L4	100.000-80.000	0.000	0.000	0.000	0.000
L5	80.000-60.000	0.000	0.000	0.000	0.000
L6	60.000-40.000	0.000	0.000	0.000	0.000
L7	40.000-20.000	0.000	0.000	0.000	0.000
L8	20.000-0.000	0.000	0.000	0.000	0.000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
4' Lightning Rod	B	From Leg	4.000	0.000	150.000	No Ice	0.250	0.008
			0.000			1/2" Ice	0.664	0.010
			7.000					
10' Low Profile Platform	C	None		0.000	150.000	No Ice	14.660	1.250
						1/2" Ice	18.870	1.481
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.000	0.000	150.000	No Ice	11.683	0.083
			0.000			1/2" Ice	12.404	0.173
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.000	0.000	150.000	No Ice	9.842	0.083
			0.000			1/2" Ice	12.404	0.173
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	4.000	0.000	150.000	No Ice	9.842	0.083
			0.000			1/2" Ice	12.404	0.173
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.000	0.000	150.000	No Ice	6.825	0.112
			0.000			1/2" Ice	7.347	0.169
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.000	0.000	150.000	No Ice	5.642	0.112
			0.000			1/2" Ice	7.347	0.169
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.000	0.000	150.000	No Ice	5.642	0.112
			0.000			1/2" Ice	7.347	0.169
RRUS 11 B12	A	From Leg	4.000	0.000	150.000	No Ice	3.306	0.051
			0.000			1/2" Ice	3.550	0.072
RRUS 11 B12	B	From Leg	4.000	0.000	150.000	No Ice	3.306	0.051
			0.000			1/2" Ice	3.550	0.072
RRUS 11 B12	C	From Leg	4.000	0.000	150.000	No Ice	3.306	0.051
			0.000			1/2" Ice	3.550	0.072
RRUS 11 B2	A	From Leg	4.000	0.000	150.000	No Ice	3.306	0.051
			0.000			1/2" Ice	3.550	0.072

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz	Lateral						
			Vert		°	ft	ft ²	ft ²	K	
			ft	ft						
			ft							
RRUS 11 B2	B	From Leg	0.000		0.000	150.000	No Ice	3.306	1.361	0.051
			4.000				1/2" Ice	3.550	1.540	0.072
			0.000							
RRUS 11 B2	C	From Leg	4.000		0.000	150.000	No Ice	3.306	1.361	0.051
			0.000				1/2" Ice	3.550	1.540	0.072
			0.000							
2" STD Pipe (2.375 OD)x6'-0"	A	From Leg	4.000		0.000	150.000	No Ice	1.425	1.425	0.022
			0.000				1/2" Ice	1.925	1.925	0.033
			0.000							
2" STD Pipe (2.375 OD)x6'-0"	B	From Leg	4.000		0.000	150.000	No Ice	1.425	1.425	0.022
			0.000				1/2" Ice	1.925	1.925	0.033
			0.000							
PD220	B	From Leg	4.000		0.000	150.000	No Ice	3.560	3.560	0.023
			0.000				1/2" Ice	7.130	7.130	0.046
			-10.000							
2" STD Pipe (2.375 OD)x6'-0"	B	From Leg	4.000		0.000	150.000	No Ice	1.425	1.425	0.022
			0.000				1/2" Ice	1.925	1.925	0.033
			0.000							

6' Side Arm	B	From Leg	3.000		0.000	98.500	No Ice	1.000	1.430	0.027
			0.000				1/2" Ice	1.250	2.050	0.038
			0.000							
PD220	B	From Leg	6.000		0.000	98.500	No Ice	3.560	3.560	0.023
			0.000				1/2" Ice	7.130	7.130	0.046
			10.000							
2" STD Pipe (2.375 OD)x4'-0"	B	From Leg	6.000		0.000	98.500	No Ice	0.866	0.866	0.015
			0.000				1/2" Ice	1.111	1.111	0.022
			0.000							

6' Side Arm	B	From Leg	3.000		0.000	70.500	No Ice	1.000	1.430	0.027
			0.000				1/2" Ice	1.250	2.050	0.038
			0.000							
PD220	B	From Leg	6.000		0.000	70.500	No Ice	3.560	3.560	0.023
			0.000				1/2" Ice	7.130	7.130	0.046
			10.000							
2" STD Pipe (2.375 OD)x4'-0"	B	From Leg	6.000		0.000	70.500	No Ice	0.866	0.866	0.015
			0.000				1/2" Ice	1.111	1.111	0.022
			0.000							

6' Side Arm	B	From Leg	3.000		0.000	50.000	No Ice	1.000	1.430	0.027
			0.000				1/2" Ice	1.250	2.050	0.038
			0.000							
2" STD Pipe (2.375 OD)x4'-0"	B	From Leg	6.000		0.000	50.000	No Ice	0.866	0.866	0.015
			0.000				1/2" Ice	1.111	1.111	0.022
			0.000							

Load Combinations

Comb. No.	Description
-----------	-------------

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

Maximum Member Forces

<i>Section No.</i>	<i>Elevation ft</i>	<i>Component Type</i>	<i>Condition</i>	<i>Gov. Load Comb.</i>	<i>Force K</i>	<i>Major Axis Moment kip-ft</i>	<i>Minor Axis Moment kip-ft</i>
L1	150 - 135	Pole	Max Tension	14	0.000	0.000	0.000
			Max. Compression	14	-4.057	-0.501	-0.135
			Max. Mx	5	-2.670	-61.683	-0.058
			Max. My	8	-2.671	-0.249	-61.455
			Max. Vy	5	4.414	-61.683	-0.058
			Max. Vx	8	4.414	-0.249	-61.455
			Max. Torque	16			-1.568
L2	135 - 120	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-5.023	-0.520	-0.142
			Max. Mx	5	-3.595	-130.786	-0.076
			Max. My	8	-3.595	-0.295	-130.554
			Max. Vy	5	4.788	-130.786	-0.076
			Max. Vx	8	4.788	-0.295	-130.554
			Max. Torque	22			1.567
L3	120 - 100	Pole	Max Tension	1	0.000	0.000	0.000

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L4	100 - 80	Pole	Max. Compression	14	-6.796	-0.541	-0.151
			Max. Mx	5	-5.214	-233.511	-0.095
			Max. My	8	-5.214	-0.340	-233.277
			Max. Vy	5	5.471	-233.511	-0.095
			Max. Vx	8	5.471	-0.340	-233.277
			Max. Torque	22			1.562
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-9.232	-1.104	-0.474
			Max. Mx	5	-7.355	-357.296	-0.132
			Max. My	8	-7.355	-0.509	-357.076
L5	80 - 60	Pole	Max. Vy	5	6.543	-357.296	-0.132
			Max. Vx	8	6.552	-0.509	-357.076
			Max. Torque	22			3.453
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-12.224	-1.673	-0.802
			Max. Mx	5	-9.979	-501.769	-0.109
			Max. My	8	-9.979	-0.628	-501.647
			Max. Vy	5	7.725	-501.769	-0.109
			Max. Vx	8	7.740	-0.628	-501.647
			Max. Torque	22			5.257
L6	60 - 40	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-15.726	-1.963	-0.970
			Max. Mx	5	-13.069	-667.718	0.102
			Max. My	8	-13.069	-0.507	-667.890
			Max. Vy	5	8.843	-667.718	0.102
			Max. Vx	8	8.865	-0.507	-667.890
			Max. Torque	22			5.671
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-19.722	-1.963	-0.970
			Max. Mx	5	-16.602	-855.345	0.488
L7	40 - 20	Pole	Max. My	8	-16.602	-0.124	-855.965
			Max. Vy	5	9.914	-855.345	0.488
			Max. Vx	8	9.936	-0.124	-855.965
			Max. Torque	22			5.670
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-24.273	-1.963	-0.970
			Max. Mx	5	-20.619	-1065.754	0.876
			Max. My	8	-20.619	0.265	-1066.819
			Max. Vy	5	11.122	-1065.754	0.876
			Max. Vx	8	11.144	0.265	-1066.819
L8	20 - 0	Pole	Max. Torque	22			5.669

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	18	24.273	-9.297	0.027
	Max. H _x	11	20.621	11.118	-0.019
	Max. H _z	2	20.621	-0.019	11.140
	Max. M _x	2	1065.635	-0.019	11.140
	Max. M _z	5	1065.754	-11.118	0.019
	Max. Torsion	22	5.669	4.672	-8.092
	Min. Vert	30	20.621	-4.343	0.008
	Min. H _x	5	20.621	-11.118	0.019
	Min. H _z	8	20.621	0.019	-11.140
	Min. M _x	8	-1066.819	0.019	-11.140

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Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. M _z	11	-1063.329	11.118	-0.019
	Min. Torsion	16	-5.669	-4.672	8.092

Tower Mast Reaction Summary

Load Combination	Vertical	Shear _x	Shear _z	Overtuning Moment, M _x	Overtuning Moment, M _z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	20.621	0.000	0.000	0.579	-1.186	0.000
Dead+Wind 0 deg - No Ice	20.621	0.019	-11.140	-1065.635	-2.657	3.844
Dead+Wind 30 deg - No Ice	20.621	5.576	-9.657	-923.527	-534.732	4.297
Dead+Wind 60 deg - No Ice	20.621	9.638	-5.587	-533.799	-923.855	3.599
Dead+Wind 90 deg - No Ice	20.621	11.118	-0.019	-0.876	-1065.754	1.937
Dead+Wind 120 deg - No Ice	20.621	9.619	5.553	532.443	-922.402	-0.244
Dead+Wind 150 deg - No Ice	20.621	5.542	9.638	923.248	-532.209	-2.360
Dead+Wind 180 deg - No Ice	20.621	-0.019	11.140	1066.819	0.265	-3.843
Dead+Wind 210 deg - No Ice	20.621	-5.576	9.657	924.693	532.338	-4.297
Dead+Wind 240 deg - No Ice	20.621	-9.638	5.587	534.958	921.444	-3.599
Dead+Wind 270 deg - No Ice	20.621	-11.118	0.019	2.045	1063.329	-1.937
Dead+Wind 300 deg - No Ice	20.621	-9.619	-5.553	-531.256	919.979	0.244
Dead+Wind 330 deg - No Ice	20.621	-5.542	-9.638	-922.053	529.803	2.360
Dead+Ice+Temp	24.273	0.000	0.000	0.970	-1.963	-0.000
Dead+Wind 0 deg+Ice+Temp	24.273	0.027	-9.328	-926.327	-4.014	5.035
Dead+Wind 30 deg+Ice+Temp	24.273	4.672	-8.092	-803.128	-466.215	5.669
Dead+Wind 60 deg+Ice+Temp	24.273	8.065	-4.687	-464.464	-804.034	4.784
Dead+Wind 90 deg+Ice+Temp	24.273	9.297	-0.027	-1.074	-926.944	2.617
Dead+Wind 120 deg+Ice+Temp	24.273	8.038	4.641	462.872	-802.000	-0.251
Dead+Wind 150 deg+Ice+Temp	24.273	4.625	8.065	803.047	-462.682	-3.052
Dead+Wind 180 deg+Ice+Temp	24.273	-0.027	9.328	928.298	0.079	-5.035
Dead+Wind 210 deg+Ice+Temp	24.273	-4.672	8.092	805.070	462.278	-5.669
Dead+Wind 240 deg+Ice+Temp	24.273	-8.065	4.687	466.393	800.071	-4.784
Dead+Wind 270 deg+Ice+Temp	24.273	-9.297	0.027	3.020	922.956	-2.617
Dead+Wind 300 deg+Ice+Temp	24.273	-8.038	-4.641	-460.897	798.015	0.251
Dead+Wind 330 deg+Ice+Temp	24.273	-4.625	-8.065	-801.060	458.723	3.052
Dead+Wind 0 deg - Service	20.621	0.008	-4.352	-416.224	-1.785	1.509
Dead+Wind 30 deg - Service	20.621	2.178	-3.772	-360.668	-209.788	1.687
Dead+Wind 60 deg - Service	20.621	3.765	-2.182	-208.311	-361.905	1.413
Dead+Wind 90 deg - Service	20.621	4.343	-0.008	0.022	-417.374	0.760
Dead+Wind 120 deg - Service	20.621	3.757	2.169	208.508	-361.335	-0.097
Dead+Wind 150 deg - Service	20.621	2.165	3.765	361.284	-208.800	-0.927
Dead+Wind 180 deg - Service	20.621	-0.008	4.352	417.411	-0.643	-1.509
Dead+Wind 210 deg - Service	20.621	-2.178	3.772	361.852	207.359	-1.687
Dead+Wind 240 deg - Service	20.621	-3.765	2.182	209.495	359.474	-1.413
Dead+Wind 270 deg - Service	20.621	-4.343	0.008	1.163	414.941	-0.760
Dead+Wind 300 deg - Service	20.621	-3.757	-2.169	-207.321	358.902	0.097
Dead+Wind 330 deg - Service	20.621	-2.165	-3.765	-360.095	206.370	0.927

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	-20.621	0.000	0.000	20.621	0.000	0.000%
2	0.019	-20.621	-11.140	-0.019	20.621	11.140	0.000%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
3	5.576	-20.621	-9.657	-5.576	20.621	9.657	0.000%
4	9.638	-20.621	-5.587	-9.638	20.621	5.587	0.000%
5	11.118	-20.621	-0.019	-11.118	20.621	0.019	0.000%
6	9.619	-20.621	5.553	-9.619	20.621	-5.553	0.000%
7	5.542	-20.621	9.638	-5.542	20.621	-9.638	0.000%
8	-0.019	-20.621	11.140	0.019	20.621	-11.140	0.000%
9	-5.576	-20.621	9.657	5.576	20.621	-9.657	0.000%
10	-9.638	-20.621	5.587	9.638	20.621	-5.587	0.000%
11	-11.118	-20.621	0.019	11.118	20.621	-0.019	0.000%
12	-9.619	-20.621	-5.553	9.619	20.621	5.553	0.000%
13	-5.542	-20.621	-9.638	5.542	20.621	9.638	0.000%
14	0.000	-24.273	0.000	-0.000	24.273	-0.000	0.000%
15	0.027	-24.273	-9.328	-0.027	24.273	9.328	0.000%
16	4.672	-24.273	-8.092	-4.672	24.273	8.092	0.000%
17	8.065	-24.273	-4.687	-8.065	24.273	4.687	0.000%
18	9.297	-24.273	-0.027	-9.297	24.273	0.027	0.000%
19	8.038	-24.273	4.641	-8.038	24.273	-4.641	0.000%
20	4.625	-24.273	8.065	-4.625	24.273	-8.065	0.000%
21	-0.027	-24.273	9.328	0.027	24.273	-9.328	0.000%
22	-4.672	-24.273	8.092	4.672	24.273	-8.092	0.000%
23	-8.065	-24.273	4.687	8.065	24.273	-4.687	0.000%
24	-9.297	-24.273	0.027	9.297	24.273	-0.027	0.000%
25	-8.038	-24.273	-4.641	8.038	24.273	4.641	0.000%
26	-4.625	-24.273	-8.065	4.625	24.273	8.065	0.000%
27	0.008	-20.621	-4.352	-0.008	20.621	4.352	0.000%
28	2.178	-20.621	-3.772	-2.178	20.621	3.772	0.000%
29	3.765	-20.621	-2.182	-3.765	20.621	2.182	0.000%
30	4.343	-20.621	-0.008	-4.343	20.621	0.008	0.000%
31	3.757	-20.621	2.169	-3.757	20.621	-2.169	0.000%
32	2.165	-20.621	3.765	-2.165	20.621	-3.765	0.000%
33	-0.008	-20.621	4.352	0.008	20.621	-4.352	0.000%
34	-2.178	-20.621	3.772	2.178	20.621	-3.772	0.000%
35	-3.765	-20.621	2.182	3.765	20.621	-2.182	0.000%
36	-4.343	-20.621	0.008	4.343	20.621	-0.008	0.000%
37	-3.757	-20.621	-2.169	3.757	20.621	2.169	0.000%
38	-2.165	-20.621	-3.765	2.165	20.621	3.765	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.0000001	0.0000001
2	Yes	5	0.0000001	0.00037017
3	Yes	6	0.0000001	0.00006038
4	Yes	5	0.0000001	0.00094627
5	Yes	5	0.0000001	0.00015860
6	Yes	6	0.0000001	0.00004621
7	Yes	6	0.0000001	0.00005483
8	Yes	5	0.0000001	0.00036679
9	Yes	5	0.0000001	0.00092843
10	Yes	6	0.0000001	0.00005730
11	Yes	5	0.0000001	0.00016187
12	Yes	6	0.0000001	0.00004839
13	Yes	5	0.0000001	0.00095339
14	Yes	4	0.0000001	0.00005518
15	Yes	6	0.0000001	0.00006796



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16	Yes	6	0.00000001	0.00015478
17	Yes	6	0.00000001	0.00011003
18	Yes	5	0.00000001	0.00076666
19	Yes	6	0.00000001	0.00011684
20	Yes	6	0.00000001	0.00013768
21	Yes	6	0.00000001	0.00006770
22	Yes	6	0.00000001	0.00011040
23	Yes	6	0.00000001	0.00014595
24	Yes	5	0.00000001	0.00076605
25	Yes	6	0.00000001	0.00011964
26	Yes	6	0.00000001	0.00010826
27	Yes	5	0.00000001	0.00007940
28	Yes	5	0.00000001	0.00015987
29	Yes	5	0.00000001	0.00009122
30	Yes	4	0.00000001	0.00068836
31	Yes	5	0.00000001	0.00009628
32	Yes	5	0.00000001	0.00013383
33	Yes	5	0.00000001	0.00007938
34	Yes	5	0.00000001	0.00009501
35	Yes	5	0.00000001	0.00014470
36	Yes	4	0.00000001	0.00068725
37	Yes	5	0.00000001	0.00010353
38	Yes	5	0.00000001	0.00008580

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 135	28.106	30	2.337	0.032
L2	135 - 120	20.953	30	2.156	0.023
L3	120 - 100	14.978	30	1.579	0.014
L4	100 - 80	9.315	30	1.078	0.010
L5	80 - 60	5.463	30	0.739	0.006
L6	60 - 40	2.862	30	0.489	0.004
L7	40 - 20	1.202	29	0.294	0.002
L8	20 - 0	0.292	29	0.134	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.000	4' Lightning Rod	30	28.106	2.337	0.032	5999
98.500	6' Side Arm	30	8.974	1.050	0.010	2914
70.500	6' Side Arm	30	4.092	0.610	0.005	4420
50.000	6' Side Arm	29	1.930	0.387	0.003	5880

Maximum Tower Deflections - Design Wind

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 135	71.532	5	5.940	0.109
L2	135 - 120	53.365	5	5.486	0.078
L3	120 - 100	38.173	4	4.023	0.048
L4	100 - 80	23.760	4	2.746	0.034
L5	80 - 60	13.942	4	1.884	0.021
L6	60 - 40	7.307	4	1.249	0.013
L7	40 - 20	3.071	3	0.751	0.007
L8	20 - 0	0.745	3	0.343	0.003

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.000	4' Lightning Rod	5	71.532	5.940	0.109	2416
98.500	6' Side Arm	4	22.890	2.676	0.033	1148
70.500	6' Side Arm	4	10.447	1.557	0.016	1738
50.000	6' Side Arm	4	4.929	0.987	0.009	2308

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
L1	150 - 135 (1)	P12x0.375	15.000	0.000	0.0	25.200	14.579	-2.670	367.390	0.007
L2	135 - 120 (2)	P12x0.375	15.000	0.000	0.0	25.200	14.579	-3.595	367.390	0.010
L3	120 - 100 (3)	P18x0.375	20.000	0.000	0.0	25.200	20.764	-5.214	523.252	0.010
L4	100 - 80 (4)	P24x0.375	20.000	0.000	0.0	25.200	27.833	-7.355	701.380	0.010
L5	80 - 60 (5)	P30x0.375	20.000	0.000	0.0	25.075	34.901	-9.979	875.146	0.011
L6	60 - 40 (6)	P36x0.375	20.000	0.000	0.0	23.696	41.970	-13.069	994.507	0.013
L7	40 - 20 (7)	P42x0.375	20.000	0.000	0.0	22.711	49.038	-16.602	1113.690	0.015
L8	20 - 0 (8)	P48x0.375	20.000	0.000	0.0	21.972	56.107	-20.619	1232.770	0.017

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M _x kip-ft	Actual f _{bx} ksi	Allow. F _{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M _y kip-ft	Actual f _{by} ksi	Allow. F _{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	150 - 135 (1)	P12x0.375	61.683	16.893	27.720	0.609	0.000	0.000	27.720	0.000
L2	135 - 120 (2)	P12x0.375	130.786	35.818	27.720	1.292	0.000	0.000	27.720	0.000
L3	120 - 100 (3)	P18x0.375	233.511	31.265	27.720	1.128	0.000	0.000	27.720	0.000
L4	100 - 80 (4)	P24x0.375	357.296	26.490	27.720	0.956	0.000	0.000	27.720	0.000
L5	80 - 60 (5)	P30x0.375	501.808	23.587	25.075	0.941	0.000	0.000	25.075	0.000
L6	60 - 40 (6)	P36x0.375	668.052	21.670	23.696	0.915	0.000	0.000	23.696	0.000

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Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L7	40 - 20 (7)	P42x0.375	856.092	20.311	22.711	0.894	0.000	0.000	22.711	0.000
L8	20 - 0 (8)	P48x0.375	1067.16	19.320	21.972	0.879	0.000	0.000	21.972	0.000

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Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	150 - 135 (1)	P12x0.375	4.414	0.606	16.800	0.036	0.367	0.050	16.800	0.003
L2	135 - 120 (2)	P12x0.375	4.788	0.657	16.800	0.039	0.365	0.050	16.800	0.003
L3	120 - 100 (3)	P18x0.375	5.471	0.527	16.800	0.031	0.364	0.024	16.800	0.001
L4	100 - 80 (4)	P24x0.375	6.543	0.470	16.800	0.028	1.065	0.039	16.800	0.002
L5	80 - 60 (5)	P30x0.375	7.741	0.444	16.800	0.026	3.248	0.076	15.644	0.005
L6	60 - 40 (6)	P36x0.375	8.865	0.422	16.800	0.025	3.600	0.058	11.901	0.005
L7	40 - 20 (7)	P42x0.375	9.947	0.406	16.800	0.024	4.297	0.051	9.978	0.005
L8	20 - 0 (8)	P48x0.375	11.155	0.398	16.800	0.024	4.297	0.039	9.027	0.004

Pole Interaction Design Data

Section No.	Elevation ft	Ratio P P_a	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	150 - 135 (1)	0.007	0.609	0.000	0.036	0.003	0.618	1.333	H1-3+VT ✓
L2	135 - 120 (2)	0.010	1.292	0.000	0.039	0.003	1.304	1.333	H1-3+VT ✓
L3	120 - 100 (3)	0.010	1.128	0.000	0.031	0.001	1.139	1.333	H1-3+VT ✓
L4	100 - 80 (4)	0.010	0.956	0.000	0.028	0.002	0.967	1.333	H1-3+VT ✓
L5	80 - 60 (5)	0.011	0.941	0.000	0.026	0.005	0.953	1.333	H1-3+VT ✓
L6	60 - 40 (6)	0.013	0.915	0.000	0.025	0.005	0.929	1.333	H1-3+VT ✓
L7	40 - 20 (7)	0.015	0.894	0.000	0.024	0.005	0.910	1.333	H1-3+VT ✓
L8	20 - 0 (8)	0.017	0.879	0.000	0.024	0.004	0.897	1.333	H1-3+VT ✓

Section Capacity Table

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Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail	
L1	150 - 135	Pole	P12x0.375	1	-2.670	489.731	46.4	Pass	
L2	135 - 120	Pole	P12x0.375	2	-3.595	489.731	97.8	Pass	
L3	120 - 100	Pole	P18x0.375	3	-5.214	697.495	85.4	Pass	
L4	100 - 80	Pole	P24x0.375	4	-7.355	934.940	72.5	Pass	
L5	80 - 60	Pole	P30x0.375	5	-9.979	1166.570	71.5	Pass	
L6	60 - 40	Pole	P36x0.375	6	-13.069	1325.678	69.7	Pass	
L7	40 - 20	Pole	P42x0.375	7	-16.602	1484.549	68.3	Pass	
L8	20 - 0	Pole	P48x0.375	8	-20.619	1643.282	67.3	Pass	
							Summary		
							Pole (L2)	97.8	Pass
							RATING =	97.8	Pass

LOAD CALCULATIONS

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

TIA Rev F

Site Data

WO#: 7421.CT11064F
 Site Name: Windsor/ I-91/ X40_1

Pole Manufacturer: *Pirol*

Anchor Rod Data

Qty: 36
 Diam: 1 in
 Rod Material: Other
 Strength (Fu): 150 ksi
 Yield (Fy): 105 ksi
 Bolt Circle: 51 in

Plate Data

Diam: 54 in
 Thick: 1.25 in
 Grade: 36 ksi
 Single-Rod B-eff: 4.19 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: 48 in
 Thick: 0.375 in
 Grade: 42 ksi
 # of Sides: 0 "0" IF Round
 Fu: 63 ksi
 Reinf. Fillet Weld: 0 "0" if None

Stress Increase Factor

ASIF: 1.333

Reactions

Moment: 1067 ft-kips
 Axial: 21 kips
 Shear: 11 kips

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

Anchor Rod Results

Maximum Rod Tension: 27.3 Kips
 Allowable Tension: 51.8 Kips
 Anchor Rod Stress Ratio: 52.7% **Pass**

Rigid

Service ASD
 Ft*ASIF

Base Plate Results

Base Plate Stress: Flexural Check Rohn/Pirol, OK
 Allowable Plate Stress: 36.0 ksi
 Base Plate Stress Ratio: Rohn/Pirol, OK

Rigid

Service ASD
 0.75*Fy*ASIF
 Y.L. Length: 17.23

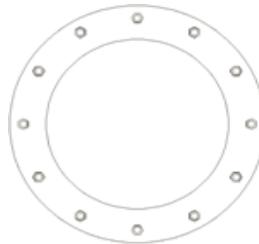
n/a

Stiffener Results

N/A for Rohn / Pirol
 Horizontal Weld : N/A
 Vertical Weld: N/A
 Plate Flex+Shear, fb/Fb+(fv/Fv)^2: N/A
 Plate Tension+Shear, ft/Ft+(fv/Fv)^2: N/A
 Plate Comp. (AISC Bracket): N/A

Pole Results

Pole Punching Shear Check: N/A



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

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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

WO#: 7421.CT11064F
 Site Name: Windsor/I-91/X40_1

Reactions		
Moment:	856.13	ft-kips
Axial:	16.60	kips
Shear:	9.94	kips
Elevation:	20	feet

Pole Manufacturer:	Pirod
--------------------	-------

Bolt Data		
Qty:	32	
Diameter (in.):	1	Bolt Fu: 120
Bolt Material:	A325	Bolt Fy: 92
N/A:	100	<-- Disregard
N/A:	75	<-- Disregard
Circle (in.):	45	Bolt Fty: 44.00

Plate Data		
Diam:	48	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.12	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:	42	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor	
ASIF:	1.333

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

Flange Bolt Results

Bolt Tension Capacity, B:	46.07 kips
Max Bolt <u>directly</u> applied T:	28.02 Kips
Min. PL "tc" for B cap. w/o Pry :	1.365 in
Min PL "treq" for actual T w/ Pry :	0.806 in
Min PL "t1" for actual T w/o Pry :	1.064 in
T allowable with Prying:	43.59 kips
Prying Force, Q:	0.00 kips
Total Bolt Tension=T+Q:	28.02 kips
Prying Bolt Stress Ratio=(T+Q)/(B):	60.8% Pass

Rigid
Service, ASD
Fty*ASIF

0≤α≤1 case

Exterior Flange Plate Results

Flexural Check	Rohn/Piroc OK
Compression Side Plate Stress:	Allowable Plate Stress: 36.0 ksi
Compression Plate Stress Ratio:	Rohn/Piroc OK
No Prying	
Tension Side Stress Ratio, (treq/t)^2:	Rohn/Piroc OK

Rigid
Service ASD
0.75*Fy*ASIF
Comp. Y.L. Length:
16.16

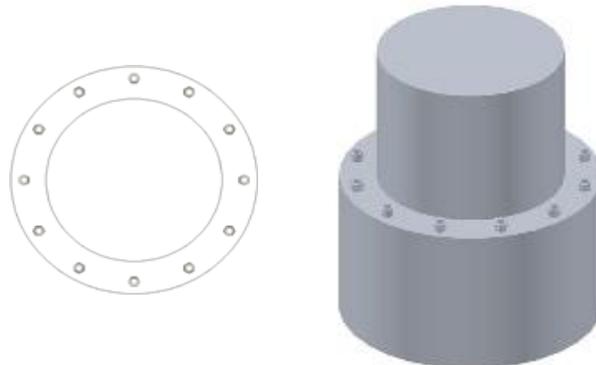
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Stiffener Results

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check:	N/A
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* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

WO#: 7421.CT11064F
 Site Name: Windsor/ I-91/ X40_1

Pole Manufacturer: **Pirod**

Bolt Data

Qty:	28	Bolt Fu:	120
Diameter (in.):	1	Bolt Fy:	92
Bolt Material:	A325	Bolt Fty:	44.00
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle (in.):	39		

Plate Data

Diam:	42	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.04	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:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor

ASIF:	1.333
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Reactions

Moment:	668.05	ft-kips
Axial:	13.07	kips
Shear:	8.87	kips
Elevation:	40	feet

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

Flange Bolt Results

Bolt Tension Capacity, B:	46.07 kips
Max Bolt <u>directly</u> applied T:	28.90 Kips
Min. PL "tc" for B cap. w/o Pry :	1.379 in
Min PL "treq" for actual T w/ Pry :	0.829 in
Min PL "t1" for actual T w/o Pry :	1.092 in
T allowable with Prying:	43.33 kips
Prying Force, Q:	0.00 kips
Total Bolt Tension=T+Q:	28.90 kips
Prying Bolt Stress Ratio=(T+Q)/(B):	62.7% Pass

Rigid
Service, ASD
Fty*ASIF

0≤α≤1 case

Exterior Flange Plate Results

Flexural Check	
Compression Side Plate Stress:	Rohn/Piroc OK
Allowable Plate Stress:	36.0 ksi
Compression Plate Stress Ratio:	Rohn/Piroc OK
No Prying	
Tension Side Stress Ratio, (treq/t)^2:	Rohn/Piroc OK

Rigid
Service ASD
0.75*Fy*ASIF
Comp. Y.L. Length:
15.00

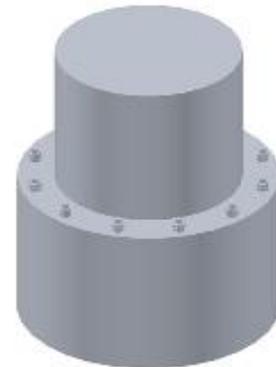
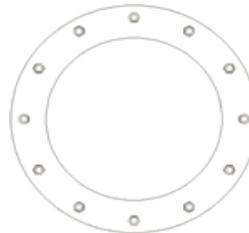
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Stiffener Results

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check:	N/A
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* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

WO#: 7421.CT11064F
 Site Name: Windsor/ I-91/ X40_1

Pole Manufacturer: **Pirod**

Bolt Data

Qty:	24	Bolt Fu:	120
Diameter (in.):	1	Bolt Fy:	92
Bolt Material:	A325	Bolt Fty:	44.00
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle (in.):	33		

Plate Data

Diam:	36	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	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:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor

ASIF:	1.333
-------	-------

Reactions

Moment:	501.81	ft-kips
Axial:	9.98	kips
Shear:	7.74	kips
Elevation:	60	feet

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

Flange Bolt Results

Bolt Tension Capacity, B:	46.07 kips
Max Bolt <u>directly</u> applied T:	30.00 Kips
Min. PL "tc" for B cap. w/o Pry :	1.398 in
Min PL "treq" for actual T w/ Pry :	0.858 in
Min PL "t1" for actual T w/o Pry :	1.128 in
T allowable with Prying:	42.98 kips
Prying Force, Q:	0.00 kips
Total Bolt Tension=T+Q:	30.00 kips
Prying Bolt Stress Ratio=(T+Q)/(B):	65.1% Pass

Rigid
Service, ASD
Fty*ASIF

0≤α≤1 case

Exterior Flange Plate Results

Flexural Check	
Compression Side Plate Stress:	Rohn/Piroc OK
Allowable Plate Stress:	36.0 ksi
Compression Plate Stress Ratio:	Rohn/Piroc OK
No Prying	
Tension Side Stress Ratio, (treq/t)^2:	Rohn/Piroc OK

Rigid
Service ASD
0.75*Fy*ASIF
Comp. Y.L. Length:
13.75

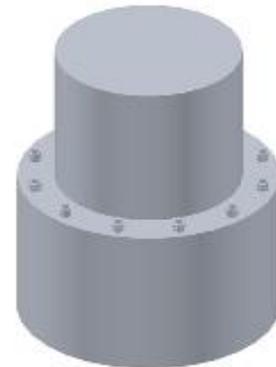
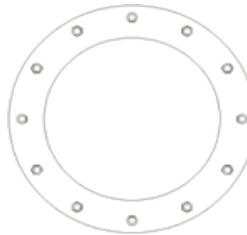
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Stiffener Results

N/A for Rohn / Pirod	
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check:	N/A
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* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

WO#: 7421.CT11064F
 Site Name: Windsor/ I-91/ X40_1

Pole Manufacturer: **Pirod**

Bolt Data

Qty:	20	Bolt Fu:	120
Diameter (in.):	1	Bolt Fy:	92
Bolt Material:	A325	Bolt Fty:	44.00
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle (in.):	27		

Plate Data

Diam:	30	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.77	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:	24	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor

ASIF:	1.333
-------	-------

Reactions

Moment:	357.30	ft-kips
Axial:	7.36	kips
Shear:	6.54	kips
Elevation:	80	feet

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

Flange Bolt Results

Bolt Tension Capacity, B:	46.07 kips
Max Bolt <u>directly</u> applied T:	31.39 Kips
Min. PL "tc" for B cap. w/o Pry :	1.427 in
Min PL "treq" for actual T w/ Pry :	0.899 in
Min PL "t1" for actual T w/o Pry :	1.178 in
T allowable with Prying:	42.49 kips
Prying Force, Q:	0.00 kips
Total Bolt Tension=T+Q:	31.39 kips
Prying Bolt Stress Ratio=(T+Q)/(B):	68.1% Pass

Rigid
Service, ASD
Fty*ASIF

0≤σ≤1 case

Exterior Flange Plate Results

Flexural Check	
Compression Side Plate Stress:	Rohn/Piroc OK
Allowable Plate Stress:	36.0 ksi
Compression Plate Stress Ratio:	Rohn/Piroc OK
No Prying	
Tension Side Stress Ratio, (treq/t)^2:	Rohn/Piroc OK

Rigid
Service ASD
0.75*Fy*ASIF
Comp. Y.L. Length:
12.37

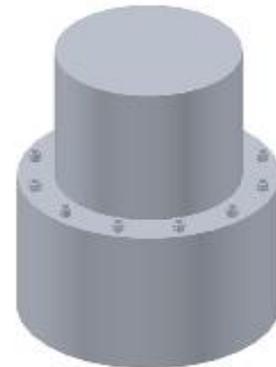
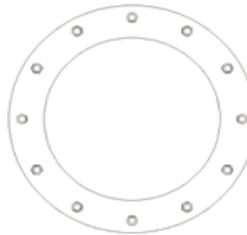
n/a

Stiffener Results

N/A for Rohn / Pirod	
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check:	N/A
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* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

WO#: 7421.CT11064F
 Site Name: Windsor/ I-91/ X40_1

Reactions		
Moment:	233.51	ft-kips
Axial:	5.21	kips
Shear:	5.47	kips
Elevation:	100	feet

Pole Manufacturer:	Pirod
--------------------	-------

Bolt Data		
Qty:	16	
Diameter (in.):	1	Bolt Fu: 120
Bolt Material:	A325	Bolt Fy: 92
N/A:	100	<-- Disregard
N/A:	75	<-- Disregard
Circle (in.):	21	Bolt Fty: 44.00

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

Flange Bolt Results

Bolt Tension Capacity, B:	46.07 kips
Max Bolt <u>directly</u> applied T:	33.03 Kips
Min. PL "tc" for B cap. w/o Pry:	1.474 in
Min PL "treq" for actual T w/ Pry :	0.958 in
Min PL "t1" for actual T w/o Pry :	1.248 in
T allowable with Prying:	41.75 kips
Prying Force, Q:	0.00 kips
Total Bolt Tension=T+Q:	33.03 kips
Prying Bolt Stress Ratio=(T+Q)/(B):	71.7% Pass

Rigid
Service, ASD
Fty*ASIF

0 ≤ α ≤ 1 case

Plate Data		
Diam:	24	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.53	in

Exterior Flange Plate Results

Compression Side Plate Stress:	Rohn/Piroc OK
Allowable Plate Stress:	36.0 ksi
Compression Plate Stress Ratio:	Rohn/Piroc OK
No Prying	
Tension Side Stress Ratio, (treq/t) ² :	Rohn/Piroc OK

Rigid
Service ASD
0.75*Fy*ASIF
Comp. Y.L. Length:
10.82

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

n/a

Stiffener Results

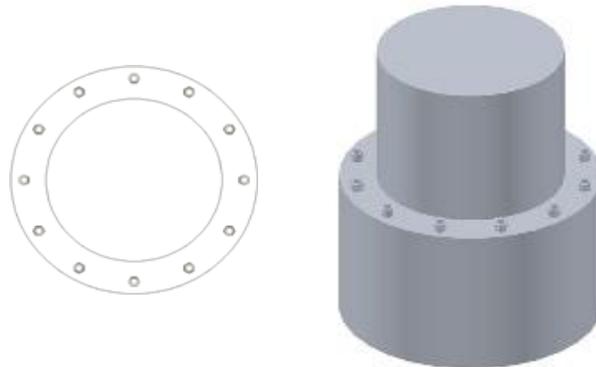
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv) ² :	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv) ² :	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check:	N/A
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Pole Data		
Diam:	18	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor	
ASIF:	1.333



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

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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

WO#: 7421.CT11064F
 Site Name: Windsor/ I-91/ X40_1

Pole Manufacturer: **Pirod**

Bolt Data

Qty:	10	Bolt Fu:	120
Diameter (in.):	1	Bolt Fy:	92
Bolt Material:	A325	Bolt Fty:	44.00
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle (in.):	15		

Plate Data

Diam:	18	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.01	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:	12.75	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor

ASIF:	1.333
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Reactions

Moment:	130.79	ft-kips
Axial:	3.59	kips
Shear:	4.79	kips
Elevation:	120	feet

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

Flange Bolt Results

Bolt Tension Capacity, B:	46.07 kips
Max Bolt <u>directly</u> applied T:	41.49 Kips
Min. PL "tc" for B cap. w/o Pry :	1.095 in
Min PL "treq" for actual T w/ Pry :	0.846 in
Min PL "t1" for actual T w/o Pry :	1.039 in
T allowable w/o Prying:	46.07 kips
Prying Force, Q:	0.00 kips
Total Bolt Tension=T+Q:	41.49 kips
Non-Prying Bolt Stress Ratio, T/B:	90.1% Pass

Rigid
Service, ASD
Fty*ASIF

$\alpha' < 0$ case

Exterior Flange Plate Results

Flexural Check	
Compression Side Plate Stress:	Rohn/Piroc OK
Allowable Plate Stress:	36.0 ksi
Compression Plate Stress Ratio:	Rohn/Piroc OK
No Prying	
Tension Side Stress Ratio, (treq/t) ² :	Rohn/Piroc OK

Rigid
Service ASD
0.75*Fy*ASIF
Comp. Y.L. Length:
7.90

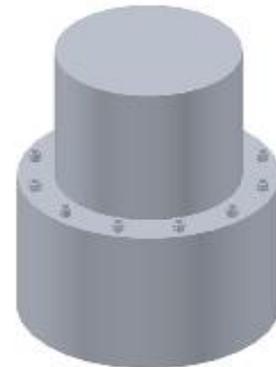
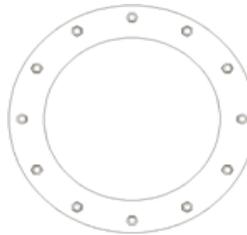
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Stiffener Results

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv) ² :	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv) ² :	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check:	N/A
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* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

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

FOUNDATION CALCULATIONS

Site Name: Windsor/ I-91/ X40_1
 Work Order: 7421.CT11064F

Monopole Drilled Pier

Input

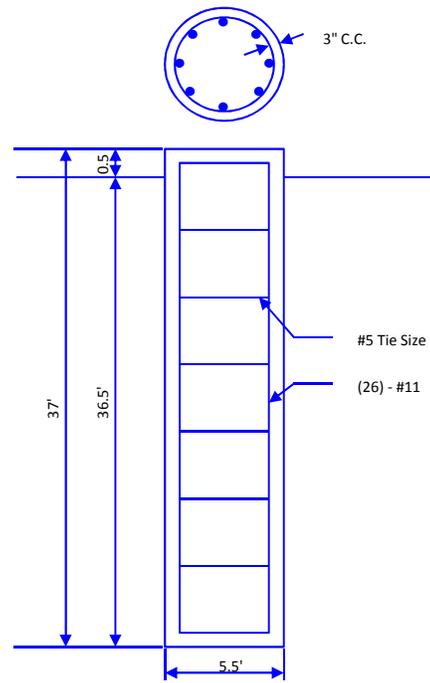
Criteria
 TIA Revision: F
 ACI 318 Revision: 2005
 Seismic Category: B

Forces
 Compression: 20 kips
 Shear: 11 kips
 Moment: 1067 k-ft
 Swelling Force: 0 kips

Foundation Dimensions
 Pier Diameter: 5.5 ft
 Ext. above grade: 0.5 ft
 Depth below grade: 36.5 ft

Material Properties
 Number of Rebar: 26
 Rebar Size: #11
 Tie Size: #5
 Rebar tensile strength: 60 ksi
 Concrete Strength: 3000 psi
 Ultimate Concrete Strain: 0.003 in/in
 Clear Cover to Ties: 3 in

Soil Profile: CT11064F Soil



Layer	Thickness (ft)	From (ft)	To (ft)	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (deg)	Ultimate Uplift Friction (ksf)	Ultimate Comp. Friction (ksf)	Ultimate Bearing Capacity (ksf)	SPT 'N' Counts
1	3.33	0	3.33	90	0	0	0	0	0	
2	4.67	3.33	8	90	0	26	0	0	0	
3	23	8	31	30	0	26	0	0	0	
4	5.5	31	36.5	65	1000	0	0	0	12	

Analysis Results

Soil Lateral Capacity
 Depth to Zero Shear: 7.47 ft
 Max Moment, Mu: 1132.78 k-ft
 Soil Safety Factor: 7.73
 Safety Factor Req'd: 2
RATING: 25.9%

Soil Axial Capacity
 Skin Friction (k): 0.00 kips
 End Bearing (k): 142.55 kips
 Comp. Capacity (k), φCn: 142.55 kips
 Comp. (k), Cu: 26.00 kips
RATING: 18.2%

Concrete/Steel Check

Mu (from soil analysis) 1472.61 k-ft
 φMn 4581.47 k-ft
RATING: 32.1%

rho provided 1.19
 rho required 0.33 OK

Rebar Spacing 5.52
 Spacing required 22.56 OK

Dev. Length required 28.78
 Dev. Length provided 61.78 OK

Overall Foundation Rating: 32.1%