

DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK



CITY OF PORTLAND BUILDING PERMIT

This is to certify that STEPHEN L MORIN

Located At 188 WARREN AVE

Job ID: 2012-08-4714-ALTCOMM

CBL: 295- G-007-001

has permission to install three (3) wireless antennas and one cabinet to the existing tower.

provided that the person or persons, firm or corporation accepting this permit shall comply with all of the provisions of the Statues of Maine and of the Ordinances of the City of Portland regulating the construction, maintenance and use of the buildings and structures, and of the application on file in the department.

Notification of inspection and written permission procured before this building or part thereof is lathed or otherwise closed-in. 48 HOUR NOTICE IS REQUIRED.

A final inspection must be completed by owner before this building or part thereof is occupied. If a certificate of occupancy is required, it must be

09/07/2012

Fire Prevention Officer

Code Enforcement Officer / Plan Reviewer

THIS CARD MUST BE POSTED ON THE STREET SIDE OF THE PROPERTY
PENALTY FOR REMOVING THIS CARD

BUILDING PERMIT INSPECTION PROCEDURES

Please call 874-8703 or 874-8693 (ONLY)

or email: buildinginspections@portlandmaine.gov

With the issuance of this permit, the owner, builder or their designee is required to provide adequate notice to the city of Portland Inspections Services for the following inspections. Appointments must be requested 48 to 72 hours in advance of the required inspection. The inspection date will need to be confirmed by this office.

- **Please read the conditions of approval that is attached to this permit!! Contact this office if you have any questions.**
 - **Permits expire in 6 months. If the project is not started or ceases for 6 months.**
 - **If the inspection requirements are not followed as stated below additional fees may be incurred due to the issuance of a "Stop Work Order" and subsequent release to continue.**
1. Close In: Electrical & Framing
 2. Final Inspection

The project cannot move to the next phase prior to the required inspection and approval to continue, REGARDLESS OF THE NOTICE OF CIRCUMSTANCES.

IF THE PERMIT REQUIRES A CERTIFICATE OF OCCUPANCY, IT MUST BE PAID FOR AND ISSUED TO THE OWNER OR DESIGNEE BEFORE THE SPACE MAY BE OCCUPIED.



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Director of Planning and Urban Development
Jeff Levine

Job ID: 2012-08-4714-ALTCOMM

Located At: 188 WARREN AVE

CBL: 295- G-007-001

Conditions of Approval:

Building

1. Application approval based upon information provided by the applicant or design professional. Any deviation from approved plans requires separate review and approval prior to work.
2. 1704.1.1 Statement of special inspections. The applicant shall submit a statement of special inspections prepared by the registered design professional in responsible charge in accordance with Section 107.1 as a condition for issuance. This report must demonstrate all deficiencies and corrective measures that were taken.

2012 08 4 14

GO B-4



General Building Permit Application

If you or the property owner owes real estate or personal property taxes or user charges on any property within the City, payment arrangements must be made before permits of any kind are accepted.

Location/Address of Construction: 188 Warren Avenue Portland ME		
Total Square Footage of Proposed Structure/Area		Square Footage of Lot N/A
Tax Assessor's Chart, Block & Lot Chart# 295 Block# ^G Lot# 6 295 G 007	Applicant * must be owner, Lessee or Buyer * Name Global Signal Acquisitions II Address 3530 Toringdon Way Suite 300 City, State & Zip Charlotte NC 28277	Telephone: 704-405-6560
Lessee/DBA (If Applicable) RECEIVED AUG 15 2012 Dept. of Building Inspections City of Portland Maine	Owner (if different from Applicant) Name Stephen Dale Address 332B Caray Rd City, State & Zip Falmouth, ME	Cost Of Work: \$ 75,000. C of O Fee: \$ Total Fee: \$
Current legal use (i.e. single family) Communication Tower If vacant, what was the previous use? N/A Proposed Specific use: Same Is property part of a subdivision? No If yes, please name Project description: The installation of 3 wireless antennas to the existing tower as well as the addition of 1 radio cabinet on the ground within the fenced compound.		
Contractor's name: Crown Castle Address: 3530 Toringdon Way Suite 300 City, State & Zip Charlotte NC 28277 Telephone: 704-405-6560 Who should we contact when the permit is ready: Kevin Savage Telephone: Mailing address: Same as above		

Needs Site Plan Admin Authorization

Please submit all of the information outlined on the applicable Checklist. Failure to do so will result in the automatic denial of your permit.

In order to be sure the City fully understands the full scope of the project, the Planning and Development Department may request additional information prior to the issuance of a permit. For further information or to download copies of this form and other applications visit the Inspections Division on-line at www.portlandmaine.gov, or stop by the Inspections Division office, room 315 City Hall or call 874-8703.

I hereby certify that I am the Owner of record of the named property, or that the owner of record authorizes the proposed work and that I have been authorized by the owner to make this application as his/her authorized agent. I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in this application is issued, I certify that the Code Official's authorized representative shall have the authority to enter all areas covered by this permit at any reasonable hour to enforce the provisions of the codes applicable to this permit.

Signature: **Kevin Savage** Date:
Digitally signed by Kevin Savage
DN: cn=Kevin Savage, ou=Crown Castle, ou,
email=kevin.savage@crowncastle.com, c=US
Date: 2012.08.10 15:02:09 -0400

This is not a permit; you may not commence ANY work until the permit is issue



Crown Castle
3530 Tarringdon Way
Charlotte NC 28277

Tel 704-405-6560
Fax 724-416-4911

August 10, 2012

City of Portland
389 Congress Street
Providence, RI 04101
Attn Gayle- Inspections Division- Rm 315

RE- Building Permit Application Fee for AT&T Site ME 5306 - Crown Castle Site 878782
located at Warren Ave.

Dear Gayle;

Enclosed please find the \$270.00 check which represents the building permit fee associated with the
above referenced building permit application. Upon receipt please let me know if you need any additional
information to complete the review of the application.

Thank you,

A handwritten signature in black ink that reads 'Kevin Savage'.

Kevin Savage
Crown Castle
East Area Property
704-405-6560



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Receipts Details:

Tender Information: Check , BusinessName: Crown Castle Eta Property (188 Warren), Check Number: 1711

Tender Amount: 270.00

Receipt Header:

Cashier Id: gguertin

Receipt Date: 8/15/2012

Receipt Number: 47143

Receipt Details:

Referance ID:	7654	Fee Type:	BP-Constr
Receipt Number:	0	Payment Date:	
Transaction Amount:	270.00	Charge Amount:	270.00
Job ID: Job ID: 2012-08-4714-ALTCOMM - install. of 3 wireless antennas to existing tower			
Additional Comments:			

Thank You for your Payment!



2012 08 4714

Administrative Authorization Application

Portland, Maine
Planning and Urban Development Department, Planning Division

PROJECT NAME: A/T ME 5306

PROJECT ADDRESS: 188 Warren Ave CHART/BLOCK/LOT: ~~245-6-6~~

APPLICATION FEE: (\$50.00) 245-6-6

PROJECT DESCRIPTION: (Please Attach Sketch/Plan of the Proposal/Development)
The addition of 3 wireless antennas and 1 ground based radio cabinet

CONTACT INFORMATION:

OWNER/APPLICANT

Name: Crown Castle
Address: 3530 Torringdon way
Suite 300, Charlotte NC 28277
Work #: 704 405-6560
Cell #: 518-928-1013
Fax #: 724-416-8701
Home #: _____
E-mail: Kevin.Savage@CrownCastle.com

CONSULTANT/AGENT

Name: N/A
Address: _____
Work #: _____
Cell #: _____
Fax #: _____
Home #: _____
E-mail: _____

Criteria for an Administrative Authorization: (see section 14-523(4) on pg .2 of this appl.)

Applicant's Assessment Y(yes), N(no), N/A

- a) Is the proposal within existing structures? Y
- b) Are there any new buildings, additions, or demolitions? Y
- c) Is the footprint increase less than 500 sq. ft.? Y
- d) Are there any new curb cuts, driveways or parking areas? N/A
- e) Are the curbs and sidewalks in sound condition? N/A
- f) Do the curbs and sidewalks comply with ADA? MA
- g) Is there any additional parking? N
- h) Is there an increase in traffic? N/A
- i) Are there any known stormwater problems? N
- j) Does sufficient property screening exist? Y
- k) Are there adequate utilities? Y
- l) Are there any zoning violations? N
- m) Is an emergency generator located to minimize noise? N
- n) Are there any noise, vibration, glare, fumes or other impacts? N

City of Portland
Planning Division
AUG 23 2012
RECEIVED

Signature of Applicant: Kevin Savage Date: 8-20-12

IMPORTANT NOTICE TO APPLICANT: The granting of an Administrative Authorization to exempt a development from site plan review does not exempt this proposal from other required approvals or permits, nor is it an authorization for construction. You should first check with the Building Inspections Office, Room 315, City Hall (207)874-8703, to determine what other City permits, such as a building permit, will be required.

Administrative Authorization Decision

Name: AT &T ME 5306
Address: 188 Warren Avenue
Project Description: The addition of 3 wireless antennas and 1 ground based radio cabinet

Criteria for an Administrative Authorizations:
(See Section 14-523 (4) on page 2 of this application)

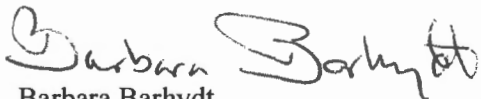
Applicant's Assessment
Y(yes), N(no), N/A

Planning Division
Use Only

a) Is the proposal within existing structures?	Y	N –addition to outside facility
b) Are there any new buildings, additions, or demolitions?	Y	Y
c) Is the footprint increase less than 500 sq. ft.?	Y	Y
d) Are there any new curb cuts, driveways or parking areas?	N/A	N/A
e) Are the curbs and sidewalks in sound condition?	N/A	N/A
f) Do the curbs and sidewalks comply with ADA?	N/A	N/A
g) Is there any additional parking?	N	N
h) Is there an increase in traffic?	N/A	N/A
i) Are there any known stormwater problems?	N	N
j) Does sufficient property screening exist?	Y	Y
k) Are there adequate utilities?	Y	Y
l) Are there any zoning violations?	N	N
m) Is an emergency generator located to minimize noise?	N	N
n) Are there any noise, vibration, glare, fumes or other impacts?	N	N

The Administrative Authorization for the antennas and radio cabinet was approved by Barbara Barhydt, Development Review Services Manager on August 31, 2012 with the following condition of approval listed below:

1. Standard Condition of Approval: The applicant shall obtain all required City Permits, including building permits from the Inspection Division (874-8703) and any other permits required from the Department of Public Services (874-8801) prior to the start of any construction.



Barbara Barhydt
Development Review Services Manager
Date of Approval: August 31, 2012



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Receipts Details:

Tender Information: Check , Check Number: 1717
Tender Amount: 50.00

Receipt Header:

Cashier Id: ldobson
Receipt Date: 8/23/2012
Receipt Number: 47442

Receipt Details:

Referance ID:	1739	Fee Type:	PEZ-ADAUTH
Receipt Number:	0	Payment Date:	
Transaction Amount:	50.00	Charge Amount:	50.00
Job ID: Project ID: 2012-570 - 188 Warren Ave.; 1 ground base radio cabinet			
Additional Comments: 1717			

Thank You for your Payment!

8/15/2012 left a message with Kevin Savage about the necessity of a site plan Administrative Authorization – Don't issue until we get the sign off - MES

Date: April 26, 2012

David Smith
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277



Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Subject: Structural Analysis Report

Carrier Designation: AT&T Mobility Co-Locate
Carrier Site Number: ME5306
Carrier Site Name: SPRINT PORTLAND

Crown Castle Designation: Crown Castle BU Number: 878782
Crown Castle Site Name: PORTLAND WARREN AVE
Crown Castle JDE Job Number: 180877
Crown Castle Work Order Number: 489572
Crown Castle Application Number: 141413 Rev. 2

Engineering Firm Designation: Crown Castle Project Number: 489572

Site Data: Warren Ave, Portland, Cumberland County, ME
Latitude 43° 41' 15.16", Longitude -70° 18' 14.96"
180 Foot - Monopole Tower

Dear David Smith,

Crown Castle is pleased to submit this "Structural Modification Report" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 489572, in accordance with application 141413, revision 2.

The purpose of the analysis is to determine acceptability of the tower stress level including the proposed modifications as outlined in the attached drawings, "Appendix D". Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC4: Modified Structure w/ Existing + Reserved + Proposed **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

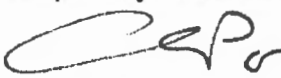
The analysis has been performed in accordance with the TIA-222-G standard and local code requirements based upon a wind speed of 100 mph 3-second gust, exposure category C with topographic category 1.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

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

Structural analysis prepared by: Michael De Jong, E.I.T./TS

Respectfully submitted by:


Aaron C. Poot, P.E.
Engineering Supervisor

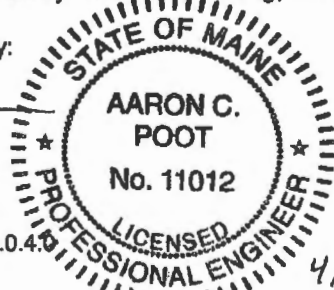


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Required Modification Drawings

1) INTRODUCTION

This tower is a 180 ft Monopole tower designed by PITTSBURG MONOPOLE in February of 1997. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

The modification drawings designed by CCI and attached in Appendix D, have been considered in this analysis.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 100 mph with no ice, 40 mph with 1 inch ice thickness and 60 mph under service loads, exposure category C with topographic category 1.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
161.0	162.0	2	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe	2 1	3/4 3/8	-
		6	powerwave technologies	7020.00			
		1	powerwave technologies	P65-17-XLH-RR w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
159.0	161.0	1	tower mounts	T-Arm Mount [TA 602-3]			
	160.0	6	ericsson	RRUS-11			
	159.0	1	tower mounts	Side Arm Mount [SO 701-3]			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
177.0	179.0	6	allgon	7184.15 w/ Mount Pipe	6	1-5/8	1
	177.0	1	tower mounts	Platform Mount [LP 715-1]			
171.0	171.0	6	dapa	58010 w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	Platform Mount [LP 401-1]			
161.0	162.0	6	powerwave technologies	7770.00 w/ Mount Pipe	12	1-5/8	1
	161.0	6	powerwave technologies	LGP2140X			
		1	tower mounts	Side Arm Mount [SO 702-3]			

Notes:

- 1) Existing Equipment
- 2) Equipment to be Removed, not considered in this analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
180	180	12	Generic	Antenna (4 SQ. FT)	-	-
170	170	2	Generic	6' Diameter Dish	-	-
160	160	12	Generic	Antenna (4 SQ. FT)	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Gemini Geotechnical Associates, Inc.	1562092	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Pittsburg Monopole Division	1480918	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Pittsburg Monopole Division	1451234	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	Crown Castle	3138336	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Crown Castle	Appendix D	ON FILE

3.1) Analysis Method

tnxTower (version 6.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
 - 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
 - 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
 - 4) Bedrock is intact with a shear capacity of 4000 psf.
 - 5) The existing base plate grout was not considered in this analysis.
- This analysis may be affected if any assumptions are not valid or have been made in error. Crown Castle should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	180 - 140	Pole	P24x3/8	1	-11.69	901.77	78.3	Pass
L2	140 - 100	Pole	P36x1/2	2	-22.01	1806.73	71.3	Pass
L3	100 - 60	Pole	P42x1/2	3	-34.12	2112.09	95.1	Pass
L4	60 - 20	Pole	P48x5/8	4	-50.89	3013.87	87.5	Pass
L5	20 - 0	Pole	P54x5/8	5	-60.05	3395.57	83.5	Pass
							Summary	
						Pole (L3)	95.1	Pass
						Rating =	95.1	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC4

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	93.1	Pass
1	Base Plate	0	38.9	Pass
1	Base Foundation	0	65.0	Pass
1,2	Flange Bolts & Plates	20	101.2 & 42.1	Pass
1,2	Flange Bolts & Plates	60	102.3 & 43.8	Pass
1	Flange Bolts & Plates	100	89.2 & 38.2	Pass
1	Flange Bolts & Plates	140	94.0 & 61.5	Pass

Structure Rating (max from all components) =	102.3%²
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Notes:

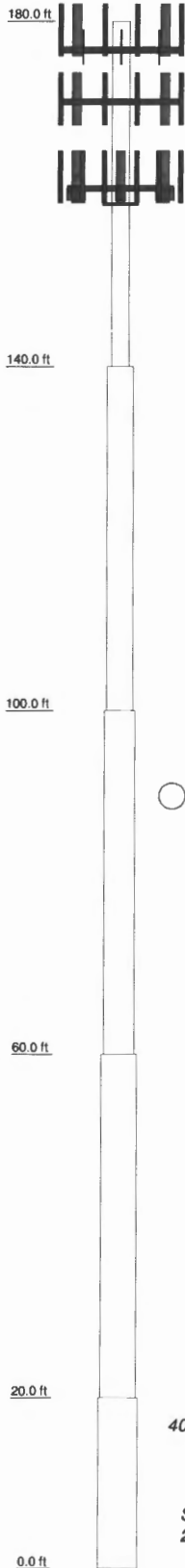
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
- 2) Capacities up to 105% are considered acceptable based on analysis methods used.

4.1) Recommendations

Perform the modifications detailed in "Appendix D" to remedy the deficiencies identified in Crown Castle Work Order No. 475189.

APPENDIX A
TNXTOWER OUTPUT

Section	1	P24x3/8	40'	A36	3.8
Section	2	P36x1/2	40'	A36	7.6
Section	3	P42x1/2	40'	A36	8.9
Section	4	P48x5/8	40'	A36	12.7
Section	5	P54x5/8	20'	A36	7.1
Section					40.0
Length (ft)					
Grade					
Weight (K)					



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lighting Rod 5/8" x 5'	182.5	(2) LGP2140X	161
(2) 7184.15 w/ Mount Pipe	177	(2) LGP2140X	161
(2) 7184.15 w/ Mount Pipe	177	(2) LGP2140X	161
(2) 7184.15 w/ Mount Pipe	177	P65-17-XLH-RR w/ Mount Pipe	161
Platform Mount [LP 715-1]	177	AM-X-CD-16-65-00T-RET w/ Mount Pipe	161
(2) 4' x 2" Pipe Mount	177	AM-X-CD-16-65-00T-RET w/ Mount Pipe	161
(2) 4' x 2" Pipe Mount	177	(2) 7020.00	161
(2) 58010 w/ Mount Pipe	171	(2) 7020.00	161
(2) 58010 w/ Mount Pipe	171	(2) 7020.00	161
(2) 58010 w/ Mount Pipe	171	DC6-48-60-18-8F	161
Platform Mount [LP 401-1]	171	T-Arm Mount [TA 602-3]	161
6' x 2" Mount Pipe	171	(2) RRUS-11	159
6' x 2" Mount Pipe	171	(2) RRUS-11	159
6' x 2" Mount Pipe	171	Side Arm Mount [SO 701-3]	159
(2) 7770.00 w/ Mount Pipe	161	(2) RRUS-11	159
(2) 7770.00 w/ Mount Pipe	161		
(2) 7770.00 w/ Mount Pipe	161		

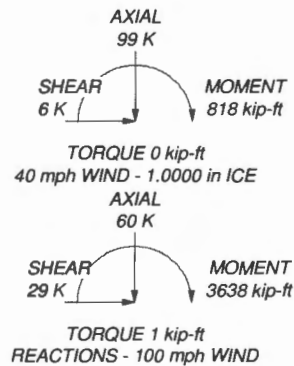
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A36	36 ksi	58 ksi			

TOWER DESIGN NOTES

1. Tower is located in Cumberland County, Maine.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 100 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0'
8. TOWER RATING: 95.1%

ALL REACTIONS
ARE FACTORED



<p>Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX: (724) 416-2254</p>	Job: BU# 878782		
	Project:	Client: Crown Castle	Drawn by: MDeJong
	Code: TIA-222-G	Date: 04/24/12	App'd: NTS
	Path:		Dwg No. E-1

Tower Input Data

There is a pole section.

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

The following design criteria apply:

- 3) Tower is located in Cumberland County, Maine.
- 4) Basic wind speed of 100 mph.
- 5) Structure Class II.
- 6) Exposure Category C.
- 7) Topographic Category 1.
- 8) Crest Height 0'.
- 9) Nominal ice thickness of 1.0000 in.
- 10) Ice thickness is considered to increase with height.
- 11) Ice density of 56 pcf.
- 12) A wind speed of 40 mph is used in combination with ice.
- 13) Temperature drop of 50 °F.
- 14) Deflections calculated using a wind speed of 60 mph.
- 15) A non-linear (P-delta) analysis was used.
- 16) Pressures are calculated at each section.
- 17) Stress ratio used in pole design is 1.
- 18) Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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) Add IBC .6D+W Combination	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 SR Members Have Cut Ends ✓ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing	Treat Feedline Bundles As Cylinder 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 Feedline Torque Include Angle Block Shear Check <div style="text-align: center; background-color: #e0e0e0; padding: 2px;">Poles</div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets
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Pole Section Geometry

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L1	180'-140'	40'	P24x3/8	A36 (36 ksi)	
L2	140'-100'	40'	P36x1/2	A36 (36 ksi)	
L3	100'-60'	40'	P42x1/2	A36 (36 ksi)	
L4	60'-20'	40'	P48x5/8	A36 (36 ksi)	
L5	20'-0'	20'	P54x5/8	A36 (36 ksi)	

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_r	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft ²	in					in	in
L1 180'-140'				1	1	1		
L2 140'-100'				1	1	1		
L3 100'-60'				1	1	1		
L4 60'-20'				1	1	1		
L5 20'-0'				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Section	Component Type	Placement	Total Number	Number Per Row	Start/End Position	Width or Diameter	Perimeter	Weight
			ft				r in	r in	plf
LDF7-50A(1-5/8")	A	Surface Ar (CaAa)	161' - 140'	2	2	0.000 0.050	1.9800		0.82
LDF7-50A(1-5/8")	B	Surface Ar (CaAa)	161' - 140'	2	2	0.000 0.050	1.9800		0.82
LDF7-50A(1-5/8")	C	Surface Ar (CaAa)	161' - 140'	2	2	0.000 0.050	1.9800		0.82
FB-L98B-002-75000(3/8")	B	Surface Ar (CaAa)	161' - 8'	1	1	-0.500 -0.480	0.3937		0.06
WR-VG86ST-BRD(3/4)	B	Surface Ar (CaAa)	161' - 8'	2	2	-0.480 -0.450	0.7740		0.59
Climbing Ladder	B	Surface Ar (CaAa)	180' - 8'	1	1	0.000 0.050	3.0000		3.00

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	$C_A A_A$	Weight
				ft		ft ² /ft	plf
FLC 158-50J(1-5/8")	C	No	Inside Pole	177' - 8'	6	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00
VXL7-50(1-5/8")	B	No	Inside Pole	171' - 8'	6	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00
LDF7-50A(1-5/8")	B	No	Inside Pole	140' - 8'	12	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00
LDF7-50A(1-5/8")	B	No	Inside Pole	161' - 140'	6	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation	Face	A_R	A_F	$C_A A_A$ In Face	$C_A A_A$ Out Face	Weight
n	ft		ft ²	ft ²	ft ²	ft ²	K
L1	180'-140'	A	0.000	0.000	8.316	0.000	0.03
		B	0.000	0.000	24.394	0.000	0.42
		C	0.000	0.000	8.316	0.000	0.24
L2	140'-100'	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	19.767	0.000	0.74
		C	0.000	0.000	0.000	0.000	0.22
L3	100'-60'	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	19.767	0.000	0.74
		C	0.000	0.000	0.000	0.000	0.22

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _A A _{Front}	C _A A _{Side}	Weight
			Horz	Lateral	Vert					
			0'							
							Ice	1.28	1.28	0.04
							1" Ice			
(2) 58010 w/ Mount Pipe	A	From Leg	4.00	0.0000	171'	No Ice	3.62	3.12	0.03	
			0'			1/2"	4.03	3.83	0.06	
			0'			Ice	4.44	4.49	0.10	
						1" Ice				
(2) 58010 w/ Mount Pipe	B	From Leg	4.00	0.0000	171'	No Ice	3.62	3.12	0.03	
			0'			1/2"	4.03	3.83	0.06	
			0'			Ice	4.44	4.49	0.10	
						1" Ice				
(2) 58010 w/ Mount Pipe	C	From Leg	4.00	0.0000	171'	No Ice	3.62	3.12	0.03	
			0'			1/2"	4.03	3.83	0.06	
			0'			Ice	4.44	4.49	0.10	
						1" Ice				
Platform Mount [LP 401-1]	C	None		0.0000	171'	No Ice	24.33	24.33	1.65	
						1/2"	30.22	30.22	2.03	
						Ice	36.11	36.11	2.41	
						1" Ice				
6' x 2" Mount Pipe	A	From Leg	4.00	0.0000	171'	No Ice	1.43	1.43	0.02	
			0'			1/2"	1.92	1.92	0.03	
			0'			Ice	2.29	2.29	0.05	
						1" Ice				
6' x 2" Mount Pipe	B	From Leg	4.00	0.0000	171'	No Ice	1.43	1.43	0.02	
			0'			1/2"	1.92	1.92	0.03	
			0'			Ice	2.29	2.29	0.05	
						1" Ice				
6' x 2" Mount Pipe	C	From Leg	4.00	0.0000	171'	No Ice	1.43	1.43	0.02	
			0'			1/2"	1.92	1.92	0.03	
			0'			Ice	2.29	2.29	0.05	
						1" Ice				
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00	0.0000	161'	No Ice	6.12	4.25	0.06	
			0'			1/2"	6.63	5.01	0.10	
			1'			Ice	7.13	5.71	0.16	
						1" Ice				
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00	0.0000	161'	No Ice	6.12	4.25	0.06	
			0'			1/2"	6.63	5.01	0.10	
			1'			Ice	7.13	5.71	0.16	
						1" Ice				
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00	0.0000	161'	No Ice	6.12	4.25	0.06	
			0'			1/2"	6.63	5.01	0.10	
			1'			Ice	7.13	5.71	0.16	
						1" Ice				
(2) LGP2140X	A	From Leg	4.00	0.0000	161'	No Ice	1.26	0.38	0.02	
			0'			1/2"	1.42	0.49	0.03	
			0'			Ice	1.58	0.62	0.04	
						1" Ice				
(2) LGP2140X	B	From Leg	4.00	0.0000	161'	No Ice	1.26	0.38	0.02	
			0'			1/2"	1.42	0.49	0.03	
			0'			Ice	1.58	0.62	0.04	
						1" Ice				
(2) LGP2140X	C	From Leg	4.00	0.0000	161'	No Ice	1.26	0.38	0.02	
			0'			1/2"	1.42	0.49	0.03	
			0'			Ice	1.58	0.62	0.04	
						1" Ice				
P65-17-XLH-RR w/ Mount Pipe	A	From Leg	4.00	0.0000	161'	No Ice	11.70	8.94	0.09	
			0'			1/2"	12.42	10.45	0.17	
			1'			Ice	13.15	11.99	0.27	
						1" Ice				
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.00	0.0000	161'	No Ice	8.50	6.30	0.07	
			0'			1/2"	9.15	7.48	0.14	
			1'			Ice	9.77	8.37	0.21	
						1" Ice				
AM-X-CD-16-65-00T-RET	C	From Leg	4.00	0.0000	161'	No Ice	8.50	6.30	0.07	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight	
			Horz	Lateral						
			ft	ft	°	ft	ft ²	ft ²	K	
w/ Mount Pipe			0'			1/2"	9.15	7.48	0.14	
			1'			Ice	9.77	8.37	0.21	
						1" Ice				
(2) 7020.00	A	From Leg	4.00		0.0000	161'	No Ice	0.12	0.20	0.00
			0'				1/2"	0.17	0.28	0.01
			1'				Ice	0.23	0.36	0.01
							1" Ice			
(2) 7020.00	B	From Leg	4.00		0.0000	161'	No Ice	0.12	0.20	0.00
			0'				1/2"	0.17	0.28	0.01
			1'				Ice	0.23	0.36	0.01
							1" Ice			
(2) 7020.00	C	From Leg	4.00		0.0000	161'	No Ice	0.12	0.20	0.00
			0'				1/2"	0.17	0.28	0.01
			1'				Ice	0.23	0.36	0.01
							1" Ice			
DC6-48-60-18-8F	A	From Leg	4.00		0.0000	161'	No Ice	1.27	1.27	0.02
			0'				1/2"	1.46	1.46	0.04
			1'				Ice	1.66	1.66	0.05
							1" Ice			
(2) RRUS-11	A	From Leg	2.00		0.0000	159'	No Ice	4.42	1.19	0.06
			0'				1/2"	4.71	1.35	0.08
			1'				Ice	5.00	1.53	0.11
							1" Ice			
(2) RRUS-11	B	From Leg	2.00		0.0000	159'	No Ice	4.42	1.19	0.06
			0'				1/2"	4.71	1.35	0.08
			1'				Ice	5.00	1.53	0.11
							1" Ice			
(2) RRUS-11	C	From Leg	2.00		0.0000	159'	No Ice	4.42	1.19	0.06
			0'				1/2"	4.71	1.35	0.08
			1'				Ice	5.00	1.53	0.11
							1" Ice			
Side Arm Mount [SO 701-3]	C	None			0.0000	159'	No Ice	2.83	2.83	0.20
							1/2"	3.92	3.92	0.24
							Ice	5.01	5.01	0.28
							1" Ice			
T-Arm Mount [TA 602-3]	C	None			0.0000	161'	No Ice	11.59	11.59	0.77
							1/2"	15.44	15.44	0.99
							Ice	19.29	19.29	1.21
							1" Ice			

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice

Comb. No.	Description
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	180 - 140	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-31.18	-0.90	2.36
			Max. Mx	8	-11.76	-410.46	0.32
			Max. My	2	-11.76	-0.15	411.30
			Max. Vy	8	14.94	-410.46	0.32
			Max. Vx	2	-14.97	-0.15	411.30
			Max. Torque	21			-0.93
L2	140 - 100	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-46.98	-2.18	4.35
			Max. Mx	8	-22.07	-1097.63	0.56
			Max. My	2	-22.07	-0.38	1099.62
			Max. Vy	8	19.29	-1097.63	0.56
			Max. Vx	2	-19.32	-0.38	1099.62
			Max. Torque	21			-0.92
L3	100 - 60	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-64.70	-3.55	6.43
			Max. Mx	8	-34.15	-1956.63	0.81
			Max. My	2	-34.15	-0.65	1959.76
			Max. Vy	8	23.48	-1956.63	0.81
			Max. Vx	2	-23.51	-0.65	1959.76
			Max. Torque	21			-0.92
L4	60 - 20	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-87.12	-4.84	8.34
			Max. Mx	8	-50.90	-2976.03	1.08
			Max. My	2	-50.90	-0.94	2980.28
			Max. Vy	8	27.25	-2976.03	1.08

Sectio n No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L5	20 - 0	Pole	Max. Vx	2	-27.28	-0.94	2980.28
			Max. Torque	21			-0.92
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-98.71	-5.21	8.87
			Max. Mx	8	-60.05	-3536.23	1.17
			Max. My	2	-60.05	-1.03	3541.02
			Max. Vy	8	28.76	-3536.23	1.17
			Max. Vx	2	-28.79	-1.03	3541.02
			Max. Torque	21			-0.92

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	98.71	-0.00	0.00
	Max. H _x	20	60.05	28.75	0.00
	Max. H _z	2	60.05	-0.00	28.77
	Max. M _x	2	3541.02	-0.00	28.77
	Max. M _z	8	3536.23	-28.75	0.00
	Max. Torsion	9	0.92	-28.75	0.00
	Min. Vert	19	45.04	24.90	-14.39
	Min. H _x	8	60.05	-28.75	0.00
	Min. H _z	14	60.05	-0.00	-28.77
	Min. M _x	14	-3538.68	-0.00	-28.77
	Min. M _z	20	-3534.17	28.75	0.00
	Min. Torsion	21	-0.92	28.75	0.00

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturing Moment, M _x kip-ft	Overturing Moment, M _z kip-ft	Torque kip-ft
Dead Only	50.04	0.00	0.00	-0.93	-0.82	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	60.05	0.00	-28.77	-3541.02	-1.03	0.00
0.9 Dead+1.6 Wind 0 deg - No Ice	45.04	0.00	-28.77	-3502.87	-0.76	0.00
1.2 Dead+1.6 Wind 30 deg - No Ice	60.05	14.37	-24.92	-3066.79	-1768.64	-0.46
0.9 Dead+1.6 Wind 30 deg - No Ice	45.04	14.37	-24.92	-3033.70	-1749.47	-0.46
1.2 Dead+1.6 Wind 60 deg - No Ice	60.05	24.90	-14.39	-1771.11	-3062.61	-0.80
0.9 Dead+1.6 Wind 60 deg - No Ice	45.04	24.90	-14.39	-1751.87	-3029.61	-0.80
1.2 Dead+1.6 Wind 90 deg - No Ice	60.05	28.75	-0.00	-1.17	-3536.23	-0.92
0.9 Dead+1.6 Wind 90 deg - No Ice	45.04	28.75	-0.00	-0.87	-3498.16	-0.92
1.2 Dead+1.6 Wind 120 deg - No Ice	60.05	24.90	14.39	1768.77	-3062.61	-0.80
0.9 Dead+1.6 Wind 120 deg - No Ice	45.04	24.90	14.39	1750.14	-3029.60	-0.80
1.2 Dead+1.6 Wind 150 deg - No Ice	60.05	14.67	25.43	3149.60	-1817.80	-0.46
0.9 Dead+1.6 Wind 150 deg - No Ice	45.04	14.67	25.43	3116.12	-1798.05	-0.46
1.2 Dead+1.6 Wind 180 deg - No Ice	60.05	0.00	28.77	3538.68	-1.03	-0.00
0.9 Dead+1.6 Wind 180 deg	45.04	0.00	28.77	3501.13	-0.76	-0.00

Load Combination	Vertical	Shear _x	Shear _z	Overturing Moment, M _x	Overturing Moment, M _z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
- No Ice						
1.2 Dead+1.6 Wind 210 deg	60.05	-14.37	24.92	3064.44	1766.57	0.46
- No Ice						
0.9 Dead+1.6 Wind 210 deg	45.04	-14.37	24.92	3031.96	1747.93	0.46
- No Ice						
1.2 Dead+1.6 Wind 240 deg	60.05	-24.90	14.39	1768.77	3060.55	0.80
- No Ice						
0.9 Dead+1.6 Wind 240 deg	45.04	-24.90	14.39	1750.14	3028.08	0.80
- No Ice						
1.2 Dead+1.6 Wind 270 deg	60.05	-28.75	-0.00	-1.17	3534.17	0.92
- No Ice						
0.9 Dead+1.6 Wind 270 deg	45.04	-28.75	-0.00	-0.87	3496.64	0.92
- No Ice						
1.2 Dead+1.6 Wind 300 deg	60.05	-24.90	-14.39	-1771.11	3060.55	0.80
- No Ice						
0.9 Dead+1.6 Wind 300 deg	45.04	-24.90	-14.39	-1751.87	3028.08	0.80
- No Ice						
1.2 Dead+1.6 Wind 330 deg	60.05	-14.67	-25.43	-3151.95	1815.74	0.46
- No Ice						
0.9 Dead+1.6 Wind 330 deg	45.04	-14.67	-25.43	-3117.86	1796.53	0.46
- No Ice						
1.2 Dead+1.0 Ice+1.0 Temp	98.71	0.00	-0.00	-8.87	-5.21	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	98.71	0.00	-6.07	-781.77	-5.33	0.00
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	98.71	3.04	-5.26	-678.25	-391.93	-0.07
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	98.71	5.26	-3.04	-395.42	-674.94	-0.13
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	98.71	6.07	-0.00	-9.08	-778.53	-0.15
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	98.71	5.26	3.04	377.27	-674.94	-0.13
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	98.71	3.15	5.45	694.95	-412.06	-0.07
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	98.71	0.00	6.07	763.61	-5.33	0.00
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	98.71	-3.04	5.26	660.09	381.27	0.07
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	98.71	-5.26	3.04	377.27	664.28	0.13
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	98.71	-6.07	-0.00	-9.08	767.87	0.15
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	98.71	-5.26	-3.04	-395.43	664.28	0.13
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	98.71	-3.15	-5.45	-713.11	401.39	0.07
Dead+Wind 0 deg - Service	50.04	0.00	-5.79	-709.12	-0.85	0.00
Dead+Wind 30 deg - Service	50.04	2.89	-5.02	-614.24	-354.46	-0.09
Dead+Wind 60 deg - Service	50.04	5.01	-2.90	-355.04	-613.31	-0.16
Dead+Wind 90 deg - Service	50.04	5.79	0.00	-0.97	-708.06	-0.19
Dead+Wind 120 deg - Service	50.04	5.01	2.90	353.10	-613.31	-0.16
Dead+Wind 150 deg - Service	50.04	2.95	5.12	629.36	-364.31	-0.09
Dead+Wind 180 deg - Service	50.04	0.00	5.79	707.17	-0.85	-0.00
Dead+Wind 210 deg - Service	50.04	-2.89	5.02	612.29	352.75	0.09
Dead+Wind 240 deg - Service	50.04	-5.01	2.90	353.10	611.61	0.16
Dead+Wind 270 deg - Service	50.04	-5.79	0.00	-0.97	706.36	0.19
Dead+Wind 300 deg - Service	50.04	-5.01	-2.90	-355.04	611.61	0.16
Dead+Wind 330 deg - Service	50.04	-2.95	-5.12	-631.30	362.60	0.09

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	0.00	-50.04	0.00	0.00	50.04	0.00	0.000%
2	0.00	-60.05	-28.77	-0.00	60.05	28.77	0.000%
3	0.00	-45.04	-28.77	0.00	45.04	28.77	0.000%
4	14.37	-60.05	-24.92	-14.37	60.05	24.92	0.000%
5	14.37	-45.04	-24.92	-14.37	45.04	24.92	0.000%
6	24.90	-60.05	-14.39	-24.90	60.05	14.39	0.000%
7	24.90	-45.04	-14.39	-24.90	45.04	14.39	0.000%
8	28.75	-60.05	0.00	-28.75	60.05	0.00	0.000%
9	28.75	-45.04	0.00	-28.75	45.04	0.00	0.000%
10	24.90	-60.05	14.39	-24.90	60.05	-14.39	0.000%
11	24.90	-45.04	14.39	-24.90	45.04	-14.39	0.000%
12	14.67	-60.05	25.43	-14.67	60.05	-25.43	0.000%
13	14.67	-45.04	25.43	-14.67	45.04	-25.43	0.000%
14	0.00	-60.05	28.77	-0.00	60.05	-28.77	0.000%
15	0.00	-45.04	28.77	0.00	45.04	-28.77	0.000%
16	-14.37	-60.05	24.92	14.37	60.05	-24.92	0.000%
17	-14.37	-45.04	24.92	14.37	45.04	-24.92	0.000%
18	-24.90	-60.05	14.39	24.90	60.05	-14.39	0.000%
19	-24.90	-45.04	14.39	24.90	45.04	-14.39	0.000%
20	-28.75	-60.05	0.00	28.75	60.05	0.00	0.000%
21	-28.75	-45.04	0.00	28.75	45.04	0.00	0.000%
22	-24.90	-60.05	-14.39	24.90	60.05	14.39	0.000%
23	-24.90	-45.04	-14.39	24.90	45.04	14.39	0.000%
24	-14.67	-60.05	-25.43	14.67	60.05	25.43	0.000%
25	-14.67	-45.04	-25.43	14.67	45.04	25.43	0.000%
26	0.00	-98.71	0.00	-0.00	98.71	0.00	0.000%
27	0.00	-98.71	-6.07	-0.00	98.71	6.07	0.000%
28	3.04	-98.71	-5.26	-3.04	98.71	5.26	0.000%
29	5.26	-98.71	-3.03	-5.26	98.71	3.04	0.000%
30	6.07	-98.71	0.00	-6.07	98.71	0.00	0.000%
31	5.26	-98.71	3.03	-5.26	98.71	-3.04	0.000%
32	3.15	-98.71	5.45	-3.15	98.71	-5.45	0.000%
33	0.00	-98.71	6.07	-0.00	98.71	-6.07	0.000%
34	-3.04	-98.71	5.26	3.04	98.71	-5.26	0.000%
35	-5.26	-98.71	3.03	5.26	98.71	-3.04	0.000%
36	-6.07	-98.71	0.00	6.07	98.71	0.00	0.000%
37	-5.26	-98.71	-3.03	5.26	98.71	3.04	0.000%
38	-3.15	-98.71	-5.45	3.15	98.71	5.45	0.000%
39	0.00	-50.04	-5.79	0.00	50.04	5.79	0.000%
40	2.89	-50.04	-5.02	-2.89	50.04	5.02	0.000%
41	5.01	-50.04	-2.90	-5.01	50.04	2.90	0.000%
42	5.79	-50.04	0.00	-5.79	50.04	0.00	0.000%
43	5.01	-50.04	2.90	-5.01	50.04	-2.90	0.000%
44	2.95	-50.04	5.12	-2.95	50.04	-5.12	0.000%
45	0.00	-50.04	5.79	0.00	50.04	-5.79	0.000%
46	-2.89	-50.04	5.02	2.89	50.04	-5.02	0.000%
47	-5.01	-50.04	2.90	5.01	50.04	-2.90	0.000%
48	-5.79	-50.04	0.00	5.79	50.04	0.00	0.000%
49	-5.01	-50.04	-2.90	5.01	50.04	2.90	0.000%
50	-2.95	-50.04	-5.12	2.95	50.04	5.12	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	4	0.0000001	0.00033708
3	Yes	4	0.0000001	0.00013834
4	Yes	5	0.0000001	0.00076512
5	Yes	5	0.0000001	0.00036363
6	Yes	5	0.0000001	0.00078296
7	Yes	5	0.0000001	0.00037283

8	Yes	4	0.00000001	0.00061832
9	Yes	4	0.00000001	0.00037657
10	Yes	5	0.00000001	0.00075868
11	Yes	5	0.00000001	0.00036064
12	Yes	5	0.00000001	0.00083583
13	Yes	5	0.00000001	0.00039508
14	Yes	4	0.00000001	0.00033671
15	Yes	4	0.00000001	0.00013825
16	Yes	5	0.00000001	0.00077607
17	Yes	5	0.00000001	0.00036965
18	Yes	5	0.00000001	0.00075779
19	Yes	5	0.00000001	0.00036034
20	Yes	4	0.00000001	0.00061791
21	Yes	4	0.00000001	0.00037641
22	Yes	5	0.00000001	0.00078204
23	Yes	5	0.00000001	0.00037252
24	Yes	5	0.00000001	0.00082241
25	Yes	5	0.00000001	0.00038821
26	Yes	4	0.00000001	0.00006497
27	Yes	5	0.00000001	0.00043446
28	Yes	5	0.00000001	0.00047544
29	Yes	5	0.00000001	0.00047550
30	Yes	5	0.00000001	0.00043167
31	Yes	5	0.00000001	0.00046391
32	Yes	5	0.00000001	0.00049439
33	Yes	5	0.00000001	0.00042090
34	Yes	5	0.00000001	0.00045647
35	Yes	5	0.00000001	0.00045683
36	Yes	5	0.00000001	0.00042461
37	Yes	5	0.00000001	0.00046835
38	Yes	5	0.00000001	0.00050184
39	Yes	4	0.00000001	0.00003832
40	Yes	4	0.00000001	0.00014750
41	Yes	4	0.00000001	0.00016051
42	Yes	4	0.00000001	0.00004399
43	Yes	4	0.00000001	0.00014341
44	Yes	4	0.00000001	0.00016879
45	Yes	4	0.00000001	0.00003817
46	Yes	4	0.00000001	0.00015470
47	Yes	4	0.00000001	0.00014272
48	Yes	4	0.00000001	0.00004386
49	Yes	4	0.00000001	0.00015969
50	Yes	4	0.00000001	0.00015935

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 140	19.350	50	0.9622	0.0014
L2	140 - 100	11.712	50	0.7742	0.0006
L3	100 - 60	5.927	50	0.5760	0.0003
L4	60 - 20	2.063	50	0.3226	0.0001
L5	20 - 0	0.220	50	0.1021	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
182'6"	Lighting Rod 5/8" x 5'	50	19.350	0.9622	0.0014	65782
177'	(2) 7184.15 w/ Mount Pipe	50	18.748	0.9479	0.0013	65782
171'	(2) 58010 w/ Mount Pipe	50	17.548	0.9195	0.0012	36546
161'	(2) 7770.00 w/ Mount Pipe	50	15.579	0.8722	0.0010	17311

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
159'	(2) RRUS-11	50	15.192	0.8628	0.0010	15662

Maximum Tower Deflections - Design Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
L1	180 - 140	96.684	24	4.8117	0.0069
L2	140 - 100	58.548	24	3.8733	0.0032
L3	100 - 60	29.638	24	2.8821	0.0017
L4	60 - 20	10.314	24	1.6137	0.0007
L5	20 - 0	1.100	24	0.5105	0.0002

Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
182'6"	Lighting Rod 5/8" x 5'	24	96.684	4.8117	0.0069	13367
177'	(2) 7184.15 w/ Mount Pipe	24	93.679	4.7407	0.0065	13367
171'	(2) 58010 w/ Mount Pipe	24	87.690	4.5988	0.0059	7425
161'	(2) 7770.00 w/ Mount Pipe	24	77.857	4.3629	0.0049	3515
159'	(2) RRUS-11	24	75.926	4.3158	0.0047	3180

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L _u	KI/r	A	P _u	φP _n	Ratio P _u / φP _n
	ft		ft	ft		in ²	K	K	
L1	180 - 140 (1)	P24x3/8	40'	0'	0.0	27.832	-11.69	901.77	0.013
L2	140 - 100 (2)	P36x1/2	40'	0'	0.0	55.763	-22.01	1806.73	0.012
L3	100 - 60 (3)	P42x1/2	40'	0'	0.0	65.188	-34.12	2112.09	0.016
L4	60 - 20 (4)	P48x5/8	40'	0'	0.0	93.020	-50.89	3013.87	0.017
L5	20 - 0 (5)	P54x5/8	20'	0'	0.0	104.80	-60.05	3395.57	0.018

Pole Bending Design Data

Section No.	Elevation	Size	M _{ux}	φM _{nx}	Ratio M _{ux} / φM _{nx}	M _{uy}	φM _{ny}	Ratio M _{uy} / φM _{ny}
	ft		kip-ft	kip-ft		kip-ft	kip-ft	
L1	180 - 140 (1)	P24x3/8	423.51	550.88	0.769	0.00	550.88	0.000
L2	140 - 100 (2)	P36x1/2	1136.11	1623.16	0.700	0.00	1623.16	0.000
L3	100 - 60 (3)	P42x1/2	2020.63	2162.84	0.934	0.00	2162.84	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L4	60 - 20 (4)	P48x5/8	3065.08	3573.96	0.858	0.00	3573.96	0.000
L5	20 - 0 (5)	P54x5/8	3637.53	4453.00	0.817	0.00	4453.00	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	180 - 140 (1)	P24x3/8	15.58	450.89	0.035	0.46	874.03	0.001
L2	140 - 100 (2)	P36x1/2	19.94	903.37	0.022	0.46	2635.86	0.000
L3	100 - 60 (3)	P42x1/2	24.12	1056.05	0.023	0.46	3609.21	0.000
L4	60 - 20 (4)	P48x5/8	27.88	1506.93	0.018	0.46	5872.81	0.000
L5	20 - 0 (5)	P54x5/8	29.37	1697.79	0.017	0.46	7465.22	0.000

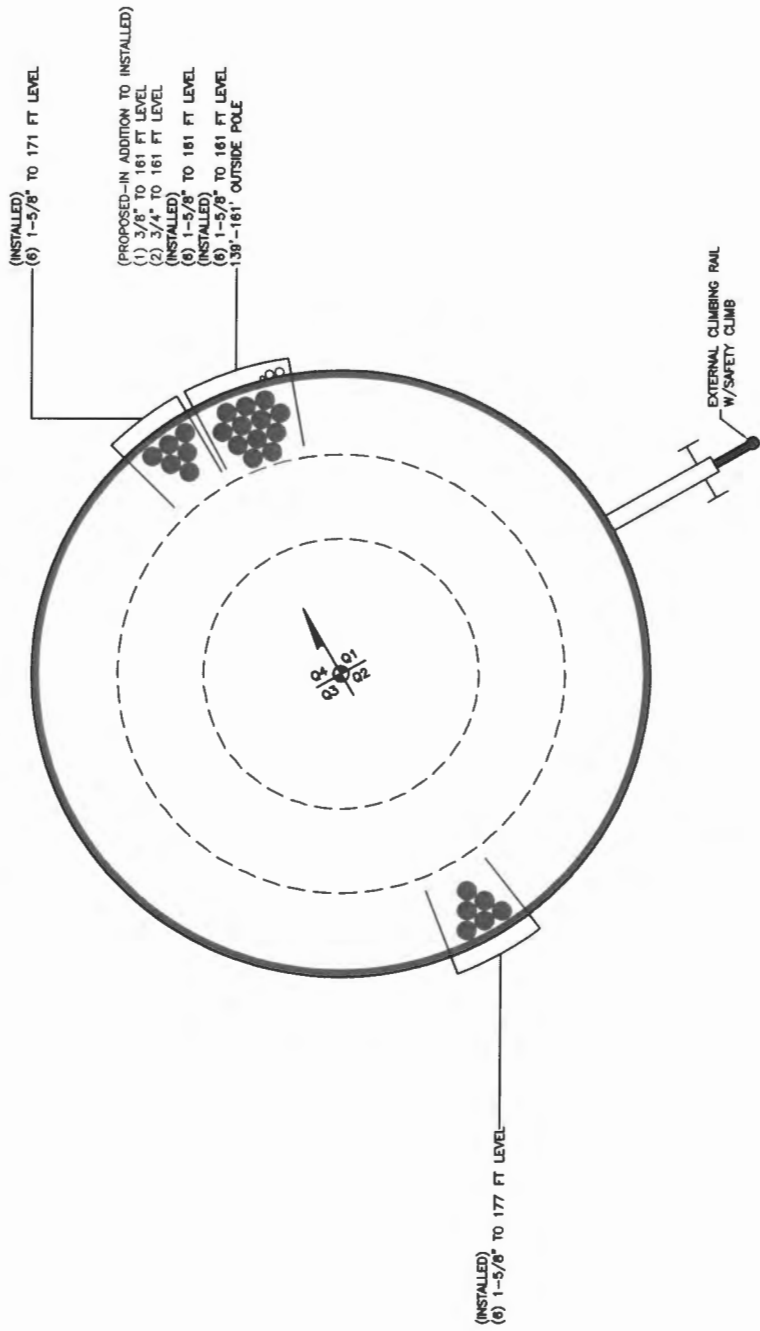
Pole Interaction Design Data

Section No.	Elevation ft	Ratio P_u ϕP_n	Ratio M_{ux} ϕM_{nx}	Ratio M_{uy} ϕM_{ny}	Ratio V_u ϕV_n	Ratio T_u ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	180 - 140 (1)	0.013	0.769	0.000	0.035	0.001	0.783	1.000	4.8.2 ✓
L2	140 - 100 (2)	0.012	0.700	0.000	0.022	0.000	0.713	1.000	4.8.2 ✓
L3	100 - 60 (3)	0.016	0.934	0.000	0.023	0.000	0.951	1.000	4.8.2 ✓
L4	60 - 20 (4)	0.017	0.858	0.000	0.018	0.000	0.875	1.000	4.8.2 ✓
L5	20 - 0 (5)	0.018	0.817	0.000	0.017	0.000	0.835	1.000	4.8.2 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	180 - 140	Pole	P24x3/8	1	-11.69	901.77	78.3	Pass
L2	140 - 100	Pole	P36x1/2	2	-22.01	1806.73	71.3	Pass
L3	100 - 60	Pole	P42x1/2	3	-34.12	2112.09	95.1	Pass
L4	60 - 20	Pole	P48x5/8	4	-50.89	3013.87	87.5	Pass
L5	20 - 0	Pole	P54x5/8	5	-60.05	3395.57	83.5	Pass
Summary								
Pole (L3)							95.1	Pass
RATING =							95.1	Pass

APPENDIX B
BASE LEVEL DRAWING



APPENDIX C
ADDITIONAL CALCULATIONS

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

TIA Rev G Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#: 878782
Site Name: PORTLAND WARREN AVE
App #: 141413 Rev. 2
Pole Manufacturer: <i>Other</i>

Reactions		
Mu:	3638	ft-kips
Axial, Pu:	60	kips
Shear, Vu:	29	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

Anchor Rod Data

Qty:	28	
Diam:	2	in
Rod Material:	Other	
Strength (Fu):	58	ksi
Yield (Fy):	36	ksi
Bolt Circle:	60.125	in

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

Anchor Rod Results

Max Rod (Cu+ Vu/η):	107.9 Kips
Allowable Axial, Φ*Fu*Anet:	116.0 Kips
Anchor Rod Stress Ratio:	93.1% Pass

Rigid
AISC LRFD
φ*Tn

Plate Data

Diam:	66	in
Thick:	3.25	in
Grade:	36	ksi
Single-Rod B-eff:	6.06	in

Base Plate Results

Base Plate Stress:	12.6 ksi	Flexural Check
Allowable Plate Stress:	32.4 ksi	
Base Plate Stress Ratio:	38.9% Pass	

Rigid
AISC LRFD
φ*Fy
Y.L. Length:
26.44

Stiffener Data (Welding at both sides)

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

n/a

Stiffener Results

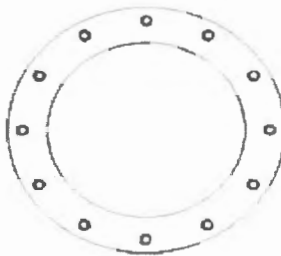
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a

Pole Data

Diam:	54	in
Thick:	0.625	in
Grade:	36	ksi
# of Sides:	0	"0" IF Round
Fu	58	ksi
Reinf. Fillet Weld	0	"0" if None



* 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 G

Site Data	
BU#: 878782	
Site Name: PORTLAND WARREN AV	
App #: 141413 Rev. 2	

Reactions		
Mu	3065.08	ft-kips
Axial, Pu:	50.89	kips
Shear, Vu:	27.88	kips
Elevation:	20	feet

Bolt Threads:
X-Excluded
$\phi V_n = \phi(0.55 A_b F_u)$
$\phi = 0.75, \phi^* V_n$ (kips):
38.88

Pole Manufacturer:	Other
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If No stiffeners, Criteria: TIA G <-Only Applicable to Unstiffened Cases

Bolt Data		
Qty:	52	
Diameter (in.):	1	Bolt Fu: 120
Bolt Material:	A325	Bolt Fy: 92
N/A:		<-- Disregard
N/A:		<-- Disregard
Circle (in.):	50.375	

Flange Bolt Results	
Bolt Tension Capacity, $\phi^* T_n, B1$:	54.54 kips
Adjusted $\phi^* T_n$ (due to $V_u = V_u / Q_t$), B:	54.53 kips
Max Bolt directly applied T_u :	55.19 Kips
Min. PL "tc" for B cap. w/o Pry:	Tu>B N/A in
Min PL "treq" for actual T w/ Pry:	1.001 in
Min PL "t1" for actual T w/o Pry:	Tu>B N/A in
T allowable w/o Prying:	54.54 kips
Prying Force, q:	0.00 kips T>B Case
Total Bolt Tension= $T_u + q$:	55.19 kips
Non-Prying Bolt Stress Ratio, T_u/B :	101.2% Pass

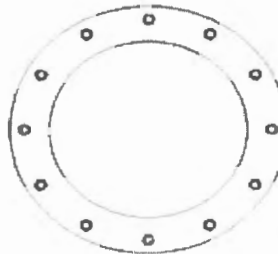
Plate Data		
Diam:	52.5	in
Thick, t:	2.5	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	2.90	in

Exterior Flange Plate Results	Flexural Check	Rigid
Compression Side Plate Stress:	9.7 ksi	TIA G
Allowable Plate Stress:	32.4 ksi	$\phi^* F_y$
Compression Plate Stress Ratio:	30.0% Pass	Comp. Y.L. Length:
No Prying Check for Tu>B		15.29
Tension Side Stress Ratio, $(treq/t)^2$:	16.0% Pass	

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
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, $f_b/F_b + (f_v/F_v)^2$: n/a
 Plate Tension+Shear, $f_t/F_t + (f_v/F_v)^2$: n/a
 Plate Comp. (AISC Bracket): n/a
Pole Results
 Pole Punching Shear Check: n/a

Pole Data		
Diam:	48	in
Thick:	0.625	in
Grade:	36	ksi
# of Sides:	0	"0" IF Round
Fu	58	ksi
Reinf. Fillet Weld	0	"0" if None



* 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, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: 878782
 Site Name: PORTLAND WARREN AV
 App #: 141413 Rev. 2

Manufacturer: Other

Bolt Data

Qty:	52	Bolt Fu:	120
Diam:	1	Bolt Fy:	92
Bolt Material:	A325		
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle:	50.375	in	

Reactions

Moment:	3065.08	ft-kips
Axial:	50.89	kips
Shear:	27.88	kips
Exterior Flange Run, T+q:	55.19	kips

Bolt Threads:

X-Excluded
$\phi V_n = \phi(0.55 A_b F_u)$
$\phi = 0.75, \phi V_n$ (kips):
38.88

Elevation: 20 feet

Interior Flange Bolt Results

Maximum Bolt Tension, Tu: 55.2 Kips, Ext. Flange Tu+q
 Adjusted ϕT_n (due to $V_u = V_u / Q_t$), I: 54.5 Kips
 Bolt Stress Ratio: 101.2% Pass

Plate Data

Plate Outer Diam:	52.75	in
Plate Inner Diam:	48.25	in (Hole @ Ctr)
Thick:	2.5	in
Grade:	36	ksi
Effective Width:	3.19	in

Interior Flange Plate Results

Controlling Bolt Axial Force: 57.1 Kips, Ext. Cu=Interior Cu
 Plate Stress: 13.6 ksi
 Allowable Plate Stress, ϕF_y : 32.4 ksi
 Plate Stress Ratio: 42.1% Pass

Flexural Check

Stiffener Data (Welding at Both Sides)

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

n/a

Stiffener Results

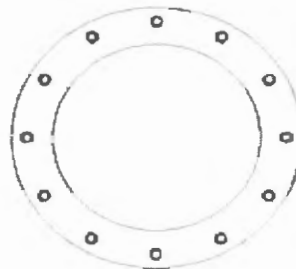
Horizontal Weld: n/a
 Vertical Weld: n/a
 Plate Flex+Shear, $f_b / F_b + (f_v / F_v)^2$: n/a
 Plate Tension+Shear, $f_t / F_t + (f_v / F_v)^2$: n/a
 Plate Comp. (AISC Bracket): n/a

Pole Results

Pole Punching Shear Check: n/a

Pole Data

Pole OuterDiam:	54	in
Thick:	0.625	in
Pole Inner Diam:	52.75	in
Grade:	36	ksi
# of Sides:	0	"0" IF Round
Fu	58	ksi



* 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 G

Site Data

BU#: 878782
 Site Name: PORTLAND WARREN AV
 App #: 141413 Rev. 2

Pole Manufacturer:	Other
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Bolt Data	
Qty:	56
Diameter (in.):	0.75
Bolt Material:	A490
N/A:	<-- Disregard
N/A:	<-- Disregard
Circle (in.):	44.375

Plate Data	
Diam:	46.5 in
Thick, t:	2.25 in
Grade (Fy):	36 ksi
Strength, Fu:	58 ksi
Single-Rod B-eff:	2.36 in

Stiffener Data (Welding at Both Sides)	
Config:	0 *
Weld Type:	
Groove Depth:	in **
Groove Angle:	degrees
Fillet H. Weld:	<-- Disregard
Fillet V. Weld:	in
Width:	in
Height:	in
Thick:	in
Notch:	in
Grade:	ksi
Weld str.:	ksi

Pole Data	
Diam:	42 in
Thick:	0.5 in
Grade:	36 ksi
# of Sides:	0 "0" IF Round
Fu:	58 ksi
Reinf. Fillet Weld:	0 "0" if None

Reactions		
Mu	2020.63	ft-kips
Axial, Pu:	34.12	kips
Shear, Vu:	24.12	kips
Elevation:	60	feet

Bolt Threads:
X-Excluded
$\phi V_n = \phi(0.55 \cdot A_b \cdot F_u)$
$\phi = 0.75, \phi \cdot V_n$ (kips):
27.34

If No stiffeners, Criteria:	TIA G
-----------------------------	-------

<-Only Applicable to Unstiffened Cases

Flange Bolt Results
 Bolt Tension Capacity, $\phi \cdot T_n, B1$: 37.58 kips
 Adjusted $\phi \cdot T_n$ (due to $V_u = V_u / Q_t$), B: 37.57 kips
 Max Bolt directly applied T_u : 38.42 Kips
 Min. PL "tc" for B cap. w/o Pry: $T_u > B$ N/A in
 Min PL "treq" for actual T w/ Pry: 1.007 in
 Min PL "t1" for actual T w/o Pry: $T_u > B$ N/A in
 T allowable w/o Prying: 37.58 kips
 Prying Force, q: 0.00 kips $T > B$ Case
 Total Bolt Tension = $T_u + q$: 38.42 kips
 Non-Prying Bolt Stress Ratio, T_u / B : 102.3% Pass

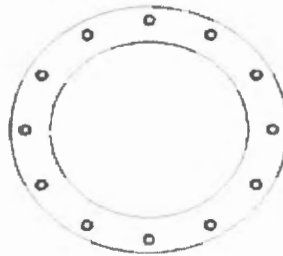
Rigid
$\phi \cdot T_n$
$\phi T_n [(1 - (V_u / \phi V_n)^2)^{0.5}]$

Exterior Flange Plate Results Flexural Check
 Compression Side Plate Stress: 10.1 ksi
 Allowable Plate Stress: 32.4 ksi
 Compression Plate Stress Ratio: 31.3% Pass
No Prying Check for $T_u > B$
 Tension Side Stress Ratio, $(treq/t)^2$: 20.0% Pass

Rigid
TIA G
$\phi \cdot F_y$
Comp. Y.L. Length: 14.32

n/a
Stiffener Results
 Horizontal Weld: n/a
 Vertical Weld: n/a
 Plate Flex+Shear, $f_b / F_b + (f_v / F_v)^2$: n/a
 Plate Tension+Shear, $f_t / F_t + (f_v / F_v)^2$: 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, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: 878782
 Site Name: PORTLAND WARREN AV
 App #: 141413 Rev. 2

Manufacturer: Other

Bolt Data		
Qty:	56	
Diam:	0.75	Bolt Fu: 150
Bolt Material:	A490	Bolt Fy: 130
N/A:		<-- Disregard
N/A:		<-- Disregard
Circle:	44.375	in

Plate Data		
Plate Outer Diam:	46.75	in
Plate Inner Diam:	42.25	in (Hole @ Ctr)
Thick:	2.25	in
Grade:	36	ksi
Effective Width:	2.62	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Pole OuterDiam:	48	in
Thick:	0.625	in
Pole Inner Diam:	46.75	in
Grade:	36	ksi
# of Sides:	0	"0" IF Round
Fu	58	ksi

Reactions

Moment:	2020.63	ft-kips
Axial:	34.12	kips
Shear:	24.12	kips
Exterior Flange Run, T+q:	38.42	kips

Bolt Threads:

X-Excluded
$\phi V_n = \phi(0.55 A_b F_u)$
$\phi = 0.75, \phi V_n$ (kips):
27.34

Elevation: 60 feet

Interior Flange Bolt Results

Maximum Bolt Tension, Tu: 38.4 Kips, Ext. Tu=Interior Tu
 Adjusted ϕT_n (due to $V_u = V_u / Q_t$), I: 37.6 Kips
 Bolt Stress Ratio: 102.3% Pass

Interior Flange Plate Results

Controlling Bolt Axial Force: 39.6 Kips, Ext. Cu=Interior Cu
 Plate Stress: 14.2 ksi
 Allowable Plate Stress, ϕF_y : 32.4 ksi
 Plate Stress Ratio: 43.8% Pass

Flexural Check

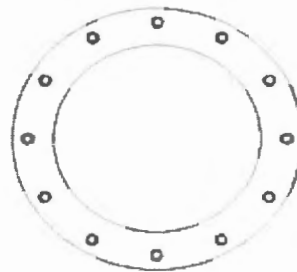
n/a

Stiffener Results

Horizontal Weld: n/a
 Vertical Weld: n/a
 Plate Flex+Shear, $f_b / F_b + (f_v / F_v)^2$: n/a
 Plate Tension+Shear, $f_t / F_t + (f_v / F_v)^2$: 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 G

Site Data

BU#: 878782

Site Name: PORTLAND WARREN AV

App #: 141413 Rev. 2

Pole Manufacturer: Other

Bolt Data

Qty:	52	Bolt Fu:	120
Diameter (in.):	0.75		
Bolt Material:	A325	Bolt Fy:	92
N/A:			
N/A:		<-- Disregard	
Circle (in.):	38.5		

Plate Data

Diam:	40.75	in
Thick, t:	2.125	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	2.17	in

Stiffener Data (Welding at Both Sides)

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

Pole Data

Diam:	36	in
Thick:	0.5	in
Grade:	36	ksi
# of Sides:	0	"0" IF Round
Fu:	58	ksi
Reinf. Fillet Weld:	0	"0" if None

Reactions

Mu	1136.11	ft-kips
Axial, Pu:	22.01	kips
Shear, Vu:	19.94	kips
Elevation:	100	feet

Bolt Threads:

X-Excluded
$\phi V_n = \phi(0.55 \cdot A_b \cdot F_u)$
$\phi = 0.75, \phi \cdot V_n$ (kips):
21.87

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

Flange Bolt Results

Bolt Tension Capacity, $\phi \cdot T_n, B1$:	30.06 kips
Adjusted $\phi \cdot T_n$ (due to $V_u = V_u / Q_t$), B:	30.06 kips
Max Bolt directly applied Tu:	26.82 Kips
Min. PL "tc" for B cap. w/o Pry:	0.962 in
Min PL "treq" for actual T w/ Pry:	0.809 in
Min PL "t1" for actual T w/o Pry:	0.909 in
T allowable w/o Prying:	30.06 kips $\alpha < 0$ case
Prying Force, q:	0.00 kips
Total Bolt Tension = Tu + q:	26.82 kips
Non-Prying Bolt Stress Ratio, Tu/B:	89.2% Pass

Exterior Flange Plate Results

Flexural Check	Rigid
Compression Side Plate Stress:	9.0 ksi
Allowable Plate Stress:	32.4 ksi
Compression Plate Stress Ratio:	27.6% Pass
No Prying	
Tension Side Stress Ratio, $(treq/t)^2$:	14.5% Pass

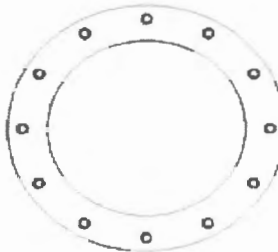
n/a

Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, $f_b/F_b + (f_v/F_v)^2$:	n/a
Plate Tension+Shear, $f_t/F_t + (f_v/F_v)^2$:	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, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: 878782
 Site Name: PORTLAND WARREN AV
 App #: 141413 Rev. 2

Manufacturer:	Other
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Bolt Data

Qty:	52		
Diam:	0.75	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle:	38.5	in	

Reactions

Moment:	1136.11	ft-kips
Axial:	22.01	kips
Shear:	19.94	kips
Exterior Flange Run, T+q:	26.82	kips

Bolt Threads:

X-Excluded
$\phi V_n = \phi(0.55 A_b F_u)$
$\phi = 0.75, \phi V_n$ (kips):
21.87

Elevation: 100 feet

Interior Flange Bolt Results

Maximum Bolt Tension, Tu: 26.8 Kips, Ext. Flange Tu+q
 Adjusted ϕT_n (due to $V_u = V_u / Q_t$), I: 30.1 Kips
 Bolt Stress Ratio: 89.2% Pass

Plate Data

Plate Outer Diam:	41	in
Plate Inner Diam:	36.25	in (Hole @ Ctr)
Thick:	2.125	in
Grade:	36	ksi
Effective Width:	2.48	in

Interior Flange Plate Results

Controlling Bolt Axial Force: 27.7 Kips, Ext. Cu=Interior Cu
 Plate Stress: 12.4 ksi
 Allowable Plate Stress, ϕF_y : 32.4 ksi
 Plate Stress Ratio: 38.2% Pass

Flexural Check

Stiffener Data (Welding at Both Sides)

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

n/a

Stiffener Results

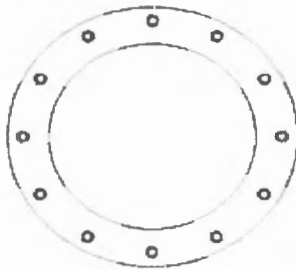
Horizontal Weld : n/a
 Vertical Weld: n/a
 Plate Flex+Shear, $f_b / F_b + (f_v / F_v)^2$: n/a
 Plate Tension+Shear, $f_t / F_t + (f_v / F_v)^2$: n/a
 Plate Comp. (AISC Bracket): n/a

Pole Results

Pole Punching Shear Check: n/a

Pole Data

Pole OuterDiam:	42	in
Thick:	0.5	in
Pole Inner Diam:	41	in
Grade:	36	ksi
# of Sides:	0	"0" IF Round
Fu	58	ksi



* 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 G

Site Data

BU#: 878782
 Site Name: PORTLAND WARREN AV
 App #: 141413 Rev. 2

Pole Manufacturer: Other

Bolt Data		
Qty:	24	
Diameter (in.):	0.75	Bolt Fu: 120
Bolt Material:	A325	Bolt Fy: 92
N/A:		<-- Disregard
N/A:		<-- Disregard
Circle (in.):	29.5	

Plate Data		
Diam:	34.75	in
Thick, t:	1.875	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.14	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
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:	36	ksi
# of Sides:	0	"0" IF Round
Fu:	58	ksi
Reinf. Fillet Weld:	0	"0" if None

Reactions		
Mu	423.51	ft-kips
Axial, Pu:	11.69	kips
Shear, Vu:	15.58	kips
Elevation:	140	feet

Bolt Threads:
X-Excluded
$\phi V_n = \phi(0.55 \cdot A_b \cdot F_u)$
$\phi = 0.75, \phi \cdot V_n$ (kips):
21.87

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

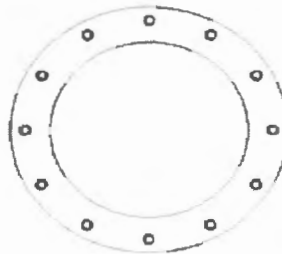
Flange Bolt Results		Rigid
Bolt Tension Capacity, $\phi \cdot T_n, B1$:	30.06 kips	$\phi \cdot T_n$
Adjusted $\phi \cdot T_n$ (due to $V_u = V_u / Q_t$), B:	30.05 kips	$\phi T_n [(1 - (V_u / \phi V_n)^2)^{0.5}]$
Max Bolt directly applied Tu:	28.23 Kips	
Min. PL "tc" for B cap. w/o Pry:	1.319 in	
Min PL "treq" for actual T w/ Pry:	1.225 in	
Min PL "t1" for actual T w/o Pry:	1.278 in	
T allowable w/o Prying:	30.06 kips	$\alpha' < 0$ case
Prying Force, q:	0.00 kips	
Total Bolt Tension = Tu + q:	28.23 kips	
Non-Prying Bolt Stress Ratio, Tu/B:	93.9% Pass	

Exterior Flange Plate Results		Flexural Check	Rigid
Compression Side Plate Stress:	16.3 ksi		TIA G
Allowable Plate Stress:	32.4 ksi		$\phi \cdot F_y$
Compression Plate Stress Ratio:	50.4% Pass		Comp. Y.L. Length:
			17.15
Tension Side Stress Ratio, $(treq/t)^2$:	42.7% Pass		

n/a

Stiffener Results	
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, $f_b / F_b + (f_v / F_v)^2$:	n/a
Plate Tension+Shear, $f_t / F_t + (f_v / F_v)^2$:	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, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: 878782
 Site Name: PORTLAND WARREN AV
 App #: 141413 Rev. 2

Manufacturer:	Other
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Bolt Data		
Qty:	24	
Diam:	0.75	Bolt Fu: 120
Bolt Material:	A325	Bolt Fy: 92
N/A:		<-- Disregard
N/A:		<-- Disregard
Circle:	29.5	in

Plate Data		
Plate Outer Diam:	35	in
Plate Inner Diam:	24.25	in (Hole @ Ctr)
Thick:	1.875	in
Grade:	36	ksi
Effective Width:	4.58	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Pole OuterDiam:	36	in
Thick:	0.5	in
Pole Inner Diam:	35	in
Grade:	36	ksi
# of Sides:	0	"0" IF Round
Fu	58	ksi

Reactions

Moment:	423.51	ft-kips
Axial:	11.69	kips
Shear:	15.58	kips
Exterior Flange Run, T+q:	28.23	kips

Bolt Threads:

X-Excluded
$\phi V_n = \phi(0.55 A_b F_u)$
$\phi = 0.75, \phi * V_n$ (kips):
21.87

Elevation: 140 feet

Interior Flange Bolt Results

Maximum Bolt Tension, Tu: 28.2 Kips, Ext. Flange Tu+q
 Adjusted $\phi * T_n$ (due to $V_u = V_u / Q_t$), I: 30.0 Kips
 Bolt Stress Ratio: 94.0% Pass

Interior Flange Plate Results

Controlling Bolt Axial Force: 29.2 Kips, Ext. Cu=Interior Cu
 Plate Stress: 19.9 ksi
 Allowable Plate Stress, $\phi * F_y$: 32.4 ksi
 Plate Stress Ratio: 61.5% Pass

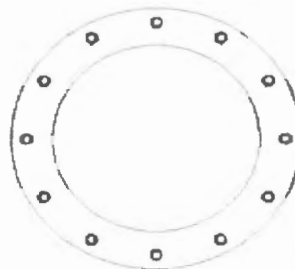
n/a

Stiffener Results

Horizontal Weld: n/a
 Vertical Weld: n/a
 Plate Flex+Shear, $f_b / F_b + (f_v / F_v)^2$: n/a
 Plate Tension+Shear, $f_t / F_t + (f_v / F_v)^2$: n/a
 Plate Comp. (AISC Bracket): n/a

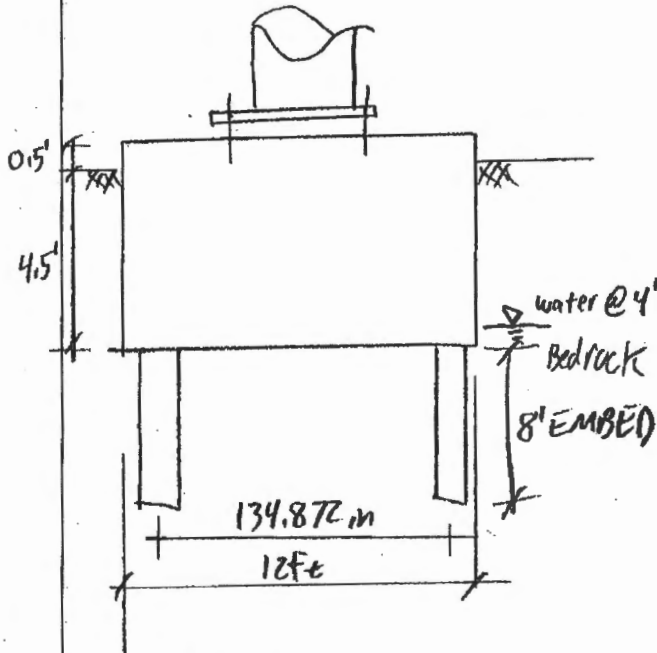
Pole Results

Pole Punching Shear Check: n/a

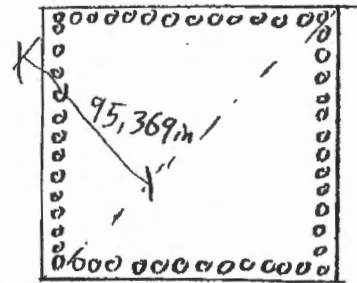


* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

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



4/c Anchors @ 10.3748 in



14 #9 Anchors per face

TOWER RCT

M: 3638 K-ft
V: 29 K
P: 60 K

Wt of Concrete

$$W_c = 0.15 \text{ Kcf} ((12 \text{ ft})^2 (4.5 \text{ ft})) + (0.15 - 0.0624) \text{ Kcf} ((12 \text{ ft})^2 (0.5 \text{ ft})) = 103.51 \text{ K}$$

Moment of Inertia of Anchors

$$I/A = (2)(14)(67.436 \text{ in})^2 + (2)(2) [57.061^2 + 46.6864^2 + 36.3116^2 + 25.9368^2 + 15.562^2 + 5.1872^2]$$

$$I/A = 158116.9 \text{ in}^4/\text{in}^2$$

Moment on Anchors

$$M_E = M + Vd = 3638 \text{ K-ft} + 29 \text{ K} (5' + 0.25') = 3790.25 \text{ K-ft}$$

Compression in Anchor (conservative - I/A based on orthogonal; c based on diagonal)

$$C = \frac{P + \phi_c W_c}{N} + \frac{M_E c}{I/A} = \frac{60 \text{ K} + 1.2(103.51 \text{ K})}{52} + \frac{(3790.25 \text{ K-ft}) \left(\frac{12 \text{ in}}{1 \text{ ft}}\right) (95.369 \text{ in})}{158116.9 \text{ in}^4/\text{in}^2}$$

$$C = 30.39 \text{ K}$$

Tension in Anchor

$$T = \frac{M_E c}{I/A} - \frac{P + \phi_c W_c}{N} = 23.30 \text{ K}$$

Anchor Capacity

$$\phi P_n = \phi F_y A_g = 0.9 (60 \text{ ksi}) (1.0 \text{ in}^2) = 54 \text{ k}$$

$$T/\phi P_n = 30.39 \text{ k} / 54 = \underline{56.3\%}$$

Development Length

$$\text{EMBED in FND} = 60'' - 3'' - 10''/8 = 55.75 \text{ in}$$

$$l_d = \frac{3}{40} \frac{f_y}{\sqrt{f_c}} \frac{\psi_t \psi_e \psi_s}{\left(\frac{c_b + k_{tr}}{d_b}\right)} d_b = \frac{3}{40} \frac{60000 \text{ psi}}{\sqrt{4000 \text{ psi}}} \frac{1.0}{2.5} 1.128 = 32.1 \text{ in } \checkmark \text{ OK}$$

Bearing

$$T = \frac{P}{A} + \frac{M}{S} = \frac{60 + (1.12)(103.51)}{(12 \text{ ft})^2} + \frac{(3709.25 \text{ k-ft})}{12^3 / (6 \times \sqrt{2})} = 19.5 \text{ ksf}$$

$$T_{\text{all}} = 0.75 (40 \text{ ksf}) = 30 \text{ ksf}$$

$$T/T_{\text{all}} = 19.5 / 30 = \underline{65\%}$$

Rock to Grout Bond

$$P_{RG} = \phi A F_y = 0.5 \left[\left(\pi \times 2.5'' \times 5' \times \frac{12''}{1'} \right) 0.075 \text{ ksi} + \left(2.5'' \pi \times 3' \times \frac{12''}{1'} \right) 0.15 \text{ ksi} \right]$$

$$P_{RG} = 38.88 \text{ k}$$

$$T/P_{RG} = \frac{23.30 \text{ k}}{38.88 \text{ k}} = \underline{60.0\%}$$

Rock Group Forces

Resistance (concrete wt)

$$\text{Diagonal} = 0.9 (103.51 \text{ k}) \left(\frac{33.94''}{12''} \right) = 263.5 \text{ k-ft}$$

$$\text{orthogonal} = 0.9 (103.51 \text{ k}) (6') = 558.95 \text{ k-ft}$$

Group uplift Force

$$\text{Diagonal} = \left[\left(\frac{1}{2} \times 3790.25 \text{ k-ft} \right) - 263.5 \text{ k-ft} \right] / \left(\frac{49.592''}{12''} \right) = 394.8 \text{ k}$$

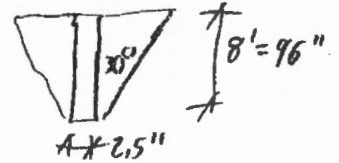
$$\text{Orthogonal} = \left[\left(\frac{1}{2} \times 3790.25 \text{ k-ft} \right) - 558.95 \text{ k-ft} \right] / \left(\frac{50.677''}{12''} \right) = 316.4 \text{ k}$$

Rock Group Mass (check on side of anchors only - conservative)

$$V = \frac{h}{3} (A_{\text{bot}} + A_{\text{top}} + \sqrt{A_{\text{bot}} A_{\text{top}}})$$

$$A_{\text{bot}} = (2.5 \text{ m} \times 136 \text{ m}) / 144 = 2,36 \text{ ft}^2$$

$$A_{\text{top}} = [2.5 \text{ m} + 2(96'' \tan 30)] [136 \text{ m} + (2)(96'' \tan 30)] / 144 = 194,3 \text{ ft}^2$$



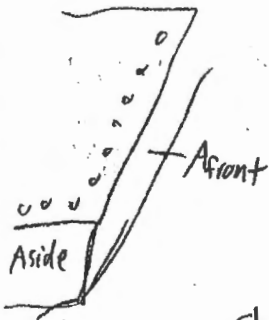
$$V = \frac{8}{3} [2,36 + 194,3 + \sqrt{2,36 \times 194,3}] = 581,5 \text{ ft}^3$$

$$\phi R_g = 0,75 (581,5 \text{ ft}^3) (0,16 \text{ Kcf}) = 69,78 \text{ K}$$

Rock shear

Orthogonal

Diagonal



$$A_{\text{side}} \approx \left(\frac{8'}{\cos 30} \right) (6') = 55,4 \text{ ft}^2$$

$$A_{\text{front}} = \frac{8'}{\cos 30} (12')$$

$$A_{\text{front}} \approx \left(\frac{8'}{\cos 30} \right) (12') = 110,9 \text{ ft}^2$$

$$A_{\text{front}} = 110,9 \text{ ft}^2$$

Total shear Area

Total shear Area

$$= A_{\text{side}} \times 2 + A_{\text{front}} = 221,7 \text{ ft}^2$$

$$= 2 A_{\text{front}} = 221,7 \text{ ft}^2$$

$$\text{Shear resistance} \Rightarrow 0,75 (221,7 \text{ ft}^2) (4 \text{ Ksf}) \cos 30 = 576 \text{ K}$$

uplift resistance

$$\text{Orthogonal} \Rightarrow \frac{316,4 \text{ K}}{576 \text{ K} + 69,78 \text{ K}} = 49,0\%$$

$$\text{Diagonal} \Rightarrow \frac{394,8 \text{ K}}{576 + 69,78} = \boxed{61,1\%}$$

APPENDIX D
REQUIRED MODIFICATION DRAWINGS



TOWER REINFORCEMENT DRAWINGS

SITE NAME: PORTLAND WARREN AVE
BU NUMBER: 878782

SITE ADDRESS:
WARREN AVE
PORTLAND, ME 04103
CUMBERLAND COUNTY, USA



ROUTE 95 NORTH MAINE TURNPIKE TO EXIT 8 WESTBROOK. AFTER TOLL MAKE A RIGHT ON RIVERSIDE DRIVE. GO ABOUT 3/4 OF A MILE TO LIGHT AT WARREN AVENUE. MAKE A RIGHT ON WARREN AVENUE. TOWER IS ABOUT 1 MILE ON WARREN AVE. ON THE RIGHT.

PROJECT CONTACTS:

1. CROWN TOWER STRUCTURAL ANALYST

DAVID SMITH
(704) 405-8818
DAVID.SMITH@CROWNCastle.COM
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

2. CROWN PROJECT MANAGER

JAMES DONAHUE
(781) 771-1111
JAMES.DONAHUE.CONTRACTOR@CROWNCastle.COM
500 WEST CUMMINGS PARK, SUITE 3600
WOBURN, MA 01901

3. CROWN DESIGN ENGINEER (EOR)

AARON C. POOT, P.E.
(724) 418-2077
AARON.POOT@CROWNCastle.COM
2000 CORPORATE DRIVE
CANONSBURG, PA 15317

DRAWINGS INCLUDED

SHEET NUMBER	DESCRIPTION
S-1	TITLE PAGE
S-2	MODIFICATION CHECKLIST
S-3	NOTES
S-4	ELEVATION & SITE LAYOUT
S-5	DETAILS
S-6	BILL OF MATERIAL

TOWER INFORMATION

TOWER MANUFACTURER / PRJ #: PITTSBURG MONOPOLE DIVISION / PROJECT # 98068-88
TOWER HEIGHT / TYPE: 180 FT MONOPOLE
TOWER LOCATION: LAT. 43° 41' 15.16"
DATUM: (NAD 1983) LONG. -70° 18' 14.96"
ELEV. 97 FT AMSL
STRUCTURAL DESIGN DRAWING: CCI / WO. # 489572
STRUCTURAL ANALYSIS REPORT: CCI / WO. # 475189
STRUCTURAL ANALYSIS DATE: 04/02/12
CCISITES DOCUMENT ID: 3138336

CODE COMPLIANCE

THIS REINFORCEMENT DESIGN IS BASED ON THE REQUIREMENTS OF TIA-222-G STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES USING A 3-SECOND GUST WIND SPEED OF 100 MPH WITH NO ICE, 40 MPH WITH 1 INCH ICE THICKNESS AND 60 MPH UNDER SERVICE LOADS, EXPOSURE CATEGORY C.

<small>This document is copyrighted and is the sole property of the owner thereof. It is produced solely for use by the owner and is not to be distributed, reproduced or used for any other purpose without the written permission of Crown Castle.</small>																																									
<table border="1"> <thead> <tr> <th>NO.</th> <th>DATE</th> <th>DESCRIPTION</th> <th>BY</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	NO.	DATE	DESCRIPTION	BY																																					<p>SITE NAME: PORTLAND WARREN AVE BU NUMBER: 878782 WO NUMBER: 88972 SITE ADDRESS: WARREN AVE PORTLAND, ME 04103 CUMBERLAND COUNTY, USA DRAWN BY: SL DATE: 04/28/12 CHKD BY: MD DATE: 4/18/12 CHKD BY: JS DATE: 4/18/12 APPRD BY: JCY DATE: 4/18/12 SCALE: N.T.S.</p>
NO.	DATE	DESCRIPTION	BY																																						
<p>TITLE PAGE</p> <p>S-1</p>																																									

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
X	MI CHECKLIST DRAWING
NA	FOR APPROVED SHOP DRAWINGS
NA	FABRICATION INSPECTION
NA	FABRICATOR CERTIFIED WELD INSPECTION
NA	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
NA	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED) PER ENG-SOW-10053
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
NA	POST INSTALLED ANCHOR ROD VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
NA	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK, LIFT AND DENSITY
NA	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
ADDITIONAL TESTING AND INSPECTIONS:	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
NA	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

NOTE: X DENOTES A DOCUMENT NEEDED FOR THE MI REPORT
NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MI REPORT

MODIFICATION INSPECTION NOTES:

GENERAL

THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWING, AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, NOR DOES THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY REMAINS WITH THE EOR AT ALL TIMES.

ALL MIs SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AEV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-BUL-10173 LIST OF APPROVED MI VENDORS.

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN POINT OF CONTACT (POC).

REFER TO ENG-SOW-10007 : MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

MI INSPECTOR

THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS

THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GENERAL CONTRACTOR (GC) INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE MI-FIELD INSPECTIONS, AND SUBMITTING THE MI REPORT TO CROWN.

GENERAL CONTRACTOR

THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE MI INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS
- BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS

THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AND ENG-SOW-10007.

RECOMMENDATIONS

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING A MI REPORT:

- IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLY 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
- IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTIONS TO COMMENCE WITH ONE SITE VISIT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

CANCELLATION OR DELAYS IN SCHEDULED MI

IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY, NOR FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.) IF CROWN CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

CORRECTION OF FAILING MIs

IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI ("FAILED MI"), THE GC SHALL WORK WITH CROWN TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:

- CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI
- OR, WITH CROWN'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION

MI VERIFICATION INSPECTIONS

CROWN RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTION(S) ON TOWER MODIFICATION PROJECTS.

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-10007.

VERIFICATION INSPECTIONS MAY BE CONDUCTED BY AN INDEPENDENT A/E/A/S/V FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASSING MI" OR "PASS AS NOTED MI" REPORT FOR THE ORIGINAL PROJECT.


REQUIRED PHOTOS

BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:

- PRE-CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
 - RAW MATERIALS
 - PHOTOS OF ALL CRITICAL DETAILS
 - FOUNDATION MODIFICATIONS
 - WELD PREPARATION
 - BOLT INSTALLATION
 - FINAL INSTALLED CONDITION
 - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
 - FINAL INFELD CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN ONLY FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO ENG-SOW-10007.

		<small>THIS DRAWING IS COPYRIGHTED AND IS THE SOLE PROPERTY OF THE COMPANY. IT IS TO BE USED ONLY FOR THE PROJECT AND SITE SPECIFICALLY IDENTIFIED ON THE DRAWING. NO REUSE OR REPRODUCTION IS PERMITTED WITHOUT THE WRITTEN PERMISSION OF CROWN CASTLE.</small>	
		<small>NO SCALE TO BE SHOWN, SEE 10007</small>	<small>BY</small>
<small>NO. DATE DESCRIPTION</small>	<small>BY</small>	STATE OF MAINE AARON C. POOT No. 11012 REGISTERED PROFESSIONAL ENGINEER	
<small>REVISIONS</small>		SITE NAME: PORTLAND WARREN AVE SU NUMBER: 07093 WO NUMBER: 48672 SITE ADDRESS: WARREN AVE PORTLAND, ME 04103 CLAMBERLAND COUNTY, USA DRAWN BY: BL DATE: 04/24/12 CHKD BY: MD DATE: 4/26/12 CHKD BY: JS DATE: 4/16/12 APPROV BY: APO DATE: 4/28/12 SCALE: N.T.S.	
<small>4/23/12</small>		MODIFICATION INSPECTION CHECKLIST S-2	

GENERAL NOTES:

- ALL WORK PRESENTED ON THESE DRAWINGS MUST BE COMPLETED BY THE CONTRACTOR UNLESS NOTED OTHERWISE. THE CONTRACTOR MUST BE EXPERIENCED IN THE PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED HEREIN. BY ACCEPTANCE OF THIS ASSIGNMENT, THE CONTRACTOR IS ATTESTING THAT HE DOES HAVE SUFFICIENT EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED, THAT HE IS PROPERLY LICENSED, AND THAT HE IS PROPERLY REGISTERED TO DO THIS WORK IN THE STATE AND/OR COUNTY IN WHICH IT IS TO BE PERFORMED.
- THE GENERAL NOTES AND TYPICAL DETAILS ARE APPLICABLE TO ALL PARTS OF THE STRUCTURE AND SHALL BE READ IN CONJUNCTION WITH THE STRUCTURAL DRAWINGS AND PROJECT SPECIFICATIONS.
- THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING APPROVALS FROM ALL AUTHORITIES HAVING JURISDICTION FOR THIS PROJECT AND SHALL NOTIFY THE APPLICABLE JURISDICTIONAL (STATE, COUNTY, OR CITY) ENGINEER 24 HOURS PRIOR TO THE BEGINNING OF CONSTRUCTION.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ABIDING BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.
- ERECT GUARDS AND BARRIERS PER APPLICABLE LABOR AND CONSTRUCTION SAFETY REGULATIONS.
- VERIFY ALL DIMENSIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER OF RECORD BEFORE PROCEEDING WITH THE WORK. ANY AND ALL FIELD CHANGES SHALL BE APPROVED AND DOCUMENTED BY THE (EOR) PRIOR TO FIELD IMPLEMENTATION.
- ALL MATERIALS AND WORKMANSHIP SHALL BE WARRANTIES FOR TWO (2) YEARS FROM THE DATE OF COMPLETED CONSTRUCTION.
- USE ONLY THE LATEST ISSUES OF ANY APPLICABLE CODES, STANDARDS, OR REGULATIONS MENTIONED IN THE FOLLOWING NOTES AND SPECIFICATIONS UNO.
- ALL WORKMANSHIP SHALL BE IN ACCORDANCE WITH ANSI, ASTM, ACI, TIA, AND AISC STANDARDS AS REFERENCED IN THE APPLICABLE CODE.
- STRUCTURAL ELEMENTS SHOWN ON THESE DRAWINGS ARE DESIGNED IN ACCORDANCE WITH APPLICABLE BUILDING CODES/STANDARDS. ALL CONSTRUCTION, EXCEPT WHERE NOTED OTHERWISE, SHALL COMPLY WITH THOSE CODES/STANDARDS.
- ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS, AND IN CONFORMANCE WITH THE DRAWINGS. ANY AND ALL SUBSTITUTIONS MUST BE DULY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND DESIGN ENGINEER PRIOR TO FABRICATION AND INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF THE MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
- ALL MANUFACTURER'S HARDWARE ASSEMBLY INSTRUCTIONS SHALL BE FOLLOWED EXACTLY AND SHALL SUPERSEDE ANY CONFLICTING NOTES ENCLOSED HEREIN.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS ALSO RESPONSIBLE FOR ENSURING THAT ALL CONSTRUCTION PROCEDURES MEET THE REQUIREMENTS OF OSHA, THE OWNER, AND ALL OTHER APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY REGULATIONS.
- ACCESS TO THE PROPOSED WORK SITE MAY BE RESTRICTED. THE CONTRACTOR SHALL COORDINATE INTENDED CONSTRUCTION ACTIVITY, INCLUDING WORK SCHEDULE AND MATERIAL ACCESS, WITH THE RESIDENT LEASING AGENT.
- IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO SAFEGUARD ALL EXISTING STRUCTURES OR BURIED SERVICES AFFECTED BY THIS CONSTRUCTION. CONTRACTOR IS ALSO RESPONSIBLE FOR TEMPORARILY RELOCATING ANY LINES OR STRUTS AS NECESSARY TO COMPLETE THE REQUIRED WORK.
- STRUCTURAL DESIGN IS FOR THE COMPLETE CONDITION ONLY. THE CONTRACTOR MUST BE COGNIZANT THAT THE REMOVAL OF ANY STRUCTURAL COMPONENT OF AN EXISTING TOWER HAS THE POTENTIAL TO CAUSE THE PARTIAL OR COMPLETE COLLAPSE OF THE STRUCTURE. ALL NECESSARY PRECAUTIONS MUST BE TAKEN TO ENSURE STRUCTURAL INTEGRITY, INCLUDING, BUT NOT LIMITED TO, ENGINEERING ASSESSMENT OF CONSTRUCTION STRESSES WITH INSTALLATION MAXIMUM WIND SPEED AND/OR TEMPORARY BRACING AND SHORING.
- DO NOT SCALE DRAWINGS
- THE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN CASTLE. THEY MAY NOT BE REPRODUCED IN ANY FORM WITHOUT THE EXPRESSED WRITTEN CONSENT/PERMISSION OF CROWN CASTLE.
- FOR THIS ANALYSIS AND REINFORCEMENT, THE TOWER HAS BEEN ASSUMED TO BE IN GOOD CONDITION WITHOUT ANY DEFECTS. IF THE CONTRACTOR DISCOVERS ANY INDICATION OF AN EXISTING STRUCTURAL DEFECT, CONTACT THE ENGINEER OF RECORD IMMEDIATELY.
- MODIFICATION WORK SHALL BE COMPLETED IN CALM WIND CONDITIONS / OR APPROPRIATE WIND SPEED FOR THE TYPE OF MODIFICATION WORK TO BE INSTALLED.

GUY WIRE TENSIONING (FOR GUYED TOWERS ONLY):


- THE GENERAL CONTRACTOR SHALL TENSION THE GUY WIRES TO WITHIN A RANGE FROM THE TARGET TENSION TO +/- 10% OF THE TARGET TENSION FOR GUY WIRES < 1" AND WITHIN +/- 5% FOR GUY WIRES > 1" IN DIAMETER. THE GENERAL CONTRACTOR SHOULD TENSION TO THE UPPER 75TH PERCENTILE OF THE LIMITS.
- ALL GUY WIRE TENSION MUST BE PERFORMED IN ACCORDANCE WITH CROWN DOCUMENT ENG-FRM-10156 GUY TENSION TOOL (LATEST VERSION) SUPPLY ALL GUY TENSION REPORTS IN THIS FORMAT.

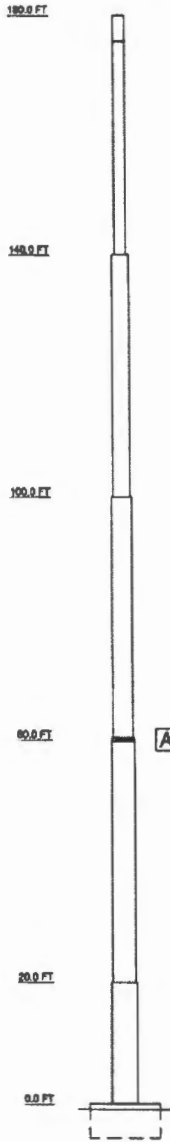
STRUCTURAL STEEL NOTES:

- DESIGN, FABRICATION, AND ERECTION SHALL CONFORM TO ANSI/AIA-222-G STANDARDS FOR STEEL, ANTENNA SUPPORTING, STRUCTURES, AND AISC-15TH ED.-2005, UNO.
- ALL STRUCTURAL STEEL IS TO BE NEW AND CONFORM TO THE FOLLOWING -ASTM A58 GR. 36 (MIN. YIELD 36 KSI) UNO.
- ALL BOLTS SHALL BE HOT DIPPED GALVANIZED ASTM A325 ASSEMBLIES, TO INCLUDE BOLT, HEAVY HEX HEAD NUT AND SPLIT LOCKWASER, UNO. BOLT THREADS ARE TO BE EXCLUDED FROM THE SHEARING PLANES. USE BLASING TYPE CONNECTIONS, TIGHTEN TO A SHUS TIGHT CONDITION UNO.
- DRILL NO HOLES IN ANY NEW OR EXISTING STRUCTURAL STEEL MEMBERS OTHER THAN THOSE SHOWN ON STRUCTURAL DRAWINGS WITHOUT THE APPROVAL OF THE ENGINEER OF RECORD.
- ALL EXPOSED EXTERIOR STRUCTURAL STEEL (INCLUDING BOLTS, LOCK WASHERS, PINS, ETC.) SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM A123 AND A123. FOR ALL FABRICATED WELDED ASSEMBLIES TO BE HOT DIPPED GALVANIZED, PROVIDE WELDS ALL AROUND OR ADD SEAL WELDS WHERE STRUCTURAL WELDS ARE NOT SPECIFIED.
- WHERE SPECIFIED, THE SEALANT BETWEEN STEEL COMPONENTS IS TO BE SILICONE CAULKING THAT IS EXTERIOR GRADE, ABLE TO BE PAINTED, AND ACCEPTABLE TO THE ENGINEER OF RECORD.
- FOR A LIST OF CROWN APPROVED COLD GALVANIZING COMPOUNDS, REFER TO CROWN ENG-BUL-10148.

WELDING NOTES:

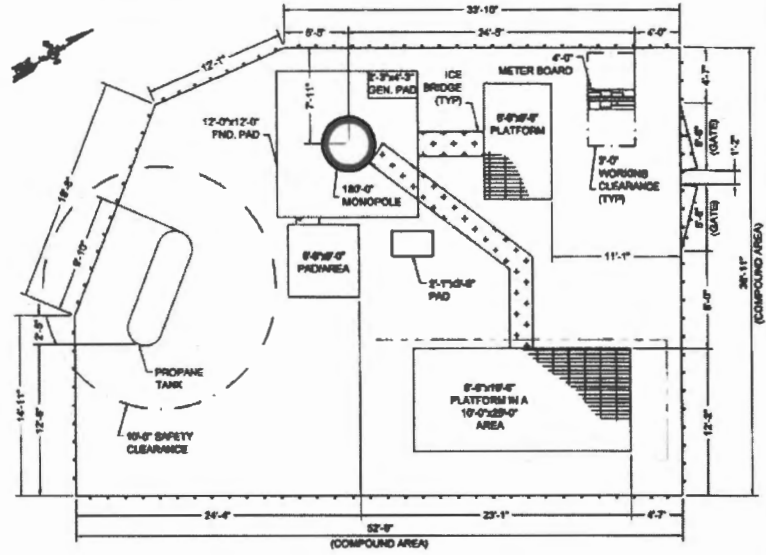
- ALL WELDING SHALL BE CARRIED OUT UNDER GOOD OPERATOR CONDITIONS AS DEFINED IN SECTION 6.12 OF AWS D1.1
- ALL ARC WELDING ON CROWN STRUCTURES SHALL BE DONE IN ACCORDANCE WITH THE CROWN CUTTING AND WELDING PLAN (ENG-FRM-10015) AND AWS D1.1 (LATEST EDITION). THIS SHALL INCLUDE A CERTIFIED WELD INSPECTOR (CWI) FOR ACCEPTANCE OR REJECTION OF ALL WELDING OPERATIONS, PRE-DURING-POST, USING THE ACCEPTANCE CRITERIA OF AWS D1.1. THE CWI SHALL WORK WITH THE GC ON THE LEVEL OF INTERACTION NEEDED TO CONDUCT THE CWI. THE CWI IS THE RESPONSIBILITY OF THE GC.
- THE CERTIFIED WELD INSPECTOR SHALL INDICATE, IN A WRITTEN CWI REPORT, THAT ALL WELDING OPERATIONS, PRE-DURING-POST, WERE CONDUCTED IN ACCORDANCE WITH AWS D1.1 INCLUDING PHOTOGRAPHS AND DOCUMENTATION SUPPORTING THE ACCEPTANCE OR REJECTION OF ALL WELDING. FOR INFORMATION, SEE ENG-STD-10066: QC INSPECTION STANDARD FOR FABRICATION AND FIELD WELDING OF STRUCTURAL STEEL AND ENG-BOW-10007: MODIFICATION INSPECTION SOW. ALL CWI WELD INSPECTION DOCUMENTATION AND PHOTOS SHALL BE SUBMITTED TO THE MI INSPECTOR.
- ALL WELDS ARE MIN. 1/4" FILLET WELDS UNO. ALL WELDS ARE SEAL WELDS. FOR ALL WELDING, USE E70XX ELECTRODES UNO.
- GRIND THE SURFACE ADJACENT TO THE WELD FOR A DISTANCE OF 2" MINIMUM ALL AROUND. ENSURE BOTH AREAS ARE 100% FREE OF ALL GALVANIZING SURFACES TO BE WELDED SHALL BE FREE FROM SCALE, SLAG, RUST, MOISTURE, GREASE OR ANY OTHER FOREIGN MATERIAL THAT WOULD PREVENT PROPER WELDING.
- AFTER FINAL INSPECTION, THE AREA OF THE WELDS, THE INSTALLATION AND ALL SURFACES DAMAGED BY WELDING OR GRINDING SHALL BE CLEANED AND COLD GALVANIZED PAINTED IN ACCORDANCE WITH ENG-BUL-10148 COLD GALVANIZING COMPOUNDS. PHOTO DOCUMENTATION IS REQUIRED TO BE SUBMITTED TO THE MI INSPECTOR.
- WHERE ACCESS PERMITS, THE INTERIOR OF THE MONOPOLE SHAFTS, IN ANY AREA AFFECTED BY ANY WELDING, SHALL BE CLEANED AND COLD GALVANIZED PAINTED IN ACCORDANCE WITH ENG-BUL-10148 COLD GALVANIZING COMPOUNDS. PHOTO DOCUMENTATION IS REQUIRED TO BE SUBMITTED TO THE MI INSPECTOR. AEROSOL CANS MAY BE ALLOWED IF ACCESS IS DIFFICULT.

																															
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<p>STATE OF MAINE AARON C. POOT No. 11012 REGISTERED PROFESSIONAL ENGINEER</p> <p>4/22/12</p>																															
<p>SITE NAME: PORTLAND WARREN AVE BLU NUMBER: 070762 WO NUMBER: 480872 SITE ADDRESS: WARREN AVE PORTLAND, ME 04103 CLATSOP AND COUNTY, USA</p> <p>DRAWN BY: BL DATE: 04/20/12 CHKD BY: MD DATE: 4/22/12 CHKD BY: S DATE: 4/22/12 APPROV BY: APY DATE: 4/22/12</p> <p>SCALE: N.T.S.</p>																															
<p>NOTES</p> <p>S-3</p>																															

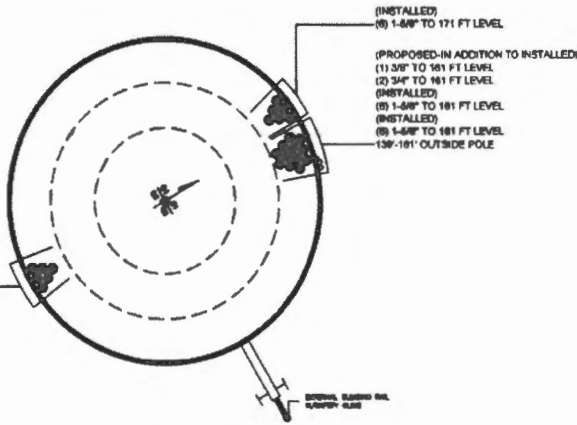


TOWER ELEVATION

TOWER MODIFICATION SCHEDULE			
NO.	HEIGHT (FT)	MODIFICATION	REFERENCE SHEET
A	60	REPLACING (8) 3/4" FLANGE BOLTS	S-4

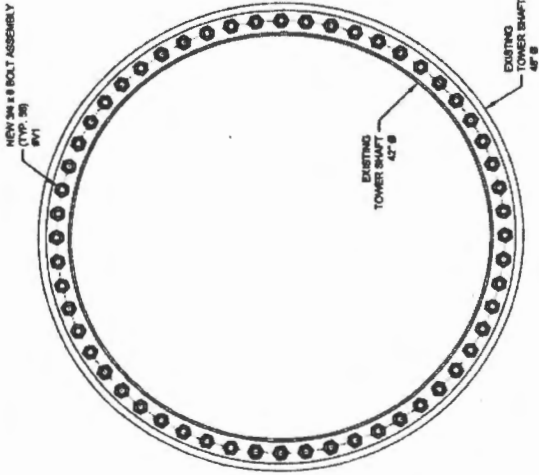


SITE PLAN

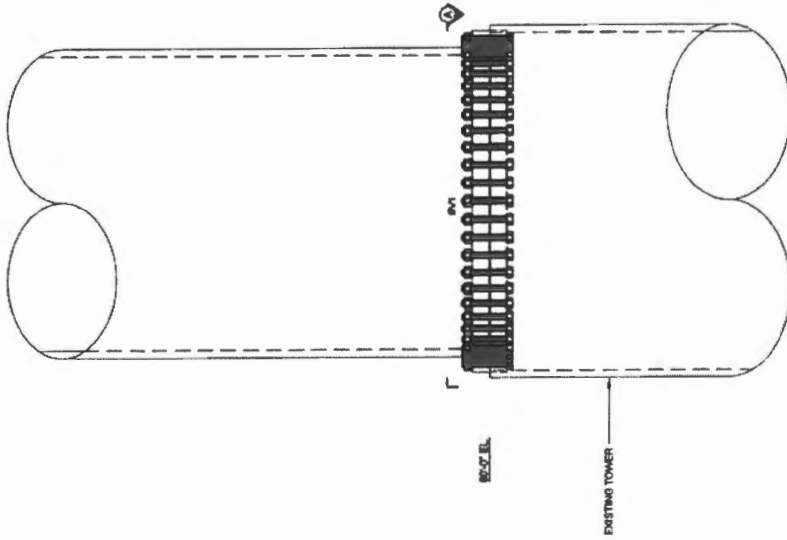


COAX LAYOUT


<small>This drawing is copyrighted and is the sole property of Crown Castle. It is intended solely for use of Crown Castle and its agents, subcontractors or use of this drawing under the restrictive conditions set or permitted through the written permission of Crown Castle.</small>		
NO.	DATE	DESCRIPTION
<small>(SEE ATTACHED FOR REVISIONS LIST)</small>		
		SITE NAME: PORTLAND WARREN AVE BU NUMBER: 67702 WO NUMBER: 66072 SITE ADDRESS: WARREN AVE PORTLAND, ME 04103 CUMBERLAND COUNTY, USA DRAWN BY: BL DATE: 04/20/12 CHKD BY: MD DATE: 4/26/12 CHKD BY: JS DATE: 4/26/12 APPVD BY: ACP DATE: 4/28/12 SCALE: N.T.S.
4/28/12		
ELEVATION & SITE LAYOUT		
S-4		



SECTION A-A



TOP OF TOWER / EXTENSION DETAIL



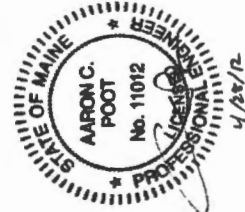
THIS COMPANY IS CONSIDERED AN EQUAL OPPORTUNITY EMPLOYER. ALL EMPLOYEES ARE REQUIRED TO FOLLOW THE COMPANY'S POLICY ON HARASSMENT. THE COMPANY IS NOT RESPONSIBLE FOR THE ACTIONS OF ITS EMPLOYEES OR FOR THE ACTIONS OF ANY INDIVIDUALS WHO MAY BE EMPLOYED BY IT OR FOR THE ACTIONS OF ANY INDIVIDUALS WHO MAY BE EMPLOYED BY IT OR FOR THE ACTIONS OF ANY INDIVIDUALS WHO MAY BE EMPLOYED BY IT.

SITE NAME: PORTLAND
 BU NUMBER: 60002
 NO NUMBER: 60002
 SITE ADDRESS:
 1000 STATE ST
 PORTLAND, ME 04101
 CUMBERLAND COUNTY, USA

DRAWN BY: BL DATE: 6/24/12
 CHECKED BY: MJ DATE: 4/10/12
 APPROVED BY: AS DATE: 4/10/12
 APPROVED BY: AM DATE: 4/12/12
 SCALE: N.T.S.

DETAILS

S-5



PROJECT INFORMATION

SCOPE OF WORK: TELECOMMUNICATIONS FACILITY UPGRADE (LTE):
 1. INSTALL (3) NEW LTE ANTENNAS, (6) RRR'S, SURGE ARRESTOR, (1) FIBER LINE (2) DC POWER LINES & (1) GPS ANTENNA.
 2. INSTALL LTE 6601 CABINET & (1) DC POWER PLANT

SITE ADDRESS: 188 WARREN AVENUE
 PORTLAND, ME 04103

LATITUDE: 43.687531 N 43° 41' 15.11" N
 LONGITUDE: -70.304242 W -70° 18' 15.27" W

CURRENT USE: TELECOMMUNICATIONS FACILITY
 PROPOSED USE: TELECOMMUNICATIONS FACILITY



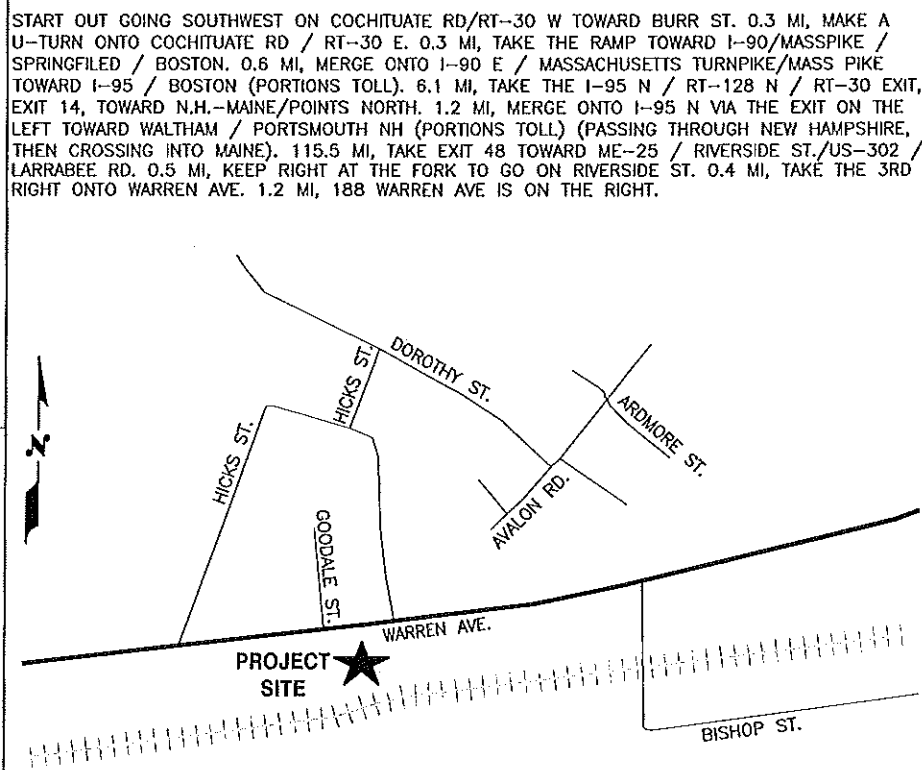
SITE NUMBER: ME5306
SITE NAME: SPRINT PORTLAND

DRAWING INDEX

REV

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VICINITY MAP



GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

CROWN CASTLE SITE ID: 878782
SITE NAME: PORTLAND WARREN AVE.

CALL
 BEFORE YOU DIG
 CALL TOLL FREE 800-922-4455

UNDERGROUND SERVICE ALERT

 1620 OLSGOD STREET SUITE 402 NORTH BOSTON TEL: 617-552-5555 FAX: 617-552-5552	 a UniTek GLOBAL SERVICES company 800 MARSHALL PHELPS ROAD UNIT#: 2A WINDSOR, CT 06095	SITE NUMBER: ME5306 SITE NAME: SPRINT PORTLAND CROWN ID: 878782 188 WARREN AVENUE PORTLAND, ME 04103 CUMBERLAND COUNTY	 550 COCHITUATE ROAD FRMINGHAM, MA 01701	3 06/06/12 CONSTRUCTION REVISED DD DC DPH	AT&T TITLE SHEET (LTE)
				2 04/02/12 CONSTRUCTION REVISED HC DC DPH	

GROUNDING NOTES

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTNING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS 2 AWG STRANDED COPPER FOR OUTDOOR BTS.
6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWS COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE 1/2" OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID TINNED COPPER GROUND WIRE, PER NEC 250.50

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
 CONTRACTOR - NEXLINK
 SUBCONTRACTOR - GENERAL CONTRACTOR (CONSTRUCTION)
 OWNER - AT&T MOBILITY
 2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.
 3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
 4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
 5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
 6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
 7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
 8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
 9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.
 10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
 11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
 12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
 13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.
 14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
 15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
 16. CONSTRUCTION SHALL COMPLY WITH UMS SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."
 17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
 18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
 19. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.
 20. APPLICABLE BUILDING CODES:
 SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.
 BUILDING CODE: IBC 2009
 ELECTRICAL CODE: REFER TO ELECTRICAL DRAWINGS
 LIGHTENING CODE: REFER TO ELECTRICAL DRAWINGS
- SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:
- AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;
 - AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) MANUAL OF STEEL CONSTRUCTION, ASD, NINTH EDITION;
 - TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-G, STRUCTURAL STANDARDS FOR STEEL
 - ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES; REFER TO ELECTRICAL DRAWINGS FOR SPECIFIC ELECTRICAL STANDARDS.
- FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

ABBREVIATIONS

AGL	ABOVE GRADE LEVEL	G.C.	GENERAL CONTRACTOR	RF	RADIO FREQUENCY
AWG	AMERICAN WIRE GAUGE	MGB	MASTER GROUND BUS		
BCW	BARE COPPER WIRE	MIN	MINIMUM	TBD	TO BE DETERMINED
BTS	BASE TRANSCIVER STATION	PROPOSED	NEW	TBR	TO BE REMOVED
EXISTING	EXISTING	N.T.S.	NOT TO SCALE	TBRR	TO BE REMOVED AND REPLACED
EG	EQUIPMENT GROUND	REF	REFERENCE	TYP	TYPICAL
EGR	EQUIPMENT GROUND RING	REQ	REQUIRED		

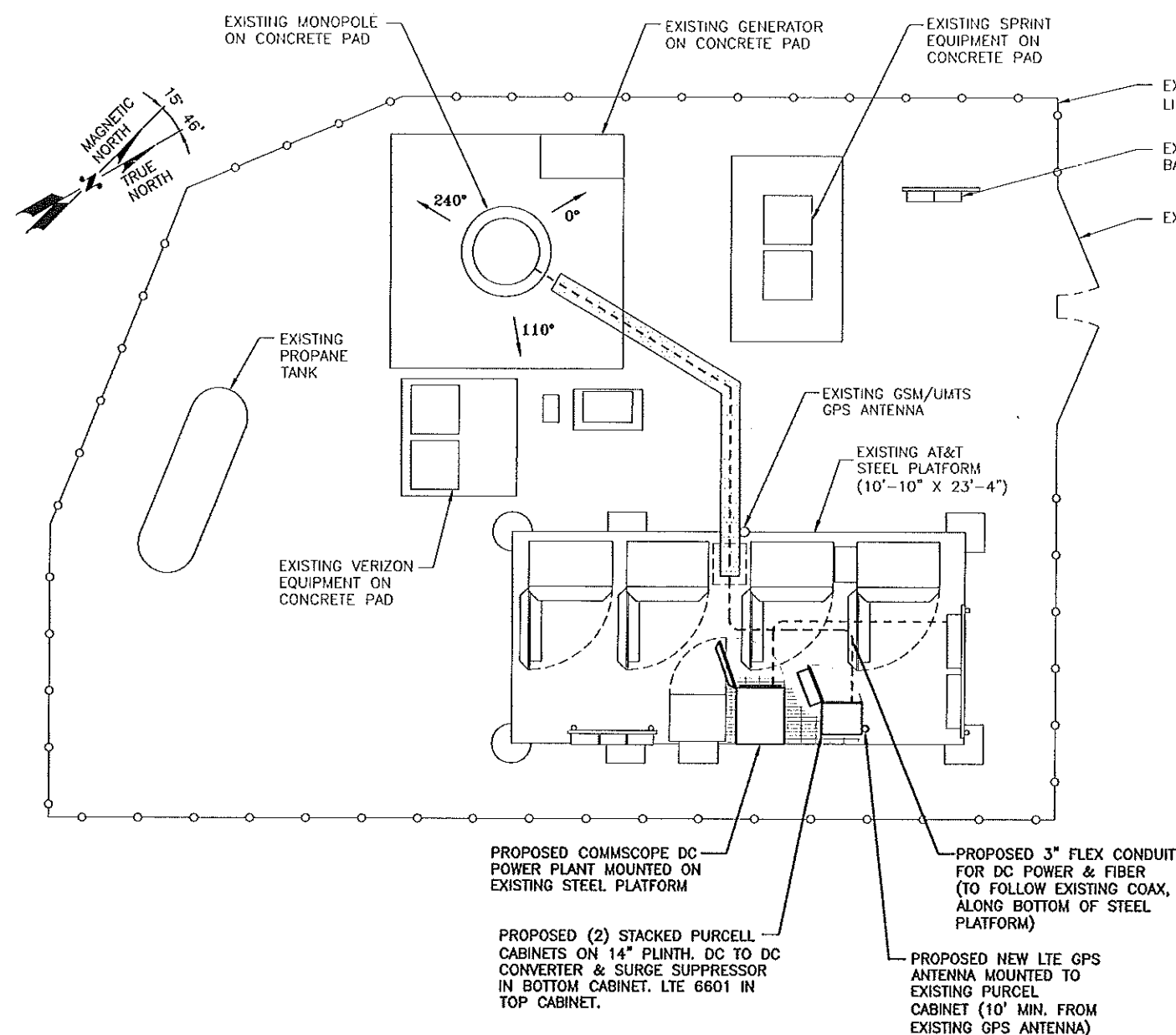
1230 OREGON STREET
 ELLENBURG, NORTH CAROLINA 27624
 TEL: 703-574-1111
 FAX: 703-574-1112

a UniTek GLOBAL SERVICES company
 800 MARSHALL PHELPS ROAD UNIT#: 2A
 WINDSOR, CT 06095

SITE NUMBER: ME5306
SITE NAME: SPRINT PORTLAND
CROWN ID: 878782
 188 WARREN AVENUE
 PORTLAND, ME 04103
 CUMBERLAND COUNTY

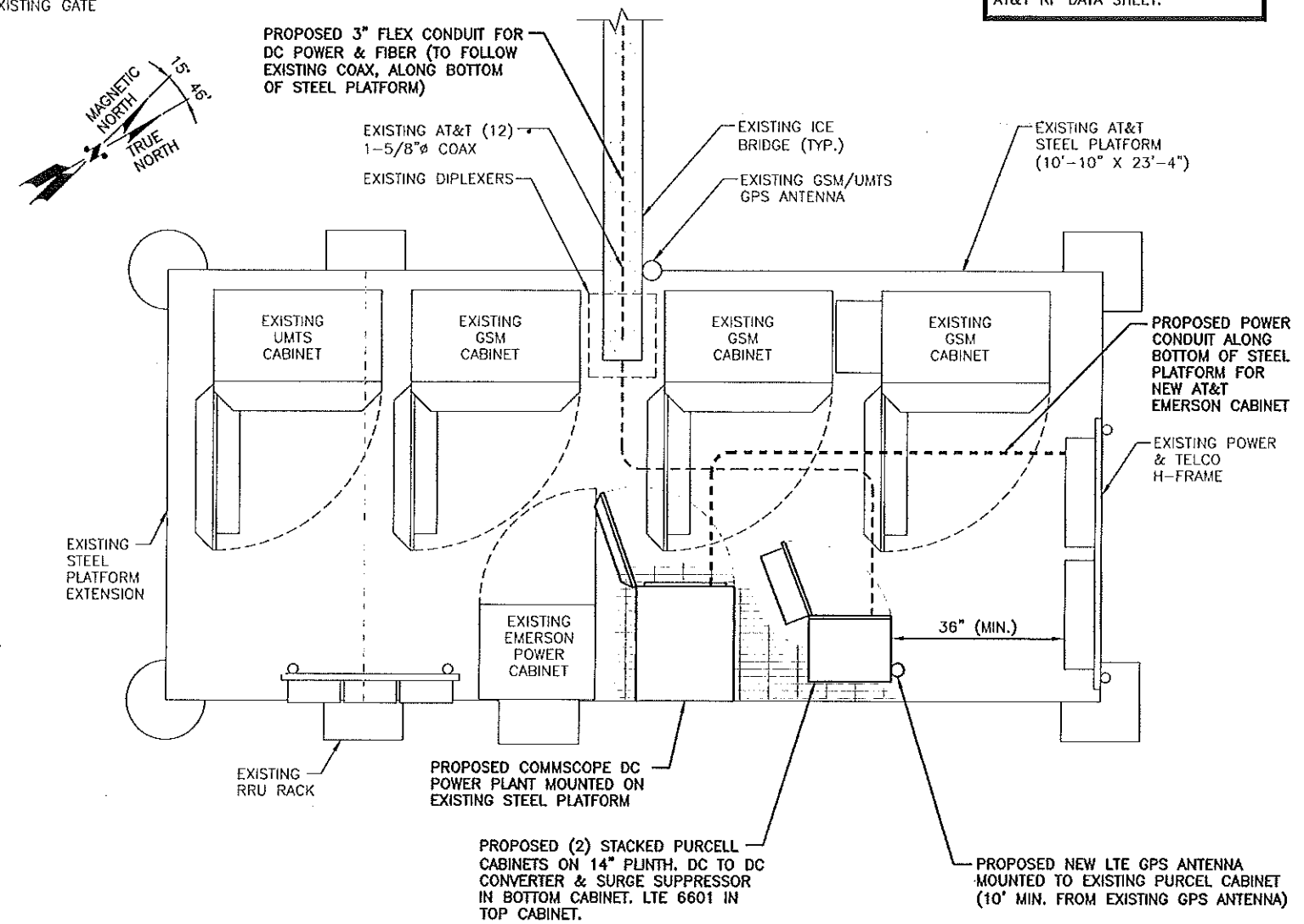
550 COCHITUATE ROAD
 FRMINGHAM, MA 01701

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2	04/02/12	CONSTRUCTION REVISED	HC	DC	DPH		
1	02/24/12	ISSUED FOR CONSTRUCTION	HC	DC	DPH		
0	02/06/12	ISSUED FOR REVIEW	HC	DC	DPH		
NO.	DATE	REVISIONS	BY	CHK	APP'D		
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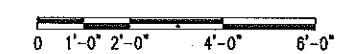
COMPOUND PLAN

SCALE: 1/4"=1'-0"



EQUIPMENT PLAN

SCALE: 1/2"=1'-0"



NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:
ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE AND FINAL AT&T RF DATA SHEET.

Hudson
TELECOMMUNICATIONS
100 GOSWOLD STREET
BURLINGTON, NH 03401
TEL: (603) 863-5552
FAX: (603) 863-5552

NEXLINK
GLOBAL SERVICES
a UniTek GLOBAL SERVICES company
800 MARSHALL PHELPS ROAD UNIT#: 2A
WINDSOR, CT 06095

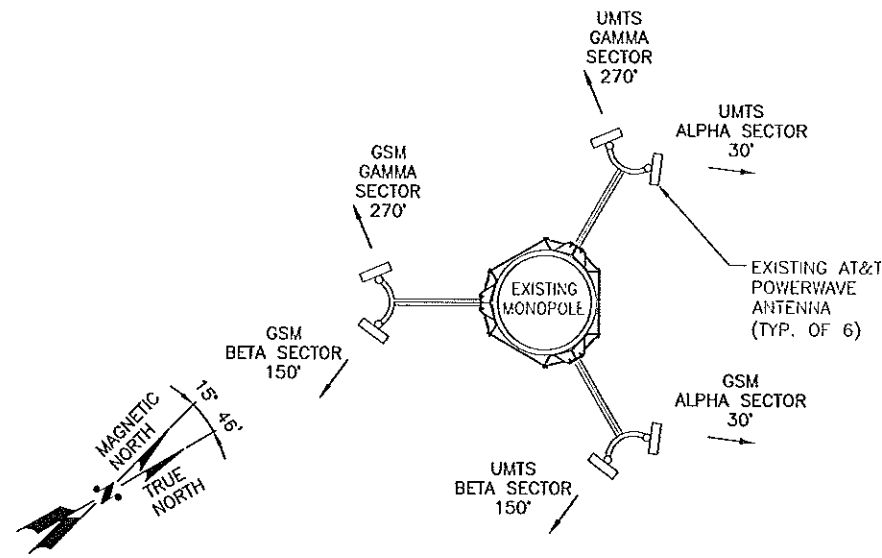
SITE NUMBER: ME5306
SITE NAME: SPRINT PORTLAND
CROWN ID: 878782
188 WARREN AVENUE
PORTLAND, ME 04103
CUMBERLAND COUNTY

at&t
550 COCHITUATE ROAD
FRMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
3	06/06/12	CONSTRUCTION REVISED	DD	JRS	DPH
2	04/02/12	CONSTRUCTION REVISED	HC	JRS	DPH
1	02/24/12	ISSUED FOR CONSTRUCTION	HC	DC	DPH
0	02/06/12	ISSUED FOR REVIEW	HC	DC	DPH

SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: HC

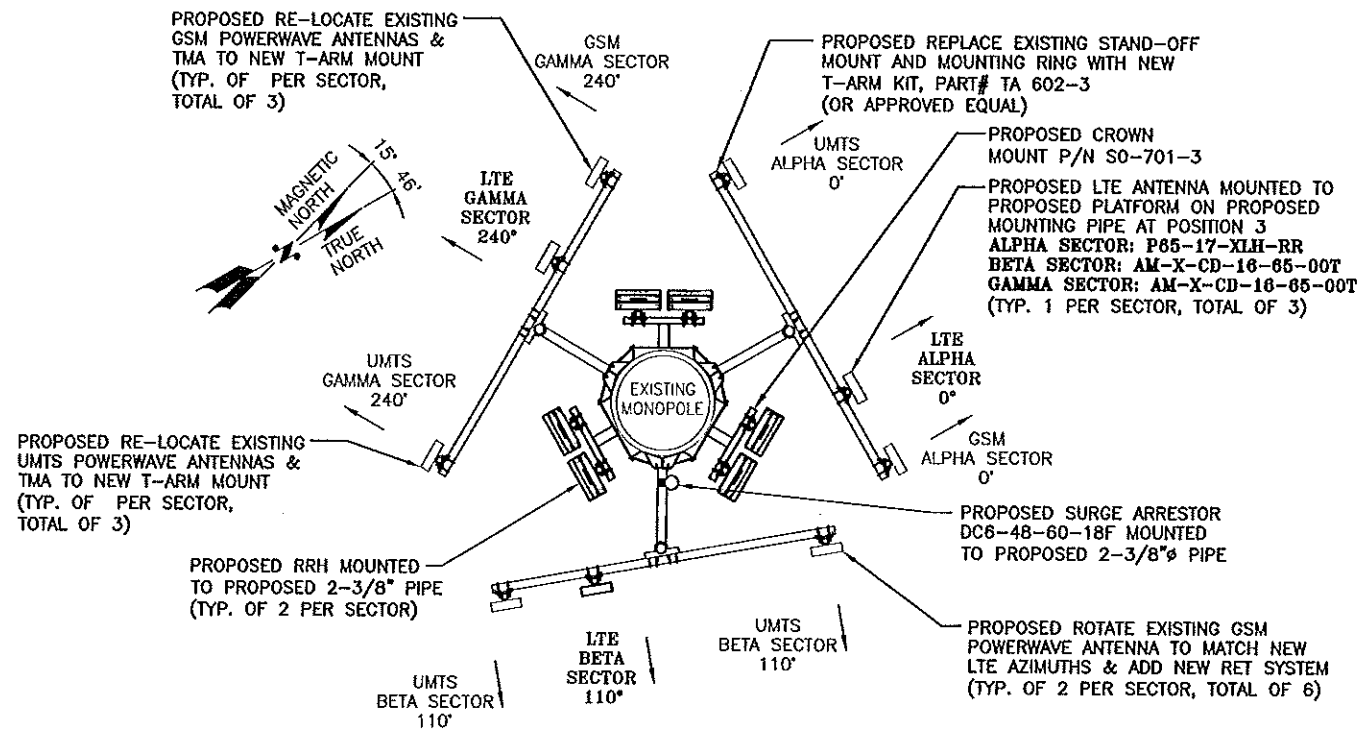
AT&T
COMPOUND AND EQUIPMENT PLAN (LTE)
DRAWING NUMBER: A-1
REV: 3



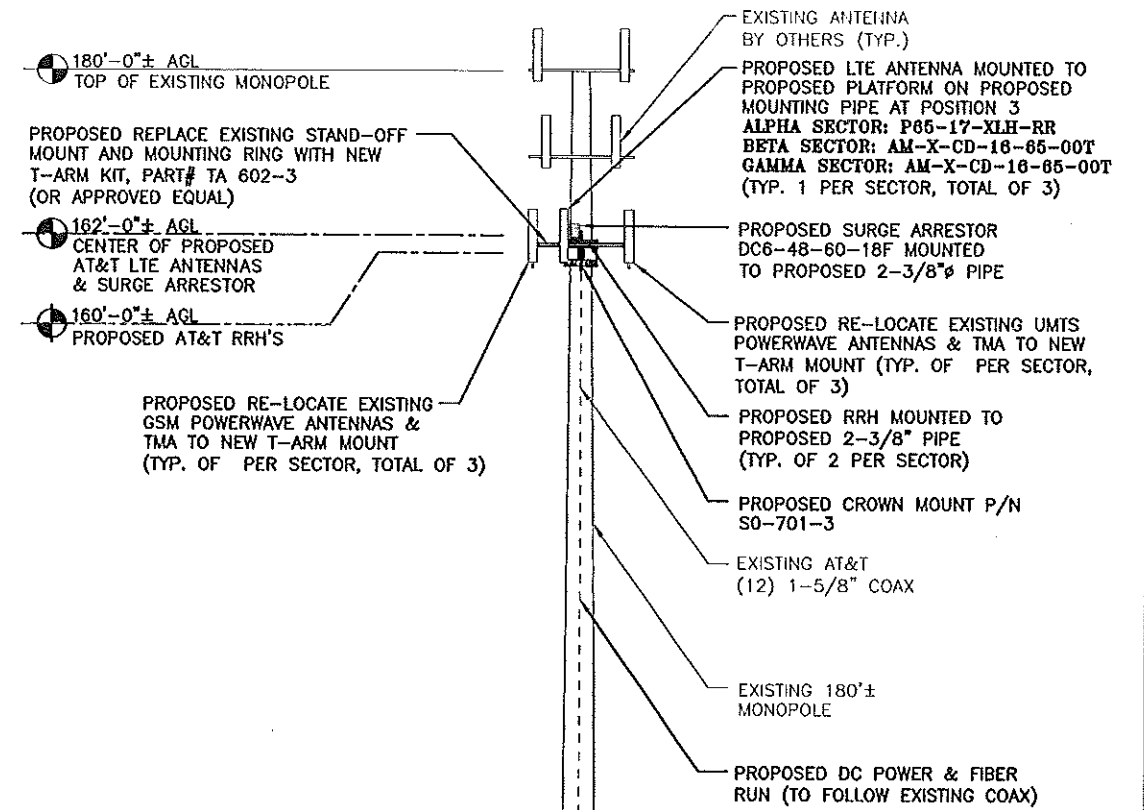
EXISTING GSM/UMTS ANTENNA PLAN
SCALE: N.T.S.

NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:
ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE AND FINAL AT&T RF DATA SHEET.



PROPOSED LTE ANTENNA PLAN
SCALE: N.T.S.



EXISTING ICE BRIDGE WITH (12) LINES OF 1-5/8" COAX

EXISTING GSM/UMTS GPS ANTENNA

EXISTING AT&T EQUIPMENT ON STEEL PLATFORM

PROPOSED NEW LTE GPS ANTENNA MOUNTED TO PROPOSED PURCEL CABINET

PROPOSED (2) STACKED PURCEL CABINETS ON 14" PLINTH.

EXISTING CHAIN LINK FENCE (TYP.)

NORTH ELEVATION
SCALE: 3/32"=1'-0"

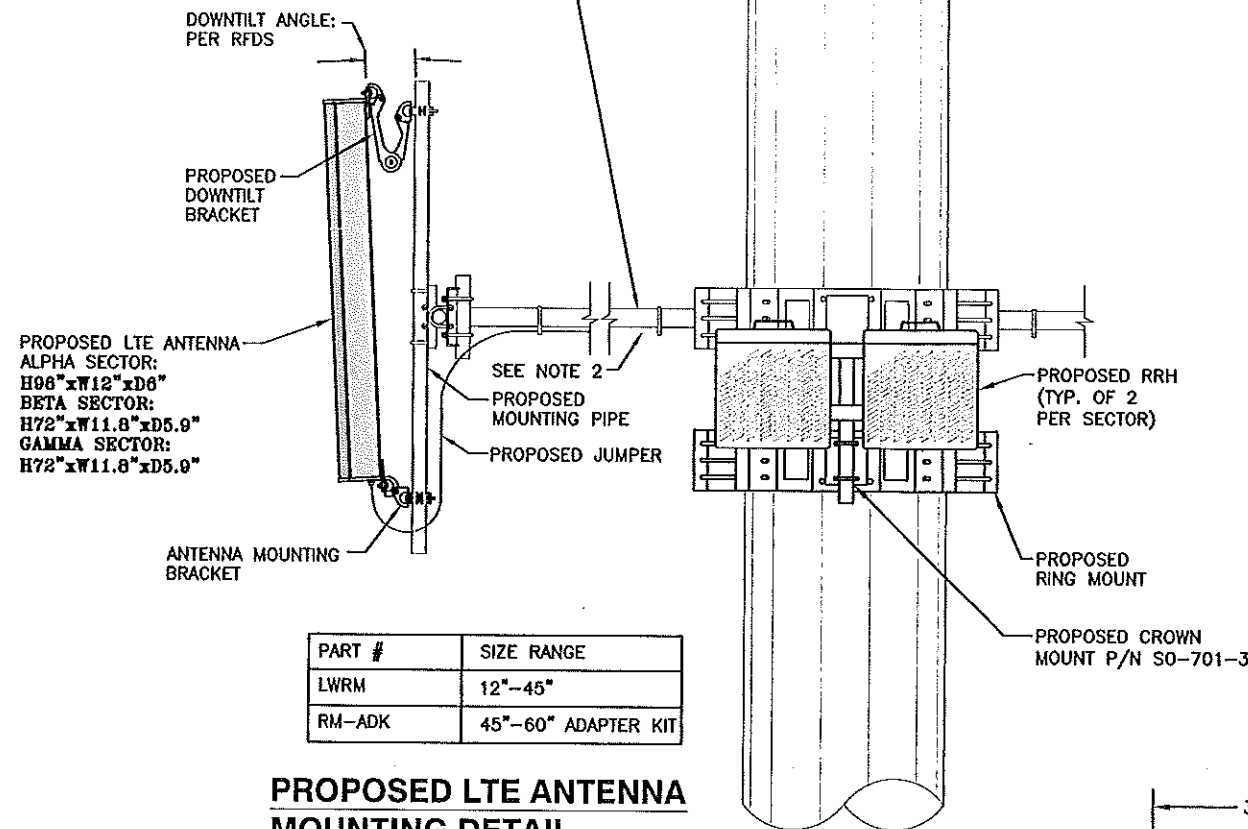


SITE NUMBER: ME5306
SITE NAME: SPRINT PORTLAND
CROWN ID: 878782
188 WARREN AVENUE
PORTLAND, ME 04103
CUMBERLAND COUNTY



3	06/06/12	CONSTRUCTION REVISED	DD	JG	DPH	AT&T ANTENNA PLAN & ELEVATION (LTE)
2	04/02/12	CONSTRUCTION REVISED	HC	EG	DPH	
1	02/24/12	ISSUED FOR CONSTRUCTION	HC	DC	DPH	
0	02/06/12	ISSUED FOR REVIEW	HC	DC	DPH	
NO.	DATE	REVISIONS	BY	CHK	APP'D	
SCALE: AS SHOWN		DESIGNED BY: DC	DRAWN BY: HC		PROJECT NO: ME5306.01	DRAWING NUMBER: A-2

PROPOSED REPLACE EXISTING STAND-OFF MOUNT AND MOUNTING RING WITH NEW T-ARM KIT, PART# TA 602-3 (OR APPROVED EQUAL)



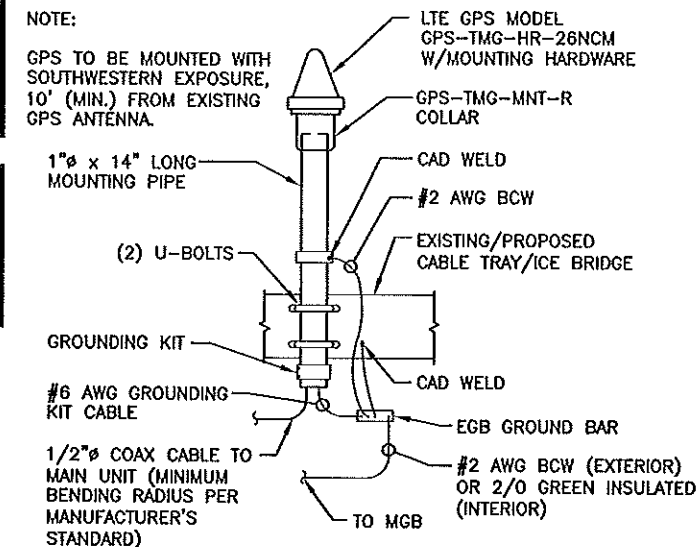
PART #	SIZE RANGE
LWRM	12"-45"
RM-ADK	45"-60" ADAPTER KIT

PROPOSED LTE ANTENNA MOUNTING DETAIL

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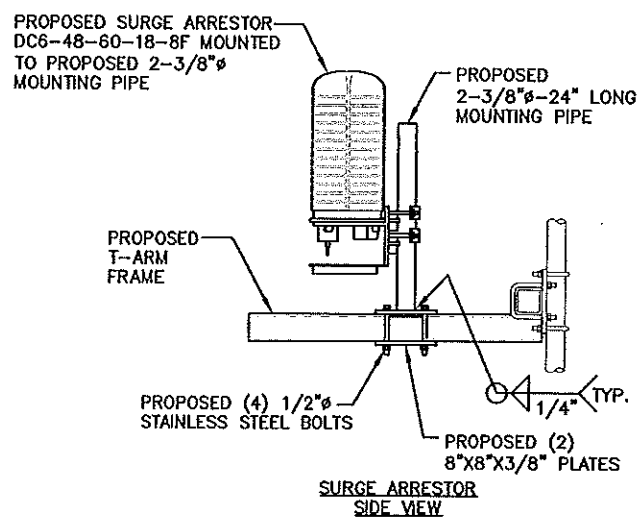
NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:
ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE AND FINAL AT&T RF DATA SHEET.



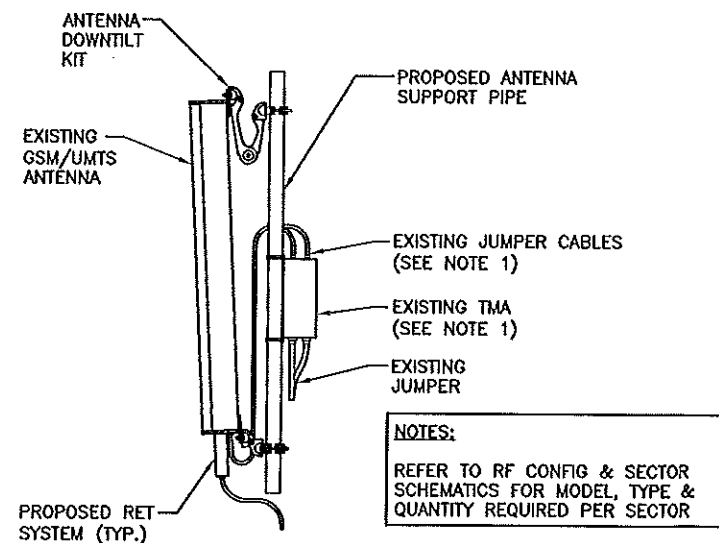
GPS MOUNTING DETAIL

SCALE: N.T.S.



PROPOSED RRH & SURGE ARRESTOR MOUNTING DETAIL

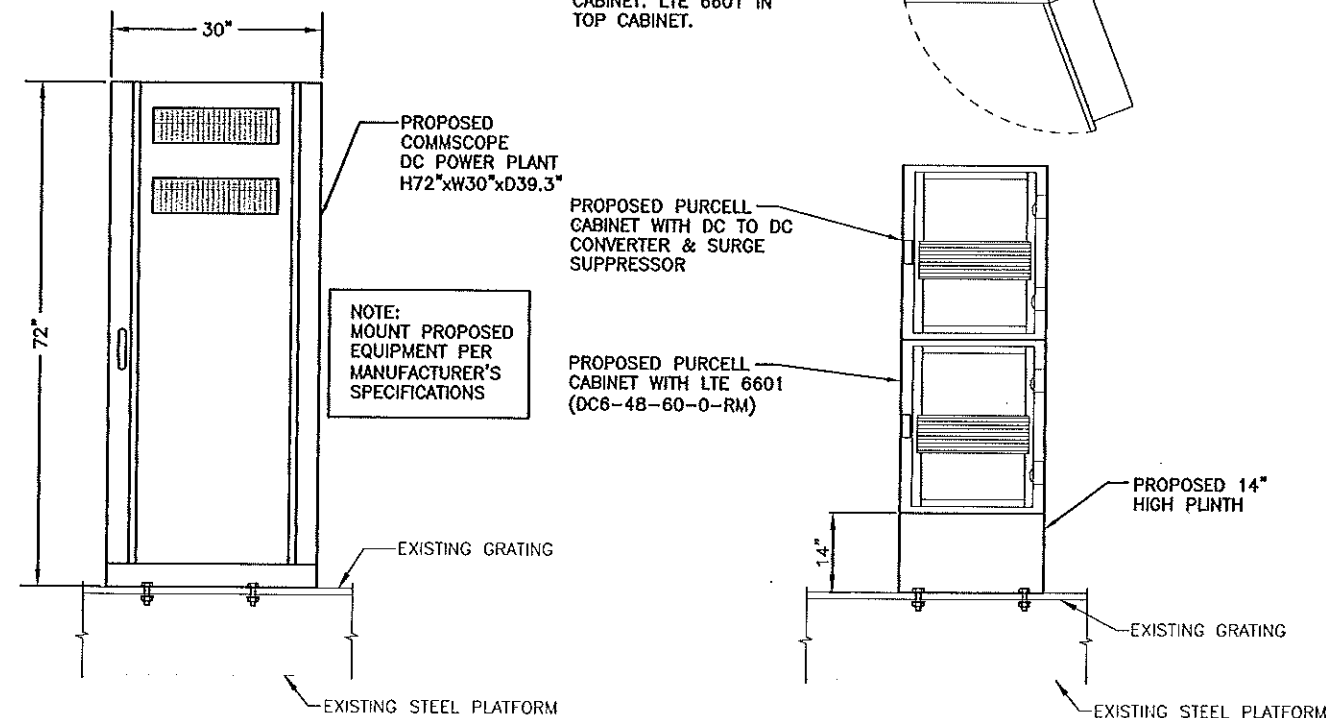
SCALE: N.T.S.



NOTES:
REFER TO RF CONFIG & SECTOR SCHEMATICS FOR MODEL, TYPE & QUANTITY REQUIRED PER SECTOR

PROPOSED UMTS/GSM ANTENNA MOUNTING DETAIL

SCALE: N.T.S.

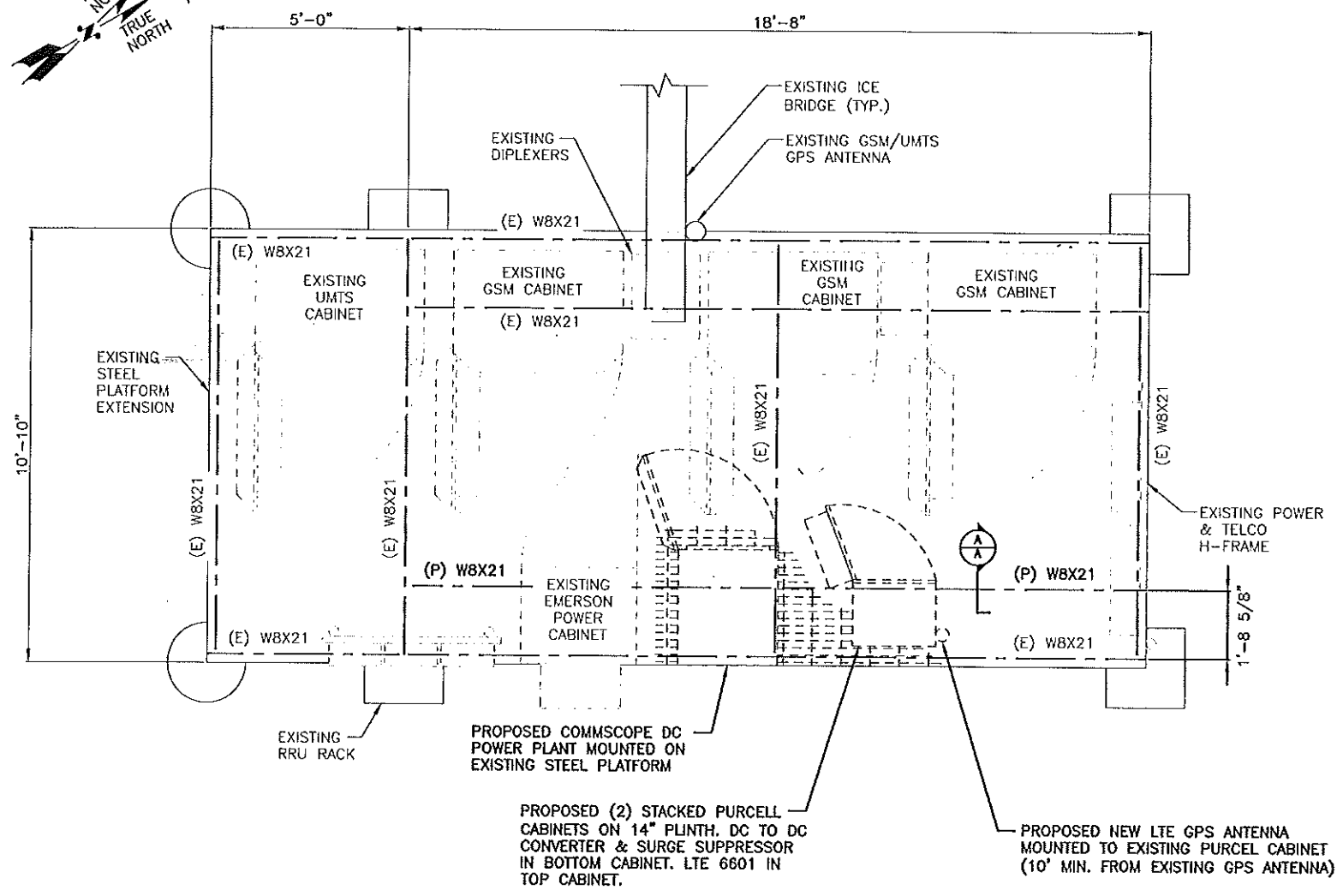
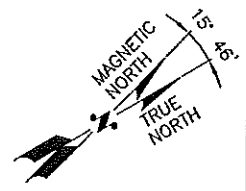


PROPOSED EQUIPMENT MOUNTING DETAIL

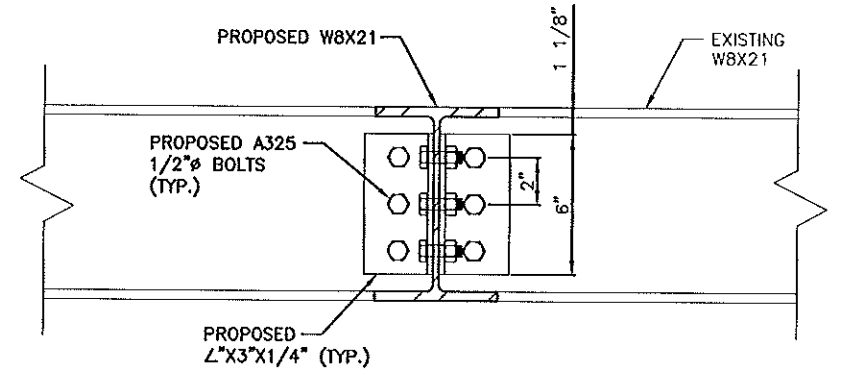
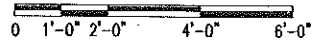
SCALE: N.T.S.

<p>550 COCHITUATE ROAD SUNDERLAND, MA 01968 TEL: (978) 897-8552 FAX: (978) 334-8552</p>	<p>a UniTek GLOBAL SERVICES company 800 MARSHALL PHELPS ROAD UNIT#: 2A WINDSOR, CT 06095</p>	<p>SITE NUMBER: ME5306 SITE NAME: SPRINT PORTLAND CROWN ID: 878782 188 WARREN AVENUE PORTLAND, ME 04103 CUMBERLAND COUNTY</p>	<p>550 COCHITUATE ROAD FRMINGHAM, MA 01701</p>	<table border="1"> <tr> <td>3</td> <td>06/06/12</td> <td>CONSTRUCTION REVISED</td> <td>DD</td> <td>DC</td> <td>DPH</td> </tr> <tr> <td>2</td> <td>04/02/12</td> <td>CONSTRUCTION REVISED</td> <td>HC</td> <td>DC</td> <td>DPH</td> </tr> <tr> <td>1</td> <td>02/24/12</td> <td>ISSUED FOR CONSTRUCTION</td> <td>HC</td> <td>DC</td> <td>DPH</td> </tr> <tr> <td>0</td> <td>02/06/12</td> <td>ISSUED FOR REVIEW</td> <td>HC</td> <td>DC</td> <td>DPH</td> </tr> <tr> <td>NO.</td> <td>DATE</td> <td>REVISIONS</td> <td>BY</td> <td>CHK</td> <td>APP'D</td> </tr> </table> <p>SCALE: AS SHOWN DESIGNED BY: DC DRAWN BY: HC</p>	3	06/06/12	CONSTRUCTION REVISED	DD	DC	DPH	2	04/02/12	CONSTRUCTION REVISED	HC	DC	DPH	1	02/24/12	ISSUED FOR CONSTRUCTION	HC	DC	DPH	0	02/06/12	ISSUED FOR REVIEW	HC	DC	DPH	NO.	DATE	REVISIONS	BY	CHK	APP'D	<p>AT&T</p> <p>DETAILS (LTE)</p> <p>DRAWING NUMBER: A-3</p> <p>REV: 3</p>
3	06/06/12	CONSTRUCTION REVISED	DD	DC	DPH																														
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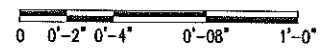
NOTE:
 ALL PROPOSED EQUIPMENT ON EXISTING PLATFORM TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS BY: HUDSON DESIGN GROUP LLC, DATED: FEBRUARY 29, 2012.



PROPOSED PLATFORM REINFORCEMENT PLAN
 SCALE: 1/2"=1'-0"



CONNECTION DETAIL (A-A)
 SCALE: 3"=1'-0"



Hudson
 DESIGN GROUP LLC
 750 GOSWOLD STREET
 SUITE 201 NORTH SUITE 201
 WINDSOR, MA 01095
 TEL: 578-557-5553
 FAX: 578-331-5551

NEXLINK
 GLOBAL SERVICES
 a UniTek GLOBAL SERVICES company
 800 MARSHALL PHELPS ROAD UNIT#: 2A
 WINDSOR, CT 06095

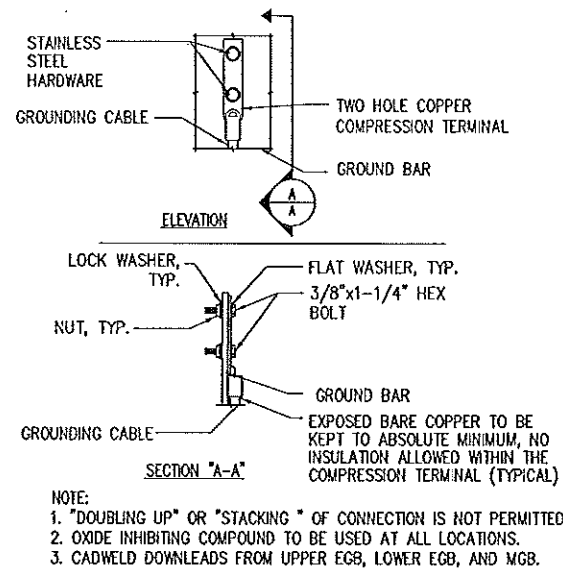
SITE NUMBER: ME5306
SITE NAME: SPRINT PORTLAND
CROWN ID: 878782
 188 WARREN AVENUE
 PORTLAND, ME 04103
 CUMBERLAND COUNTY

at&t
 550 COCHITUATE ROAD
 FRMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
3	06/06/12	CONSTRUCTION REVISED	DD	JG	DPH
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0	02/06/12	ISSUED FOR REVIEW	HC	DC	DPH

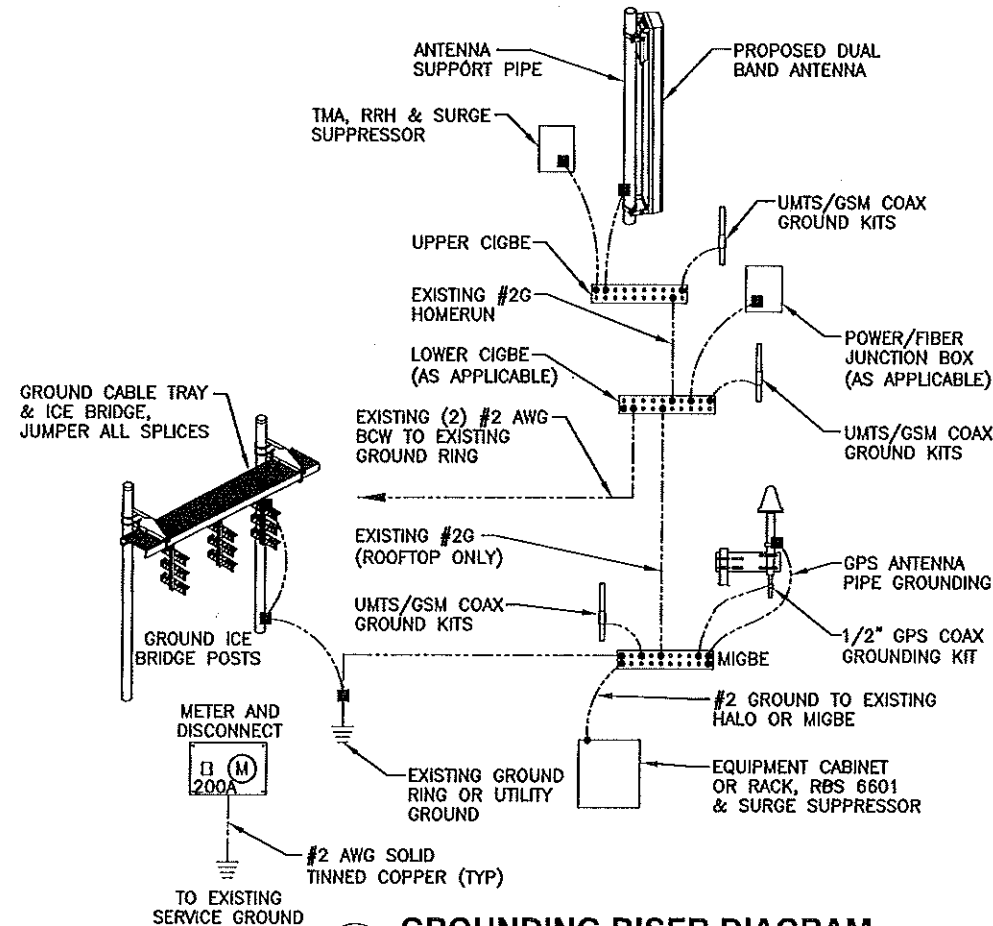
SCALE: AS SHOWN DESIGNED BY: DC DRAWN BY: HC

AT&T
 PLATFORM MODIFICATION PLAN (LTE)
 DRAWING NUMBER: S-108-01 DRAWING NUMBER: S-1
 REV: 3



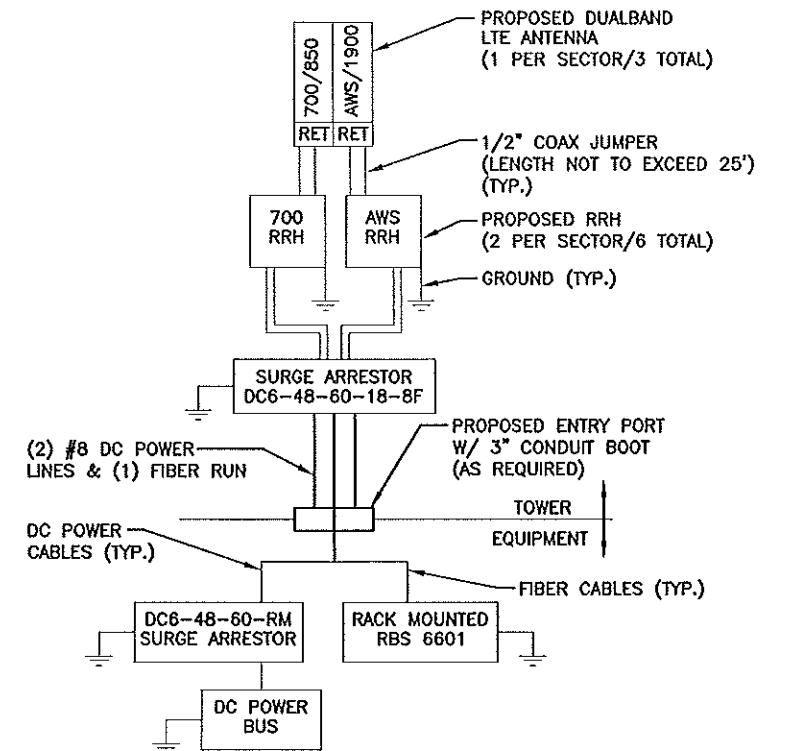
TYPICAL GROUND BAR CONNECTION DETAIL

2
N.T.S.



GROUNDING RISER DIAGRAM

1
N.T.S.



NOTES:

- CONTRACTOR TO CONFIRM ALL PARTS.
- INSTALL ALL EQUIPMENT TO MANUFACTURER'S RECOMMENDATIONS.

4
PLUMBING DIAGRAM
N.T.S.

EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION.

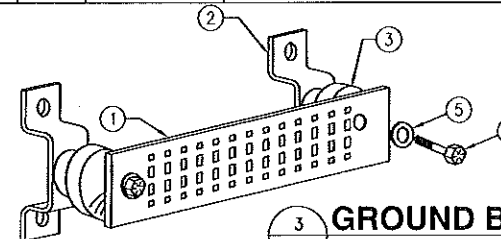
SECTION "P" - SURGE PRODUCERS

- CABLE ENTRY PORTS (HATCH PLATES) (#2)
- GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
- TELCO GROUND BAR
- COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2)
- +24V POWER SUPPLY RETURN BAR (#2)
- 48V POWER SUPPLY RETURN BAR (#2)
- RECTIFIER FRAMES.

SECTION "A" - SURGE ABSORBERS

- INTERIOR GROUND RING (#2)
- EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)
- METALLIC COLD WATER PIPE (IF AVAILABLE) (#2)
- BUILDING STEEL (IF AVAILABLE) (#2)

WIRELESS SOLUTIONS INC.			
NO.	REQ.	PART NO.	DESCRIPTION
①	1	HLGB-0420-IS	SOLID GND. BAR (20"x4"x1/4")
②	2	---	WALL MTG. BRKT.
③	2	---	INSULATORS
④	4	---	5/8"-11x1" H.H.C.S.
⑤	4	---	5/8 LOCKWASHER



3
GROUND BAR - DETAIL
N.T.S.



SITE NUMBER: ME5306
SITE NAME: SPRINT PORTLAND
CROWN ID: 878782
 188 WARREN AVENUE
 PORTLAND, ME 04103
 CUMBERLAND COUNTY



NO.	DATE	REVISIONS	BY	CHK APP'D	REV
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0	02/06/12	ISSUED FOR REVIEW	HC	DC	DPH

SCALE: AS SHOWN DESIGNED BY: DC DRAWN BY: HC

AT&T
 PLUMBING DIAGRAM & GROUNDING DETAILS
 (LTE)
 DRAWING NUMBER: G-1 REV: 3