Centek Engineering, Inc.
3-2 North Branford Road
Branford, Connecticut 06405
Phone: (203) 488-0580
Fax: (203) 488-8587

Steven L. Levine
Real Estate Consultant

HAND DELIVERED

June 30, 2015

Attorney Melanie Bachman
Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

Re: New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 90 Industrial Park Road, Middletown

Dear Ms. Bachman:

In order to accommodate technological changes, implement Uniform Mobile Telecommunications System ("UMTS") and/or Long Term Evolution ("LTE") capabilities, and enhance system performance in the State of Connecticut, New Cingular Wireless PCS, LLC ("AT&T") plans to modify the equipment configurations at many of its existing cell sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, copies of this letter are being sent to the chief elected official of the municipality in which the affected cell site is located, the property owner of record, and the tower owner or operator.

UMTS technology offers services to mobile computer and phone users anywhere in the world. Based on the Global System for Mobile ("GSM") communication standard, UMTS is the planned worldwide standard for mobile users. UMTS, fully implemented, gives computer and phone users high-speed access to the Internet as they travel. They have the same capabilities even when they roam, through both terrestrial wireless and satellite transmissions.

LTE is a high-performance air interface for cellular mobile communications. It is designed to increase the capacity and speed of mobile telephone networks.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in AT&T's operations at the site. Also included is documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration.

The changes to the facility do not constitute modifications as defined in Connecticut General

Statutes ("C.G.S.") Section 16-50i(d) because the general physical and environmental characteristics of the site will not be significantly changed or altered. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. The height of the overall structure will not increase.

2. The proposed changes will not extend the site boundaries.

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

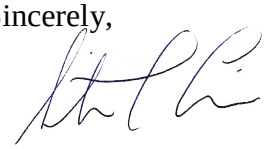
4. The changes will not add radio frequency sending or receiving capability which increases the total radio frequency electromagnetic radiation power density measured at the site boundary to or above the standards adopted by the Federal Communications Commission pursuant to Section 704 of the Telecommunications Act of 1996, as amended, and the State Department of Energy and Environmental Protection, pursuant to Section 22a-162 of the Connecticut General Statutes.

5. The proposed changes will not impair the structural integrity of the facility, as determined in a certification provided by a professional engineer licensed in Connecticut.

For the foregoing reasons, AT&T respectfully submits that the proposed changes at the referenced site constitute exempt modifications under R.C.S.A. Section 16-50j-72(b)(2).

Please feel free to call me at (860) 830-0380 with questions concerning this matter. Thank you for your consideration.

Sincerely,



Steven L. Levine
Real Estate Consultant

cc: TownCEO – Honorable Daniel T. Drew, Mayor, City of Middletown
Property owner of Record – Philip C. Arrmetta
Tower Owner / Operator – Crown Castle (by email)

Attachments

NEW CINGULAR WIRELESS
Equipment Modification

90 Industrial Park Road, Middletown
Site Number 1044
Prior Approvals: Exempt Mods 9/98, 7/02, 1/09, 9/12 (expired), 2/14, and 12/14

Background Note: In **EM-AT&T-083-120827** (acknowledged 9/14/12), New Cingular Wireless ("AT&T") gave notice of its intent to install a single-frequency LTE upgrade at the 90 Industrial Park Road facility. This installation did not occur, and the Council's acknowledgment expired on 9/14/13. Subsequently, **EM-AT&T-083-141208** was submitted (acknowledged 12/29/14) for a dual-frequency LTE upgrade at the site.

While AT&T still intends to install this dual-frequency upgrade at some future date, the work is being deferred. In the interim, AT&T proposes to implement the single-frequency LTE upgrade, and that upgrade is the subject of this Notice of Exempt Modification.

Please note that the present Notice of Exempt Modification submitted for installation of the interim single-frequency LTE upgrade is not intended to substitute for or prejudice the Council's previous acknowledgment of the dual-frequency LTE upgrade in **EM-AT&T-083-141208**. That upgrade is merely being delayed.

Tower Owner/Manager: Crown Castle

Property Owner of Notice: Philip C. Armetta

Lease Area: The 90 Industrial Park Road cell site was originally approved by Middletown planning and zoning authorities in or before 1998. Early site drawings (see SNET's 1998 exempt modification site plan, attached) depict the facility as trapezoidal in shape with an area of approximately 1800 square feet. Comparison with AT&T's current site plan (attached) demonstrates that the area of the site's fenced compound has not changed since that time. Since AT&T's proposed modifications will all take place only on the tower or within AT&T's existing equipment shelter, the proposed modifications will not increase the area of the fenced compound or the overall lease area.

Equipment Configuration: Monopole

Current and/or Approved: Six Powerwave 7770 antennas @ 175 ft c.l.
Six Powerwave TMA's and six Powerwave diplexers @ 175 ft
Twelve runs 1 5/8 inch coax cable
Equipment Shelter

Planned Modifications: Remove Powerwave TMA's and diplexers.
Install three KMW AM-X-CD-16-65-00T-RET antennas @ 175 ft c.l.
Install six CCI TMA's model DTMABP7819VG12A @ 175 ft.
Install six new Powerwave diplexers @ 175 ft.
Install six Ericsson RRUS-11 remote radio heads @ 175 ft.
Install one Raycap DC6-48-60-18-8F surge arrestor @ 175 ft.
Install one fiber and two DC lines.

Power Density:

Worst-case calculations for existing wireless operations at the site indicate a radio frequency electromagnetic radiation power density, measured at ground level beside the tower, of approximately 38.9 % of the standard adopted by the FCC. As depicted in the second table below, the total radio frequency electromagnetic radiation power density following proposed modifications would be approximately 44.1 % of the standard.

Existing

Company	Centerline Ht (feet)	Frequency (MHz)	Number of Channels	Power Per Channel (Watts)	Power Density (mW/cm^2)	Standard Limits (mW/cm^2)	Percent of Limit
Other Users *							33.56
AT&T UMTS	175	1900 Band	2	500	0.0117	1.0000	1.00
AT&T UMTS	175	880 - 894	1	500	0.0059	0.5867	1.00
AT&T GSM	175	1900 Band	2	427	0.0100	1.0000	1.00
AT&T GSM	175	880 - 894	4	296	0.0139	0.5867	2.37
Total							**38.9%**

***** Per CSC records.

Proposed

Company	Centerline Ht (feet)	Frequency (MHz)	Number of Channels	Power Per Channel (Watts)	Power Density (mW/cm^2)	Standard Limits (mW/cm^2)	Percent of Limit
Other Users *							33.56
AT&T LTE	175	734	1	1313	0.0154	0.4893	3.15
AT&T UMTS	175	880 - 894	2	565	0.0133	0.5867	2.26
AT&T UMTS	175	1900 Band	2	875	0.0205	1.0000	2.05
AT&T GSM	175	880 - 894	1	283	0.0033	0.5867	0.57
AT&T GSM	175	1900 Band	4	525	0.0247	1.0000	2.47
Total							**44.1%**

***** Per CSC records

Structural information:

The attached structural analyses and modification inspection report summaries demonstrate that the tower and foundation have adequate structural capacity to accommodate the proposed equipment modifications.

AT&T Single-Frequency LTE Upgrade: Had AT&T installed its single-frequency LTE upgrade before further equipment modifications by other carriers, the August 14, 2013 structural analysis by Paul J. Ford & Company (see attachment) demonstrates that the Middletown tower would have been structurally adequate to support the new equipment following completion of structural modifications. See attached drawings for the Crown Castle "Monopole Reinforcement and Retrofit Project" dated August 14, 2013. AT&T's initial LTE upgrade was not constructed, however, and Verizon Wireless and T-Mobile subsequently proposed and constructed their own equipment modifications. Nonetheless, as demonstrated below, the AT&T structural modifications dated August 14, 2013 have been performed, as have other necessary structural modifications for Verizon's equipment upgrade. Consequently, the tower's structural capacity is adequate to support AT&T's single-frequency LTE upgrade.

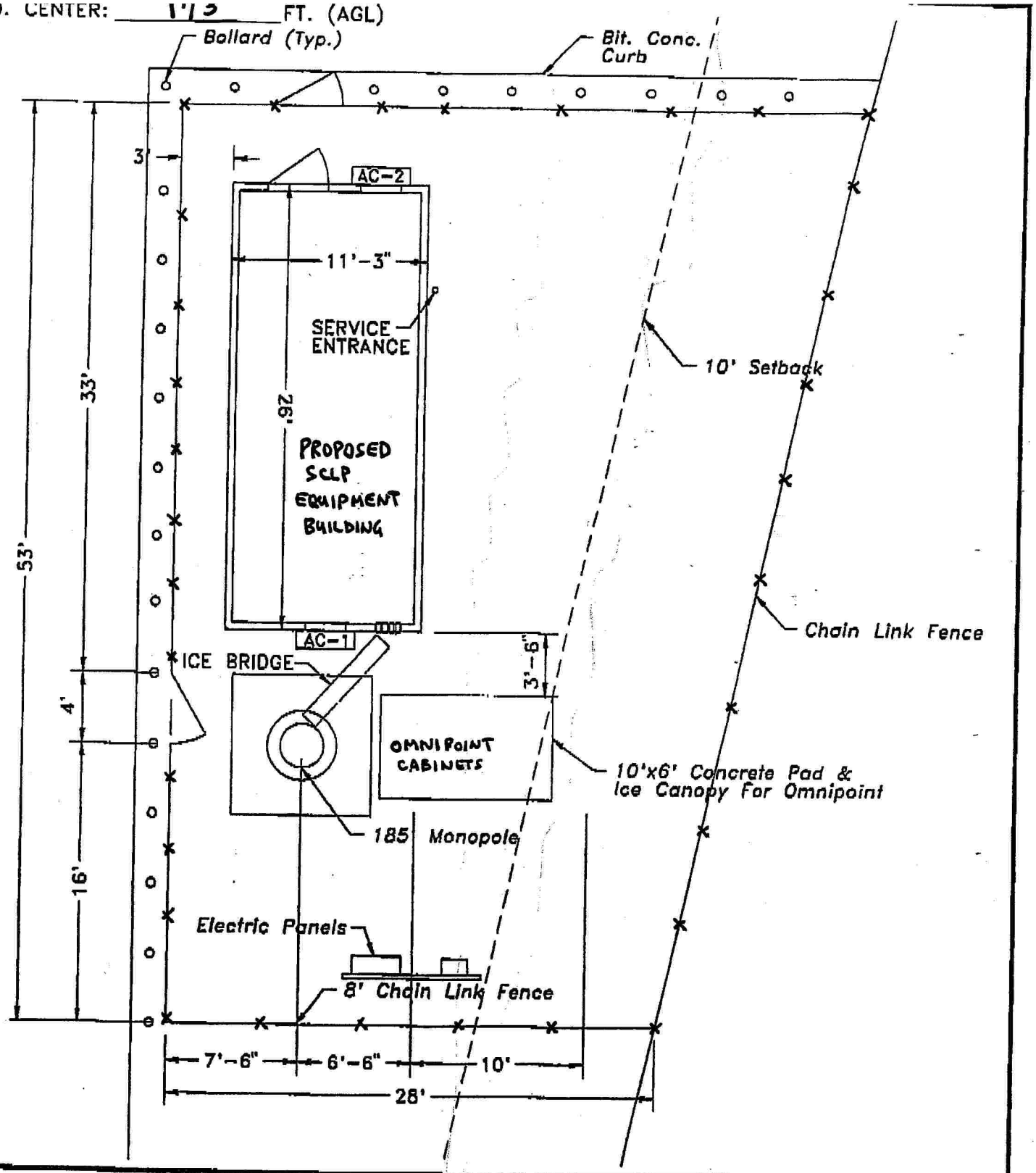
TS-VER-083-140127: Verizon's September 17, 2013 structural analysis conditioned the tower's structural sufficiency upon 1) prior completion of AT&T's tower modifications dated August 14, 2013, and 2) completion of tower modifications pursuant to a Crown Castle "Monopole Reinforcement and Retrofit Project" dated September 17, 2013 (engineer's stamp September 19, 2013). (See attached excerpts.)

EM-T-MOBILE-083-141027: T-Mobile's September 9, 2014 structural analysis carried no new requirements for structural modifications, but it also conditioned the tower's structural adequacy upon prior completion of both AT&T's August 14, 2013 and Verizon's September 17, 2013 structural modifications. (See attached excerpts.)

Modification Inspection Reports: In conjunction with performance of the two required sets of structural modifications, Crown Castle commissioned "Modification Inspection Reports" by Sinnott Gering and Schmitt Towers, INC. The attached excerpt from these reports demonstrate that AT&T's and Verizon's tower modifications, dated August 14, 2013 and September 17, 2013, respectively, were successfully completed. (.Pdf files of the full Modification Inspection reports are being submitted to the Council separately from this Notice of Exempt modification due to their excessive size.)

The 90 Industrial Park Road tower, therefore, has sufficient structural capacity to support AT&T's single-frequency LTE upgrade proposed herein, as well as the 2014 equipment modifications by Verizon and T-Mobile.

As previously noted, AT&T's subsequent CSC-approved dual-frequency LTE upgrade is deferred to a later date.



SNET MOBILITY PRELIMINARY DESIGN EXHIBIT	NORTH	SITE NAME: DAINTY RUBBISH SERVICE	SNET #:
		ADDRESS: 90 INDUSTRIAL PARK RD. MIDDLETOWN, CT 06457	MGI #: 14777
			TASK #: 2049
		DRAWN: GMP / CHECKED: RGT / SCALE: 1/8" = 1'-0"	DATE: 7/8/98

Maguire Group Inc.
Architects · Engineers · Planners
One Court Street
New Britain, Connecticut 06051

SNET

PROJECT INFORMATION

SCOPE OF WORK:	ADD (3) NEW ANTENNAS TO AN EXISTING MONOPOLE. INSTALL FIBER AND POWER CONDUITS, AND INSTALL ADDITIONAL EQUIPMENT INSIDE AN EXISTING SHELTER.
SITE ADDRESS:	90 INDUSTRIAL PARK ROAD MIDDLETOWN, CT 06457
LATITUDE:	42° 35' 8.22" (NAD 83)*
LONGITUDE:	72° 42' 50.34" (NAD 83)* * PER AT&T EXISTING PLANS
JURISDICTION:	CONNECTICUT SITING COUNCIL
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
NAME OF APPLICANT:	AT&T MOBILITY 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067
TOWER OWNER:	N/A
TOWER NUMBER:	N/A

DRAWING INDEX

		REV
T01	TITLE SHEET	3
G01	GENERAL NOTES	3
A01	SITE PLAN & SHELTER LAYOUT	3
A02	ELEVATION & CONSTRUCTION DETAILS	3
E01	GROUNDING DETAILS	3

THIS DOCUMENT WAS DEVELOPED TO REFLECT A SPECIFIC SITE AND ITS SITE CONDITIONS AND IS NOT TO BE USED FOR ANOTHER SITE OR WHEN OTHER CONDITIONS PERTAIN. REUSE OF THIS DOCUMENT IS AT THE SOLE RISK OF THE USER.

STRUCTURAL NOTE:

1. AS REQUIRED THE TIA/EIA 222F – STANDARD, A STRUCTURAL ANALYSIS OF THE TOWER PREPARED BY A LICENSED CONNECTICUT STRUCTURAL ENGINEER CERTIFYING THAT, THE EXISTING TOWER AND ANY REQUIRED IMPROVEMENTS AND REINFORCEMENTS HAVE SUFFICIENT CAPACITY TO SUPPORT ALL EXISTING AND PROPOSED ANTENNAS, SUPPORTS AND APPURTENANCES AND COMPLIES WITH THE CURRENT CONNECTICUT STATE BUILDING CODE AND EIA/TIA CRITERIA. THE CONTRACTOR IS RESPONSIBLE TO CONFIRM THAT ANY IMPROVEMENTS AND REINFORCEMENTS REQUIRED BY THE STRUCTURAL ANALYSIS CERTIFICATION ARE PROPERLY INSTALLED PRIOR TO THE ADDITION OF ANTENNAS, SUPPORTS AND APPURTENANCES PROPOSED ON THESE DRAWINGS OR OTHERWISE NOTED IN THE STRUCTURAL ANALYSIS.

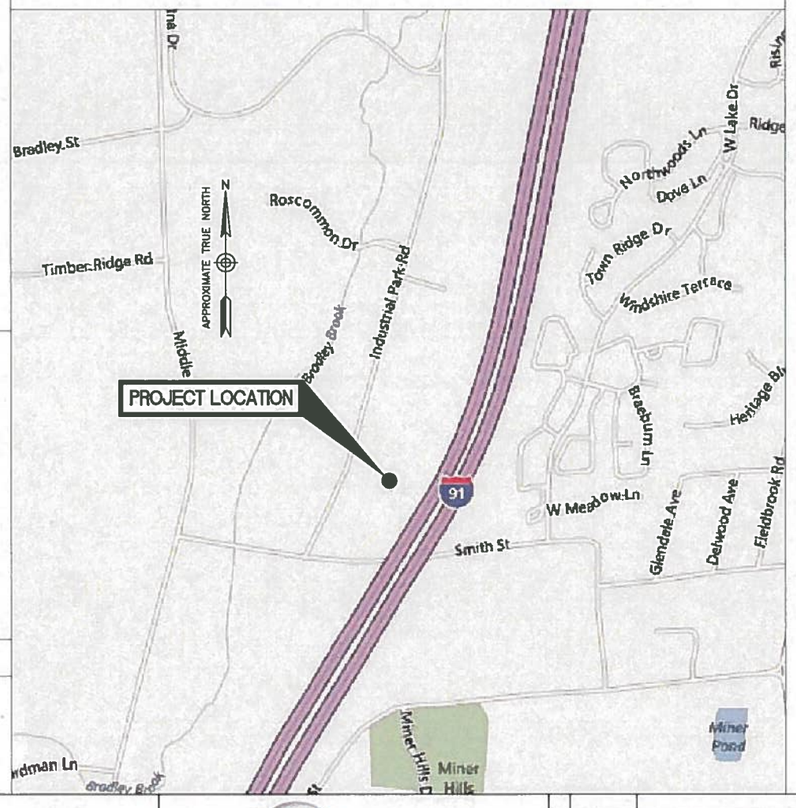
CONTACT INFORMATION

CONTACT	CONTACT	COMPANY	PHONE NO.
ENGINEERING:	GREG H. NAWROTZKI	DEWBERRY	(973) 576-9653
SAC:	CARL AQUILINA	SAI	(603) 560-6185
CONST.:	TBD	SAI	TBD

SITE NAME: CROMWELL EAST
SITE NUMBER: CT1044

VICINITY MAP

DIRECTIONS: (FROM ROCKY HILL, CT) DEPART OLD MAIN STREET TOWARD CHURCH STREET. TURN LEFT ONTO PARSONAGE STREET. BEAR RIGHT ONTO CT-99 / SILAS DEANE HIGHWAY. TAKE RAMP LEFT FOR I-91 SOUTH. AT EXIT 21, TAKE RAMP RIGHT FOR CT-372 TOWARD CROMWELL / BERLIN. BEAR RIGHT ONTO INDUSTRIAL PARK ROAD. THE SITE WILL BE ON THE LEFT.



APPLICABLE BUILDING CODES AND STANDARDS

CONTRACTOR'S WORK SHALL COMPLY WITH PROJECT STANDARD NOTES, SYMBOLS AND DETAILS (SEE DRAWING INDEX FOR STANDARD NOTES AND DETAILS INCLUDED WITH TYPICAL DRAWING PACKAGE). CONTRACTOR 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:
CONNECTICUT STATE BUILDING CODE (2005) & ALL SUBSEQUENT AMENDMENTS

ELECTRICAL CODE:
NATIONAL ELECTRICAL CODE (NEC 2005)

CONTRACTOR'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-F, STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES:
TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS

INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVITY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM
IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT

IEEE C62.41, RECOMMENDED PRACTICES ON SURGE VOLTAGES IN LOW VOLTAGE AC POWER CIRCUITS (FOR LOCATION CATEGORY "C3" AND "HIGH SYSTEM EXPOSURE")

TELCORDIA GR-1503, COAXIAL CABLE CONNECTIONS

ANSI T1.311, FOR TELECOM – DC POWER SYSTEMS – TELECOM, ENVIRONMENTAL PROTECTION

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.

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Dewberry-Goodkind, Inc.
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SUITE 301
PARSIPPANY, NJ 07054
PHONE: 973.739.9400
FAX: 973.739.9710

SAI
500 ENTERPRISE DRIVE,
SUITE 3A
ROCKY HILL, CT 06067

CROMWELL EAST
SITE NO. CT1044

90 INDUSTRIAL PARK ROAD
MIDDLETOWN, CT 06457

at&t
500 ENTERPRISE DRIVE,
SUITE 3A
ROCKY HILL, CT 06067

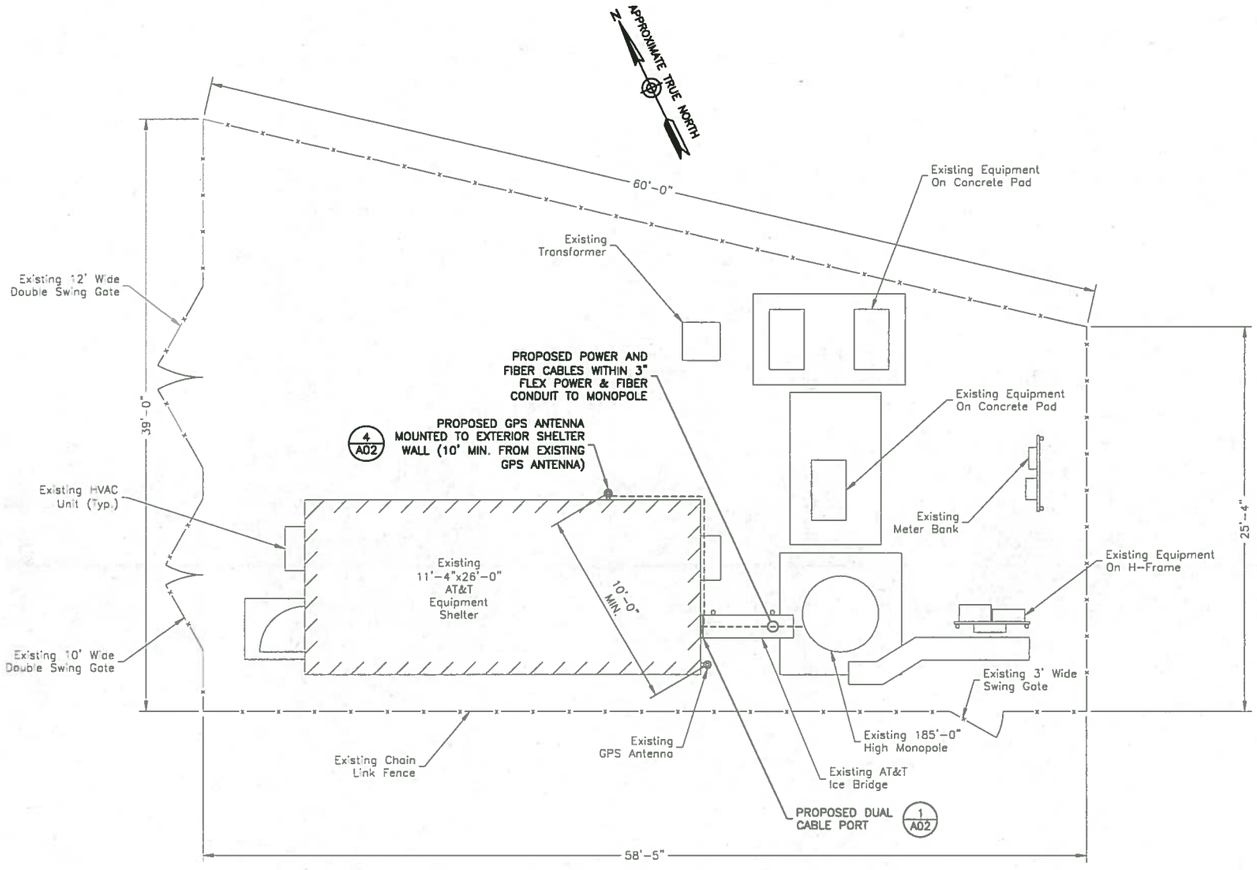
NO.	DATE	REVISIONS	BY	CHK	APP'D
3	06/29/15	FINAL SUBMISSION	DER	GHN	GHN
2	06/25/15	FINAL SUBMISSION	DER	GHN	GHN
1	01/14/14	REVISED PER RF REVISION	JC	GHN	GHN
0	03/06/12	PRELIMINARY SUBMISSION	JRF	GHN	GHN

SCALE: AS SHOWN | DESIGNED BY: GHN | DRAWN BY: JRF

STATE OF CONNECTICUT

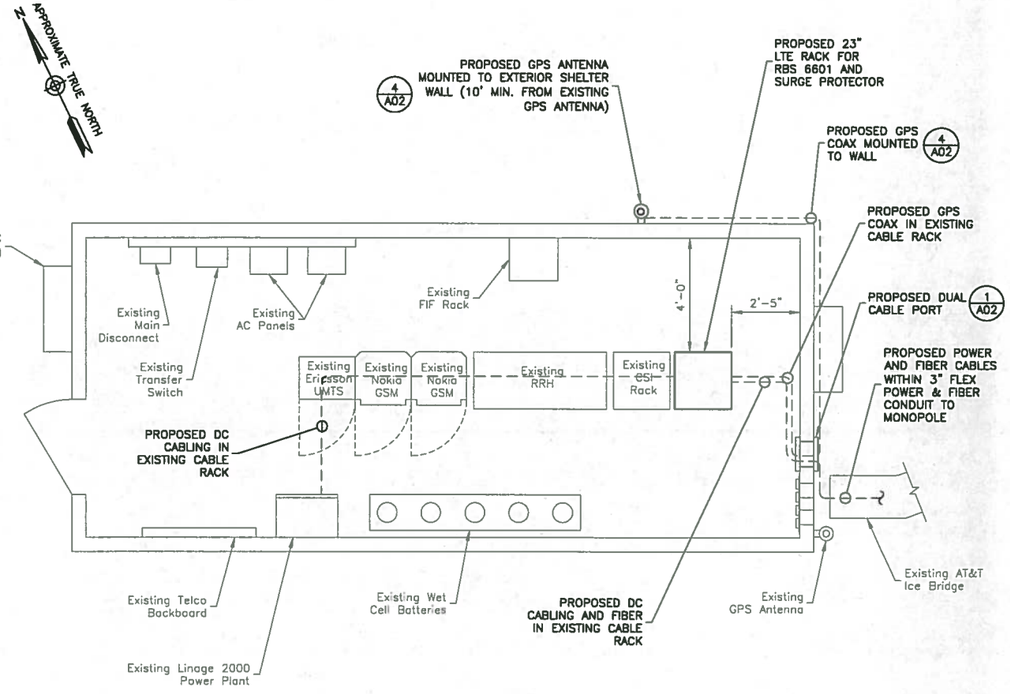
TITLE SHEET

DEWBERRY NO.	DRAWING NUMBER	REV
50048347/50048361	T01	3



SITE PLAN

SCALE: 1"=10' FOR 11"x17"
1"=5' FOR 22"x34"
0' 5' 10'



NOTES:

1. NORTH SHOWN AS APPROXIMATE.
2. MOUNT ALL ANTENNAS, COAX, SURGE ARRESTORS, RRU'S, ETC. IN ACCORDANCE WITH STRUCTURAL ANALYSIS BY OTHERS.
3. NOT ALL INFORMATION SHOWN FOR CLARITY.

SHELTER LAYOUT DETAIL

SCALE: 3/16"=1' FOR 11"x17"
3/8"=1' FOR 22"x34"
0' 2' 4' 6'

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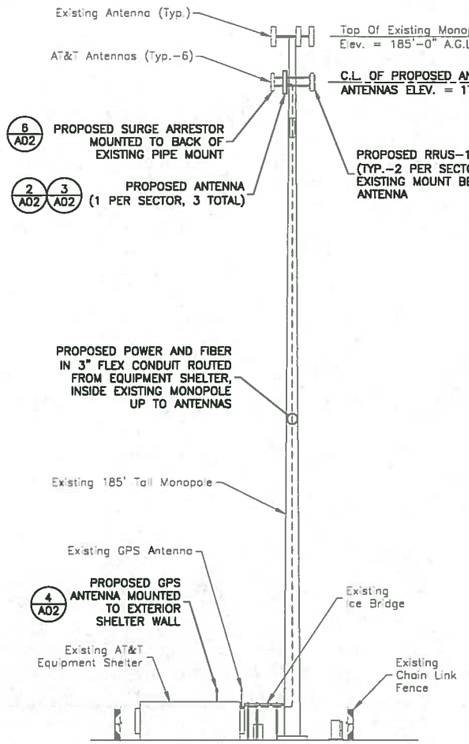
0	03/06/12	PRELIMINARY SUBMISSION	JRF	GHN	GHN

SCALE: AS SHOWN | DESIGNED BY: GHN | DRAWN BY: JRF

SITE PLAN & SHELTER LAYOUT

DEWBERRY NO.	DRAWING NUMBER	REV
50048347/50048361	A01	3



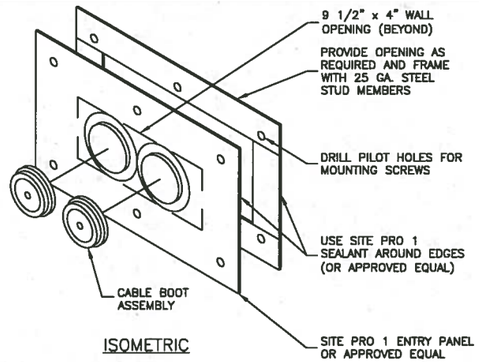
NOTE:

1. CONTRACTOR TO INSPECT EXISTING MOUNTS CONDITION & SIZE AND INFORM CM & ENGINEER ASAP IF DETERIORATED OR TOO SMALL

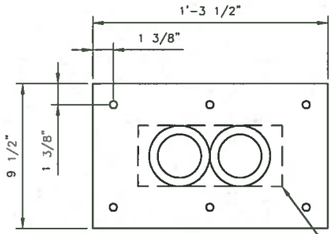
ELEVATION LOOKING NORTH

SCALE: 1"=20' FOR 11"x17"
1"=10' FOR 22"x34"
0' 5' 10'

A.G.L. = ABOVE GRADE LEVEL
C.L. = CENTER LINE



ISOMETRIC



ELEVATION

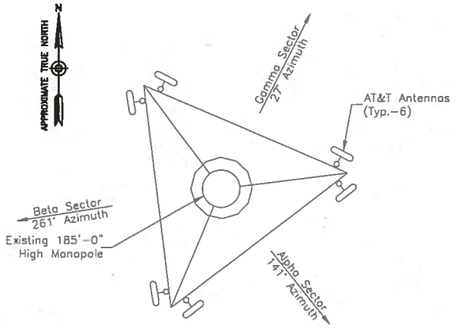
CABLE ENTRY PANEL CHART
SITE PRO 1 E1448 FOR (2 PORTS)

NOTES:

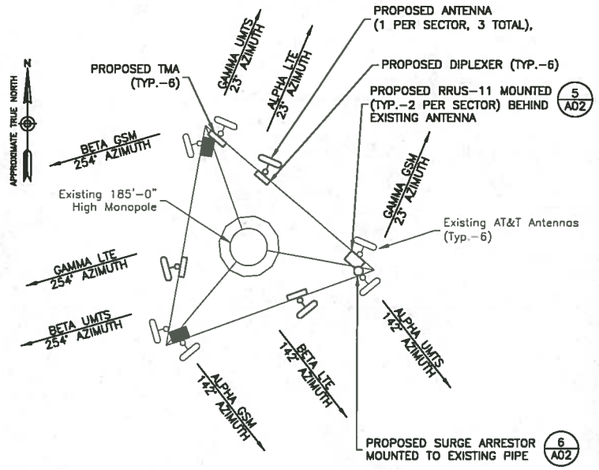
1. ENTRY PANEL AND BOOTS BY SITE PRO 1 (SEE CHART FOR PART #). ORDER BOOTS SEPARATELY FOR SPECIFIC CABLE SIZE(S) & QUANTITY. PROVIDE PLUGS BY SITE PRO 1 FOR EACH UNUSED HOLE IN BOOT.

DUAL COAX PORT 1

SCALE: N.T.S.



EXISTING



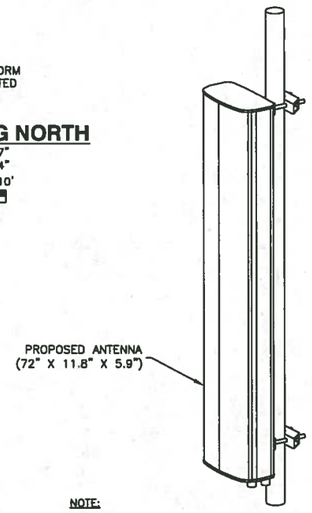
PROPOSED

NOTES:

1. AZIMUTHS BASED ON TRUE NORTH.

PLATFORM ANTENNA ORIENTATION 2

SCALE: N.T.S.

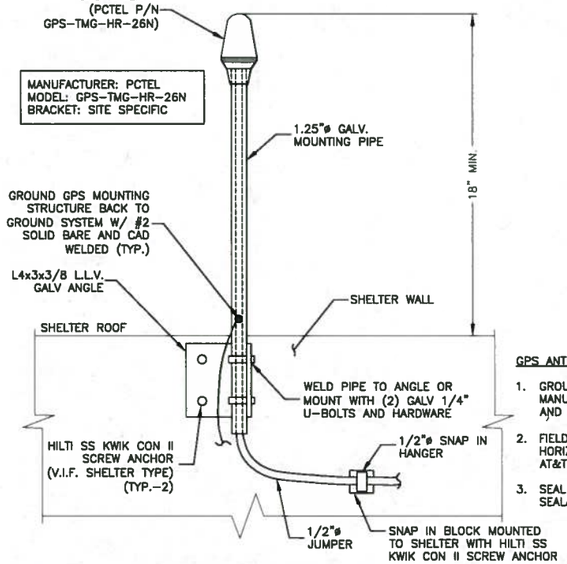


NOTE:

1. PLEASE SEE RFDS FOR SPECIFIC ANTENNA MODEL.

ISOMETRIC ANTENNA DETAIL 3

SCALE: N.T.S.

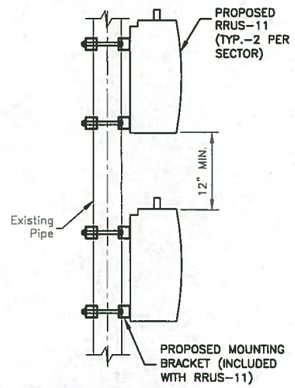


GPS ANTENNA NOTES:

1. GROUND ANTENNAS AND MOUNTS PER MANUFACTURERS RECOMMENDATIONS AND AT&T STANDARDS.
2. FIELD LOCATE GPS ANTENNA A MINIMUM OF 10' HORIZONTALLY FROM EXISTING GPS ANTENNA WITH AT&T CM APPROVAL.
3. SEAL ALL WALL PENETRATIONS WILL SILICONE SEALANT.

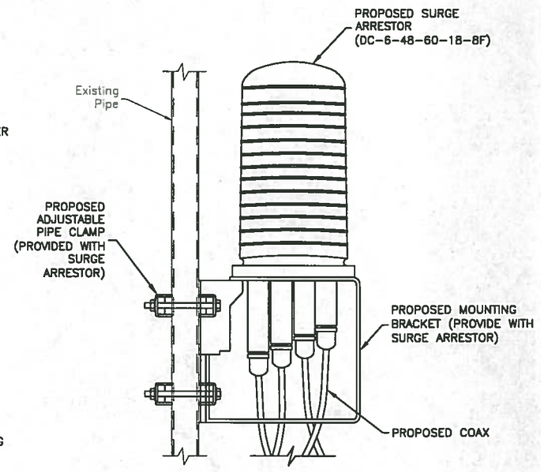
GPS ANTENNA 4

SCALE: N.T.S.



RRUS-11 MOUNTING DETAIL 5

SCALE: N.T.S.



SURGE ARRESTOR MOUNTING DETAIL 6

SCALE: N.T.S.

Dewberry
Dewberry-Goodkind, Inc.
600 PARSIPPANY ROAD
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0	03/06/12	PRELIMINARY SUBMISSION	JRF	GHN	GHN

SCALE: AS SHOWN | DESIGNED BY: GHN | DRAWN BY: JRF

ELEVATION & CONSTRUCTION DETAILS

DEWBERRY NO.	DRAWING NUMBER	REV
50048347/50048361	A02	3

Excerpt from AT&T's 8/14/2013 Structural Documents

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

Date: August 14, 2013

Steve Tuttle
Crown Castle
8 Parkmeadow Drive
Pittsford, NY 14534
585.899.3445

Paul J Ford and Company
600 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
bkermode@pjfweb.com

Subject: Structural Modification Report

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT1044
	Carrier Site Name:	CT1044
Crown Castle Designation:	**Crown Castle BU Number:**	825983
	Crown Castle Site Name:	MIDDLETOWN_1
	Crown Castle JDE Job Number:	231183
	Crown Castle Work Order Number:	628395
	Crown Castle Application Number:	185826 Rev. 13
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37513-1570 BP
Site Data:	**90 Industrial Park Road, Middletown, Middlesex County, CT** **Latitude *41° 35' 8.124"*, Longitude *-72° 42' 49.867"*** **185 Foot - Monopole Tower**	

Dear Steve Tuttle,

Paul J Ford and Company 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 559770, in accordance with application 185826, revision 13.

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

LC4.5: Modified Structure w/ Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing loading, respectively.

The structural analysis was performed for this tower in accordance with the requirements the 2005 Connecticut State Building Code of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

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 *Paul J Ford and Company* 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:

Respectfully submitted by:

Brian K. Kermode
Project Engineer

tnxTower Report - version 6.1.3.1

STATE OF CONNECTICUT
PACHICARAH JACOBS
No. PEN 22731
LICENSED
PROFESSIONAL ENGINEER

AUG 1 4 2013

1) INTRODUCTION

This tower is a 185 ft Monopole tower designed by FRED A. NUDD CORPORATION in May of 1998. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-E.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
175.0	175.0	6	communication components inc.	DTMABP7819VG12A	1 2	3/8 3/4	-
		6	ericsson	RRUS-11			
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		6	powerwave technologies	LGP13519			
		1	raycap	DC6-48-60-18-8F			

Table 2 - Existing 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
185.0	185.0	3	andrew	ETW190VS12UB	21	1-5/8	1
		1	andrew	HP2-102			
		9	ericsson	AIR 21 w/ Mount Pipe			
		3	ericsson	AIR 33 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Sector Mount [SM 802-3]			
175.0	175.0	6	powerwave technologies	LGP21401	-	-	2
		6	powerwave technologies	LGP21903			
		6	powerwave technologies	7770.00 w/ Mount Pipe	12	1-1/4	1
		1	tower mounts	Sector Mount [SM 802-3]			
165.0	165.0	3	kathrein	742 213 w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	Pipe Mount [PM 601-3]			

Notes:
1) Existing Equipment
2) Equipment To Be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Clarence Welti, 3/27/1998	3473514	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Nudd, 98-5980, 5/1/1998	3880469	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Nudd, 98-5980, 5/1/1998	3473517	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	All-Points Tech, CT107572, 4/26/2005	3879955	CCISITES

3.1) Analysis Method

tnxTower (version 6.1.3.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

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) The Nudd manufacturer's drawings specify an anchor rod that does not exist. From experience with Nudd monopoles, the anchors are likely A36 standard anchors and have been assumed as such.
5) Monopole was reinforced in conformance with the referenced modification drawings.
6) Monopole will be reinforced in conformance with the attached proposed modification drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J Ford and Company should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	185 - 180	Pole	TP18x18x0.1875	1	-2.156	361.254	23.1	Pass
L2	180 - 151.833	Pole	TP27.1894x18x0.25	2	-6.406	728.474	95.3	Pass
L3	151.833 - 130	Pole	TP34.3125x27.1894x0.3802	3	-9.032	1328.220	76.1	Pass
L4	130 - 120.667	Pole	TP36.844x31.9209x0.3636	4	-12.136	1434.774	88.3	Pass
L5	120.667 - 115	Pole	TP38.6875x36.844x0.4005	5	-13.263	1624.154	83.8	Pass
L6	115 - 95	Pole	TP45.1875x38.6875x0.4463	6	-16.525	2065.883	76.7	Pass
L7	95 - 91	Pole	TP45.8125x42.3448x0.4379	7	-20.227	2149.036	82.2	Pass
L8	91 - 51	Pole	TP58.875x45.8125x0.375	8	-28.461	2262.447	99.7	Pass
L9	51 - 40	Pole	TP61.6875x55.8391x0.4404	9	-35.883	2765.682	92.6	Pass
L10	40 - 19	Pole	TP68.5x61.6875x0.4375	10	-40.031	3068.846	89.2	Pass
L11	19 - 0	Pole	TP73.8125x64.7054x0.4375	11	-53.315	3244.402	98.1	Pass
							Summary	
						Pole (L8)	99.7	Pass
						Rating =	99.7	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	59.0	Pass
1	Base Plate	0	42.7	Pass
1	Base Foundation	0	71.4	Pass

Structure Rating (max from all components) =	99.7%

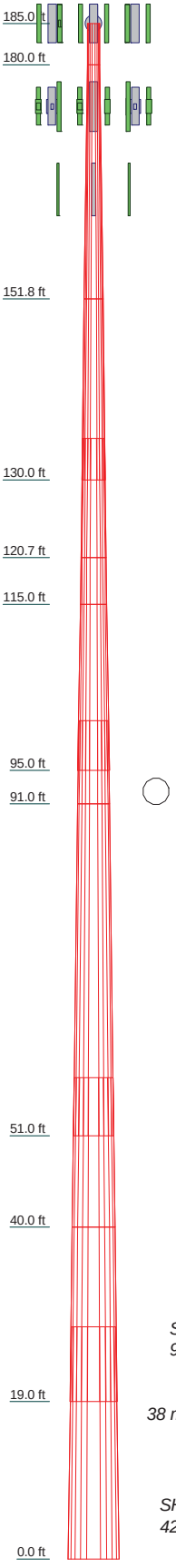
Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.

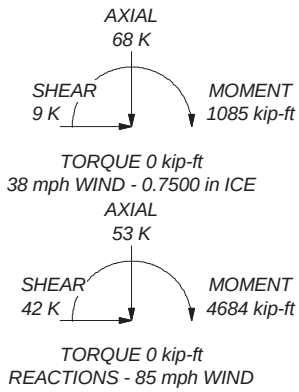
4.1) Recommendations

Install modifications per the attached reinforcing drawings.

Section	1	2	3	4	5	6	7	8	9	10	11
Length (ft)	5.000	28.167	21.833	14.333	5.667	20.000	10.000	40.000	18.000	21.000	28.000
Number of Sides	12	12	12	12	12	12	12	12	12	12	12
Thickness (in)	0.1875	0.2500	0.3802	0.3636	0.4005	0.4463	0.4379	0.3750	0.4404	0.4375	0.4375
Socket Length (ft)			5.000			6.000		7.000		9.000	
Top Dia (in)	18.0000	18.0000	27.1894	31.9209	36.8440	38.6875	42.3448	45.8125	55.8391	61.6875	64.7054
Bot Dia (in)	18.0000	27.1894	34.3125	36.8440	38.6875	45.1875	45.8125	58.8750	61.6875	68.5000	73.8125
Grade	A36M-42			Reinf 42.00 ksi	Reinf 41.13 ksi		Reinf 42.00 ksi	A36M-42	Reinf 39.81 ksi	A36M-42	
Weight (K)	0.2	1.7	2.8	1.9	0.9	4.1	2.1	8.5	5.1	6.5	9.2

43.0





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(3) AIR 21 w/ Mount Pipe	185	AM-X-CD-16-65-00T-RET w/ Mount Pipe	175
(3) AIR 21 w/ Mount Pipe	185	(2) RRUS-11	175
(3) AIR 21 w/ Mount Pipe	185	(2) RRUS-11	175
AIR 33 w/ Mount Pipe	185	(2) RRUS-11	175
AIR 33 w/ Mount Pipe	185	(2) LGP13519	175
AIR 33 w/ Mount Pipe	185	(2) LGP13519	175
ETW190VS12UB	185	(2) LGP13519	175
ETW190VS12UB	185	(2) DTMABP7819VG12A	175
ETW190VS12UB	185	(2) DTMABP7819VG12A	175
DC6-48-60-18-8F	185	(2) DTMABP7819VG12A	175
Sector Mount [SM 802-3]	185	DC6-48-60-18-8F	175
HP2-102	185	Sector Mount [SM 802-3]	175
(2) 7770.00 w/ Mount Pipe	175	(2) 7770.00 w/ Mount Pipe	175
(2) 7770.00 w/ Mount Pipe	175	742 213 w/ Mount Pipe	165
AM-X-CD-16-65-00T-RET w/ Mount Pipe	175	742 213 w/ Mount Pipe	165
AM-X-CD-16-65-00T-RET w/ Mount Pipe	175	Pipe Mount [PM 601-3]	165
		742 213 w/ Mount Pipe	165

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A36M-42	42 ksi	60 ksi	Reinf 41.13 ksi	41 ksi	52 ksi
Reinf 42.00 ksi	42 ksi	53 ksi	Reinf 39.81 ksi	40 ksi	50 ksi

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 99.7%

Paul J Ford and Company
600 E. Broad Street Suite 1500
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: ***185' Monopole / Middletown_1***		
Project: ***PJF 37513-1570 / BU 825983***		
Client: CCI	Drawn by: Brian K Kermode	App'd:
Code: TIA/EIA-222-F	Date: 08/08/13	Scale: NTS
Path: G:\TOWER\375_Crown_Castle\2013\37513-1570 BU 825983\WO628395 BU825983\37513-1570 Aero.eri		Dwg No. E-1

37513-1570 PERMIT.DWG

MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

BU NUMBER; SITE NAME

BU #825983; MIDDLETOWN_1

APP: 185826 REV. 13; WO: 628395

SITE ADDRESS

90 INDUSTRIAL PARK ROAD
MIDDLETOWN, CT 06457
MIDDLESEX COUNTY

PROJECT NOTES

1. DETAILED FIELD INFORMATION REGARDING INTERFERENCES AND/OR EXISTING FIELD CONDITIONS MAY BE AVAILABLE ON CROWN'S CCISITES AND FROM CONTRACTOR'S PRE-MOD MAPPING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AND COORDINATE WITH THE AVAILABLE SOURCES OF INFORMATION ABOVE AND WITH THE PROJECT PLANS BEFORE PROCEEDING WITH THE WORK. CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND CROWN CASTLE FIELD PERSONNEL BEFORE PROCEEDING WITH THE WORK.

2. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

3. ALL STRUCTURAL BOLTS SHALL BE FIELD INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

4. (A.) DTI'S REQUIRED: ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAILS ON SHEET S-3 FOR REQUIREMENTS ON THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

   (B.) EFFECTIVE 5/30/2012: UNTIL FURTHER NOTICE, CROWN CASTLE WILL ACCEPT AJAX BOLTS TIGHTENED USING AISC "TURN-OF-NUT" METHOD. INSTALLERS SHALL FOLLOW CROWN GUIDELINES FOR AISC "TURN-OF-NUT" METHOD AND ALSO PROVIDE COMPLETE INSPECTION DOCUMENTATION IN THE PMI. PRIOR TO STARTING WORK, CONTRACTOR SHALL CONSULT WITH CROWN ENGINEERING TO DETERMINE WHETHER THIS POLICY IS STILL IN PLACE.

   (C.) REQUIREMENT EFFECTIVE 04/20/2013, PER CROWN CASTLE DIRECTIVE: ANY AND ALL STRUCTURAL BOLTS THAT ARE TIGHTENED TO THE PRETENSIONED CONDITION USING THE AISC "TURN-OF-NUT" TENSIONING PROCEDURE (NON-TENSION CONTROLLED ['NON-TC'] BOLTS AND/OR BOLTS WITHOUT DTI'S INSTALLED) SHALL BE INSPECTED ONSITE BY AN INDEPENDENT THIRD-PARTY BOLT INSPECTOR, AS APPROVED BY CROWN. **THIS INSPECTION IS REQUIRED TO BE AN ONSITE FIELD INSPECTION.** THE THIRD-PARTY BOLT INSPECTOR SHALL FOLLOW THE PUBLISHED CROWN CASTLE INSPECTION PROCEDURE "MI NON-TC BOLT INSPECTION", DATED APRIL 2013. THE THIRD-PARTY BOLT INSPECTOR SHALL PREPARE A FULLY DOCUMENTED BOLT INSPECTION REPORT, AS SPECIFIED BY CROWN, AND SHALL SUBMIT A COPY OF THE BOLT INSPECTION REPORT TO THE MI INSPECTOR, THE EOR, AND TO CROWN CASTLE.

5. NDE OF THE CIRCUMFERENTIAL WELD OF THE BASE PLATE TO SHAFT CONNECTION IS REQUIRED. SEE CCI DOCUMENTS ENG-SOW-1033 *'TOWER BASE PLATE NDE'* AND ENG-BUL-10051 *'NDE REQUIREMENTS FOR MONOPOLE BASE PLATE TO PREVENT CONNECTION FAILURE'*. NOTIFY THE EOR AND CROWN ENGINEERING IMMEDIATELY IF ANY CRACKS ARE SUSPECTED OR HAVE BEEN IDENTIFIED. THE NDE SHALL INCLUDE ALL EXISTING REINFORCEMENTS THAT HAVE BEEN WELDED TO THE BASE PLATE. ANY FULL PENETRATION WELDING TO THE BASE PLATE REQUIRED AS PART OF THIS ACTIVE REINFORCEMENT DESIGN SHALL BE INCLUDED IN THE NDE SCOPE OF WORK.

PROJECT CONTACTS:

MONOPOLE OWNER:
CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
CONTACT: STEVE TUTTLE
PH: (585) 899-3445

STRUCTURAL ENGINEER OF RECORD (EOR):
PAUL J. FORD AND COMPANY
250 EAST BROAD STREET, SUITE 600
COLUMBUS, OHIO 43215-3708
CONTACT: BRIAN KERMODE AT BKERMODE@PJFWEB.COM
PHONE: 614-221-6679

DESIGN STANDARD

THIS REINFORCEMENT DESIGN IS BASED UPON THE REQUIREMENTS OF THE TIA/EIA-222-F-1996 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, USING A DESIGN BASIC WIND SPEED OF 85 MPH (FASTEST MILE) WITH NO ICE, 38 MPH WITH 3/4 INCH ICE AND 50 MPH SERVICE LOADS.

REFER TO THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF STRUCTURAL ANALYSIS FOR THIS SITE (PJF#37513-1570), DATED 8-14-2013.

THIS PROJECT INCLUDES THE FOLLOWING REINFORCING ELEMENTS:

SHAFT REINFORCING
FIELD WELDED MICROPILE BRACKETS
HIGH STRENGTH GROUT
FOUNDATION AUGMENTATION: MICROPILES

SHEET INDEX

SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
S-1	GENERAL NOTES
S-2	GENERAL NOTES
S-3	AJAX BOLT DETAIL
S-4	MONOPOLE PROFILE
S-5	BASE PLATE DETAILS
S-6	MICROPILE DETAILS
S-7	MISC DETAILS
S-8	MI CHECKLIST

AUG 1 4 2013

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
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(614) 221-6679 www.pjfweb.com

CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
PH: (585) 899-3445 FAX: (585) 899-3448

BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570	ISSUE DATE OF PERMIT: 8-14-2013
DRAWN BY: B.M.S.	
CHECKED BY: B.K.K.	
APPROVED BY:	T-1
DATE: 8-14-2013	

CROWN CASTLE PROJECT: BU #825983; MIDDLETOWN_1; MIDDLETOWN, CT
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 2, 1/22/2009)

A. GENERAL NOTES

1. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO FABRICATION AND CONSTRUCTION. THESE DRAWINGS WERE PREPARED FROM INFORMATION AND DOCUMENTS PROVIDED TO PAUL J. FORD & COMPANY BY CROWN CASTLE. THIS INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY PAUL J. FORD & COMPANY FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. ANY DISCREPANCIES AND/OR CHANGES BETWEEN THE INFORMATION CONTAINED IN THESE DRAWINGS AND THE ACTUAL VERIFIED SITE CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF CROWN CASTLE AND PAUL J. FORD & COMPANY SO THAT ANY CHANGES AND/OR ADJUSTMENTS, IF NECESSARY, CAN BE MADE TO THE DESIGN AND DRAWINGS.
2. THE EXISTING UNREINFORCED MONOPOLE STRUCTURE DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE ANTENNA AND PLATFORM LOADS SHOWN ON THESE DRAWINGS AT THE REQUIRED MINIMUM TIA/EIA-222-F BASIC WIND SPEEDS. DO NOT INSTALL ANY ADDITIONAL OR NEW ANTENNA AND PLATFORM LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.
3. IF MATERIALS, QUANTITIES, STRENGTHS OR SIZES INDICATED BY THE DRAWINGS OR SPECIFICATIONS ARE NOT IN AGREEMENT WITH THESE NOTES, THE BETTER QUALITY AND/OR GREATER QUANTITY, STRENGTH OR SIZE INDICATED, SPECIFIED OR NOTED SHALL BE PROVIDED.
4. THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN PROPERLY AND ADEQUATELY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO INSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND ITS COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT. IMPORTANT CUTTING, WELDING AND SAFETY GUIDELINES: THE CONTRACTOR SHALL FOLLOW ALL CROWN CASTLE CUTTING, WELDING, FIRE PREVENTION AND SAFETY GUIDELINES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES FROM CROWN CASTLE. PER THE 12-01-2005 CROWN CASTLE DIRECTIVE: "ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CROWN CASTLE POLICY "CUTTING AND WELDING PLAN" (DOC # ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT".
5. THE STRUCTURAL CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OR MEANS OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES.
6. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY THE INSPECTION/TESTING AGENCY. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
7. ALL MATERIALS AND EQUIPMENT FURNISHED WILL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.
10. ANY EXISTING ATTACHMENTS AND/OR PROJECTIONS ON THE POLE THAT MAY INTERFERE WITH THE INSTALLATION OF THE REINFORCING SYSTEM WILL HAVE TO BE REMOVED, AND/OR RELOCATED, AND/OR REPLACED AND RE-INSTALLED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH THE OWNER, TESTING AGENCY, AND ENGINEER.
11. ANY AND ALL EXISTING PLATFORMS THAT ARE LOCATED IN AREAS OF THE POLE SHAFT WHERE SHAFT REINFORCING MUST BE APPLIED SHALL BE TEMPORARILY REMOVED OR OTHERWISE SUPPORTED TO PERMIT NEW CONTINUOUS REINFORCEMENT TO BE ATTACHED. AFTER THE CONTRACTOR HAS SUCCESSFULLY INSTALLED THE MONOPOLE REINFORCEMENT SYSTEM, THE CONTRACTOR SHALL RE-INSTALL THE PLATFORMS. IN NO CASE SHALL ANY NEW AND/OR ADDITIONAL PLATFORMS AND/OR ANTENNAS AND/OR COAX CABLES AND/OR OTHER EQUIPMENT BE INSTALLED ON THE MONOPOLE UNTIL THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF ALL OF THE REQUIRED STRUCTURAL REINFORCING SYSTEM COMPONENTS.

B. (SECTION NOT USED)

C. SPECIAL INSPECTION AND TESTING

1. ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY THE OWNER'S REPRESENTATIVE AND THE OWNER'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY. REFER TO CROWN CASTLE DOCUMENT ENG-SOW-10066 FOR SPECIFICATION.
2. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE PERFORMED SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
3. OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
4. AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY THE OWNER FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
   (A.) ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
   (B.) THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO, AND COORDINATE WITH, THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
5. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES FOR THE OWNER. THE TESTING AGENCY SHALL INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.
   A. GENERAL:
      (1.) PERFORM CONTINUOUS ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY OWNER IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.
   B. FOUNDATIONS, CONCRETE, AND SOIL PREPARATION
      (1.) VERIFY MATERIALS AT BOTTOM OF EXCAVATION ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.
      (2.) VERIFY THAT EXCAVATIONS HAVE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.
      (3.) PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS.
      (4.) VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESS DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.
      (5.) PRIOR TO PLACEMENT OF COMPACTED FILL, OBSERVE SUBGRADE AND VERIFY SITE HAS BEEN PREPARED PROPERLY.
   C. CONCRETE TESTING PER ACI - (NOT REQUIRED)
   D. STRUCTURAL STEEL
      (1.) CHECK THE STEEL ON THE JOB WITH THE PLANS.
      (2.) CHECK MILL CERTIFICATIONS.
      (3.) CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
      (4.) INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
      (5.) CALL FOR LABORATORY TEST REPORTS WHEN IN DOUBT.
      (6.) CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
      (7.) CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
      (8.) CHECK BOLT TIGHTENING ACCORDING TO AISC "TURN OF THE NUT" METHOD.
   E. WELDING:
      (1.) VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.
      (2.) INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND IN ACCORDANCE WITH AWS D1.1.
      (3.) APPROVE FIELD WELDING SEQUENCE.
         (A.) A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO THE OWNER BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM THE OWNER.
      (4.) INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
         (A.) INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE AND WORKING CONDITIONS.
         (B.) VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
         (C.) INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
         (D.) VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1.
         (E.) SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE OR DYE PENETRANT.
         (F.) INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED PLANS.
         (G.) VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
         (H.) REVIEW THE REPORTS BY TESTING LABS.
         (I.) CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
         (J.) INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
         (K.) CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.
   F. SPECIAL INSPECTION OF EXISTING SHAFT-TO-FLANGE WELD CONNECTIONS:
      (1.) PRIOR TO CONSTRUCTION, TESTING AGENCY SHALL INSPECT CONDITION OF EXISTING SHAFT-TO-BASE-PLATE WELD CONNECTION. ALSO INSPECT EXISTING STIFFENERS IF PRESENT. THE INSPECTOR SHALL USE THE FOLLOWING INSPECTION METHODS, OR COMBINATION OF METHODS, AS REQUIRED TO IDENTIFY ANY CRACKS: VISUAL, MAGNETIC PARTICLE, AND/OR ULTRA-SONIC. IN ADDITION, OTHER TEST METHODS MAY ALSO BE USED AT THE RECOMMENDATION OF THE TESTING AGENCY AND UPON THE APPROVAL OF THE OWNER AND THE ENGINEER. THE TESTING AGENCY SHALL PROVIDE CAREFUL AND THOROUGH DOCUMENTATION OF THIS INSPECTION TO THE OWNER AND THE ENGINEER. TESTING AGENCY SHALL COORDINATE THESE INSPECTION ACTIVITIES WITH THE OWNER'S REQUIRED PROCESSES AND PROCEDURES. IMPORTANT: THE TESTING AGENCY SHALL IMMEDIATELY REPORT ANY INDICATIONS OF CRACKS, FRACTURES, DISTRESS, AND/OR CORROSION TO THE OWNER AND ENGINEER.
      (2.) AFTER CONSTRUCTION, TESTING AGENCY SHALL INSPECT ANY AND ALL FIELD REPAIRS IMPLEMENTED AS REQUIRED BY THE OWNER FROM THE RESULTS OF THE INSPECTION IN THE PREVIOUS NOTE 5.F.(1.) ABOVE.
      (3.) REFER TO CROWN CASTLE DOCUMENTS ENG-SOW-10033 AND ENG-BUL-10051 FOR SPECIFICATIONS.
   G. REPORTS:
      (1.) COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO THE OWNER.
6. THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL-INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DECIDE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES AND PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO THE OWNER'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT THE OWNER'S REVIEW AND SPECIFIC WRITTEN CONSENT. THE OWNER RESERVES THE RIGHT TO DETERMINE WHAT IS AN ACCEPTABLE RESOLUTION OF DISCREPANCIES AND PROBLEMS.
7. AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO THE OWNER. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
8. RESPONSIBILITY: THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATIONS. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.

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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570	ISSUE DATE OF PERMIT: 8-14-2013
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D. STRUCTURAL STEEL

1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:

A. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
   (A.) "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
   (B.) "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS OF THE ENGINEERING FOUNDATION.
   (C.) "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (PARAGRAPH 4.2.1 SPECIFICALLY EXCLUDED).

B. BY THE AMERICAN WELDING SOCIETY (AWS):
   (A.) "STRUCTURAL WELDING CODE - STEEL D1.1."
   (B.) "SYMBOLS FOR WELDING AND NON-DESTRUCTIVE TESTING"

2. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
3. TIGHTEN ALL STRUCTURAL BOLTS, INCLUDING THE AJAX M20 BOLTS WITH SHEAR SLEEVES, ACCORDING TO THE REQUIREMENTS OF THE AISC "TURN OF THE NUT" METHOD. TIGHTEN BOLTS 1/3 TURN PAST THE SNUG TIGHT CONDITION AS DEFINED BY AISC.
4. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E80XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO THE OWNER'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65 (FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
7. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION I NOTES REGARDING TOUCH-UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
8. UNLESS OTHERWISE NOTED, ALL STEEL MEMBERS SHALL BE HOT-DIP GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH ASTM A123. SEE SECTION J FOR FURTHER NOTES AND FOR EXCEPTIONS (IF ANY).
9. ALL WELDS SHALL BE VISUALLY INSPECTED BY THE OWNER'S APPROVED TESTING AGENCY. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT. THE CONTRACTOR SHALL COOPERATE WITH THE TESTING AGENCY IN THEIR TESTING EFFORTS.
10. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
11. FIELD CUTTING OF STEEL:
   (A.) PRIOR TO ANY FIELD CUTTING, THE CONTRACTOR SHALL MARK THE CUT OUTLINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS.
   (B.) ANY REQUIRED CUTS IN THE STEEL SHALL BE CAREFULLY CUT BY MECHANICAL METHODS SUCH AS DRILLING, SAW CUTTING, AND GRINDING. THE CONTRACTOR IS RESPONSIBLE TO PREVENT ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, DURING THE CUTTING WORK. ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
   (C.) ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.

E. BASE PLATE GROUT

1. NEW GROUT FOR THE POLE BASE SHALL BE NON-SHRINK, NON-METALLIC, GROUT (EUCO NS GROUT BY EUCLID, OR APPROVED EQUAL) WITH A 7500 PSI MINIMUM COMPRESSIVE STRENGTH. PVC DRAINAGE PIPES SHALL BE PROVIDED FROM INSIDE THE POLE SHAFT OUT THROUGH THE GROUT SPACE UNDER THE BASE PLATE IN ORDER TO ALLOW MOISTURE TO ADEQUATELY DRAIN FROM THE INTERIOR OF THE POLE SHAFT. CONTRACTOR SHALL SUBMIT PROPOSED GROUT SPECIFICATION INFORMATION TO THE OWNER FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION. CONTRACTOR SHALL FOLLOW GROUT MANUFACTURER'S SPECIFICATIONS FOR COLD WEATHER GROUTING PROCEDURES (IF NECESSARY) AND THE TESTING AGENCY SHALL PREPARE GROUT SAMPLE SPECIMENS FOR COMPRESSIVE STRENGTH TESTING AND VERIFICATION.
2. GROUT SHALL BE INSTALLED TIGHT UNDER BASE PLATE WITH NO VOIDS REMAINING BETWEEN TOP OF EXISTING CONCRETE AND UNDERSIDE OF EXISTING BASE PLATE (EXCEPT FOR DRAIN PIPES). GROUT COMPLETELY SOLID (EXCEPT FOR DRAIN PIPES) UNDER ENTIRE SURFACE OF BASE PLATE FROM OUTSIDE EDGE TO INSIDE EDGE.

F. FOUNDATION WORK - (NOT REQUIRED)

G. CAST-IN-PLACE CONCRETE - (NOT REQUIRED)

H. EPOXY GROUTED REINFORCING ANCHOR RODS - (NOT REQUIRED)

I. TOUCH UP OF GALVANIZING

1. THE CONTRACTOR SHALL TOUCH UP ANY AND/OR ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED DURING CONSTRUCTION. **GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.**
2. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. THE OWNER'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.
3. THE OWNER'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE INADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.

J. HOT DIP GALVANIZING

1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.
2. PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING.
3. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES AS REQUIRED.
4. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.

K. PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER

1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY THE OWNER, THE OWNER WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
2. THE MONOPOLE REINFORCING SYSTEM INDICATED IN THESE DOCUMENTS USES REINFORCING COMPONENTS THAT INVOLVE FIELD WELDING STEEL MEMBERS TO THE EXISTING GALVANIZED STEEL POLE STRUCTURE. THESE FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. **ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE CONNECTED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT THE OWNER REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.**
3. THE OWNER SHALL REFER TO TIA/EIA-222-F-1996, SECTION 14 AND ANNEX E FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY THE OWNER BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. **PAUL J. FORD & COMPANY RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT.** ACCORDING TO TIA/EIA-222-F-1996 SECTION 14.1, NOTE 1: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570	ISSUE DATE OF PERMIT: 8-14-2013
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APPROVED BY:	S-2
DATE: 8-14-2013	

AJAX BOLT NOTE SHEET: REV. 1.4, 5-20-2013

NOTES:
1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

3. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAIL BELOW FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

4. ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. DTI'S SHALL BE THE SQUIRTER® STYLE, MADE TO ASTM F959 LATEST REVISION; AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF RC 38 OR HIGHER.

NOTES FOR AJAX M20 'ONE-SIDE' BOLTS WITH DIRECT TENSION INDICATORS (DTI'S):

DTI'S REQUIRED: DTI'S SHALL BE "SELF-INDICATING" SQUIRTER® STYLE DTI'S MADE WITH SILICONE EMBEDDED IN THEM, INSPECTED BY MEANS OF THE VISUAL EJECTION OF SILICONE AS THE DTI PROTRUSIONS COMPRESS. SQUIRTER® DTI'S SHALL BE CALIBRATED PER MANUFACTURER'S INSTRUCTIONS PRIOR TO USE.

THE DIRECT TENSION INDICATOR (DTI) WASHERS SHALL BE THE "SQUIRTER® STYLE" AS MANUFACTURED BY:

APPLIED BOLTING TECHNOLOGY PRODUCTS, INC.
1413 ROCKINGHAM ROAD BELLOWS FALLS, VERMONT, USA 05101
PHONE 1-800-552-1999
WEBSITE: WWW.APPLIEDBOLTING.COM

DISTRIBUTORS OF SQUIRTER® DTI'S:
HTTP://WWW.APPLIEDBOLTING.COM/APPLIED-BOLTING-DISTRIBUTORS.HTML

DTI: USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 20 MM (M20) NOMINAL A325 BOLTS FOR THE AJAX M20 BOLTS. DTI'S SHALL NOT BE HOT-DIP GALVANIZED. DTI'S SHALL BE MECHANICALLY GALVANIZED (MG) BY THE COLD MECHANICAL PROCESS ONLY AS PROVIDED BY THE DTI MANUFACTURER.

HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 20 MM (M20) NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY GALVANIZED BY THE COLD MECHANICAL PROCESS. ALTERNATIVELY, CORRECTLY MADE HOT DIP GALVANIZED HARDENED FLAT WASHERS HAVING A MINIMUM HARDNESS OF RC 38 CAN BE USED; CONTRACTOR SHALL PROVIDE DOCUMENTATION OF WASHER SPECIFICATION AND HARDNESS.

NUT LUBRICATION REQUIRED: PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW DTI MANUFACTURER INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING.

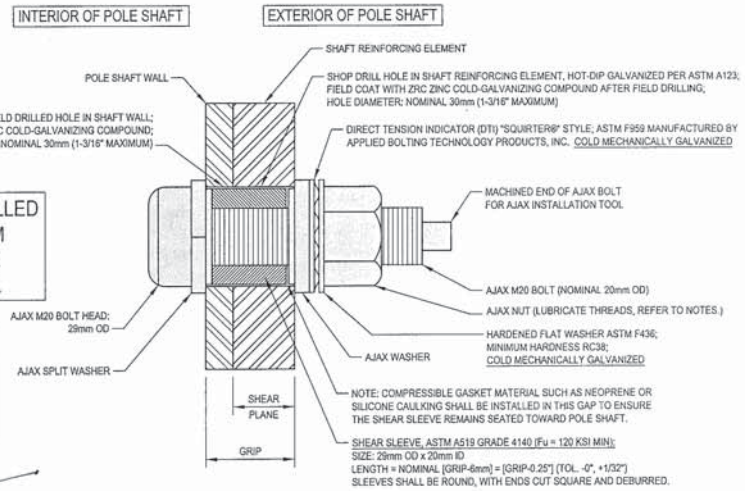
NOTE: COMPLETELY COMPRESSED DTI'S SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE OF A HARDENED FLAT WASHER, NEVER DIRECTLY AGAINST THE NUT.

CONTRACTOR SHALL FOLLOW DTI MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION, LUBRICATION, TIGHTENING AND INSPECTION.

INSPECTION REQUIRED: ALL AJAX BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009, BY A QUALIFIED BOLT INSPECTOR. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE AJAX BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. IN ADDITION, ALL AJAX BOLTS AND DTI'S SHALL BE VISUALLY INSPECTED ACCORDING TO THE DTI MANUFACTURER'S INSTRUCTIONS. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE PHOTO DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTI'S.

NOTE: ALL SHOP AND FIELD DRILLED HOLES SHALL BE NOMINAL 30MM DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1-3/16".

NOTE: ALL AJAX BOLTS, AJAX SPLIT WASHERS, AJAX WASHERS, AJAX NUTS, AND SHEAR SLEEVES SHALL BE HOT DIP GALVANIZED PER ASTM A123 OR A153 AS APPROPRIATE. SHEAR SLEEVES MAY BE COLD GALVANIZED OR ZINC PLATED.



TYPICAL AJAX BOLT DETAIL 1/S-3

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37513-1570 PERMIT.DWG

POLE SPECIFICATIONS	
POLE SHAPE TYPE:	12-SIDED POLYGON
TAPER:	0.325000 IN/FT
SHAFT STEEL:	ASTM A38M-42
BASE PL STEEL:	ASTM A36
ANCHOR RODS:	2"ø ASTM A36

SHAFT SECTION DATA					
SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN) @ TOP	DIAMETER ACROSS FLATS (IN) @ BOTTOM
1	5.00	0.1875	60.00	18.000	18.000
2	50.00	0.2500		18.000	34.313
3	20.00	0.2500		32.181	38.688
4	20.00	0.3125	72.00	38.688	45.188
5	10.00	0.3125		42.613	45.813
6	40.00	0.3750	84.00	45.813	58.875
7	18.00	0.3750		55.839	61.688
8	21.00	0.4375	108.00	61.688	68.500
9	28.00	0.4375		64.705	73.813

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

CONTRACTOR SHALL PROVIDE ASTM A36 SHIM PLATES BELOW SLIP JOINTS. THE SHIM PLATES SHALL BE PLACED BETWEEN THE NEW SHAFT REINFORCEMENT AND THE EXISTING POLE SHAFT FROM THE SLIP JOINT TO THE NEW SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND A EXTRA LONG "SPLICE SHIM" SHALL BE PLACED BETWEEN THE NEW UPPER AND LOWER SHAFT REINFORCEMENT PLATES AT THE SHAFT REINFORCEMENT SPLICE PLATE LOCATION.

MODIFICATIONS:

(A) INSTALL NEW MICROPILES AND MICROPILE BRACKETS AT BASE PLATE. SEE SHEET S-5.

(B) INSTALL NEW SHAFT REINFORCING. SEE CHART.

NEW AEROSOLUTIONS MP3 REINFORCING

ELEVATION	FLAT #	REINFORCING ELEMENT
38'-4" TO 53'-4"	1, 5 & 9	MP304
88'-4" TO 123'-4"	1, 5 & 9	MP305
118'-9" TO 153'-9"	2, 6 & 10	MP304

ALL BOLTS SHALL BE AJAX M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A519 GR 4140, MIN. Fu=120 KSI). CONTACT SUPPLIER FOR MATERIAL (PLATE & BOLTS) AND INSTALLATION PROCEDURES.

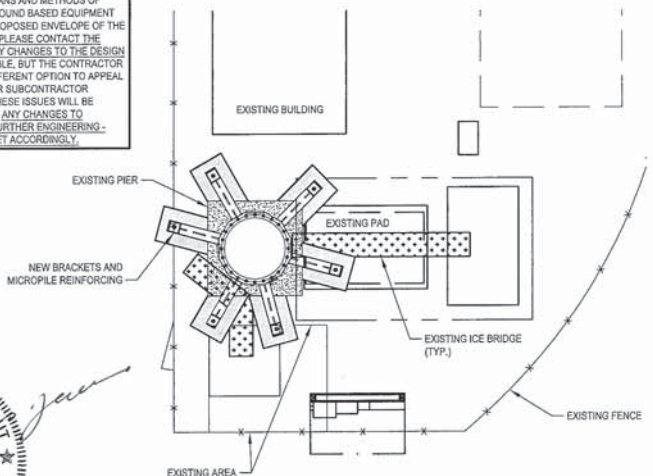
NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE

BOTTOM ELEVATION	TOP ELEVATION	FLAT # / DEGREE SEPARATION	ELEMENT	ELEMENT LENGTH	ELEMENT QUANTITY	APPROXIMATE AJAX BOLTS PER ELEMENT	APPROXIMATE TOTAL AJAX BOLT QUANTITY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	ESTIMATED TOTAL STEEL WEIGHT
38' - 6"	53' - 6"	1, 5 & 9	1" x 4-1/2"	15' - 0"	3	20	60	6	6	16"	689 LBS.
88' - 6"	123' - 6"	1, 5 & 9	1" x 6"	35' - 0"	3	37	111	10	10	20"	2144 LBS.
118' - 0"	154' - 0"	2, 6 & 10	1" x 4-1/2"	35' - 0"	3	39	117	8	8	16"	1608 LBS.
							288				4441 LBS.

NOTES:

1.) AJAX BOLTS ARE TO BE 20mm DIAMETER WITH CORRESPONDING 29mm DIAMETER SLEEVE WITH MATCHING STEEL GRADE.
2.) ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND, FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.
3.) ALL REINFORCING SHALL BE ASTM A572 GR. 65.
4.) WELDS ARE ASSUMED E80XX OR GREATER. TERMINATION WELDS SHALL BE 3/8" FILLET WELDS.
5.) HOLES FOR AJAX BOLTS AND SHEAR SLEEVES ARE 30mm UNLESS NOTED OTHERWISE.
6.) ALL SHIMS SHALL BE ASTM A-36.

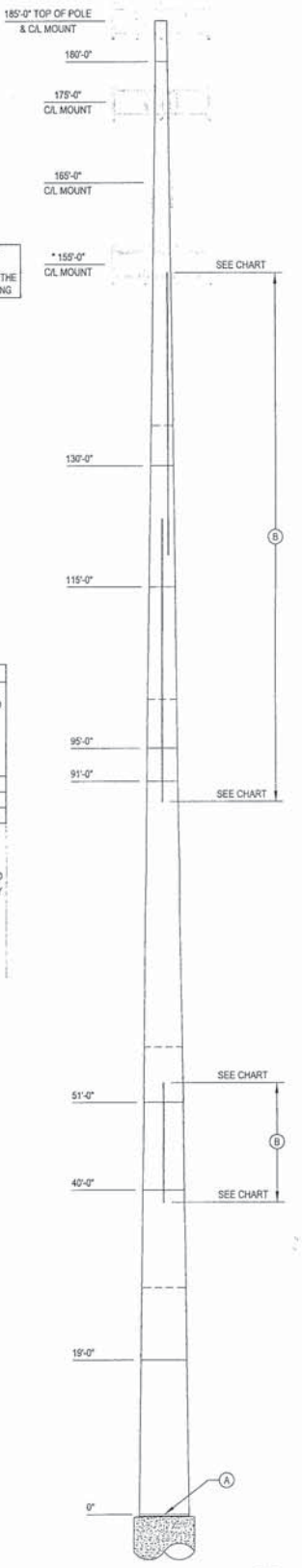
SITE COORDINATION REQUIRED: IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE MEANS AND METHODS OF SHORING AND/OR RELOCATION OF GROUND BASED EQUIPMENT THAT IS WILL BE AFFECTED BY THE PROPOSED ENVELOPE OF THE CURRENT FOUNDATION MOD DESIGN. PLEASE CONTACT THE E.O.R. IF DESIGN INPUT OR NECESSARY CHANGES TO THE DESIGN ARE NEEDED. IF THE DESIGN IS FEASIBLE, BUT THE CONTRACTOR HAS A PREFERENCE TO INSTALL A DIFFERENT OPTION TO APPEAL TO MORE FAVORABLE TECHNIQUES OR SUBCONTRACTOR LIMITATIONS - IT IS EXPECTED THAT THESE ISSUES WILL BE ADDRESSED AT THE TIME OF BIDDING. ANY CHANGES TO ORIGINAL DESIGN WILL BE REQUIRE FURTHER ENGINEERING - CONTRACTOR IS EXPECTED TO BUDGET ACCORDINGLY.



PARTIAL SITE PLAN 2 S-4

AUG 1 4 2013

* EXISTING MOUNTS MAY NEED TO BE ADJUSTED, MOVED AND/OR TEMPORARILY SUPPORTED DURING THE INSTALLATION OF SHAFT REINFORCING



POLE ELEVATION 1 S-4

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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

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DRAWN BY: B.M.S.	
CHECKED BY: B.K.K.	
APPROVED BY:	S-4
DATE: 8-14-2013	

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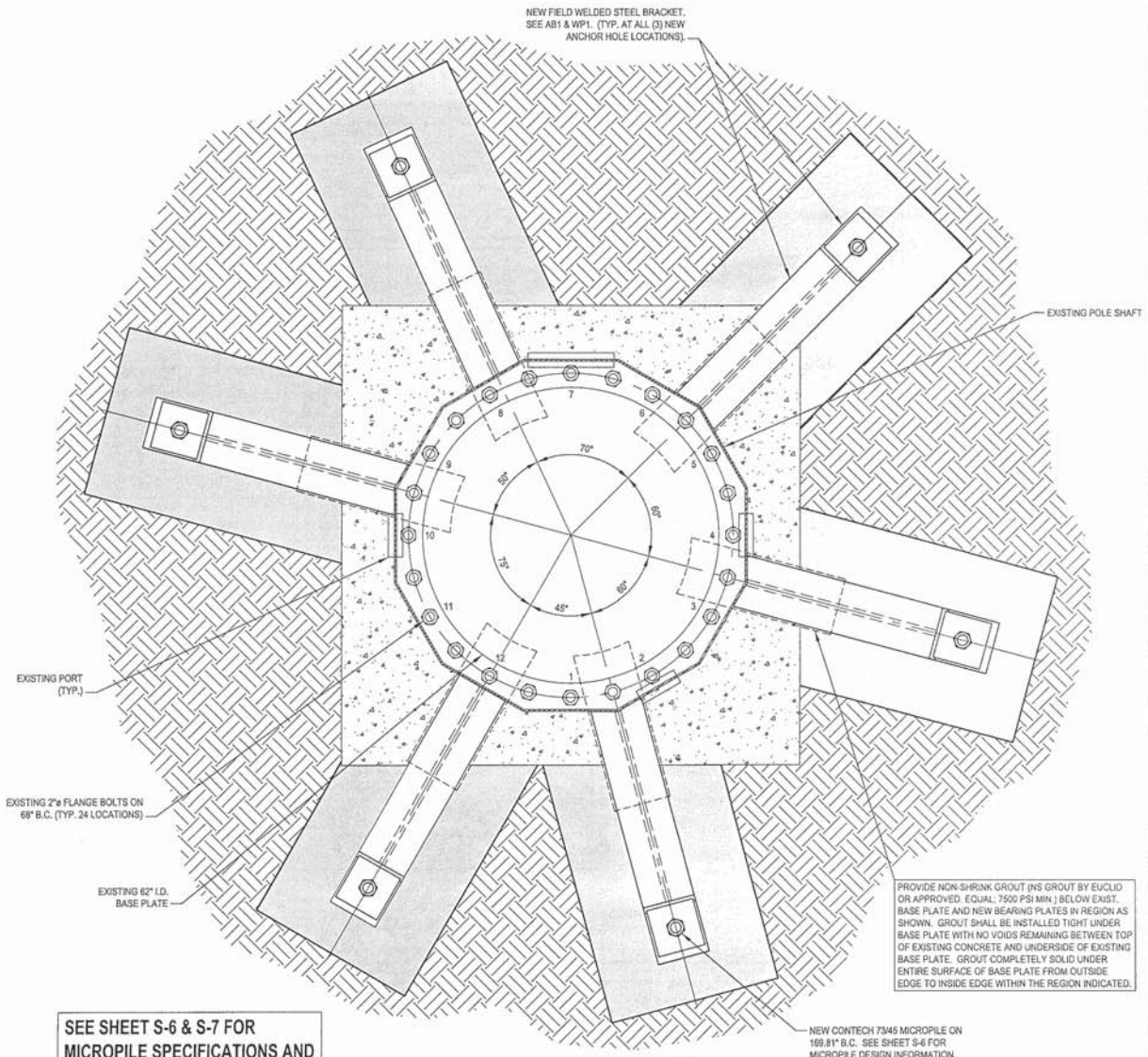
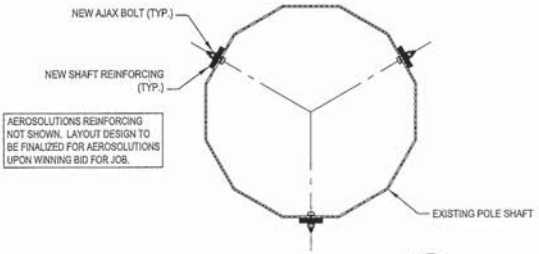


SEE SHEET S-6 & S-7 FOR MICROPILE SPECIFICATIONS AND ANCHOR BRACKET DETAILS

A BASE SECTION 1 / S-5



AEROSOLUTIONS REINFORCING NOT SHOWN. LAYOUT DESIGN TO BE FINALIZED FOR AEROSOLUTIONS UPON WINNING BID FOR JOB.

B BASE SECTION 2 / S-5

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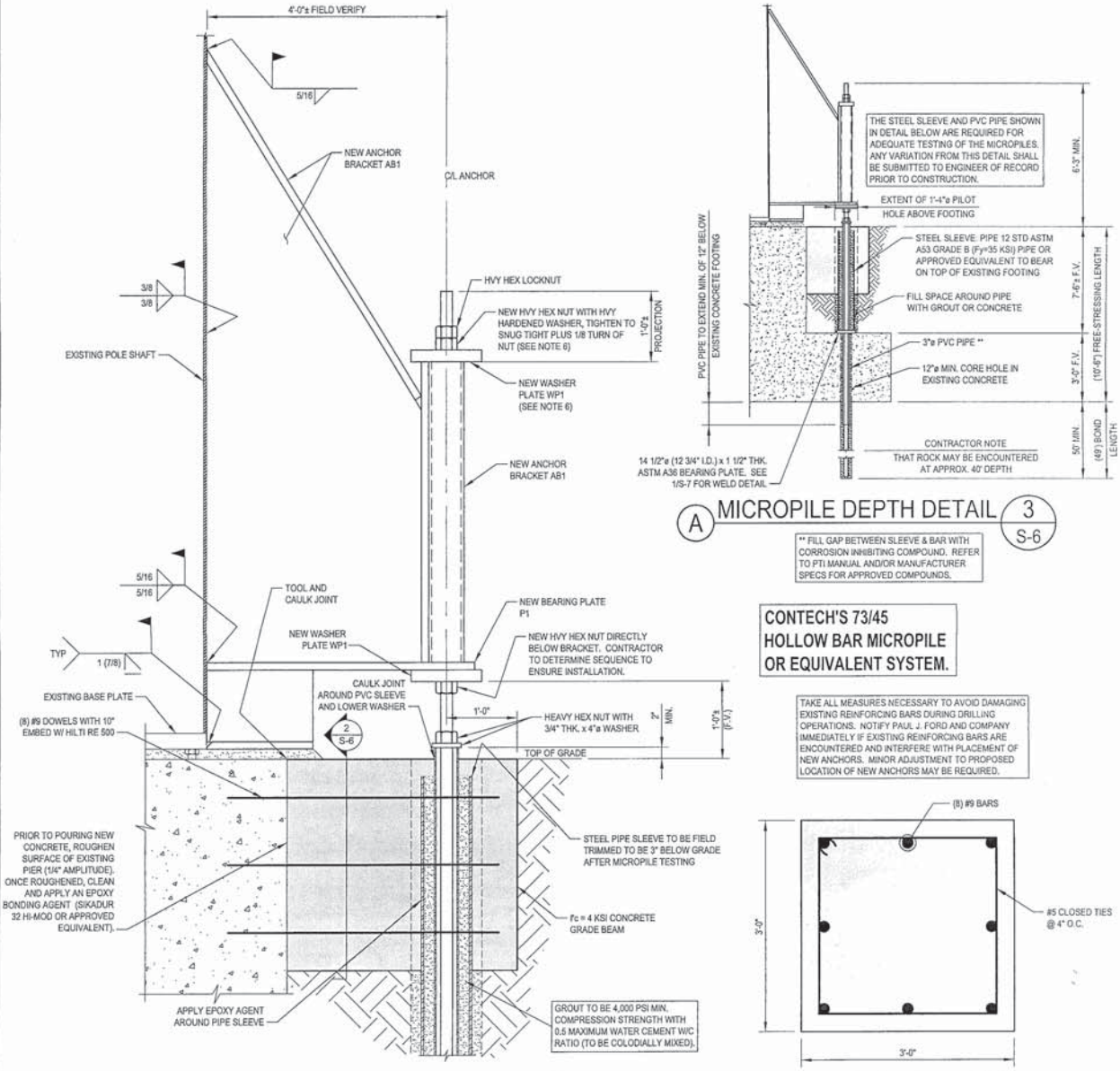
MICROPILE TESTING REQUIREMENTS

A MINIMUM OF 2 IN-PLACE MICROPILES (TEST PILES SHALL BE IN OPPOSITE CORNERS) ARE TO BE TESTED TO 274k IN TENSION. ALL PILE TESTING SHALL BE CARRIED OUT IN GENERAL CONFORMANCE WITH ASTM D1143 OR D3689. A HYDRAULIC JACK MAY BE SUBSTITUTED FOR THE PILE TESTING SET-UPS SHOWN IN THE ASTM SPECS. IF A HYDRAULIC JACK IS USED, FOLLOW EQUIPMENT GUIDELINES DISCUSSED IN THE POST TENSIONING INSTITUTE "RECOMMENDATIONS FOR PRESTRESSED ROCK AND SOIL ANCHORS" DESIGN GUIDE, SECTION 8.2. PILES SHALL BE LOADED USING PTI'S PROOF TEST METHODOLOGY (REFER TO SECTION 8.3.3 OF THE PTI DESIGN GUIDE; ALIGNMENT LOAD, AL, SHALL BE 20 KIPS; DESIGN LOAD, DL, IS 206 KIPS). PROVISION SHALL BE MADE TO ALLOW FOR MOVEMENT BETWEEN MICROPILE CROSS-SECTION AND SOIL SO THAT GROUT-TO-SOIL BOND LINE IS ADEQUATELY TESTED. IF COMPRESSION TESTING IS PERFORMED, CONTRACTOR SHALL PROTECT BAR FROM DAMAGE DUE TO BUCKLING FOR LENGTH ABOVE GRADE.

MICROPILE NOTES:

1. ALL HOLLOW BAR STEEL AND ASSOCIATED HARDWARE SHALL BE SUPPLIED BY CON-TECH SYSTEMS OR OWNER/EOR APPROVED EQUIVALENT.
2. ALL HOLLOW BAR, NUTS AND BEARING PLATES SHALL BE HOT-DIP GALVANIZED PER ASTM A123 OR A153, AS APPROPRIATE.
3. CONTACT CON-TECH SYSTEMS (OR MANUFACTURER OF APPROVED ALTERNATE) FOR MATERIALS AND INSTALLATION PROCEDURES AND RECOMMENDATIONS.
4. SPECIAL INSPECTION OF THE MICROPILES IS REQUIRED AS FOLLOWS: (1) VERIFY THAT MICROPILE MATERIAL, SIZE AND LENGTH COMPLY WITH THE INFORMATION SHOWN ON THIS DRAWING, (2) VERIFY PLACEMENT OF EACH MICROPILE, (3) OBSERVE DRILLING, GROUTING AND TESTING (AS APPROPRIATE) OPERATIONS FOR EACH MICROPILE AND MAINTAIN COMPLETE AND ACCURATE RECORDS FOR EACH MICROPILE.
5. FOUNDATION DESIGN IS BASED ON THE ORIGINAL GEOTECHNICAL REPORT PREPARED BY FDH, DATED 8-2-2013.
6. CONTACT CONTECH SYSTEMS (OR MANUFACTURER OF APPROVED ALTERNATE) TO VERIFY NUT & WASHER CONNECTION ARE COMPATIBLE WITH MICROPILE THREADS



A NEW MICROPILE & BRACKET DETAIL 1 S-6

A MICROPILE DEPTH DETAIL 3 S-6

** FILL GAP BETWEEN SLEEVE & BAR WITH CORROSION INHIBITING COMPOUND. REFER TO PTI MANUAL AND/OR MANUFACTURER SPECS FOR APPROVED COMPOUNDS.

CONTECH'S 73/45 HOLLOW BAR MICROPILE OR EQUIVALENT SYSTEM.

TAKE ALL MEASURES NECESSARY TO AVOID DAMAGING EXISTING REINFORCING BARS DURING DRILLING OPERATIONS. NOTIFY PAUL J. FORD AND COMPANY IMMEDIATELY IF EXISTING REINFORCING BARS ARE ENCOUNTERED AND INTERFERE WITH PLACEMENT OF NEW ANCHORS. MINOR ADJUSTMENT TO PROPOSED LOCATION OF NEW ANCHORS MAY BE REQUIRED.

SECTION 2 S-6

PILE DESIGN PARAMETER SCHEDULE

PARAMETER / OPTIONS	MIN. HOLE ø/STEEL AREA	PILE CAPACITY (Pw/D)	ULTIMATE SKIN FRICTION (PSI)	FREESTRESSING LENGTH	FRICTION DEVELOPMENT LENGTH/BOND LENGTH	ROCK SOCKET/ PLUNGE LENGTH	TOTAL LENGTH
MICROPILE	* 12"ø 4.02 IN² MIN.	219.9K	VARIES, SEE GEOTECH	5'	50'	N.A.	61'-3"

* THE DESIGN ANTICIPATES A FINAL GROUT DIAMETER OF 12" BASED ON A MINIMUM 280MM AUGER IN SILT W/ CLAY AND SAND. THE DESIGN REQUIRES UNCASED MICROPILES FOR THE LISTED CAPACITY IN TENSION AND COMPRESSION AS LAID OUT PER PLAN. THE CONTRACTOR/MICROPILE INSTALLER IS RESPONSIBLE FOR THE MEANS AND METHODS TO ENSURE THE NECESSARY CAPACITY AND WILL DEMONSTRATE THE INSTALLED CAPACITY PER THE SPECIFIED TESTING. THE EMBEDMENT DEPTH AND AUGER/GROUT DIAMETERS ARE LISTED AS A PRELIMINARY BASIS FOR BIDDING. THE INTENT IS FOR THE INSTALLER TO REVIEW THE CURRENT SOIL INFORMATION AND DESIGN REQUIREMENTS TO ENSURE THAT THE CONTRACTOR'S SPECIFIC EQUIPMENT OR INSTALLATION TECHNIQUE IS APPROPRIATE. IF THE CONTRACTOR BELIEVES THE SCOPE SHOULD CHANGE UPON REVIEW, PLEASE ADDRESS PRIOR TO BIDDING. PLEASE COORDINATE WITH ENGINEER OF RECORD PRIOR TO INSTALLATION.

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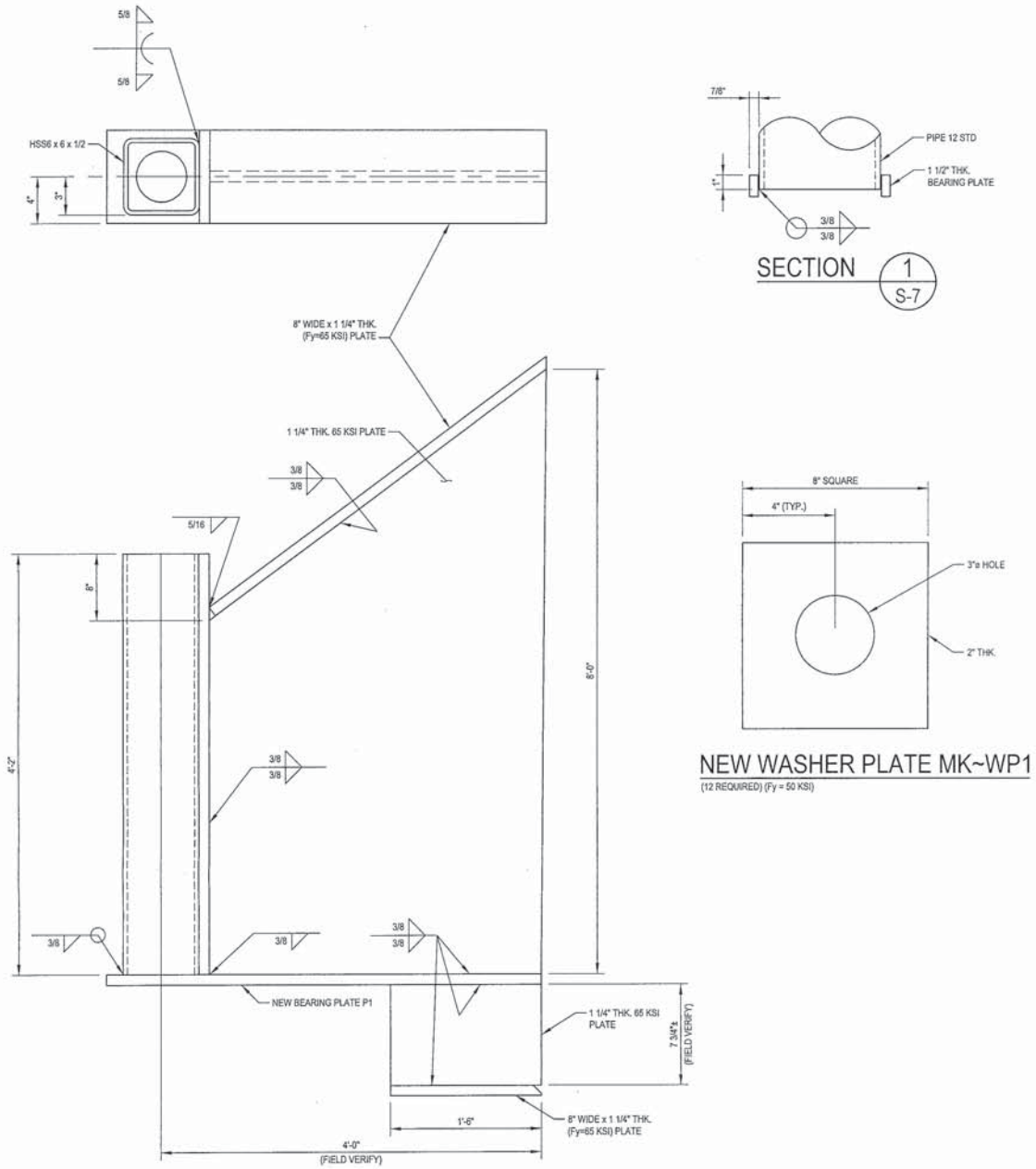
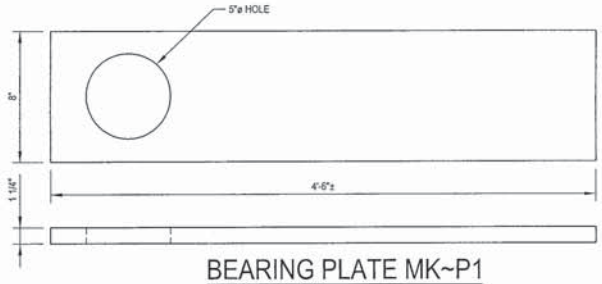


NEW MICROPILE BRACKET MK~AB1

(6 REQUIRED) (PIPE Fy=42 KSI) (STIFFENER Fy = 65 KSI)

NEW WASHER PLATE MK~WP1

(12 REQUIRED) (Fy = 50 KSI)



BEARING PLATE MK~P1

(6 REQUIRED) (Fy = 65 KSI)

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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 DRAWINGS, 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 RESIDES WITH THE EOR AT ALL TIMES.

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) 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 IN-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 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 AN DENG-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, PREFERABLE 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 INSPECTION(S) 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 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 MI'S
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 INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV 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.

PHOTOGRAPHS
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 AND TORQUE
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

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

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

MI CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
	PRE-CONSTRUCTION
X	MI CHECKLIST DRAWINGS
X	EOR APPROVED SHOP DRAWINGS
X	FABRICATION INSPECTION
X	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
X	FABRICATOR NDE INSPECTION
X	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
	CONSTRUCTION
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
X	POST INSTALLED MICROPILE VERIFICATION
X	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK: LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
X	THIRD PARTY ONSITE INSPECTION OF BOLT PRETENSION PER CROWN REQUIREMENTS
X	INSPECTION OF AJAX BOLTS AND DTI'S PER REQUIREMENTS ON SHEET S-3
ADDITIONAL TESTING AND INSPECTIONS:	
	POST-CONSTRUCTION
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
X	THIRD PARTY ONSITE BOLT INSPECTION REPORT
X	POST INSTALLED MICROPILE PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

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

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Excerpt from 9/17/13 Verizon Structural Documents

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

Date: **September 17, 2013**

Steve Tuttle
Crown Castle
8 Parkmeadow Drive
Pittsford, NY 14534

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679

Subject: **Structural Modification Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	119681
	Carrier Site Name:	Middletown NW CT
Crown Castle Designation:	**Crown Castle BU Number:**	825983
	Crown Castle Site Name:	MIDDLETOWN_1
	Crown Castle JDE Job Number:	236900
	Crown Castle Work Order Number:	649747
	Crown Castle Application Number:	188916 Rev. 6
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37513-1570 BP A
Site Data:	**90 Industrial Park Road, Middletown, Middlesex County, CT** **Latitude *41° 35' 8.124"*, Longitude *-72° 42' 49.867"*** **185 Foot - Monopole Tower**	

Dear Steve Tuttle,

Paul J Ford and Company 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 577622, in accordance with application 188916, revision 6.

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

LC4.7: Modified Structure w/ Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The structural analysis was performed for this tower in accordance with the requirements the 2005 Connecticut State Building Code of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings and referenced drawings, dated 8/14/12, for the determined available structural capacity to be effective.

We at *Paul J Ford and Company* 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.

Respectfully submitted by:

John J. Woolley, E.I. BKK
Structural Designer

STATE OF CONNECTICUT
JOSEPH PACHICARAH JACOBS
No. PEN 22731
LICENSED
PROFESSIONAL ENGINEER

tnxTower Report - version 6.1.3.1

SEP 19 2013

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Clarence Welti, 3/27/1998	3473514	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Nudd, 98-5980, 5/1/1998	3880469	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Nudd, 98-5980, 5/1/1998	3473517	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	All-Points Tech, CT107572, 4/26/2005	3879955	CCISITES
4-TOWER PROPOSED REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37513-1570 BP, 8/14/2013	3954032	CCISITES

3.1) Analysis Method

tnxTower (version 6.1.3.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

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) The Nudd manufacturer's drawings specify an anchor rod that does not exist. From experience with Nudd monopoles, the anchors are likely A36 standard anchors and have been assumed as such.
5) Monopole will be reinforced in conformance with the referenced modification drawings dated 8/14/2013.
6) Monopole will be reinforced in conformance with the attached proposed modification drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J Ford and Company should be notified to determine the effect on the structural integrity of the tower.

37513-1570 A PERMIT.DWG

MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

BU NUMBER; SITE NAME

BU #825983; MIDDLETOWN_1

APP: 188916 REV. 6; WO: 649747

SITE ADDRESS

90 INDUSTRIAL PARK ROAD
MIDDLETOWN, CT 06457
MIDDLESEX COUNTY

PROJECT NOTES

1. DETAILED FIELD INFORMATION REGARDING INTERFERENCES AND/OR EXISTING FIELD CONDITIONS MAY BE AVAILABLE ON CROWN'S CCISITES AND FROM CONTRACTOR'S PRE-MOD MAPPING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AND COORDINATE WITH THE AVAILABLE SOURCES OF INFORMATION ABOVE AND WITH THE PROJECT PLANS BEFORE PROCEEDING WITH THE WORK. CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND CROWN CASTLE FIELD PERSONNEL BEFORE PROCEEDING WITH THE WORK.

2. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

3. ALL STRUCTURAL BOLTS SHALL BE FIELD INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

4. (A.) DTI'S REQUIRED: ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAILS ON SHEET S-3 FOR REQUIREMENTS ON THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

   (B.) EFFECTIVE 5/30/2012: UNTIL FURTHER NOTICE, CROWN CASTLE WILL ACCEPT AJAX BOLTS TIGHTENED USING AISC "TURN-OF-NUT" METHOD. INSTALLERS SHALL FOLLOW CROWN GUIDELINES FOR AISC "TURN-OF-NUT" METHOD AND ALSO PROVIDE COMPLETE INSPECTION DOCUMENTATION IN THE PMI. PRIOR TO STARTING WORK, CONTRACTOR SHALL CONSULT WITH CROWN ENGINEERING TO DETERMINE WHETHER THIS POLICY IS STILL IN PLACE.

   (C.) REQUIREMENT EFFECTIVE 04/20/2013, PER CROWN CASTLE DIRECTIVE: ANY AND ALL STRUCTURAL BOLTS THAT ARE TIGHTENED TO THE PRETENSIONED CONDITION USING THE AISC "TURN-OF-NUT" TENSIONING PROCEDURE (NON-TENSION CONTROLLED ['NON-TC'] BOLTS AND/OR BOLTS WITHOUT DTI'S INSTALLED) SHALL BE INSPECTED ONSITE BY AN INDEPENDENT THIRD-PARTY BOLT INSPECTOR, AS APPROVED BY CROWN. **THIS INSPECTION IS REQUIRED TO BE AN ONSITE FIELD INSPECTION.** THE THIRD-PARTY BOLT INSPECTOR SHALL FOLLOW THE PUBLISHED CROWN CASTLE INSPECTION PROCEDURE "MI NON-TC BOLT INSPECTION", DATED APRIL 2013. THE THIRD-PARTY BOLT INSPECTOR SHALL PREPARE A FULLY DOCUMENTED BOLT INSPECTION REPORT, AS SPECIFIED BY CROWN, AND SHALL SUBMIT A COPY OF THE BOLT INSPECTION REPORT TO THE MI INSPECTOR, THE EOR, AND TO CROWN CASTLE.

PROJECT CONTACTS:

MONOPOLE OWNER:
CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
CONTACT: STEVE TUTTLE
PH: (585) 899-3445

STRUCTURAL ENGINEER OF RECORD (EOR):
PAUL J. FORD AND COMPANY
250 EAST BROAD STREET, SUITE 600
COLUMBUS, OHIO 43215-3708
CONTACT: JOHN WOOLLEY AT JWOOLLEY@PJFWEB.COM
PHONE: 614-221-6679

DESIGN STANDARD

THIS REINFORCEMENT DESIGN IS BASED UPON THE REQUIREMENTS OF THE TIA/EIA-222-F-1996 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, USING A DESIGN BASIC WIND SPEED OF 85 MPH (FASTEST MILE) WITH NO ICE, 38 MPH WITH 3/4 INCH ICE AND 50 MPH SERVICE LOADS.

REFER TO THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF STRUCTURAL ANALYSIS FOR THIS SITE (PJF#37513-1570 BP A), DATED 9-17-2013.

THIS PROJECT INCLUDES THE FOLLOWING REINFORCING ELEMENTS:

SHAFT REINFORCING

SHEET INDEX

STATE OF CONNECTICUT — JOSEPH PACHICARA JACOBS — No. PEN.22131 — REGISTERED PROFESSIONAL ENGINEER

SEP 19 2013

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street - Suite 600 - Columbus, Ohio 43215
(614) 221-6679 www.pjfweb.com

CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
PH: (585) 899-3445 FAX: (585) 899-3448

BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No:	37513-1570A
DRAWN BY:	B.M.S.
CHECKED BY:	J.J.W.
APPROVED BY:	BKK
DATE:	9-17-2013

ISSUE DATE OF PERMIT: 9-17-2013

T-1

Excerpt from 9/9/14 T-Mobile Structural Analysis

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

Date: **September 09, 2014**

Debra Elliott
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
jwoolley@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11057C
	Carrier Site Name:	N/A
Crown Castle Designation:	**Crown Castle BU Number:**	825983
	Crown Castle Site Name:	MIDDLETOWN_1
	Crown Castle JDE Job Number:	302375
	Crown Castle Work Order Number:	907744
	Crown Castle Application Number:	261508 Rev. 1
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37513-1570.002.7805
Site Data:	**90 Industrial Park Road, Middletown, Middlesex County, CT** **Latitude *41° 35' 8.3"*, Longitude *-72° 42' 50.49"*** **185 Foot - Monopole Tower**	

Dear Debra Elliott,

Paul J Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 685783, in accordance with application 261508, revision 1.

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

LC4.7: Existing + Reserved + Proposed Equipment w/ Proposed Modifications **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The structural analysis was performed for this tower in accordance with the requirements the 2005 Connecticut State Building Code of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

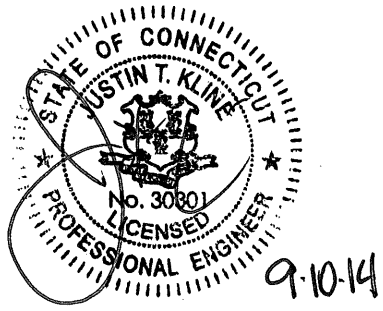
All modifications and equipment proposed in this report shall be installed in accordance with the referenced drawings, dated 8/14/13 and 9/17/13, for the determined available structural capacity to be effective.

We at *Paul J Ford and Company* 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.

Respectfully submitted by:

John J. Woolley, E.I.
Structural Designer

tnxTower Report - version 6.1.4.1



3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Clarence Welti, 3/27/1998	3473514	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Nudd, 98-5980, 5/1/1998	3880469	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Nudd, 98-5980, 5/1/1998	3473517	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	All-Points Tech, CT107572, 4/26/2005	3879955	CCISITES
4-TOWER PROPOSED REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37513-1570 BP, 8/14/2013	3954032	CCISITES
4-TOWER PROPOSED REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37513-1570 BP A, 9/17/13	3990532	CCISITES

3.1) Analysis Method

tnxTower (version 6.1.4.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

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) The Nudd manufacturer's drawings specify an anchor rod that does not exist. From experience with Nudd monopoles, the anchors are likely A36 standard anchors and have been assumed as such.
5) Monopole will be reinforced in conformance with the referenced modification drawings dated 8/14/2013.
6) Monopole will be reinforced in conformance with the referenced proposed modification drawings dated 9/17/13.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J Ford and Company should be notified to determine the effect on the structural integrity of the tower.

Excerpt from Modification Inspection Reports

6.2.1 CONSTRUCTION INSPECTIONS

LCC Deployment Services Inc.
2242 Old Marlton Pike, Marlton, NJ 08053
856-810-1658 (Ph) 856-810-1659 (Fax)

To: Crown Castle

Subject: Construction inspection

Site: **Middletown 1 - 825983**

December 10, 2014

Please be advised that all work was completed per drawings dated **09/17/2013 & 08/14/2013** by **Paul J. Ford and Company**, in accordance with industry standards and contract documents including modification drawings and specifications, state and local regulations, OSHA, and engineering standards. On-site cold galvanizing was applied in accordance with Crown ENG-BUL-10149.

Please let me know if you have any questions.

Thank you,

Keith A. Stackhouse
Structural Construction Manager
LCC Deployment Services

Centek Engineering, Inc.
3-2 North Branford Road
Branford, Connecticut 06405
Phone: (203) 488-0580
Fax: (203) 488-8587

Steven L. Levine
Real Estate Consultant

June 30, 2015

Mayor Daniel T. Drew
City of Middletown
Municipal Bldg., 245 DeKoven Drive
Middletown, CT 06457

Re: New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 90 Industrial Park Road, Middletown

Dear Mayor Drew:

In order to accommodate technological changes, implement Uniform Mobile Telecommunications System ("UMTS") and Long Term Evolution ("LTE") capabilities, and enhance system performance in the State of Connecticut, New Cingular Wireless PCS, LLC ("AT&T") will be changing its equipment configuration at certain cell sites.

As required by Regulations of Connecticut State Agencies ("R.C.S.A.") Section 16-50j-73, the Connecticut Siting Council has been notified of the changes and will review AT&T's proposal. Please accept this letter as notification under Section 16-50j-73 of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2).

The enclosed Notice fully sets forth the AT&T proposal. However, if you have any questions or require any further information on the plans for the site or the Siting Council's procedures, please contact the undersigned at 860-830-0380 or Ms. Melanie Bachman, Acting Executive Director, Connecticut Siting Council at (860) 827-2935.

Sincerely,

Steven L. Levine
Real Estate Consultant

Enclosure

Centek Engineering, Inc.
3-2 North Branford Road
Branford, Connecticut 06405
Phone: (203) 488-0580
Fax: (203) 488-8587

Steven L. Levine
Real Estate Consultant

June 30, 2015

Philip C. Armetta
90 Industrial Park Road
Middletown, CT 06457

Re: New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 90 Industrial Park Road, Middletown

Dear Mr. Armetta,

In order to accommodate technological changes, implement Uniform Mobile Telecommunications System ("UMTS") and Long Term Evolution ("LTE") capabilities, and enhance system performance in the State of Connecticut, New Cingular Wireless PCS, LLC ("AT&T") will be changing its equipment configuration at certain cell sites.

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Sincerely,

Steven L. Levine
Real Estate Consultant

Enclosure

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

Date: **August 14, 2013**

Steve Tuttle
Crown Castle
8 Parkmeadow Drive
Pittsford, NY 14534
585.899.3445

Paul J Ford and Company
600 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
bkermode@pjfweb.com

Subject: Structural Modification Report

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT1044
	Carrier Site Name:	CT1044
Crown Castle Designation:	**Crown Castle BU Number:**	825983
	Crown Castle Site Name:	MIDDLETOWN_1
	Crown Castle JDE Job Number:	231183
	Crown Castle Work Order Number:	628395
	Crown Castle Application Number:	185826 Rev. 13
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37513-1570 BP
Site Data:	**90 Industrial Park Road, Middletown, Middlesex County, CT** **Latitude *41° 35' 8.124"*, Longitude *-72° 42' 49.867"*** **185 Foot - Monopole Tower**	

Dear Steve Tuttle,

Paul J Ford and Company 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 559770, in accordance with application 185826, revision 13.

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

LC4.5: Modified Structure w/ Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing loading, respectively.

The structural analysis was performed for this tower in accordance with the requirements the 2005 Connecticut State Building Code of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

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 *Paul J Ford and Company* 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:

Respectfully submitted by:

Brian K. Kermode
Project Engineer

tnxTower Report - version 6.1.3.1

AUG 1 4 2013

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

Date: **August 14, 2013**

Steve Tuttle
Crown Castle
8 Parkmeadow Drive
Pittsford, NY 14534
585.899.3445

Paul J Ford and Company
600 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
bkermode@pjfweb.com

Subject: Structural Modification Report

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT1044
	Carrier Site Name:	CT1044
Crown Castle Designation:	**Crown Castle BU Number:**	825983
	Crown Castle Site Name:	MIDDLETOWN_1
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	Crown Castle Work Order Number:	628395
	Crown Castle Application Number:	185826 Rev. 13
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37513-1570 BP
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We at *Paul J Ford and Company* 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:

Respectfully submitted by:

Brian K. Kermode
Project Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 185 ft Monopole tower designed by FRED A. NUDD CORPORATION in May of 1998. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-E.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
175.0	175.0	6	communication components inc.	DTMABP7819VG12A	1 2	3/8 3/4	-
		6	ericsson	RRUS-11			
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		6	powerwave technologies	LGP13519			
		1	raycap	DC6-48-60-18-8F			

Table 2 - Existing 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
185.0	185.0	3	andrew	ETW190VS12UB	21	1-5/8	1
		1	andrew	HP2-102			
		9	ericsson	AIR 21 w/ Mount Pipe			
		3	ericsson	AIR 33 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Sector Mount [SM 802-3]			
175.0	175.0	6	powerwave technologies	LGP21401	-	-	2
		6	powerwave technologies	LGP21903			
		6	powerwave technologies	7770.00 w/ Mount Pipe	12	1-1/4	1
		1	tower mounts	Sector Mount [SM 802-3]			
165.0	165.0	3	kathrein	742 213 w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	Pipe Mount [PM 601-3]			

Notes:
1) Existing Equipment
2) Equipment To Be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Clarence Welti, 3/27/1998	3473514	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Nudd, 98-5980, 5/1/1998	3880469	CCISITES
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4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	All-Points Tech, CT107572, 4/26/2005	3879955	CCISITES

3.1) Analysis Method

tnxTower (version 6.1.3.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

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.
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5) Monopole was reinforced in conformance with the referenced modification drawings.
6) Monopole will be reinforced in conformance with the attached proposed modification drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J Ford and Company should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	185 - 180	Pole	TP18x18x0.1875	1	-2.156	361.254	23.1	Pass
L2	180 - 151.833	Pole	TP27.1894x18x0.25	2	-6.406	728.474	95.3	Pass
L3	151.833 - 130	Pole	TP34.3125x27.1894x0.3802	3	-9.032	1328.220	76.1	Pass
L4	130 - 120.667	Pole	TP36.844x31.9209x0.3636	4	-12.136	1434.774	88.3	Pass
L5	120.667 - 115	Pole	TP38.6875x36.844x0.4005	5	-13.263	1624.154	83.8	Pass
L6	115 - 95	Pole	TP45.1875x38.6875x0.4463	6	-16.525	2065.883	76.7	Pass
L7	95 - 91	Pole	TP45.8125x42.3448x0.4379	7	-20.227	2149.036	82.2	Pass
L8	91 - 51	Pole	TP58.875x45.8125x0.375	8	-28.461	2262.447	99.7	Pass
L9	51 - 40	Pole	TP61.6875x55.8391x0.4404	9	-35.883	2765.682	92.6	Pass
L10	40 - 19	Pole	TP68.5x61.6875x0.4375	10	-40.031	3068.846	89.2	Pass
L11	19 - 0	Pole	TP73.8125x64.7054x0.4375	11	-53.315	3244.402	98.1	Pass
							Summary	
						Pole (L8)	99.7	Pass
						Rating =	99.7	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	59.0	Pass
1	Base Plate	0	42.7	Pass
1	Base Foundation	0	71.4	Pass

Structure Rating (max from all components) =	99.7%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.

4.1) Recommendations

Install modifications per the attached reinforcing drawings.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

1. Tower is located in Middlesex County, Connecticut.
2. Basic wind speed of 85 mph.
3. Nominal ice thickness of 0.7500 in.
4. Ice density of 56.000 pcf.
5. A wind speed of 38 mph is used in combination with ice.
6. Temperature drop of 50.000 °F.
7. Deflections calculated using a wind speed of 50 mph.
8. A non-linear (P-delta) analysis was used.
9. Pressures are calculated at each section.
10. Stress ratio used in pole design is 1.333.
11. Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	185.000-180.000	5.000	0.000	12	18.0000	18.0000	0.1875	0.7500	A36M-42 (42 ksi)
L2	180.000-151.833	28.167	0.000	12	18.0000	27.1894	0.2500	1.0000	A36M-42 (42 ksi)
L3	151.833-130.000	21.833	5.000	12	27.1894	34.3125	0.3802	1.5206	Reinf 42.00 ksi (42 ksi)
L4	130.000-120.667	14.333	0.000	12	31.9209	36.8440	0.3636	1.4544	Reinf 42.00 ksi (42 ksi)
L5	120.667-115.000	5.667	0.000	12	36.8440	38.6875	0.4005	1.6019	Reinf 41.13 ksi (41 ksi)
L6	115.000-95.000	20.000	6.000	12	38.6875	45.1875	0.4463	1.7854	Reinf 42.00 ksi (42 ksi)
L7	95.000-91.000	10.000	0.000	12	42.3448	45.8125	0.4379	1.7515	Reinf 42.00 ksi (42 ksi)
L8	91.000-51.000	40.000	7.000	12	45.8125	58.8750	0.3750	1.5000	A36M-42 (42 ksi)
L9	51.000-40.000	18.000	0.000	12	55.8391	61.6875	0.4404	1.7618	Reinf 39.81 ksi (40 ksi)
L10	40.000-19.000	21.000	9.000	12	61.6875	68.5000	0.4375	1.7500	A36M-42 (42 ksi)
L11	19.000-0.000	28.000		12	64.7054	73.8125	0.4375	1.7500	A36M-42

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
									(42 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	18.6350	10.7543	435.5296	6.3769	9.3240	46.7106	882.5011	5.2929	4.3215	23.048
	18.6350	10.7543	435.5296	6.3769	9.3240	46.7106	882.5011	5.2929	4.3215	23.048
L2	18.6350	14.2888	574.6149	6.3545	9.3240	61.6275	1164.3256	7.0325	4.1540	16.616
	28.1485	21.6862	2008.8389	9.6443	14.0841	142.6316	4070.4522	10.6733	6.6168	26.467
L3	28.1485	32.8176	3010.6569	9.5977	14.0841	213.7628	6100.4071	16.1518	6.2679	16.488
	35.5229	41.5371	6104.4940	12.1478	17.7739	343.4532	12369.3598	20.4433	8.1769	21.509
L4	34.8249	36.9481	4696.5399	11.2975	16.5350	284.0356	9516.4632	18.1847	7.5803	20.847
	38.1438	42.7122	7255.3353	13.0600	19.0852	380.1548	14701.2763	21.0216	8.8997	24.476
L5	38.1438	46.9956	7966.8206	13.0468	19.0852	417.4342	16142.9385	23.1298	8.8009	21.976
	40.0522	49.3729	9237.9871	13.7068	20.0401	460.9745	18718.6663	24.2998	9.2950	23.21
L6	40.0522	54.9608	10258.9002	13.6903	20.0401	511.9180	20787.3131	27.0500	9.1721	20.549
	46.7815	64.3027	16429.6893	16.0173	23.4071	701.9098	33291.0048	31.6478	10.9141	24.452
L7	45.9926	59.0863	13244.7930	15.0027	21.9346	603.8306	26837.5414	29.0805	10.1749	23.237
	47.4286	63.9756	16812.2680	16.2441	23.7309	708.4555	34066.2129	31.4868	11.1043	25.36
L8	47.4286	54.8658	14458.2714	16.2666	23.7309	609.2599	29296.3778	27.0033	11.2728	30.061
	60.9519	70.6388	30856.0755	20.9430	30.4973	1011.7658	62522.7744	34.7662	14.7735	39.396
L9	60.1635	78.5673	30776.9426	19.8327	28.9246	1064.0391	62362.4297	38.6684	13.7845	31.297
	63.8636	86.8616	41589.5590	21.9264	31.9541	1301.5396	84271.7220	42.7506	15.3519	34.856
L10	63.8636	86.2859	41317.8922	21.9275	31.9541	1293.0378	83721.2515	42.4673	15.3598	35.108
	70.9164	95.8830	56694.8448	24.3664	35.4830	1597.8030	114879.1262	47.1907	17.1855	39.281
L11	70.0185	90.5373	47731.0885	23.0079	33.5174	1424.0700	96716.1258	44.5597	16.1685	36.957
	76.4163	103.3670	71033.6649	26.2682	38.2349	1857.8239	143933.4632	50.8741	18.6092	42.535

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 185.000-180.000				1	1	1		
L2 180.000-151.833				1	1	1		
L3 151.833-130.000				1	1	1		
L4 130.000-120.667				1	1	1		
L5 120.667-115.000				1	1	1		
L6 115.000-95.000				1	1	1		
L7 95.000-91.000				1	1	1		
L8 91.000-51.000				1	1	1		
L9 51.000-				1	1	1		

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
40.000								
L10 40.000-19.000				1	1	1		
L11 19.000-0.000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	185.000 - 0.000	1	No Ice	0.198	0.001
						1/2" Ice	0.298	0.002
						1" Ice	0.398	0.004
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	185.000 - 0.000	5	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
LDF7-50A(1-5/8")	C	No	Inside Pole	185.000 - 0.000	15	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
LDF6-50A(1-1/4")	C	No	Inside Pole	175.000 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
FB-L98-002-XXX(3/8)	C	No	Inside Pole	175.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	175.000 - 0.000	2	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
LDF7-50A(1-5/8")	C	No	Inside Pole	165.000 - 0.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
Aero MP3-04	C	No	CaAa (Out Of Face)	53.330 - 38.330	1	No Ice	0.269	0.000
						1/2" Ice	0.380	0.000
						1" Ice	0.491	0.000
Aero MP3-05	C	No	CaAa (Out Of Face)	123.330 - 88.330	1	No Ice	0.348	0.000
						1/2" Ice	0.400	0.000
						1" Ice	0.657	0.000
Aero MP3-04	C	No	CaAa (Out Of Face)	153.750 - 123.330	1	No Ice	0.269	0.000
						1/2" Ice	0.380	0.000
						1" Ice	0.491	0.000

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	185.000-180.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.990	0.086
L2	180.000-151.833	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	6.093	0.762
L3	151.833-130.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	10.197	0.683
L4	130.000-120.667	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	4.569	0.292
L5	120.667-115.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	3.093	0.177
L6	115.000-95.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	0.000	10.916	0.626
L7	95.000-91.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	2.183	0.125
L8	91.000-51.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	9.475	1.252
L9	51.000-40.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	5.137	0.344
L10	40.000-19.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	4.607	0.657
L11	19.000-0.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	3.762	0.595

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	185.000-180.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	1.740	0.163
L2	180.000-151.833	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	10.637	1.198
L3	151.833-130.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	17.111	1.021
L4	130.000-120.667	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	7.561	0.437
L5	120.667-115.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	4.966	0.265
L6	115.000-95.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	17.526	0.935
L7	95.000-91.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	3.505	0.187
L8	91.000-51.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	16.346	1.871
L9	51.000-40.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	8.621	0.514
L10	40.000-19.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	8.036	0.982
L11	19.000-0.000	A	0.750	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	6.612	0.889

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	185.000-180.000	-0.2272	0.1312	-0.3437	0.1984
L2	180.000-151.833	-0.2561	0.1478	-0.3930	0.2269
L3	151.833-130.000	-0.5132	0.2963	-0.7516	0.4339
L4	130.000-120.667	-0.5459	0.3151	-0.7991	0.4613
L5	120.667-115.000	-0.6042	0.3488	-0.8636	0.4986

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L6	115.000-95.000	-0.6132	0.3541	-0.8848	0.5109
L7	95.000-91.000	-0.6191	0.3575	-0.8990	0.5190
L8	91.000-51.000	-0.2908	0.1679	-0.4717	0.2723
L9	51.000-40.000	-0.5548	0.3203	-0.8613	0.4973
L10	40.000-19.000	-0.2726	0.1574	-0.4526	0.2613
L11	19.000-0.000	-0.2488	0.1437	-0.4185	0.2416

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***									
(3) AIR 21 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	6.738 7.246 7.753	5.668 6.491 7.261	0.111 0.168 0.231
(3) AIR 21 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	6.738 7.246 7.753	5.668 6.491 7.261	0.111 0.168 0.231
(3) AIR 21 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	6.738 7.246 7.753	5.668 6.491 7.261	0.111 0.168 0.231
AIR 33 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	6.458 6.934 7.416	5.742 6.489 7.229	0.127 0.183 0.245
AIR 33 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	6.458 6.934 7.416	5.742 6.489 7.229	0.127 0.183 0.245
AIR 33 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	6.458 6.934 7.416	5.742 6.489 7.229	0.127 0.183 0.245
ETW190VS12UB	A	From Leg	4.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	0.664 0.778 0.901	0.367 0.461 0.564	0.015 0.020 0.026
ETW190VS12UB	B	From Leg	4.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	0.664 0.778 0.901	0.367 0.461 0.564	0.015 0.020 0.026
ETW190VS12UB	C	From Leg	4.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	0.664 0.778 0.901	0.367 0.461 0.564	0.015 0.020 0.026
DC6-48-60-18-8F	A	From Leg	4.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice 1" Ice	2.567 2.798 3.038	2.567 2.798 3.038	0.019 0.041 0.067
Sector Mount [SM 802-3]	C	None		0.000	185.000	No Ice 1/2" Ice 1" Ice	24.410 31.390 38.370	24.410 31.390 38.370	0.930 1.362 1.794
****									
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	10.000	175.000	No Ice 1/2" Ice 1" Ice	6.119 6.626 7.128	4.254 5.014 5.711	0.055 0.103 0.157
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.000	10.000	175.000	No Ice	6.119	4.254	0.055

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1/2" Ice	6.626	5.014	0.103
			0.000			1" Ice	7.128	5.711	0.157
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.000	10.000	175.000	No Ice	6.119	4.254	0.055
			0.000			1/2" Ice	6.626	5.014	0.103
			0.000			1" Ice	7.128	5.711	0.157
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.000	23.000	175.000	No Ice	8.498	6.304	0.074
			0.000			1/2" Ice	9.149	7.479	0.139
			0.000			1" Ice	9.767	8.368	0.212
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.000	22.000	175.000	No Ice	8.498	6.304	0.074
			0.000			1/2" Ice	9.149	7.479	0.139
			0.000			1" Ice	9.767	8.368	0.212
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.000	14.000	175.000	No Ice	8.498	6.304	0.074
			0.000			1/2" Ice	9.149	7.479	0.139
			0.000			1" Ice	9.767	8.368	0.212
(2) RRUS-11	A	From Leg	4.000	23.000	175.000	No Ice	3.249	1.373	0.048
			0.000			1/2" Ice	3.491	1.551	0.068
			0.000			1" Ice	3.741	1.738	0.092
(2) RRUS-11	B	From Leg	4.000	22.000	175.000	No Ice	3.249	1.373	0.048
			0.000			1/2" Ice	3.491	1.551	0.068
			0.000			1" Ice	3.741	1.738	0.092
(2) RRUS-11	C	From Leg	4.000	14.000	175.000	No Ice	3.249	1.373	0.048
			0.000			1/2" Ice	3.491	1.551	0.068
			0.000			1" Ice	3.741	1.738	0.092
(2) LGP13519	A	From Leg	4.000	23.000	175.000	No Ice	0.338	0.207	0.005
			0.000			1/2" Ice	0.422	0.280	0.008
			0.000			1" Ice	0.515	0.362	0.012
(2) LGP13519	B	From Leg	4.000	22.000	175.000	No Ice	0.338	0.207	0.005
			0.000			1/2" Ice	0.422	0.280	0.008
			0.000			1" Ice	0.515	0.362	0.012
(2) LGP13519	C	From Leg	4.000	14.000	175.000	No Ice	0.338	0.207	0.005
			0.000			1/2" Ice	0.422	0.280	0.008
			0.000			1" Ice	0.515	0.362	0.012
(2) DTMABP7819VG12A	A	From Leg	4.000	23.000	175.000	No Ice	1.139	0.391	0.019
			0.000			1/2" Ice	1.284	0.488	0.026
			0.000			1" Ice	1.437	0.595	0.036
(2) DTMABP7819VG12A	B	From Leg	4.000	22.000	175.000	No Ice	1.139	0.391	0.019
			0.000			1/2" Ice	1.284	0.488	0.026
			0.000			1" Ice	1.437	0.595	0.036
(2) DTMABP7819VG12A	C	From Leg	4.000	14.000	175.000	No Ice	1.139	0.391	0.019
			0.000			1/2" Ice	1.284	0.488	0.026
			0.000			1" Ice	1.437	0.595	0.036
DC6-48-60-18-8F	B	From Leg	4.000	22.000	175.000	No Ice	2.567	2.567	0.019
			0.000			1/2" Ice	2.798	2.798	0.041
			0.000			1" Ice	3.038	3.038	0.067
Sector Mount [SM 802-3]	C	None		0.000	175.000	No Ice	24.410	24.410	0.930
						1/2" Ice	31.390	31.390	1.362
						1" Ice	38.370	38.370	1.794
****									
742 213 w/ Mount Pipe	A	From Leg	4.000	30.000	165.000	No Ice	5.373	4.620	0.049

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000 0.000			1/2" Ice 1" Ice	5.950 6.501	6.000 6.982	0.094 0.146
742 213 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	30.000	165.000	No Ice 1/2" Ice 1" Ice	5.373 5.950 6.501	4.620 6.000 6.982	0.049 0.094 0.146
742 213 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	30.000	165.000	No Ice 1/2" Ice 1" Ice	5.373 5.950 6.501	4.620 6.000 6.982	0.049 0.094 0.146
Pipe Mount [PM 601-3]	C	None		0.000	165.000	No Ice 1/2" Ice 1" Ice	4.390 5.480 6.570	4.390 5.480 6.570	0.195 0.237 0.280
**** ***									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
HP2-102	A	Paraboloid w/Shroud (HP)	From Leg	1.000 0.000 0.000	0.000		185.000	2.000	No Ice 1/2" Ice 1" Ice	3.140 3.410 3.680	0.025 0.040 0.060

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 185.000-180.000	182.500	1.63	0.030	7.500	A	0.000	7.500	7.500	100.00	0.000	0.000
					B	0.000	7.500		100.00	0.000	0.000
					C	0.000	7.500		100.00	0.000	0.990
L2 180.000-151.833	164.962	1.584	0.029	53.035	A	0.000	53.035	53.035	100.00	0.000	0.000
					B	0.000	53.035		100.00	0.000	0.000
					C	0.000	53.035		100.00	0.000	6.093
L3 151.833-130.000	140.495	1.513	0.028	55.950	A	0.000	55.950	55.950	100.00	0.000	0.000
					B	0.000	55.950		100.00	0.000	0.000
					C	0.000	55.950		100.00	0.000	10.197
L4 130.000-120.667	125.263	1.464	0.027	27.410	A	0.000	27.410	27.410	100.00	0.000	0.000
					B	0.000	27.410		100.00	0.000	0.000
					C	0.000	27.410		100.00	0.000	4.569
L5 120.667-115.000	117.810	1.438	0.027	17.834	A	0.000	17.834	17.834	100.00	0.000	0.000
					B	0.000	17.834		100.00	0.000	0.000
					C	0.000	17.834		100.00	0.000	3.093
L6 115.000-95.000	104.742	1.391	0.026	69.896	A	0.000	69.896	69.896	100.00	0.000	0.000
					B	0.000	69.896		100.00	0.000	0.000
					C	0.000	69.896		100.00	0.000	10.916
L7 95.000-91.000	92.990	1.344	0.025	15.040	A	0.000	15.040	15.040	100.00	0.000	0.000
					B	0.000	15.040		100.00	0.000	0.000
					C	0.000	15.040		100.00	0.000	2.183
L8 91.000-51.000	70.573	1.243	0.023	174.479	A	0.000	174.479	174.479	100.00	0.000	0.000
					B	0.000	174.479		100.00	0.000	0.000
					C	0.000	174.479		100.00	0.000	9.475

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L9 51.000-40.000	45.445	1.096	0.020	54.909	A	0.000	54.909	54.909	100.00	0.000	0.000
					B	0.000	54.909		100.00	0.000	0.000
					C	0.000	54.909		100.00	0.000	5.137
L10 40.000-19.000	29.317	1	0.018	113.914	A	0.000	113.914	113.914	100.00	0.000	0.000
					B	0.000	113.914		100.00	0.000	0.000
					C	0.000	113.914		100.00	0.000	4.607
L11 19.000-0.000	9.362	1	0.018	111.977	A	0.000	111.977	111.977	100.00	0.000	0.000
					B	0.000	111.977		100.00	0.000	0.000
					C	0.000	111.977		100.00	0.000	3.762

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z ksf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 185.000-180.000	182.500	1.63	0.006	0.7500	8.125	A	0.000	8.125	8.125	100.00	0.000	0.000
						B	0.000	8.125		100.00	0.000	0.000
						C	0.000	8.125		100.00	0.000	1.740
L2 180.000-151.833	164.962	1.584	0.006	0.7500	56.556	A	0.000	56.556	56.556	100.00	0.000	0.000
						B	0.000	56.556		100.00	0.000	0.000
						C	0.000	56.556		100.00	0.000	10.637
L3 151.833-130.000	140.495	1.513	0.005	0.7500	58.679	A	0.000	58.679	58.679	100.00	0.000	0.000
						B	0.000	58.679		100.00	0.000	0.000
						C	0.000	58.679		100.00	0.000	17.111
L4 130.000-120.667	125.263	1.464	0.005	0.7500	28.576	A	0.000	28.576	28.576	100.00	0.000	0.000
						B	0.000	28.576		100.00	0.000	0.000
						C	0.000	28.576		100.00	0.000	7.561
L5 120.667-115.000	117.810	1.438	0.005	0.7500	18.542	A	0.000	18.542	18.542	100.00	0.000	0.000
						B	0.000	18.542		100.00	0.000	0.000
						C	0.000	18.542		100.00	0.000	4.966
L6 115.000-95.000	104.742	1.391	0.005	0.7500	72.396	A	0.000	72.396	72.396	100.00	0.000	0.000
						B	0.000	72.396		100.00	0.000	0.000
						C	0.000	72.396		100.00	0.000	17.526
L7 95.000-91.000	92.990	1.344	0.005	0.7500	15.540	A	0.000	15.540	15.540	100.00	0.000	0.000
						B	0.000	15.540		100.00	0.000	0.000
						C	0.000	15.540		100.00	0.000	3.505
L8 91.000-51.000	70.573	1.243	0.004	0.7500	179.479	A	0.000	179.479	179.479	100.00	0.000	0.000
						B	0.000	179.479		100.00	0.000	0.000
						C	0.000	179.479		100.00	0.000	16.346
L9 51.000-40.000	45.445	1.096	0.004	0.7500	56.284	A	0.000	56.284	56.284	100.00	0.000	0.000
						B	0.000	56.284		100.00	0.000	0.000
						C	0.000	56.284		100.00	0.000	8.621
L10 40.000-19.000	29.317	1	0.004	0.7500	116.539	A	0.000	116.539	116.539	100.00	0.000	0.000
						B	0.000	116.539		100.00	0.000	0.000
						C	0.000	116.539		100.00	0.000	8.036
L11 19.000-0.000	9.362	1	0.004	0.7500	114.352	A	0.000	114.352	114.352	100.00	0.000	0.000
						B	0.000	114.352		100.00	0.000	0.000
						C	0.000	114.352		100.00	0.000	6.612

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 185.000-180.000	182.500	1.63	0.010	7.500	A	0.000	7.500	7.500	100.00	0.000	0.000
					B	0.000	7.500		100.00	0.000	0.000
					C	0.000	7.500		100.00	0.000	0.990
L2 180.000-	164.962	1.584	0.010	53.035	A	0.000	53.035	53.035	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
151.833					B	0.000	53.035		100.00	0.000	0.000
					C	0.000	53.035		100.00	0.000	6.093
L3 151.833-130.000	140.495	1.513	0.010	55.950	A	0.000	55.950	55.950	100.00	0.000	0.000
					B	0.000	55.950		100.00	0.000	0.000
					C	0.000	55.950		100.00	0.000	10.197
L4 130.000-120.667	125.263	1.464	0.009	27.410	A	0.000	27.410	27.410	100.00	0.000	0.000
					B	0.000	27.410		100.00	0.000	0.000
					C	0.000	27.410		100.00	0.000	4.569
L5 120.667-115.000	117.810	1.438	0.009	17.834	A	0.000	17.834	17.834	100.00	0.000	0.000
					B	0.000	17.834		100.00	0.000	0.000
					C	0.000	17.834		100.00	0.000	3.093
L6 115.000-95.000	104.742	1.391	0.009	69.896	A	0.000	69.896	69.896	100.00	0.000	0.000
					B	0.000	69.896		100.00	0.000	0.000
					C	0.000	69.896		100.00	0.000	10.916
L7 95.000-91.000	92.990	1.344	0.009	15.040	A	0.000	15.040	15.040	100.00	0.000	0.000
					B	0.000	15.040		100.00	0.000	0.000
					C	0.000	15.040		100.00	0.000	2.183
L8 91.000-51.000	70.573	1.243	0.008	174.479	A	0.000	174.479	174.479	100.00	0.000	0.000
					B	0.000	174.479		100.00	0.000	0.000
					C	0.000	174.479		100.00	0.000	9.475
L9 51.000-40.000	45.445	1.096	0.007	54.909	A	0.000	54.909	54.909	100.00	0.000	0.000
					B	0.000	54.909		100.00	0.000	0.000
					C	0.000	54.909		100.00	0.000	5.137
L10 40.000-19.000	29.317	1	0.006	113.914	A	0.000	113.914	113.914	100.00	0.000	0.000
					B	0.000	113.914		100.00	0.000	0.000
					C	0.000	113.914		100.00	0.000	4.607
L11 19.000-0.000	9.362	1	0.006	111.977	A	0.000	111.977	111.977	100.00	0.000	0.000
					B	0.000	111.977		100.00	0.000	0.000
					C	0.000	111.977		100.00	0.000	3.762

Load Combinations

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

Comb. No.	Description
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	185 - 180	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-4.621	0.066	0.307
			Max. Mx	11	-2.165	28.861	0.147
			Max. My	2	-2.156	0.010	29.288
			Max. Vy	5	6.001	-28.831	0.152
			Max. Vx	8	6.104	0.016	-29.238
			Max. Torque	11			-0.838
L2	180 - 151.833	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-12.444	0.308	-0.094
			Max. Mx	11	-6.426	371.855	-0.712
			Max. My	8	-6.409	1.366	-376.058
			Max. Vy	5	15.258	-371.790	1.863
			Max. Vx	8	15.397	1.366	-376.058
			Max. Torque	12			-0.930
L3	151.833 - 130	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-15.788	0.689	-0.314
			Max. Mx	11	-9.051	648.975	-1.385
			Max. My	8	-9.035	2.388	-655.495
			Max. Vy	5	17.737	-648.764	3.058
			Max. Vx	8	17.875	2.388	-655.495
			Max. Torque	12			-0.875
L4	130 - 120.667	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-19.567	1.044	-0.519
			Max. Mx	11	-12.152	920.373	-1.968
			Max. My	8	-12.139	3.270	-928.871
			Max. Vy	5	20.114	-920.029	4.072
			Max. Vx	8	20.253	3.270	-928.871
			Max. Torque	12			-0.738
L5	120.667 - 115	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-20.967	1.201	-0.610
			Max. Mx	11	-13.279	1037.087	-2.201
			Max. My	8	-13.266	3.622	-1046.366
			Max. Vy	5	21.089	-1036.685	4.470
			Max. Vx	8	21.228	3.622	-1046.366
			Max. Torque	12			-0.669
L6	115 - 95	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-24.944	1.633	-0.859
			Max. Mx	11	-16.539	1349.484	-2.783
			Max. My	8	-16.527	4.506	-1360.688
			Max. Vy	5	23.584	-1348.920	5.448
			Max. Vx	8	23.723	4.506	-1360.688
			Max. Torque	5			0.621
L7	95 - 91	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-29.215	1.951	-1.043
			Max. Mx	11	-20.240	1595.260	-3.202
			Max. My	8	-20.230	5.140	-1607.842
			Max. Vy	5	25.539	-1594.578	6.147
			Max. Vx	8	25.679	5.140	-1607.842
			Max. Torque	5			0.515
L8	91 - 51	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-39.261	3.222	-1.777
			Max. Mx	11	-28.469	2531.984	-4.617

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	8	-28.462	7.285	-2549.070
			Max. Vy	5	31.321	-2530.811	8.402
			Max. Vx	8	31.457	7.285	-2549.070
			Max. Torque	5			0.493
L9	51 - 40	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-47.829	3.977	-2.212
			Max. Mx	11	-35.889	3126.508	-5.393
			Max. My	8	-35.884	8.463	-3146.029
			Max. Vy	5	34.707	-3125.040	9.615
			Max. Vx	8	34.845	8.463	-3146.029
			Max. Torque	4			0.409
L10	40 - 19	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-52.752	4.552	-2.544
			Max. Mx	11	-40.034	3554.886	-5.918
			Max. My	8	-40.031	9.262	-3576.013
			Max. Vy	5	36.710	-3553.189	10.408
			Max. Vx	8	36.847	9.262	-3576.013
			Max. Torque	4			0.409
L11	19 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-68.021	5.971	-3.364
			Max. Mx	11	-53.315	4653.785	-7.148
			Max. My	8	-53.315	11.131	-4678.623
			Max. Vy	5	41.792	-4651.517	12.232
			Max. Vx	8	41.925	11.131	-4678.623
			Max. Torque	3			0.475

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	68.021	0.000	-0.000
	Max. H_x	11	53.322	41.780	-0.037
	Max. H_z	2	53.322	-0.054	41.877
	Max. M_x	2	4669.570	-0.054	41.877
	Max. M_z	5	4651.517	-41.784	0.072
	Max. Torsion	3	0.475	-20.918	36.312
	Min. Vert	8	53.322	0.054	-41.916
	Min. H_x	5	53.322	-41.784	0.072
	Min. H_z	8	53.322	0.054	-41.916
	Min. M_x	8	-4678.623	0.054	-41.916
	Min. M_z	11	-4653.785	41.780	-0.037
	Min. Torsion	9	-0.455	20.928	-36.353

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	53.322	-0.000	0.000	0.775	1.416	0.000
Dead+Wind 0 deg - No Ice	53.322	0.054	-41.877	-4669.570	-8.246	-0.449
Dead+Wind 30 deg - No Ice	53.322	20.918	-36.312	-4052.012	-2329.487	-0.475
Dead+Wind 60 deg - No Ice	53.322	36.199	-21.021	-2349.525	-4030.220	-0.409
Dead+Wind 90 deg - No Ice	53.322	41.784	-0.072	-12.232	-4651.517	-0.239
Dead+Wind 120 deg - No Ice	53.322	36.133	20.965	2341.469	-4018.405	0.097
Dead+Wind 150 deg - No Ice	53.322	20.834	36.299	4051.642	-2314.489	0.324
Dead+Wind 180 deg - No Ice	53.322	-0.054	41.916	4678.623	11.131	0.450
Dead+Wind 210 deg - No Ice	53.322	-20.928	36.353	4061.307	2334.147	0.455
Dead+Wind 240 deg - No Ice	53.322	-36.187	21.059	2358.239	4030.955	0.353
Dead+Wind 270 deg - No Ice	53.322	-41.780	0.037	7.148	4653.785	0.239
Dead+Wind 300 deg - No Ice	53.322	-36.145	-20.928	-2332.751	4023.436	-0.041
Dead+Wind 330 deg - No Ice	53.322	-20.825	-36.258	-4042.344	2315.600	-0.304
Dead+Ice+Temp	68.021	-0.000	0.000	3.364	5.971	0.000
Dead+Wind 0	68.021	0.010	-9.252	-1073.145	4.294	-0.206

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
deg+Ice+Temp						
Dead+Wind 30 deg+Ice+Temp	68.021	4.620	-8.020	-930.361	-530.906	-0.166
Dead+Wind 60 deg+Ice+Temp	68.021	7.996	-4.642	-537.831	-923.114	-0.089
Dead+Wind 90 deg+Ice+Temp	68.021	9.231	-0.014	0.861	-1066.621	0.011
Dead+Wind 120 deg+Ice+Temp	68.021	7.983	4.633	543.140	-920.786	0.130
Dead+Wind 150 deg+Ice+Temp	68.021	4.604	8.019	937.155	-528.106	0.196
Dead+Wind 180 deg+Ice+Temp	68.021	-0.010	9.260	1081.733	7.989	0.206
Dead+Wind 210 deg+Ice+Temp	68.021	-4.622	8.029	939.001	543.589	0.161
Dead+Wind 240 deg+Ice+Temp	68.021	-7.994	4.650	546.339	934.916	0.076
Dead+Wind 270 deg+Ice+Temp	68.021	-9.231	0.006	4.556	1078.904	-0.011
Dead+Wind 300 deg+Ice+Temp	68.021	-7.986	-4.624	-534.631	933.549	-0.118
Dead+Wind 330 deg+Ice+Temp	68.021	-4.602	-8.010	-928.513	539.990	-0.192
Dead+Wind 0 deg - Service	53.322	0.019	-14.490	-1616.174	-1.913	-0.155
Dead+Wind 30 deg - Service	53.322	7.238	-12.564	-1402.228	-805.487	-0.165
Dead+Wind 60 deg - Service	53.322	12.525	-7.273	-812.852	-1394.249	-0.143
Dead+Wind 90 deg - Service	53.322	14.457	-0.025	-3.720	-1609.271	-0.084
Dead+Wind 120 deg - Service	53.322	12.502	7.254	811.089	-1390.152	0.032
Dead+Wind 150 deg - Service	53.322	7.208	12.559	1403.127	-800.293	0.111
Dead+Wind 180 deg - Service	53.322	-0.019	14.504	1620.345	4.798	0.155
Dead+Wind 210 deg - Service	53.322	-7.241	12.578	1406.482	808.990	0.158
Dead+Wind 240 deg - Service	53.322	-12.521	7.286	816.901	1396.392	0.123
Dead+Wind 270 deg - Service	53.322	-14.456	0.013	2.990	1612.156	0.084
Dead+Wind 300 deg - Service	53.322	-12.506	-7.241	-807.040	1393.780	-0.013
Dead+Wind 330 deg - Service	53.322	-7.205	-12.545	-1398.873	802.561	-0.104

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.000	-53.322	0.000	0.000	53.322	-0.000	0.000%
2	0.054	-53.322	-41.884	-0.054	53.322	41.877	0.011%
3	20.918	-53.322	-36.312	-20.918	53.322	36.312	0.000%
4	36.199	-53.322	-21.021	-36.199	53.322	21.021	0.000%
5	41.787	-53.322	-0.072	-41.784	53.322	0.072	0.005%
6	36.133	-53.322	20.965	-36.133	53.322	-20.965	0.000%
7	20.834	-53.322	36.299	-20.834	53.322	-36.299	0.000%
8	-0.054	-53.322	41.923	0.054	53.322	-41.916	0.011%
9	-20.928	-53.322	36.353	20.928	53.322	-36.353	0.000%
10	-36.188	-53.322	21.059	36.187	53.322	-21.059	0.000%
11	-41.787	-53.322	0.037	41.780	53.322	-0.037	0.011%
12	-36.145	-53.322	-20.928	36.145	53.322	20.928	0.000%
13	-20.825	-53.322	-36.258	20.825	53.322	36.258	0.000%
14	0.000	-68.021	0.000	0.000	68.021	-0.000	0.000%
15	0.010	-68.021	-9.252	-0.010	68.021	9.252	0.000%
16	4.620	-68.021	-8.020	-4.620	68.021	8.020	0.000%
17	7.996	-68.021	-4.642	-7.996	68.021	4.642	0.000%
18	9.232	-68.021	-0.014	-9.231	68.021	0.014	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
19	7.984	-68.021	4.633	-7.983	68.021	-4.633	0.000%
20	4.604	-68.021	8.019	-4.604	68.021	-8.019	0.000%
21	-0.010	-68.021	9.261	0.010	68.021	-9.260	0.000%
22	-4.622	-68.021	8.029	4.622	68.021	-8.029	0.000%
23	-7.994	-68.021	4.650	7.994	68.021	-4.650	0.000%
24	-9.232	-68.021	0.006	9.231	68.021	-0.006	0.000%
25	-7.986	-68.021	-4.624	7.986	68.021	4.624	0.000%
26	-4.602	-68.021	-8.010	4.602	68.021	8.010	0.000%
27	0.019	-53.322	-14.493	-0.019	53.322	14.490	0.005%
28	7.238	-53.322	-12.565	-7.238	53.322	12.564	0.002%
29	12.526	-53.322	-7.274	-12.525	53.322	7.273	0.002%
30	14.459	-53.322	-0.025	-14.457	53.322	0.025	0.005%
31	12.503	-53.322	7.254	-12.502	53.322	-7.254	0.002%
32	7.209	-53.322	12.560	-7.208	53.322	-12.559	0.002%
33	-0.019	-53.322	14.506	0.019	53.322	-14.504	0.005%
34	-7.241	-53.322	12.579	7.241	53.322	-12.578	0.002%
35	-12.522	-53.322	7.287	12.521	53.322	-7.286	0.002%
36	-14.459	-53.322	0.013	14.456	53.322	-0.013	0.005%
37	-12.507	-53.322	-7.241	12.506	53.322	7.241	0.002%
38	-7.206	-53.322	-12.546	7.205	53.322	12.545	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	13	0.00014013	0.00013389
3	Yes	18	0.00000001	0.00009501
4	Yes	18	0.00000001	0.00009621
5	Yes	14	0.00006390	0.00008078
6	Yes	18	0.00000001	0.00009390
7	Yes	18	0.00000001	0.00009490
8	Yes	13	0.00014011	0.00013371
9	Yes	18	0.00000001	0.00009634
10	Yes	18	0.00000001	0.00009543
11	Yes	13	0.00014018	0.00014322
12	Yes	18	0.00000001	0.00009499
13	Yes	18	0.00000001	0.00009370
14	Yes	6	0.00000001	0.00000001
15	Yes	16	0.00000001	0.00009903
16	Yes	16	0.00000001	0.00010629
17	Yes	16	0.00000001	0.00010615
18	Yes	16	0.00000001	0.00009831
19	Yes	16	0.00000001	0.00010613
20	Yes	16	0.00000001	0.00010662
21	Yes	16	0.00000001	0.00009979
22	Yes	16	0.00000001	0.00010795
23	Yes	16	0.00000001	0.00010764
24	Yes	16	0.00000001	0.00009936
25	Yes	16	0.00000001	0.00010668
26	Yes	16	0.00000001	0.00010664
27	Yes	13	0.00014518	0.00006045
28	Yes	14	0.00000001	0.00010978
29	Yes	14	0.00000001	0.00011392
30	Yes	13	0.00014515	0.00006167
31	Yes	14	0.00000001	0.00010749
32	Yes	14	0.00000001	0.00011173
33	Yes	13	0.00014517	0.00006061
34	Yes	14	0.00000001	0.00011376
35	Yes	14	0.00000001	0.00010990
36	Yes	13	0.00014515	0.00006123
37	Yes	14	0.00000001	0.00011266
38	Yes	14	0.00000001	0.00010812

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	185 - 180	29.289	34	1.724	0.005
L2	180 - 151.833	27.489	34	1.708	0.004
L3	151.833 - 130	18.350	34	1.325	0.001
L4	135 - 120.667	14.050	34	1.115	0.000
L5	120.667 - 115	10.902	34	0.961	0.000
L6	115 - 95	9.799	34	0.897	0.000
L7	101 - 91	7.371	34	0.761	0.000
L8	91 - 51	5.835	34	0.694	0.000
L9	58 - 40	2.218	34	0.363	0.000
L10	40 - 19	1.039	34	0.248	0.000
L11	28 - 0	0.526	34	0.161	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
185.000	HP2-102	34	29.289	1.724	0.005	8513
175.000	(2) 7770.00 w/ Mount Pipe	34	25.725	1.670	0.003	6020
165.000	742 213 w/ Mount Pipe	34	22.355	1.537	0.002	4361

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	185 - 180	84.419	9	4.973	0.014
L2	180 - 151.833	79.239	9	4.926	0.010
L3	151.833 - 130	52.920	9	3.821	0.003
L4	135 - 120.667	40.528	9	3.217	0.001
L5	120.667 - 115	31.453	9	2.774	0.001
L6	115 - 95	28.273	9	2.588	0.001
L7	101 - 91	21.270	9	2.196	0.000
L8	91 - 51	16.839	9	2.003	0.000
L9	58 - 40	6.402	9	1.046	0.000
L10	40 - 19	3.000	9	0.717	0.000
L11	28 - 0	1.519	9	0.464	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
185.000	HP2-102	9	84.419	4.973	0.014	3002
175.000	(2) 7770.00 w/ Mount Pipe	9	74.159	4.816	0.008	2117
165.000	742 213 w/ Mount Pipe	9	64.455	4.433	0.005	1528

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	185 - 180 (1)	TP18x18x0.1875	5.000	0.000	0.0	25.200	10.7543	-2.156	271.008	0.008
L2	180 - 151.833 (2)	TP27.1894x18x0.25	28.167	0.000	0.0	25.200	21.6862	-6.406	546.492	0.012
L3	151.833 - 130 (3)	TP34.3125x27.1894x0.3802	21.833	0.000	0.0	25.200	39.5403	-9.032	996.414	0.009

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L4	130 - 120.667 (4)	TP36.844x31.9209x0.3636	14.333	0.000	0.0	25.200	42.7122	-12.136	1076.350	0.011
L5	120.667 - 115 (5)	TP38.6875x36.844x0.4005	5.667	0.000	0.0	24.678	49.3729	-13.263	1218.420	0.011
L6	115 - 95 (6)	TP45.1875x38.6875x0.4463	20.000	0.000	0.0	25.200	61.5001	-16.525	1549.800	0.011
L7	95 - 91 (7)	TP45.8125x42.3448x0.4379	10.000	0.000	0.0	25.200	63.9756	-20.227	1612.180	0.013
L8	91 - 51 (8)	TP58.875x45.8125x0.375	40.000	0.000	0.0	25.004	67.8785	-28.461	1697.260	0.017
L9	51 - 40 (9)	TP61.6875x55.8391x0.4404	18.000	0.000	0.0	23.886	86.8616	-35.883	2074.780	0.017
L10	40 - 19 (10)	TP68.5x61.6875x0.4375	21.000	0.000	0.0	25.087	91.7700	-40.031	2302.210	0.017
L11	19 - 0 (11)	TP73.8125x64.7054x0.4375	28.000	0.000	0.0	23.546	103.3670	-53.315	2433.910	0.022

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	185 - 180 (1)	TP18x18x0.1875	29.288	7.524	25.200	0.299	0.000	0.000	25.200	0.000
L2	180 - 151.833 (2)	TP27.1894x18x0.25	376.548	31.680	25.200	1.257	0.000	0.000	25.200	0.000
L3	151.833 - 130 (3)	TP34.3125x27.1894x0.3802	656.495	25.327	25.200	1.005	0.000	0.000	25.200	0.000
L4	130 - 120.667 (4)	TP36.844x31.9209x0.3636	930.325	29.367	25.200	1.165	0.000	0.000	25.200	0.000
L5	120.667 - 115 (5)	TP38.6875x36.844x0.4005	1048.000	27.281	24.678	1.105	0.000	0.000	24.678	0.000
L6	115 - 95 (6)	TP45.1875x38.6875x0.4463	1362.792	25.482	25.200	1.011	0.000	0.000	25.200	0.000
L7	95 - 91 (7)	TP45.8125x42.3448x0.4379	1610.283	27.275	25.200	1.082	0.000	0.000	25.200	0.000
L8	91 - 51 (8)	TP58.875x45.8125x0.375	2552.658	32.797	25.004	1.312	0.000	0.000	25.004	0.000
L9	51 - 40 (9)	TP61.6875x55.8391x0.4404	3150.250	29.045	23.886	1.216	0.000	0.000	23.886	0.000
L10	40 - 19 (10)	TP68.5x61.6875x0.4375	3580.667	29.365	25.087	1.171	0.000	0.000	25.087	0.000
L11	19 - 0 (11)	TP73.8125x64.7054x0.4375	4684.275	30.256	23.546	1.285	0.000	0.000	23.546	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	185 - 180 (1)	TP18x18x0.1875	6.064	0.564	16.800	0.068	0.008	0.001	16.800	0.000
L2	180 - 151.833 (2)	TP27.1894x18x0.25	15.425	0.711	16.800	0.086	0.075	0.003	16.800	0.000
L3	151.833 - 130 (3)	TP34.3125x27.1894x0.3802	17.907	0.453	16.800	0.055	0.017	0.000	16.800	0.000
L4	130 - 120.667 (4)	TP36.844x31.9209x0.3636	20.284	0.475	16.800	0.057	0.046	0.001	16.800	0.000
L5	120.667 - 115 (5)	TP38.6875x36.844x0.4005	21.259	0.431	16.452	0.053	0.074	0.001	16.452	0.000
L6	115 - 95 (6)	TP45.1875x38.6875x0.4463	23.753	0.386	16.800	0.047	0.146	0.001	16.800	0.000
L7	95 - 91 (7)	TP45.8125x42.3448x0.4379	25.709	0.402	16.800	0.049	0.202	0.002	16.800	0.000
L8	91 - 51 (8)	TP58.875x45.8125x0.375	31.487	0.464	16.800	0.056	0.285	0.002	16.800	0.000
L9	51 - 40 (9)	TP61.6875x55.8391x0.4404	34.871	0.401	15.924	0.051	0.360	0.002	15.924	0.000

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L10	40 - 19 (10)	TP68.5x61.6875x0.4375	36.874	0.402	16.800	0.049	0.388	0.002	16.800	0.000
L11	19 - 0 (11)	TP73.8125x64.7054x0.4375	41.955	0.406	16.800	0.049	0.455	0.001	16.800	0.000

Pole Interaction Design Data

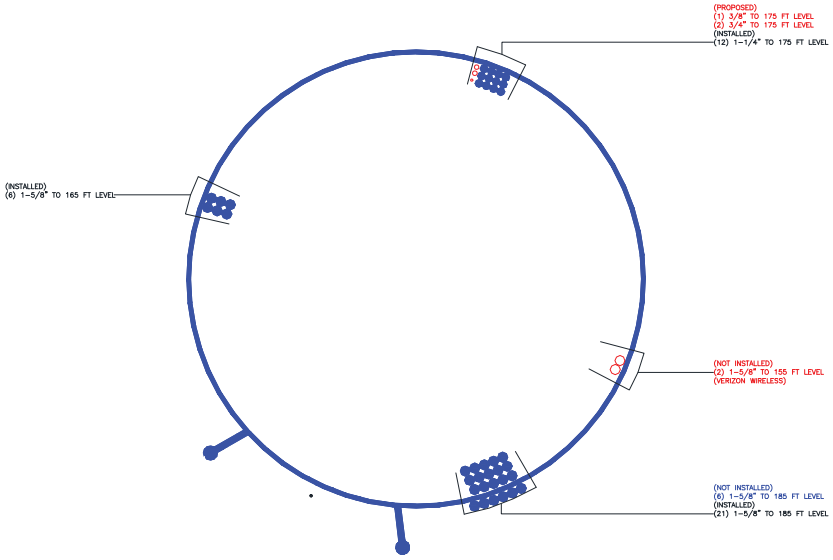
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	185 - 180 (1)	0.008	0.299	0.000	0.068	0.000	0.308 ✔	1.333	H1-3+VT ✔
L2	180 - 151.833 (2)	0.012	1.257	0.000	0.086	0.000	1.271 ✔	1.333	H1-3+VT ✔
L3	151.833 - 130 (3)	0.009	1.005	0.000	0.055	0.000	1.015 ✔	1.333	H1-3+VT ✔
L4	130 - 120.667 (4)	0.011	1.165	0.000	0.057	0.000	1.177 ✔	1.333	H1-3+VT ✔
L5	120.667 - 115 (5)	0.011	1.105	0.000	0.053	0.000	1.117 ✔	1.333	H1-3+VT ✔
L6	115 - 95 (6)	0.011	1.011	0.000	0.047	0.000	1.022 ✔	1.333	H1-3+VT ✔
L7	95 - 91 (7)	0.013	1.082	0.000	0.049	0.000	1.095 ✔	1.333	H1-3+VT ✔
L8	91 - 51 (8)	0.017	1.312	0.000	0.056	0.000	1.329 ✔	1.333	H1-3+VT ✔
L9	51 - 40 (9)	0.017	1.216	0.000	0.051	0.000	1.234 ✔	1.333	H1-3+VT ✔
L10	40 - 19 (10)	0.017	1.171	0.000	0.049	0.000	1.189 ✔	1.333	H1-3+VT ✔
L11	19 - 0 (11)	0.022	1.285	0.000	0.049	0.000	1.307 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	185 - 180	Pole	TP18x18x0.1875	1	-2.156	361.254	23.1	Pass
L2	180 - 151.833	Pole	TP27.1894x18x0.25	2	-6.406	728.474	95.3	Pass
L3	151.833 - 130	Pole	TP34.3125x27.1894x0.3802	3	-9.032	1328.220	76.1	Pass
L4	130 - 120.667	Pole	TP36.844x31.9209x0.3636	4	-12.136	1434.774	88.3	Pass
L5	120.667 - 115	Pole	TP38.6875x36.844x0.4005	5	-13.263	1624.154	83.8	Pass
L6	115 - 95	Pole	TP45.1875x38.6875x0.4463	6	-16.525	2065.883	76.7	Pass
L7	95 - 91	Pole	TP45.8125x42.3448x0.4379	7	-20.227	2149.036	82.2	Pass
L8	91 - 51	Pole	TP58.875x45.8125x0.375	8	-28.461	2262.447	99.7	Pass
L9	51 - 40	Pole	TP61.6875x55.8391x0.4404	9	-35.883	2765.682	92.6	Pass
L10	40 - 19	Pole	TP68.5x61.6875x0.4375	10	-40.031	3068.846	89.2	Pass
L11	19 - 0	Pole	TP73.8125x64.7054x0.4375	11	-53.315	3244.402	98.1	Pass
							Summary	
						Pole (L8)	99.7	Pass
						RATING =	**99.7**	**Pass**

APPENDIX B

BASE LEVEL DRAWING

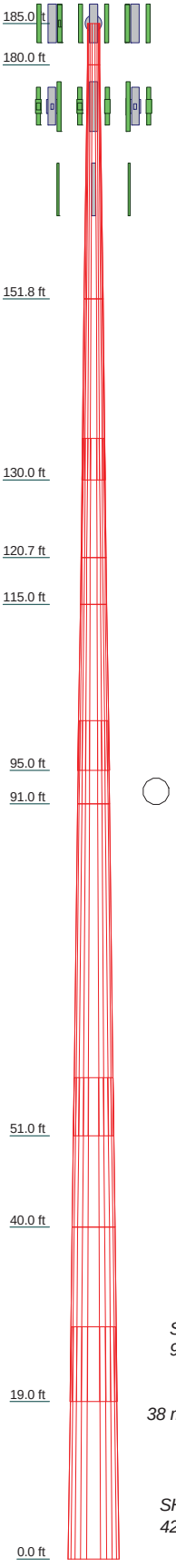

(PROPOSED)
(1) 3/8" TO 175 FT LEVEL
(2) 3/4" TO 175 FT LEVEL
(INSTALLED)
(12) 1-1/4" TO 175 FT LEVEL
(INSTALLED)
(6) 1-5/8" TO 165 FT LEVEL
(NOT INSTALLED)
(2) 1-5/8" TO 155 FT LEVEL
(VERIZON WIRELESS)
(NOT INSTALLED)
(6) 1-5/8" TO 185 FT LEVEL
(INSTALLED)
(21) 1-5/8" TO 185 FT LEVEL

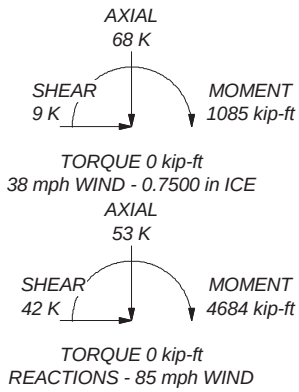
APPENDIX C

ADDITIONAL CALCULATIONS

Section	1	2	3	4	5	6	7	8	9	10	11
Length (ft)	5.000	28.167	21.833	14.333	5.667	20.000	10.000	40.000	18.000	21.000	28.000
Number of Sides	12	12	12	12	12	12	12	12	12	12	12
Thickness (in)	0.1875	0.2500	0.3802	0.3636	0.4005	0.4463	0.4379	0.3750	0.4404	0.4375	0.4375
Socket Length (ft)			5.000			6.000		7.000		9.000	
Top Dia (in)	18.0000	18.0000	27.1894	31.9209	36.8440	38.6875	42.3448	45.8125	55.8391	61.6875	64.7054
Bot Dia (in)	18.0000	27.1894	34.3125	36.8440	38.6875	45.1875	45.8125	58.8750	61.6875	68.5000	73.8125
Grade	A36M-42			Reinf 42.00 ksi	Reinf 41.13 ksi		Reinf 42.00 ksi	A36M-42	Reinf 39.81 ksi	A36M-42	
Weight (K)	0.2	1.7	2.8	1.9	0.9	4.1	2.1	8.5	5.1	6.5	9.2

43.0





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(3) AIR 21 w/ Mount Pipe	185	AM-X-CD-16-65-00T-RET w/ Mount Pipe	175
(3) AIR 21 w/ Mount Pipe	185	(2) RRUS-11	175
(3) AIR 21 w/ Mount Pipe	185	(2) RRUS-11	175
AIR 33 w/ Mount Pipe	185	(2) RRUS-11	175
AIR 33 w/ Mount Pipe	185	(2) LGP13519	175
AIR 33 w/ Mount Pipe	185	(2) LGP13519	175
ETW190VS12UB	185	(2) LGP13519	175
ETW190VS12UB	185	(2) DTMABP7819VG12A	175
ETW190VS12UB	185	(2) DTMABP7819VG12A	175
DC6-48-60-18-8F	185	(2) DTMABP7819VG12A	175
Sector Mount [SM 802-3]	185	DC6-48-60-18-8F	175
HP2-102	185	Sector Mount [SM 802-3]	175
(2) 7770.00 w/ Mount Pipe	175	(2) 7770.00 w/ Mount Pipe	175
(2) 7770.00 w/ Mount Pipe	175	742 213 w/ Mount Pipe	165
AM-X-CD-16-65-00T-RET w/ Mount Pipe	175	742 213 w/ Mount Pipe	165
AM-X-CD-16-65-00T-RET w/ Mount Pipe	175	Pipe Mount [PM 601-3]	165
		742 213 w/ Mount Pipe	165

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A36M-42	42 ksi	60 ksi	Reinf 41.13 ksi	41 ksi	52 ksi
Reinf 42.00 ksi	42 ksi	53 ksi	Reinf 39.81 ksi	40 ksi	50 ksi

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 99.7%

Paul J Ford and Company
600 E. Broad Street Suite 1500
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: ***185' Monopole / Middletown_1***		
Project: ***PJF 37513-1570 / BU 825983***		
Client: CCI	Drawn by: Brian K Kermode	App'd:
Code: TIA/EIA-222-F	Date: 08/08/13	Scale: NTS
Path: G:\TOWER\375_Crown_Castle\2013\37513-1570 BU 825983\WO628395 BU825983\37513-1570 Aero.eri		Dwg No. E-1

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708
Phone 614-221-6679 • Fax 614-448-4105 • www.PJFweb.com

v4.2 - Effective 4-3-13

Date: 8/8/2013
PJF Project: 37513-1570
Client Ref. # 825983
Site Name: Middletown_1
Description: Micropile
Owner: CCI
Engineer: BKK

Micropile Analysis

Moment =	4684	k-ft	TIA Ref.	F	Location =	Micropile		
Axial =	53.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	42.0	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G	
Item Qty =	30				Soil =	Soft Clay / Silty Clay (Lean)	for Micropile	

** For Post Installed Anchors: Check anchors for embedment, epoxy/grout bond, and capacity based on proof load. **

Item	Nominal Anchor Dia, in	Description	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio	Required Bond Length, ft
1	2.000	A36	36	58	0.0	68.00	0.00	3.14	47.42	44.08	44.08	0.00	80.17	55.0%	
2	2.000	A36	36	58	15.0	68.00	0.00	3.14	48.57	45.22	45.22	0.00	80.17	56.4%	
3	2.000	A36	36	58	30.0	68.00	0.00	3.14	49.68	46.33	46.33	0.00	80.17	57.8%	
4	2.000	A36	36	58	45.0	68.00	0.00	3.14	50.44	47.10	47.10	0.00	80.17	58.7%	
5	2.000	A36	36	58	60.0	68.00	0.00	3.14	50.65	47.30	47.30	0.00	80.17	59.0%	
6	2.000	A36	36	58	75.0	68.00	0.00	3.14	50.20	46.85	46.85	0.00	80.17	58.4%	
7	2.000	A36	36	58	90.0	68.00	0.00	3.14	49.16	45.81	45.81	0.00	80.17	57.1%	
8	2.000	A36	36	58	105.0	68.00	0.00	3.14	47.73	44.38	44.38	0.00	80.17	55.4%	
9	2.000	A36	36	58	120.0	68.00	0.00	3.14	46.22	42.88	42.88	0.00	80.17	53.5%	
10	2.000	A36	36	58	135.0	68.00	0.00	3.14	45.01	41.66	41.66	0.00	80.17	52.0%	
11	2.000	A36	36	58	150.0	68.00	0.00	3.14	44.42	41.07	41.07	0.00	80.17	51.2%	
12	2.000	A36	36	58	165.0	68.00	0.00	3.14	44.60	41.25	41.25	0.00	80.17	51.5%	
13	2.000	A36	36	58	180.0	68.00	0.00	3.14	45.49	42.14	42.14	0.00	80.17	52.6%	
14	2.000	A36	36	58	195.0	68.00	0.00	3.14	46.81	43.46	43.46	0.00	80.17	54.2%	
15	2.000	A36	36	58	210.0	68.00	0.00	3.14	48.21	44.86	44.86	0.00	80.17	56.0%	
16	2.000	A36	36	58	225.0	68.00	0.00	3.14	49.34	45.99	45.99	0.00	80.17	57.4%	
17	2.000	A36	36	58	240.0	68.00	0.00	3.14	49.96	46.61	46.61	0.00	80.17	58.1%	
18	2.000	A36	36	58	255.0	68.00	0.00	3.14	49.96	46.62	46.62	0.00	80.17	58.1%	
19	2.000	A36	36	58	270.0	68.00	0.00	3.14	49.40	46.05	46.05	0.00	80.17	57.4%	
20	2.000	A36	36	58	285.0	68.00	0.00	3.14	48.45	45.10	45.10	0.00	80.17	56.3%	
21	2.000	A36	36	58	300.0	68.00	0.00	3.14	47.40	44.06	44.06	0.00	80.17	55.0%	
22	2.000	A36	36	58	315.0	68.00	0.00	3.14	46.58	43.24	43.24	0.00	80.17	53.9%	
23	2.000	A36	36	58	330.0	68.00	0.00	3.14	46.27	42.92	42.92	0.00	80.17	53.5%	
24	2.000	A36	36	58	345.0	68.00	0.00	3.14	46.57	43.23	43.23	0.00	80.17	53.9%	
25	0.000	Other			45.0	169.81	4.02	4.02	156.90	152.62	156.90	219.90	219.90	71.4%	55.00
26	0.000	Other			165.0	169.81	4.02	4.02	141.20	136.92	141.20	219.90	219.90	64.2%	55.00
27	0.000	Other			285.0	169.81	4.02	4.02	150.90	146.62	150.90	219.90	219.90	68.6%	55.00
28	0.000	Other			105.0	169.81	4.02	4.02	149.97	145.69	149.97	219.90	219.90	68.2%	55.00
29	0.000	Other			210.0	169.81	4.02	4.02	152.23	147.95	152.23	219.90	219.90	69.2%	55.00
30	0.000	Other			335.0	169.81	4.02	4.02	142.91	138.63	142.91	219.90	219.90	65.0%	55.00
								99.52							

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

Site Data	
BU#:	
Site Name:	
App #:	

Manufacturer:	Other

Reactions		
Moment:	1665.1	ft-kips
Axial:	40.2	kips
Shear:	31.8	kips
Exterior Flange Run, T+Q:	0	kips

Reactions adjusted to account for micropiles

Elevation: 0 feet

Bolt Data				
Qty:	24			
Diam:	2		Bolt Fu:	58
Bolt Material:	Other		Bolt Fy:	36
Strength (Fu):	58	ksi	Bolt Fty:	19.14
Yield (Fy):	36	ksi		
Circle:	68	in		

Plate Data		
Plate Outer Diam:	72.9375	in
Plate Inner Diam:	62	in (Hole @ Ctr)
Thick:	2	in
Grade:	36	ksi
Effective Width:	9.77	in

Stiffener Data (Welding at Both Sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.75	in
Fillet V. Weld:	0.375	in
Width:	5	in
Height:	18	in
Thick:	1	in
Notch:	1	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data		
Pole OuterDiam:	73.8125	in
Thick:	0.4375	in
Pole Inner Diam:	72.9375	in
Grade:	42	ksi
# of Sides:	12	"0" IF Round
Fu	60	ksi

Stress Increase Factor		
ASIF:	1.333	

Interior Flange Bolt Results

Maximum Bolt Tension:	47.3	Kips, Ext. T=Interior T
Allowable Tension:	80.2	Kips
Bolt Stress Ratio:	59.0%	**Pass**

Interior Flange Plate Results Flexural Check

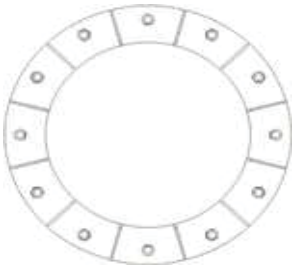
Controlling Bolt Axial Force:	50.6	Kips, Ext. C= Interior C
Plate Stress:	15.4	ksi
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	42.7%	**Pass**

Stiffener Results

Horizontal Weld :	19.3%	**Pass**
Vertical Weld:	9.7%	**Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	1.8%	**Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	14.2%	**Pass**
Plate Comp. (AISC Bracket):	12.7%	**Pass**

Pole Results

Pole Punching Shear Check:	3.1%	**Pass**



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

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

Foundation Loads:

Pole weight or tower leg compression =	**40.2**	(kips)
Horizontal load at top of pier =	**31.8**	(kips)
Overturning moment at top of pier=	**1665.1**	(ft-kips)

Design criteria:

Safety factor against overturning =	**1.5**	

Soil Properties:

Soil density =	**120**	(pcf)
Allowable soil bearing =	**3**	(ksf)
Depth to water table =	**16**	(ft)

Dimensions:

Pier shape (round or square)	**R**	("R" or "S")
Pier width =	**7.5**	(ft)
Pier height above grade =	**0.25**	(ft)
depth to bottom of footing =	**10.5**	(ft)
Footing thickness =	**3**	(ft)
Footing width =	**25**	(ft)
Footing length =	**25**	(ft)

Concrete:

Concrete strength =	**4**	(ksi)
Rebar strength =	**60**	(ksi)
ultimate load factor =	**1.3**	

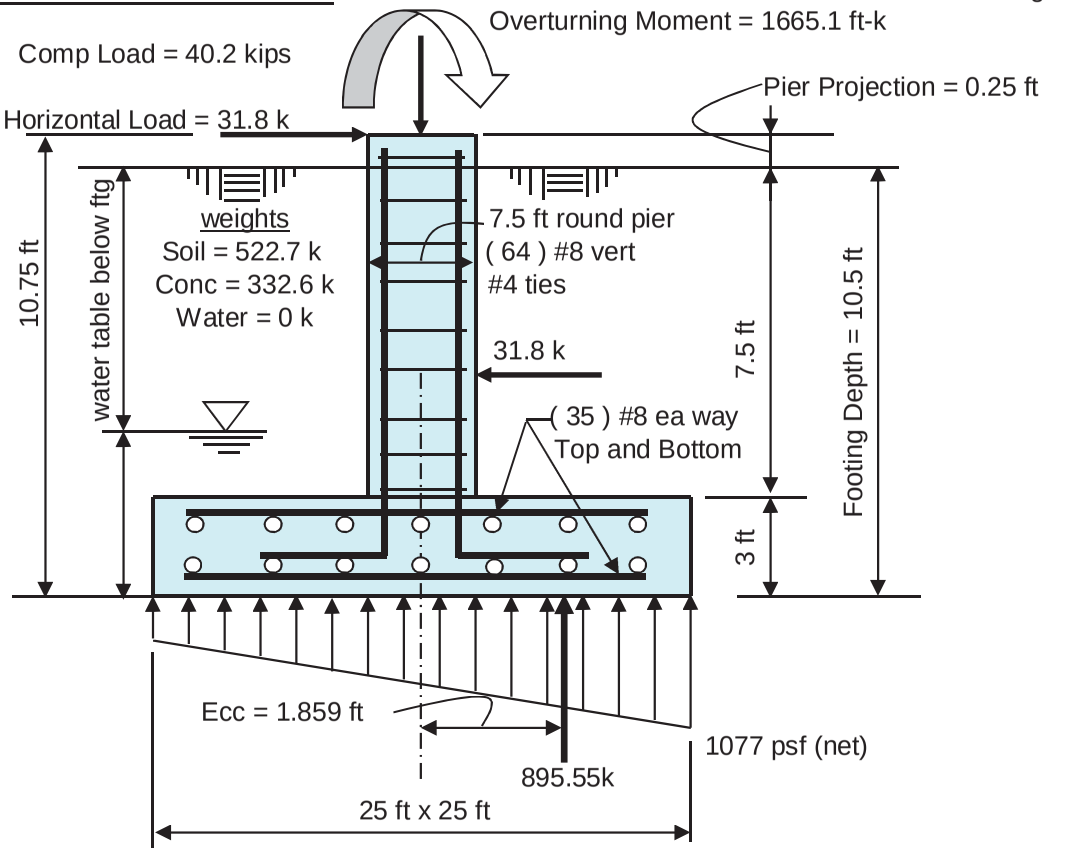
Reinforcing Steel:

	Pad	
minimum cover over rebar =	**3**	inches
size of pad rebar =	**#8**	bar
quantity of pad rebar =	**35**	(ea direction)

Reinforcing Steel:

	Pier	
size of vert rebar in pier=	**#8**	bar
vertical rebar quantity =	**64**	
size of pier ties =	**#4**	bar
minimum cover over rebar =	**3**	inches

Total volume of concrete = 82.1 cu yd



Summary of analysis results	
Maximum Net Soil Bearing = 1.077 ksf Allowable Net Soil Bearing = 3 ksf **Soil Bearing Stress Ratio = 0.36 Okay**	Ult Bending Shear Capacity = 126 psi Ult Bending Shear Stress = 16 psi **Bending Shear Stress Ratio = 0.13 Okay**
Ftg Overturning Resistance = 11194 ft-kips Overturning Moment = 1665 ft-kips Required Overturning Safety Factor = 1.5 Overturning Safety Factor = 6.723 **Ratio = 0.22 Okay**	Pad Bending Moment Capacity= 3818 ft-k Pad Bending Moment = 713 ft-k **Bending Moment Stress Ratio = 0.19 OK**

37513-1570 PERMIT.DWG

MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

BU NUMBER; SITE NAME

BU #825983; MIDDLETOWN_1

APP: 185826 REV. 13; WO: 628395

SITE ADDRESS

90 INDUSTRIAL PARK ROAD
MIDDLETOWN, CT 06457
MIDDLESEX COUNTY

PROJECT NOTES

1. DETAILED FIELD INFORMATION REGARDING INTERFERENCES AND/OR EXISTING FIELD CONDITIONS MAY BE AVAILABLE ON CROWN'S CCISITES AND FROM CONTRACTOR'S PRE-MOD MAPPING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AND COORDINATE WITH THE AVAILABLE SOURCES OF INFORMATION ABOVE AND WITH THE PROJECT PLANS BEFORE PROCEEDING WITH THE WORK. CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND CROWN CASTLE FIELD PERSONNEL BEFORE PROCEEDING WITH THE WORK.

2. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

3. ALL STRUCTURAL BOLTS SHALL BE FIELD INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

4. (A.) DTI'S REQUIRED: ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAILS ON SHEET S-3 FOR REQUIREMENTS ON THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

   (B.) EFFECTIVE 5/30/2012: UNTIL FURTHER NOTICE, CROWN CASTLE WILL ACCEPT AJAX BOLTS TIGHTENED USING AISC "TURN-OF-NUT" METHOD. INSTALLERS SHALL FOLLOW CROWN GUIDELINES FOR AISC "TURN-OF-NUT" METHOD AND ALSO PROVIDE COMPLETE INSPECTION DOCUMENTATION IN THE PMI. PRIOR TO STARTING WORK, CONTRACTOR SHALL CONSULT WITH CROWN ENGINEERING TO DETERMINE WHETHER THIS POLICY IS STILL IN PLACE.

   (C.) REQUIREMENT EFFECTIVE 04/20/2013, PER CROWN CASTLE DIRECTIVE: ANY AND ALL STRUCTURAL BOLTS THAT ARE TIGHTENED TO THE PRETENSIONED CONDITION USING THE AISC "TURN-OF-NUT" TENSIONING PROCEDURE (NON-TENSION CONTROLLED ['NON-TC'] BOLTS AND/OR BOLTS WITHOUT DTI'S INSTALLED) SHALL BE INSPECTED ONSITE BY AN INDEPENDENT THIRD-PARTY BOLT INSPECTOR, AS APPROVED BY CROWN. **THIS INSPECTION IS REQUIRED TO BE AN ONSITE FIELD INSPECTION.** THE THIRD-PARTY BOLT INSPECTOR SHALL FOLLOW THE PUBLISHED CROWN CASTLE INSPECTION PROCEDURE "MI NON-TC BOLT INSPECTION", DATED APRIL 2013. THE THIRD-PARTY BOLT INSPECTOR SHALL PREPARE A FULLY DOCUMENTED BOLT INSPECTION REPORT, AS SPECIFIED BY CROWN, AND SHALL SUBMIT A COPY OF THE BOLT INSPECTION REPORT TO THE MI INSPECTOR, THE EOR, AND TO CROWN CASTLE.

5. NDE OF THE CIRCUMFERENTIAL WELD OF THE BASE PLATE TO SHAFT CONNECTION IS REQUIRED. SEE CCI DOCUMENTS ENG-SOW-1033 '*TOWER BASE PLATE NDE*' AND ENG-BUL-10051 '*NDE REQUIREMENTS FOR MONOPOLE BASE PLATE TO PREVENT CONNECTION FAILURE*'. NOTIFY THE EOR AND CROWN ENGINEERING IMMEDIATELY IF ANY CRACKS ARE SUSPECTED OR HAVE BEEN IDENTIFIED. THE NDE SHALL INCLUDE ALL EXISTING REINFORCEMENTS THAT HAVE BEEN WELDED TO THE BASE PLATE. ANY FULL PENETRATION WELDING TO THE BASE PLATE REQUIRED AS PART OF THIS ACTIVE REINFORCEMENT DESIGN SHALL BE INCLUDED IN THE NDE SCOPE OF WORK.

PROJECT CONTACTS:

MONOPOLE OWNER:
CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
CONTACT: STEVE TUTTLE
PH: (585) 899-3445

STRUCTURAL ENGINEER OF RECORD (EOR):
PAUL J. FORD AND COMPANY
250 EAST BROAD STREET, SUITE 600
COLUMBUS, OHIO 43215-3708
CONTACT: BRIAN KERMODE AT BKERMODE@PJFWEB.COM
PHONE: 614-221-6679

DESIGN STANDARD

THIS REINFORCEMENT DESIGN IS BASED UPON THE REQUIREMENTS OF THE TIA/EIA-222-F-1996 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, USING A DESIGN BASIC WIND SPEED OF 85 MPH (FASTEST MILE) WITH NO ICE, 38 MPH WITH 3/4 INCH ICE AND 50 MPH SERVICE LOADS.

REFER TO THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF STRUCTURAL ANALYSIS FOR THIS SITE (PJF#37513-1570), DATED 8-14-2013.

THIS PROJECT INCLUDES THE FOLLOWING REINFORCING ELEMENTS:

SHAFT REINFORCING
FIELD WELDED MICROPILE BRACKETS
HIGH STRENGTH GROUT
FOUNDATION AUGMENTATION: MICROPILES

SHEET INDEX

SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
S-1	GENERAL NOTES
S-2	GENERAL NOTES
S-3	AJAX BOLT DETAIL
S-4	MONOPOLE PROFILE
S-5	BASE PLATE DETAILS
S-6	MICROPILE DETAILS
S-7	MISC DETAILS
S-8	MI CHECKLIST

PAUL J. FORD AND COMPANY
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CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
PH: (585) 899-3445 FAX: (585) 899-3448

BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No:	37513-1570
DRAWN BY:	B.M.S.
CHECKED BY:	B.K.K.
APPROVED BY:	
DATE:	8-14-2013

ISSUE DATE OF PERMIT: 8-14-2013

T-1

CROWN CASTLE PROJECT: BU #825983; MIDDLETOWN_1; MIDDLETOWN, CT
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 2, 1/22/2009)

A. GENERAL NOTES

1. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO FABRICATION AND CONSTRUCTION. THESE DRAWINGS WERE PREPARED FROM INFORMATION AND DOCUMENTS PROVIDED TO PAUL J. FORD & COMPANY BY CROWN CASTLE. THIS INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY PAUL J. FORD & COMPANY FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. ANY DISCREPANCIES AND/OR CHANGES BETWEEN THE INFORMATION CONTAINED IN THESE DRAWINGS AND THE ACTUAL VERIFIED SITE CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF CROWN CASTLE AND PAUL J. FORD & COMPANY SO THAT ANY CHANGES AND/OR ADJUSTMENTS, IF NECESSARY, CAN BE MADE TO THE DESIGN AND DRAWINGS.
2. THE EXISTING UNREINFORCED MONOPOLE STRUCTURE DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE ANTENNA AND PLATFORM LOADS SHOWN ON THESE DRAWINGS AT THE REQUIRED MINIMUM TIA/EIA-222-F BASIC WIND SPEEDS. DO NOT INSTALL ANY ADDITIONAL OR NEW ANTENNA AND PLATFORM LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.
3. IF MATERIALS, QUANTITIES, STRENGTHS OR SIZES INDICATED BY THE DRAWINGS OR SPECIFICATIONS ARE NOT IN AGREEMENT WITH THESE NOTES, THE BETTER QUALITY AND/OR GREATER QUANTITY, STRENGTH OR SIZE INDICATED, SPECIFIED OR NOTED SHALL BE PROVIDED.
4. THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN PROPERLY AND ADEQUATELY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO INSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND ITS COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT. IMPORTANT CUTTING, WELDING AND SAFETY GUIDELINES: THE CONTRACTOR SHALL FOLLOW ALL CROWN CASTLE CUTTING, WELDING, FIRE PREVENTION AND SAFETY GUIDELINES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES FROM CROWN CASTLE. PER THE 12-01-2005 CROWN CASTLE DIRECTIVE: "ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CROWN CASTLE POLICY 'CUTTING AND WELDING PLAN' (DOC # ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT".
5. THE STRUCTURAL CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OR MEANS OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES.
6. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY THE INSPECTION/TESTING AGENCY. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
7. ALL MATERIALS AND EQUIPMENT FURNISHED WILL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.
10. ANY EXISTING ATTACHMENTS AND/OR PROJECTIONS ON THE POLE THAT MAY INTERFERE WITH THE INSTALLATION OF THE REINFORCING SYSTEM WILL HAVE TO BE REMOVED, AND/OR RELOCATED, AND/OR REPLACED AND RE-INSTALLED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH THE OWNER, TESTING AGENCY, AND ENGINEER.
11. ANY AND ALL EXISTING PLATFORMS THAT ARE LOCATED IN AREAS OF THE POLE SHAFT WHERE SHAFT REINFORCING MUST BE APPLIED SHALL BE TEMPORARILY REMOVED OR OTHERWISE SUPPORTED TO PERMIT NEW CONTINUOUS REINFORCEMENT TO BE ATTACHED. AFTER THE CONTRACTOR HAS SUCCESSFULLY INSTALLED THE MONOPOLE REINFORCEMENT SYSTEM, THE CONTRACTOR SHALL RE-INSTALL THE PLATFORMS. IN NO CASE SHALL ANY NEW AND/OR ADDITIONAL PLATFORMS AND/OR ANTENNAS AND/OR COAX CABLES AND/OR OTHER EQUIPMENT BE INSTALLED ON THE MONOPOLE UNTIL THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF ALL OF THE REQUIRED STRUCTURAL REINFORCING SYSTEM COMPONENTS.

B. (SECTION NOT USED)

C. SPECIAL INSPECTION AND TESTING

1. ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY THE OWNER'S REPRESENTATIVE AND THE OWNER'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY. REFER TO CROWN CASTLE DOCUMENT ENG-SOW-10066 FOR SPECIFICATION.
2. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE PERFORMED SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
3. OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
4. AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY THE OWNER FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
   (A.) ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
   (B.) THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO, AND COORDINATE WITH, THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
5. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES FOR THE OWNER. THE TESTING AGENCY SHALL INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.
   A. GENERAL:
      (1.) PERFORM CONTINUOUS ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY OWNER IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.
   B. FOUNDATIONS, CONCRETE, AND SOIL PREPARATION
      (1.) VERIFY MATERIALS AT BOTTOM OF EXCAVATION ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.
      (2.) VERIFY THAT EXCAVATIONS HAVE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.
      (3.) PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS.
      (4.) VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESS DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.
      (5.) PRIOR TO PLACEMENT OF COMPACTED FILL, OBSERVE SUBGRADE AND VERIFY SITE HAS BEEN PREPARED PROPERLY.
   C. CONCRETE TESTING PER ACI - (NOT REQUIRED)
   D. STRUCTURAL STEEL
      (1.) CHECK THE STEEL ON THE JOB WITH THE PLANS.
      (2.) CHECK MILL CERTIFICATIONS.
      (3.) CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
      (4.) INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
      (5.) CALL FOR LABORATORY TEST REPORTS WHEN IN DOUBT.
      (6.) CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
      (7.) CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
      (8.) CHECK BOLT TIGHTENING ACCORDING TO AISC "TURN OF THE NUT" METHOD.
   E. WELDING:
      (1.) VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.
      (2.) INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND IN ACCORDANCE WITH AWS D1.1.
      (3.) APPROVE FIELD WELDING SEQUENCE.
         (A.) A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO THE OWNER BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM THE OWNER.
      (4.) INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
         (A.) INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE AND WORKING CONDITIONS.
         (B.) VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
         (C.) INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
         (D.) VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1.
         (E.) SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE OR DYE PENETRANT.
         (F.) INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED PLANS.
         (G.) VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
         (H.) REVIEW THE REPORTS BY TESTING LABS.
         (I.) CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
         (J.) INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
         (K.) CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.
   F. SPECIAL INSPECTION OF EXISTING SHAFT-TO-FLANGE WELD CONNECTIONS:
      (1.) PRIOR TO CONSTRUCTION, TESTING AGENCY SHALL INSPECT CONDITION OF EXISTING SHAFT-TO-BASE-PLATE WELD CONNECTION. ALSO INSPECT EXISTING STIFFENERS IF PRESENT. THE INSPECTOR SHALL USE THE FOLLOWING INSPECTION METHODS, OR COMBINATION OF METHODS, AS REQUIRED TO IDENTIFY ANY CRACKS: VISUAL, MAGNETIC PARTICLE, AND/OR ULTRA-SONIC. IN ADDITION, OTHER TEST METHODS MAY ALSO BE USED AT THE RECOMMENDATION OF THE TESTING AGENCY AND UPON THE APPROVAL OF THE OWNER AND THE ENGINEER. THE TESTING AGENCY SHALL PROVIDE CAREFUL AND THOROUGH DOCUMENTATION OF THIS INSPECTION TO THE OWNER AND THE ENGINEER. TESTING AGENCY SHALL COORDINATE THESE INSPECTION ACTIVITIES WITH THE OWNER'S REQUIRED PROCESSES AND PROCEDURES. IMPORTANT: THE TESTING AGENCY SHALL IMMEDIATELY REPORT ANY INDICATIONS OF CRACKS, FRACTURES, DISTRESS, AND/OR CORROSION TO THE OWNER AND ENGINEER.
      (2.) AFTER CONSTRUCTION, TESTING AGENCY SHALL INSPECT ANY AND ALL FIELD REPAIRS IMPLEMENTED AS REQUIRED BY THE OWNER FROM THE RESULTS OF THE INSPECTION IN THE PREVIOUS NOTE 5.F.(1.) ABOVE.
      (3.) REFER TO CROWN CASTLE DOCUMENTS ENG-SOW-10033 AND ENG-BUL-10051 FOR SPECIFICATIONS.
   G. REPORTS:
      (1.) COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO THE OWNER.

6. THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL-INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DECIDE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES AND PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO THE OWNER'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT THE OWNER'S REVIEW AND SPECIFIC WRITTEN CONSENT. THE OWNER RESERVES THE RIGHT TO DETERMINE WHAT IS AN ACCEPTABLE RESOLUTION OF DISCREPANCIES AND PROBLEMS.
7. AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO THE OWNER. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
8. RESPONSIBILITY: THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATIONS. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.

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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570	ISSUE DATE OF PERMIT: 8-14-2013
DRAWN BY: B.M.S.	
CHECKED BY: B.K.K.	
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D. STRUCTURAL STEEL

1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:

A. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (**AISC**):
   (A.) "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS,"
   (B.) "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS OF THE ENGINEERING FOUNDATION.
   (C.) "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (PARAGRAPH 4.2.1 SPECIFICALLY EXCLUDED).

B. BY THE AMERICAN WELDING SOCIETY (**AWS**):
   (A.) "STRUCTURAL WELDING CODE - STEEL D1.1."
   (B.) "SYMBOLS FOR WELDING AND NON-DESTRUCTIVE TESTING"

2. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
3. TIGHTEN ALL STRUCTURAL BOLTS, INCLUDING THE AJAX M20 BOLTS WITH SHEAR SLEEVES, ACCORDING TO THE REQUIREMENTS OF THE AISC "TURN OF THE NUT" METHOD. TIGHTEN BOLTS 1/3 TURN PAST THE SNUG TIGHT CONDITION AS DEFINED BY AISC.
4. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E80XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO THE OWNER'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65 (FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
7. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION I NOTES REGARDING TOUCH-UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
8. UNLESS OTHERWISE NOTED, ALL STEEL MEMBERS SHALL BE HOT-DIP GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH ASTM A123. SEE SECTION J FOR FURTHER NOTES AND FOR EXCEPTIONS (IF ANY).
9. ALL WELDS SHALL BE VISUALLY INSPECTED BY THE OWNER'S APPROVED TESTING AGENCY. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT. THE CONTRACTOR SHALL COOPERATE WITH THE TESTING AGENCY IN THEIR TESTING EFFORTS.
10. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
11. FIELD CUTTING OF STEEL:
   (A.) PRIOR TO ANY FIELD CUTTING, THE CONTRACTOR SHALL MARK THE CUT OUTLINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS.
   (B.) ANY REQUIRED CUTS IN THE STEEL SHALL BE CAREFULLY CUT BY MECHANICAL METHODS SUCH AS DRILLING, SAW CUTTING, AND GRINDING. THE CONTRACTOR IS RESPONSIBLE TO PREVENT ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, DURING THE CUTTING WORK. ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
   (C.) ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.

E. BASE PLATE GROUT

1. NEW GROUT FOR THE POLE BASE SHALL BE NON-SHRINK, NON-METALLIC, GROUT (EUCO NS GROUT BY EUCLID, OR APPROVED EQUAL) WITH A 7500 PSI MINIMUM COMPRESSIVE STRENGTH. PVC DRAINAGE PIPES SHALL BE PROVIDED FROM INSIDE THE POLE SHAFT OUT THROUGH THE GROUT SPACE UNDER THE BASE PLATE IN ORDER TO ALLOW MOISTURE TO ADEQUATELY DRAIN FROM THE INTERIOR OF THE POLE SHAFT. CONTRACTOR SHALL SUBMIT PROPOSED GROUT SPECIFICATION INFORMATION TO THE OWNER FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION. CONTRACTOR SHALL FOLLOW GROUT MANUFACTURER'S SPECIFICATIONS FOR COLD WEATHER GROUTING PROCEDURES (IF NECESSARY) AND THE TESTING AGENCY SHALL PREPARE GROUT SAMPLE SPECIMENS FOR COMPRESSIVE STRENGTH TESTING AND VERIFICATION.
2. GROUT SHALL BE INSTALLED TIGHT UNDER BASE PLATE WITH NO VOIDS REMAINING BETWEEN TOP OF EXISTING CONCRETE AND UNDERSIDE OF EXISTING BASE PLATE (EXCEPT FOR DRAIN PIPES). GROUT COMPLETELY SOLID (EXCEPT FOR DRAIN PIPES) UNDER ENTIRE SURFACE OF BASE PLATE FROM OUTSIDE EDGE TO INSIDE EDGE.

F. FOUNDATION WORK - (NOT REQUIRED)

G. CAST-IN-PLACE CONCRETE - (NOT REQUIRED)

H. EPOXY GROUTED REINFORCING ANCHOR RODS - (NOT REQUIRED)

I. TOUCH UP OF GALVANIZING

1. THE CONTRACTOR SHALL TOUCH UP ANY AND/OR ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED DURING CONSTRUCTION. **GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.**
2. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. THE OWNER'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.
3. THE OWNER'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE INADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.

J. HOT DIP GALVANIZING

1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.
2. PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING.
3. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES AS REQUIRED.
4. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.

K. PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER

1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY THE OWNER, THE OWNER WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
2. THE MONOPOLE REINFORCING SYSTEM INDICATED IN THESE DOCUMENTS USES REINFORCING COMPONENTS THAT INVOLVE FIELD WELDING STEEL MEMBERS TO THE EXISTING GALVANIZED STEEL POLE STRUCTURE. THESE FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. **ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE CONNECTED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT THE OWNER REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.**
3. THE OWNER SHALL REFER TO TIA/EIA-222-F-1996, SECTION 14 AND ANNEX E FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY THE OWNER BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. **PAUL J. FORD & COMPANY RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT.** ACCORDING TO TIA/EIA-222-F-1996 SECTION 14.1, NOTE 1: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

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BU #825983; MIDDLETOWN_1
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MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570	ISSUE DATE OF PERMIT: 8-14-2013
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AJAX BOLT NOTE SHEET: REV. 1.4, 5-20-2013

NOTES: 1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

3. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAIL BELOW FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

4. ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. DTI'S SHALL BE THE SQUIRTER® STYLE, MADE TO ASTM F959 LATEST REVISION; AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF RC 38 OR HIGHER.

NOTES FOR AJAX M20 'ONE-SIDE' BOLTS WITH DIRECT TENSION INDICATORS (DTI'S):

DTI'S REQUIRED: DTI'S SHALL BE "SELF-INDICATING" SQUIRTER® STYLE DTI'S MADE WITH SILICONE EMBEDDED IN THEM, INSPECTED BY MEANS OF THE VISUAL EJECTION OF SILICONE AS THE DTI PROTRUSIONS COMPRESS. SQUIRTER® DTI'S SHALL BE CALIBRATED PER MANUFACTURER'S INSTRUCTIONS PRIOR TO USE.

THE DIRECT TENSION INDICATOR (DTI) WASHERS SHALL BE THE "SQUIRTER® STYLE" AS MANUFACTURED BY:

APPLIED BOLTING TECHNOLOGY PRODUCTS, INC.
1413 ROCKINGHAM ROAD BELLOWS FALLS, VERMONT, USA 05101
PHONE 1-800-552-1999
WEBSITE: WWW.APPLIEDBOLTING.COM

DISTRIBUTORS OF SQUIRTER® DTI'S:
HTTP://WWW.APPLIEDBOLTING.COM/APPLIED-BOLTING-DISTRIBUTORS.HTML

DTI: USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 20 MM (M20) NOMINAL A325 BOLTS FOR THE AJAX M20 BOLTS. DTI'S SHALL NOT BE HOT-DIP GALVANIZED. DTI'S SHALL BE MECHANICALLY GALVANIZED (MG) BY THE COLD MECHANICAL PROCESS ONLY AS PROVIDED BY THE DTI MANUFACTURER.

HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 20 MM (M20) NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY GALVANIZED BY THE COLD MECHANICAL PROCESS. ALTERNATIVELY, CORRECTLY MADE HOT DIP GALVANIZED HARDENED FLAT WASHERS HAVING A MINIMUM HARDNESS OF RC 38 CAN BE USED; CONTRACTOR SHALL PROVIDE DOCUMENTATION OF WASHER SPECIFICATION AND HARDNESS.

NUT LUBRICATION REQUIRED: PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW DTI MANUFACTURER INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING.

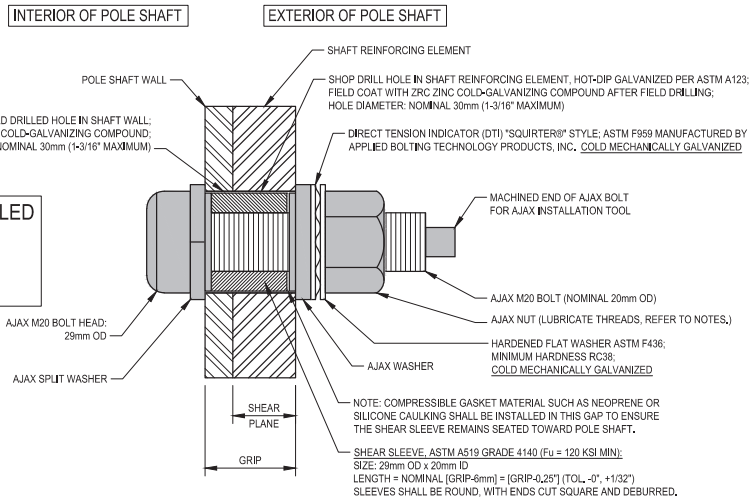
NOTE: COMPLETELY COMPRESSED DTI'S SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE OF A HARDENED FLAT WASHER, NEVER DIRECTLY AGAINST THE NUT.

CONTRACTOR SHALL FOLLOW DTI MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION, LUBRICATION, TIGHTENING AND INSPECTION.

INSPECTION REQUIRED: ALL AJAX BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009, BY A QUALIFIED BOLT INSPECTOR. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE AJAX BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. IN ADDITION, ALL AJAX BOLTS AND DTI'S SHALL BE VISUALLY INSPECTED ACCORDING TO THE DTI MANUFACTURER'S INSTRUCTIONS. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE PHOTO DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTI'S.

NOTE: ALL SHOP AND FIELD DRILLED HOLES SHALL BE NOMINAL 30MM DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1-3/16".

NOTE: ALL AJAX BOLTS, AJAX SPLIT WASHERS, AJAX WASHERS, AJAX NUTS, AND SHEAR SLEEVES SHALL BE HOT DIP GALVANIZED PER ASTM A123 OR A153 AS APPROPRIATE. SHEAR SLEEVES MAY BE COLD GALVANIZED OR ZINC PLATED.



TYPICAL AJAX BOLT DETAIL 1 / S-3

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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570	ISSUE DATE OF PERMIT: 8-14-2013
DRAWN BY: B.M.S.	
CHECKED BY: B.K.K.	
APPROVED BY:	S-3
DATE: 8-14-2013	

37513-1570 PERMIT.DWG

POLE SPECIFICATIONS	
POLE SHAPE TYPE:	12-SIDED POLYGON
TAPER:	0.325000 IN/FT
SHAFT STEEL:	ASTM A36M-42
BASE PL STEEL:	ASTM A36
ANCHOR RODS:	2"ø ASTM A36

SHAFT SECTION DATA					
SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN)	
				@ TOP	@ BOTTOM
1	5.00	0.1875	60.00	18.000	18.000
2	50.00	0.2500		18.000	34.313
3	20.00	0.2500		32.181	38.688
4	20.00	0.3125	72.00	38.688	45.188
5	10.00	0.3125		42.613	45.813
6	40.00	0.3750	84.00	45.813	58.875
7	18.00	0.3750		55.839	61.688
8	21.00	0.4375	108.00	61.688	68.500
9	28.00	0.4375		64.705	73.813

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

CONTRACTOR SHALL PROVIDE ASTM A36 SHIM PLATES BELOW SLIP JOINTS. THE SHIM PLATES SHALL BE PLACED BETWEEN THE NEW SHAFT REINFORCEMENT AND THE EXISTING POLE SHAFT FROM THE SLIP JOINT TO THE NEW SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND A EXTRA LONG "SPLICE SHIM" SHALL BE PLACED BETWEEN THE NEW UPPER AND LOWER SHAFT REINFORCEMENT PLATES AT THE SHAFT REINFORCEMENT SPLICE PLATE LOCATION.

MODIFICATIONS:

(A) INSTALL NEW MICROPILES AND MICROPILE BRACKETS AT BASE PLATE. SEE SHEET S-5.

(B) INSTALL NEW SHAFT REINFORCING. SEE CHART.

NEW AEROSOLUTIONS MP3 REINFORCING

ELEVATION	FLAT #	REINFORCING ELEMENT
38'-4" TO 53'-4"	1, 5 & 9	MP304
88'-4" TO 123'-4"	1, 5 & 9	MP305
118'-9" TO 153'-9"	2, 6 & 10	MP304

ALL BOLTS SHALL BE AJAX M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A519 GR 4140, MIN. Fu=120 KSI). CONTACT SUPPLIER FOR MATERIAL (PLATE & BOLTS) AND INSTALLATION PROCEDURES.

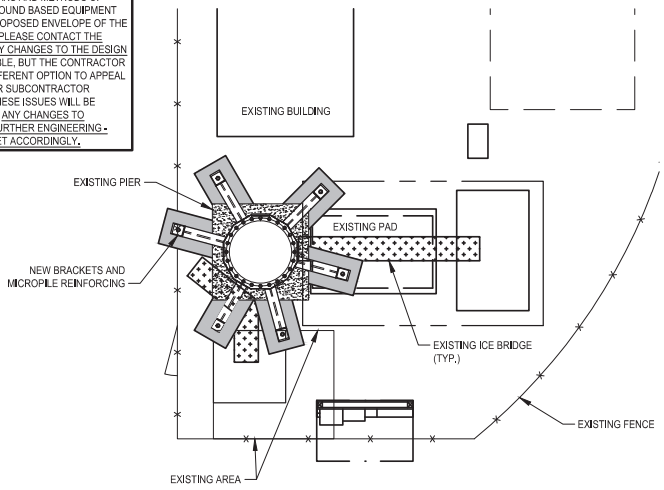
NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE

BOTTOM ELEVATION	TOP ELEVATION	FLAT # / DEGREE SEPARATION	ELEMENT	ELEMENT LENGTH	ELEMENT QUANTITY	APPROXIMATE AJAX BOLTS PER ELEMENT	APPROXIMATE TOTAL AJAX BOLT QUANTITY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	ESTIMATED TOTAL STEEL WEIGHT
38' - 6"	53' - 6"	1, 5 & 9	1" x 4-1/2"	15' - 0"	3	20	60	6	6	16"	689 LBS.
88' - 6"	123' - 6"	1, 5 & 9	1" x 6"	35' - 0"	3	37	111	10	10	20"	2144 LBS.
119' - 0"	154' - 0"	2, 6 & 10	1" x 4-1/2"	35' - 0"	3	39	117	8	8	16"	1608 LBS.
							288				4441 LBS.

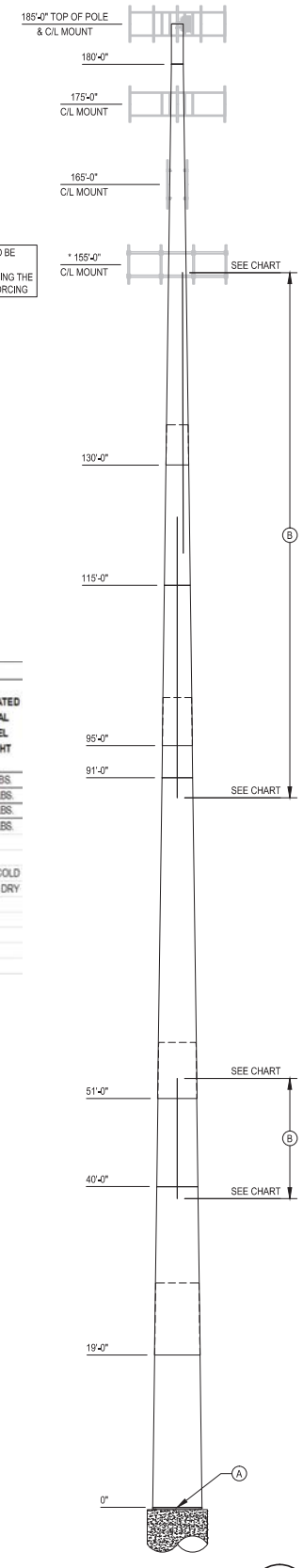
NOTES:

1.) AJAX BOLTS ARE TO BE 20mm DIAMETER WITH CORRESPONDING 29mm DIAMETER SLEEVE WITH MATCHING STEEL GRADE.
2.) ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.
3.) ALL REINFORCING SHALL BE ASTM A572 GR. 65.
4.) WELDS ARE ASSUMED E80XX OR GREATER. TERMINATION WELDS SHALL BE 3/8" FILLET WELDS.
5.) HOLES FOR AJAX BOLTS AND SHEAR SLEEVES ARE 30mm UNLESS NOTED OTHERWISE.
6.) ALL SHIMS SHALL BE ASTM A36.

SITE COORDINATION REQUIRED: IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE MEANS AND METHODS OF SHORING AND/OR RELOCATION OF GROUND BASED EQUIPMENT THAT IS WILL BE AFFECTED BY THE PROPOSED ENVELOPE OF THE CURRENT FOUNDATION MOD DESIGN. PLEASE CONTACT THE E.O.R. IF DESIGN INPUT OR NECESSARY CHANGES TO THE DESIGN ARE NEEDED. IF THE DESIGN IS FEASIBLE, BUT THE CONTRACTOR HAS A PREFERENCE TO INSTALL A DIFFERENT OPTION TO APPEAL TO MORE FAVORABLE TECHNIQUES OR SUBCONTRACTOR LIMITATIONS - IT IS EXPECTED THAT THESE ISSUES WILL BE ADDRESSED AT THE TIME OF BIDDING. ANY CHANGES TO ORIGINAL DESIGN WILL BE REQUIRE FURTHER ENGINEERING - CONTRACTOR IS EXPECTED TO BUDGET ACCORDINGLY.



PARTIAL SITE PLAN 2 / S-4



* EXISTING MOUNTS MAY NEED TO BE ADJUSTED, MOVED AND/OR TEMPORARILY SUPPORTED DURING THE INSTALLATION OF SHAFT REINFORCING

POLE ELEVATION 1 / S-4

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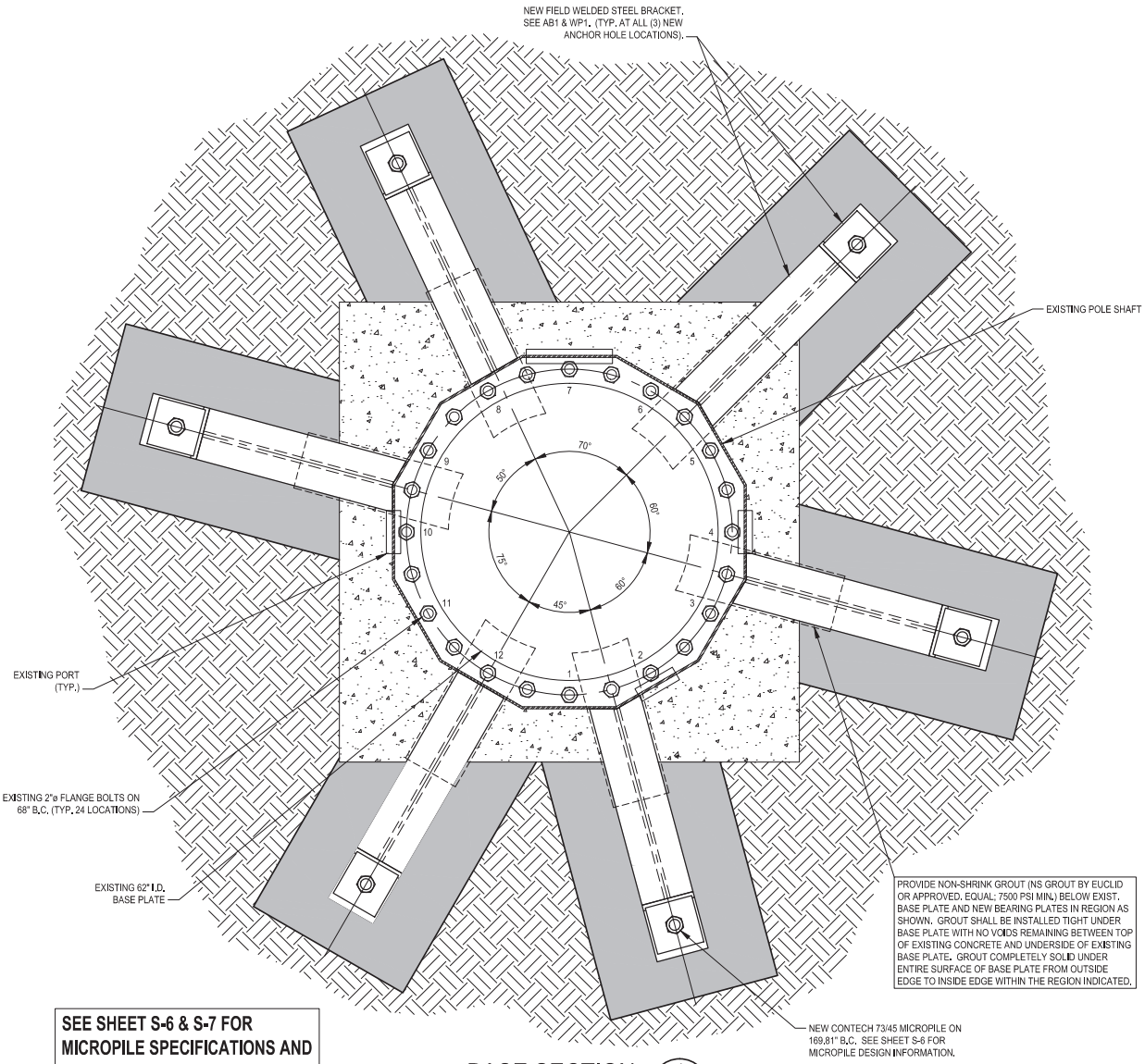
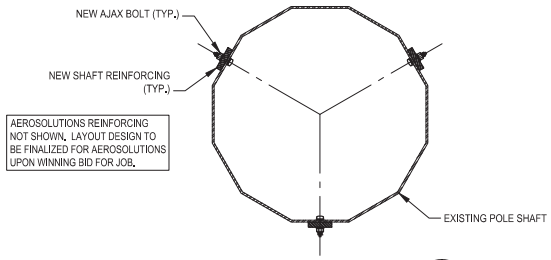
S-4



PROVIDE NON-SHRINK GROUT (NS GROUT BY EUCLID OR APPROVED. EQUAL; 7500 PSI MIN.) BELOW EXIST. BASE PLATE AND NEW BEARING PLATES IN REGION AS SHOWN. GROUT SHALL BE INSTALLED TIGHT UNDER BASE PLATE WITH NO VOIDS REMAINING BETWEEN TOP OF EXISTING CONCRETE AND UNDERSIDE OF EXISTING BASE PLATE. GROUT COMPLETELY SOLID UNDER ENTIRE SURFACE OF BASE PLATE FROM OUTSIDE EDGE TO INSIDE EDGE WITHIN THE REGION INDICATED.

SEE SHEET S-6 & S-7 FOR MICROPILE SPECIFICATIONS AND ANCHOR BRACKET DETAILS

A BASE SECTION 1 / S-5



AEROSOLUTIONS REINFORCING NOT SHOWN. LAYOUT DESIGN TO BE FINALIZED FOR AEROSOLUTIONS UPON WINNING BID FOR JOB.

B BASE SECTION 2 / S-5

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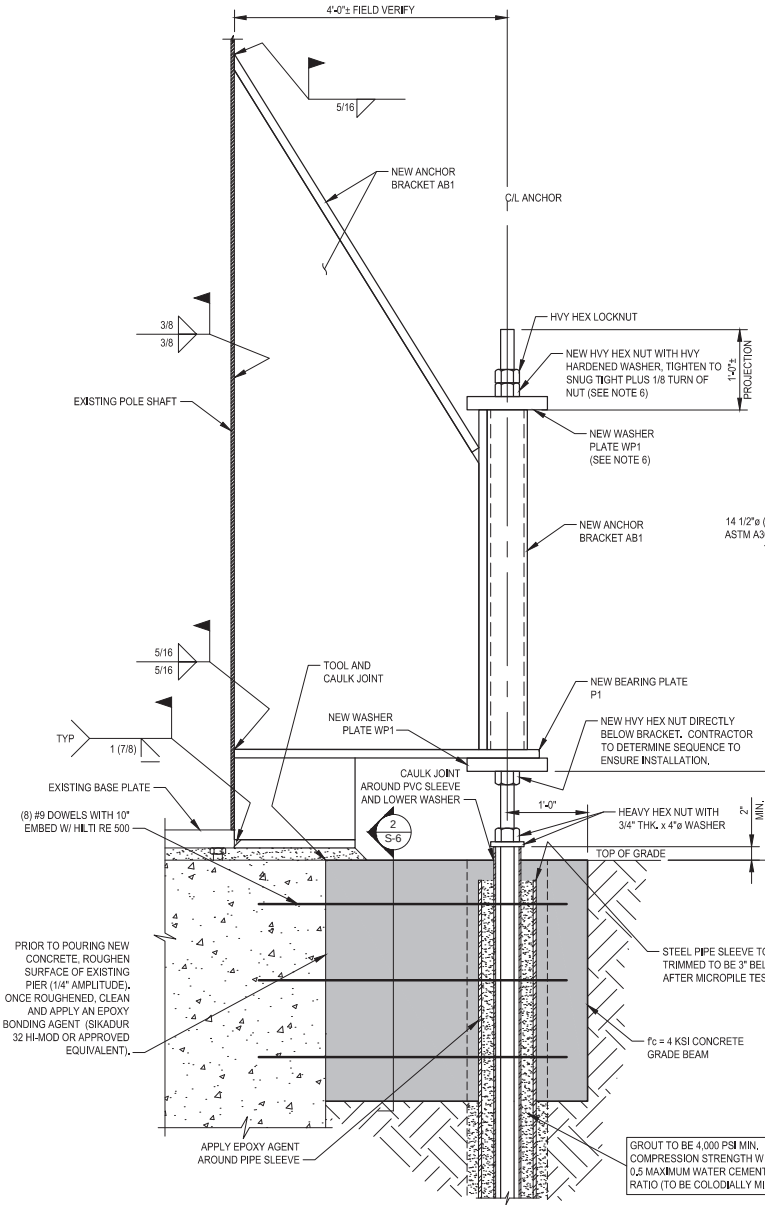
S-5

MICROPILE TESTING REQUIREMENTS

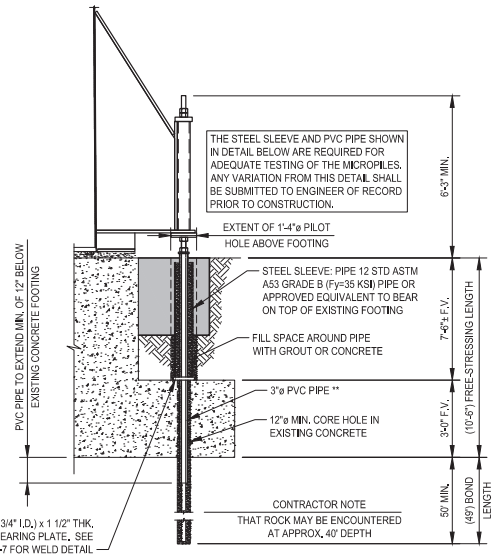
A MINIMUM OF 2 IN-PLACE MICROPILES (TEST PILES SHALL BE IN OPPOSITE CORNERS) ARE TO BE TESTED TO 274k IN TENSION. ALL PILE TESTING SHALL BE CARRIED OUT IN GENERAL CONFORMANCE WITH ASTM D1143 OR D3689. A HYDRAULIC JACK MAY BE SUBSTITUTED FOR THE PILE TESTING SET-UPS SHOWN IN THE ASTM SPECS. IF A HYDRAULIC JACK IS USED, FOLLOW EQUIPMENT GUIDELINES DISCUSSED IN THE POST TENSIONING INSTITUTE "RECOMMENDATIONS FOR PRESTRESSED ROCK AND SOIL ANCHORS" DESIGN GUIDE, SECTION 8.2. PILES SHALL BE LOADED USING PTI'S PROOF TEST METHODOLOGY (REFER TO SECTION 8.3.3 OF THE PTI DESIGN GUIDE; ALIGNMENT LOAD, AL, SHALL BE 20 KIPS; DESIGN LOAD, DL, IS 206 KIPS). PROVISION SHALL BE MADE TO ALLOW FOR MOVEMENT BETWEEN MICROPILE CROSS-SECTION AND SOIL SO THAT GROUT-TO-SOIL BOND LINE IS ADEQUATELY TESTED. IF COMPRESSION TESTING IS PERFORMED, CONTRACTOR SHALL PROTECT BAR FROM DAMAGE DUE TO BUCKLING FOR LENGTH ABOVE GRADE.

MICROPILE NOTES:

1. ALL HOLLOW BAR STEEL AND ASSOCIATED HARDWARE SHALL BE SUPPLIED BY CON-TECH SYSTEMS OR OWNER/EOR APPROVED EQUIVALENT.
2. ALL HOLLOW BAR, NUTS AND BEARING PLATES SHALL BE HOT-DIP GALVANIZED PER ASTM A123 OR A153, AS APPROPRIATE.
3. CONTACT CON-TECH SYSTEMS (OR MANUFACTURER OF APPROVED ALTERNATE) FOR MATERIALS AND INSTALLATION PROCEDURES AND RECOMMENDATIONS.
4. SPECIAL INSPECTION OF THE MICROPILES IS REQUIRED AS FOLLOWS: (1) VERIFY THAT MICROPILE MATERIAL, SIZE AND LENGTH COMPLY WITH THE INFORMATION SHOWN ON THIS DRAWING, (2) VERIFY PLACEMENT OF EACH MICROPILE, (3) OBSERVE DRILLING, GROUTING AND TESTING (AS APPROPRIATE) OPERATIONS FOR EACH MICROPILE AND MAINTAIN COMPLETE AND ACCURATE RECORDS FOR EACH MICROPILE.
5. FOUNDATION DESIGN IS BASED ON THE ORIGINAL GEOTECHNICAL REPORT PREPARED BY FDH, DATED 8-2-2013.
6. CONTACT CONTECH SYSTEMS (OR MANUFACTURER OF APPROVED ALTERNATE) TO VERIFY NUT & WASHER CONNECTION ARE COMPATIBLE WITH MICROPILE THREADS



A NEW MICROPILE & BRACKET DETAIL 1 S-6

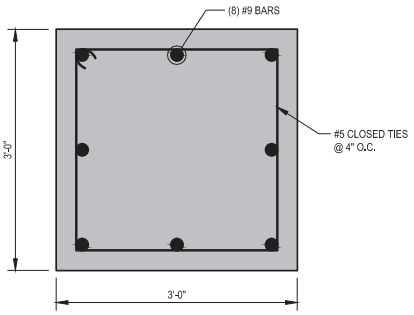


A MICROPILE DEPTH DETAIL 3 S-6

** FILL GAP BETWEEN SLEEVE & BAR WITH CORROSION INHIBITING COMPOUND. REFER TO PTI MANUAL AND/OR MANUFACTURER SPECS FOR APPROVED COMPOUNDS.

CONTECH'S 73/45 HOLLOW BAR MICROPILE OR EQUIVALENT SYSTEM.

TAKE ALL MEASURES NECESSARY TO AVOID DAMAGING EXISTING REINFORCING BARS DURING DRILLING OPERATIONS. NOTIFY PAUL J. FORD AND COMPANY IMMEDIATELY IF EXISTING REINFORCING BARS ARE ENCOUNTERED AND INTERFERE WITH PLACEMENT OF NEW ANCHORS. MINOR ADJUSTMENT TO PROPOSED LOCATION OF NEW ANCHORS MAY BE REQUIRED.



SECTION 2 S-6

PILE DESIGN PARAMETER SCHEDULE

PARAMETER / OPTIONS	MIN. HOLE ø/STEEL AREA	PILE CAPACITY (Pn/Ω)	ULTIMATE SKIN FRICTION (PSI)	FREESTRESSING LENGTH	FRICTION DEVELOPMENT LENGTH/BOND LENGTH	ROCK SOCKET/ PLUNGE LENGTH	TOTAL LENGTH
MICROPILE	* 12"ø / 4.02 IN² MIN.	219.9K	VARIES. SEE GEOTECH	5'	50'	N.A.	61'-3"

* THE DESIGN ANTICIPATES A FINAL GROUT DIAMETER OF 12" BASED ON A MINIMUM 280MM AUGER IN SILT W/ CLAY AND SAND. THE DESIGN REQUIRES UNCASED MICROPILES FOR THE LISTED CAPACITY IN TENSION AND COMPRESSION AS LAID OUT PER PLAN. THE CONTRACTOR/MICROPILE INSTALLER IS RESPONSIBLE FOR THE MEANS AND METHODS TO ENSURE THE NECESSARY CAPACITY AND WILL DEMONSTRATE THE INSTALLED CAPACITY PER THE SPECIFIED TESTING. THE EMBEDMENT DEPTH AND AUGER/GROUT DIAMETERS ARE LISTED AS A PRELIMINARY BASIS FOR BIDDING. THE INTENT IS FOR THE INSTALLER TO REVIEW THE CURRENT SOIL INFORMATION AND DESIGN REQUIREMENTS TO ENSURE THAT THE CONTRACTOR'S SPECIFIC EQUIPMENT OR INSTALLATION TECHNIQUE IS APPROPRIATE. IF THE CONTRACTOR BELIEVES THE SCOPE SHOULD CHANGE UPON REVIEW, PLEASE ADDRESS PRIOR TO BIDDING. PLEASE COORDINATE WITH ENGINEER OF RECORD PRIOR TO INSTALLATION.

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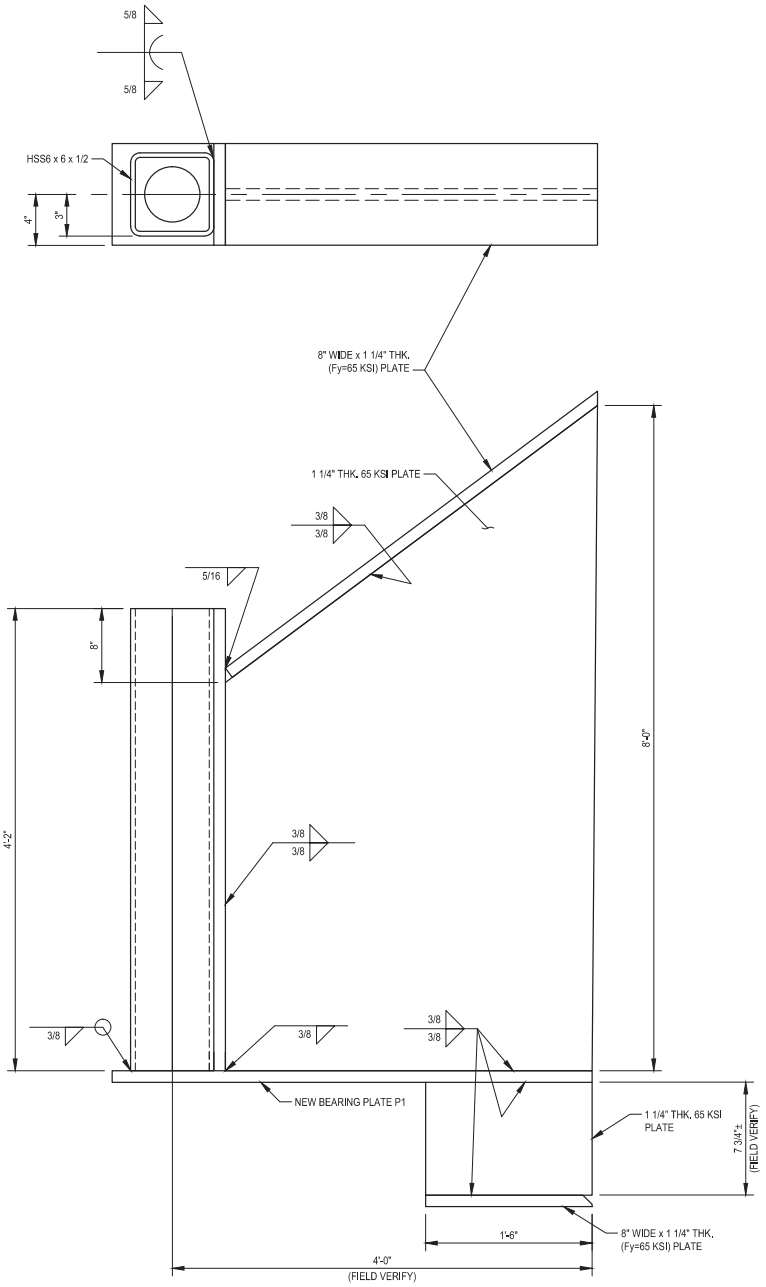
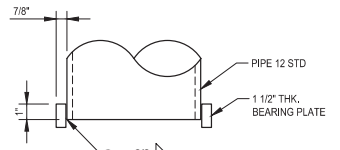
S-6

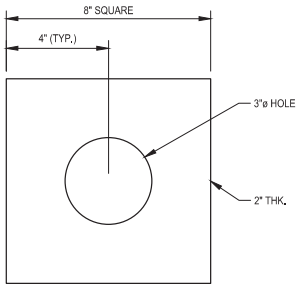


NEW MICROPILE BRACKET MK~AB1

(6 REQUIRED) (PIPE Fy=42 KSI) (STIFFENER Fy = 65 KSI)

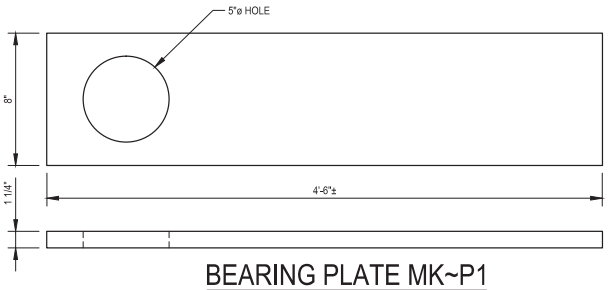


SECTION 1 / S-7



NEW WASHER PLATE MK~WP1

(12 REQUIRED) (Fy = 50 KSI)



BEARING PLATE MK~P1

(6 REQUIRED) (Fy = 65 KSI)

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S-7

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 DRAWINGS, 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 RESIDES WITH THE EOR AT ALL TIMES.

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) 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 IN-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 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 AN DENG-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, PREFERABLE 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 INSPECTION(S) 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 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 MI'S
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 INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV 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.

PHOTOGRAPHS
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 AND TORQUE
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

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

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

MI CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
	PRE-CONSTRUCTION
X	MI CHECKLIST DRAWINGS
X	EOR APPROVED SHOP DRAWINGS
X	FABRICATION INSPECTION
X	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
X	FABRICATOR NDE INSPECTION
X	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
	CONSTRUCTION
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
X	POST INSTALLED MICROPILE VERIFICATION
X	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK: LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
X	THIRD PARTY ONSITE INSPECTION OF BOLT PRETENSION PER CROWN REQUIREMENTS
X	INSPECTION OF AJAX BOLTS AND DTI'S PER REQUIREMENTS ON SHEET S-3
ADDITIONAL TESTING AND INSPECTIONS:	
	POST-CONSTRUCTION
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
X	THIRD PARTY ONSITE BOLT INSPECTION REPORT
X	POST INSTALLED MICROPILE PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

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

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PH: (585) 899-3445 FAX: (585) 899-3448

BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No:	37513-1570
DRAWN BY:	B.M.S.
CHECKED BY:	B.K.K.
APPROVED BY:	
DATE:	8-14-2013

ISSUE DATE OF PERMIT: 8-14-2013

S-8

37513-1570 PERMIT.DWG

MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

BU NUMBER; SITE NAME

BU #825983; MIDDLETOWN_1

APP: 185826 REV. 13; WO: 628395

SITE ADDRESS

90 INDUSTRIAL PARK ROAD
MIDDLETOWN, CT 06457
MIDDLESEX COUNTY

PROJECT NOTES

1. DETAILED FIELD INFORMATION REGARDING INTERFERENCES AND/OR EXISTING FIELD CONDITIONS MAY BE AVAILABLE ON CROWN'S CCISITES AND FROM CONTRACTOR'S PRE-MOD MAPPING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AND COORDINATE WITH THE AVAILABLE SOURCES OF INFORMATION ABOVE AND WITH THE PROJECT PLANS BEFORE PROCEEDING WITH THE WORK. CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND CROWN CASTLE FIELD PERSONNEL BEFORE PROCEEDING WITH THE WORK.

2. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

3. ALL STRUCTURAL BOLTS SHALL BE FIELD INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

4. (A.) DTI'S REQUIRED: ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAILS ON SHEET S-3 FOR REQUIREMENTS ON THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

   (B.) EFFECTIVE 5/30/2012: UNTIL FURTHER NOTICE, CROWN CASTLE WILL ACCEPT AJAX BOLTS TIGHTENED USING AISC "TURN-OF-NUT" METHOD. INSTALLERS SHALL FOLLOW CROWN GUIDELINES FOR AISC "TURN-OF-NUT" METHOD AND ALSO PROVIDE COMPLETE INSPECTION DOCUMENTATION IN THE PMI. PRIOR TO STARTING WORK, CONTRACTOR SHALL CONSULT WITH CROWN ENGINEERING TO DETERMINE WHETHER THIS POLICY IS STILL IN PLACE.

   (C.) REQUIREMENT EFFECTIVE 04/20/2013, PER CROWN CASTLE DIRECTIVE: ANY AND ALL STRUCTURAL BOLTS THAT ARE TIGHTENED TO THE PRETENSIONED CONDITION USING THE AISC "TURN-OF-NUT" TENSIONING PROCEDURE (NON-TENSION CONTROLLED ['NON-TC'] BOLTS AND/OR BOLTS WITHOUT DTI'S INSTALLED) SHALL BE INSPECTED ONSITE BY AN INDEPENDENT THIRD-PARTY BOLT INSPECTOR, AS APPROVED BY CROWN. **THIS INSPECTION IS REQUIRED TO BE AN ONSITE FIELD INSPECTION.** THE THIRD-PARTY BOLT INSPECTOR SHALL FOLLOW THE PUBLISHED CROWN CASTLE INSPECTION PROCEDURE "MI NON-TC BOLT INSPECTION", DATED APRIL 2013. THE THIRD-PARTY BOLT INSPECTOR SHALL PREPARE A FULLY DOCUMENTED BOLT INSPECTION REPORT, AS SPECIFIED BY CROWN, AND SHALL SUBMIT A COPY OF THE BOLT INSPECTION REPORT TO THE MI INSPECTOR, THE EOR, AND TO CROWN CASTLE.

5. NDE OF THE CIRCUMFERENTIAL WELD OF THE BASE PLATE TO SHAFT CONNECTION IS REQUIRED. SEE CCI DOCUMENTS ENG-SOW-1033 *'TOWER BASE PLATE NDE'* AND ENG-BUL-10051 *'NDE REQUIREMENTS FOR MONOPOLE BASE PLATE TO PREVENT CONNECTION FAILURE'*. NOTIFY THE EOR AND CROWN ENGINEERING IMMEDIATELY IF ANY CRACKS ARE SUSPECTED OR HAVE BEEN IDENTIFIED. THE NDE SHALL INCLUDE ALL EXISTING REINFORCEMENTS THAT HAVE BEEN WELDED TO THE BASE PLATE. ANY FULL PENETRATION WELDING TO THE BASE PLATE REQUIRED AS PART OF THIS ACTIVE REINFORCEMENT DESIGN SHALL BE INCLUDED IN THE NDE SCOPE OF WORK.

PROJECT CONTACTS:

MONOPOLE OWNER:
CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
CONTACT: STEVE TUTTLE
PH: (585) 899-3445

STRUCTURAL ENGINEER OF RECORD (EOR):
PAUL J. FORD AND COMPANY
250 EAST BROAD STREET, SUITE 600
COLUMBUS, OHIO 43215-3708
CONTACT: BRIAN KERMODE AT BKERMODE@PJFWEB.COM
PHONE: 614-221-6679

DESIGN STANDARD

THIS REINFORCEMENT DESIGN IS BASED UPON THE REQUIREMENTS OF THE TIA/EIA-222-F-1996 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, USING A DESIGN BASIC WIND SPEED OF 85 MPH (FASTEST MILE) WITH NO ICE, 38 MPH WITH 3/4 INCH ICE AND 50 MPH SERVICE LOADS.

REFER TO THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF STRUCTURAL ANALYSIS FOR THIS SITE (PJF#37513-1570), DATED 8-14-2013.

THIS PROJECT INCLUDES THE FOLLOWING REINFORCING ELEMENTS:

SHAFT REINFORCING
FIELD WELDED MICROPILE BRACKETS
HIGH STRENGTH GROUT
FOUNDATION AUGMENTATION: MICROPILES

SHEET INDEX

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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570	ISSUE DATE OF PERMIT: 8-14-2013
DRAWN BY: B.M.S.	
CHECKED BY: B.K.K.	
APPROVED BY:	T-1
DATE: 8-14-2013	

CROWN CASTLE PROJECT: BU #825983; MIDDLETOWN_1; MIDDLETOWN, CT
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 2, 1/22/2009)

A. GENERAL NOTES

1. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO FABRICATION AND CONSTRUCTION. THESE DRAWINGS WERE PREPARED FROM INFORMATION AND DOCUMENTS PROVIDED TO PAUL J. FORD & COMPANY BY CROWN CASTLE. THIS INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY PAUL J. FORD & COMPANY FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. ANY DISCREPANCIES AND/OR CHANGES BETWEEN THE INFORMATION CONTAINED IN THESE DRAWINGS AND THE ACTUAL VERIFIED SITE CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF CROWN CASTLE AND PAUL J. FORD & COMPANY SO THAT ANY CHANGES AND/OR ADJUSTMENTS, IF NECESSARY, CAN BE MADE TO THE DESIGN AND DRAWINGS.
2. THE EXISTING UNREINFORCED MONOPOLE STRUCTURE DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE ANTENNA AND PLATFORM LOADS SHOWN ON THESE DRAWINGS AT THE REQUIRED MINIMUM TIA/EIA-222-F BASIC WIND SPEEDS. DO NOT INSTALL ANY ADDITIONAL OR NEW ANTENNA AND PLATFORM LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.
3. IF MATERIALS, QUANTITIES, STRENGTHS OR SIZES INDICATED BY THE DRAWINGS OR SPECIFICATIONS ARE NOT IN AGREEMENT WITH THESE NOTES, THE BETTER QUALITY AND/OR GREATER QUANTITY, STRENGTH OR SIZE INDICATED, SPECIFIED OR NOTED SHALL BE PROVIDED.
4. THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN PROPERLY AND ADEQUATELY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO INSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND ITS COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT. IMPORTANT CUTTING, WELDING AND SAFETY GUIDELINES: THE CONTRACTOR SHALL FOLLOW ALL CROWN CASTLE CUTTING, WELDING, FIRE PREVENTION AND SAFETY GUIDELINES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES FROM CROWN CASTLE. PER THE 12-01-2005 CROWN CASTLE DIRECTIVE: "ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CROWN CASTLE POLICY "CUTTING AND WELDING PLAN" (DOC # ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT".
5. THE STRUCTURAL CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OR MEANS OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES.
6. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY THE INSPECTION/TESTING AGENCY. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
7. ALL MATERIALS AND EQUIPMENT FURNISHED WILL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.
10. ANY EXISTING ATTACHMENTS AND/OR PROJECTIONS ON THE POLE THAT MAY INTERFERE WITH THE INSTALLATION OF THE REINFORCING SYSTEM WILL HAVE TO BE REMOVED, AND/OR RELOCATED, AND/OR REPLACED AND RE-INSTALLED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH THE OWNER, TESTING AGENCY, AND ENGINEER.
11. ANY AND ALL EXISTING PLATFORMS THAT ARE LOCATED IN AREAS OF THE POLE SHAFT WHERE SHAFT REINFORCING MUST BE APPLIED SHALL BE TEMPORARILY REMOVED OR OTHERWISE SUPPORTED TO PERMIT NEW CONTINUOUS REINFORCEMENT TO BE ATTACHED. AFTER THE CONTRACTOR HAS SUCCESSFULLY INSTALLED THE MONOPOLE REINFORCEMENT SYSTEM, THE CONTRACTOR SHALL RE-INSTALL THE PLATFORMS. IN NO CASE SHALL ANY NEW AND/OR ADDITIONAL PLATFORMS AND/OR ANTENNAS AND/OR COAX CABLES AND/OR OTHER EQUIPMENT BE INSTALLED ON THE MONOPOLE UNTIL THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF ALL OF THE REQUIRED STRUCTURAL REINFORCING SYSTEM COMPONENTS.

B. (SECTION NOT USED)

C. SPECIAL INSPECTION AND TESTING

1. ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY THE OWNER'S REPRESENTATIVE AND THE OWNER'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY. REFER TO CROWN CASTLE DOCUMENT ENG-SOW-10066 FOR SPECIFICATION.
2. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE PERFORMED SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
3. OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
4. AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY THE OWNER FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
   (A.) ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
   (B.) THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO, AND COORDINATE WITH, THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
5. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES FOR THE OWNER. THE TESTING AGENCY SHALL INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.
   A. GENERAL:
      (1.) PERFORM CONTINUOUS ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY OWNER IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.
   B. FOUNDATIONS, CONCRETE, AND SOIL PREPARATION
      (1.) VERIFY MATERIALS AT BOTTOM OF EXCAVATION ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.
      (2.) VERIFY THAT EXCAVATIONS HAVE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.
      (3.) PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS.
      (4.) VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESS DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.
      (5.) PRIOR TO PLACEMENT OF COMPACTED FILL, OBSERVE SUBGRADE AND VERIFY SITE HAS BEEN PREPARED PROPERLY.
   C. CONCRETE TESTING PER ACI - (NOT REQUIRED)
   D. STRUCTURAL STEEL
      (1.) CHECK THE STEEL ON THE JOB WITH THE PLANS.
      (2.) CHECK MILL CERTIFICATIONS.
      (3.) CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
      (4.) INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
      (5.) CALL FOR LABORATORY TEST REPORTS WHEN IN DOUBT.
      (6.) CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
      (7.) CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
      (8.) CHECK BOLT TIGHTENING ACCORDING TO AISC "TURN OF THE NUT" METHOD.
   E. WELDING:
      (1.) VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.
      (2.) INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND IN ACCORDANCE WITH AWS D1.1.
      (3.) APPROVE FIELD WELDING SEQUENCE.
         (A.) A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO THE OWNER BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM THE OWNER.
      (4.) INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
         (A.) INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE AND WORKING CONDITIONS.
         (B.) VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
         (C.) INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
         (D.) VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1.
         (E.) SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE OR DYE PENETRANT.
         (F.) INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED PLANS.
         (G.) VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
         (H.) REVIEW THE REPORTS BY TESTING LABS.
         (I.) CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
         (J.) INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
         (K.) CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.
   F. SPECIAL INSPECTION OF EXISTING SHAFT-TO-FLANGE WELD CONNECTIONS:
      (1.) PRIOR TO CONSTRUCTION, TESTING AGENCY SHALL INSPECT CONDITION OF EXISTING SHAFT-TO-BASE-PLATE WELD CONNECTION. ALSO INSPECT EXISTING STIFFENERS IF PRESENT. THE INSPECTOR SHALL USE THE FOLLOWING INSPECTION METHODS, OR COMBINATION OF METHODS, AS REQUIRED TO IDENTIFY ANY CRACKS: VISUAL, MAGNETIC PARTICLE, AND/OR ULTRA-SONIC. IN ADDITION, OTHER TEST METHODS MAY ALSO BE USED AT THE RECOMMENDATION OF THE TESTING AGENCY AND UPON THE APPROVAL OF THE OWNER AND THE ENGINEER. THE TESTING AGENCY SHALL PROVIDE CAREFUL AND THOROUGH DOCUMENTATION OF THIS INSPECTION TO THE OWNER AND THE ENGINEER. TESTING AGENCY SHALL COORDINATE THESE INSPECTION ACTIVITIES WITH THE OWNER'S REQUIRED PROCESSES AND PROCEDURES. IMPORTANT: THE TESTING AGENCY SHALL IMMEDIATELY REPORT ANY INDICATIONS OF CRACKS, FRACTURES, DISTRESS, AND/OR CORROSION TO THE OWNER AND ENGINEER.
      (2.) AFTER CONSTRUCTION, TESTING AGENCY SHALL INSPECT ANY AND ALL FIELD REPAIRS IMPLEMENTED AS REQUIRED BY THE OWNER FROM THE RESULTS OF THE INSPECTION IN THE PREVIOUS NOTE 5.F.(1.) ABOVE.
      (3.) REFER TO CROWN CASTLE DOCUMENTS ENG-SOW-10033 AND ENG-BUL-10051 FOR SPECIFICATIONS.
   G. REPORTS:
      (1.) COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO THE OWNER.
6. THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL-INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DECIDE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES AND PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO THE OWNER'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT THE OWNER'S REVIEW AND SPECIFIC WRITTEN CONSENT. THE OWNER RESERVES THE RIGHT TO DETERMINE WHAT IS AN ACCEPTABLE RESOLUTION OF DISCREPANCIES AND PROBLEMS.
7. AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO THE OWNER. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
8. RESPONSIBILITY: THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATIONS. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.

STATE OF CONNECTICUT
JOSEPH PACHICARAH JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

AUG 1 4 2013

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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570	ISSUE DATE OF PERMIT: 8-14-2013
DRAWN BY: B.M.S.	
CHECKED BY: B.K.K.	
APPROVED BY:	S-1
DATE: 8-14-2013	

D. STRUCTURAL STEEL

1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:

A. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
   (A.) "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
   (B.) "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS OF THE ENGINEERING FOUNDATION.
   (C.) "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (PARAGRAPH 4.2.1 SPECIFICALLY EXCLUDED).

B. BY THE AMERICAN WELDING SOCIETY (AWS):
   (A.) "STRUCTURAL WELDING CODE - STEEL D1.1."
   (B.) "SYMBOLS FOR WELDING AND NON-DESTRUCTIVE TESTING"

2. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
3. TIGHTEN ALL STRUCTURAL BOLTS, INCLUDING THE AJAX M20 BOLTS WITH SHEAR SLEEVES, ACCORDING TO THE REQUIREMENTS OF THE AISC "TURN OF THE NUT" METHOD. TIGHTEN BOLTS 1/3 TURN PAST THE SNUG TIGHT CONDITION AS DEFINED BY AISC.
4. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E80XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO THE OWNER'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65 (FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
7. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION I NOTES REGARDING TOUCH-UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
8. UNLESS OTHERWISE NOTED, ALL STEEL MEMBERS SHALL BE HOT-DIP GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH ASTM A123. SEE SECTION J FOR FURTHER NOTES AND FOR EXCEPTIONS (IF ANY).
9. ALL WELDS SHALL BE VISUALLY INSPECTED BY THE OWNER'S APPROVED TESTING AGENCY. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT. THE CONTRACTOR SHALL COOPERATE WITH THE TESTING AGENCY IN THEIR TESTING EFFORTS.
10. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
11. FIELD CUTTING OF STEEL:
   (A.) PRIOR TO ANY FIELD CUTTING, THE CONTRACTOR SHALL MARK THE CUT OUTLINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS.
   (B.) ANY REQUIRED CUTS IN THE STEEL SHALL BE CAREFULLY CUT BY MECHANICAL METHODS SUCH AS DRILLING, SAW CUTTING, AND GRINDING. THE CONTRACTOR IS RESPONSIBLE TO PREVENT ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, DURING THE CUTTING WORK. ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
   (C.) ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.

E. BASE PLATE GROUT

1. NEW GROUT FOR THE POLE BASE SHALL BE NON-SHRINK, NON-METALLIC, GROUT (EUCO NS GROUT BY EUCLID, OR APPROVED EQUAL) WITH A 7500 PSI MINIMUM COMPRESSIVE STRENGTH. PVC DRAINAGE PIPES SHALL BE PROVIDED FROM INSIDE THE POLE SHAFT OUT THROUGH THE GROUT SPACE UNDER THE BASE PLATE IN ORDER TO ALLOW MOISTURE TO ADEQUATELY DRAIN FROM THE INTERIOR OF THE POLE SHAFT. CONTRACTOR SHALL SUBMIT PROPOSED GROUT SPECIFICATION INFORMATION TO THE OWNER FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION. CONTRACTOR SHALL FOLLOW GROUT MANUFACTURER'S SPECIFICATIONS FOR COLD WEATHER GROUTING PROCEDURES (IF NECESSARY) AND THE TESTING AGENCY SHALL PREPARE GROUT SAMPLE SPECIMENS FOR COMPRESSIVE STRENGTH TESTING AND VERIFICATION.
2. GROUT SHALL BE INSTALLED TIGHT UNDER BASE PLATE WITH NO VOIDS REMAINING BETWEEN TOP OF EXISTING CONCRETE AND UNDERSIDE OF EXISTING BASE PLATE (EXCEPT FOR DRAIN PIPES). GROUT COMPLETELY SOLID (EXCEPT FOR DRAIN PIPES) UNDER ENTIRE SURFACE OF BASE PLATE FROM OUTSIDE EDGE TO INSIDE EDGE.

F. FOUNDATION WORK - (NOT REQUIRED)

G. CAST-IN-PLACE CONCRETE - (NOT REQUIRED)

H. EPOXY GROUTED REINFORCING ANCHOR RODS - (NOT REQUIRED)

I. TOUCH UP OF GALVANIZING

1. THE CONTRACTOR SHALL TOUCH UP ANY AND/OR ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED DURING CONSTRUCTION. **GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.**
2. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. THE OWNER'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.
3. THE OWNER'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE INADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.

J. HOT DIP GALVANIZING

1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.
2. PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING.
3. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES AS REQUIRED.
4. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.

K. PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER

1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY THE OWNER, THE OWNER WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
2. THE MONOPOLE REINFORCING SYSTEM INDICATED IN THESE DOCUMENTS USES REINFORCING COMPONENTS THAT INVOLVE FIELD WELDING STEEL MEMBERS TO THE EXISTING GALVANIZED STEEL POLE STRUCTURE. THESE FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. **ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE CONNECTED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT THE OWNER REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.**
3. THE OWNER SHALL REFER TO TIA/EIA-222-F-1996, SECTION 14 AND ANNEX E FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY THE OWNER BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. **PAUL J. FORD & COMPANY RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT.** ACCORDING TO TIA/EIA-222-F-1996 SECTION 14.1, NOTE 1: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

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AJAX BOLT NOTE SHEET: REV. 1.4, 5-20-2013

NOTES:
1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

3. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAIL BELOW FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

4. ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. DTI'S SHALL BE THE SQUIRTER® STYLE, MADE TO ASTM F959 LATEST REVISION; AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF RC 38 OR HIGHER.

NOTES FOR AJAX M20 'ONE-SIDE' BOLTS WITH DIRECT TENSION INDICATORS (DTI'S):

DTI'S REQUIRED: DTI'S SHALL BE "SELF-INDICATING" SQUIRTER® STYLE DTI'S MADE WITH SILICONE EMBEDDED IN THEM, INSPECTED BY MEANS OF THE VISUAL EJECTION OF SILICONE AS THE DTI PROTRUSIONS COMPRESS. SQUIRTER® DTI'S SHALL BE CALIBRATED PER MANUFACTURER'S INSTRUCTIONS PRIOR TO USE.

THE DIRECT TENSION INDICATOR (DTI) WASHERS SHALL BE THE "SQUIRTER® STYLE" AS MANUFACTURED BY:

APPLIED BOLTING TECHNOLOGY PRODUCTS, INC.
1413 ROCKINGHAM ROAD BELLOWS FALLS, VERMONT, USA 05101
PHONE 1-800-552-1999
WEBSITE: WWW.APPLIEDBOLTING.COM

DISTRIBUTORS OF SQUIRTER® DTI'S:
HTTP://WWW.APPLIEDBOLTING.COM/APPLIED-BOLTING-DISTRIBUTORS.HTML

DTI: USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 20 MM (M20) NOMINAL A325 BOLTS FOR THE AJAX M20 BOLTS. DTI'S SHALL NOT BE HOT-DIP GALVANIZED. DTI'S SHALL BE MECHANICALLY GALVANIZED (MG) BY THE COLD MECHANICAL PROCESS ONLY AS PROVIDED BY THE DTI MANUFACTURER.

HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 20 MM (M20) NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY GALVANIZED BY THE COLD MECHANICAL PROCESS. ALTERNATIVELY, CORRECTLY MADE HOT DIP GALVANIZED HARDENED FLAT WASHERS HAVING A MINIMUM HARDNESS OF RC 38 CAN BE USED; CONTRACTOR SHALL PROVIDE DOCUMENTATION OF WASHER SPECIFICATION AND HARDNESS.

NUT LUBRICATION REQUIRED: PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW DTI MANUFACTURER INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING.

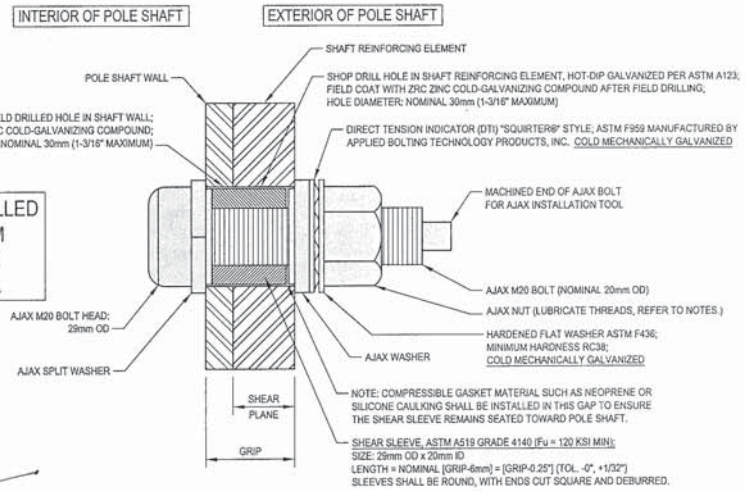
NOTE: COMPLETELY COMPRESSED DTI'S SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE OF A HARDENED FLAT WASHER, NEVER DIRECTLY AGAINST THE NUT.

CONTRACTOR SHALL FOLLOW DTI MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION, LUBRICATION, TIGHTENING AND INSPECTION.

INSPECTION REQUIRED: ALL AJAX BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009, BY A QUALIFIED BOLT INSPECTOR. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE AJAX BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. IN ADDITION, ALL AJAX BOLTS AND DTI'S SHALL BE VISUALLY INSPECTED ACCORDING TO THE DTI MANUFACTURER'S INSTRUCTIONS. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE PHOTO DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTI'S.

NOTE: ALL SHOP AND FIELD DRILLED HOLES SHALL BE NOMINAL 30MM DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1-3/16".

NOTE: ALL AJAX BOLTS, AJAX SPLIT WASHERS, AJAX WASHERS, AJAX NUTS, AND SHEAR SLEEVES SHALL BE HOT DIP GALVANIZED PER ASTM A123 OR A153 AS APPROPRIATE. SHEAR SLEEVES MAY BE COLD GALVANIZED OR ZINC PLATED.



TYPICAL AJAX BOLT DETAIL 1/S-3

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37513-1570 PERMIT.DWG

POLE SPECIFICATIONS	
POLE SHAPE TYPE:	12-SIDED POLYGON
TAPER:	0.325000 IN/FT
SHAFT STEEL:	ASTM A38M-42
BASE PL STEEL:	ASTM A36
ANCHOR RODS:	2"ø ASTM A36

SHAFT SECTION DATA					
SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN) @ TOP	DIAMETER ACROSS FLATS (IN) @ BOTTOM
1	5.00	0.1875	60.00	18.000	18.000
2	50.00	0.2500		18.000	34.313
3	20.00	0.2500		32.181	38.688
4	20.00	0.3125	72.00	38.688	45.188
5	10.00	0.3125		42.613	45.813
6	40.00	0.3750	84.00	45.813	58.875
7	18.00	0.3750		55.839	61.688
8	21.00	0.4375	108.00	61.688	68.500
9	28.00	0.4375		64.705	73.813

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

CONTRACTOR SHALL PROVIDE ASTM A36 SHIM PLATES BELOW SLIP JOINTS. THE SHIM PLATES SHALL BE PLACED BETWEEN THE NEW SHAFT REINFORCEMENT AND THE EXISTING POLE SHAFT FROM THE SLIP JOINT TO THE NEW SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND A EXTRA LONG "SPLICE SHIM" SHALL BE PLACED BETWEEN THE NEW UPPER AND LOWER SHAFT REINFORCEMENT PLATES AT THE SHAFT REINFORCEMENT SPLICE PLATE LOCATION.

MODIFICATIONS:

(A) INSTALL NEW MICROPILES AND MICROPILE BRACKETS AT BASE PLATE. SEE SHEET S-5.

(B) INSTALL NEW SHAFT REINFORCING. SEE CHART.

NEW AEROSOLUTIONS MP3 REINFORCING

ELEVATION	FLAT #	REINFORCING ELEMENT
38'-4" TO 53'-4"	1, 5 & 9	MP304
88'-4" TO 123'-4"	1, 5 & 9	MP305
118'-9" TO 153'-9"	2, 6 & 10	MP304

ALL BOLTS SHALL BE AJAX M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A519 GR 4140, MIN. Fu=120 KSI). CONTACT SUPPLIER FOR MATERIAL (PLATE & BOLTS) AND INSTALLATION PROCEDURES.

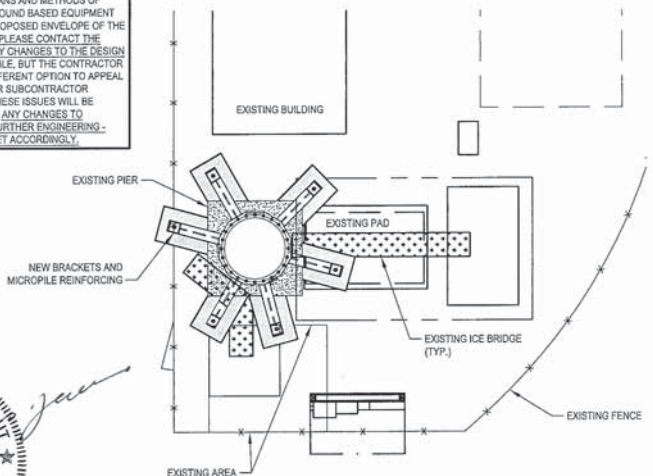
NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE

BOTTOM ELEVATION	TOP ELEVATION	FLAT # / DEGREE SEPARATION	ELEMENT	ELEMENT LENGTH	ELEMENT QUANTITY	APPROXIMATE AJAX BOLTS PER ELEMENT	APPROXIMATE TOTAL AJAX BOLT QUANTITY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	ESTIMATED TOTAL STEEL WEIGHT
38' - 6"	53' - 6"	1, 5 & 9	1" x 4-1/2"	15' - 0"	3	20	60	6	6	16"	689 LBS.
88' - 6"	123' - 6"	1, 5 & 9	1" x 6"	35' - 0"	3	37	111	10	10	20"	2144 LBS.
118' - 0"	154' - 0"	2, 6 & 10	1" x 4-1/2"	35' - 0"	3	39	117	8	8	16"	1608 LBS.
							288				4441 LBS.

NOTES:

1.) AJAX BOLTS ARE TO BE 20mm DIAMETER WITH CORRESPONDING 29mm DIAMETER SLEEVE WITH MATCHING STEEL GRADE.
2.) ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND, FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.
3.) ALL REINFORCING SHALL BE ASTM A572 GR. 65.
4.) WELDS ARE ASSUMED E80XX OR GREATER. TERMINATION WELDS SHALL BE 3/8" FILLET WELDS.
5.) HOLES FOR AJAX BOLTS AND SHEAR SLEEVES ARE 30mm UNLESS NOTED OTHERWISE.
6.) ALL SHIMS SHALL BE ASTM A-36.

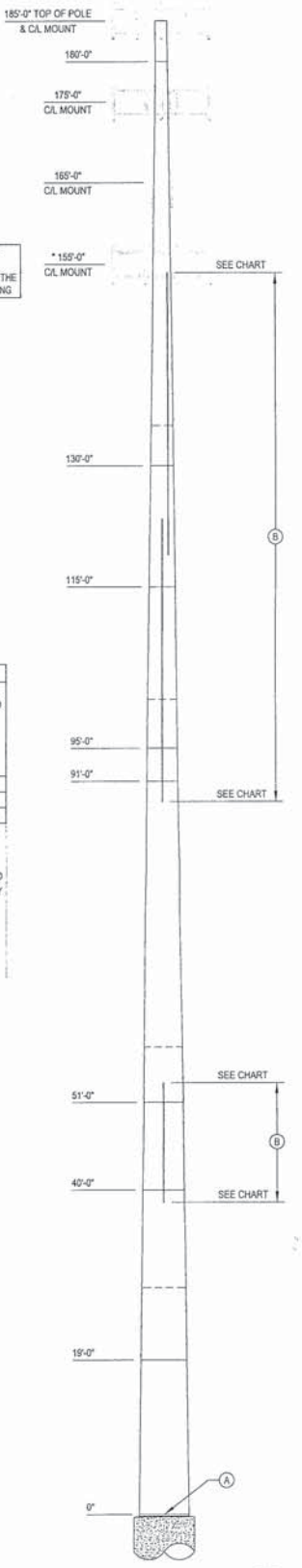
SITE COORDINATION REQUIRED: IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE MEANS AND METHODS OF SHORING AND/OR RELOCATION OF GROUND BASED EQUIPMENT THAT IS WILL BE AFFECTED BY THE PROPOSED ENVELOPE OF THE CURRENT FOUNDATION MOD DESIGN. PLEASE CONTACT THE E.O.R. IF DESIGN INPUT OR NECESSARY CHANGES TO THE DESIGN ARE NEEDED. IF THE DESIGN IS FEASIBLE, BUT THE CONTRACTOR HAS A PREFERENCE TO INSTALL A DIFFERENT OPTION TO APPEAL TO MORE FAVORABLE TECHNIQUES OR SUBCONTRACTOR LIMITATIONS - IT IS EXPECTED THAT THESE ISSUES WILL BE ADDRESSED AT THE TIME OF BIDDING. ANY CHANGES TO ORIGINAL DESIGN WILL BE REQUIRE FURTHER ENGINEERING - CONTRACTOR IS EXPECTED TO BUDGET ACCORDINGLY.



PARTIAL SITE PLAN 2 S-4

AUG 1 4 2013

* EXISTING MOUNTS MAY NEED TO BE ADJUSTED, MOVED AND/OR TEMPORARILY SUPPORTED DURING THE INSTALLATION OF SHAFT REINFORCING



POLE ELEVATION 1 S-4

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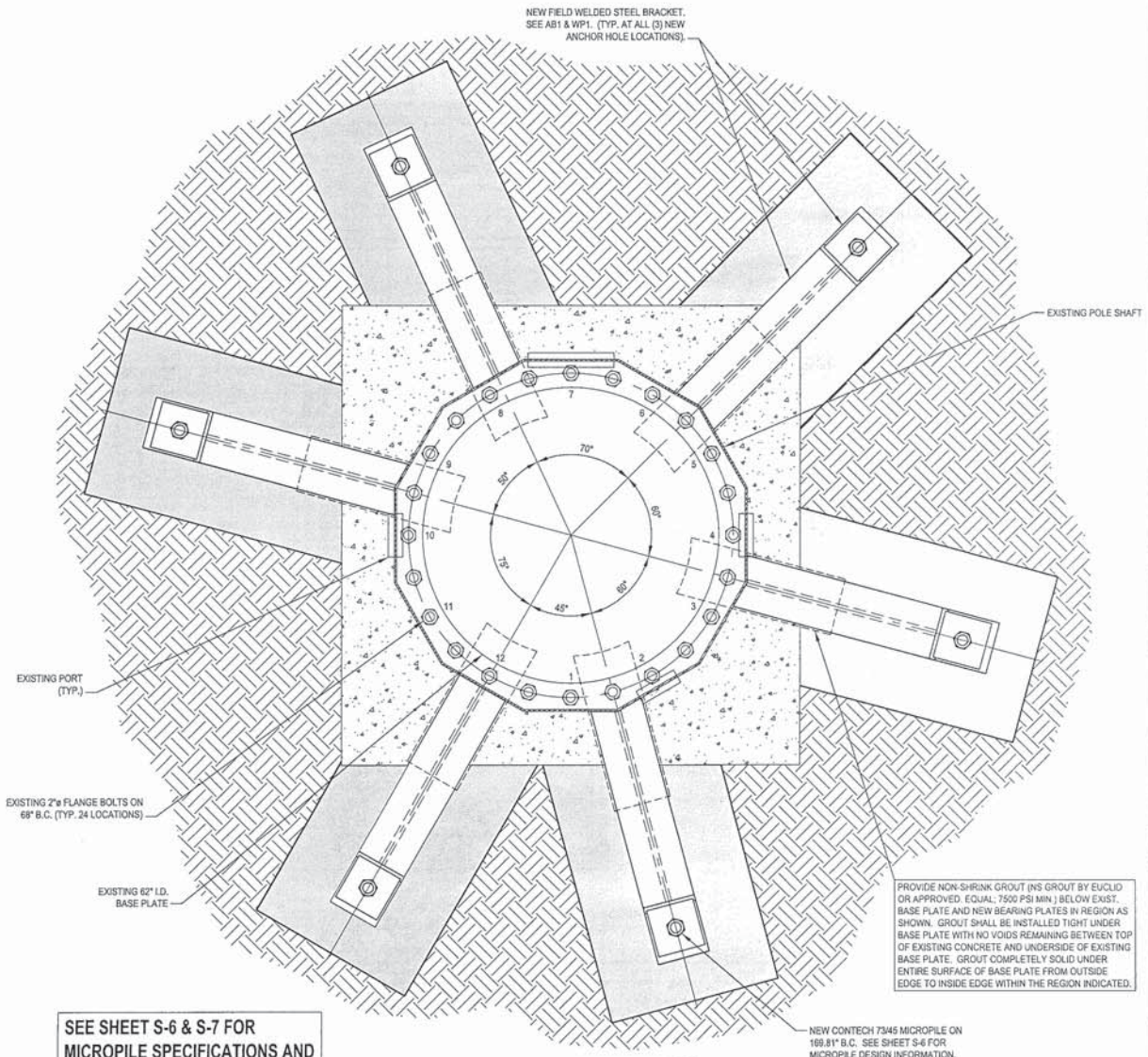
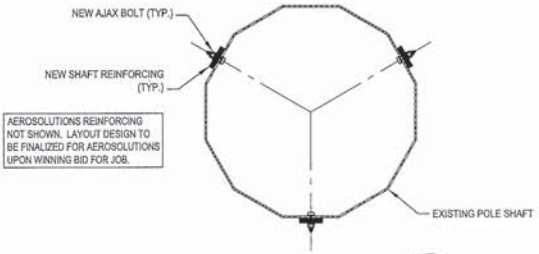


SEE SHEET S-6 & S-7 FOR MICROPILE SPECIFICATIONS AND ANCHOR BRACKET DETAILS

A BASE SECTION 1 / S-5



AEROSOLUTIONS REINFORCING NOT SHOWN. LAYOUT DESIGN TO BE FINALIZED FOR AEROSOLUTIONS UPON WINNING BID FOR JOB.

B BASE SECTION 2 / S-5

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CHECKED BY: B.K.K.	
APPROVED BY:	S-5
DATE: 8-14-2013	

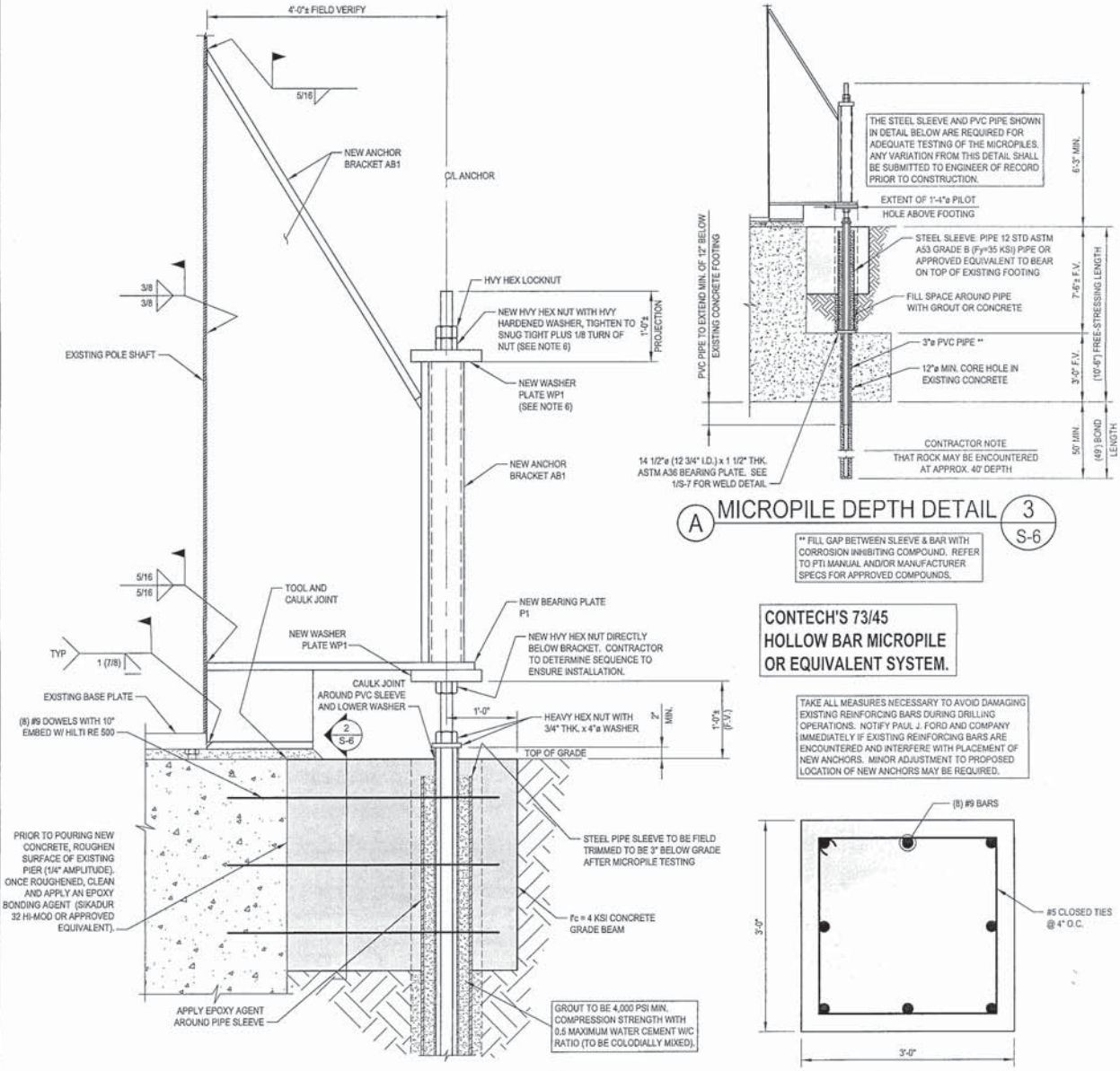
37513-1570 PERMIT.DWG

MICROPILE TESTING REQUIREMENTS

A MINIMUM OF 2 IN-PLACE MICROPILES (TEST PILES SHALL BE IN OPPOSITE CORNERS) ARE TO BE TESTED TO 274k IN TENSION. ALL PILE TESTING SHALL BE CARRIED OUT IN GENERAL CONFORMANCE WITH ASTM D1143 OR D3689. A HYDRAULIC JACK MAY BE SUBSTITUTED FOR THE PILE TESTING SET-UPS SHOWN IN THE ASTM SPECS. IF A HYDRAULIC JACK IS USED, FOLLOW EQUIPMENT GUIDELINES DISCUSSED IN THE POST TENSIONING INSTITUTE "RECOMMENDATIONS FOR PRESTRESSED ROCK AND SOIL ANCHORS" DESIGN GUIDE, SECTION 8.2. PILES SHALL BE LOADED USING PTI'S PROOF TEST METHODOLOGY (REFER TO SECTION 8.3.3 OF THE PTI DESIGN GUIDE; ALIGNMENT LOAD, AL, SHALL BE 20 KIPS; DESIGN LOAD, DL, IS 206 KIPS). PROVISION SHALL BE MADE TO ALLOW FOR MOVEMENT BETWEEN MICROPILE CROSS-SECTION AND SOIL SO THAT GROUT-TO-SOIL BOND LINE IS ADEQUATELY TESTED. IF COMPRESSION TESTING IS PERFORMED, CONTRACTOR SHALL PROTECT BAR FROM DAMAGE DUE TO BUCKLING FOR LENGTH ABOVE GRADE.

MICROPILE NOTES:

1. ALL HOLLOW BAR STEEL AND ASSOCIATED HARDWARE SHALL BE SUPPLIED BY CON-TECH SYSTEMS OR OWNER/EOR APPROVED EQUIVALENT.
2. ALL HOLLOW BAR, NUTS AND BEARING PLATES SHALL BE HOT-DIP GALVANIZED PER ASTM A123 OR A153, AS APPROPRIATE.
3. CONTACT CON-TECH SYSTEMS (OR MANUFACTURER OF APPROVED ALTERNATE) FOR MATERIALS AND INSTALLATION PROCEDURES AND RECOMMENDATIONS.
4. SPECIAL INSPECTION OF THE MICROPILES IS REQUIRED AS FOLLOWS: (1) VERIFY THAT MICROPILE MATERIAL, SIZE AND LENGTH COMPLY WITH THE INFORMATION SHOWN ON THIS DRAWING, (2) VERIFY PLACEMENT OF EACH MICROPILE, (3) OBSERVE DRILLING, GROUTING AND TESTING (AS APPROPRIATE) OPERATIONS FOR EACH MICROPILE AND MAINTAIN COMPLETE AND ACCURATE RECORDS FOR EACH MICROPILE.
5. FOUNDATION DESIGN IS BASED ON THE ORIGINAL GEOTECHNICAL REPORT PREPARED BY FDH, DATED 8-2-2013.
6. CONTACT CONTECH SYSTEMS (OR MANUFACTURER OF APPROVED ALTERNATE) TO VERIFY NUT & WASHER CONNECTION ARE COMPATIBLE WITH MICROPILE THREADS



A NEW MICROPILE & BRACKET DETAIL 1 S-6

A MICROPILE DEPTH DETAIL 3 S-6

** FILL GAP BETWEEN SLEEVE & BAR WITH CORROSION INHIBITING COMPOUND. REFER TO PTI MANUAL AND/OR MANUFACTURER SPECS FOR APPROVED COMPOUNDS.

CONTECH'S 73/45 HOLLOW BAR MICROPILE OR EQUIVALENT SYSTEM.

TAKE ALL MEASURES NECESSARY TO AVOID DAMAGING EXISTING REINFORCING BARS DURING DRILLING OPERATIONS. NOTIFY PAUL J. FORD AND COMPANY IMMEDIATELY IF EXISTING REINFORCING BARS ARE ENCOUNTERED AND INTERFERE WITH PLACEMENT OF NEW ANCHORS. MINOR ADJUSTMENT TO PROPOSED LOCATION OF NEW ANCHORS MAY BE REQUIRED.

SECTION 2 S-6

PILE DESIGN PARAMETER SCHEDULE

PARAMETER / OPTIONS	MIN. HOLE ø/STEEL AREA	PILE CAPACITY (Pw/D)	ULTIMATE SKIN FRICTION (PSI)	FREESTRESSING LENGTH	FRICTION DEVELOPMENT LENGTH/BOND LENGTH	ROCK SOCKET/ PLUNGE LENGTH	TOTAL LENGTH
MICROPILE	* 12"ø 4.02 IN² MIN.	219.9K	VARIES, SEE GEOTECH	5'	50'	N.A.	61'-3"

* THE DESIGN ANTICIPATES A FINAL GROUT DIAMETER OF 12" BASED ON A MINIMUM 280MM AUGER IN SILT W/ CLAY AND SAND. THE DESIGN REQUIRES UNCASED MICROPILES FOR THE LISTED CAPACITY IN TENSION AND COMPRESSION AS LAID OUT PER PLAN. THE CONTRACTOR/MICROPILE INSTALLER IS RESPONSIBLE FOR THE MEANS AND METHODS TO ENSURE THE NECESSARY CAPACITY AND WILL DEMONSTRATE THE INSTALLED CAPACITY PER THE SPECIFIED TESTING. THE EMBEDMENT DEPTH AND AUGER/GROUT DIAMETERS ARE LISTED AS A PRELIMINARY BASIS FOR BIDDING. THE INTENT IS FOR THE INSTALLER TO REVIEW THE CURRENT SOIL INFORMATION AND DESIGN REQUIREMENTS TO ENSURE THAT THE CONTRACTOR'S SPECIFIC EQUIPMENT OR INSTALLATION TECHNIQUE IS APPROPRIATE. IF THE CONTRACTOR BELIEVES THE SCOPE SHOULD CHANGE UPON REVIEW, PLEASE ADDRESS PRIOR TO BIDDING. PLEASE COORDINATE WITH ENGINEER OF RECORD PRIOR TO INSTALLATION.

STATE OF CONNECTICUT · TACHICARAH JACOBS · No. PEN 22731 · LICENSED PROFESSIONAL ENGINEER

AUG 1 4 2013

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street · Suite 600 · Columbus, Ohio 43215
(614) 221-6679 www.pjfweb.com

CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
PH: (585) 899-3445 FAX: (585) 899-3448

BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

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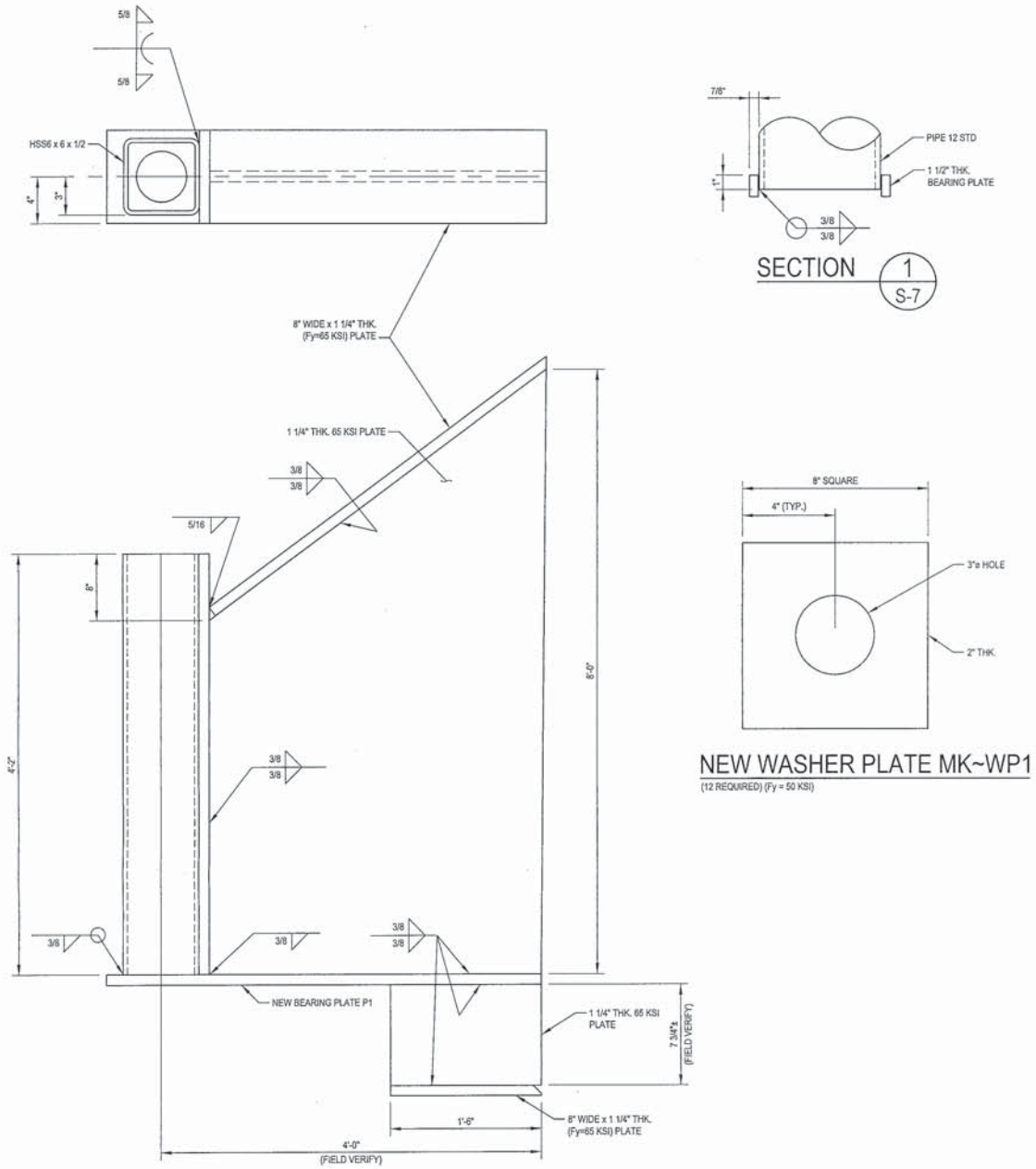
37513-1570 PERMIT.DWG

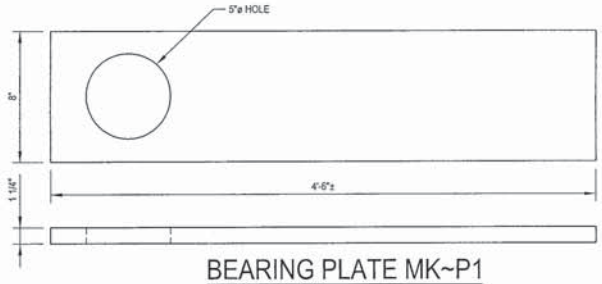


NEW MICROPILE BRACKET MK~AB1

(6 REQUIRED) (PIPE Fy=42 KSI) (STIFFENER Fy = 65 KSI)

NEW WASHER PLATE MK~WP1

(12 REQUIRED) (Fy = 50 KSI)



BEARING PLATE MK~P1

(6 REQUIRED) (Fy = 65 KSI)

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MODIFICATION INSPECTION NOTES:

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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 RESIDES WITH THE EOR AT ALL TIMES.

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) 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 IN-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 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 AN DENG-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, PREFERABLE 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 INSPECTION(S) 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 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 MI'S
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 INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV 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.

PHOTOGRAPHS
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 AND TORQUE
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

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

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

MI CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
	PRE-CONSTRUCTION
X	MI CHECKLIST DRAWINGS
X	EOR APPROVED SHOP DRAWINGS
X	FABRICATION INSPECTION
X	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
X	FABRICATOR NDE INSPECTION
X	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
	CONSTRUCTION
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
X	POST INSTALLED MICROPILE VERIFICATION
X	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK: LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
X	THIRD PARTY ONSITE INSPECTION OF BOLT PRETENSION PER CROWN REQUIREMENTS
X	INSPECTION OF AJAX BOLTS AND DTI'S PER REQUIREMENTS ON SHEET S-3
ADDITIONAL TESTING AND INSPECTIONS:	
	POST-CONSTRUCTION
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
X	THIRD PARTY ONSITE BOLT INSPECTION REPORT
X	POST INSTALLED MICROPILE PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

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

STATE OF CONNECTICUT
PACHICARAH JACOBS
No. PEN 22731
LICENSED
PROFESSIONAL ENGINEER

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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

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DRAWN BY: B.M.S.	
CHECKED BY: B.K.K.	
APPROVED BY:	S-8
DATE: 8-14-2013	

December 30, 2014

Jerry Bruno
Crown Castle
500 West Cummings Park, STE 3600
Woburn, MA 01801
(781) 970-0069
Jerry Bruno.Contractor@crowncastle.com

Sinnott Gering and Schmitt Towers, INC
14301 First National Bank Pkwy, STE 100
Omaha, NE 68154
(402) 507-5170
SGS_PMI@sgstowers.com

Subject: ***Modification Inspection Report***

Crown Castle Designation:	**Crown Castle BU Number:**	825983
	Crown Castle Site Name:	MIDDLETOWN_1
	Crown Castle JDE Job Number:	236900
Engineering Firm Designation:	**SGS Project Number:**	146075
Site Data:	**90 Industrial Park Road** **Middletown, CT 06457** **N 41° 35' 8.3", W 72° 42' 50.49"** **185 Foot Monopole**	

Dear Mr. Bruno,

Sinnott Gering and Schmitt Towers, Inc. (SGS) is pleased to submit this "Modification Inspection Report" (MI Report) to Crown Castle for the modification/reinforcement to the subject structure. This Modification Inspection (MI) was performed in accordance with Crown Castle ENG-SOW-10007 Modification Inspection SOW, Contract Documents, and Crown Castle Purchase Order number 733664. The purpose of this MI is to confirm that the modification installation configuration and workmanship are in accordance with the contract document(s) listed in Table 2. The MI is not a review of the adequacy or effectiveness of the modification/reinforcement solution.

Table 1 – General Information

	Company	Contact	Dates on Site
MI Inspector	SGS	Nicholas J. Schmitt, P.E., S.E.	N/A
MI Inspector Field Representative (if applicable)	SGS	Caleb Christner	November 26, 2014
■ Independent	☐ EOR	☐ Turnkey	
Modification Design EOR	Paul J. Ford	Joseph Jacobs, P.E.	N/A
General Contractor	LCC	Keith Stackhouse	Unknown
Sub to the General Contractor	N/A	N/A	N/A
Field CWI for the General Contractor	N/A	N/A	N/A
Field NDE for the General Contractor	N/A	N/A	N/A

Table 2 – Documents

Document(s)	Remarks	Source
Modification Drawings Date: 8/14/2013 EOR: Joseph Jacobs, P.E. Job#: 37513-1570	Creator of Drawings: Paul J. Ford Job #: 37513-1570 Date of Drawings: 8/14/2013	CCI sites Drawing File: 3954032

Based on our inspection, SGS determines this project:

X PASSING MI

The configuration, materials and/or workmanship of the modifications are installed in accordance with the Contract Documents and no deficiencies were found.

EXECUTIVE SUMMARY

MODIFICATION	CONFIGURATION	MATERIALS	WORKMANSHIP
Install Micropiles and Micropile Brackets. Flats 1/2, 3/4, 5/6, 8, 9/10 & 12 at Tower Base.	Passing	Passing	Passing
Note: Brackets Had Different Configurations and Dimensions than Designed. See Section 6.3.2 for EOR Approval E-Mail.			
Install Plate Shaft Reinforcement. Flats 1, 5 & 9 from 38' 6" to 53' 6".	Passing	Passing	Passing
Install Plate Shaft Reinforcement. Flats 1, 5 & 9 from 88' 6" to 123' 6".	Passing	Passing	Passing
Install Plate Shaft Reinforcement. Flats 2, 6 & 10 from 119' to 154'.	Passing	Passing	Passing
Note: All Plates were Installed Higher than Designed. See Section 6.3.2 for EOR Approval & Additional Welding Detail.			

All observations were performed after the construction was complete. SGS was not present during the construction phase. The onsite PMI was performed by Caleb Christner SGS.

We at SGS 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.

Respectfully submitted,

Nick Schmitt, P.E., S.E.

Table of Contents

PRE-CONSTRUCTION

6.1.1 MI CHECKLIST DRAWING

37513-1570 PERMIT.DWG

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  - FINAL INFIELD CONDITION

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

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

MI CHECKLIST	
CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
PRE-CONSTRUCTION	
X	MI CHECKLIST DRAWINGS
X	EOR APPROVED SHOP DRAWINGS
X	FABRICATION INSPECTION
X	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
X	FABRICATOR NDE INSPECTION
X	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
CONSTRUCTION	
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
X	POST INSTALLED MICROPILE VERIFICATION
X	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK: LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
X	THIRD PARTY ONSITE INSPECTION OF BOLT PRETENSION PER CROWN REQUIREMENTS
X	INSPECTION OF AJAX BOLTS AND DTI'S PER REQUIREMENTS ON SHEET S-3
ADDITIONAL TESTING AND INSPECTIONS:	
POST-CONSTRUCTION	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
X	THIRD PARTY ONSITE BOLT INSPECTION REPORT
X	POST INSTALLED MICROPILE PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

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

STATE OF CONNECTICUT
TACHICARAH JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

AUG 1 4 2013

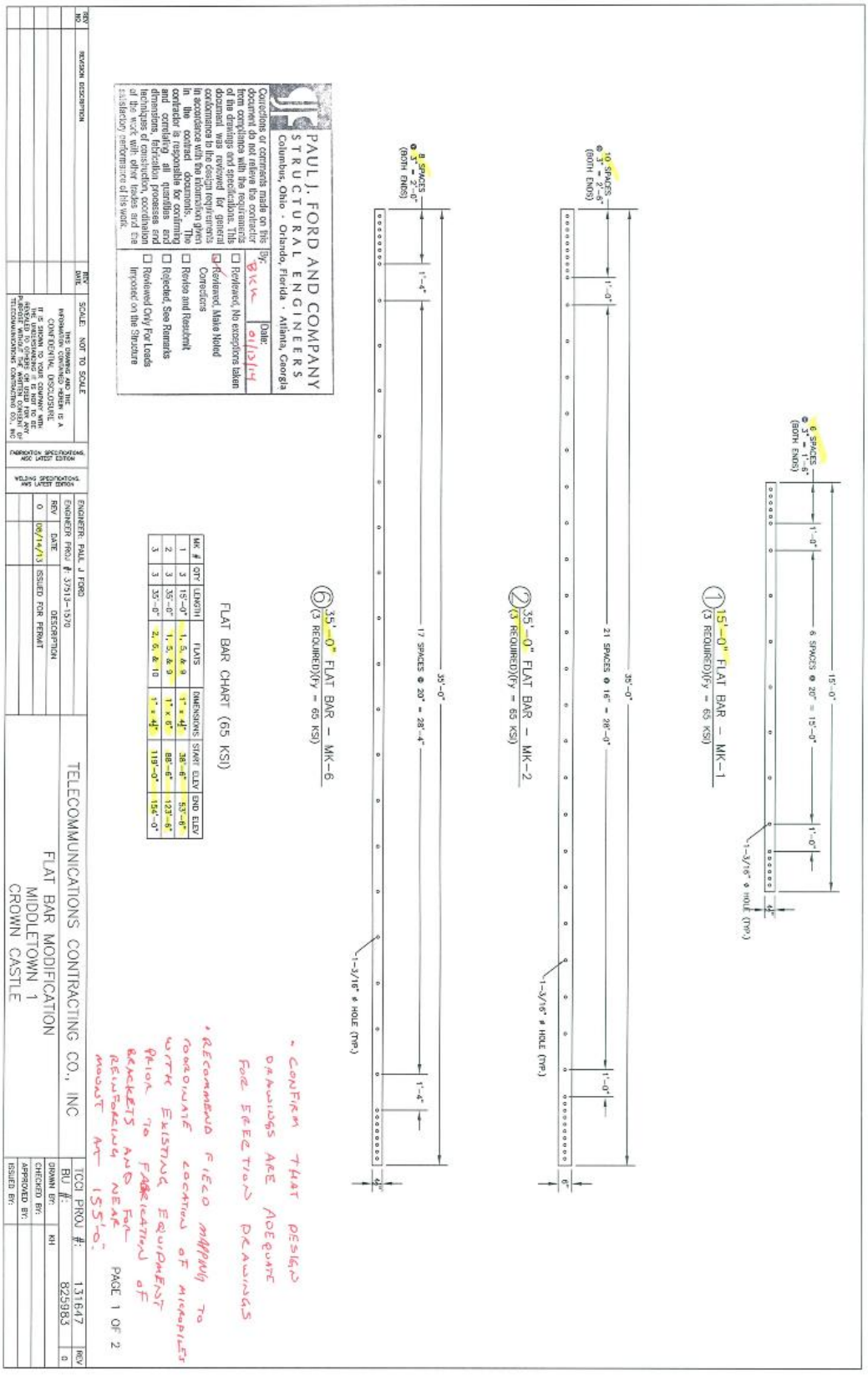
PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street · Suite 600 · Columbus, Ohio 43215
(614) 221-6679 www.pjfweb.com

CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
PH: (585) 899-3445 FAX: (585) 899-3448

BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570	ISSUE DATE OF PERMIT: 8-14-2013
DRAWN BY: B.M.S.	
CHECKED BY: B.K.K.	
APPROVED BY:	S-8
DATE: 8-14-2013	

6.1.2 EOR APPROVED SHOP DRAWINGS



PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
Columbus, Ohio · Orlando, Florida · Atlanta, Georgia

Corrections or comments made on this document do not relieve the contractor from compliance with the requirements of the drawings and specifications. This document was reviewed for general conformance to the design requirements in accordance with the construction documents. The contractor is responsible for confirming and correlating all quantities and dimensions, fabrication processes and techniques of construction, coordination of the work with other trades and the satisfactory performance of this work.

By: BKW Date: 01/13/14

☐ Reviewed, No exceptions taken
☒ Reviewed, Make Noted Corrections
☐ Revise and Resubmit
☐ Rejected, See Remarks
☐ Reviewed Only For Loads Imposed on the Structure

- CONFIRM THAT DESIGN DRAWINGS ARE ADEQUATE FOR ERECTION PURPOSES

* RECOMMEND FIELD MAPPING TO DOCUMENT LOCATION OF MISMATCHES WITH EXISTING EQUIPMENT PRIOR TO FABRICATION AND REINFORCING OF BRACKETS AND REINFORCING NEAR MOUNT AT 155'-0"

PAGE 1 OF 2

6 35'-0" FLAT BAR – MK-6

FLAT BAR CHART (65 KSI)

MK #	QTY	LENGTH	FLATS	DIMENSIONS	START ELEV	END ELEV
1	3	15'-0"	1, 5, & 9	1" x 4"	38'-6"	53'-6"
2	3	35'-0"	1, 5, & 9	1" x 6"	88'-6"	123'-6"
3	3	35'-0"	2, 6, & 10	1" x 4"	119'-0"	154'-0"

REV NO.	REVISION DESCRIPTION	REV DATE

SCALE: NOT TO SCALE

THE DRAWING AND INFORMATION CONTAINED HEREIN IS A CONFIDENTIAL DISCLOSURE. IT IS SHOWN TO YOUR COMPANY WITH THE UNDERSTANDING THAT IT WILL NOT BE REVEALED TO OTHERS OR USED FOR ANY PURPOSE WHATSOEVER WITHOUT THE WRITTEN CONSENT OF TELECOMMUNICATIONS CONTRACTING CO., INC.

FABRICATION SPECIFICATIONS: AISC LATEST EDITION

WELDING SPECIFICATIONS: AWS LATEST EDITION

ENGINEER: PAUL J FORD
ENGINEER PROJ. #: 37513-1570

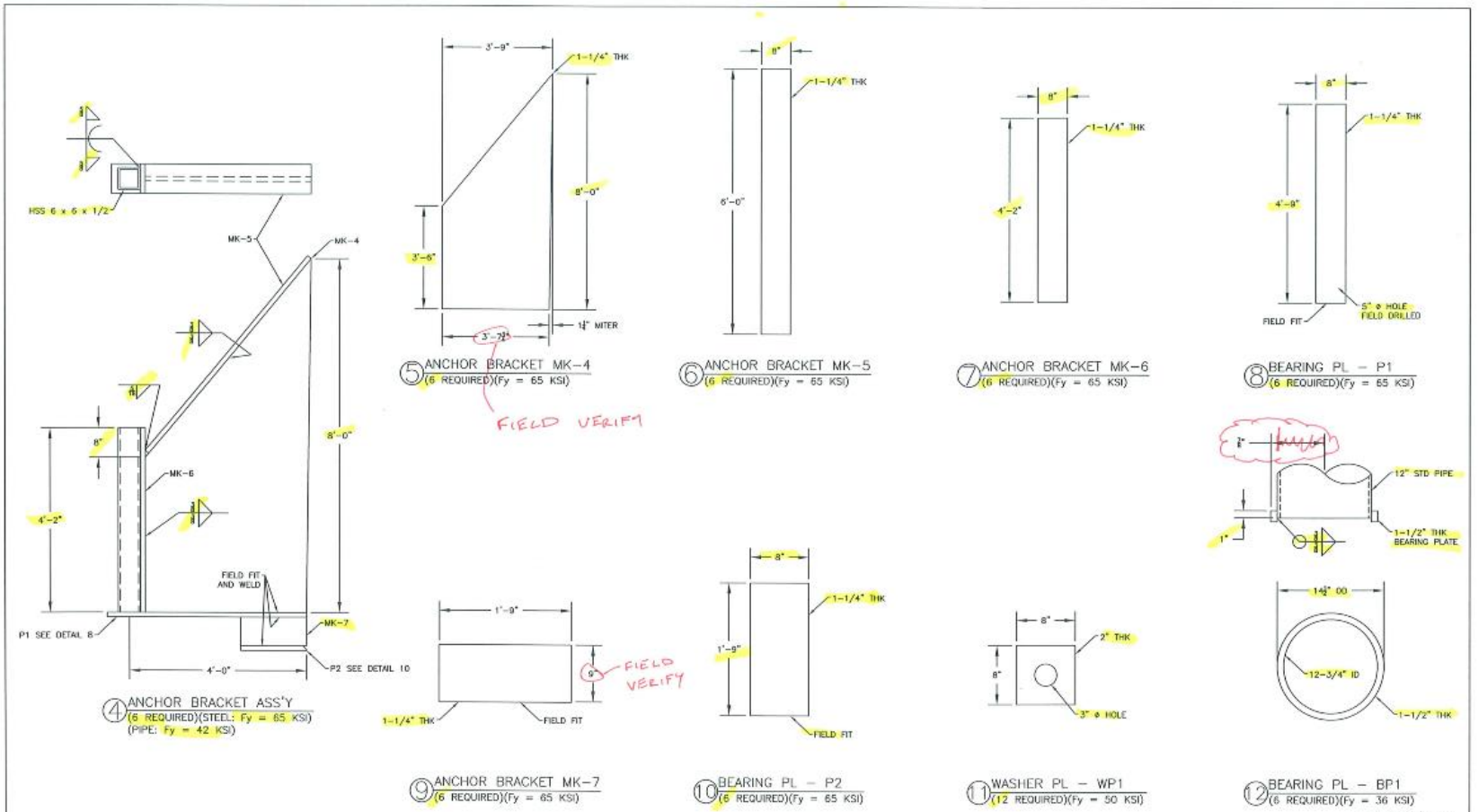
REV	DATE	DESCRIPTION
0	08/14/13	ISSUED FOR PERMIT

TELECOMMUNICATIONS CONTRACTING CO., INC

FLAT BAR MODIFICATION
MIDDLETOWN 1
CROWN CASTLE

TCCI PROJ #:	131647
BU #:	825983
DRAWN BY:	KH
CHECKED BY:	
APPROVED BY:	
ISSUED BY:	

REV 0



④ ANCHOR BRACKET ASS'Y
(6 REQUIRED)(STEEL: Fy = 65 KSI)
(PIPE: Fy = 42 KSI)

⑤ ANCHOR BRACKET MK-4
(6 REQUIRED)(Fy = 65 KSI)

⑥ ANCHOR BRACKET MK-5
(6 REQUIRED)(Fy = 65 KSI)

⑦ ANCHOR BRACKET MK-6
(6 REQUIRED)(Fy = 65 KSI)

⑧ BEARING PL – P1
(6 REQUIRED)(Fy = 65 KSI)

⑨ ANCHOR BRACKET MK-7
(6 REQUIRED)(Fy = 65 KSI)

⑩ BEARING PL – P2
(6 REQUIRED)(Fy = 65 KSI)

⑪ WASHER PL – WP1
(12 REQUIRED)(Fy = 50 KSI)

⑫ BEARING PL – BP1
(6 REQUIRED)(Fy = 36 KSI)

PAGE 2 OF 2

REV NO.	REVISION DESCRIPTION	REV DATE

SCALE: NOT TO SCALE

THIS DRAWING AND THE INFORMATION CONTAINED HEREIN IS A CONFIDENTIAL DISCLOSURE IT IS SHOWN TO YOUR COMPANY WITH THE UNDERSTANDING IT IS NOT TO BE REVEALED TO OTHERS OR USED FOR ANY PURPOSE WITHOUT THE WRITTEN CONSENT OF TELECOMMUNICATIONS CONTRACTING CO., INC

ENGINEER: PAUL J FORD
ENGINEER PROJ #: 37513-1570

REV	DATE	DESCRIPTION
0	08/14/13	ISSUED FOR PERMIT

TELECOMMUNICATIONS CONTRACTING CO., INC

FLAT BAR MODIFICATION
MIDDLETOWN 1
CROWN CASTLE

TCCI PROJ #:	131647	REV
BU #:	825983	0
DRAWN BY:	KH	
CHECKED BY:		
APPROVED BY:		
ISSUED BY:		

6.1.3 FABRICATION INSPECTION

Lockport Steel Fabricators, LLC
3051 S State Street
Lockport IL 60441
815.726.6281

To: LCC Deployment Service

Subject: Middletown

Date: 5/21/14

Please accept this letter as certification that our work on LSF SO#-15639 - LCC Site ID-Middleton CT-was performed in accordance with industry standards and the contractor documents.

Please contact me if you have any questions.

Thank you.

Mat Yingling
QA Manager
Lockport Steel Fabricators, LLC

James G. Whittaker
CWI
Lockport Steel Fabricators, LLC

James G Whittaker
CWI 06040341
QC1 EXP. 4/1/2015

6.1.4 FABRICATOR CERTIFIED WELD INSPECTION

Lockport Steel Fabricators, LLC
3051 S State Street
Lockport IL 60441
815.726.6281

To: LCC Deployment Service

Subject: Middletown

Date: 5/21/14

Please accept this letter as certification that our work on LSF SO#-15639 - LCC Site ID-Middleton CT-was performed in accordance with industry standards and the contractor documents.

Please contact me if you have any questions.

Thank you,

Mat Yingling
QA Manager
Lockport Steel Fabricators, LLC

James G. Whittaker
CWI
Lockport Steel Fabricators, LLC

James G Whittaker
CWI 06040341
QC1 EXP. 4/1/2015

LSF LOCKPORT STEEL FABRICATORS

Form 8.07

INSPECTION REPORT

Project No.: 15639	**Client:** TCCI **P.O. No.**	**Report No.:** 15639
Prepared By: MY	**Location:** Middletown, CT	**Date:** 21-May-14
Description:	Reinforcement bars,Anchor bracket Ass'y, Anchor bracket plates, Bearing plates, washer plates	

Visual	x	NDE	x	PT		In Progress	x
Dimensional	x	OTHER		MT	x	Final	x

Reference Drawing/Standard: AWS D1.1 ASME Section IX

Findings: No relevant indications were noted at time of inspection

NOTE:		
1	QC OK	
2	QC OK	
3	QC OK	
4	QC OK	
5	QC OK	
1-1	QC OK	
2-1	QC OK	
3-1	QC OK	
AB1	QC OK	Mag particle testing performed MT OK
P7	QC OK	
P1	QC OK	
P2	QC OK	
WP1	QC OK	

Sketch

Q.A. Manager — Signature

5/21/14 — Date

Lockport Steel Fabricators, LLC
3051 S State Street
Lockport IL 60441
815.726.6281

Customer: LCC

Project: Middletown

Location: Middletown, CT

LSF SO#: 15639

Date: 5/21/14

To whom it may concern;

We have performed visual observation and monitoring during all phases of the fabrication of the referenced welded components. This includes; pre, post and in process review consisting of a visual examination by an AWS Certified Welding Inspector of all welded components to evaluate their conformance with the applicable welding code requirements. We have reviewed the scope of work to ensure that it meets or exceeds the customer contractual requirements.

During the examination of all welded components it was found that all parts were in compliance with the specified requirements of AWS D1.1 and conformed to the customer project specifications. Please refer to the attached signed inspection sheet for individual piece marks and any relevant notes.

Respectfully submitted,

Lockport Steel Fabricators, LLC.

3051 South State St.

Lockport, Illinois 60441

See Attached: Weld Inspection form and Photos

LSF
LOCKPORT STEEL FABRICATORS

ALL WELDS INSPECTED TO AWS D1.1 / ASME SECTION IX

Project			LSF SO#	Date:	
Middletown/ 131647			15639	5/21/2014	
Dwg #	Piece Mark	Qty.	Code or Specification	Type of Material	
15639-1	AB1		AWS D1.1	A500 GR b/c	
Weld Procedure			Base Metal	Filler Metal	
			A500 GR b/c	115k	
Location			Foreman Signature		
High bay					
			Welder Signatures	Additional Welders Sign Back	

PICTURES MUST BE TAKEN AT EACH HOLD POINT WITH SO# AND PC-MARK VISIBLE IN PHOTO

INSPECTION STEPS	INSPECTOR INITIALS	REMARKS
INSPECT ALL MATERIAL FOR PROPERLY GROUND WELD BEVELS	MY	QC OK
HOLD POINT UNTIL INSPECTION IS COMPLETE	MY	QC OK
REPAIR IF NEEDED		
INSPECT REPAIRS		
INSPECT FIT UP PER DWG AND PROPER TACK WELD OF JOINTS	MY	QC OK
HOLD POINT UNTIL INSPECTION IS COMPLETE	MY	QC OK
REPAIR IF NEEDED		
INSPECT REPAIRS		
VISUAL INSPECTION OF ROOT WELDING AND BACK GOUGING BEFORE WELDING BACK SIDE	GW	CWI OK CAWI 14090664
HOLD POINT UNTIL INSPECTION IS COMPLETE	JW/MY	QC OK
REPAIR IF NEEDED		
INSPECT REPAIRS		
VISUAL INSPECTION OF FINAL WELDS	JW/MY	QC OK
HOLD POINT UNTIL INSPECTION IS COMPLETE	JW/MY	QC OK
REPAIR IF NEEDED		
INSPECT REPAIRS		
WELD INPECTION FORM MUST BE SIGNED BY WELDER, FOREMAN, QA AND CWI		

ADDITIONAL NOTES:

Q.A. SIGNATURE

5/21/14
DATE

CWI SIGNATURE

LEVEL (•) CAWI ( ) CWI ( ) SCWI

5/21/14
DATE

AISC CERTIFIED FABRICATOR

WELDER, WELDING OPERATOR OR TACK WELDER QUALIFICATION TEST RECORD

Type of Welder: Constant Voltage
Name: Daniel Soria — Identification No.: WS-9
Welding Procedure Specification No.: FC-10S — Rev: 0 — Date: February 18, 2013

Variables	Record Actual Values Used in Qualifications	QUALIFICATION RANGE
Process/Type [Table 4.12, Item (1)]	FCAW	FCAW
Electrode (single or multiple)[Table 4.12, Item(7)]	Single	Single
Current/Polarity	DCEP	
Position [Table 4.12, Item (4)]	3G	1G, 2G, 3G, 1F, 2F and 3F
Weld Progression [Table 4.12, Item (5)]	Uphill	Uphill
Backing (YES or NO) [Table 4.12, Item (6)]	YES	With Backing
Material/Spec.	A-36 to A-36	
Base Metal		
Thickness: (Plate)		
Groove	3/8" Plate	1/8" thru 0.750"
Fillet	N/A	1/8" thru Unlimited
Thickness: (Pipe/tube)		
Groove	N/A	1/8" thru 0.750"
Fillet	N/A	1/8" thru Unlimited
Diameter (Pipe)		
Groove	N/A	24" OD and Over
Fillet	N/A	24" OD and Over
Filler Metal [Table 4.12]		
Spec. No.	A5.20	A5.20 and A5.29
Class	E71T-1	
F-No.[Table 4.12, Item (2)]	None Assigned	
Gas/Flux Type (Table 4.12)	Ar/CO_2 75/25	Fillet Dihedrals 30° thru Unlimited
Other	---	

VISUAL INSPECTION (4.9.1)

Acceptable YES or NO: YES

Guided Bend Test Results (4.31.5)

Type	Result	Type	Result
---		---	
---		---	

Fillet Test Results (4.31.2.3 and 4.31.4.1)

Appearance: ---
Fracture Test Root Penetration: ---
(Describe the location, nature, and size of any crack or tearing of the specimen.)
Fillet Size: ---
Macroetch: ---

Inspected by: ---
Organization: ---
Test Number: ---
Date: ---

RADIOGRAPHIC TEST RESULTS (4.31.3.2)

Film Identification Number	Results	Remarks	Film Identification Number	Results	Remarks
WS-9 - 3G	Acceptable		---	---	
			---	---	

Interpreted by: Don Devich — Level II
Organization: Calumet Testing Services
Test Number: CTS Job No. 23184
Date: May 2, 2014

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in conformance with the requirements of Clause 4 of AWS D1.1/D1.1M: 2010, *Structural Welding Code - Steel*.

Manufacturer or Contractor: **Lockport Steel Fabricators**
Authorized By: [signature] C.W. Manager
Date: May 2, 2014

Form N-4

WELDER, WELDING OPERATOR OR TACK WELDER QUALIFICATION TEST RECORD

Type of Welder: Constant Voltage
Name: Gabriel Magana — Identification No.: WS-N
Welding Procedure Specification No.: FC-105 — Rev: 0 — Date: February 18, 2013

Variables	Record Actual Values Used in Qualifications	QUALIFICATION RANGE
Process/Type [Table 4.12, Item (1)]	FCAW	FCAW
Electrode (single or multiple)[Table 4.12, Item(7)]	Single	Single
Current/Polarity	DCEP	
Position [Table 4.12, Item (4)]	3G	1G, 2G, 3G, 1F, 2F and 3F
Weld Progression [Table 4.12, Item (5)]	Uphill	Uphill
Backing (YES or NO) [Table 4.12, Item (6)]	YES	With Backing
Material/Spec.	A-36 to A-36	
Base Metal		
Thickness: (Plate)		
Groove	3/8" Plate	1/8" thru 0.750"
Fillet	N/A	1/8" thru Unlimited
Thickness: (Pipe/tube)		
Groove	N/A	1/8" thru 0.750"
Fillet	N/A	1/8" thru Unlimited
Diameter (Pipe)		
Groove	N/A	24" OD and Over
Fillet	N/A	24" OD and Over
Filler Metal [Table 4.12]		
Spec. No.	A5.20	A5.20 and A5.29
Class	E71T-1	
F-No.[Table 4.12, Item (2)]	None Assigned	
Gas/Flux Type (Table 4.12)	Ar/CO_2 75/25	Fillet Dihedrals 30° thru Unlimited
Other	---	

VISUAL INSPECTION (4.9.1)
Acceptable YES or NO: YES

Guided Bend Test Results (4.31.5)

Type	Result	Type	Result
---		---	
---		---	

Fillet Test Results (4.31.2.3 and 4.31.4.1)

Appearance: ---
Fracture Test Root Penetration: ---
(Describe the location, nature, and size of any crack or tearing of the specimen.)
Fillet Size: ---
Macroetch: ---

Inspected by: ---
Organization: ---
Test Number: ---
Date: ---

RADIOGRAPHIC TEST RESULTS (4.31.3.2)

Film Identification Number	Results	Remarks	Film Identification Number	Results	Remarks
WS-N - 3G	Acceptable	Film marked as "WS-F"	---	---	
			---	---	

Interpreted by: Don Devich — Level II
Organization: Calumet Testing Services
Test Number: CTS Job No. 23184
Date: May 2, 2014

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in conformance with the requirements of Clause 4 of AWS D1.1/D1.1M: 2010, *Structural Welding Code - Steel.*

Manufacturer or Contractor: **Lockport Steel Fabricators**
Authorized By: Q.A. manager
Date: May 2, 2014

Form N-4

WELDER, WELDING OPERATOR OR TACK WELDER QUALIFICATION TEST RECORD

Type of Welder: Constant Voltage
Name: Jose Cruz — Identification No.: WS-T
Welding Procedure Specification No.: FC-105 — Rev: 0 — Date: February 18, 2013

Variables	Record Actual Values Used in Qualifications	QUALIFICATION RANGE
Process/Type [Table 4.12, Item (1)]	FCAW	FCAW
Electrode (single or multiple)[Table 4.12, Item(7)]	Single	Single
Current/Polarity	DCEP	
Position [Table 4.12, Item (4)]	3G	1G, 2G, 3G, 1F, 2F and 3F
Weld Progression [Table 4.12, Item (5)]	Uphill	Uphill
Backing (YES or NO) [Table 4.12, Item (6)]	YES	With Backing
Material/Spec.	A-36 to A-36	
Base Metal		
Thickness: (Plate)		
Groove	3/8" Plate	1/8" thru 0.750"
Fillet	N/A	1/8" thru Unlimited
Thickness: (Pipe/tube)		
Groove	N/A	1/8" thru 0.750"
Fillet	N/A	1/8" thru Unlimited
Diameter (Pipe)		
Groove	N/A	24" OD and Over
Fillet	N/A	24" OD and Over
Filler Metal [Table 4.12]		
Spec. No.	A5.20	A5.20 and A5.29
Class	E71T-1	
F-No.[Table 4.12, Item (2)]	None Assigned	
Gas/Flux Type (Table 4.12)	Ar/CO_2 75/25	Fillet Dihedrals 30° thru
Other	---	Unlimited

VISUAL INSPECTION (4.9.1)

Acceptable YES or NO: **YES**

Guided Bend Test Results (4.31.5)

Type	Result	Type	Result
---		---	
---		---	

Fillet Test Results (4.31.2.3 and 4.31.4.1)

Appearance: ---
Fracture Test Root Penetration: ---
Fillet Size: ---
Macroetch: ---
(Describe the location, nature, and size of any crack or tearing of the specimen.)

Inspected by: ---
Organization: ---
Test Number: ---
Date: ---

RADIOGRAPHIC TEST RESULTS (4.31.3.2)

Film Identification Number	Results	Remarks	Film Identification Number	Results	Remarks
WS-T - 3G	Acceptable		---	---	
			---	---	

Interpreted by: Don Devich — Level II
Organization: Calumet Testing Services
Test Number: CTS Job No. 21099
Date: April 2, 2013

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in conformance with the requirements of Clause 4 of AWS D1.1/D1.1M, (2010) *Structural Welding Code - Steel.*

James G Whittaker
CWI 08040341
QC1 EXP. 4/1/2015

Manufacturer or Contractor: **Lockport Steel Fabricators**
Authorized By
Date: April 2, 2013

Form N-4

WELDER, WELDING OPERATOR OR TACK WELDER QUALIFICATION TEST RECORD

Type of Welder: Constant Voltage
Name: Michael Collins — Identification No.: WS-O
Welding Procedure Specification No.: FC-106 — Rev: 0 — Date: February 18, 2013

Variables	Record Actual Values Used in Qualifications	QUALIFICATION RANGE
Process/Type [Table 4.12, Item (1)]	FCAW	FCAW
Electrode (single or multiple)[Table 4.12, Item(7)]	Single	Single
Current/Polarity	DCEP	
Position [Table 4.12, Item (4)]	3G	1G, 2G, 3G, 1F, 2F and 3F
Weld Progression [Table 4.12, Item (5)]	Uphill	Uphill
Backing (YES or NO) [Table 4.12, Item (6)]	YES	With Backing
Material/Spec.	A-36 to A-36	
Base Metal		
Thickness: (Plate)		
Groove	3/8" Plate	1/8" thru 0.750"
Fillet	N/A	1/8" thru Unlimited
Thickness: (Pipe/tube)		
Groove	N/A	1/8" thru 0.750"
Fillet	N/A	1/8" thru Unlimited
Diameter (Pipe)		
Groove	N/A	24" OD and Over
Fillet	N/A	24" OD and Over
Filler Metal [Table 4.12]		
Spec. No.	A5.20	A5.20 and A5.29
Class	E71T-1	
F-No.[Table 4.12, Item (2)]	None Assigned	
Gas/Flux Type (Table 4.12)	Ar/CO_2 75/25	Fillet Dihedrals 30° thru Unlimited
Other	---	

VISUAL INSPECTION (4.9.1)

Acceptable YES or NO: YES

Guided Bend Test Results (4.31.5)

Type	Result	Type	Result
---		---	
---		---	

Fillet Test Results (4.31.2.3 and 4.31.4.1)

Appearance	---	Fillet Size	---
Fracture Test Root Penetration	---	Macroetch	---

(Describe the location, nature, and size of any crack or tearing of the specimen.)

Inspected by: --- — Test Number: ---
Organization: --- — Date: ---

RADIOGRAPHIC TEST RESULTS (4.31.3.2)

Film Identification Number	Results	Remarks	Film Identification Number	Results	Remarks
WS-O - 3G	Acceptable		---	---	
			---	---	

Interpreted by: Don Devich Level II — Test Number: CTS Job No. 23184
Organization: Calumet Testing Services — Date: May 2, 2014

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in conformance with the requirements of Clause 4 of AWS D1.1/D1.1M: 2010, *Structural Welding Code - Steel*.

Manufacturer or Contractor: **Lockport Steel Fabricators** — Authorized By: J.A. Mueller — Date: May 2, 2014

Form N-4

WELDER, WELDING OPERATOR OR TACK WELDER QUALIFICATION TEST RECORD

Type of Welder: Constant Voltage
Name: Jose Mosqueda — Identification No.: WS-JM
Welding Procedure Specification No.: FC-105 — Rev: 0 — Date: February 18, 2013

Variables	Record Actual Values Used in Qualifications	QUALIFICATION RANGE
Process/Type [Table 4.12, Item (1)]	FCAW	FCAW
Electrode (single or multiple)[Table 4.12, Item(7)]	Single	Single
Current/Polarity	DCEP	
Position [Table 4.12, Item (4)]	3G	1G, 2G, 3G, 1F, 2F and 3F
Weld Progression [Table 4.12, Item (5)]	Uphill	Uphill
Backing (YES or NO) [Table 4.12, Item (6)]	YES	With Backing
Material/Spec.	A-36 to A-36	
Base Metal		
Thickness: (Plate)		
Groove	3/8" Plate	1/8" thru 0.750"
Fillet	N/A	1/8" thru Unlimited
Thickness: (Pipe/tube)		
Groove	N/A	1/8" thru 0.750"
Fillet	N/A	1/8" thru Unlimited
Diameter (Pipe)		
Groove	N/A	24" OD and Over
Fillet	N/A	24" OD and Over
Filler Metal [Table 4.12]		
Spec. No.	A5.20	A5.20 and A5.29
Class	E71T-1	
F-No.[Table 4.12, Item (2)]	None Assigned	
Gas/Flux Type (Table 4.12)	Ar/CO_2 75/25	Fillet Dihedrals 30° thru Unlimited
Other	---	

VISUAL INSPECTION (4.9.1)

Acceptable YES or NO: **YES**

Guided Bend Test Results (4.31.5)

Type	Result	Type	Result
---		---	
---		---	

Fillet Test Results (4.31.2.3 and 4.31.4.1)

Appearance: ---
Fracture Test Root Penetration: ---
Fillet Size: ---
Macroetch: ---
(Describe the location, nature, and size of any crack or tearing of the specimen.)

Inspected by: ---
Organization: ---
Test Number: ---
Date: ---

RADIOGRAPHIC TEST RESULTS (4.31.3.2)

Film Identification Number	Results	Remarks	Film Identification Number	Results	Remarks
WS-JM - 3G	Acceptable		---	---	
			---	---	

Interpreted by: Don Devich — Level II
Organization: Calumet Testing Services
Test Number: CTS Job No. 21099
Date: April 2, 2013

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in conformance with the requirements of Clause 4 of AWS D1.1/D1.1M, (2010) *Structural Welding Code - Steel.*

Manufacturer or Contractor: **Lockport Steel Fabricators**

Authorized By: James G Whittaker
CWI 06040341
QC1 EXP. 4/1/2015
Date: April 2, 2013

Form N-4

WELDER, WELDING OPERATOR OR TACK WELDER QUALIFICATION TEST RECORD

Type of Welder: Constant Voltage
Name: Lupe Martinez — Identification No.: WS-E
Welding Procedure Specification No.: FC-105 — Rev: 0 — Date: February 18, 2013

Variables	Record Actual Values Used in Qualifications	QUALIFICATION RANGE
Process/Type [Table 4.12, Item (1)]	FCAW	FCAW
Electrode (single or multiple)[Table 4.12, Item(7)]	Single	Single
Current/Polarity	DCEP	
Position [Table 4.12, Item (4)]	3G	1G, 2G, 3G, 1F, 2F and 3F
Weld Progression [Table 4.12, Item (5)]	Uphill	Uphill
Backing (YES or NO) [Table 4.12, Item (6)]	YES	With Backing
Material/Spec.	A-36 to A-36	
Base Metal		
Thickness: (Plate)		
Groove	3/8" Plate	1/8" thru 0.750"
Fillet	N/A	1/8" thru Unlimited
Thickness: (Pipe/tube)		
Groove	N/A	1/8" thru 0.750"
Fillet	N/A	1/8" thru Unlimited
Diameter (Pipe)		
Groove	N/A	24" OD and Over
Fillet	N/A	24" OD and Over
Filler Metal [Table 4.12]		
Spec. No.	A5.20	A5.20 and A5.29
Class	E71T-1	
F-No.[Table 4.12, Item (2)]	None Assigned	
Gas/Flux Type (Table 4.12)	Ar/CO_2 75/25	Fillet Dihedrals 30° thru
Other	---	Unlimited

VISUAL INSPECTION (4.9.1)

Acceptable YES or NO: **YES**

Guided Bend Test Results (4.31.5)

Type	Result	Type	Result
---		---	
---		---	

Fillet Test Results (4.31.2.3 and 4.31.4.1)

Appearance: --- — Fillet Size: ---
Fracture Test Root Penetration: --- — Macroetch: ---
(Describe the location, nature, and size of any crack or tearing of the specimen.)

Inspected by: --- — Test Number: ---
Organization: --- — Date: ---

RADIOGRAPHIC TEST RESULTS (4.31.3.2)

Film Identification Number	Results	Remarks	Film Identification Number	Results	Remarks
WS-E - 3G	Acceptable		---	---	
			---	---	

Interpreted by: Don Devich — Level II — Test Number: CTS Job No. 21099
Organization: Calumet Testing Services — Date: April 2, 2013

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in conformance with the requirements of Clause 4 of AWS D1.1/D1.1M, (2010) *Structural Welding Code - Steel.*

James G Whittaker
CWI 08040341
QC1 EXP. 4/1/2015

Manufacturer or Contractor: **Lockport Steel Fabricators** — Authorized By
Date: April 2, 2013

Form N-4

WELDER, WELDING OPERATOR OR TACK WELDER QUALIFICATION TEST RECORD

Type of Welder: Constant Voltage
Name: Martin Juarez — Identification No.: WS-Q
Welding Procedure Specification No.: FC-105 — Rev: 0 — Date: February 18, 2013

Variables	Record Actual Values Used in Qualifications	QUALIFICATION RANGE
Process/Type [Table 4.12, Item (1)]	FCAW	FCAW
Electrode (single or multiple)[Table 4.12, Item(7)]	Single	Single
Current/Polarity	DCEP	
Position [Table 4.12, Item (4)]	3G	1G, 2G, 3G, 1F, 2F and 3F
Weld Progression [Table 4.12, Item (5)]	Uphill	Uphill
Backing (YES or NO) [Table 4.12, Item (6)]	YES	With Backing
Material/Spec.	A-36 to A-36	
Base Metal		
Thickness: (Plate)		
Groove	3/8" Plate	1/8" thru 0.750"
Fillet	N/A	1/8" thru Unlimited
Thickness: (Pipe/tube)		
Groove	N/A	1/8" thru 0.750"
Fillet	N/A	1/8" thru Unlimited
Diameter (Pipe)		
Groove	N/A	24" OD and Over
Fillet	N/A	24" OD and Over
Filler Metal [Table 4.12]		
Spec. No.	A5.20	A5.20 and A5.29
Class	E71T-1	
F-No.[Table 4.12, Item (2)]	None Assigned	
Gas/Flux Type (Table 4.12)	Ar/CO_2 75/25	Fillet Dihedrals 30° thru
Other	---	Unlimited

VISUAL INSPECTION (4.9.1)

Acceptable YES or NO: **YES**

Guided Bend Test Results (4.31.5)

Type	Result	Type	Result
---		---	
---		---	

Fillet Test Results (4.31.2.3 and 4.31.4.1)

Appearance: --- — Fillet Size: ---
Fracture Test Root Penetration: --- — Macroetch: ---
(Describe the location, nature, and size of any crack or tearing of the specimen.)

Inspected by: --- — Test Number: ---
Organization: --- — Date: ---

RADIOGRAPHIC TEST RESULTS (4.31.3.2)

Film Identification Number	Results	Remarks	Film Identification Number	Results	Remarks
WS-Q - 3G	Acceptable		---	---	
			---	---	

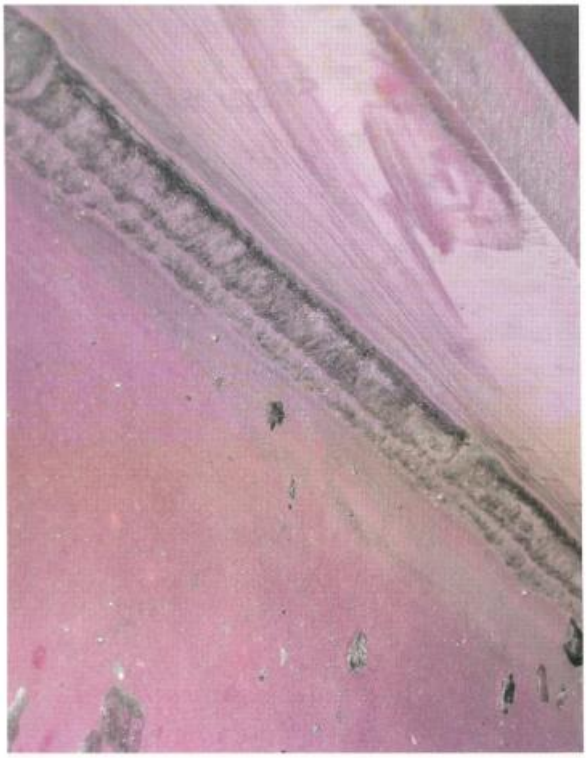
Interpreted by: Don Devich Level II — Test Number: CTS Job No. 21099
Organization: Calumet Testing Services — Date: April 2, 2013

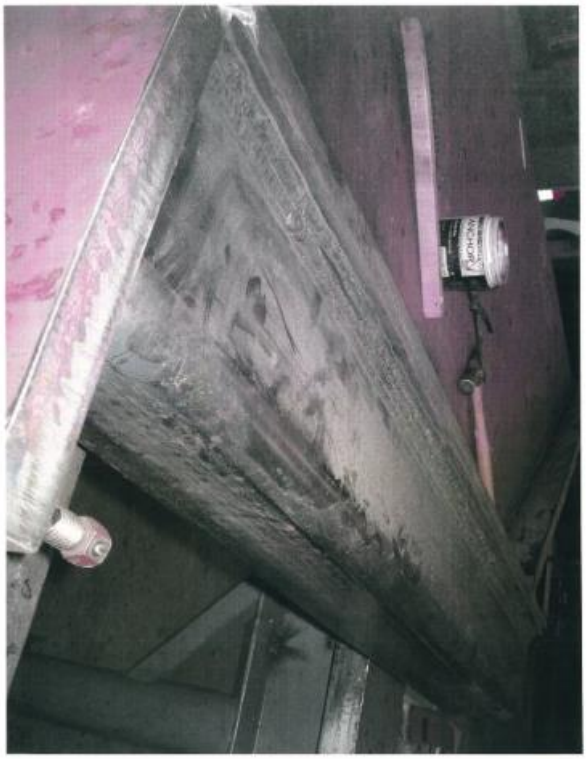
We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in conformance with the requirements of Clause 4 of AWS D1.1/D1.1M, (2010) *Structural Welding Code - Steel*.

James G Whittaker
CWI 08040341
QC1 EXP. 4/1/2015

Manufacturer or Contractor: **Lockport Steel Fabricators** — Authorized By
Date: April 2, 2013

Form N-4





6.1.5 MATERIAL TEST REPORT (MTR)

MARUICHI LEAVITT PIPE AND TUBE

MATERIAL TEST REPORT

ORIGINAL

M/C No. MC0000020806
Date 12/26/2013

BL No. SH0000024011
Destination LIEBOVICH BROS-ROCKFORD
Supplier

MARUICHI LEAVITT PIPE & TUBE, LLC
1717 W. 115th St.
Chicago, IL 60643
TEL: (773) 239-7700 FAX: (773) 239-1073

	SPEC / SIZE / Customer PO No. - Customer Item No	No of PCS / Calculated Wt.(LBS)	Heat No	C (%) x 100	Si (%) x 100	Mn (%) x 100	P (%) x 1000	S (%) x 1000	Cu (%) x 1000	Ni (%) x 1000	Cr (%) x 1000	Mo (%) x 1000	V (%) x 1000	Yield Strength (PSI)	Tensile Strength (PSI)	Elongation (%)	Hydrostatic Test Pressure (PSI) / Result	Flattening Test	Remarks
1	ASTM A500/A500M-10 GRADE B ERW TUBING 4IN x 4IN x 0.250IN x 20FT HRB 4686 / ZHW SQ 4D240 5920097-1	48 11,720	0173378	15	2	61	14	10	40	20	30	10	1	56,836	67,152	34			SA30C0059351
2	ASTM A500/A500M-10 GRADE B ERW TUBING 4IN x 4IN x 0.250IN x 40FT HRB 4687 / ZHW SQ 4D480 5920098-1	36 17,580	0154914	16	1	60	15	11	40	10	30	0	1	67,030	67,684	32			SA30C0059353
3	ASTM A500/A500M-10 GRADE B ERW TUBING 6IN x 6IN x 0.500IN x 40FT HRB 4688 / ZHW SQ 6H480 5919955-1	4 5,638	342890	5	2	77	11	7	23	10	32	2	2	68,709	76,910	29			SA30C0059354
4	ASTM A500/A500M-10 GRADE B ERW TUBING 8IN x 3IN x 0.375IN x 40FT HRB 5919267 / ZHW RECT 83F480 5919267-1	6 5,984	R2708	15	2	63	8	9	80	60	70	20	2	57,812	63,712	34			SA30C0057491
5	ASTM A500/A500M-10 GRADE B ERW TUBING 6IN x 6IN x 0.500IN x 40FT HRB 5919795 / ZHW SQ 6H480 5920099-1	4 5,638	342890	6	2	77	11	7	23	10	32	2	2	68,709	76,910	29			SA30C0058868

Made and Melted in The U.S.A.
This material has not come in direct contact with mercury during the manufacturing or testing processes. No Weld Repair.

Remarks:

We hereby certify that the material described herein conforms fully to the said specification.

Maruichi Leavitt Pipe & Tube, LLC

F-824-101 - Rev. 0

SSAB

1770 Bill Sharp Boulevard, Muscatine, IA 52761-9412

Test Certificate

Form TC1 Revision 1 Date 31 Oct 2010

Customer: LIEBOVICH BROTHERS 2116 PRESTON STREET ROCKFORD IL 61102	Customer P.O. No.: 5292769 -- 4	Mill Order No.: 41-382131-04	Shipping Manifest: MT218112
	Product Description: ASTM A572-50/M345(12)/A709-50/M345(11)	Ship Date: 30 Dec 13 Cert Date: 30 Dec 13	Cert No: 0614304 (Page 1 of 1)
	Size: 2.000 X 96.00 X 240.0 (IN)		

Heat Id	Piece Id	Tested Thickness	Tst Loc	YS (KSI)	UTS (KSI)	%RA	Elong % 2in	Elong % 8in	Tst Dir	Hardness	Abs. Energy (FTLB) 1	2	3	Avg	% Shear 1	2	3	Avg	Tst Tmp	Tst Dir	Tst Siz	BDWTT Tmp	%Shr
A3K116	CD6	2.009 (DISCRT)	L	59	82			24	T														
A3K116	CD8	2.007 (DISCRT)	L	60	81			26	T														
B3L516	A12	2.009 (DISCRT)	L	57	81			20	T														
B3L516	A13	2.010 (DISCRT)	L	58	80			22	T														

Chemical Analysis

Heat Id	C	Mn	P	S	Si	Tot Al	Cu	Ni	Cr	Mo	Cb	V	Ti	ORGN
A3K116	.17	1.24	.012	.002	.19	.029	.26	.18	.16	.04	.001	.096	.008	USA
B3L516	.16	1.26	.013	.001	.18	.031	.25	.17	.16	.05	.001	.096	.008	USA

MERCURY IS NOT A METALLURGICAL COMPONENT OF THE STEEL AND NO MERCURY WAS INTENTIONALLY ADDED
DURING THE MANUFACTURE OF THIS PRODUCT
MTR EN 10204:2004 INSPECTION CERTIFICATE 3.1 COMPLIANT
100% MELTED AND MANUFACTURED IN THE USA
PRODUCTS SHIPPED:
B3L516 A16 PCES 1 WGT: 26246 A3K116 CD9 PCES 1, [illegible]

Cust Part # :

WE HEREBY CERTIFY THAT THIS MATERIAL WAS TESTED IN ACCORDANCE WITH, AND MEETS THE REQUIREMENTS OF, THE APPROPRIATE SPECIFICATION

B. H. Wales

NUCOR PLATE MILL

P.O.Box 279
Winton, NC 27986
(252) 358-3790

Mill Test Report

Page 1

NUCOR It's our Nature

Issuing Date : 03/24/2014 B/L No. : 383462 Load No. : 386923 Our Order No. : 116781/17 Cust. Order No. : 12085

Vehicle No: 9517

Specification : 1.2500" x 96.000" x 468.000"
ASTM A572 Grade 65-13a .05 Max Si

Sold To : RANGER STEEL SERVICES LP
1225 NORTH LOOP W STE 850
HOUSTON,TX 77008

Ship To : RANGER STEEL (TRUCK)
1650 S 81ST W AVE
TULSA,OK 74127

Marking :

Heat No	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Al(tot)	V	Nb	Ti	N	Ca	B	Sn	CEQ	PCM
4501901	0.16	1.37	0.019	0.002	0.03	0.15	0.06	0.08	0.01	0.025	0.058	0.042	0.002	0.0127	0.0019	0.0005	0.007	0.43	0.25

			Tensile Test					Charpy Impacts											
Plate Serial No	Pieces	Tons	Dir.	(psi) Yield	(psi) Tensile	Elongation % in 2"	Elongation % in 8"	Dir.	(ft-lbs) 1	(%) shear	(ft-lbs) 2	(%) shear	(ft-lbs) 3	(%) shear	(ft-lbs) Ave.	(%) shear	Size	Temp (°F)	Min Ave.
4501901-01	2	16.33	T	65,300	86,600	52.7		H-L	20.3		35.4		55.8		37.2		10mm	-20	15
			T	69,400	86,800	40.7													

po 25602

Ranger Steel

Plate Frequency per A673, each plate "as-rolled" :

Manufactured to fully killed fine grain practice by Electric Arc Furnace. Welding or weld repair was not performed on this material. Mercury has not been used in the direct manufacturing of this material. Produced as continuous cast slab/ace plate as-rolled, unless otherwise noted in Specification.
Yield by 0.5EUL method unless otherwise specified. Ceq = C+[(Mn/6)+(Cr+Mo+V)/5]+[(Cu+Ni)/15]
Pcm = C+(Si/30)+(Mn/20)+(Cu/20)+(Ni/60)+(Cr/20)+(Mo/15)+(V/10)+5B
Melted and manufactured in the USA. ISO 9001:2008 certified (8003063) by SRI Quality System Registrar (RQ085-08). PED 97/23/EC 7/2 Annex 1, Para. 4.3 Compliant. DIN 50049 3.1/BEN 10204 3.1B(2004), DIN EN 10204 3.1(2005) compliant. For ABS grades only, Quality Assurance certificate 09-AMPQA-846

We hereby certify that the contents of this report are accurate and correct. All test results and operations performed by the material manufacturer are in compliance with the applicable specifications, including customer specifications.

T. A. Deputo

T. A. Deputo, Metallurgist

03/24/2014 3:50:34 PM

NUCOR
PLATE MILL
P.O.Box 279
Wilton, NC 27986
(252) 356-3700

Mill Test Report

Page 1

NUCOR
It's our Nature

Issuing Date : 02/05/2014 Bill. No. : 379017 Load No. : 383952 Our Order No. : 117776/15 Cust. Order No. : 12286

Vehicle No: LW 62063

Specification : 1.0000" x 96.000" x 480.000"
ASTM A572 Grade 65-13a .05 Max SI

Sold To : RANGER STEEL SERVICES LP
1225 NORTH LOOP W STE 550
HOUSTON,TX 77008

Ship To : RANGER STEEL (RAIL)
SAND SPRINGS RAIL RD
1650 S 81ST ST
SAND SPRINGS,OK 74063

Marking :

Heat No	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Al(tot)	V	Nb	Ti	N	Ca	B	Sn	CEQ	PCM
4500888	0.16	1.38	0.025	0.004	0.03	0.14	0.05	0.08	0.01	0.037	0.061	0.045	0.002	0.0127	0.0017	0.0000	0.006	0.43	0.25
4500889	0.16	1.44	0.029	0.006	0.03	0.16	0.05	0.10	0.01	0.035	0.056	0.046	0.002	0.0145	0.0024	0.0000	0.006	0.44	0.25

				Tensile Test				Charpy Impacts										
Plate Seria No	Pieces	Tons	Dir.	(psi) Yield	(psi) Tensile	Elongation % in 2"	Elongation % in 8"	Dir.	(ft-lbs) 1	(%) shear	(ft-lbs) 2	(%) shear	(ft-lbs) 3	(%) shear	(ft-lbs) Ave.	(%) shear	Size	Temp (°F)	Min Ave.
4500888-02	6	39.20	T	68,800	85,300	27.1		H-L	134.5		71.3		134.6		113.5		10mm	-20	15
			T	68,600	85,300	20.9													
4500888-03	6	39.20	T	68,800	85,300	27.1		H-L	71.8		85.3		124.9		94.0		10mm	-20	15
			T	68,600	85,300	20.9													
4500889-02	1	6.53	T	67,200	89,100	43.8		H-L	124.8		132.7		147.4		138.3		10mm	-20	15
			T	66,900	84,800	22.5													

RANGER STEEL
D.C.

Piece Frequency per A673, each plate "as-rolled" :

Manufactured to fully killed fine grain practice by Electric Arc Furnace. Welding or weld repair was not performed on this material. Mercury has not been used in the direct manufacturing of this material. Produced as continuous cast discrete plate as-rolled, unless otherwise noted in Specification.
Yield by 0.5EUL method unless otherwise specified. Ceq = C+(Mn/6)+((Cr+Mo+V)/5)+((Cu+Ni)/15)
Pcm = C+(Si/30)+(Mn/20)+(Cu/20)+(Ni/60)+(Cr/20)+(Mo/15)+(V/10)+5B
Melted and manufactured in the USA, ISO 9001:2008 certified (8000003) by SRI Quality System Registrar (RQ985-09). PED 97/23/EC 7/2 Annex 1, Para. 4.3 Compliant. DIN 50049 3.1.B/EN 10204 3.1B(2004), DIN EN 10204 3.1(2005) compliant. For ABS grades only, Quality Assurance certificate 09-MMPQA-546

We hereby certify that the contents of this report are accurate and correct. All test results and operations performed by the material manufacturer are in compliance with the applicable specifications, including customer specifications.

T. A. Depreta

T. A. Depreta, Metallurgist

02/05/2014 4:33:01 PM

6.1.6 FABRICATOR NDE INSPECTION

From: John Woolley <jwoolley@pjfweb.com>
Sent: Friday, December 19, 2014 2:52 PM
To: Keith_ Stackhouse
Cc: James (Vendor) Donahue; Jason (Vendor) D'Amico; Jerry (Contractor) Bruno; SGS MI; lccmods; pjfmod pjfmod
Subject: Re: Middletown 1 - 825983 - project #37513-1570 fab CWI

Keith,

As long as the parts are built as specified and the CWI passed, I have no issue with this.

Thanks,

John J. Woolley, E.I.
Structural Designer
Main: 614.221.6679 ext. 2164
Direct: 614.448.4164
E-mail: jwoolley@pjfweb.com

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
Since 1965 | Employee-Owned | www.PJFweb.com
P.E. Registrations in 50 States, Puerto Rico, and Canada

>>> Keith_ Stackhouse <keith_stackhouse@lcc.com> 12/19/2014 2:41 PM >>>

Hello John,

As per our conversation,

The fabricator did not collect any photos of the fabrication process nor perform NDE of the shop weld. Our CWI performed NDE(MT) of the fabricated anchor brackets while performing his CWI inspection.

Could review the CWI/NDE report and approve of the fabricated parts in lieu of not having photo documentation of the fabrication process?

Thanks,

Keith A. Stackhouse
Structural Construction Manager

1

6.1.7 NDE REPORT OF MONOPOLE BASE PLATE

See Section 6.2.4 Contractor's Certified Weld Inspection.

6.1.8 PACKING SLIPS

LCC

Purchase Order

PO Number
412547

LCC Deployment Services, Inc.
7900 Westpark Drive, Suite A300
Mclean, VA 22102

Ship To: 90 Industrial Park Rd
Middletown, CT 06457

Vendor: Lockport Steel Fabricators, LLC
3051 S. State Street
P.O. Box 248
Lockport, IL 60441

Bill To: LCC Deployment Services, Inc.
7900 Westpark Drive, Suite A300
Mclean, VA 22102

PAYMENT TERMS	FOB	DATE OF ORDER	FREIGHT TERMS
Net 30		04/04/2014	Prepaid
DATE EXPECTED		REFERENCE	
04/04/2014		131647	

ITEM	DESCRIPTION	QUANTITY	U.O.M.	UNIT PRICE	AMOUNT
A-D-Subcontractor-Equipment	FB - 1-1/4" x 8-1/2" x 35'-0" cut to size, drilled, fabbed, and HDG per provided sketches A572-65 Ready 3-4 weeks	4	Each		
A-D-Subcontractor-Equipment	FB - 1" x 6-1/2" x 35'-0" cut to size, drilled, fabbed, and HDG per provided sketches A572-65	3	Each		
A-D-Subcontractor-Equipment	FB - 1" x 6-1/2" x 40'-0" cut to size, drilled, fabbed, and HDG per provided sketches A572-65	3	Each		
A-D-Subcontractor-Equipment	FB - 3/4" x 4" x 20'-0" cut to size, drilled, fabbed, and HDG per provided sketches A572-65	3	Each		
A-D-Subcontractor-Equipment	FB - 3/4" x 4" x 5'-0" cut to size, drilled, fabbed, and HDG per provided sketches A572-65	3	Each		
A-D-Subcontractor-Equipment	FB - 1" x 4-1/2" x 15'-0" cut to size, drilled, fabbed, and HDG per provided sketches A572-65	3	Each		
A-D-Subcontractor-Equipment	FB - 1" x 6" x 35'-0" cut to size, drilled, fabbed, and HDG per provided sketches A572-65	3	Each		
A-D-Subcontractor-Equipment	FB - 1" x 4-1/2" x 35'-0" cut to size, drilled, fabbed, and HDG per provided sketches A572-65	3	Each		
A-D-Subcontractor-Equipment	HSS - 6 x 6 x 1/2" x 4'-2" cut to size, fabbed, and HDG per provided sketches A500-42 - AB/HSS1	6	Each		
A-D-Subcontractor-Equipment	PL - 1-1/4" x 43-3/4" x 8'-0" cut to size, fabbed, and HDG per provided sketches A572-65 - AB1	6	Each		
A-D-Subcontractor-Equipment	PL - 1-1/4" x 8" x 4'-2" cut to size, fabbed, and HDG per provided sketches A572-65 - AB1-Vert	6	Each		
A-D-Subcontractor-Equipment	PL - 1-1/4" x 8" x 6'-3" cut to size, fabbed, and HDG per provided sketches A572-65 - AB1-Cap	6	Each		

Purchase Order

PO Number
412547

LCC Deployment Services, Inc.
7900 Westpark Drive, Suite A300
Mclean, VA 22102

Ship To: 90 Industrial Park Rd
Middletown, CT 06457

Vendor: Lockport Steel Fabricators, LLC
3051 S. State Street
P.O. Box 248
Lockport, IL 60441

Bill To: LCC Deployment Services, Inc.
7900 Westpark Drive, Suite A300
Mclean, VA 22102

A-D-Subcontractor-Equipment	PL - 1-1/4" x 8" x 4'-9" cut to size, fabbed, and HDG per provided sketches A572-65 - P1	6	Each	[redacted]
A-D-Subcontractor-Equipment	PL - 1-1/4" x 9" x 1'-9" cut to size, fabbed, and HDG per provided sketches A572-65	6	Each	
A-D-Subcontractor-Equipment	PL - 1-1/4" x 8" x 1'-9" cut to size, fabbed, and HDG per provided sketches A572-65 - P2	6	Each	
A-D-Subcontractor-Equipment	PL - 2" x 8" x 8" cut to size, fabbed, and HDG per provided sketches A572-50 - WP1	12	Each	

SUPPLIER INSTRUCTIONS

1. Invoice must reference Purchase Order Number listed above or supplier will experience payment delays.
2. Invoice should be emailed to "AP_TEAM@lcc.com"
3. Process order with the above shipping method, terms, prices, and specifications.
4. Please notify LCC's contact person immediately if you are unable to ship as specified. Upon acceptance of this purchase order seller agrees to adhere to LCC terms and conditions located at http://www.lcc.com/index.php/en/purchasing-terms-conditions , as amended from time to time, which are incorporated herein by this reference, with the same force and effect as if they were given in full text.

LCC APPROVAL

Procurement Dept. 04/04/2014
LCC Authorized Agent Date

EAST COAST STEEL INC.
317 SALINA ROAD
SEWELL, NJ 08080
856-582-6776
FAX 856-582-0288

MIDDLETOWN
131647

PACKING SLIP

Date	Invoice #
4/7/2014	153247

Bill To	Ship To
LCC DEPLOYMENT SERVICES, INC. 7900 WESTPARK DRIVE, SUITE A300 MCLEAN, VA 22102	2242 OLD MARLTON PIKE MARLTON, NJ. 08053 856-810-1658 *SEND MTRS WITH ALL ORDERS*

P.O. NUMBER	TERMS	DUE DATE	REP	Ship VIA	FOB
412550	N30	5/7/2014	CD	PICKUP	ECS

Qty	Description
6 ✓	1-1/2" HR PLATE 14-1/4" OD X 12-3/4" ID NJ Sales Tax P/U on 4-9-10 By Tom M PO# 412550 for Site MIDDLETOWN-131647 6 PCS

TERMS & CONDITIONS:
Random lengths are estimates only, overages to be paid by customer.
Shipping weights calculated based on material theoretical weights.
ECS must be notified within ten days of any discrepancies.
VISIT US AT WWW.EASTCOASTSTEEL.NET

Re-Steel Supply Co., Inc.
2000 Eddystone Industrial Park
Eddystone, PA 19022-
Phone: (610)876-8216 FAX: (610)876-9279

JOB NUMBER	RELEASE NUMBER	REQ. DELIVERY DATE	PAGE
S4549	1	8/14/2014	1 of 1

JOB NAME: MARLTON NJ
CC: A23Y
CUSTOMER: LCC DEPLOYMENT SERVICES
BY: MDO

MATERIAL TYPE: Rebar, Grade 60, Black
REFERENCE: EDDY
DRAWING ID:
DESCRIPTION: PO# 413317 MIDDLETOWN 1

Itm	Qty	Size	Length	Mark	Shape	Lbs	A	B	C	D	E	F/R	G	H	J	K	O	BC
CPU																		
CONTACT RICH TASCHEK 609-685-1655																		
$575.00																		
RM																		
1	30	9	4-06			459												0
	30.					459.												
2	48	5	11-00	500	T1	551	0-06	2-06	2-06	2-06	2-06		0-06					L06
	48.					551.												

CPU

Total Weight: 1,010 Lbs

Longest Length: 11-00

WEIGHT SUMMARY

	TOTAL			STRAIGHT			LIGHT BENDING			HEAVY BENDING		
SIZE	ITEMS	PIECES	LBS	ITEMS	PIECES	LBS	ITEMS	PIECES	LBS	ITEMS	PIECES	LBS
Rebar, Grade 60, Black												
5	1	48	551	0	0	0	1	48	551	0	0	0
9	1	30	459	1	30	459	0	0	0	0	0	0
	2	78	1010	1	30	459	1	48	551	0	0	0

Total Weight: 1,010 Lbs

Longest Length: 11-00

PO# 413317 FOR
MIDDLETOWN-1 131647
P/U 8-14-14

040366

CONSTRUCTION

6.2.1 CONSTRUCTION INSPECTIONS

LCC Deployment Services Inc.
2242 Old Marlton Pike, Marlton, NJ 08053
856-810-1658 (Ph) 856-810-1659 (Fax)

To: Crown Castle

Subject: Construction inspection

Site: **Middletown 1 - 825983**

December 10, 2014

Please be advised that all work was completed per drawings dated **09/17/2013 & 08/14/2013** by **Paul J. Ford and Company**, in accordance with industry standards and contract documents including modification drawings and specifications, state and local regulations, OSHA, and engineering standards. On-site cold galvanizing was applied in accordance with Crown ENG-BUL-10149.

Please let me know if you have any questions.

Thank you,

Keith A. Stackhouse

Keith A. Stackhouse
Structural Construction Manager
LCC Deployment Services

6.2.2 POST INSTALLED MICROPILE VERIFICATION

6.2.3 BASE PLATE GROUT VERIFICATION

6.2.4 CONTRACTOR'S CERTIFIED WELD INSPECTION

Applied Testing Group, LLC
Quality Nondestructive Testing Solutions

11017 Mt. Charron Rd., NW
Huntsville, AL 35810

Phone: (256) 425-8975
daniel.irons11@att.net

December 09, 2014

Mr. Keith Stackhouse
LCC Deployment Services, Inc.
2500 Sylon Boulevard
Hainesport, New Jersey 08036

Subject: ATG Project No. 074-14, Final Examination Report, Monopole Reinforcement and Retrofit Project, Middletown_1, BU# 825983, 90 Industrial Park Road, Middletown, Connecticut 06457

Dear Mr. Stackhouse:

We are pleased to submit two copies of our Final Examination Report for the above referenced project. These services were provided in accordance with our Master Subcontract Agreement dated June 20, 2014. We proceeded with our services based on both your purchase order and email authorization.

SCOPE OF SERVICES

We have reviewed or observed the pre, during, and post welding operations, and accomplished a 100% ultrasonic (UT), 100% magnetic particle, (MT), and 100% visual (VT) examination of the base plate-to-pole shaft circumferential weld, a 100% VT and 50% MT examination of the six new anchor bracket assembly welds, a 100% VT and 50% MT of the six anchor bracket base plate welds, a 100% VT and 50% MT of six fabricated anchor bracket tube-to-plate welds, and a 100% VT and 100% MT of the anchor bracket-to-tower shaft welded connections, to evaluate their conformance with the applicable code requirements, project plans, and specifications.

The following services have not been provided by our firm: surveying for line and grade, cost estimates, review of design and contract documents, tests of material other than structural steel, and professional services not discussed herein.

WELDING, VISUAL MAGNETIC PARTICLE, AND ULTRASONIC OBSERVATIONS

AWS/Certified Welding Inspector and NDE II/III Technician personnel from our office reviewed or observed the pre, during, and post welding operations. We also accomplished a 100% ultrasonic (UT), 100% magnetic particle, (MT), and 100% visual (VT) examination of the base plate-to-pole shaft circumferential weld, a 100% VT and 50% MT examination of the six new anchor bracket assembly welds, a 100% VT and 50% MT of the six anchor bracket base plate welds, a 100% VT and 50% MT of six fabricated anchor bracket tube-to-plate welds, and a 100% VT and 100% MT of the anchor bracket-to-tower shaft welded connections, at the site between September 28, 2014 and December 06, 2014. The plans used were those prepared by Paul J. Ford, Inc., dated August 14, 2013.

WELDING, VISUAL, MAGNETIC PARTICLE, AND ULTRASONIC OBSERVATION RESULTS

The pre, during, and post welding operations, the UT, MT, and VT examinations of the base plate-to-pole shaft circumferential weld, the VT and MT examination of the six new anchor bracket assembly welds, the VT and MT of the six new anchor bracket base plate welds, the VT and MT of six fabricated anchor bracket tube-to-plate welds, and the VT and MT of the anchor bracket-to-tower shaft welded connections, were in conformance with the applicable requirements delineated in ANSI/AWS D 1.1:2010-*Stuctural Steel Code*, and the project plans and specifications, as we understand them. Refer to the appended Visual Observation Report, Welder Certifications, Ultrasonic Calibration Report, Ultrasonic Testing of Welds Report, Magnetic Particle Observation Report, Welding Procedure Specifications, CWI/NDE Certifications, and supporting photographs for particulars.

Discrepancies noted between the plans and specifications or code requirements, and the as-built construction observed in the conduct of the welding and structural steel observations were brought to the attention of the contractor. According to our records, all of the noted discrepancies have been corrected in the field in accordance with the project plans and specifications.

We have endeavored to complete the services identified herein in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality and under similar conditions as this project. No other representation, express or implied, is included or intended, and no warranty or guarantee is included or intended in this agreement, or any report, opinion, document, or other instrument of service.

We are pleased to be of service to you on this project. If you have any questions concerning this report, do not hesitate to contact either of the undersigned.

Very truly yours,

APPLIED TESTING GROUP, LLC.

L. John Harper, CWI/NDE Level II
Senior Staff Technologist

Daniel Irons

Daniel Irons, NDE Level III
Principal

Appended: Visual Observation Reports (1)
Magnetic Particle Observation Report (1)
Ultrasonic Calibration Reports (1)
Ultrasonic Testing of Welds Reports (1)
Welding Procedures (2)
Welder Certification (1)
CWI/NDE Certifications (2)
Photographs (42)

Applied Testing Group, LLC
Quality Nondestructive Testing Solutions

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

MAGNETIC-PARTICLE EXMAINATION REPORT

Client: LCC Deployment Services, Inc. **Project:** Middletown_1 **ATG No:** 074-14
Location: 90 Industrial Park Road, Middletown, CT **Area:** Various Welds (see below) **BU/Site#:** 825983

WELD LOCATION AND IDENTIFICATION SKETCH

Component/Weld Identification	Area Examined		Interpretation		Repairs		Remarks
	Entire	Specific	Accept	Reject	Accept	Reject	
Six new anchor bracket assembly welds - 50%		X	X		N/A	N/A	ACCEPTABLE
One base plate circumferential weld - 100% (all available)	X		X		N/A	N/A	ACCEPTABLE
Six new bearing plate welds – 50%		X	X		N/A	N/A	ACCEPTABLE
Six fabricated anchor bracket tube-to-plate welds – 100%	X		X		N/A	N/A	ACCEPTABLE
Six new anchor bracket-to-tower welds – 100%	X		X		N/A	N/A	ACCEPTABLE

PRE-EXAMINATION:
Surface Preparation: Wire Brush

EQUIPMENT:
Instrument Make: Parker Research Corp. **Model:** DA-400 **Serial No:** 13018
Powder Manufacturer: Parker Research Corp. **Description:** RP6 Red Powder **Batch No:** 17209

METHOD OF INSPECTION:

☒Dry ☐Wet ☒Visible ☐Fluorescent

How Media Applied: Manual Dusting, Magnetic Powder Blower

☐Residual ☒Continuous ☐True-Continuous
☐AC ☒DC ☐Half-Wave
☐Prods ☒Yoke ☐Cable Wrap ☐Other: _____

Direction for Field: ☒ Longitudinal ☐ Circular ☐ Other: _____

Strength of Field: Verified with pie gauge, varying intensity

POST EXAMINATION:
Demagnetizing Technique (if required): N/A
Cleaning (if required): Wipe **Coating Method :** Manual, CRC Zinc.

We, the undersigned, certify that the statements in this record are correct, and that the test welds were prepared and tested in accordance with the requirements of ANSI/AWS D1.1 2010.

Inspector / Level: L. John Harper, CWI/NDE Level II Date: 11/13/2014

Reviewed by: Daniel Irons, NDE Level III Date: 11/13/2014

NOTICE: THIS EXAMINATION REPORT REFLECTS THE ACTUAL NDE PROCEDURE THAT WAS CONDUCTED BY APPLIED TESTING GROUP, LLC PERSONNEL. SUBMISSION OF THIS REPORT IS FOR INFORMATIONAL PURPOSES AND DOES NOT REFLECT ANY GUARANTEE OF THE PART, INSPECTION PROCEDURES, OR STANDARDS AND IS SUBJECT TO THE LIMITATIONS OF EACH TEST METHOD.

Applied Testing Group, LLC

11017 Mt. Charron Rd., NW
Huntsville, Al. 35810
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ULTRASONIC CALIBRATION REPORT

Client: LCC Deployment Services, Inc.			**Project**: Middletown_1			**BU#**: 825983
Location/Area: 90 Industrial Park Road, Middletown, CT			**Component(s)**: Tower-to-Base Plate Weld			
Time In: 11:45 a.m.	**Time Out:** 3:45 p.m.		**Job No.:** ATG-074-14	**PJF Reference #:** 37513-1570		
ITEM:	☒ Weld(s)	☐ Structural	☐ Casting(s)	☐ Pipe(s)	☒ Plate(s)	
	☐ Machinery	☐ Machined Part	☒ Other: Tower-to-Base Plate Weld			
Material:	**Size**	**No. of Pieces**	**Base Metal**	**Process/Filler Metal**	**Weld Condition:**	
Carbon Steel	0.438"	(1)	A572 Gr. 65	E 8018	☒As Welded ☐Ground	
Acceptance Standard: ANSI/AWS D1.1: 2010 Edition			**Procedure**: AWS-UT-1, Rev. 1			
Type of Inspection Method	☒ Soundness	☐Thickness	**UT Equipment Name/Model/Serial No.:** KrautKramer Branson / USK-7 / SER# 27276-3260			
	☒Angle Beam	☐ Bond	**Straight Beam:** **Transducer**: GE Gamma RPH **Size:** .500" Diameter **Frequency**: 2.25 MHz **Serial No.** 022L3D	**Angle Beam:** **Transducer**: GE Gamma **Size:** .375" Diameter **Frequency**: 2.25 MHz **Serial No.** 00P1CV		
	☐ Other:		**Transducer Type:** ☒ Single ☐ Dual ☐ Delay	**Wedge Angle(s):** ☒ 60 Degree S/N W-300 ☒ 70 Degree S/N W-223		
Reference Block : ☒ DSC ☐ IIW ☐ Other :	**Reference Block No.:** 97-8116	**Material:** Carbon Steel	**Calibration Block Type:** DSC **Diameter:** N/A	**Calibration Block No.:** 97-8116	**Material:** C/S - 1.0"	
Screen Size: ☐ 2.5" ☒ 5" ☐ 10" ☐ Other:	**Reference Gain:** 42.0 dB – 60 Degree 46.0 dB – 70Degree	**Scanning Gain:** ☐ +6db ☒ Other: 14dB	**Initial Calibration Time:** 11:45 a.m.	**Calibration Rechecks:** 1) 3:45 pm 2) 3) 4)	**Couplant:** Ultragel II, Batch # 25-004/10125E	
EXAMINATION SUMMARY: Acceptable. See "notes" on UTR-001 for details.						
Examined By: Daniel Irons, Level III D. Irons			**Date**: November 01, 2014			
Reviewed By: L.J. Harper, CWI/Level II			**Date**: November 01, 2014			

AWS QC 1 LLOYD J. HARPER 00030761 CWI

Cal. Sheet No. : UTC - 001
Indication Report No(s). : UTR – 001

Applied Testing Group, LLC
Quality Nondestructive Testing Solutions

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Phone: (256) 425-8975

REPORT OF ULTRASONIC TESTING OF WELDS

Client: : LCC Deployment Services, Inc.	**Project:** Middletown_1	**Job No.:** ATG-075-14	**BU#:** 825983
Location: 90 Industrial Park Road, Middletown, CT	**Area:** Tower-to-Base Plate Weld	**Report No:** UTR-001	

WELD IDENTIFICATION:	Full Penetration Tower-to-Base Plate Circumferential Weld
MATERIAL THICKNESS:	0.478"
WELD JOINT AWS:	T/C
WELDING PROCESS:	SMAW
QUALITY REQUIREMENTS	ANSI/ AWS D1.1: 2010
REMARKS:	All dimensions are expressed in inches.
NOTES:	100% of available surface areas examined

FLAT NO./ LOCATION	INDICATION NUMBER	TRANSDUCER ANGLE	FROM FACE / SURFACE	LEG*	DECIBELS				DISCONTINUITY					ACCEPTABLE	REJECTABLE	REMARKS
					INDICATION LEVEL	REFERENCE LEVEL	ATTENUATION FACTOR	INDICATION RATING	LENGTH	ANGULAR DISTANCE (SOUND PATH)	DEPTH FROM SURFACE "A"	DISTANCE				
					A	B	C	D				FROM X	FROM Y			
100% of available surface area scanned	-	60/ 70	A	-	-	42 46	-	-	-	-	-	-	-	X		ACCEPTABLE

NOTE:

An ultrasonic examination of 100% of the available existing full penetration tower-to-base plate circumferential welded connection was conducted. The subject weld proved to be acceptable in accordance with the applicable acceptance criteria as set forth in ANSI/AWS D1.1: 2010- *Structural Welding Code – Steel,* and the project plans and specifications, as we understand them.

Examined By: Daniel Irons, Level III D. Irons	**Date**: November 01, 2014
Reviewed By: L.J. Harper, CWI/Level II	**Date**: November 01, 2014

AWS D1.1 LLOYD J. HARPER 04050761 CWI

NOTE: We, the above signed, have evaluated the above referenced welded connections, and to the best of our knowledge, state that the information in this report is accurate. This examination report reflects the actual NDE procedure that was conducted by Applied Testing Group, LLC. Submission of this report is for informational purposes and does not reflect any guarantee of the part, inspection procedures, or standards, and is subject to the limitations of each test method.

Applied Testing Group, LLC

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VISUAL OBSERVATION REPORT

Client: : LCC Deployment Services, Inc.		**Project:** Middletown_1	**Site#:** 825983
Project Location: 90 Industrial Park Road, Middletown, CT		**ATG Technician:** L. Harper	**Date:** 12-03-14
Time In: 11:30 a.m.	**Time Out**: 5:30 p.m.	**Job No:** ATG-074-14	**PJF Ref. #:** 37513-1570

FIELD OBSERVATIONS

☒	**New Anchor Bracket Connections:**	Location	Acceptable
	Installation of six new anchor bracket assembly-to-pole shaft and base plate	Plate Size	Acceptable
	welded connections at the base elevation.	Welds Correct Size	Acceptable
		Welds Correct Length	Acceptable
	☒ Acceptable ☐ Unacceptable ☒ See note: 1		
☒	**Fabricated Anchor Bracket Connections:**	Location	Acceptable
	Installation of six anchor tube-to-steel plate welds at the base elevation.	Plate Size	Acceptable
		Welds Correct Size	Acceptable
		Welds Correct Length	Acceptable
	☒ Acceptable ☐ Unacceptable ☒ See note: 2		
☒	**Base Plate-to-Pole Shaft Circumferential Welded Connection:**	Beams Correct Size	Acceptable
	Installation of existing base plate-to-pole shaft circumferential weld at the base	Locations / Orientation	Acceptable
	elevation.	Welds Correct Size	Acceptable
		Welds Correct Length	Acceptable
	☒ Acceptable ☐ Unacceptable ☒ See note: 3		
☐	**Bridge Stiffener Welded Connections:**	Location	
		Plate Size	
		Welds Correct Size	
		Welds Correct Length	
	☐ Acceptable ☐ Unacceptable ☐ See note:		
☒	**Steel Plate-to-Pole Shaft Welded Connections:**	Location	Acceptable
	Installation of six new anchor bracket-to-pole shaft top welded connections at the	Plate Size	Acceptable
	base elevation (changed from original design).	Welds Correct Size	Acceptable
		Welds Correct Length	Acceptable
	☒ Acceptable ☐ Unacceptable ☒ See note: 4		
☐	**New Reinforcing Plate-to-Pole Shaft Welded Connections:**	Location	
		Plate Size	
		Welds Correct Size	
		Welds Correct Length	
	☐ Acceptable ☐ Unacceptable ☐ See note:		
☒	**Other:**		
	The pre, during, and post welding operations were observed to be acceptable in accordance with the applicable		
	requirements delineated in ANSI/AWS D1.1:2010.		
	☒ Acceptable ☐ Unacceptable		

Applied Testing Group, LLC

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

Project: Middletown_1	Site #: 825983	Job No: ATG-074-14	Date: 12-03-14
REMARKS AND/OR DISCREPANCIES:			

Notes:

On December 03, 2013, Applied Testing Group LLC, performed a visual examination of the installation of six new anchor bracket assembly-to-pole shaft, six anchor tube-to-steel plate, one existing pole shaft-to-base plate circumferential, and six new bearing plate-to-pole shaft welded connections, located at 90 Industrial Park Road, Middletown, CT. The pre, during, and post welding operations were noted to be acceptable in accordance with the applicable requirements delineated in ANSI/AWS D1.1:2010.

The following were examined:

1) Installation of six new anchor bracket assembly-to-pole shaft welded connections at the base elevation.
2) Installation of six anchor tube-to-steel plate welds at the base elevation.
3) Installation of one existing base plate-to-pole shaft circumferential weld at the base elevation.
4) Installation of six new bearing plate-to-pole shaft welded connections at the base elevation.

The welds were acceptable in accordance with ANSI/AWS D1.1:2010 and the project plans/specifications. Cold galvanizing paint has been acceptably applied to all exterior locations.

PLANS USED:

Title(s): Paul J. Ford	Date: 08-14-13	As-Built Date:	N/A
Drawing No(s): T1, S1 to S8			
Visit Requested by: Keith Stackhouse	Title: Project Coordinator – : LCC Deployment Services, Inc.		

Examined By: L. John Harper, AWS/CWI-NDE Level II	Date: December 03, 2014
Reviewed By: Daniel Irons, NDE Level III D. Irons	Date: December 03, 2014

AWS QC 1 LLOYD J. HARPER 04050761 CWI

NOTE: We, the above signed, have evaluated the above referenced welded connections, and to the best of our knowledge, state that the information in this report is accurate. This examination report reflects the actual NDE procedure that was conducted by Applied Testing Group, LLC. Submission of this report is for informational purposes and does not reflect any guarantee of the part, inspection procedures, or standards, and is subject to the limitations of each test method.

Applied Testing Group, LLC
Quality Nondestructive Testing Solutions

11017 Mt. Charron Rd., NW
Huntsville, AL 35810

Phone: (256) 425-8975
daniel.irons11@att.net

December 22, 2014

Mr. Keith Stackhouse
LCC Deployment Services, Inc.
2500 Sylon Boulevard
Hainesport, New Jersey 08036

Subject: ATG Project No. 074-14, Final Examination Report, Monopole Reinforcement and Retrofit Project, Middletown_1, BU# 825983, 90 Industrial Park Road, Middletown, Connecticut 06457

Dear Mr. Stackhouse:

We are pleased to submit two copies of our Final Examination Report for the above referenced project. These services were provided in accordance with our Master Subcontract Agreement dated June 20, 2014. We proceeded with our services based on both your purchase order and email authorization.

SCOPE OF SERVICES

We have reviewed or observed the pre, during, and post welding operations and accomplished a 100% magnetic particle, (MT) and 100% visual (VT) examination of the six new flat bar welded connections at approximately the 38' and 88' elevations, to evaluate their conformance with the applicable code requirements, project plans, and specifications.

The following services have not been provided by our firm: surveying for line and grade, cost estimates, review of design and contract documents, tests of material other than structural steel, and professional services not discussed herein.

WELDING, VISUAL, AND MAGNETIC PARTICLE OBSERVATIONS

AWS/Certified Welding Inspector and NDE II/III Technician personnel from our office reviewed or observed the pre, during, and post welding operations. We also accomplished a 100% magnetic particle, (MT), and 100% visual (VT) examination of the six new flat bar welded connections at approximately the 38' and 83' elevations, at the site between December 15, 2014 and December 22, 2014. The plans used were those prepared by Paul J. Ford, Inc., dated August 14, 2013.

WELDING, VISUAL, AND MAGNETIC PARTICLE OBSERVATION RESULTS

The pre, during, and post welding operations, and the MT and VT examination of the six new flat bar welded connections, were in conformance with the applicable requirements delineated in ANSI/AWS D 1.1:2010-*Stuctural Steel Code*, and the project plans and specifications, as we understand them. Refer to the appended Visual Observation Report, Welder Certifications, Magnetic Particle Observation Report, Welding Procedure Specifications, CWI/NDE Certifications, and supporting photographs for particulars.

Discrepancies noted between the plans and specifications or code requirements, and the as-built construction observed in the conduct of the welding and structural steel observations were brought to the attention of the contractor. According to our records, all of the noted discrepancies have been corrected in the field in accordance with the project plans and specifications.

We have endeavored to complete the services identified herein in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality and under similar conditions as this project. No other representation, express or implied, is included or intended, and no warranty or guarantee is included or intended in this agreement, or any report, opinion, document, or other instrument of service.

We are pleased to be of service to you on this project. If you have any questions concerning this report, do not hesitate to contact either of the undersigned.

Very truly yours,

APPLIED TESTING GROUP, LLC.

L. John Harper, CWI/NDE Level II
Senior Staff Technologist

Daniel Irons

Daniel Irons, NDE Level III
Principal

Appended: Visual Observation Report (1)
Magnetic Particle Observation Report (1)
Welding Procedures (2)
Welder Certification (1)
CWI/NDE Certifications (2)
Photographs (13)

Applied Testing Group, LLC
Quality Nondestructive Testing Solutions

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

MAGNETIC-PARTICLE EXMAINATION REPORT

Client: LCC Deployment Services, Inc. **Project:** Middletown_1 **ATG No:** 074-14
Location: 90 Industrial Park Road, Middletown, CT **Area:** Various Welds (see below) **BU/Site#:** 825983

WELD LOCATION AND IDENTIFICATION SKETCH

Component/Weld Identification	Area Examined		Interpretation		Repairs		Remarks
	Entire	Specific	Accept	Reject	Accept	Reject	
Six new flat plate reinforcing welds at approximately the 38' and 88' elevations.		X	X		N/A	N/A	ACCEPTABLE

PRE-EXAMINATION:
Surface Preparation: Wire Brush

EQUIPMENT:
Instrument Make: Parker Research Corp. **Model:** DA-400 **Serial No:** 13018
Powder Manufacturer: Parker Research Corp. **Description:** RP6 Red Powder **Batch No:** 17209

METHOD OF INSPECTION:

☒Dry ☐Wet ☒Visible ☐Fluorescent

How Media Applied: Manual Dusting, Magnetic Powder Blower

☐Residual ☒Continuous ☐True-Continuous
☐AC ☒DC ☐Half-Wave
☐Prods ☒Yoke ☐Cable Wrap ☐Other: _____

Direction for Field: ☒ Longitudinal ☐ Circular ☐ Other: _____

Strength of Field: Verified with pie gauge, varying intensity

POST EXAMINATION:
Demagnetizing Technique (if required): N/A
Cleaning (if required): Wipe **Coating Method :** Manual, CRC Zinc.

We, the undersigned, certify that the statements in this record are correct, and that the test welds were prepared and tested in accordance with the requirements of ANSI/AWS D1.1 2010.

Inspector / Level: L. John Harper, CWI/NDE Level II Date: 12/22/2014

Reviewed by: Daniel Irons, NDE Level III Date: 12/22/2014

AWS QC 1 DAVID J. HARPER 04050761 CWI

NOTICE: THIS EXAMINATION REPORT REFLECTS THE ACTUAL NDE PROCEDURE THAT WAS CONDUCTED BY APPLIED TESTING GROUP, LLC PERSONNEL. SUBMISSION OF THIS REPORT IS FOR INFORMATIONAL PURPOSES AND DOES NOT REFLECT ANY GUARANTEE OF THE PART, INSPECTION PROCEDURES, OR STANDARDS AND IS SUBJECT TO THE LIMITATIONS OF EACH TEST METHOD.

Applied Testing Group, LLC

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Phone: (256) 425-8975

VISUAL OBSERVATION REPORT

Client: : LCC Deployment Services, Inc.		**Project:** Middletown_1	**Site#:** 825983
Project Location: 90 Industrial Park Road, Middletown, CT		**ATG Technician:** L. Harper	**Date:** 12-22-14
Time In: 9:30 a.m.	**Time Out**: 1:30 p.m.	**Job No:** ATG-074-14	**PJF Ref. #:** 37513-1570

FIELD OBSERVATIONS

☐	**New Anchor Bracket Connections:**	Location	
		Plate Size	
		Welds Correct Size	
		Welds Correct Length	
	☐ Acceptable ☐ Unacceptable ☐ See note:		
☐	**Fabricated Anchor Bracket Connections:**	Location	
		Plate Size	
		Welds Correct Size	
		Welds Correct Length	
	☐ Acceptable ☐ Unacceptable ☐ See note:		
☐	**Base Plate-to-Pole Shaft Circumferential Welded Connection:**	Beams Correct Size	
		Locations / Orientation	
		Welds Correct Size	
		Welds Correct Length	
	☐ Acceptable ☐ Unacceptable ☐ See note:		
☐	**Bridge Stiffener Welded Connections:**	Location	
		Plate Size	
		Welds Correct Size	
		Welds Correct Length	
	☐ Acceptable ☐ Unacceptable ☐ See note:		
☒	**New Reinforcing Plate-to-Pole Shaft Welded Connections:**	Location	Acceptable
	Installation of six new reinforcing plate-to-pole shaft welded connections at	Plate Size	Acceptable
	approximately the 38' and 88' elevations.	Welds Correct Size	Acceptable
		Welds Correct Length	Acceptable
	☒ Acceptable ☐ Unacceptable ☒ See note: 1		
☐	**Steel Plate-to-Pole Shaft Welded Connections:**	Location	
		Plate Size	
		Welds Correct Size	
		Welds Correct Length	
	☐ Acceptable ☐ Unacceptable ☐ See note:		
☒	**Other:**		
	The pre, during, and post welding operations were observed to be acceptable in accordance with the applicable		
	requirements delineated in ANSI/AWS D1.1:2010.		
	☒ Acceptable ☐ Unacceptable		

Applied Testing Group, LLC

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

Project: Middletown_1	Site #: 825983	Job No: ATG-074-14	Date: 12-22-14
REMARKS AND/OR DISCREPANCIES:			

Notes:

On December 22, 2013, Applied Testing Group LLC, performed a visual examination of six new reinforcing plate-to-pole shaft welded connections, located at 90 Industrial Park Road, Middletown, CT. The pre, during, and post welding operations were noted to be acceptable in accordance with the applicable requirements delineated in ANSI/AWS D1.1:2010.

The following were examined:

1) Installation of six new six new reinforcing plate-to-pole shaft welded connections at approximately the 38' and 88' elevations.

The welds were acceptable in accordance with ANSI/AWS D1.1:2010 and the project plans/specifications. Cold galvanizing paint has been acceptably applied to all exterior locations.

PLANS USED:

Title(s): Paul J. Ford	Date: 08-14-13	As-Built Date:	N/A
Drawing No(s): T1, S1 to S8			
Visit Requested by: Keith Stackhouse	Title: Project Coordinator – : LCC Deployment Services, Inc.		

Examined By: L. John Harper, AWS/CWI-NDE Level II	**Date:** December 22, 2014
Reviewed By: Daniel Irons, NDE Level III D. Irons	**Date:** December 22, 2014

AWS QC 1 LLOYD J. HARPER 04050761 CWI

NOTE: We, the above signed, have evaluated the above referenced welded connections, and to the best of our knowledge, state that the information on this record is accurate. This examination report reflects the actual NDE procedure that was conducted by Applied Testing Group, LLC. Submission of this report is for informational purposes and does not reflect any guarantee of the part, inspection procedures, or standards, and is subject to the limitations of each test method.

WELDER, WELDING OPERATOR OR TACK WELDER QUALIFICATION TEST RECORD

Type of Process SMAW
Name Turner, Tarry Identification No. 3241
Welding Procedure Specification No. 031 Rev 0 Date 11/16/2013

Variable	Record Actual Values Used in Qualification	Qualification Range
Process/Type	SMAW	
Electrode (single or multiple)	Single	
Current/Polarity	DCEP	
Position	3-G	
Weld Progression	Vertical-Up	
Backing (YES or NO)	Yes ASTM A-148-73	
Material/Spec.	ASTM A-148-73 to ASTM A-148-73	
Base Metal		
Thickness: (Plate)	1"	1/8" To Unlimited
Groove		
Fillet		
Thickness: (Pipe/tube)	N/A	
Groove	N/A	
Fillet		
Diameter: (Pipe)	N/A	
Groove	N/A	
Fillet		
Filler Metal		
Spec. No.	ANSI/AWS A5-1	
Class	E11018	
F-No.	F-4	
Gas/Flux Type	N/A	
Other		

AWS QC 1 MARVIN L. TYLER 94070891 CWI

Marvin L. Tyler

VISUAL INSPECTION
Acceptable YES or NO YES

Guided Bend Test Results

Type	Result	Type	Result
Side Bend (2)	Satisfactory		

FILLET TEST RESULTS

Appearance N/A
Fracture Test Root Penetration N/A
(Describe the location, nature, and size of any crack or tearing of the specimen)

Fillet Size N/A
Macroetch N/A

Inspected by Marvin L. Tyler (AWS-CWI) #94070891
Organization TYLER ASSOCIATES, INC.

Test Number 014
Date 11/16/2013

RADIOGRAPHIC TEST RESULTS

Film Identification Number	Result	Remarks	Film Identification Number	Result	Remarks
RADIOGRAPHIC TEST N/A					

Interpreted by
Organization

Test Number
Date

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of section 4, Part C of ANSI/AWS D1.1 Structural Welding Code-Steel 2010 Ed.

Manufacturer or contractor: Tyler Welding Lab, 110 Fairchild Downs Place, Cary, NC 27518 (919) 367-6872 tyweld@juno.com
Authorized by: Marvin Tyler (Welding Engineer & AWS QC-1 CWI) Certified Welding Inspector
Date 11/16/2013

WELDER, WELDING OPERATOR OR TACK WELDER QUALIFICATION TEST RECORD

Type of Process SMAW
Name Turner, Tarry Identification No. 3245
Welding Procedure Specification No. 031 Rev 0 Date 11/16/2013

Variable	Record Actual Values Used in Qualification	Qualification Range
Process/Type	SMAW	
Electrode (single or multiple)	Single	
Current/Polarity	DCEP	
Position	4-G	
Weld Progression	N/A	
Backing (YES or NO)	Yes ASTM A-148-73	
Material/Spec.	ASTM A-148-73 to ASTM A-148-73	
Base Metal		
Thickness: (Plate)	1"	1/8" To Unlimited
Groove		
Fillet		
Thickness: (Pipe/tube)	N/A	
Groove	N/A	
Fillet		
Diameter: (Pipe)	N/A	
Groove	N/A	
Fillet		
Filler Metal		
Spec. No.	ANSI/AWS A5-1	
Class	E11018	
F-No.	F-4	
Gas/Flux Type	N/A	
Other		

AWS QC 1 MARVIN L TYLER 94070891 CWI

Marvin L. Tyler

VISUAL INSPECTION
Acceptable YES or NO YES

Guided Bend Test Results

Type	Result	Type	Result
Side Bend (2)	Satisfactory		

FILLET TEST RESULTS

Appearance N/A
Fracture Test Root Penetration N/A
(Describe the location, nature, and size of any crack or tearing of the specimen)
Fillet Size N/A
Macroetch N/A

Inspected by Marvin L. Tyler (AWS-CWI) #94070891
Organization TYLER ASSOCIATES, INC.
Test Number 019
Date 11/16/2013

RADIOGRAPHIC TEST RESULTS

Film Identification Number	Result	Remarks	Film Identification Number	Result	Remarks
RADIOGRAPHIC TEST N/A					

Interpreted by
Organization
Test Number
Date

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of section 4, Part C of ANSI/AWS D1.1 Structural Welding Code-Steel 2010 Ed.

Manufacturer or contractor: Tyler Welding Lab, 110 Fairchild Downs Place, Cary, NC 27518 (919) 367-6872 tyweld@juno.com
Authorized by: Marvin Tyler (Welding Engineer & AWS QC-1 CWI) Certified Welding Inspector
Date 11/16/2013

AWS
Welder and Welding Operator Qualification Test Record

Welder or operator's name Ervin Moore Identification no. 231-72-5884
Welding process SMAW Manual X Semiautomatic Machine
Position F4 Overhead
(flat, horizontal, overhead or vertical--if vertical, state whether upward or downward)
In accordance with procedure specification AWS D1.1 Pre qualified Telcom-SM1
Material specification ASTM A36
Diameter and wall thickness (if pipe) - otherwise, joint thickness 1/2"in. Plate
Thickness range this qualifies 1/8- Unlimited.

FILLER METAL

Specification no. AWS 5.1 Classification E7018 F no. F4
Describe filler metal (if not covered by AWS specification)
Is backing strip used? N/A
Filler metal diameter and trade name 1/8"Lincoln Flux for submerged arc or gas for gas metal arc or flux cored arc welding N/A

VISUAL INSPECTION (9.25.1)

Appearance Good Undercut None Piping porosity None

Guided Bent Test Results

Type	Result	Type	Result

Test conducted by laboratory test no
per Test date

Fillet Test Results

Appearance Acceptable Fillet size 5/16" inch
Fracture test root penetration Acceptable Marcoeth Acceptable
(describe the location, nature, and size of any crack or tearing of the specimen.)
Test conducted by D. Preston CWI Laboratory test no. 5884 - oh
per AWS D1.1 2000 4.25 Test date 5/9/07

RADIOGRAPHIC TEST RESULTS

Film identification	Results	Remarks	Film identification	Results	Remarks

Test witnessed by Test no.
per

We, the undersigned, certify that the statements in this record are correct and that the welds were prepared and tested in accordance with the requirements of 5C or D of AWS D1.1 (2000) Structural Welding Code.
year

Dale Preston AWS CWI

AWS QC 1 DALE W. PRESTON 05041051 CWI

Manufacturer or Contractor Telecommunications Contracting Co.
Authorized by T. Roberts.
Date 5/9/07

AWS
Welder and Welding Operator Qualification Test Record

Welder or operator's name Ervin Moore Identification no. 231-72-5884
Welding process SMAW Manual X Semiautomatic Machine
Position F3 Vertical Up
(flat, horizontal, overhead or vertical--if vertical, state whether upward or downward)
In accordance with procedure specification AWS D1.1 Pre qualified Telcom-SM1
Material specification ASTM A36
Diameter and wall thickness (if pipe) - otherwise, joint thickness 1/2"in. Plate
Thickness range this qualifies 1/8- Unlimited.

FILLER METAL

Specification no. AWS 5.1 Classification E7018 F no. F4
Describe filler metal (if not covered by AWS specification)
Is backing strip used? N/A
Filler metal diameter and trade name 1/8"Lincoln Flux for submerged arc or gas for gas metal arc or flux cored arc welding N/A

VISUAL INSPECTION (9.25.1)

Appearance Good Undercut None Piping porosity None

Guided Bent Test Results

Type	Result	Type	Result

Test conducted by laboratory test no
per Test date

Fillet Test Results

Appearance Acceptable Fillet size 5/16" inch
Fracture test root penetration Acceptable Marcoeth Acceptable
(describe the location, nature, and size of any crack or tearing of the specimen.)
Test conducted by D. Preston CWI Laboratory test no. 5884
per AWS D1.1 2000 4.25 Test date 5/9/07

RADIOGRAPHIC TEST RESULTS

Film identification	Results	Remarks	Film identification	Results	Remarks

Test witnessed by Test no.
per
We, the undersigned, certify that the statements in this record are correct and that the welds were prepared and tested in accordance with the requirements of 5C or D of AWS D1.1 (2000) Structural Welding Code.
year

Dale Preston AWS CWI

AWS QC 1 DALE W. PRESTON 85041051 CWI

Manufacturer or Contractor Telecommunications Contracting Co.
Authorized by T. Roberts.
Date 5/9/07

RAMBALL TESTLAB, INC.

1703 INDUSTRIAL HIGHWAY - UNIT 3
CINNAMINSON, NJ 08077-2546
PHONE: (856) 786-8880 FAX: (856) 786-3144

LABORATORY REPORT

Submitted to:
Telecommunications Contracting
2242 Old Marlton Pike
Marlton NJ 08053
ATTN: Tom Roberts

1/7/2013

P.O. Number: Verbal T. Roberts
Lab Number: 333149

Item: 1" Thick Weld Test Plate
Material: A514 to A572 Gr.65
Heat Number: 88778 to 88776
Welder: Erv Moore
Filler Metal: E8018
Weld Process: SMAW
Weld Position: 4G
PQR: 25.PQR.TccI.D.1-A5.5

VISUAL INSPECTION

Test Specification: AWS D1.1
Disposition: Acceptable

RADIOGRAPHIC INSPECTION

Acceptance Specification: AWS D1.1

QUANTITY TESTED	QUANTITY ACCEPTED	QUANTITY REJECTED
1	1	0

Tested By: Donahue, B. Level II

Joel Muzik
Quality Manager

RAMBALL TESTLAB, INC.

1703 INDUSTRIAL HIGHWAY - UNIT 3
CINNAMINSON, NJ 08077-2546
PHONE: (856) 786-8880 FAX: (856) 786-3144

LABORATORY REPORT

Submitted to:
Telecommunications Contracting
2242 Old Marlton Pike
Marlton NJ 08053
ATTN: Tom Roberts

1/7/2013

P.O. Number: Verbal T. Roberts
Lab Number: 333151
Page 1 of 1

Item: 1" Thick Weld Test Plate
Material: A514 to A572 Gr.65
Heat Number: 88778 to 88776
Welder: Erv Moore
Filler Metal: E8018
Weld Process: SMAW
Weld Position: 3G
PQR: 25.PQR.TccI.D.1-A5.5

VISUAL INSPECTION

Test Specification: AWS D1.1
Disposition: Acceptable

RADIOGRAPHIC INSPECTION

Acceptance Specification: AWS D1.1

QUANTITY TESTED	QUANTITY ACCEPTED	QUANTITY REJECTED
1	1	0

Tested By: Donahue, B. Level II

Joel Muzik
Quality Manager

RAMBALL TESTLAB, INC.
1703 INDUSTRIAL HIGHWAY - UNIT 3
CINNAMINSON, NJ 08077-2546
PHONE: (856) 786-8880 FAX: (856) 786-3144

LABORATORY REPORT

Submitted to:
Telecommunications Contracting
2242 Old Marlton Pike
Marlton NJ 08053
ATTN:

11/2/2012

P.O. Number: Verbal Tom Roberts
Lab Number: 332318
Page 1 of 1

Item: 1" Thick Weld Test Plate
Material: Grade B
Material Specification: ASTM A514
Filler Material: E11018-M, AWS A5.5
Position: 3G Vertical
Process: SMAW
Welder: Erv Moore
PQR Number: 25.PQR.TccI.D.1-A5.5
Note: Visual Inspection Required. State Visual acceptance per AWS D1.1

VISUAL INSPECTION

Test Specification: AWS D1.1
Disposition: Acceptable

RADIOGRAPHIC INSPECTION

Test Specification: AWS D1.1

QUANTITY TESTED	QUANTITY ACCEPTED	QUANTITY REJECTED
1	1	0

Disposition: Acceptable

Tested By:Donahue, B. Level II

Joel Muzik
Quality Manager

RAMBALL TESTLAB, INC.
1703 INDUSTRIAL HIGHWAY - UNIT 3
CINNAMINSON, NJ 08077-2546
PHONE: (856) 786-8880 FAX: (856) 786-3144

LABORATORY REPORT

Submitted to:
Telecommunications Contracting
2242 Old Marlton Pike
Marlton NJ 08053
ATTN:

11/2/2012

P.O. Number: Verbal Tom
Lab Number: 332319
Page 1 of 1

Item: 1" Thick Weld Test Plate
Material: Grade B
Material Specification: ASTM A514
Filler Material: E11018-M, AWS A5.5
Position: 3G Vertical
Process: SMAW
Welder: Erv Moore
PQR Number: 25.PQR.TccI.D.1-A5.5

WELD PROCEDURE QUALIFICATION TEST

IAW AWS D1.1

TRANSVERSE TENSILE TEST

Required Stress, ksi: 110-130 minimum/maximum

	SPECIMEN #1	SPECIMEN #2
WIDTH (inches):	0.754	0.755
THICKNESS (inches):	0.930	0.975
AREA (sq. inches):	0.701	0.736
ULTIMATE LOAD (lbs):	79,816	82,757
ULTIMATE STRESS (ksi):	114	112
LOCATION OF FRACTURE:	Weld	Weld
CHARACTER OF FAILURE:	Ductile	Ductile
DISPOSITION:	Acceptable	Acceptable

GUIDED BEND TEST

Bend Diameter: 2-1/2" Bend Angle: 180 Degrees

	SPECIMEN #1	SPECIMEN #2	SPECIMEN #3	SPECIMEN #4
TYPE:	Side	Side	Side	Side
DEFECTS:	Absent	Absent	Absent	Absent
DISPOSITION:	Acceptable	Acceptable	Acceptable	Acceptable

Joel Muzik
Quality Manager

AWS
Welder and Welding Operator Qualification Test Record

Welder or operator's name Ervin Moore Identification no. 231-72-5884
Welding process SMAW Manual X Semiautomatic Machine
Position F4 Overhead
(flat, horizontal, overhead or vertical--if vertical, state whether upward or downward)
In accordance with procedure specification AWS D1.1 Pre qualified Telcom-SM1
Material specification ASTM A36
Diameter and wall thickness (if pipe) - otherwise, joint thickness 1/2"in. Plate
Thickness range this qualifies 1/8- Unlimited.

FILLER METAL

Specification no. AWS 5.1 Classification E7018 F no. F4
Describe filler metal (if not covered by AWS specification)
Is backing strip used? N/A
Filler metal diameter and trade name 1/8"Lincoln Flux for submerged arc or gas for gas metal arc or flux cored arc welding N/A

VISUAL INSPECTION (9.25.1)

Appearance Good Undercut None Piping porosity None

Guided Bent Test Results

Type	Result	Type	Result

Test conducted by . laboratory test no
per Test date

Fillet Test Results

Appearance Acceptable Fillet size 5/16" inch
Fracture test root penetration Acceptable Marcoeth Acceptable
(describe the location, nature, and size of any crack or tearing of the specimen.)
Test conducted by D. Preston CWI Laboratory test no. 5884 - oh
per AWS D1.1 2000 4.25 Test date 5/9/07

RADIOGRAPHIC TEST RESULTS

Film identification	Results	Remarks	Film identification	Results	Remarks

Test witnessed by Test no.
per

We, the undersigned, certify that the statements in this record are correct and that the welds were prepared and tested in accordance with the requirements of 5C or D of AWS D1.1 (2000) Structural Welding Code.
year

Dale Preston AWS CWI

AWS QC 1 DALE W. PRESTON 05041051 CWI

Manufacturer or Contractor Telecommunications Contracting Co.
Authorized by T. Roberts.
Date 5/9/07

RAMBALL TESTLAB, INC.
1703 INDUSTRIAL HIGHWAY - UNIT 3
CINNAMINSON, NJ 08077-2546
PHONE: (856) 786-8880 FAX: (856) 786-3144

LABORATORY REPORT

Submitted to:
Telecommunications Contracting
2242 Old Marlton Pike
Marlton NJ 08053
ATTN:

11/2/2012

P.O. Number: Verbal Tom Roberts
Lab Number: 332320
Page 1 of 1

Item: 1" Thick Weld Test Plate
Material: Grade B
Material Specification: ASTM A514
Filler Material: E11018-M, AWS A5.5
Position: 4G
Process: SMAW
Welder: Erv Moore
PQR Number: 25.PQR.TccI.D.1-A5.5
Note: Visual Inspection Required. State Visual acceptance per AWS D1.1

VISUAL INSPECTION

Test Specification: AWS D1.1

Disposition: Acceptable

RADIOGRAPHIC INSPECTION

Test Specification: AWS D1.1

QUANTITY TESTED	QUANTITY ACCEPTED	QUANTITY REJECTED
1	1	0

Disposition: Acceptable

Tested By: Donahue, B. Level II

Joel Muzik
Quality Manager

RAMBALL TESTLAB, INC.
1703 INDUSTRIAL HIGHWAY - UNIT 3
CINNAMINSON, NJ 08077-2546
PHONE: (856) 786-8880 FAX: (856) 786-3144

LABORATORY REPORT

11/2/2012

Submitted to:
Telecommunications Contracting
2242 Old Marlton Pike
Marlton NJ 08053
ATTN:

P.O. Number: Verbal Tom
Lab Number: 332321
Page 1 of 1

Item: ." Thick Weld Test Plate
Material: Grade B
Material Specification: ASTM A514
Filler Material: E11018-M, AWS A5.5
Position: 4G Overhead
Process: SMAW
Welder: Erv Moore
PQR Number: 25.PQR.TccI.D.1-A5.5

WELD PROCEDURE QUALIFICATION TEST

IAW AWS D1.1

TRANSVERSE TENSILE TEST

Required Stress, ksi: 110-130 minimum/maximum

	SPECIMEN #1	SPECIMEN #2
WIDTH (inches):	0.752	0.749
THICKNESS (inches):	0.920	0.850
AREA (sq. inches):	0.692	0.637
ULTIMATE LOAD (lbs):	77,723	70,678
ULTIMATE STRESS (ksi):	112	111
LOCATION OF FRACTURE:	Weld	Weld
CHARACTER OF FAILURE:	Ductile	Ductile
DISPOSITION:	Acceptable	Acceptable

GUIDED BEND TEST

Bend Diameter: 2-1/2" Bend Angle: 180 Degrees

	SPECIMEN #1	SPECIMEN #2	SPECIMEN #3	SPECIMEN #4
TYPE:	Side	Side	Side	Side
DEFECTS:	Absent	Absent	Absent	Absent
DISPOSITION:	Acceptable	Acceptable	Acceptable	Acceptable

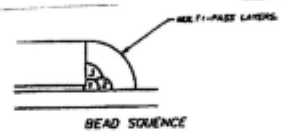
Joel Muzik
Quality Manager

We certify that the above results are correct as contained in the records of this company. This report shall not be reproduced, except in full, without the permission of Ramball Testlab, Inc. Testing is performed in accordance with the appropriate method identified in the above listed product or material specification. The method of testing is performed in accordance with the current revision at the time of test, unless otherwise specified. The recording of false, fictitious or fraudulent statements or entries on this document may be punishable under federal statutes including Federal Law, Title 18, Chapter 47. We are an ISO 17025 Accredited Laboratory, by multiple agencies. Testing and or inspections were performed in accordance with Ramball Testlab Quality Manual Rev. 12. A2LA Certificate Number: 142.01. During test and inspections this product did not come in direct contact with mercury or any of its compounds, nor with any mercury-containing device employing a single boundary of containment.

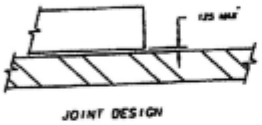
Telecommunications Contracting Co., Inc.
Prequalified Welding Procedure Specification

Sketch A

Sketch B



Sketch C



MEMO

1. Paint will be abated by others prior to welding.
2. All welds will be welded vertically.
3. Welds to be cleaned free of slag.
4. All welds after cleaning will be brushed with (2) coats of ZRC Galvilite primer.
5. Finish coat to match existing.

Telecommunications Contracting Co., Inc.

Welding Procedure Specification

WPS No. 6 TCCI - D1.1 - All Fillets Revision 0 Date _____ By _____

Authorized By Tom Roberts Date 11/10/09 Prequalified ☒

Welding Process(es) SMAW _____ Type: Manual ☒ Machine ☐ Semi-Auto ☐ Auto ☐

Supporting PQR(s) N/A PreQualified _____

JOINT

Type Lapped/Inside Corner 1/8" to 5/8" Fillet Welds

Backing Yes ☒ No ☒ Single Weld ☒ Double Weld ☐

Backing Material A572

Root Opening 0 Root Face Dimension 0

Groove Angle 0 Radius (J-U) 0

Back Gouge Yes ☒ No ☒

Method N/A

Prequalifed Joint Parameters:

See Page 2

BASE METALS

Material Spec. A572 to Per Table 3.1

Type or Grade Any Group II to Any Group II or III

Thickness: Groove (in) N/A -

Fillet (in) Various -

Diameter (Pipe, in) N/A -

FILLER METALS

AWS Specification AWS A5.1

AWS Classification E7018

SHIELDING

Flux N/A

Electrode-Flux (Class) N/A

Gas -

Composition -

Flow Rate -

Gas Cup Size -

PREHEAT

Preheat Temp., Min. Per AWS Table 3.2 Category B

Thickness	Temperature
Up to 3/4"	< 32 F - 70 F
Over 3/4" to 1-1/2"	50 F
Over 1-1/2" to 2-1/2"	150 F
Over 2-1/2"	225 F

Interpass Temp., Min. _____ Max. _____

POSITION

Position of Groove N/A Fillet Vertical Up

Vertical Progression: ☒ Up ☐ Down

ELECTRICAL CHARACTERISTICS

Transfer Mode (GMAW):

Short-Circuiting ☐ Globular ☐ Spray ☐

Current: AC ☐ DCEP ☒ DCEN ☐ Pulsed ☐

Other _____

Tungsten Electrode (GTAW):

Size N/A Type -

TECHNIQUE

Stringer or Weave Bead Stringer

Multi-pass or Single Pass (per side) Multi-pass

Number of Electrodes 1

Electrode Spacing: Longitudinal N/A

Lateral N/A

Angle N/A

Contact Tube to Work Distance N/A

Peening None

Interpass Cleaning Wire Brush, Chip, or Grind

POSTWELD HEAT TREATMENT PWHT Required ☐

Temp. N/A Time N/A

WELDING PROCEDURE

Layer/Pass	Process	Filler Metal Class	Diameter	Cur. Type	Amps or WFS	Volts	Travel Speed	Other Notes
1-n	SMAW	E7018	1/8"	DCEP	75 - 130	18-26	6 - 10 ipm	

Telecommunications Contracting Co., Inc.

Welding Procedure Specification

WPS No. 010 TCCI - D1.1 - BU4a Revision 0 Date 11/12/09 By Michael whelan

Authorized By Tom Roberts Date 11/13/09 Prequalified ■

Welding Process(es) SMAW Type: Manual ■ Machine ☐ Semi-Auto ☐ Auto ☐

Supporting PQR(s) N/A PreQualified

JOINT

Type B-U4a Single Bevel Groove

Backing Yes ■ No ☐ Single Weld ■ Double Weld ☐

Backing Material A572

Root Opening 1/4" Root Face Dimension 0

Groove Angle 45 Radius (J-U) N/A

Back Gouge Yes ☒ No ■

Method

Prequalifed Joint Parameters:

See Page 2

BASE METALS

Material Spec. A572 to A572

Type or Grade 50 to 50

Thickness: Groove (in) 1" -

Fillet (in) -

Diameter (Pipe, in) N/A -

FILLER METALS

AWS Specification AWS A5.5

AWS Classification E8018-C3

POSITION

Position of Groove Horizontal Fillet Horizontal

Vertical Progression: ■ Up ☐ Down

ELECTRICAL CHARACTERISTICS

Transfer Mode (GMAW):

Short-Circuiting ☐ Globular ☐ Spray ☐

Current: AC ☐ DCEP ■ DCEN ☐ Pulsed ☐

Other

Tungsten Electrode (GTAW):

Size N/A Type N/A

SHIELDING

Flux N/A

Electrode-Flux (Class) N/A

Gas -

Composition -

Flow Rate -

Gas Cup Size -

TECHNIQUE

Stringer or Weave Bead Stringer

Multi-pass or Single Pass (per side) Multi-pass

Number of Electrodes 1

Electrode Spacing: Longitudinal N/A

Lateral N/A

Angle N/A

Contact Tube to Work Distance N/A

Peening None

Interpass Cleaning Wire Brush, Chip, or Grind

PREHEAT

Preheat Temp., Min. 150 F Per AWS Table 3.2 Category C

Thickness	Temperature
Up to 3/4"	
Over 3/4" to 1-1/2"	150 F
Over 1-1/2" to 2-1/2"	
Over 2-1/2"	

Interpass Temp., Min. 150 F Max. 300 F

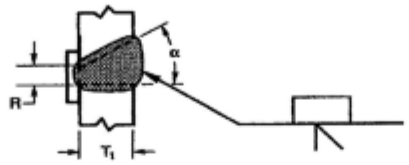
POSTWELD HEAT TREATMENT PWHT Required ☐

Temp. N/A Time N/A

WELDING PROCEDURE

Layer/Pass	Process	Filler Metal Class	Diameter	Cur. Type	Amps or WFS	Volts	Travel Speed	Other Notes
1 - 2	SMAW	E8018	1/8"	DCEP	110 - 140		6 -10 ipm	
3 - n	SMAW	E8018	5/32"	DCEP	150 - 187		8 -11 ipm	

Single-bevel-groove weld (4)
Butt joint (B)

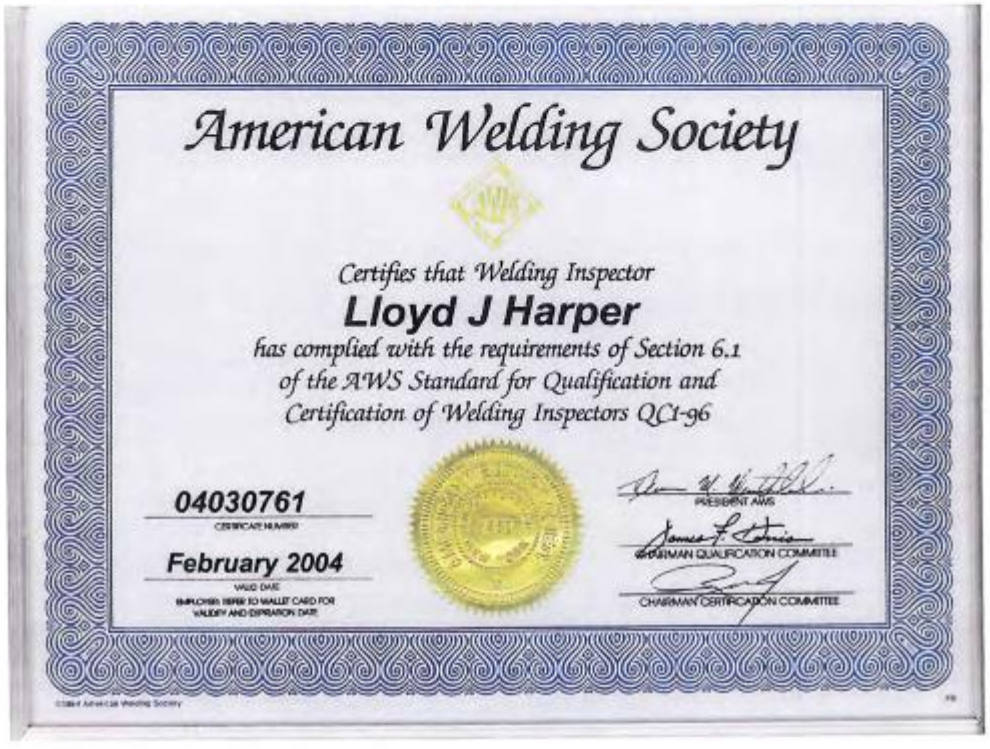


Tolerances	
As Detailed (see 3.13.1)	As Fit-Up (see 3.13.1)
R = +1/16, –0	+1/4, –1/16
α = +10°, –0°	+10°, –5°

Welding Process	Joint Designation	Base Metal Thickness (U = unlimited)		Groove Preparation		Permitted Welding Positions	Gas Shielding for FCAW
		T_1	T_2	Root Opening	Groove Angle		
SMAW	B-U4a	U	—	R = 1/4	α = 45°	All	—
				R = 3/8	α = 30°	All	—

MEMO

1. Paint will be abated by others prior to welding.
2. All welds will be welded vertically.
3. Welds to be cleaned free of slag.
4. All welds after cleaning will be brushed with (2) coats of ZRC Galvilite primer.
5. Finish coat to match existing.



American Welding Society

Certifies that Welding Inspector

Lloyd J Harper

has complied with the requirements of Section 6.1
of the AWS Standard for Qualification and
Certification of Welding Inspectors QC1-96

04030761
CERTIFICATE NUMBER

February 2004
VALID DATE
EMPLOYERS REFER TO WALLET CARD FOR VALIDITY AND EXPIRATION DATE

PRESIDENT AWS

CHAIRMAN QUALIFICATION COMMITTEE

CHAIRMAN CERTIFICATION COMMITTEE

Certification QuikCheck

AWS's Free Online Certification Verification Service

Please enter a Certification number below, along with the last name of the inspector. This number can be found on a wallet card or wall certificate produced by the inspector. The search will return the certification number, a name, and an expiration date for that individual.

Certification was found

Cert. No.	Name	Expiration	Cert. Description
04030761	Lloyd J Harper	March 1, 2016	Certified Welding Inspector

Certification number 04030761

Last name harper

Go

Alternatively, you may search using the individual's information to view all certifications *(all fields are required)*:

Last Name

First Name or First Initial

Birth Month / Day --select birth month-- / --select birth day--

Search

AWS strongly suggests that the certification identity be verified with a government issued photo identification card, such as a driver's license.

How to interpret the Certification number to determine the level of certification:

Key
1 = CWI
2 = CAWI eligible for upgrade*
3 = cwi by upgrade*
4 = CAWI
5 = CWI through CWSIP
7 = CWI through Reciprocity
8 = SCWI
E = CWE
G = CWENG

Applied Testing Group, LLC

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

VISUAL ACUITY RECORD

NAME : Llyod J. Harper **Social Security Number:** 9716

NEAR VISION : Required ☒ Not Required: ☐

	LEFT		RIGHT	
	Jaeger #	Distance	Jaeger #	Distance
UNCORRECTED				
CORRECTED	J-2	12"	J-2	12"

FAR VISION: Required: ☐ Not Required: ☒

	LEFT	RIGHT
UNCORRECTED		
CORRECTED	20/20	20/20

COLOR CONTRAST DIFFERENTIATION: **REQUIRED** ☒ **NOT REQUIRED** ☐

PSEUDO ISOCHROMATIC PLATES: **PASS** ☒ **FAIL** ☐

BRIGHTNESS DISCRIMINATION: **PASS** ☒ **FAIL** ☐

Restrictions: None

Corrective Lenses Required: Yes ☒ No: ☐

Examiner: Thomas B Munson Date: November 4, 2013

Expiration date of visual acuity examination: **Date:** **NOVEMBER 4, 2014**

Applied Testing Group, LLC
Quality Nondestructive Testing Solutions

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

Nondestructive Testing
Qualification and Certification Record

This is to certify that:

Name: Lloyd J. Harper **Social Security Number:** 9716

fully meets the requirements of NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

NDT Method: Magnetic Particle

Certification Level : II **Date of Certification:** 06/28/14

Certification Expiration Date: 06/28/2017

Test Scores:

Test	Grade	Administered By	Remarks
General:	85.0	T. Munson	
Specific:	95.0	T. Munson	
Practical	95.0	T. Munson	
Composite:	91.6		

Limitations: None

Recommended for certification by: Thomas J Munson **Date:** 06/28/14

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Certified by : Daniel Lemons **Date:** 06/28/14

NDE Manager

Applied Testing Group, LLC

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

Nondestructive Testing
Qualification and Certification Record

This is to certify that:

Name: Lloyd J. Harper **Social Security Number:** 9716

fully meets the requirements of NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

NDT Method: Liquid Penetrant

Certification Level : II **Date of Certification:** 06/21/2014

Certification Expiration Date: 06/21/2017

Test Scores:

Test	Grade	Administered By	Remarks
General:	90.0	T. Munson	
Specific:	95.0	T. Munson	
Practical	95.0	T. Munson	
Composite:	96.3		

Recommended for certification by: Thomas J Munson **Date:** 06/20/2014

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Certified by : Daniel Lamm **Date:** 06/21/2014

NDE Manager

Applied Testing Group, LLC

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

Nondestructive Testing
Qualification and Certification Record

This is to certify that:

Name: Lloyd J. Harper **Social Security Number:** 9716

fully meets the requirements of NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

NDT Method: Visual

Certification Level : II **Date of Certification:** 01/12/14

Certification Expiration Date: 02/26/2017

Test Scores:

Test	Grade	Administered By	Remarks
General:	95.0	T. Munson	
Specific:	100.0	T. Munson	
Practical	100.0	T. Munson	AWS-CWI
Composite:	98.3		

Recommended for certification by: Thomas J Munson **Date:** 01/10/14

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Certified by : Daniel Lyons **Date:** 01/12/14

NDE Manager

Applied Testing Group, LLC
Quality Nondestructive Testing Solutions

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

Personnel Testing
Education, Training and Experience Record

Name: Lloyd J. Harper Signature:* L. D. Harper

Date of Birth: 06/10/1956 Date of Employment: 11/24/03

Training and Experience Through: July 1, 2014

- The information provided is accurate and true to the best of my knowledge.

EDUCATION

School	Location	Date Graduated	Degree/Major
Varina High School	Varina, VA	1984	Diploma/General Studies

CLASSROOM TRAINING

Subject	Training Hours	Dates Completed	Source/ Company
Liquid Penetrant Level I & II	40	2003	Schnabel
Magnetic Particle Level I & II	40	2002	Schnabel
Radiation Safety/Level I	49	2002	E. I. Dupont
Visual Testing – AWS	40	1993	AWS
Fundamental of Weld Engineering	40	1994	Ohio State U.
Liquid Penetrant Level I	12	1996	ASNT

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Phone: (256) 425-8975

Personnel Testing
Education, Training and Experience Record

WORK EXPERIENCE

Test Method	Level	Company	Total Months Exp.
Visual Testing	II	Applied Testing Group, LLC	41
	II	Mistras Services, Inc.	36
	II	Schnabel Engineering	44
	CWI	American Welding Society	181
Magnetic Particle	II	Applied Testing Group, LLC	42
	II	Mistras Services, Inc.	24
	II	Schnabel Engineering	22
Liquid Penetrant	II	Applied Testing Group, LLC	34
	II	Mistras Services, Inc.	24
	II	Schnabel Engineering	40
	II		
Radiographic	II	Mistras Services, Inc.	9
	II	Schnabel Engineering	14

Applied Testing Group, LLC

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HUNTSVILLE, ALABAMA 35810
PH: (256) 425-8975

VISUAL ACUITY RECORD

NAME : Daniel Irons **Social Security Number:** 6010

NEAR VISION: Required ☒ Not Required: ☐

	LEFT		RIGHT	
	Jaeger #	Distance	Jaeger #	Distance
UNCORRECTED				
CORRECTED	J-2	12"	J-2	12"

FAR VISION: Required: ☒ Not Required: ☐

	LEFT	RIGHT
UNCORRECTED		
CORRECTED	20/20	20/20

COLOR CONTRAST DIFFERENTIATION: **REQUIRED** ☒ **NOT REQUIRED** ☐

PSEUDO ISOCHROMATIC PLATES: **PASS** ☒**FAIL** ☐

BRIGHTNESS DISCRIMINATION: **PASS** ☒ **FAIL** ☐

Restrictions: Far Vision

Corrective Lenses Required: Yes ☒ No: ☐

Examiner: Thomas B Mennon Date: September 14, 2013

Expiration date of visual acuity examination: **Date:** **SEPTEMBER 14, 2014**

Applied Testing Group, LLC

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HUNTSVILLE, ALABAMA 35810
PH: (256) 425-8975

Nondestructive Testing
Qualification and Certification Record

This is to certify that:

Name: Daniel Irons **Social Security Number:** 6010

Fully meets the requirements of ATG-NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

NDT Method: UT

Certification Level : III **Date of Certification:** 03/14/2011

Certification Expiration Date: 03/13/2016

Test Scores:

Test	Grade	Administered By	Remarks
Basic:	90.0	T. Munson, P.E.	
Method:	92.0	T. Munson, P.E.	
Specific:	96.0	T. Munson, P.E.	
Practical	92.0	T. Munson, P.E.	
Composite:	92.5		

Limitations: Contact, Immersion, Air Coupled

Recommended for certification by: Thomas B Munson, P.E. **Date:** 03/14/2011

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Certified by : Thomas B Munson, P.E. **Date:** 03/14/2011

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Applied Testing Group, LLC

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HUNTSVILLE, ALABAMA 35810
PH: (256) 425-8975

Nondestructive Testing
Qualification and Certification Record

This is to certify that:

Name: Daniel Irons **Social Security Number:** 6010

Fully meets the requirements of ATG-NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

NDT Method: BT

Certification Level : III **Date of Certification:** 03/17/2011

Certification Expiration Date: 03/16/2016

Test Scores:

Test	Grade	Administered By	Remarks
Basic:	90.0	T. Munson, P.E.	
Method:	96.0	T. Munson, P.E.	
Specific:	96.0	T. Munson, P.E.	
Practical	92.0	T. Munson, P.E.	
Composite:	93.5		

Limitations: Bubble Leak

Recommended for certification by: Thomas B Munson, P.E.
Corporate Professional ASNT NDT Level III
ASNT File Number 9295
Date: 03/17/2011

Certified by : Thomas B Munson, P.E.
Corporate Professional ASNT NDT Level III
ASNT File Number 9295
Date: 03/17/2011

Applied Testing Group, LLC

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HUNTSVILLE, ALABAMA 35810
PH: (256) 425-8975

Nondestructive Testing
Qualification and Certification Record

This is to certify that:

Name: Daniel Irons **Social Security Number:** 6010

Fully meets the requirements of ATG-NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

NDT Method: MT

Certification Level : III **Date of Certification:** 03/14/2011

Certification Expiration Date: 03/13/2011

Test Scores:

Test	Grade	Administered By	Remarks
Basic:	90.0	T. Munson, P.E.	
Method:	88.0	T. Munson, P.E.	
Specific:	96.0	T. Munson, P.E.	
Practical	90.0	T. Munson, P.E.	
Composite:	91.0		

Limitations: Visible Dry, Fluorescent Wet

Recommended for certification by: Thomas B Munson, P.E. **Date:** 03/14/2011

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Certified by : Thomas B Munson, P.E. **Date:** 03/14/2011

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Applied Testing Group, LLC

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Nondestructive Testing
Qualification and Certification Record

This is to certify that:

Name: Daniel Irons **Social Security Number:** 6010

Fully meets the requirements of ATG-NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

NDT Method: RT

Certification Level : III **Date of Certification:** 03/15/2011

Certification Expiration Date: 03/14/2016

Test Scores:

Test	Grade	Administered By	Remarks
Basic:	90.0	T. Munson, P.E.	
Method:	90.0	T. Munson, P.E.	
Specific:	94.0	T. Munson, P.E.	
Practical	96.0	T. Munson, P.E.	
Composite:	92.5		

Limitations: Conventional Film, Digital, Computed, Neutron

Recommended for certification by: Thomas B Munson, P.E. **Date:** 03/15/2011

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Certified by : Thomas B Munson, P.E. **Date:** 03/15/2011

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Applied Testing Group, LLC

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PH: [256] 425-8975

Nondestructive Testing
Qualification and Certification Record

This is to certify that:

Name: Daniel Irons **Social Security Number:** 6010

Fully meets the requirements of ATG-NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

NDT Method: PT

Certification Level : III **Date of Certification:** 03/15/2011

Certification Expiration Date: 03/14/2016

Test Scores:

Test	Grade	Administered By	Remarks
Basic:	90.0	T. Munson, P.E.	
Method:	88.0	T. Munson, P.E.	
Specific:	92.0	T. Munson, P.E.	
Practical	92.0	T. Munson, P.E.	
Composite:	90.5		

Limitations: Visible Solvent Dye, Visible & Fluorescent Water Washable, Visible & Fluorescent Solvent Dye

Recommended for certification by: Thomas S Munson, P.E. **Date:** 03/15/2011

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Certified by : Thomas S Munson P.E. **Date:** 03/15/2011

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Applied Testing Group, LLC

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HUNTSVILLE, ALABAMA 35810
PH: (256) 425-8975

Nondestructive Testing
Qualification and Certification Record

This is to certify that:

Name: Daniel Irons **Social Security Number:** 6010

Fully meets the requirements of ATG-NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

NDT Method: Eddy Current

Certification Level : III **Date of Certification:** 03/16/2011

Certification Expiration Date: 03/15/2016

Test Scores:

Test	Grade	Administered By	Remarks
Basic:	90.0	T. Munson, P.E.	
Method:	84.0	T. Munson, P.E.	
Specific:	88.0	T. Munson, P.E.	
Practical	92.0	T. Munson, P.E.	
Composite:	88.5		

Limitations: Tubing Ferrous and Nonferrous, Surface

Recommended for certification by: Thomas S Munson, P.E. **Date:** 03/16/2011

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Certified by : Thomas S Munson, P.E. **Date:** 03/16/2011

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Applied Testing Group, LLC

11017 MT. CHARRON RD., NW
HUNTSVILLE, ALABAMA 35810
PH: (256) 425-8975

Nondestructive Testing
Qualification and Certification Record

This is to certify that:

Name: Daniel Irons **Social Security Number:** 6010

Fully meets the requirements of ATG-NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

NDT Method: Visual

Certification Level : III **Date of Certification:** 03/16/2011

Certification Expiration Date: 03/15/2016

Test Scores:

Test	Grade	Administered By	Remarks
Basic:	90.0	T. Munson, P.E.	
Method:	94.0	T. Munson, P.E.	
Specific:	96.0	T. Munson, P.E.	
Practical	100.0	T. Munson, P.E.	
Composite:	95.0		

Limitations: Manual and Remote

Recommended for certification by: Thomas B Munson, P.E.
Corporate Professional ASNT NDT Level III
ASNT File Number 9295
Date: 03/16/2011

Certified by : Thomas B Munson, P.E.
Corporate Professional ASNT NDT Level III
ASNT File Number 9295
Date: 03/16/2011

Applied Testing Group, LLC

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HUNTSVILLE, ALABAMA 35810
PH: (256) 425-8975

Nondestructive Testing
Education, Training and Experience Form

Name: Daniel Irons Signature:

Date of Birth: 11/26/57 Date of Employment: 03/14/2011

Training and Experience Through: January 1, 2014

EDUCATION

School	Location	Date Graduated	Degree/Major
MenchvilleHigh School	Newport News, VA	1976	Advanced Studies
General Nuclear Services, Inc.	Newport News, VA	1979	Nondestructive Testing Technology
Newport News Shipbuilding & Drydock, Inc.	Newport News, VA	1981	Advanced Automated Ultrasonic
Newport News Shipbuilding & Drydock, Inc.	Newport News, VA	1981	Eddy Current
Northeast Utilities, Inc.	Milford, CT	1982	IGSCC Detection
Ebasco Services, Inc.	New York, NY	1983	Automated Ultrasonics, Eddy Current, IGSCC Detection & Sizing
Electric Power Research Institute (ERPI)	Charlotte, NC	1985	IGSCC Detection & Sizing
Electric Power Research Institute (ERPI)	Charlotte, NC	1985	IGSCC Overlay
American Welding Society (AWS)	Houston, TX	2002	NDT of Welds
Fundamentals of Professional Practice	Silver Spring, MD	2003	American Soils & Foundation Engineers (ASFE)
Computed Radiography – Starr System	Pensacola, FL	2007	Virtual Media Integration (VMI)
Infrared Testing &Technologies	Richmond, VA	2010	Munson NDT
Computed Radiography Image Interpretation	Richmond, VA	2010	General Electric

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Nondestructive TestingTraining Form

Subject	Training Hours	Dates Completed	Source/ Company
Ultrasonic Testing, Level I & II	650	1979	General Nuclear Services, Inc.
Radiographic Testing, Level I & II	725	1979	General Nuclear Services, Inc.
Eddy Current Testing, Level I & II	180	1979	General Nuclear Services, Inc.
Liquid Penetrant Testing, Level I & II	95	1979	General Nuclear Services, Inc.
Magnetic Particle Testing, Level I & II	110	1979	General Nuclear Services, Inc.
Visual Testing, Level I & II	425	1979	General Nuclear Services, Inc.
Leak Testing, Level I & II – Bubble	40	1979	General Nuclear Services, Inc.
Leak Testing, Level I & II – Pressure Change	40	1979	General Nuclear Services, Inc.
Leak Testing, Level I & II – Halogen Diode,	40	1979	General Nuclear Services, Inc.
Leak Testing, Mass Spectrometer – Level I & II	80	1979	General Nuclear Services, Inc.
Advanced Automated Ultrasonic Testing – (UDARPS)	80	1981	Newport News Shipbuilding & Drydock, Inc.
Eddy Current-Shipboard and BOP Applications	80	1981	Newport News Shipbuilding & Drydock, Inc.
IGSCC Detection	8	1982	Northeast Utilities, Inc.
Automated Ultrasonic, Eddy Current, IGSCC Detection & Sizing, Leak Testing (BT and PC)	160	1983	Ebasco Services, Inc.
IGSCC Detection & Sizing	40	1985	Electric Power Research Institute (ERPI)
IGSCC Overlay Detection & Sizing	8	1985	Electric Power Research Institute (ERPI)
NDT of Welds	24	2002	American Welding Society (AWS)
Computer Radiography	24	2007	Virtual Media Integration (VMI)
InfraredTesting &Technologies	80	2010	Munson NDT
Computed Radiography Interpretation	24	2010	General Electric

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Nondestructive TestingExperience Form Continued...

Test Method	Level	Company	Total Months Experience
Ultrasonic	II	General Services Nuclear Corporation, Inc.	37
	II	Newport News Shipbuilding & Drydock, Inc.	20
	II	Ebasco Services, Inc.	27
	III	Nuclear Energy Services, Inc.	14
	III	General Electric, Nuclear Plant Services	22
	III	ATEC Associates, Inc.	49
	III	Deadline Support Services, Inc.	99
	II	Mechanical Integrity Quality Assurance, Inc.	15
	III	Schnabel Engineering, Inc.	93
	III	Mistras Services, Inc.	29
↓	III	Applied Testing Group, Inc.	48
Radiographic	II	General Services Nuclear Corporation, Inc.	37
	II	Newport News Shipbuilding & Drydock, Inc.	20
	II	Ebasco Services, Inc.	27
	III	Nuclear Energy Services, Inc.	14
	III	General Electric, Nuclear Plant Services	22
	III	ATEC Associates, Inc.	49
	III	Deadline Support Services, Inc.	99
	II	Mechanical Integrity Quality Assurance, Inc.	2
	III	Schnabel Engineering, Inc.	95
	III	Mistras Services, Inc.	29
↓	III	Applied Testing Group, Inc.	3
Liquid Penetrant	II	General Services Nuclear Corporation, Inc.	37
	II	Newport News Shipbuilding & Drydock, Inc.	20
	II	Ebasco Services, Inc.	27
	III	Nuclear Energy Services, Inc.	14
	III	General Electric, Nuclear Plant Services	22
	III	ATEC Associates, Inc.	49
	III	Deadline Support Services, Inc.	99
	II	Mechanical Integrity Quality Assurance, Inc.	15
↓	III	Schnabel Engineering, Inc.	74

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PH: (256) 425-8975

Nondestructive Testing
Experience Form Continued...

Liquid Penetrant-Continued	III	Applied Testing Group, Inc.	11
Magnetic Particle	II	General Services Nuclear Corporation, Inc.	37
	II	Newport News Shipbuilding & Drydock, Inc.	20
	II	Ebasco Services, Inc.	27
	III	Nuclear Energy Services, Inc.	14
	III	General Electric, Nuclear Plant Services	22
	III	ATEC Associates, Inc.	49
	III	Deadline Support Services, Inc.	99
	II	Mechanical Integrity Quality Assurance, Inc.	15
	III	Schnabel Engineering, Inc.	62
	III	Mistras Services, Inc.	29
	III	Applied Testing Group, Inc.	39
Eddy Current	II	General Services Nuclear Corporation, Inc.	37
	II	Newport News Shipbuilding & Drydock, Inc.	20
	II	Ebasco Services, Inc.	27
	III	ATEC Associates, Inc.	49
	III	Deadline Support Services, Inc.	99
	II	Mechanical Integrity Quality Assurance, Inc.	15
	III	Schnabel Engineering, Inc.	48
	III	Mistras Services, Inc.	15
	III	Applied Testing Group, Inc.	26
Visual Testing	II	General Services Nuclear Corporation, Inc.	37
	II	Newport News Shipbuilding & Drydock, Inc.	20
	II	Ebasco Services, Inc.	27
	III	Nuclear Energy Services, Inc.	14
	III	General Electric, Nuclear Plant Services	22
	III	ATEC Associates, Inc.	49
	III	Deadline Support Services, Inc.	99
	II	Mechanical Integrity Quality Assurance, Inc.	15
	III	Schnabel Engineering, Inc.	95
	III	Mistras Services, Inc.	29
	III	Applied Testing Group, Inc.	48


NOTICE
NOTICE
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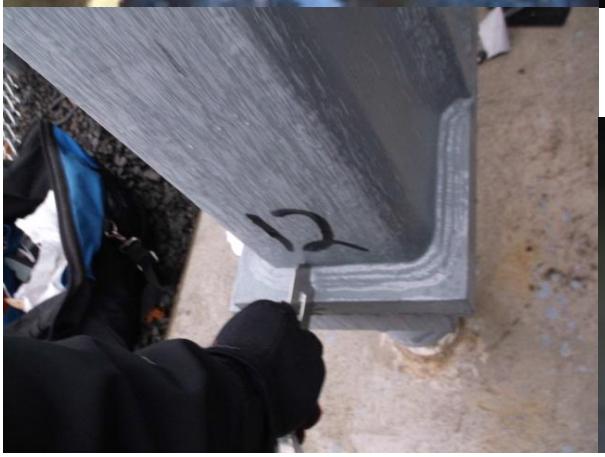
825983


6


5


MT OK
CIRC
WELD
11/13/14
MT
3/4
11/13/14
CAUTION
PARKER
MT/VT
OK
11/13/14




PRIVATE PROPERTY
1
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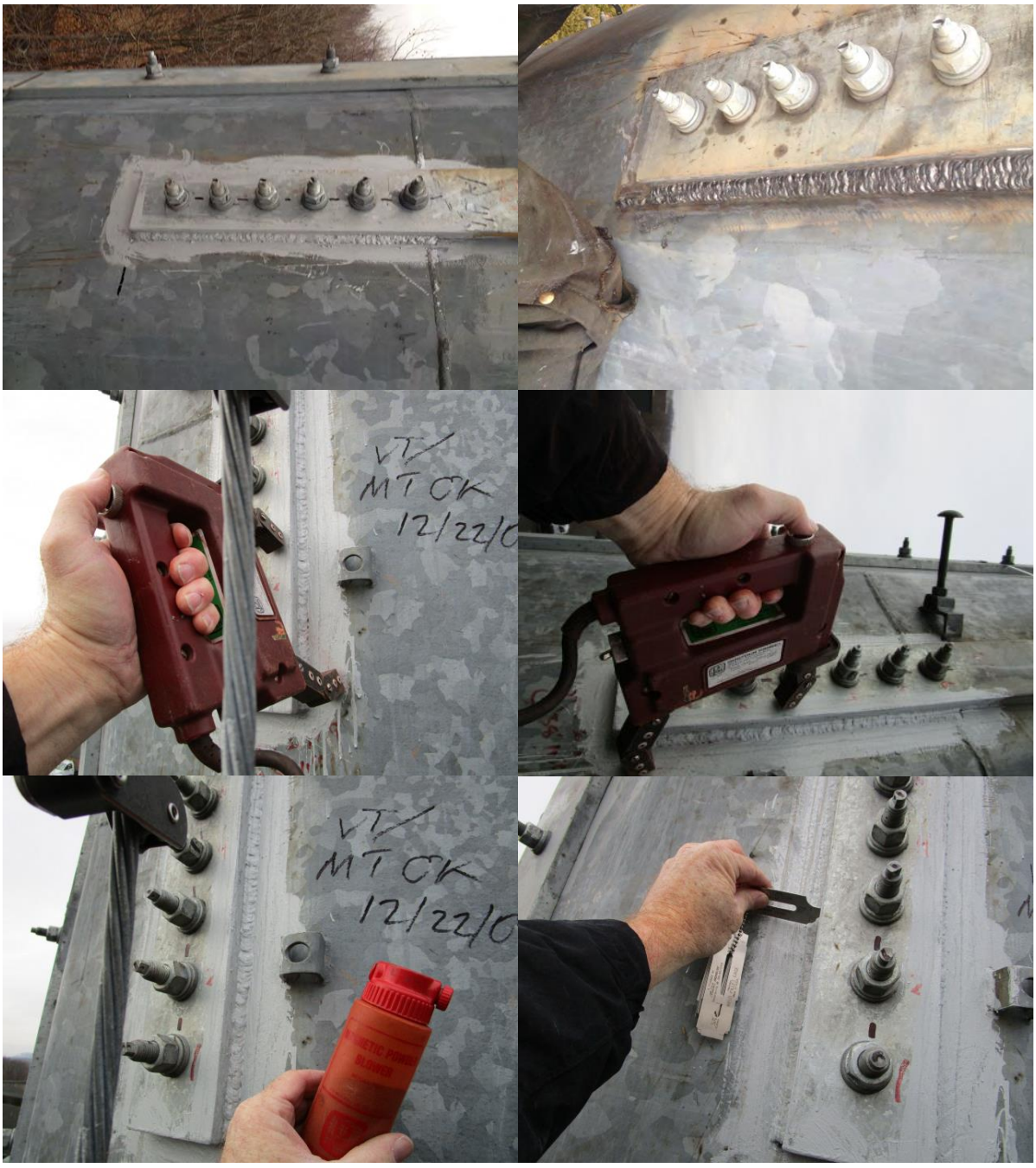
Root


VT/
MT CK
12/22/0
VT/
MT CK
12/22/0

6.2.5 ON SITE COLD GALVANIZING VERIFICATION

6.2.6 GC AS-BUILT DOCUMENTS

37513-1570 PERMIT.DWG

MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

BU NUMBER; SITE NAME

BU #825983; MIDDLETOWN_1

APP: 185826 REV. 13; WO: 628395

SITE ADDRESS

90 INDUSTRIAL PARK ROAD
MIDDLETOWN, CT 06457
MIDDLESEX COUNTY

LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse

PROJECT NOTES

1. DETAILED FIELD INFORMATION REGARDING INTERFERENCES AND/OR EXISTING FIELD CONDITIONS MAY BE AVAILABLE ON CROWN'S CCISITES AND FROM CONTRACTOR'S PRE-MOD MAPPING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AND COORDINATE WITH THE AVAILABLE SOURCES OF INFORMATION ABOVE AND WITH THE PROJECT PLANS BEFORE PROCEEDING WITH THE WORK. CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND CROWN CASTLE FIELD PERSONNEL BEFORE PROCEEDING WITH THE WORK.
2. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
3. ALL STRUCTURAL BOLTS SHALL BE FIELD INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
4. (A.) DTI'S REQUIRED: ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAILS ON SHEET S-3 FOR REQUIREMENTS ON THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

   (B.) EFFECTIVE 5/30/2012: UNTIL FURTHER NOTICE, CROWN CASTLE WILL ACCEPT AJAX BOLTS TIGHTENED USING AISC "TURN-OF-NUT" METHOD. INSTALLERS SHALL FOLLOW CROWN GUIDELINES FOR AISC "TURN-OF-NUT" METHOD AND ALSO PROVIDE COMPLETE INSPECTION DOCUMENTATION IN THE PMI. PRIOR TO STARTING WORK, CONTRACTOR SHALL CONSULT WITH CROWN ENGINEERING TO DETERMINE WHETHER THIS POLICY IS STILL IN PLACE.

   (C.) REQUIREMENT EFFECTIVE 04/20/2013, PER CROWN CASTLE DIRECTIVE: ANY AND ALL STRUCTURAL BOLTS THAT ARE TIGHTENED TO THE PRETENSIONED CONDITION USING THE AISC "TURN-OF-NUT" TENSIONING PROCEDURE (NON-TENSION CONTROLLED ['NON-TC'] BOLTS AND/OR BOLTS WITHOUT DTI'S INSTALLED) SHALL BE INSPECTED ONSITE BY AN INDEPENDENT THIRD-PARTY BOLT INSPECTOR, AS APPROVED BY CROWN. **THIS INSPECTION IS REQUIRED TO BE AN ONSITE FIELD INSPECTION.** THE THIRD-PARTY BOLT INSPECTOR SHALL FOLLOW THE PUBLISHED CROWN CASTLE INSPECTION PROCEDURE "MI NON-TC BOLT INSPECTION", DATED APRIL 2013. THE THIRD-PARTY BOLT INSPECTOR SHALL PREPARE A FULLY DOCUMENTED BOLT INSPECTION REPORT, AS SPECIFIED BY CROWN, AND SHALL SUBMIT A COPY OF THE BOLT INSPECTION REPORT TO THE MI INSPECTOR, THE EOR, AND TO CROWN CASTLE.
5. NDE OF THE CIRCUMFERENTIAL WELD OF THE BASE PLATE TO SHAFT CONNECTION IS REQUIRED. SEE CCI DOCUMENTS ENG-SOW-1033 *'TOWER BASE PLATE NDE'* AND ENG-BUL-10051 *'NDE REQUIREMENTS FOR MONOPOLE BASE PLATE TO PREVENT CONNECTION FAILURE'*. NOTIFY THE EOR AND CROWN ENGINEERING IMMEDIATELY IF ANY CRACKS ARE SUSPECTED OR HAVE BEEN IDENTIFIED. THE NDE SHALL INCLUDE ALL EXISTING REINFORCEMENTS THAT HAVE BEEN WELDED TO THE BASE PLATE. ANY FULL PENETRATION WELDING TO THE BASE PLATE REQUIRED AS PART OF THIS ACTIVE REINFORCEMENT DESIGN SHALL BE INCLUDED IN THE NDE SCOPE OF WORK.

PROJECT CONTACTS:

MONOPOLE OWNER:
CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
CONTACT: STEVE TUTTLE
PH: (585) 899-3445

STRUCTURAL ENGINEER OF RECORD (EOR):
PAUL J. FORD AND COMPANY
250 EAST BROAD STREET, SUITE 600
COLUMBUS, OHIO 43215-3708
CONTACT: BRIAN KERMODE AT BKERMODE@PJFWEB.COM
PHONE: 614-221-6679

DESIGN STANDARD

THIS REINFORCEMENT DESIGN IS BASED UPON THE REQUIREMENTS OF THE TIA/EIA-222-F-1996 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, USING A DESIGN BASIC WIND SPEED OF 85 MPH (FASTEST MILE) WITH NO ICE, 38 MPH WITH 3/4 INCH ICE AND 50 MPH SERVICE LOADS.

REFER TO THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF STRUCTURAL ANALYSIS FOR THIS SITE (PJF#37513-1570), DATED 8-14-2013.

THIS PROJECT INCLUDES THE FOLLOWING REINFORCING ELEMENTS:

SHAFT REINFORCING
FIELD WELDED MICROPILE BRACKETS
HIGH STRENGTH GROUT
FOUNDATION AUGMENTATION: MICROPILES

SHEET INDEX

SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
S-1	GENERAL NOTES
S-2	GENERAL NOTES
S-3	AJAX BOLT DETAIL
S-4	MONOPOLE PROFILE
S-5	BASE PLATE DETAILS
S-6	MICROPILE DETAILS
S-7	MISC DETAILS
S-8	MI CHECKLIST

STATE OF CONNECTICUT
JOSEPH PACHICARAH JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

AUG 1 4 2013

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CROWN CASTLE
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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570
DRAWN BY: B.M.S.
CHECKED BY: B.K.K.
APPROVED BY:
DATE: 8-14-2013

ISSUE DATE OF PERMIT: 8-14-2013

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37513-1570 PERMIT.DWG

CROWN CASTLE PROJECT: BU #825983; MIDDLETOWN_1; MIDDLETOWN, CT
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 2, 1/22/2009)

A. GENERAL NOTES

1. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO FABRICATION AND CONSTRUCTION. THESE DRAWINGS WERE PREPARED FROM INFORMATION AND DOCUMENTS PROVIDED TO PAUL J. FORD & COMPANY BY CROWN CASTLE. THIS INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY PAUL J. FORD & COMPANY FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. ANY DISCREPANCIES AND/OR CHANGES BETWEEN THE INFORMATION CONTAINED IN THESE DRAWINGS AND THE ACTUAL VERIFIED SITE CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF CROWN CASTLE AND PAUL J. FORD & COMPANY SO THAT ANY CHANGES AND/OR ADJUSTMENTS, IF NECESSARY, CAN BE MADE TO THE DESIGN AND DRAWINGS.
2. THE EXISTING UNREINFORCED MONOPOLE STRUCTURE DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE ANTENNA AND PLATFORM LOADS SHOWN ON THESE DRAWINGS AT THE REQUIRED MINIMUM TIA/EIA-222-F BASIC WIND SPEEDS. DO NOT INSTALL ANY ADDITIONAL OR NEW ANTENNA AND PLATFORM LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.
3. IF MATERIALS, QUANTITIES, STRENGTHS OR SIZES INDICATED BY THE DRAWINGS OR SPECIFICATIONS ARE NOT IN AGREEMENT WITH THESE NOTES, THE BETTER QUALITY AND/OR GREATER QUANTITY, STRENGTH OR SIZE INDICATED, SPECIFIED OR NOTED SHALL BE PROVIDED.
4. THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN PROPERLY AND ADEQUATELY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO INSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND ITS COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT. IMPORTANT CUTTING, WELDING AND SAFETY GUIDELINES: THE CONTRACTOR SHALL FOLLOW ALL CROWN CASTLE CUTTING, WELDING, FIRE PREVENTION AND SAFETY GUIDELINES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES FROM CROWN CASTLE. PER THE 12-01-2005 CROWN CASTLE DIRECTIVE: "ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CROWN CASTLE POLICY 'CUTTING AND WELDING PLAN' (DOC # ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT".
5. THE STRUCTURAL CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OR MEANS OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES.
6. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY THE INSPECTION/TESTING AGENCY. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
7. ALL MATERIALS AND EQUIPMENT FURNISHED WILL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.
10. ANY EXISTING ATTACHMENTS AND/OR PROJECTIONS ON THE POLE THAT MAY INTERFERE WITH THE INSTALLATION OF THE REINFORCING SYSTEM WILL HAVE TO BE REMOVED, AND/OR RELOCATED, AND/OR REPLACED AND RE-INSTALLED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH THE OWNER, TESTING AGENCY, AND ENGINEER.
11. ANY AND ALL EXISTING PLATFORMS THAT ARE LOCATED IN AREAS OF THE POLE SHAFT WHERE SHAFT REINFORCING MUST BE APPLIED SHALL BE TEMPORARILY REMOVED OR OTHERWISE SUPPORTED TO PERMIT NEW CONTINUOUS REINFORCEMENT TO BE ATTACHED. AFTER THE CONTRACTOR HAS SUCCESSFULLY INSTALLED THE MONOPOLE REINFORCEMENT SYSTEM, THE CONTRACTOR SHALL RE-INSTALL THE PLATFORMS. IN NO CASE SHALL ANY NEW AND/OR ADDITIONAL PLATFORMS AND/OR ANTENNAS AND/OR COAX CABLES AND/OR OTHER EQUIPMENT BE INSTALLED ON THE MONOPOLE UNTIL THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF ALL OF THE REQUIRED STRUCTURAL REINFORCING SYSTEM COMPONENTS.

B. (SECTION NOT USED)

LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse

STATE OF CONNECTICUT
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

AUG 1 4 2013

C. SPECIAL INSPECTION AND TESTING

1. ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY THE OWNER'S REPRESENTATIVE AND THE OWNER'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY. REFER TO CROWN CASTLE DOCUMENT ENG-SOW-10006 FOR SPECIFICATION.
2. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE PERFORMED SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
3. OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
4. AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY THE OWNER FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
   (A.) ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
   (B.) THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO, AND COORDINATE WITH, THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
5. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES FOR THE OWNER. THE TESTING AGENCY SHALL INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.

A. GENERAL:
   (1.) PERFORM CONTINUOUS ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY OWNER IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.

B. FOUNDATIONS, CONCRETE, AND SOIL PREPARATION
   (1.) VERIFY MATERIALS AT BOTTOM OF EXCAVATION ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.
   (2.) VERIFY THAT EXCAVATIONS HAVE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.
   (3.) PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS.
   (4.) VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESS DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.
   (5.) PRIOR TO PLACEMENT OF COMPACTED FILL, OBSERVE SUBGRADE AND VERIFY SITE HAS BEEN PREPARED PROPERLY.

C. CONCRETE TESTING PER ACI - (NOT REQUIRED)

D. STRUCTURAL STEEL
   (1.) CHECK THE STEEL ON THE JOB WITH THE PLANS.
   (2.) CHECK MILL CERTIFICATIONS.
   (3.) CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
   (4.) INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
   (5.) CALL FOR LABORATORY TEST REPORTS WHEN IN DOUBT.
   (6.) CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
   (7.) CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
   (8.) CHECK BOLT TIGHTENING ACCORDING TO AISC "TURN OF THE NUT" METHOD.

E. WELDING:
   (1.) VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.
   (2.) INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND IN ACCORDANCE WITH AWS D1.1.
   (3.) APPROVE FIELD WELDING SEQUENCE.
      (A.) A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO THE OWNER BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM THE OWNER.
   (4.) INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
      (A.) INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE AND WORKING CONDITIONS.
      (B.) VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
      (C.) INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
      (D.) VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1.
      (E.) SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE OR DYE PENETRANT.
      (F.) INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED PLANS.
      (G.) VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
      (H.) REVIEW THE REPORTS BY TESTING LABS.
      (I.) CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
      (J.) INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
      (K.) CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.

F. SPECIAL INSPECTION OF EXISTING SHAFT-TO-FLANGE WELD CONNECTIONS:
   (1.) PRIOR TO CONSTRUCTION, TESTING AGENCY SHALL INSPECT CONDITION OF EXISTING SHAFT-TO-BASE-PLATE WELD CONNECTION. ALSO INSPECT EXISTING STIFFENERS IF PRESENT. THE INSPECTOR SHALL USE THE FOLLOWING INSPECTION METHODS, OR COMBINATION OF METHODS, AS REQUIRED TO IDENTIFY ANY CRACKS: VISUAL, MAGNETIC PARTICLE, AND/OR ULTRA-SONIC. IN ADDITION, OTHER TEST METHODS MAY ALSO BE USED AT THE RECOMMENDATION OF THE TESTING AGENCY AND UPON THE APPROVAL OF THE OWNER AND THE ENGINEER. THE TESTING AGENCY SHALL PROVIDE CAREFUL AND THOROUGH DOCUMENTATION OF THIS INSPECTION TO THE OWNER AND THE ENGINEER. TESTING AGENCY SHALL COORDINATE THESE INSPECTION ACTIVITIES WITH THE OWNER'S REQUIRED PROCESSES AND PROCEDURES. IMPORTANT: THE TESTING AGENCY SHALL IMMEDIATELY REPORT ANY INDICATIONS OF CRACKS, FRACTURES, DISTRESS, AND/OR CORROSION TO THE OWNER AND ENGINEER.
   (2.) AFTER CONSTRUCTION, TESTING AGENCY SHALL INSPECT ANY AND ALL FIELD REPAIRS IMPLEMENTED AS REQUIRED BY THE OWNER FROM THE RESULTS OF THE INSPECTION IN THE PREVIOUS NOTE 5.F.(1.) ABOVE.
   (3.) REFER TO CROWN CASTLE DOCUMENTS ENG-SOW-10033 AND ENG-BUL-10051 FOR SPECIFICATIONS.

G. REPORTS:
   (1.) COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO THE OWNER.

6. THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL-INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DECIDE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES AND PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO THE OWNER'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT THE OWNER'S REVIEW AND SPECIFIC WRITTEN CONSENT. THE OWNER RESERVES THE RIGHT TO DETERMINE WHAT IS AN ACCEPTABLE RESOLUTION OF DISCREPANCIES AND PROBLEMS.
7. AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO THE OWNER. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
8. RESPONSIBILITY: THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATIONS. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.

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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570	ISSUE DATE OF PERMIT: 8-14-2013
DRAWN BY: B.M.S.	
CHECKED BY: B.K.K.	
APPROVED BY:	S-1
DATE: 8-14-2013	

37513-1570 PERMIT.DWG

D. STRUCTURAL STEEL

1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:

A. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
   - (A.) "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
   - (B.) "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS OF THE ENGINEERING FOUNDATION.
   - (C.) "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (PARAGRAPH 4.2.1 SPECIFICALLY EXCLUDED).

B. BY THE AMERICAN WELDING SOCIETY (AWS):
   - (A.) "STRUCTURAL WELDING CODE - STEEL D1.1."
   - (B.) "SYMBOLS FOR WELDING AND NON-DESTRUCTIVE TESTING"

2. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
3. TIGHTEN ALL STRUCTURAL BOLTS, INCLUDING THE AJAX M20 BOLTS WITH SHEAR SLEEVES, ACCORDING TO THE REQUIREMENTS OF THE AISC "TURN OF THE NUT" METHOD. TIGHTEN BOLTS 1/3 TURN PAST THE SNUG TIGHT CONDITION AS DEFINED BY AISC.
4. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E80XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO THE OWNER'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65 (FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
7. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION I NOTES REGARDING TOUCH-UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
8. UNLESS OTHERWISE NOTED, ALL STEEL MEMBERS SHALL BE HOT-DIP GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH ASTM A123. SEE SECTION J FOR FURTHER NOTES AND FOR EXCEPTIONS (IF ANY).
9. ALL WELDS SHALL BE VISUALLY INSPECTED BY THE OWNER'S APPROVED TESTING AGENCY. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT. THE CONTRACTOR SHALL COOPERATE WITH THE TESTING AGENCY IN THEIR TESTING EFFORTS.
10. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
11. FIELD CUTTING OF STEEL:
   - (A.) PRIOR TO ANY FIELD CUTTING, THE CONTRACTOR SHALL MARK THE CUT OUTLINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS.
   - (B.) ANY REQUIRED CUTS IN THE STEEL SHALL BE CAREFULLY CUT BY MECHANICAL METHODS SUCH AS DRILLING, SAW CUTTING, AND GRINDING. THE CONTRACTOR IS RESPONSIBLE TO PREVENT ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, DURING THE CUTTING WORK. ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
   - (C.) ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.

E. BASE PLATE GROUT

1. NEW GROUT FOR THE POLE BASE SHALL BE NON-SHRINK, NON-METALLIC, GROUT (EUCO NS GROUT BY EUCLID, OR APPROVED EQUAL) WITH A 7500 PSI MINIMUM COMPRESSIVE STRENGTH. PVC DRAINAGE PIPES SHALL BE PROVIDED FROM INSIDE THE POLE SHAFT OUT THROUGH THE GROUT SPACE UNDER THE BASE PLATE IN ORDER TO ALLOW MOISTURE TO ADEQUATELY DRAIN FROM THE INTERIOR OF THE POLE SHAFT. CONTRACTOR SHALL SUBMIT PROPOSED GROUT SPECIFICATION INFORMATION TO THE OWNER FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION. CONTRACTOR SHALL FOLLOW GROUT MANUFACTURER'S SPECIFICATIONS FOR COLD WEATHER GROUTING PROCEDURES (IF NECESSARY) AND THE TESTING AGENCY SHALL PREPARE GROUT SAMPLE SPECIMENS FOR COMPRESSIVE STRENGTH TESTING AND VERIFICATION.
2. GROUT SHALL BE INSTALLED TIGHT UNDER BASE PLATE WITH NO VOIDS REMAINING BETWEEN TOP OF EXISTING CONCRETE AND UNDERSIDE OF EXISTING BASE PLATE (EXCEPT FOR DRAIN PIPES). GROUT COMPLETELY SOLID (EXCEPT FOR DRAIN PIPES) UNDER ENTIRE SURFACE OF BASE PLATE FROM OUTSIDE EDGE TO INSIDE EDGE.

F. FOUNDATION WORK - (NOT REQUIRED)

G. CAST-IN-PLACE CONCRETE - (NOT REQUIRED)

H. EPOXY GROUTED REINFORCING ANCHOR RODS - (NOT REQUIRED)

I. TOUCH UP OF GALVANIZING

1. THE CONTRACTOR SHALL TOUCH UP ANY AND/OR ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED DURING CONSTRUCTION. **GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.**
2. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. THE OWNER'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.
3. THE OWNER'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE INADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.

J. HOT DIP GALVANIZING

1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.
2. PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING.
3. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES AS REQUIRED.
4. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.

K. PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER

1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY THE OWNER, THE OWNER WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
2. THE MONOPOLE REINFORCING SYSTEM INDICATED IN THESE DOCUMENTS USES REINFORCING COMPONENTS THAT INVOLVE FIELD WELDING STEEL MEMBERS TO THE EXISTING GALVANIZED STEEL POLE STRUCTURE. THESE FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. **ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE CONNECTED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT THE OWNER REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.**
3. THE OWNER SHALL REFER TO TIA/EIA-222-F-1996, SECTION 14 AND ANNEX E FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY THE OWNER BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. **PAUL J. FORD & COMPANY RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT.** ACCORDING TO TIA/EIA-222-F-1996 SECTION 14.1, NOTE 1: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

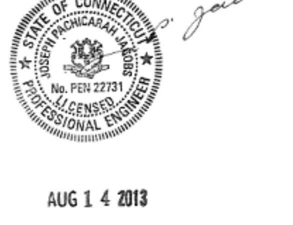
LCC

AS-BUILT

No changes

Date 12-17-14

Signed_ K.A. Stackhouse



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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570	ISSUE DATE OF PERMIT: 8-14-2013
DRAWN BY: B.M.S.	
CHECKED BY: B.K.K.	
APPROVED BY:	S-2
DATE: 8-14-2013	

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AJAX BOLT NOTE SHEET: REV. 1.4, 5-20-2013

NOTES: 1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

3. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAIL BELOW FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

4. ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. DTI'S SHALL BE THE SQUIRTER® STYLE, MADE TO ASTM F959 LATEST REVISION; AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF RC 38 OR HIGHER.

NOTES FOR AJAX M20 'ONE-SIDE' BOLTS WITH DIRECT TENSION INDICATORS (DTI'S):

DTI'S REQUIRED: DTI'S SHALL BE "SELF-INDICATING" SQUIRTER® STYLE DTI'S MADE WITH SILICONE EMBEDDED IN THEM, INSPECTED BY MEANS OF THE VISUAL EJECTION OF SILICONE AS THE DTI PROTRUSIONS COMPRESS. SQUIRTER® DTI'S SHALL BE CALIBRATED PER MANUFACTURER'S INSTRUCTIONS PRIOR TO USE.

THE DIRECT TENSION INDICATOR (DTI) WASHERS SHALL BE THE "SQUIRTER® STYLE" AS MANUFACTURED BY:

APPLIED BOLTING TECHNOLOGY PRODUCTS, INC.
1413 ROCKINGHAM ROAD BELLOWS FALLS, VERMONT, USA 05101
PHONE 1-800-552-1999
WEBSITE: WWW.APPLIEDBOLTING.COM

DISTRIBUTORS OF SQUIRTER® DTI'S:
HTTP://WWW.APPLIEDBOLTING.COM/APPLIED-BOLTING-DISTRIBUTORS.HTML

DTI: USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 20 MM (M20) NOMINAL A325 BOLTS FOR THE AJAX M20 BOLTS. DTI'S SHALL NOT BE HOT-DIP GALVANIZED. DTI'S SHALL BE MECHANICALLY GALVANIZED (MG) BY THE COLD MECHANICAL PROCESS ONLY AS PROVIDED BY THE DTI MANUFACTURER.

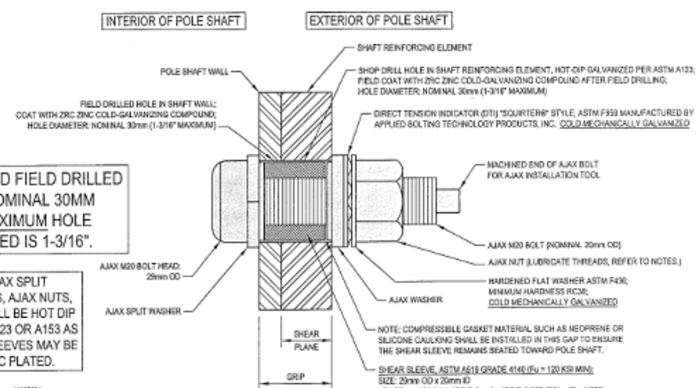
HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 20 MM (M20) NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY GALVANIZED BY THE COLD MECHANICAL PROCESS. ALTERNATIVELY, CORRECTLY MADE HOT DIP GALVANIZED HARDENED FLAT WASHERS HAVING A MINIMUM HARDNESS OF RC 38 CAN BE USED; CONTRACTOR SHALL PROVIDE DOCUMENTATION OF WASHER SPECIFICATION AND HARDNESS.

NUT LUBRICATION REQUIRED: PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW DTI MANUFACTURER INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING.

NOTE: COMPLETELY COMPRESSED DTI'S SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE OF A HARDENED FLAT WASHER, NEVER DIRECTLY AGAINST THE NUT.

CONTRACTOR SHALL FOLLOW DTI MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION, LUBRICATION, TIGHTENING AND INSPECTION.

INSPECTION REQUIRED: ALL AJAX BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009, BY A QUALIFIED BOLT INSPECTOR. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE AJAX BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. IN ADDITION, ALL AJAX BOLTS AND DTI'S SHALL BE VISUALLY INSPECTED ACCORDING TO THE DTI MANUFACTURER'S INSTRUCTIONS. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE PHOTO DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTI'S.



NOTE: ALL SHOP AND FIELD DRILLED HOLES SHALL BE NOMINAL 30MM DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1-3/16".

NOTE: ALL AJAX BOLTS, AJAX SPLIT WASHERS, AJAX WASHERS, AJAX NUTS, AND SHEAR SLEEVES SHALL BE HOT DIP GALVANIZED PER ASTM A123 OR A153 AS APPROPRIATE. SHEAR SLEEVES MAY BE COLD GALVANIZED OR ZINC PLATED.

TYPICAL AJAX BOLT DETAIL (1 / S-3)

STATE OF CONNECTICUT
JOSEPH ZACHARIAH JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

AUG 1 4 2013

LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse

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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570	ISSUE DATE OF PERMIT: 8-14-2013
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CHECKED BY: B.K.K.	
APPROVED BY:	S-3
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POLE SPECIFICATIONS	
POLE SHAPE TYPE:	12-SIDED POLYGON
TAPER:	0.325000 IN/FT
SHAFT STEEL:	ASTM A36M-42
BASE PL STEEL:	ASTM A36
ANCHOR RODS:	2"ø ASTM A36

SHAFT SECTION DATA

SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN) @ TOP	DIAMETER ACROSS FLATS (IN) @ BOTTOM
1	5.000	0.1875		18.000	18.000
2	50.00	0.2500	60.00	18.000	34.313
3	20.00	0.2500		32.181	38.688
4	20.00	0.3125	72.00	38.688	45.188
5	10.00	0.3125		42.613	45.813
6	40.00	0.3750	84.00	45.813	58.875
7	18.00	0.3750		55.639	61.688
8	21.00	0.4375	108.00	61.688	68.500
9	28.00	0.4375		64.705	73.813

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

CONTRACTOR SHALL PROVIDE ASTM A36 SHIM PLATES BELOW SLIP JOINTS. THE SHIM PLATES SHALL BE PLACED BETWEEN THE NEW SHAFT REINFORCEMENT AND THE EXISTING POLE SHAFT FROM THE SLIP JOINT TO THE NEW SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND A EXTRA LONG "SPLICE SHIM" SHALL BE PLACED BETWEEN THE NEW UPPER AND LOWER SHAFT REINFORCEMENT PLATES AT THE SHAFT REINFORCEMENT SPLICE PLATE LOCATION.

MODIFICATIONS:

(A) INSTALL NEW MICROPILES AND MICROPILE BRACKETS AT BASE PLATE. SEE SHEET S-5.

(B) INSTALL NEW SHAFT REINFORCING. SEE CHART.

LCC

AS-BUILT

No changes

Date 12-17-14

Signed K.A. Stackhouse

NEW AEROSOLUTIONS MP3 REINFORCING

ELEVATION	FLAT #	REINFORCING ELEMENT
38'-4" TO 53'-4"	1, 5 & 9	MP304
88'-4" TO 123'-4"	1, 5 & 9	MP305
118'-9" TO 153'-9"	2, 6 & 10	MP304

ALL BOLTS SHALL BE AJAX M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A519 GR 4140, MIN. Fu=120 KSI). CONTACT SUPPLIER FOR MATERIAL (PLATE & BOLTS) AND INSTALLATION PROCEDURES.

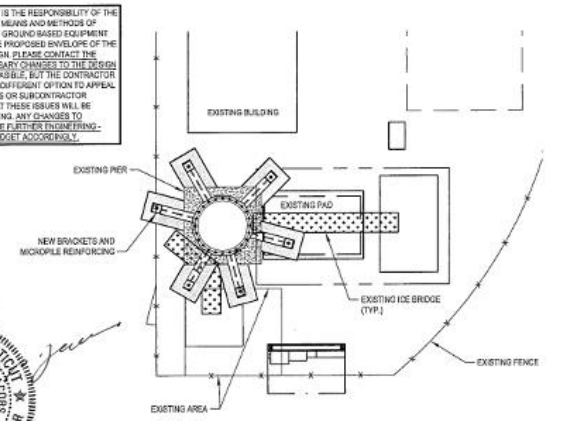
NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE

BOTTOM ELEVATION	TOP ELEVATION	FLAT #/ DEGREE SEPARATION	ELEMENT	ELEMENT LENGTH	ELEMENT QUANTITY	APPROXIMATE AJAX BOLTS PER ELEMENT	APPROXIMATE TOTAL AJAX BOLT QUANTITY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	ESTIMATED TOTAL STEEL WEIGHT
38'-6"	53'-6"	1, 5 & 9	1" x 4-1/2"	15'-0"	3	20	60	6	6	16"	689 LBS.
88'-6"	123'-6"	1, 5 & 9	1" x 6"	35'-0"	3	37	111	10	10	20"	2144 LBS.
119'-0"	154'-0"	2, 6 & 10	1" x 4-1/2"	35'-0"	3	39	117	8	8	16"	1608 LBS.
							288				4441 LBS.

NOTES:

1.) AJAX BOLTS ARE TO BE 20mm DIAMETER WITH CORRESPONDING 29mm DIAMETER SLEEVE WITH MATCHING STEEL GRADE.
2.) ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAYBE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.
3.) *ALL REINFORCING SHALL BE ASTM A572 GR. 65.
4.) *WELDS ARE ASSUMED E80XX OR GREATER. TERMINATION WELDS SHALL BE 3/8" FILLET WELDS.
5.) HOLES FOR AJAX BOLTS AND SHEAR SLEEVES ARE 30mm UNLESS NOTED OTHERWISE.
6.) *ALL SHIMS SHALL BE ASTM A-36.

SITE COORDINATION REQUIRED: IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE MEANS AND METHODS OF SHORING AND/OR RELOCATION OF GROUND BASED EQUIPMENT THAT IS WILL BE AFFECTED BY THE PROPOSED ENVELOPE OF THE CURRENT FOUNDATION MOD DESIGN. PLEASE CONTACT THE E.O.R. IF DESIGN INPUT OR NECESSARY CHANGES TO THE DESIGN ARE NEEDED. IF THE DESIGN IS FEASIBLE, BUT THE CONTRACTOR HAS A PREFERENCE TO INSTALL A DIFFERENT OPTION TO APPEAL TO MORE FAVORABLE TECHNIQUES OR SUBCONTRACTOR LIMITATIONS - IT IS EXPECTED THAT THESE ISSUES WILL BE ADDRESSED AT THE TIME OF BIDDING. ANY CHANGES TO ORIGINAL DESIGN WILL BE REQUIRE FURTHER ENGINEERING - CONTRACTOR IS EXPECTED TO BUDGET ACCORDINGLY.



PARTIAL SITE PLAN (2/S-4)

STATE OF CONNECTICUT JOSEPH PACHICARAH JACOBS No. PEN 22731 LICENSED PROFESSIONAL ENGINEER

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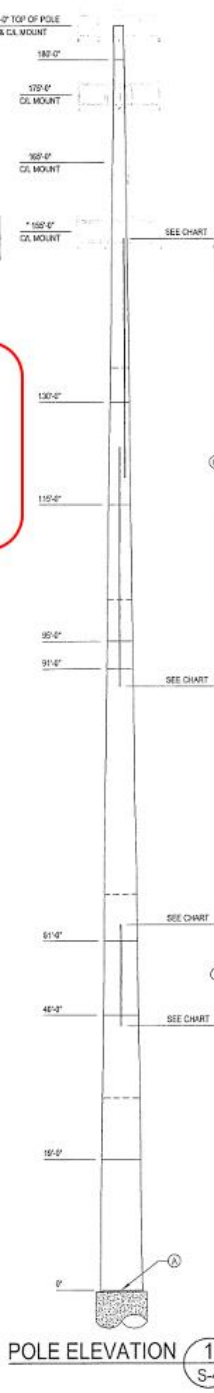
* EXISTING MOUNTS MAY NEED TO BE ADJUSTED, MOVED AND/OR TEMPORARILY SUPPORTED DURING THE INSTALLATION OF SHAFT REINFORCING



POLE ELEVATION (1/S-4)

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S-4

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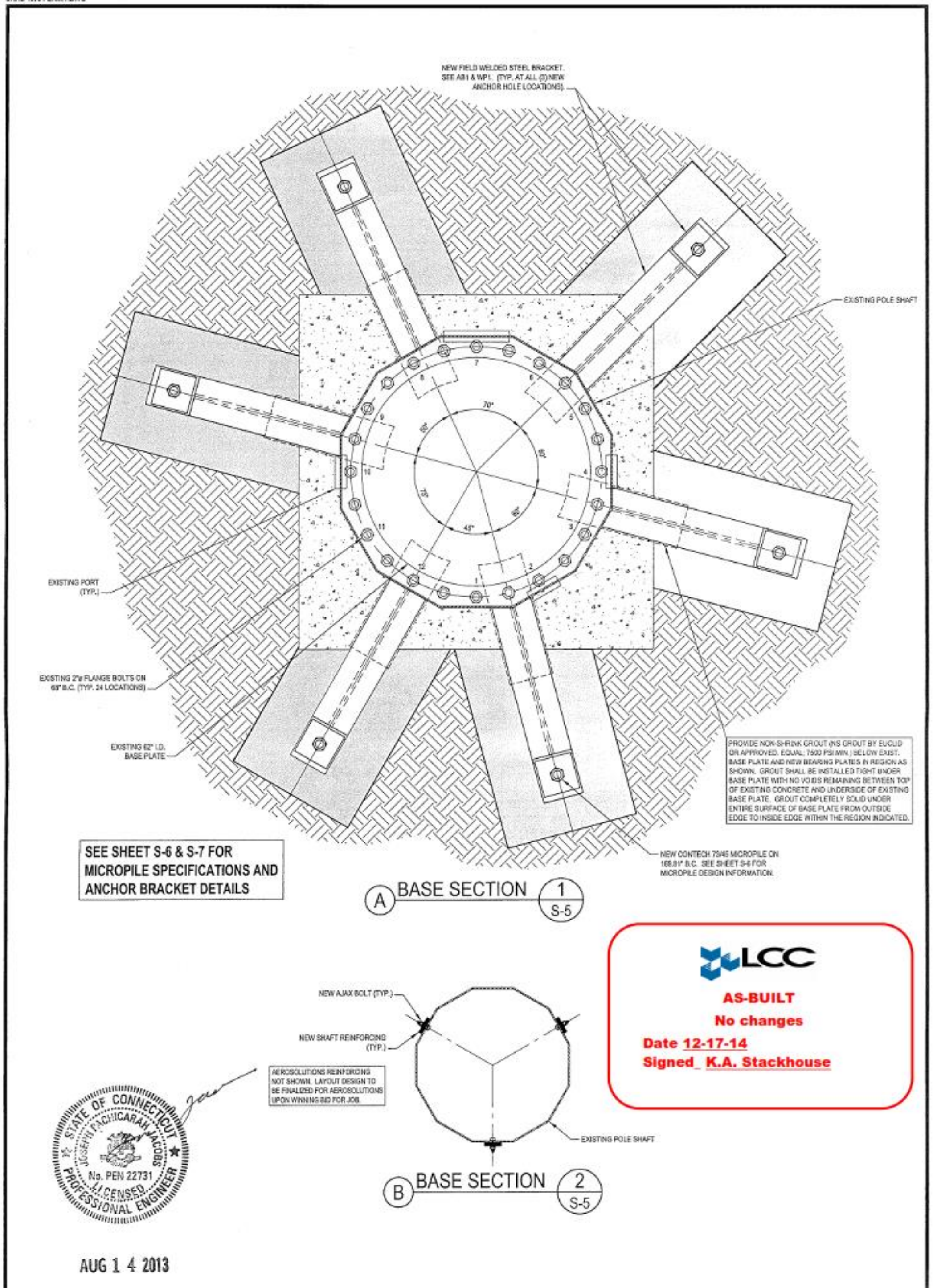

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MICROPILE TESTING REQUIREMENTS

A MINIMUM OF 2 IN-PLACE MICROPILES (TEST PILES SHALL BE IN OPPOSITE CORNERS) ARE TO BE TESTED TO 274k IN TENSION. ALL PILE TESTING SHALL BE CARRIED OUT IN GENERAL CONFORMANCE WITH ASTM D1143 OR D3689. A HYDRAULIC JACK MAY BE SUBSTITUTED FOR THE PILE TESTING SET-UPS SHOWN IN THE ASTM SPECS. IF A HYDRAULIC JACK IS USED, FOLLOW EQUIPMENT GUIDELINES DISCUSSED IN THE POST TENSIONING INSTITUTE "RECOMMENDATIONS FOR PRESTRESSED ROCK AND SOIL ANCHORS" DESIGN GUIDE, SECTION 8.2. PILES SHALL BE LOADED USING PTI'S PROOF TEST METHODOLOGY (REFER TO SECTION 8.3.3 OF THE PTI DESIGN GUIDE; ALIGNMENT LOAD, AL, SHALL BE 20 KIPS; DESIGN LOAD, DL, IS 206 KIPS). PROVISION SHALL BE MADE TO ALLOW FOR MOVEMENT BETWEEN MICROPILE CROSS-SECTION AND SOIL SO THAT GROUT-TO-SOIL BOND LINE IS ADEQUATELY TESTED. IF COMPRESSION TESTING IS PERFORMED, CONTRACTOR SHALL PROTECT BAR FROM DAMAGE DUE TO BUCKLING FOR LENGTH ABOVE GRADE.

MICROPILE NOTES:

1. ALL HOLLOW BAR STEEL AND ASSOCIATED HARDWARE SHALL BE SUPPLIED BY CON-TECH SYSTEMS OR OWNER/EOR APPROVED EQUIVALENT.
2. ALL HOLLOW BAR, NUTS AND BEARING PLATES SHALL BE HOT-DIP GALVANIZED PER ASTM A123 OR A153, AS APPROPRIATE.
3. CONTACT CON-TECH SYSTEMS (OR MANUFACTURER OF APPROVED ALTERNATE) FOR MATERIALS AND INSTALLATION PROCEDURES AND RECOMMENDATIONS.
4. SPECIAL INSPECTION OF THE MICROPILES IS REQUIRED AS FOLLOWS: (1) VERIFY THAT MICROPILE MATERIAL, SIZE AND LENGTH COMPLY WITH THE INFORMATION SHOWN ON THIS DRAWING, (2) VERIFY PLACEMENT OF EACH MICROPILE, (3) OBSERVE DRILLING, GROUTING AND TESTING (AS APPROPRIATE) OPERATIONS FOR EACH MICROPILE AND MAINTAIN COMPLETE AND ACCURATE RECORDS FOR EACH MICROPILE.
5. FOUNDATION DESIGN IS BASED ON THE ORIGINAL GEOTECHNICAL REPORT PREPARED BY FDH, DATED 8-2-2013.
6. CONTACT CONTECH SYSTEMS (OR MANUFACTURER OF APPROVED ALTERNATE) TO VERIFY NUT & WASHER CONNECTION ARE COMPATIBLE WITH MICROPILE THREADS

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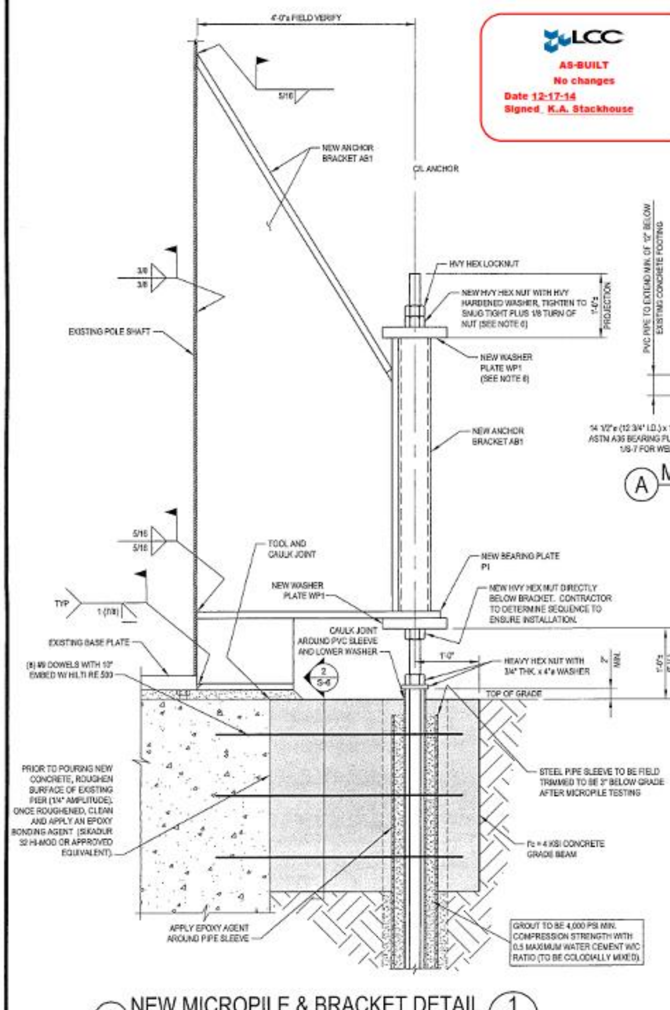
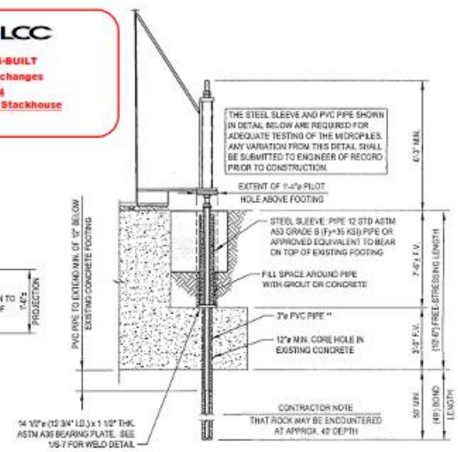
No changes
Date 12-17-14
Signed K.A. Stackhouse



NEW MICROPILE & BRACKET DETAIL (1 / S-6)

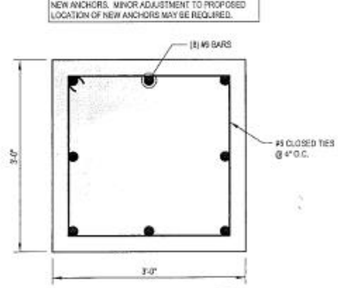


MICROPILE DEPTH DETAIL (3 / S-6)

** FILL GAP BETWEEN SLEEVE & BAR WITH CORROSION INHIBITING COMPOUND. REFER TO PTI MANUAL AND/OR MANUFACTURER SPECS FOR APPROVED COMPOUNDS.

CONTECH'S 73/45 HOLLOW BAR MICROPILE OR EQUIVALENT SYSTEM.

TAKE ALL MEASURES NECESSARY TO AVOID DAMAGING EXISTING REINFORCING BARS DURING DRILLING OPERATIONS. NOTIFY PAUL J. FORD AND COMPANY IMMEDIATELY IF EXISTING REINFORCING BARS ARE ENCOUNTERED AND INTERFERE WITH PLACEMENT OF NEW ANCHORS. MINOR ADJUSTMENT TO PROPOSED LOCATION OF NEW ANCHORS MAY BE REQUIRED.



SECTION (2 / S-6)

STATE OF CONNECTICUT — LICENSED PROFESSIONAL ENGINEER — No. PEN 22731

AUG 1 4 2013

PILE DESIGN PARAMETER SCHEDULE

PARAMETER / OPTIONS	MIN. HOLE ø/STEEL AREA	PILE CAPACITY (Pn/Ω)	ULTIMATE SKIN FRICTION (PSI)	FREESTRESSING LENGTH	FRICTION DEVELOPMENT LENGTH/BOND LENGTH	ROCK SOCKET/ PLUNGE LENGTH	TOTAL LENGTH
MICROPILE	* 12"ø / 4.02 IN² MIN.	218.9K	VARIES, SEE GEOTECH	5'	50'	N.A.	61'-3"

* THE DESIGN ANTICIPATES A FINAL GROUT DIAMETER OF 12" BASED ON A MINIMUM 280MM AUGER IN SILT W/ CLAY AND SAND. THE DESIGN REQUIRES UNCASED MICROPILES FOR THE LISTED CAPACITY IN TENSION AND COMPRESSION AS LAID OUT PER PLAN. THE CONTRACTOR/MICROPILE INSTALLER IS RESPONSIBLE FOR THE MEANS AND METHODS TO ENSURE THE NECESSARY CAPACITY AND WILL DEMONSTRATE THE INSTALLED CAPACITY PER THE SPECIFIED TESTING. THE EMBEDMENT DEPTH AND AUGER/GROUT DIAMETERS ARE LISTED AS A PRELIMINARY BASIS FOR BIDDING. THE INTENT IS FOR THE INSTALLER TO REVIEW THE CURRENT SOIL INFORMATION AND DESIGN REQUIREMENTS TO ENSURE THAT THE CONTRACTOR'S SPECIFIC EQUIPMENT OR INSTALLATION TECHNIQUE IS APPROPRIATE. IF THE CONTRACTOR BELIEVES THE SCOPE SHOULD CHANGE UPON REVIEW, PLEASE ADDRESS PRIOR TO BIDDING. PLEASE COORDINATE WITH ENGINEER OF RECORD PRIOR TO INSTALLATION.

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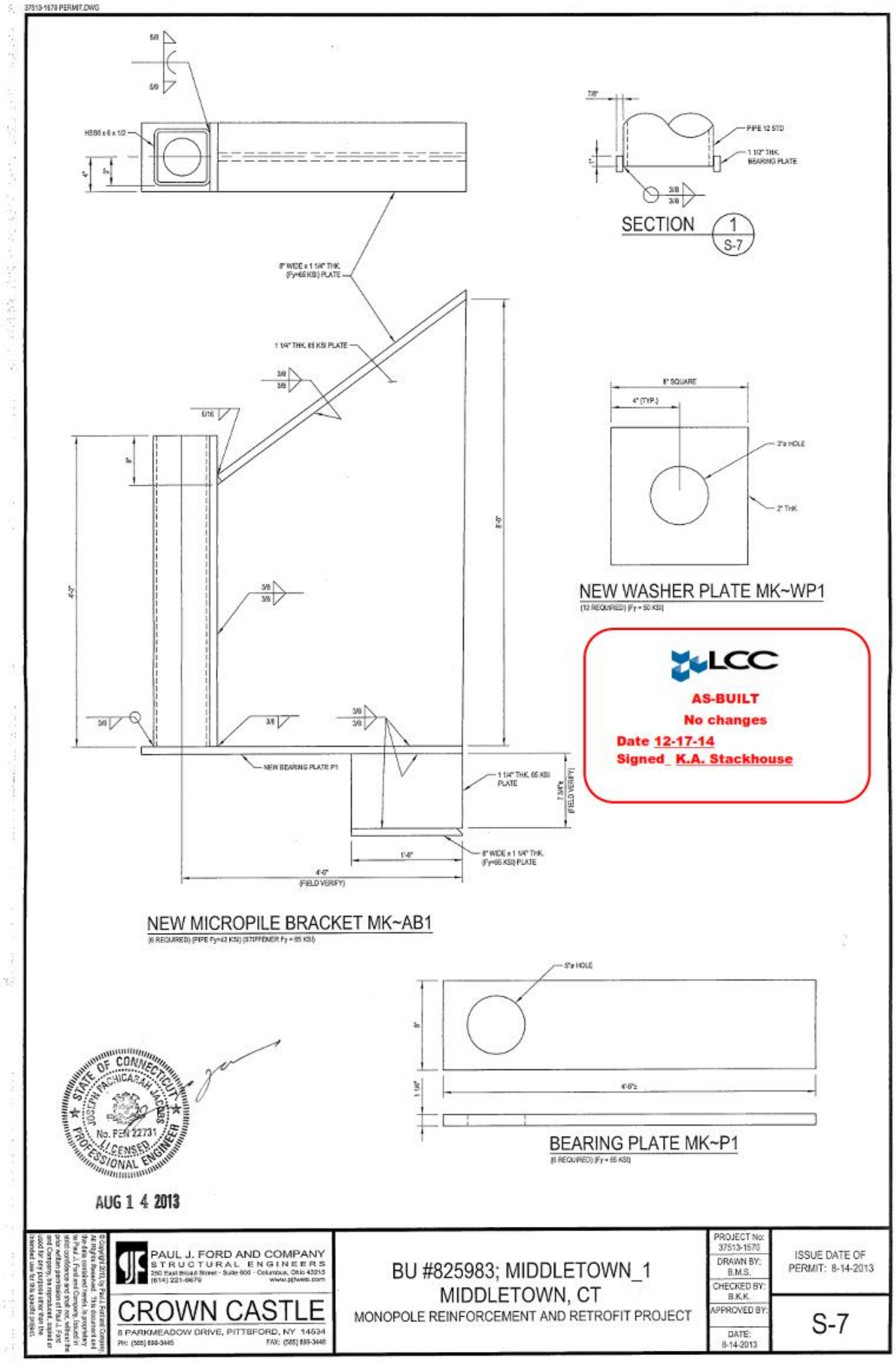
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570	ISSUE DATE OF PERMIT: 8-14-2013
DRAWN BY: B.M.S.	
CHECKED BY: B.K.K.	
APPROVED BY:	S-6
DATE: 8-14-2013	


37513-1570 PERMIT.DWG
HSS6 x 6 x 1/2
PIPE 12 STD
1 1/2" THK. BEARING PLATE
SECTION 1 S-7
8" WIDE x 1 1/4" THK. (Fy=65 KSI) PLATE
1 1/4" THK. 65 KSI PLATE
8" SQUARE
4" (TYP.)
3"ø HOLE
2" THK
NEW WASHER PLATE MK~WP1
(12 REQUIRED) (Fy = 50 KSI)
LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse
NEW BEARING PLATE P1
1 1/4" THK. 65 KSI PLATE
(FIELD VERIFY)
8" WIDE x 1 1/4" THK. (Fy=65 KSI) PLATE
1'-6"
4'-0" (FIELD VERIFY)
8'-0"
NEW MICROPILE BRACKET MK~AB1
(6 REQUIRED) (PIPE Fy=42 KSI) (STIFFENER Fy = 65 KSI)
5"ø HOLE
BEARING PLATE MK~P1
(6 REQUIRED) (Fy = 65 KSI)
STATE OF CONNECTICUT
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER
AUG 1 4 2013
PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT
PROJECT No: 37513-1570
DRAWN BY: B.M.S.
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APPROVED BY:
DATE: 8-14-2013
ISSUE DATE OF PERMIT: 8-14-2013
S-7

37513-1570 PERMIT.DWG

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 DRAWINGS, 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 RESIDES WITH THE EOR AT ALL TIMES.

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (NESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-SUL-10175 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 IN-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 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 AN DENG-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, PREFERABLE 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 INSPECTION(S) 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 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 MI'S
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 INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV 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.

PHOTOGRAPHS
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 AND TORQUE
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

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

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

MI CHECKLIST	
CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
PRE-CONSTRUCTION	
X	MI CHECKLIST DRAWINGS
X	EOR APPROVED SHOP DRAWINGS
X	FABRICATION INSPECTION
X	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
X	FABRICATOR NDE INSPECTION
X	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
CONSTRUCTION	
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
X	POST INSTALLED MICROPILE VERIFICATION
X	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK: LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
X	THIRD PARTY ONSITE INSPECTION OF BOLT PRETENSION PER CROWN REQUIREMENTS
X	INSPECTION OF AJAX BOLTS AND DTI'S PER REQUIREMENTS ON SHEET S-3
ADDITIONAL TESTING AND INSPECTIONS:	
POST-CONSTRUCTION	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
X	THIRD PARTY ONSITE BOLT INSPECTION REPORT
X	POST INSTALLED MICROPILE PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

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

LCC
AS-BUILT
No changes
Date 12-17-14
Signed_ K.A. Stackhouse

STATE OF CONNECTICUT
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

AUG 1 4 2013

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street · Suite 600 · Columbus, Ohio 43215
(614) 221-6679 www.pjfweb.com

CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
PH: (585) 899-3445 FAX: (585) 899-3448

BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570
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ISSUE DATE OF PERMIT: 8-14-2013

S-8

POST-CONSTRUCTION

6.3.1 MI INSPECTOR REDLINE OR RECORD DRAWING(S)

37513-1570 PERMIT.DWG

MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

SGS REDLINES
Discrepancies Noted
See Section 6.3.2

BU NUMBER; SITE NAME

BU #825983; MIDDLETOWN_1

APP: 185826 REV. 13; WO: 628395

SITE ADDRESS

90 INDUSTRIAL PARK ROAD
MIDDLETOWN, CT 06457
MIDDLESEX COUNTY

LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse

PROJECT NOTES

1. DETAILED FIELD INFORMATION REGARDING INTERFERENCES AND/OR EXISTING FIELD CONDITIONS MAY BE AVAILABLE ON CROWN'S CCISITES AND FROM CONTRACTOR'S PRE-MOD MAPPING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AND COORDINATE WITH THE AVAILABLE SOURCES OF INFORMATION ABOVE AND WITH THE PROJECT PLANS BEFORE PROCEEDING WITH THE WORK. CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND CROWN CASTLE FIELD PERSONNEL BEFORE PROCEEDING WITH THE WORK.

2. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

3. ALL STRUCTURAL BOLTS SHALL BE FIELD INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

4. (A.) DTI'S REQUIRED: ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAILS ON SHEET S-3 FOR REQUIREMENTS ON THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

   (B.) EFFECTIVE 5/30/2012: UNTIL FURTHER NOTICE, CROWN CASTLE WILL ACCEPT AJAX BOLTS TIGHTENED USING AISC "TURN-OF-NUT" METHOD. INSTALLERS SHALL FOLLOW CROWN GUIDELINES FOR AISC "TURN-OF-NUT" METHOD AND ALSO PROVIDE COMPLETE INSPECTION DOCUMENTATION IN THE PMI. PRIOR TO STARTING WORK, CONTRACTOR SHALL CONSULT WITH CROWN ENGINEERING TO DETERMINE WHETHER THIS POLICY IS STILL IN PLACE.

   (C.) REQUIREMENT EFFECTIVE 04/20/2013, PER CROWN CASTLE DIRECTIVE: ANY AND ALL STRUCTURAL BOLTS THAT ARE TIGHTENED TO THE PRETENSIONED CONDITION USING THE AISC "TURN-OF-NUT" TENSIONING PROCEDURE (NON-TENSION CONTROLLED ['NON-TC'] BOLTS AND/OR BOLTS WITHOUT DTI'S INSTALLED) SHALL BE INSPECTED ONSITE BY AN INDEPENDENT THIRD-PARTY BOLT INSPECTOR, AS APPROVED BY CROWN. **THIS INSPECTION IS REQUIRED TO BE AN ONSITE FIELD INSPECTION.** THE THIRD-PARTY BOLT INSPECTOR SHALL FOLLOW THE PUBLISHED CROWN CASTLE INSPECTION PROCEDURE "MI NON-TC BOLT INSPECTION", DATED APRIL 2013. THE THIRD-PARTY BOLT INSPECTOR SHALL PREPARE A FULLY DOCUMENTED BOLT INSPECTION REPORT, AS SPECIFIED BY CROWN, AND SHALL SUBMIT A COPY OF THE BOLT INSPECTION REPORT TO THE MI INSPECTOR, THE EOR, AND TO CROWN CASTLE.

5. NDE OF THE CIRCUMFERENTIAL WELD OF THE BASE PLATE TO SHAFT CONNECTION IS REQUIRED. SEE CCI DOCUMENTS ENG-SOW-1033 *'TOWER BASE PLATE NDE'* AND ENG-BUL-10051 *'NDE REQUIREMENTS FOR MONOPOLE BASE PLATE TO PREVENT CONNECTION FAILURE'*. NOTIFY THE EOR AND CROWN ENGINEERING IMMEDIATELY IF ANY CRACKS ARE SUSPECTED OR HAVE BEEN IDENTIFIED. THE NDE SHALL INCLUDE ALL EXISTING REINFORCEMENTS THAT HAVE BEEN WELDED TO THE BASE PLATE. ANY FULL PENETRATION WELDING TO THE BASE PLATE REQUIRED AS PART OF THIS ACTIVE REINFORCEMENT DESIGN SHALL BE INCLUDED IN THE NDE SCOPE OF WORK.

PROJECT CONTACTS:

MONOPOLE OWNER:
CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
CONTACT: STEVE TUTTLE
PH: (585) 899-3445

STRUCTURAL ENGINEER OF RECORD (EOR):
PAUL J. FORD AND COMPANY
250 EAST BROAD STREET, SUITE 600
COLUMBUS, OHIO 43215-3708
CONTACT: BRIAN KERMODE AT BKERMODE@PJFWEB.COM
PHONE: 614-221-6679

DESIGN STANDARD

THIS REINFORCEMENT DESIGN IS BASED UPON THE REQUIREMENTS OF THE TIA/EIA-222-F-1996 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, USING A DESIGN BASIC WIND SPEED OF 85 MPH (FASTEST MILE) WITH NO ICE, 38 MPH WITH 3/4 INCH ICE AND 50 MPH SERVICE LOADS.

REFER TO THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF STRUCTURAL ANALYSIS FOR THIS SITE (PJF#37513-1570), DATED 8-14-2013.

THIS PROJECT INCLUDES THE FOLLOWING REINFORCING ELEMENTS:

- SHAFT REINFORCING
- FIELD WELDED MICROPILE BRACKETS
- HIGH STRENGTH GROUT
- FOUNDATION AUGMENTATION: MICROPILES

SHEET INDEX

SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
S-1	GENERAL NOTES
S-2	GENERAL NOTES
S-3	AJAX BOLT DETAIL
S-4	MONOPOLE PROFILE
S-5	BASE PLATE DETAILS
S-6	MICROPILE DETAILS
S-7	MISC DETAILS
S-8	MI CHECKLIST

STATE OF CONNECTICUT
JOSEPH PACHICARAH JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

AUG 1 4 2013

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street - Suite 600 - Columbus, Ohio 43215
(614) 221-6679 www.pjfweb.com

CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

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DRAWN BY: B.M.S.
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APPROVED BY:
DATE: 8-14-2013

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T-1

37513-1570 PERMIT.DWG

CROWN CASTLE PROJECT: BU #825983; MIDDLETOWN_1; MIDDLETOWN, CT
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 2, 1/22/2009)

A. GENERAL NOTES

1. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO FABRICATION AND CONSTRUCTION. THESE DRAWINGS WERE PREPARED FROM INFORMATION AND DOCUMENTS PROVIDED TO PAUL J. FORD & COMPANY BY CROWN CASTLE. THIS INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY PAUL J. FORD & COMPANY FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. ANY DISCREPANCIES AND/OR CHANGES BETWEEN THE INFORMATION CONTAINED IN THESE DRAWINGS AND THE ACTUAL VERIFIED SITE CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF CROWN CASTLE AND PAUL J. FORD & COMPANY SO THAT ANY CHANGES AND/OR ADJUSTMENTS, IF NECESSARY, CAN BE MADE TO THE DESIGN AND DRAWINGS.
2. THE EXISTING UNREINFORCED MONOPOLE STRUCTURE DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE ANTENNA AND PLATFORM LOADS SHOWN ON THESE DRAWINGS AT THE REQUIRED MINIMUM TIA/EIA-222-F BASIC WIND SPEEDS. DO NOT INSTALL ANY ADDITIONAL OR NEW ANTENNA AND PLATFORM LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.
3. IF MATERIALS, QUANTITIES, STRENGTHS OR SIZES INDICATED BY THE DRAWINGS OR SPECIFICATIONS ARE NOT IN AGREEMENT WITH THESE NOTES, THE BETTER QUALITY AND/OR GREATER QUANTITY, STRENGTH OR SIZE INDICATED, SPECIFIED OR NOTED SHALL BE PROVIDED.
4. THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN PROPERLY AND ADEQUATELY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO INSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND ITS COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT. IMPORTANT CUTTING, WELDING AND SAFETY GUIDELINES: THE CONTRACTOR SHALL FOLLOW ALL CROWN CASTLE CUTTING, WELDING, FIRE PREVENTION AND SAFETY GUIDELINES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES FROM CROWN CASTLE. PER THE 12-01-2005 CROWN CASTLE DIRECTIVE: "ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CROWN CASTLE POLICY 'CUTTING AND WELDING PLAN' (DOC # ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT".
5. THE STRUCTURAL CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OR MEANS OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES.
6. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY THE INSPECTION/TESTING AGENCY. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
7. ALL MATERIALS AND EQUIPMENT FURNISHED WILL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.
10. ANY EXISTING ATTACHMENTS AND/OR PROJECTIONS ON THE POLE THAT MAY INTERFERE WITH THE INSTALLATION OF THE REINFORCING SYSTEM WILL HAVE TO BE REMOVED, AND/OR RELOCATED, AND/OR REPLACED AND RE-INSTALLED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH THE OWNER, TESTING AGENCY, AND ENGINEER.
11. ANY AND ALL EXISTING PLATFORMS THAT ARE LOCATED IN AREAS OF THE POLE SHAFT WHERE SHAFT REINFORCING MUST BE APPLIED SHALL BE TEMPORARILY REMOVED OR OTHERWISE SUPPORTED TO PERMIT NEW CONTINUOUS REINFORCEMENT TO BE ATTACHED. AFTER THE CONTRACTOR HAS SUCCESSFULLY INSTALLED THE MONOPOLE REINFORCEMENT SYSTEM, THE CONTRACTOR SHALL RE-INSTALL THE PLATFORMS. IN NO CASE SHALL ANY NEW AND/OR ADDITIONAL PLATFORMS AND/OR ANTENNAS AND/OR COAX CABLES AND/OR OTHER EQUIPMENT BE INSTALLED ON THE MONOPOLE UNTIL THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF ALL OF THE REQUIRED STRUCTURAL REINFORCING SYSTEM COMPONENTS.

B. (SECTION NOT USED)

SGS
REDLINES
Discrepancies Noted
See Section 6.3.2

LCC
AS-BUILT
No changes
Date 12-17-14
Signed_ K.A. Stackhouse

STATE OF CONNECTICUT
No. PEN 22731
LICENSED
PROFESSIONAL ENGINEER

AUG 1 4 2013

C. SPECIAL INSPECTION AND TESTING

1. ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY THE OWNER'S REPRESENTATIVE AND THE OWNER'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY. REFER TO CROWN CASTLE DOCUMENT ENG-SOW-10066 FOR SPECIFICATION.
2. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE PERFORMED SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
3. OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
4. AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY THE OWNER FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
   - (A.) ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
   - (B.) THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO, AND COORDINATE WITH, THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
5. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES FOR THE OWNER. THE TESTING AGENCY SHALL INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.

A. GENERAL:
   - (1.) PERFORM CONTINUOUS ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY OWNER IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.

B. FOUNDATIONS, CONCRETE, AND SOIL PREPARATION
   - (1.) VERIFY MATERIALS AT BOTTOM OF EXCAVATION ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.
   - (2.) VERIFY THAT EXCAVATIONS HAVE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.
   - (3.) PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS.
   - (4.) VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESS DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.
   - (5.) PRIOR TO PLACEMENT OF COMPACTED FILL, OBSERVE SUBGRADE AND VERIFY SITE HAS BEEN PREPARED PROPERLY.

C. CONCRETE TESTING PER ACI - (NOT REQUIRED)

D. STRUCTURAL STEEL
   - (1.) CHECK THE STEEL ON THE JOB WITH THE PLANS.
   - (2.) CHECK MILL CERTIFICATIONS.
   - (3.) CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
   - (4.) INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
   - (5.) CALL FOR LABORATORY TEST REPORTS WHEN IN DOUBT.
   - (6.) CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
   - (7.) CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
   - (8.) CHECK BOLT TIGHTENING ACCORDING TO AISC "TURN OF THE NUT" METHOD.

E. WELDING:
   - (1.) VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.
   - (2.) INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND IN ACCORDANCE WITH AWS D1.1.
   - (3.) APPROVE FIELD WELDING SEQUENCE.
     - (A.) A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO THE OWNER BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM THE OWNER.
   - (4.) INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
     - (A.) INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE AND WORKING CONDITIONS.
     - (B.) VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
     - (C.) INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
     - (D.) VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1.
     - (E.) SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE OR DYE PENETRANT.
     - (F.) INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED PLANS.
     - (G.) VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
     - (H.) REVIEW THE REPORTS BY TESTING LABS.
     - (I.) CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
     - (J.) INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
     - (K.) CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.

F. SPECIAL INSPECTION OF EXISTING SHAFT-TO-FLANGE WELD CONNECTIONS:
   - (1.) PRIOR TO CONSTRUCTION, TESTING AGENCY SHALL INSPECT CONDITION OF EXISTING SHAFT-TO-BASE-PLATE WELD CONNECTION. ALSO INSPECT EXISTING STIFFENERS IF PRESENT. THE INSPECTOR SHALL USE THE FOLLOWING INSPECTION METHODS, OR COMBINATION OF METHODS, AS REQUIRED TO IDENTIFY ANY CRACKS: VISUAL, MAGNETIC PARTICLE, AND/OR ULTRA-SONIC. IN ADDITION, OTHER TEST METHODS MAY ALSO BE USED AT THE RECOMMENDATION OF THE TESTING AGENCY AND UPON THE APPROVAL OF THE OWNER AND THE ENGINEER. THE TESTING AGENCY SHALL PROVIDE CAREFUL AND THOROUGH DOCUMENTATION OF THIS INSPECTION TO THE OWNER AND THE ENGINEER. TESTING AGENCY SHALL COORDINATE THESE INSPECTION ACTIVITIES WITH THE OWNER'S REQUIRED PROCESSES AND PROCEDURES. IMPORTANT: THE TESTING AGENCY SHALL IMMEDIATELY REPORT ANY INDICATIONS OF CRACKS, FRACTURES, DISTRESS, AND/OR CORROSION TO THE OWNER AND ENGINEER.
   - (2.) AFTER CONSTRUCTION, TESTING AGENCY SHALL INSPECT ANY AND ALL FIELD REPAIRS IMPLEMENTED AS REQUIRED BY THE OWNER FROM THE RESULTS OF THE INSPECTION IN THE PREVIOUS NOTE 5.F.(1.) ABOVE.
   - (3.) REFER TO CROWN CASTLE DOCUMENTS ENG-SOW-10033 AND ENG-BUL-10051 FOR SPECIFICATIONS.

G. REPORTS:
   - (1.) COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO THE OWNER.

6. THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL-INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DECIDE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES AND PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO THE OWNER'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT THE OWNER'S REVIEW AND SPECIFIC WRITTEN CONSENT. THE OWNER RESERVES THE RIGHT TO DETERMINE WHAT IS AN ACCEPTABLE RESOLUTION OF DISCREPANCIES AND PROBLEMS.
7. AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO THE OWNER. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
8. RESPONSIBILITY: THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATIONS. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.

PAUL J. FORD AND COMPANY STRUCTURAL ENGINEERS 250 East Broad Street - Suite 600 - Columbus, Ohio 43215 (614) 221-6679 www.pjfweb.com CROWN CASTLE 8 PARKMEADOW DRIVE, PITTSFORD, NY 14534 PH: (585) 899-3445 FAX: (585) 899-3448	BU #825983; MIDDLETOWN_1 MIDDLETOWN, CT MONOPOLE REINFORCEMENT AND RETROFIT PROJECT	PROJECT No: 37513-1570 DRAWN BY: B.M.S. CHECKED BY: B.K.K. APPROVED BY: DATE: 8-14-2013	ISSUE DATE OF PERMIT: 8-14-2013 S-1

37513-1570 PERMIT.DWG

D. **STRUCTURAL STEEL**

1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:
   - A. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
     - (A.) "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
     - (B.) "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS OF THE ENGINEERING FOUNDATION.
     - (C.) "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (PARAGRAPH 4.2.1 SPECIFICALLY EXCLUDED).
   - B. BY THE AMERICAN WELDING SOCIETY (AWS):
     - (A.) "STRUCTURAL WELDING CODE - STEEL D1.1."
     - (B.) "SYMBOLS FOR WELDING AND NON-DESTRUCTIVE TESTING"
2. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
3. TIGHTEN ALL STRUCTURAL BOLTS, INCLUDING THE AJAX M20 BOLTS WITH SHEAR SLEEVES, ACCORDING TO THE REQUIREMENTS OF THE AISC "TURN OF THE NUT" METHOD. TIGHTEN BOLTS 1/3 TURN PAST THE SNUG TIGHT CONDITION AS DEFINED BY AISC.
4. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E80XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO THE OWNER'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65 (FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
7. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION I NOTES REGARDING TOUCH-UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
8. UNLESS OTHERWISE NOTED, ALL STEEL MEMBERS SHALL BE HOT-DIP GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH ASTM A123. SEE SECTION J FOR FURTHER NOTES AND FOR EXCEPTIONS (IF ANY).
9. ALL WELDS SHALL BE VISUALLY INSPECTED BY THE OWNER'S APPROVED TESTING AGENCY. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT. THE CONTRACTOR SHALL COOPERATE WITH THE TESTING AGENCY IN THEIR TESTING EFFORTS.
10. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
11. FIELD CUTTING OF STEEL:
    - (A.) PRIOR TO ANY FIELD CUTTING, THE CONTRACTOR SHALL MARK THE CUT OUTLINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS.
    - (B.) ANY REQUIRED CUTS IN THE STEEL SHALL BE CAREFULLY CUT BY MECHANICAL METHODS SUCH AS DRILLING, SAW CUTTING, AND GRINDING. THE CONTRACTOR IS RESPONSIBLE TO PREVENT ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, DURING THE CUTTING WORK. ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
    - (C.) ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.

E. **BASE PLATE GROUT**

1. NEW GROUT FOR THE POLE BASE SHALL BE NON-SHRINK, NON-METALLIC, GROUT (EUCO NS GROUT BY EUCLID, OR APPROVED EQUAL) WITH A 7500 PSI MINIMUM COMPRESSIVE STRENGTH. PVC DRAINAGE PIPES SHALL BE PROVIDED FROM INSIDE THE POLE SHAFT CUT THROUGH THE GROUT SPACE UNDER THE BASE PLATE IN ORDER TO ALLOW MOISTURE TO ADEQUATELY DRAIN FROM THE INTERIOR OF THE POLE SHAFT. CONTRACTOR SHALL SUBMIT PROPOSED GROUT SPECIFICATION INFORMATION TO THE OWNER FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION. CONTRACTOR SHALL FOLLOW GROUT MANUFACTURER'S SPECIFICATIONS FOR COLD WEATHER GROUTING PROCEDURES (IF NECESSARY) AND THE TESTING AGENCY SHALL PREPARE GROUT SAMPLE SPECIMENS FOR COMPRESSIVE STRENGTH TESTING AND VERIFICATION.
2. GROUT SHALL BE INSTALLED TIGHT UNDER BASE PLATE WITH NO VOIDS REMAINING BETWEEN TOP OF EXISTING CONCRETE AND UNDERSIDE OF EXISTING BASE PLATE (EXCEPT FOR DRAIN PIPES). GROUT COMPLETELY SOLID (EXCEPT FOR DRAIN PIPES) UNDER ENTIRE SURFACE OF BASE PLATE FROM OUTSIDE EDGE TO INSIDE EDGE.

F. **FOUNDATION WORK - (NOT REQUIRED)**

G. **CAST-IN-PLACE CONCRETE - (NOT REQUIRED)**

H. **EPOXY GROUTED REINFORCING ANCHOR RODS - (NOT REQUIRED)**

I. **TOUCH UP OF GALVANIZING**

1. THE CONTRACTOR SHALL TOUCH UP ANY AND/OR ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED DURING CONSTRUCTION. **GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.**
2. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. THE OWNER'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.
3. THE OWNER'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE INADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.

J. **HOT DIP GALVANIZING**

1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.
2. PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING.
3. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES AS REQUIRED.
4. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.

K. **PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER**

1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY THE OWNER, THE OWNER WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
2. THE MONOPOLE REINFORCING SYSTEM INDICATED IN THESE DOCUMENTS USES REINFORCING COMPONENTS THAT INVOLVE FIELD WELDING STEEL MEMBERS TO THE EXISTING GALVANIZED STEEL POLE STRUCTURE. THESE FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. **ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE CONNECTED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT THE OWNER REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.**
3. THE OWNER SHALL REFER TO TIA/EIA-222-F-1996, SECTION 14 AND ANNEX E FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY THE OWNER BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. **PAUL J. FORD & COMPANY RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT.** ACCORDING TO TIA/EIA-222-F-1996 SECTION 14.1, NOTE 1: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

SGS
REDLINES
Discrepancies Noted
See Section 6.3.2

LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse

STATE OF CONNECTICUT
JOSEPH PACHICARAH JACOBS
No. PEN 22731
LICENSED
PROFESSIONAL ENGINEER

AUG 1 4 2013

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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570	ISSUE DATE OF PERMIT: 8-14-2013
DRAWN BY: B.M.S.	
CHECKED BY: B.K.K.	
APPROVED BY:	S-2
DATE: 8-14-2013	

37513-1570 PERMIT.DWG

AJAX BOLT NOTE SHEET: REV. 1.4, 5-20-2013

NOTES: 1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

3. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAIL BELOW FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

4. ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. DTI'S SHALL BE THE SQUIRTER® STYLE, MADE TO ASTM F959 LATEST REVISION; AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF RC 38 OR HIGHER.

NOTES FOR AJAX M20 'ONE-SIDE' BOLTS WITH DIRECT TENSION INDICATORS (DTI'S):

DTI'S REQUIRED: DTI'S SHALL BE "SELF-INDICATING" SQUIRTER® STYLE DTI'S MADE WITH SILICONE EMBEDDED IN THEM, INSPECTED BY MEANS OF THE VISUAL EJECTION OF SILICONE AS THE DTI PROTRUSIONS COMPRESS. SQUIRTER® DTI'S SHALL BE CALIBRATED PER MANUFACTURER'S INSTRUCTIONS PRIOR TO USE.

SGS REDLINES
Discrepancies Noted
See Section 6.3.2

THE DIRECT TENSION INDICATOR (DTI) WASHERS SHALL BE THE "SQUIRTER® STYLE" AS MANUFACTURED BY:

APPLIED BOLTING TECHNOLOGY PRODUCTS, INC.
1413 ROCKINGHAM ROAD BELLOWS FALLS, VERMONT, USA 05101
PHONE 1-800-552-1999
WEBSITE: WWW.APPLIEDBOLTING.COM

DISTRIBUTORS OF SQUIRTER® DTI'S:
HTTP://WWW.APPLIEDBOLTING.COM/APPLIED-BOLTING-DISTRIBUTORS.HTML

DTI: USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 20 MM (M20) NOMINAL A325 BOLTS FOR THE AJAX M20 BOLTS. DTI'S SHALL NOT BE HOT-DIP GALVANIZED. DTI'S SHALL BE MECHANICALLY GALVANIZED (MG) BY THE COLD MECHANICAL PROCESS ONLY AS PROVIDED BY THE DTI MANUFACTURER.

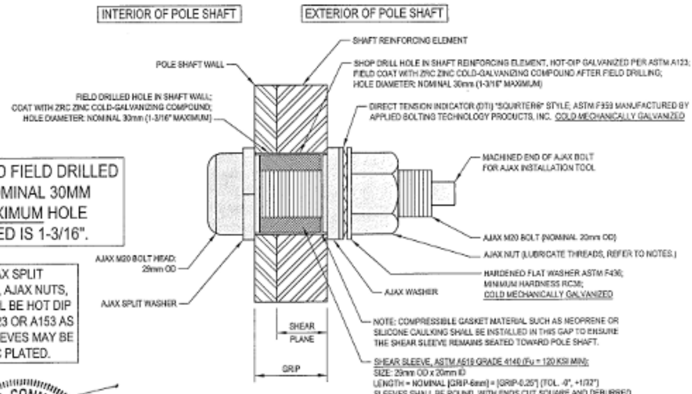
HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 20 MM (M20) NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY GALVANIZED BY THE COLD MECHANICAL PROCESS. ALTERNATIVELY, CORRECTLY MADE HOT DIP GALVANIZED HARDENED FLAT WASHERS HAVING A MINIMUM HARDNESS OF RC 38 CAN BE USED; CONTRACTOR SHALL PROVIDE DOCUMENTATION OF WASHER SPECIFICATION AND HARDNESS.

NUT LUBRICATION REQUIRED: PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW DTI MANUFACTURER INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING.

NOTE: COMPLETELY COMPRESSED DTI'S SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE OF A HARDENED FLAT WASHER, NEVER DIRECTLY AGAINST THE NUT.

CONTRACTOR SHALL FOLLOW DTI MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION, LUBRICATION, TIGHTENING AND INSPECTION.

INSPECTION REQUIRED: ALL AJAX BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009, BY A QUALIFIED BOLT INSPECTOR. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE AJAX BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. IN ADDITION, ALL AJAX BOLTS AND DTI'S SHALL BE VISUALLY INSPECTED ACCORDING TO THE DTI MANUFACTURER'S INSTRUCTIONS. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE PHOTO DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTI'S.



NOTE: ALL SHOP AND FIELD DRILLED HOLES SHALL BE NOMINAL 30MM DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1-3/16".

NOTE: ALL AJAX BOLTS, AJAX SPLIT WASHERS, AJAX WASHERS, AJAX NUTS, AND SHEAR SLEEVES SHALL BE HOT DIP GALVANIZED PER ASTM A123 OR A153 AS APPROPRIATE. SHEAR SLEEVES MAY BE COLD GALVANIZED OR ZINC PLATED.

TYPICAL AJAX BOLT DETAIL (1 / S-3)

STATE OF CONNECTICUT
JOSEPH ZACHARIAH JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

AUG 1 4 2013

LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse

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BU #825983; MIDDLETOWN_1
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MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570	ISSUE DATE OF PERMIT: 8-14-2013
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APPROVED BY:	S-3
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37613-1570 PERMIT.DWG

POLE SPECIFICATIONS	
POLE SHAPE TYPE:	12-SIDED POLYGON
TAPER:	0.325000 IN/FT
SHAFT STEEL:	ASTM A36M-42
BASE PL. STEEL:	ASTM A36
ANCHOR RODS:	2"ø ASTM A36

SHAFT SECTION DATA

SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN) @ TOP	DIAMETER ACROSS FLATS (IN) @ BOTTOM
1	5.000	0.1875		18.000	18.000
2	50.00	0.2500	60.00	18.000	34.313
3	20.00	0.2500		32.161	38.688
4	20.00	0.3125	72.00	38.088	45.188
5	10.00	0.3125		42.613	45.813
6	40.00	0.3750	84.00	45.813	58.875
7	18.00	0.3750		55.639	61.888
8	21.00	0.4375	108.00	61.088	68.500
9	28.00	0.4375		64.705	73.813

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

CONTRACTOR SHALL PROVIDE ASTM A36 SHIM PLATES BELOW SLIP JOINTS. THE SHIM PLATES SHALL BE PLACED BETWEEN THE NEW SHAFT REINFORCEMENT AND THE EXISTING POLE SHAFT FROM THE SLIP JOINT TO THE NEW SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND A EXTRA LONG "SPLICE SHIM" SHALL BE PLACED BETWEEN THE NEW UPPER AND LOWER SHAFT REINFORCEMENT PLATES AT THE SHAFT REINFORCEMENT SPLICE PLATE LOCATION.

MODIFICATIONS:

(A) INSTALL NEW MICROPILES AND MICROPILE BRACKETS AT BASE PLATE. SEE SHEET S-5.

(B) INSTALL NEW SHAFT REINFORCING. SEE CHART.

NEW AEROSOLUTIONS MP3 REINFORCING

ELEVATION	FLAT #	REINFORCING ELEMENT
38'-4" TO 53'-4"	1, 5 & 9	MP304
88'-4" TO 123'-4"	1, 5 & 9	MP305
118'-9" TO 153'-9"	2, 6 & 10	MP304

ALL BOLTS SHALL BE AJAX M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A519 GR 4140, MIN. Fu=120 KSI). CONTACT SUPPLIER FOR MATERIAL (PLATE & BOLTS) AND INSTALLATION PROCEDURES.

SGS REDLINES
Discrepancies Noted
See Section 6.3.2

LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse

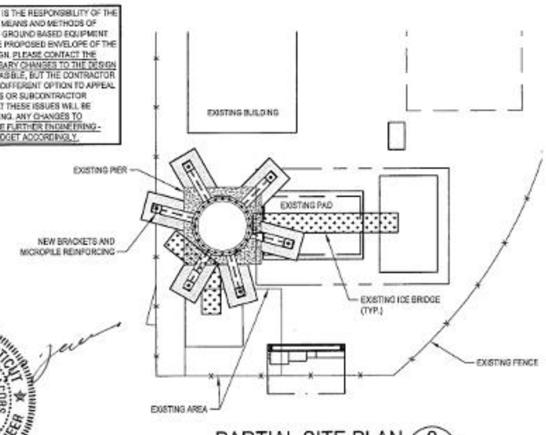
NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE

BOTTOM ELEVATION	TOP ELEVATION	FLAT #/ DEGREE SEPARATION	ELEMENT	ELEMENT LENGTH	ELEMENT QUANTITY	APPROXIMATE AJAX BOLTS PER ELEMENT	APPROXIMATE TOTAL AJAX BOLT QUANTITY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	ESTIMATED TOTAL STEEL WEIGHT
38'-6"	53'-6"	1, 5 & 9	1"x 4-1/2"	15'-0"	3	20	60	6	6	16"	689 LBS.
88'-6"	123'-6"	1, 5 & 9	1"x 6"	35'-0"	3	37	111	10	10	20"	2144 LBS.
119'-0"	154'-0"	2, 6 & 10	1"x 4-1/2"	35'-0"	3	39	117	8	8	16"	1608 LBS.
							288				4441 LBS.

NOTES:

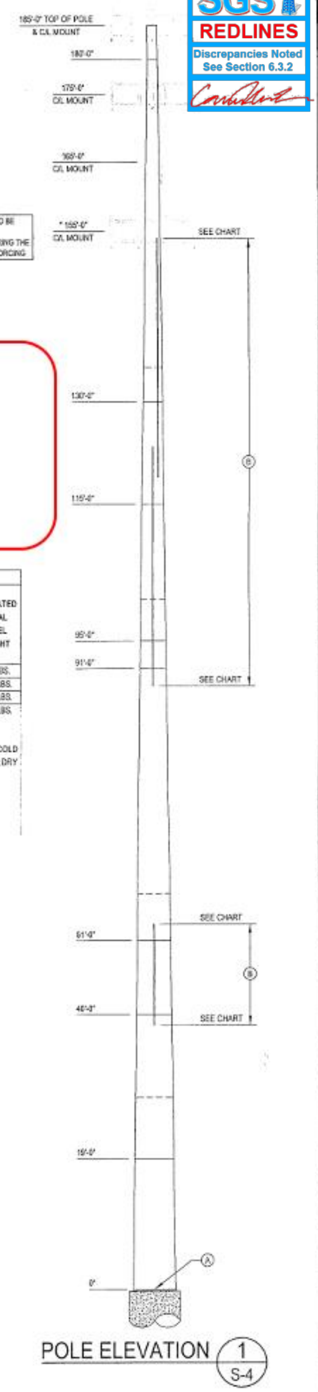
1.) AJAX BOLTS ARE TO BE 20mm DIAMETER WITH CORRESPONDING 29mm DIAMETER SLEEVE WITH MATCHING STEEL GRADE.
2.) ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.
3.) ALL REINFORCING SHALL BE ASTM A572 GR. 65.
4.) WELDS ARE ASSUMED E80XX OR GREATER. TERMINATION WELDS SHALL BE 3/8" FILLET WELDS.
5.) HOLES FOR AJAX BOLTS AND SHEAR SLEEVES ARE 30mm UNLESS NOTED OTHERWISE.
6.) ALL SHIMS SHALL BE ASTM A-36.

SITE COORDINATION REQUIRED: IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE MEANS AND METHODS OF SHORING AND/OR RELOCATION OF GROUND BASED EQUIPMENT THAT IS WILL BE AFFECTED BY THE PROPOSED ENVELOPE OF THE CURRENT FOUNDATION MOD DESIGN. PLEASE CONTACT THE E.O.R. IF DESIGN INPUT OR NECESSARY CHANGES TO THE DESIGN ARE NEEDED. IF THE DESIGN IS FEASIBLE, BUT THE CONTRACTOR HAS A PREFERENCE TO INSTALL A DIFFERENT OPTION TO APPEAL TO MORE FAVORABLE TECHNIQUES OR SUBCONTRACTOR LIMITATIONS - IT IS EXPECTED THAT THESE ISSUES WILL BE ADDRESSED AT THE TIME OF BIDDING. ANY CHANGES TO ORIGINAL DESIGN WILL BE REQUIRE FURTHER ENGINEERING - CONTRACTOR IS EXPECTED TO BUDGET ACCORDINGLY.



PARTIAL SITE PLAN (2/S-4)

AUG 1 4 2013



POLE ELEVATION (1/S-4)

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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

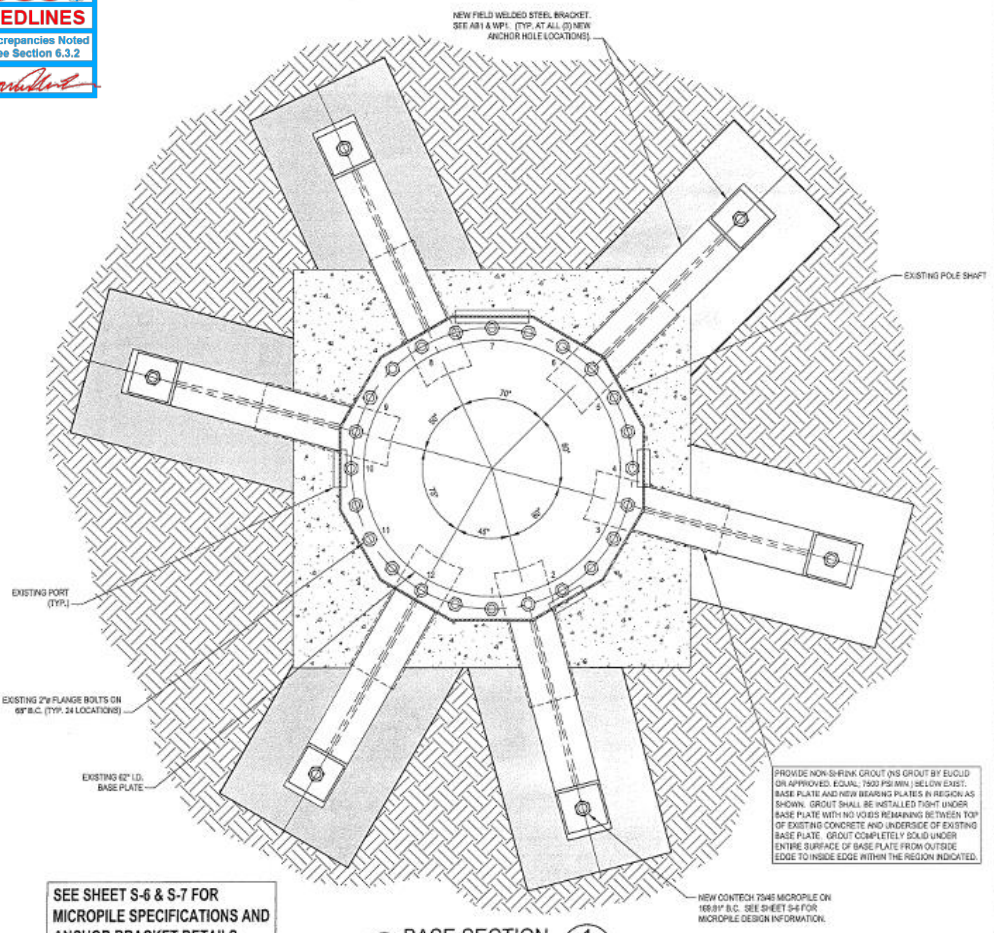
PROJECT No: 37513-1570
DRAWN BY: B.M.S.
CHECKED BY: B.K.K.
APPROVED BY:
DATE: 8-14-2013

ISSUE DATE OF PERMIT: 8-14-2013

S-4

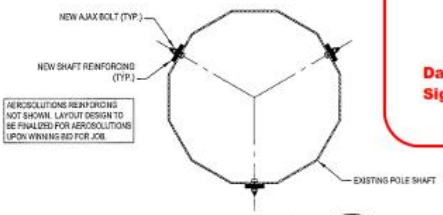
37513-1570 PERMIT.DWG

SGS REDLINES
Discrepancies Noted
See Section 6.3.2



SEE SHEET S-6 & S-7 FOR MICROPILE SPECIFICATIONS AND ANCHOR BRACKET DETAILS

A BASE SECTION 1 / S-5



AEROSOLUTIONS REINFORCING NOT SHOWN. LAYOUT DESIGN TO BE FINALIZED FOR AEROSOLUTIONS UPON WINNING BID FOR JOB.

B BASE SECTION 2 / S-5

LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse

STATE OF CONNECTICUT
JOSEPH PACHIGARAN JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

AUG 1 4 2013

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APPROVED BY:	S-5
DATE: 8-14-2013	

37513-1570 PERMIT.DWG

MICROPILE TESTING REQUIREMENTS

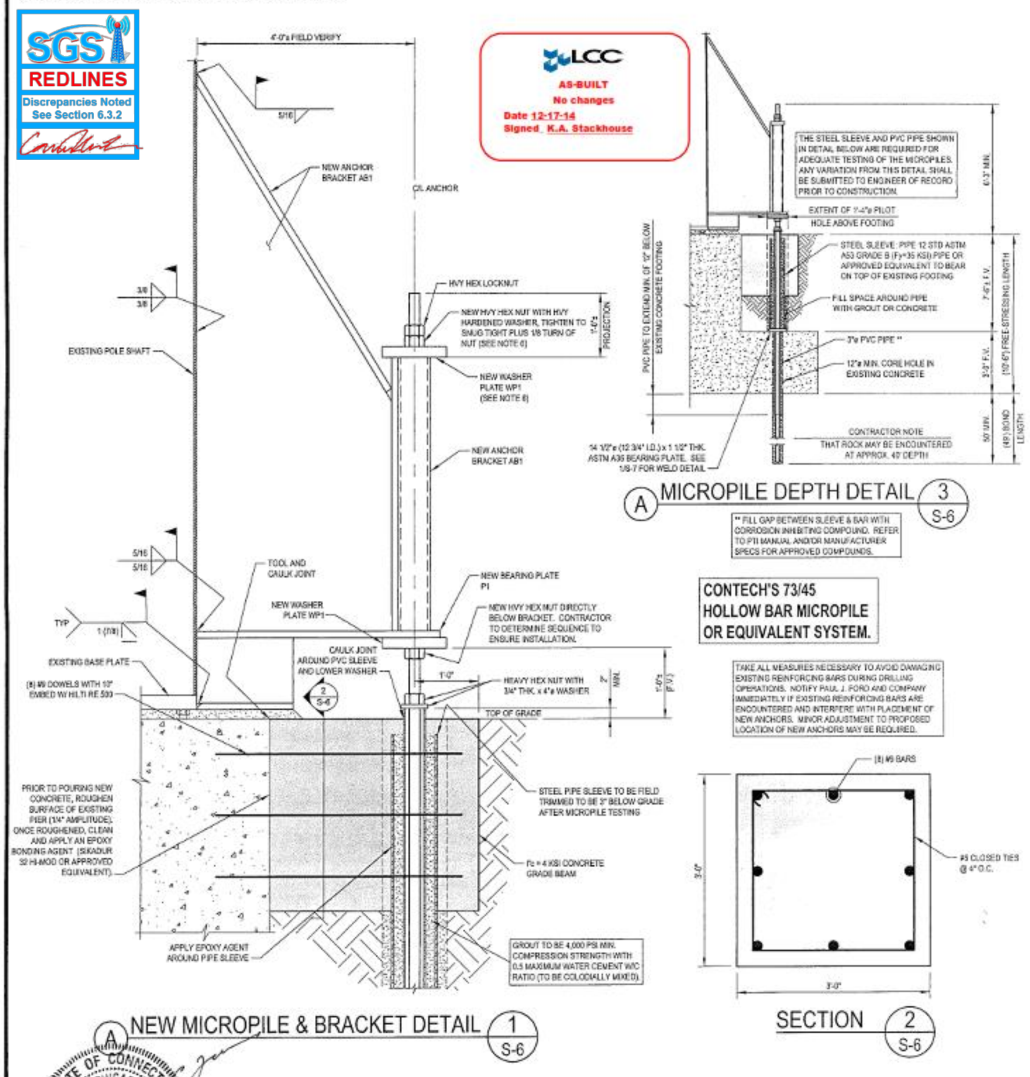
A MINIMUM OF 2 IN-PLACE MICROPILES (TEST PILES SHALL BE IN OPPOSITE CORNERS) ARE TO BE TESTED TO 274k IN TENSION. ALL PILE TESTING SHALL BE CARRIED OUT IN GENERAL CONFORMANCE WITH ASTM D1143 OR D3689. A HYDRAULIC JACK MAY BE SUBSTITUTED FOR THE PILE TESTING SET-UPS SHOWN IN THE ASTM SPECS. IF A HYDRAULIC JACK IS USED, FOLLOW EQUIPMENT GUIDELINES DISCUSSED IN THE POST TENSIONING INSTITUTE "RECOMMENDATIONS FOR PRESTRESSED ROCK AND SOIL ANCHORS" DESIGN GUIDE, SECTION 8.2. PILES SHALL BE LOADED USING PTI'S PROOF TEST METHODOLOGY (REFER TO SECTION 8.3.3 OF THE PTI DESIGN GUIDE; ALIGNMENT LOAD, AL, SHALL BE 20 KIPS; DESIGN LOAD, DL, IS 206 KIPS). PROVISION SHALL BE MADE TO ALLOW FOR MOVEMENT BETWEEN MICROPILE CROSS-SECTION AND SOIL SO THAT GROUT-TO-SOIL BOND LINE IS ADEQUATELY TESTED. IF COMPRESSION TESTING IS PERFORMED, CONTRACTOR SHALL PROTECT BAR FROM DAMAGE DUE TO BUCKLING FOR LENGTH ABOVE GRADE.

MICROPILE NOTES:

1. ALL HOLLOW BAR STEEL AND ASSOCIATED HARDWARE SHALL BE SUPPLIED BY CON-TECH SYSTEMS OR OWNER/EOR APPROVED EQUIVALENT.
2. ALL HOLLOW BAR, NUTS AND BEARING PLATES SHALL BE HOT-DIP GALVANIZED PER ASTM A123 OR A153, AS APPROPRIATE.
3. CONTACT CON-TECH SYSTEMS (OR MANUFACTURER OF APPROVED ALTERNATE) FOR MATERIALS AND INSTALLATION PROCEDURES AND RECOMMENDATIONS.
4. SPECIAL INSPECTION OF THE MICROPILES IS REQUIRED AS FOLLOWS: (1) VERIFY THAT MICROPILE MATERIAL, SIZE AND LENGTH COMPLY WITH THE INFORMATION SHOWN ON THIS DRAWING, (2) VERIFY PLACEMENT OF EACH MICROPILE, (3) OBSERVE DRILLING, GROUTING AND TESTING (AS APPROPRIATE) OPERATIONS FOR EACH MICROPILE AND MAINTAIN COMPLETE AND ACCURATE RECORDS FOR EACH MICROPILE.
5. FOUNDATION DESIGN IS BASED ON THE ORIGINAL GEOTECHNICAL REPORT PREPARED BY FDH, DATED 8-2-2013.
6. CONTACT CONTECH SYSTEMS (OR MANUFACTURER OF APPROVED ALTERNATE) TO VERIFY NUT & WASHER CONNECTION ARE COMPATIBLE WITH MICROPILE THREADS

SGS REDLINES
Discrepancies Noted
See Section 6.3.2

LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse



STATE OF CONNECTICUT — JOSEPH FACHICARAH JACOBS — No. PEN 22731 — LICENSED PROFESSIONAL ENGINEER

AUG 1 4 2013

PILE DESIGN PARAMETER SCHEDULE							
PARAMETER / OPTIONS	MIN. HOLE ø/STEEL AREA	PILE CAPACITY (Pn/Ω)	ULTIMATE SKIN FRICTION (PSI)	FREESTRESSING LENGTH	FRICTION DEVELOPMENT LENGTH/BOND LENGTH	ROCK SOCKET/ PLUNGE LENGTH	TOTAL LENGTH
MICROPILE	* 12"ø / 4.02 IN² MIN.	215.9K	VARIES, SEE GEOTECH	5'	50'	N.A.	61'-3"

* THE DESIGN ANTICIPATES A FINAL GROUT DIAMETER OF 12" BASED ON A MINIMUM 280MM AUGER IN SILT W/ CLAY AND SAND. THE DESIGN REQUIRES UNCASED MICROPILES FOR THE LISTED CAPACITY IN TENSION AND COMPRESSION AS LAID OUT PER PLAN. THE CONTRACTOR/MICROPILE INSTALLER IS RESPONSIBLE FOR THE MEANS AND METHODS TO ENSURE THE NECESSARY CAPACITY AND WILL DEMONSTRATE THE INSTALLED CAPACITY PER THE SPECIFIED TESTING. THE EMBEDMENT DEPTH AND AUGER/GROUT DIAMETERS ARE LISTED AS A PRELIMINARY BASIS FOR BIDDING. THE INTENT IS FOR THE INSTALLER TO REVIEW THE CURRENT SOIL INFORMATION AND DESIGN REQUIREMENTS TO ENSURE THAT THE CONTRACTOR'S SPECIFIC EQUIPMENT OR INSTALLATION TECHNIQUE IS APPROPRIATE. IF THE CONTRACTOR BELIEVES THE SCOPE SHOULD CHANGE UPON REVIEW, PLEASE ADDRESS PRIOR TO BIDDING. PLEASE COORDINATE WITH ENGINEER OF RECORD PRIOR TO INSTALLATION.

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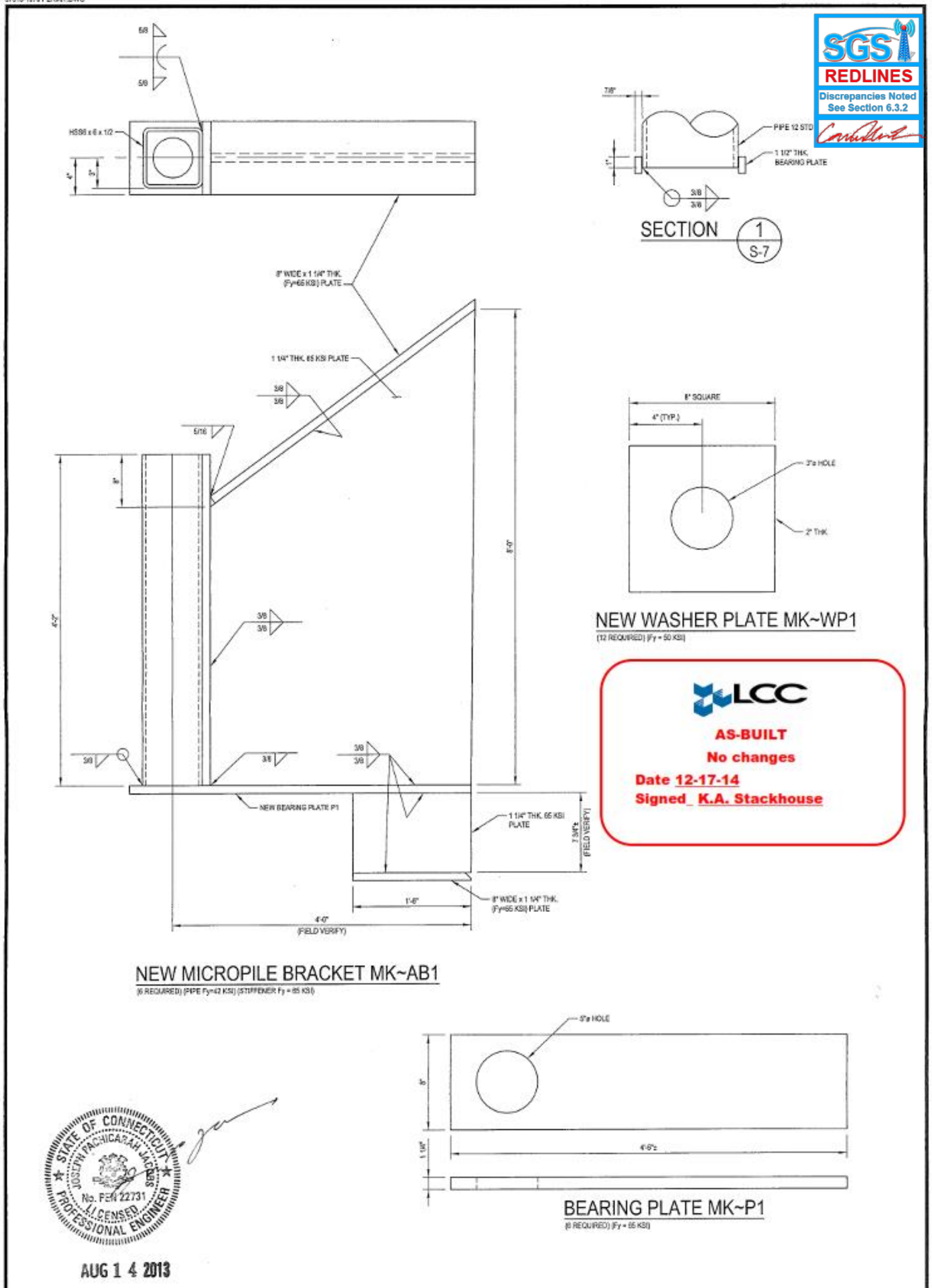
S-6

37513-1570 PERMIT.DWG



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S-7

37513-1570 PERMIT.DWG

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 DRAWINGS, 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 RESIDES WITH THE EOR AT ALL TIMES.

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-BUL-10175 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 IN-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 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 AN DENG-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, PREFERABLE 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 INSPECTION(S) 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 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 MI'S
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 INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV 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.

PHOTOGRAPHS
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 AND TORQUE
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

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

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

MI CHECKLIST	
CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
PRE-CONSTRUCTION	
X	MI CHECKLIST DRAWINGS
X	EOR APPROVED SHOP DRAWINGS
X	FABRICATION INSPECTION
X	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
X	FABRICATOR NDE INSPECTION
X	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
CONSTRUCTION	
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
X	POST INSTALLED MICROPILE VERIFICATION
X	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK: LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
X	THIRD PARTY ONSITE INSPECTION OF BOLT PRETENSION PER CROWN REQUIREMENTS
X	INSPECTION OF AJAX BOLTS AND DTI'S PER REQUIREMENTS ON SHEET S-3
ADDITIONAL TESTING AND INSPECTIONS:	
POST-CONSTRUCTION	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
X	THIRD PARTY ONSITE BOLT INSPECTION REPORT
X	POST INSTALLED MICROPILE PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

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

SGS
REDLINES
Discrepancies Noted
See Section 6.3.2

LCC
AS-BUILT
No changes
Date 12-17-14
Signed_ K.A. Stackhouse

STATE OF CONNECTICUT
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

AUG 1 4 2013

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APPROVED BY:	S-8
DATE: 8-14-2013	

6.3.2 ENGINEER OF RECORD EMAIL

Stephen Teti

From: Brian Kermode
Sent: Monday, August 11, 2014 8:41 AM
To: Rich Taschek
Cc: Joseph Gentes; Keith_ Stackhouse; Stephen Teti; jorge_forsythe@lcc.com; pjfmod
Subject: Re: 825983 Middletown

Good morning Rich,

The changes to the cage are acceptable.

Thanks,
Brian

Brian K Kermode, PE, SE
Project Engineer
Main: 614.221.6679 x2169
Direct: 614.448.4169
E-Mail: bkermode@pjfweb.com
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P.E. Registrations in 50 States, Puerto Rico, and Canada

>>> Rich Taschek <rich_taschek@lcc.com> 8/11/2014 8:37 AM >>>
Hi Brain,

Please see attached PDF for changes made to the rebar cage. Let us know if this is acceptable.

Thanks,
Rich

1

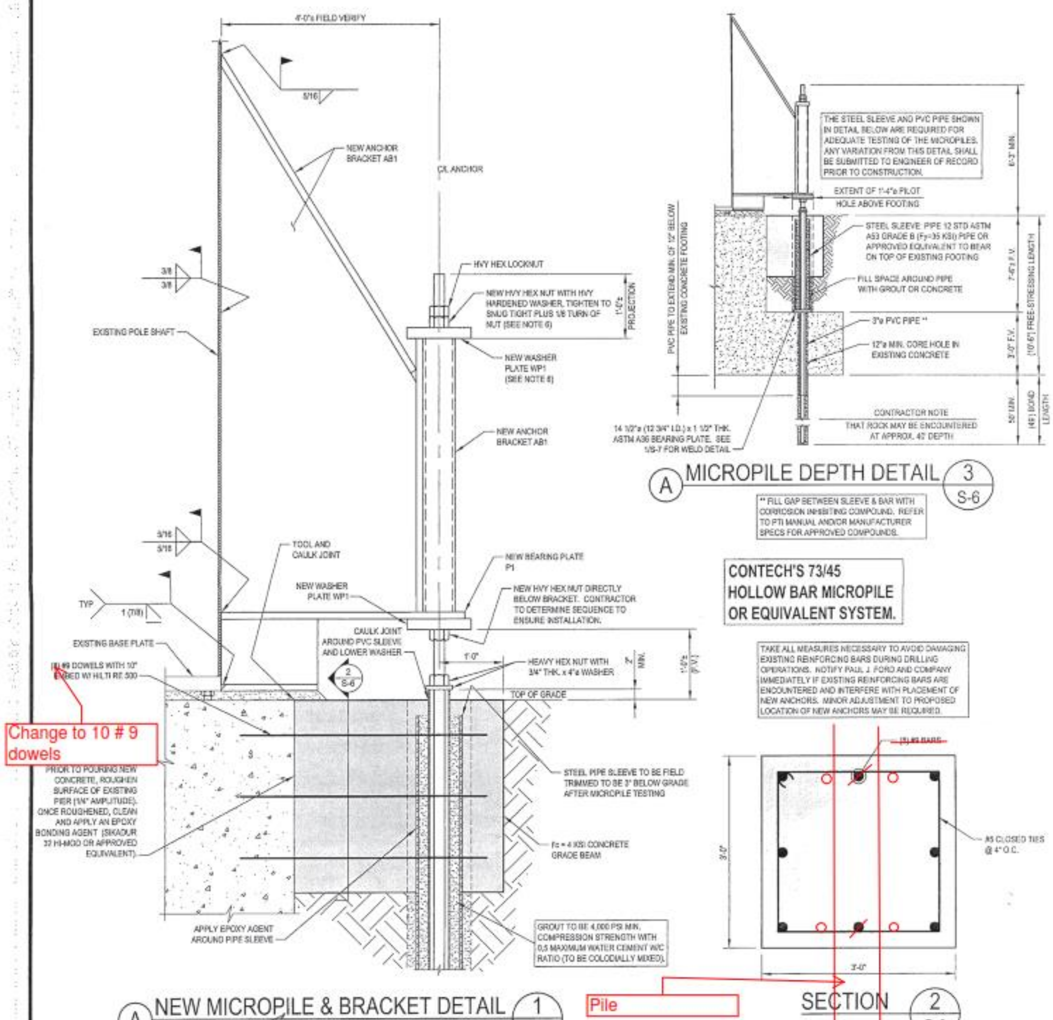
37513-1570 PERMIT.DWG

MICROPILE TESTING REQUIREMENTS

A MINIMUM OF 2 IN-PLACE MICROPILES (TEST PILES SHALL BE IN OPPOSITE CORNERS) ARE TO BE TESTED TO 274k IN TENSION. ALL PILE TESTING SHALL BE CARRIED OUT IN GENERAL CONFORMANCE WITH ASTM D1143 OR D3689. A HYDRAULIC JACK MAY BE SUBSTITUTED FOR THE PILE TESTING SET-UPS SHOWN IN THE ASTM SPECS. IF A HYDRAULIC JACK IS USED, FOLLOW EQUIPMENT GUIDELINES DISCUSSED IN THE POST TENSIONING INSTITUTE "RECOMMENDATIONS FOR PRESTRESSED ROCK AND SOIL ANCHORS" DESIGN GUIDE, SECTION 8.2. PILES SHALL BE LOADED USING PTI'S PROOF TEST METHODOLOGY (REFER TO SECTION 8.3.3 OF THE PTI DESIGN GUIDE; ALIGNMENT LOAD, AL, SHALL BE 20 KIPS; DESIGN LOAD, DL, IS 208 KIPS). PROVISION SHALL BE MADE TO ALLOW FOR MOVEMENT BETWEEN MICROPILE CROSS-SECTION AND SOIL SO THAT GROUT-TO-SOIL BOND LINE IS ADEQUATELY TESTED. IF COMPRESSION TESTING IS PERFORMED, CONTRACTOR SHALL PROTECT BAR FROM DAMAGE DUE TO BUCKLING FOR LENGTH ABOVE GRADE.

MICROPILE NOTES:

1. ALL HOLLOW BAR STEEL AND ASSOCIATED HARDWARE SHALL BE SUPPLIED BY CON-TECH SYSTEMS OR OWNER/EOR APPROVED EQUIVALENT.
2. ALL HOLLOW BAR, NUTS AND BEARING PLATES SHALL BE HOT-DIP GALVANIZED PER ASTM A123 OR A153, AS APPROPRIATE.
3. CONTACT CON-TECH SYSTEMS (OR MANUFACTURER OF APPROVED ALTERNATE) FOR MATERIALS AND INSTALLATION PROCEDURES AND RECOMMENDATIONS.
4. SPECIAL INSPECTION OF THE MICROPILES IS REQUIRED AS FOLLOWS: (1) VERIFY THAT MICROPILE MATERIAL, SIZE AND LENGTH COMPLY WITH THE INFORMATION SHOWN ON THIS DRAWING, (2) VERIFY PLACEMENT OF EACH MICROPILE, (3) OBSERVE DRILLING, GROUTING AND TESTING (AS APPROPRIATE) OPERATIONS FOR EACH MICROPILE AND MAINTAIN COMPLETE AND ACCURATE RECORDS FOR EACH MICROPILE.
5. FOUNDATION DESIGN IS BASED ON THE ORIGINAL GEOTECHNICAL REPORT PREPARED BY FDH, DATED 8-2-2013.
6. CONTACT CONTECH SYSTEMS (OR MANUFACTURER OF APPROVED ALTERNATE) TO VERIFY NUT & WASHER CONNECTION ARE COMPATIBLE WITH MICROPILE THREADS



NEW MICROPILE & BRACKET DETAIL (1/S-6)

MICROPILE DEPTH DETAIL (3/S-6)

SECTION (2/S-6)

AUG 1 4 2013

PILE DESIGN PARAMETER SCHEDULE

OPTIONS \ PARAMETER	MIN. HOLE ø/STEEL AREA	PILE CAPACITY (Pn/Ω)	ULTIMATE SKIN FRICTION (PSI)	FREESTRESSING LENGTH	FRICTION DEVELOPMENT LENGTH/BOND LENGTH	ROCK SOCKET/ PLUNGE LENGTH	TOTAL LENGTH
MICROPILE	* 12"ø / 4.02 IN² MIN.	215.0K	VARIES, SEE GEOTECH	5'	50'	N.A.	61'-3"

* THE DESIGN ANTICIPATES A FINAL GROUT DIAMETER OF 12" BASED ON A MINIMUM 280MM AUGER IN SILT W/ CLAY AND SAND. THE DESIGN REQUIRES UNCASED MICROPILES FOR THE LISTED CAPACITY IN TENSION AND COMPRESSION AS LAID OUT PER PLAN. THE CONTRACTOR/MICROPILE INSTALLER IS RESPONSIBLE FOR THE MEANS AND METHODS TO ENSURE THE NECESSARY CAPACITY AND WILL DEMONSTRATE THE INSTALLED CAPACITY PER THE SPECIFIED TESTING. THE EMBEDMENT DEPTH AND AUGER/GROUT DIAMETERS ARE LISTED AS A PRELIMINARY BASIS FOR BIDDING. THE INTENT IS FOR THE INSTALLER TO REVIEW THE CURRENT SOIL INFORMATION AND DESIGN REQUIREMENTS TO ENSURE THAT THE CONTRACTOR'S SPECIFIC EQUIPMENT OR INSTALLATION TECHNIQUE IS APPROPRIATE. IF THE CONTRACTOR BELIEVES THE SCOPE SHOULD CHANGE UPON REVIEW, PLEASE ADDRESS PRIOR TO BIDDING. PLEASE COORDINATE WITH ENGINEER OF RECORD PRIOR TO INSTALLATION.

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street · Suite 600 · Columbus, Ohio 43215
(614) 221-6679 www.pjfweb.com

CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
PH: (585) 899-3445 FAX: (585) 899-3446

BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570
DRAWN BY: B.M.S.
CHECKED BY: B.K.K.
APPROVED BY:
DATE: 8-14-2013

ISSUE DATE OF PERMIT: 8-14-2013

S-6

From: John Woolley <jwoolley@pjfweb.com>
Sent: Wednesday, December 10, 2014 10:53 AM
To: Keith_ Stackhouse
Cc: Jason D'Amico; Jerry (Contractor) Bruno; SGS_PMI@sgstowers.com; lccmods
Subject: RE: Middletown_1 825983 130608 Punch List

Keith,

All of these items are acceptable.

Thanks,

John J. Woolley, E.I.
Structural Designer
Main: 614.221.6679 ext. 2164
Direct: 614.448.4164
E-mail: jwoolley@pjfweb.com

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>>> Keith_ Stackhouse <keith_stackhouse@lcc.com> 12/10/2014 9:33 AM >>>

Hello John,

Have you had a chance to review this punch list, there are 2 separate punch list for each mod.

Keith A. Stackhouse
Structural Construction Manager

LCC

LCC Construction Services
2500 Sylon Blvd.
Hainesport, NJ 08036

PUNCH ITEM 1

HEIGHT	FLAT/ARC	PLATE #	PLATE HT START/STOP	DRAWING PG #
Base	3/4 , 5/6 ,8,12	N/A	N/A	S-7

DISCREPANCY:

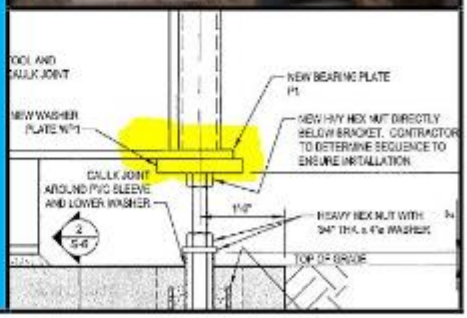
Washer plates are not centered under the anchor brackets in the above mentioned locations.

APPROVED-EOR-KDS

ACTIONS NEEDED BY GC:

Provide EOR approval for the existing conditions or install per the modification drawings.

PHOTOGRAPHS



PUNCH ITEM 2

HEIGHT	FLAT/ARC	PLATE #	PLATE HT START/STOP	DRAWING PG #
Base	9/10, 3/4 , 1/2	N/A	N/A	S-7

DISCREPANCY:

The bottom bearing plate was found to be short in length in the above mentioned locations.

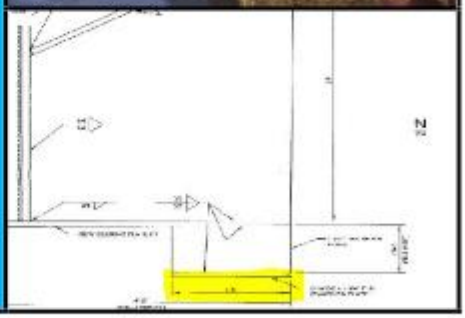
APPROVED-EOR-KDS

ACTIONS NEEDED BY GC:

Provide EOR approval for the existing conditions or install per the modification drawings.

PHOTOGRAPHS



PUNCH ITEM 4

HEIGHT	FLAT/ARC	PLATE #	PLATE HT START/STOP	DRAWING PG #
Base	All	NA	NA	S-7

DISCREPANCY:

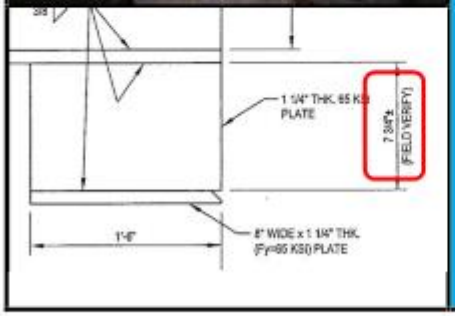
The vertical plate under the new anchor bracket was found to be 9", drawings specify it at 7 ¾"

APPROVED-EOR-KDS

ACTIONS NEEDED BY GC:

Provide EOR approval for the existing conditions or install per the modification drawings.

PHOTOGRAPHS



SGS_PMI@Sgstowers.com

PUNCH ITEM 5

HEIGHT	FLAT/ARC	PLATE #	PLATE HT START/STOP	DRAWING PG #
Base	All new mod	NA	NA	S-7

DISCREPANCY:

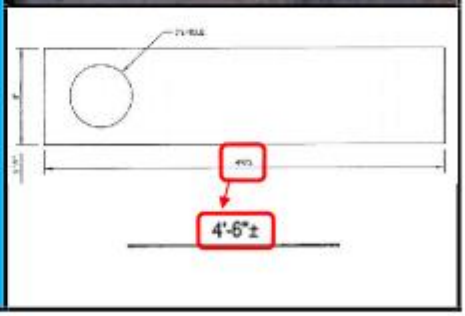
The bottom MK-P1 plate was found to be short at 4'-4 ½", the drawings specify 4'-6".

APPROVED-EOR-KDS

ACTIONS NEEDED BY GC:

Provide EOR approval for the existing conditions or install per the modification drawings.

PHOTOGRAPHS



PUNCH ITEM 6

HEIGHT	FLAT/ARC	PLATE #	PLATE HT START/STOP	DRAWING PG #
Base	See below	NA	NA	S-6

DISCREPANCY:

The drawings specified an anchor height/top of grade to washer plate distance of 12". The following measurements were observed:

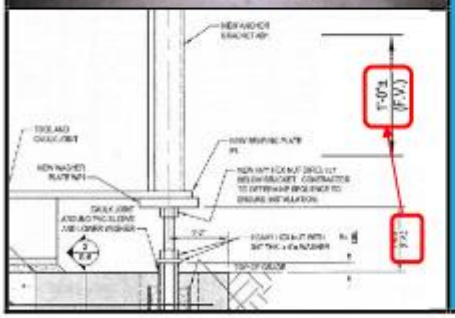
1. Flat 1/2, 11" distance observed.
2. Flat 5/6, 13" distance observed.

ACTIONS NEEDED BY GC:

Provide EOR approval for the existing conditions or install per the modification drawings.

APPROVED-EOR-KDS

PHOTOGRAPHS



SGS_PMI@Sgstowers.com

PUNCH ITEM 7

HEIGHT	FLAT/ARC	PLATE #	PLATE HT START/STOP	DRAWING PG #
Base	All	NA	NA	S-7

DISCREPANCY:

The inner plate of the anchor modification was found to be short. A height of 7'-11" was observed, the drawings specify 8'

APPROVED-EOR-KDS

ACTIONS NEEDED BY GC:

Provide EOR approval for the existing conditions or install per the modification drawings.

PHOTOGRAPHS

SGS_PMI@Sgstowers.com

PUNCH ITEM 8

HEIGHT	FLAT/ARC	PLATE #	PLATE HT START/STOP	DRAWING PG #
Base	1/2	N/A	N/A	S-6

DISCREPANCY:

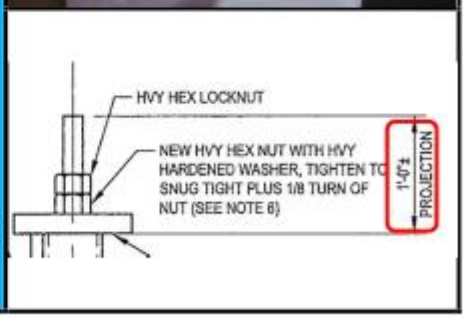
The drawings specify an anchor rod projection of 12", a projection of 13" was observed in the above mentioned location.

APPROVED-EOR-KDS

ACTIONS NEEDED BY GC:

Provide EOR approval for the existing conditions or install per the modification drawings.

PHOTOGRAPHS



From: John Woolley [mailto:jwoolley@pjfweb.com]
Sent: Wednesday, December 10, 2014 1:48 PM
To: Keith_ Stackhouse
Cc: Jason D'Amico; Jerry (Contractor) Bruno; SGS_PMI@sgstowers.com; lccmods
Subject: RE: Middletown_1 825983 146075 Punch List

Keith,

See the attached rough sketch. That should give you the idea of what's required.

Thanks,

John J. Woolley, E.I.
Structural Designer
Main: 614.221.6679 ext. 2164
Direct: 614.448.4164
E-mail: jwoolley@pjfweb.com

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>>> Keith_ Stackhouse <keith_stackhouse@lcc.com> 12/10/2014 1:41 PM >>>

Hello John,

As per our conversation,

I believe the welded fix is going to be the best solution, could you shoot over a hand sketch of the weld detail?

Thanks,

Keith A. Stackhouse
Structural Construction Manager

LCC

LCC Construction Services
2500 Sylon Blvd.
Hainesport, NJ 08036

(Cell) 609-367-6107
keith_stackhouse@lcc.com

1

From: John Woolley [mailto:jwoolley@pjfweb.com]
Sent: Tuesday, December 09, 2014 12:47 PM
To: Keith_ Stackhouse
Cc: Jason D'Amico; Jerry (Contractor) Bruno; SGS_PMI@sgstowers.com; lccmods
Subject: Re: Middletown_1 825983 146075 Punch List

Keith,

I see only two items in the document you sent, but the answers are as follows to those two:

1) Unfortunately, plates 1 and 2 are now starting too high. The lap on plate 3 is still effective, so that one is approved. The welded splice in the pole should be above the development bolts on plate 2. If you can confirm that this is still the case, I can approve plate 2. Plate 1 will need to have the 6" gap bridged on an adjacent flat or have the bottom termination welded up with a 3/8" weld on both sides.

2) New bolts will need to be installed to meet the minimum spacing requirements.

Thanks,

John J. Woolley, E.I.
Structural Designer
Main: 614.221.6679 ext. 2164
Direct: 614.448.4164
E-mail: jwoolley@pjfweb.com

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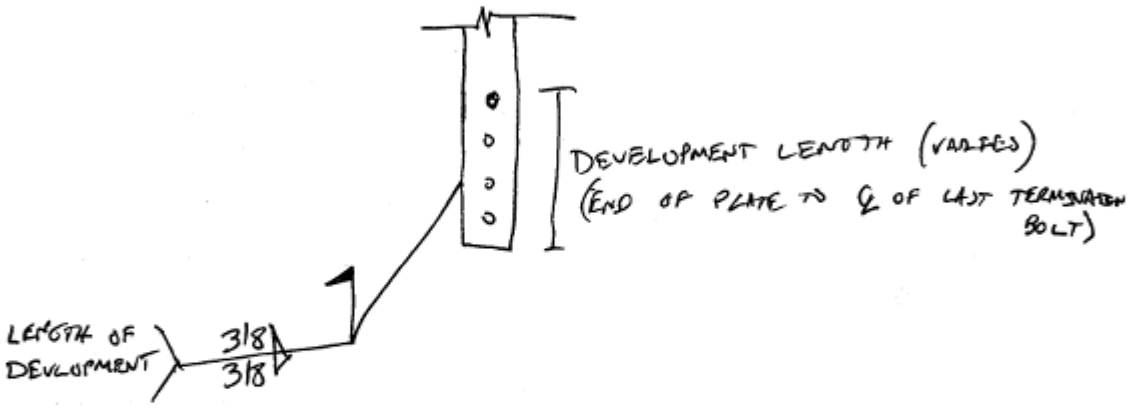
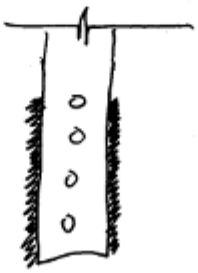
Page _____ Of _____
By _____ Date _____
Project _____
Client _____ Comm. No. _____

WELDED TERMINATION FIX SKETCH



FINAL WOULD LOOK LIKE THIS



PUNCH ITEM 1

HEIGHT	FLAT/ARC	PLATE #	PLATE HT START/STOP	DRAWING PG #
35' – 155'	See below	1,2,3	See below	S4

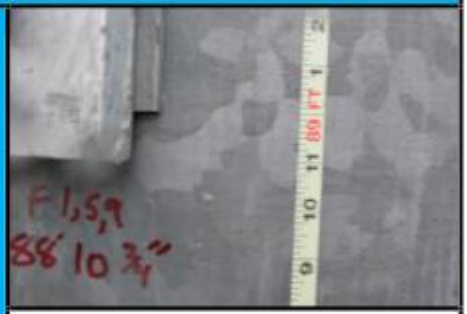
DISCREPANCY:

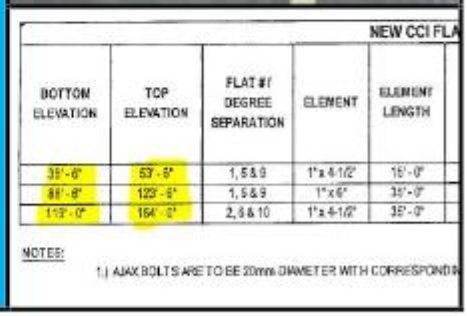
The newly installed plate heights were found to be different from the specified heights in the drawings.
Plate 1 on flats 1, 5, and 9 was found to be from 38'-11" – 53'-11" instead of 38'-6" – 53'-6"
Plate 2 on flats 1, 5, and 9 was found to be from 88'-10 ¾" – 123'-11" instead of 88'-6" – 123'-6"
Plate 3 on flats 2, 6, and 10 was found to be from 119'-6" – 154'-6" instead of 119' – 154'

ACTIONS NEEDED BY GC:

Please provide EOR approval for existing condition, or install per drawing specifications.

PHOTOGRAPHS




NEW CCI FLA

BOTTOM ELEVATION	TOP ELEVATION	FLAT #/ DEGREE SEPARATION	ELEMENT	ELEMENT LENGTH
38'-6"	53'-6"	1, 5 & 9	1"x 4-1/2"	15'-0"
88'-6"	123'-6"	1, 5 & 9	1"x 6"	35'-0"
119'-0"	154'-0"	2, 6 & 10	1"x 4-1/2"	35'-0"

NOTES:
1.) AJAX BOLTS ARE TO BE 20mm DIAMETER WITH CORRESPOND

SGS_PMI@Sgstowers.com

6.3.3 PHOTOGRAPHS

6.3.4 POST INSTALLED ANCHOR ROD PULL-OUT TESTING

LCC Deployment Services Inc.
2242 Old Marlton Pike, Marlton, NJ 08053
856-810-1658 (Ph) 856-810-1659 (Fax)

MICROPILE PULL & COMPRESSION TEST REPORT

SITE NAME:	Middletown 1
ADDRESS:	90 Industrial Park Road Middletown, CT 06457
CROWN BU #:	825983
DATE OF TEST	9/22/2014
TECHNICIAN	Joseph Gentes
ANCHOR SIZE:	Con- Tech Titan 73/45 Hollow Bar
QUANTITY OF TEST MICROPILES INSTALLED:	(6) Production (1) Test
QUANTITY TESTED:	(2) Productions opposite and (1) Test pile
GROUT USED:	PORTLAND CEMENT
WEATHER CONDITIONS:	70 Degrees SUNNY
TEST UNIT:	ENERPAC RRH1508
TEST RESULT # 1:	PASS
TEST RESULT # 2:	PASS
TEST RESULT # 3:	PASS
COMMENTS:	Production piles were pulled to 190, 222 & 276 kips and held for 3 minutes each. No movement or bleed-off on the jack was detected. The test pile was pulled to 190, 222, 270 & 288 kips and








January 13, 2015

Jerry Bruno
Crown Castle
500 West Cummings Park, STE 3600
Woburn, MA 01801
(781) 970-0069
Jerry Bruno.Contractor@crowncastle.com

Sinnott Gering and Schmitt Towers, INC
14301 First National Bank Pkwy, STE 100
Omaha, NE 68154
(402) 507-5170
SGS_PMI@sgstowers.com

Subject: ***Modification Inspection Report***

Crown Castle Designation:	**Crown Castle BU Number:**	825983
	Crown Castle Site Name:	MIDDLETOWN_1
	Crown Castle JDE Job Number:	236900
Engineering Firm Designation:	**SGS Project Number:**	130608
Site Data:	**90 Industrial Park Road** **Middletown, CT 06457** **N 41° 35' 8.3", W 72° 42' 50.49"** **185 Foot Monopole Tower**	

Dear Mr. Bruno,

Sinnott Gering and Schmitt Towers, Inc. (SGS) is pleased to submit this "Modification Inspection Report" (MI Report) to Crown Castle for the modification/reinforcement to the subject structure. This Modification Inspection (MI) was performed in accordance with Crown Castle ENG-SOW-10007 Modification Inspection SOW, Contract Documents, and Crown Castle Purchase Order number 594361. The purpose of this MI is to confirm that the modification installation configuration and workmanship are in accordance with the contract document(s) listed in Table 2. The MI is not a review of the adequacy or effectiveness of the modification/reinforcement solution.

Table 1 – General Information

	Company	Contact	Dates on Site
MI Inspector	SGS	Nicholas J. Schmitt, P.E., S.E.	N/A
MI Inspector Field Representative (if applicable)	SGS	Caleb Christner	December 30, 2014
■ Independent	☐ EOR	☐ Turnkey	
Modification Design EOR	Paul J. Ford	Joseph Jacobs, P.E.	N/A
General Contractor	LCC	Keith Stackhouse	Unknown
Sub to the General Contractor	N/A	N/A	N/A
Field CWI for the General Contractor	Applied Testing Group	L. John Harper, C.W.I. Daniel Irons, C.W.I.	November 1 to December 3, 2014
Field NDE for the General Contractor			

Table 2 – Documents

Document(s)	Remarks	Source
Modification Drawings Date: 9/19/2013 EOR: Joseph Jacobs, P.E. Job#: 37513-1570A	Creator of Drawings: Paul J. Ford Job #: 37513-1570A Date of Drawings: 9/19/2013	CCI sites Drawing File: N/A

Based on our inspection, SGS determines this project:

X PASSING MI

The configuration, materials and/or workmanship of the modifications are installed in accordance with the Contract Documents and no deficiencies were found.

EXECUTIVE SUMMARY

MODIFICATION	CONFIGURATION	MATERIALS	WORKMANSHIP
Install Plate Shaft Reinforcement. Flats 3, 6, 9 & 11 from 2' to 37'.	Passing	Passing	Passing
Install Plate Shaft Reinforcement. Flats 4, 8 & 12 from 30' 9" to 65' 9".	Passing	Passing	Passing
Install Plate Shaft Reinforcement. Flats 3, 7 & 11 from 61' 3" to 101' 3".	Passing	Passing	Passing
Install Plate Shaft Reinforcement. Flats 3, 7 & 11 from 112' 9" to 132' 9".	Passing	Passing	Passing
Install Plate Shaft Reinforcement. Flats 3, 7 & 11 from 149' 9" to 154' 9".	Passing	Passing	Passing
Note: Plates were Installed at Different Elevations than Designed. See Section 6.3.2 for EOR Approval E-Mail.			

All observations were performed after the construction was complete. SGS was not present during the construction phase. The onsite PMI was performed by Caleb Christner, SGS.

We at SGS 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.

Respectfully submitted,

Nick Schmitt, P.E., S.E.

Table of Contents

PRE-CONSTRUCTION

6.1.1 MI CHECKLIST DRAWING

37513-1570 A PERMIT.DWG

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 DRAWINGS, 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 RESIDES WITH THE EOR AT ALL TIMES.

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) 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 IN-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 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 AN DENG-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, PREFERABLE 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 INSPECTION(S) 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 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 MI'S
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 INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV 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.

PHOTOGRAPHS
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 AND TORQUE
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

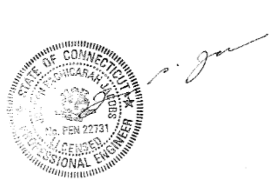
PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

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

MI CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
PRE-CONSTRUCTION	
X	MI CHECKLIST DRAWINGS
X	EOR APPROVED SHOP DRAWINGS
NA	FABRICATION INSPECTION
NA	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
NA	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
CONSTRUCTION	
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
NA	POST INSTALLED MICROPILE VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK: LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
X	THIRD PARTY ONSITE INSPECTION OF BOLT PRETENSION PER CROWN REQUIREMENTS
X	INSPECTION OF AJAX BOLTS AND DTI'S PER REQUIREMENTS ON SHEET S-3
ADDITIONAL TESTING AND INSPECTIONS:	
POST-CONSTRUCTION	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
X	THIRD PARTY ONSITE BOLT INSPECTION REPORT
NA	POST INSTALLED MICROPILE PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

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



SEP 1 9 2013

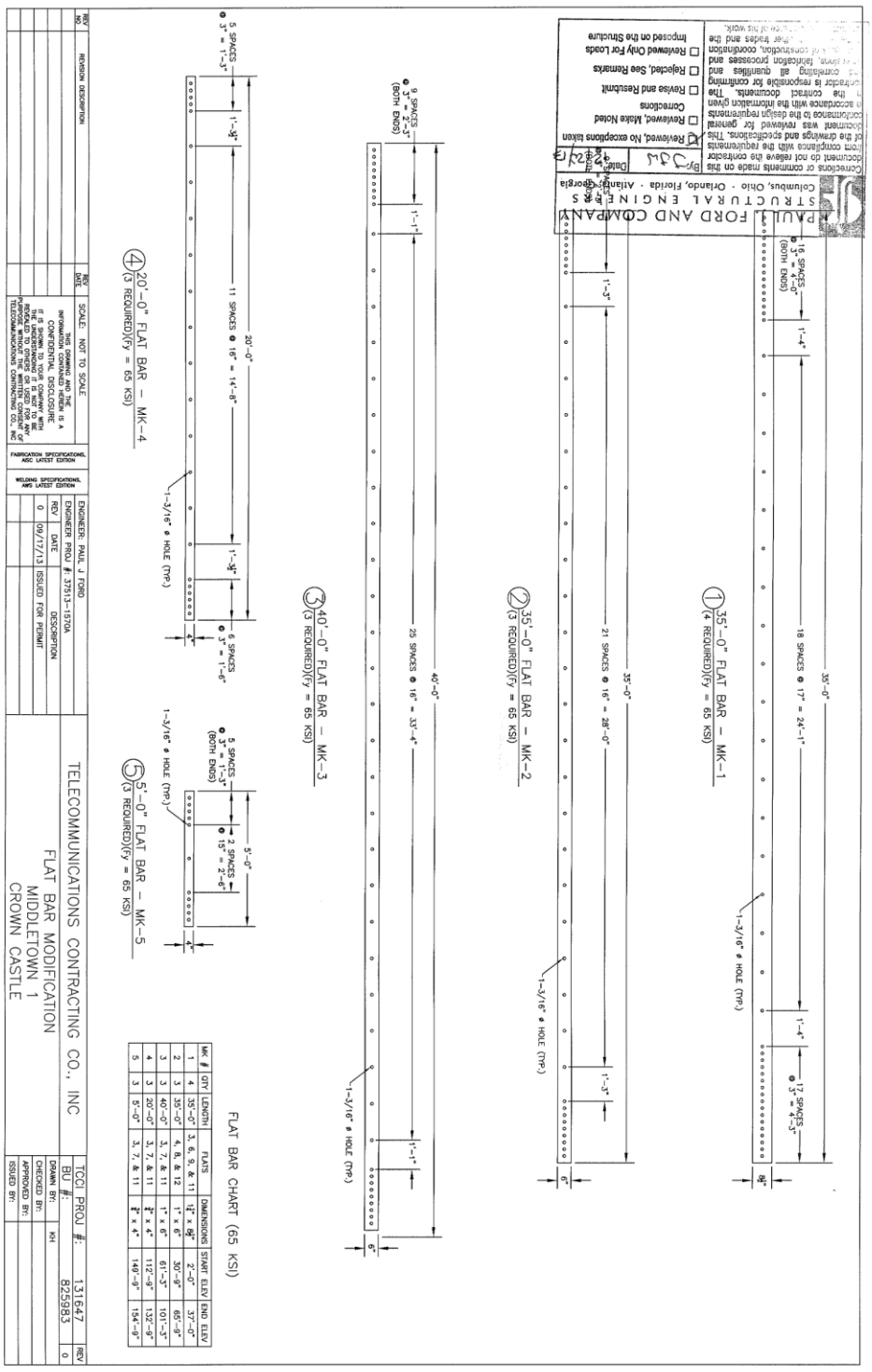
PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street · Suite 600 · Columbus, Ohio 43215
(614) 221-6679 www.pjfweb.com

CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
PH: (585) 899-3445 FAX: (585) 899-3448

BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570A	ISSUE DATE OF PERMIT: 9-17-2013
DRAWN BY: B.M.S.	
CHECKED BY: J.J.W.	
APPROVED BY: BKK	S-6
DATE: 9-17-2013	

6.1.2 EOR APPROVED SHOP DRAWINGS



6.1.3 MATERIAL TEST REPORT (MTR)

NUCOR PLATE MILL

P.O.Box 279
Wilson, NC 27986
(252) 366-3700

Mill Test Report

Page 1

NUCOR It's in our Nature!

Issuing Date : 03/24/2014 — B/L No. : 383452 — Load No. : 386923 — Our Order No. : 115781/17 — Cust. Order No. : 12085

Vehicle No: 9517 — Sold To : RANGER STEEL SERVICES LP — Ship To : RANGER STEEL (TRUCK)

Specification : 1.2500" x 86.000" x 460.000" — 1225 NORTH LOOP W STE 850 — 1950 S 81ST W AVE

ASTM A572 Grade 50-13a .05 Max SI — HOUSTON,TX 77008 — TULSA,OK 74127

Marking :

Heat No	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Al(tot)	V	Nb	Ti	N	Ca	B	Sn	CEQ	PCM
4501901	0.16	1.37	0.019	0.002	0.03	0.15	0.06	0.08	0.01	0.025	0.058	0.042	0.002	0.0127	0.0019	0.0005	0.007	0.43	0.25

Plate Serial No	Pieces	Tensile Test Tons	Dir.	(psi) Yield	(psi) Tensile	Elongation % in 2"	Elongation % in 8"	Charpy Impacts Dir.	(ft-lbs) 1	(%) shear	(ft-lbs) 2	(%) shear	(ft-lbs) 3	(%) shear	(ft-lbs) Ave.	(%) shear	Size	Temp(°F)	Min Ave.
4501901-01	2	16.33	T	65,300	88,600	52.7		H-L	20.3		35.4		55.8		37.2		10mm	-20	15
			T	69,400	86,800	40.7													

Piece Frequency per A673, each plate "as-rolled";

Manufactured to fully killed fine grain practice by Electric Arc Furnace. Welding or weld repair was not performed on this material. We hereby certify that the contents of this report are accurate and correct. All test results Mercury has not been used in the direct manufacturing of this material. Produced as continuous cast discrete plate as-rolled, unless and operations performed by the material manufacturer are in compliance with the otherwise noted in Specification. applicable specifications, including customer specifications.

Yield by 0.5EUL method unless otherwise specified. Ceq = C+(Mn/6)+((Cr+Mo+V)/5)+((Cu+Ni)/15)

Pcm = C+(Si/30)+(Mn/20)+(Cu/20)+(Ni/60)+(Cr/20)+(Mo/15)+(V/10)+5B

Melted and manufactured in the USA. ISO 9001:2008 certified (#0080053) by SRI Quality System Registrar (#0985-48). PED 97/23/EC 7/2 Annex 1, Para 4.3 Compliant.

DIN 50049 3.1.B/EN 10204 3.1B(2004), DIN EN 10204 3.1(2005) compliant. For ABS grades only, Quality Assurance certificate 09-AM/PQA-546

T. A. Dopzeck, Metallurgist — 03/24/2014 3:57:34 PM

Ranger Steel

PO 35602

NUCOR PLATE MILL
P.O.Box 279
Winton, NC 27986
(252) 358-3700

Mill Test Report

Page 1

NUCOR It's our Nature!

Issuing Date : 01/14/2014 B/L No. : 377966 Load No. : 381793 Our Order No. : 117288/12 Cust. Order No. : 12223

Vehicle No: ALY 91720

Specification : 0.7500" x 96.000" x 480.000"
ASTM A572 Grade 65-13a .06 Max Si

Sold To : RANGER STEEL SERVICES LP
1225 NORTH LOOP W STE 850
HOUSTON,TX 77008

Ship To : RANGER STEEL (RAIL)
SAND SPRINGS RAIL RD
1650 S 81ST ST
SAND SPRINGS,OK 74063

Marking :

Heat No	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Al(tot)	V	Nb	Ti	N	Ca	B	Sn	CEQ	PCM
4500264	0.15	1.36	0.015	0.005	0.03	0.15	0.05	0.07	0.01	0.031	0.057	0.045	0.002	0.0134	0.0018	0.0000	0.006	0.42	0.24

				Tensile Test				Charpy Impacts											
Plate Serial No	Pieces	Tons	Dir.	(psi) Yield	(psi) Tensile	Elongation % in 2"	Elongation % in 8"	Dir.	(ft-lbs) 1	(%) shear	(ft-lbs) 2	(%) shear	(ft-lbs) 3	(%) shear	(ft-lbs) Ave.	(%) shear	Size	Temp (°F)	Min Ave.
4500264-02	4	19.60	T	67,800	92,200	26.2		H-L	14.0		42.8		21.0		25.9		10mm	-20	15
			T	68,400	91,500	23.3													
4500264-03	3	14.70	T	67,800	92,200	26.2		H-L	28.8		30.7		24.7		28.1		10mm	-20	15
			T	68,400	91,500	23.3													

RANGER S...
Q.C. ...

Piece Frequency per A673, each plate "as-rolled" ;

Manufactured to fully killed fine grain practice by Electric Arc Furnace. Welding or weld repair was not performed on this material. Mercury has not been used in the direct manufacturing of this material. Produced as continuous cast discrete plate as-rolled, unless otherwise noted in Specification.
Yield by 0.5EUL method unless otherwise specified. Ceq = C+(Mn/6)+((Cr+Mo+V)/5)+((Cu+Ni)/15)
Pcm = C+(Si/30)+(Mn/20)+(Cu/20)+(Ni/60)+(Cr/20)+(Mo/15)+(V/10)+5B
Melted and manufactured in the USA. ISO 9001:2008 certified (#0006063) by SRI Quality System Registrar (#0985-09). PED 97/23/EC 7/2 Annex 1, Para. 4.3 Compliant. DIN 50049 3.1.B/EN 10204 3.1B(2004), DIN EN 10204 3.1(2005) compliant. For ABS grades only, Quality Assurance certificate 09-MMPQA-546

We hereby certify that the contents of this report are accurate and correct. All test results and operations performed by the material manufacturer are in compliance with the applicable specifications, including customer specifications.

T. A. Depretis

T. A. Depretis, Metallurgist

01/14/2014 7:56:34 AM

NUCOR
PLATE MILL
P.O.Box 279
Winton, NC 27986
(252) 358-3700

Mill Test Report

Page 1

NUCOR It's Our Nature

Issuing Date : 02/08/2014 B/L No. : 379817 Load No. : 383852 Our Order No. : 117776/15 Cust. Order No. : 12285

Vehicle No: LW 62063

Specification : 1.0000" x 96.000" x 480.000"
ASTM A572 Grade 65-13a .05 Max SI

Sold To : RANGER STEEL SERVICES LP
1225 NORTH LOOP W STE 550
HOUSTON,TX 77008

Ship To : RANGER STEEL (RAIL)
SAND SPRINGS RAIL RD
1650 S 81ST ST
SAND SPRINGS,OK 74063

Marking :

Heat No	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	Al(tot)	V	Nb	Ti	N	Ca	B	Sn	CEQ	PCM
4500888	0.16	1.38	0.025	0.004	0.03	0.14	0.05	0.08	0.01	0.037	0.061	0.045	0.002	0.0127	0.0017	0.0000	0.006	0.43	0.25
4500889	0.16	1.44	0.029	0.006	0.03	0.16	0.05	0.10	0.01	0.035	0.056	0.046	0.002	0.0145	0.0024	0.0000	0.006	0.44	0.25

				Tensile Test				Charpy Impacts										
Plate Serial No	Pieces	Tons	Dir.	(psi) Yield	(psi) Tensile	Elongation % in 2"	Elongation % in 8"	Dir.	(ft-lbs) 1	(%) shear	(ft-lbs) 2	(%) shear	(ft-lbs) 3	(%) shear	(ft-lbs) Ave.	(%) shear	Size	Temp (°F)	Min Ave.
4500888-02	6	39.20	T	68,800	85,300	27.1		H-L	134.5		71.3		134.6		113.5		10mm	-20	15
			T	68,600	85,300	20.9													
4500888-03	6	39.20	T	68,800	85,300	27.1		H-L	71.8		85.3		124.9		94.0		10mm	-20	15
			T	68,600	85,300	20.9													
4500889-02	1	6.53	T	67,200	89,100	43.8		H-L	134.8		132.7		147.4		138.3		10mm	-20	15
			T	66,900	84,800	22.5													

RANGER STEEL
P.O. [illegible]

Plate Frequency per A673, each plate "as-rolled" ;

Manufactured to fully killed fine grain practice by Electric Arc Furnace. Welding or weld repair was not performed on this material. Mercury has not been used in the direct manufacturing of this material. Produced as continuous cast discrete plate as-rolled, unless otherwise noted in Specification.

Yield by 0.5EUL method unless otherwise specified. Ceq = C+(Mn/6)+((Cr+Mo+V)/5)+((Cu+Ni)/15)

Pcm= C+(Si/30)+(Mn/20)+(Cu/20)+(Ni/60)+(Cr/20)+(Mo/15)+(V/10)+5B

Melted and manufactured in the USA. ISO 9001:2008 certified (#008063) by SRI Quality System Registrar (#0085-09). PED 97/23/EC 7/2 Annex 1, Para. 4.3 Compliant. DIN 50049 3.1.B/EN 10204 3.1B(2004), DIN EN 10204 3.1(2005) compliant. For ABS grades only, Quality Assurance certificate 09-MMPQA-546

We hereby certify that the contents of this report are accurate and correct. All test results and operations performed by the material manufacturer are in compliance with the applicable specifications, including customer specifications.

T. A. Depretis

T. A. Depretis, Metallurgist

02/08/2014 4:33:01 PM

6.1.4 PACKING SLIPS

LCC

Purchase Order

PO Number
412547

LCC Deployment Services, Inc.
7900 Westpark Drive, Suite A300
Mclean, VA 22102

Ship To: 90 Industrial Park Rd
Middletown, CT 06457

Vendor: Lockport Steel Fabricators, LLC
3051 S. State Street
P.O. Box 248
Lockport, IL 60441

Bill To: LCC Deployment Services, Inc.
7900 Westpark Drive, Suite A300
Mclean, VA 22102

PAYMENT TERMS	FOB	DATE OF ORDER	FREIGHT TERMS
Net 30		04/04/2014	Prepaid
DATE EXPECTED 04/04/2014		REFERENCE 131647	

ITEM	DESCRIPTION	QUANTITY	U.O.M.
A-D-Subcontractor-Equipment	FB - 1-1/4" x 8-1/2" x 35'-0" cut to size, drilled, fabbed, and HDG per provided sketches A572-65 Ready 3-4 weeks	4	Each
A-D-Subcontractor-Equipment	FB - 1" x 6-1/2" x 35'-0" cut to size, drilled, fabbed, and HDG per provided sketches A572-65	3	Each
A-D-Subcontractor-Equipment	FB - 1" x 6-1/2" x 40'-0" cut to size, drilled, fabbed, and HDG per provided sketches A572-65	3	Each
A-D-Subcontractor-Equipment	FB - 3/4" x 4" x 20'-0" cut to size, drilled, fabbed, and HDG per provided sketches A572-65	3	Each
A-D-Subcontractor-Equipment	FB - 3/4" x 4" x 5'-0" cut to size, drilled, fabbed, and HDG per provided sketches A572-65	3	Each
A-D-Subcontractor-Equipment	FB - 1" x 4-1/2" x 15'-0" cut to size, drilled, fabbed, and HDG per provided sketches A572-65	3	Each
A-D-Subcontractor-Equipment	FB - 1" x 6" x 35'-0" cut to size, drilled, fabbed, and HDG per provided sketches A572-65	3	Each
A-D-Subcontractor-Equipment	FB - 1" x 4-1/2" x 35'-0" cut to size, drilled, fabbed, and HDG per provided sketches A572-65	3	Each
A-D-Subcontractor-Equipment	HSS - 6 x 6 x 1/2" x 4'-2" cut to size, fabbed, and HDG per provided sketches A500-42 - AB/HSS1	6	Each
A-D-Subcontractor-Equipment	PL - 1-1/4" x 43-3/4" x 8'-0" cut to size, fabbed, and HDG per provided sketches A572-65 - AB1	6	Each
A-D-Subcontractor-Equipment	PL - 1-1/4" x 8" x 4'-2" cut to size, fabbed, and HDG per provided sketches A572-65 - AB1-Vert	6	Each
A-D-Subcontractor-Equipment	PL - 1-1/4" x 8" x 6'-3" cut to size, fabbed, and HDG per provided sketches A572-65 - AB1-Cap	6	Each

Purchase Order

PO Number
412547

LCC Deployment Services, Inc.
7900 Westpark Drive, Suite A300
Mclean, VA 22102

Ship To: 90 Industrial Park Rd
Middletown, CT 06457

Vendor: Lockport Steel Fabricators, LLC
3051 S. State Street
P.O. Box 248
Lockport, IL 60441

Bill To: LCC Deployment Services, Inc.
7900 Westpark Drive, Suite A300
Mclean, VA 22102

A-D-Subcontractor-Equipment	PL - 1-1/4" x 8" x 4'-9" cut to size, fabbed, and HDG per provided sketches A572-65 - P1	6	Each	
A-D-Subcontractor-Equipment	PL - 1-1/4" x 9" x 1'-9" cut to size, fabbed, and HDG per provided sketches A572-65	6	Each	
A-D-Subcontractor-Equipment	PL - 1-1/4" x 8" x 1'-9" cut to size, fabbed, and HDG per provided sketches A572-65 - P2	6	Each	
A-D-Subcontractor-Equipment	PL - 2" x 8" x 8" cut to size, fabbed, and HDG per provided sketches A572-50 - WP1	12	Each	

SUPPLIER INSTRUCTIONS

1. Invoice must reference Purchase Order Number listed above or supplier will experience payment delays.
2. Invoice should be emailed to 'AP_TEAM@lcc.com'
3. Process order with the above shipping method, terms, prices, and specifications.
4. Please notify LCC's contact person immediately if you are unable to ship as specified. Upon acceptance of this purchase order seller agrees to adhere to LCC terms and conditions located at http://www.lcc.com/index.php/en/purchasing-terms-conditions , as amended from time to time, which are incorporated herein by this reference, with the same force and effect as if they were given in full text.

LCC APPROVAL

Procurement Dept.
LCC Authorized Agent

04/04/2014
Date

CONSTRUCTION

6.2.1 CONSTRUCTION INSPECTIONS

LCC Deployment Services Inc.
2242 Old Marlton Pike, Marlton, NJ 08053
856-810-1658 (Ph) 856-810-1659 (Fax)

To: Crown Castle

Subject: Construction inspection

Site: **Middletown 1 - 825983**

August 12, 2014

Please be advised that all work was completed per drawings dated **9-17-2013** by **Paul J. Ford Engineering**, in accordance with industry standards and contract documents including modification drawings and specifications, state and local regulations, OSHA, and engineering standards. On-site cold galvanizing was applied in accordance with Crown ENG-BUL-10149.

Please let me know if you have any questions.

Thank you,

Stephen J. Teti
Sr. Project Manager
Structural
LCC Deployment Services

6.2.2 CONTRACTOR'S CERTIFIED WELD INSPECTION

Applied Testing Group, LLC
Quality Nondestructive Testing Solutions

11017 Mt. Charron Rd., NW
Huntsville, AL 35810

Phone: (256) 425-6975
daniel.irons11@att.net

December 09, 2014

Mr. Keith Stackhouse
LCC Deployment Services, Inc.
2500 Sylon Boulevard
Hainesport, New Jersey 08036

Subject: ATG Project No. 074-14, Final Examination Report, Monopole Reinforcement and Retrofit Project, Middletown_1, BU# 825983, 90 Industrial Park Road, Middletown, Connecticut 06457

Dear Mr. Stackhouse:

We are pleased to submit two copies of our Final Examination Report for the above referenced project. These services were provided in accordance with our Master Subcontract Agreement dated June 20, 2014. We proceeded with our services based on both your purchase order and email authorization.

SCOPE OF SERVICES

We have reviewed or observed the pre, during, and post welding operations, and accomplished a 100% ultrasonic (UT), 100% magnetic particle, (MT), and 100% visual (VT) examination of the base plate-to-pole shaft circumferential weld, a 100% VT and 50% MT examination of the six new anchor bracket assembly welds, a 100% VT and 50% MT of the six anchor bracket base plate welds, a 100% VT and 50% MT of six fabricated anchor bracket tube-to-plate welds, and a 100% VT and 100% MT of the anchor bracket-to-tower shaft welded connections, to evaluate their conformance with the applicable code requirements, project plans, and specifications.

The following services have not been provided by our firm: surveying for line and grade, cost estimates, review of design and contract documents, tests of material other than structural steel, and professional services not discussed herein.

WELDING, VISUAL MAGNETIC PARTICLE, AND ULTRASONIC OBSERVATIONS

AWS/Certified Welding Inspector and NDE II/III Technician personnel from our office reviewed or observed the pre, during, and post welding operations. We also accomplished a 100% ultrasonic (UT), 100% magnetic particle, (MT), and 100% visual (VT) examination of the base plate-to-pole shaft circumferential weld, a 100% VT and 50% MT examination of the six new anchor bracket assembly welds, a 100% VT and 50% MT of the six anchor bracket base plate welds, a 100% VT and 50% MT of six fabricated anchor bracket tube-to-plate welds, and a 100% VT and 100% MT of the anchor bracket-to-tower shaft welded connections, at the site between September 28, 2014 and December 06, 2014. The plans used were those prepared by Paul J. Ford, Inc., dated August 14, 2013.

WELDING, VISUAL, MAGNETIC PARTICLE, AND ULTRASONIC OBSERVATION RESULTS

The pre, during, and post welding operations, the UT, MT, and VT examinations of the base plate-to-pole shaft circumferential weld, the VT and MT examination of the six new anchor bracket assembly welds, the VT and MT of the six new anchor bracket base plate welds, the VT and MT of six fabricated anchor bracket tube-to-plate welds, and the VT and MT of the anchor bracket-to-tower shaft welded connections, were in conformance with the applicable requirements delineated in ANSI/AWS D 1.1:2010-*Stuctural Steel Code*, and the project plans and specifications, as we understand them. Refer to the appended Visual Observation Report, Welder Certifications, Ultrasonic Calibration Report, Ultrasonic Testing of Welds Report, Magnetic Particle Observation Report, Welding Procedure Specifications, CWI/NDE Certifications, and supporting photographs for particulars.

Discrepancies noted between the plans and specifications or code requirements, and the as-built construction observed in the conduct of the welding and structural steel observations were brought to the attention of the contractor. According to our records, all of the noted discrepancies have been corrected in the field in accordance with the project plans and specifications.

We have endeavored to complete the services identified herein in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality and under similar conditions as this project. No other representation, express or implied, is included or intended, and no warranty or guarantee is included or intended in this agreement, or any report, opinion, document, or other instrument of service.

We are pleased to be of service to you on this project. If you have any questions concerning this report, do not hesitate to contact either of the undersigned.

Very truly yours,

APPLIED TESTING GROUP, LLC.

L. John Harper, CWI/NDE Level II
Senior Staff Technologist

Daniel Irons, NDE Level III
Principal

Appended: Visual Observation Reports (1)
Magnetic Particle Observation Report (1)
Ultrasonic Calibration Reports (1)
Ultrasonic Testing of Welds Reports (1)
Welding Procedures (2)
Welder Certification (1)
CWI/NDE Certifications (2)
Photographs (42)

Applied Testing Group, LLC

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

MAGNETIC-PARTICLE EXMAINATION REPORT

Client: LCC Deployment Services, Inc. **Project:** Middletown_1 **ATG No:** 074-14
Location: 90 Industrial Park Road, Middletown, CT **Area:** Various Welds (see below) **BU/Site#:** 825983

WELD LOCATION AND IDENTIFICATION SKETCH

Component/Weld Identification	Area Examined		Interpretation		Repairs		Remarks
	Entire	Specific	Accept	Reject	Accept	Reject	
Six new anchor bracket assembly welds - 50%		X	X		N/A	N/A	ACCEPTABLE
One base plate circumferential weld - 100% (all available)	X		X		N/A	N/A	ACCEPTABLE
Six new bearing plate welds – 50%		X	X		N/A	N/A	ACCEPTABLE
Six fabricated anchor bracket tube-to-plate welds – 100%	X		X		N/A	N/A	ACCEPTABLE
Six new anchor bracket-to-tower welds – 100%	X		X		N/A	N/A	ACCEPTABLE

PRE-EXAMINATION:
Surface Preparation: Wire Brush

EQUIPMENT:
Instrument Make: Parker Research Corp. **Model:** DA-400 **Serial No:** 13018
Powder Manufacturer: Parker Research Corp. **Description:** RP6 Red Powder **Batch No:** 17209

METHOD OF INSPECTION:

☒Dry ☐Wet ☒Visible ☐Fluorescent

How Media Applied: Manual Dusting, Magnetic Powder Blower

☐Residual ☒Continuous ☐True-Continuous
☐AC ☒DC ☐Half-Wave
☐Prods ☒Yoke ☐Cable Wrap ☐Other: _____

Direction for Field: ☒Longitudinal ☐Circular ☐Other: _____

Strength of Field: Verified with pie gauge, varying intensity

POST EXAMINATION:
Demagnetizing Technique (if required): N/A
Cleaning (if required): Wipe **Coating Method :** Manual, CRC Zinc

We, the undersigned, certify that the statements in this record are correct, and that the test welds were prepared and tested in accordance with the requirements of ANSI/AWS D1.1 2010.

Inspector / Level: L. John Harper, CWI/NDE Level II Date: 11/13/2014

Reviewed by: Daniel Irons, NDE Level III Date: 11/13/2014

NOTICE: THIS EXAMINATION REPORT REFLECTS THE ACTUAL NDE PROCEDURE THAT WAS CONDUCTED BY APPLIED TESTING GROUP, LLC PERSONNEL. SUBMISSION OF THIS REPORT IS FOR INFORMATIONAL PURPOSES AND DOES NOT REFLECT ANY GUARANTEE OF THE PART, INSPECTION PROCEDURES, OR STANDARDS AND IS SUBJECT TO THE LIMITATIONS OF EACH TEST METHOD.

Applied Testing Group, LLC
11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

ULTRASONIC CALIBRATION REPORT

Client: LCC Deployment Services, Inc.			**Project:** Middletown_1			**BLW:** 825983
Location/Area: 90 Industrial Park Road, Middletown, CT			**Component(s):** Tower-to-Base Plate Weld			
Time In: 11:45 a.m.	**Time Out:** 3:45 p.m.		**Job No.:** ATG-074-14	**PJF Reference #:** 37513-1570		
ITEM:	☒ Weld(s)	☐ Structural	☐ Casting(s)	☐ Pipe(s)	☒ Plate(s)	
	☐ Machinery	☐ Machined Part	☒ Other: Tower-to-Base Plate Weld			
Material:	**Size**	**No. of Pieces**	**Base Metal**	**Process/Filler Metal**	**Weld Condition:**	
Carbon Steel	0.438"	(1)	A572 Gr. 65	E 8018	☒As Welded ☐Ground	
Acceptance Standard: ANSI/AWS D1.1: 2010 Edition			**Procedure:** AWS-UT-1, Rev. 1			
Type of Inspection Method	☒ Soundness	☐ Thickness	**UT Equipment Name/Model/Serial No.:** KrautKramer Branson / USK-7 / SER# 27276-3260			
	☒ Angle Beam	☐ Bond	**Straight Beam:** Transducer: GE Gamma RPH Size: .500" Diameter Frequency: 2.25 MHz Serial No. 0221.3D		**Angle Beam:** Transducer: GE Gamma Size: .375" Diameter Frequency: 2.25 MHz Serial No. 00P1CV	
	☐ Other:		**Transducer Type:** ☒ Single ☐ Dual ☐ Delay		**Wedge Angle(s):** ☒ 60 Degree S/N W-300 ☒ 70 Degree S/N W-223	
Reference Block: ☒ DSC ☐ IIW ☐ Other:	**Reference Block No.:** 97-8116	**Material:** Carbon Steel	**Calibration Block Type:** DSC Diameter: N/A	**Calibration Block No.:** 97-8116		**Material:** C/S - 1.0"
Screen Size: ☐ 2.5" ☒ 5" ☐ 10" ☐ Other:	**Reference Gain:** 42.0 dB – 60 Degree 46.0 dB – 70Degree	**Scanning Gain:** ☐ +6db ☒ Other: 14dB	**Initial Calibration Time:** 11:45 a.m.	**Calibration Rechecks:** 1) 3:45 pm 2) 3) 4)		**Couplant:** Ultragel II, Batch # 25-004/10125E
EXAMINATION SUMMARY: Acceptable. See "notes" on UTR-001 for details.						
Examined By: Daniel Irons, Level III			**Date:** November 01, 2014			
Reviewed By: L.J. Harper, CWI/Level II			**Date:** November 01, 2014			

AWS QC 1 LLOYD J. HARPER CWI

Cal. Sheet No. : UTC - 001
Indication Report No(s). : UTR – 001

Applied Testing Group, LLC
11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

REPORT OF ULTRASONIC TESTING OF WELDS

Client: : LCC Deployment Services, Inc.	**Project:** Middletown_1	**Job No.:** ATG-075-14	**BU#:** 825983
Location: 90 Industrial Park Road, Middletown, CT	**Area:** Tower-to-Base Plate Weld	**Report No:** UTR-001	

WELD IDENTIFICATION: Full Penetration Tower-to-Base Plate Circumferential Weld
MATERIAL THICKNESS: 0.478"
WELD JOINT AWS: T/C
WELDING PROCESS: SMAW
QUALITY REQUIREMENTS ANSI/ AWS D1.1: 2010
REMARKS: All dimensions are expressed in inches.
NOTES: 100% of available surface areas examined

FLAT NO./ LOCATION	INDICATION NUMBER	TRANSDUCER ANGLE	FROM FACE / SURFACE	LEG*	DECIBELS				DISCONTINUITY					ACCEPTABLE	REJECTABLE	REMARKS
					INDICATION LEVEL	REFERENCE LEVEL	ATTENUATION FACTOR	INDICATION RATING	LENGTH	ANGULAR DISTANCE (SOUND PATH)	DEPTH FROM SURFACE "A"	DISTANCE				
					A	B	C	D				FROM X	FROM Y			
100% of available surface area scanned	-	60/ 70	A	-	-	42 46	-	-	-	-	-	-	-	X		ACCEPTABLE

NOTE:

An ultrasonic examination of 100% of the available existing full penetration tower-to-base plate circumferential welded connection was conducted. The subject weld proved to be acceptable in accordance with the applicable acceptance criteria as set forth in ANSI/AWS D1.1: 2010- *Structural Welding Code – Steel.* and the project plans and specifications, as we understand them.

Examined By: Daniel Irons, Level III D. Irons	**Date:** November 01, 2014
Reviewed By: L.J. Harper, CWI/Level II	**Date:** November 01, 2014

NOTE: We, the above signed, have evaluated the above referenced welded connections, and to the best of our knowledge, state that the information in this report is accurate. This examination report reflects the actual NDE procedure that was conducted by Applied Testing Group, LLC. Submission of this report is for informational purposes and does not reflect any guarantee of the part, inspection procedures, or standards, and is subject to the limitations of each test method.

Applied Testing Group, LLC

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

VISUAL OBSERVATION REPORT

Client: : LCC Deployment Services, Inc.		**Project:** Middletown_1	**Site#:** 825983
Project Location: 90 Industrial Park Road, Middletown, CT		**ATG Technician:** L. Harper	**Date:** 12-03-14
Time In: 11:30 a.m.	**Time Out**: 5:30 p.m.	**Job No:** ATG-074-14	**PJF Ref. #:** 37513-1570

FIELD OBSERVATIONS

☒	**New Anchor Bracket Connections:**	Location	Acceptable
	Installation of six new anchor bracket assembly-to-pole shaft and base plate	Plate Size	Acceptable
	welded connections at the base elevation.	Welds Correct Size	Acceptable
		Welds Correct Length	Acceptable
	☒ Acceptable ☐ Unacceptable ☒ See note: 1		
☒	**Fabricated Anchor Bracket Connections:**	Location	Acceptable
	Installation of six anchor tube-to-steel plate welds at the base elevation.	Plate Size	Acceptable
		Welds Correct Size	Acceptable
		Welds Correct Length	Acceptable
	☒ Acceptable ☐ Unacceptable ☒ See note: 2		
☒	**Base Plate-to-Pole Shaft Circumferential Welded Connection:**	Beams Correct Size	Acceptable
	Installation of existing base plate-to-pole shaft circumferential weld at the base	Locations / Orientation	Acceptable
	elevation.	Welds Correct Size	Acceptable
		Welds Correct Length	Acceptable
	☒ Acceptable ☐ Unacceptable ☒ See note: 3		
☐	**Bridge Stiffener Welded Connections:**	Location	
		Plate Size	
		Welds Correct Size	
		Welds Correct Length	
	☐ Acceptable ☐ Unacceptable ☐ See note:		
☒	**Steel Plate-to-Pole Shaft Welded Connections:**	Location	Acceptable
	Installation of six new anchor bracket-to-pole shaft top welded connections at the	Plate Size	Acceptable
	base elevation (changed from original design).	Welds Correct Size	Acceptable
		Welds Correct Length	Acceptable
	☒ Acceptable ☐ Unacceptable ☒ See note: 4		
☐	**New Reinforcing Plate-to-Pole Shaft Welded Connections:**	Location	
		Plate Size	
		Welds Correct Size	
		Welds Correct Length	
	☐ Acceptable ☐ Unacceptable ☐ See note:		
☒	**Other:**		
	The pre, during, and post welding operations were observed to be acceptable in accordance with the applicable		
	requirements delineated in ANSI/AWS D1.1:2010.		
	☒ Acceptable ☐ Unacceptable		

Applied Testing Group, LLC

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

Project: Middletown_1	Site #: 825983	Job No: ATG-074-14	Date: 12-03-14
REMARKS AND/OR DISCREPANCIES:			

Notes:

On December 03, 2013, Applied Testing Group LLC, performed a visual examination of the installation of six new anchor bracket assembly-to-pole shaft, six anchor tube-to-steel plate, one existing pole shaft-to-base plate circumferential, and six new bearing plate-to-pole shaft welded connections, located at 90 Industrial Park Road, Middletown, CT. The pre, during, and post welding operations were noted to be acceptable in accordance with the applicable requirements delineated in ANSI/AWS D1.1:2010.

The following were examined:

1) Installation of six new anchor bracket assembly-to-pole shaft welded connections at the base elevation.
2) Installation of six anchor tube-to-steel plate welds at the base elevation.
3) Installation of one existing base plate-to-pole shaft circumferential weld at the base elevation.
4) Installation of six new bearing plate-to-pole shaft welded connections at the base elevation.

The welds were acceptable in accordance with ANSI/AWS D1.1:2010 and the project plans/specifications. Cold galvanizing paint has been acceptably applied to all exterior locations.

PLANS USED:

Title(s): Paul J. Ford	Date: 08-14-13	As-Built Date:	N/A
Drawing No(s): T1, S1 to S8			
Visit Requested by: Keith Stackhouse	Title: Project Coordinator – : LCC Deployment Services, Inc.		

Examined By: L. John Harper, AWS/CWI-NDE Level II	Date: December 03, 2014
Reviewed By: Daniel Irons, NDE Level III	Date: December 03, 2014

AWS QC 1
LLOYD J. HARPER
04090761
CWI

NOTE: We, the above signed, have evaluated the above referenced welded connections, and to the best of our knowledge, state that the information on this report is accurate. This examination report reflects the actual NDE procedure that was conducted by Applied Testing Group, LLC. Submission of this report is for informational purposes and does not reflect any guarantee of the part, inspection procedures, or standards, and is subject to the limitations of each test method.

AWS
Welder and Welding Operator Qualification Test Record

Welder or operator's name Ervin Moore Identification no. 231-72-5884
Welding process SMAW Manual X Semiautomatic Machine
Position F4 Overhead
(flat, horizontal, overhead or vertical--if vertical, state whether upward or downward)
In accordance with procedure specification AWS D1.1 Pre qualified Telcom-SM1
Material specification ASTM A36
Diameter and wall thickness (if pipe) - otherwise, joint thickness 1/2"in. Plate
Thickness range this qualifies 1/8- Unlimited.

FILLER METAL

Specification no. AWS 5.1 Classification E7018 F no. F4
Describe filler metal (if not covered by AWS specification)
Is backing strip used? N/A
Filler metal diameter and trade name 1/8"Lincoln Flux for submerged arc or gas for gas metal arc or flux cored arc welding N/A

VISUAL INSPECTION (9.25.1)

Appearance Good Undercut None Piping porosity None

Guided Bent Test Results

Type	Result	Type	Result

Test conducted by . laboratory test no
per Test date

Fillet Test Results

Appearance Acceptable Fillet size 5/16" inch
Fracture test root penetration Acceptable Marcoeth Acceptable
(describe the location, nature, and size of any crack or tearing of the specimen.)
Test conducted by D. Preston CWI Laboratory test no. 5884 - oh
per AWS D1.1 2000 4.25 Test date 5/9/07

RADIOGRAPHIC TEST RESULTS

Film identification	Results	Remarks	Film identification	Results	Remarks

Test witnessed by Test no.
per

We, the undersigned, certify that the statements in this record are correct and that the welds were prepared and tested in accordance with the requirements of 5C or D of AWS D1.1 (2000) Structural Welding Code.
year

Dale Preston AWS CWI

AWS QC 1 DALE W. PRESTON 85041051 CWI

Manufacturer or Contractor Telecommunications Contracting Co.
Authorized by T. Roberts.
Date 5/9/07

AWS
Welder and Welding Operator Qualification Test Record

Welder or operator's name Ervin Moore Identification no. 231-72-5884
Welding process SMAW Manual X Semiautomatic Machine
Position F3 Vertical Up
(flat, horizontal, overhead or vertical--if vertical, state whether upward or downward)
In accordance with procedure specification AWS D1.1 Pre qualified Telcom-SM1
Material specification ASTM A36
Diameter and wall thickness (if pipe) - otherwise, joint thickness 1/2"in. Plate
Thickness range this qualifies 1/8- Unlimited.

FILLER METAL

Specification no. AWS 5.1 Classification E7018 F no. F4
Describe filler metal (if not covered by AWS specification)
Is backing strip used? N/A
Filler metal diameter and trade name 1/8"Lincoln Flux for submerged arc or gas for gas metal arc or flux cored arc welding N/A

VISUAL INSPECTION (9.25.1)

Appearance Good Undercut None Piping porosity None

Guided Bent Test Results

Type	Result	Type	Result

Test conducted by . laboratory test no
per Test date

Fillet Test Results

Appearance Acceptable Fillet size 5/16" inch
Fracture test root penetration Acceptable Marcoeth Acceptable
(describe the location, nature, and size of any crack or tearing of the specimen.)
Test conducted by D. Preston CWI Laboratory test no. 5884
per AWS D1.1 2000 4.25 Test date 5/9/07

RADIOGRAPHIC TEST RESULTS

Film identification	Results	Remarks	Film identification	Results	Remarks

Test witnessed by Test no.
per

We, the undersigned, certify that the statements in this record are correct and that the welds were prepared and tested in accordance with the requirements of 5C or D of AWS D1.1 (2000) Structural Welding Code.
year

Dale Preston AWS CWI

AWS QC 1 DALE W. PRESTON 85041051 CWI

Manufacturer or Contractor Telecommunications Contracting Co.
Authorized by T. Roberts.
Date 5/9/07

RAMBALL TESTLAB, INC.

1703 INDUSTRIAL HIGHWAY - UNIT 3
CINNAMINSON, NJ 08077-2546
PHONE: (856) 786-8880 FAX: (856) 786-3144

LABORATORY REPORT

Submitted to:
Telecommunications Contracting
2242 Old Marlton Pike
Marlton NJ 08053
ATTN: Tom Roberts

1/7/2013

P.O. Number: Verbal T. Roberts
Lab Number: 333149

Item: 1" Thick Weld Test Plate
Material: A514 to A572 Gr.65
Heat Number: 88778 to 88776
Welder: Erv Moore
Filler Metal: E8018
Weld Process: SMAW
Weld Position: 4G
PQR: 25.PQR.TccI.D.1-A5.5

VISUAL INSPECTION

Test Specification: AWS D1.1
Disposition: Acceptable

RADIOGRAPHIC INSPECTION

Acceptance Specification: AWS D1.1

QUANTITY TESTED	QUANTITY ACCEPTED	QUANTITY REJECTED
1	1	0

Tested By: Donahue, B. Level II

Joel Muzik
Quality Manager

RAMBALL TESTLAB, INC.
1703 INDUSTRIAL HIGHWAY - UNIT 3
CINNAMINSON, NJ 08077-2546
PHONE: (856) 786-8880 FAX: (856) 786-3144

LABORATORY REPORT

11/2/2012

Submitted to:
Telecommunications Contracting
2242 Old Marlton Pike
Marlton NJ 08053
ATTN:

P.O. Number: Verbal Tom
Lab Number: 332321
Page 1 of 1

Item: ." Thick Weld Test Plate
Material: Grade B
Material Specification: ASTM A514
Filler Material: E11018-M, AWS A5.5
Position: 4G Overhead
Process: SMAW
Welder: Erv Moore
PQR Number: 25.PQR.TocI.D.1-A5.5

WELD PROCEDURE QUALIFICATION TEST

IAW AWS D1.1

TRANSVERSE TENSILE TEST

Required Stress, ksi: 110-130 minimum/maximum

	SPECIMEN #1	SPECIMEN #2
WIDTH (inches):	0.752	0.749
THICKNESS (inches):	0.920	0.850
AREA (sq. inches):	0.692	0.637
ULTIMATE LOAD (lbs):	77,723	70,678
ULTIMATE STRESS (ksi):	112	111
LOCATION OF FRACTURE:	Weld	Weld
CHARACTER OF FAILURE:	Ductile	Ductile
DISPOSITION:	Acceptable	Acceptable

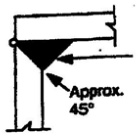
GUIDED BEND TEST

Bend Diameter: 2-1/2" Bend Angle: 180 Degrees

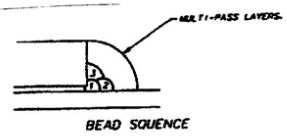
	SPECIMEN #1	SPECIMEN #2	SPECIMEN #3	SPECIMEN #4
TYPE:	Side	Side	Side	Side
DEFECTS:	Absent	Absent	Absent	Absent
DISPOSITION:	Acceptable	Acceptable	Acceptable	Acceptable

Joel Muzik
Quality Manager

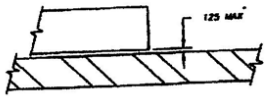
Sketch A



Sketch B



Sketch C



MEMO

1. Paint will be abated by others prior to welding.
2. All welds will be welded vertically.
3. Welds to be cleaned free of slag.
4. All welds after cleaning will be brushed with (2) coats of ZRC Galvilite primer.
5. Finish coat to match existing.

Telecommunications Contracting Co., Inc.

Welding Procedure Specification

WPS No. 6 TCCI - D1.1 - All Fillets Revision 0 Date _____ By _____

Authorized By Tom Roberts Date 11/10/09 Prequalified ☒

Welding Process(es) SMAW Type: Manual ☒ Machine ☐ Semi-Auto ☐ Auto ☐

Supporting PQR(s) N/A PreQualified

JOINT

Type Lapped/Inside Corner 1/8" to 5/8" Fillet Welds

Backing Yes ☒ No ☒ Single Weld ☒ Double Weld ☐

Backing Material A572

Root Opening 0 Root Face Dimension 0

Groove Angle 0 Radius (J-U) 0

Back Gouge Yes ☒ No ☒

Method N/A

Prequalifed Joint Parameters:

See Page 2

BASE METALS

Material Spec. A572 to Per Table 3.1

Type or Grade Any Group II to Any Group II or III

Thickness: Groove (in) N/A - _____

Fillet (in) Various - _____

Diameter (Pipe, in) N/A - _____

FILLER METALS

AWS Specification AWS A5.1

AWS Classification E7018

SHIELDING

Flux N/A

Electrode-Flux (Class) N/A

Gas -

Composition -

Flow Rate -

Gas Cup Size -

PREHEAT

Preheat Temp., Min. Per AWS Table 3.2 Category B

Thickness	Temperature
Up to 3/4"	< 32 F - 70 F
Over 3/4" to 1-1/2"	50 F
Over 1-1/2" to 2-1/2"	150 F
Over 2-1/2"	225 F

Interpass Temp., Min. _____ Max. _____

POSITION

Position of Groove N/A Fillet Vertical Up

Vertical Progression: ☒ Up ☐ Down

ELECTRICAL CHARACTERISTICS

Transfer Mode (GMAW):

Short-Circuiting ☐ Globular ☐ Spray ☐

Current: AC ☐ DCEP ☒ DCEN ☐ Pulsed ☐

Other _____

Tungsten Electrode (GTAW):

Size N/A Type -

TECHNIQUE

Stringer or Weave Bead Stringer

Multi-pass or Single Pass (per side) Multi-pass

Number of Electrodes 1

Electrode Spacing: Longitudinal N/A

Lateral N/A

Angle N/A

Contact Tube to Work Distance N/A

Peening None

Interpass Cleaning Wire Brush, Chip, or Grind

POSTWELD HEAT TREATMENT PWHT Required ☐

Temp. N/A Time N/A

WELDING PROCEDURE

Layer/Pass	Process	Filler Metal Class	Diameter	Cur. Type	Amps or WFS	Volts	Travel Speed	Other Notes
1-n	SMAW	E7018	1/8"	DCEP	75 - 130	18-26	6 - 10 ipm	

Telecommunications Contracting Co., Inc.

Welding Procedure Specification

WPS No. 010 TCCI - D1.1 - BU4a Revision 0 Date 11/12/09 By Michael whelan

Authorized By Tom Roberts Date 11/13/09 Prequalified ☒

Welding Process(es) SMAW Type: Manual ☒ Machine ☐ Semi-Auto ☐ Auto ☐

Supporting PQR(s) N/A PreQualified

JOINT

Type B-U4a Single Bevel Groove

Backing Yes ☒ No ☐ Single Weld ☒ Double Weld ☐

Backing Material A572

Root Opening 1/4" Root Face Dimension 0

Groove Angle 45 Radius (J-U) N/A

Back Gouge Yes ☒ No ☒

Method

Prequalifed Joint Parameters:

See Page 2

BASE METALS

Material Spec. A572 to A572

Type or Grade 50 to 50

Thickness: Groove (in) 1" -

Fillet (in) -

Diameter (Pipe, in) N/A -

FILLER METALS

AWS Specification AWS A5.5

AWS Classification E8018-C3

SHIELDING

Flux N/A

Electrode-Flux (Class) N/A

Gas -

Composition -

Flow Rate -

Gas Cup Size -

PREHEAT

Preheat Temp., Min. 150 F Per AWS Table 3.2 Category C

Thickness Up to 3/4" Temperature

Over 3/4" to 1-1/2" 150 F

Over 1-1/2" to 2-1/2"

Over 2-1/2"

Interpass Temp., Min. 150 F Max. 300 F

POSITION

Position of Groove Horizontal Fillet Horizontal

Vertical Progression: ☒ Up ☐ Down

ELECTRICAL CHARACTERISTICS

Transfer Mode (GMAW):

Short-Circuiting ☐ Globular ☐ Spray ☐

Current: AC ☐ DCEP ☒ DCEN ☐ Pulsed ☐

Other

Tungsten Electrode (GTAW):

Size N/A Type N/A

TECHNIQUE

Stringer or Weave Bead Stringer

Multi-pass or Single Pass (per side) Multi-pass

Number of Electrodes 1

Electrode Spacing: Longitudinal N/A

Lateral N/A

Angle N/A

Contact Tube to Work Distance N/A

Peening None

Interpass Cleaning Wire Brush, Chip, or Grind

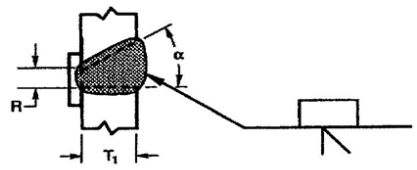
POSTWELD HEAT TREATMENT PWHT Required ☐

Temp. N/A Time N/A

WELDING PROCEDURE

Layer/Pass	Process	Filler Metal Class	Diameter	Cur. Type	Amps or WFS	Volts	Travel Speed	Other Notes
1 - 2	SMAW	E8018	1/8"	DCEP	110 - 140		6 -10 ipm	
3 - n	SMAW	E8018	5/32"	DCEP	150 - 187		8 -11 ipm	

Single-bevel-groove weld (4)
Butt joint (B)

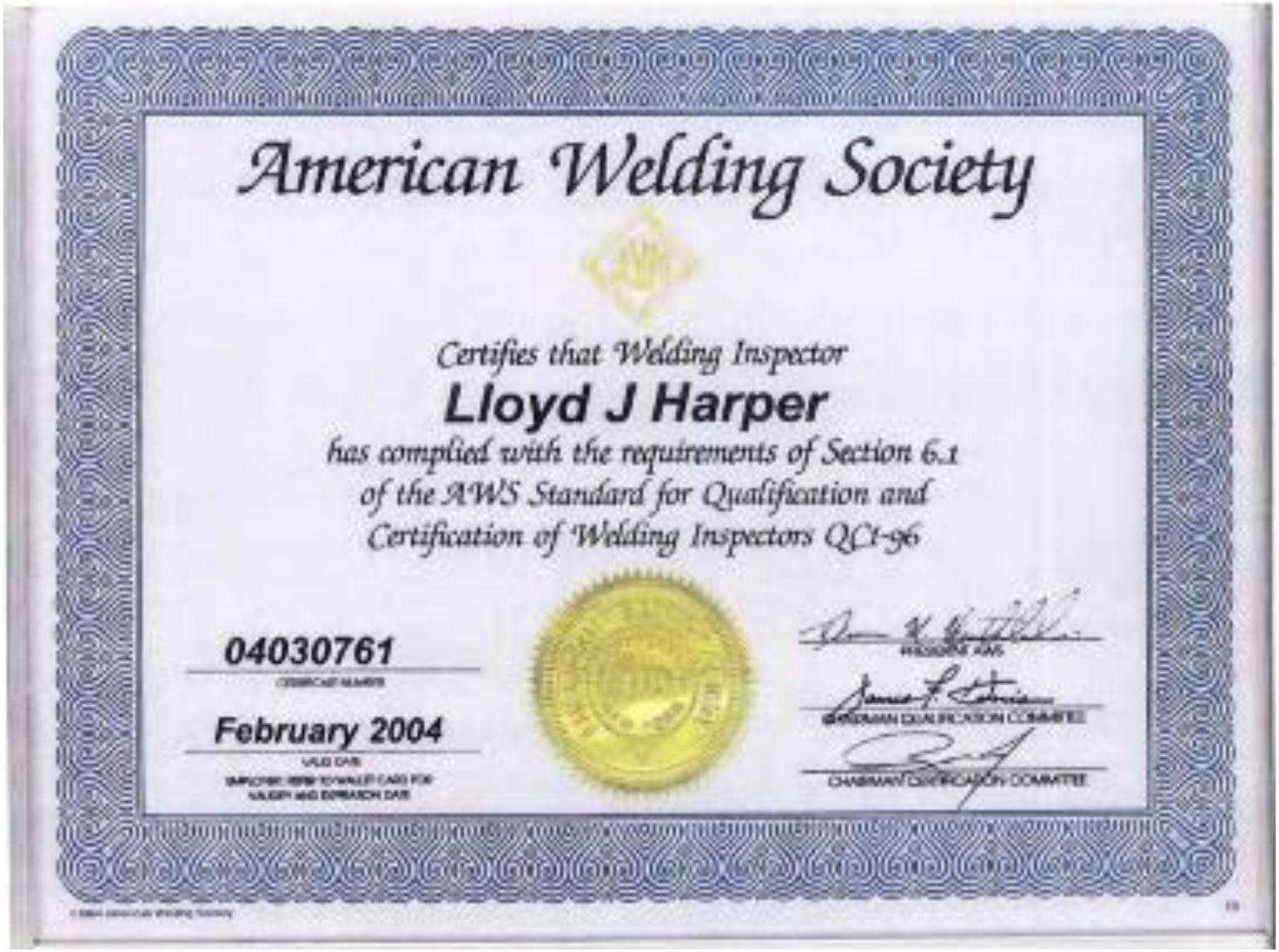


Tolerances	
As Detailed (see 3.13.1)	As Fit-Up (see 3.13.1)
R = +1/16, –0	+1/4, –1/16
α = +10°, –0°	+10°, –5°

Welding Process	Joint Designation	Base Metal Thickness (U = unlimited)		Groove Preparation		Permitted Welding Positions	Gas Shielding for FCAW
		T_1	T_2	Root Opening	Groove Angle		
SMAW	B-U4a	U	—	R = 1/4	α = 45°	All	—
				R = 3/8	α = 30°	All	—

MEMO

1. Paint will be abated by others prior to welding.
2. All welds will be welded vertically.
3. Welds to be cleaned free of slag.
4. All welds after cleaning will be brushed with (2) coats of ZRC Galvilite primer.
5. Finish coat to match existing.



American Welding Society

Certifies that Welding Inspector

Lloyd J Harper

has complied with the requirements of Section 6.1
of the AWS Standard for Qualification and
Certification of Welding Inspectors QC1-96

04030761

February 2004

VALID DATE

PRESIDENT AWS

CHAIRMAN QUALIFICATION COMMITTEE

CHAIRMAN CERTIFICATION COMMITTEE

Certification QuikCheck

AWS's Free Online Certification Verification Service

Please enter a Certification number below, along with the last name of the inspector. This number can be found on a wallet card or wall certificate produced by the inspector. The search will return the certification number, a name, and an expiration date for that individual.

Certification was found .....

Cert. No.	Name	Expiration	Cert. Description
04030761	Lloyd J Harper	March 1, 2016	Certified Welding Inspector

Certification number 04030761

Last name harper

Go

Alternatively, you may search using the individual's information to view all certifications *(all fields are required)*:

Last Name

First Name or First Initial

Birth Month / Day --select birth month-- / --select birth day--

Search

AWS strongly suggests that the certification identity be verified with a government issued photo identification card, such as a driver's license.

How to interpret the Certification number to determine the level of certification:

Key
1 = CWI
2 = CAWI eligible for upgrade*
3 = cwi by upgrade*
4 = CAWI
5 = CWI through CWSIP
7 = CWI through Reciprocity
8 = SCWI
E = CWE
G = CWENG

Applied Testing Group, LLC

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

VISUAL ACUITY RECORD

NAME : Llyod J. Harper **Social Security Number:** 9716

NEAR VISION : Required ☒ Not Required: ☐

	LEFT		RIGHT	
	Jaeger #	Distance	Jaeger #	Distance
UNCORRECTED				
CORRECTED	J-2	12"	J-2	12"

FAR VISION: Required: ☐ Not Required: ☒

	LEFT	RIGHT
UNCORRECTED		
CORRECTED	20/20	20/20

COLOR CONTRAST DIFFERENTIATION: **REQUIRED** ☒ **NOT REQUIRED** ☐

PSEUDO ISOCHROMATIC PLATES: **PASS** ☒ **FAIL** ☐

BRIGHTNESS DISCRIMINATION: **PASS** ☒ **FAIL** ☐

Restrictions: None

Corrective Lenses Required: Yes ☒ No: ☐

Examiner: Thomas J Munson Date: November 4, 2013

Expiration date of visual acuity examination: **Date:** **NOVEMBER 4, 2014**

Applied Testing Group, LLC
Quality Nondestructive Testing Solutions

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

Nondestructive Testing
Qualification and Certification Record

This is to certify that:

Name: Lloyd J. Harper **Social Security Number:** 9716

fully meets the requirements of NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

NDT Method: Magnetic Particle

Certification Level : II **Date of Certification:** 06/28/14

Certification Expiration Date: 06/28/2017

Test Scores:

Test	Grade	Administered By	Remarks
General:	85.0	T. Munson	
Specific:	95.0	T. Munson	
Practical	95.0	T. Munson	
Composite:	91.6		

Limitations: None

Recommended for certification by: Thomas J Munson **Date:** 06/28/14

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Certified by : Daniel Lions **Date:** 06/28/14

NDE Manager

Applied Testing Group, LLC

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

Nondestructive Testing
Qualification and Certification Record

This is to certify that:

Name: Lloyd J. Harper **Social Security Number:** 9716

fully meets the requirements of NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

NDT Method: Liquid Penetrant

Certification Level : II **Date of Certification:** 06/21/2014

Certification Expiration Date: 06/21/2017

Test Scores:

Test	Grade	Administered By	Remarks
General:	90.0	T. Munson	
Specific:	95.0	T. Munson	
Practical	95.0	T. Munson	
Composite:	96.3		

Recommended for certification by: Thomas J Munson **Date:** 06/20/2014

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Certified by : Daniel Lions **Date:** 06/21/2014

NDE Manager

Applied Testing Group, LLC
Quality Nondestructive Testing Solutions

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

Nondestructive Testing
Qualification and Certification Record

This is to certify that:

Name: Lloyd J. Harper **Social Security Number:** 9716

fully meets the requirements of NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

NDT Method: Visual

Certification Level : II **Date of Certification:** 01/12/14

Certification Expiration Date: 02/26/2017

Test Scores:

Test	Grade	Administered By	Remarks
General:	95.0	T. Munson	
Specific:	100.0	T. Munson	
Practical	100.0	T. Munson	AWS-CWI
Composite:	98.3		

Recommended for certification by: Thomas J Munson **Date:** 01/10/14

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Certified by : Daniel Lions **Date:** 01/12/14

NDE Manager

Applied Testing Group, LLC
Quality Nondestructive Testing Solutions

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

Personnel Testing
Education, Training and Experience Record

Name: Lloyd J. Harper Signature:* L. J. Harper

Date of Birth: 06/10/1956 Date of Employment: 11/24/03

Training and Experience Through: July 1, 2014

- The information provided is accurate and true to the best of my knowledge.

EDUCATION

School	Location	Date Graduated	Degree/Major
Varina High School	Varina, VA	1984	Diploma/General Studies

CLASSROOM TRAINING

Subject	Training Hours	Dates Completed	Source/ Company
Liquid Penetrant Level I & II	40	2003	Schnabel
Magnetic Particle Level I & II	40	2002	Schnabel
Radiation Safety/Level I	49	2002	E. I. Dupont
Visual Testing – AWS	40	1993	AWS
Fundamental of Weld Engineering	40	1994	Ohio State U.
Liquid Penetrant Level I	12	1996	ASNT

Applied Testing Group, LLC

11017 Mt. Charron Rd., NW
Huntsville, AL 35810
Phone: (256) 425-8975

Personnel Testing
Education, Training and Experience Record

WORK EXPERIENCE

Test Method	Level	Company	Total Months Exp.
Visual Testing	II	Applied Testing Group, LLC	41
	II	Mistras Services, Inc.	36
	II	Schnabel Engineering	44
	CWI	American Welding Society	181
Magnetic Particle	II	Applied Testing Group, LLC	42
	II	Mistras Services, Inc.	24
	II	Schnabel Engineering	22
Liquid Penetrant	II	Applied Testing Group, LLC	34
	II	Mistras Services, Inc.	24
	II	Schnabel Engineering	40
	II		
Radiographic	II	Mistras Services, Inc.	9
	II	Schnabel Engineering	14

Applied Testing Group, LLC
Quality Nondestructive Testing Solutions

11017 MT. CHARRON RD., NW
HUNTSVILLE, ALABAMA 35810
PH: (256) 425-8975

VISUAL ACUITY RECORD

NAME : Daniel Irons **Social Security Number:** 6010

NEAR VISION: Required ☒ Not Required: ☐

	LEFT		RIGHT	
	Jaeger #	Distance	Jaeger #	Distance
UNCORRECTED				
CORRECTED	J-2	12"	J-2	12"

FAR VISION: Required: ☒ Not Required: ☐

	LEFT	RIGHT
UNCORRECTED		
CORRECTED	20/20	20/20

COLOR CONTRAST DIFFERENTIATION: **REQUIRED** ☒ **NOT REQUIRED** ☐

PSEUDO ISOCHROMATIC PLATES: **PASS** ☒**FAIL** ☐

BRIGHTNESS DISCRIMINATION: **PASS** ☒ **FAIL** ☐

Restrictions: Far Vision

Corrective Lenses Required: Yes ☒ No: ☐

Examiner: Thomas J Munson Date: September 14, 2013

Expiration date of visual acuity examination: **Date:** **SEPTEMBER 14, 2014**

Applied Testing Group, LLC
Quality Nondestructive Testing Solutions

11017 MT. CHARRON RD., NW
HUNTSVILLE, ALABAMA 35810
PH: (256) 425-8975

Nondestructive Testing
Qualification and Certification Record

This is to certify that:

Name: Daniel Irons **Social Security Number:** 6010

Fully meets the requirements of ATG-NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

NDT Method: UT

Certification Level : III **Date of Certification:** 03/14/2011

Certification Expiration Date: 03/13/2016

Test Scores:

Test	Grade	Administered By	Remarks
Basic:	90.0	T. Munson, P.E.	
Method:	92.0	T. Munson, P.E.	
Specific:	96.0	T. Munson, P.E.	
Practical	92.0	T. Munson, P.E.	
Composite:	92.5		

Limitations: Contact, Immersion, Air Coupled

Recommended for certification by: Thomas B Munson, P.E. **Date:** 03/14/2011

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Certified by : Thomas B Munson, P.E. **Date:** 03/14/2011

Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Applied Testing Group, LLC
Quality Nondestructive Testing Solutions

11017 MT. CHARRON RD., NW
HUNTSVILLE, ALABAMA 35810
PH: (256) 425-8975

Nondestructive Testing
Qualification and Certification Record

This is to certify that:

Name: Daniel Irons **Social Security Number:** 6010

Fully meets the requirements of ATG-NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

NDT Method: MT

Certification Level : III **Date of Certification:** 03/14/2011

Certification Expiration Date: 03/13/2011

Test Scores:

Test	Grade	Administered By	Remarks
Basic:	90.0	T. Munson, P.E.	
Method:	88.0	T. Munson, P.E.	
Specific:	96.0	T. Munson, P.E.	
Practical	90.0	T. Munson, P.E.	
Composite:	91.0		

Limitations: Visible Dry, Fluorescent Wet

Recommended for certification by: Thomas J Munson, P.E. **Date:** 03/14/2011
Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Certified by : Thomas J Munson, P.E. **Date:** 03/14/2011
Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Applied Testing Group, LLC
Quality Nondestructive Testing Solutions

11017 MT. CHARRON RD., NW
HUNTSVILLE, ALABAMA 35810
PH: (256) 425-8975

Nondestructive Testing
Qualification and Certification Record

This is to certify that:

Name: Daniel Irons **Social Security Number:** 6010

Fully meets the requirements of ATG-NDE-QC-PQ-1 and is hereby certified in the method and the qualification level shown below:

NDT Method: Visual

Certification Level : III **Date of Certification:** 03/16/2011

Certification Expiration Date: 03/15/2016

Test Scores:

Test	Grade	Administered By	Remarks
Basic:	90.0	T. Munson, P.E.	
Method:	94.0	T. Munson, P.E.	
Specific:	96.0	T. Munson, P.E.	
Practical	100.0	T. Munson, P.E.	
Composite:	95.0		

Limitations: Manual and Remote

Recommended for certification by: Thomas S Munson, P.E. **Date:** 03/16/2011
Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Certified by : Thomas S Munson, P.E. **Date:** 03/16/2011
Corporate Professional ASNT NDT Level III
ASNT File Number 9295

Applied Testing Group, LLC

11017 MT. CHARRON RD., NW
HUNTSVILLE, ALABAMA 35810
PH: (256) 425-8975

Nondestructive Testing
Education, Training and Experience Form

Name: Daniel Irons Signature:

Date of Birth: 11/26/57 Date of Employment: 03/14/2011

Training and Experience Through: January 1, 2014

EDUCATION

School	Location	Date Graduated	Degree/Major
MenchvilleHigh School	Newport News, VA	1976	Advanced Studies
General Nuclear Services, Inc.	Newport News, VA	1979	Nondestructive Testing Technology
Newport News Shipbuilding & Drydock, Inc.	Newport News, VA	1981	Advanced Automated Ultrasonic
Newport News Shipbuilding & Drydock, Inc.	Newport News, VA	1981	Eddy Current
Northeast Utilities, Inc.	Milford, CT	1982	IGSCC Detection
Ebasco Services, Inc.	New York, NY	1983	Automated Ultrasonics, Eddy Current, IGSCC Detection & Sizing
Electric Power Research Institute (ERPI)	Charlotte, NC	1985	IGSCC Detection & Sizing
Electric Power Research Institute (ERPI)	Charlotte, NC	1985	IGSCC Overlay
American Welding Society (AWS)	Houston, TX	2002	NDT of Welds
Fundamentals of Professional Practice	Silver Spring, MD	2003	American Soils & Foundation Engineers (ASFE)
Computed Radiography – Starr System	Pensacola, FL	2007	Virtual Media Integration (VMI)
Infrared Testing &Technologies	Richmond, VA	2010	Munson NDT
Computed Radiography Image Interpretation	Richmond, VA	2010	General Electric

Nondestructive TestingTraining Form

Subject	Training Hours	Dates Completed	Source/ Company
Ultrasonic Testing, Level I & II	650	1979	General Nuclear Services, Inc.
Radiographic Testing, Level I & II	725	1979	General Nuclear Services, Inc.
Eddy Current Testing, Level I & II	180	1979	General Nuclear Services, Inc.
Liquid Penetrant Testing, Level I & II	95	1979	General Nuclear Services, Inc.
Magnetic Particle Testing, Level I & II	110	1979	General Nuclear Services, Inc.
Visual Testing, Level I & II	425	1979	General Nuclear Services, Inc.
Leak Testing, Level I & II – Bubble	40	1979	General Nuclear Services, Inc.
Leak Testing, Level I & II – Pressure Change	40	1979	General Nuclear Services, Inc.
Leak Testing, Level I & II – Halogen Diode,	40	1979	General Nuclear Services, Inc.
Leak Testing, Mass Spectrometer – Level I & II	80	1979	General Nuclear Services, Inc.
Advanced Automated Ultrasonic Testing – (UDARPS)	80	1981	Newport News Shipbuilding & Drydock, Inc.
Eddy Current-Shipboard and BOP Applications	80	1981	Newport News Shipbuilding & Drydock, Inc.
IGSCC Detection	8	1982	Northeast Utilities, Inc.
Automated Ultrasonic, Eddy Current, IGSCC Detection & Sizing, Leak Testing (BT and PC)	160	1983	Ebasco Services, Inc.
IGSCC Detection & Sizing	40	1985	Electric Power Research Institute (ERPI)
IGSCC Overlay Detection & Sizing	8	1985	Electric Power Research Institute (ERPI)
NDT of Welds	24	2002	American Welding Society (AWS)
Computer Radiography	24	2007	Virtual Media Integration (VMI)
InfraredTesting &Technologies	80	2010	Munson NDT
Computed Radiography Interpretation	24	2010	General Electric

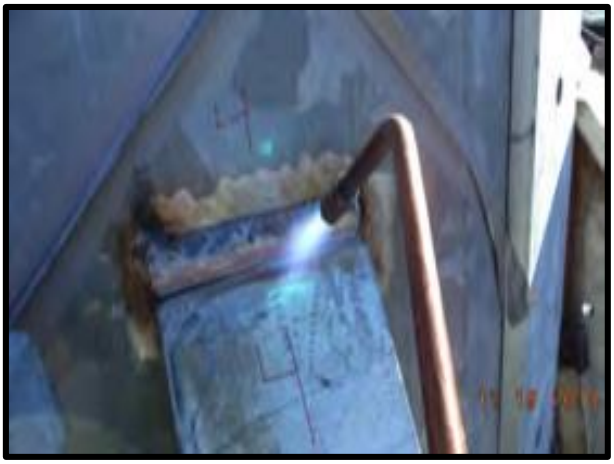
Nondestructive TestingExperience Form Continued...

Test Method	Level	Company	Total Months Experience
Ultrasonic	II	General Services Nuclear Corporation, Inc.	37
	II	Newport News Shipbuilding & Drydock, Inc.	20
	II	Ebasco Services, Inc.	27
	III	Nuclear Energy Services, Inc.	14
	III	General Electric, Nuclear Plant Services	22
	III	ATEC Associates, Inc.	49
	III	Deadline Support Services, Inc.	99
	II	Mechanical Integrity Quality Assurance, Inc.	15
	III	Schnabel Engineering, Inc.	93
	III	Mistras Services, Inc.	29
↓	III	Applied Testing Group, Inc.	48
Radiographic	II	General Services Nuclear Corporation, Inc.	37
	II	Newport News Shipbuilding & Drydock, Inc.	20
	II	Ebasco Services, Inc.	27
	III	Nuclear Energy Services, Inc.	14
	III	General Electric, Nuclear Plant Services	22
	III	ATEC Associates, Inc.	49
	III	Deadline Support Services, Inc.	99
	II	Mechanical Integrity Quality Assurance, Inc.	2
	III	Schnabel Engineering, Inc.	95
	III	Mistras Services, Inc.	29
↓	III	Applied Testing Group, Inc.	3
Liquid Penetrant	II	General Services Nuclear Corporation, Inc.	37
	II	Newport News Shipbuilding & Drydock, Inc.	20
	II	Ebasco Services, Inc.	27
	III	Nuclear Energy Services, Inc.	14
	III	General Electric, Nuclear Plant Services	22
	III	ATEC Associates, Inc.	49
	III	Deadline Support Services, Inc.	99
	II	Mechanical Integrity Quality Assurance, Inc.	15
↓	III	Schnabel Engineering, Inc.	74

Nondestructive Testing
Experience Form Continued...

Liquid Penetrant-Continued	III	Applied Testing Group, Inc.	11
Magnetic Particle	II	General Services Nuclear Corporation, Inc.	37
	II	Newport News Shipbuilding & Drydock, Inc.	20
	II	Ebasco Services, Inc.	27
	III	Nuclear Energy Services, Inc.	14
	III	General Electric, Nuclear Plant Services	22
	III	ATEC Associates, Inc.	49
	III	Deadline Support Services, Inc.	99
	II	Mechanical Integrity Quality Assurance, Inc.	15
	III	Schnabel Engineering, Inc.	62
	III	Mistras Services, Inc.	29
	III	Applied Testing Group, Inc.	39
Eddy Current	II	General Services Nuclear Corporation, Inc.	37
	II	Newport News Shipbuilding & Drydock, Inc.	20
	II	Ebasco Services, Inc.	27
	III	ATEC Associates, Inc.	49
	III	Deadline Support Services, Inc.	99
	II	Mechanical Integrity Quality Assurance, Inc.	15
	III	Schnabel Engineering, Inc.	48
	III	Mistras Services, Inc.	15
	III	Applied Testing Group, Inc.	26
Visual Testing	II	General Services Nuclear Corporation, Inc.	37
	II	Newport News Shipbuilding & Drydock, Inc.	20
	II	Ebasco Services, Inc.	27
	III	Nuclear Energy Services, Inc.	14
	III	General Electric, Nuclear Plant Services	22
	III	ATEC Associates, Inc.	49
	III	Deadline Support Services, Inc.	99
	II	Mechanical Integrity Quality Assurance, Inc.	15
	III	Schnabel Engineering, Inc.	95
	III	Mistras Services, Inc.	29
	III	Applied Testing Group, Inc.	48


NOTICE
NOTICE
www.crowncastle.com
877-486-9377
800-788-7011
825983

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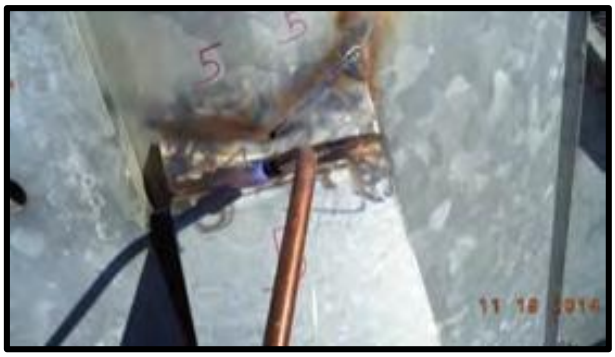
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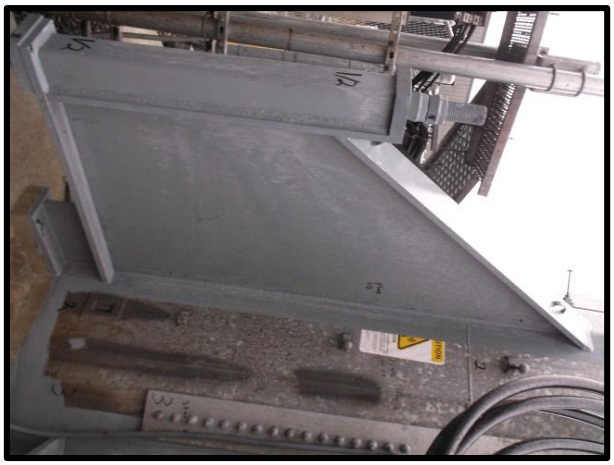
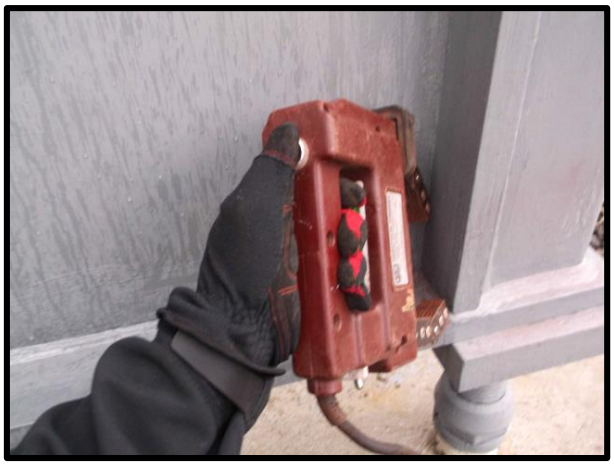
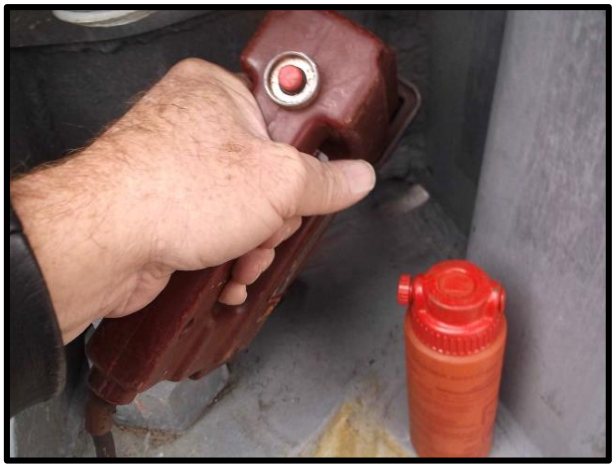





CAUTION
PARKER


CAUTION


11/13/14
MT/VT OK 11/13/14




MADE IN U.S.A.
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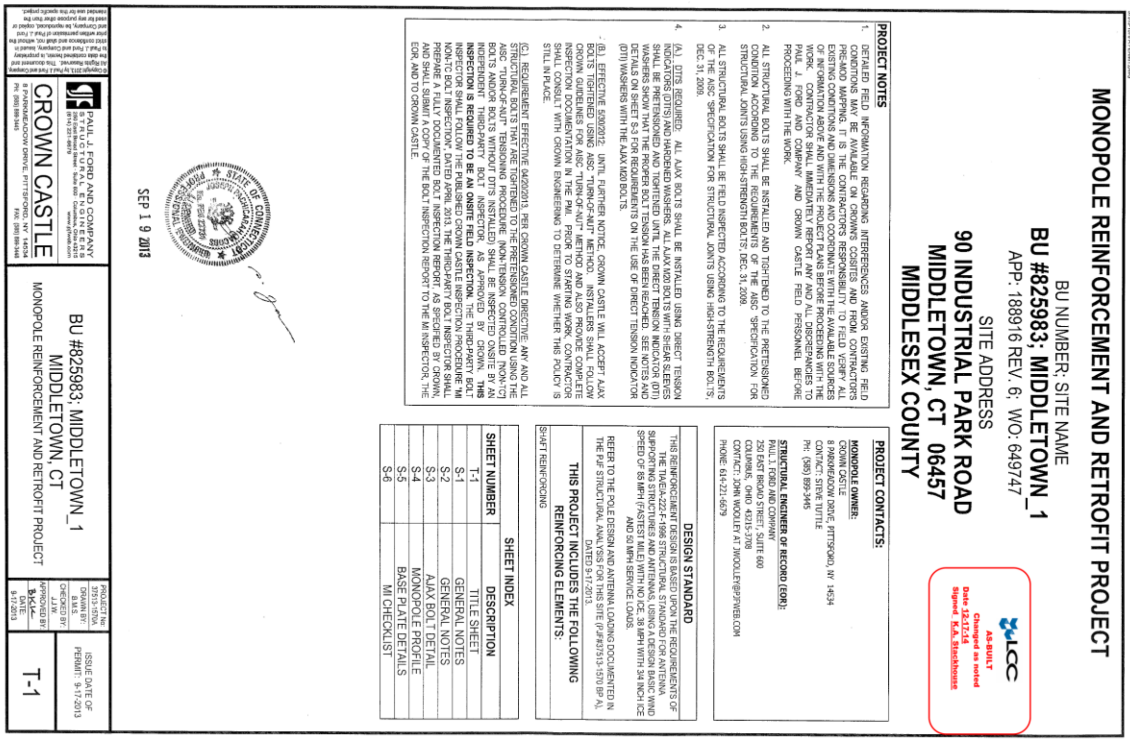
6.2.3 ON SITE COLD GALVANIZING VERIFICATION

6.2.4 GC AS-BUILT DOCUMENTS



MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

BU NUMBER; SITE NAME

BU #825983; MIDDLETOWN_1

APP: 188916 REV. 6; WO: 649747

SITE ADDRESS

90 INDUSTRIAL PARK ROAD
MIDDLETOWN, CT 06457
MIDDLESEX COUNTY

PROJECT NOTES

1. DETAILED FIELD INFORMATION REGARDING INTERFERENCES AND/OR EXISTING FIELD CONDITIONS MAY BE AVAILABLE ON CROWN'S CCISITES AND FROM CONTRACTORS PRE-MOD MAPPING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AND COORDINATE WITH THE AVAILABLE SOURCES OF INFORMATION ABOVE AND WITH THE PROJECT PLANS BEFORE PROCEEDING WITH THE WORK. CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND CROWN CASTLE FIELD PERSONNEL BEFORE PROCEEDING WITH THE WORK.
2. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC "SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS", DEC. 31, 2009.
3. ALL STRUCTURAL BOLTS SHALL BE FIELD INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC "SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS", DEC. 31, 2009.
4. (A.) DTIS REQUIRED: ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAILS ON SHEET S-3 FOR REQUIREMENTS ON THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

   (B.) EFFECTIVE 5/30/2012: UNTIL FURTHER NOTICE, CROWN CASTLE WILL ACCEPT AJAX BOLTS TIGHTENED USING AISC "TURN-OF-NUT" METHOD. INSTALLERS SHALL FOLLOW CROWN GUIDELINES FOR AISC "TURN-OF-NUT" METHOD AND ALSO PROVIDE COMPLETE INSPECTION DOCUMENTATION IN THE PMI. PRIOR TO STARTING WORK, CONTRACTOR SHALL CONSULT WITH CROWN ENGINEERING TO DETERMINE WHETHER THIS POLICY IS STILL IN PLACE.

   (C.) REQUIREMENT EFFECTIVE 04/20/2013, PER CROWN CASTLE DIRECTIVE: ANY AND ALL STRUCTURAL BOLTS THAT ARE TIGHTENED TO THE PRETENSIONED CONDITION USING THE AISC "TURN-OF-NUT" TENSIONING PROCEDURE (NON-TENSION CONTROLLED ["NON-TC"] BOLTS AND/OR BOLTS WITHOUT DTI'S INSTALLED) SHALL BE INSPECTED ONSITE BY AN INDEPENDENT THIRD-PARTY BOLT INSPECTOR, AS APPROVED BY CROWN. **THIS INSPECTION IS REQUIRED TO BE AN ONSITE FIELD INSPECTION.** THE THIRD-PARTY BOLT INSPECTOR SHALL FOLLOW THE PUBLISHED CROWN CASTLE INSPECTION PROCEDURE "MI NON-TC BOLT INSPECTION", DATED APRIL 2013. THE THIRD-PARTY BOLT INSPECTOR SHALL PREPARE A FULLY DOCUMENTED BOLT INSPECTION REPORT, AS SPECIFIED BY CROWN, AND SHALL SUBMIT A COPY OF THE BOLT INSPECTION REPORT TO THE MI INSPECTOR, THE EOR, AND TO CROWN CASTLE.

PROJECT CONTACTS:

MONOPOLE OWNER:
CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
CONTACT: STEVE TUTTLE
PH: (585) 899-3445

STRUCTURAL ENGINEER OF RECORD (EOR):
PAUL J. FORD AND COMPANY
250 EAST BROAD STREET, SUITE 600
COLUMBUS, OHIO 43215-3708
CONTACT: JOHN WOOLEY AT JWOOLEY@PJFWEB.COM
PHONE: 614-221-6679

DESIGN STANDARD

THIS REINFORCEMENT DESIGN IS BASED UPON THE REQUIREMENTS OF THE TIA/EIA-222-F-1996 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, USING A DESIGN BASIC WIND SPEED OF 85 MPH (FASTEST MILE) WITH NO ICE, 38 MPH WITH 3/4 INCH ICE AND 50 MPH SERVICE LOADS.

REFER TO THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF STRUCTURAL ANALYSIS FOR THIS SITE (PJF#37513-1570 BP A), DATED 9-17-2013.

THIS PROJECT INCLUDES THE FOLLOWING REINFORCING ELEMENTS:

SHAFT REINFORCING

SHEET INDEX

SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
S-1	GENERAL NOTES
S-2	GENERAL NOTES
S-3	AJAX BOLT DETAIL
S-4	MONOPOLE PROFILE
S-5	BASE PLATE DETAILS
S-6	MI CHECKLIST

LCC
AS-BUILT
Changed as noted
Date 12-17-14
Signed K.A. Stackhouse

SEP 1 9 2013

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS

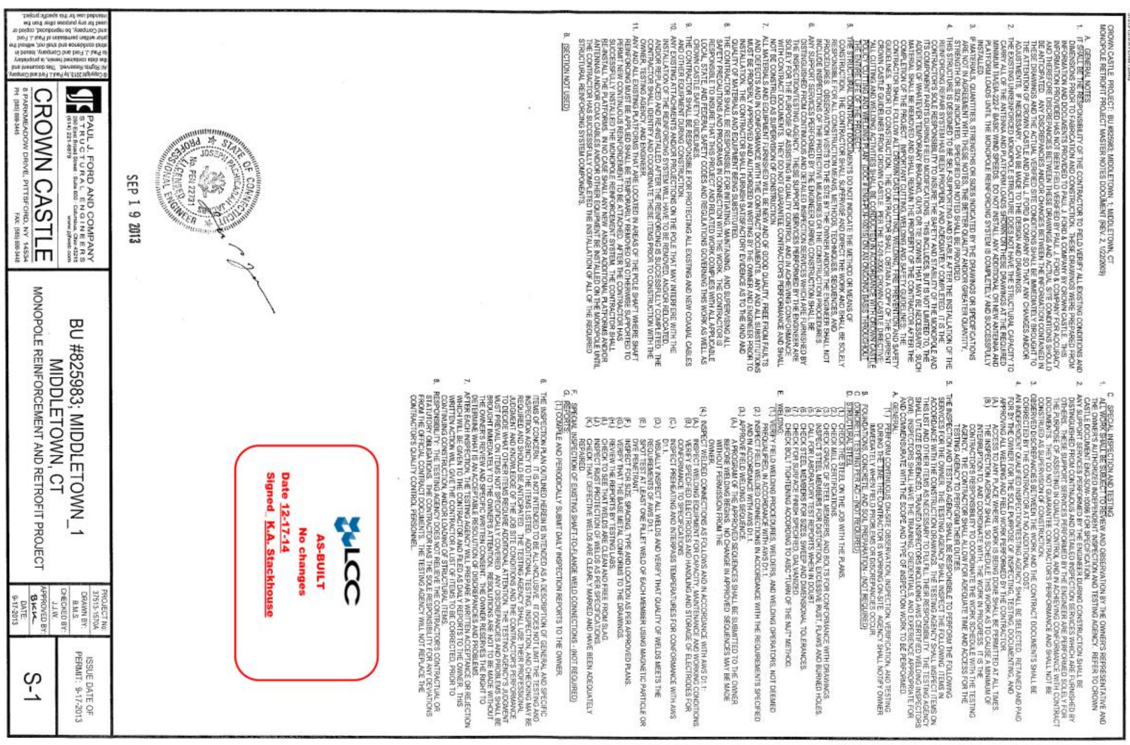
CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534

BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570A
DRAWN BY: B.M.S.
CHECKED BY: J.J.W.
DATE: 9-17-2013

ISSUE DATE OF PERMIT: 9-17-2013

T-1



LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse

SEP 1 9 2013

PAUL J. FORD AND COMPANY

CROWN CASTLE

BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

ISSUE DATE OF PERMIT: 9-17-2013

S-1

37513-1570 A PERMIT.DWG

D. STRUCTURAL STEEL

1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:

A. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (**AISC**):
   - (A.) "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
   - (B.) "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS OF THE ENGINEERING FOUNDATION.
   - (C.) "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (PARAGRAPH 4.2.1 SPECIFICALLY EXCLUDED).

B. BY THE AMERICAN WELDING SOCIETY (**AWS**):
   - (A.) "STRUCTURAL WELDING CODE - STEEL D1.1."
   - (B.) "SYMBOLS FOR WELDING AND NON-DESTRUCTIVE TESTING"

2. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
3. TIGHTEN ALL STRUCTURAL BOLTS, INCLUDING THE AJAX M20 BOLTS WITH SHEAR SLEEVES, ACCORDING TO THE REQUIREMENTS OF THE AISC "TURN OF THE NUT" METHOD. TIGHTEN BOLTS 1/3 TURN PAST THE SNUG TIGHT CONDITION AS DEFINED BY AISC.
4. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E80XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO THE OWNER'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65 (FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
7. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION I NOTES REGARDING TOUCH-UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
8. UNLESS OTHERWISE NOTED, ALL STEEL MEMBERS SHALL BE HOT-DIP GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH ASTM A123. SEE SECTION J FOR FURTHER NOTES AND FOR EXCEPTIONS (IF ANY).
9. ALL WELDS SHALL BE VISUALLY INSPECTED BY THE OWNER'S APPROVED TESTING AGENCY. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT. THE CONTRACTOR SHALL COOPERATE WITH THE TESTING AGENCY IN THEIR TESTING EFFORTS.
10. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
11. FIELD CUTTING OF STEEL:
   - (A.) PRIOR TO ANY FIELD CUTTING, THE CONTRACTOR SHALL MARK THE CUT OUTLINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS.
   - (B.) ANY REQUIRED CUTS IN THE STEEL SHALL BE CAREFULLY CUT BY MECHANICAL METHODS SUCH AS DRILLING, SAW CUTTING, AND GRINDING. THE CONTRACTOR IS RESPONSIBLE TO PREVENT ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, DURING THE CUTTING WORK. ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
   - (C.) ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.

E. BASE PLATE GROUT - (NOT REQUIRED)

F. FOUNDATION WORK - (NOT REQUIRED)

G. CAST-IN-PLACE CONCRETE - (NOT REQUIRED)

H. EPOXY GROUTED REINFORCING ANCHOR RODS - (NOT REQUIRED)

I. TOUCH UP OF GALVANIZING

1. THE CONTRACTOR SHALL TOUCH UP ANY AND/OR ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED DURING CONSTRUCTION. **GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.**
2. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. THE OWNER'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.
3. THE OWNER'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE INADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.

J. HOT DIP GALVANIZING

1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.
2. PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING.
3. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES AS REQUIRED.
4. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.

K. PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER

1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY THE OWNER, THE OWNER WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
2. THE MONOPOLE REINFORCING SYSTEM INDICATED IN THESE DOCUMENTS USES REINFORCING COMPONENTS THAT INVOLVE FIELD WELDING STEEL MEMBERS TO THE EXISTING GALVANIZED STEEL POLE STRUCTURE. THESE FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. **ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE CONNECTED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT THE OWNER REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.**
3. THE OWNER SHALL REFER TO TIA/EIA-222-F-1996, SECTION 14 AND ANNEX E FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY THE OWNER BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. **PAUL J. FORD & COMPANY RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT.** ACCORDING TO TIA/EIA-222-F-1996 SECTION 14.1, NOTE 1: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

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AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse

STATE OF CONNECTICUT
JOSEPH PACHICARAH JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

SEP 19 2013

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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570A
DRAWN BY: B.M.S.
CHECKED BY: J.J.W.
APPROVED BY: BKK
DATE: 9-17-2013

ISSUE DATE OF PERMIT: 9-17-2013

S-2

37513-1570 A PERMIT.DWG

AJAX BOLT NOTE SHEET: REV. 1.4, 5-20-2013

NOTES:

1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
3. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAIL BELOW FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.
4. ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. DTI'S SHALL BE THE SQUIRTER® STYLE, MADE TO ASTM F959 LATEST REVISION; AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF RC 38 OR HIGHER.

NOTES FOR AJAX M20 'ONE-SIDE' BOLTS WITH DIRECT TENSION INDICATORS (DTI'S):

DTI'S REQUIRED: DTI'S SHALL BE "SELF-INDICATING" SQUIRTER® STYLE DTI'S MADE WITH SILICONE EMBEDDED IN THEM, INSPECTED BY MEANS OF THE VISUAL EJECTION OF SILICONE AS THE DTI PROTRUSIONS COMPRESS. SQUIRTER® DTI'S SHALL BE CALIBRATED PER MANUFACTURER'S INSTRUCTIONS PRIOR TO USE.

THE DIRECT TENSION INDICATOR (DTI) WASHERS SHALL BE THE "SQUIRTER® STYLE" AS MANUFACTURED BY:

APPLIED BOLTING TECHNOLOGY PRODUCTS, INC.
1413 ROCKINGHAM ROAD BELLOWS FALLS, VERMONT, USA 05101
PHONE 1-800-552-1999
WEBSITE: WWW.APPLIEDBOLTING.COM

DISTRIBUTORS OF SQUIRTER® DTI'S:
HTTP://WWW.APPLIEDBOLTING.COM/APPLIED-BOLTING-DISTRIBUTORS.HTML

DTI: USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 20 MM (M20) NOMINAL A325 BOLTS FOR THE AJAX M20 BOLTS. DTI'S SHALL NOT BE HOT-DIP GALVANIZED. DTI'S SHALL BE MECHANICALLY GALVANIZED (MG) BY THE COLD MECHANICAL PROCESS ONLY AS PROVIDED BY THE DTI MANUFACTURER.

HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 20 MM (M20) NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY GALVANIZED BY THE COLD MECHANICAL PROCESS. ALTERNATIVELY, CORRECTLY MADE HOT DIP GALVANIZED HARDENED FLAT WASHERS HAVING A MINIMUM HARDNESS OF RC 38 CAN BE USED; CONTRACTOR SHALL PROVIDE DOCUMENTATION OF WASHER SPECIFICATION AND HARDNESS.

NUT LUBRICATION REQUIRED: PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW DTI MANUFACTURER INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING.

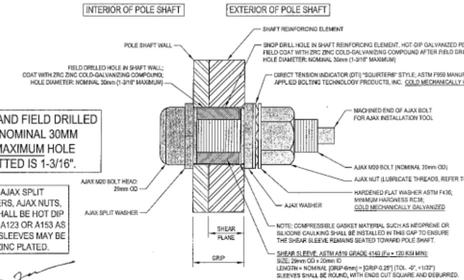
NOTE: COMPLETELY COMPRESSED DTI'S SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE OF A HARDENED FLAT WASHER, NEVER DIRECTLY AGAINST THE NUT.

CONTRACTOR SHALL FOLLOW DTI MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION, LUBRICATION, TIGHTENING AND INSPECTION.

INSPECTION REQUIRED: ALL AJAX BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009, BY A QUALIFIED BOLT INSPECTOR. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE AJAX BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. IN ADDITION, ALL AJAX BOLTS AND DTI'S SHALL BE VISUALLY INSPECTED ACCORDING TO THE DTI MANUFACTURER'S INSTRUCTIONS. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE PHOTO DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTI'S.

NOTE: ALL SHOP AND FIELD DRILLED HOLES SHALL BE NOMINAL 30MM DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1-3/16".

NOTE: ALL AJAX BOLTS, AJAX SPLIT WASHERS, AJAX WASHERS, AJAX NUTS, AND SHEAR SLEEVES SHALL BE HOT DIP GALVANIZED PER ASTM A123 OR A153 AS APPROPRIATE. SHEAR SLEEVES MAY BE COLD GALVANIZED OR ZINC PLATED.



TYPICAL AJAX BOLT DETAIL 1 / S-3

STATE OF CONNECTICUT
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SEP 19 2013

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No changes
Date 12-17-14
Signed K.A. Stackhouse

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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570A
DRAWN BY: B.M.S.
CHECKED BY: J.J.W.
APPROVED BY: BKK
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S-3

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POLE SPECIFICATIONS	
POLE SHAPE TYPE:	12-SIDED POLYGON
TAPER:	0.2250000 IN/FT
SHAFT STEEL:	ASTM A588/-42
BASE PL STEEL:	ASTM A36
ANCHOR RODS:	Fy ASTM A36

SHAFT SECTION DATA					
SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN) @ TOP	DIAMETER ACROSS FLATS (IN) @ BOTTOM
1	5.000	0.1875		18.000	18.000
2	10.00	0.2500	60.00	18.000	34.310
3	20.00	0.2500		32.161	36.899
4	20.00	0.3125	72.00	36.688	43.168
5	10.00	0.3125		42.813	45.813
6	40.00	0.3750	84.00	45.813	58.875
7	16.00	0.3750		56.839	61.468
8	21.60	0.4375	108.00	61.593	65.580
9	29.00	0.4375		64.765	73.813

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

CONTRACTOR SHALL PROVIDE ASTM A36 SHIM PLATES BELOW SLIP JOINTS. THE SHIM PLATES SHALL BE PLACED BETWEEN THE NEW SHAFT REINFORCEMENT AND THE EXISTING POLE SHAFT FROM THE SLIP JOINT TO THE NEW SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND A EXTRA LONG "SPLICE SHIM" SHALL BE PLACED BETWEEN THE NEW UPPER AND LOWER SHAFT REINFORCEMENT PLATES AT THE SHAFT REINFORCEMENT SPLICE PLATE LOCATION.

MODIFICATIONS:

(A) INSTALL NEW SHAFT REINFORCING. SEE CHART.

NEW AEROSOLUTIONS MP3 REINFORCING		
ELEVATION	FLAT #	REINFORCING ELEMENT
2'-0" TO 37'-0"	3, 6, 9 & 11	MP308
29'-9" TO 64'-9"	4, 8 & 12	MP306
58'-3" TO 93'-3"	3, 7 & 11	MP305
85'-3" TO 96'-3"	4, 8 & 12	MP304
112'-9" TO 132'-9"	3, 7 & 11	MP303
140'-9" TO 154'-9"	3, 7 & 11	MP303

ALL BOLTS SHALL BE AJAX M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A519 GR 4140, MIN. Fu=120 KSI). CONTACT SUPPLIER FOR MATERIAL (PLATE & BOLTS) AND INSTALLATION PROCEDURES.

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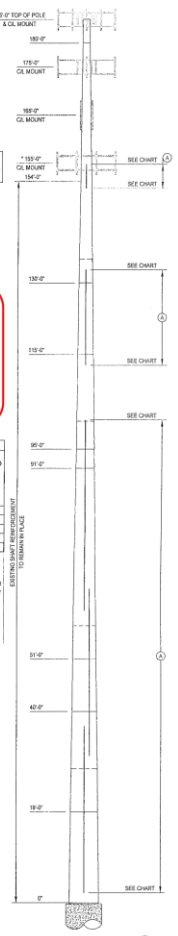
No changes
Date 12-17-14
Signed K.A. Stackhouse

NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE

BOTTOM ELEVATION	TOP ELEVATION	FLAT # / DEGREE SEPARATION	ELEMENT	ELEMENT LENGTH	ELEMENT QUANTITY	APPROXIMATE AJAX BOLTS PER ELEMENT	APPROXIMATE TOTAL AJAX BOLT QUANTITY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	ESTIMATED TOTAL STEEL WEIGHT
2'-0"	37'-0"	3, 6, 9 & 11	1-5/8" x 8-1/2"	35'-0"	4	61	264	16	17	17"	5062 LBS.
30'-9"	65'-9"	4, 8 & 12	1"x 6"	35'-0"	3	40	120	9	9	18"	2144 LBS.
61'-3"	101'-3"	3, 7 & 11	1"x 6"	40'-0"	3	44	132	9	9	18"	2450 LBS.
112'-9"	132'-9"	3, 7 & 11	3/4" x 4"	20'-0"	3	33	99	5	6	18"	617 LBS.
145'-3"	154'-9"	3, 7 & 11	3/4" x 4"	5'-0"	3	11	33	5	5	18"	153 LBS.
							668				10421 LBS.

NOTES:
1.) AJAX BOLTS ARE TO BE 20mm DIAMETER WITH CORRESPONDING 28mm DIAMETER SLEEVE WITH MATCHING STEEL GRADE.
2.) ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS. APPLY A MINIMUM OF TWO COATS OF ZINC-BRAND ZINC -RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET: 3.0 MILS, DRY : 1.5 MILS. APPLY PER ZINC MANUFACTURERS RECOMMENDED PROCEDURES. CONTACT ZINC AT 1-800-831-3275 FOR PRODUCT INFORMATION.
3.) ALL REINFORCING SHALL BE ASTM A572 GR. 65.
4.) WELDS ARE ASSUMED E80XX OR GREATER. TERMINATION WELDS SHALL BE 3/8" FILLET WELDS.
5.) HOLES FOR AJAX BOLTS AND 9-HEAR SLEEVES ARE 30mm UNLESS NOTED OTHERWISE.
6.) ALL SHIMS SHALL BE ASTM A 36.



* EXISTING MOUNTS MAY NEED TO BE ADJUSTED, MOVED AND/OR TEMPORARILY SUPPORTED DURING THE INSTALLATION OF SHAFT REINFORCING

POLE ELEVATION (1 / S-4)

STATE OF CONNECTICUT — JOSEPH J. LEGERE — No. PEN 22731 — PROFESSIONAL ENGINEER

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APPROVED BY: [illegible]	S-4
DATE: 9-17-2013	

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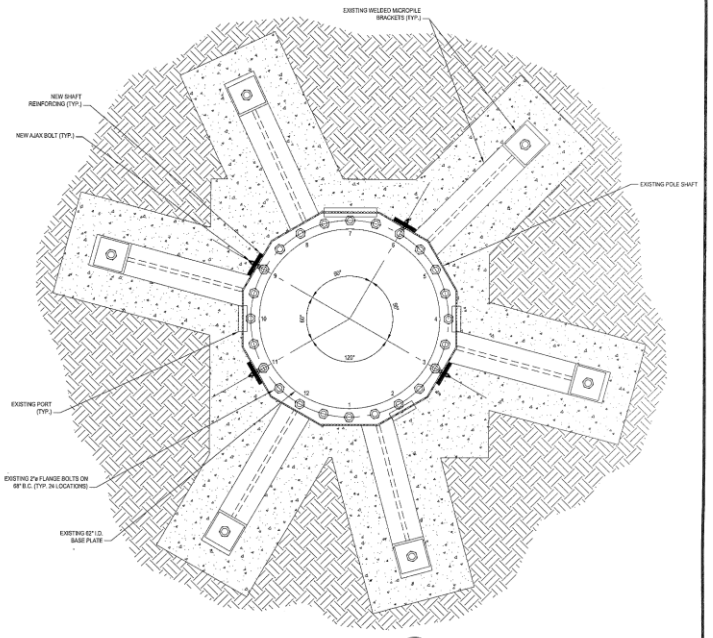

(A) BASE SECTION (1 / S-5)

AEROSOLUTIONS® REINFORCING NOT SHOWN. LAYOUT DESIGN TO BE FINALIZED FOR AEROSOLUTIONS UPON WINNING BID FOR JOB.

STATE OF CONNECTICUT — JOSEPH J. LEGERE — No. PEN 22731 — PROFESSIONAL ENGINEER

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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 DRAWINGS, 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 RESIDES WITH THE EOR AT ALL TIMES.

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) 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 IN-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 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 AN DENG-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, PREFERABLE 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 INSPECTION(S) 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 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 MI'S
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 INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV 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.

PHOTOGRAPHS
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 AND TORQUE
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

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

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

MI CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
PRE-CONSTRUCTION	
X	MI CHECKLIST DRAWINGS
X	EOR APPROVED SHOP DRAWINGS
NA	FABRICATION INSPECTION
NA	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
NA	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
CONSTRUCTION	
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
NA	POST INSTALLED MICROPILE VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK: LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
X	THIRD PARTY ONSITE INSPECTION OF BOLT PRETENSION PER CROWN REQUIREMENTS
X	INSPECTION OF AJAX BOLTS AND DTI'S PER REQUIREMENTS ON SHEET S-3
ADDITIONAL TESTING AND INSPECTIONS:	
POST-CONSTRUCTION	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
X	THIRD PARTY ONSITE BOLT INSPECTION REPORT
NA	POST INSTALLED MICROPILE PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

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

LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse

STATE OF CONNECTICUT
PEN 22731
LICENSED PROFESSIONAL ENGINEER

SEP 19 2013

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street · Suite 600 · Columbus, Ohio 43215
(614) 221-6679 www.pjfweb.com

CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
PH: (585) 899-3445 FAX: (585) 899-3448

BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570A
DRAWN BY: B.M.S.
CHECKED BY: J.J.W.
APPROVED BY: BKK
DATE: 9-17-2013

ISSUE DATE OF PERMIT: 9-17-2013

S-6

POST-CONSTRUCTION

37513-1570 A PERMIT.DWG

MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

SGS REDLINES Discrepancies Noted See Section 6.3.2 Cancelled

BU NUMBER; SITE NAME

BU #825983; MIDDLETOWN_1

APP: 188916 REV. 6; WO: 649747

SITE ADDRESS

90 INDUSTRIAL PARK ROAD
MIDDLETOWN, CT 06457
MIDDLESEX COUNTY

LCC
AS-BUILT
Changed as noted
Date 12-17-14
Signed K.A. Stackhouse

PROJECT NOTES

1. DETAILED FIELD INFORMATION REGARDING INTERFERENCES AND/OR EXISTING FIELD CONDITIONS MAY BE AVAILABLE ON CROWN'S COSITES AND FROM CONTRACTOR'S PRE-MOD MAPPING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AND COORDINATE WITH THE AVAILABLE SOURCES OF INFORMATION ABOVE AND WITH THE PROJECT PLANS BEFORE PROCEEDING WITH THE WORK. CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND CROWN CASTLE FIELD PERSONNEL BEFORE PROCEEDING WITH THE WORK.
2. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
3. ALL STRUCTURAL BOLTS SHALL BE FIELD INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
4. (A.) DTIS REQUIRED: ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTIS) AND HARDENED WASHERS. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAILS ON SHEET S-3 FOR REQUIREMENTS ON THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

   (B.) EFFECTIVE 5/30/2012: UNTIL FURTHER NOTICE, CROWN CASTLE WILL ACCEPT AJAX BOLTS TIGHTENED USING AISC "TURN-OF-NUT" METHOD. INSTALLERS SHALL FOLLOW CROWN GUIDELINES FOR AISC "TURN-OF-NUT" METHOD AND ALSO PROVIDE COMPLETE INSPECTION DOCUMENTATION IN THE PMI. PRIOR TO STARTING WORK, CONTRACTOR SHALL CONSULT WITH CROWN ENGINEERING TO DETERMINE WHETHER THIS POLICY IS STILL IN PLACE.

   (C.) REQUIREMENT EFFECTIVE 04/20/2013, PER CROWN CASTLE DIRECTIVE: ANY AND ALL STRUCTURAL BOLTS THAT ARE TIGHTENED TO THE PRETENSIONED CONDITION USING THE AISC "TURN-OF-NUT" TENSIONING PROCEDURE (NON-TENSION CONTROLLED "NON-TC") BOLTS AND/OR BOLTS WITHOUT DTIS INSTALLED) SHALL BE INSPECTED ONSITE BY AN INDEPENDENT THIRD-PARTY BOLT INSPECTOR, AS APPROVED BY CROWN. **THIS INSPECTION IS REQUIRED TO BE AN ONSITE FIELD INSPECTION.** THE THIRD-PARTY BOLT INSPECTOR SHALL FOLLOW THE PUBLISHED CROWN CASTLE INSPECTION PROCEDURE "MI NON-TC BOLT INSPECTION", DATED APRIL 2013. THE THIRD-PARTY BOLT INSPECTOR SHALL PREPARE A FULLY DOCUMENTED BOLT INSPECTION REPORT, AS SPECIFIED BY CROWN, AND SHALL SUBMIT A COPY OF THE BOLT INSPECTION REPORT TO THE MI INSPECTOR, THE EOR, AND TO CROWN CASTLE.

PROJECT CONTACTS:

MONOPOLE OWNER:
CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
CONTACT: STEVE TUTTLE
PH: (585) 899-3445

STRUCTURAL ENGINEER OF RECORD (EOR):
PAUL J. FORD AND COMPANY
250 EAST BROAD STREET, SUITE 600
COLUMBUS, OHIO 43215-3706
CONTACT: JOHN WOOLLEY AT JWOOLLEY@PJFWEB.COM
PHONE: 614-221-6679

DESIGN STANDARD

THIS REINFORCEMENT DESIGN IS BASED UPON THE REQUIREMENTS OF THE TIA/EIA-222-F-1996 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, USING A DESIGN BASIC WIND SPEED OF 85 MPH (FASTEST MILE) WITH NO ICE, 38 MPH WITH 3/4 INCH ICE AND 50 MPH SERVICE LOADS.

REFER TO THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF STRUCTURAL ANALYSIS FOR THIS SITE (PJF#37513-1570 BP A), DATED 9-17-2013.

THIS PROJECT INCLUDES THE FOLLOWING REINFORCING ELEMENTS:

SHAFT REINFORCING

SHEET INDEX

SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
S-1	GENERAL NOTES
S-2	GENERAL NOTES
S-3	AJAX BOLT DETAIL
S-4	MONOPOLE PROFILE
S-5	BASE PLATE DETAILS
S-6	MI CHECKLIST

STATE OF CONNECTICUT — PAUL J. FORD — No. PEN 22731 — LICENSED PROFESSIONAL ENGINEER

SEP 19 2013

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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570A
DRAWN BY: B.M.S.
CHECKED BY: J.J.W.
APPROVED BY: J.J.W.
DATE: 9-17-2013

ISSUE DATE OF PERMIT: 9-17-2013

T-1

37513-1570 A PERMIT.DWG

CROWN CASTLE PROJECT: BU #825983; MIDDLETOWN_1 MIDDLETOWN, CT
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 2, 1/22/2003)

A. GENERAL NOTES

1. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO FABRICATION AND CONSTRUCTION. THESE DRAWINGS WERE PREPARED FROM INFORMATION AND DOCUMENTS PROVIDED TO PAUL J. FORD & COMPANY BY CROWN CASTLE. THIS INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY PAUL J. FORD & COMPANY FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. ANY DISCREPANCIES AND/OR OMISSIONS BETWEEN THE INFORMATION CONTAINED IN THESE DRAWINGS AND THE ACTUAL VERIFIED SITE CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF CROWN CASTLE AND PAUL J. FORD & COMPANY SO THAT ANY CHANGES AND/OR ADJUSTMENTS, IF NECESSARY, CAN BE MADE TO THE DESIGN AND DRAWINGS.
2. THE EXISTING UNREINFORCED MONOPOLE STRUCTURE DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE ANTENNA AND PLATFORM LOADS SHOWN ON THESE DRAWINGS AT THE REQUIRED MINIMUM TIA/EIA-222-F BASIC WIND SPEEDS. DO NOT INSTALL ANY ADDITIONAL ON NEW ANTENNA AND PLATFORM LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.
3. IF MATERIALS, QUANTITIES, STRENGTHS OR SIZES INDICATED BY THE DRAWINGS OR SPECIFICATIONS ARE NOT IN AGREEMENT WITH THESE NOTES, THE BETTER QUALITY AND/OR GREATER QUANTITY, STRENGTH OR SIZE (INDICATED, SPECIFIED OR NOTED) SHALL BE PROVIDED.
4. THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN PROPERLY AND ADEQUATELY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO INSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND ITS COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT. IMPORTANT CUTTING, WELDING AND SAFETY GUIDELINES: THE CONTRACTOR SHALL FOLLOW ALL CROWN CASTLE CUTTING, WELDING, FIRE PREVENTION AND SAFETY GUIDELINES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES FROM CROWN CASTLE. PER THE 12-01-2005 CROWN CASTLE DIRECTIVE: "ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CROWN CASTLE HOT WORK (CUTTING AND WELDING) PLAN" (DOC # ENGPLAN-10618) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT."
5. THE STRUCTURAL CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OR MEANS OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES.
6. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY THE INSPECTION/TESTING AGENCY. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
7. ALL MATERIALS AND EQUIPMENT FURNISHED WILL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.
10. ANY EXISTING ATTACHMENTS AND/OR PROJECTIONS ON THE POLE THAT MAY INTERFERE WITH THE INSTALLATION OF THE REINFORCING SYSTEM WILL HAVE TO BE REMOVED, ANCHOR RELOCATED, AND/OR REPLACED AND RE-INSTALLED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH THE OWNER, TESTING AGENCY, AND ENGINEER.
11. ANY AND ALL EXISTING PLATFORMS THAT ARE LOCATED IN AREAS OF THE POLE SHAFT WHERE SHAFT REINFORCING MUST BE APPLIED SHALL BE TEMPORARILY REMOVED OR OTHERWISE SUPPORTED TO PERMIT NEW CONTINUOUS REINFORCEMENT TO BE ATTACHED. AFTER THE CONTRACTOR HAS SUCCESSFULLY INSTALLED THE MONOPOLE REINFORCEMENT SYSTEM, THE CONTRACTOR SHALL RE-INSTALL THE PLATFORMS. IN NO CASE SHALL ANY NEW AND/OR ADDITIONAL PLATFORMS AND/OR ANTENNA AND/OR COAX CABLES AND/OR OTHER EQUIPMENT BE INSTALLED ON THE MONOPOLE UNTIL THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF ALL OF THE REQUIRED STRUCTURAL REINFORCING SYSTEM COMPONENTS.

B. (SECTION NOT USED)

C. SPECIAL INSPECTION AND TESTING

1. ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY THE OWNER'S REPRESENTATIVE AND THE OWNER'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY. REFER TO CROWN CASTLE DOCUMENT ENG-SOW-10096 FOR SPECIFICATION.
2. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE PERFORMED SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
3. OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
4. AN INDEPENDENT QUALIFIED INSPECT CONTESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY THE OWNER FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
   (A.) ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
   (B.) THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO AND COORDINATE WITH THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
5. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES FOR THE OWNER. THE TESTING AGENCY SHALL INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE APPROPRIATE TRADES INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI), INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.
   A. GENERAL:
      (1.) PERFORM CONTINUOUS ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY OWNER IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.
   B. FOUNDATIONS, CONCRETE, AND SOIL PREPARATION - (NOT REQUIRED)
   C. CONCRETE TESTING AND PLACE - (NOT REQUIRED)
   D. STRUCTURAL STEEL:
      (1.) CHECK THE STEEL ON THE JOB WITH THE PLANS.
      (2.) CHECK MILL CERTIFICATIONS.
      (3.) CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
      (4.) INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
      (5.) CALL FOR LABORATORY TEST REPORTS WHEN IN DOUBT.
      (6.) CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
      (7.) CHECK FOR SIGN AGE FINISH SPECIFIED, GALVANIZED.
      (8.) CHECK BOLT TIGHTENING ACCORDING TO AISC "TURN OF THE NUT" METHOD.
   E. WELDING:
      (1.) VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1
      (2.) INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND IN ACCORDANCE WITH AWS D1.1.
      (3.) APPROVE FIELD WELDING SEQUENCE.
         (A.) A PROGRAM FOR THE APPROVED SEQUENCES SHALL BE SUBMITTED TO THE OWNER BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM THE OWNER.
      (4.) INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
         (A.) INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE AND WORKING CONDITIONS.
         (B.) VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
         (C.) INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
         (D.) VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1.
         (E.) SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE OR DYE PENETRANT.
         (F.) INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED PLANS.
         (G.) VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
         (H.) REVIEW THE REPORTS BY TESTING LABS.
         (I.) CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
         (J.) INSPECT FOR PROTECTION OF PER ISS AS PER SPECIFICATIONS.
         (K.) CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.
   F. SPECIAL INSPECTION OF EXISTING SHAFT-TO-FLANGE WELD CONNECTIONS - (NOT REQUIRED)
   G. REPORTS:
      (1.) COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO THE OWNER.
5. THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL-INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DECIDE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES AND PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO THE OWNER'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT THE OWNER'S REVIEW AND SPECIFIC WRITTEN CONSENT. THE OWNER RESERVES THE RIGHT TO DETERMINE WHAT IS AN ACCEPTABLE RESOLUTION OF DISCREPANCIES AND PROBLEMS.
7. AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO THE OWNER. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
8. RESPONSIBILITY: THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATIONS. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.

SGS REDLINES Discrepancies Noted See Section 6.3.2 Cancelled

LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse

STATE OF CONNECTICUT — PAUL J. FORD — No. PEN 22731 — LICENSED PROFESSIONAL ENGINEER

SEP 19 2013

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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570A
DRAWN BY: B.M.S.
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APPROVED BY: J.J.W.
DATE: 9-17-2013

ISSUE DATE OF PERMIT: 9-17-2013

S-1

D. STRUCTURAL STEEL

1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:
   - A. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
     - (A.) "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
     - (B.) "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS." AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS OF THE ENGINEERING FOUNDATION.
     - (C.) "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (PARAGRAPH 4.2.1 SPECIFICALLY EXCLUDED).
   - B. BY THE AMERICAN WELDING SOCIETY (AWS):
     - (A.) "STRUCTURAL WELDING CODE - STEEL D1.1."
     - (B.) "SYMBOLS FOR WELDING AND NON-DESTRUCTIVE TESTING"
2. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
3. TIGHTEN ALL STRUCTURAL BOLTS, INCLUDING THE AJAX M20 BOLTS WITH SHEAR SLEEVES, ACCORDING TO THE REQUIREMENTS OF THE AISC "TURN OF THE NUT" METHOD. TIGHTEN BOLTS 1/3 TURN PAST THE SNUG TIGHT CONDITION AS DEFINED BY AISC.
4. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E70XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO THE OWNER'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65 (FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
7. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION I, NOTES REGARDING TOUCH-UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
8. UNLESS OTHERWISE NOTED, ALL STEEL MEMBERS SHALL BE HOT-DIP GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH ASTM A123. SEE SECTION J FOR FURTHER NOTES AND FOR EXCEPTIONS (IF ANY).
9. ALL WELDS SHALL BE VISUALLY INSPECTED BY THE OWNER'S APPROVED TESTING AGENCY. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT. THE CONTRACTOR SHALL COOPERATE WITH THE TESTING AGENCY IN THEIR TESTING EFFORTS.
10. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
11. FIELD CUTTING OF STEEL:
    - (A.) PRIOR TO ANY FIELD CUTTING, THE CONTRACTOR SHALL MARK THE CUT OUTLINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS.
    - (B.) ANY REQUIRED CUTS IN THE STEEL SHALL BE CAREFULLY CUT BY MECHANICAL METHODS SUCH AS DRILLING, SAW CUTTING, AND GRINDING. THE CONTRACTOR IS RESPONSIBLE TO PREVENT ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, DURING THE CUTTING WORK. ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTOR/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
    - (C.) ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.

E. BASE PLATE GROUT - (NOT REQUIRED)

F. FOUNDATION WORK - (NOT REQUIRED)

G. CAST-IN-PLACE CONCRETE - (NOT REQUIRED)

H. EPOXY GROUTED REINFORCING ANCHOR RODS - (NOT REQUIRED)

I. TOUCH UP OF GALVANIZING

1. THE CONTRACTOR SHALL TOUCH UP ANY AND/OR ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED DURING CONSTRUCTION. **GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.6 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-631-3276 FOR PRODUCT INFORMATION.**
2. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. THE OWNER'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.
3. THE OWNER'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE INADEQUATELY COATED SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.

J. HOT DIP GALVANIZING

1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.
2. PROPERLY PREPARE SISEL ITEMS FOR GALVANIZING.
3. DRILL OR PUNCH VENT AND/OR DRAINAGE HOLES AS REQUIRED.
4. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.

K. PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER

1. AT TIME THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY THE OWNER, THE OWNER WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
2. THE MONOPOLE REINFORCING SYSTEM INDICATED IN THESE DOCUMENTS USES REINFORCING COMPONENTS THAT INVOLVE FIELD WELDING STEEL MEMBERS TO THE EXISTING GALVANIZED STEEL POLE STRUCTURE. THESE FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTING COATING SUCH AS THE ZINC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. **ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE CONNECTED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT THE OWNER REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.**
3. THE OWNER SHALL REFER TO TIA/EIA-222-F-1996, SECTION 14 AND ANNEX E FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY THE OWNER BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. **PAUL J. FORD & COMPANY RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT.** ACCORDING TO TIA/EIA-222-F-1996, SECTION 14.1, NOTE 1, "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS"

SGS REDLINES Discrepancies Noted See Section 6.3.2 — Crawford

LCC AS-BUILT No changes Date 12-17-14 Signed K.A. Stackhouse

STATE OF CONNECTICUT — JOSEPH ENGINEERING JACKSON — No. PEN 22731 — LICENSED PROFESSIONAL ENGINEER

SEP 1 9 2013

PAUL J. FORD AND COMPANY STRUCTURAL ENGINEERS, 250 East Broad Street - Suite 800 - Columbus, Ohio 43215, (614) 221-6679, www.pjford.com

CROWN CASTLE, 8 PARKMEADOW DRIVE, PITTSFORD, NY 14534, PH: (585) 586-3440, FAX: (585) 586-3446

BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570A	ISSUE DATE OF PERMIT: 9-17-2013
DRAWN BY: B.M.S.	
CHECKED BY: J.J.W.	
APPROVED BY: [signature] DATE: 9-17-2013	S-2

AJAX BOLT NOTE SHEET: REV. 1.4, 5-20-2013

NOTES:
1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
3. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAIL BELOW FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.
4. ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. DTI'S SHALL BE THE SQUIRTER® STYLE, MADE TO ASTM F959 LATEST REVISION, AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF RC 38 OR HIGHER.

NOTES FOR AJAX M20 'ONE-SIDE' BOLTS WITH DIRECT TENSION INDICATORS (DTI'S):

DTI'S REQUIRED: DTI'S SHALL BE "SELF-INDICATING" SQUIRTER® STYLE DTI'S MADE WITH SILICONE EMBEDDED IN THEM, INSPECTED BY MEANS OF THE VISUAL EJECTION OF SILICONE AS THE DTI PROTRUSIONS COMPRESS. SQUIRTER® DTI'S SHALL BE CALIBRATED PER MANUFACTURER'S INSTRUCTIONS PRIOR TO USE.

THE DIRECT TENSION INDICATOR (DTI) WASHERS SHALL BE THE "SQUIRTER® STYLE" AS MANUFACTURED BY:

APPLIED BOLTING TECHNOLOGY PRODUCTS, INC.
1413 ROCKINGHAM ROAD BELLOWS FALLS, VERMONT, USA 05101
PHONE 1-800-552-1999
WEBSITE: WWW.APPLIEDBOLTING.COM/

DISTRIBUTORS OF SQUIRTER® DTI'S:
HTTP://WWW.APPLIEDBOLTING.COM/APPLIED-BOLTING-DISTRIBUTORS.HTML

DTI USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 20 MM (M20) NOMINAL A325 BOLTS FOR THE AJAX M20 BOLTS. DTI'S SHALL NOT BE HOT-DIP GALVANIZED. DTI'S SHALL BE MECHANICALLY GALVANIZED (MG) BY THE COLD MECHANICAL PROCESS ONLY AS PROVIDED BY THE DTI MANUFACTURER.

HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 20 MM (M20) NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY GALVANIZED BY THE COLD MECHANICAL PROCESS. ALTERNATIVELY, CORRECTLY MADE HOT DIP GALVANIZED HARDENED FLAT WASHERS HAVING A MINIMUM HARDNESS OF RC 38 CAN BE USED; CONTRACTOR SHALL PROVIDE DOCUMENTATION OF WASHER SPECIFICATION AND HARDNESS.

NUT LUBRICATION REQUIRED: PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW DTI MANUFACTURER INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING.

NOTE: COMPLETELY COMPRESSED DTI'S SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE OF A HARDENED FLAT WASHER, NEVER DIRECTLY AGAINST THE NUT.

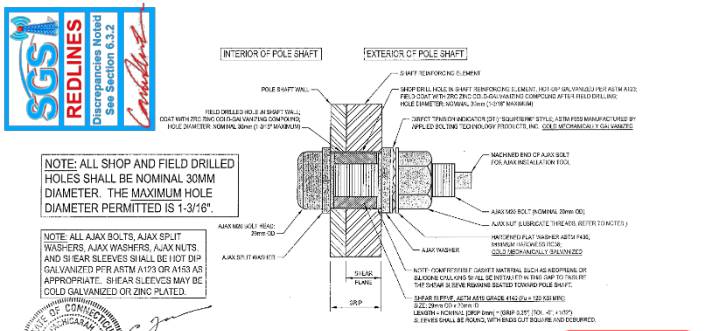
CONTRACTOR SHALL FOLLOW DTI MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION, LUBRICATION, TIGHTENING AND INSPECTION.

INSPECTION REQUIRED: ALL AJAX BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009, BY A QUALIFIED BOLT INSPECTOR. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE AJAX BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. IN ADDITION, ALL AJAX BOLTS AND DTI'S SHALL BE VISUALLY INSPECTED ACCORDING TO THE DTI MANUFACTURER'S INSTRUCTIONS. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE PHOTO DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTI'S.

SGS REDLINES Discrepancies Noted See Section 6.3.2 — Crawford

NOTE: ALL SHOP AND FIELD DRILLED HOLES SHALL BE NOMINAL 30MM DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1-3/16".

NOTE: ALL AJAX BOLTS, AJAX SPLIT WASHERS, AJAX WASHERS, AJAX NUTS, AND SI'EAR SLEEVES SHALL BE HOT DIP GALVANIZED PER ASTM A123 OR A153 AS APPROPRIATE. SHEAR SLEEVES MAY BE COLD GALVANIZED OR ZINC PLATED.



TYPICAL AJAX BOLT DETAIL 1 S-3

LCC AS-BUILT No changes Date 12-17-14 Signed K.A. Stackhouse

STATE OF CONNECTICUT — JOSEPH ENGINEERING JACKSON — No. PEN 22731 — LICENSED PROFESSIONAL ENGINEER

SEP 1 9 2013

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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

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DRAWN BY: B.M.S.	
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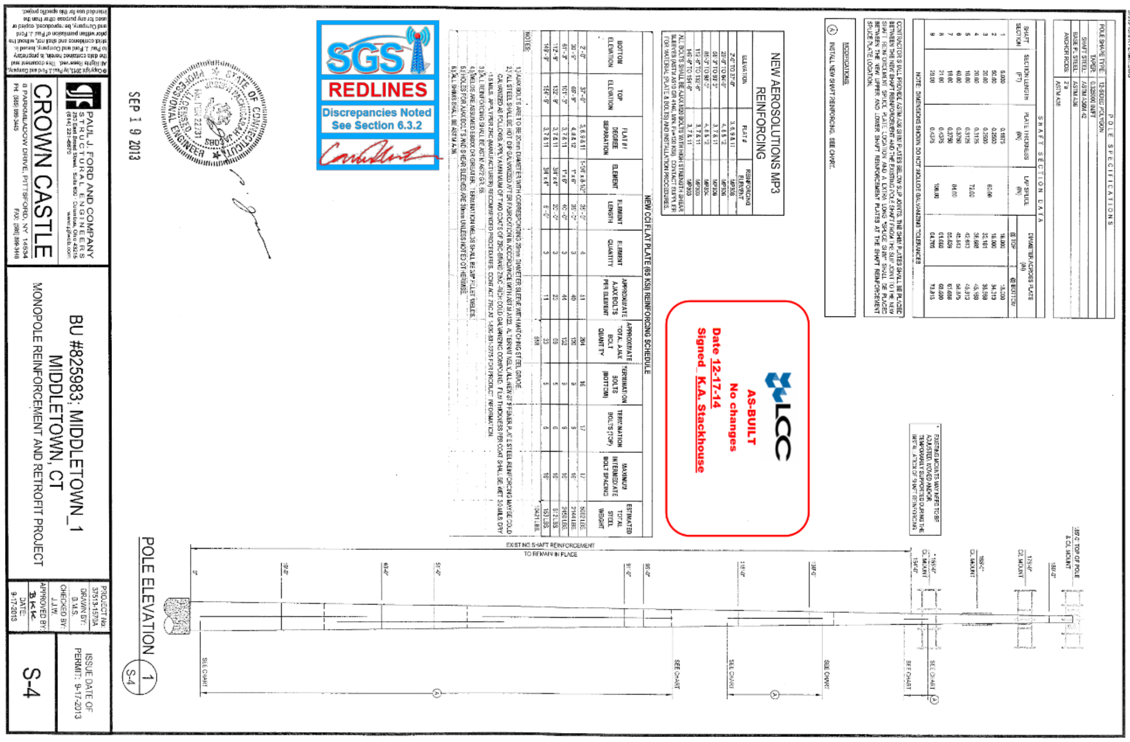
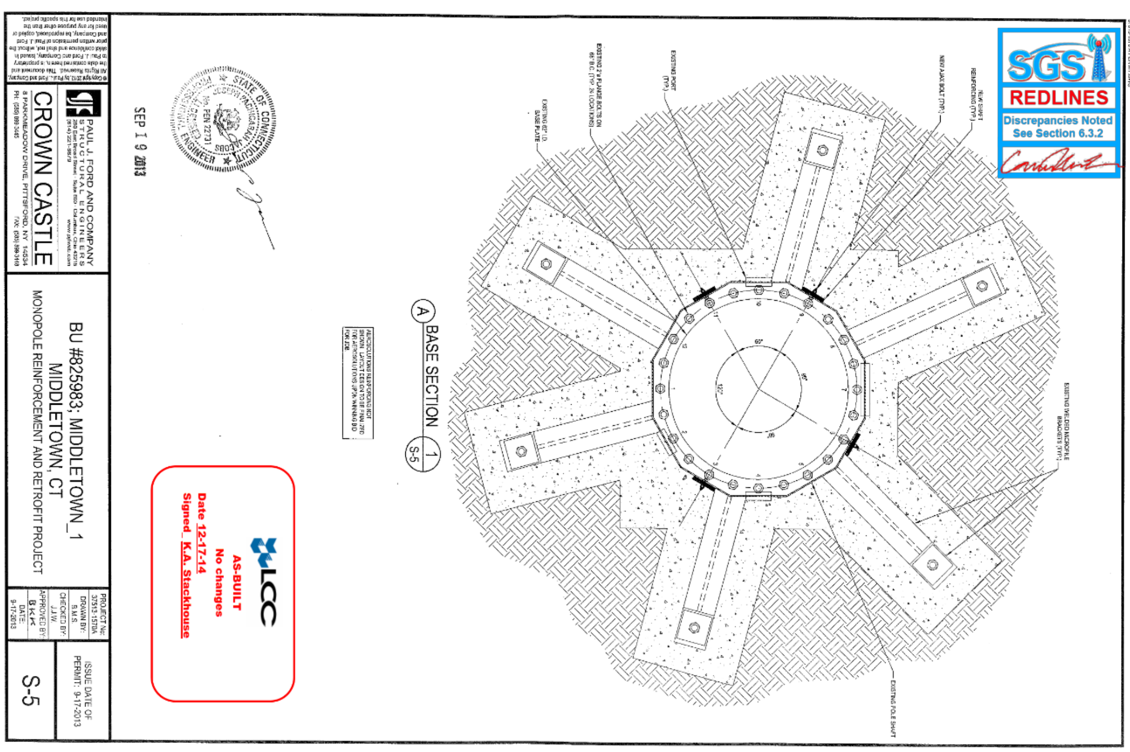
APPROVED BY: [signature] DATE: 9-17-2013	S-3


NEW AEROSOLUTIONS MP3 REINFORCING
NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE
POLE ELEVATION
SGS
REDLINES
Discrepancies Noted
See Section 6.3.2
LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse
SEP 1 9 2013
PAUL J. FORD AND COMPANY
CROWN CASTLE
BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT
ISSUE DATE OF PERMIT: 9-17-2013
S-4


SGS
REDLINES
Discrepancies Noted
See Section 6.3.2
BASE SECTION
LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse
SEP 1 9 2013
PAUL J. FORD AND COMPANY
CROWN CASTLE
BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT
ISSUE DATE OF PERMIT: 9-17-2013
S-5

37513-1570 A PERMIT DWG

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 DRAWINGS, 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 RESIDES WITH THE EOR AT ALL TIMES.

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) 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 IN-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 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 AN DENG-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, PREFERABLE 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 INSPECTION(S) 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 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 MI'S

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 INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV 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.

PHOTOGRAPHS

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 AND TORQUE
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

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

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

MI CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
PRE-CONSTRUCTION	
X	MI CHECKLIST DRAWINGS
X	EOR APPROVED SHOP DRAWINGS
NA	FABRICATION INSPECTION
NA	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
NA	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
CONSTRUCTION	
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
NA	POST INSTALLED MICROPILE VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK: LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
X	THIRD PARTY ONSITE INSPECTION OF BOLT PRETENSION PER CROWN REQUIREMENTS
X	INSPECTION OF AJAX BOLTS AND DTI'S PER REQUIREMENTS ON SHEET S-3
ADDITIONAL TESTING AND INSPECTIONS:	
POST-CONSTRUCTION	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
X	THIRD PARTY ONSITE BOLT INSPECTION REPORT
NA	POST INSTALLED MICROPILE PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

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

SGS REDLINES
Discrepancies Noted
See Section 6.3.2

LCC
AS-BUILT
No changes
Date 12-17-14
Signed K.A. Stackhouse

STATE OF CONNECTICUT LICENSED PROFESSIONAL ENGINEER PEN 27231

SEP 19 2013

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street · Suite 600 · Columbus, Ohio 43215
(614) 221-6679 www.pjfweb.com

CROWN CASTLE
8 PARKMEADOW DRIVE, PITTSFORD, NY 14534
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BU #825983; MIDDLETOWN_1
MIDDLETOWN, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-1570A
DRAWN BY: B.M.S.
CHECKED BY: J.J.W.
APPROVED BY: BKK
DATE: 9-17-2013

ISSUE DATE OF PERMIT: 9-17-2013

S-6

6.3.2 ENGINEER OF RECORD EMAIL

From: John Woolley [mailto:jwoolley@pjfweb.com]
Sent: Monday, January 12, 2015 11:06 AM
To: Keith_ Stackhouse
Cc: Jerry (Contractor) Bruno; SGS PMI; lccmods; pjfmod pjfmod
Subject: Re: FW: Middletown 1 825983 130608 Punch List

Keith,

The plate locations are acceptable.

Thanks,

John J. Woolley, E.I.
Structural Designer
Main: 614.221.6679 ext. 2164
Direct: 614.448.4164
E-mail: jwoolley@pjfweb.com

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
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P.E. Registrations in 50 States, Puerto Rico, and Canada

>>> Keith_ Stackhouse <keith_stackhouse@lcc.com> 1/12/2015 9:40 AM >>>
Hello John,

Could you review the attached punch list and approve of these discrepancies?

Thanks,

Keith A. Stackhouse
Structural Construction Manager

LCC

LCC Construction Services
2500 Sylon Blvd.
Hainesport, NJ 08036

(Cell) 609-367-6107
keith_stackhouse@lcc.com

PUNCH ITEM 1

HEIGHT	FLAT/ARC	PLATE #	PLATE HT START/STOP	DRAWING PG #
2' – 155'	See below	1-5	See below	S4

DISCREPANCY:

Newly installed plate heights differed from those specified in the drawings. Plate heights were found to be as follows:

- Plate 1 observed at 2'5" – 37'5".
- Plate 2 observed at 30'6" – 65'6".
- Plate 3 observed at 61'8" – 101'8".
- Plate 4 observed at 112'6" – 132'6".
- Plate 5 observed at 150'3" – 155'3".

ACTIONS NEEDED BY GC:

Provide EOR approval for the existing conditions or install to drawing specifications.

PHOTOGRAPHS

BOTTOM ELEVATION	TOP ELEVATION	FLAT # / DEGREE SEPARATION
2' - 0"	37' - 0"	3, 6, 9 & 11
30' - 9"	65' - 9"	4, 8 & 12
61' - 3"	101' - 3"	3, 7 & 11
112' - 9"	132' - 9"	3, 7 & 11
149' - 9"	154' - 9"	3, 7 & 11

6.3.3 PHOTOGRAPHS