COHEN and WOLF P.C.
ATTORNEYS AT LAW

RACHEL A. SCHWARTZMAN

Please Reply To: Bridgeport
Writer's Direct Dial: (203) 337-4110
E-Mail: rschwartzman@cohenandwolf.com

July 16, 2014

Attorney Melanie Bachman
Acting Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06501

Re: Notice of Exempt Modification
Cell Tower Lease Acquisition LLC/Metro PCS co-location
CTHA535A
50 Plantation Road, Broad Brook (East Windsor), Connecticut 06016

Dear Attorney Bachman:

This office represents MetroPCS Massachusetts, LLC ("MetroPCS") and has been retained to file exempt modification filings with the Connecticut Siting Council on its behalf.

In this case, Cell Tower Lease Acquisition LLC owns the existing water tank telecommunications tower and related facility at 50 Plantation Road, Broad Brook (East Windsor), Connecticut (Latitude 41.5237/Longitude -72.9358]).[1] MetroPCS intends to replace 3 existing antennas with 6 new antennas and related equipment at this existing telecommunications facility in Broad Brook (East Windsor) ("Broad Brook Facility"). Please accept this letter as notification, pursuant to R.C.S.A. §16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the First Selectman, Denise Menard, and the property owner, Plantation Properties, LLC.

The existing Broad Brook Facility consists of a 135 foot water tank tower.[2] MetroPCS plans to replace 3 existing antennas on pipe mounts with 6 new antennas on pipe mounts at a centerline of 120 feet. (See the plans revised to April 28, 2014 attached hereto as **Exhibit A**). MetroPCS will also install a 6' x 6' concrete pad within its lease area, replace a Nortel cabinet with a 6201 equipment cabinet, install a battery backup

[1] This facility is also listed on the Connnecticut Siting Council online database as being located at 160 Plantation Road, Broad Brook (East Windsor).

[2] While the online docket for the Connecticut Siting Council does not provide a docket or petition number for approval of this structure, it does reference this structure in connection with a notices of intent captioned TS-CING-047-060405, EM-POCKET-047-090504, and EM-SPRING-047-140530.

unit, install fiber cables, and reuse existing coax cables. The existing Broad Brook Facility is structurally capable of supporting Metro PCS' proposed modifications, as indicated in the structural analysis dated July 7, 2014, and attached hereto as **Exhibit B**.[3]

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

1. The proposed modification will not increase the height of the tower. MetroPCS' existing antennas are at a centerline of 120 feet; the replacement antennas will be installed at the same 120 foot level. The enclosed tower drawing confirms that the proposed modification will not increase the height of the tower.

2. The proposed modifications will not require an extension on the site boundaries or lease area, as depicted on Sheet 2 of Exhibit A. MetroPCS' equipment will be located entirely within the existing compound area.

3. The proposed modification to the Facility will not increase the noise levels at the existing facility by six decibels or more.

4. The operation of the replacement antennas will not increase the total radio frequency (RF) power density, measured at the base of the tower, to a level at or above the applicable standard. According to a Radio Frequency Emissions Analysis Report prepared by EBI dated July 16, 2014 MetroPCS's's operations would add 0.802% of the FCC Standard. Therefore, the calculated "worst case" power density for the planned combined operation at the site including all of the proposed antennas would be 14.552% of the FCC Standard as calculated for a mixed frequency site as evidenced by the engineering exhibit attached hereto as **Exhibit C.**

For the foregoing reasons, MetroPCS respectfully submits that the proposed replacement antennas and equipment at the Broad Brook Facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Upon acknowledgement of this exempt modification, MetroPCS shall commence construction approximately sixty days from the receipt of the Council's decision.

Sincerely,

Rachel Schwartzman

Rachel A. Schwartzman, Esq.

---

[3] The structural analysis provides that the tower is adequate to support the proposed equipment with the reinforcement of the existing pole shaft detailed in the Tectonic Construction Drawings in the report. Those reinforcements will be completed prior to the installation of the proposed modifications.

cc: Town of Broad Brook (East Windsor), First Selectman Denise Manard
Cell Tower Lease Acquisition LLC,
Plantation Properties, LLC
Sheldon J. Freincle, Northeast Site Solutions

EXHIBIT A

ATC
SITE NUMBER:CT-9016
SITE NAME:RASMUSSEN

KEY PLAN

N.T.S.

CONFIGURATION

5A

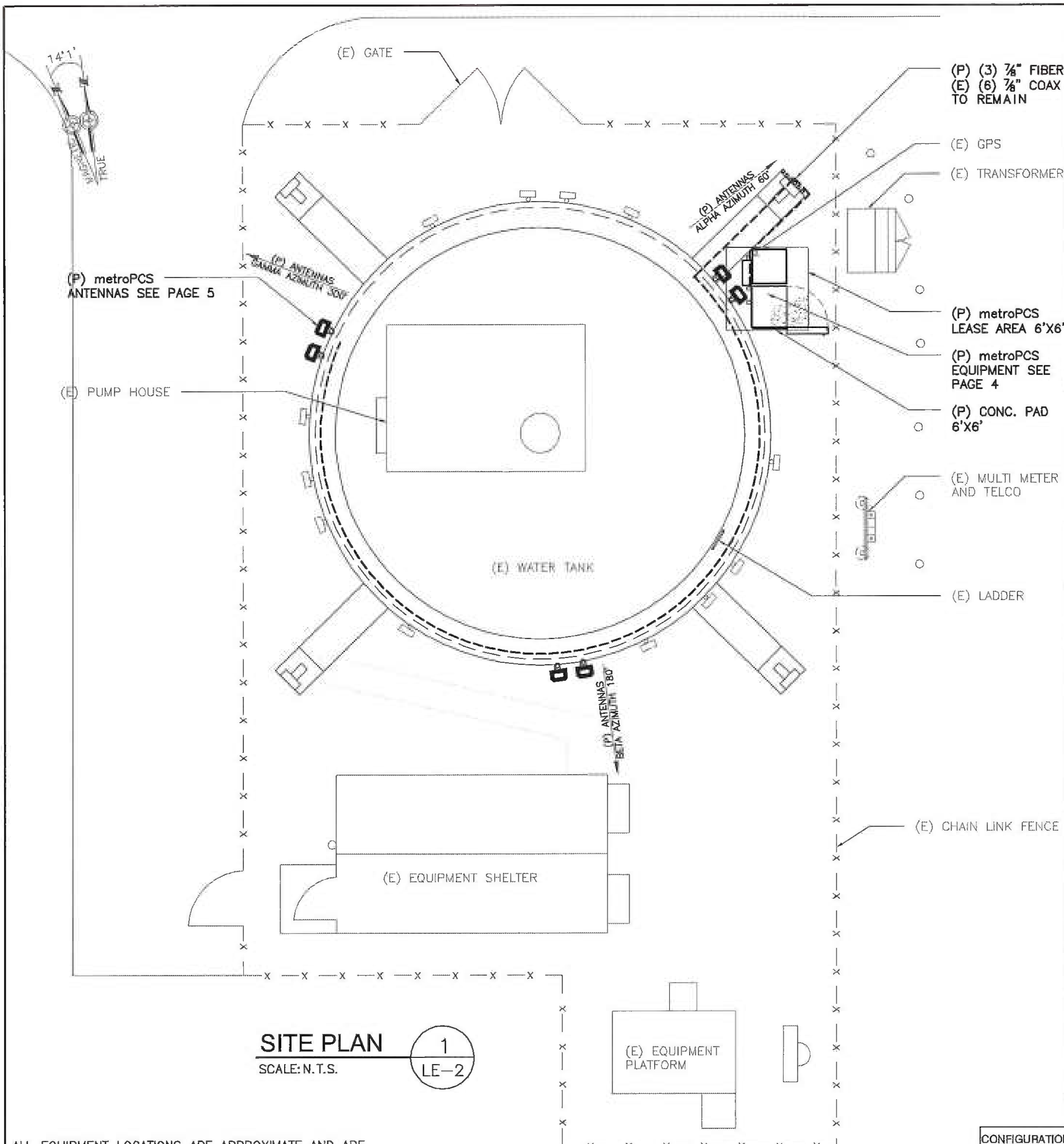
SUBMITTALS	
LE REV A	04.28.14

ATLANTIS GROUP
1340 Centre Street
Suite 212
Newton, MA 02459
Office: 617-965-0789
Fax: 617-213-5056

LEASE EXHIBIT
SITE NUMBER:
CTHA535A
SITE NAME:
UNISON E WINDSOR WATERTANK
SITE ADDRESS:
50 PLANTATION RD,
EAST WINDSOR, CT

NORTHEAST SITE SOLUTIONS
54 MAIN STREET, UNIT 3
STURBRIDGE, MA 01566
(508) 434-5237
FOR
metroPCS.
metroPCS WIRELESS, INC.
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

DRAWN BY: MB | CHECKED BY:SM



SITE PLAN

1 / LE-2

SCALE: N.T.S.

ALL EQUIPMENT LOCATIONS ARE APPROXIMATE AND ARE SUBJECT TO APPROVAL BY LESSEE/LICENSEE'S STRUCTURAL & RF ENGINEERS. LOCATIONS OF POWER & TELEPHONE FACILITIES ARE SUBJECT TO APPROVAL BY UTILITY COMPANIES.

CONFIGURATION

5A

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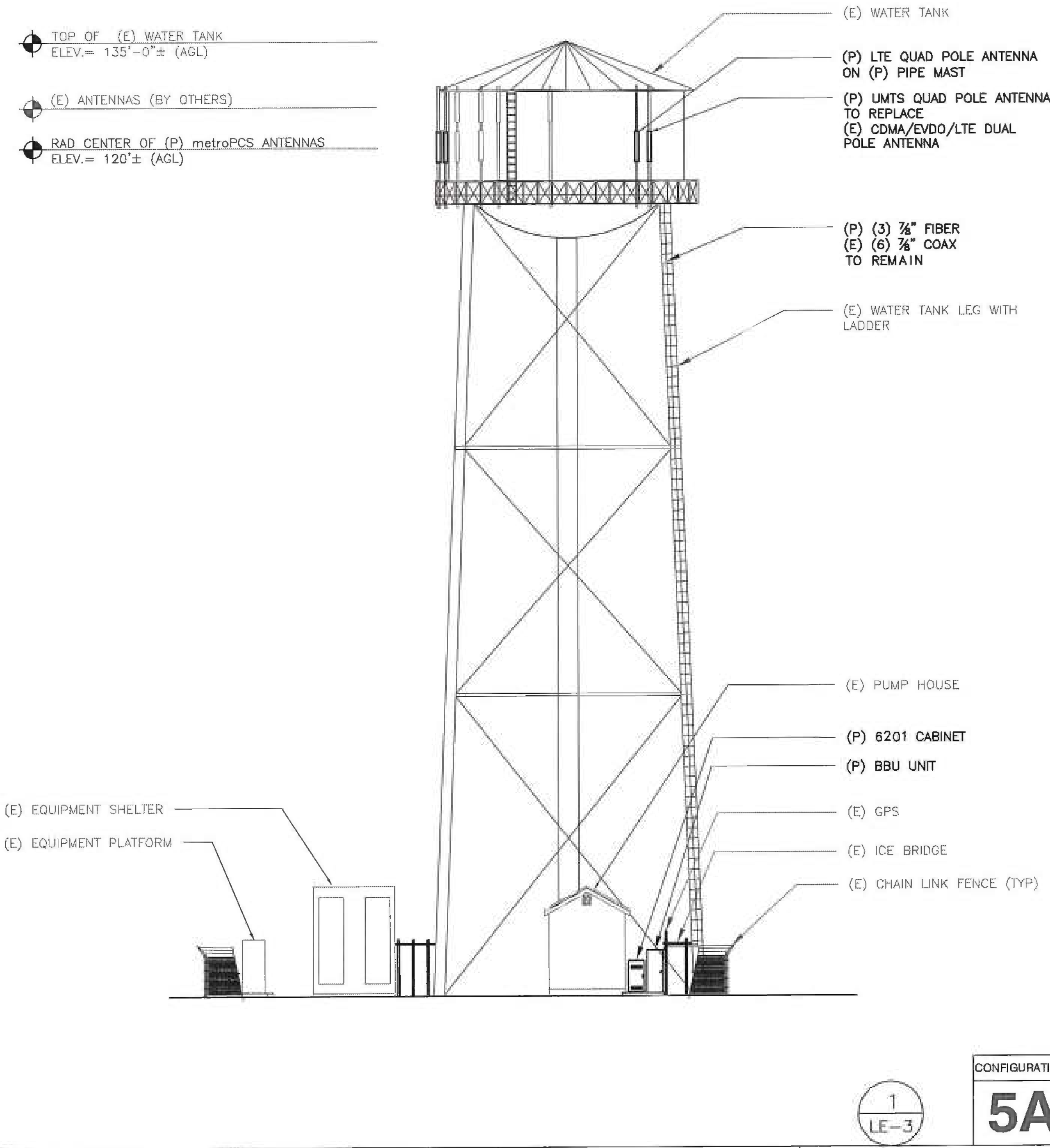

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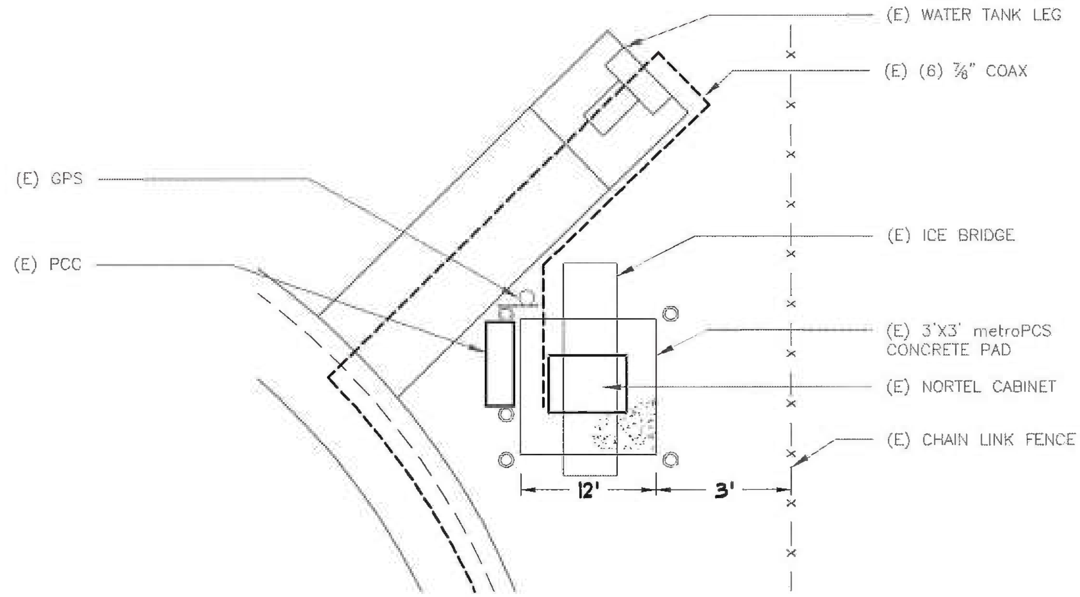
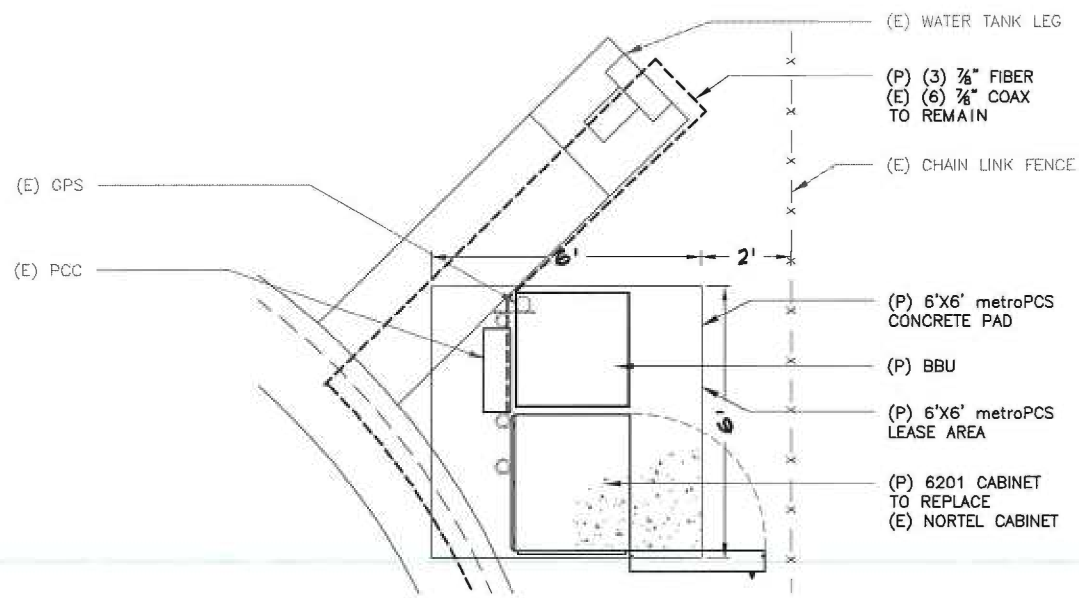


EXISTING EQUIPMENT PLAN



PROPOSED EQUIPMENT PLAN

CONFIGURATION

5A

SUBMITTALS	
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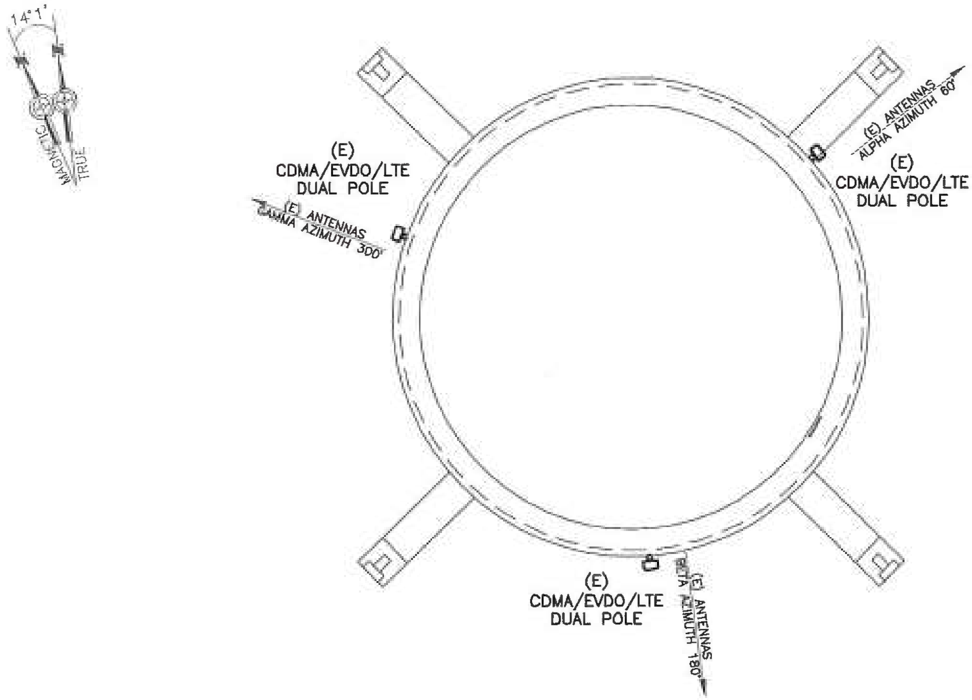
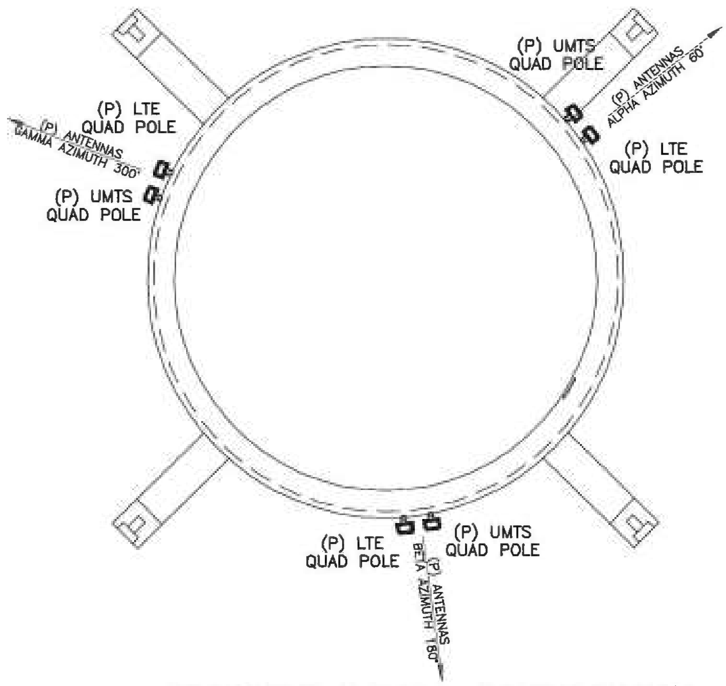


EXISTING ANTENNA CONFIGURATION



PROPOSED ANTENNA CONFIGURATION

CONFIGURATION
5A

SUBMITTALS	
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FOR
metroPCS.
metroPCS WIRELESS, INC.
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

DRAWN BY: MB | CHECKED BY: SM

EXHIBIT B

STRUCTURAL REINFORCEMENT REPORT
WATER TOWER

Prepared For:

metroPCS

35 Griffin Road South
Bloomfield, CT 06002

Site ID: CTHA535A
Site Name: Unison E Windsor WT
50 Plantation Road
East Windsor, CT

STATE OF CONNECTICUT
DMITRIY V. ALBUL
No. 28725
LICENSED PROFESSIONAL ENGINEER

7/7/2014

Prepared By:
Atlantis Group, Inc.
1340 Centre Street, Suite 212
Newton, Massachusetts 02459
Phone: 617-965-0789, Fax: 617-213-5056

CONTENTS

1.0 SUBJECT AND REFERENCES

The purpose of this analysis is to evaluate the structural capacity of the existing 132.5 feet high water tower, located at 50 Plantation Road, East Windsor, CT for the alteration and addition of wireless telecommunication appurtenances proposed by Metro PCS.

The structural analysis of the site is based on the following documents provided to us:

1. Site mapping conducted by representatives of this office on June 19, 2014.
2. Proposed antenna information provided by Metro PCS.

The provided structural information does not include information about the foundations. This certification does not include foundations.

1.1 STRUCTURE

The water tower is an existing ±132.5 feet high tower with 4 legs and a standpipe. Back to back channel legs (laced) are X-braced with structural steel horizontals and tension rod diagonals. The round standpipe supports each of the tower legs with tension rods. Please refer to the tower elevation photos in Appendix A for details about the tower geometry.

2.0 EXISTING AND PROPOSED CONFIGURATION

Antennas and Appurtenances:

The analysis is based on the following existing and proposed appurtenances:

Existing Configuration of Metro PCS Appurtenances:

Sector	RAD Center (ft.)	Antenna & TMA Description	Antenna & TMA Model	Mount	Feed Lines
Alpha	120	(1) CDMA / EVDO / LTE Dual Pole antenna	(1) RFS APXV18	(1) Pipe Mount per antenna	(6) 1 5/8"
Beta	120	(1) CDMA / EVDO / LTE Dual Pole antenna	(1) RFS APXV18	(1) Pipe Mount per antenna	
Gamma	120	(1) CDMA / EVDO / LTE Dual Pole antenna	(1) RFS APXV18	(1) Pipe Mount per antenna	

Proposed Configuration of Metro PCS Appurtenances:

Sector	RAD Center (ft.)	Antenna & TMA Description	Antenna & TMA Model	Mount	Feed Lines
Alpha	120	(1) Quad Pole LTE antenna (1) Quad Pole UMTS antenna	(1) AIR21 B2A/B4P (1) AIR21 B4A/B2P	(1) Pipe Mount per antenna	(6) 1-5/8" + (3) 7/8" Fiber
Beta	120	(1) Quad Pole LTE antenna (1) Quad Pole UMTS antenna	(1) AIR21 B2A/B4P (1) AIR21 B4A/B2P	(1) Pipe Mount per antenna	
Gamma	120	(1) Quad Pole LTE antenna (1) Quad Pole UMTS antenna	(1) AIR21 B2A/B4P (1) AIR21 B4A/B2P	(1) Pipe Mount per antenna	

Existing and Remaining Appurtenances by Others:

RAD Center (ft.) Carrier	Antenna & TMA	Mount	Feed Lines
112 AT&T	(3) LLPX-10R-4, (6) RA21.7770, (3) RRUs, (12) Powerwave (3) Distro. boxes	(6) Pipe Mounts	(12) 1 5/8" + (2) 1/2" + (4) Cat 5
121 Sprint	(3) APXVSPP18-C-A2, (9) RRHs	(3) Pipe Mounts	(3) 1 1/4"
119 Clearwire	(3) KMW AM-X-CD-16-65 antennas	Pipe Mounts	(2) 1/2" + (4) conduit
125 Unknown	(2) VHLP800 dishes	Pipe Mounts	

3.0 CODES AND LOADING

The tower was analyzed per ANSI/TIA-222-F as referenced by the 2005 Connecticut Building Code with 2011 Supplement, which is the adopted building code. The following wind loading was used in compliance with the standard for Hartford County, CT.

- Basic wind speed 80 mph (W) without ice [fastest-mile speed equivalent to 103 mph 3-second gust].

4.0 STANDARD CONDITIONS FOR ENGINEERING SERVICES ON EXISTING STRUCTURES

The analysis is based on the information provided to Atlantis Group and is assumed to be current and correct. Unless otherwise noted, the structure and the foundation system are assumed to be in good condition, free of defects and can achieve theoretical strength.

It is assumed that the structure has been maintained and shall be maintained during its service. The superstructure and the foundation system are assumed to be designed with proper engineering practice and fabricated, constructed and erected in accordance with the design documents. Atlantis Group will accept no liability which may arise due to any existing deficiency in design, material, fabrication, erection, construction, etc. or lack of maintenance. Contractor should inspect the condition of the existing structure, mounts and connections and notify Atlantis Group for any discrepancies and deficiencies before proceeding with the construction.

The evaluation results presented in this report are only applicable for the previously mentioned existing and proposed additions and alterations. Any deviation of the proposed equipment and placement, etc., will require Atlantis Group to generate an additional structural evaluation.

5.0 ANALYSIS and ASSUMPTIONS

The structure is considered to have adequate strength for the proposed loading if the existing structural members which will be used to support the proposed equipment are structurally adequate per the current code criteria or the additions or alterations to the existing structure do not significantly increase the force in any structural element.

It is assumed that the water tank is in service, and filled with water.

6.0 RESULTS and CONCLUSION

Based on an analysis per ANSI/TIA-222-F, it is our opinion that the subject water tank is ***loaded within acceptable limits within the scope of this analysis, provided the existing tension rods are replaced as detailed on the attached drawings*** . All reinforcement must be completed prior to any antenna equipment additions or alterations can be implemented. All other tank elements are within acceptable limits.

Foundation details have not been provided for our review and are therefore considered unknown.

Should you have any questions or need any clarifications about this report, please contact us at (617) 965-0789.

Sincerely,

S. Alan Bodnar

Atlantis Group, Inc.

STATE OF CONNECTICUT
DMITRIY V. ALBUL
No. 28725
LICENSED
PROFESSIONAL ENGINEER

D. Albul

7/7/2014

APPENDIX A

CALCULATIONS

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1340 Centre Street
Suite 212
Newton, MA 02459

Calculate the wind areas:

$Diam := 19 \cdot ft \qquad BulbHt := 33.58 \cdot ft$

$TankHt := 132.58ft$

$CylinderHt := 17.58ft$

$ConeHt := 7ft$

$HSphereHt := 9ft$

Tank:

$$Area_1 := Diam \cdot CylinderHt \cdot (0.6) \ldots + Diam \cdot ConeHt \cdot .5 \cdot (0.5) \ldots + Diam \cdot HSphereHt \cdot .785 \cdot (0.5)$$

$Area_1 = 300.8 \cdot ft^2$

Riser: $RiserDiam := 3 \cdot ft \qquad RiserHt := 99ft$

$Area_2 := RiserDiam \cdot RiserHt \cdot (0.6)$

Legs: $LegWidth := 18in \qquad LegHt := RiserHt + HSphereHt$

$Area_3 := 4 \cdot LegWidth \cdot (LegHt) \cdot 2.0$

Diagonals: $Diag_1 := 86.5ft$ Length of diagonals determined graphically

$Diag_2 := 48ft$

$Area_4 := 4 \cdot 1.125in \cdot Diag_1 \cdot (1.2)$ Upper two bays

$Area_5 := 4 \cdot 1.375in \cdot Diag_2 \cdot (1.2)$ Bottom bay

Girts: $GirtL := 51ft$ Girt length det. graphically

$Area_6 := 2 \cdot GirtL \cdot 8 \cdot in \cdot (2.0)$

$Centroid_1 := TankHt - 0.5 \cdot BulbHt$

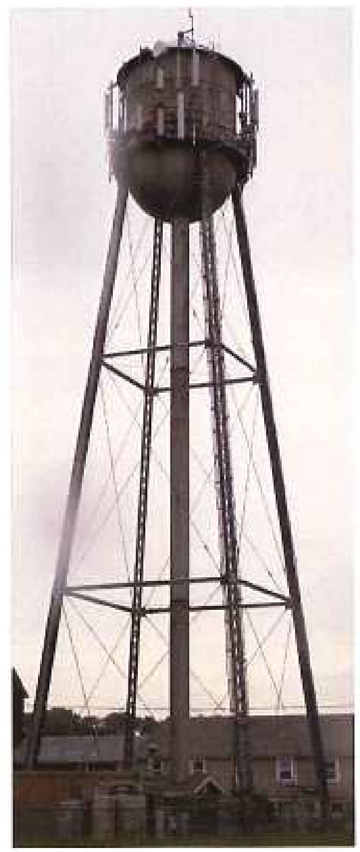
$Centroid_2 := 0.5 \cdot RiserHt$

$Centroid_3 := 0.5 \cdot LegHt$

$Centroid_4 := 67.5ft$

$Centroid_5 := 18ft$

$Centroid_6 := 54.5ft$



"C:\Users\Alan Bodnar\Desktop\

Area Moment about base of basic watertank:

$$Tank_{Moment} := \sum_i \left(Area_i \cdot Centroid_i\right)$$

$$Tank_{area} := \sum_i \left(Area_i\right) = 1976.3 \cdot ft^2$$

$$Tank_{Moment} = 1.2 \times 10^5 \cdot ft^3$$

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Newton, MA 02459

Determine moment change with the addition of the antennas:

$\text{Antennas1} := \text{CaAa}(42.4\cdot\text{in}, 11.8\cdot\text{in}, \text{"Flat"})\cdot 3\cdot\frac{2}{3} = 9.7\cdot\text{ft}^2$ 3 LLPX310R-V4 (E)

$\text{AntennaHt1} := 120\text{ft}$

$\text{Antennas2} := \text{CaAa}(33.6\cdot\text{in}, 33.6\cdot\text{in}, \text{"Flat"})\cdot .785\cdot 2 = 17.2\cdot\text{ft}^2$ 2 VHLP800 dishes (E)

$\text{AntennaHt2} := 125.6\text{ft}$

$\text{Antennas3} := \text{CaAa}(63\cdot\text{in}, 11\cdot\text{in}, \text{"Flat"})\cdot 6\cdot\frac{2}{3} = 26.9\cdot\text{ft}^2$ 6 RA21.7770 (E)

$\text{AntennaHt3} := 112\text{ft}$

$\text{Antennas4} := \text{CaAa}(72\cdot\text{in}, 11.8\cdot\text{in}, \text{"Flat"})\cdot 3\cdot\frac{2}{3} = 16.5\cdot\text{ft}^2$ 3 APXVSPP18 (E)

$\text{AntennaHt4} := 120\text{ft}$

$\text{Antennas5} := \text{CaAa}(100\cdot\text{in}, 12\cdot\text{in}, \text{"Flat"})\cdot 3\cdot\frac{2}{3} = 24.1\cdot\text{ft}^2$ 3 AM-X-CD-16-65 (E)

$\text{AntennaHt5} := 112\text{ft}$

$\text{Antennas6} := \text{CaAa}(24\cdot\text{in}, 12\cdot\text{in}, \text{"Flat"})\cdot 36\cdot\frac{2}{3} = 67.2\cdot\text{ft}^2$ 36 RRHs (E)

$\text{AntennaHt6} := 120\text{ft}$

$\text{Antennas7} := \text{CaAa}(56\cdot\text{in}, 12\cdot\text{in}, \text{"Flat"})\cdot 6\cdot\frac{2}{3} = 26.1\cdot\text{ft}^2$ 6 Proposed antennas

$\text{AntennaHt7} := 120\text{ft}$

$\text{PipeMount1} := \text{CaAa}(18\text{ft}, 3.5\text{in}, \text{"Round"})\cdot 12\cdot\frac{2}{3} = 50.4\cdot\text{ft}^2$ 9 (E) 3.5in pipe mounts + 3 proposed

$\text{PipeHt1} := 120\text{ft}$

$\text{PipeMount2} := \text{CaAa}(18\text{ft}, 4\text{in}, \text{"Round"})\cdot 3\cdot\frac{2}{3} = 14.4\cdot\text{ft}^2$ 3 4in pipe mounts (E)

$\text{PipeHt2} := 120\text{ft}$

$$\text{AntennaMoment} := \begin{pmatrix} \text{Antennas1}\cdot\text{AntennaHt1} + \text{Antennas2}\cdot\text{AntennaHt2}\ \ldots \\ + \text{Antennas3}\cdot\text{AntennaHt3} + \text{Antennas4}\cdot\text{AntennaHt4}\ \ldots \\ + \text{Antennas5}\cdot\text{AntennaHt5} + \text{Antennas6}\cdot\text{AntennaHt6}\ \ldots \\ + \text{Antennas7}\cdot\text{AntennaHt7} + \text{PipeMount1}\cdot\text{PipeHt1}\ \ldots \\ + \text{PipeMount2}\cdot\text{PipeHt2} \end{pmatrix} = 30004.9\cdot\text{ft}^3$$

$$\text{Centroid}_{tank} := \frac{\text{Tank}_{Moment}}{\text{Tank}_{area}} = 62.8\cdot\text{ft}$$

$TLineArea := 1.2 \cdot 10in \cdot RiserHt = 99 \cdot ft^2$ $\quad TLineHt := 0.5 \cdot RiserHt = 49.5 \cdot ft$

$TLineMoment := TLineArea \cdot TLineHt = 4900.5 \cdot ft^3$

$CombinedMoment := AntennaMoment + TLineMoment$

$CombinedMoment = 34905.4 \cdot ft^3$

$$MomentIncrease := \frac{CombinedMoment}{Tank_{Moment}} = 28.1 \cdot \%$$

This is greater than the 10% allowance for increase in lateral load allowed per IBC 2009 Section 3403.4 - additional analysis is required

$$AntennaArea := Antennas1 + Antennas2 + Antennas3 + Antennas4 \ldots + Antennas5 + Antennas6 + Antennas7 + PipeMount1 \ldots + PipeMount2 + TLineArea = 351.6 \cdot ft^2$$

$$Centroid_{antenna} := \frac{AntennaMoment}{AntennaArea} = 85.3 \cdot ft$$

$TotalArea := AntennaArea + Tank_{area} = 2327.9 \cdot ft^2$

$TotalShear := AntennaWindForce(TotalArea, 80mph, Centroid_{tank}, 132.6ft) = 52346.8 \cdot lbf$

$AddShear := AntennaWindForce(AntennaArea, 80mph, Centroid_{antenna}, 132.6ft) = 8630.1 \cdot lbf$

Design diagonal rods:

Bottom diagonal: 1 3/8"

$Area_{bottom} := RiserDiam \cdot 36ft \cdot .6 + 4 \cdot LegWidth \cdot 36ft \cdot 2 = 496.8 \cdot ft^2$

$Shear_{bottom} := AntennaWindForce(Area_{bottom}, 80mph, 18ft, 132.6ft) = 7816.5 \cdot lbf$

$$BottomDesignShear := \frac{TotalShear - \frac{Shear_{bottom}}{2}}{2} = 24219.3 \cdot lbf$$

$$TensionDiag := \frac{TotalShear - \frac{Shear_{bottom}}{2}}{2 \cdot \cos(50.6deg)} = 38156.8 \cdot lbf$$

$$F_t := .6 \cdot 36000psi \cdot \frac{4}{3} = 28800 \cdot psi$$

$$AreaRod := \pi \cdot \left(\frac{1.375in}{2}\right)^2 = 1.5 \cdot in^2$$

$$TensileStressRod := \frac{TensionDiag}{AreaRod} = 25696.7 \cdot psi$$

$$\frac{TensileStressRod}{F_t} = 89.2 \cdot \%$$

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Middle diagonal: 1 3/8"

$Area_{middle} := RiserDiam \cdot 37ft \cdot .6 + 4 \cdot LegWidth \cdot 37ft \cdot 2 = 510.6 \cdot ft^2$

$Shear_{middle} := AntennaWindForce\left(Area_{middle}, 80mph, 54.5ft, 132.6ft\right) = 11024.9 \cdot lbf$

$$TensionMidDiag := \frac{TotalShear - Shear_{bottom} - \frac{Shear_{middle}}{2}}{2 \cdot \cos(57deg)} = 35819.9 \cdot lbf$$

$$AreaMidRod := \pi \cdot \left(\frac{1.375in}{2}\right)^2 = 1.5 \cdot in^2$$

$$TensileMidRod := \frac{TensionMidDiag}{AreaMidRod} = 24122.9 \cdot psi$$

$$\frac{TensileMidRod}{F_t} = 83.8 \cdot \%$$

Top diagonal: 1 1/8"

$Area_{top} := RiserDiam \cdot 35ft \cdot .6 + 4 \cdot LegWidth \cdot 35ft \cdot 2 = 483 \cdot ft^2$

$Shear_{top} := AntennaWindForce\left(Area_{top}, 80mph, 89.5ft, 132.6ft\right) = 12016.9 \cdot lbf$

$$TensionTopDiag := \frac{TotalShear - Shear_{bottom} - Shear_{middle} - \frac{Shear_{top}}{2}}{2 \cdot \cos(59deg)} = 26694.1 \cdot lbf$$

$$AreaTopRod := \pi \cdot \left(\frac{1.125in}{2}\right)^2 = 1 \cdot in^2$$

$$TensileTopRod := \frac{TensionTopDiag}{AreaTopRod} = 26854.7 \cdot psi$$

$$\frac{TensileTopRod}{F_t} = 93.2 \cdot \%$$

Check bottom girt axial forces:

Girt Properties: C7x9.8 flat, C6x8.2 vert (forms a "T")

$A_6 := 2.39in^2$ $I_{x6} := 13.1in^4$ $I_{y6} := .687in^4$ $C_{x6} := .512in$ $C_{y6} := 3in$ $L := 27ft$

$A_7 := 2.87in^2$ $I_{x7} := .957in^4$ $I_{y7} := 21.2in^4$ $C_{x7} := 3.5in$ $C_{y7} := .541in$

$A_{girt} := A_6 + A_7 = 5.3 \cdot in^2$

$$C_{ygirt} := \frac{A_6 \cdot C_{y6} + A_7 \cdot (6in + C_{y7})}{A_{girt}} = 4.9 \cdot in$$

$d_1 := C_{ygirt} - C_{y6} = 1.9 \cdot in$ $d_2 := 6in + C_{y7} - C_{ygirt} = 1.6 \cdot in$

$I_6 := I_{x6} + A_6 \cdot d_1^2 = 22 \cdot in^4$ $I_7 := I_{x7} + A_7 \cdot d_2^2 = 8.4 \cdot in^4$ $I_{xgirt} := I_6 + I_7 = 30.4 \cdot in^4$

$I_{ygirt} := I_{y6} + I_{y7} = 21.9 \cdot in^4$ Assumes global axis Y align with both parts

$$r_x := \sqrt{\frac{I_{xgirt}}{A_{girt}}} = 2.4 \cdot in \qquad r_y := \sqrt{\frac{I_{ygirt}}{A_{girt}}} = 2 \cdot in \qquad K := 1.0$$

$E := 29 \cdot 10^3 ksi$ $F_y := 36ksi$

$$\frac{K \cdot L}{r_x} = 134.8 \qquad \frac{K \cdot L}{r_y} = 158.8 \qquad C_c := \sqrt{\frac{2 \cdot \pi^2 \cdot E}{F_y}} = 126.1$$ < the largest KL/r

$$F_a := \frac{12 \cdot \pi^2 \cdot E}{23 \cdot \left(\frac{K \cdot L}{r_y}\right)^2} \cdot \frac{4}{3} = 7892.2 \cdot psi$$ AISC 9th, (E2-2) short term load increase used

$$BottomGirtCompression := \frac{TotalShear - \frac{Shear_{bottom}}{2}}{2} = 24.2 \cdot kip$$

$$f_{bg} := \frac{BottomGirtCompression}{A_{girt}} = 4604.4 \cdot psi$$

$$\frac{f_{bg}}{F_a} = 58.3 \cdot \%$$ Therefore, existing tank bottom girt OK

Check top girt axial forces:

Girt Properties: C6x8.2 flat & vert (forms a "T")

$A_{6f} := 2.39in^2$ $I_{x6f} := .687in^4$ $I_{y6f} := 13.1in^4$ $C_{x6f} := 3in$ $C_{y6f} := .512in$ $L_{tg} := 22.75ft$

$A_{tgirt} := A_6 + A_{6f} = 4.8 \cdot in^2$

$$C_{ytgirt} := \frac{A_6 \cdot C_{y6} + A_{6f} \cdot (6in + C_{y6f})}{A_{tgirt}} = 4.8 \cdot in$$

$d_{1t} := C_{ytgirt} - C_{y6} = 1.8 \cdot in$ $d_{2t} := 6in + C_{y6f} - C_{ytgirt} = 1.8 \cdot in$

$I_{6t} := I_{x6} + A_6 \cdot d_{1t}^2 = 20.5 \cdot in^4$ $I_{6f} := I_{x6f} + A_{6f} \cdot d_{2t}^2 = 8.1 \cdot in^4$ $I_{xtgirt} := I_6 + I_{6f} = 30.1 \cdot in^4$

$I_{ytgirt} := I_{y6} + I_{y6f} = 13.8 \cdot in^4$ Assumes global axis Y align with both parts

$$r_{tx} := \sqrt{\frac{I_{xtgirt}}{A_{tgirt}}} = 2.5 \cdot in \qquad r_{ty} := \sqrt{\frac{I_{ytgirt}}{A_{tgirt}}} = 1.7 \cdot in \quad K_{tg} := 1.0$$

$$\frac{K_{tg} \cdot L_{tg}}{r_{tx}} = 108.8 \qquad \frac{K_{tg} \cdot L_{tg}}{r_{ty}} = 160.7 \qquad C_c := \sqrt{\frac{2 \cdot \pi^2 \cdot E}{F_y}} = 126.1$$

> KL/rx
< KL/ry

$$F_{atg} := \frac{12 \cdot \pi^2 \cdot E}{23 \cdot \left(\frac{K_{tg} \cdot L_{tg}}{r_{ty}}\right)^2} \cdot \frac{4}{3} = 7705.6 \cdot psi$$ EQ 2-2

$$TopGirtCompression := \frac{TotalShear - Shear_{bottom} - \frac{Shear_{middle}}{2}}{2} = 19.5 \cdot kip$$

$$f_{tg} := \frac{TopGirtCompression}{A_{tgirt}} = 4081.4 \cdot psi$$

$\frac{f_{tg}}{F_{atg}} = 53 \cdot \%$ Therefore, existing tank top girt OK

ATLANTIS GROUP
1340 Centre Street
Suite 212
Newton, MA 02459

Check increase in tower leg loading:

$$LoadIncrease := \frac{AddShear \cdot TankHt}{2 \cdot 34ft} = 16826.2 \cdot lbf$$

$WaterTankVolume := 40000gal$ Calculated from tank geometry

$WaterWeight := 62.4pcf \cdot WaterTankVolume = 333.7 \cdot kip$

$TankWeight := 33.3kip$ Approximately 10% water weight

$TankWind := AntennaWindForce(Tank_{area}, 80mph, Centroid_{tank}, 132.6ft) = 44439.8 \cdot lbf$

$$ODL := \frac{WaterWeight + TankWeight}{4} + \frac{TankWind \cdot Centroid_{tank}}{2 \cdot 34ft} = 132.8 \cdot kip$$

$\frac{LoadIncrease + ODL}{ODL} = 112.7 \cdot \%$ Exceeds 5% allowable increase, therefore, check leg capacity

Legs are C12x20.7 back to back (8 3/16" gap), and plate laced (23" o.c. space)

$K_1 := 0.7$ $L_1 := 37ft$ $I_{x1} := 256.25in^4$ $I_{y1} := 292.94in^4$

$A_1 := 12.1in^2$ Tower leg properties determinded graphically

$r_1 := \sqrt{\frac{I_{x1}}{A_1}}$ $\frac{K_1 \cdot L_1}{r_1} = 67.5$ $C_c = 126.1$ KL/r < Cc, therefore, Use E2-1

$$F_{a1} := \frac{\left[1 - \frac{\left(\frac{K_1 \cdot L_1}{r_1}\right)^2}{2 \cdot C_c^2}\right] \cdot F_y}{\frac{5}{3} + \frac{3 \cdot \frac{K_1 \cdot L_1}{r_1}}{8 \cdot C_c} - \frac{\left(\frac{K_1 \cdot L_1}{r_1}\right)^3}{8 \cdot C_c^3}} = 16683.7 \cdot psi$$

$$f_{a1} := \frac{LoadIncrease + ODL}{A_1} = 12365.4 \cdot psi$$

$\frac{f_{a1}}{F_{a1}} = 74.1 \cdot \%$ Existing tower legs OK

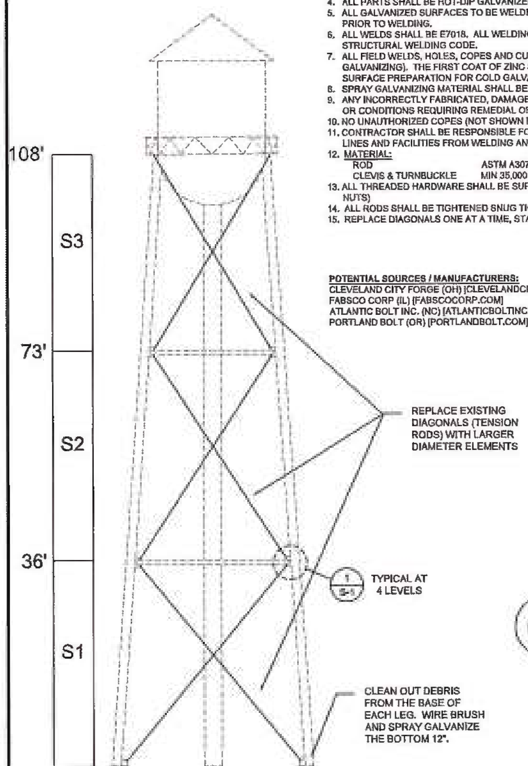
APPENDIX B

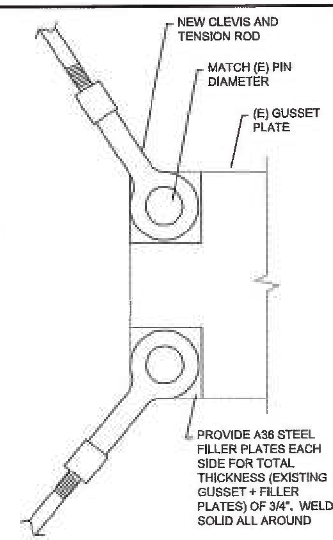
REINFORCEMENT DRAWINGS

CONSTRUCTION NOTES:

1. THE CONTRACTOR COMPLETING THIS WORK SHALL HAVE PRIOR EXPERIENCE WITH THIS LEVEL OF CONSTRUCTION COMPLEXITY.
2. CONTRACTOR SHALL BUDGET A SITE VISIT TO CHECK CRITICAL DIMENSIONS PRIOR TO MATERIAL ORDERING AND FABRICATION.
3. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING ENGINEER (ATLANTIS GROUP) OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
4. ALL PARTS SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION TO ASTM A123 SPECIFICATIONS.
5. ALL GALVANIZED SURFACES TO BE WELDED SHALL BE GROUND CLEAN OF ZINC AND PAINT PRIOR TO WELDING.
6. ALL WELDS SHALL BE E7018. ALL WELDING SHALL BE COMPLETED ACCORDING TO AWS D1.1 STRUCTURAL WELDING CODE.
7. ALL FIELD WELDS, HOLES, COPES AND CUT ENDS SHALL BE PROTECTED WITH 2 COATS OF ZINC-RICH PAINT (COLD GALVANIZING). THE FIRST COAT OF ZINC SHALL BE DRY PRIOR TO APPLYING SECOND COAT. SURFACE PREPARATION FOR COLD GALVANIZING SHALL BE PER ASTM A780 SPECIFICATIONS.
8. SPRAY GALVANIZING MATERIAL SHALL BE ZINGA PRODUCT OR EQUIVALENT.
9. ANY INCORRECTLY FABRICATED, DAMAGED, OR OTHERWISE MISFITTING OR NONCONFORMING MATERIALS OR CONDITIONS REQUIRING REMEDIAL OR CORRECTIVE ACTION SHALL REQUIRE ENGINEER'S REVIEW.
10. NO UNAUTHORIZED COPES (NOT SHOWN IN DRAWINGS) ARE PERMITTED. PLEASE CONTACT ATLANTIS GROUP FOR GUIDANCE.
11. CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS & METHODS AS WELL AS PROTECTING EXISTING LINES AND FACILITIES FROM WELDING AND CONSTRUCTION DAMAGE.
12. MATERIAL:
    ROD — ASTM A307
    CLEVIS & TURNBUCKLE — MIN 35,000 LB ASD RATING
13. ALL THREADED HARDWARE SHALL BE SUPPLIED WITH NUTS AND A MECHANICAL NUT LOCKING DEVICE (EX: ANCO NUTS, PAL NUTS)
14. ALL RODS SHALL BE TIGHTENED SNUG TIGHT.
15. REPLACE DIAGONALS ONE AT A TIME, STARTING AT THE BOTTOM AND WORKING UP.

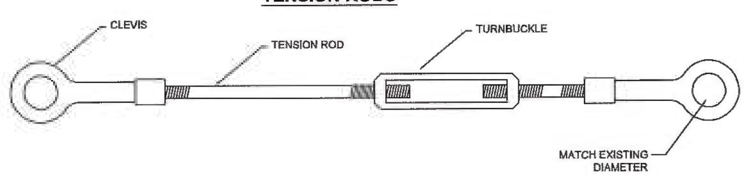
POTENTIAL SOURCES / MANUFACTURERS:
CLEVELAND CITY FORGE (OH) [CLEVELANDCITYFORGE.COM]
FABSCO CORP (IL) [FABSCOCORP.COM]
ATLANTIC BOLT INC. (NC) [ATLANTICBOLTINC.COM]
PORTLAND BOLT (OR) [PORTLANDBOLT.COM]





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

TENSION RODS



ROD REPLACEMENT SCHEDULE:

SECTION	ROD LENGTH*	TOTAL LENGTH*	ROD SIZE	CLEVIS SIZE	TURNBUCKLE SIZE	QTY
S3	40'-0"	320'	1 1/8"	#4 1" GRIP	1 1/8"	8 KITS
S2	42'-6"	340'	1 3/8"	#4 1" GRIP	1 3/8"	8 KITS
S1	44'-6"	356'	1 3/8"	#4 1" GRIP	1 3/8"	8 KITS

* LENGTH ESTIMATES. VERIFY IN THE FIELD.

PREPARED FOR:
metroPCS

ENGINEER'S APPROVAL:
STATE OF CONNECTICUT — LICENSED PROFESSIONAL ENGINEER
7/7/2014

ATLANTIS GROUP

1340 CENTRE STREET, SUITE 212
NEWTON, MA 02459
PHONE: (617) 965-0789
FAX: (617) 213-5056

NO.	DATE	ISSUE DESCRIPTION	BY/CHK
1	7/7/14	INITIAL RELEASE	AB / DA

SITE INFO
UNISON E WINDSOR WT
50 PLANTATION ROAD
EAST WINDSOR, CT

SHEET SCALE / UNITS
NTS — ALL DIMENSIONS IN INCHES UNLESS NOTED OTHERWISE

SHEET TITLE
WT REINFORCEMENT

SHEET NUMBER
S-1

PROJECT NUMBER
CTHA535A

EXHIBIT C

EBI Consulting

environmental | engineering | due diligence

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

Metro MobilePCS Existing Facility

Site ID: CTHA535A

Unison Windsor Water Tank
50 Plantation Road
East Windsor, CT 06016

July 16, 2014

EBI Project Number: 62143674

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

EBI Consulting

environmental | engineering | due diligence

July 16, 2014

Metro MobilePCS USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Re: Emissions Values for Site: **CTHA535A– Unison Windsor Water Tank**

EBI Consulting was directed to analyze the proposed Metro MobilePCS facility located at 50 Plantation Road, East Windsor, CT, for the purpose of determining whether the emissions from the Proposed Metro MobilePCS Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of μW/cm2 calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter (μW/cm2). The general population exposure limit for the cellular band is 567 μW/cm2, and the general population exposure limit for the PCS and AWS bands is 1000 μW/cm2. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed Metro MobilePCS Wireless antenna facility located at 50 Plantation Road, East Windsor, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since Metro MobilePCS is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, the actual antenna pattern gain value in the direction of the sample area was used. For this report the sample point is a 6 foot person standing at the base of the tower

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

1) 2 GSM channels (1935.000 MHz—to 1945.000 MHz) were considered for each sector of the proposed installation.
2) 2 UMTS channels (2110.000 MHz to 2120.000 MHz / 2140.000 MHz to 2145.000 MHz) were considered for each sector of the proposed installation.
3) 2 LTE channels (2110.000 MHz to 2120.000 MHz / 2140.000 MHz to 2145.000 MHz) were considered for each sector of the proposed installation.
4) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
5) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
6) The antenna used in this modeling is the Ericsson AIR21 for LTE, UMTS and GSM. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna has a 15.6 dBd gain value at its main lobe. Actual antenna gain values were used for all calculations as per the manufacturers specifications.

7) The antenna mounting height centerline of the proposed antennas is **120 feet** above ground level (AGL).
8) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

Site ID	CTHA535A - Unison Windsor Water Tank
Site Addresss	50 Plantation Road, East Windsor, CT 06016
Site Type	Water Tank

Sector 1

Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B4A/B2P	Active	AWS - 2100 MHz	LTE	60	2	120	-3.95	120	114	None	0	0	48.326044	1.336834	0.13368%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-			0	-3.95	120	114	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	120	114	1-5/8"	0	0	24.163022	0.668417	0.06684%
2B	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	1	60	-3.95	120	114	1-5/8"	0	0	24.163022	0.668417	0.06684%
													Sector total Power Density Value:		0.267%		

Sector 2

Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B4A/B2P	Active	AWS - 2100 MHz	LTE	60	2	120	-3.95	120	114	None	0	0	48.326044	1.336834	0.13368%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-			0	-3.95	120	114	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	1	60	-3.95	120	114	1-5/8"	0	0	24.163022	0.668417	0.06684%
2b	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	1	60	-3.95	120	114	1-5/8"	0	0	24.163022	0.668417	0.06684%
													Sector total Power Density Value:		0.267%		

Sector 3

Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B4A/B2P	Active	AWS - 2100 MHz	LTE	60	1	120	-3.95	120	114	None	0	0	48.326044	1.336834	0.13368%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-			0	-3.95	120	114	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	1	60	-3.95	120	114	1-5/8"	0	0	24.163022	0.668417	0.06684%
2b	Ericsson	AIR21 B2A / B4P	Passive	AWS - 2100 MHz	UMTS	30	2	60	-3.95	120	114	1-5/8"	0	0	24.163022	0.668417	0.06684%
													Sector total Power Density Value:		0.267%		

Site Composite MPE %	
Carrier	MPE %
T-Mobile	0.802%
Cingular (AT&T)	11.510%
Clearwire	2.240%
Total Site MPE %	**14.552%**

EBI Consulting
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Summary

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

The anticipated Maximum Composite contributions from the Metro MobilePCS facility are **0.802% (0.267% from each sector)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **14.552%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Scott Heffernan
RF Engineering Director

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