



August 31, 2015

Members of the Siting Council  
Connecticut Siting Council  
Ten Franklin Square  
New Britain, CT 06051

RE: Notice of Exempt Modification  
239 East Middle Turnpike, Manchester CT 06040  
Longitude: 72.51177  
Latitude: 41.78439  
T-Mobile Site#: CT11365D\_L700

Members of the Siting Council:

On behalf of T-Mobile, Northeast Site Solutions (NSS) is submitting an exempt modification application to the Connecticut Siting Council for modification of existing equipment at a tower facility located at 239 East Middle Turnpike, Manchester CT 06040.

The 239 East Middle Turnpike, Manchester CT 06040 facility consists of a 183' Monopole Tower owned and operated by Town of Manchester. In order to accommodate technological changes and enhance system performance in the State of Connecticut, T-Mobile 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, a copy of this letter and attachments is being sent to the chief elected official of the municipality in which the affected cell site is located.

As part of T-Mobile's L700 Project, T-Mobile desires to upgrade their equipment to meet the new standards of 4G technology. The new equipment will allow customers to download files and browse the internet at a high rate of speed while also allowing their phones to be compatible with the latest 4G technology.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in T-Mobile's operations at the site along with the required fee of \$625.



**NSS** **NORTHEAST**  
SITE SOLUTIONS

*Turnkey Wireless Development*

The changes to the facility do not constitute modifications as defined in Connecticut General Statutes 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 overall height of the structure will be unaffected.
2. The proposed changes will not extend the site boundaries. There will be no effect on the site compound.
3. The proposed changes will not increase the noise level at the existing facility by six decibels or more.
4. The changes in radio frequency power density will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site.

For the foregoing reasons, Northeast Site Solutions (NSS) on behalf of T-Mobile, 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 860.209.4690 with any questions you may have concerning this matter.

Sincerely,

**Denise Sabo**

**Mobile:** 860-209-4690

**Fax:** 413-521-0558

**Office:** 199 Brickyard Rd, Farmington, CT 06032

**Email:** [denise@northeastsitesolutions.com](mailto:denise@northeastsitesolutions.com)

cc: Town of Manchester



T-MOBILE USA, INC.  
 12920 SE 38TH STREET  
 BELLEVUE, WA 98006  
 (425) 378-4000

3160500  
 8/13/2015  
 2000011160

| Invoice Number | Inv. Date | Description                    | Deductions | Voucher    | Amount Paid |
|----------------|-----------|--------------------------------|------------|------------|-------------|
| CKKMB00427     | 8/10/2015 | SR CT11365D SITING COUNCIL FIL | 0.00       | 1101442227 | 625.00      |

DO NOT ACCEPT THIS CHECK UNLESS THE FACE FADES FROM BLACK TO RED WITH LOGO IN BACKGROUND. THE BACK OF THIS DOCUMENT HAS HEAT-SENSITIVE INK THAT CHANGES FROM ORANGE TO YELLOW



T-MOBILE USA, INC.  
 12920 SE 38th Street  
 Bellevue, WA 98006  
 (425) 378-4000

The Bank of New York Mellon  
 Pittsburgh, PA  
 60-160/433

3160500  
 8/13/2015  
 VID 2000011160

PAY **\$625.00**  
SIX TWO FIVE DOLLARS AND NO CENTS

**\*\$625.00**

\*\*\*Six Hundred Twenty Five Dollars Only\*\*\*

To The Order Of **CONNECTICUT SITING COUNCIL**  
 10 FRANKLIN SQ  
 NEW BRITAIN, CT 06051

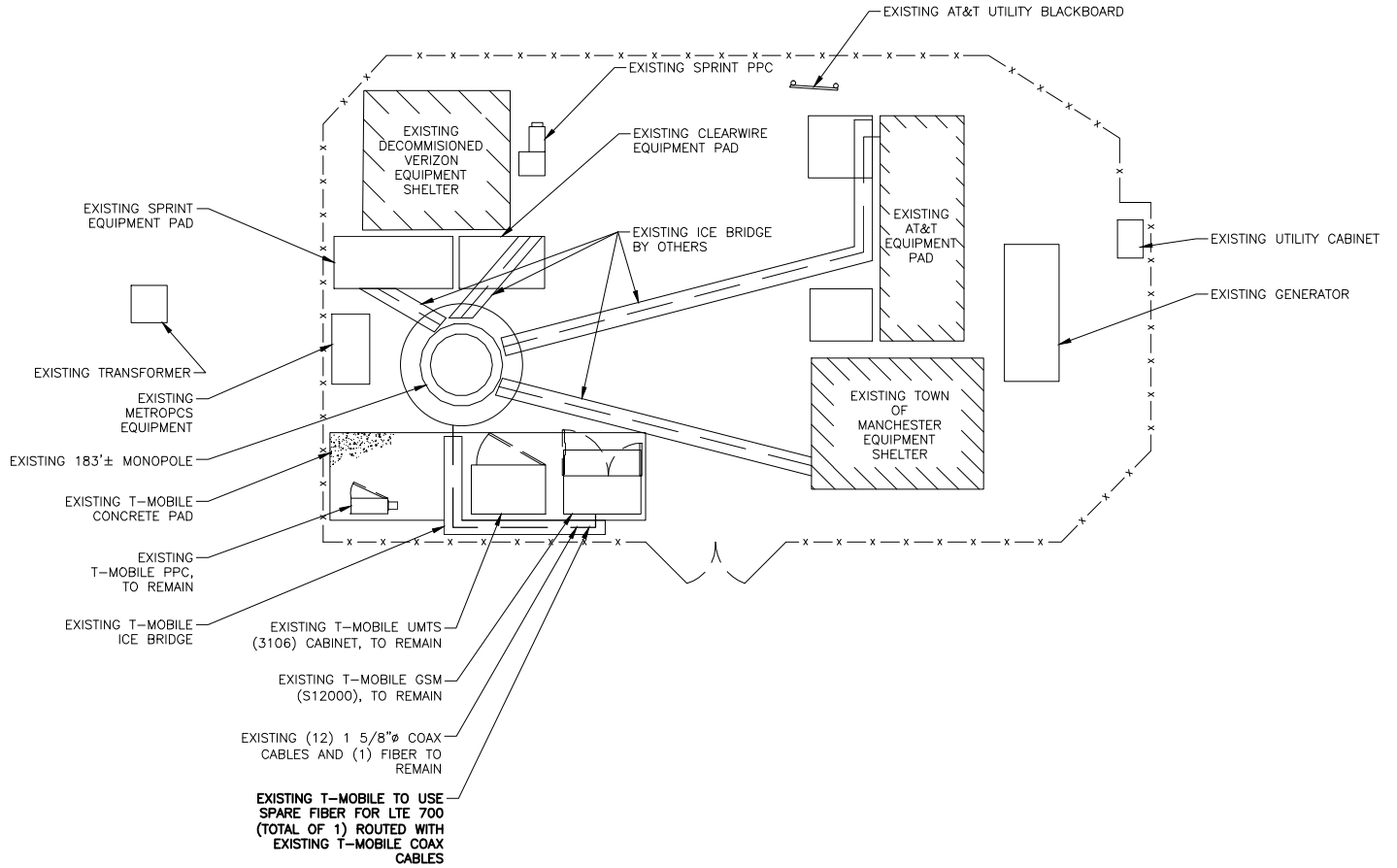
VOID AFTER 180 DAYS  
 THIS CHECK CLEARS THROUGH POSITIVE PAY

*David [Signature]*

⑈0003 160500⑈ ⑆043301601⑆ 013⑈8430⑈

THE ORIGINAL DOCUMENT HAS A REFLECTIVE WATERMARK ON THE BACK. HOLD AT AN ANGLE TO VIEW, DO NOT CASH IF MISSING.

# Exhibit A



CONFIGURATION  
**702CU**



APPROX. NORTH

**NOTE:**  
 ALL EQUIPMENT LOCATIONS ARE APPROXIMATE AND ARE SUBJECT TO APPROVAL BY LESSEE/LICENSEE STRUCTURAL AND RF ENGINEERS.

**SITE PLAN**

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

PREPARED BY:  
  
 21 B Street | Burlington, MA 01803  
 Tel: (781) 273-2500 | Fax: (781) 273-3311  
 www.ebiconsulting.com  
 EBI JOB NO.:  
 8114000813

CLIENT:  
 T-Mobile Northeast, LLC  
 35 GRIFFIN ROAD SOUTH  
 BLOOMFIELD, CT 06002  
 860.692.7100

SITE INFO:  
 CT11365D  
 CT365/MANCHESTER  
 PD\_MP  
 239 E. MIDDLE TURNPIKE,  
 MANCHESTER, CT. 06040

| SUBMITTALS |          |                       |    |
|------------|----------|-----------------------|----|
| NO.        | DATE     | DESCRIPTION           | BY |
| A          | 08/05/14 | FOR REVIEW            | SH |
| B          | 08/13/15 | REVISED PER COMMENTS  | LF |
| 3          | 09/01/15 | REVISED CONFIGURATION | SS |

DRAWN BY: SH  
 CHECKED BY: PM  
 DATE: 07/30/14

SHEET NO:  
**LE-1**



# Exhibit B

(Revised)  
**STRUCTURAL ANALYSIS REPORT**

For

**CT43XC827**  
**MANCHESTER/POLICE TOWER**

239 Middle Turnpike  
Manchester, CT 06040

**Antennas Mounted to the Monopole**



Prepared for:

**Sprint**<sup>®</sup>  
VISION

1 INTERNATIONAL BLVD, SUITE 800  
MAHWAH, NJ 07495  
TEL: (201) 684-4223

Dated: August 4, 2015

Prepared by:

**Hudson**  
Design Group LLC



1600 Osgood Street Bldg. 20N Suite 3090  
North Andover, MA 01845  
(P) 978.557.5553 (F) 978.336.5586  
[www.hudsondesigngroupllc.com](http://www.hudsondesigngroupllc.com)



*Gi Kai Wang 8/4/2015*





## SCOPE OF WORK:

Hudson Design Group LLC (HDG) has been authorized by T-Mobile to conduct a structural evaluation of the 183' monopole supporting the existing and proposed T-Mobile's antennas located at elevation 163' above the ground level.

This report represents this office's findings, conclusions and recommendations pertaining to the support of T-Mobile's existing and proposed antennas listed below.

Record drawings of the existing monopole prepared by Engineered Endeavors Inc., dated September 17, 2002, were available for our use. The previous structural analysis report prepared by Ramaker & Associates, Inc., dated November 26, 2012, was available and obtained for our use. The previous structural analysis report prepared by Destek Engineering, LLC, dated October 14, 2014, was also available and obtained for our use.

Structural analysis with monopole modification report prepared by this office, dated April 10, 2015, was used for monopole analysis.

## CONCLUSION SUMMARY:

HDG performed structural analysis of the existing monopole with the following proposed modification:

**Add steel reinforcing plates to the existing monopole from El.88' to El.118'.**

Based on our evaluation, we have determined that the existing monopole with the proposed modification and foundation **are in conformance** with the ANSI/TIA-222-F Standard for the loading considered under the criteria listed in this report. The monopole structure is rated at **96.0%** - (Pole section L5 from EL.43.9' to EL.88.0' Controlling).



**APPURTANENCES CONFIGURATION:**

| Tenant          | Appurtenances                      | Elev. | Mount                  |
|-----------------|------------------------------------|-------|------------------------|
|                 | Lighting Rod                       | 194'  | Low Profile Platform   |
|                 | (2) 20' Dipole                     | 184'  | Low Profile Platform   |
| <b>T-MOBILE</b> | <b>(3) AIR 21 B2A B4P Antennas</b> | 163'  | Low Profile Platform   |
| <b>T-MOBILE</b> | <b>(3) AIR 21 B4A B2P Antennas</b> | 163'  | Low Profile Platform   |
| <b>T-MOBILE</b> | <b>(3) ATMAP1412D TMA</b>          | 163'  | Low Profile Platform   |
| <b>T-MOBILE</b> | <b>(3) LNX-6515DS-VTM Antennas</b> | 163'  | Low Profile Platform   |
| <b>T-MOBILE</b> | <b>(3) RRUS 11</b>                 | 163'  | Low Profile Platform   |
| Sprint          | (3) APXVSP18 Antennas              | 153'  | Low Profile Platform   |
| Sprint          | (3) RRH-800                        | 153'  | Low Profile Platform   |
| Sprint          | (6) RRH-1900                       | 153'  | Low Profile Platform   |
| Sprint          | (3) APXVTM14-C-120 Antennas        | 153'  | Low Profile Platform   |
| Sprint          | (3) RRH8x20-25                     | 151'  | Ring Mount             |
|                 | (3) 840-10054 Antennas             | 153'  | Low Profile Platform   |
|                 | (3) 860-10025 RCU                  | 153'  | Low Profile Platform   |
|                 | Panel Antenna                      | 153'  | Low Profile Platform   |
|                 | (2) 2' Dishes                      | 150'  | Low Profile Platform   |
|                 | 2.5' Dish                          | 150'  | Low Profile Platform   |
| AT&T            | (3) 800-10121 Antennas             | 143'  | Low Profile Platform   |
| AT&T            | (2) OPA-65R-LCUU-H6 Antennas       | 143'  | Low Profile Platform   |
| AT&T            | (4) OPA-65R-LCUU-H8 Antennas       | 143'  | Low Profile Platform   |
| AT&T            | (12) RRUs                          | 143'  | Low Profile Platform   |
| AT&T            | (3) A2 Modules                     | 143'  | Low Profile Platform   |
| AT&T            | (2) Surge Arrestors                | 143'  | Low Profile Platform   |
|                 | (2) 20' Omni                       | 129'  | Low Profile Platform   |
|                 | 20' Dipole                         | 126'  | Low Profile Platform   |
|                 | (2) 3' Yagi                        | 126'  | Low Profile Platform   |
| VERIZON         | (6) LNX 6514DS-VTM Antennas        | 110'  | Low Profile Platform   |
| VERIZON         | (6) HBX 6517DS-VTM Antennas        | 110'  | Low Profile Platform   |
| VERIZON         | (3) RRH 2X40-AWS                   | 110'  | Low Profile Platform   |
| VERIZON         | (3) RRH 2X40-07U                   | 110'  | Low Profile Platform   |
| VERIZON         | (3) RRH 2X40-PCS                   | 110'  | Low Profile Platform   |
| VERIZON         | (2) DB-T1-6Z-8AB-0Z                | 110'  | Low Profile Platform   |
|                 | GPS                                | 54'   | 1' Side Mount Standoff |
| POLICE          | (4) VHLPX2-18 Dish                 | 38.9' | 1' Side Mount Standoff |

**\*Proposed T-Mobile Appurtenances shown in Bold.**



**T-MOBILE EXISTING/PROPOSED COAX CABLES:**

| Tenant          | Coax Cables            | Elev. | Mount           |
|-----------------|------------------------|-------|-----------------|
| <b>T-MOBILE</b> | (12) 1 5/8" Cables     | 163'  | Inside Monopole |
| <b>T-MOBILE</b> | (1) 1-5/8" Fiber Cable | 163'  | Inside Monopole |
|                 |                        |       |                 |

*\*Proposed T-Mobile Coax Cables shown in Bold.*

**ANALYSIS RESULTS SUMMARY:**

| Component              | Max. Stress Ratio | Elev. of Component (ft) | Pass/Fail | Comments           |
|------------------------|-------------------|-------------------------|-----------|--------------------|
| <b>Pole Section-L1</b> | 13.9 %            | 166.5 – 184.0           | PASS      |                    |
| <b>Pole Section-L2</b> | 70.7 %            | 133.1 – 166.5           | PASS      |                    |
| <b>Pole Section-L3</b> | 81.2 %            | 113.0 – 133.1           | PASS      |                    |
| <b>Pole Section-L4</b> | 91.1 %            | 88.0 – 113.0            | PASS      |                    |
| <b>Pole Section-L5</b> | <b>96.0 %</b>     | 43.9 – 88.0             | PASS      | <b>Controlling</b> |
| <b>Pole Section-L6</b> | 92.2 %            | 1.0 – 43.9              | PASS      |                    |
| <b>Base Plate</b>      | 87.3 %            | 1.0                     | PASS      |                    |



### **DESIGN CRITERIA:**

1. EIA/TIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures

County: Hartford  
Wind Load: 80 mph (fastest mile)  
100 mph (3 second gust)  
Nominal Ice Thickness: 1/2 inch

2. Approximate height above grade to proposed antennas: 163'-0"

**\*Calculations and referenced documents are attached.**

### **ASSUMPTIONS:**

1. The monopole dimensions, member sizes and strength of material are as indicated in the record drawings prepared by Engineered Endeavors Inc., dated September 17, 2002.
2. The appurtenances configuration is as stated in this report. All antennas, coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer's requirements.
3. The monopole and foundation are properly constructed and maintained. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities.
4. The support mounts and platforms are not analyzed and are considered adequate to support the loading. The analysis is limited to the primary support structure itself.
5. All prior structural modification, if any, are assumed to be as per the data supplied (if available), and installed properly.



### **SUPPORT RECOMMENDATIONS:**

HDG recommends that the proposed antennas and RRHs be mounted on the existing steel platform supported by the monopole.

Reference HDG's Latest Construction Drawings for all component and connection requirements (attached).

### **ONGOING AND PERIODIC INSPECTION AND MAINTENANCE:**

After the Contractor has successfully completed the installation and the work has been accepted, the Owner will be responsible for the ongoing and periodic inspection and maintenance of the tower.

The owner shall refer to TIA/EIA-222-F 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. It is recommended that a complete and thorough inspection of the entire tower structural system be performed at least yearly and more frequently as conditions warrant. According to TIA/EIA-222-F 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.



**Photo 1:** Photo illustrating the Monopole with Appurtenances shown.



**CALCULATIONS**

## DESIGNED APPURTENANCE LOADING

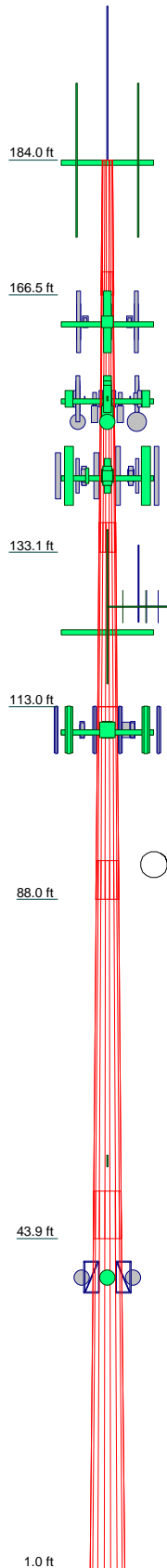
| TYPE   | ELEVATION | TYPE  | ELEVATION |
|--|-----------|---|-----------|
| Lightning Rod 2"x21'                                 | 184       | PIROD 13' Low Profile Platform (ATI)                | 143       |
| PIROD 13' Low Profile Platform                       | 184       | Kathrein 800 10121 w/mount pipe                     | 143       |
| 20'-4 Bay Dipole                                     | 184       | Kathrein 800 10121 w/mount pipe                     | 143       |
| 20'-4 Bay Dipole                                     | 184       | Kathrein 800 10121 w/mount pipe                     | 143       |
| PIROD 13' Low Profile Platform (T-Mobile - Existing) | 163       | Ericsson RRUS-11                                    | 143       |
| ERICSSON AIR 21 B2A B4P w/ Mount Pipe                | 163       | Ericsson RRUS-11                                    | 143       |
| ERICSSON AIR 21 B2A B4P w/ Mount Pipe                | 163       | Ericsson RRUS-11                                    | 143       |
| ERICSSON AIR 21 B2A B4P w/ Mount Pipe                | 163       | DC6-48-60-18-8F                                     | 143       |
| ERICSSON AIR 21 B2A B4P w/ Mount Pipe                | 163       | (2) OPA-65R-LCUU-H6 w/mount pipe                    | 143       |
| ERICSSON AIR 21 B2A B4P w/ Mount Pipe                | 163       | (2) OPA-65R-LCUU-H8 w/mount pipe                    | 143       |
| RFS ATMAP1412D-1A20                                  | 163       | (2) OPA-65R-LCUU-H8 w/mount pipe                    | 143       |
| RFS ATMAP1412D-1A20                                  | 163       | Ericsson RRUS-12                                    | 143       |
| RFS ATMAP1412D-1A20                                  | 163       | Ericsson RRUS-12                                    | 143       |
| ERICSSON AIR 21 B4A B2P w/ Mount Pipe                | 163       | Ericsson RRUS-12                                    | 143       |
| ERICSSON AIR 21 B4A B2P w/ Mount Pipe                | 163       | Ericsson RRUS-32                                    | 143       |
| ERICSSON AIR 21 B4A B2P w/ Mount Pipe                | 163       | Ericsson RRUS-32                                    | 143       |
| ERICSSON AIR 21 B4A B2P w/ Mount Pipe                | 163       | Ericsson RRUS-32                                    | 143       |
| ERICSSON AIR 21 B4A B2P w/ Mount Pipe                | 163       | Ericsson RRUS-E2                                    | 143       |
| ERICSSON AIR 21 B4A B2P w/ Mount Pipe                | 163       | Ericsson RRUS-E2                                    | 143       |
| ERICSSON AIR 21 B4A B2P w/ Mount Pipe                | 163       | Ericsson RRUS-E2                                    | 143       |
| LNx-6515DS-VTM w/ Mount Pipe (T-Mobile - Proposed)   | 163       | Ericsson A2 Module                                  | 143       |
| LNx-6515DS-VTM w/ Mount Pipe                         | 163       | Ericsson A2 Module                                  | 143       |
| LNx-6515DS-VTM w/ Mount Pipe                         | 163       | Ericsson A2 Module                                  | 143       |
| Ericsson RRUS 11                                     | 163       | Surge Arrestor (DC6-48-60-18-8F)                    | 143       |
| Ericsson RRUS 11                                     | 163       | 20'-4 Bay Dipole                                    | 123       |
| Ericsson RRUS 11                                     | 163       | 3' Yagi antenna                                     | 123       |
| PIROD 13' Low Profile Platform (SPRINT)              | 153       | 3' Yagi antenna                                     | 123       |
| APXVSP18-C w/mount pipe                              | 153       | PIROD 13' Low Profile Platform                      | 123       |
| APXVSP18-C w/mount pipe                              | 153       | Omni 2"x10'   | 123       |
| APXVSP18-C w/mount pipe                              | 153       | Omni 2"x10'   | 123       |
| (2) RRH-1900   | 153       | (2) LNx 6514DS-VTM w/mount pipe                     | 110       |
| (2) RRH-1900   | 153       | (2) LNx 6514DS-VTM w/mount pipe                     | 110       |
| (2) RRH-1900   | 153       | (2) LNx 6514DS-VTM w/mount pipe                     | 110       |
| RRH-800  | 153       | (2) HBx-6517DS-VTM w/mount pipe                     | 110       |
| RRH-800  | 153       | (2) HBx-6517DS-VTM w/mount pipe                     | 110       |
| RRH-800  | 153       | (2) HBx-6517DS-VTM w/mount pipe                     | 110       |
| APXVTM14-C-120 w/mount pipe (SPRINT)                 | 153       | RRH 2X40-AWS+RDEM                                   | 110       |
| APXVTM14-C-120 w/mount pipe                          | 153       | RRH 2X40-AWS+RDEM                                   | 110       |
| APXVTM14-C-120 w/mount pipe                          | 153       | RRH 2X40-07U  | 110       |
| 840-10054 w/mount pipe                               | 153       | RRH 2X40-07U  | 110       |
| 840-10054 w/mount pipe                               | 153       | RRH 2X40-07U  | 110       |
| 840-10054 w/mount pipe                               | 153       | RRH 2X40-PCS  | 110       |
| Kathrein 860 10025 RCU                               | 153       | RRH 2X40-PCS  | 110       |
| Kathrein 860 10025 RCU                               | 153       | RRH 2X40-PCS  | 110       |
| Panel Antenna 18"X18"                                | 153       | RFS DB-T1-6Z-8AB-0Z                                 | 110       |
| Ring Mount   | 151       | RFS DB-T1-6Z-8AB-0Z                                 | 110       |
| RRH 8x20-25  | 151       | PIROD 13' Low Profile Platform (Verizon - proposed) | 110       |
| RRH 8x20-25  | 151       | GPS   | 54        |
| RRH 8x20-25  | 151       | 1' Side Mount Standoff                              | 54        |
| Andrew VHLP2-11                                      | 150       | 1' Side Mount Standoff                              | 38.9      |
| Andrew VHLP2-11                                      | 150       | 1' Side Mount Standoff                              | 38.9      |
| Andrew VHLP2-11                                      | 150       | Andrew VHLPX2-18-2WH/B                              | 38.9      |
| Andrew VHLP2-11                                      | 150       | Andrew VHLPX2-18-2WH/B                              | 38.9      |
|  |           | (2) Andrew VHLPX2-18-2WH/B                          | 38.9      |

### MATERIAL STRENGTH

| GRADE   | Fy     | Fu     | GRADE | Fy | Fu |
|---------|--------|--------|-------|----|----|
| A572-65 | 65 ksi | 80 ksi |       |    |    |

### TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80.0 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 69.3 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50.0 mph wind.



| Section | Length (ft) | Number of Sides | Thickness (in) | Socket Length (ft) | Top Dia (in) | Bot Dia (in) | Grade   | Weight (lb) |
|---------|-------------|-----------------|----------------|--------------------|--------------|--------------|---------|-------------|
| 1       | 17.50       | 18              | 0.1875         | 3.00               | 15.5000      | 19.3990      | A572-65 | 611.7       |
| 2       | 36.42       | 18              | 0.2500         | 3.83               | 18.3556      | 26.4010      | A572-65 | 2176.1      |
| 3       | 23.92       | 18              | 0.3750         | 5.00               | 25.0549      | 30.2850      | A572-65 | 2644.3      |
| 4       | 25.00       | 18              | 0.4150         | 5.00               | 30.2850      | 35.8920      | A572-65 | 3661.2      |
| 5       | 49.08       | 18              | 0.4850         | 6.17               | 33.9406      | 44.9030      | A572-65 | 10010.3     |
| 6       | 49.08       | 18              | 0.5400         | 6.17               | 42.5549      | 53.5000      | A572-65 | 13593.1     |
|         |             |                 |                |                    |              |              |         | 32696.8     |

**Hudson Design Group LLC**  
 1600 Osgood Street Bldg. 20N Suite 3090  
 North Andover, MA 01845  
 Phone: (978) 557-5553  
 FAX: (978) 336-5586

**Job: CT43XC827 MANCHESTER POLICE TOWER**

Project: **183 ft Monopole**

|                     |                |             |
|---------------------|----------------|-------------|
| Client: SPRINT      | Drawn by: kw   | App'd:      |
| Code: TIA/EIA-222-F | Date: 08/04/15 | Scale: NTS  |
| Path:               |                | Dwg No. E-1 |

C:\Users\kwp\Documents\HUDSON DESIGN GROUP\AA\CT43XC827\_MP\_183ft\8-2015\CT43XC827\_8-2015\CT43XC827\_Mid\_8-2015.dwg





**Hudson Design Group LLC**  
 1600 Osgood Street Bldg. 20N Suite 3090  
 North Andover, MA 01845  
 Phone: (978) 557-5553  
 FAX: (978) 336-5586

|                |                                   |                    |                   |
|----------------|-----------------------------------|--------------------|-------------------|
| <b>Job</b>     | CT43XC827 MANCHESTER POLICE TOWER | <b>Page</b>        | 1 of 12           |
| <b>Project</b> | 183 ft Monopole                   | <b>Date</b>        | 09:03:12 08/04/15 |
| <b>Client</b>  | SPRINT                            | <b>Designed by</b> | kw                |

## Tower Input Data

There is a pole section.

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

The following design criteria apply:

Tower is located in Hartford County, Connecticut.

Basic wind speed of 80.0 mph.

Nominal ice thickness of 0.5000 in.

Ice density of 56.0 pcf.

A wind speed of 69.3 mph is used in combination with ice.

Temperature drop of 50.0 °F.

Deflections calculated using a wind speed of 50.0 mph.

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

Pressures are calculated at each section.

Stress ratio used in pole design is 1.333.

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

## Tapered Pole Section Geometry

| Section | Elevation<br>ft | Section<br>Length<br>ft | Splice<br>Length<br>ft | Number<br>of<br>Sides | Top<br>Diameter<br>in | Bottom<br>Diameter<br>in | Wall<br>Thickness<br>in | Bend<br>Radius<br>in | Pole Grade          |
|---------|-----------------|-------------------------|------------------------|-----------------------|-----------------------|--------------------------|-------------------------|----------------------|---------------------|
| L1      | 184.00-166.50   | 17.50                   | 3.00                   | 18                    | 15.5000               | 19.3990                  | 0.1875                  | 0.7500               | A572-65<br>(65 ksi) |
| L2      | 166.50-133.08   | 36.42                   | 3.83                   | 18                    | 18.3556               | 26.4010                  | 0.2500                  | 1.0000               | A572-65<br>(65 ksi) |
| L3      | 133.08-112.99   | 23.92                   | 0.00                   | 18                    | 25.0549               | 30.2850                  | 0.3750                  | 1.5000               | A572-65<br>(65 ksi) |
| L4      | 112.99-87.99    | 25.00                   | 5.00                   | 18                    | 30.2850               | 35.8920                  | 0.4150                  | 1.6600               | A572-65<br>(65 ksi) |
| L5      | 87.99-43.91     | 49.08                   | 6.17                   | 18                    | 33.9406               | 44.9030                  | 0.4850                  | 1.9400               | A572-65<br>(65 ksi) |
| L6      | 43.91-1.00      | 49.08                   |                        | 18                    | 42.5549               | 53.5000                  | 0.5400                  | 2.1600               | A572-65<br>(65 ksi) |

## Monopole Base Plate Data

### Base Plate Data

|                       |            |
|-----------------------|------------|
| Base plate is square  |            |
| Base plate is grouted | √          |
| Anchor bolt grade     | A615-75    |
| Anchor bolt size      | 2.2500 in  |
| Number of bolts       | 18         |
| Embedment length      | 84.0000 in |
| $f_c$                 | 4.0 ksi    |
| Grout space           | 4.0000 in  |
| Base plate grade      | A572-60    |
| Base plate thickness  | 2.0000 in  |
| Bolt circle diameter  | 62.0000 in |
| Outer diameter        | 68.0000 in |



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|----------------|-----------------------------------|--------------------|-------------------|
| <b>Job</b>     | CT43XC827 MANCHESTER POLICE TOWER | <b>Page</b>        | 2 of 12           |
| <b>Project</b> | 183 ft Monopole                   | <b>Date</b>        | 09:03:12 08/04/15 |
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**Base Plate Data**

|                     |                 |
|---------------------|-----------------|
| Inner diameter      | 43.0000 in      |
| Base plate type     | Stiffened Plate |
| Bolts per stiffener | 1               |
| Stiffener thickness | 0.5000 in       |
| Stiffener height    | 9.0000 in       |

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

| Description                                | Face or Leg | Allow Shield | Component Type     | Placement<br>ft | Total Number |          | C <sub>A</sub> A <sub>A</sub> |      | Weight |
|--|-------------|--------------|--------------------|-----------------|--------------|----------|-------------------------------|------|--------|
|  |             |              |                    |                 |              |          | ft <sup>2</sup> /ft           | plf  |        |
| 2" Conduit                                 | A           | No           | CaAa (Out Of Face) | 153.00 - 6.00   | 2            | No Ice   | 0.20                          | 2.80 |        |
|  |             |              |                    |                 |              | 1/2" Ice | 0.30                          | 4.33 |        |
| 1/2  | A           | No           | CaAa (Out Of Face) | 153.00 - 6.00   | 3            | No Ice   | 0.06                          | 0.25 |        |
|  |             |              |                    |                 |              | 1/2" Ice | 0.16                          | 0.91 |        |
| 3/8  | A           | No           | Inside Pole        | 153.00 - 6.00   | 3            | No Ice   | 0.00                          | 0.25 |        |
|  |             |              |                    |                 |              | 1/2" Ice | 0.00                          | 0.25 |        |
| 7/8  | B           | No           | Inside Pole        | 184.00 - 6.00   | 4            | No Ice   | 0.00                          | 0.54 |        |
|  |             |              |                    |                 |              | 1/2" Ice | 0.00                          | 0.54 |        |
| 1 5/8<br>(T-MOBILE)                        | B           | No           | Inside Pole        | 163.00 - 6.00   | 12           | No Ice   | 0.00                          | 1.04 |        |
|  |             |              |                    |                 |              | 1/2" Ice | 0.00                          | 1.04 |        |
| 1 5/8 Fiber Cable<br>(T-MOBILE)            | B           | No           | Inside Pole        | 163.00 - 6.00   | 9            | No Ice   | 0.00                          | 1.04 |        |
|  |             |              |                    |                 |              | 1/2" Ice | 0.00                          | 1.04 |        |
| 1 5/8 Fiber Cable<br>(T-MOBILE - proposed) | B           | No           | Inside Pole        | 163.00 - 6.00   | 6            | No Ice   | 0.00                          | 1.04 |        |
|  |             |              |                    |                 |              | 1/2" Ice | 0.00                          | 1.04 |        |
| 1 1/4<br>(SPRINT)                          | B           | No           | Inside Pole        | 153.00 - 6.00   | 3            | No Ice   | 0.00                          | 0.66 |        |
|  |             |              |                    |                 |              | 1/2" Ice | 0.00                          | 0.66 |        |
| 1 5/8<br>(AT&T)                            | B           | No           | Inside Pole        | 143.00 - 6.00   | 6            | No Ice   | 0.00                          | 1.04 |        |
|  |             |              |                    |                 |              | 1/2" Ice | 0.00                          | 1.04 |        |
| FB-L98B-002<br>(AT&T)                      | B           | No           | Inside Pole        | 143.00 - 6.00   | 3            | No Ice   | 0.00                          | 0.25 |        |
|  |             |              |                    |                 |              | 1/2" Ice | 0.00                          | 0.25 |        |
| WR-VG122ST-BRDA<br>(AT&T)                  | B           | No           | Inside Pole        | 143.00 - 6.00   | 6            | No Ice   | 0.00                          | 0.25 |        |
|  |             |              |                    |                 |              | 1/2" Ice | 0.00                          | 0.25 |        |
| 1/2  | B           | No           | Inside Pole        | 123.00 - 6.00   | 5            | No Ice   | 0.00                          | 0.25 |        |
|  |             |              |                    |                 |              | 1/2" Ice | 0.00                          | 0.25 |        |
| 1/2  | B           | No           | Inside Pole        | 54.00 - 6.00    | 1            | No Ice   | 0.00                          | 0.25 |        |
|  |             |              |                    |                 |              | 1/2" Ice | 0.00                          | 0.25 |        |
| 1/2  | B           | No           | Inside Pole        | 38.90 - 6.00    | 4            | No Ice   | 0.00                          | 0.25 |        |
|  |             |              |                    |                 |              | 1/2" Ice | 0.00                          | 0.25 |        |
| *****                                      |             |              |                    |                 |              |          |                               |      |        |
| 1 5/8 Fiber Cable<br>(VERIZON)             | B           | No           | Inside Pole        | 110.00 - 6.00   | 2            | No Ice   | 0.00                          | 1.04 |        |
|  |             |              |                    |                 |              | 1/2" Ice | 0.00                          | 1.04 |        |

**Discrete Tower Loads**

| Description           | Face or Leg | Offset Type | Offsets:              |            | Azimuth Adjustment | Placement<br>ft | C <sub>A</sub> A <sub>A</sub> |                         | Weight<br>lb |         |
|-----------------------|-------------|-------------|-----------------------|------------|--------------------|-----------------|-------------------------------|-------------------------|--------------|---------|
|                       |             |             | Horz<br>Lateral<br>ft | Vert<br>ft |                    |                 | Front<br>ft <sup>2</sup>      | Side<br>ft <sup>2</sup> |              |         |
| Lightning Rod 2"x21'  | A           | From Leg    | 1.00                  | 0.0000     | 0.0000             | 184.00          | No Ice                        | 4.20                    | 4.20         | 80.00   |
|                       |             |             | 0.00                  |            |                    |                 | 1/2" Ice                      | 6.33                    | 6.33         | 112.30  |
|                       |             |             | 10.00                 |            |                    |                 |                               |                         |              |         |
| PiROD 13' Low Profile | A           | None        |                       | 0.0000     | 0.0000             | 184.00          | No Ice                        | 15.70                   | 15.70        | 1300.00 |



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| <b>Project</b> | 183 ft Monopole                   | <b>Date</b>        | 09:03:12 08/04/15 |
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| Description                           | Face or Leg | Offset Type | Offsets: Horz Lateral Vert<br>ft<br>ft<br>ft | Azimuth Adjustment<br>° | Placement<br>ft | C <sub>AA</sub> Front<br>ft <sup>2</sup>       | C <sub>AA</sub> Side<br>ft <sup>2</sup> | Weight<br>lb              |
|---------------------------------------|-------------|-------------|--|-------------------------|-----------------|--|---|---------------------------|
| Platform                              |             |             |  |                         |                 |  |   |                           |
| 20'-4 Bay Dipole                      | C           | From Face   | 3.50<br>4.00<br>0.00                         | 0.0000                  | 184.00          | 1/2" Ice 20.10<br>No Ice 4.75<br>1/2" Ice 6.25 | 20.10<br>4.75<br>6.25                   | 1765.00<br>50.00<br>80.00 |
| 20'-4 Bay Dipole                      | C           | From Face   | 3.50<br>-4.00<br>0.00                        | 0.0000                  | 184.00          | No Ice 4.75<br>1/2" Ice 6.25                   | 4.75<br>6.25                            | 50.00<br>80.00            |
| *****                                 |             |             |  |                         |                 |  |   |                           |
| PiROD 13' Low Profile Platform        | A           | None        |  | 0.0000                  | 163.00          | No Ice 15.70<br>1/2" Ice 20.10                 | 15.70<br>20.10                          | 1300.00<br>1765.00        |
| (T-Mobile - Existing)                 |             |             |  |                         |                 |  |   |                           |
| ERICSSON AIR 21 B2A B4P w/ Mount Pipe | A           | From Face   | 3.50<br>0.00<br>0.00                         | 0.0000                  | 163.00          | No Ice 6.85<br>1/2" Ice 7.41                   | 5.78<br>6.70                            | 104.90<br>162.69          |
| ERICSSON AIR 21 B2A B4P w/ Mount Pipe | B           | From Face   | 3.50<br>0.00<br>0.00                         | 0.0000                  | 163.00          | No Ice 6.85<br>1/2" Ice 7.41                   | 5.78<br>6.70                            | 104.90<br>162.69          |
| ERICSSON AIR 21 B2A B4P w/ Mount Pipe | C           | From Face   | 3.50<br>0.00<br>0.00                         | 0.0000                  | 163.00          | No Ice 6.85<br>1/2" Ice 7.41                   | 5.78<br>6.70                            | 104.90<br>162.69          |
| RFS ATMAP1412D-1A20                   | A           | From Face   | 2.50<br>0.00<br>0.00                         | 0.0000                  | 163.00          | No Ice 1.17<br>1/2" Ice 1.31                   | 0.47<br>0.57                            | 13.00<br>20.62            |
| RFS ATMAP1412D-1A20                   | B           | From Face   | 2.50<br>0.00<br>0.00                         | 0.0000                  | 163.00          | No Ice 1.17<br>1/2" Ice 1.31                   | 0.47<br>0.57                            | 13.00<br>20.62            |
| RFS ATMAP1412D-1A20                   | C           | From Face   | 2.50<br>0.00<br>0.00                         | 0.0000                  | 163.00          | No Ice 1.17<br>1/2" Ice 1.31                   | 0.47<br>0.57                            | 13.00<br>20.62            |
| ERICSSON AIR 21 B4A B2P w/ Mount Pipe | A           | From Face   | 3.50<br>0.00<br>0.00                         | 0.0000                  | 163.00          | No Ice 6.85<br>1/2" Ice 7.41                   | 5.78<br>6.70                            | 104.90<br>162.69          |
| ERICSSON AIR 21 B4A B2P w/ Mount Pipe | B           | From Face   | 3.50<br>0.00<br>0.00                         | 0.0000                  | 163.00          | No Ice 6.85<br>1/2" Ice 7.41                   | 5.78<br>6.70                            | 104.90<br>162.69          |
| ERICSSON AIR 21 B4A B2P w/ Mount Pipe | C           | From Face   | 3.50<br>0.00<br>0.00                         | 0.0000                  | 163.00          | No Ice 6.85<br>1/2" Ice 7.41                   | 5.78<br>6.70                            | 104.90<br>162.69          |
| *****                                 |             |             |  |                         |                 |  |   |                           |
| LNx-6515DS-VTM w/ Mount Pipe          | A           | From Face   | 3.50<br>0.00<br>0.00                         | 0.0000                  | 163.00          | No Ice 11.67<br>1/2" Ice 12.39                 | 9.83<br>11.35                           | 83.15<br>172.72           |
| (T-Mobile - Proposed)                 |             |             |  |                         |                 |  |   |                           |
| LNx-6515DS-VTM w/ Mount Pipe          | B           | From Face   | 3.50<br>0.00<br>0.00                         | 0.0000                  | 163.00          | No Ice 11.67<br>1/2" Ice 12.39                 | 9.83<br>11.35                           | 83.15<br>172.72           |
| LNx-6515DS-VTM w/ Mount Pipe          | C           | From Face   | 3.50<br>0.00<br>0.00                         | 0.0000                  | 163.00          | No Ice 11.67<br>1/2" Ice 12.39                 | 9.83<br>11.35                           | 83.15<br>172.72           |
| Ericsson RRUS 11                      | A           | From Face   | 2.50<br>0.00<br>0.00                         | 0.0000                  | 163.00          | No Ice 2.94<br>1/2" Ice 3.17                   | 1.25<br>1.41                            | 55.00<br>74.32            |
| Ericsson RRUS 11                      | B           | From Face   | 2.50<br>0.00<br>0.00                         | 0.0000                  | 163.00          | No Ice 2.94<br>1/2" Ice 3.17                   | 1.25<br>1.41                            | 55.00<br>74.32            |
| Ericsson RRUS 11                      | C           | From Face   | 2.50<br>0.00<br>0.00                         | 0.0000                  | 163.00          | No Ice 2.94<br>1/2" Ice 3.17                   | 1.25<br>1.41                            | 55.00<br>74.32            |



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| <b>Project</b> | 183 ft Monopole                   | <b>Date</b>        | 09:03:12 08/04/15 |
| <b>Client</b>  | SPRINT                            | <b>Designed by</b> | kw                |

| Description                             | Face or Leg | Offset Type | Offsets: Horz Lateral Vert<br>ft ft ft | Azimuth Adjustment<br>° | Placement<br>ft | C <sub>AA</sub> Front<br>ft <sup>2</sup> | C <sub>AA</sub> Side<br>ft <sup>2</sup> | Weight<br>lb       |
|---|-------------|-------------|--|-------------------------|-----------------|--|---|--------------------|
| *****                                   |             |             |  |                         |                 |  |   |                    |
| PiROD 13' Low Profile Platform (SPRINT) | A           | None        |  | 0.0000                  | 153.00          | No Ice<br>1/2" Ice                       | 15.70<br>20.10                          | 1300.00<br>1765.00 |
| APXVSPP18-C w/mount pipe                | A           | From Face   | 3.50<br>0.00<br>0.00                   | 0.0000                  | 153.00          | No Ice<br>1/2" Ice                       | 8.50<br>9.15                            | 82.55<br>150.56    |
| APXVSPP18-C w/mount pipe                | B           | From Face   | 3.50<br>0.00<br>0.00                   | 0.0000                  | 153.00          | No Ice<br>1/2" Ice                       | 8.50<br>9.15                            | 82.55<br>150.56    |
| APXVSPP18-C w/mount pipe                | C           | From Face   | 3.50<br>0.00<br>0.00                   | 0.0000                  | 153.00          | No Ice<br>1/2" Ice                       | 8.50<br>9.15                            | 82.55<br>150.56    |
| (2) RRH-1900                            | A           | From Face   | 1.00<br>0.00<br>0.00                   | 0.0000                  | 153.00          | No Ice<br>1/2" Ice                       | 2.71<br>2.95                            | 60.00<br>88.32     |
| (2) RRH-1900                            | B           | From Face   | 1.00<br>0.00<br>0.00                   | 0.0000                  | 153.00          | No Ice<br>1/2" Ice                       | 2.71<br>2.95                            | 60.00<br>88.32     |
| (2) RRH-1900                            | C           | From Face   | 1.00<br>0.00<br>0.00                   | 0.0000                  | 153.00          | No Ice<br>1/2" Ice                       | 2.71<br>2.95                            | 60.00<br>88.32     |
| RRH-800                                 | A           | From Face   | 1.00<br>0.00<br>0.00                   | 0.0000                  | 153.00          | No Ice<br>1/2" Ice                       | 2.49<br>2.71                            | 64.00<br>91.74     |
| RRH-800                                 | B           | From Face   | 1.00<br>0.00<br>0.00                   | 0.0000                  | 153.00          | No Ice<br>1/2" Ice                       | 2.49<br>2.71                            | 64.00<br>91.74     |
| RRH-800                                 | C           | From Face   | 1.00<br>0.00<br>0.00                   | 0.0000                  | 153.00          | No Ice<br>1/2" Ice                       | 2.49<br>2.71                            | 64.00<br>91.74     |
| *****                                   |             |             |  |                         |                 |  |   |                    |
| APXVTM14-C-120 w/mount pipe (SPRINT)    | A           | From Face   | 3.50<br>0.00<br>0.00                   | 0.0000                  | 153.00          | No Ice<br>1/2" Ice                       | 7.21<br>7.77                            | 91.90<br>147.31    |
| APXVTM14-C-120 w/mount pipe             | B           | From Face   | 3.50<br>0.00<br>0.00                   | 0.0000                  | 153.00          | No Ice<br>1/2" Ice                       | 7.21<br>7.77                            | 91.90<br>147.31    |
| APXVTM14-C-120 w/mount pipe             | C           | From Face   | 3.50<br>0.00<br>0.00                   | 0.0000                  | 153.00          | No Ice<br>1/2" Ice                       | 7.21<br>7.77                            | 91.90<br>147.31    |
| RRH 8x20-25                             | A           | From Face   | 1.00<br>0.00<br>0.00                   | 0.0000                  | 151.00          | No Ice<br>1/2" Ice                       | 4.72<br>5.01                            | 70.00<br>97.14     |
| RRH 8x20-25                             | B           | From Face   | 1.00<br>0.00<br>0.00                   | 0.0000                  | 151.00          | No Ice<br>1/2" Ice                       | 4.72<br>5.01                            | 70.00<br>97.14     |
| RRH 8x20-25                             | C           | From Face   | 1.00<br>0.00<br>0.00                   | 0.0000                  | 151.00          | No Ice<br>1/2" Ice                       | 4.72<br>5.01                            | 70.00<br>97.14     |
| Ring Mount                              | C           | None        |  | 0.0000                  | 151.00          | No Ice<br>1/2" Ice                       | 1.40<br>2.40                            | 90.00<br>130.00    |
| *****                                   |             |             |  |                         |                 |  |   |                    |
| 840-10054 w/mount pipe                  | A           | From Face   | 3.50<br>0.00<br>0.00                   | 0.0000                  | 153.00          | No Ice<br>1/2" Ice                       | 5.41<br>5.83                            | 46.43<br>82.55     |
| 840-10054 w/mount pipe                  | B           | From Face   | 3.50                                   | 0.0000                  | 153.00          | No Ice                                   | 5.41                                    | 46.43              |



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| <b>Client</b>  | SPRINT                            | <b>Designed by</b> | kw                |

| Description                           | Face or Leg | Offset Type | Offsets: Horz Lateral Vert<br>ft ft ft | Azimuth Adjustment<br>° | Placement<br>ft | C <sub>AA</sub> Front<br>ft <sup>2</sup> | C <sub>AA</sub> Side<br>ft <sup>2</sup> | Weight<br>lb       |  |
|---------------------------------------|-------------|-------------|--|-------------------------|-----------------|--|---|--------------------|--|
|                                       |             |             | 0.00                                   |                         |                 | 1/2" Ice 5.83                            | 2.92                                    | 82.55              |  |
| 840-10054 w/mount pipe                | C           | From Face   | 0.00<br>3.50                           | 0.0000                  | 153.00          | No Ice 5.41<br>1/2" Ice 5.83             | 2.39                                    | 46.43<br>82.55     |  |
| Kathrein 860 10025 RCU                | A           | From Face   | 0.00<br>2.50                           | 0.0000                  | 153.00          | No Ice 0.16<br>1/2" Ice 0.23             | 0.14                                    | 1.20<br>2.76       |  |
| Kathrein 860 10025 RCU                | B           | From Face   | 0.00<br>2.50                           | 0.0000                  | 153.00          | No Ice 0.16<br>1/2" Ice 0.23             | 0.14                                    | 1.20<br>2.76       |  |
| Kathrein 860 10025 RCU                | C           | From Face   | 0.00<br>2.50                           | 0.0000                  | 153.00          | No Ice 0.16<br>1/2" Ice 0.23             | 0.14                                    | 1.20<br>2.76       |  |
| Panel Antenna 18"X18"                 | B           | From Face   | 0.00<br>3.50                           | 0.0000                  | 153.00          | No Ice 3.15<br>1/2" Ice 3.39             | 0.53                                    | 15.00<br>30.30     |  |
| *****                                 |             |             |  |                         |                 |  |   |                    |  |
| PiROD 13' Low Profile Platform        | A           | None        |  | 0.0000                  | 123.00          | No Ice 15.70<br>1/2" Ice 20.10           | 15.70                                   | 1300.00<br>1765.00 |  |
| Omni 2"x10'                           | B           | From Face   | 0.00<br>3.50                           | 0.0000                  | 123.00          | No Ice 2.00<br>1/2" Ice 3.02             | 2.00                                    | 20.00<br>35.50     |  |
| Omni 2"x10'                           | B           | From Face   | 6.00<br>3.50                           | 0.0000                  | 123.00          | No Ice 2.00<br>1/2" Ice 3.02             | 2.00                                    | 20.00<br>35.50     |  |
| 20'-4 Bay Dipole                      | C           | From Face   | 6.00<br>3.50                           | 0.0000                  | 123.00          | No Ice 4.75<br>1/2" Ice 6.25             | 4.75                                    | 50.00<br>80.00     |  |
| 3' Yagi antenna                       | B           | From Face   | 0.00<br>3.50                           | 0.0000                  | 123.00          | No Ice 0.70<br>1/2" Ice 0.95             | 0.35                                    | 10.00<br>36.35     |  |
| 3' Yagi antenna                       | C           | From Face   | 0.00<br>3.50                           | 0.0000                  | 123.00          | No Ice 0.70<br>1/2" Ice 0.95             | 0.35                                    | 10.00<br>36.35     |  |
| *****                                 |             |             |  |                         |                 |  |   |                    |  |
| 1' Side Mount Standoff                | C           | From Face   | 0.00<br>1.00                           | 0.0000                  | 54.00           | No Ice 1.00<br>1/2" Ice 1.50             | 1.00                                    | 30.00<br>50.00     |  |
| GPS                                   | C           | From Face   | 0.00<br>3.00                           | 0.0000                  | 54.00           | No Ice 0.21<br>1/2" Ice 0.32             | 0.21                                    | 5.00<br>7.52       |  |
| *****                                 |             |             |  |                         |                 |  |   |                    |  |
| PiROD 13' Low Profile Platform (AT&T) | A           | None        |  | 0.0000                  | 143.00          | No Ice 15.70<br>1/2" Ice 20.10           | 15.70                                   | 1300.00<br>1765.00 |  |
| Kathrein 800 10121 w/mount pipe       | A           | From Face   | 0.00<br>3.50                           | 0.0000                  | 143.00          | No Ice 5.72<br>1/2" Ice 6.21             | 4.81                                    | 78.15<br>128.24    |  |
| Kathrein 800 10121 w/mount pipe       | B           | From Face   | 0.00<br>3.50                           | 0.0000                  | 143.00          | No Ice 5.72<br>1/2" Ice 6.21             | 4.81                                    | 78.15<br>128.24    |  |
| Kathrein 800 10121 w/mount pipe       | C           | From Face   | 0.00<br>3.50                           | 0.0000                  | 143.00          | No Ice 5.72<br>1/2" Ice 6.21             | 4.81                                    | 78.15<br>128.24    |  |
| Ericsson RRUS-11                      | A           | From Face   | 0.00<br>2.50                           | 0.0000                  | 143.00          | No Ice 3.26<br>1/2" Ice 3.50             | 1.38                                    | 50.70<br>71.57     |  |



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| <b>Job</b>     | CT43XC827 MANCHESTER POLICE TOWER | <b>Page</b>        | 6 of 12           |
| <b>Project</b> | 183 ft Monopole                   | <b>Date</b>        | 09:03:12 08/04/15 |
| <b>Client</b>  | SPRINT                            | <b>Designed by</b> | kw                |

| Description                      | Face or Leg | Offset Type | Offsets: |         | Azimuth Adjustment | Placement | C <sub>AA</sub> Front | C <sub>AA</sub> Side | Weight |        |
|----------------------------------|-------------|-------------|----------|---------|--------------------|-----------|-----------------------|----------------------|--------|--------|
|                                  |             |             | Horz     | Lateral |                    |           |                       |                      |        |        |
|                                  |             |             | ft       | ft      | °                  | ft        | ft <sup>2</sup>       | ft <sup>2</sup>      | lb     |        |
| Ericsson RRUS-11                 | B           | From Face   | 0.00     | 2.50    | 0.0000             | 143.00    | No Ice                | 3.26                 | 1.38   | 50.70  |
|                                  |             |             | 0.00     | 0.00    |                    |           | 1/2" Ice              | 3.50                 | 1.56   | 71.57  |
|                                  |             |             | 0.00     | 0.00    |                    |           |                       |                      |        |        |
| Ericsson RRUS-11                 | C           | From Face   | 2.50     | 0.00    | 0.0000             | 143.00    | No Ice                | 3.26                 | 1.38   | 50.70  |
|                                  |             |             | 0.00     | 0.00    |                    |           | 1/2" Ice              | 3.50                 | 1.56   | 71.57  |
|                                  |             |             | 0.00     | 0.00    |                    |           |                       |                      |        |        |
| DC6-48-60-18-8F                  | C           | From Leg    | 2.00     | 0.00    | 0.0000             | 143.00    | No Ice                | 1.27                 | 1.27   | 20.00  |
|                                  |             |             | 0.00     | 0.00    |                    |           | 1/2" Ice              | 1.46                 | 1.46   | 35.12  |
|                                  |             |             | 0.00     | 0.00    |                    |           |                       |                      |        |        |
| *****                            |             |             |          |         |                    |           |                       |                      |        |        |
| (2) OPA-65R-LCUU-H6 w/mount pipe | A           | From Face   | 3.50     | 0.00    | 0.0000             | 143.00    | No Ice                | 10.65                | 7.53   | 112.53 |
|                                  |             |             | 0.00     | 0.00    |                    |           | 1/2" Ice              | 11.30                | 8.56   | 192.76 |
|                                  |             |             | 0.00     | 0.00    |                    |           |                       |                      |        |        |
| (2) OPA-65R-LCUU-H8 w/mount pipe | B           | From Face   | 3.50     | 0.00    | 0.0000             | 143.00    | No Ice                | 13.34                | 9.83   | 140.11 |
|                                  |             |             | 0.00     | 0.00    |                    |           | 1/2" Ice              | 14.18                | 11.34  | 239.33 |
|                                  |             |             | 0.00     | 0.00    |                    |           |                       |                      |        |        |
| (2) OPA-65R-LCUU-H8 w/mount pipe | C           | From Face   | 3.50     | 0.00    | 0.0000             | 143.00    | No Ice                | 13.34                | 9.83   | 140.11 |
|                                  |             |             | 0.00     | 0.00    |                    |           | 1/2" Ice              | 14.18                | 11.34  | 239.33 |
|                                  |             |             | 0.00     | 0.00    |                    |           |                       |                      |        |        |
| Ericsson RRUS-12                 | A           | From Face   | 2.50     | 0.00    | 0.0000             | 143.00    | No Ice                | 3.67                 | 1.49   | 58.00  |
|                                  |             |             | 0.00     | 0.00    |                    |           | 1/2" Ice              | 3.93                 | 1.67   | 81.22  |
|                                  |             |             | 0.00     | 0.00    |                    |           |                       |                      |        |        |
| Ericsson RRUS-12                 | B           | From Face   | 2.50     | 0.00    | 0.0000             | 143.00    | No Ice                | 3.67                 | 1.49   | 58.00  |
|                                  |             |             | 0.00     | 0.00    |                    |           | 1/2" Ice              | 3.93                 | 1.67   | 81.22  |
|                                  |             |             | 0.00     | 0.00    |                    |           |                       |                      |        |        |
| Ericsson RRUS-12                 | C           | From Face   | 2.50     | 0.00    | 0.0000             | 143.00    | No Ice                | 3.67                 | 1.49   | 58.00  |
|                                  |             |             | 0.00     | 0.00    |                    |           | 1/2" Ice              | 3.93                 | 1.67   | 81.22  |
|                                  |             |             | 0.00     | 0.00    |                    |           |                       |                      |        |        |
| Ericsson RRUS-32                 | A           | From Face   | 2.50     | 0.00    | 0.0000             | 143.00    | No Ice                | 3.87                 | 2.76   | 77.00  |
|                                  |             |             | 0.00     | 0.00    |                    |           | 1/2" Ice              | 4.15                 | 3.02   | 104.93 |
|                                  |             |             | 0.00     | 0.00    |                    |           |                       |                      |        |        |
| Ericsson RRUS-32                 | B           | From Face   | 2.50     | 0.00    | 0.0000             | 143.00    | No Ice                | 3.87                 | 2.76   | 77.00  |
|                                  |             |             | 0.00     | 0.00    |                    |           | 1/2" Ice              | 4.15                 | 3.02   | 104.93 |
|                                  |             |             | 0.00     | 0.00    |                    |           |                       |                      |        |        |
| Ericsson RRUS-32                 | C           | From Face   | 2.50     | 0.00    | 0.0000             | 143.00    | No Ice                | 3.87                 | 2.76   | 77.00  |
|                                  |             |             | 0.00     | 0.00    |                    |           | 1/2" Ice              | 4.15                 | 3.02   | 104.93 |
|                                  |             |             | 0.00     | 0.00    |                    |           |                       |                      |        |        |
| Ericsson RRUS-E2                 | A           | From Face   | 2.50     | 0.00    | 0.0000             | 143.00    | No Ice                | 3.87                 | 2.76   | 77.00  |
|                                  |             |             | 0.00     | 0.00    |                    |           | 1/2" Ice              | 4.15                 | 3.02   | 104.93 |
|                                  |             |             | 0.00     | 0.00    |                    |           |                       |                      |        |        |
| Ericsson RRUS-E2                 | B           | From Face   | 2.50     | 0.00    | 0.0000             | 143.00    | No Ice                | 3.87                 | 2.76   | 77.00  |
|                                  |             |             | 0.00     | 0.00    |                    |           | 1/2" Ice              | 4.15                 | 3.02   | 104.93 |
|                                  |             |             | 0.00     | 0.00    |                    |           |                       |                      |        |        |
| Ericsson RRUS-E2                 | C           | From Face   | 2.50     | 0.00    | 0.0000             | 143.00    | No Ice                | 3.87                 | 2.76   | 77.00  |
|                                  |             |             | 0.00     | 0.00    |                    |           | 1/2" Ice              | 4.15                 | 3.02   | 104.93 |
|                                  |             |             | 0.00     | 0.00    |                    |           |                       |                      |        |        |
| Ericsson A2 Module               | A           | From Face   | 2.50     | 0.00    | 0.0000             | 143.00    | No Ice                | 2.42                 | 0.54   | 22.00  |
|                                  |             |             | 0.00     | 0.00    |                    |           | 1/2" Ice              | 2.63                 | 0.67   | 34.73  |
|                                  |             |             | 0.00     | 0.00    |                    |           |                       |                      |        |        |
| Ericsson A2 Module               | B           | From Face   | 2.50     | 0.00    | 0.0000             | 143.00    | No Ice                | 2.42                 | 0.54   | 22.00  |
|                                  |             |             | 0.00     | 0.00    |                    |           | 1/2" Ice              | 2.63                 | 0.67   | 34.73  |
|                                  |             |             | 0.00     | 0.00    |                    |           |                       |                      |        |        |
| Ericsson A2 Module               | C           | From Face   | 2.50     | 0.00    | 0.0000             | 143.00    | No Ice                | 2.42                 | 0.54   | 22.00  |
|                                  |             |             | 0.00     | 0.00    |                    |           | 1/2" Ice              | 2.63                 | 0.67   | 34.73  |
|                                  |             |             | 0.00     | 0.00    |                    |           |                       |                      |        |        |
| Surge Arrestor                   | A           | From Leg    | 2.00     | 0.00    | 0.0000             | 143.00    | No Ice                | 1.27                 | 1.27   | 20.00  |



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|----------------|-----------------------------------|--------------------|-------------------|
| <b>Job</b>     | CT43XC827 MANCHESTER POLICE TOWER | <b>Page</b>        | 7 of 12           |
| <b>Project</b> | 183 ft Monopole                   | <b>Date</b>        | 09:03:12 08/04/15 |
| <b>Client</b>  | SPRINT                            | <b>Designed by</b> | kw                |

| Description  | Face or Leg | Offset Type | Offsets: Horz Lateral Vert<br>ft ft ft | Azimuth Adjustment<br>° | Placement<br>ft | C <sub>AA</sub> Front<br>ft <sup>2</sup> | C <sub>AA</sub> Side<br>ft <sup>2</sup> | Weight<br>lb       |
|--|-------------|-------------|--|-------------------------|-----------------|--|---|--------------------|
| (DC6-48-60-18-8F)                                      |             |             | 0.00<br>0.00                           |                         | 1/2" Ice        | 1.46                                     | 1.46                                    | 35.12              |
| *****  |             |             |  |                         |                 |  |   |                    |
| PiROD 13' Low Profile Platform<br>(Verizon - proposed) | C           | None        |  | 0.0000                  | 110.00          | No Ice 15.70<br>1/2" Ice 20.10           | 15.70<br>20.10                          | 1300.00<br>1765.00 |
| (2) LNX 6514DS-VTM w/mount pipe                        | A           | From Face   | 3.50<br>0.00<br>0.00                   | 0.0000                  | 110.00          | No Ice 8.63<br>1/2" Ice 9.29             | 7.07<br>8.25                            | 64.55<br>133.55    |
| (2) LNX 6514DS-VTM w/mount pipe                        | B           | From Face   | 3.50<br>0.00<br>0.00                   | 0.0000                  | 110.00          | No Ice 8.63<br>1/2" Ice 9.29             | 7.07<br>8.25                            | 64.55<br>133.55    |
| (2) LNX 6514DS-VTM w/mount pipe                        | C           | From Face   | 3.50<br>0.00<br>0.00                   | 0.0000                  | 110.00          | No Ice 8.63<br>1/2" Ice 9.29             | 7.07<br>8.25                            | 64.55<br>133.55    |
| (2) HBX-6517DS-VTM w/mount pipe                        | A           | From Face   | 3.50<br>0.00<br>0.00                   | 0.0000                  | 110.00          | No Ice 5.42<br>1/2" Ice 5.97             | 4.96<br>6.14                            | 39.25<br>85.00     |
| (2) HBX-6517DS-VTM w/mount pipe                        | B           | From Face   | 3.50<br>0.00<br>0.00                   | 0.0000                  | 110.00          | No Ice 5.42<br>1/2" Ice 5.97             | 4.96<br>6.14                            | 39.25<br>85.00     |
| (2) HBX-6517DS-VTM w/mount pipe                        | C           | From Face   | 3.50<br>0.00<br>0.00                   | 0.0000                  | 110.00          | No Ice 5.42<br>1/2" Ice 5.97             | 4.96<br>6.14                            | 39.25<br>85.00     |
| RRH 2X40-AWS+RDEM                                      | A           | From Face   | 2.50<br>0.00<br>0.00                   | 0.0000                  | 110.00          | No Ice 3.77<br>1/2" Ice 4.04             | 2.23<br>2.46                            | 47.60<br>73.79     |
| RRH 2X40-AWS+RDEM                                      | B           | From Face   | 2.50<br>0.00<br>0.00                   | 0.0000                  | 110.00          | No Ice 3.77<br>1/2" Ice 4.04             | 2.23<br>2.46                            | 47.60<br>73.79     |
| RRH 2X40-AWS+RDEM                                      | C           | From Face   | 2.50<br>0.00<br>0.00                   | 0.0000                  | 110.00          | No Ice 3.77<br>1/2" Ice 4.04             | 2.23<br>2.46                            | 47.60<br>73.79     |
| RRH 2X40-07U   | A           | From Face   | 2.50<br>0.00<br>0.00                   | 0.0000                  | 110.00          | No Ice 2.29<br>1/2" Ice 2.49             | 1.21<br>1.36                            | 50.00<br>66.78     |
| RRH 2X40-07U   | B           | From Face   | 2.50<br>0.00<br>0.00                   | 0.0000                  | 110.00          | No Ice 2.29<br>1/2" Ice 2.49             | 1.21<br>1.36                            | 50.00<br>66.78     |
| RRH 2X40-07U   | C           | From Face   | 2.50<br>0.00<br>0.00                   | 0.0000                  | 110.00          | No Ice 2.29<br>1/2" Ice 2.49             | 1.21<br>1.36                            | 50.00<br>66.78     |
| RRH 2X40-PCS   | A           | From Face   | 2.50<br>0.00<br>0.00                   | 0.0000                  | 110.00          | No Ice 2.57<br>1/2" Ice 2.79             | 2.02<br>2.23                            | 55.00<br>75.41     |
| RRH 2X40-PCS   | B           | From Face   | 2.50<br>0.00<br>0.00                   | 0.0000                  | 110.00          | No Ice 2.57<br>1/2" Ice 2.79             | 2.02<br>2.23                            | 55.00<br>75.41     |
| RRH 2X40-PCS   | C           | From Face   | 2.50<br>0.00<br>0.00                   | 0.0000                  | 110.00          | No Ice 2.57<br>1/2" Ice 2.79             | 2.02<br>2.23                            | 55.00<br>75.41     |
| RFS DB-T1-6Z-8AB-0Z                                    | B           | From Face   | 1.50<br>0.00<br>0.00                   | 0.0000                  | 110.00          | No Ice 5.60<br>1/2" Ice 5.92             | 2.33<br>2.56                            | 44.00<br>80.13     |
| RFS DB-T1-6Z-8AB-0Z                                    | C           | From Face   | 1.50<br>0.00<br>0.00                   | 0.0000                  | 110.00          | No Ice 5.60<br>1/2" Ice 5.92             | 2.33<br>2.56                            | 44.00<br>80.13     |



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|----------------|-----------------------------------|--------------------|-------------------|
| <b>Job</b>     | CT43XC827 MANCHESTER POLICE TOWER | <b>Page</b>        | 8 of 12           |
| <b>Project</b> | 183 ft Monopole                   | <b>Date</b>        | 09:03:12 08/04/15 |
| <b>Client</b>  | SPRINT                            | <b>Designed by</b> | kw                |

| Description            | Face or Leg | Offset Type | Offsets: Horz Lateral Vert | Azimuth Adjustment | Placement | C <sub>AA</sub> Front | C <sub>AA</sub> Side | Weight       |                |
|------------------------|-------------|-------------|----------------------------|--------------------|-----------|-----------------------|----------------------|--------------|----------------|
|                        |             |             | ft<br>ft<br>ft             | °                  | ft        | ft <sup>2</sup>       | ft <sup>2</sup>      | lb           |                |
| *****                  |             |             |                            |                    |           |                       |                      |              |                |
| 1' Side Mount Standoff | A           | From Face   | 0.50<br>0.00<br>0.00       | 0.0000             | 38.90     | No Ice<br>1/2" Ice    | 1.00<br>1.50         | 1.00<br>1.50 | 30.00<br>50.00 |
| 1' Side Mount Standoff | B           | From Face   | 0.50<br>0.00<br>0.00       | 0.0000             | 38.90     | No Ice<br>1/2" Ice    | 1.00<br>1.50         | 1.00<br>1.50 | 30.00<br>50.00 |
| 1' Side Mount Standoff | C           | From Face   | 0.50<br>0.00<br>0.00       | 0.0000             | 38.90     | No Ice<br>1/2" Ice    | 1.00<br>1.50         | 1.00<br>1.50 | 30.00<br>50.00 |

### Dishes

| Description              | Face or Leg | Dish Type                | Offset Type | Offsets: Horz Lateral Vert | Azimuth Adjustment | 3 dB Beam Width | Elevation | Outside Diameter | Aperture Area      | Weight        |
|--------------------------|-------------|--------------------------|-------------|----------------------------|--------------------|-----------------|-----------|------------------|--------------------|---------------|
|                          |             |                          |             | ft<br>ft<br>ft             | °                  | °               | ft        | ft               | ft <sup>2</sup>    | lb            |
| Andrew VHL2-11           | A           | Paraboloid w/Radome      | From Face   | 3.50<br>0.00<br>0.00       | 0.0000             |                 | 150.00    | 2.00             | No Ice<br>1/2" Ice | 31.4<br>41.00 |
| Andrew VHL2.5-11         | B           | Paraboloid w/Shroud (HP) | From Face   | 3.50<br>0.00<br>0.00       | 0.0000             |                 | 150.00    | 2.50             | No Ice<br>1/2" Ice | 6.00<br>77.00 |
| Andrew VHL2-11           | C           | Paraboloid w/Radome      | From Face   | 3.50<br>0.00<br>0.00       | 0.0000             |                 | 150.00    | 2.00             | No Ice<br>1/2" Ice | 31.4<br>41.00 |
| Andrew VHL2-18-2WH/B     | A           | Paraboloid w/Radome      | From Face   | 2.00<br>0.00<br>0.00       | 0.0000             |                 | 38.90     | 2.00             | No Ice<br>1/2" Ice | 31.4<br>35.00 |
| Andrew VHL2-18-2WH/B     | B           | Paraboloid w/Radome      | From Face   | 2.00<br>0.00<br>0.00       | 0.0000             |                 | 38.90     | 2.00             | No Ice<br>1/2" Ice | 31.4<br>35.00 |
| (2) Andrew VHL2-18-2WH/B | C           | Paraboloid w/Radome      | From Face   | 2.00<br>0.00<br>0.00       | 0.0000             |                 | 38.90     | 2.00             | No Ice<br>1/2" Ice | 31.4<br>35.00 |

### 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 |





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| <b>Project</b> | 183 ft Monopole                   | <b>Date</b>        | 09:03:12 08/04/15 |
| <b>Client</b>  | SPRINT                            | <b>Designed by</b> | kw                |

| Comb. No. | Description                 |
|-----------|-----------------------------|
| 10        | Dead+Wind 240 deg - No Ice  |
| 11        | Dead+Wind 270 deg - No Ice  |
| 12        | Dead+Wind 300 deg - No Ice  |
| 13        | Dead+Wind 330 deg - No Ice  |
| 14        | Dead+Ice+Temp               |
| 15        | Dead+Wind 0 deg+Ice+Temp    |
| 16        | Dead+Wind 30 deg+Ice+Temp   |
| 17        | Dead+Wind 60 deg+Ice+Temp   |
| 18        | Dead+Wind 90 deg+Ice+Temp   |
| 19        | Dead+Wind 120 deg+Ice+Temp  |
| 20        | Dead+Wind 150 deg+Ice+Temp  |
| 21        | Dead+Wind 180 deg+Ice+Temp  |
| 22        | Dead+Wind 210 deg+Ice+Temp  |
| 23        | Dead+Wind 240 deg+Ice+Temp  |
| 24        | Dead+Wind 270 deg+Ice+Temp  |
| 25        | Dead+Wind 300 deg+Ice+Temp  |
| 26        | Dead+Wind 330 deg+Ice+Temp  |
| 27        | Dead+Wind 0 deg - Service   |
| 28        | Dead+Wind 30 deg - Service  |
| 29        | Dead+Wind 60 deg - Service  |
| 30        | Dead+Wind 90 deg - Service  |
| 31        | Dead+Wind 120 deg - Service |
| 32        | Dead+Wind 150 deg - Service |
| 33        | Dead+Wind 180 deg - Service |
| 34        | Dead+Wind 210 deg - Service |
| 35        | Dead+Wind 240 deg - Service |
| 36        | Dead+Wind 270 deg - Service |
| 37        | Dead+Wind 300 deg - Service |
| 38        | Dead+Wind 330 deg - Service |

### Maximum Reactions

| Location | Condition           | Gov. Load Comb. | Vertical lb | Horizontal, X lb | Horizontal, Z lb |
|----------|---------------------|-----------------|-------------|------------------|------------------|
| Pole     | Max. Vert           | 24              | 65972.65    | 32753.61         | -135.40          |
|          | Max. H <sub>x</sub> | 11              | 54519.98    | 37264.98         | -182.71          |
|          | Max. H <sub>z</sub> | 2               | 54519.98    | -230.38          | 37240.39         |
|          | Max. M <sub>x</sub> | 2               | 4622869.48  | -230.38          | 37240.39         |
|          | Max. M <sub>z</sub> | 5               | 4628206.67  | -37238.44        | 246.35           |
|          | Max. Torsion        | 9               | 2570.31     | 18807.61         | -32341.69        |
|          | Min. Vert           | 1               | 54519.98    | 0.00             | 0.00             |
|          | Min. H <sub>x</sub> | 5               | 54519.98    | -37238.44        | 246.35           |
|          | Min. H <sub>z</sub> | 8               | 54519.98    | 272.09           | -37282.32        |
|          | Min. M <sub>x</sub> | 8               | -4626109.38 | 272.09           | -37282.32        |
|          | Min. M <sub>z</sub> | 11              | -4631060.50 | 37264.98         | -182.71          |
|          | Min. Torsion        | 3               | -2631.61    | -18840.95        | 32321.06         |

### Tower Mast Reaction Summary

| Load Combination | Vertical lb | Shear <sub>x</sub> lb | Shear <sub>z</sub> lb | Overturning Moment, M <sub>x</sub> lb-ft | Overturning Moment, M <sub>z</sub> lb-ft | Torque lb-ft |
|------------------|-------------|-----------------------|-----------------------|--|--|--------------|
| Dead Only        | 54519.98    | 0.00                  | 0.00                  | -711.73                                  | -598.64                                  | -0.00        |



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| <b>Project</b> | 183 ft Monopole                   | <b>Date</b>        | 09:03:12 08/04/15 |
| <b>Client</b>  | SPRINT                            | <b>Designed by</b> | kw                |

| Load Combination            | Vertical<br>lb | Shear <sub>x</sub><br>lb | Shear <sub>z</sub><br>lb | Overturning Moment, M <sub>x</sub><br>lb-ft | Overturning Moment, M <sub>z</sub><br>lb-ft | Torque<br>lb-ft |
|-----------------------------|----------------|--------------------------|--------------------------|---|---|-----------------|
| Dead+Wind 0 deg - No Ice    | 54519.98       | 230.38                   | -37240.39                | -4622869.48                                 | -34313.45                                   | 1913.08         |
| Dead+Wind 30 deg - No Ice   | 54519.98       | 18840.95                 | -32321.06                | -4011683.67                                 | -2343570.11                                 | 2631.61         |
| Dead+Wind 60 deg - No Ice   | 54519.98       | 32357.91                 | -18781.04                | -2333136.44                                 | -4021213.44                                 | 2519.14         |
| Dead+Wind 90 deg - No Ice   | 54519.98       | 37238.44                 | -246.35                  | -34115.01                                   | -4628206.67                                 | 1722.20         |
| Dead+Wind 120 deg - No Ice  | 54519.98       | 32178.46                 | 18396.30                 | 2280253.15                                  | -4000637.11                                 | 579.89          |
| Dead+Wind 150 deg - No Ice  | 54519.98       | 18506.86                 | 32177.38                 | 3991535.94                                  | -2299472.43                                 | -712.45         |
| Dead+Wind 180 deg - No Ice  | 54519.98       | -272.09                  | 37282.32                 | 4626109.38                                  | 39620.70                                    | -1721.31        |
| Dead+Wind 210 deg - No Ice  | 54519.98       | -18807.61                | 32341.69                 | 4014635.54                                  | 2341008.65                                  | -2570.31        |
| Dead+Wind 240 deg - No Ice  | 54519.98       | -32311.22                | 18738.96                 | 2329621.42                                  | 4017518.84                                  | -2492.11        |
| Dead+Wind 270 deg - No Ice  | 54519.98       | -37264.98                | 182.71                   | 28280.17                                    | 4631060.50                                  | -1761.93        |
| Dead+Wind 300 deg - No Ice  | 54519.98       | -32263.08                | -18412.10                | -2279589.67                                 | 4007710.50                                  | -798.66         |
| Dead+Wind 330 deg - No Ice  | 54519.98       | -18490.72                | -32215.96                | -3997830.32                                 | 2291724.08                                  | 691.05          |
| Dead+Ice+Temp               | 65972.65       | 0.00                     | 0.00                     | -1380.21                                    | -1168.91                                    | 0.02            |
| Dead+Wind 0 deg+Ice+Temp    | 65972.65       | 174.24                   | -32725.55                | -4127953.19                                 | -27219.33                                   | 1843.17         |
| Dead+Wind 30 deg+Ice+Temp   | 65972.65       | 16535.68                 | -28392.17                | -3580921.67                                 | -2089933.69                                 | 2309.63         |
| Dead+Wind 60 deg+Ice+Temp   | 65972.65       | 28429.61                 | -16482.93                | -2080786.18                                 | -3589840.69                                 | 2052.65         |
| Dead+Wind 90 deg+Ice+Temp   | 65972.65       | 32732.92                 | -187.51                  | -27164.38                                   | -4133635.75                                 | 1237.91         |
| Dead+Wind 120 deg+Ice+Temp  | 65972.65       | 28295.54                 | 16192.01                 | 2038601.70                                  | -3574566.61                                 | 188.18          |
| Dead+Wind 150 deg+Ice+Temp  | 65972.65       | 16285.46                 | 28287.61                 | 3564392.31                                  | -2056625.12                                 | -907.13         |
| Dead+Wind 180 deg+Ice+Temp  | 65972.65       | -207.33                  | 32759.49                 | 4128963.04                                  | 29979.37                                    | -1688.89        |
| Dead+Wind 210 deg+Ice+Temp  | 65972.65       | -16507.81                | 28408.31                 | 3581622.30                                  | 2086210.47                                  | -2260.09        |
| Dead+Wind 240 deg+Ice+Temp  | 65972.65       | -28390.78                | 16448.20                 | 2076147.06                                  | 3585158.84                                  | -2030.76        |
| Dead+Wind 270 deg+Ice+Temp  | 65972.65       | -32753.61                | 135.40                   | 20630.24                                    | 4134344.79                                  | -1270.08        |
| Dead+Wind 300 deg+Ice+Temp  | 65972.65       | -28363.84                | -16205.55                | -2039795.09                                 | 3578801.83                                  | -364.35         |
| Dead+Wind 330 deg+Ice+Temp  | 65972.65       | -16273.02                | -28318.62                | -3571195.37                                 | 2048767.49                                  | 889.93          |
| Dead+Wind 0 deg - Service   | 54519.98       | 89.99                    | -14547.03                | -1810107.58                                 | -13843.68                                   | 760.12          |
| Dead+Wind 30 deg - Service  | 54519.98       | 7359.75                  | -12625.41                | -1570881.74                                 | -917848.65                                  | 1046.34         |
| Dead+Wind 60 deg - Service  | 54519.98       | 12639.81                 | -7336.35                 | -913784.65                                  | -1574599.36                                 | 1002.75         |
| Dead+Wind 90 deg - Service  | 54519.98       | 14546.27                 | -96.23                   | -13787.04                                   | -1812183.80                                 | 686.83          |
| Dead+Wind 120 deg - Service | 54519.98       | 12569.71                 | 7186.05                  | 892179.77                                   | -1566477.87                                 | 232.76          |
| Dead+Wind 150 deg - Service | 54519.98       | 7229.24                  | 12569.29                 | 1562064.80                                  | -900548.09                                  | -281.36         |
| Dead+Wind 180 deg - Service | 54519.98       | -106.29                  | 14563.41                 | 1810502.18                                  | 15102.48                                    | -682.80         |
| Dead+Wind 210 deg - Service | 54519.98       | -7346.72                 | 12633.47                 | 1571172.41                                  | 916025.40                                   | -1021.80        |
| Dead+Wind 240 deg - Service | 54519.98       | -12621.57                | 7319.91                  | 911545.07                                   | 1572332.23                                  | -992.79         |
| Dead+Wind 270 deg - Service | 54519.98       | -14556.63                | 71.37                    | 10640.25                                    | 1812500.01                                  | -703.63         |
| Dead+Wind 300 deg - Service | 54519.98       | -12602.77                | -7192.23                 | -892795.20                                  | 1568449.72                                  | -320.03         |
| Dead+Wind 330 deg - Service | 54519.98       | -7222.94                 | -12584.36                | -1565411.53                                 | 896703.24                                   | 273.68          |

## Solution Summary

| Load Comb. | Sum of Applied Forces |           |           | Sum of Reactions |          |           | % Error |
|------------|-----------------------|-----------|-----------|------------------|----------|-----------|---------|
|            | PX<br>lb              | PY<br>lb  | PZ<br>lb  | PX<br>lb         | PY<br>lb | PZ<br>lb  |         |
| 1          | 0.00                  | -54519.98 | 0.00      | 0.00             | 54519.98 | 0.00      | 0.000%  |
| 2          | 230.38                | -54519.98 | -37240.39 | -230.38          | 54519.98 | 37240.39  | 0.000%  |
| 3          | 18840.95              | -54519.98 | -32321.06 | -18840.95        | 54519.98 | 32321.06  | 0.000%  |
| 4          | 32357.91              | -54519.98 | -18781.04 | -32357.91        | 54519.98 | 18781.04  | 0.000%  |
| 5          | 37238.44              | -54519.98 | -246.35   | -37238.44        | 54519.98 | 246.35    | 0.000%  |
| 6          | 32178.46              | -54519.98 | 18396.30  | -32178.46        | 54519.98 | -18396.30 | 0.000%  |
| 7          | 18506.86              | -54519.98 | 32177.38  | -18506.86        | 54519.98 | -32177.38 | 0.000%  |
| 8          | -272.09               | -54519.98 | 37282.32  | 272.09           | 54519.98 | -37282.32 | 0.000%  |
| 9          | -18807.61             | -54519.98 | 32341.69  | 18807.61         | 54519.98 | -32341.69 | 0.000%  |
| 10         | -32311.22             | -54519.98 | 18738.96  | 32311.22         | 54519.98 | -18738.96 | 0.000%  |
| 11         | -37264.98             | -54519.98 | 182.71    | 37264.98         | 54519.98 | -182.71   | 0.000%  |
| 12         | -32263.08             | -54519.98 | -18412.10 | 32263.08         | 54519.98 | 18412.10  | 0.000%  |
| 13         | -18490.72             | -54519.98 | -32215.96 | 18490.72         | 54519.98 | 32215.96  | 0.000%  |
| 14         | 0.00                  | -65972.65 | 0.00      | -0.00            | 65972.65 | -0.00     | 0.000%  |



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 FAX: (978) 336-5586

|                |                                   |                    |                   |
|----------------|-----------------------------------|--------------------|-------------------|
| <b>Job</b>     | CT43XC827 MANCHESTER POLICE TOWER | <b>Page</b>        | 11 of 12          |
| <b>Project</b> | 183 ft Monopole                   | <b>Date</b>        | 09:03:12 08/04/15 |
| <b>Client</b>  | SPRINT                            | <b>Designed by</b> | kw                |

| Load Comb. | Sum of Applied Forces |           |           | Sum of Reactions |          |           | % Error |
|------------|-----------------------|-----------|-----------|------------------|----------|-----------|---------|
|            | PX lb                 | PY lb     | PZ lb     | PX lb            | PY lb    | PZ lb     |         |
| 15         | 174.24                | -65972.65 | -32725.54 | -174.24          | 65972.65 | 32725.55  | 0.000%  |
| 16         | 16535.67              | -65972.65 | -28392.17 | -16535.68        | 65972.65 | 28392.17  | 0.000%  |
| 17         | 28429.61              | -65972.65 | -16482.93 | -28429.61        | 65972.65 | 16482.93  | 0.000%  |
| 18         | 32732.91              | -65972.65 | -187.51   | -32732.92        | 65972.65 | 187.51    | 0.000%  |
| 19         | 28295.54              | -65972.65 | 16192.01  | -28295.54        | 65972.65 | -16192.01 | 0.000%  |
| 20         | 16285.46              | -65972.65 | 28287.61  | -16285.46        | 65972.65 | -28287.61 | 0.000%  |
| 21         | -207.33               | -65972.65 | 32759.48  | 207.33           | 65972.65 | -32759.49 | 0.000%  |
| 22         | -16507.81             | -65972.65 | 28408.31  | 16507.81         | 65972.65 | -28408.31 | 0.000%  |
| 23         | -28390.78             | -65972.65 | 16448.20  | 28390.78         | 65972.65 | -16448.20 | 0.000%  |
| 24         | -32753.60             | -65972.65 | 135.40    | 32753.61         | 65972.65 | -135.40   | 0.000%  |
| 25         | -28363.84             | -65972.65 | -16205.55 | 28363.84         | 65972.65 | 16205.55  | 0.000%  |
| 26         | -16273.02             | -65972.65 | -28318.62 | 16273.02         | 65972.65 | 28318.62  | 0.000%  |
| 27         | 89.99                 | -54519.98 | -14547.03 | -89.99           | 54519.98 | 14547.03  | 0.000%  |
| 28         | 7359.75               | -54519.98 | -12625.41 | -7359.75         | 54519.98 | 12625.41  | 0.000%  |
| 29         | 12639.81              | -54519.98 | -7336.35  | -12639.81        | 54519.98 | 7336.35   | 0.000%  |
| 30         | 14546.26              | -54519.98 | -96.23    | -14546.27        | 54519.98 | 96.23     | 0.000%  |
| 31         | 12569.71              | -54519.98 | 7186.05   | -12569.71        | 54519.98 | -7186.05  | 0.000%  |
| 32         | 7229.24               | -54519.98 | 12569.29  | -7229.24         | 54519.98 | -12569.29 | 0.000%  |
| 33         | -106.29               | -54519.98 | 14563.41  | 106.29           | 54519.98 | -14563.41 | 0.000%  |
| 34         | -7346.72              | -54519.98 | 12633.47  | 7346.72          | 54519.98 | -12633.47 | 0.000%  |
| 35         | -12621.57             | -54519.98 | 7319.91   | 12621.57         | 54519.98 | -7319.91  | 0.000%  |
| 36         | -14556.63             | -54519.98 | 71.37     | 14556.63         | 54519.98 | -71.37    | 0.000%  |
| 37         | -12602.77             | -54519.98 | -7192.23  | 12602.77         | 54519.98 | 7192.23   | 0.000%  |
| 38         | -7222.94              | -54519.98 | -12584.36 | 7222.94          | 54519.98 | 12584.36  | 0.000%  |

### Maximum Tower Deflections - Service Wind

| Section No. | Elevation ft    | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|-------------|-----------------|---------------------|-----------------|--------|---------|
| L1          | 184 - 166.5     | 66.6915             | 29              | 3.2171 | 0.0193  |
| L2          | 169.5 - 133.08  | 57.0034             | 29              | 3.1566 | 0.0118  |
| L3          | 136.91 - 112.99 | 36.5635             | 29              | 2.7122 | 0.0057  |
| L4          | 112.99 - 87.99  | 24.1382             | 29              | 2.1990 | 0.0036  |
| L5          | 92.99 - 43.91   | 15.9219             | 29              | 1.7190 | 0.0022  |
| L6          | 50.08 - 1       | 4.3452              | 29              | 0.8250 | 0.0008  |

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

| Elevation ft | Appurtenance                   | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|--------------|--------------------------------|-----------------|---------------|--------|---------|------------------------|
| 184.00       | Lightning Rod 2"x21'           | 29              | 66.6915       | 3.2171 | 0.0197  | 29320                  |
| 163.00       | PIROD 13' Low Profile Platform | 29              | 52.7243       | 3.1029 | 0.0096  | 6692                   |
| 153.00       | PIROD 13' Low Profile Platform | 29              | 46.2954       | 2.9822 | 0.0075  | 4400                   |
| 151.00       | RRH 8x20-25                    | 29              | 45.0392       | 2.9532 | 0.0072  | 4117                   |
| 150.00       | Andrew VHLP2-11                | 29              | 44.4154       | 2.9381 | 0.0071  | 3988                   |
| 143.00       | PIROD 13' Low Profile Platform | 29              | 40.1386       | 2.8235 | 0.0063  | 3269                   |
| 123.00       | PIROD 13' Low Profile Platform | 29              | 29.0027       | 2.4266 | 0.0045  | 2471                   |
| 110.00       | PIROD 13' Low Profile Platform | 29              | 22.7857       | 2.1281 | 0.0033  | 2343                   |
| 54.00        | 1' Side Mount Standoff         | 29              | 5.0463        | 0.8980 | 0.0008  | 2468                   |
| 38.90        | Andrew VHLPX2-18-2WH/B         | 29              | 2.7383        | 0.6247 | 0.0006  | 3152                   |



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|                |                                   |                    |                   |
|----------------|-----------------------------------|--------------------|-------------------|
| <b>Job</b>     | CT43XC827 MANCHESTER POLICE TOWER | <b>Page</b>        | 12 of 12          |
| <b>Project</b> | 183 ft Monopole                   | <b>Date</b>        | 09:03:12 08/04/15 |
| <b>Client</b>  | SPRINT                            | <b>Designed by</b> | kw                |

### Section Capacity Table

| Section No.     | Elevation ft    | Component Type | Size                   | Critical Element | P lb      | SF*P <sub>allow</sub> lb | % Capacity  | Pass Fail   |
|-----------------|-----------------|----------------|------------------------|------------------|-----------|--------------------------|-------------|-------------|
| L1              | 184 - 166.5     | Pole           | TP19.399x15.5x0.1875   | 1                | -2474.25  | 573700.52                | 13.9        | Pass        |
| L2              | 166.5 - 133.08  | Pole           | TP26.401x18.3556x0.25  | 2                | -11200.10 | 1043870.92               | 70.7        | Pass        |
| L3              | 133.08 - 112.99 | Pole           | TP30.285x25.0549x0.375 | 3                | -16780.10 | 1850750.45               | 81.2        | Pass        |
| L4              | 112.99 - 87.99  | Pole           | TP35.892x30.285x0.415  | 4                | -23124.30 | 2352598.27               | 91.1        | Pass        |
| L5              | 87.99 - 43.91   | Pole           | TP44.903x33.9406x0.485 | 5                | -35764.50 | 3444405.21               | 96.0        | Pass        |
| L6              | 43.91 - 1       | Pole           | TP53.5x42.5549x0.54    | 6                | -47861.60 | 4359922.90               | 92.2        | Pass        |
| Summary         |                 |                |                        |                  |           |                          |             |             |
| Pole (L5)       |                 |                |                        |                  |           |                          | 96.0        | Pass        |
| Base Plate      |                 |                |                        |                  |           |                          | 87.3        | Pass        |
| <b>RATING =</b> |                 |                |                        |                  |           |                          | <b>96.0</b> | <b>Pass</b> |

BU: CT143XC827  
 Site Name:  
 App Number: N/A  
 Work Order:

**Monopole Drilled Pier**

**Input**

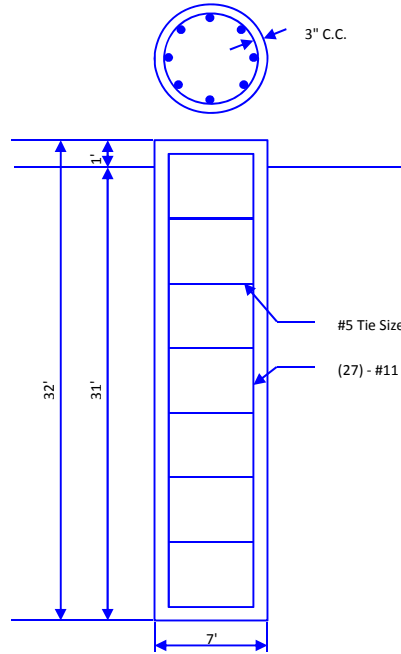
**Criteria**  
 TIA Revision: F  
 ACI 318 Revision: 2002  
 Seismic Category: B

**Forces**  
 Compression: 54.2 kips  
 Shear: 37.4 kips  
 Moment: 4649 k-ft  
 Swelling Force: 0 kips

**Foundation Dimensions**  
 Pier Diameter: 7 ft  
 Ext. above grade: 1 ft  
 Depth below grade: 31 ft

**Material Properties**  
 Number of Rebar: 27  
 Rebar Size: 11  
 Tie Size: 5  
 Rebar tensile strength: 60 ksi  
 Concrete Strength: 4000 psi  
 Ultimate Concrete Strain: 0.003 in/in  
 Clear Cover to Ties: 3 in

Soil Profile: Profile 1



| Layer | Thickness (ft) | From (ft) | To (ft) | Unit Weight (pcf) | Cohesion (psf) | Friction Angle (deg) | Ultimate Uplift Skin Friction (ksf) | Ultimate Comp. Skin Friction (ksf) | Ultimate Bearing Capacity (ksf) | SPT 'N' Counts |
|-------|----------------|-----------|---------|-------------------|----------------|----------------------|-------------------------------------|------------------------------------|---------------------------------|----------------|
| 1     | 3.5            | 0         | 3.5     | 100               | 0              | 0                    | 0                                   | 0                                  |                                 |                |
| 2     | 2.5            | 3.5       | 6       | 100               | 0              | 30                   |                                     |                                    |                                 |                |
| 3     | 10             | 6         | 16      | 37.6              | 0              | 30                   |                                     |                                    |                                 |                |
| 4     | 15             | 16        | 31      | 37.6              | 0              | 30                   |                                     |                                    |                                 |                |
|       |                |           |         |                   |                |                      |                                     |                                    |                                 |                |
|       |                |           |         |                   |                |                      |                                     |                                    |                                 |                |
|       |                |           |         |                   |                |                      |                                     |                                    |                                 |                |
|       |                |           |         |                   |                |                      |                                     |                                    |                                 |                |
|       |                |           |         |                   |                |                      |                                     |                                    |                                 |                |
|       |                |           |         |                   |                |                      |                                     |                                    |                                 |                |
|       |                |           |         |                   |                |                      |                                     |                                    |                                 |                |
|       |                |           |         |                   |                |                      |                                     |                                    |                                 |                |
|       |                |           |         |                   |                |                      |                                     |                                    |                                 |                |

**Analysis Results**

**Soil Lateral Capacity**  
 Depth to Zero Shear: 5.87 ft  
 Max Moment, Mu: 4894.69 k-ft  
 Soil Safety Factor: 2.13  
 Safety Factor Req'd: 2  
**RATING: 93.7%**

**Soil Axial Capacity**  
 Skin Friction (k): 106.41 kips  
 End Bearing (k): 0.00 kips  
 Comp. Capacity (k), φCn: 106.41 kips  
 Comp. (k), Cu: 70.46 kips  
**RATING: 66.2%**

**Concrete/Steel Check**

Mu (from soil analysis): 6363.09 k-ft  
 φMn: 6758.24 k-ft  
**RATING: 94.2%**

rho provided: 0.76  
 rho required: 0.33 OK

Rebar Spacing: 7.36  
 Spacing required: 22.56 OK

Dev. Length required: 24.88  
 Dev. Length provided: 53.51 OK

**Overall Foundation Rating: 94.2%**

# Exhibit C

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

T-Mobile Existing Facility

Site ID: CT11365D

CT365 / Manchester PD\_MP  
239 East Middle Turnpike  
Manchester, CT 06040

**August 13, 2015**

**EBI Project Number: 6215004416**

| Site Compliance Summary                                      |                  |
|--|------------------|
| Compliance Status:   | <b>COMPLIANT</b> |
| Site total MPE% of<br>FCC general public<br>allowable limit: | <b>70.39 %</b>   |

August 13, 2015

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

Emissions Analysis for Site: **CT11365D – CT365 / Manchester PD\_MP**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **239 East Middle Turnpike, Manchester, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The number of  $\mu\text{W}/\text{cm}^2$  calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

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



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

Additional details can be found in FCC OET 65.

## **CALCULATIONS**

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **239 East Middle Turnpike, Manchester, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

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

- 1) 2 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel
- 2) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 3) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 4) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.
- 5) 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.

- 6) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 7) The antennas used in this modeling are the **Ericsson AIR21 B4A/B2P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 B4A/B2P** has a maximum gain of **15.9 dBd** at its main lobe. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

The antennas used in this modeling are the **Ericsson AIR21 B4A/B2P & B2A/B4P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 B4A/B2P & B2A/B4P** have a maximum gain of **15.9 dBd** at their main lobe

- 8) The antenna mounting height centerline of the proposed antennas is **163 feet** above ground level (AGL).
- 9) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

### T-Mobile Site Inventory and Power Data

| Sector:         | A                              | Sector:         | B                              | Sector:         | C                              |
|-----------------|--------------------------------|-----------------|--------------------------------|-----------------|--------------------------------|
| Antenna #:      | 1                              | Antenna #:      | 1                              | Antenna #:      | 1                              |
| Make / Model:   | Ericsson AIR21 B4A/B2P         | Make / Model:   | Ericsson AIR21 B4A/B2P         | Make / Model:   | Ericsson AIR21 B4A/B2P         |
| Gain:           | 15.9 dBd                       | Gain:           | 15.9 dBd                       | Gain:           | 15.9 dBd                       |
| Height (AGL):   | 163                            | Height (AGL):   | 163                            | Height (AGL):   | 163                            |
| Frequency Bands | 1900 MHz(PCS) / 2100 MHz (AWS) | Frequency Bands | 1900 MHz(PCS) / 2100 MHz (AWS) | Frequency Bands | 1900 MHz(PCS) / 2100 MHz (AWS) |
| Channel Count   | 2                              | Channel Count   | 2                              | # PCS Channels: | 2                              |
| Total TX Power: | 120                            | Total TX Power: | 120                            | # AWS Channels: | 120                            |
| ERP (W):        | 4,668.54                       | ERP (W):        | 4,668.54                       | ERP (W):        | 4,668.54                       |
| Antenna A1 MPE% | 0.68                           | Antenna B1 MPE% | 0.68                           | Antenna C1 MPE% | 0.68                           |
| Antenna #:      | 2                              | Antenna #:      | 2                              | Antenna #:      | 2                              |
| Make / Model:   | Ericsson AIR21 B4A/B2P         | Make / Model:   | Ericsson AIR21 B4A/B2P         | Make / Model:   | Ericsson AIR21 B4A/B2P         |
| Gain:           | 15.9 dBd                       | Gain:           | 15.9 dBd                       | Gain:           | 15.9 dBd                       |
| Height (AGL):   | 163                            | Height (AGL):   | 163                            | Height (AGL):   | 163                            |
| Frequency Bands | 1900 MHz(PCS) / 2100 MHz (AWS) | Frequency Bands | 1900 MHz(PCS) / 2100 MHz (AWS) | Frequency Bands | 1900 MHz(PCS) / 2100 MHz (AWS) |
| Channel Count   | 4                              | Channel Count   | 4                              | Channel Count   | 4                              |
| Total TX Power: | 120                            | Total TX Power: | 120                            | Total TX Power: | 120                            |
| ERP (W):        | 4,668.54                       | ERP (W):        | 4,668.54                       | ERP (W):        | 4,668.54                       |
| Antenna A2 MPE% | 0.68                           | Antenna B2 MPE% | 0.68                           | Antenna C2 MPE% | 0.68                           |
| Antenna #:      | 3                              | Antenna #:      | 3                              | Antenna #:      | 3                              |
| Make / Model:   | Commscope LNX-6515DS-VTM       | Make / Model:   | Commscope LNX-6515DS-VTM       | Make / Model:   | Commscope LNX-6515DS-VTM       |
| Gain:           | 14.6 dBd                       | Gain:           | 14.6 dBd                       | Gain:           | 14.6 dBd                       |
| Height (AGL):   | 163                            | Height (AGL):   | 163                            | Height (AGL):   | 163                            |
| Frequency Bands | 700 MHz                        | Frequency Bands | 700 MHz                        | Frequency Bands | 700 MHz                        |
| Channel Count   | 1                              | Channel Count   | 1                              | Channel Count   | 1                              |
| Total TX Power: | 30                             | Total TX Power: | 30                             | Total TX Power: | 30                             |
| ERP (W):        | 865.21                         | ERP (W):        | 865.21                         | ERP (W):        | 865.21                         |
| Antenna A3 MPE% | 0.27                           | Antenna B3 MPE% | 0.27                           | Antenna C3 MPE% | 0.27                           |

| Site Composite MPE%      |                |
|--------------------------|----------------|
| Carrier                  | MPE%           |
| T-Mobile                 | <b>4.90</b>    |
| Town MFRE                | 0.96 %         |
| Town MPD - ch 1          | 0.13 %         |
| Town MPD - ch 2          | 0.15 %         |
| Town MFD                 | 0.26 %         |
| Town services intercity  | 0.49 %         |
| RAFS I/2                 | 1.65 %         |
| Town public works        | 0.73 %         |
| Town Services EOC        | 0.73 %         |
| Town FD                  | 0.73 %         |
| town SP hotline          | 0.97 %         |
| Town Vol FD              | 0.56 %         |
| Town Service - School    | 0.16 %         |
| Htfd City FD             | 0.73 %         |
| Tolland MUT              | 0.73 %         |
| Sprint                   | 11.76 %        |
| Clearwire                | 0.81 %         |
| Verizon                  | 6.80 %         |
| AT&T                     | 17.51 %        |
| Verizon Wireless         | 9.63 %         |
| <b>Site Total MPE %:</b> | <b>70.39 %</b> |

|                          |                |
|--------------------------|----------------|
| T-Mobile Sector 1 Total: | 1.63 %         |
| T-Mobile Sector 2 Total: | 1.63 %         |
| T-Mobile Sector 3 Total: | 1.63 %         |
| <b>Site Total:</b>       | <b>70.39 %</b> |

## Summary

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

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

| T-Mobile Sector         | Power Density Value (%) |
|-------------------------|-------------------------|
| Sector 1:               | 1.63 %                  |
| Sector 2:               | 1.63 %                  |
| Sector 3 :              | 1.63 %                  |
| T-Mobile Total:         | 4.90 %                  |
|                         |                         |
| Site Total:             | 70.39 %                 |
|                         |                         |
| Site Compliance Status: | <b>COMPLIANT</b>        |

The anticipated composite MPE value for this site assuming all carriers present is **70.39%** 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.



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