

App No:

2019080964

Revised 10.1.19 - JR

## Application General Information

Applicant Name	<input type="text" value="Site Link Wireless"/>	Updated	<input type="text" value="8/29/2019"/>
Application Type	<input type="text" value="Minor Modification"/>	Ann. Plan?	<input type="text" value="Yes"/>
Carrier	<input type="text" value="Verizon Wireless"/>	Will site be used to support government telecommunications facilities or other equipment for government use?	<input type="text" value="No"/>
Solution Type	<input type="text" value="Macro"/>	Gvt. Use Desc.	<input type="text"/>
Existing	<input type="text" value="Existing"/>		

## Application Description

This is an existing rooftop site with a height of 151'-0" and a penthouse height of 168'-7". Verizon proposes to modify their existing installation of (12) panel antennas at the 147' and 157' RAD centers by **removing and replacing (9) antennas**, (3) each sector. The proposed new antennas will be (3) Nokia AEUB Airscale antennas (23.62"x11.97"x4.72"), (1) at each sector, and (6) JMA MX06FR0660-02 antennas (95.9"x15.4"x10.7"), (2) at each sector.

They will also remove and replace (6) RRH's. The new RRH's will be (3) Nokia Airscale Dual RRH 4T4R B5/B13 320 W (AHBCC)

## Site Information

Site Id	<input type="text" value="48"/>	Zoning	<input type="text" value="R-10"/>
Structure Type	<input type="text" value="Building"/>	Latitude	<input type="text" value="38.983867"/>
Address	<input type="text" value="7600 Maple Ave, Takoma Park"/>	Longitude	<input type="text" value="-77.007964"/>
County Site Name	<input type="text" value="Park Ritchie Apts"/>	Ground Elevation	<input type="text" value="198"/>
Carrier Site Name	<input type="text" value="Takoma Park"/>	City	<input type="text" value="Takoma Park"/>
Site Owner	<input type="text" value="Park Ritchie LLC"/>	Lease Status	<input type="text" value="Leased"/>
Structure Owner	<input type="text" value="PARK RITCHIE LLC"/>	Does the structure require an antenna structure registration under FCC Title 47	<input type="text" value="No"/>
Existing Structure Height	<input type="text" value="151"/>	Distance to Residential Property (New, Replacement, Colocation Only)	<input type="text"/>
Provide the proposed height of the replacement structure without any antenna (New, Replacement Apps Only)	<input type="text"/>	Distance to Commercial Property (New, Replacement, Colocation Only)	<input type="text"/>

Justification of why this site was selected:

This site was selected to provide coverage and add capacity to Verizon's network. The new equipment will serve to enhance existing coverage and provide congestion relief for customers in the Takoma Park area. This site was chosen as it would provide the b

NearbySites (New, Replacement Apps Only):

Thursday, August 29, 2019

1:24:31 PM

App No:

2019080964

Screening considerations(New, Colocations, Replacement Apps Only):

App No:

2019080964

6409 Questions

Does this qualify as a 6409 application? (Minor Mod, Colocations Only)

Yes

For towers outside the public ROW will the proposed installation increase the height of the structure by: (1) more than 10% or (2) more than 20 feet, whichever is greater?

N/A

Will the proposed installation increase the width by adding appurtenance to the body of the structure that would protrude from the edge of the structure by more than 6 feet?

No

For towers outside the public ROW will the proposed installation increase the width by adding appurtenance to the body of the structure that would protrude from the edge of the structure by more than 20 feet?

N/A

More than four Equipment Cabinets? YN

No

Will the proposed installation require excavation or expansion outside the current boundaries of the site?

No

Will the proposed installation increase the height of the structure by: (1) more than 10% or (2) more than 10 feet, whichever is greater?

No

Does the structure or current installation have concealment elements/measures?

No

If yes, describe how the proposed installation does not defeat the existing concealment.

Small Wireless Facility Informatio

Small Wireless Facility Questions

Small Wireless Facility?

No

Is the structure 10% taller than adjacent structures?

Cumulative volume of the proposed wireless equipment(s) exclusive of antennas in cubic feet

Please list adjacent structure heights

Cumulative volume of the proposed antenna antenna(s) exclusive of equipment

Tribal Lands?

No

5

ROW Information

PROW?

No

Pole Number

ROW owner

ROW width

App No: 2019080964

Antenna Infomatio

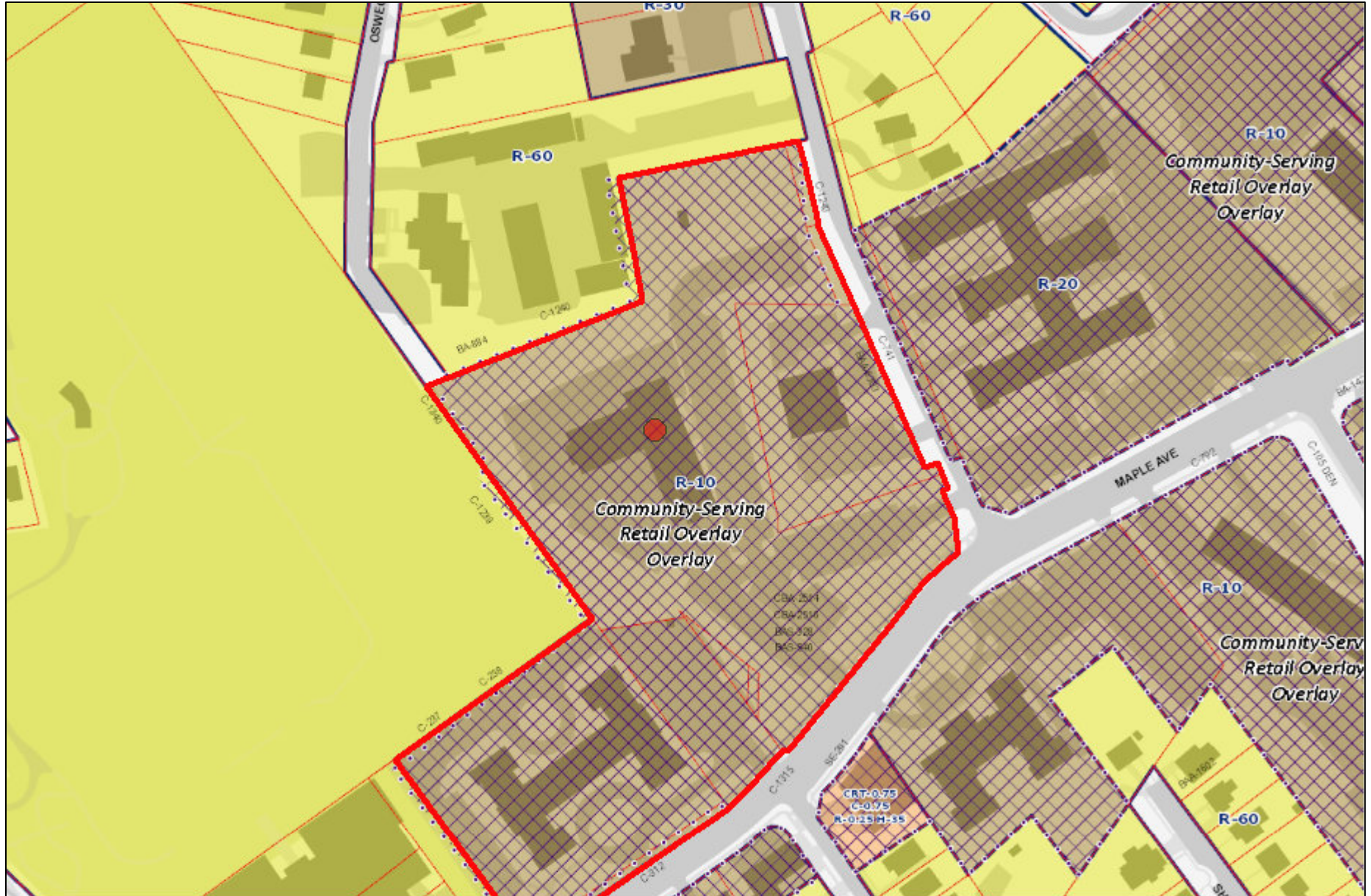
Antenna Compliance   
Compliance Desc   
Antenna Location   
Antenna Loc. Desc.   
Env. Assessment   
Cat. Excluded?   
Routine Env. Evaluation

Antenna Model   
Frequency   
RAD Center  Max ERP  Antenna Dimensions  Quantity

Antenna Model   
Frequency   
RAD Center  Max ERP  Antenna Dimensions  Quantity

Antenna Model   
Frequency   
RAD Center  Max ERP  Antenna Dimensions  Quantity

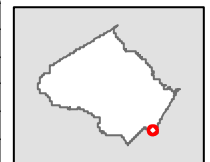
Antenna Model   
Frequency   
RAD Center  Max ERP  Antenna Dimensions  Quantity



Account #	01073182
Address	7600 MAPLE AVE TAKOMA PARK, 20912
Zone	R-10
Overlay Zone	Community-Serving Retail Overlay
TDR Overlay Zone	N/A
Landuse	Multi-Family
Parcel, Lot, Block	N/A, P29, 60
WSSC Grid	209NE01
Map Amendments	G-791 G-956

Parking District	N/A
CBD	N/A
Special Protection Area	N/A
Urban District	N/A
Enterprise Zone	N/A
Arts & Ent. District	N/A
Special Tax District	N/A
Legal Description	B F G ART OF ORGANIZATION CONV

Bike/Ped Priority Area	N/A
Urban Renewal Area	N/A
Metro Station Policy Area	N/A
Priority Funding Area	Yes
Septic Tier	Tier 1: Sewer existing
Municipality	TAKOMA PARK
Master Plan	TAKOMA PARK
Historic Site/District	N/A
Water/Sewer Categories	W-1/ S-1



1 inch = 218 feet

# MX06FRO660-02

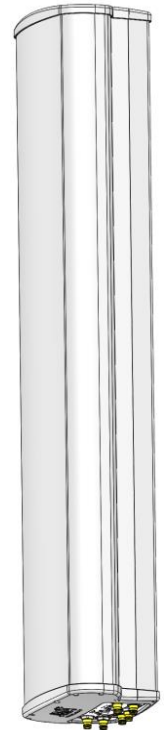
NWAV™ X-Pol Antenna | Hex-Port | 6 ft | 60°



## X-Pol, Hex-Port 6 ft 60° Fast Roll Off with Smart Bias T

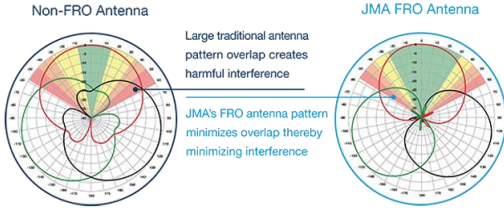
### (2) 698-894 MHz & (4) 1695-2180 MHz

- Fast Roll Off (FRO™) Azimuth beam pattern improves Intra- and Inter-cell SINR
- Excellent Passive Intermodulation (PIM) performance reduces harmful interference
- Fully integrated (iRETs) with independent RET control for low and high bands for ease of network optimization
- SON-Ready array spacing supports beamforming capabilities
- Suitable for LTE/CDMA/PCS/UMTS/GSM Air interface technologies
- Integrated Smart BIAS-Ts reduces leasing costs



Fast Roll-Off (FRO) increased throughput, without compromising coverage.

FRO technology increases the Signal to Interference & Noise Ratio (SINR) by eliminating overlap between sectors.



LTE Throughput	SINR	Speed (bps/Hz)	Speed Increase	CQI
Excellent	>20	>5	333+ %	14-15
Good	12-20	3.3-5	277%	10-13
Fair	6-12	1.5-3.3	160%	7-9
Poor	<6	<1.5	0%	1-7



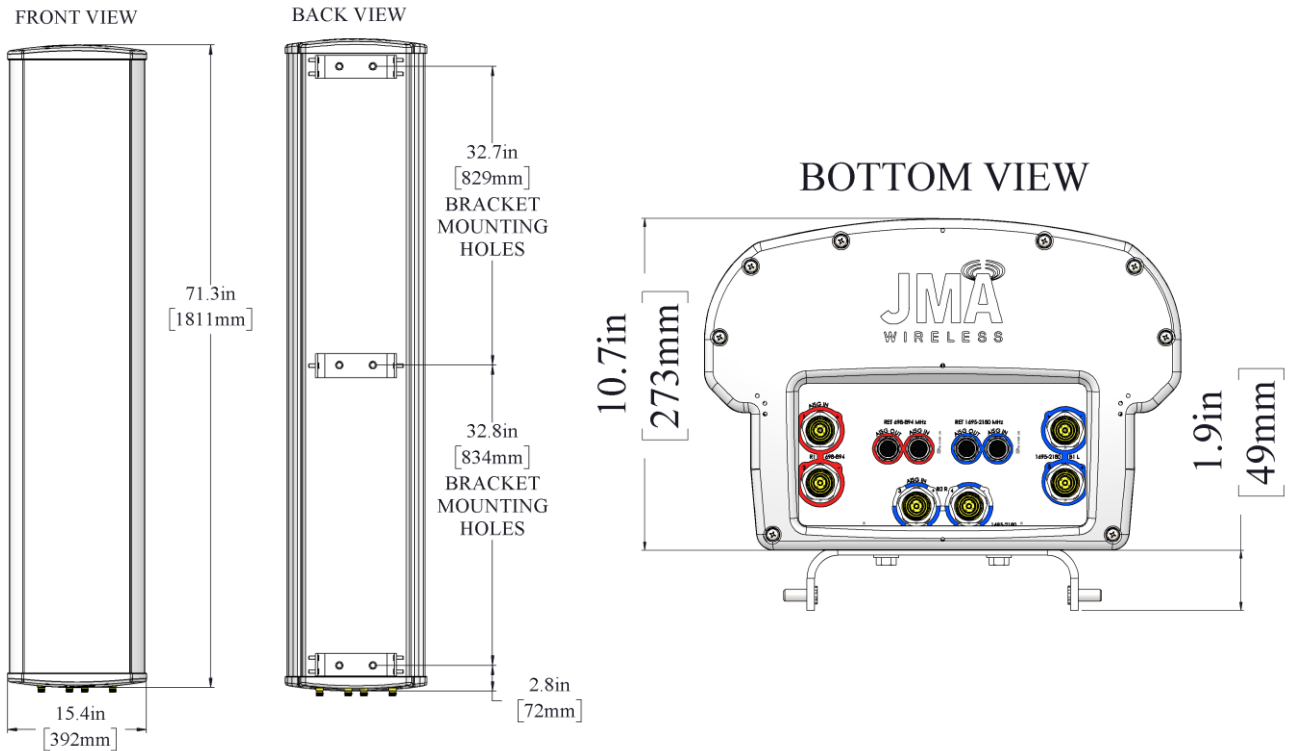
Electrical Specification (Minimum/ Maximum)	Ports 1,2		Ports 3,4,5,6		
	Frequency bands, MHz	698–798	824–894	1695–1880	1850–1990
Polarization	± 45°		± 45°		
Average gain over all tilts, dBi	15.0	14.7	17.6	18.0	18.2
Horizontal beamwidth (HBW), degrees <sup>1</sup>	62.5	53.5	55.0	55.0	55.5
Front-to-back ratio, co-polar power @ 180°± 30°, dB	>23.7	>21.0	>25.0	>25.0	>25.0
X-Pol discrimination (CPR) at boresight, dB	>17.8	>14.2	>18	>18	>15
Sector power ratio, percent	<4.8	<3.8	<3.7	<3.8	<3.6
Vertical beamwidth, (VBW), degrees <sup>1</sup>	13.6	11.8	6.0	5.5	5.5
Electrical downtilt (EDT) range, degrees	2-14	2-14	0-9		
First upper side lobe (USLS) suppression, dB <sup>1</sup>	≤ -15.0	≤ -16.5	≤ -16.0	≤ -16.0	≤ -16.0
Minimum cross-polar isolation, port-to-port, dB	25	25	25	25	25
Maximum VSWR/ return loss, dB	1.5/ -14.0	1.5/ -14.0	1.5/ -14.0	1.5/ -14.0	1.5/ -14.0
Maximum passive Intermodulation (PIM), 2x 20W carrier, dBc	-153	-153	-153		
Maximum input power per any port, watts	300		250		
Total composite power all ports, watts	1500				

<sup>1</sup> Typical value over frequency and tilt

# MX06FRO660-02

NWAV™ X-Pol Antenna | Hex-Port | 6 ft | 60°

Mechanical Specifications	
Dimensions height/ width/ depth, inches (mm)	71.3/ 15.4/ 10.7 (1811/ 392/ 272)
Shipping dimensions length/ width/ height, inches (mm)	82/ 20/ 15 (2083/ 508/ 381)
No. of RF input ports, connector type & location	6 x 4.3-10 female, bottom
RF connector torque	96 lbf-in (10.85 N m or 8 lbf-ft)
Net antenna weight, lb (kg)	57 (25.91)
Shipping weight, lb (kg)	97 (44.09)
Antenna mounting and downtilt kit included with antenna	91900318
Net weight of the mounting and downtilt kit, lb (kg)	18 (8.18)
Range of mechanical up/ down tilt	-2° to 12°
Rated wind survival speed, mph (km/h)	150 (241)
Frontal, lateral & rear wind loading @ 150 km/h, lbf (N)	154 (685), 73 (325), 158 (703)
Equivalent flat plate @100 mph and Cd=2, sq. ft.	2.6



Ordering Information	
Antenna Model	Description
MX06FRO660-02	6F X- Pol HEX FRO 60° 2-14°/ 0-9° RET, 4.3-10 & SBT
Optional Accessories	
992100-CA030-SC	Optional AISG jumper cable, M/F, 3.0 meters
PCU-1000	Primary control unit, USB

# MX06FRO660-02

NWAV™ X-Pol Antenna | Hex-Port | 6 ft | 60°

Remote Electrical Tilt (RET 1000) Information	
RET location	Integrated into antenna
RET interface connector type	8-pin AISG connector per IEC 60130-9
RET interface connector quantity	2 pairs of AISG male/ female connectors
RET interface connector location	Bottom of the antenna
Total No. of internal RETs low bands	1
Total No. of internal RETs high bands	1
RET input operating voltage, vdc	10–30
RET max. power consumption, idle state, W	≤ 2.0
RET max. power consumption, normal operating conditions, W	≤ 13.0
RET communication protocol	AISG 2.0/ 3GPP

### RET & RF Connector Topology

Each RET device can be controlled either via the designated external AISG connector or RF port as shown below

RET Device	Band	RF Port
1	698–894	1–2

RET Device	Band	RF Port
2	1695–2180	3–6

### Array Topology

3 sets of radiating arrays

R1: 698–894MHz  
B1: 1695–2180MHz  
B2: 1695–2180MHz

Band	RF Port
1695–2180	3–4
698–894	1–2
1695–2180	5–6



# AEUB 28 GHz Radio Unit

AEUB AirScale MAA 8T8R 512AE 28 GHz 8W		
<b>Specification</b>	3GPP compliant	
<b>Frequency range</b>	26500 – 29500 MHz NR n257	
<b>Max. supported modulation</b>	256 QAM down link / 64 QAM up link	
<b>Instantaneous Bandwidth IBW</b>	1400 MHz	
<b>Occupied Bandwidth OBW</b>	800 MHz	
<b>Number of TX/RX paths</b>	8T / 8R mode	2T / 2R mode
<b>Total average EIRP</b>	54 dBm	60 dBm
<b>Peak EIRP</b>	62 dBm	68 dBm
<b>Antenna type</b>	4 x 8 x 8 phased array	16 x 16 phased array
<b>Horizontal beamwidth (3 dB)</b>	13° (boresight)	6.5° (boresight)
<b>Vertical beamwidth (3 dB)</b>	9.5° (boresight)	4.3° (boresight)
<b>Horizontal steering angle (3 dB)</b>	±45°	
<b>Horizontal steering angle (8 dB)</b>	±60°	
<b>Vertical steering angle (3 dB)</b>	±45°	
<b>Dimensions</b>	600 mm/23.62" (H) x 304 mm/11.97" (W) x 120 mm/4.72" (D) (w/o lifting handle and mounting brackets)	
<b>Volume</b>	22 l	
<b>Weight</b>	20 kg (without mounting brackets)	
<b>Supply Voltage</b>	AC 90 to 250 V / DC 40.5 to 57 V	
<b>Power consumption</b>	<500 W	



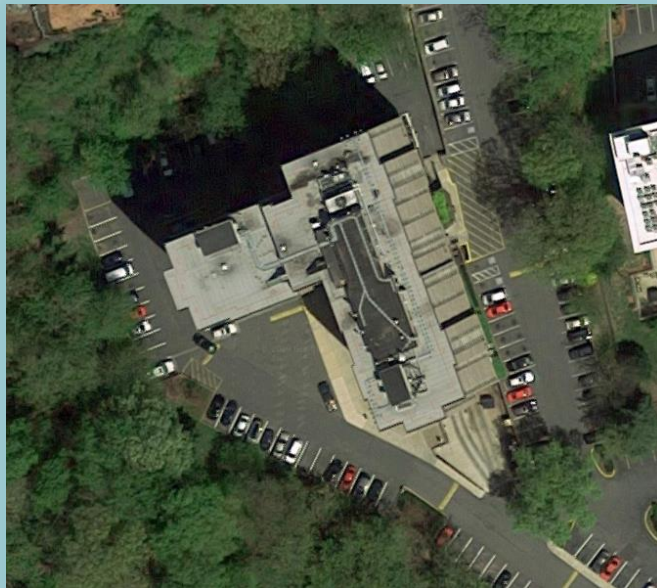
<b>Optical Ports</b>	2 x SFP28 eCPRI
<b>Other Interfaces</b>	Two pcs of three color LED's
<b>Operational temperature range</b>	-40°C to 55°C
<b>Cooling</b>	Natural convection cooling
<b>Ingress protection class</b>	IP65
<b>Installation options</b>	Pole, Wall
<b>Surge protection</b>	Class II 5kA

Revised 6.4.20 - JR

# Radio Frequency - Electromagnetic Energy (RF-EME) Jurisdictional Report

Site No. 114383  
Takoma Park  
7600 Maple Avenue  
Silver Spring, Maryland 20910  
Montgomery County  
38° 59' 3.00" N, -77° 0' 28.00" W NAD83

EBI Project No. 6219005076  
June 2, 2020



Prepared for:

Verizon Wireless  
10170 Junction Drive, 3rd Floor  
Annapolis Junction, Maryland 20701

Prepared by:



**TABLE OF CONTENTS**

**EXECUTIVE SUMMARY ..... 1**

**1.0 INTRODUCTION ..... 2**

**2.0 SITE DESCRIPTION ..... 2**

**3.0 WORST-CASE PREDICTIVE MODELING ..... 5**

**4.0 MITIGATION/SITE CONTROL OPTIONS ..... 6**

**5.0 SUMMARY AND CONCLUSIONS ..... 6**

**6.0 LIMITATIONS ..... 7**

**APPENDICES**

- APPENDIX A CERTIFICATIONS**
- APPENDIX B RADIO FREQUENCY ELECTROMAGNETIC ENERGY SAFETY / SIGNAGE PLANS**
- APPENDIX C FEDERAL COMMUNICATIONS COMMISSION (FCC) REQUIREMENTS**

## EXECUTIVE SUMMARY

### Purpose of Report

EnviroBusiness Inc. (dba EBI Consulting) has been contracted by Verizon Wireless (“Verizon”) to conduct radio frequency electromagnetic (RF-EME) modeling for Verizon Site 114383 located at 7600 Maple Avenue in Silver Spring, Maryland to determine RF-EME exposure levels from proposed Verizon communications equipment at this site. As described in greater detail in Appendix C of this report, the Federal Communications Commission (FCC) has developed Maximum Permissible Exposure (MPE) Limits for the general public and for occupational activities. This report summarizes the results of RF-EME modeling in relation to relevant FCC RF-EME compliance standards for limiting human exposure to RF-EME fields.

### Statement of Compliance

A site is considered out of compliance with FCC regulations if there are areas that exceed the FCC exposure limits and there are no RF hazard mitigation measures in place. Any carrier which has an installation that contributes more than 5% of the applicable MPE must participate in mitigating these RF hazards.

As presented in the sections below, based on worst-case predictive modeling, the worst-case emitted power density may exceed the FCC’s general public limit within approximately 41 feet of Verizon’s proposed antennas at the main roof level. Modeling also indicates that the worst-case emitted power density may exceed the FCC’s occupational limit within approximately 21 feet of Verizon’s proposed antennas at the main roof level. Additionally, there are areas where workers who may be elevated above the rooftop or ground may be exposed to power densities greater than the occupational limits. Therefore, workers should be informed about the presence and locations of antennas and their associated fields.

At the nearest walking/working surface to the Verizon antennas at the main roof level, the maximum power density generated by the Verizon antennas is approximately **2,598.45** percent of the FCC’s general public limit (**519.69** percent of the FCC’s occupational limit).

The composite exposure level from all carriers on this site is approximately **2,598.55** percent of the FCC’s general public limit (**519.71** percent of the FCC’s occupational limit) at the main roof level.

Composite worst-case emitted power densities for each elevation analyzed in this report can be found in Appendix B.

Recommended control measures are outlined in Section 4.0 and within the Site Safety Plan (attached); Verizon should also provide procedures to shut down and lockout/tagout this wireless equipment in accordance with Verizon’s standard operating protocol. Non-telecom workers who will be working in areas of exceedance are required to contact Verizon since only Verizon has the ability to lockout/tagout the facility, or to authorize others to do so.

## 1.0 INTRODUCTION

Radio frequency waves are electromagnetic waves from the portion of the electromagnetic spectrum at frequencies lower than visible light and microwaves. The wavelengths of radio waves range from thousands of meters to around 30 centimeters. These wavelengths correspond to frequencies as low as 3 cycles per second (or hertz [Hz]) to as high as one gigahertz (one billion cycles per second).

Personal Communication (PCS) facilities used by Verizon in this area will potentially operate within a frequency range of 700 to 5000 MHz. Facilities typically consist of: 1) electronic transceivers (the radios or cabinets) connected to wired telephone lines; and 2) antennas that send the wireless signals created by the transceivers to be received by individual subscriber units (PCS telephones). Transceivers are typically connected to antennas by coaxial cables.

Because of the short wavelength of PCS services, the antennas require line-of-site paths for good propagation, and are typically installed a distance above ground level. Antennas are constructed to concentrate energy towards the horizon, with as little energy as possible scattered towards the ground or the sky. This design, combined with the low power of PCS facilities, generally results in no possibility for exposure to approach Maximum Permissible Exposure (MPE) levels, with the exception of in areas in the immediate vicinity of the antennas.

MPE limits do not represent levels where a health risk exists, since they are designed to provide a substantial margin of safety. These limits apply for continuous exposures and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size or health.

## 2.0 SITE DESCRIPTION

This project site includes the following proposed wireless telecommunication antennas on a rooftop located at 7600 Maple Avenue in Silver Spring, Maryland.

Ant #	Operator	Antenna Make	Antenna Model	Frequency (MHz)	Azimuth (deg.)	Mechanical Downtilt (deg.)	Horizontal Beamwidth (Degrees)	Aperture (feet)	Total Power Input (Watts)	Antenna Gain (dBd)	Total ERP (Watts)	Total EIRP (Watts)
1	Verizon	JMA	MX06FRO660-02 04DT 700	700	4	0	60	5.9	80	12.45	1117.09	1832.04
1	Verizon	JMA	MX06FRO660-02 05DT 850	850	4	0	53	5.9	80	12.45	1117.09	1832.04
1	Verizon	JMA	MX06FRO660-02 02DT 1900	1900	4	0	57	5.9	160	15.95	5001.73	8202.83
2	Verizon	JMA	MX06FRO660-02 04DT 700	700	4	0	60	5.9	80	12.45	1117.09	1832.04
2	Verizon	JMA	MX06FRO660-02 05DT 850	850	4	0	53	5.9	80	12.45	1117.09	1832.04
2	Verizon	JMA	MX06FRO660-02 02DT 2100	2100	4	0	52	5.9	240	15.55	6842.44	11221.61
3	Verizon	Amphenol	CWWX063X19x00-T06 850	850	4	2	65	6.2	160	13.1	2594.90	4255.63
4	Verizon	NOKIA	SON_AEUB_VZW	28000	4	0	13	1.5	1.26	26.85	610.06	1000.49
5	Verizon	JMA	MX06FRO660-02 10DT 700	700	124	0	58	5.9	80	12.35	1091.67	1790.33
5	Verizon	JMA	MX06FRO660-02 10DT 850	850	124	0	55	5.9	80	12.75	1196.99	1963.06
5	Verizon	JMA	MX06FRO660-02 03DT 1900	1900	124	0	55	5.9	160	15.95	5001.73	8202.83
6	Verizon	JMA	MX06FRO660-02 10DT 700	700	124	0	58	5.9	80	12.35	1091.67	1790.33
6	Verizon	JMA	MX06FRO660-02 10DT 850	850	124	0	55	5.9	80	12.75	1196.99	1963.06
6	Verizon	JMA	MX06FRO660-02 03DT 2100	2100	124	0	51	5.9	240	15.65	7001.82	11482.99
7	Verizon	AMPHENOL	CWWX063X19x00-T07 850	850	124	2	65	6.2	160	13.1	2594.90	4255.63
8	Verizon	NOKIA	SON_AEUB_VZW	28000	124	0	13	1.5	1.26	26.85	610.06	1000.49

Ant #	Operator	Antenna Make	Antenna Model	Frequency (MHz)	Azimuth (deg.)	Mechanical Downtilt (deg.)	Horizontal Beamwidth (Degrees)	Aperture (feet)	Total Power Input (Watts)	Antenna Gain (dBd)	Total ERP (Watts)	Total EIRP (Watts)
9	Verizon	JMA	MX06FRO660-02 02DT 700	700	244	0	60	5.9	80	12.45	1117.09	1832.04
9	Verizon	JMA	MX06FRO660-02 02DT 850	850	244	0	54	5.9	80	12.15	1042.53	1709.75
9	Verizon	JMA	MX06FRO660-02 02DT 1900	1900	244	0	57	5.9	160	15.95	5001.73	8202.83
10	Verizon	JMA	MX06FRO660-02 02DT 700	700	244	0	60	5.9	80	12.45	1117.09	1832.04
10	Verizon	JMA	MX06FRO660-02 02DT 850	850	244	0	54	5.9	80	12.15	1042.53	1709.75
10	Verizon	JMA	MX06FRO660-02 02DT 2100	2100	244	0	52	5.9	240	15.55	6842.44	11221.61
11	Verizon	AMPHENOL	CWWX063X19x00-T05 850	850	244	2	65	6.2	160	13.1	2594.90	4255.63
12	Verizon	NOKIA	SON_AEUB_VZW	28000	244	0	13	1.5	1.26	26.85	610.06	1000.49
13	AT&T	GENERIC	PANEL 6FT 00DT 850	850	0	0	66	6.0	120	12.62	1099.46	1803.12
14	AT&T	GENERIC	PANEL 6FT 00DT 1900	1900	0	0	66	6.0	120	15.84	2307.71	3784.64
15	AT&T	GENERIC	PANEL 6FT 00DT 2100	2100	0	0	63	6.0	80	16.39	1746.18	2863.74
15	AT&T	GENERIC	PANEL 6FT 00DT 700	700	0	0	68	6.0	60	12.33	514.22	843.33
16	AT&T	GENERIC	PANEL 6FT 00DT 850	850	120	0	66	6.0	120	12.62	1099.46	1803.12
17	AT&T	GENERIC	PANEL 6FT 00DT 1900	1900	120	0	66	6.0	120	15.84	2307.71	3784.64
18	AT&T	GENERIC	PANEL 6FT 00DT 2100	2100	120	0	63	6.0	80	16.39	1746.18	2863.74
18	AT&T	GENERIC	PANEL 6FT 00DT 700	700	120	0	68	6.0	60	12.33	514.22	843.33
19	AT&T	GENERIC	PANEL 6FT 00DT 850	850	240	0	66	6.0	120	12.62	1099.46	1803.12
20	AT&T	GENERIC	PANEL 6FT 00DT 1900	1900	240	0	66	6.0	120	15.84	2307.71	3784.64
21	AT&T	GENERIC	PANEL 6FT 00DT 2100	2100	240	0	63	6.0	80	16.39	1746.18	2863.74
21	AT&T	GENERIC	PANEL 6FT 00DT 700	700	240	0	68	6.0	60	12.33	514.22	843.33
22	Sprint	GENERIC	PANEL 6FT 00DT 850	850	20	0	66	6.0	20	12.62	183.24	300.52
23	Sprint	GENERIC	PANEL 6FT 00DT 1900	1900	20	0	66	6.0	120	15.84	2307.71	3784.64
24	Sprint	GENERIC	PANEL 6FT 00DT 850	850	150	0	66	6.0	20	12.62	183.24	300.52
25	Sprint	GENERIC	PANEL 6FT 00DT 1900	1900	150	0	66	6.0	120	15.84	2307.71	3784.64
26	Sprint	GENERIC	PANEL 6FT 00DT 850	850	260	0	66	6.0	20	12.62	183.24	300.52
27	Sprint	GENERIC	PANEL 6FT 00DT 1900	1900	260	0	66	6.0	120	15.84	2307.71	3784.64
28	T-Mobile	GENERIC	PANEL 6FT 00DT 1900	1900	350	0	66	6.0	120	15.84	2307.71	3784.64
29	T-Mobile	GENERIC	PANEL 6FT 00DT 2100	2100	350	0	63	6.0	120	16.39	4657.80	7638.80
30	T-Mobile	GENERIC	PANEL 6FT 00DT 1900	1900	150	0	66	6.0	120	15.84	2307.71	3784.64
31	T-Mobile	GENERIC	PANEL 6FT 00DT 2100	2100	150	0	63	6.0	120	16.39	4657.80	7638.80
32	T-Mobile	GENERIC	PANEL 6FT 00DT 1900	1900	220	0	66	6.0	120	15.84	2307.71	3784.64
33	T-Mobile	GENERIC	PANEL 6FT 00DT 2100	2100	220	0	63	6.0	120	16.39	4657.80	7638.80

• Note there are 4 Verizon antennas per sector at this site. For clarity, the different frequencies for each antenna are entered on separate lines.

Ant #	Carrier	X	Y	Antenna Radiation Centerline	Z-Height Penthouse	Z-Height Main Roof	Z-Height Top Floor (Below Main Roof)	Z-Height Lower Roof	Z-Height Top Floor (Below Lower Roof)	Z-Height Ground
1	Verizon	110.0	18.3	147.0	-21.6	-4.0	6.0	6.0	16.0	147.0
2	Verizon	113.1	16.6	147.0	-21.6	-4.0	6.0	6.0	16.0	147.0
3	Verizon	117.9	14.9	147.0	-21.6	-4.0	6.0	6.0	16.0	147.0
4	Verizon	120.5	13.5	147.0	-21.6	-4.0	6.0	6.0	16.0	147.0
5	Verizon	168.9	164.3	157.0	-11.6	6.0	16.0	16.0	26.0	157.0
6	Verizon	167.2	166.7	157.0	-11.6	6.0	16.0	16.0	26.0	157.0
7	Verizon	164.8	170.8	157.0	-11.6	6.0	16.0	16.0	26.0	157.0
8	Verizon	163.2	172.9	157.0	-11.6	6.0	16.0	16.0	26.0	157.0
9	Verizon	137.8	190.0	147.0	-21.6	-4.0	6.0	6.0	16.0	147.0
10	Verizon	136.6	186.9	147.0	-21.6	-4.0	6.0	6.0	16.0	147.0
11	Verizon	135.7	184.0	147.0	-21.6	-4.0	6.0	6.0	16.0	147.0
12	Verizon	134.5	181.4	147.0	-21.6	-4.0	6.0	6.0	16.0	147.0
13	AT&T	35.6	77.8	152.5	-16.1	1.5	11.5	11.5	21.5	152.5
14	AT&T	39.1	76.4	152.5	-16.1	1.5	11.5	11.5	21.5	152.5
15	AT&T	42.9	74.7	152.5	-16.1	1.5	11.5	11.5	21.5	152.5
16	AT&T	149.6	104.8	173.5	4.9	22.5	32.5	32.5	42.5	173.5
17	AT&T	151.3	108.6	173.5	4.9	22.5	32.5	32.5	42.5	173.5
18	AT&T	153.2	112.9	173.5	4.9	22.5	32.5	32.5	42.5	173.5
19	AT&T	111.7	83.0	173.5	4.9	22.5	32.5	32.5	42.5	173.5
20	AT&T	110.3	79.4	173.5	4.9	22.5	32.5	32.5	42.5	173.5
21	AT&T	108.9	76.1	173.5	4.9	22.5	32.5	32.5	42.5	173.5
22	Sprint	113.8	38.2	161.5	-7.1	10.5	20.5	20.5	30.5	161.5
23	Sprint	117.2	39.1	161.5	-7.1	10.5	20.5	20.5	30.5	161.5
24	Sprint	164.1	137.8	178.5	9.9	27.5	37.5	37.5	47.5	178.5
25	Sprint	159.1	147.3	178.5	9.9	27.5	37.5	37.5	47.5	178.5
26	Sprint	135.4	144.9	178.5	9.9	27.5	37.5	37.5	47.5	178.5
27	Sprint	131.4	136.1	178.5	9.9	27.5	37.5	37.5	47.5	178.5
28	T-Mobile	111.9	67.6	178.5	9.9	27.5	37.5	37.5	47.5	178.5
29	T-Mobile	120.7	63.8	178.5	9.9	27.5	37.5	37.5	47.5	178.5
30	T-Mobile	162.9	145.8	178.5	9.9	27.5	37.5	37.5	47.5	178.5
31	T-Mobile	155.8	148.9	178.5	9.9	27.5	37.5	37.5	47.5	178.5
32	T-Mobile	143.5	154.2	178.5	9.9	27.5	37.5	37.5	47.5	178.5
33	T-Mobile	138.7	152.7	178.5	9.9	27.5	37.5	37.5	47.5	178.5

• Note the Z-Height represents the distance from the antenna centerline.

The above tables contain an inventory of proposed Verizon Antennas and other carrier antennas if sufficient information was available to model them. Note that EBI uses an assumed set of antenna specifications and powers for unknown and other carrier antennas for modeling purposes. The FCC guidelines incorporate two separate tiers of exposure limits that are based upon occupational/controlled exposure limits (for workers) and general population/uncontrolled exposure limits for members of the general public that may be exposed to antenna fields. While access to this site is considered uncontrolled, the analysis has considered exposures with respect to both controlled and uncontrolled limits as an untrained worker may access adjacent rooftop locations. Additional information regarding controlled/uncontrolled exposure limits is provided in Appendix C. Appendix B presents a site safety plan that provides a plan view of the rooftop with antenna locations.

### 3.0 WORST-CASE PREDICTIVE MODELING

EBI has performed theoretical MPE modeling using RoofMaster™ software to estimate the worst-case power density at the site's nearby broadcast levels resulting from operation of the antennas. RoofMaster™ is a widely-used predictive modeling program that has been developed by Waterford Consultants to predict RF power density values for rooftop and tower telecommunications sites produced by vertical collinear antennas that are typically used in the cellular, PCS, paging and other communications services. Using the computational methods set forth in Federal Communications Commission (FCC) Office of Engineering & Technology (OET) Bulletin 65, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields" (OET-65), RoofMaster™ calculates predicted power density in a scalable grid based on the contributions of all RF sources characterized in the study scenario. At each grid location, the cumulative power density is expressed as a percentage of the FCC limits. Manufacturer antenna pattern data is utilized in these calculations. RoofMaster™ models consist of the Far Field model as specified in OET-65 and an implementation of the OET-65 Cylindrical Model (Sula9). The models utilize several operational specifications for different types of antennas to produce a plot of spatially-averaged power densities that can be expressed as a percentage of the applicable exposure limit.

For this report, EBI utilized antenna and power data provided by Verizon and compared the resultant worst-case MPE levels to the FCC's occupational/controlled exposure limits outlined in OET Bulletin 65. The assumptions used in the modeling are based upon information provided by Verizon and information gathered from other sources. The parameters used for modeling are summarized in the Site Description antenna inventory table in Section 2.0.

Because actual building materials are unknown and to provide worst-case results, EBI did not include material attenuation for the building roof or exterior walls. It should be noted that building materials such as concrete, metal, wood, etc...reduce RF energy penetration; therefore, the theoretical MPE calculations found in this report for areas within the building at the top floor levels will be higher than real-world MPE levels encounter on site. The top floor levels were estimated to be 10 feet below each corresponding roof level.

T-Mobile, Sprint and AT&T also have antennas on the rooftop. Information about these antennas was included in the modeling analysis.

Based on worst-case predictive modeling, the worst-case emitted power density may exceed the FCC's general public limit within approximately 41 feet of Verizon's Sector B antennas at the main roof level. Modeling also indicates that the worst-case emitted power density may exceed the FCC's occupational limit within approximately 21 feet of Verizon's Sector B antennas at the main rooftop level. At the nearest walking/working surfaces to the Verizon antennas at the main roof, the maximum power density generated by the Verizon antennas is approximately 2,598.45 percent of the FCC's general public limit (519.69 percent of the FCC's occupational limit). The composite exposure level from all carriers on this site is approximately 2,598.55 percent of the FCC's general public limit (519.71 percent of the FCC's occupational limit) at the main roof level.

Composite worst-case emitted power densities for each elevation analyzed in this report can be found in Appendix B.

The Site Safety Plan also presents areas where Verizon Wireless antennas contribute greater than 5% of the applicable MPE limit for a site. A site is considered out of compliance with FCC regulations if there are areas that exceed the FCC exposure limits and there are no RF hazard mitigation measures in place.



Any carrier which has an installation that contributes more than 5% of the applicable MPE must participate in mitigating these RF hazards.

There were also worst-case predicted exposures above the general public MPE in front of the AT&T antennas. However, modeling indicates that the Verizon contribution to these areas is less than 5% of the general public MPE and as such, under FCC regulations, Verizon is not responsible for these predicted exceedances.

The inputs used in the modeling are summarized in the Site Description antenna inventory table in Section 2.0. A graphical representation of the RoofMaster™ modeling results is presented in Appendix B.

#### **4.0 MITIGATION/SITE CONTROL OPTIONS**

EBI's modeling indicates that there are areas in front of the Verizon antennas that exceed the FCC standards for general public and occupational exposure. In order to alert people accessing the rooftop, a Guidelines sign and an NOC Information sign are recommended for installation at each access point to the rooftop. Additionally, yellow Caution signs are recommended for installation on the proposed barrier at the Verizon Sector B antennas. These signs must be placed in a conspicuous manner so that they are visible to any person approaching the barrier from any direction.

Barriers are recommended for installation when possible to block access to the areas in front of the antennas that exceed the FCC general public and/or occupational limits. Barriers may consist of rope, chain, or fencing. Painted stripes should only be used as a last resort. Barriers are recommended 15 feet on either side of the Verizon Sector B antennas.

These protocols and recommended control measures have been summarized and included with a graphic representation of the antennas and associated signage and control areas in a RF-EME Site Safety Plan, which is included as Appendix B. Individuals and workers accessing the rooftop should be provided with a copy of the attached Site Safety Plan, made aware of the posted signage and barriers, and signify their understanding of the Site Safety Plan.

To reduce the risk of exposure, EBI recommends that access to areas associated with the active antenna installation be restricted and secured where possible.

Implementation of the signage and barriers recommended in the Site Safety Plan and in this report will bring this site into compliance with the FCC's rules and regulations.

#### **5.0 SUMMARY AND CONCLUSIONS**

EBI has prepared a Radiofrequency – Electromagnetic Energy (RF-EME) Compliance Report for telecommunications equipment installed by Verizon Site Number 114383 located at 7600 Maple Avenue in Silver Spring, Maryland to determine worst-case predicted RF-EME exposure levels from wireless communications equipment installed at this site. This report summarizes the results of RF-EME modeling in relation to relevant Federal Communications Commission (FCC) RF-EME compliance standards for limiting human exposure to RF-EME fields.

As presented in the sections above, based on the FCC criteria, the worst-case emitted power density may exceed the FCC's general public limit within approximately 41 feet of Verizon's proposed antennas at the main roof level. Modeling also indicates that the worst-case emitted power density may exceed the FCC's occupational limit within approximately 21 feet of Verizon's proposed antennas at the main roof level.

Workers should be informed about the presence and locations of antennas and their associated fields. Recommended control measures are outlined in Section 4.0 and within the Site Safety Plan (attached); Verizon should also provide procedures to shut down and lockout/tagout this wireless equipment in accordance with Verizon's standard operating protocol. Non-telecom workers who will be working in areas of exceedance are required to contact Verizon since only Verizon has the ability to lockout/tagout the facility, or to authorize others to do so.

## **6.0 LIMITATIONS**

This report was prepared for the use of Verizon Wireless. It was performed in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same locale under like circumstances. The conclusions provided by EBI are based solely on the information provided by the client. The observations in this report are valid on the date of the investigation. Any additional information that becomes available concerning the site should be provided to EBI so that our conclusions may be revised and modified, if necessary. This report has been prepared in accordance with Standard Conditions for Engagement and authorized proposal, both of which are integral parts of this report. No other warranty, expressed or implied, is made.


# **Appendix A**

## **Certifications**

## Preparer Certification

I, Jonathan Ilgenfritz, state that:

- I am an employee of EnviroBusiness Inc. (d/b/a EBI Consulting), which provides RF-EME safety and compliance services to the wireless communications industry.
- I have successfully completed RF-EME safety training, and I am aware of the potential hazards from RF-EME and would be classified “occupational” under the FCC regulations.
- I am fully aware of and familiar with the Rules and Regulations of both the Federal Communications Commissions (FCC) and the Occupational Safety and Health Administration (OSHA) with regard to Human Exposure to Radio Frequency Radiation.
- I have reviewed the data provided by the client and incorporated it into this Site Compliance Report such that the information contained in this report is true and accurate to the best of my knowledge.



Reviewed and Approved by:



sealed 3jun2020 mike@h2dc.com  
H2DC PLLC Md CoA#: 09-50517

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Michael A McGuire PE  
Electrical Engineer  
[mike@h2dc.com](mailto:mike@h2dc.com)

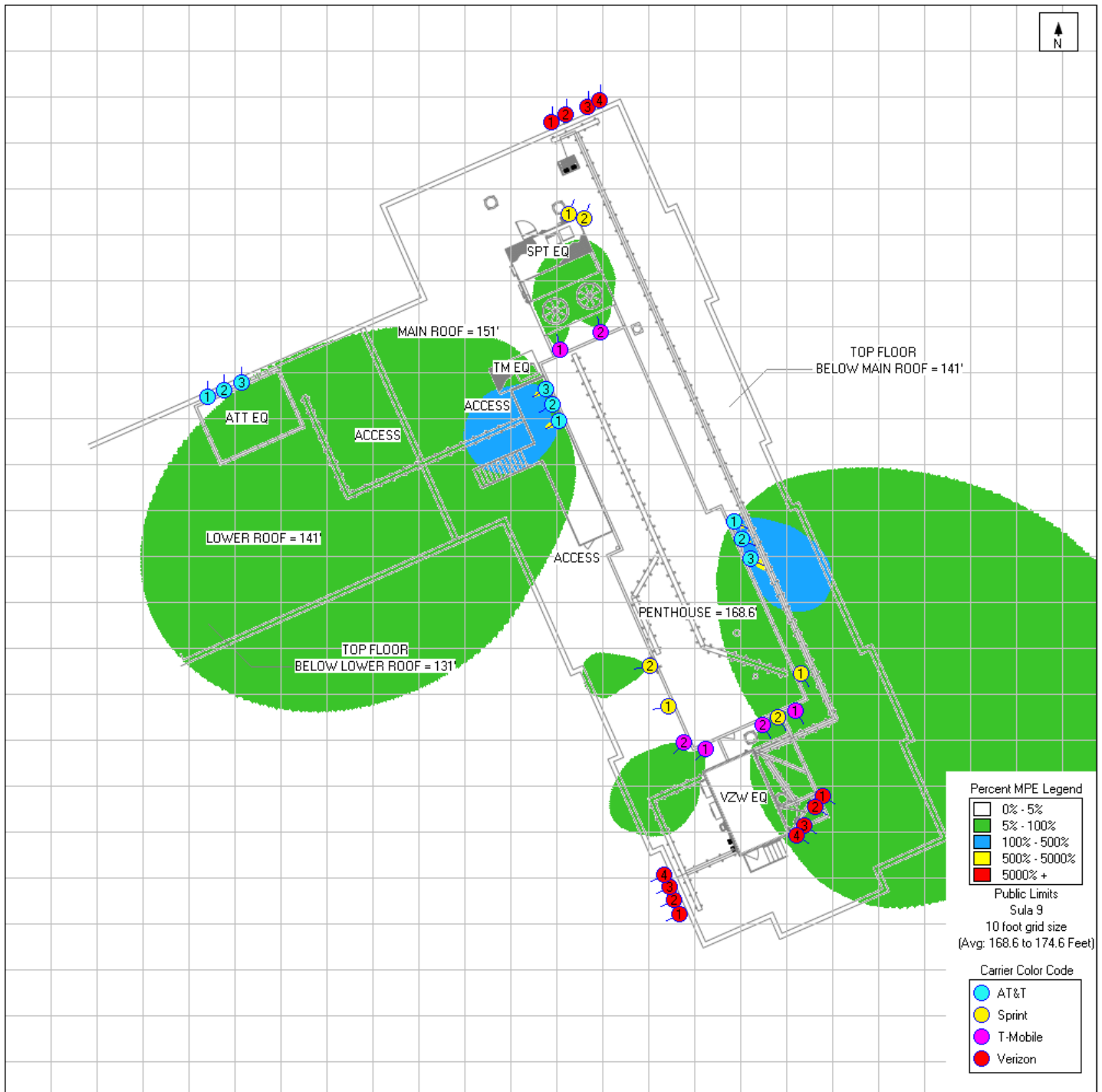
Note that EBI's scope of work is limited to an evaluation of the Radio Frequency – Electromagnetic Energy (RF-EME) field generated by the antennas and broadcast equipment noted in this report. The engineering and design of the structure, as well as the impact of the antennas and broadcast equipment on the structural integrity of the structure, are specifically excluded from EBI's scope of work.

**Appendix B**

**Radio Frequency Electromagnetic Energy**

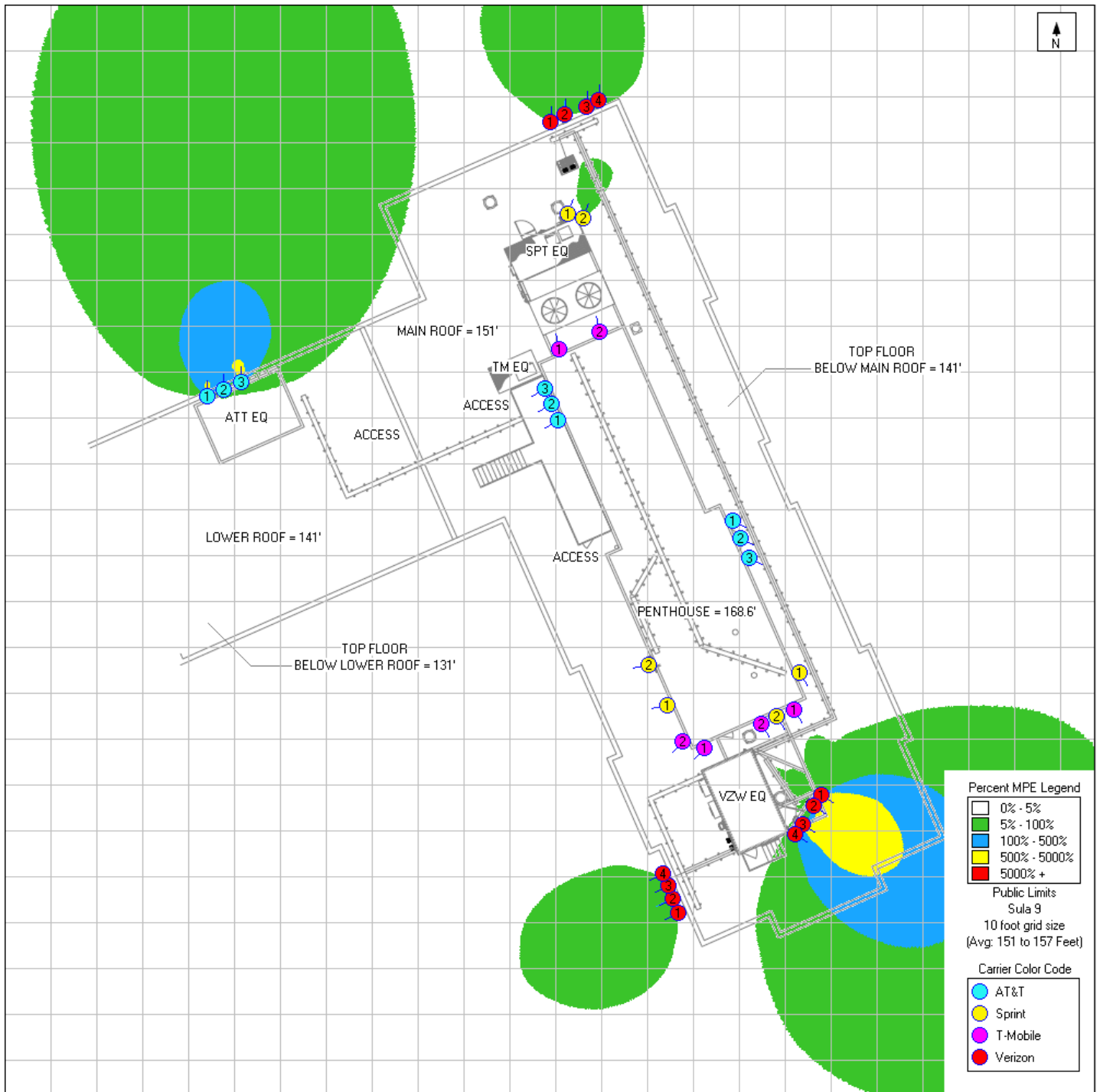
**Safety Information and Signage Plans**

### Penthouse Roof Simulation (168.6 feet AGL)



Max Composite MPE:  
 771.6% FCC General  
 Public Limit

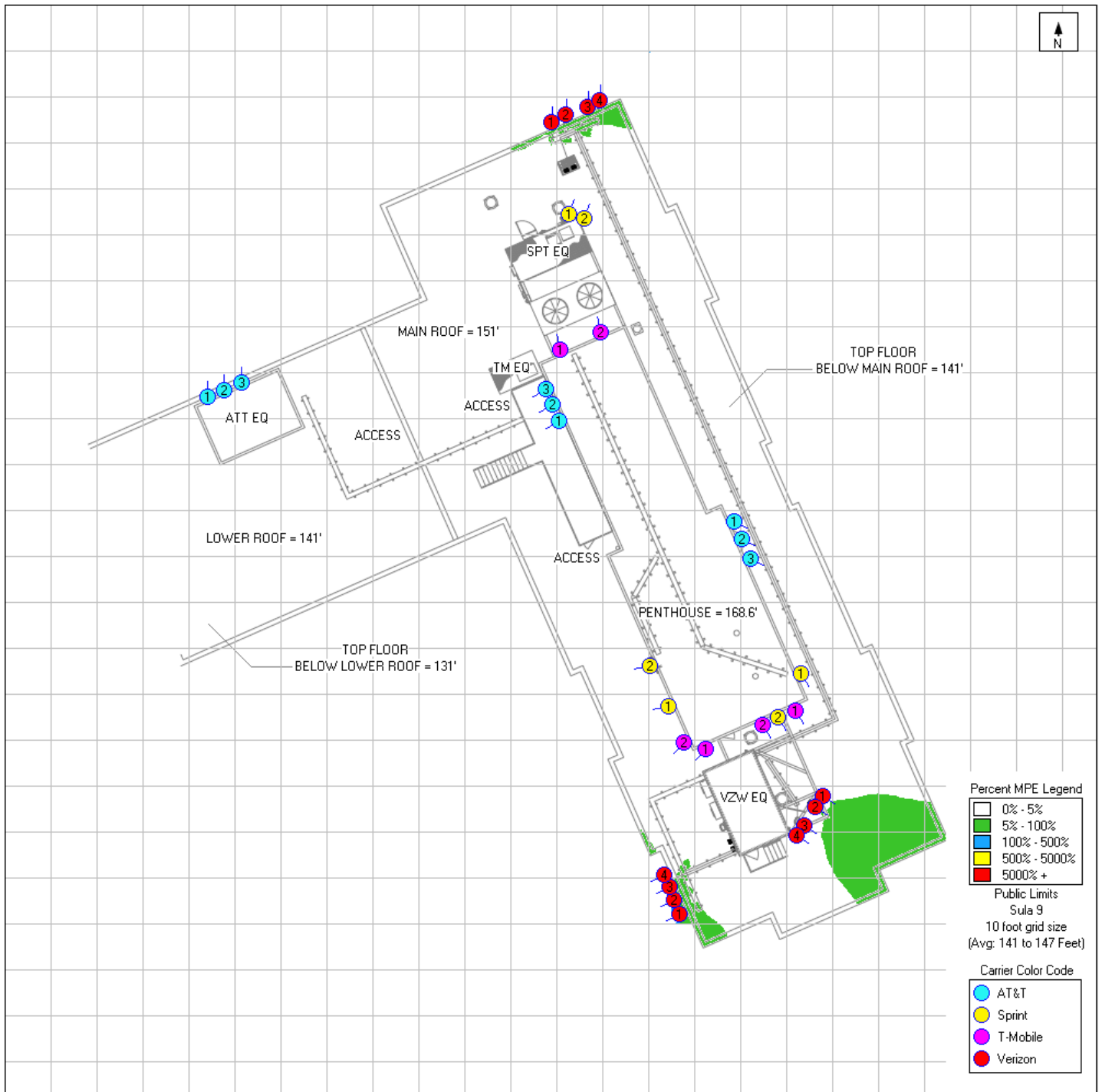
### Main Roof Simulation (151 feet AGL)



Max Composite MPE:  
 2598.6% FCC General  
 Public Limit

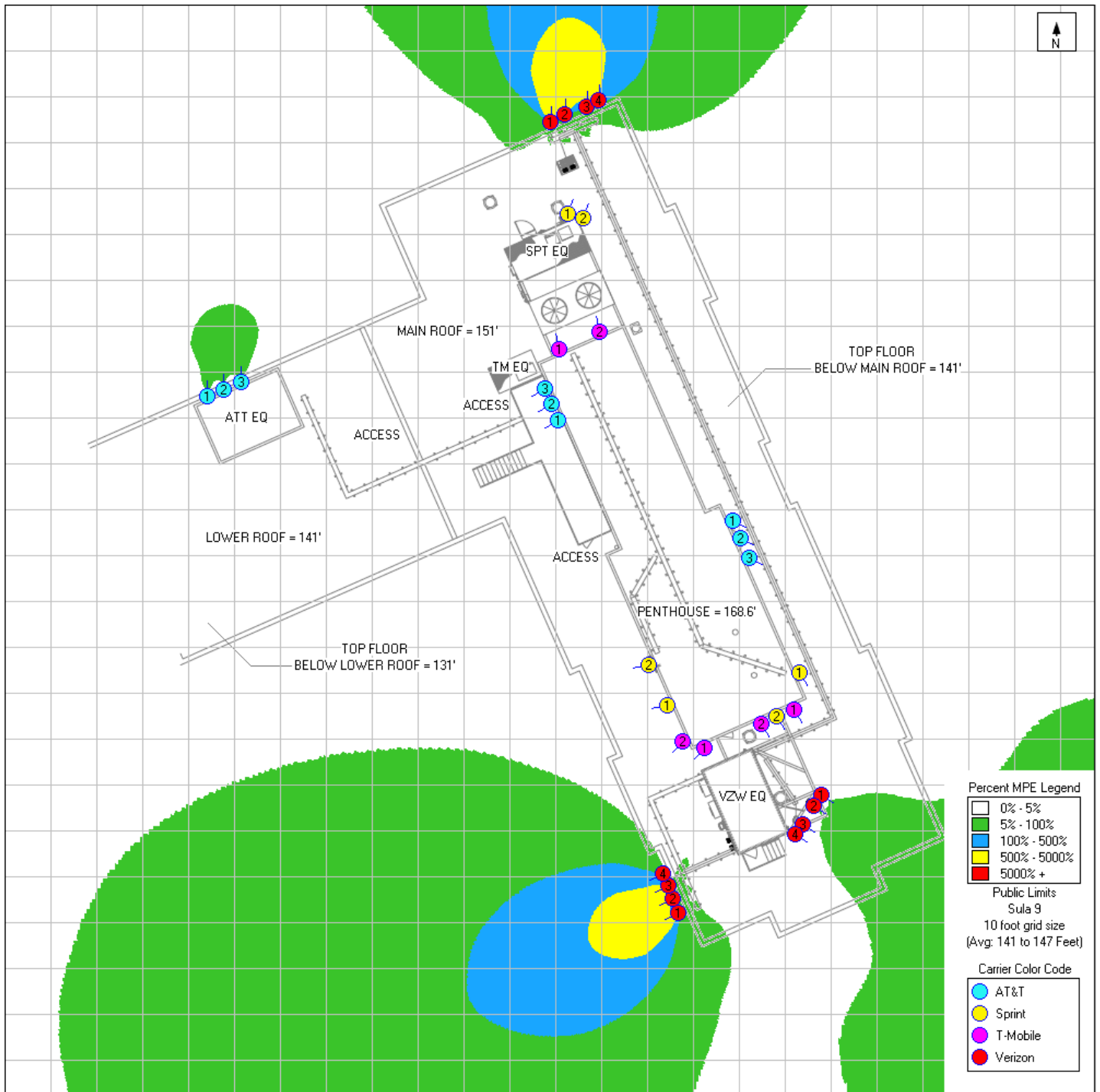


## Top Floor (Interior Below Main Roof) Simulation (141 feet AGL)



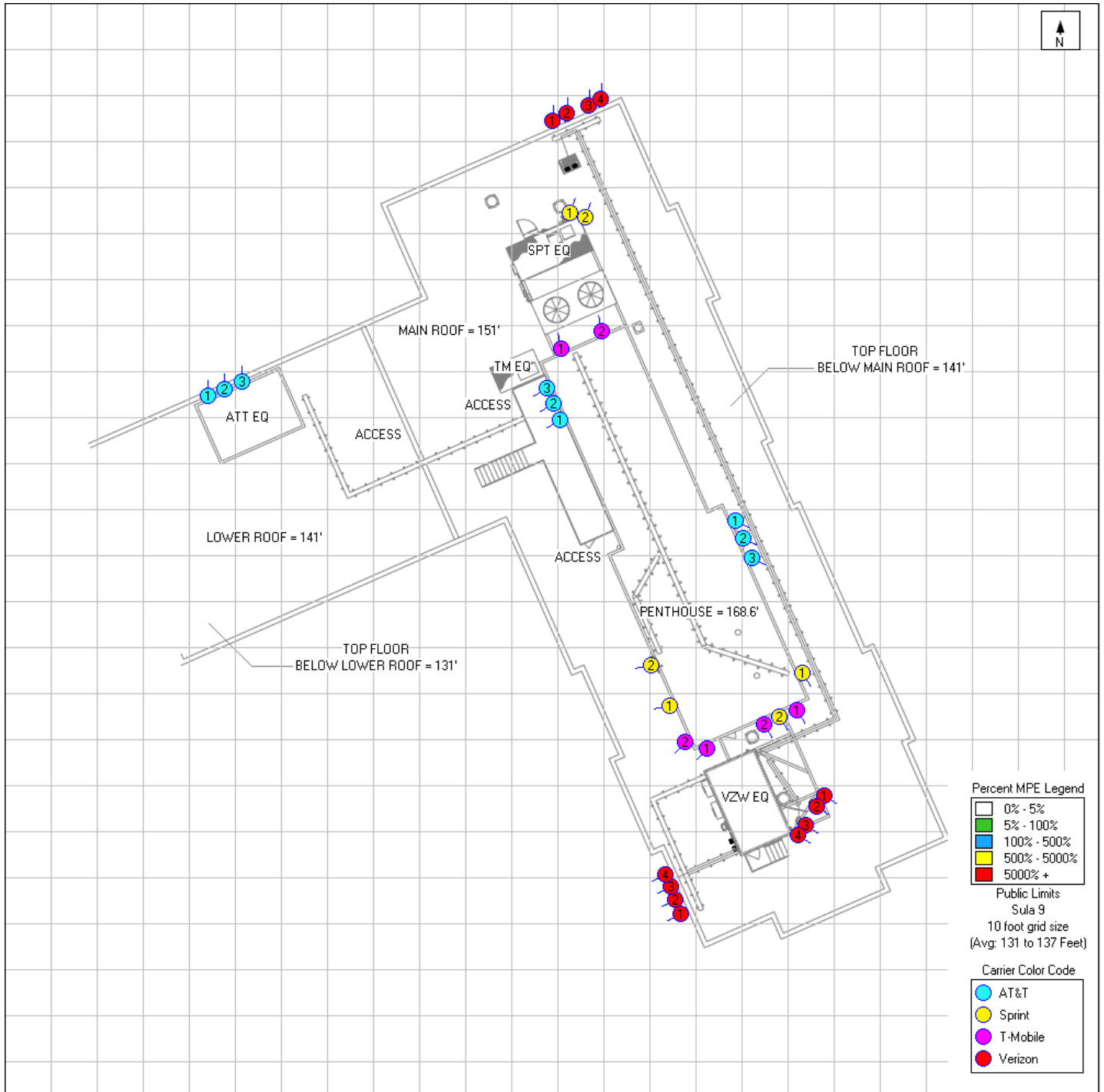
Max Composite MPE:  
 50.2% FCC General Public  
 Limit

### Lower Roof Simulation (141 feet AGL)



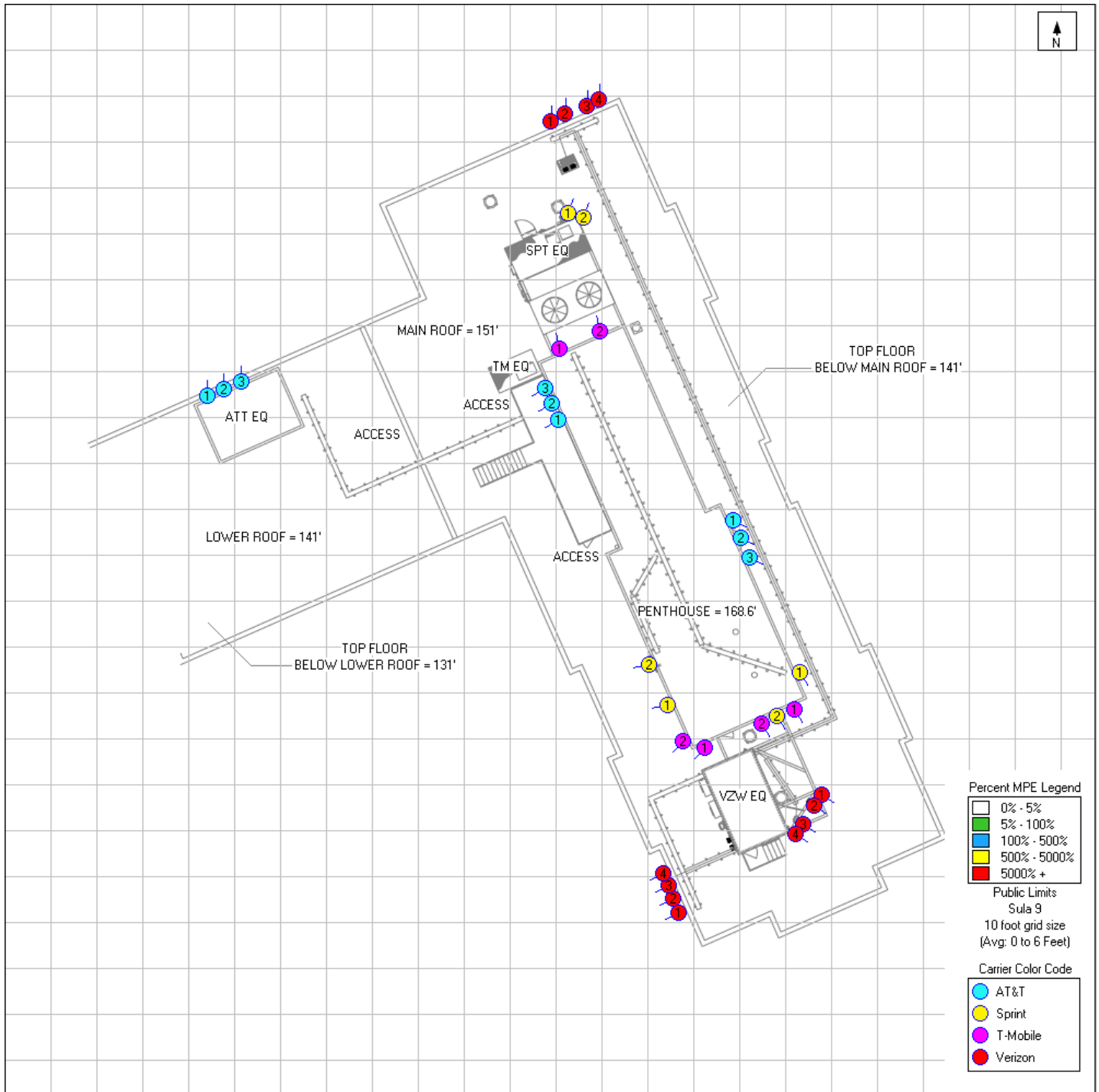
Max Composite MPE:  
 2526.8% FCC General  
 Public Limit

## Top Floor (Interior Below Lower Roof) Simulation (131 feet AGL)



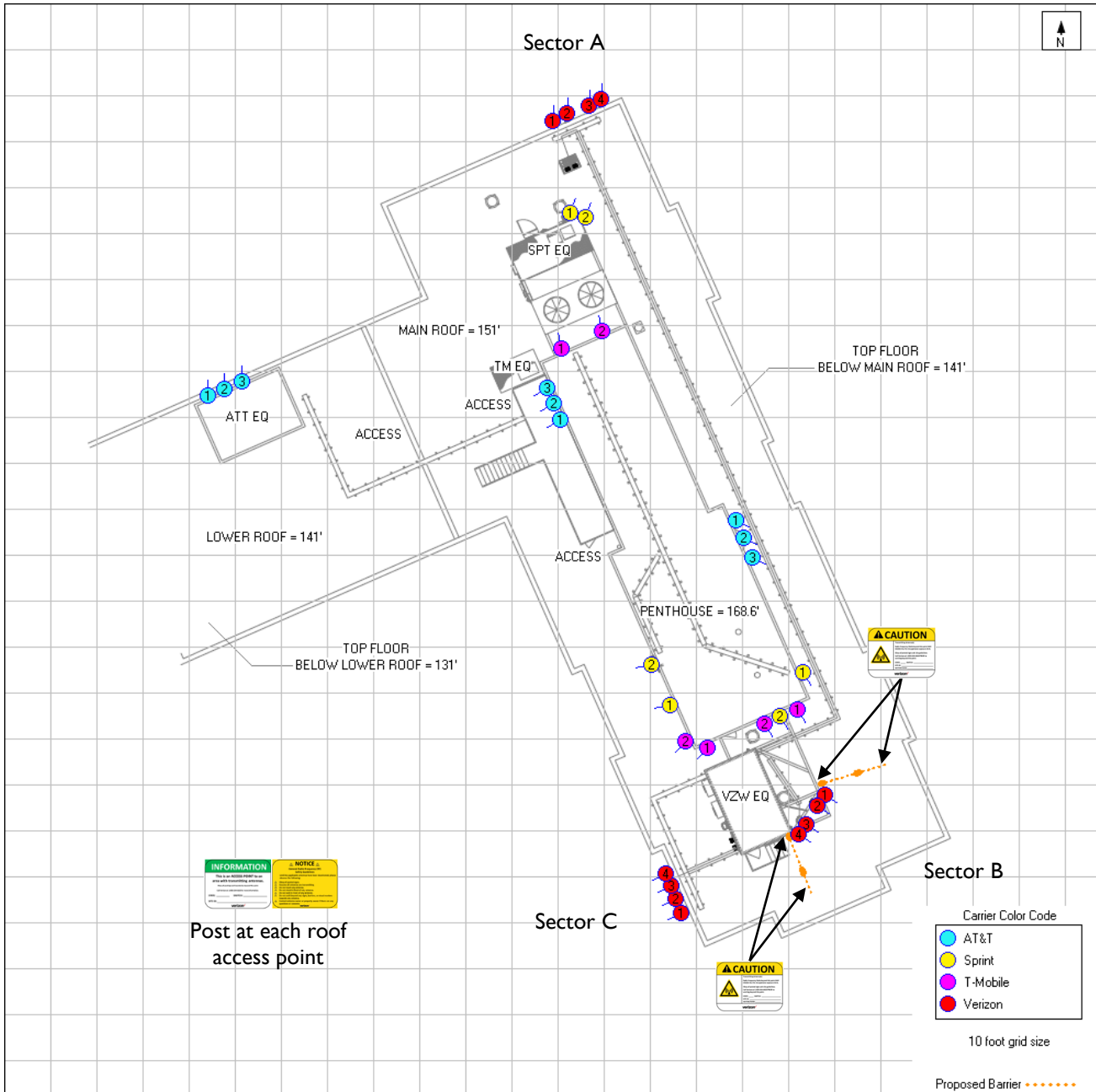
Max Composite MPE:  
 0.835% FCC General  
 Public Limit

### Ground Level Simulation (0 feet AGL)






Max Composite MPE:  
0.06% FCC General Public  
Limit

## Verizon Signage Plan



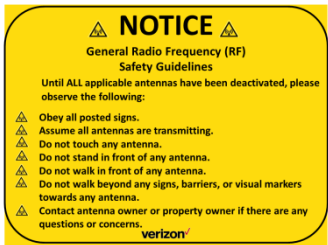
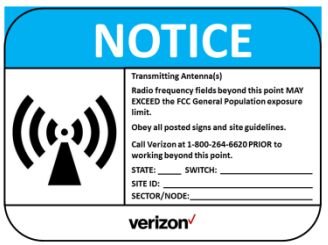
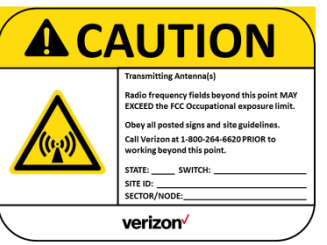
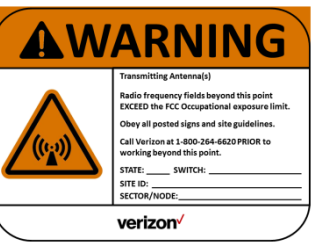
Post at each roof access point


Sign	Posting Instructions	Required Signage / Mitigation
	Securely post at every point of access to the site and on the proposed barrier in a manner conspicuous to all individuals entering thereon as indicated in the signage plan.	3 – on each access point
	Securely post at every point of access to the site.	3 – on each access point
	Securely post on the proposed barrier in a manner conspicuous to all individuals entering thereon as indicated in the signage plan.	4 – on approaching sides of the proposed barrier at Sector B

## RF Signage and Safety Information

### RF Signage

Areas or portions of any transmitter site may be susceptible to high power densities that could cause personnel exposures in excess of the FCC guidelines. These areas must be demarcated by conspicuously posted signage that identifies the potential exposure. Signage **MUST** be viewable regardless of the viewer's position.

GUIDELINES	NOTICE	CAUTION	WARNING
This sign will inform anyone of the basic precautions to follow when entering an area with transmitting radiofrequency equipment.	This sign indicates that RF emissions may exceed the FCC General Population MPE limit.	This sign indicates that RF emissions may exceed the FCC Occupational MPE limit.	This sign indicates that RF emissions may exceed at least 10x the FCC Occupational MPE limit.
			

NOC INFORMATION	INFORMATION
Information signs are used as a means to provide contact information for any questions or concerns. They will include specific cell site identification information and the Verizon Wireless Network Operations Center phone number.	

### Physical Barriers

Physical barriers are control measures that require awareness and participation of personnel. Physical barriers are employed as an additional administration control to complement RF signage and physically demarcate an area in which RF exposure levels may exceed the FCC General Population limit. **Example:** chain-connected stanchions

### Indicative Markers

Indicative markers are visible control measures that require awareness and participation of personnel, as they cannot physically prevent someone from entering an area of potential concern. Indicative markers are employed as an additional administration control to complement RF signage and visually demarcate an area in which RF exposure levels may exceed the FCC General Population limit. **Example:** paint stripes

### Occupational Safety and Health Administration (OSHA) Requirements

A formal adopter of FCC Standards, OSHA stipulates that those in the Occupational classification must complete training in the following: RF Safety, RF Awareness, and Utilization of Personal Protective Equipment. OSHA also provides options for Hazard Prevention and Control:

Hazard Prevention	Control
<ul style="list-style-type: none"> <li>• Utilization of good equipment</li> <li>• Enact control of hazard areas</li> <li>• Limit exposures</li> <li>• Employ medical surveillance and accident response</li> </ul>	<ul style="list-style-type: none"> <li>• Employ Lockout/Tag out</li> <li>• Utilize personal alarms &amp; protective clothing</li> <li>• Prevent access to hazardous locations</li> <li>• Develop or operate an administrative control program</li> </ul>

# **Appendix C**

## **Federal Communications Commission (FCC) Requirements**

The FCC has established Maximum Permissible Exposure (MPE) limits for human exposure to Radiofrequency Electromagnetic (RF-EME) energy fields, based on exposure limits recommended by the National Council on Radiation Protection and Measurements (NCRP) and, over a wide range of frequencies, the exposure limits developed by the Institute of Electrical and Electronics Engineers, Inc. (IEEE) and adopted by the American National Standards Institute (ANSI) to replace the 1982 ANSI guidelines. Limits for localized absorption are based on recommendations of both ANSI/IEEE and NCRP.

The FCC guidelines incorporate two separate tiers of exposure limits that are based upon occupational/controlled exposure limits (for workers) and general public/uncontrolled exposure limits for members of the general public.

**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 public/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.

**General public/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.

Table I and Figure I (below), which are included within the FCC's OET Bulletin 65, summarize the MPE limits for RF emissions. These limits are designed to provide a substantial margin of safety. They vary by frequency to take into account the different types of equipment that may be in operation at a particular facility and are "time-averaged" limits to reflect different durations resulting from controlled and uncontrolled exposures.

The FCC's MPEs are measured in terms of power (mW) over a unit surface area (cm<sup>2</sup>). Known as the power density, the FCC has established an occupational MPE of 5 milliwatts per square centimeter (mW/cm<sup>2</sup>) and an uncontrolled MPE of 1 mW/cm<sup>2</sup> for equipment operating in the 1900 MHz frequency range. For the Verizon equipment operating at 700 MHz or 850 MHz, the FCC's occupational MPE is 2.83 mW/cm<sup>2</sup> and an uncontrolled MPE of 0.57 mW/cm<sup>2</sup>. For the Verizon equipment operating at 1900 MHz, the FCC's occupational MPE is 5.0 mW/cm<sup>2</sup> and an uncontrolled MPE limit of 1.0 mW/cm<sup>2</sup>. These limits are considered protective of these populations.

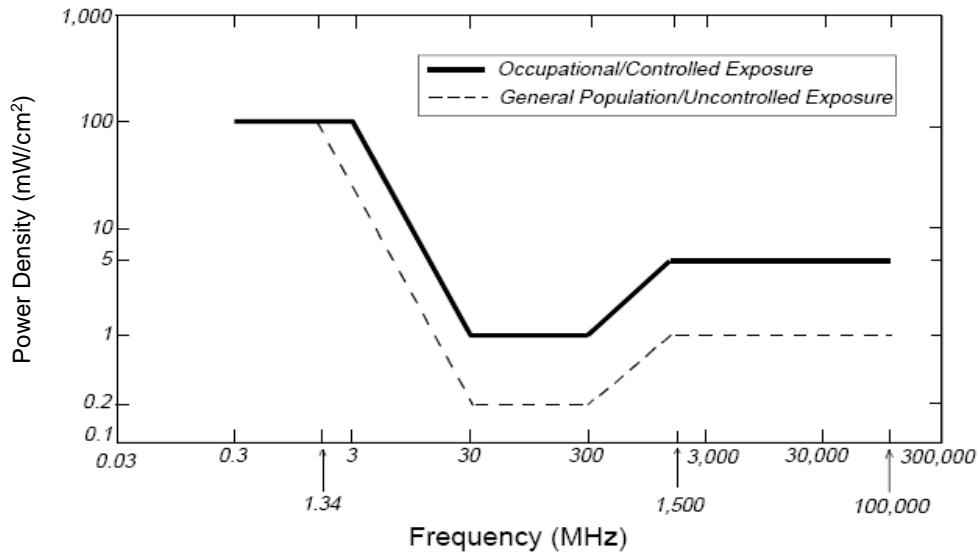


Table 1: Limits for Maximum Permissible Exposure (MPE)				
(A) Limits for Occupational/Controlled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time [E] <sup>2</sup> , [H] <sup>2</sup> , or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f <sup>2</sup> )*	6
30-300	61.4	0.163	1.0	6
300-1,500	--	--	f/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Public/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time [E] <sup>2</sup> , [H] <sup>2</sup> , or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f <sup>2</sup> )*	30
30-300	27.5	0.073	0.2	30
300-1,500	--	--	f/1,500	30
1,500-100,000	--	--	1.0	30

f = Frequency in (MHz)

\* Plane-wave equivalent power density

Figure 1. FCC Limits for Maximum Permissible Exposure (MPE)  
 Plane-wave Equivalent Power Density



Based on the above, the most restrictive thresholds for exposures of unlimited duration to RF energy for several personal wireless services are summarized below:

Personal Wireless Service	Approximate Frequency	Occupational MPE	Public MPE
Microwave (Point-to-Point)	5,000 - 80,000 MHz	5.00 mW/cm <sup>2</sup>	1.00 mW/cm <sup>2</sup>
Broadband Radio (BRS)	2,600 MHz	5.00 mW/cm <sup>2</sup>	1.00 mW/cm <sup>2</sup>
Wireless Communication (WCS)	2,300 MHz	5.00 mW/cm <sup>2</sup>	1.00 mW/cm <sup>2</sup>
Advanced Wireless (AWS)	2,100 MHz	5.00 mW/cm <sup>2</sup>	1.00 mW/cm <sup>2</sup>
Personal Communication (PCS)	1,950 MHz	5.00 mW/cm <sup>2</sup>	1.00 mW/cm <sup>2</sup>
Cellular Telephone	870 MHz	2.90 mW/cm <sup>2</sup>	0.58 mW/cm <sup>2</sup>
Specialized Mobile Radio (SMR)	855 MHz	2.85 mW/cm <sup>2</sup>	0.57 mW/cm <sup>2</sup>
Long Term Evolution (LTE)	700 MHz	2.33 mW/cm <sup>2</sup>	0.47 mW/cm <sup>2</sup>
Most Restrictive Frequency Range	30-300 MHz	1.00 mW/cm <sup>2</sup>	0.20 mW/cm <sup>2</sup>

MPE limits are designed to provide a substantial margin of safety. These limits apply for continuous exposures and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health.

Personal Communication (PCS) facilities used by Verizon in this area will potentially operate within a frequency range of 700 to 2100 MHz. Facilities typically consist of: 1) electronic transceivers (the radios or cabinets) connected to wired telephone lines; and 2) antennas that send the wireless signals created by the transceivers to be received by individual subscriber units (PCS telephones). Transceivers are typically connected to antennas by coaxial cables.

Because of the short wavelength of PCS services, the antennas require line-of-site paths for good propagation, and are typically installed above ground level. Antennas are constructed to concentrate energy towards the horizon, with as little energy as possible scattered towards the ground or the sky. This design, combined with the low power of PCS facilities, generally results in no possibility for exposure to approach Maximum Permissible Exposure (MPE) levels, with the exception of areas directly in front of the antennas.

### FCC Compliance Requirement

A site is considered out of compliance with FCC regulations if there are areas that exceed the FCC exposure limits and there are no RF hazard mitigation measures in place. Any carrier which has an installation that contributes more than 5% of the applicable MPE must participate in mitigating these RF hazards.

# Radio Frequency - Electromagnetic Energy (RF-EME) Jurisdictional Report

Site No. 114383  
Takoma Park  
7600 Maple Avenue  
Silver Spring, Maryland 20910  
Montgomery County  
38° 59' 3.00" N, -77° 0' 28.00" W NAD83

EBI Project No. 6219005076  
September 30, 2019



Prepared for:  
Verizon Wireless  
10170 Junction Drive, 3rd Floor  
Annapolis Junction, Maryland 20701

Prepared by:  
 **EBI Consulting**  
environmental | engineering | due diligence

## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY .....</b>	<b>1</b>
<b>1.0 INTRODUCTION.....</b>	<b>2</b>
<b>2.0 SITE DESCRIPTION .....</b>	<b>2</b>
<b>3.0 WORST-CASE PREDICTIVE MODELING.....</b>	<b>5</b>
<b>4.0 MITIGATION/SITE CONTROL OPTIONS .....</b>	<b>6</b>
<b>5.0 SUMMARY AND CONCLUSIONS.....</b>	<b>6</b>
<b>6.0 LIMITATIONS .....</b>	<b>7</b>

## APPENDICES

- APPENDIX A CERTIFICATIONS**
- APPENDIX B RADIO FREQUENCY ELECTROMAGNETIC ENERGY SAFETY / SIGNAGE PLANS**
- APPENDIX C FEDERAL COMMUNICATIONS COMMISSION (FCC) REQUIREMENTS**

## EXECUTIVE SUMMARY

### Purpose of Report

EnviroBusiness Inc. (dba EBI Consulting) has been contracted by Verizon Wireless (“Verizon”) to conduct radio frequency electromagnetic (RF-EME) modeling for Verizon Site 114383 located at 7600 Maple Avenue in Silver Spring, Maryland to determine RF-EME exposure levels from proposed Verizon communications equipment at this site. As described in greater detail in Appendix C of this report, the Federal Communications Commission (FCC) has developed Maximum Permissible Exposure (MPE) Limits for the general public and for occupational activities. This report summarizes the results of RF-EME modeling in relation to relevant FCC RF-EME compliance standards for limiting human exposure to RF-EME fields.

### Statement of Compliance

A site is considered out of compliance with FCC regulations if there are areas that exceed the FCC exposure limits and there are no RF hazard mitigation measures in place. Any carrier which has an installation that contributes more than 5% of the applicable MPE must participate in mitigating these RF hazards.

As presented in the sections below, based on worst-case predictive modeling, the worst-case emitted power density may exceed the FCC’s general public limit within approximately 41 feet of Verizon’s proposed antennas at the main roof level. Modeling also indicates that the worst-case emitted power density may exceed the FCC’s occupational limit within approximately 21 feet of Verizon’s proposed antennas at the main roof level. Additionally, there are areas where workers who may be elevated above the rooftop or ground may be exposed to power densities greater than the occupational limits. Therefore, workers should be informed about the presence and locations of antennas and their associated fields.

At the nearest walking/working surfaces to the Verizon antennas, the maximum power density generated by the Verizon antennas is approximately **2,598.45** percent of the FCC’s general public limit (**519.69** percent of the FCC’s occupational limit).

The composite exposure level from all carriers on this site is approximately **2,598.55** percent of the FCC’s general public limit (**519.71** percent of the FCC’s occupational limit) at the nearest walking/working surface to each antenna.

Recommended control measures are outlined in Section 4.0 and within the Site Safety Plan (attached); Verizon should also provide procedures to shut down and lockout/tagout this wireless equipment in accordance with Verizon’s standard operating protocol. Non-telecom workers who will be working in areas of exceedance are required to contact Verizon since only Verizon has the ability to lockout/tagout the facility, or to authorize others to do so.

## 1.0 INTRODUCTION

Radio frequency waves are electromagnetic waves from the portion of the electromagnetic spectrum at frequencies lower than visible light and microwaves. The wavelengths of radio waves range from thousands of meters to around 30 centimeters. These wavelengths correspond to frequencies as low as 3 cycles per second (or hertz [Hz]) to as high as one gigahertz (one billion cycles per second).

Personal Communication (PCS) facilities used by Verizon in this area will potentially operate within a frequency range of 700 to 5000 MHz. Facilities typically consist of: 1) electronic transceivers (the radios or cabinets) connected to wired telephone lines; and 2) antennas that send the wireless signals created by the transceivers to be received by individual subscriber units (PCS telephones). Transceivers are typically connected to antennas by coaxial cables.

Because of the short wavelength of PCS services, the antennas require line-of-site paths for good propagation, and are typically installed a distance above ground level. Antennas are constructed to concentrate energy towards the horizon, with as little energy as possible scattered towards the ground or the sky. This design, combined with the low power of PCS facilities, generally results in no possibility for exposure to approach Maximum Permissible Exposure (MPE) levels, with the exception of in areas in the immediate vicinity of the antennas.

MPE limits do not represent levels where a health risk exists, since they are designed to provide a substantial margin of safety. These limits apply for continuous exposures and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size or health.

## 2.0 SITE DESCRIPTION

This project site includes the following proposed wireless telecommunication antennas on a rooftop located at 7600 Maple Avenue in Silver Spring, Maryland.

Ant #	Operator	Antenna Make	Antenna Model	Frequency (MHz)	Azimuth (deg.)	Mechanical Downtilt (deg.)	Horizontal Beamwidth (Degrees)	Aperture (feet)	Total Power Input (Watts)	Antenna Gain (dBd)	Total ERP (Watts)	Total EIRP (Watts)
1	Verizon	JMA	MX06FRO660-02 04DT 700	700	4	0	60	5.9	80	12.45	1117.09	1832.04
1	Verizon	JMA	MX06FRO660-02 05DT 850	850	4	0	53	5.9	80	12.45	1117.09	1832.04
1	Verizon	JMA	MX06FRO660-02 02DT 1900	1900	4	0	57	5.9	160	15.95	5001.73	8202.83
2	Verizon	JMA	MX06FRO660-02 04DT 700	700	4	0	60	5.9	80	12.45	1117.09	1832.04
2	Verizon	JMA	MX06FRO660-02 05DT 850	850	4	0	53	5.9	80	12.45	1117.09	1832.04
2	Verizon	JMA	MX06FRO660-02 02DT 2100	2100	4	0	52	5.9	240	15.55	6842.44	11221.61
3	Verizon	Amphenol	CWWX063X19x00-T06 850	850	4	2	65	6.2	160	13.1	2594.90	4255.63
4	Verizon	NOKIA	SON_AEUB_VZW	28000	4	0	13	1.5	1.26	26.85	610.06	1000.49
5	Verizon	JMA	MX06FRO660-02 10DT 700	700	124	0	58	5.9	80	12.35	1091.67	1790.33
5	Verizon	JMA	MX06FRO660-02 10DT 850	850	124	0	55	5.9	80	12.75	1196.99	1963.06
5	Verizon	JMA	MX06FRO660-02 03DT 1900	1900	124	0	55	5.9	160	15.95	5001.73	8202.83
6	Verizon	JMA	MX06FRO660-02 10DT 700	700	124	0	58	5.9	80	12.35	1091.67	1790.33
6	Verizon	JMA	MX06FRO660-02 10DT 850	850	124	0	55	5.9	80	12.75	1196.99	1963.06
6	Verizon	JMA	MX06FRO660-02 03DT 2100	2100	124	0	51	5.9	240	15.65	7001.82	11482.99
7	Verizon	AMPHENOL	CWWX063X19x00-T07 850	850	124	2	65	6.2	160	13.1	2594.90	4255.63
8	Verizon	NOKIA	SON_AEUB_VZW	28000	124	0	13	1.5	1.26	26.85	610.06	1000.49

Ant #	Operator	Antenna Make	Antenna Model	Frequency (MHz)	Azimuth (deg.)	Mechanical Downtilt (deg.)	Horizontal Beamwidth (Degrees)	Aperture (feet)	Total Power Input (Watts)	Antenna Gain (dBd)	Total ERP (Watts)	Total EIRP (Watts)
9	Verizon	JMA	MX06FRO660-02 02DT 700	700	244	0	60	5.9	80	12.45	1117.09	1832.04
9	Verizon	JMA	MX06FRO660-02 02DT 850	850	244	0	54	5.9	80	12.15	1042.53	1709.75
9	Verizon	JMA	MX06FRO660-02 02DT 1900	1900	244	0	57	5.9	160	15.95	5001.73	8202.83
10	Verizon	JMA	MX06FRO660-02 02DT 700	700	244	0	60	5.9	80	12.45	1117.09	1832.04
10	Verizon	JMA	MX06FRO660-02 02DT 850	850	244	0	54	5.9	80	12.15	1042.53	1709.75
10	Verizon	JMA	MX06FRO660-02 02DT 2100	2100	244	0	52	5.9	240	15.55	6842.44	11221.61
11	Verizon	AMPHENOL	CWWX063X19x00-T05 850	850	244	2	65	6.2	160	13.1	2594.90	4255.63
12	Verizon	NOKIA	SON_AEUB_VZW	28000	244	0	13	1.5	1.26	26.85	610.06	1000.49
13	AT&T	GENERIC	PANEL 6FT 00DT 850	850	0	0	66	6.0	120	12.62	1099.46	1803.12
14	AT&T	GENERIC	PANEL 6FT 00DT 1900	1900	0	0	66	6.0	120	15.84	2307.71	3784.64
15	AT&T	GENERIC	PANEL 6FT 00DT 2100	2100	0	0	63	6.0	80	16.39	1746.18	2863.74
15	AT&T	GENERIC	PANEL 6FT 00DT 700	700	0	0	68	6.0	60	12.33	514.22	843.33
16	AT&T	GENERIC	PANEL 6FT 00DT 850	850	120	0	66	6.0	120	12.62	1099.46	1803.12
17	AT&T	GENERIC	PANEL 6FT 00DT 1900	1900	120	0	66	6.0	120	15.84	2307.71	3784.64
18	AT&T	GENERIC	PANEL 6FT 00DT 2100	2100	120	0	63	6.0	80	16.39	1746.18	2863.74
18	AT&T	GENERIC	PANEL 6FT 00DT 700	700	120	0	68	6.0	60	12.33	514.22	843.33
19	AT&T	GENERIC	PANEL 6FT 00DT 850	850	240	0	66	6.0	120	12.62	1099.46	1803.12
20	AT&T	GENERIC	PANEL 6FT 00DT 1900	1900	240	0	66	6.0	120	15.84	2307.71	3784.64
21	AT&T	GENERIC	PANEL 6FT 00DT 2100	2100	240	0	63	6.0	80	16.39	1746.18	2863.74
21	AT&T	GENERIC	PANEL 6FT 00DT 700	700	240	0	68	6.0	60	12.33	514.22	843.33
22	Sprint	GENERIC	PANEL 6FT 00DT 850	850	20	0	66	6.0	20	12.62	183.24	300.52
23	Sprint	GENERIC	PANEL 6FT 00DT 1900	1900	20	0	66	6.0	120	15.84	2307.71	3784.64
24	Sprint	GENERIC	PANEL 6FT 00DT 850	850	150	0	66	6.0	20	12.62	183.24	300.52
25	Sprint	GENERIC	PANEL 6FT 00DT 1900	1900	150	0	66	6.0	120	15.84	2307.71	3784.64
26	Sprint	GENERIC	PANEL 6FT 00DT 850	850	260	0	66	6.0	20	12.62	183.24	300.52
27	Sprint	GENERIC	PANEL 6FT 00DT 1900	1900	260	0	66	6.0	120	15.84	2307.71	3784.64
28	T-Mobile	GENERIC	PANEL 6FT 00DT 1900	1900	350	0	66	6.0	120	15.84	2307.71	3784.64
29	T-Mobile	GENERIC	PANEL 6FT 00DT 2100	2100	350	0	63	6.0	120	16.39	4657.80	7638.80
30	T-Mobile	GENERIC	PANEL 6FT 00DT 1900	1900	150	0	66	6.0	120	15.84	2307.71	3784.64
31	T-Mobile	GENERIC	PANEL 6FT 00DT 2100	2100	150	0	63	6.0	120	16.39	4657.80	7638.80
32	T-Mobile	GENERIC	PANEL 6FT 00DT 1900	1900	220	0	66	6.0	120	15.84	2307.71	3784.64
33	T-Mobile	GENERIC	PANEL 6FT 00DT 2100	2100	220	0	63	6.0	120	16.39	4657.80	7638.80

• Note there are 4 Verizon antennas per sector at this site. For clarity, the different frequencies for each antenna are entered on separate lines.

Ant #	NAME	X	Y	Antenna Radiation Centerline	Z-Height Main Roof	Z-Height Penthouse	Z-Height Lower Roof
1	Verizon	110.0	18.3	147.0	-4.0	-21.6	6.0
2	Verizon	113.1	16.6	147.0	-4.0	-21.6	6.0
3	Verizon	117.9	14.9	147.0	-4.0	-21.6	6.0
4	Verizon	120.5	13.5	147.0	-4.0	-21.6	6.0
5	Verizon	168.9	164.3	157.0	6.0	-11.6	16.0
6	Verizon	167.2	166.7	157.0	6.0	-11.6	16.0
7	Verizon	164.8	170.8	157.0	6.0	-11.6	16.0
8	Verizon	163.2	172.9	157.0	6.0	-11.6	16.0
9	Verizon	137.8	190.0	147.0	-4.0	-21.6	6.0
10	Verizon	136.6	186.9	147.0	-4.0	-21.6	6.0
11	Verizon	135.7	184.0	147.0	-4.0	-21.6	6.0
12	Verizon	134.5	181.4	147.0	-4.0	-21.6	6.0
13	AT&T	35.6	77.8	152.5	1.5	-16.1	11.5
14	AT&T	39.1	76.4	152.5	1.5	-16.1	11.5
15	AT&T	42.9	74.7	152.5	1.5	-16.1	11.5
16	AT&T	149.6	104.8	173.5	22.5	4.9	32.5
17	AT&T	151.3	108.6	173.5	22.5	4.9	32.5
18	AT&T	153.2	112.9	173.5	22.5	4.9	32.5
19	AT&T	111.7	83.0	173.5	22.5	4.9	32.5
20	AT&T	110.3	79.4	173.5	22.5	4.9	32.5
21	AT&T	108.9	76.1	173.5	22.5	4.9	32.5
22	Sprint	113.8	38.2	161.5	10.5	-7.1	20.5
23	Sprint	117.2	39.1	161.5	10.5	-7.1	20.5
24	Sprint	164.1	137.8	178.5	27.5	9.9	37.5
25	Sprint	159.1	147.3	178.5	27.5	9.9	37.5
26	Sprint	135.4	144.9	178.5	27.5	9.9	37.5
27	Sprint	131.4	136.1	178.5	27.5	9.9	37.5
28	T-Mobile	111.9	67.6	178.5	27.5	9.9	37.5
29	T-Mobile	120.7	63.8	178.5	27.5	9.9	37.5
30	T-Mobile	162.9	145.8	178.5	27.5	9.9	37.5
31	T-Mobile	155.8	148.9	178.5	27.5	9.9	37.5
32	T-Mobile	143.5	154.2	178.5	27.5	9.9	37.5
33	T-Mobile	138.7	152.7	178.5	27.5	9.9	37.5

• Note the Z-Height represents the distance from the antenna centerline.

The above tables contain an inventory of proposed Verizon Antennas and other carrier antennas if sufficient information was available to model them. Note that EBI uses an assumed set of antenna specifications and powers for unknown and other carrier antennas for modeling purposes. The FCC guidelines incorporate two separate tiers of exposure limits that are based upon occupational/controlled exposure limits (for workers) and general population/uncontrolled exposure limits for members of the general public that may be exposed to antenna fields. While access to this site is considered uncontrolled, the analysis has considered exposures with respect to both controlled and uncontrolled limits as an untrained worker may access adjacent rooftop locations. Additional information regarding controlled/uncontrolled exposure limits is provided in Appendix C. Appendix B presents a site safety plan that provides a plan view of the rooftop with antenna locations.



### 3.0 WORST-CASE PREDICTIVE MODELING

EBI has performed theoretical MPE modeling using RoofMaster™ software to estimate the worst-case power density at the site's nearby broadcast levels resulting from operation of the antennas. RoofMaster™ is a widely-used predictive modeling program that has been developed by Waterford Consultants to predict RF power density values for rooftop and tower telecommunications sites produced by vertical collinear antennas that are typically used in the cellular, PCS, paging and other communications services. Using the computational methods set forth in Federal Communications Commission (FCC) Office of Engineering & Technology (OET) Bulletin 65, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields" (OET-65), RoofMaster™ calculates predicted power density in a scalable grid based on the contributions of all RF sources characterized in the study scenario. At each grid location, the cumulative power density is expressed as a percentage of the FCC limits. Manufacturer antenna pattern data is utilized in these calculations. RoofMaster™ models consist of the Far Field model as specified in OET-65 and an implementation of the OET-65 Cylindrical Model (Sula9). The models utilize several operational specifications for different types of antennas to produce a plot of spatially-averaged power densities that can be expressed as a percentage of the applicable exposure limit.

For this report, EBI utilized antenna and power data provided by Verizon and compared the resultant worst-case MPE levels to the FCC's occupational/controlled exposure limits outlined in OET Bulletin 65. The assumptions used in the modeling are based upon information provided by Verizon and information gathered from other sources. The parameters used for modeling are summarized in the Site Description antenna inventory table in Section 2.0.

T-Mobile, Sprint and AT&T also have antennas on the rooftop. Information about these antennas was included in the modeling analysis.

Based on worst-case predictive modeling, the worst-case emitted power density may exceed the FCC's general public limit within approximately 41 feet of Verizon's Sector B antennas at the main roof level. Modeling also indicates that the worst-case emitted power density may exceed the FCC's occupational limit within approximately 21 feet of Verizon's Sector B antennas at the main rooftop level. At the nearest walking/working surfaces to the Verizon antennas, the maximum power density generated by the Verizon antennas is approximately 2,598.45 percent of the FCC's general public limit (519.69 percent of the FCC's occupational limit). The composite exposure level from all carriers on this site is approximately 2,598.55 percent of the FCC's general public limit (519.71 percent of the FCC's occupational limit) at the nearest walking/working surface to each antenna.

The Site Safety Plan also presents areas where Verizon Wireless antennas contribute greater than 5% of the applicable MPE limit for a site. A site is considered out of compliance with FCC regulations if there are areas that exceed the FCC exposure limits and there are no RF hazard mitigation measures in place. Any carrier which has an installation that contributes more than 5% of the applicable MPE must participate in mitigating these RF hazards.

There were also worst-case predicted exposures above the general public MPE in front of the AT&T antennas. However, modeling indicates that the Verizon contribution to these areas is less than 5% of the general public MPE and as such, under FCC regulations, Verizon is not responsible for these predicted exceedances.

The inputs used in the modeling are summarized in the Site Description antenna inventory table in Section 2.0. A graphical representation of the RoofMaster™ modeling results is presented in Appendix B. It should be noted that RoofMaster™ is not suitable for modeling microwave dish antennas; however,

these units are designed for point-to-point operations at the elevations of the installed equipment rather than ground level coverage.

#### **4.0 MITIGATION/SITE CONTROL OPTIONS**

EBI's modeling indicates that there are areas in front of the Verizon antennas that exceed the FCC standards for general public and occupational exposure. In order to alert people accessing the rooftop, a Guidelines sign and an NOC Information sign are recommended for installation at each access point to the rooftop. Additionally, Guidelines and yellow Caution signs are recommended for installation on the proposed barrier at the Verizon Sector B antennas. These signs must be placed in a conspicuous manner so that they are visible to any person approaching the barrier from any direction.

Barriers are recommended for installation when possible to block access to the areas in front of the antennas that exceed the FCC general public and/or occupational limits. Barriers may consist of rope, chain, or fencing. Painted stripes should only be used as a last resort. Barriers are recommended 15 feet on either side of the Verizon Sector B antennas.

These protocols and recommended control measures have been summarized and included with a graphic representation of the antennas and associated signage and control areas in a RF-EME Site Safety Plan, which is included as Appendix B. Individuals and workers accessing the rooftop should be provided with a copy of the attached Site Safety Plan, made aware of the posted signage and barriers, and signify their understanding of the Site Safety Plan.

To reduce the risk of exposure, EBI recommends that access to areas associated with the active antenna installation be restricted and secured where possible.

Implementation of the signage and barriers recommended in the Site Safety Plan and in this report will bring this site into compliance with the FCC's rules and regulations.

#### **5.0 SUMMARY AND CONCLUSIONS**

EBI has prepared a Radiofrequency – Electromagnetic Energy (RF-EME) Compliance Report for telecommunications equipment installed by Verizon Site Number 114383 located at 7600 Maple Avenue in Silver Spring, Maryland to determine worst-case predicted RF-EME exposure levels from wireless communications equipment installed at this site. This report summarizes the results of RF-EME modeling in relation to relevant Federal Communications Commission (FCC) RF-EME compliance standards for limiting human exposure to RF-EME fields.

As presented in the sections above, based on the FCC criteria, the worst-case emitted power density may exceed the FCC's general public limit within approximately 41 feet of Verizon's proposed antennas at the main roof level. Modeling also indicates that the worst-case emitted power density may exceed the FCC's occupational limit within approximately 21 feet of Verizon's proposed antennas at the main roof level.

Workers should be informed about the presence and locations of antennas and their associated fields. Recommended control measures are outlined in Section 4.0 and within the Site Safety Plan (attached); Verizon should also provide procedures to shut down and lockout/tagout this wireless equipment in accordance with Verizon's standard operating protocol. Non-telecom workers who will be working in areas of exceedance are required to contact Verizon since only Verizon has the ability to lockout/tagout the facility, or to authorize others to do so.

## **6.0 LIMITATIONS**

This report was prepared for the use of Verizon Wireless. It was performed in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same locale under like circumstances. The conclusions provided by EBI are based solely on the information provided by the client. The observations in this report are valid on the date of the investigation. Any additional information that becomes available concerning the site should be provided to EBI so that our conclusions may be revised and modified, if necessary. This report has been prepared in accordance with Standard Conditions for Engagement and authorized proposal, both of which are integral parts of this report. No other warranty, expressed or implied, is made.

# **Appendix A**

## **Certifications**

Reviewed and Approved by:



sealed 1oct2019 mike@h2dc.com  
H2DC PLLC Md CoA#: 09-50517

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Michael A McGuire PE  
Electrical Engineer  
[mike@h2dc.com](mailto:mike@h2dc.com)

Note that EBI's scope of work is limited to an evaluation of the Radio Frequency – Electromagnetic Energy (RF-EME) field generated by the antennas and broadcast equipment noted in this report. The engineering and design of the structure, as well as the impact of the antennas and broadcast equipment on the structural integrity of the structure, are specifically excluded from EBI's scope of work.

## Preparer Certification

I, Jonathan Ilgenfritz, state that:

- I am an employee of EnviroBusiness Inc. (d/b/a EBI Consulting), which provides RF-EME safety and compliance services to the wireless communications industry.
- I have successfully completed RF-EME safety training, and I am aware of the potential hazards from RF-EME and would be classified “occupational” under the FCC regulations.
- I am fully aware of and familiar with the Rules and Regulations of both the Federal Communications Commissions (FCC) and the Occupational Safety and Health Administration (OSHA) with regard to Human Exposure to Radio Frequency Radiation.
- I have reviewed the data provided by the client and incorporated it into this Site Compliance Report such that the information contained in this report is true and accurate to the best of my knowledge.

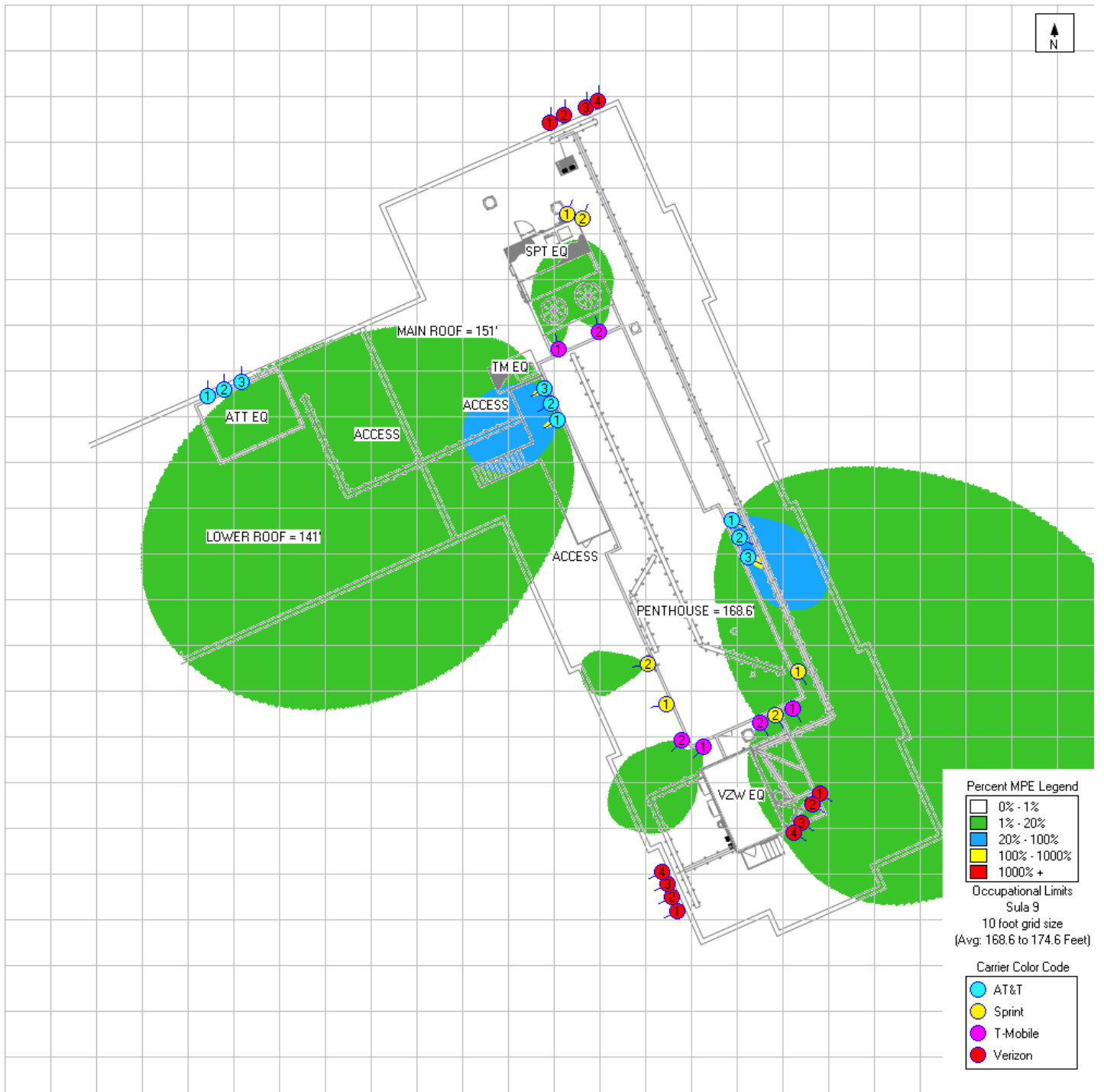


**Appendix B**

**Radio Frequency Electromagnetic Energy**

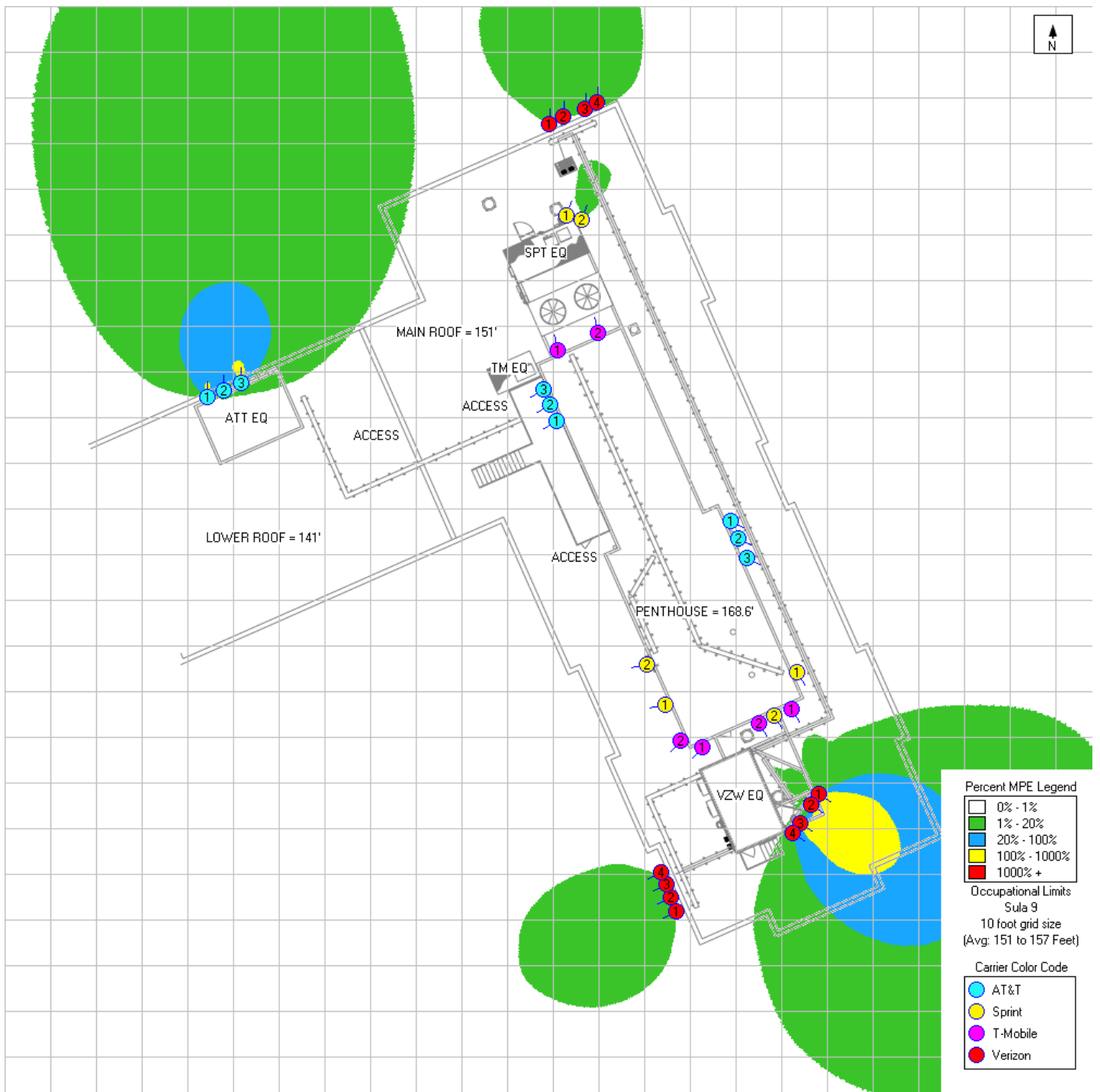
**Safety Information and Signage Plans**

# Penthouse Simulation

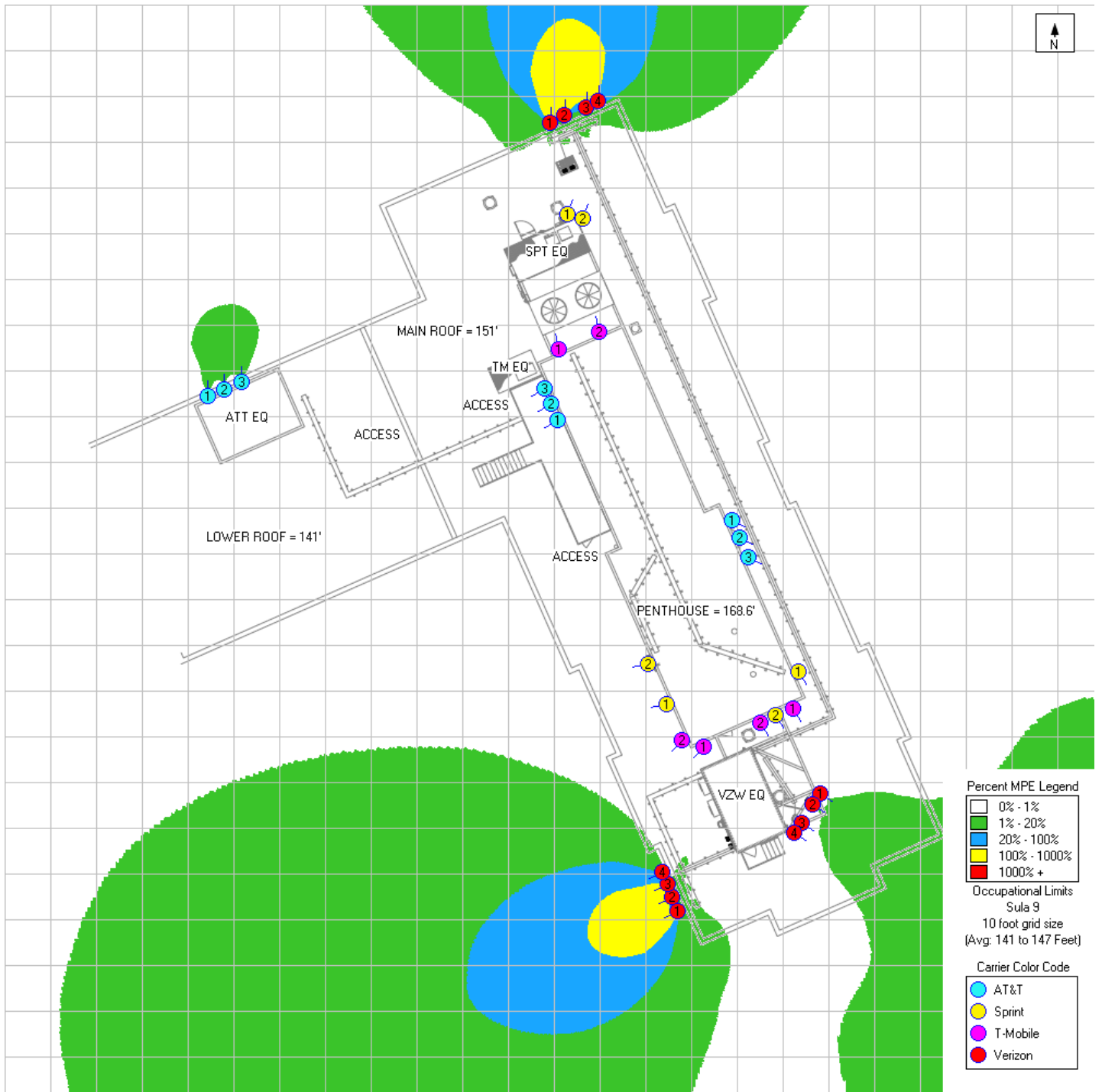




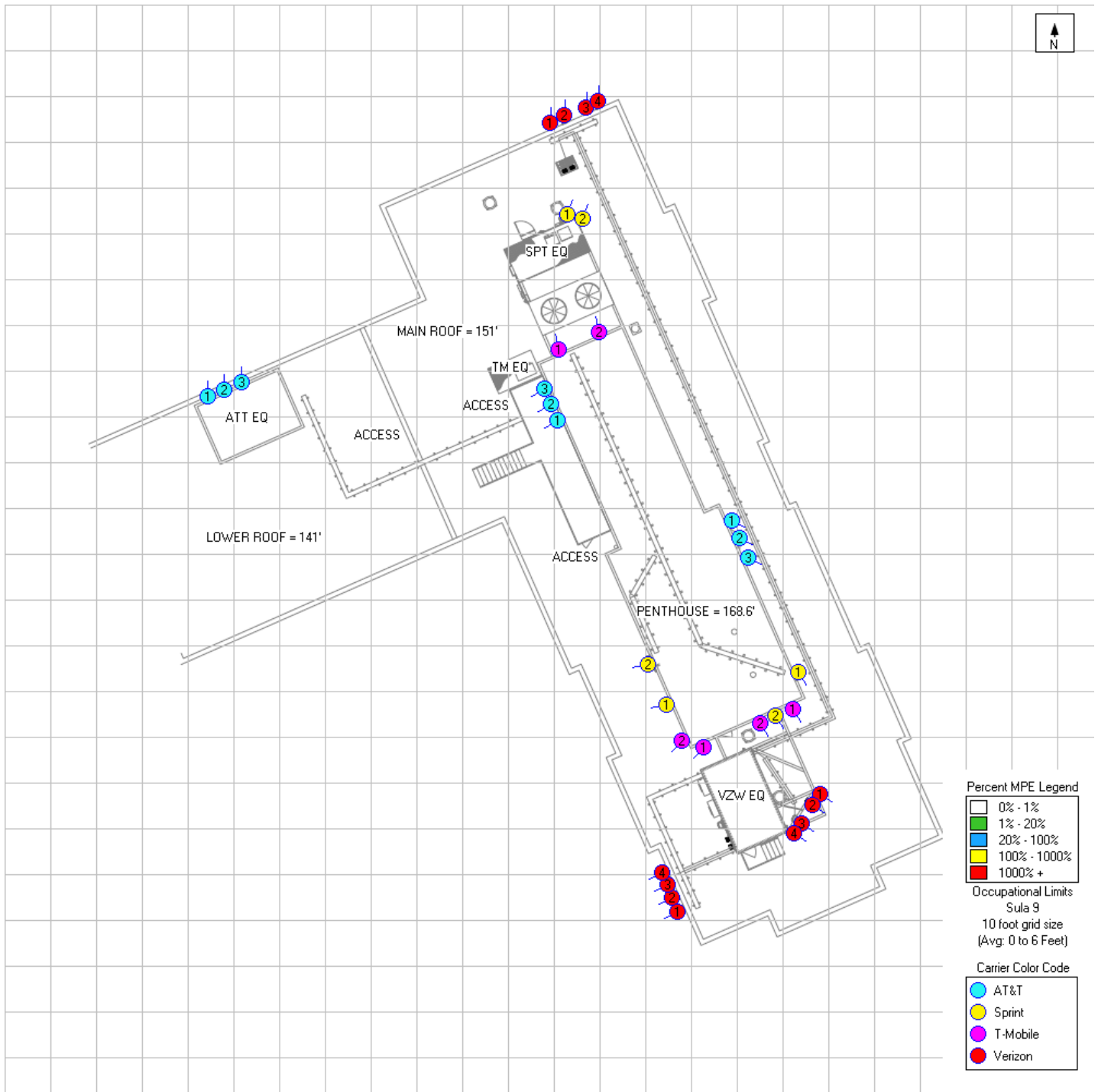
### Main Roof Simulation



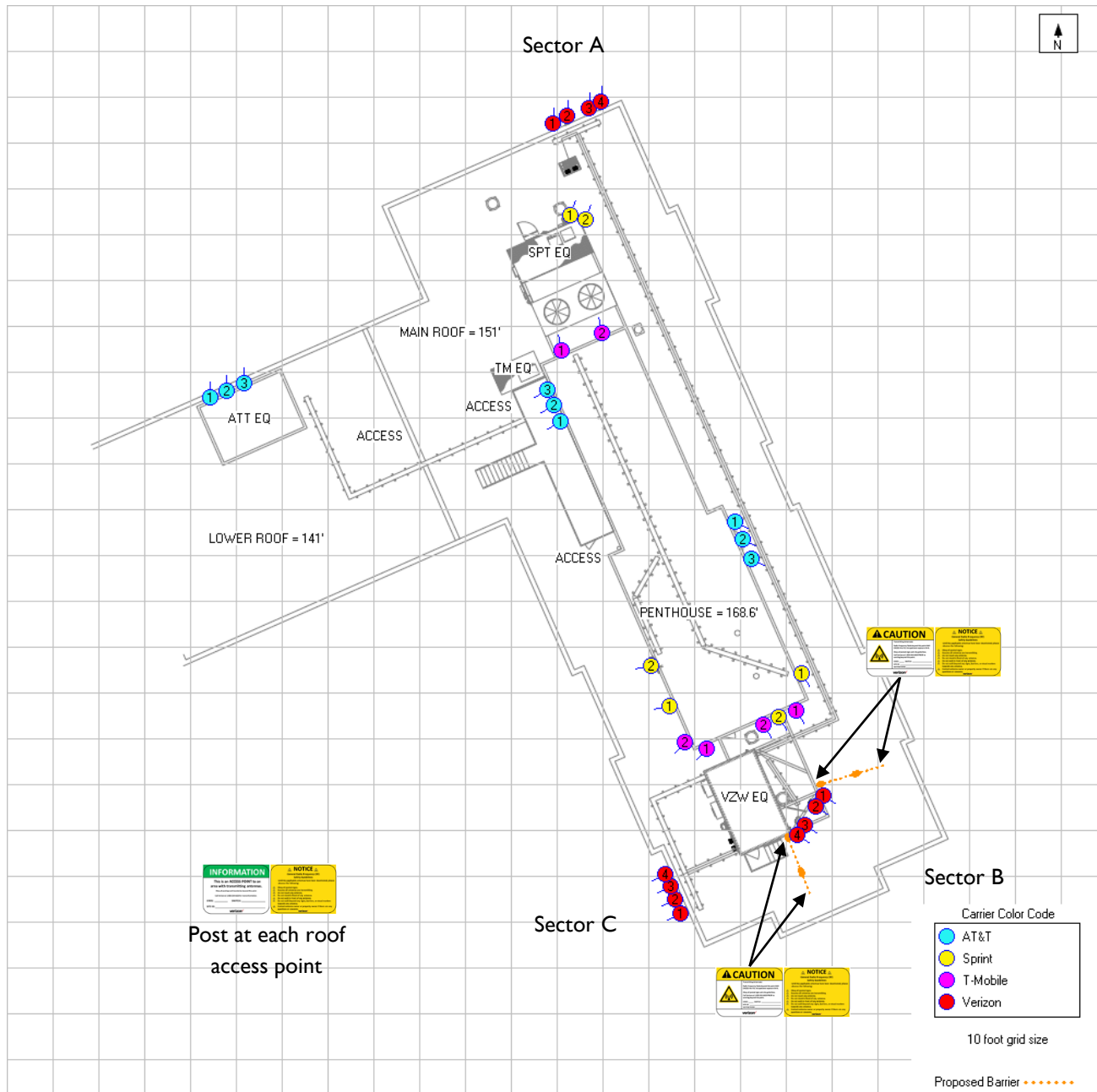
### Lower Roof Simulation






## Ground Level Simulation



## Verizon Signage Plan

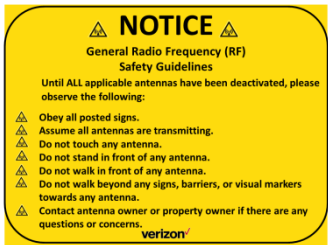
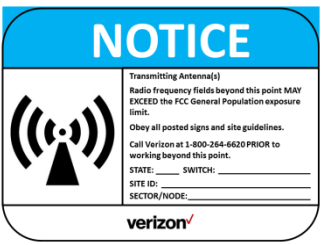





Sign	Posting Instructions	Required Signage / Mitigation
	Securely post at every point of access to the site and on the proposed barrier in a manner conspicuous to all individuals entering thereon as indicated in the signage plan.	3 – on each access point 4 – on approaching sides of the proposed barrier at Sector B
	Securely post at every point of access to the site.	3 – on each access point
	Securely post on the proposed barrier in a manner conspicuous to all individuals entering thereon as indicated in the signage plan.	4 – on approaching sides of the proposed barrier at Sector B

## RF Signage and Safety Information

### RF Signage

Areas or portions of any transmitter site may be susceptible to high power densities that could cause personnel exposures in excess of the FCC guidelines. These areas must be demarcated by conspicuously posted signage that identifies the potential exposure. Signage **MUST** be viewable regardless of the viewer's position.

GUIDELINES	NOTICE	CAUTION	WARNING
This sign will inform anyone of the basic precautions to follow when entering an area with transmitting radiofrequency equipment.	This sign indicates that RF emissions may exceed the FCC General Population MPE limit.	This sign indicates that RF emissions may exceed the FCC Occupational MPE limit.	This sign indicates that RF emissions may exceed at least 10x the FCC Occupational MPE limit.
			

NOC INFORMATION	INFORMATION
Information signs are used as a means to provide contact information for any questions or concerns. They will include specific cell site identification information and the Verizon Wireless Network Operations Center phone number.	

### Physical Barriers

Physical barriers are control measures that require awareness and participation of personnel. Physical barriers are employed as an additional administration control to complement RF signage and physically demarcate an area in which RF exposure levels may exceed the FCC General Population limit. **Example:** chain-connected stanchions

### Indicative Markers

Indicative markers are visible control measures that require awareness and participation of personnel, as they cannot physically prevent someone from entering an area of potential concern. Indicative markers are employed as an additional administration control to complement RF signage and visually demarcate an area in which RF exposure levels may exceed the FCC General Population limit. **Example:** paint stripes

### Occupational Safety and Health Administration (OSHA) Requirements

A formal adopter of FCC Standards, OSHA stipulates that those in the Occupational classification must complete training in the following: RF Safety, RF Awareness, and Utilization of Personal Protective Equipment. OSHA also provides options for Hazard Prevention and Control:

Hazard Prevention	Control
<ul style="list-style-type: none"> <li>• Utilization of good equipment</li> <li>• Enact control of hazard areas</li> <li>• Limit exposures</li> <li>• Employ medical surveillance and accident response</li> </ul>	<ul style="list-style-type: none"> <li>• Employ Lockout/Tag out</li> <li>• Utilize personal alarms &amp; protective clothing</li> <li>• Prevent access to hazardous locations</li> <li>• Develop or operate an administrative control program</li> </ul>

# **Appendix C**

## **Federal Communications Commission (FCC) Requirements**

The FCC has established Maximum Permissible Exposure (MPE) limits for human exposure to Radiofrequency Electromagnetic (RF-EME) energy fields, based on exposure limits recommended by the National Council on Radiation Protection and Measurements (NCRP) and, over a wide range of frequencies, the exposure limits developed by the Institute of Electrical and Electronics Engineers, Inc. (IEEE) and adopted by the American National Standards Institute (ANSI) to replace the 1982 ANSI guidelines. Limits for localized absorption are based on recommendations of both ANSI/IEEE and NCRP.

The FCC guidelines incorporate two separate tiers of exposure limits that are based upon occupational/controlled exposure limits (for workers) and general public/uncontrolled exposure limits for members of the general public.

**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 public/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.

**General public/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.

Table I and Figure I (below), which are included within the FCC's OET Bulletin 65, summarize the MPE limits for RF emissions. These limits are designed to provide a substantial margin of safety. They vary by frequency to take into account the different types of equipment that may be in operation at a particular facility and are "time-averaged" limits to reflect different durations resulting from controlled and uncontrolled exposures.

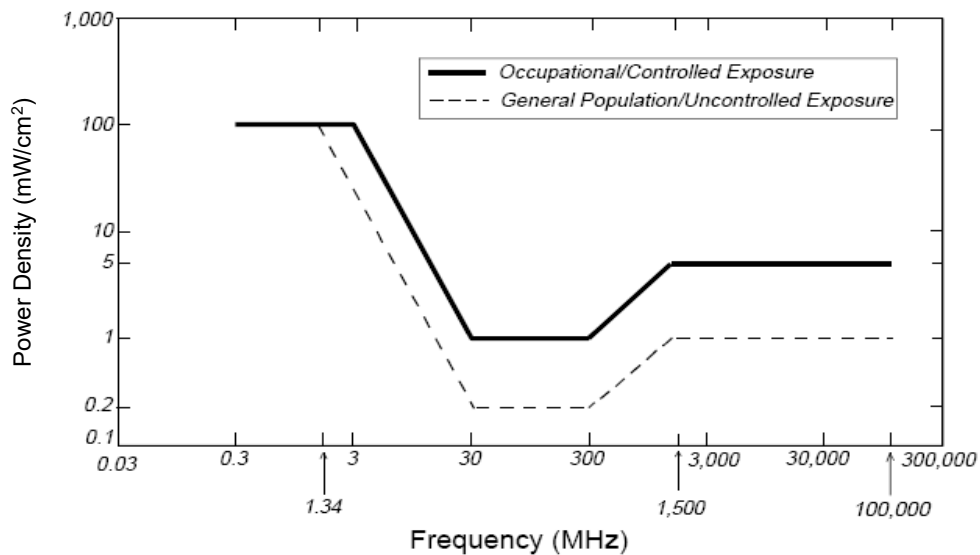
The FCC's MPEs are measured in terms of power (mW) over a unit surface area (cm<sup>2</sup>). Known as the power density, the FCC has established an occupational MPE of 5 milliwatts per square centimeter (mW/cm<sup>2</sup>) and an uncontrolled MPE of 1 mW/cm<sup>2</sup> for equipment operating in the 1900 MHz frequency range. For the Verizon equipment operating at 700 MHz or 850 MHz, the FCC's occupational MPE is 2.83 mW/cm<sup>2</sup> and an uncontrolled MPE of 0.57 mW/cm<sup>2</sup>. For the Verizon equipment operating at 1900 MHz, the FCC's occupational MPE is 5.0 mW/cm<sup>2</sup> and an uncontrolled MPE limit of 1.0 mW/cm<sup>2</sup>. These limits are considered protective of these populations.

Table 1: Limits for Maximum Permissible Exposure (MPE)				
(A) Limits for Occupational/Controlled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time [E] <sup>2</sup> , [H] <sup>2</sup> , or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f <sup>2</sup> )*	6
30-300	61.4	0.163	1.0	6
300-1,500	--	--	f/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Public/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time [E] <sup>2</sup> , [H] <sup>2</sup> , or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f <sup>2</sup> )*	30
30-300	27.5	0.073	0.2	30
300-1,500	--	--	f/1,500	30
1,500-100,000	--	--	1.0	30

f = Frequency in (MHz)

\* Plane-wave equivalent power density

Figure 1. FCC Limits for Maximum Permissible Exposure (MPE)  
 Plane-wave Equivalent Power Density





Based on the above, the most restrictive thresholds for exposures of unlimited duration to RF energy for several personal wireless services are summarized below:

Personal Wireless Service	Approximate Frequency	Occupational MPE	Public MPE
Microwave (Point-to-Point)	5,000 - 80,000 MHz	5.00 mW/cm <sup>2</sup>	1.00 mW/cm <sup>2</sup>
Broadband Radio (BRS)	2,600 MHz	5.00 mW/cm <sup>2</sup>	1.00 mW/cm <sup>2</sup>
Wireless Communication (WCS)	2,300 MHz	5.00 mW/cm <sup>2</sup>	1.00 mW/cm <sup>2</sup>
Advanced Wireless (AWS)	2,100 MHz	5.00 mW/cm <sup>2</sup>	1.00 mW/cm <sup>2</sup>
Personal Communication (PCS)	1,950 MHz	5.00 mW/cm <sup>2</sup>	1.00 mW/cm <sup>2</sup>
Cellular Telephone	870 MHz	2.90 mW/cm <sup>2</sup>	0.58 mW/cm <sup>2</sup>
Specialized Mobile Radio (SMR)	855 MHz	2.85 mW/cm <sup>2</sup>	0.57 mW/cm <sup>2</sup>
Long Term Evolution (LTE)	700 MHz	2.33 mW/cm <sup>2</sup>	0.47 mW/cm <sup>2</sup>
Most Restrictive Frequency Range	30-300 MHz	1.00 mW/cm <sup>2</sup>	0.20 mW/cm <sup>2</sup>

MPE limits are designed to provide a substantial margin of safety. These limits apply for continuous exposures and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health.

Personal Communication (PCS) facilities used by Verizon in this area will potentially operate within a frequency range of 700 to 2100 MHz. Facilities typically consist of: 1) electronic transceivers (the radios or cabinets) connected to wired telephone lines; and 2) antennas that send the wireless signals created by the transceivers to be received by individual subscriber units (PCS telephones). Transceivers are typically connected to antennas by coaxial cables.

Because of the short wavelength of PCS services, the antennas require line-of-site paths for good propagation, and are typically installed above ground level. Antennas are constructed to concentrate energy towards the horizon, with as little energy as possible scattered towards the ground or the sky. This design, combined with the low power of PCS facilities, generally results in no possibility for exposure to approach Maximum Permissible Exposure (MPE) levels, with the exception of areas directly in front of the antennas.

### FCC Compliance Requirement

A site is considered out of compliance with FCC regulations if there are areas that exceed the FCC exposure limits and there are no RF hazard mitigation measures in place. Any carrier which has an installation that contributes more than 5% of the applicable MPE must participate in mitigating these RF hazards.

## GENERAL NOTES

1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES.
2. THE ARCHITECT/ENGINEER HAVE MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.
3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE VERIZON REPRESENTATIVE OF ANY CONFLICTS, ERRORS OR OMISSIONS PRIOR TO THE SUBMISSION OF CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK. IN THE EVENT OF DISCREPANCIES, THE CONTRACTOR SHALL PRICE THE MORE COSTLY OR EXTENSIVE WORK, UNLESS DIRECTED IN WRITING OTHERWISE.
4. THE SCOPE OF WORK SHALL INCLUDE FURNISHING ALL MATERIALS, EQUIPMENT, LABOR AND ALL OTHER MATERIALS AND LABOR DEEMED NECESSARY TO COMPLETE THE WORK/PROJECT AS DESCRIBED HEREIN.
5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
6. THE CONTRACTOR SHALL OBTAIN AUTHORIZATION TO PROCEED WITH CONSTRUCTION PRIOR TO STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED BY THE CONSTRUCTION DRAWINGS/CONTRACT DOCUMENTS.
7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S/VENDOR'S SPECIFICATIONS UNLESS OTHERWISE NOTED OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.
8. THE CONTRACTOR SHALL PROVIDE A FULL SET OF CONSTRUCTION DOCUMENTS AT THE SITE UPDATED WITH THE LATEST REVISIONS AND ADDENDUMS OR CLARIFICATIONS AVAILABLE FOR THE USE BY ALL PERSONNEL INVOLVED WITH THE PROJECT.
9. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS WHICH MAY BE REQUIRED FOR THE WORK BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY, OR LOCAL GOVERNMENT AUTHORITY.
11. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, EASEMENTS, PAVEMENTS, CURBS, ETC. DURING CONSTRUCTION. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE PROPERTY.
12. THE CONTRACTOR SHALL MAINTAIN THE GENERAL WORK AREA AS CLEAN AND HAZARD FREE DURING CONSTRUCTION AND DISPOSE OF ALL DEBRIS, RUBBISH AND REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY. PREMISES SHALL BE LEFT IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE.
13. THE CONTRACTOR SHALL COMPLY WITH ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJECT.
14. THE CONTRACTOR SHALL NOTIFY THE VERIZON REPRESENTATIVE WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE VERIZON REPRESENTATIVE.
15. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, PROPERTY LINES, ETC. ON THE JOB.
16. THE CONTRACTOR SHALL SUBMIT SHOP DRAWING FOR ALL EQUIPMENT/MATERIALS AS DIRECTED IN THESE DRAWINGS. SHOP DRAWINGS SHALL BE SUBMITTED FOR ARCHITECTURAL FINISHES, HARDWARE, ETC.; STRUCTURAL COMPONENTS; AND SERVICE EQUIPMENT ETC.

## INDEX OF DRAWINGS

CS-1	COVER SHEET
C-1	SITE PLAN
C-2	SITE DETAILS
C-3	SITE DETAILS
S-1	STRUCTURAL DETAILS
S-2	STRUCTURAL DETAILS & NOTES
E-1	KEY PLAN
E-2	PART PLANS AND NOTES
E-3	ANTENNA GROUNDING SYSTEM DIAGRAM, DETAIL, AND SCHEDULE

## ANTENNA ANALYSIS

EXISTING ANTENNAS:	TWELVE (12)	FOUR (4) PER SECTOR
ANTENNAS TO BE REMOVED:	NINE (9)	THREE (3) PER SECTOR
ANTENNAS TO BE INSTALLED:	NINE (9)	THREE (3) PER SECTOR
TOTAL ANTENNAS: (PROPOSED & EXISTING)	TWELVE (12)	FOUR (4) PER SECTOR

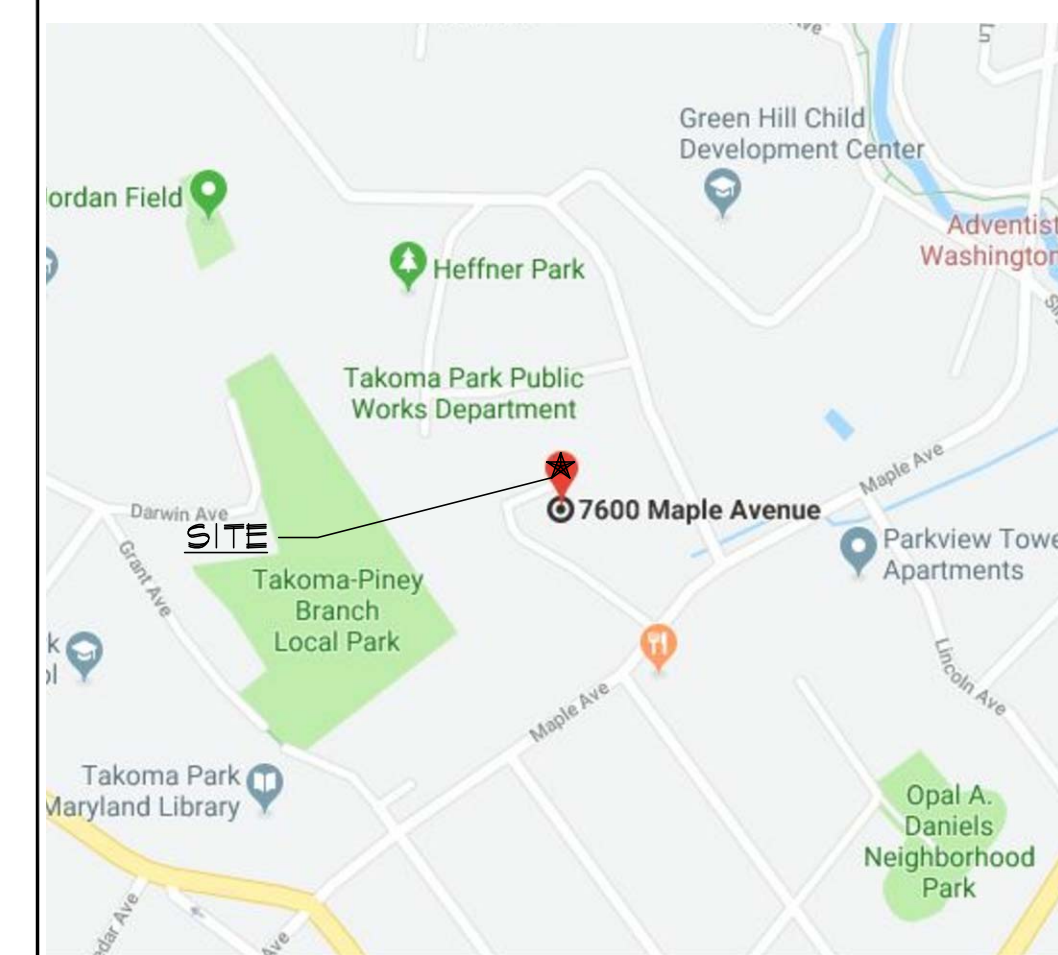
## CODE ANALYSIS

APPLICABLE BUILDING CODE:	IBC 2015
USE GROUP:	UTILITY (U)
CONSTRUCTION TYPE:	5B NONCOMBUSTIBLE/

## VERIZON REVIEW

BUILDING OWNER	DATE
ENGINEERING	DATE
OPERATIONS	DATE
CONSTRUCTION	DATE

## VICINITY PLAN



## PROJECT DESCRIPTION

THE PROJECT INVOLVES REMOVING AND INSTALLING NINE (9) ANTENNAS, THREE (3) AT EACH SECTOR AS WELL AS REMOVING AND INSTALLING SIX (6) REMOTE RADIO HEADS (RRH), TWO (2) AT EACH SECTOR.

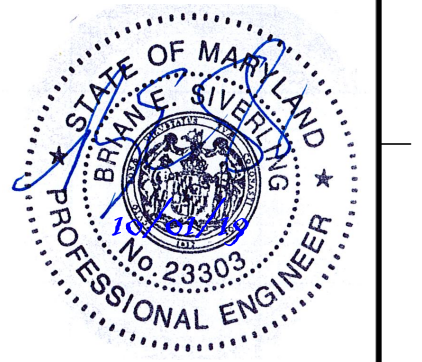
## DIRECTIONS TO SITE

FROM 1010 JUNCTION DRIVE, ANNAPOLIS JUNCTION, MD:

1. HEAD NORTHEAST ON JUNCTION DR TOWARD HENKELS LN
2. SLIGHT RIGHT TOWARDS DORSEY RUN ROAD
3. USE THE LEFT TWO LANES TO MERGE ONTO MD-32W
4. TAKE EXIT 18B FOR I-95 S TO WASHINGTON DC
5. USE RIGHT 2 LANES TO MERGE ONTO I-495 W
6. TAKE EXIT 28B FOR MD-650 S TOWARD TAKOMA PARK
7. TURN RIGHT ONTO MERRIMAC DR
8. TURN LEFT ONTO MD-195 S
9. TURN RIGHT ONTO LINCOLN AVE
10. TURN LEFT ONTO MAPLE DRIVE  
DESTINATION ON RIGHT



**MORRIS & RITCHIE ASSOCIATES, INC.**  
Civil / Structural Engineers  
1320-C East Joppa Road, Suite 505  
Towson, Maryland 21286  
410-821-1600  
410-821-1748 Fax



### PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 23303, EXPIRATION DATE: 07/07/2025.

**verizon**  
TAKOMA PARK - ANTENNA SWAP/RRH SWAP  
7600 MAPLE AVE  
TAKOMA PARK, MD 20912 (MONTGOMERY COUNTY)

### REVISIONS:

NO.	DESCRIPTION	DATE

PERMIT DWGS: 8/21/19

DESIGNED BY: BES

DRAWN BY: SUK

PROJECT NO: 19214.118

DATE: 07/31/2019

SCALE: AS NOTED

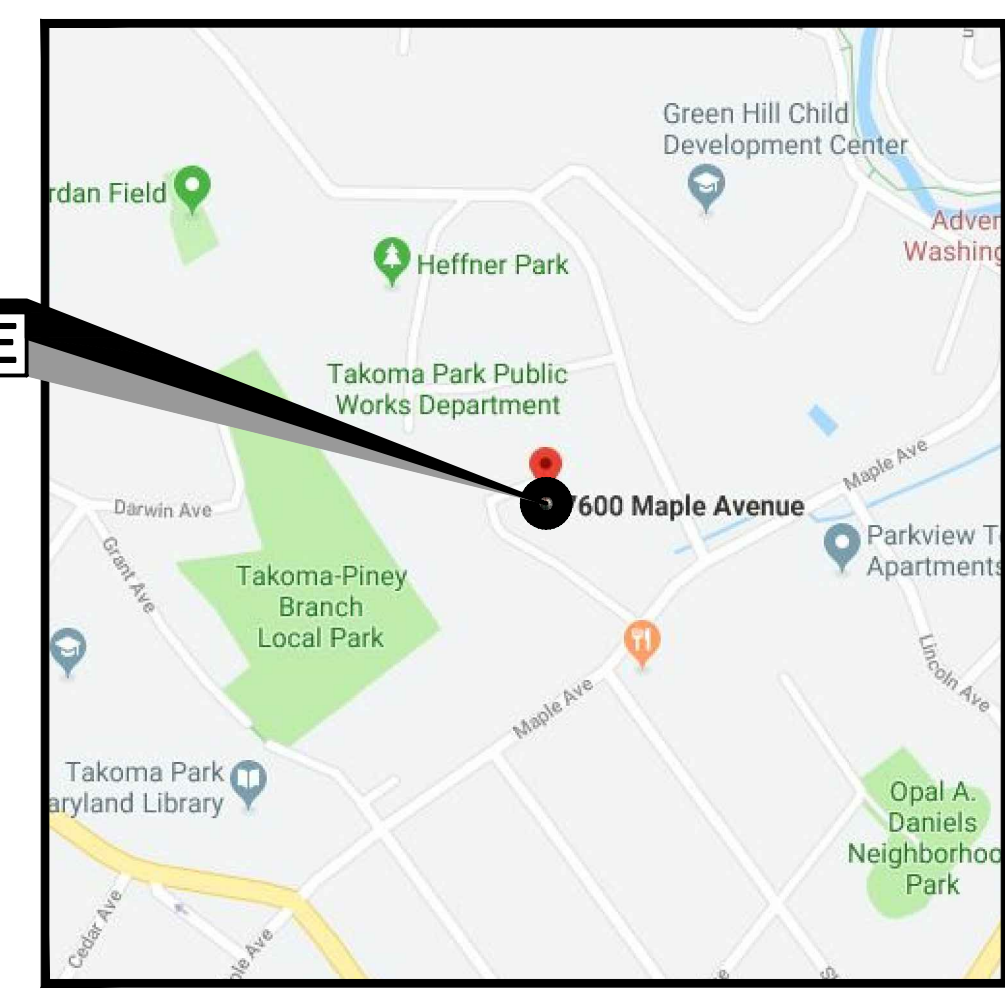
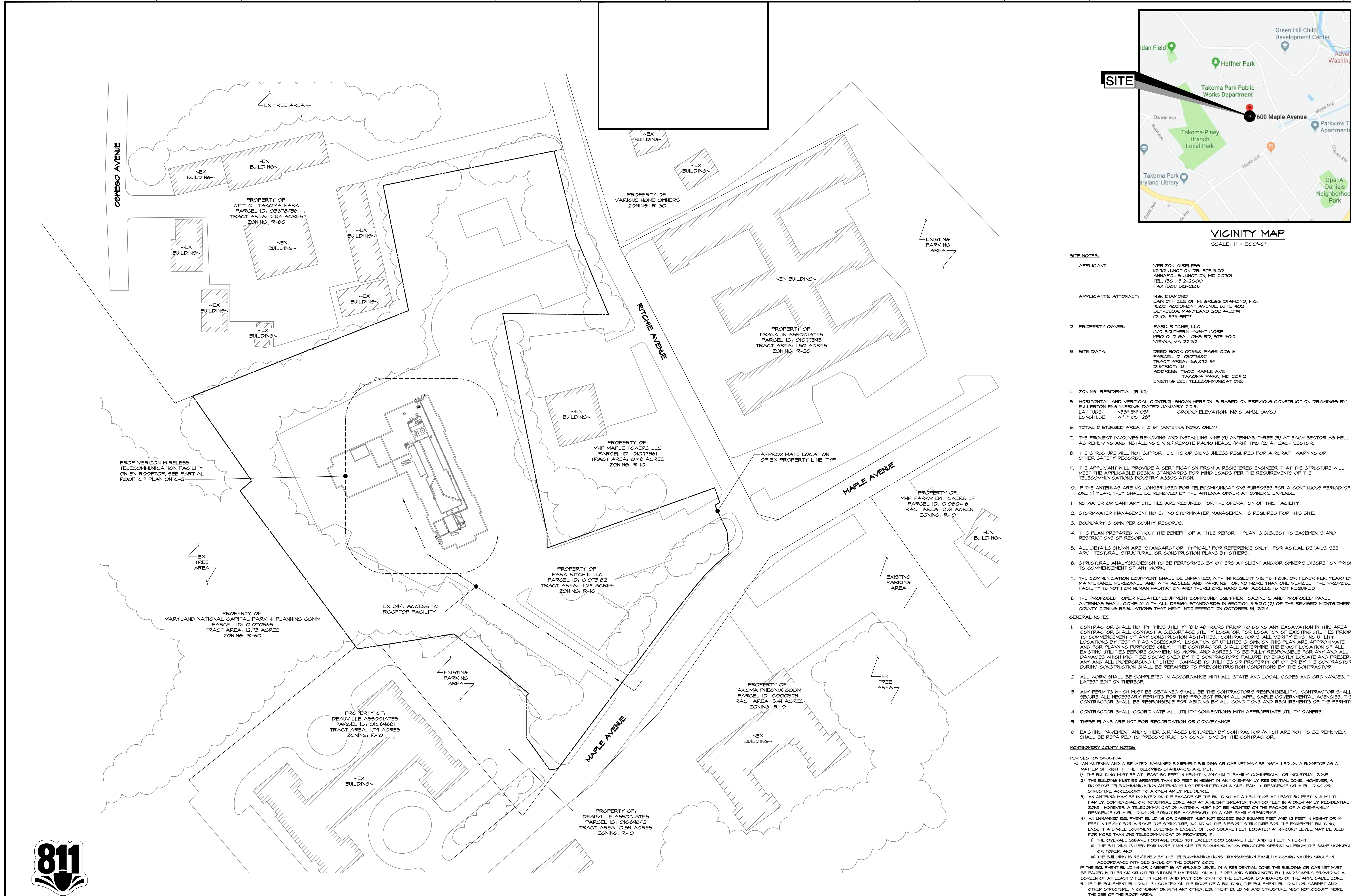
TITLE:

**Cover Sheet**

SHEET:

**CS-1**

A B C D E F G H J K L M N P Q R



VICINITY MAP  
SCALE: 1" = 500'-0"

- SITE NOTES:**
1. APPLICANT: VERIZON WIRELESS  
10710 JUNCTION DR, STE 900  
ANNAPOLIS JUNCTION, MD 20701  
TEL: (301) 912-2000  
FAX: (301) 912-2186
  2. APPLICANT'S ATTORNEY: M.S. DIAMOND  
LAW OFFICES OF M. GREGG DIAMOND, P.C.  
7800 WOODMONT AVENUE, SUITE 402  
BETHESDA, MARYLAND 20814-5574  
(240) 346-5314
  3. PROPERTY OWNER: PARK RITCHIE LLC  
C/O SOUTHERN MGMT CORP  
1950 OLD GALLONS RD, STE 600  
VIENNA, VA 22182
  4. SITE DATA: DEED BOOK 07688, PAGE 00616  
PARCEL ID: 01073182  
TRACT AREA: 186,872 SF  
DISTRICT: 15  
ADDRESS: 7600 MAPLE AVE  
TAKOMA PARK, MD 20912  
EXISTING USE: TELECOMMUNICATIONS
  5. ZONING: RESIDENTIAL (R-10)
  6. HORIZONTAL AND VERTICAL CONTROL SHOWN HEREON IS BASED ON PREVIOUS CONSTRUCTION DRAWINGS BY FULLERTON ENGINEERING, DATED JANUARY 2015.  
LATITUDE: N83° 54' 03" GROUND ELEVATION: 118.0' AMSL (AVG.)  
LONGITUDE: W77° 00' 28"
  7. TOTAL DISTURBED AREA = 0 SF (ANTENNA WORK ONLY)
  8. THE PROJECT INVOLVES REMOVING AND INSTALLING NINE (9) ANTENNAS, THREE (3) AT EACH SECTOR AS WELL AS REMOVING AND INSTALLING SIX (6) REMOTE RADIO HEADS (RRH), TWO (2) AT EACH SECTOR.
  9. THE STRUCTURE WILL NOT SUPPORT LIGHTS OR SIGNS UNLESS REQUIRED FOR AIRCRAFT WARNING OR OTHER SAFETY RECORDS.
  10. THE APPLICANT WILL PROVIDE A CERTIFICATION FROM A REGISTERED ENGINEER THAT THE STRUCTURE WILL MEET THE APPLICABLE DESIGN STANDARDS FOR WIND LOADS PER THE REQUIREMENTS OF THE TELECOMMUNICATIONS INDUSTRY ASSOCIATION.
  11. IF THE ANTENNAS ARE NO LONGER USED FOR TELECOMMUNICATIONS PURPOSES FOR A CONTINUOUS PERIOD OF ONE (1) YEAR, THEY SHALL BE REMOVED BY THE ANTENNA OWNER AT OWNER'S EXPENSE.
  12. NO WATER OR SANITARY UTILITIES ARE REQUIRED FOR THE OPERATION OF THIS FACILITY.
  13. STORMWATER MANAGEMENT NOTE: NO STORMWATER MANAGEMENT IS REQUIRED FOR THIS SITE.
  14. BOUNDARY SHOWN PER COUNTY RECORDS.
  15. THIS PLAN PREPARED WITHOUT THE BENEFIT OF A TITLE REPORT. PLAN IS SUBJECT TO EASEMENTS AND RESTRICTIONS OF RECORD.
  16. ALL DETAILS SHOWN ARE 'STANDARD' OR 'TYPICAL' FOR REFERENCE ONLY. FOR ACTUAL DETAILS, SEE ARCHITECTURAL, STRUCTURAL, OR CONSTRUCTION PLANS BY OTHERS.
  17. STRUCTURAL ANALYSIS/DESIGN TO BE PERFORMED BY OTHERS AT CLIENT AND/OR OWNER'S DISCRETION PRIOR TO COMMENCEMENT OF ANY WORK.
  18. THE COMMUNICATION EQUIPMENT SHALL BE UNMANNED, WITH INFREQUENT VISITS (FOUR OR FEWER PER YEAR) BY MAINTENANCE PERSONNEL, AND WITH ACCESS AND PARKING FOR NO MORE THAN ONE VEHICLE. THE PROPOSED FACILITY IS NOT FOR HANDICAPPED ACCESS IS NOT REQUIRED.
  19. THE PROPOSED TOWER RELATED EQUIPMENT CONDUIT, EQUIPMENT CABINETS AND PROPOSED PANEL ANTENNAS SHALL COMPLY WITH ALL DESIGN STANDARDS IN SECTION 5.2.2(2) OF THE REVISED MONTGOMERY COUNTY ZONING REGULATIONS THAT WENT INTO EFFECT ON OCTOBER 31, 2014.

- GENERAL NOTES:**
1. CONTRACTOR SHALL NOTIFY "MISS UTILITY" (811) 48 HOURS PRIOR TO DOING ANY EXCAVATION IN THIS AREA. CONTRACTOR SHALL CONTACT A SUBSURFACE UTILITY LOCATOR FOR LOCATION OF EXISTING UTILITIES PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL VERIFY EXISTING UTILITY LOCATIONS BY TEST PIT AS NECESSARY. LOCATION OF UTILITIES SHOWN ON THIS PLAN ARE APPROXIMATE AND FOR PLANNING PURPOSES ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES OR PROPERTY OF OTHER BY THE CONTRACTOR DURING CONSTRUCTION SHALL BE REPAIRED TO PRECONSTRUCTION CONDITIONS BY THE CONTRACTOR.
  2. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH ALL STATE AND LOCAL CODES AND ORDINANCES, THE LATEST EDITION THEREOF.
  3. ANY PERMITS WHICH MUST BE OBTAINED SHALL BE THE CONTRACTOR'S RESPONSIBILITY. CONTRACTOR SHALL SECURE ALL NECESSARY PERMITS FOR THIS PROJECT FROM ALL APPLICABLE GOVERNMENTAL AGENCIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ABIDING BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.
  4. CONTRACTOR SHALL COORDINATE ALL UTILITY CONNECTIONS WITH APPROPRIATE UTILITY OWNERS.
  5. THESE PLANS ARE NOT FOR RECORDATION OR CONVEYANCE.
  6. EXISTING PAVEMENT AND OTHER SURFACES DISTURBED BY CONTRACTOR (WHICH ARE NOT TO BE REMOVED) SHALL BE REPAIRED TO PRECONSTRUCTION CONDITIONS BY THE CONTRACTOR.

- MONTGOMERY COUNTY NOTES:**
- PER SECTION 25A-8-14**
- A) AN ANTENNA AND A RELATED UNMANNED EQUIPMENT BUILDING OR CABINET MAY BE INSTALLED ON A ROOFTOP AS A MATTER OF RIGHT IF THE FOLLOWING STANDARDS ARE MET:
    - 1) THE BUILDING MUST BE AT LEAST 30 FEET IN HEIGHT IN ANY MULTI-FAMILY, COMMERCIAL OR INDUSTRIAL ZONE.
    - 2) THE BUILDING MUST BE GREATER THAN 30 FEET IN HEIGHT IN ANY ONE-FAMILY RESIDENTIAL ZONE. HOWEVER, A ROOFTOP TELECOMMUNICATION ANTENNA IS NOT PERMITTED ON A ONE-FAMILY RESIDENCE OR A BUILDING OR STRUCTURE ACCESSORY TO A ONE-FAMILY RESIDENCE.
    - 3) AN ANTENNA MAY BE MOUNTED ON THE FACADE OF THE BUILDING AT A HEIGHT OF AT LEAST 30 FEET IN A MULTI-FAMILY, COMMERCIAL OR INDUSTRIAL ZONE AND AT A HEIGHT GREATER THAN 30 FEET IN A ONE-FAMILY RESIDENTIAL ZONE. HOWEVER, A TELECOMMUNICATION ANTENNA MUST NOT BE MOUNTED ON THE FACADE OF A ONE-FAMILY RESIDENCE OR A BUILDING OR STRUCTURE ACCESSORY TO A ONE-FAMILY RESIDENCE.
    - 4) AN UNMANNED EQUIPMENT BUILDING OR CABINET MUST NOT EXCEED 560 SQUARE FEET AND 12 FEET IN HEIGHT OR 14 FEET IN HEIGHT FOR A ROOF TOP STRUCTURE, INCLUDING THE SUPPORT STRUCTURE FOR THE EQUIPMENT BUILDING, EXCEPT A SINGLE EQUIPMENT BUILDING IN EXCESS OF 560 SQUARE FEET, LOCATED AT GROUND LEVEL, MAY BE USED FOR MORE THAN ONE TELECOMMUNICATION PROVIDER, IF:
      - 1) THE OVERALL SQUARE FOOTAGE DOES NOT EXCEED 1800 SQUARE FEET AND 12 FEET IN HEIGHT.
      - 2) THE BUILDING IS USED FOR MORE THAN ONE TELECOMMUNICATION PROVIDER OPERATING FROM THE SAME MONOPOLE OR TOWER AND
      - 3) THE BUILDING IS REVIEWED BY THE TELECOMMUNICATIONS TRANSMISSION FACILITY COORDINATING GROUP IN ACCORDANCE WITH SEC 2-502 OF THE COUNTY CODE.
  - B) IN ADDITION TO A ROOFTOP, AN ANTENNA MAY BE ATTACHED AS A MATTER OF RIGHT TO AN EXISTING STRUCTURE ON PRIVATELY OWNED LAND, INCLUDING BUT NOT LIMITED TO A RADIO, TELEVISION, OR TELEPHONE TRANSMISSION TOWER, A MONOPOLE, A LIGHT POLE, A WATER TANK, OR AN OVERHEAD TRANSMISSION LINE SUPPORT STRUCTURE. AN EQUIPMENT BUILDING LOCATED ON SUCH A STRUCTURE IS SUBJECT TO THE REQUIREMENTS OF SUBSECTION A(A). A STRUCTURE CONSTRUCTED FOR THE SUPPORT OF: 1) AN ANTENNA THAT IS PART OF AN AMATEUR RADIO STATION LICENSED BY THE FEDERAL COMMUNICATIONS COMMISSION, OR 2) AN ANTENNA TO RECEIVE TELEVISION IMAGES IN THE HOME, MAY NOT BE USED AS A SUPPORT STRUCTURE FOR ANY OTHER ANTENNA.

**MRA**  
**MORRIS & RITCHIE ASSOCIATES, INC.**  
 Civil / Structural Engineers  
 1320-C East Joppa Road, Suite 505  
 Towson, Maryland 21286  
 410-821-1600  
 410-821-1748 Fax



**PROFESSIONAL CERTIFICATION**  
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 23303, EXPIRATION DATE: 07/01/2020.

**verizon**  
 TAKOMA PARK - ANTENNA SWAP/RRH SWAP  
 7600 MAPLE AVE  
 TAKOMA PARK, MD 20912 (MONTGOMERY COUNTY)

**REVISIONS:**

NO.	DESCRIPTION	DATE

PERMIT DWGS: 6/21/19  
 DESIGNED BY: BES  
 DRAWN BY: SUK  
 PROJECT NO.: 19214.118  
 DATE: 07/31/2019  
 SCALE: AS NOTED

TITLE:  
**Site Plan**

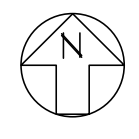
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**C-1**



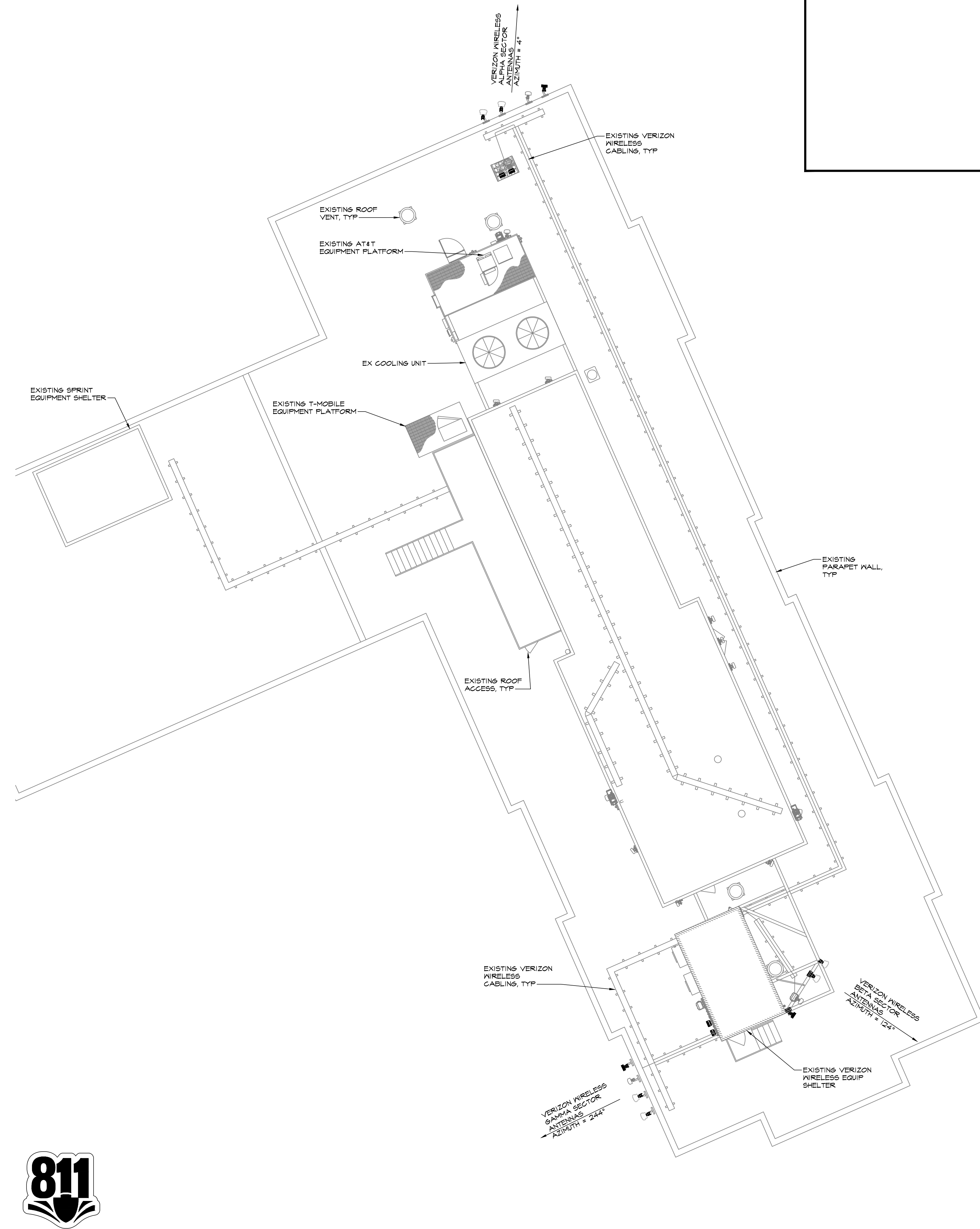
**Know what's below. Call before you dig.**

PROTECT YOURSELF. GIVE THREE WORKING DAYS NOTICE.  
 THIS DRAWING DOES NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY. ALL CONSTRUCTION MUST BE DONE IN COMPLIANCE WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 AND ALL RULES AND REGULATIONS THERE TO APPURTENANT.

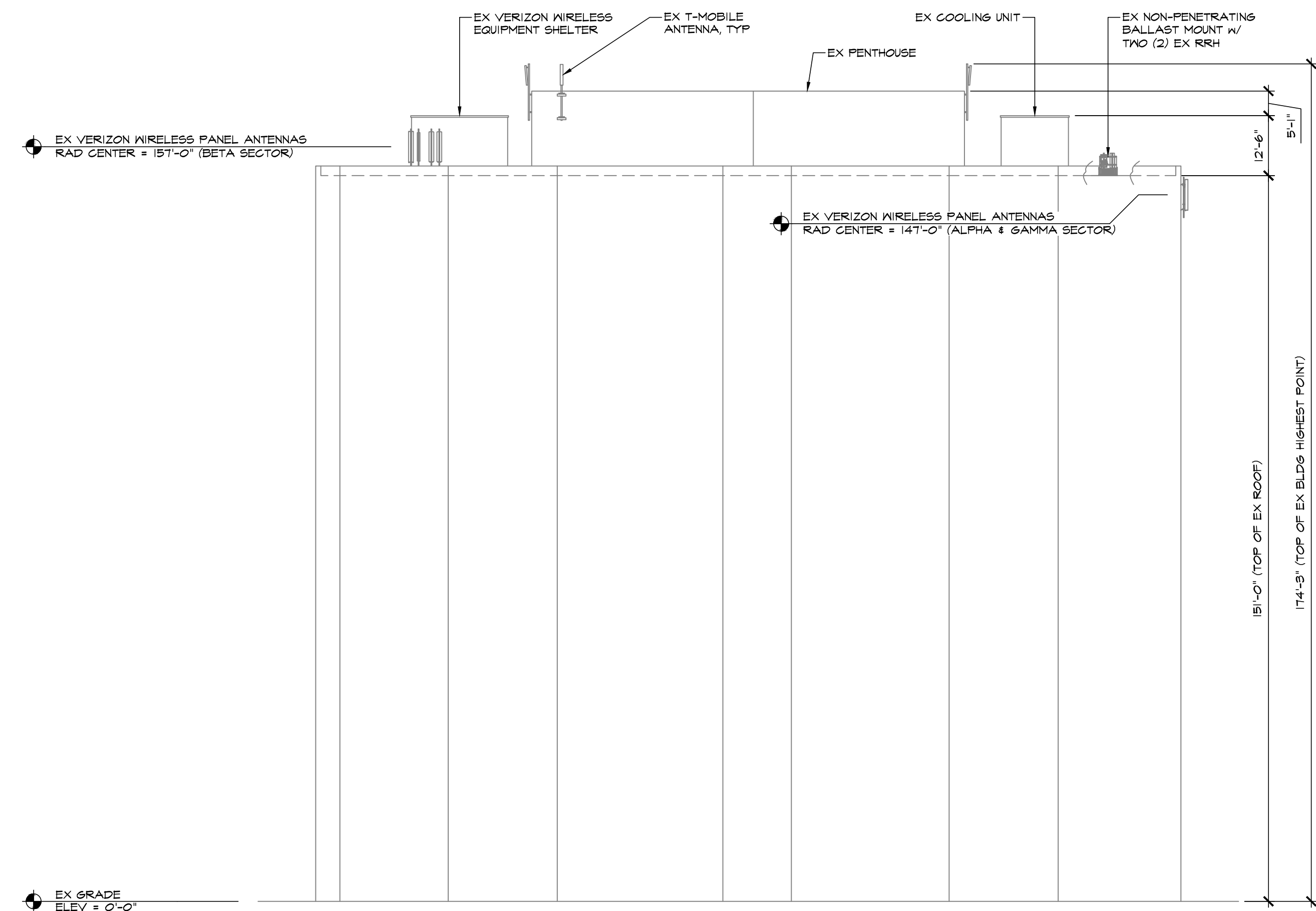
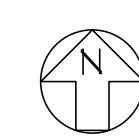
**SITE PLAN**  
 SCALE: 1" = 50'-0"



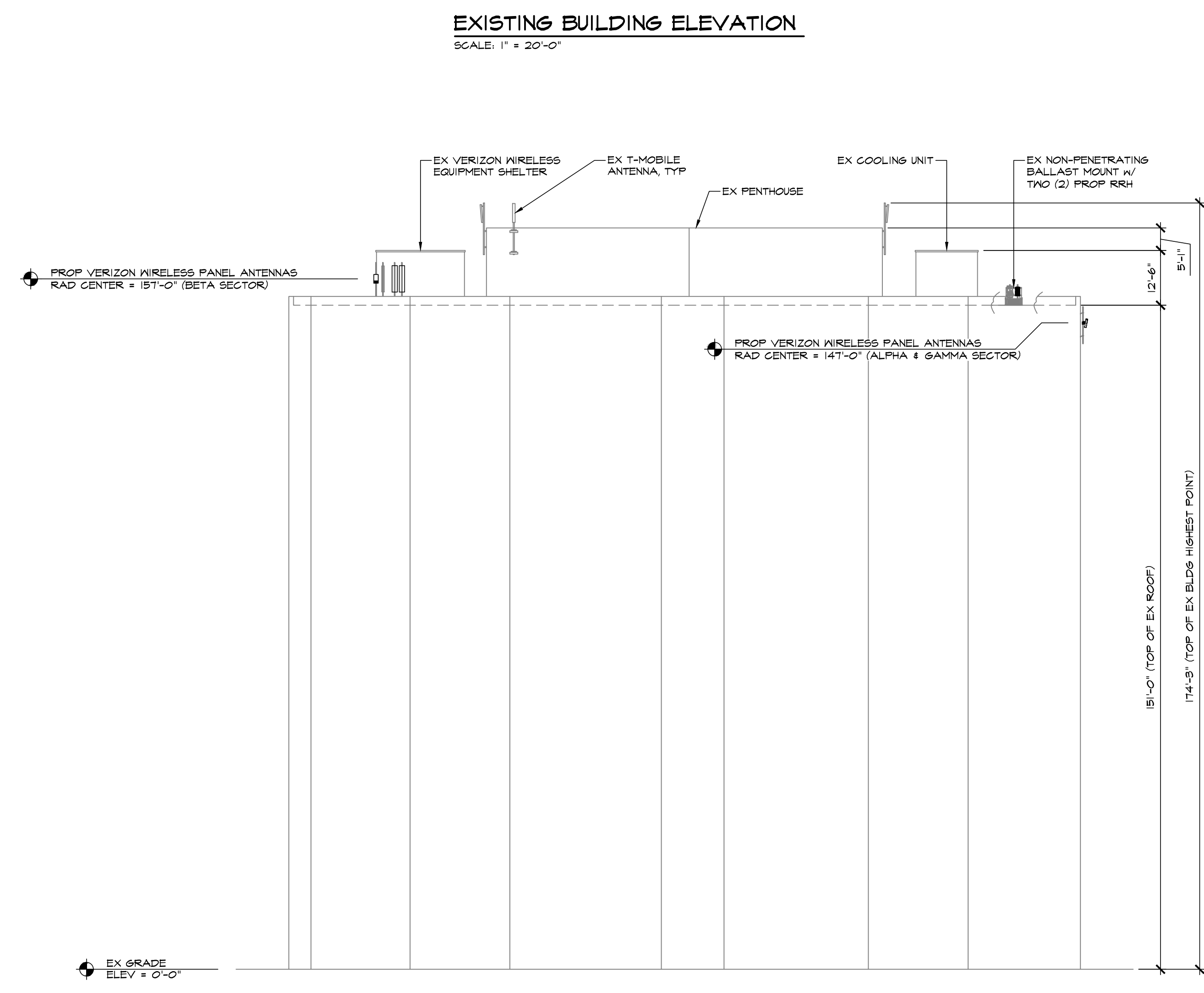
A B C D E F G H J K L M N P Q R



**PARTIAL ROOF PLAN**  
SCALE: 1" = 10'-0"



**EXISTING BUILDING ELEVATION**  
SCALE: 1" = 20'-0"



**PROPOSED BUILDING ELEVATION**  
SCALE: 1" = 20'-0"

**MRA**  
**MORRIS & RITCHIE ASSOCIATES, INC.**  
Civil / Structural Engineers  
1220-C East Joppa Road, Suite 505  
Towson, Maryland 21286  
410-821-1600  
410-821-1748 Fax



**PROFESSIONAL CERTIFICATION**  
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 23303, EXPIRATION DATE: 07/07/2020.

**verizon**  
TAKOMA PARK - ANTENNA SWAP/RRH SWAP  
7600 MAPLE AVE  
TAKOMA PARK, MD 20912 (MONTGOMERY COUNTY)

**REVISIONS:**

NO.	DESCRIPTION	DATE

PERMIT DWGS: 6/21/19  
DESIGNED BY: BES  
DRAWN BY: SUK  
PROJECT NO: 19214.118  
DATE: 07/31/2019  
SCALE: AS NOTED

TITLE:  
**Site Details**

SHEET:  
**C-2**



**Know what's below. Call before you dig.**

PROTECT YOURSELF, GIVE THREE WORKING DAYS NOTICE  
THIS DRAWING DOES NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY. ALL CONSTRUCTION MUST BE DONE IN COMPLIANCE WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 AND ALL RULES AND REGULATIONS THERE TO APPURTENANT.

A B C D E F G H J K L M N P Q R

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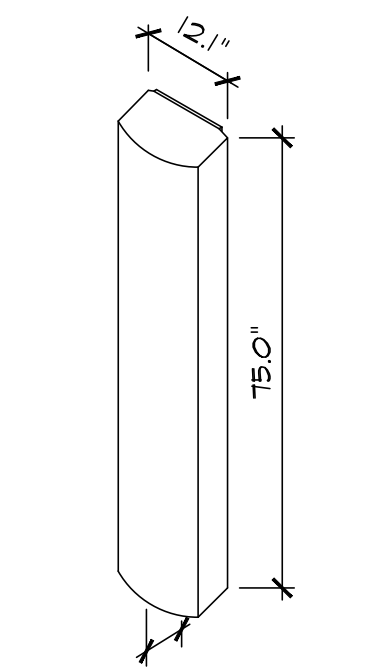
**verizon**  
 TAKOMA PARK - ANTENNA SWAP/RRH SWAP  
 T600 MAPLE AVE  
 TAKOMA PARK, MD 20912 (MONTGOMERY COUNTY)

REVISIONS:

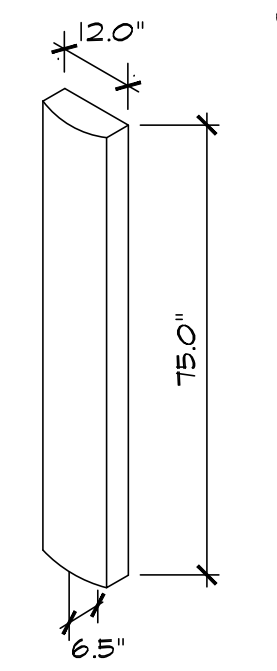
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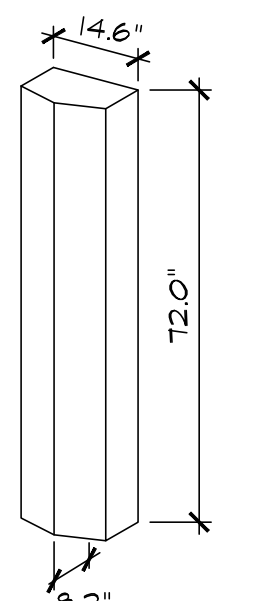
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**Site Details**  
 SHEET:  
**C-3**



AMPHENOL  
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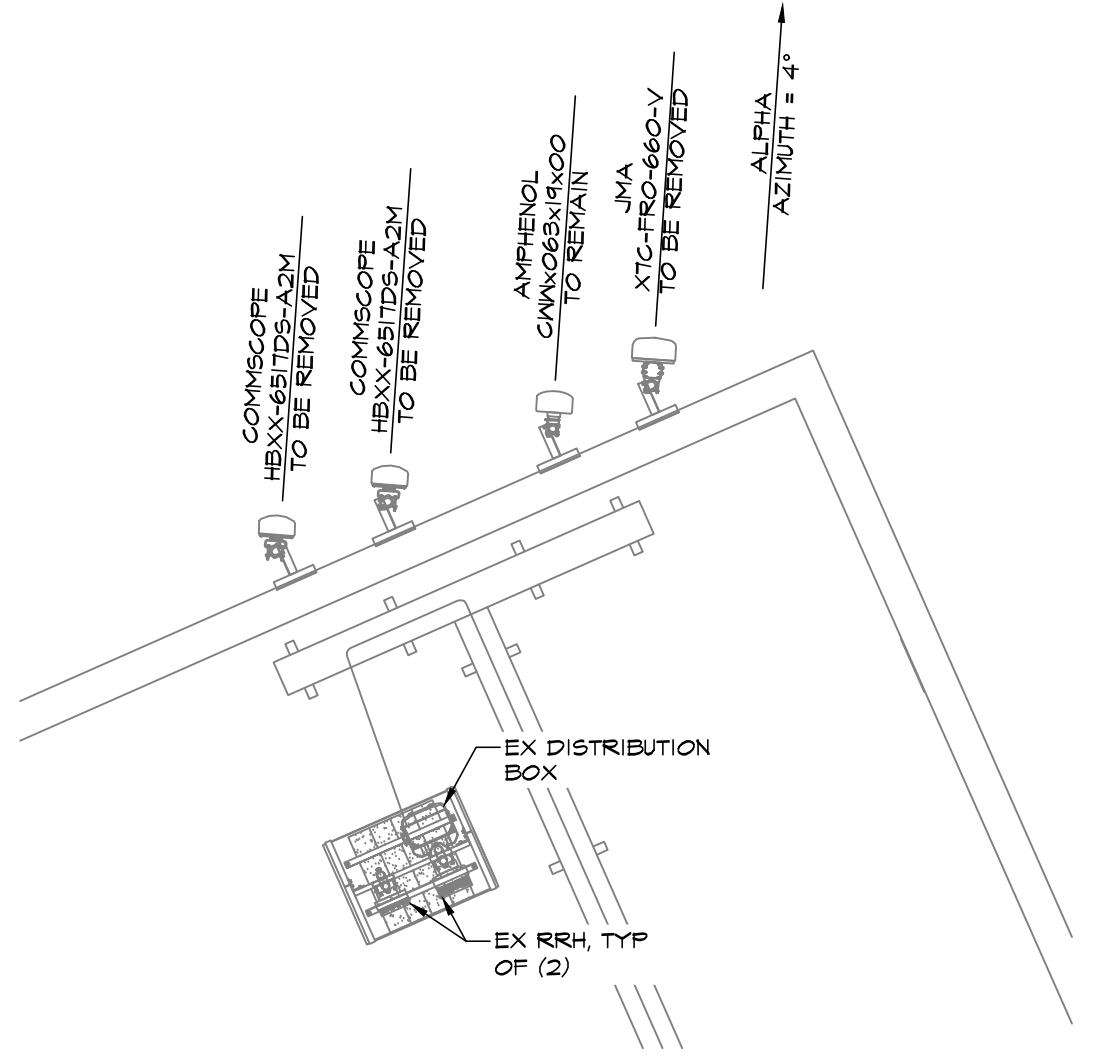


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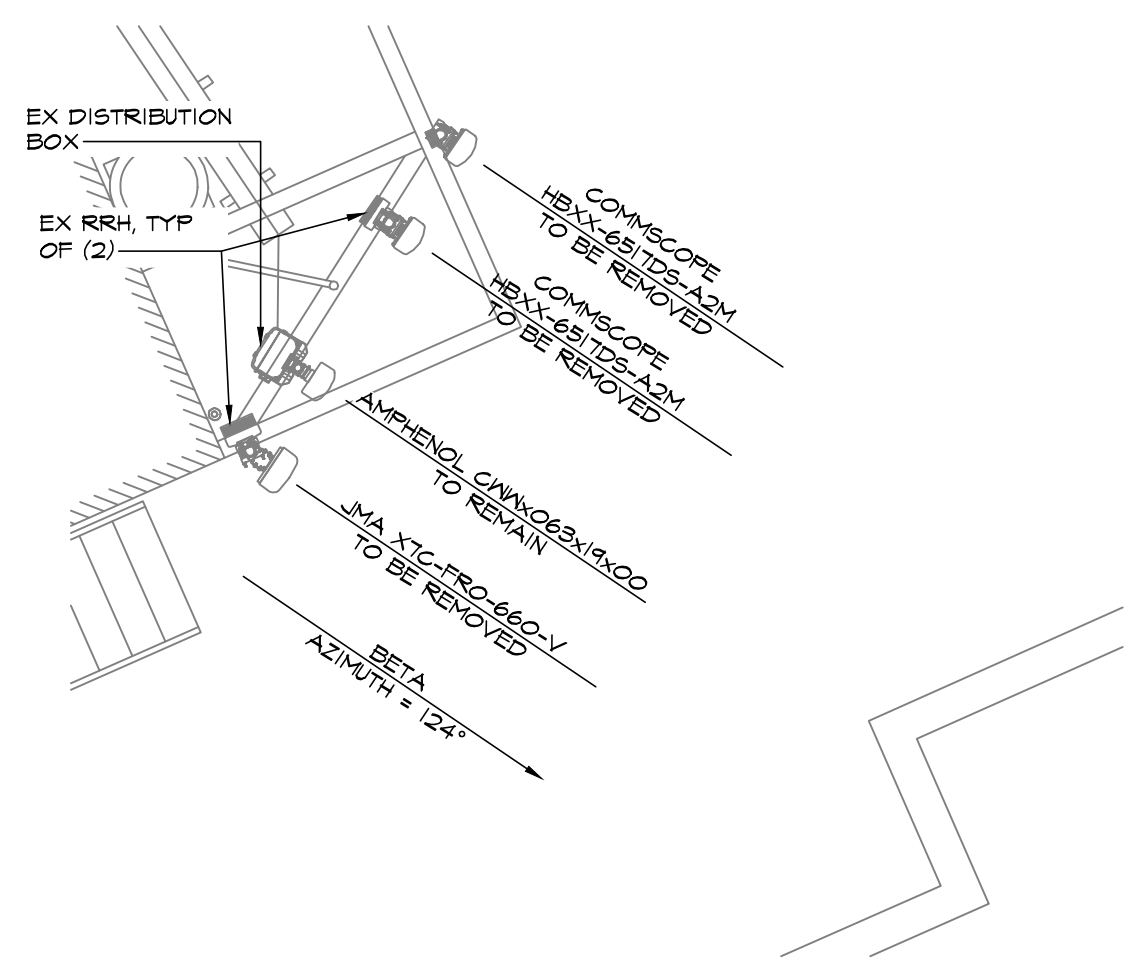


JMA X7C-FRO-660-Y

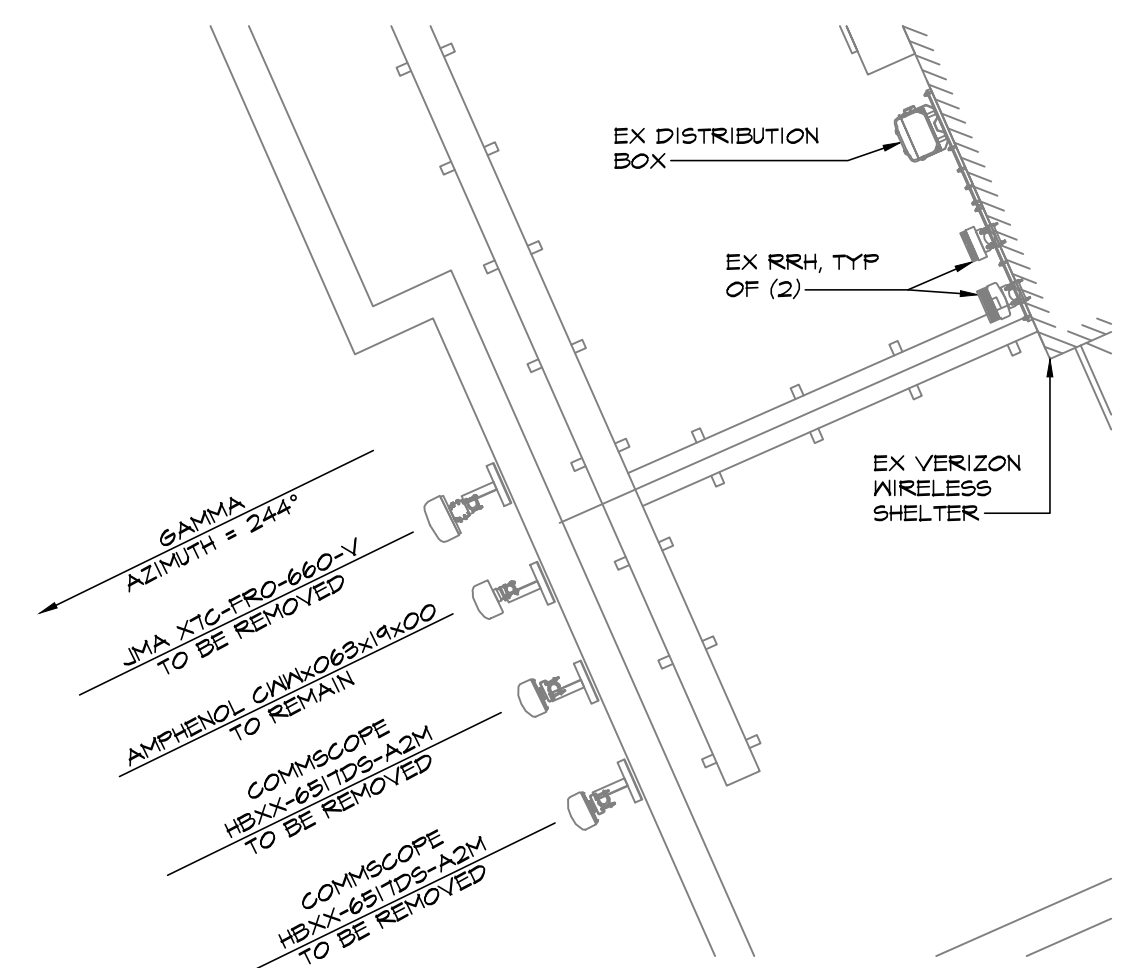
EXISTING VERIZON WIRELESS ANTENNA DETAILS  
 NOT TO SCALE



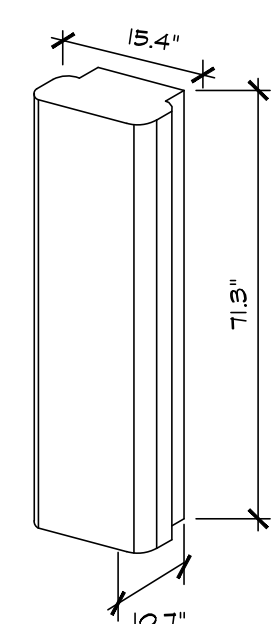
EXISTING ALPHA SECTOR PLAN  
 SCALE: 3/8" = 1'-0"



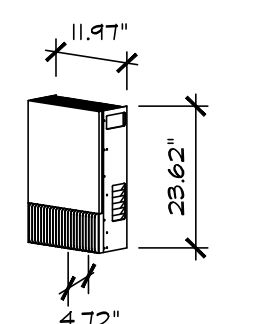
EXISTING BETA SECTOR PLAN  
 SCALE: 3/8" = 1'-0"



EXISTING GAMMA SECTOR PLAN  
 SCALE: 3/8" = 1'-0"

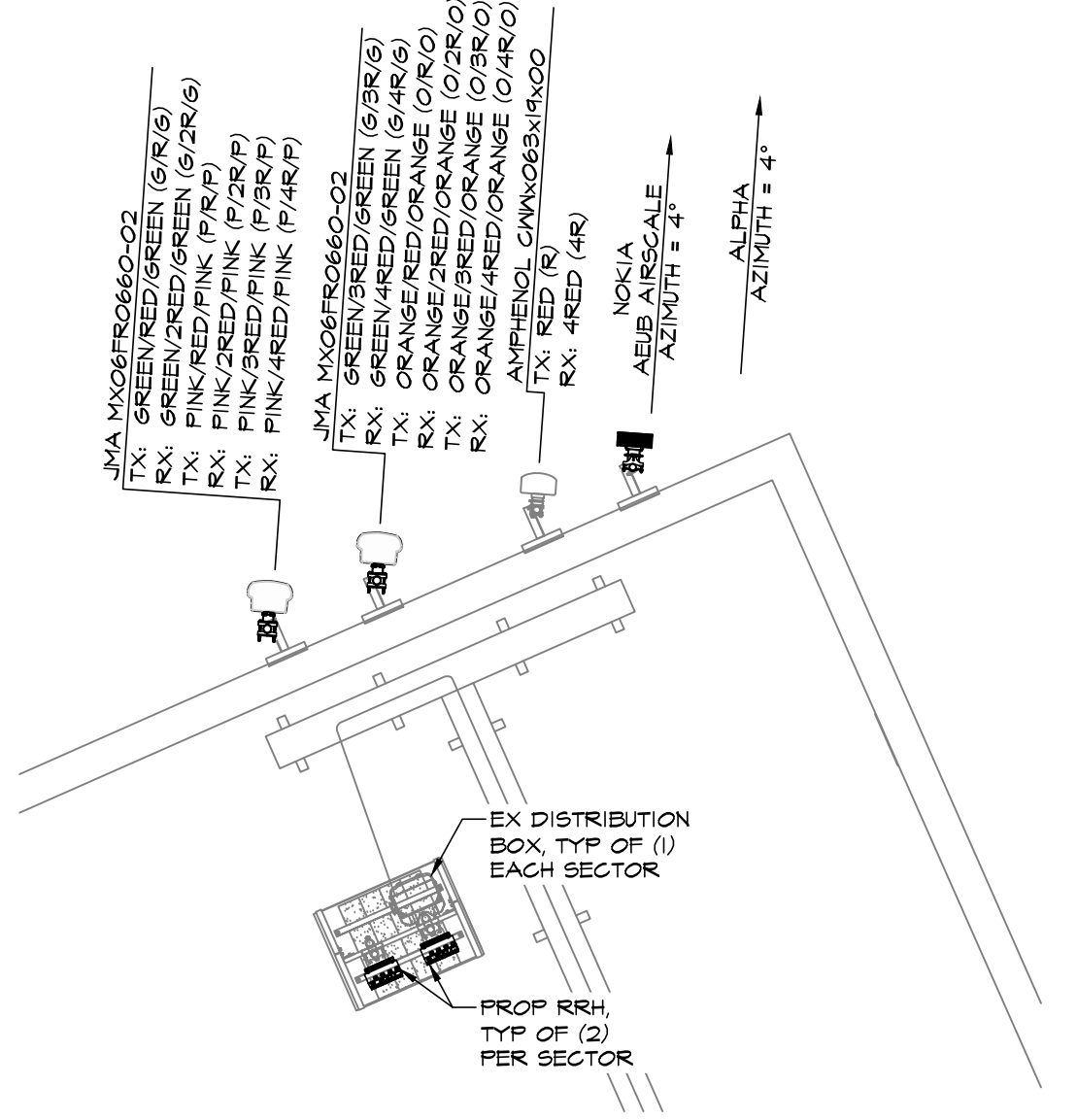


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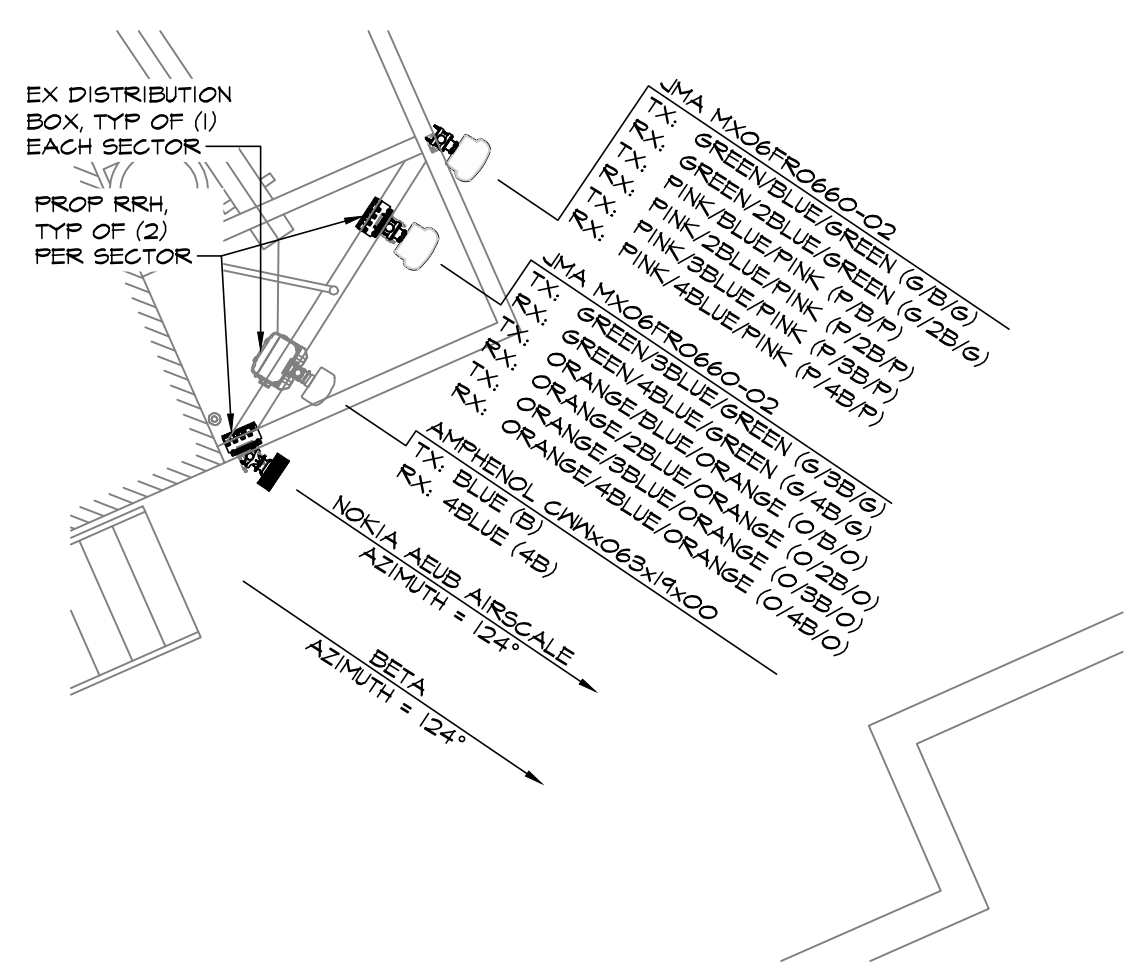


NOKIA AEB AIRSCALE

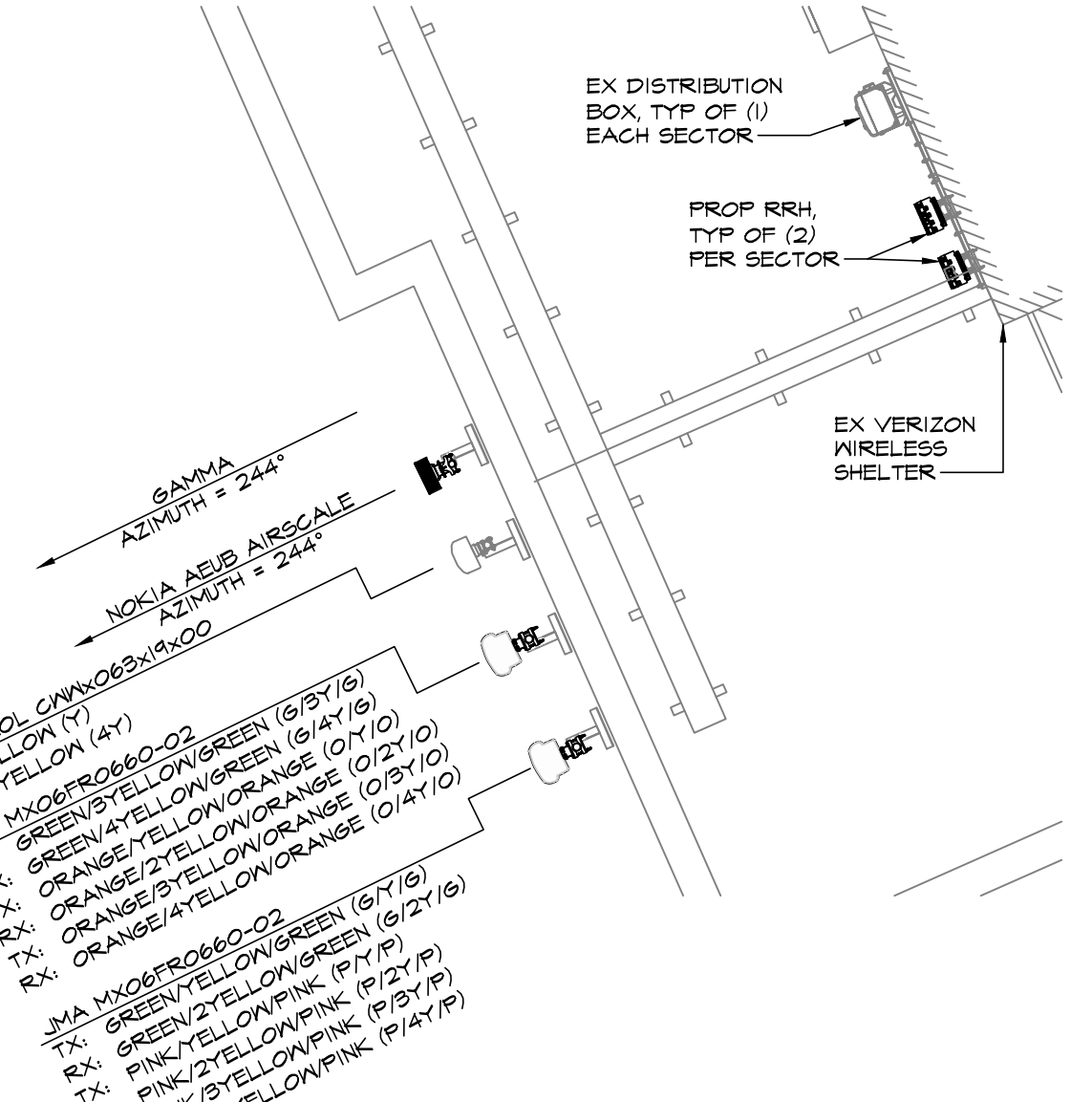
PROPOSED VERIZON WIRELESS ANTENNA DETAILS  
 NOT TO SCALE



PROPOSED ALPHA SECTOR PLAN  
 SCALE: 3/8" = 1'-0"



PROPOSED BETA SECTOR PLAN  
 SCALE: 3/8" = 1'-0"



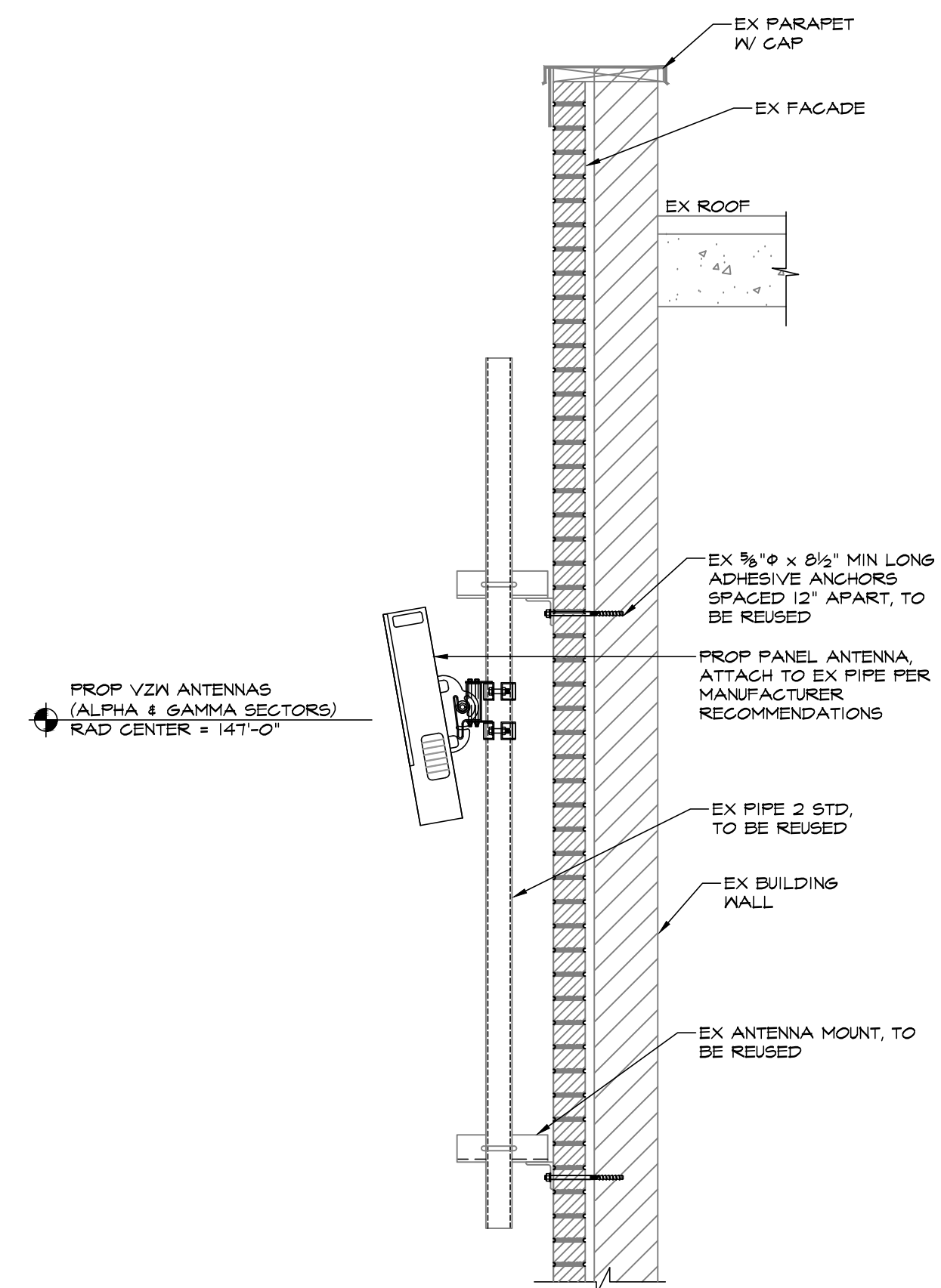
PROPOSED GAMMA SECTOR PLAN  
 SCALE: 3/8" = 1'-0"



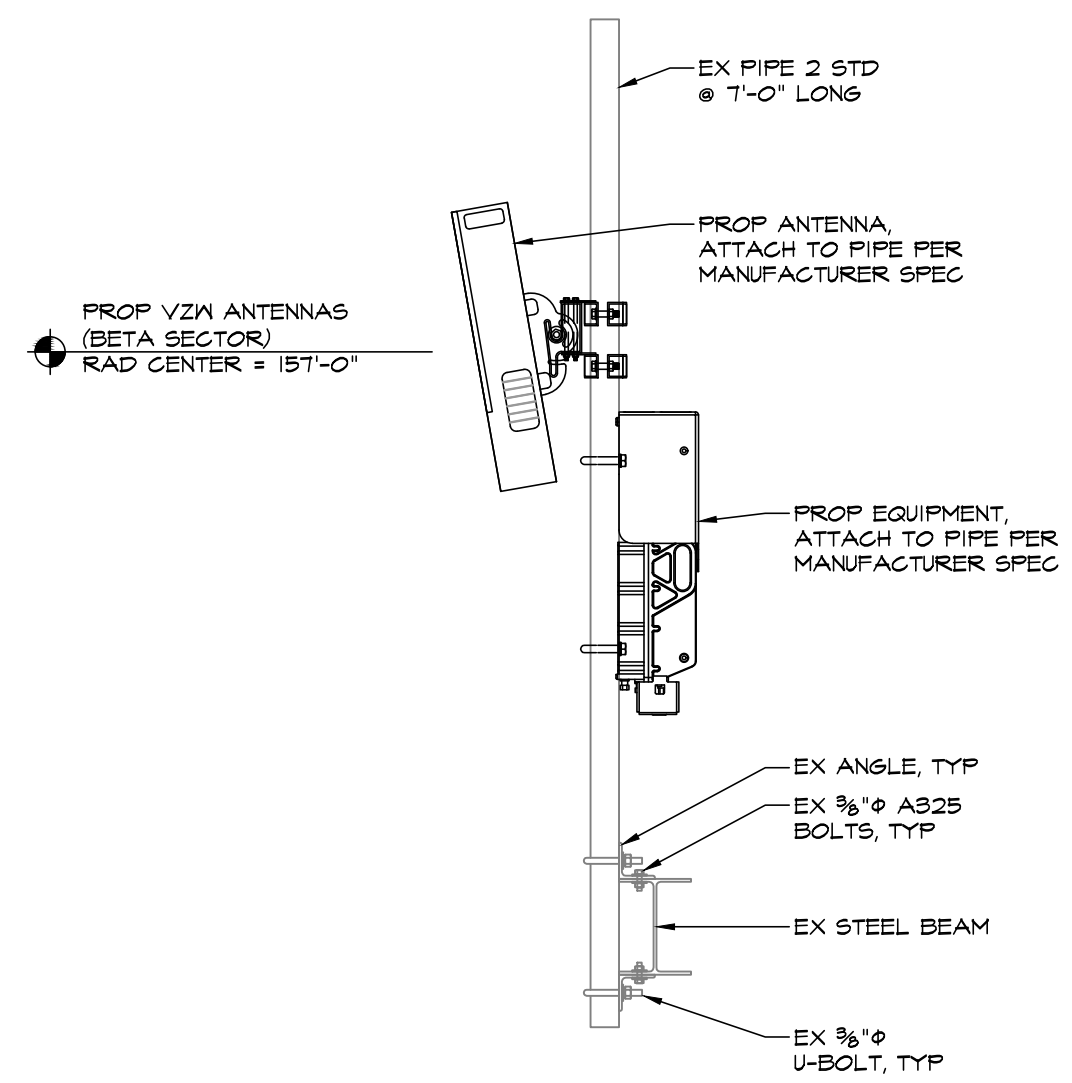
Know what's below.  
 Call before you dig.

PROTECT YOURSELF, GIVE THREE WORKING DAYS NOTICE  
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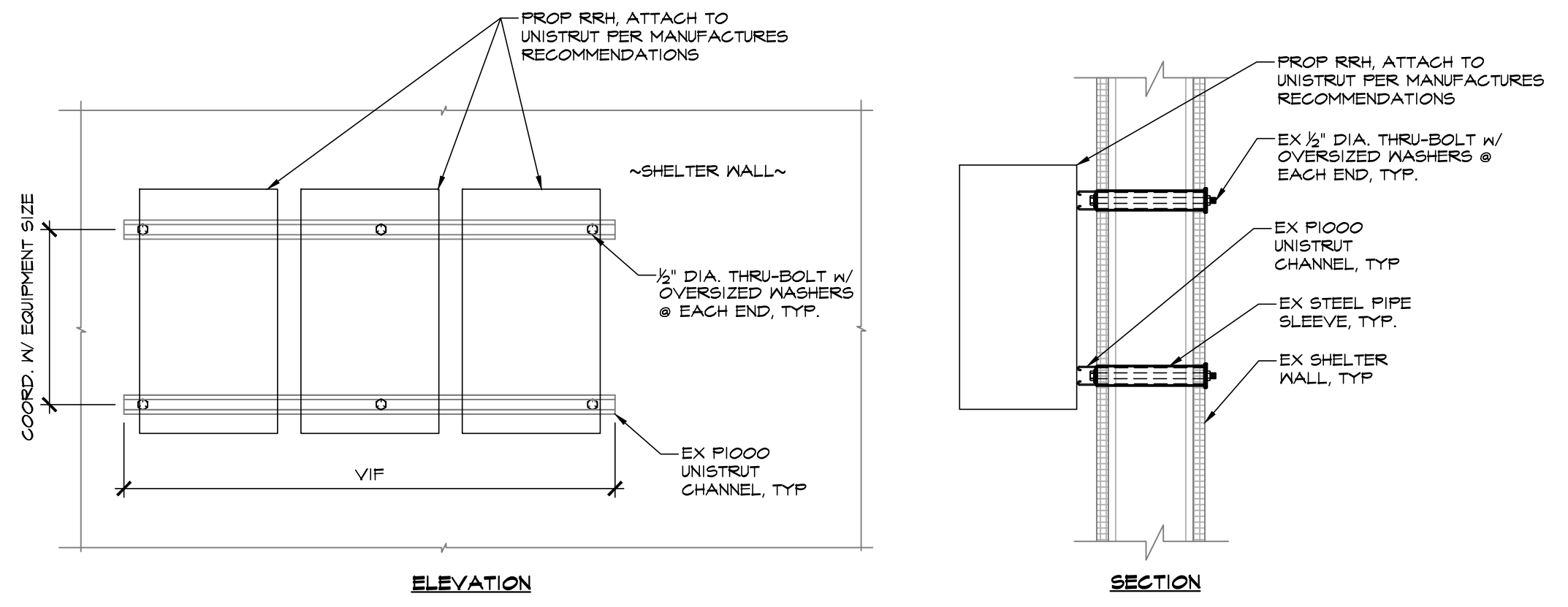
A B C D E F G H J K L M N P Q R



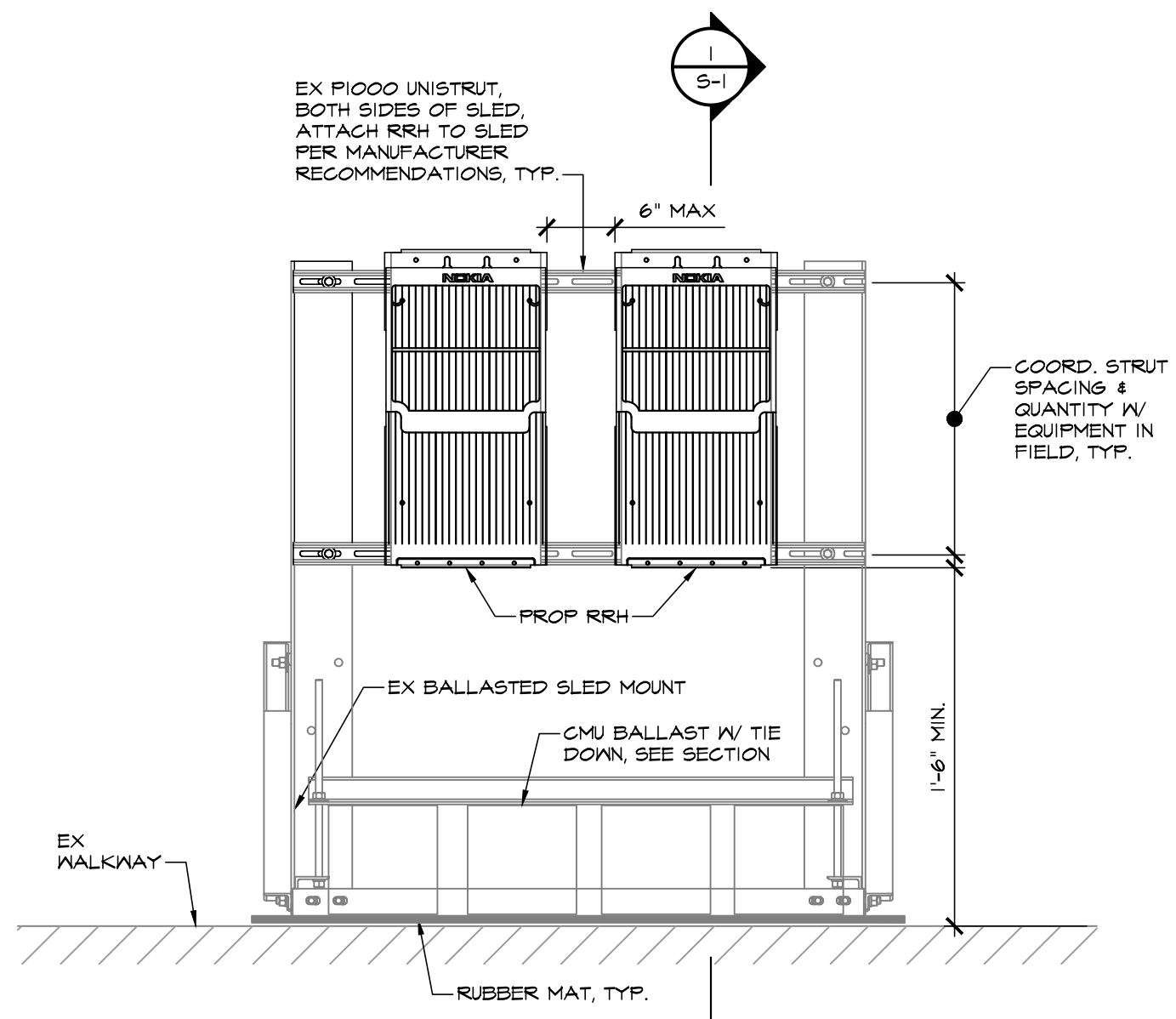
**ANTENNA MOUNT (ALPHA & GAMMA SECTORS)**  
SCALE: 3/4" = 1'-0"



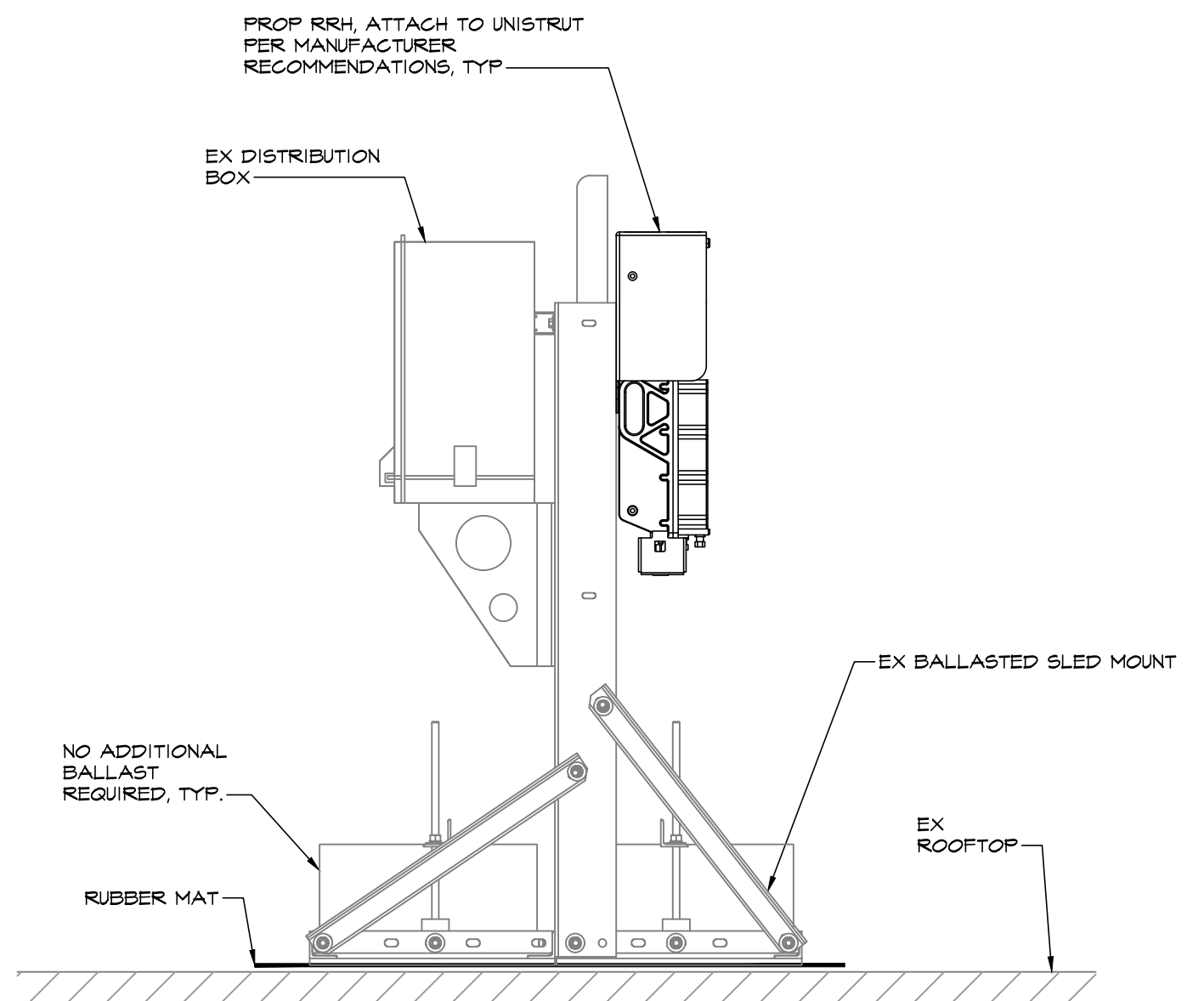
**ANTENNA & EQUIPMENT MOUNT (BETA SECTOR)**  
SCALE: 3/4" = 1'-0"



**RRH MOUNTED TO SHELTER WALL (GAMMA SECTOR)**  
SCALE: 1" = 1'-0"



**TYPICAL RRH BALLASTED SLED (ALPHA SECTOR)**  
SCALE: 1" = 1'-0"



**TYPICAL RRH BALLASTED SLED**  
SCALE: 1" = 1'-0"

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**verizon**  
TAKOMA PARK - ANTENNA SWAP/RRH SWAP  
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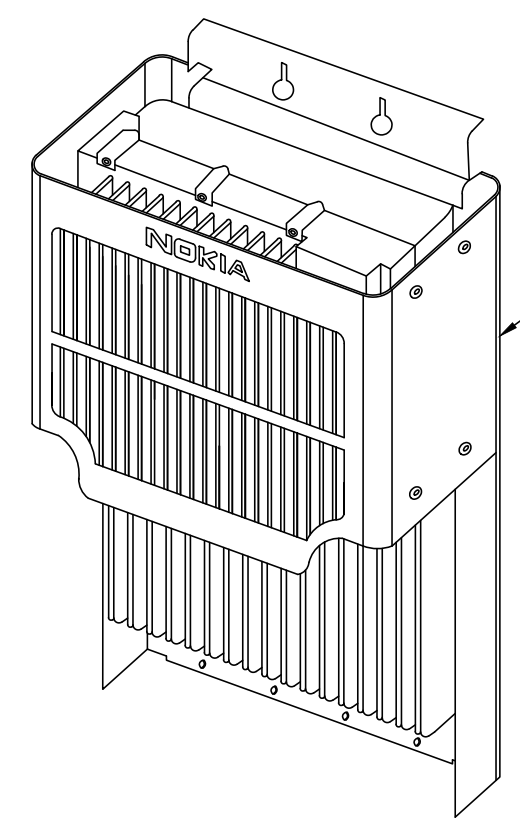
REVISIONS:

NO.	DESCRIPTION	DATE

PERMIT DWGS: 6/21/19  
DESIGNED BY: BES  
DRAWN BY: SUK  
PROJECT NO: 19214.118  
DATE: 07/31/2019  
SCALE: AS NOTED

TITLE:  
**Structural Details**  
SHEET:  
**S-1**

**811**  
Know what's below.  
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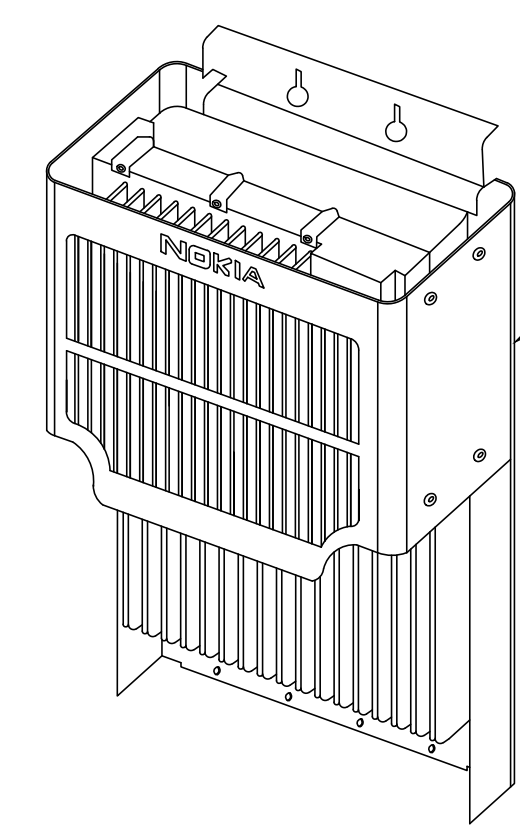


AIR SCALE DUAL RRH  
4T4R B2/66a 320W AHFC

**AIRSCALE DUAL RRH 4T4R B2/66a 320W AHFC**  
 MANUFACTURER: NOKIA  
 ANTENNA TECH: 1900/2100 MHz  
 DIMENSIONS: 7.25"Dx12.1"Wx22.2"H (NO BRACKET)  
 7.6"Dx12.9"Wx26.6"H (W BRACKET)  
 WEIGHT: 79 LBS

- NOTES:**
1. INSTALL RRH PER MANUFACTURER'S RECOMMENDATIONS.
  2. FIBER, DC POWER & GROUND CONNECTIONS NOT SHOWN.

**NOKIA AIRSCALE DUAL RRH 4T4R B2/66a 320 W AHFC - DETAIL**  
 NOT TO SCALE



AIR SCALE DUAL RRH  
4T4R B5/13 320W AHBC

**AIRSCALE DUAL RRH 4T4R B5/13 320W AHBC**  
 MANUFACTURER: NOKIA  
 ANTENNA TECH: 700/850 MHz  
 DIMENSIONS: 7.5"Dx12.1"Wx22.2"H (NO BRACKET)  
 8.1"Dx12.9"Wx26.6"H (W BRACKET)  
 WEIGHT: 84 LBS

- NOTES:**
1. INSTALL RRH PER MANUFACTURER'S RECOMMENDATIONS.
  2. FIBER, DC POWER & GROUND CONNECTIONS NOT SHOWN.

**NOKIA AIRSCALE DUAL RRH 4T4R B5/13 320 W AHBC - DETAIL**  
 NOT TO SCALE



**STRUCTURAL NOTES**

- BUILDING CODES**
  - ALL CONSTRUCTION SHALL CONFORM WITH THE IBC 2015 BUILDING CODE AND ALL SUBSEQUENT SUPPLEMENTS.
  - IN ADDITION, ALL CONSTRUCTION SHALL CONFORM WITH THE GOVERNING LOCAL BUILDING CODE.
- DESIGN LOADS**
  - WIND LOAD DESIGN CRITERIA:**  
 ULTIMATE WIND SPEED (VULT) = 115 MPH  
 RISK CATEGORY: II  
 WIND EXPOSURE: B  
 IMPORTANCE FACTOR (I) = 1.0
  - SEISMIC LOADING: DOES NOT CONTROL**
- MISCELLANEOUS**
  - SHOP DRAWINGS FOR ALL STRUCTURAL ELEMENTS SHOWN ON THE CONTRACT DOCUMENTS MUST BE SUBMITTED BY THE CONTRACTOR OR OWNER FOR REVIEW BY THE ENGINEER. IF THE CONTRACTOR OR OWNER FAILS TO SUBMIT THE SHOP DRAWINGS, THE ENGINEER WILL NOT BE RESPONSIBLE FOR STRUCTURAL CERTIFICATION AND DESIGN OF THE PROJECT. THE SHOP DRAWINGS SHALL INDICATE ANY DEVIATIONS OR OMISSIONS FROM THE CONTRACT DOCUMENTS. THE GENERAL CONTRACTOR SHALL REVIEW ALL SHOP DRAWINGS PRIOR TO SUBMISSION AND MAKE ALL CORRECTIONS DEEMED NECESSARY.
  - THE CONTRACTOR SHALL REVIEW THE ARCHITECTURAL, CIVIL, MECHANICAL AND ELECTRICAL DRAWINGS FOR LOCATION AND DIMENSION OF CHASES, INSERTS, OPENINGS, SLEEVES, DEPRESSIONS AND OTHER PROJECT REQUIREMENTS WHICH IMPACT THE STRUCTURAL COMPONENTS.
  - THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS SHOWN ON THE CONTRACT DRAWINGS BEFORE PROCEEDING WITH CONSTRUCTION. ALL DISCREPANCIES AND OMISSIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT.
  - THE CONTRACTOR SHALL NOT SUBMIT REPRODUCTIONS OF THE STRUCTURAL CONTRACT DOCUMENTS AS SHOP DRAWINGS.
  - SCALES SHOWN ON THE STRUCTURAL CONTRACT DRAWINGS ARE FOR GENERAL INFORMATION ONLY. DIMENSIONAL INFORMATION SHALL NOT BE OBTAINED BY SCALING THE DRAWINGS.
- EXISTING STRUCTURE**
  - ALL EXISTING PLANS, DETAILS, DIMENSIONS, AND ELEVATIONS INDICATE EXISTING CONDITIONS AS KNOWN. THE EXISTING INFORMATION SHOWN IS NOT INTENDED TO BE "AS BUILT" AND THE ACTUAL CONSTRUCTION MAY DIFFER FROM THAT SHOWN. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS INCLUDING DIMENSIONS AND ELEVATIONS PRIOR TO STARTING CONSTRUCTION. MINOR VARIATIONS CAN BE EXPECTED AND ANY REQUIRED DEVIATION FROM THE CONTRACT DOCUMENTS SHALL BE APPROVED BY THE ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION.
  - THE CONTRACTOR SHALL LOCATE ALL UTILITIES IN THE AREA OF CONSTRUCTION AND PREVENT DAMAGE TO THEM. SHOULD DAMAGE OCCUR TO ANY UTILITIES, THE CONTRACTOR IS REQUIRED TO REPAIR THE DAMAGE TO THE SATISFACTION OF THE OWNER AT HIS OWN EXPENSE.
  - THE CONTRACTOR SHALL MONITOR THE EXISTING STRUCTURE DURING CONSTRUCTION. IMMEDIATELY NOTIFY THE ENGINEER OF AREAS EXHIBITING DISTRESS OR FAILURE.
  - THE CONTRACTOR SHALL FIELD VERIFY THE SIZE AND CONDITION OF ALL EXISTING FRAMING. SHOULD THE SIZE OR CONDITION OF THE EXISTING FRAMING DIFFER FROM THAT SHOWN ON THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER.
- STRUCTURAL AND MISCELLANEOUS STEEL**
  - ALL STEEL CONSTRUCTION SHALL CONFORM TO THE NINTH EDITION OF THE AISC "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS; ALLOWABLE STRESS DESIGN AND PLASTIC DESIGN" AND THE AISC "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES".
  - ALL STRUCTURAL STEEL SHALL CONFORM TO ASTM A 992 GRADE 50.
  - ALL MISCELLANEOUS STEEL (ANGLES, PLATES, ETC.) SHALL CONFORM TO ASTM A 36 HAVING A MINIMUM YIELD STRENGTH OF Fy = 36,000 PSI.
  - ALL STRUCTURAL STEEL PIPE SHALL CONFORM TO ASTM A 53 GRADE "B", HAVING A MINIMUM YIELD STRENGTH OF Fy = 35,000 PSI.
  - ALL SHOP AND FIELD WELDS SHALL BE PERFORMED BY CERTIFIED WELDERS AND CONFORM TO THE AMERICAN WELDING SOCIETY CODE FOR BUILDINGS AND D11. WELDS SHALL DEVELOP THE FULL STRENGTH OF MATERIALS BEING WELDED UNLESS OTHERWISE INDICATED.
  - ALL CONNECTIONS TO EXISTING STEEL FRAMING SHALL BE FIELD BOLTED UNLESS OTHERWISE INDICATED. THE CONTRACTOR MAY SUBSTITUTE WELDED CONNECTIONS PROVIDED THE EXISTING STEEL IS TESTED TO DETERMINE STRENGTH AND CHEMICAL PROPERTIES. TEST METHODS AND RESULTS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO ANY FIELD WELDING TO EXISTING STEEL.
  - ALL EXPOSED STRUCTURAL STEEL SHALL CONFORM TO THE AISC "SPECIFICATION FOR ARCHITECTURALLY EXPOSED STRUCTURAL STEEL".
  - THE CONTRACTOR SHALL NOT SPLICE OR CUT OPENINGS IN STEEL MEMBERS NOT SHOWN ON CONTRACT DRAWINGS WITHOUT THE PERMISSION OF THE STRUCTURAL ENGINEER.
  - AN INDEPENDENT INSPECTION AGENCY SHALL INSPECT ALL STRUCTURAL STEEL AND VERIFY THAT IT CONFORMS TO THE REQUIREMENTS OF THE CONTRACT DOCUMENTS. FIELD INSPECTION REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN 5 DAYS OF THE INSPECTION. THE CONTRACTOR SHALL NOTIFY THE INSPECTION AGENCY OF ALL PHASES OF STEEL CONSTRUCTION AND WELDING.
  - STEEL MEMBERS, FABRICATIONS AND ASSEMBLIES INDICATED TO BE GALVANIZED SHALL BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A 123 AFTER FABRICATION. ALL EXPOSED STEEL MEMBERS SHALL BE HOT DIPPED GALVANIZED.
  - GROUT FOR BASE AND BEARING PLATES SHALL BE NON-SHRINK, NON-METALLIC GROUT CONFORMING TO ASTM C 827 WITH MINIMUM COMPRESSIVE STRENGTH OF 5000 PSI AT 28 DAYS.
  - THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS INDICATING THE SIZES, EXTENT, AND LOCATION OF ALL STRUCTURAL AND MISCELLANEOUS STEEL FRAMING INCLUDING ALL CONNECTIONS, FASTENERS, AND BEARINGS.
  - POST-INSTALLATION INSPECTION**
    - A POST-INSTALLATION INSPECTION REPORT IS REQUIRED AND SHALL BE INCLUDED IN THE CONTRACTOR'S BID. A POST-INSTALLATION INSPECTION IS A VISUAL INSPECTION OF TOWER INSTALLATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE INSTALLATION DRAWINGS.
    - THE POST-INSTALLATION INSPECTION REPORT SHALL BE COMPLETED BY A PROFESSIONAL ENGINEER LICENSED IN THE JURISDICTION IN WHICH THE PROJECT IS LOCATED.
    - THE INTENT OF THE POST-INSTALLATION INSPECTION REPORT IS TO CONFIRM INSTALLATION AND CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE INSTALLATION DESIGN ITSELF.
    - TO ENSURE THAT THE REQUIREMENTS OF THE POST-INSTALLATION INSPECTION REPORT ARE MET, IT IS VITAL THAT THE CONTRACTOR AND POST-INSTALLATION INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED.

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**verizon**  
 TAKOMA PARK - ANTENNA SWAP/RRH SWAP  
 7600 MAPLE AVE  
 TAKOMA PARK, MD 20912 (MONTGOMERY COUNTY)

**REVISIONS:**

NO.	DESCRIPTION	DATE

PERMIT DWGS: 6/21/19  
 DESIGNED BY: BES  
 DRAWN BY: SUK  
 PROJECT NO: 19214.118  
 DATE: 07/31/2019  
 SCALE: AS NOTED

**Structural Details & Notes**

SHEET:  
**S-2**



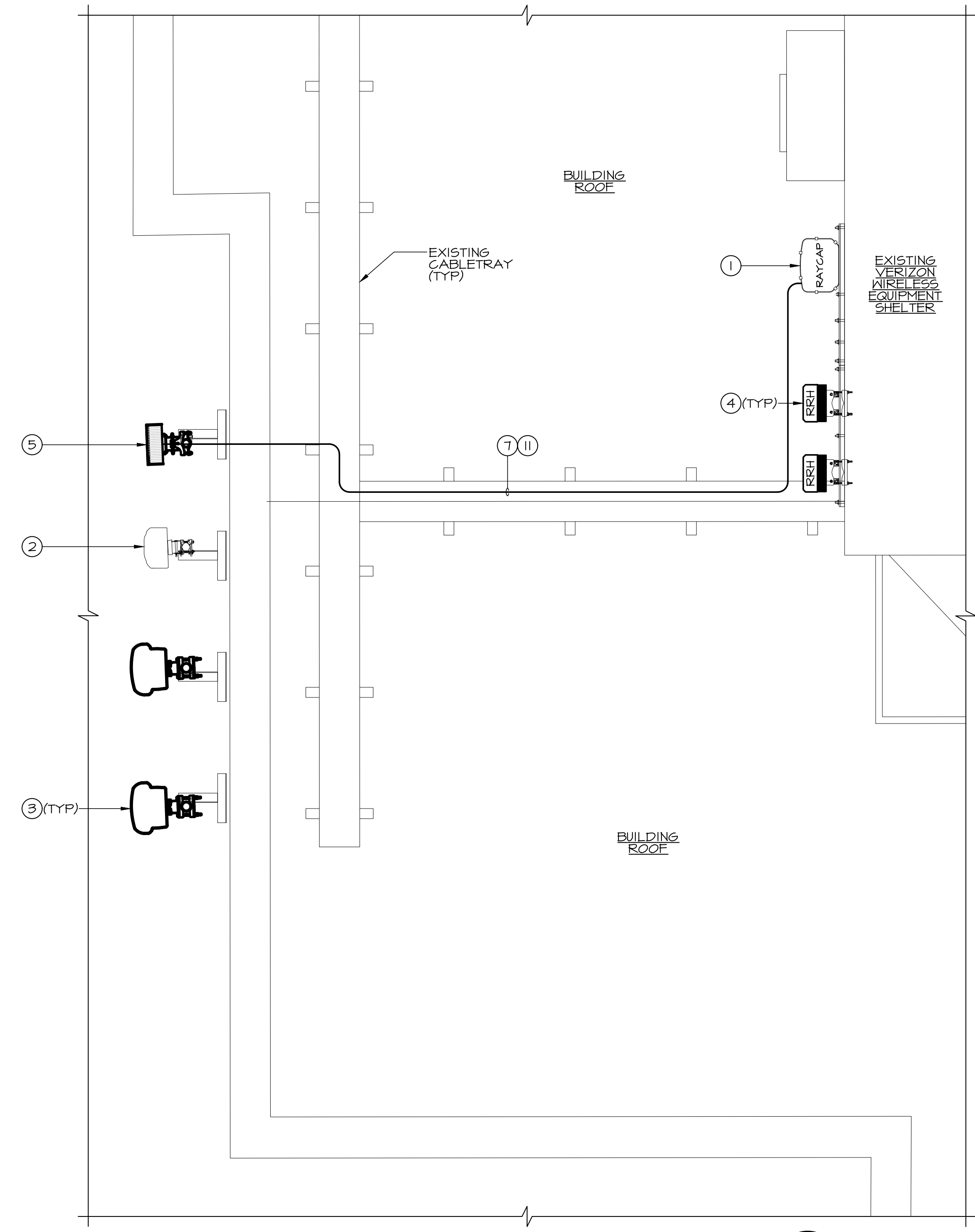
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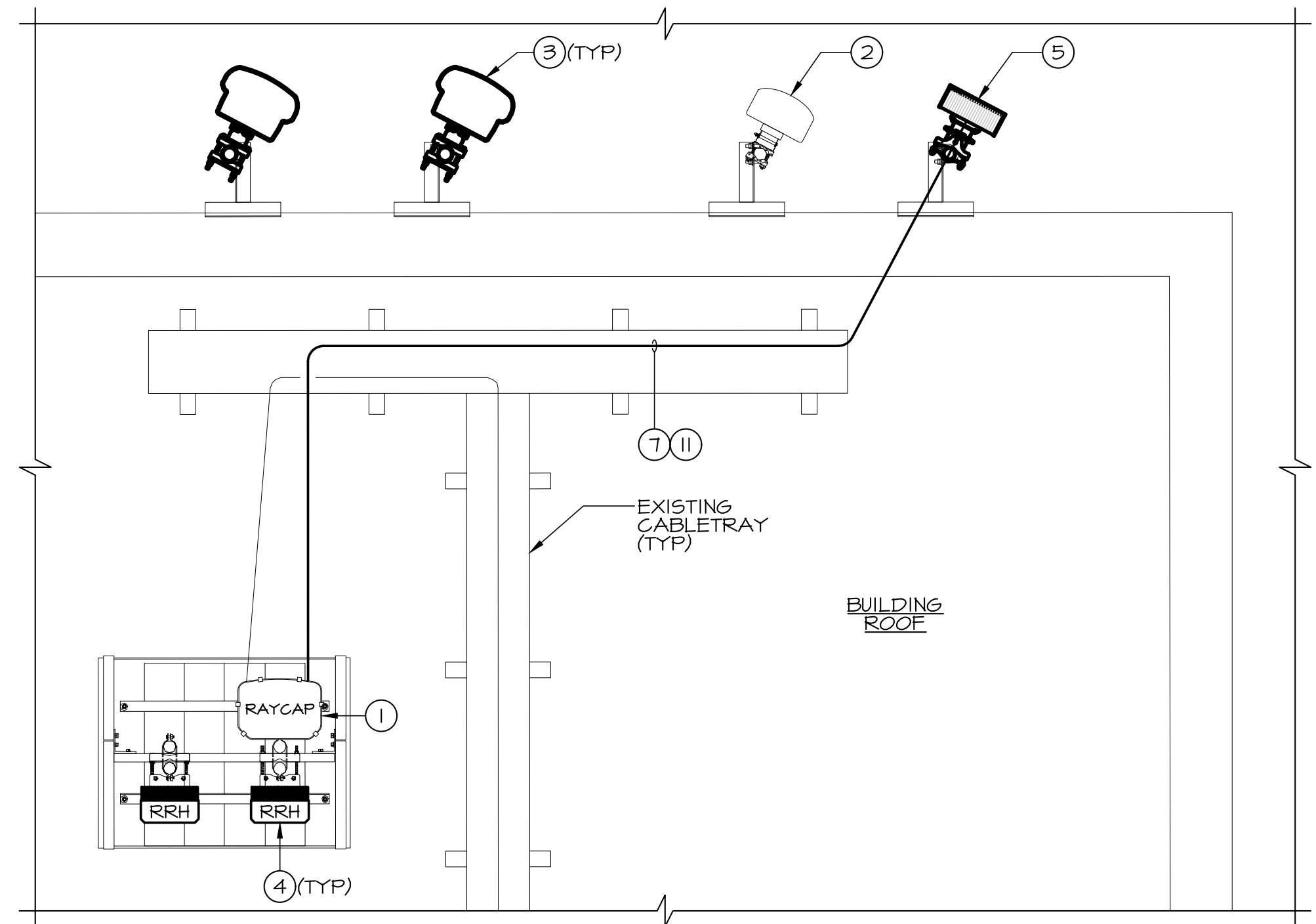


**DRAWING NOTES**

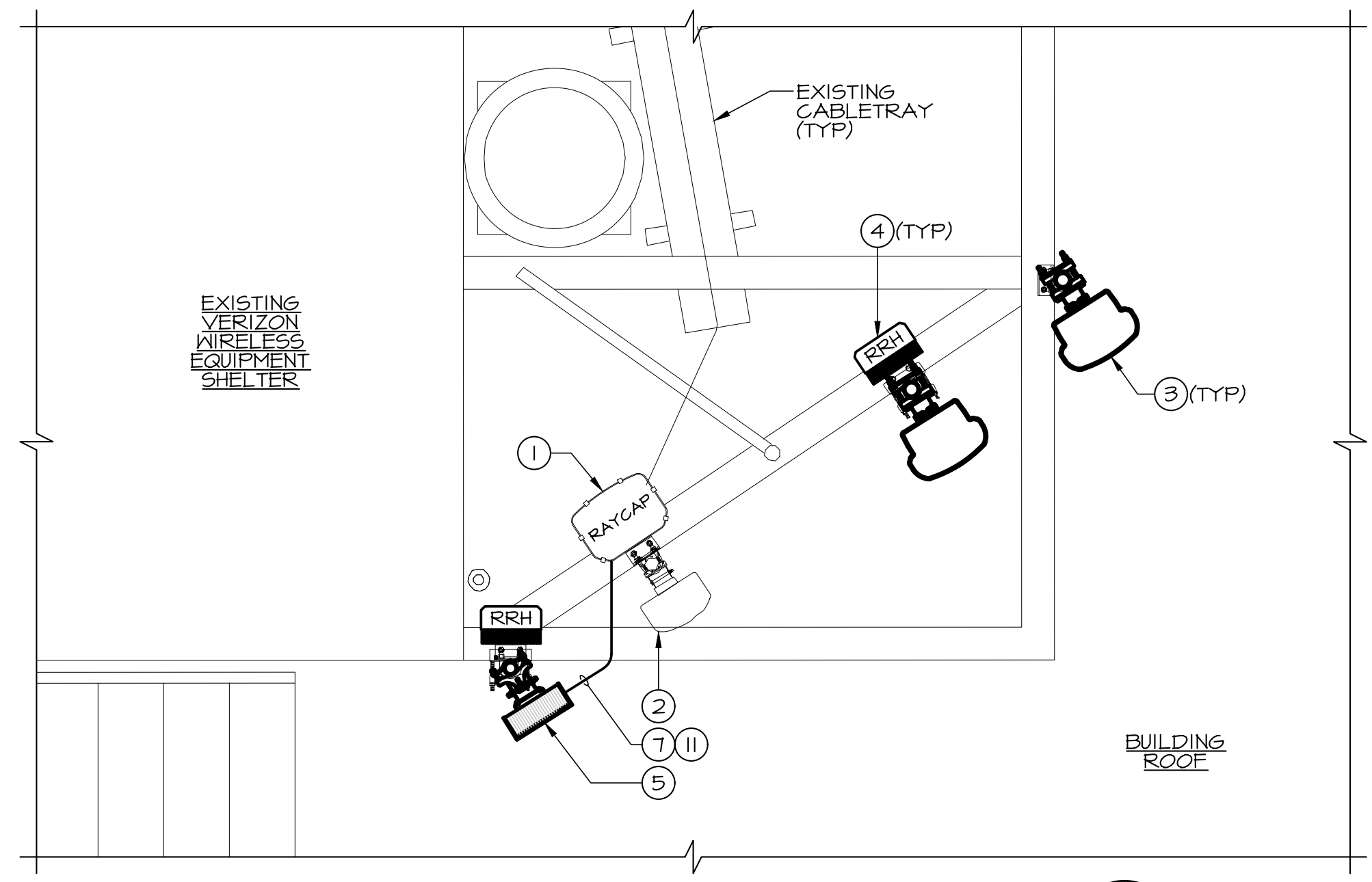
- ① EXISTING VERIZON WIRELESS RAYCAP DISTRIBUTION BOX MOUNTED AT ANTENNA SECTORS TO REMAIN.
- ② EXISTING VERIZON WIRELESS ANTENNAS TO REMAIN.
- ③ VERIZON WIRELESS PROVIDED CONTRACTOR INSTALLED ANTENNAS. REFER TO STRUCTURAL DRAWINGS FOR ADDITIONAL MOUNTING INFORMATION.
- ④ PROPOSED LOCATION OF VERIZON WIRELESS REMOTE RADIO HEADS MOUNTED AT ANTENNA SECTORS.
- ⑤ VERIZON WIRELESS PROVIDED AND CONTRACTOR INSTALLED NOKIA ANTENNA (TYP OF 3). REFER TO STRUCTURAL DRAWINGS FOR ADDITIONAL MOUNTING INFORMATION.
- ⑥ VERIZON WIRELESS PROVIDED AND CONTRACTOR INSTALLED NOKIA AIRSCALE CORE OUTDOOR 175W ASOD REMOTE RADIO HEAD MOUNTED IN EQUIPMENT SHELTER (TYP OF 3). REFER TO STRUCTURAL DRAWINGS FOR ADDITIONAL MOUNTING INFORMATION.
- ⑦ CONTRACTOR SHALL EXTEND NEW JUMPER CABLE FROM EXISTING RAYCAP MAIN DISTRIBUTION BOX TO PROPOSED NOKIA ANTENNA FOR DC POWER AND FIBER TO PROPOSED ANTENNA. CONTRACTOR SHALL VERIFY EXISTING RAYCAP BOX HAS SUFFICIENT SPARE DC POWER AND FIBER TO SERVE PROPOSED ANTENNA WITH VERIZON WIRELESS REPRESENTATIVE PRIOR TO START OF WORK.
- ⑧ CONTRACTOR SHALL COORDINATE WITH VERIZON WIRELESS CONSTRUCTION MANAGER THAT THERE ARE AMPLE SPARE FIBER PAIRS TO SUPPLY PROPOSED NOKIA ANTENNAS. IN THE EVENT THERE ARE NOT AMPLE SPARE FIBER PAIRS, CONTRACTOR SHALL EXTEND 46-STRAND FIBER CABLE FROM EXISTING TELCO DEMARC LOCATION TO FIBER TERMINATION POINT IN EQUIPMENT SHELTER. NEW CABLE SHALL BE EXTENDED IN EXISTING TELCO RACEWAY.
- ⑨ REFER TO SHEET E-3 FOR ANTENNA GROUNDING DIAGRAM AND DETAIL.
- ⑩ ALL ITEMS ARE EXISTING TO REMAIN UNLESS NOTED OTHERWISE.
- ⑪ ROUTE PROPOSED CABLES ALONG SAME PATH AS EXISTING ANTENNA CABLES TO FARTHEST EXTENT POSSIBLE.



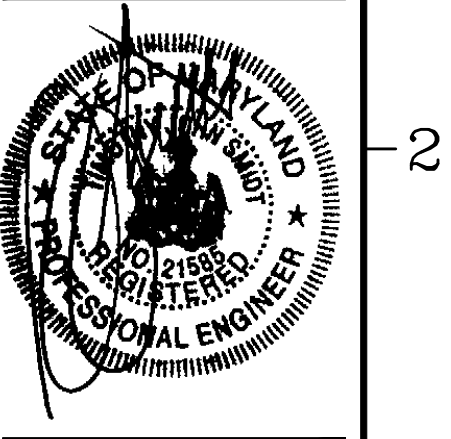
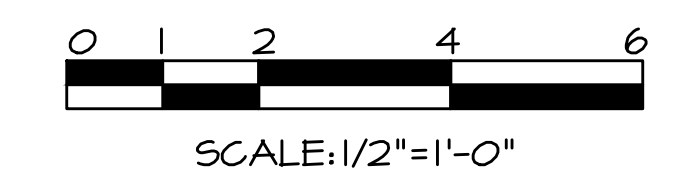
⑥⑧⑨⑩ **GAMMA SECTOR PART PLAN**  
SCALE: 1/2" = 1'-0"



⑥⑧⑨⑩ **ALPHA SECTOR PART PLAN**  
SCALE: 1/2" = 1'-0"



⑥⑧⑨⑩ **BETA SECTOR PART PLAN**  
SCALE: 1/2" = 1'-0"



I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, TIMOTHY SMITH, AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 21595, EXPIRATION DATE: MAY 8, 2021.

**verizon**  
TAKOMA PARK - ANTENNA SWAP/ RRH SWAP  
1600 MAPLE AVENUE, TAKOMA PARK, MONTGOMERY COUNTY, MARYLAND 20912

REVISIONS:

NO.	DESCRIPTION	DATE

PERMIT DWG 08/21/19  
LAST REV.:  
PROJECT NO: 19106W  
DATE: AUGUST 21, 2019  
SCALE: AS NOTED

TITLE:  
PART PLANS AND NOTES

SHEET:  
**E-2**



App No: 2019080964

Application General Information

Applicant Name	Site Link Wireless	Updated	8/29/2019
Application Type	Minor Modification	Ann. Plan?	Yes
Carrier	Verizon Wireless	Will site be used to support government telecommunications facilities or other equipment for government use?	No
Solution Type	Macro	Gvt. Use Desc.	
Existing	Existing		

Application Description

This is an existing rooftop site with a height of 151'-0" and a penthouse height of 168'-7". Verizon proposes to modify their existing installation of (12) panel antennas at the 147' and 157' RAD centers by removing (3) antennas and installing (9) new antennas, (3) each sector. The proposed new antennas will be (3) Nokia AEUB Airscale antennas (23.62"x11.97"x4.72"), (1) at each sector, and (6) JMA MX06FR0660-02 antennas (95.9"x15.4"x10.7"), (2) at each sector.

They will also remove and replace (6) RRH's. The new RRH's will be (3) Nokia Airscale Dual RRH 4T4R B5/B13 320 W (AHBCC)

Site Information

Site Id	48	Zoning	R-10
Structure Type	Building	Latitude	38.983867
Address	7600 Maple Ave, Takoma Park	Longitude	-77.007964
County Site Name	Park Ritchie Apts	Ground Elevation	198
Carrier Site Name	Takoma Park	City	Takoma Park
Site Owner	Park Ritchie LLC	Lease Status	Leased
Structure Owner	PARK RITCHIE LLC	Does the structure require an antenna structure registration under FCC Title 47	No
Existing Structure Height	151	Distance to Residential Property (New, Replacement, Colocation Only)	
Provide the proposed height of the replacement structure without any antenna (New, Replacement Apps Only)		Distance to Commercial Property (New, Replacement, Colocation Only)	

Justification of why this site was selected:

This site was selected to provide coverage and add capacity to Verizon's network. The new equipment will serve to enhance existing coverage and provide congestion relief for customers in the Takoma Park area. This site was chosen as it would provide the b

NearbySites (New, Replacement Apps Only):

App No:

2019080964

Screening considerations(New, Colocations, Replacement Apps Only):

App No:

2019080964

6409 Questions

Does this qualify as a 6409 application? (Minor Mod, Colocations Only)

Yes

For towers outside the public ROW will the proposed installation increase the height of the structure by: (1) more than 10% or (2) more than 20 feet, whichever is greater?

N/A

Will the proposed installation increase the width by adding appurtenance to the body of the structure that would protrude from the edge of the structure by more than 6 feet?

No

For towers outside the public ROW will the proposed installation increase the width by adding appurtenance to the body of the structure that would protrude from the edge of the structure by more than 20 feet?

N/A

More than four Equipment Cabinets? YN

No

Will the proposed installation require excavation or expansion outside the current boundaries of the site?

No

Will the proposed installation increase the height of the structure by: (1) more than 10% or (2) more than 10 feet, whichever is greater?

No

Does the structure or current installation have concealment elements/measures?

No

If yes, describe how the proposed installation does not defeat the existing concealment.

[Empty text box for describing concealment]

Small Wireless Facility Informatio

Small Wireless Facility Questions

Small Wireless Facility?

No

Is the structure 10% taller than adjacent structures?

[Empty text box]

Cumulative volume of the proposed wireless equipment(s) exclusive of antennas in cubic feet

[Empty text box]

Please list adjacent structure heights

[Empty text box]

Cumulative volume of the proposed antenna antenna(s) exclusive of equipment

5

Tribal Lands?

No

ROW Information

PROW?

No

Pole Number

[Empty text box]

ROW owner

[Empty text box]

ROW width

[Empty text box]

App No: 2019080964

Antenna Infomatio

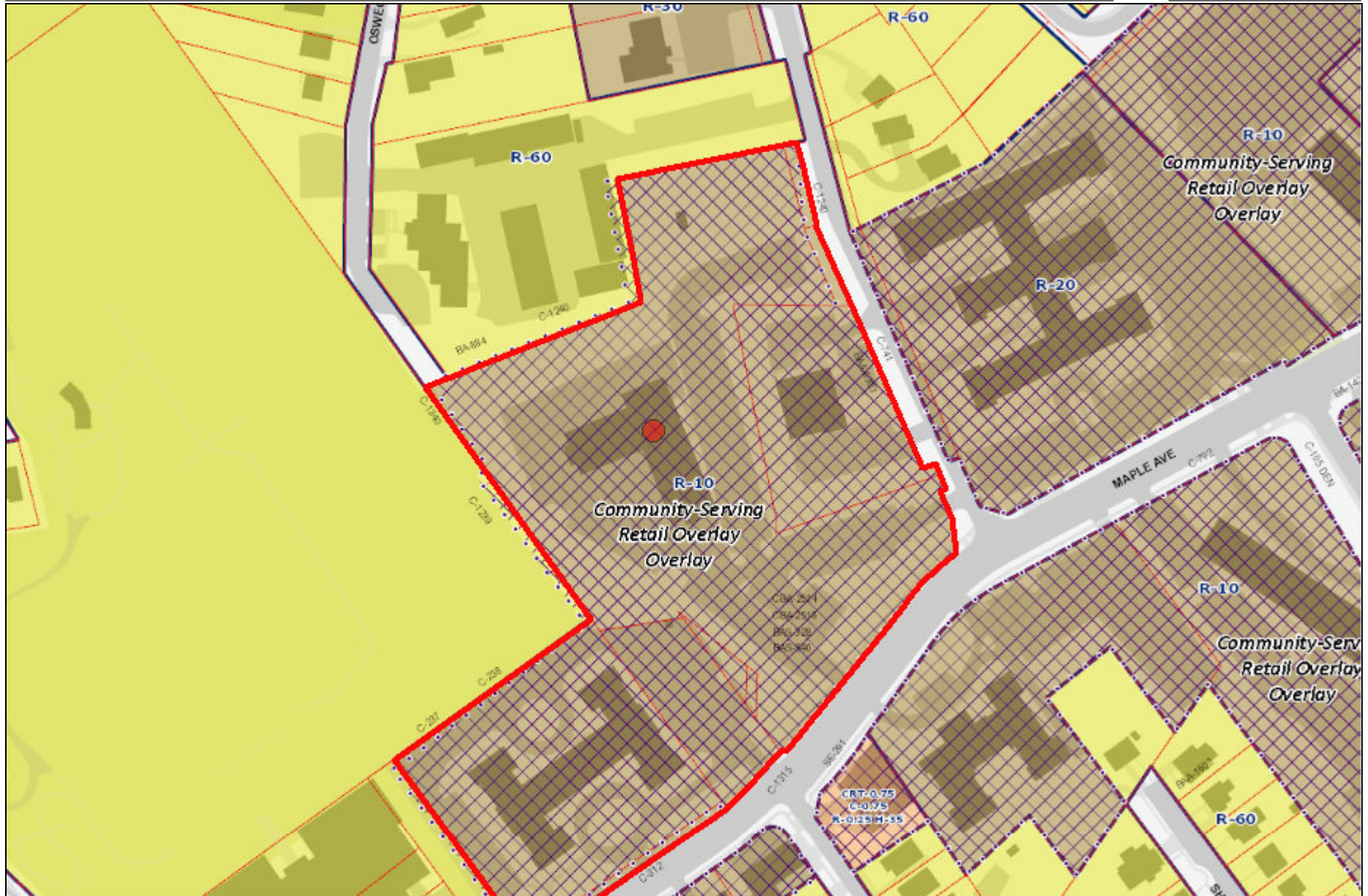
Antenna Compliance   
Compliance Desc   
Antenna Location   
Antenna Loc. Desc.   
Env. Assessment   
Cat. Excluded?   
Routine Env. Evaluation

Antenna Model   
Frequency   
RAD Center  Max ERP  Antenna Dimensions  Quantity

Antenna Model   
Frequency   
RAD Center  Max ERP  Antenna Dimensions  Quantity

Antenna Model   
Frequency   
RAD Center  Max ERP  Antenna Dimensions  Quantity

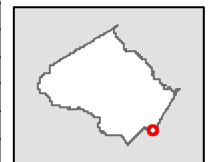
Antenna Model   
Frequency   
RAD Center  Max ERP  Antenna Dimensions  Quantity



Account #	01073182
Address	7600 MAPLE AVE TAKOMA PARK, 20912
Zone	R-10
Overlay Zone	Community-Serving Retail Overlay
TDR Overlay Zone	N/A
Landuse	Multi-Family
Parcel, Lot, Block	N/A, P29, 60
WSSC Grid	209NE01
Map Amendments	G-791 G-956

Parking District	N/A
CBD	N/A
Special Protection Area	N/A
Urban District	N/A
Enterprise Zone	N/A
Arts & Ent. District	N/A
Special Tax District	N/A
Legal Description	B F G ART OF ORGANIZATION CONV

Bike/Ped Priority Area	N/A
Urban Renewal Area	N/A
Metro Station Policy Area	N/A
Priority Funding Area	Yes
Septic Tier	Tier 1: Sewer existing
Municipality	TAKOMA PARK
Master Plan	TAKOMA PARK
Historic Site/District	N/A
Water/Sewer Categories	W-1/ S-1



1 inch = 218 feet

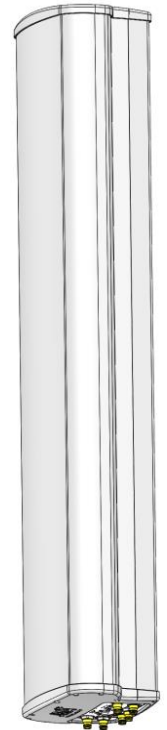
# MX06FRO660-02

NWAV™ X-Pol Antenna | Hex-Port | 6 ft | 60°



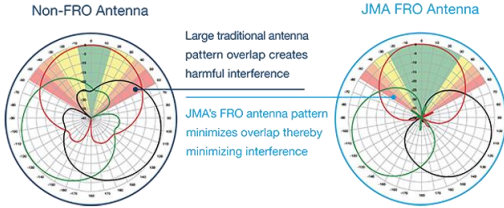
## X-Pol, Hex-Port 6 ft 60° Fast Roll Off with Smart Bias T (2) 698-894 MHz & (4) 1695-2180 MHz

- Fast Roll Off (FRO™) Azimuth beam pattern improves Intra- and Inter-cell SINR
- Excellent Passive Intermodulation (PIM) performance reduces harmful interference
- Fully integrated (iRETs) with independent RET control for low and high bands for ease of network optimization
- SON-Ready array spacing supports beamforming capabilities
- Suitable for LTE/CDMA/PCS/UMTS/GSM Air interface technologies
- Integrated Smart BIAS-Ts reduces leasing costs



Fast Roll-Off (FRO) increased throughput, without compromising coverage.

FRO technology increases the Signal to Interference & Noise Ratio (SINR) by eliminating overlap between sectors.



LTE Throughput	SINR	Speed (bps/Hz)	Speed Increase	CQI
Excellent	>20	>5	333+ %	14-15
Good	12-20	3.3-5	277%	10-13
Fair	6-12	1.5-3.3	160%	7-9
Poor	<6	<1.5	0%	1-7



Electrical Specification (Minimum/ Maximum)	Ports 1,2		Ports 3,4,5,6		
	Frequency bands, MHz	698–798	824–894	1695–1880	1850–1990
Polarization	± 45°		± 45°		
Average gain over all tilts, dBi	15.0	14.7	17.6	18.0	18.2
Horizontal beamwidth (HBW), degrees <sup>1</sup>	62.5	53.5	55.0	55.0	55.5
Front-to-back ratio, co-polar power @ 180°± 30°, dB	>23.7	>21.0	>25.0	>25.0	>25.0
X-Pol discrimination (CPR) at boresight, dB	>17.8	>14.2	>18	>18	>15
Sector power ratio, percent	<4.8	<3.8	<3.7	<3.8	<3.6
Vertical beamwidth, (VBW), degrees <sup>1</sup>	13.6	11.8	6.0	5.5	5.5
Electrical downtilt (EDT) range, degrees	2-14	2-14	0-9		
First upper side lobe (USLS) suppression, dB <sup>1</sup>	≤ -15.0	≤ -16.5	≤ -16.0	≤ -16.0	≤ -16.0
Minimum cross-polar isolation, port-to-port, dB	25	25	25	25	25
Maximum VSWR/ return loss, dB	1.5/ -14.0	1.5/ -14.0	1.5/ -14.0	1.5/ -14.0	1.5/ -14.0
Maximum passive Intermodulation (PIM), 2x 20W carrier, dBc	-153	-153	-153		
Maximum input power per any port, watts	300		250		
Total composite power all ports, watts	1500				

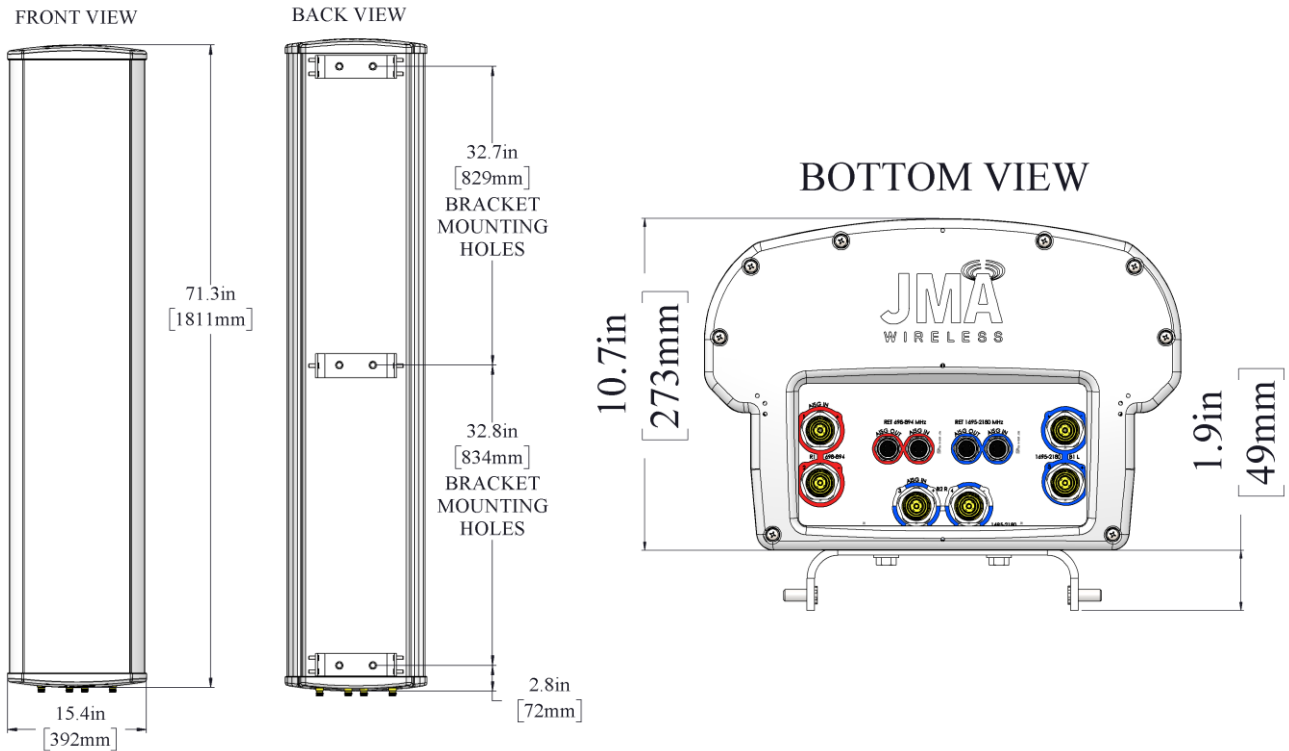
<sup>1</sup> Typical value over frequency and tilt



# MX06FRO660-02

NWAV™ X-Pol Antenna | Hex-Port | 6 ft | 60°

Mechanical Specifications	
Dimensions height/ width/ depth, inches (mm)	71.3/ 15.4/ 10.7 (1811/ 392/ 272)
Shipping dimensions length/ width/ height, inches (mm)	82/ 20/ 15 (2083/ 508/ 381)
No. of RF input ports, connector type & location	6 x 4.3-10 female, bottom
RF connector torque	96 lbf-in (10.85 N m or 8 lbf-ft)
Net antenna weight, lb (kg)	57 (25.91)
Shipping weight, lb (kg)	97 (44.09)
Antenna mounting and downtilt kit included with antenna	91900318
Net weight of the mounting and downtilt kit, lb (kg)	18 (8.18)
Range of mechanical up/ down tilt	-2° to 12°
Rated wind survival speed, mph (km/h)	150 (241)
Frontal, lateral & rear wind loading @ 150 km/h, lbf (N)	154 (685), 73 (325), 158 (703)
Equivalent flat plate @100 mph and Cd=2, sq. ft.	2.6



Ordering Information	
Antenna Model	Description
MX06FRO660-02	6F X- Pol HEX FRO 60° 2-14°/ 0-9° RET, 4.3-10 & SBT
Optional Accessories	
992100-CA030-SC	Optional AISG jumper cable, M/F, 3.0 meters
PCU-1000	Primary control unit, USB

# MX06FRO660-02

NWAV™ X-Pol Antenna | Hex-Port | 6 ft | 60°

Remote Electrical Tilt (RET 1000) Information	
RET location	Integrated into antenna
RET interface connector type	8-pin AISG connector per IEC 60130-9
RET interface connector quantity	2 pairs of AISG male/ female connectors
RET interface connector location	Bottom of the antenna
Total No. of internal RETs low bands	1
Total No. of internal RETs high bands	1
RET input operating voltage, vdc	10–30
RET max. power consumption, idle state, W	≤ 2.0
RET max. power consumption, normal operating conditions, W	≤ 13.0
RET communication protocol	AISG 2.0/ 3GPP

### RET & RF Connector Topology

Each RET device can be controlled either via the designated external AISG connector or RF port as shown below

RET Device	Band	RF Port
1	698–894	1–2

RET Device	Band	RF Port
2	1695–2180	3–6

### Array Topology

3 sets of radiating arrays

R1: 698–894MHz  
B1: 1695–2180MHz  
B2: 1695–2180MHz

Band	RF Port
1695–2180	3–4
698–894	1–2
1695–2180	5–6

# AEUB 28 GHz Radio Unit

AEUB AirScale MAA 8T8R 512AE 28 GHz 8W		
<b>Specification</b>	3GPP compliant	
<b>Frequency range</b>	26500 – 29500 MHz NR n257	
<b>Max. supported modulation</b>	256 QAM down link / 64 QAM up link	
<b>Instantaneous Bandwidth IBW</b>	1400 MHz	
<b>Occupied Bandwidth OBW</b>	800 MHz	
<b>Number of TX/RX paths</b>	8T / 8R mode	2T / 2R mode
<b>Total average EIRP</b>	54 dBm	60 dBm
<b>Peak EIRP</b>	62 dBm	68 dBm
<b>Antenna type</b>	4 x 8 x 8 phased array	16 x 16 phased array
<b>Horizontal beamwidth (3 dB)</b>	13° (boresight)	6.5° (boresight)
<b>Vertical beamwidth (3 dB)</b>	9.5° (boresight)	4.3° (boresight)
<b>Horizontal steering angle (3 dB)</b>	±45°	
<b>Horizontal steering angle (8 dB)</b>	±60°	
<b>Vertical steering angle (3 dB)</b>	±45°	
<b>Dimensions</b>	600 mm/23.62" (H) x 304 mm/11.97" (W) x 120 mm/4.72" (D) (w/o lifting handle and mounting brackets)	
<b>Volume</b>	22 l	
<b>Weight</b>	20 kg (without mounting brackets)	
<b>Supply Voltage</b>	AC 90 to 250 V / DC 40.5 to 57 V	
<b>Power consumption</b>	<500 W	



<b>Optical Ports</b>	2 x SFP28 eCPRI
<b>Other Interfaces</b>	Two pcs of three color LED's
<b>Operational temperature range</b>	-40°C to 55°C
<b>Cooling</b>	Natural convection cooling
<b>Ingress protection class</b>	IP65
<b>Installation options</b>	Pole, Wall
<b>Surge protection</b>	Class II 5kA

## GENERAL NOTES

1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES.
2. THE ARCHITECT/ENGINEER HAVE MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.
3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE VERIZON REPRESENTATIVE OF ANY CONFLICTS, ERRORS OR OMISSIONS PRIOR TO THE SUBMISSION OF CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK. IN THE EVENT OF DISCREPANCIES, THE CONTRACTOR SHALL PRICE THE MORE COSTLY OR EXTENSIVE WORK, UNLESS DIRECTED IN WRITING OTHERWISE.
4. THE SCOPE OF WORK SHALL INCLUDE FURNISHING ALL MATERIALS, EQUIPMENT, LABOR AND ALL OTHER MATERIALS AND LABOR DEEMED NECESSARY TO COMPLETE THE WORK/PROJECT AS DESCRIBED HEREIN.
5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
6. THE CONTRACTOR SHALL OBTAIN AUTHORIZATION TO PROCEED WITH CONSTRUCTION PRIOR TO STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED BY THE CONSTRUCTION DRAWINGS/CONTRACT DOCUMENTS.
7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S/VENDOR'S SPECIFICATIONS UNLESS OTHERWISE NOTED OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.
8. THE CONTRACTOR SHALL PROVIDE A FULL SET OF CONSTRUCTION DOCUMENTS AT THE SITE UPDATED WITH THE LATEST REVISIONS AND ADDENDUMS OR CLARIFICATIONS AVAILABLE FOR THE USE BY ALL PERSONNEL INVOLVED WITH THE PROJECT.
9. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS WHICH MAY BE REQUIRED FOR THE WORK BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY, OR LOCAL GOVERNMENT AUTHORITY.
11. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, EASEMENTS, PAVEMENTS, CURBING, ETC. DURING CONSTRUCTION. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE PROPERTY.
12. THE CONTRACTOR SHALL MAINTAIN THE GENERAL WORK AREA AS CLEAN AND HAZARD FREE DURING CONSTRUCTION AND DISPOSE OF ALL DEBRIS, RUBBISH AND REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY. PREMISES SHALL BE LEFT IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE.
13. THE CONTRACTOR SHALL COMPLY WITH ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJECT.
14. THE CONTRACTOR SHALL NOTIFY THE VERIZON REPRESENTATIVE WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE VERIZON REPRESENTATIVE.
15. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, PROPERTY LINES, ETC. ON THE JOB.
16. THE CONTRACTOR SHALL SUBMIT SHOP DRAWING FOR ALL EQUIPMENT/MATERIALS AS DIRECTED IN THESE DRAWINGS. SHOP DRAWINGS SHALL BE SUBMITTED FOR ARCHITECTURAL FINISHES, HARDWARE, ETC.; STRUCTURAL COMPONENTS; AND SERVICE EQUIPMENT ETC.

## INDEX OF DRAWINGS

CS-1	COVER SHEET
C-1	SITE PLAN
C-2	SITE DETAILS
C-3	SITE DETAILS
S-1	STRUCTURAL DETAILS
S-2	STRUCTURAL DETAILS & NOTES
E-1	KEY PLAN
E-2	PART PLANS AND NOTES
E-3	ANTENNA GROUNDING SYSTEM DIAGRAM, DETAIL, AND SCHEDULE

## ANTENNA ANALYSIS

EXISTING ANTENNAS:	TWELVE (12)
	FOUR (4) PER SECTOR
ANTENNAS TO BE REMOVED:	NINE (9)
	THREE (3) PER SECTOR
ANTENNAS TO BE INSTALLED:	NINE (9)
	THREE (3) PER SECTOR
TOTAL ANTENNAS:	TWELVE (12)
(PROPOSED & EXISTING)	FOUR (4) PER SECTOR

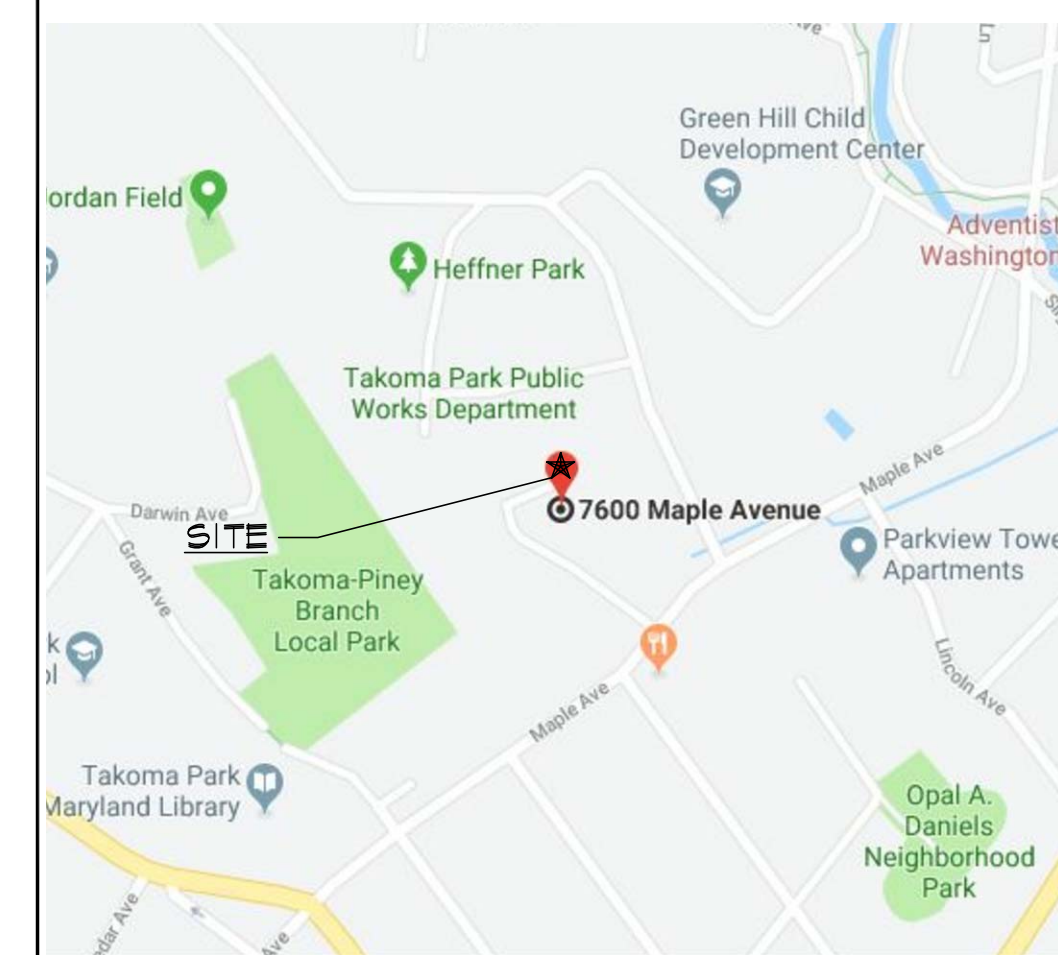
## CODE ANALYSIS

APPLICABLE BUILDING CODE:	IBC 2015
USE GROUP:	UTILITY (U)
CONSTRUCTION TYPE:	5B NONCOMBUSTIBLE/

## VERIZON REVIEW

BUILDING OWNER	DATE
ENGINEERING	DATE
OPERATIONS	DATE
CONSTRUCTION	DATE

## VICINITY PLAN



## PROJECT DESCRIPTION

THE PROJECT INVOLVES REMOVING AND INSTALLING NINE (9) ANTENNAS, THREE (3) AT EACH SECTOR AS WELL AS REMOVING AND INSTALLING SIX (6) REMOTE RADIO HEADS (RRH), TWO (2) AT EACH SECTOR.

## DIRECTIONS TO SITE

- FROM 1010 JUNCTION DRIVE, ANNAPOLIS JUNCTION, MD:
1. HEAD NORTHEAST ON JUNCTION DR TOWARD HENKELS LN
  2. SLIGHT RIGHT TOWARDS DORSEY RUN ROAD
  3. USE THE LEFT TWO LANES TO MERGE ONTO MD-32W
  4. TAKE EXIT 18B FOR I-95 S TO WASHINGTON DC
  5. USE RIGHT 2 LANES TO MERGE ONTO I-495 W
  6. TAKE EXIT 28B FOR MD-650 S TOWARD TAKOMA PARK
  7. TURN RIGHT ONTO MERRIMAC DR
  8. TURN LEFT ONTO MD-195 S
  9. TURN RIGHT ONTO LINCOLN AVE
  10. TURN LEFT ONTO MAPLE DRIVE  
DESTINATION ON RIGHT



**MORRIS & RITCHIE ASSOCIATES, INC.**  
Civil / Structural Engineers  
1320-C East Joppa Road, Suite 505  
Towson, Maryland 21286  
410-821-1600  
410-821-1748 Fax



### PROFESSIONAL CERTIFICATION

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 28808, EXPIRATION DATE: 07/07/2025.

**verizon**  
TAKOMA PARK - ANTENNA SWAP/RRH SWAP  
7600 MAPLE AVE  
TAKOMA PARK, MD 20912 (MONTGOMERY COUNTY)

### REVISIONS:

NO.	DESCRIPTION	DATE

PERMIT DWGS: 8/21/19

DESIGNED BY: BES

DRAWN BY: SUK

PROJECT NO: 19214.118

DATE: 07/31/2019

SCALE: AS NOTED

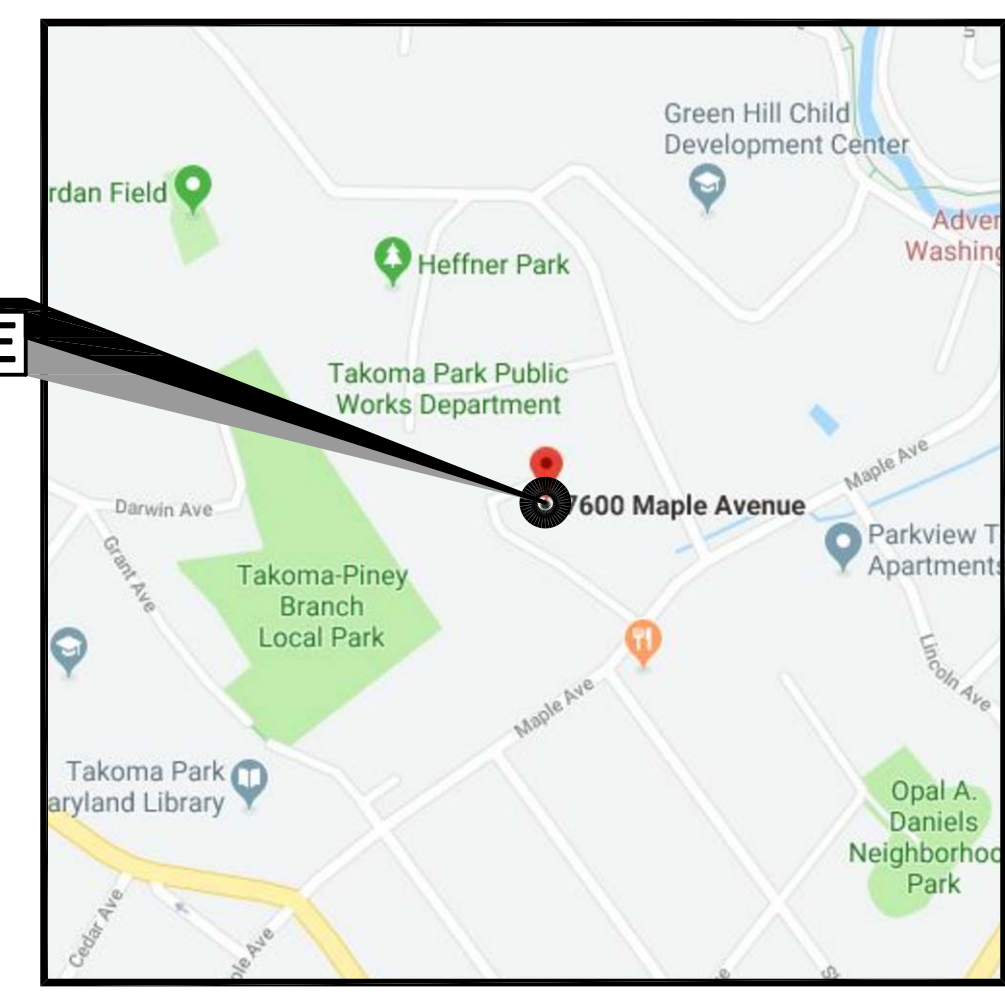
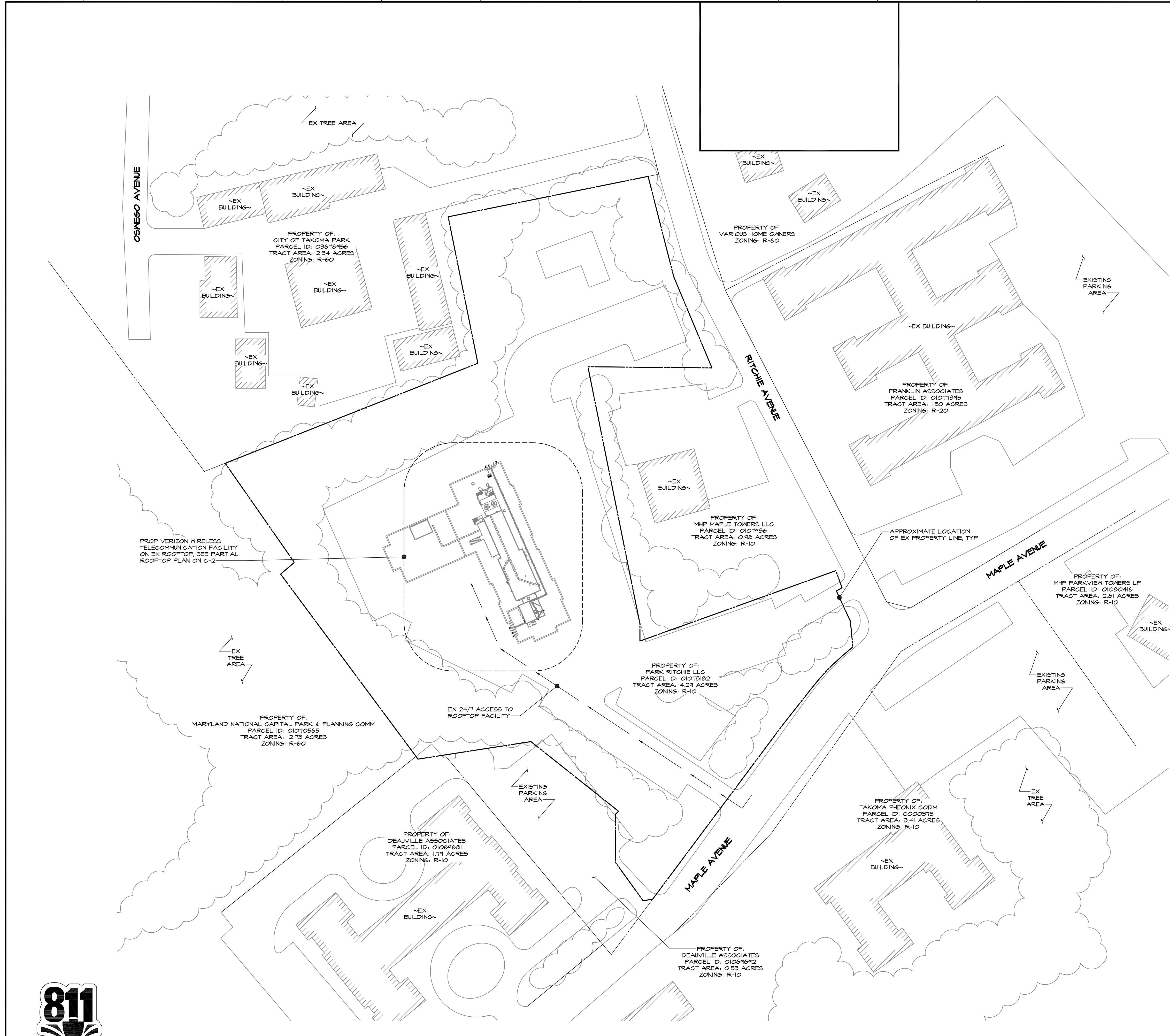
TITLE:

**Cover Sheet**

SHEET:

**CS-1**

A B C D E F G H J K L M N P Q R



**MRA**  
**MORRIS & RITCHIE ASSOCIATES, INC.**  
 Civil / Structural Engineers  
 1320-C East Joppa Road, Suite 505  
 Towson, Maryland 21286  
 410-821-1800  
 410-821-1748 Fax

PROFESSIONAL CERTIFICATION  
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- SITE NOTES:**
- APPLICANT: VERIZON WIRELESS  
 1070 JUNCTION DR, STE 500  
 ANNAPOLIS JUNCTION, MD 20701  
 TEL: (301) 512-2000  
 FAX: (301) 512-2186
  - APPLICANT'S ATTORNEY: M.S. DIAMOND  
 LAW OFFICES OF M. GREGG DIAMOND, P.C.  
 7800 WOODMONT AVENUE, SUITE 402  
 BETHESDA, MARYLAND 20814-5574  
 (240) 346-5574
  - PROPERTY OWNER: PARK RITCHIE, LLC  
 C/O SOUTHERN MGMT CORP  
 1850 OLD FALLONS RD, STE 600  
 VIENNA, VA 22182
  - DEED BOOK 07688, PAGE 00616  
 PARCEL ID: 01073182  
 TRACT AREA: 186,672 SF  
 DISTRICT: 19  
 ADDRESS: 7600 MAPLE AVE  
 TAKOMA PARK, MD 20912  
 EXISTING USE: TELECOMMUNICATIONS
  - ZONING: RESIDENTIAL (R-10)
  - HORIZONTAL AND VERTICAL CONTROL SHOWN HEREON IS BASED ON PREVIOUS CONSTRUCTION DRAWINGS BY FULLERTON ENGINEERING, DATED JANUARY 2015.  
 LATITUDE: N 83° 54' 03"      GROUND ELEVATION: 198.0' AMSL (AVG.)  
 LONGITUDE: W 77° 00' 28"
  - TOTAL DISTURBED AREA = 0 SF (ANTENNA WORK ONLY)
  - THE PROJECT INVOLVES REMOVING AND INSTALLING NINE (9) ANTENNAS, THREE (3) AT EACH SECTOR AS WELL AS REMOVING AND INSTALLING SIX (6) REMOTE RADIO HEADS (RRH), TWO (2) AT EACH SECTOR.
  - THE STRUCTURE WILL NOT SUPPORT LIGHTS OR SIGNS UNLESS REQUIRED FOR AIRCRAFT WARNING OR OTHER SAFETY RECORDS.
  - THE APPLICANT WILL PROVIDE A CERTIFICATION FROM A REGISTERED ENGINEER THAT THE STRUCTURE WILL MEET THE APPLICABLE DESIGN STANDARDS FOR WIND LOADS PER THE REQUIREMENTS OF THE TELECOMMUNICATIONS INDUSTRY ASSOCIATION.
  - IF THE ANTENNAS ARE NO LONGER USED FOR TELECOMMUNICATIONS PURPOSES FOR A CONTINUOUS PERIOD OF ONE (1) YEAR, THEY SHALL BE REMOVED BY THE ANTENNA OWNER AT OWNER'S EXPENSE.
  - NO WATER OR SANITARY UTILITIES ARE REQUIRED FOR THE OPERATION OF THIS FACILITY.
  - STORMWATER MANAGEMENT NOTE: NO STORMWATER MANAGEMENT IS REQUIRED FOR THIS SITE.
  - BOUNDARY SHOWN PER COUNTY RECORDS.
  - THIS PLAN PREPARED WITHOUT THE BENEFIT OF A TITLE REPORT. PLAN IS SUBJECT TO EASEMENTS AND RESTRICTIONS OF RECORD.
  - ALL DETAILS SHOWN ARE 'STANDARD' OR 'TYPICAL' FOR REFERENCE ONLY. FOR ACTUAL DETAILS, SEE ARCHITECTURAL, STRUCTURAL, OR CONSTRUCTION PLANS BY OTHERS.
  - STRUCTURAL ANALYSIS/DESIGN TO BE PERFORMED BY OTHERS AT CLIENT AND/OR OWNER'S DISCRETION PRIOR TO COMMENCEMENT OF ANY WORK.
  - THE COMMUNICATION EQUIPMENT SHALL BE UNMANNED, WITH INFREQUENT VISITS (FOUR OR FEWER PER YEAR) BY MAINTENANCE PERSONNEL, AND WITH ACCESS AND PARKING FOR NO MORE THAN ONE VEHICLE. THE PROPOSED FACILITY IS NOT FOR HUMAN HABITATION AND THEREFORE HANDICAP ACCESS IS NOT REQUIRED.
  - THE PROPOSED TOWER RELATED EQUIPMENT COMPOND, EQUIPMENT CABINETS AND PROPOSED PANEL ANTENNAS SHALL COMPLY WITH ALL DESIGN STANDARDS IN SECTION 3.5.2.G.(2) OF THE REVISED MONTGOMERY COUNTY ZONING REGULATIONS THAT WENT INTO EFFECT ON OCTOBER 31, 2014.
- GENERAL NOTES:**
- CONTRACTOR SHALL NOTIFY "MISS UTILITY" (BU) 48 HOURS PRIOR TO DOING ANY EXCAVATION IN THIS AREA. CONTRACTOR SHALL CONTACT A SUBSURFACE UTILITY LOCATOR FOR LOCATION OF EXISTING UTILITIES PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION ACTIVITY. CONTRACTOR SHALL VERIFY EXISTING UTILITY LOCATIONS BY TEST PIT AS NECESSARY. LOCATION OF UTILITIES SHOWN ON THIS PLAN ARE APPROXIMATE AND FOR PLANNING PURPOSES ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES OR PROPERTY OF OTHER BY THE CONTRACTOR DURING CONSTRUCTION SHALL BE REPAIRED TO PRECONSTRUCTION CONDITIONS BY THE CONTRACTOR.
  - ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH ALL STATE AND LOCAL CODES AND ORDINANCES, THE LATEST EDITION THEREOF.
  - ANY PERMITS WHICH MUST BE OBTAINED SHALL BE THE CONTRACTOR'S RESPONSIBILITY. CONTRACTOR SHALL SECURE ALL NECESSARY PERMITS FOR THIS PROJECT FROM ALL APPLICABLE GOVERNMENTAL AGENCIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ABIDING BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.
  - CONTRACTOR SHALL COORDINATE ALL UTILITY CONNECTIONS WITH APPROPRIATE UTILITY OWNERS.
  - THESE PLANS ARE NOT FOR RECORDATION OR CONVEYANCE.
  - EXISTING PAVEMENT AND OTHER SURFACES DISTURBED BY CONTRACTOR (WHICH ARE NOT TO BE REMOVED) SHALL BE REPAIRED TO PRECONSTRUCTION CONDITIONS BY THE CONTRACTOR.
- MONTGOMERY COUNTY NOTES:**
- PER SECTION 28A-815:**
- AN ANTENNA AND A RELATED UNMANNED EQUIPMENT BUILDING OR CABINET MAY BE INSTALLED ON A ROOFTOP AS A MATTER OF RIGHT IF THE FOLLOWING STANDARDS ARE MET:
    - THE BUILDING MUST BE AT LEAST 30 FEET IN HEIGHT IN ANY MULTI-FAMILY, COMMERCIAL OR INDUSTRIAL ZONE.
    - THE BUILDING MUST BE GREATER THAN 30 FEET IN HEIGHT IN RESIDENTIAL ZONE. HOWEVER, A ROOFTOP TELECOMMUNICATION ANTENNA IS NOT PERMITTED ON A ONE-FAMILY RESIDENCE OR A BUILDING OR STRUCTURE ACCESSORY TO A ONE-FAMILY RESIDENCE.
    - AN ANTENNA MAY BE MOUNTED ON THE FACADE OF THE BUILDING AT A HEIGHT OF AT LEAST 30 FEET IN A MULTI-FAMILY, COMMERCIAL OR INDUSTRIAL ZONE AND AT A HEIGHT GREATER THAN 30 FEET IN A ONE-FAMILY RESIDENTIAL ZONE. HOWEVER, A TELECOMMUNICATION ANTENNA MUST NOT BE MOUNTED ON THE FACADE OF A ONE-FAMILY RESIDENCE OR A BUILDING OR STRUCTURE ACCESSORY TO A ONE-FAMILY RESIDENCE.
    - AN UNMANNED EQUIPMENT BUILDING OR CABINET MUST NOT EXCEED 360 SQUARE FEET AND 12 FEET IN HEIGHT OR 14 FEET IN HEIGHT FOR A ROOF TOP STRUCTURE, INCLUDING THE SUPPORT STRUCTURE FOR THE EQUIPMENT BUILDING, EXCEPT A SINGLE EQUIPMENT BUILDING IN EXCESS OF 360 SQUARE FEET, LOCATED AT GROUND LEVEL, MAY BE USED FOR MORE THAN ONE TELECOMMUNICATION PROVIDER, IF:
      - THE OVERALL SQUARE FOOTAGE DOES NOT EXCEED 1800 SQUARE FEET AND 12 FEET IN HEIGHT.
      - THE BUILDING IS USED FOR MORE THAN ONE TELECOMMUNICATION PROVIDER OPERATING FROM THE SAME MONOPOLE OR TOWER AND
      - THE BUILDING IS REVIEWED BY THE TELECOMMUNICATIONS TRANSMISSION FACILITY COORDINATING GROUP IN ACCORDANCE WITH SEC 2-50E OF THE COUNTY CODE.
  - IF THE EQUIPMENT BUILDING OR CABINET IS AT GROUND LEVEL IN A RESIDENTIAL ZONE, THE BUILDING OR CABINET MUST BE FACED WITH BRICK OR OTHER SUITABLE MATERIAL ON ALL SIDES AND SURROUNDED BY LANDSCAPING PROVIDING A SCREEN OF AT LEAST 5 FEET IN HEIGHT, AND MUST CONFORM TO THE SETBACK STANDARDS OF THE APPLICABLE ZONE.
  - IF THE EQUIPMENT BUILDING IS LOCATED ON THE ROOF OF A BUILDING, THE EQUIPMENT BUILDING OR CABINET AND OTHER STRUCTURE IN COMBINATION WITH ANY OTHER EQUIPMENT BUILDING AND STRUCTURE, MUST NOT OCCUPY MORE THAN 25% OF THE ROOF AREA.
- IN ADDITION TO A ROOFTOP, AN ANTENNA MAY BE ATTACHED AS A MATTER OF RIGHT TO AN EXISTING STRUCTURE ON PRIVATELY OWNED LAND, INCLUDING BUT NOT LIMITED TO A RADIO, TELEVISION, OR TELEPHONE TRANSMISSION TOWER, A MONOPOLE, A LIGHT POLE, A WATER TANK, OR AN OVERHEAD TRANSMISSION LINE SUPPORT STRUCTURE. AN EQUIPMENT BUILDING LOCATED ON SUCH A STRUCTURE IS SUBJECT TO THE REQUIREMENTS OF SUBSECTION A.M. A STRUCTURE CONSTRUCTED FOR THE SUPPORT OF: 1) AN ANTENNA THAT IS PART OF AN AMATEUR RADIO STATION LICENSED BY THE FEDERAL COMMUNICATIONS COMMISSION, OR 2) AN ANTENNA TO RECEIVE TELEVISION IMAGES IN THE HOME, MAY NOT BE USED AS A SUPPORT STRUCTURE FOR ANY OTHER ANTENNA.

**verizon**  
 TAKOMA PARK - ANTENNA SWAP/RRH SWAP  
 7600 MAPLE AVE  
 TAKOMA PARK, MD 20912 (MONTGOMERY COUNTY)

**REVISIONS:**

NO.	DESCRIPTION	DATE

PERMIT DWGS: 6/21/19  
 DESIGNED BY: BES  
 DRAWN BY: SUK  
 PROJECT NO.: 19214.118  
 DATE: 07/31/2019  
 SCALE: AS NOTED

TITLE:  
**Site Plan**

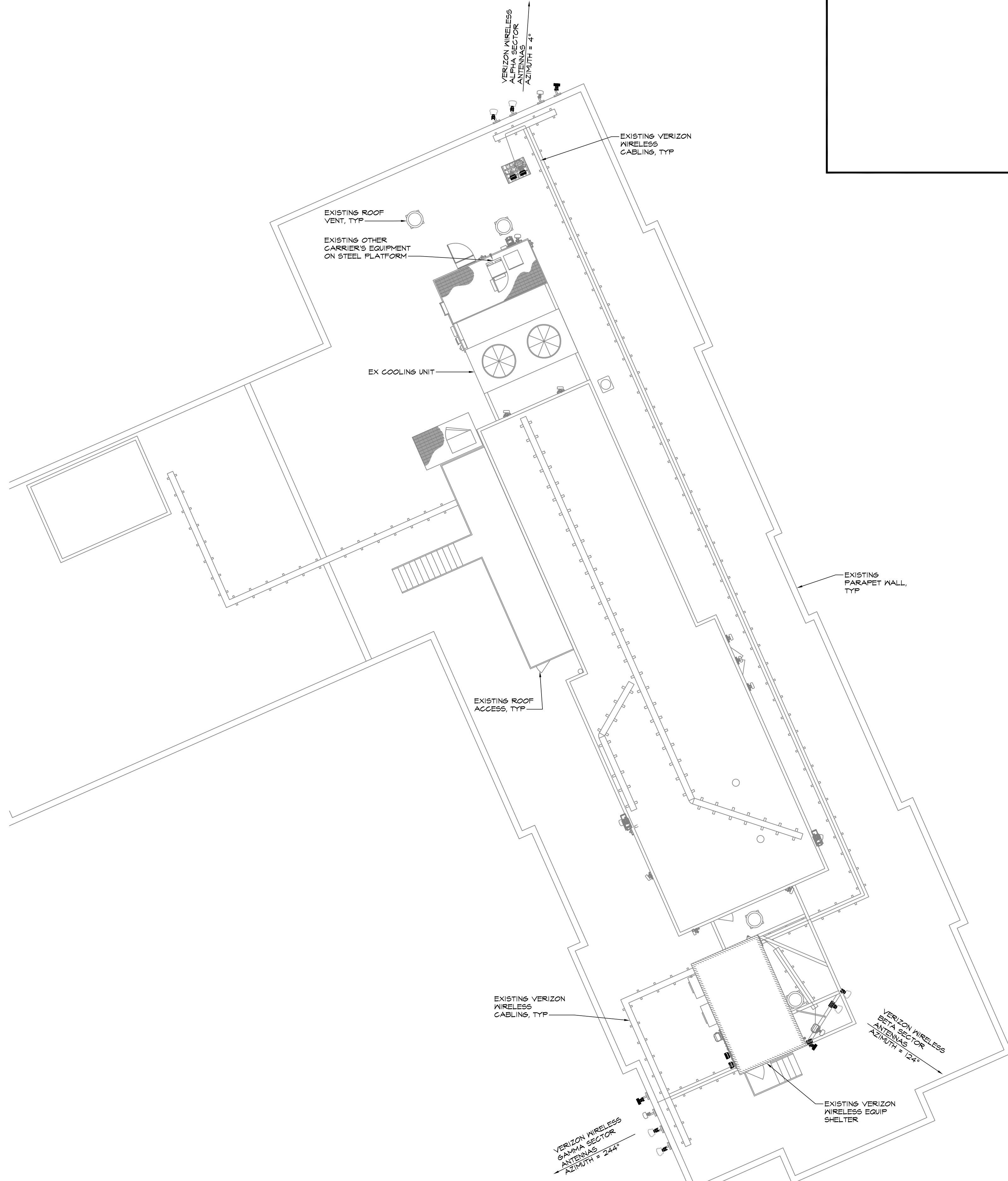
SHEET:  
**C-1**

**Know what's below.  
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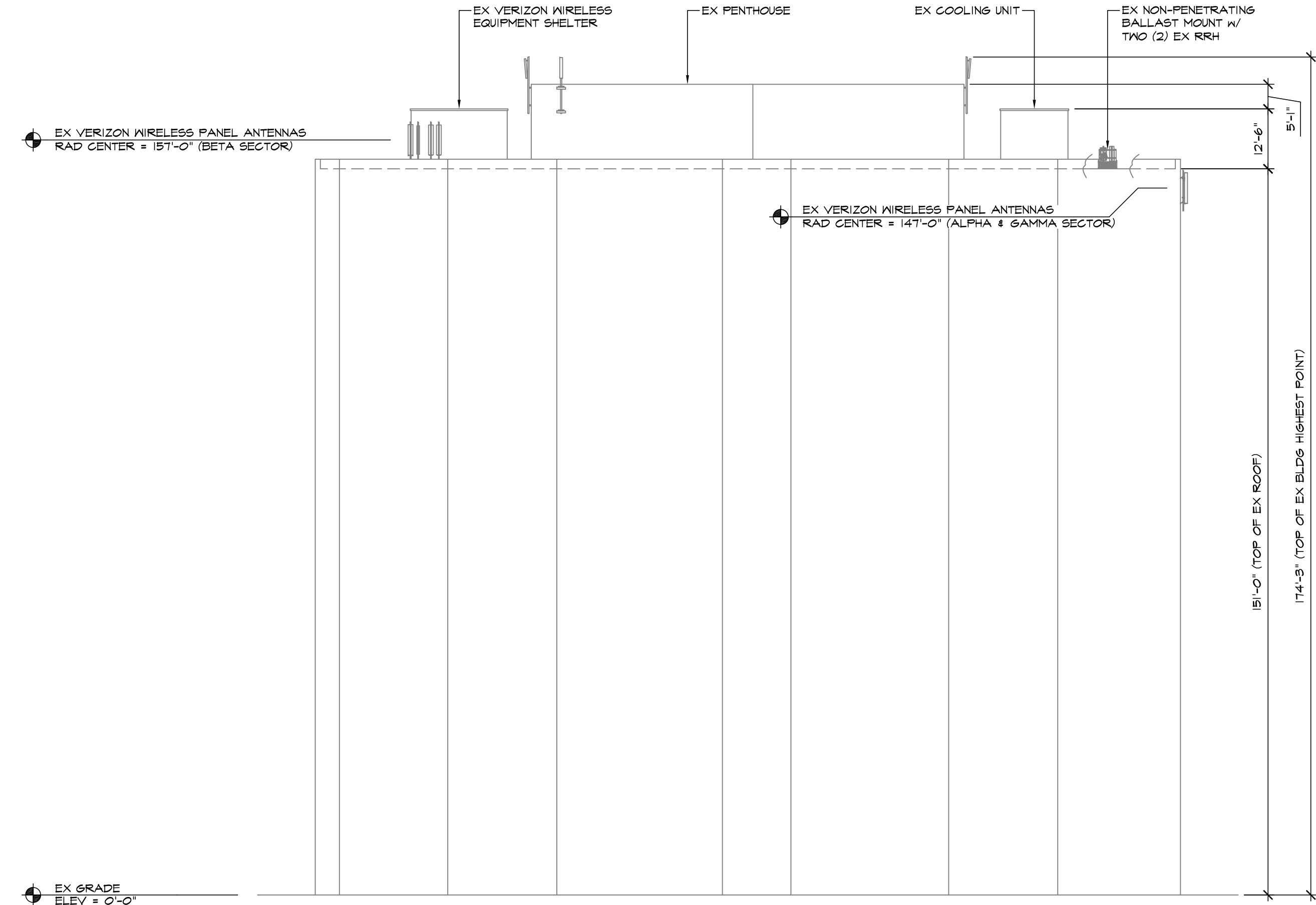
PROTECT YOURSELF, GIVE THREE WORKING DAYS NOTICE.  
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**SITE PLAN**  
 SCALE: 1" = 50'-0"

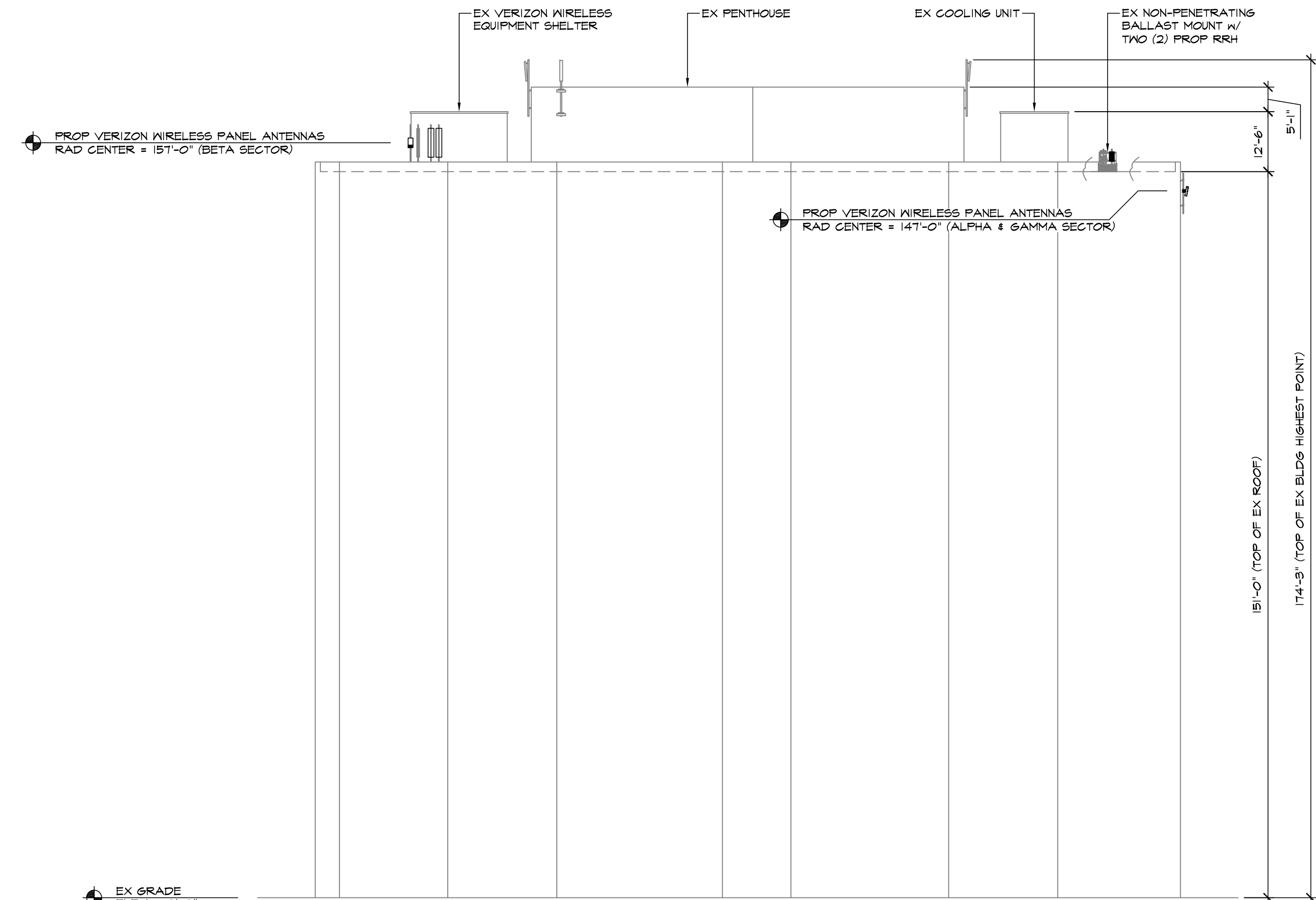
A B C D E F G H J K L M N P Q R



**PARTIAL ROOF PLAN**  
SCALE: 1" = 10'-0"

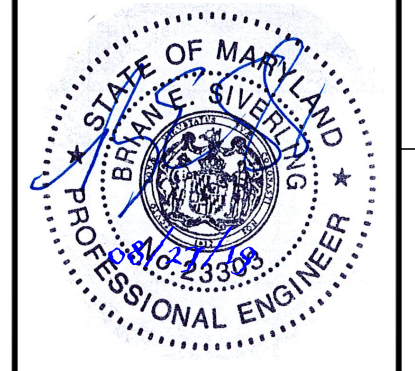


**EXISTING BUILDING ELEVATION**  
SCALE: 1" = 20'-0"



**PROPOSED BUILDING ELEVATION**  
SCALE: 1" = 20'-0"

**MRA**  
**MORRIS & RITCHIE ASSOCIATES, INC.**  
Civil/Structural Engineers  
1320-C East Joppa Road, Suite 505  
Towson, Maryland 21286  
410-821-1690  
410-821-1748 Fax



**PROFESSIONAL CERTIFICATION**  
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 23304, EXPIRATION DATE: 07/01/2020.

**verizon**  
TAKOMA PARK - ANTENNA SWAP/RRH SWAP  
7600 MAPLE AVE  
TAKOMA PARK, MD 20912 (MONTGOMERY COUNTY)

**REVISIONS:**

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DRAWN BY: SUK  
PROJECT NO: 19214.118  
DATE: 07/31/2019  
SCALE: AS NOTED

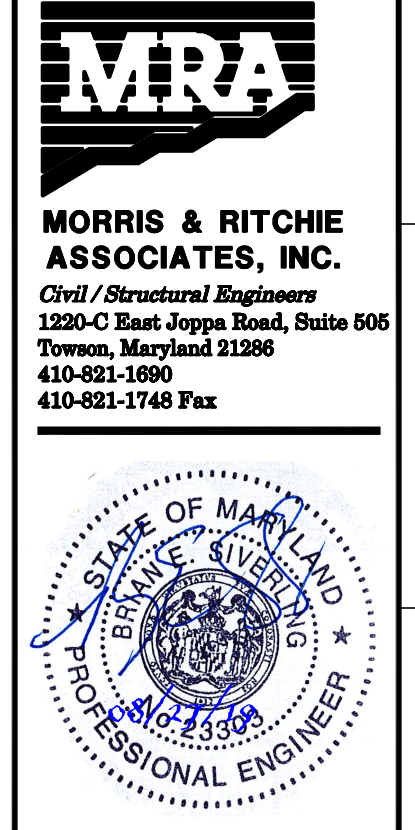
TITLE:  
**Site Details**

SHEET:  
**C-2**



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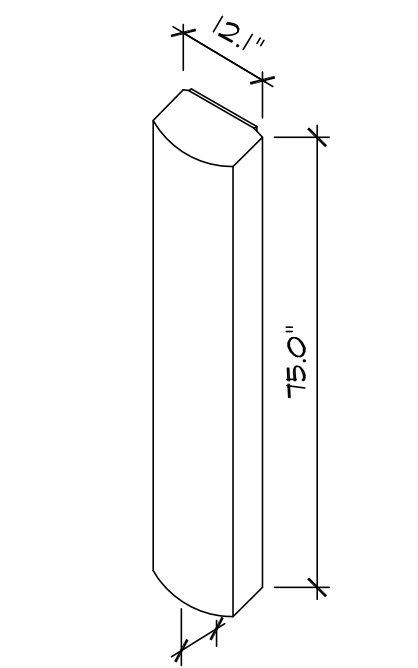
**verizon**  
 TAKOMA PARK - ANTENNA SWAP/RRH SWAP  
 7600 MAPLE AVE  
 TAKOMA PARK, MD 20912 (MONTGOMERY COUNTY)

**REVISIONS:**

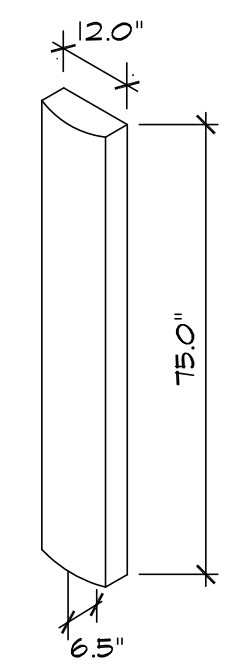
NO.	DESCRIPTION	DATE

PERMIT DWGS 8/21/19  
 DESIGNED BY: BES  
 DRAWN BY: SUK  
 PROJECT NO: 19214.118  
 DATE: 07/31/2019  
 SCALE: AS NOTED

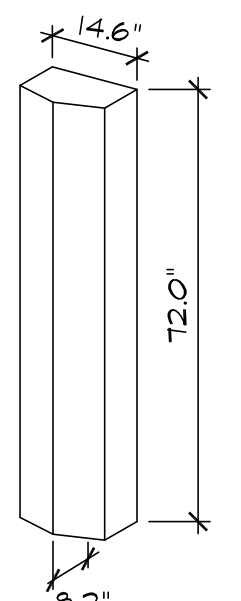
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**Site Details**  
 SHEET:  
**C-3**



**AMPHENOL**  
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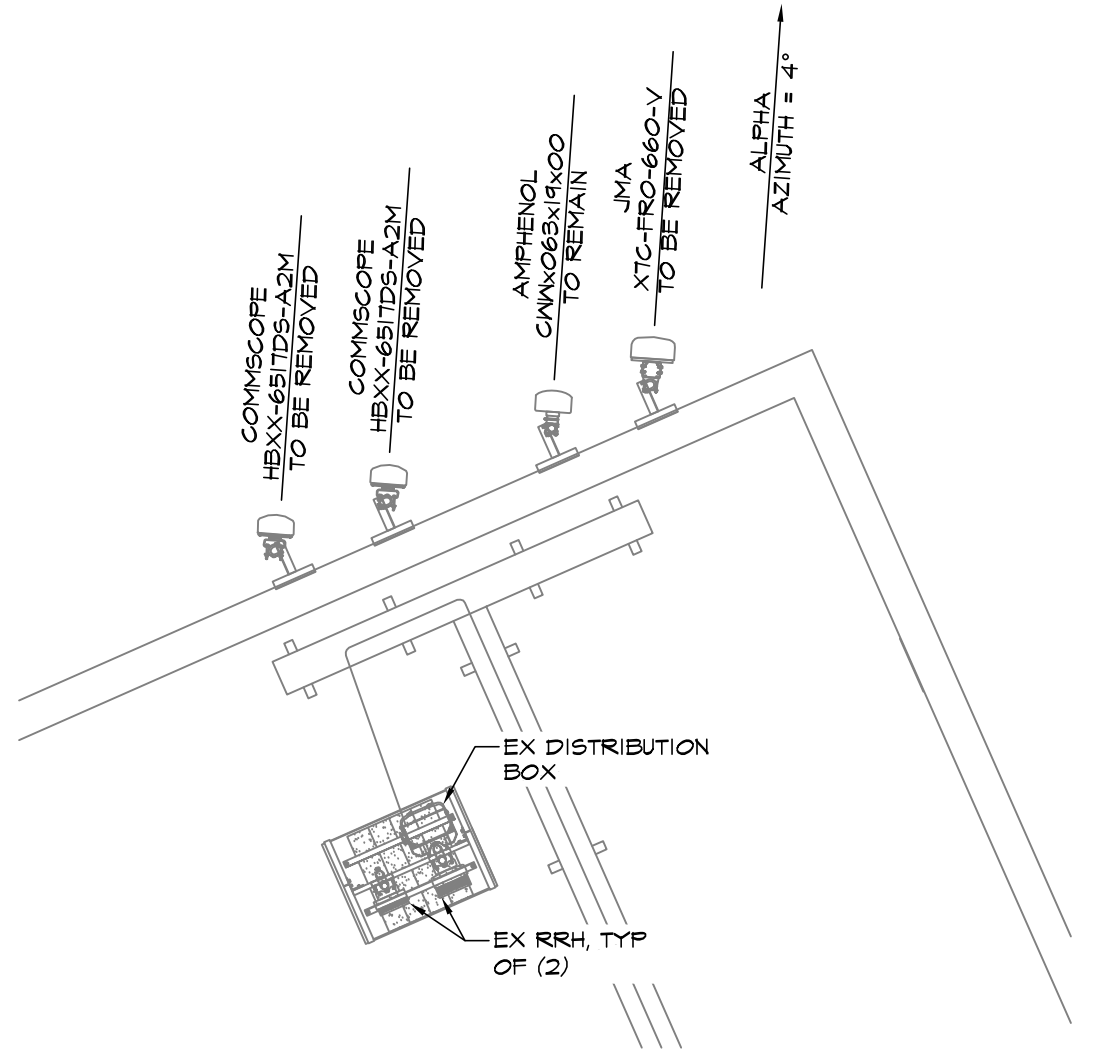


**COMMSCOPE**  
 HBXX-6517DS-A2M

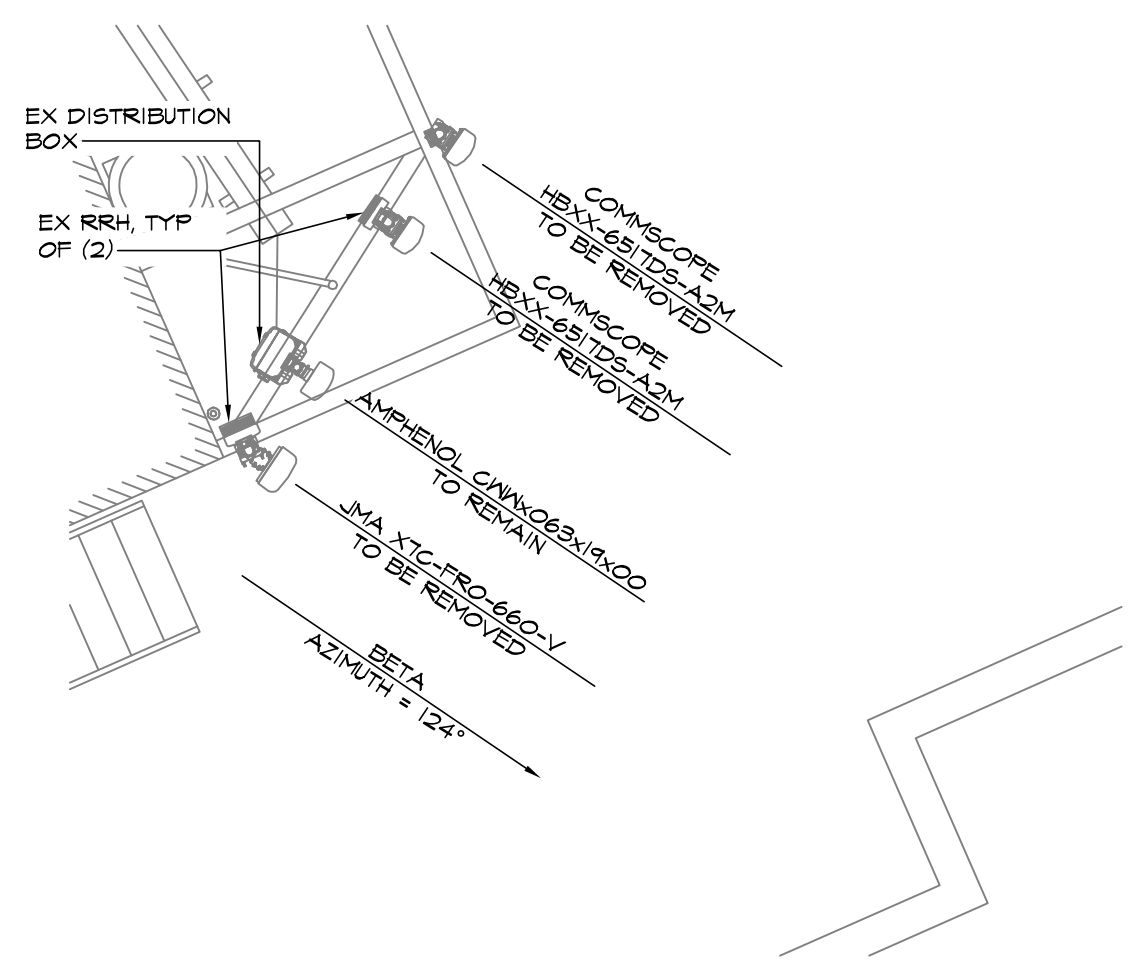


**JMA X7C-FRO-660-V**

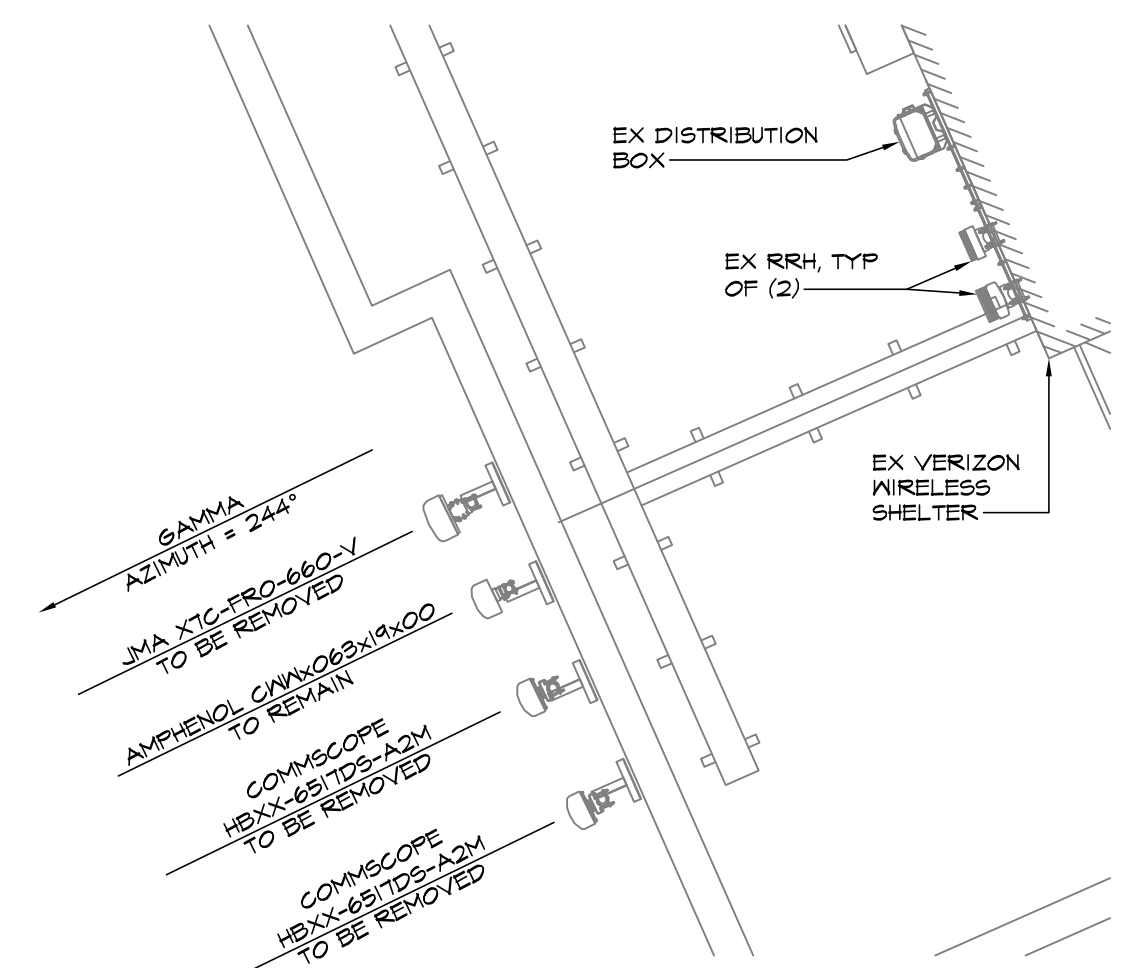
**EXISTING VERIZON WIRELESS ANTENNA DETAILS**  
 NOT TO SCALE



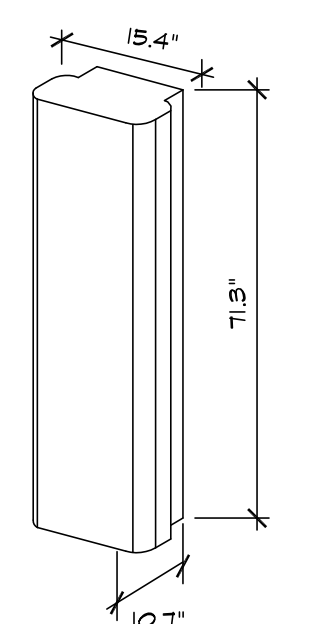
**EXISTING ALPHA SECTOR PLAN**  
 SCALE: 3/8" = 1'-0"



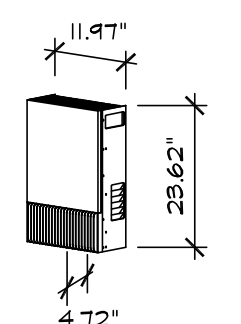
**EXISTING BETA SECTOR PLAN**  
 SCALE: 3/8" = 1'-0"



**EXISTING GAMMA SECTOR PLAN**  
 SCALE: 3/8" = 1'-0"

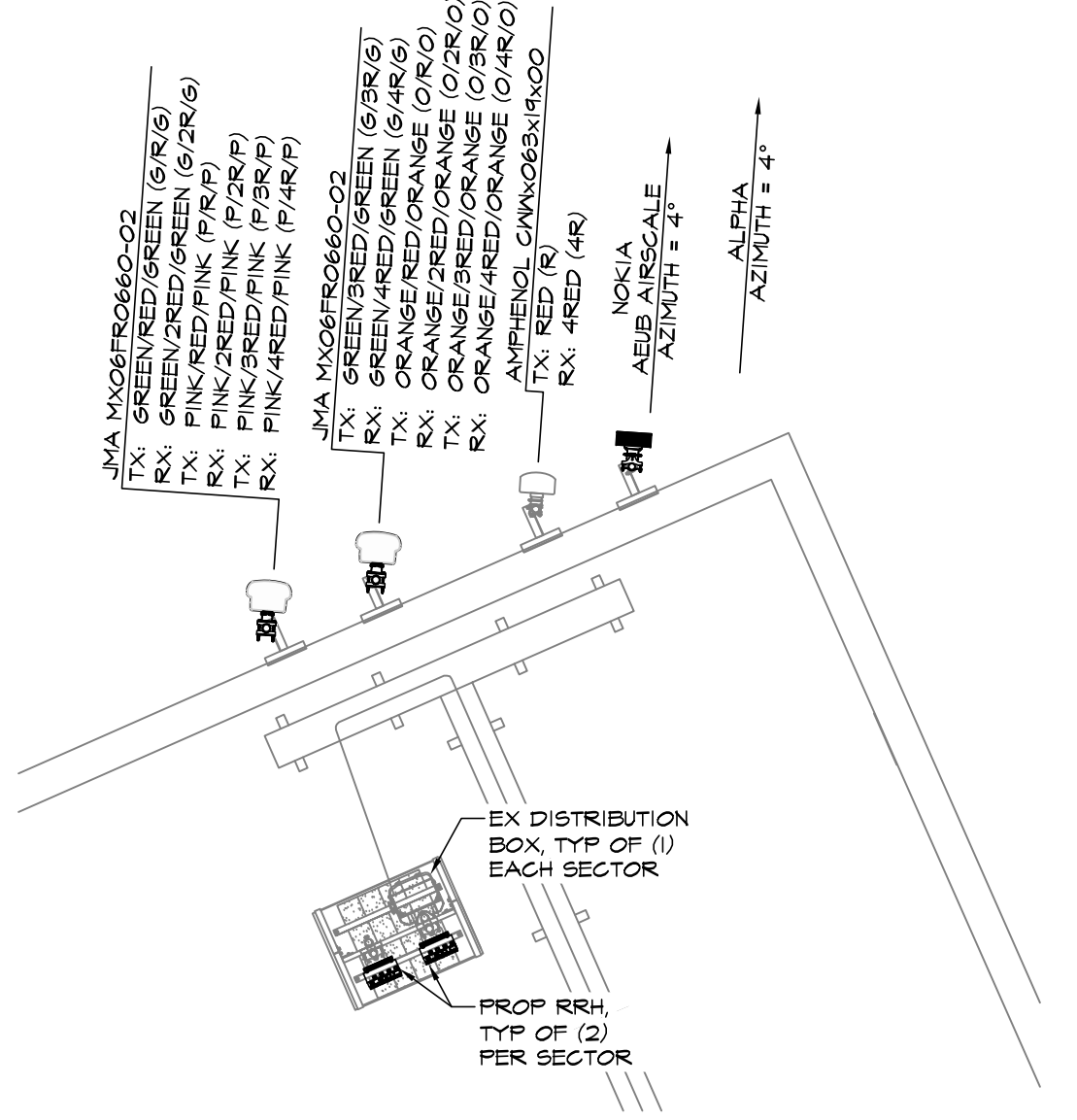


**JMA MX06FRO660-02**

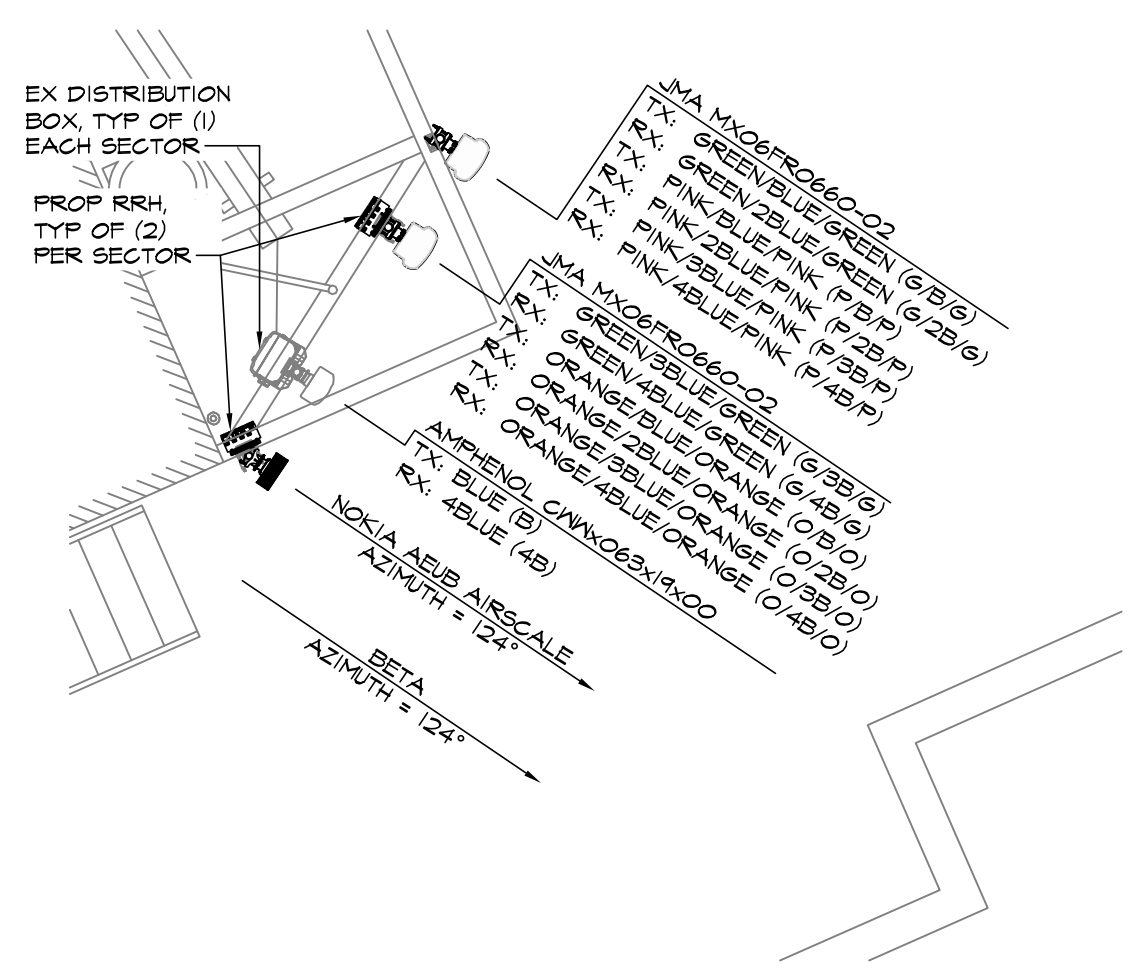


**NOKIA AEB AIRSCALE**

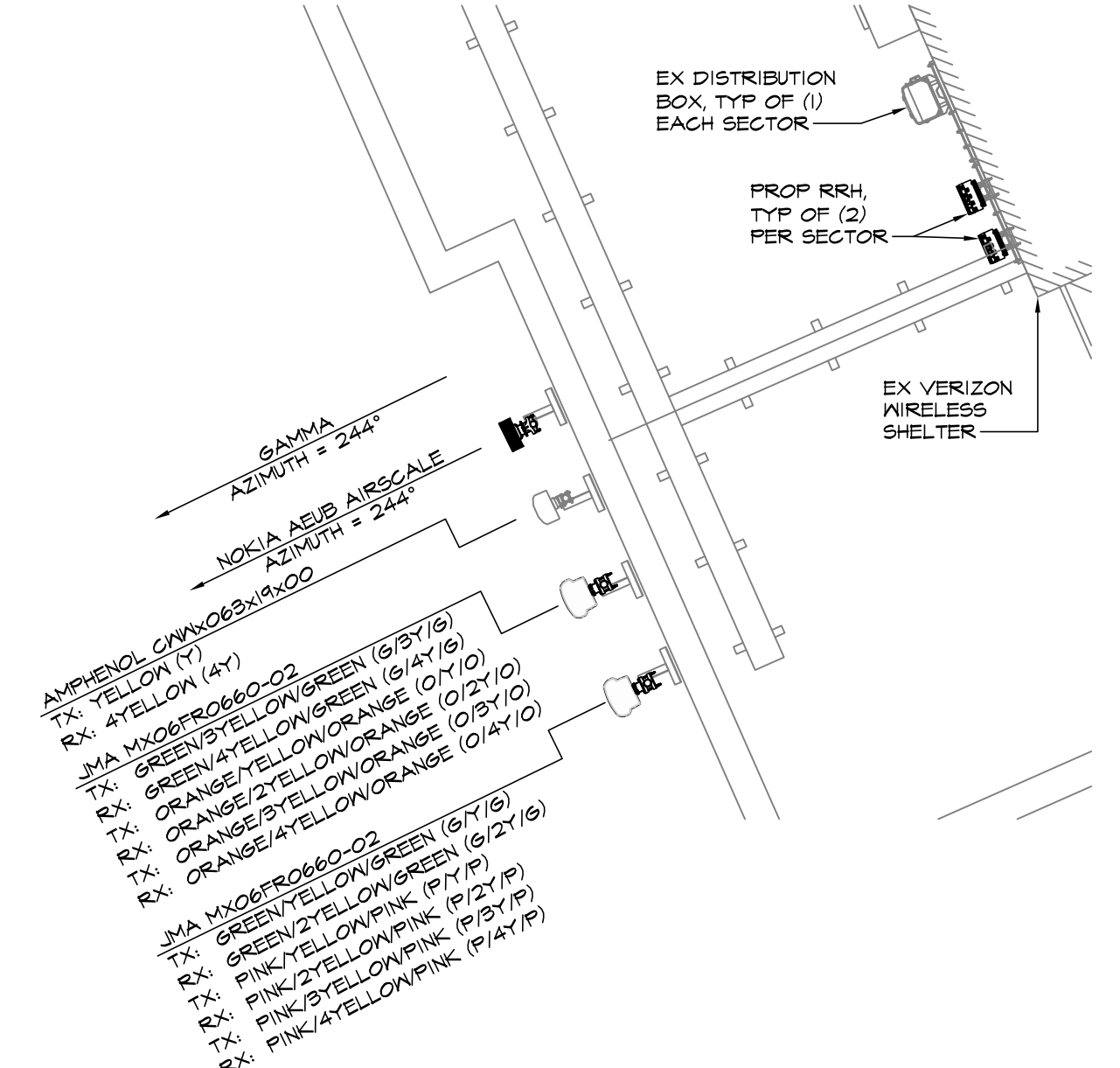
**PROPOSED VERIZON WIRELESS ANTENNA DETAILS**  
 NOT TO SCALE



**PROPOSED ALPHA SECTOR PLAN**  
 SCALE: 3/8" = 1'-0"



**PROPOSED BETA SECTOR PLAN**  
 SCALE: 3/8" = 1'-0"



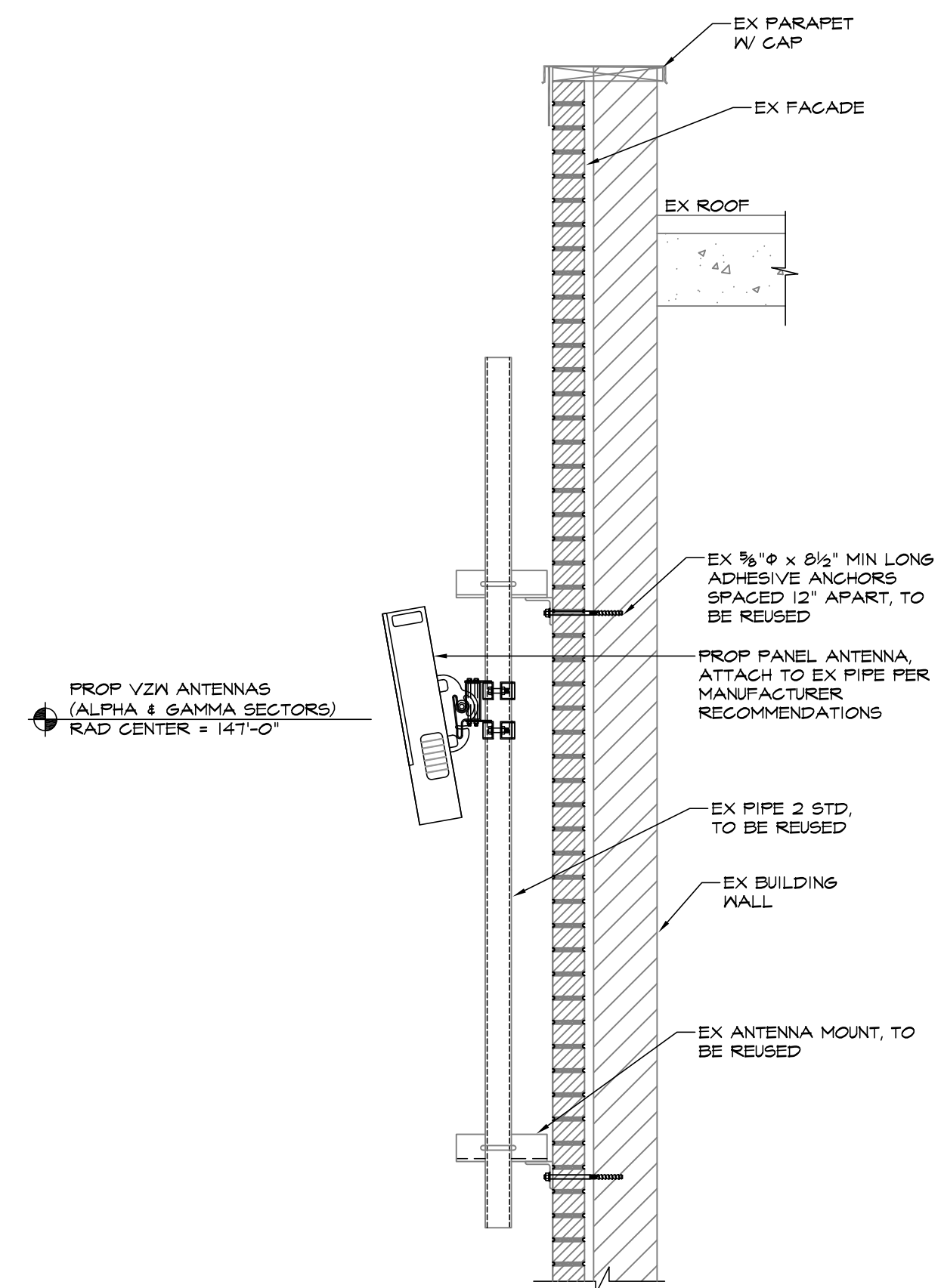
**PROPOSED GAMMA SECTOR PLAN**  
 SCALE: 3/8" = 1'-0"



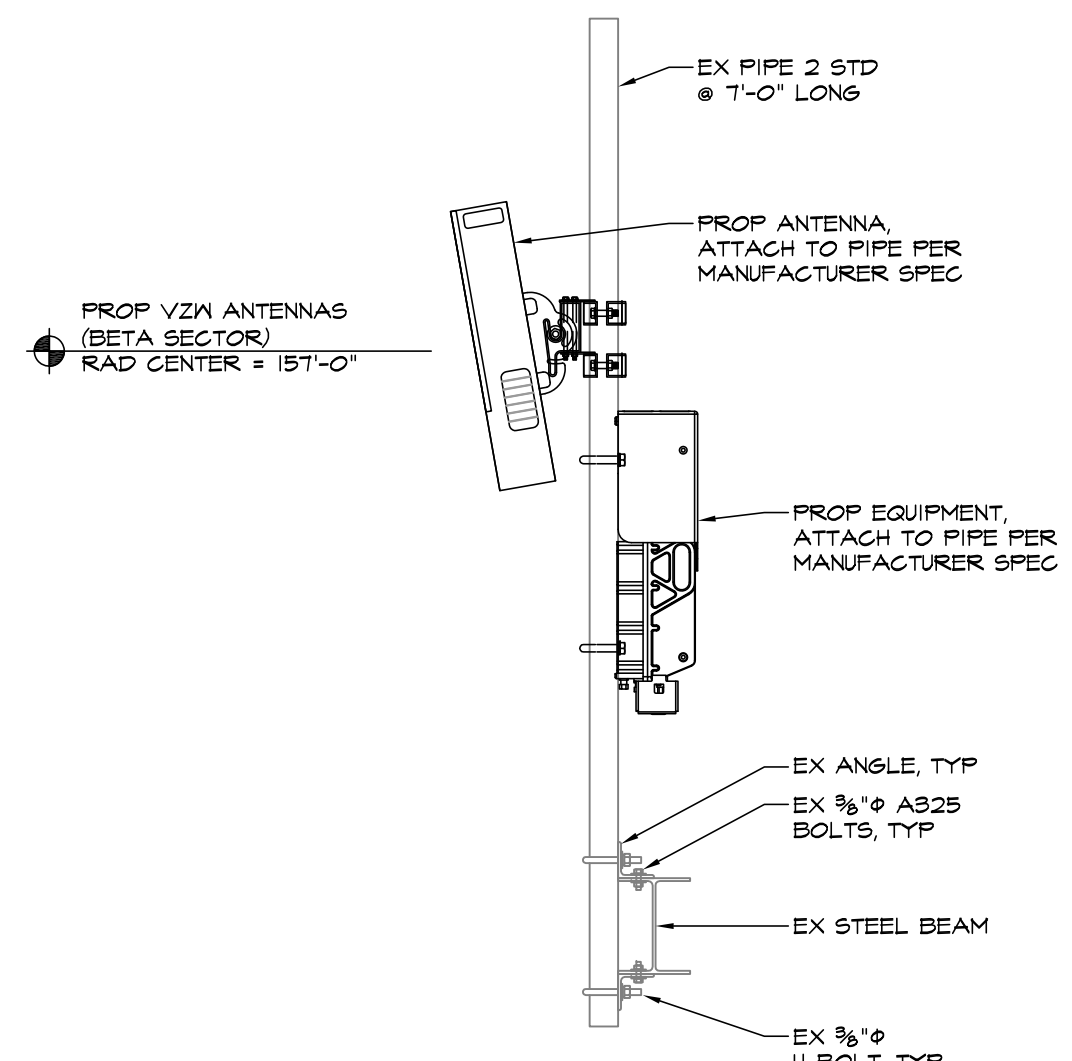
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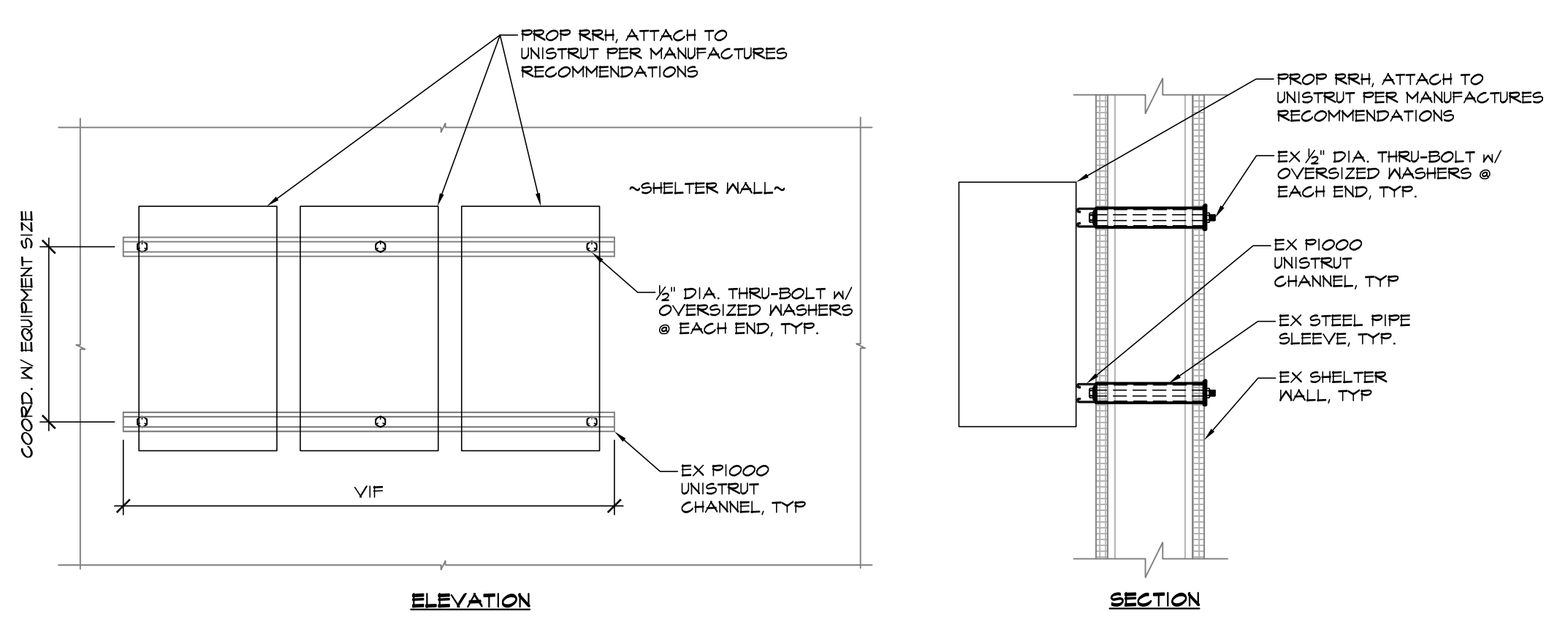
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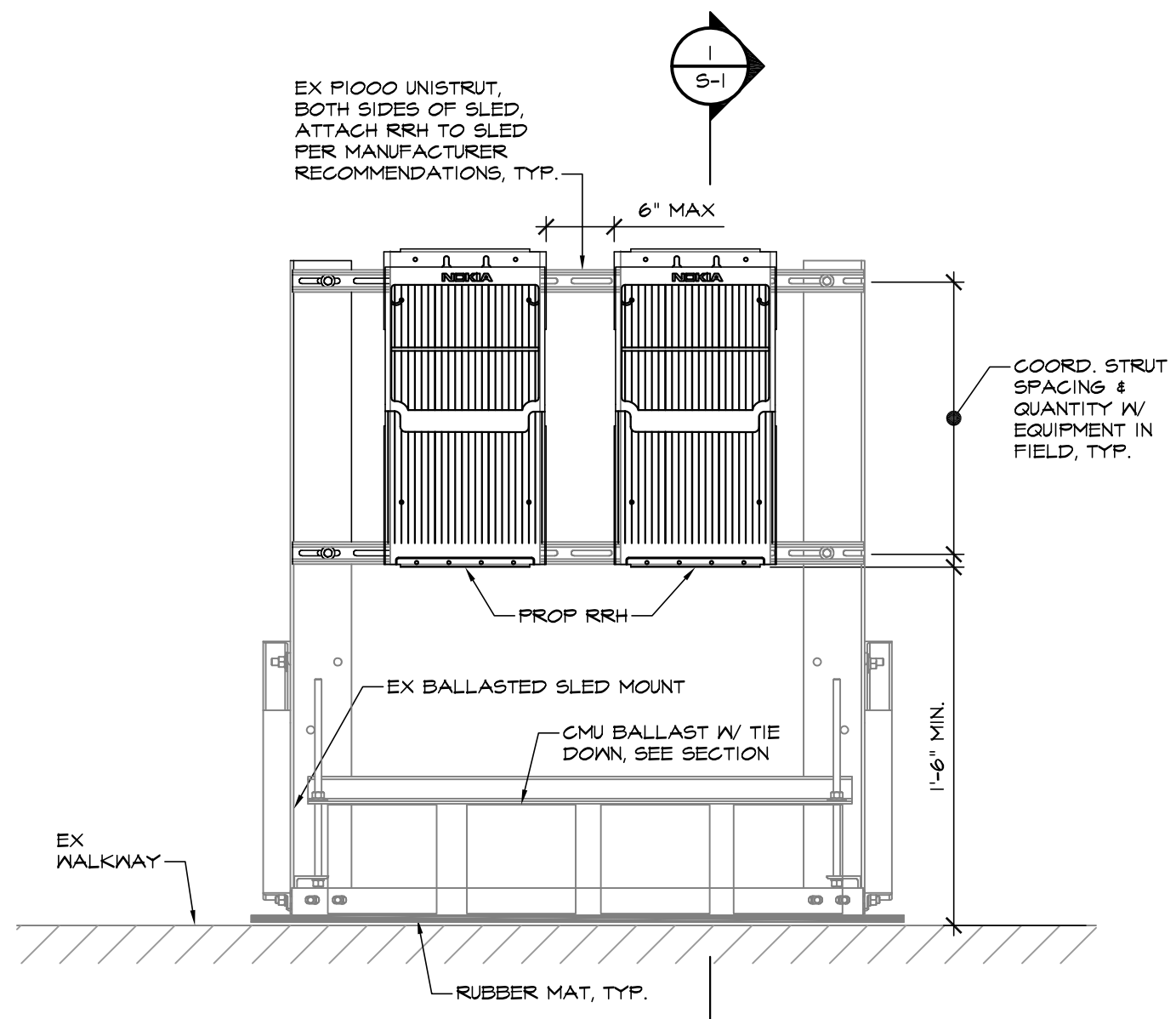
**ANTENNA MOUNT (ALPHA & GAMMA SECTORS)**  
SCALE: 3/4" = 1'-0"



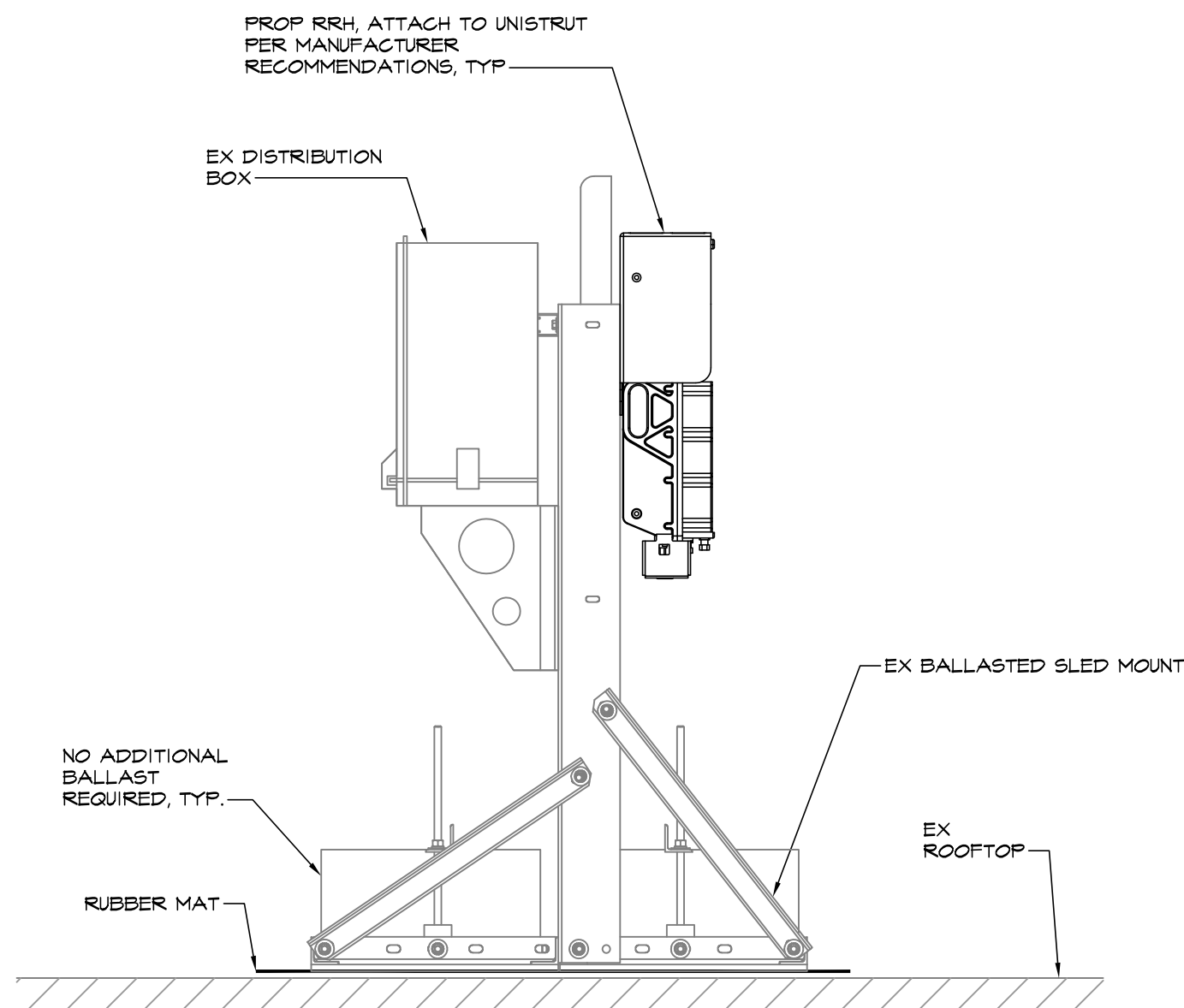
**ANTENNA & EQUIPMENT MOUNT (BETA SECTOR)**  
SCALE: 3/4" = 1'-0"



**RRH MOUNTED TO SHELTER WALL (GAMMA SECTOR)**  
SCALE: 1" = 1'-0"



**TYPICAL RRH BALLASTED SLED (ALPHA SECTOR)**  
SCALE: 1" = 1'-0"



**TYPICAL RRH BALLASTED SLED**  
SCALE: 1" = 1'-0"

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**verizon**  
TAKOMA PARK - ANTENNA SNAP/RRH SWAP  
7600 MAPLE AVE  
TAKOMA PARK, MD 20912 (MONTGOMERY COUNTY)

**REVISIONS:**

NO.	DESCRIPTION	DATE

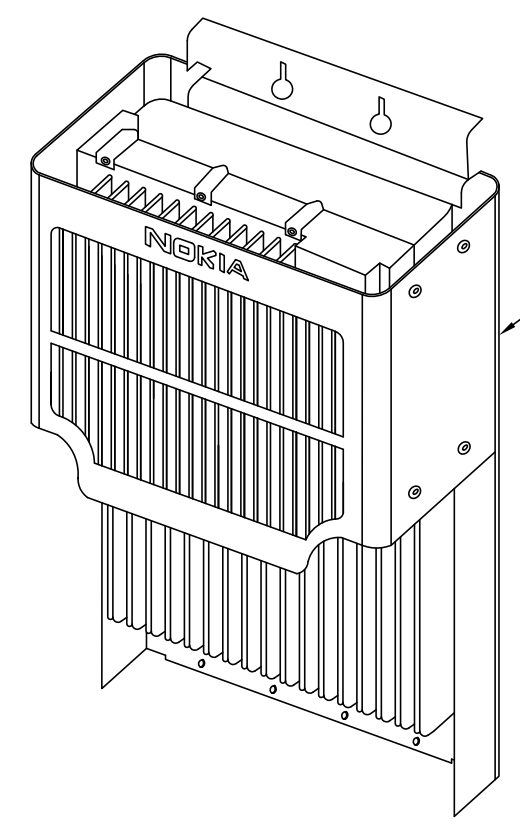
PERMIT DWGS: 6/21/19  
DESIGNED BY: BES  
DRAWN BY: SUK  
PROJECT NO: 19214.118  
DATE: 07/31/2019  
SCALE: AS NOTED

TITLE:  
**Structural Details**

SHEET:  
**S-1**

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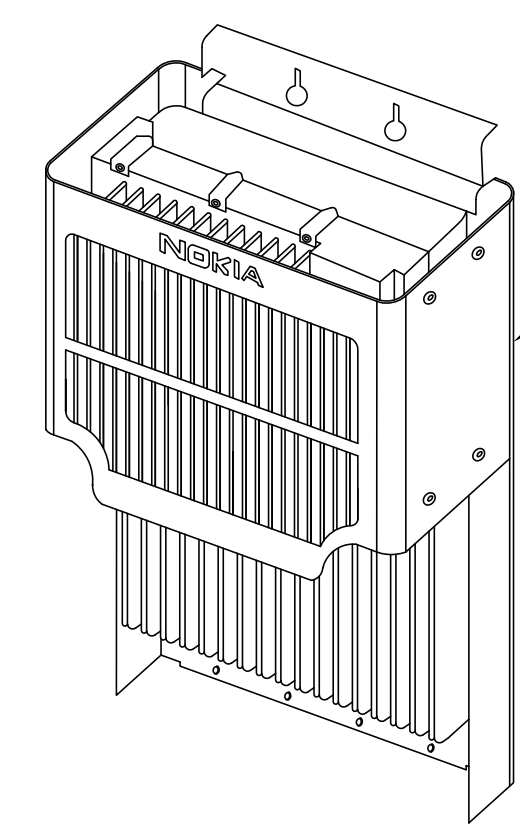


AIR SCALE DUAL RRH  
4T4R B2/66a 320W AHFC

**AIRSCALE DUAL RRH 4T4R B2/66a 320W AHFC**  
 MANUFACTURER: NOKIA  
 ANTENNA TECH: 1900/2100 MHz  
 DIMENSIONS: 7.25'Dx12.1'Nx22.2'H (NO BRACKET)  
 7.6'Dx12.9'Nx26.6'H (W BRACKET)  
 WEIGHT: 79 LBS

- NOTES:**
1. INSTALL RRH PER MANUFACTURER'S RECOMMENDATIONS.
  2. FIBER, DC POWER & GROUND CONNECTIONS NOT SHOWN.

**NOKIA AIRSCALE DUAL RRH 4T4R B2/66a 320 W AHFC - DETAIL**  
 NOT TO SCALE



AIR SCALE DUAL RRH  
4T4R B5/13 320W AHBC

**AIRSCALE DUAL RRH 4T4R B5/13 320W AHBC**  
 MANUFACTURER: NOKIA  
 ANTENNA TECH: 700/850 MHz  
 DIMENSIONS: 7.5'Dx12.1'Nx22.2'H (NO BRACKET)  
 8.1'Dx12.9'Nx26.6'H (W BRACKET)  
 WEIGHT: 84 LBS

- NOTES:**
1. INSTALL RRH PER MANUFACTURER'S RECOMMENDATIONS.
  2. FIBER, DC POWER & GROUND CONNECTIONS NOT SHOWN.

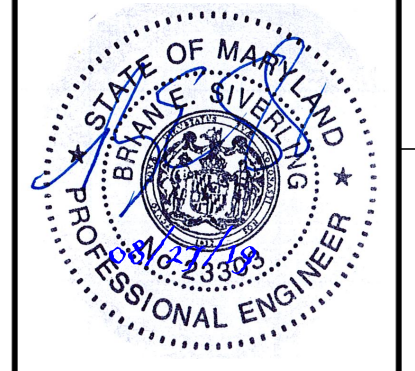
**NOKIA AIRSCALE DUAL RRH 4T4R B5/13 320 W AHBC - DETAIL**  
 NOT TO SCALE



**STRUCTURAL NOTES**

- BUILDING CODES**
  - ALL CONSTRUCTION SHALL CONFORM WITH THE IBC 2015 BUILDING CODE AND ALL SUBSEQUENT SUPPLEMENTS.
  - IN ADDITION, ALL CONSTRUCTION SHALL CONFORM WITH THE GOVERNING LOCAL BUILDING CODE.
- DESIGN LOADS**
  - KIND LOAD DESIGN CRITERIA:**  
 ULTIMATE WIND SPEED (VULT) = 115 MPH  
 RISK CATEGORY: II  
 WIND EXPOSURE: B  
 IMPORTANCE FACTOR (I) = 1.0
  - SEISMIC LOADING:** DOES NOT CONTROL.
- MISCELLANEOUS**
  - SHOP DRAWINGS FOR ALL STRUCTURAL ELEMENTS SHOWN ON THE CONTRACT DOCUMENTS MUST BE SUBMITTED BY THE CONTRACTOR OR OWNER FOR REVIEW BY THE ENGINEER. IF THE CONTRACTOR OR OWNER FAILS TO SUBMIT THE SHOP DRAWINGS, THE ENGINEER WILL NOT BE RESPONSIBLE FOR STRUCTURAL CERTIFICATION AND DESIGN OF THE PROJECT. THE SHOP DRAWINGS SHALL INDICATE ANY DEVIATIONS OR OMISSIONS FROM THE CONTRACT DOCUMENTS. THE GENERAL CONTRACTOR SHALL REVIEW ALL SHOP DRAWINGS PRIOR TO SUBMISSION AND MAKE ALL CORRECTIONS DEEMED NECESSARY.
  - THE CONTRACTOR SHALL REVIEW THE ARCHITECTURAL, CIVIL, MECHANICAL AND ELECTRICAL DRAWINGS FOR LOCATION AND DIMENSION OF CHASES, INSERTS, OPENINGS, SLEEVES, DEPRESSIONS AND OTHER PROJECT REQUIREMENTS WHICH IMPACT THE STRUCTURAL COMPONENTS.
  - THE CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS SHOWN ON THE CONTRACT DRAWINGS BEFORE PROCEEDING WITH CONSTRUCTION. ALL DISCREPANCIES AND OMISSIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT.
  - THE CONTRACTOR SHALL NOT SUBMIT REPRODUCTIONS OF THE STRUCTURAL CONTRACT DOCUMENTS AS SHOP DRAWINGS.
  - SCALES SHOWN ON THE STRUCTURAL CONTRACT DRAWINGS ARE FOR GENERAL INFORMATION ONLY. DIMENSIONAL INFORMATION SHALL NOT BE OBTAINED BY SCALING THE DRAWINGS.
- EXISTING STRUCTURE**
  - ALL EXISTING PLANS, DETAILS, DIMENSIONS, AND ELEVATIONS INDICATE EXISTING CONDITIONS AS KNOWN. THE EXISTING INFORMATION SHOWN IS NOT INTENDED TO BE "AS BUILT" AND THE ACTUAL CONSTRUCTION MAY DIFFER FROM THAT SHOWN. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS INCLUDING DIMENSIONS AND ELEVATIONS PRIOR TO STARTING CONSTRUCTION. MINOR VARIATIONS CAN BE EXPECTED AND ANY REQUIRED DEVIATION FROM THE CONTRACT DOCUMENTS SHALL BE APPROVED BY THE ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION.
  - THE CONTRACTOR SHALL LOCATE ALL UTILITIES IN THE AREA OF CONSTRUCTION AND PREVENT DAMAGE TO THEM. SHOULD DAMAGE OCCUR TO ANY UTILITIES, THE CONTRACTOR IS REQUIRED TO REPAIR THE DAMAGE TO THE SATISFACTION OF THE OWNER AT HIS OWN EXPENSE.
  - THE CONTRACTOR SHALL MONITOR THE EXISTING STRUCTURE DURING CONSTRUCTION. IMMEDIATELY NOTIFY THE ENGINEER OF AREAS EXHIBITING DISTRESS OR FAILURE.
  - THE CONTRACTOR SHALL FIELD VERIFY THE SIZE AND CONDITION OF ALL EXISTING FRAMING. SHOULD THE SIZE OR CONDITION OF THE EXISTING FRAMING DIFFER FROM THAT SHOWN ON THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER.
- STRUCTURAL AND MISCELLANEOUS STEEL**
  - ALL STEEL CONSTRUCTION SHALL CONFORM TO THE NINTH EDITION OF THE AISC "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS, ALLOWABLE STRESS DESIGN AND PLASTIC DESIGN" AND THE AISC "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES".
  - ALL STRUCTURAL STEEL SHALL CONFORM TO ASTM A 992 GRADE 50.
  - ALL MISCELLANEOUS STEEL (ANGLES, PLATES, ETC.) SHALL CONFORM TO ASTM A 36 HAVING A MINIMUM YIELD STRENGTH OF F<sub>y</sub> = 36,000 PSI.
  - ALL STRUCTURAL STEEL PIPE SHALL CONFORM TO ASTM A 53 GRADE "B", HAVING A MINIMUM YIELD STRENGTH OF F<sub>y</sub> = 35,000 PSI.
  - ALL SHOP AND FIELD WELDS SHALL BE PERFORMED BY CERTIFIED WELDERS AND CONFORM TO THE AMERICAN WELDING SOCIETY CODE FOR BUILDINGS AND D.I.I. WELDS SHALL DEVELOP THE FULL STRENGTH OF MATERIALS BEING WELDED UNLESS OTHERWISE INDICATED.
  - ALL CONNECTIONS TO EXISTING STEEL FRAMING SHALL BE FIELD BOLTED UNLESS OTHERWISE INDICATED. THE CONTRACTOR MAY SUBSTITUTE WELDED CONNECTIONS PROVIDED THE EXISTING STEEL IS TESTED TO DETERMINE STRENGTH AND CHEMICAL PROPERTIES. TEST METHODS AND RESULTS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO ANY FIELD WELDING TO EXISTING STEEL.
  - ALL EXPOSED STRUCTURAL STEEL SHALL CONFORM TO THE AISC "SPECIFICATION FOR ARCHITECTURALLY EXPOSED STRUCTURAL STEEL".
  - THE CONTRACTOR SHALL NOT SPlice OR CUT OPENINGS IN STEEL MEMBERS NOT SHOWN ON CONTRACT DRAWINGS WITHOUT THE PERMISSION OF THE STRUCTURAL ENGINEER.
  - AN INDEPENDENT INSPECTION AGENCY SHALL INSPECT ALL STRUCTURAL STEEL AND VERIFY THAT IT CONFORMS TO THE REQUIREMENTS OF THE CONTRACT DOCUMENTS. FIELD INSPECTION REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN 5 DAYS OF THE INSPECTION. THE CONTRACTOR SHALL NOTIFY THE INSPECTION AGENCY OF ALL PHASES OF STEEL CONSTRUCTION AND WELDING.
  - STEEL MEMBERS, FABRICATIONS AND ASSEMBLIES INDICATED TO BE GALVANIZED SHALL BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A 123 AFTER FABRICATION. ALL EXPOSED STEEL MEMBERS SHALL BE HOT DIPPED GALVANIZED.
  - GRout FOR BASE AND BEARING PLATES SHALL BE NON-SHRINK, NON-METALLIC GRout CONFORMING TO ASTM C 827 WITH MINIMUM COMPRESSIVE STRENGTH OF 5000 PSI AT 28 DAYS.
  - THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS INDICATING THE SIZES, EXTENT, AND LOCATION OF ALL STRUCTURAL AND MISCELLANEOUS STEEL FRAMING INCLUDING ALL CONNECTIONS, FASTENERS, AND BEARINGS.
  - POST-INSTALLATION INSPECTION**
    - A POST-INSTALLATION INSPECTION REPORT IS REQUIRED AND SHALL BE INCLUDED IN THE CONTRACTOR'S BID. A POST-INSTALLATION INSPECTION IS A VISUAL INSPECTION OF TOWER INSTALLATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE INSTALLATION DRAWINGS.
    - THE POST-INSTALLATION INSPECTION REPORT SHALL BE COMPLETED BY A PROFESSIONAL ENGINEER LICENSED IN THE JURISDICTION IN WHICH THE PROJECT IS LOCATED.
    - THE INTENT OF THE POST-INSTALLATION INSPECTION REPORT IS TO CONFIRM INSTALLATION AND CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE INSTALLATION DESIGN ITSELF.
    - TO ENSURE THAT THE REQUIREMENTS OF THE POST-INSTALLATION INSPECTION REPORT ARE MET, IT IS VITAL THAT THE CONTRACTOR AND POST-INSTALLATION INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED.

**MRA**  
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 Towson, Maryland 21286  
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**TITLE:**  
 Structural  
 Details & Notes

**SHEET:**  
 S-2



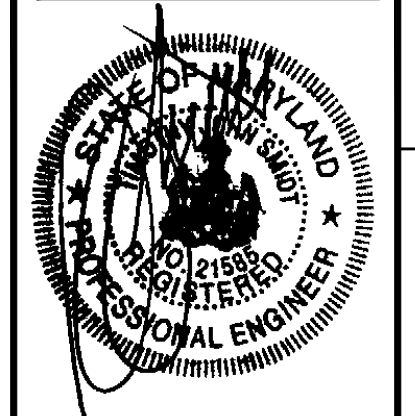
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A B C D E F G H J K L M N P Q R



**TEI**  
TELECENT ENGINEERING INC.  
2216 Commerce Road, Suite 1  
Forest Hill, MD 21050  
410-692-5816  
www.tel-eng.com



I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, TIMOTHY SMITH, AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 21595, EXPIRATION DATE: MAY 9, 2021.

**verizon**  
**TAKOMA PARK - ANTENNA SWAP / RRH SWAP**  
1600 MAPLE AVENUE, TAKOMA PARK,  
MONTGOMERY COUNTY, MARYLAND 20912

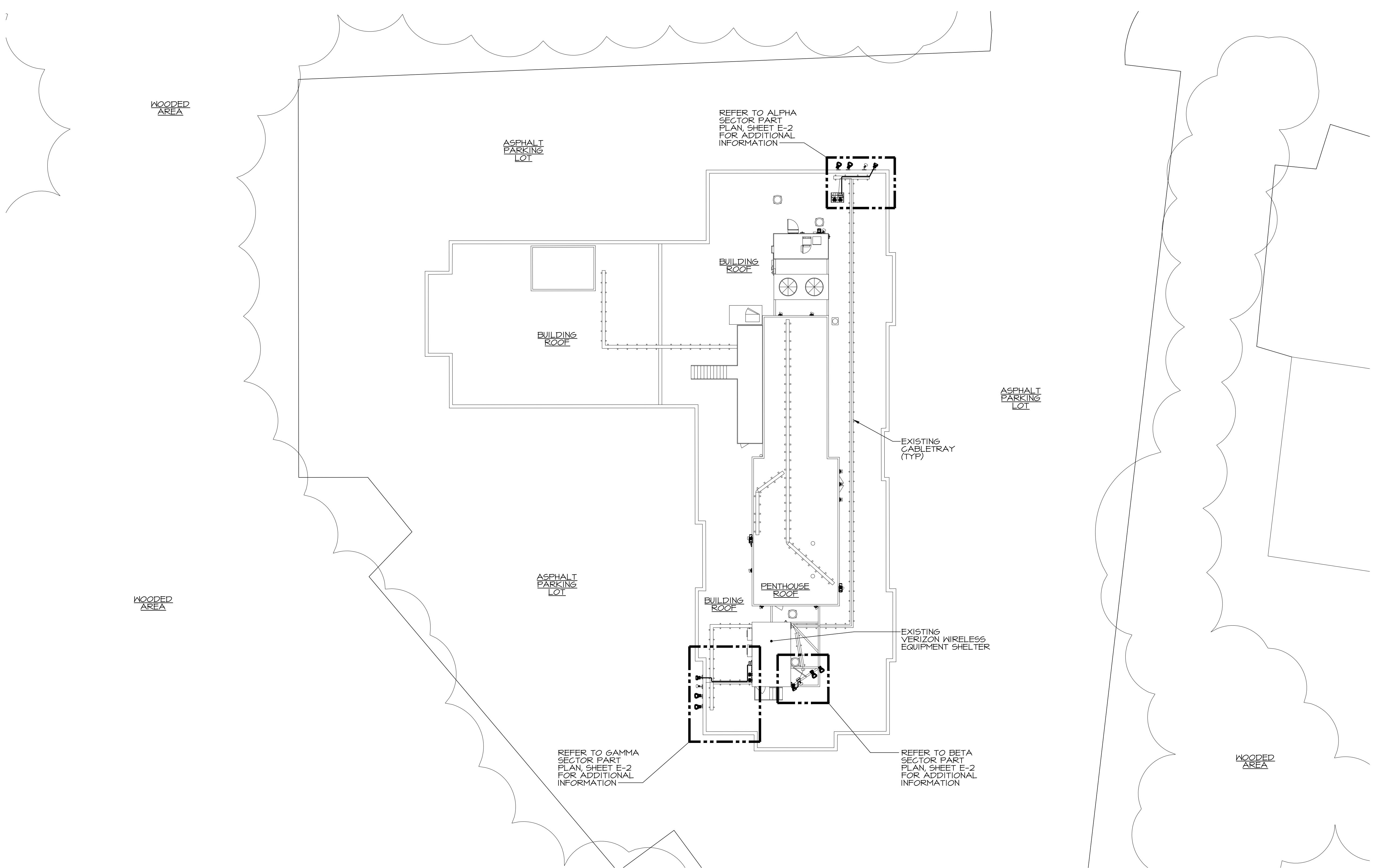
REVISIONS:

NO.	DESCRIPTION	DATE

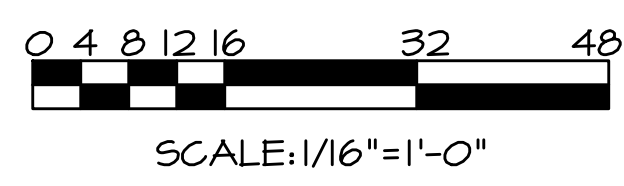
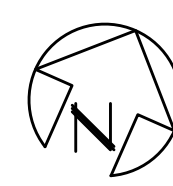
PERMIT DWG 66, 8/21/19  
LAST REV.:  
PROJECT NO: 19106W  
DATE: AUGUST 21, 2019  
SCALE: AS NOTED

TITLE:  
KEY PLAN

SHEET:  
E-1



**KEY PLAN**  
SCALE: 1/16" = 1'-0"



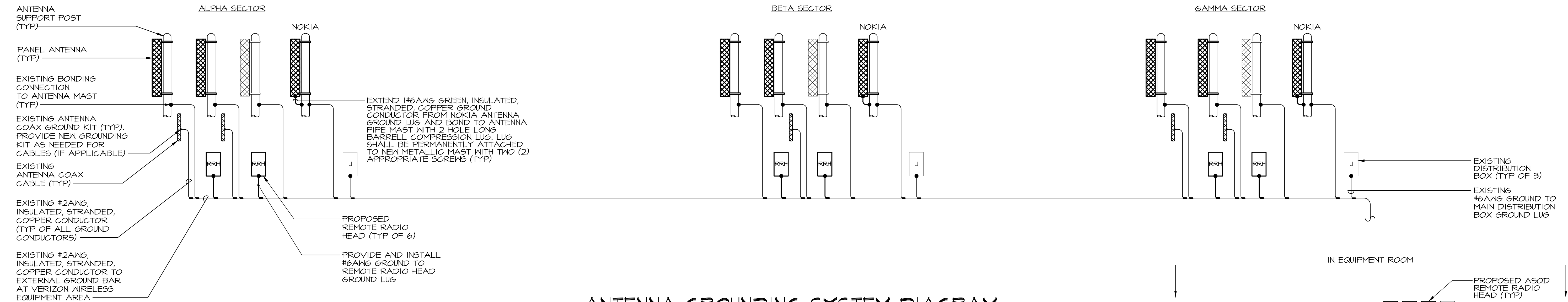


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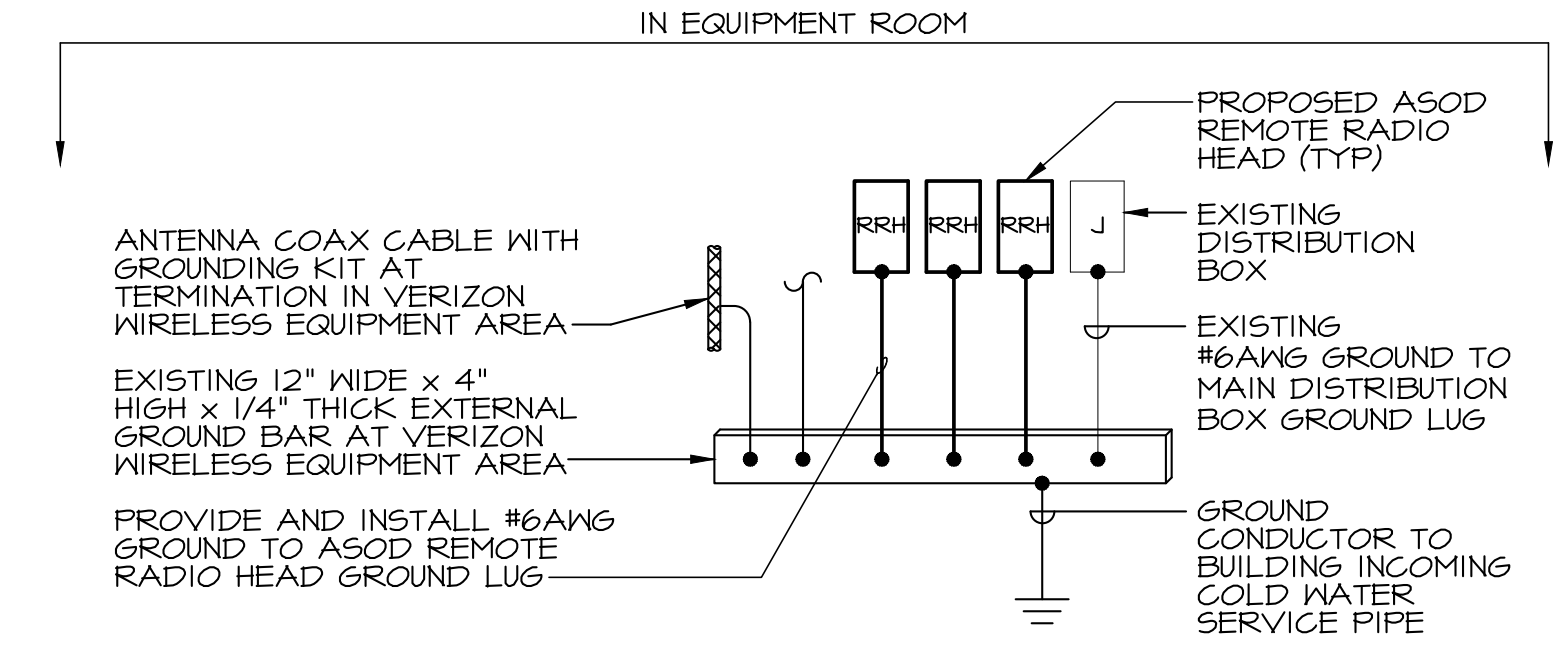
### ANTENNA SCHEDULE

ALPHA SECTOR				BETA SECTOR				GAMMA SECTOR			
ANTENNA MODEL NUMBER	HEIGHT	WIDTH	DEPTH	ANTENNA MODEL NUMBER	HEIGHT	WIDTH	DEPTH	ANTENNA MODEL NUMBER	HEIGHT	WIDTH	DEPTH
AMPHENOL (MODEL #CWNx063x19x00)	75.0"	12.1"	7.0"	AMPHENOL (MODEL #CWNx063x19x00)	75.0"	12.1"	7.0"	AMPHENOL (MODEL #CWNx063x19x00)	75.0"	12.1"	7.0"
JMA (MODEL #MX06FR0660-02)	71.3"	15.4"	10.7"	JMA (MODEL #MX06FR0660-02)	71.3"	15.4"	10.7"	JMA (MODEL #MX06FR0660-02)	71.3"	15.4"	10.7"
JMA (MODEL #MX06FR0660-02)	71.3"	15.4"	10.7"	JMA (MODEL #MX06FR0660-02)	71.3"	15.4"	10.7"	JMA (MODEL #MX06FR0660-02)	71.3"	15.4"	10.7"
NOKIA AEUB AIRSCALE	23.62"	11.97"	4.72"	NOKIA AEUB AIRSCALE	23.62"	11.97"	4.72"	NOKIA AEUB AIRSCALE	23.62"	11.97"	4.72"

NOTE: INFORMATION SHOWN DARK IS PROPOSED. INFORMATION SHOWN LIGHT IS EXISTING TO REMAIN.



### ANTENNA GROUNDING SYSTEM DIAGRAM NO SCALE

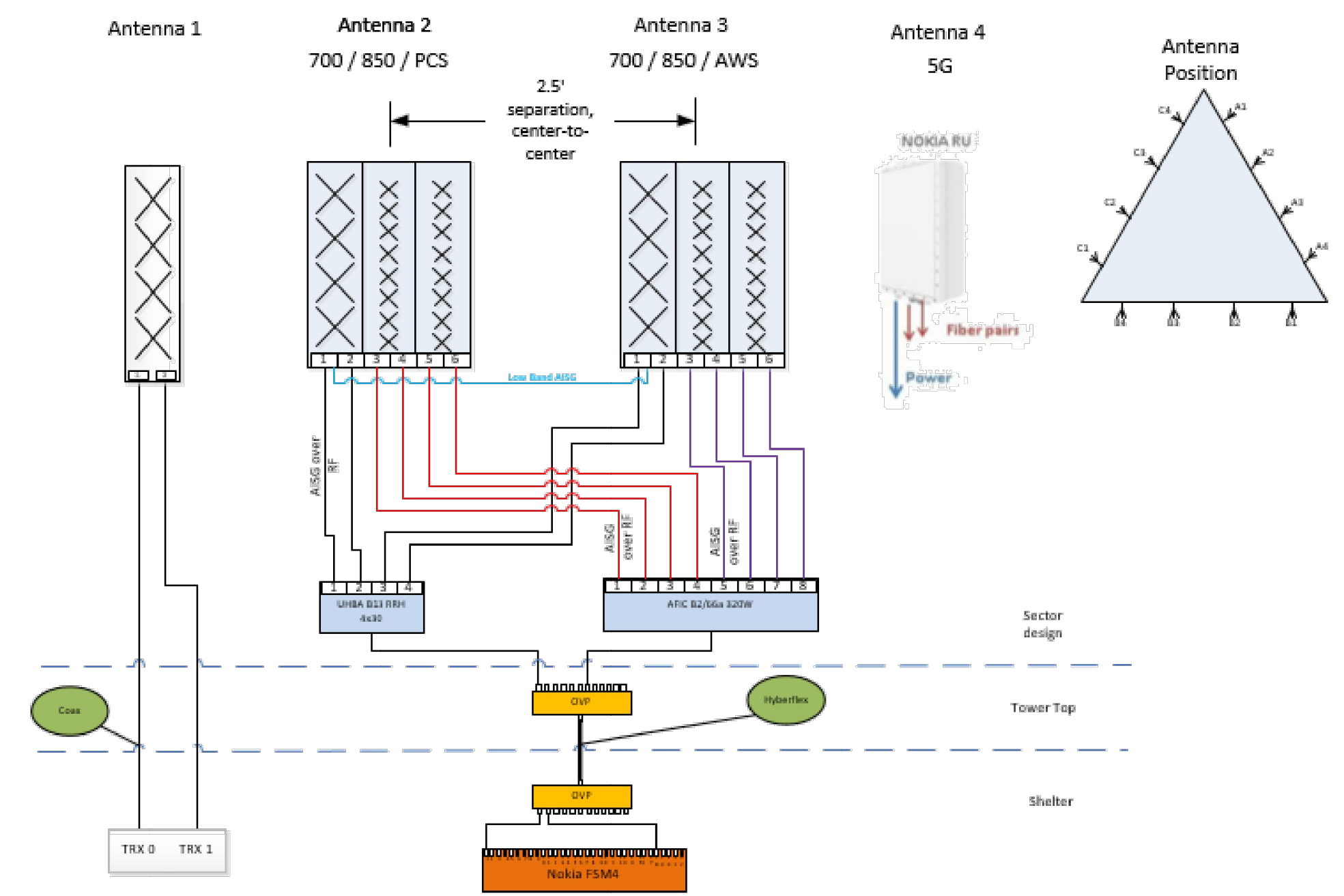


### AEUB 28 GHz Radio Unit Preliminary Technical data (all values are tentative)

AEUB AirScale MAA 8TR 512AE 28 GHz 8W		
Specification	3GPP compliant	
Frequency range	26500 – 29500 MHz NR n257	
Max. supported modulation	256 QAM down link / 64 QAM up link	
Instantaneous Bandwidth IBW	1400 MHz	
Occupied Bandwidth OBW	800 MHz	
Number of TX/RX paths	8T / 8R mode	2T / 2R mode
Total average EIRP	54 dBm	60 dBm
Peak EIRP	62 dBm	68 dBm
Antenna type	4 x 8 x 8 phased array	16 x 16 phased array
Horizontal beamwidth (3 dB)	13° (boresight)	6.5° (boresight)
Vertical beamwidth (3 dB)	9.5° (boresight)	4.3° (boresight)
Horizontal steering angle (3 dB)	±45°	±60°
Horizontal steering angle (8 dB)		
Vertical steering angle (3 dB)	±45°	
Dimensions	600 mm/23.62" (H) x 304 mm/11.97" (W) x 120 mm/4.72" (D) (w/o lifting handle and mounting brackets)	
Volume	22 l	
Weight	20 kg (without mounting brackets)	
Supply Voltage	AC 90 to 250 V / DC 40.5 to 57 V	
Power consumption	<500 W	



Optical Ports	2 x SFP28 eCPRI
Other interfaces	Two pcs of three color LED's
Operational temperature range	-40°C to 55°C
Cooling	Natural convection cooling
Ingress protection class	IP65
Installation options	Pole, Wall
Surge protection	Class II 5kA



### ANTENNA PLUMBING DIAGRAM NO SCALE

### DETAIL - NOKIA ANTENNA/ RADIO NO SCALE

**verizon**  
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TITLE:  
ANTENNA  
GROUNDING  
SYSTEM DIAGRAM,  
DETAIL, AND  
SCHEDULE

SHEET:  
**E-3**