

APPENDIX D

SITESAFE REPORT



Attn: Ernest Klock, Operations Officer
Marin Emergency Radio Authority
c/o Marin County Department of Public Works
3501 Civic Center Dr
San Rafael, CA 94913

Date: April 22, 2019

Subject: Radio Frequency Exposure Report for MERA Next Generation Project

Dear Mr. Klock:

SiteSafe is pleased to submit the attached radio frequency (RF) exposure report for the 18 communication sites that comprise the proposed MERA Next Generation Project.

As explained in the report, our determination of exposure level impacts is made in relation to the Federal Communications Commission (FCC) Rules and Regulations for RF exposure found in 47 CFR § 1.1310, which were established in 1996. The Rules and Regulations were created after considering various industry standards that had been previously developed by medical researchers, engineers, and industry representatives.

Guidelines for human exposure to RF energy are based on the Specific Absorption Rate (SAR), a measure of the rate of energy absorbed by and dissipated in biological tissue. The SAR is usually expressed in watts per kilogram (W/kg). The FCC has adopted a human exposure SAR threshold level of "4 watts per kilogram (4 W/kg), as averaged over the entire mass of the body, above which expert organizations have determined that potentially hazardous exposures may occur" (OET Bulletin 65).

The FCC regulations also define two primary RF-exposure environments, "controlled/ occupational" and "uncontrolled/general public", each with its own exposure threshold. The exposure threshold within occupational environments was established at one-tenth of the SAR threshold described above (0.4 W/kg), and the exposure threshold within general public environments was established at one-fiftieth of the threshold above (0.08 W/kg).

In order to ensure human exposure to RF energy remains within a safe Specific Absorption Rate, the FCC Rules and Regulations impose Maximum Permissible Exposure (MPE) limits, which are derived from the SAR's described above. These MPE limits are defined in terms of the power density (expressed in milliwatts per centimeter squared, mW/cm²) that is emitted from transmitting antennas. The limits vary depending on frequency, since the human body absorbs RF energy differently at varying frequencies.

SiteSafe has made reasonable assumptions where information was not readily available for use in this analysis, and these assumptions are outlined in Appendix B of the report. Under these assumptions, each site has been modeled to show its maximum potential RF power density. Consequently, SiteSafe believes this to be a "worst-case" analysis of RF exposure levels, based on the best available data.

Again, we are grateful that MERA has placed its confidence in SiteSafe to perform this investigation. If you have any questions regarding this report or RF safety and regulatory compliance, please do not hesitate to contact SiteSafe's Customer Support Department at (703) 276-1100.

Sincerely,

Michael McGuire H2DC PLLC
Professional Engineer
Site Safe, LLC



sealed 22apr2019



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Marin Emergency Radio Authority Assessment Purpose – Radio System Upgrade Site Name – Multiple Sites Site Compliance Report

Site visit dates: August 21, 2018 through August 24, 2018
Sites surveyed by: Jeff Desira

Report generated date: March 28, 2019
Report by: Sam Cosgrove
Customer Contact: David Mortimer

Site Addresses:

Site ID 1: 1600 Los Gamos Dr. San Rafael, CA 94903
Site ID 2: 3501 Civic Center Dr. San Rafael, CA 94903
Site ID 3: 325 H Ranch Rd. San Rafael, CA 94947
Site ID 4: 2001 Ridgecrest Blvd. Mill Valley CA 94941
Site ID 5: 1 Barnabe Peak Ave. Lagunitas, CA 94938
Site ID 8: 3 Mt. Vision Rd. Inverness, CA 94937
Site ID 10: Robert Dollar Dr. San Rafael, CA 94945
Site ID 11: 3000 Bayhills Dr. San Rafael, CA 94903
Site ID 14: 99 1/2 Mt. Tiburon Rd Tiburon, CA 94920
Site ID 18: Near 2430 Sonoma Mt. Rd. Petaluma, CA 94954
Site ID 19: 315 Paradise Valley Rd Bolinas, CA 94924
Site ID 20: 28775 Shoreline Hwy Tomales, CA 94971
Site ID 21: Near 1700 Marshall Petaluma Rd Petaluma, CA 94954
Site ID 22: Near 70 Skyview Terrace San Rafael, CA 94903
Site ID 23: Muir Beach Overlook Muir Beach, CA 94965
Site ID 24: 200 Sundial Rd Sausalito, CA 94965
Site ID 25: Mt. Burdell Novato, CA 94945
Site ID 26: Mill Valley Reservoir Mill Valley, CA 94941

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1 Executive Summary

The County of Marin on behalf of Marin Emergency Radio Authority has contracted with Sitesafe, LLC. (Sitesafe), an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine the RF conditions on the sites listed below in relation to the Federal Communications Commission (FCC) Rules and Regulations for RF emissions.

In 1996, the Federal Communications Commission (FCC) adopted regulations for the evaluating of the effects of RF emissions in 47 CFR § 1.1307 and 1.1310. The guideline from the FCC Office of Engineering and Technology is Bulletin 65 ("OET Bulletin 65"), Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields, Edition 97-01, published August 1997. As detailed in OET 65, the standards are based on research from various standards and health organizations and include a 10 to 1 safety factor for occupational workers and a 50 to 1 safety factor for the general public. The safety factors are based on research showing that a Specific Absorption Rate (SAR) of 4 W/kg could be harmful to humans and factors in environmental factors and the condition of the test subject. The FCC divided this number by 10 to use 0.4 W/kg as the basis for the occupational safety level. The maximum level for the public cuts the occupational level by 5, resulting in a 50:1 safety factor over the 4W/kg basis for the standard. Since 1996 the FCC periodically reviews these rules and regulations as per their congressional mandate. The most up to date OET-65 form can be found at on the FCC's website in the following link: <https://www.fcc.gov/general/oet-bulletins-line>

Sitesafe's field personnel visited 12 sites from August 21, 2018 through August 24, 2018. An assessment for these 12 sites is included in this report. In addition, SiteSafe performed predicted MPE simulations (theoretical calculations) for 6 other sites and an assessment for each of these sites has been included in this report. This report contains an RF emissions analysis on the proposed configurations for the Next Generation radio communications sites.

This report contains a detailed summary of the RF environment at the sites including:

- Site compliance determination;
- Photographs of the site (at sites physically visited by Sitesafe's field tech);
- Diagram of the site;
- Inventory of the make / model of all transmitting antennas found on the site (where possible);
- Record of any Maximum Permissible Exposure ("MPE") measurements taken on the site, as applicable; and
- Theoretical MPE based on modeling.



The theoretical modeling diagrams for each site represent worst case MPE levels based on the assumption(s) detailed in each section, the measurement data is a snapshot of MPE levels at the time of our visit, and dependent on transmitter duty cycle, system implementation and emissions from other RF sources at nearby antenna sites.

Theoretical simulations for each site were run with up to three different configurations:

- "Existing Antennas Only On Air" – This configuration includes all antennas currently on site. This configuration shows the theoretical simulation of the RF environment before the proposed antennas are on air.
- "All Antennas On Air" – This configuration includes all antennas currently on site along with the proposed antennas. This is a theoretical simulation of the transition period when all antennas will be on air.
- "Proposed Configuration On Air" – This configuration includes the antennas that will be on air when the project is complete. This is a theoretical simulation of the RF environment that the proposed configuration will create.

This report addresses exposure to radio frequency electromagnetic fields in accordance with the FCC Rules and Regulations for all individuals, classified in two groups, "Occupational or Controlled" and "General Public or Uncontrolled." Five of the sites studied require mitigation to be within acceptable safety standards. Of the sites requiring action, three are the responsibility of the County of Marin.

During our field visits, Sitesafe documented the presence and location of signs and barriers. This document specifically addresses compliance of Marin Emergency Radio Authority's transmitting facilities independently and in relation to all colocated transmitting facilities, which together constitute the RF environment at the site.

Access to all sites was arranged through David Mortimer with Federal Engineering.

If you have any questions regarding RF safety and regulatory compliance, please do not hesitate to contact Sitesafe's Customer Support Department at (703) 276-1100.

2 Regulatory Basis

2.1 FCC Rules and Regulations

In 1996, the Federal Communications Commission (FCC) adopted regulations for the evaluating of the effects of RF emissions in 47 CFR § 1.1307 and 1.1310. The guideline from the FCC Office of Engineering and Technology is Bulletin 65 ("OET Bulletin 65"), *Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields*, Edition 97-01, published August 1997. Since 1996 the FCC periodically reviews these rules and regulations as per their congressional mandate.

FCC regulations define two separate tiers of exposure limits: Occupational or "Controlled environment" and General Public or "Uncontrolled environment". The General Public limits are generally five times more conservative or restrictive than the Occupational limit. These limits apply to accessible areas where workers or the general public may be exposed to Radio Frequency (RF) electromagnetic fields.

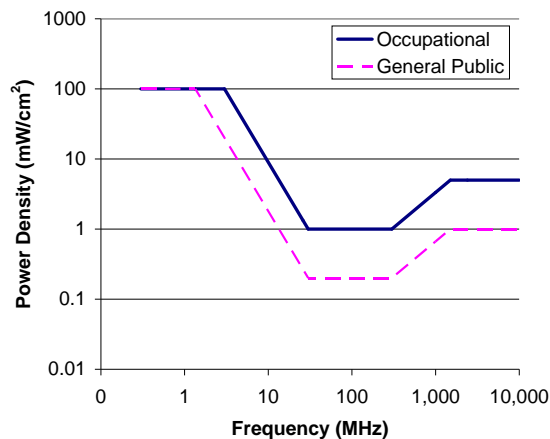
Occupational or Controlled limits apply in situations in which persons are exposed as a consequence of their employment and where those persons exposed have been made fully aware of the potential for exposure and can exercise control over their exposure.

An area is considered a Controlled environment when access is limited to these aware personnel. Typical criteria are restricted access (i.e. locked or alarmed doors, barriers, etc.) to the areas where antennas are located coupled with proper RF warning signage. A site with Controlled environments is evaluated with Occupational limits.

All other areas are considered Uncontrolled environments. If a site has no access controls or no RF warning signage it is evaluated with General Public limits.

The theoretical modeling of the RF electromagnetic fields has been performed in accordance with OET Bulletin 65. The Maximum Permissible Exposure (MPE) limits utilized in this analysis are outlined in the following diagram:

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



Limits for Occupational/Controlled Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f ²)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

Limits for General Population/Uncontrolled Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

f = frequency in MHz

*Plane-wave equivalent power density

3 EOF Prime Site



Marin Emergency Radio Authority Site Name – EOF Prime Site Site ID: 1 Site Compliance Report

**1600 Los Gamos Dr.
San Rafael, CA 94903**

Site visit date: August 21, 2018
Site visit time: 12:58 PM
Site survey by: Jeff Desira

Latitude: N38-1-09.00
Longitude: W122-32-29.50
Structure Type: Rooftop

Report generated date: March 28, 2019
Report by: Sam Cosgrove
Customer Contact: David Mortimer

The site will be compliant upon completion of the remediation identified in Section 3.2.2.



3.1 Site Summary

The County of Marin on behalf of Marin Emergency Radio Authority has contracted with Sitesafe, LLC. (Sitesafe), an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine the RF conditions at the proposed communications site, 1 - EOF Prime Site, located at 1600 Los Gamos Dr., San Rafael, CA, in relation to Federal Communications Commission (FCC) Rules and Regulations for RF emissions.

Sitesafe's field personnel visited 1 - EOF Prime Site on August 21, 2018. This section contains a detailed summary of the RF environment at the site including:

- Site compliance determination;
- Photographs of the site;
- Diagram of the site;
- Inventory of the make / model of all transmitting antennas found on the site (where possible);
- Record of any Maximum Permissible Exposure ("MPE") measurements taken on the site, as applicable; and
- Theoretical MPE based on modeling.

RF emissions levels exceed 100% MPE in the northeast corner of PH 2 due to the height from rooftop level, powers used, and amount of antennas being proposed. Signage should be posted in areas where it will be clearly visible to anyone approaching the antenna mount structure.



3.2 Site Compliance

3.2.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, and a thorough review of site access procedures, RF hazard signage and visible antenna locations, Sitesafe has determined that:

The site will be compliant with the FCC rules and regulations, as described in OET Bulletin 65 **upon implementation of the proposed remediation.** The corrective actions needed to make this site compliant are located in Section 3.2.2.

The compliance determination is based on General Public MPE levels due to theoretical modeling and/or physical measurements, RF signage placement, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the Marin Emergency Radio Authority's proposed deployment plan could result in the site being rendered non-compliant. Measurements have also been performed to validate the assumptions used in our theoretical modeling of this site.

Modeling is used for determining compliance and the percentage of MPE contribution. Measurements provide a view of MPE percentage levels at the site at the time of Sitesafe's visit and are used to validate modeling results.

3.2.2 Actions for Site Compliance

Based on common industry practice and our understanding of FCC and OSHA requirements, this section provides a statement of recommendations for site compliance. RF alert signage recommendations have been proposed based on existing measurements and theoretical analysis of MPE levels. Sitesafe has documented the locations of any RF signs and barriers that are required for compliance. Barriers can consist of locked doors, fencing, railing, rope, chain, paint striping or tape, combined with RF alert signage.

The site will be made compliant if the following changes are implemented:

Antenna Mount Location

Install a Notice sign.

3.3 RF Emissions Diagram

The RF diagram(s) below display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix B.

The key at the bottom of each diagram indicates if percentages displayed are referenced to FCC General Population Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Gray represents areas predicted to be at 5% of the MPE limits, or below.
- Green represents areas predicted to be between 5% and 100% of the MPE limits.
- Blue represents areas predicted to be between 100% and 500% of the MPE limits.
- Yellow represents areas predicted to be between 500% and 5000% of the MPE limits.
- Red areas indicated predicted levels greater than 5000% of the MPE limits.

The theoretical analysis identified the maximum predicted MPE levels on the rooftop to be:

Maximum Cumulative Theoretical General Public MPE level (Existing Antennas) : 553.6%
Maximum Cumulative Theoretical General Public MPE level (All Antennas): 577.1%
Maximum Cumulative Theoretical General Public MPE level (Proposed Antennas): 553.2%

General Population diagrams are specified when an area is accessible to the public; i.e. personnel that do not meet Occupational or RF Safety trained criteria, could gain access.

Grey areas in the diagrams are <5% of the General Public threshold and are not predicted to pose any danger to anyone accessing these areas.

Green areas in the diagrams are between 5% and 100% of the General Public threshold and are not predicted to pose any danger to anyone accessing these areas.

If trained occupational personnel require access to areas that are delineated as **Blue** or above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the operators to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

The key at the bottom also indicates the level or height of the modeling with respect to the main level. The origin is typically referenced to the main rooftop level, or ground level for a structure without access to the antenna level. For example:

Average from 0 feet above to 6 feet above origin

and

Average from 20 feet above to 26 feet above origin



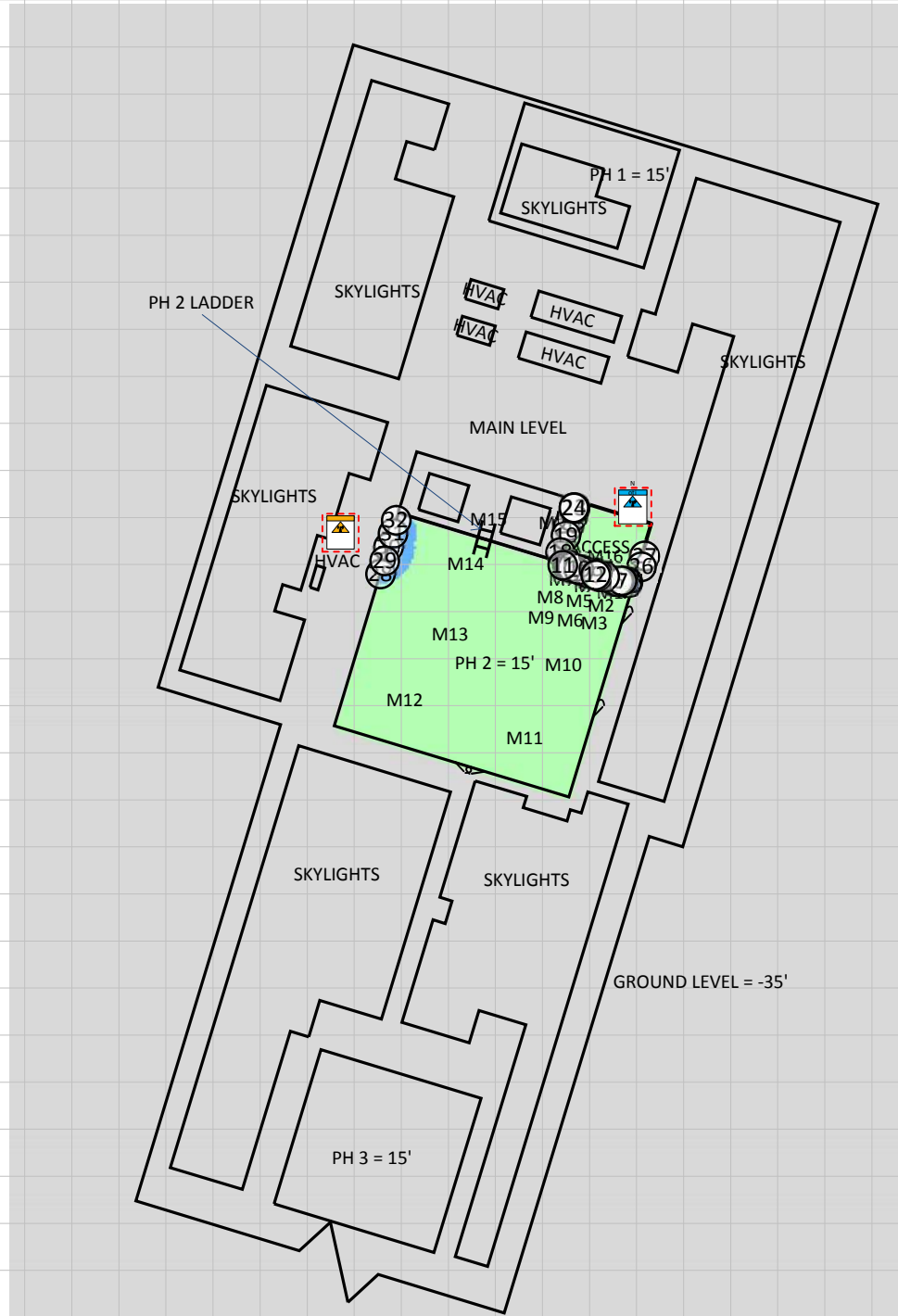
The first indicates modeling at the main rooftop (or ground) level averaged over 6 feet. The second indicates modeling at a higher level (possibly a penthouse level) of 20 feet averaged over 6 feet.

Abbreviations used in the RF Emissions Diagrams

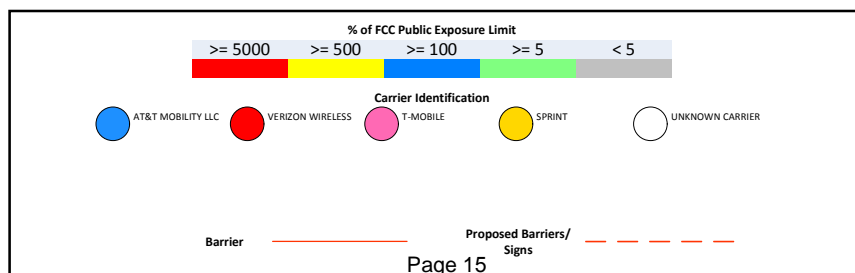
PH=##'	Penthouse at ## feet above main roof
M##	Measurement ## taken during a site visit

As discussed in Section 3.4, site measurement locations for spatial average measurements collected at the time of Sitesafe's visit have been added to the RF emissions diagram. While the theoretical modeling represents worst case MPE levels based on the assumption(s) detailed above, the measurement data is a snapshot of MPE levels at the time of our visit, and dependent on transmitter duty cycle, system implementation and emissions from other RF sources at nearby antenna sites.

RF Exposure Simulation For: EOF Prime Site Existing Antennas Only On Air



% of FCC Public Exposure Limit
Spatial average 0' - 6'



(Feet)
0 37.7 75.3
www.sitesafe.com
Site Name: EOF Prime Site
8/29/2018 8:49:45 AM

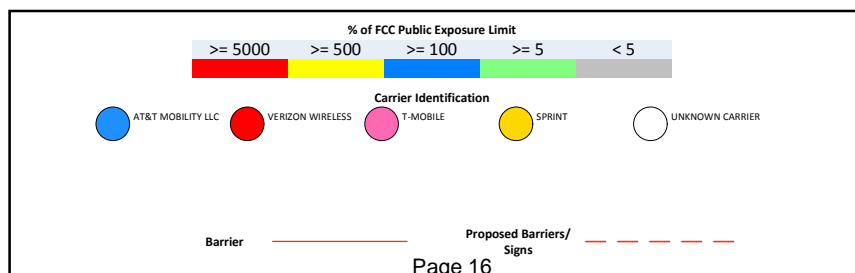
Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: EOF Prime Site Existing Antennas Only On Air – Detail View



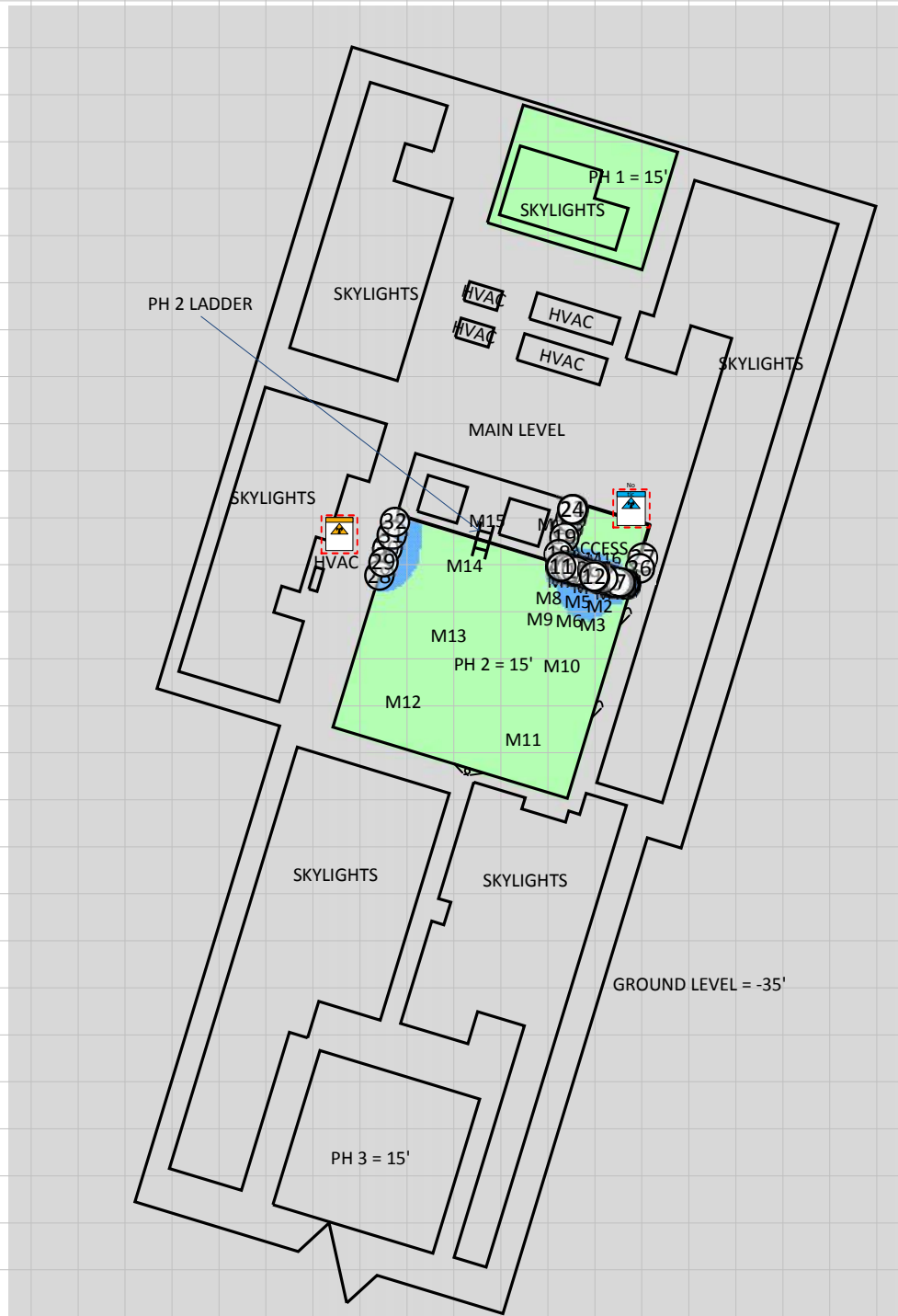
% of FCC Public Exposure Limit
Spatial average 0' - 6'

(Feet)
0 7.7 15.4
www.sitesafe.com
Site Name: EOF Prime Site
8/28/2018 9:42:05 AM

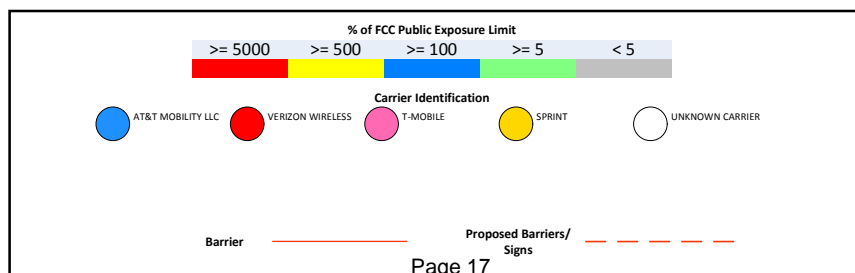


Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: EOF Prime Site All Antennas On Air



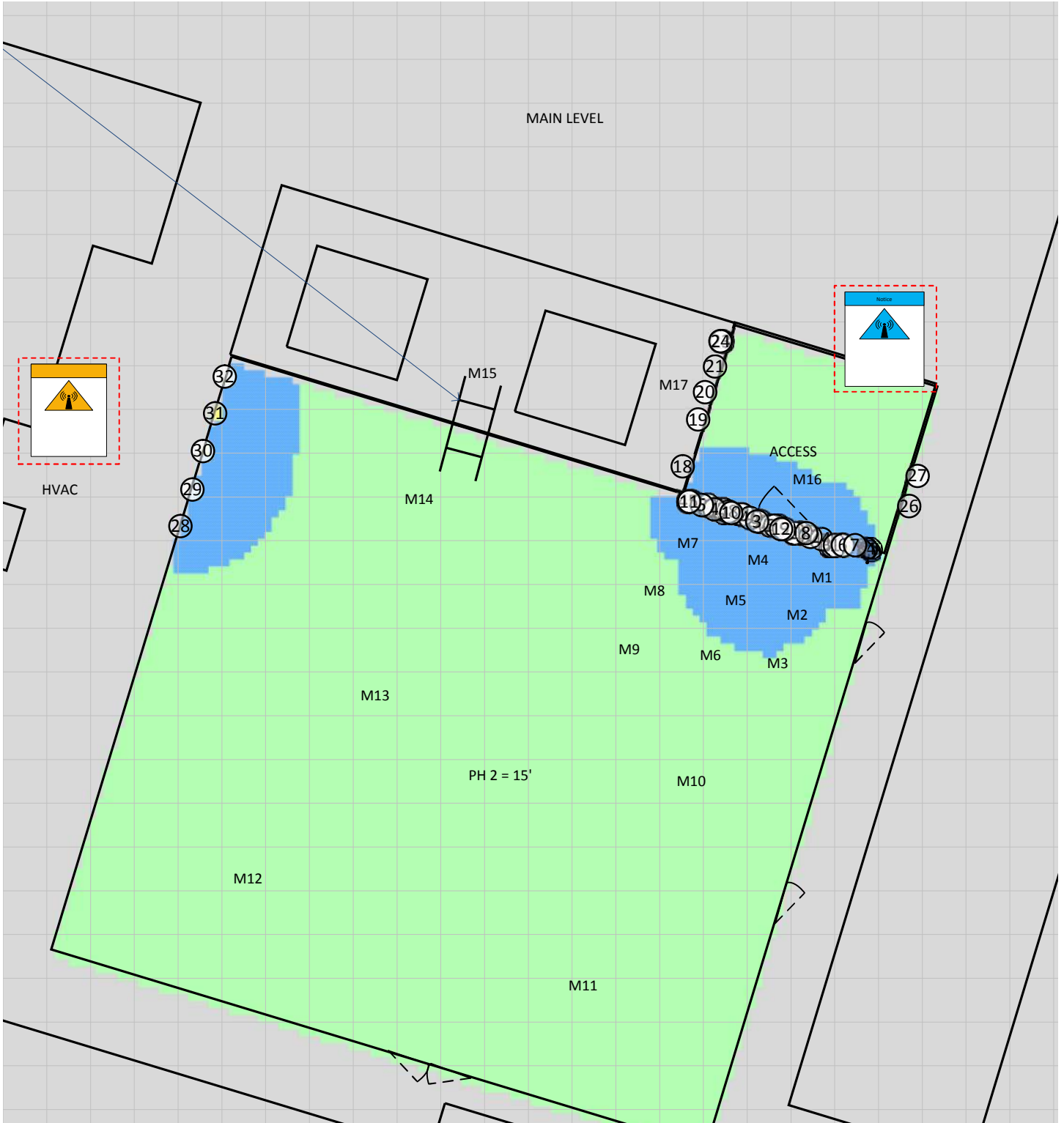
% of FCC Public Exposure Limit
Spatial average 0' - 6'



(Feet)
0 37.4 74.8
www.sitesafe.com
Site Name: EOF Prime Site
8/29/2018 8:46:18 AM

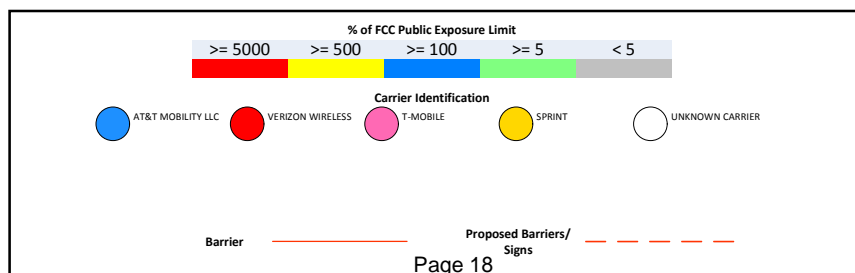
Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: EOF Prime Site All Antennas On Air – Detail View



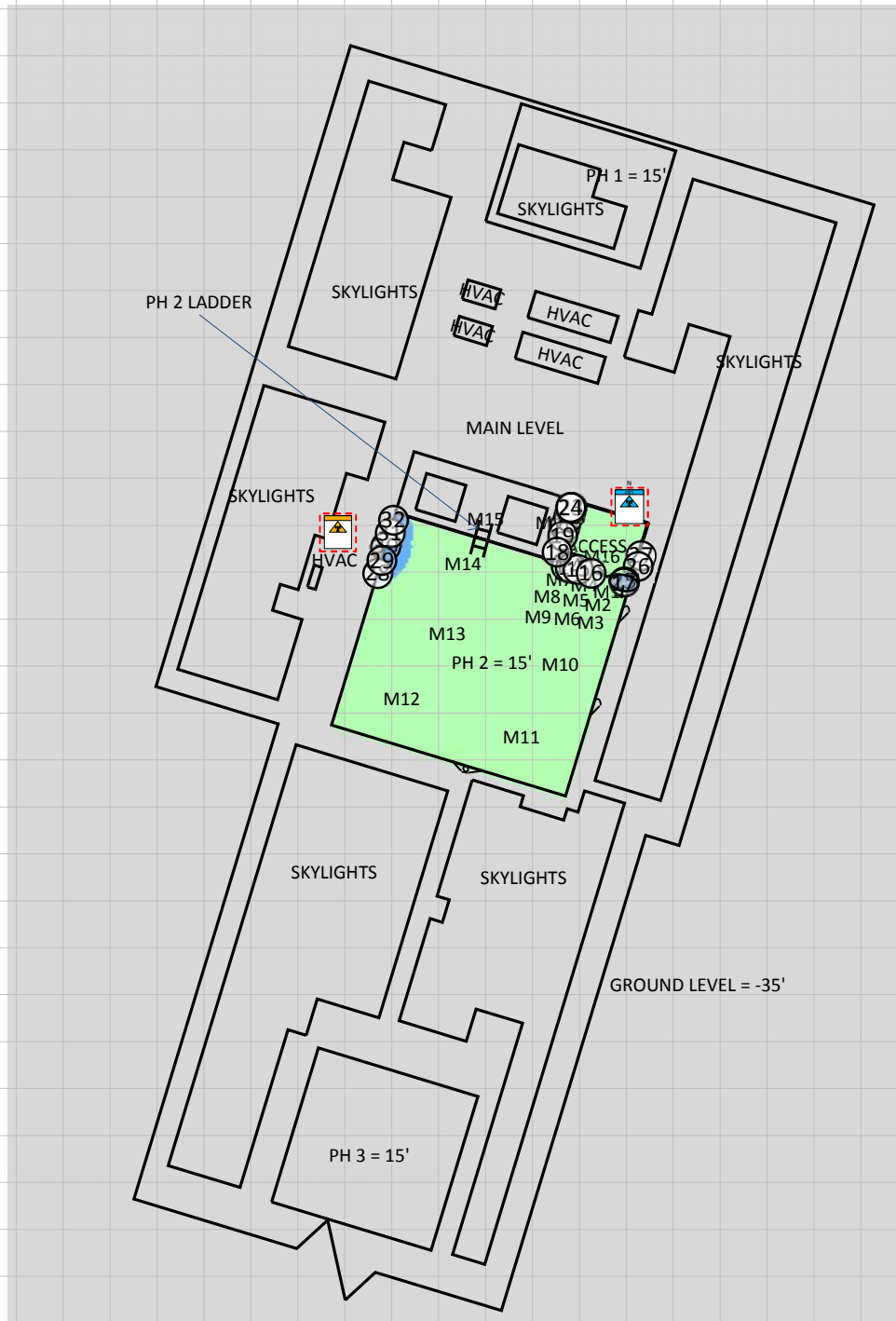
% of FCC Public Exposure Limit
Spatial average 0' - 6'

(Feet)
0 10 20.1
www.sitesafe.com
Site Name: EOF Prime Site
8/29/2018 8:46:58 AM

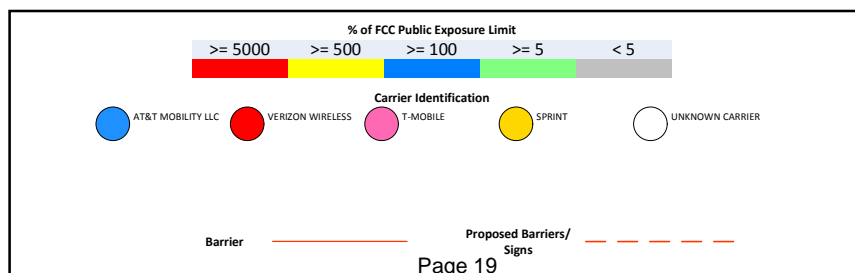


Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: EOF Prime Site Proposed Antennas Only On Air



% of FCC Public Exposure Limit
Spatial average 0' - 6'



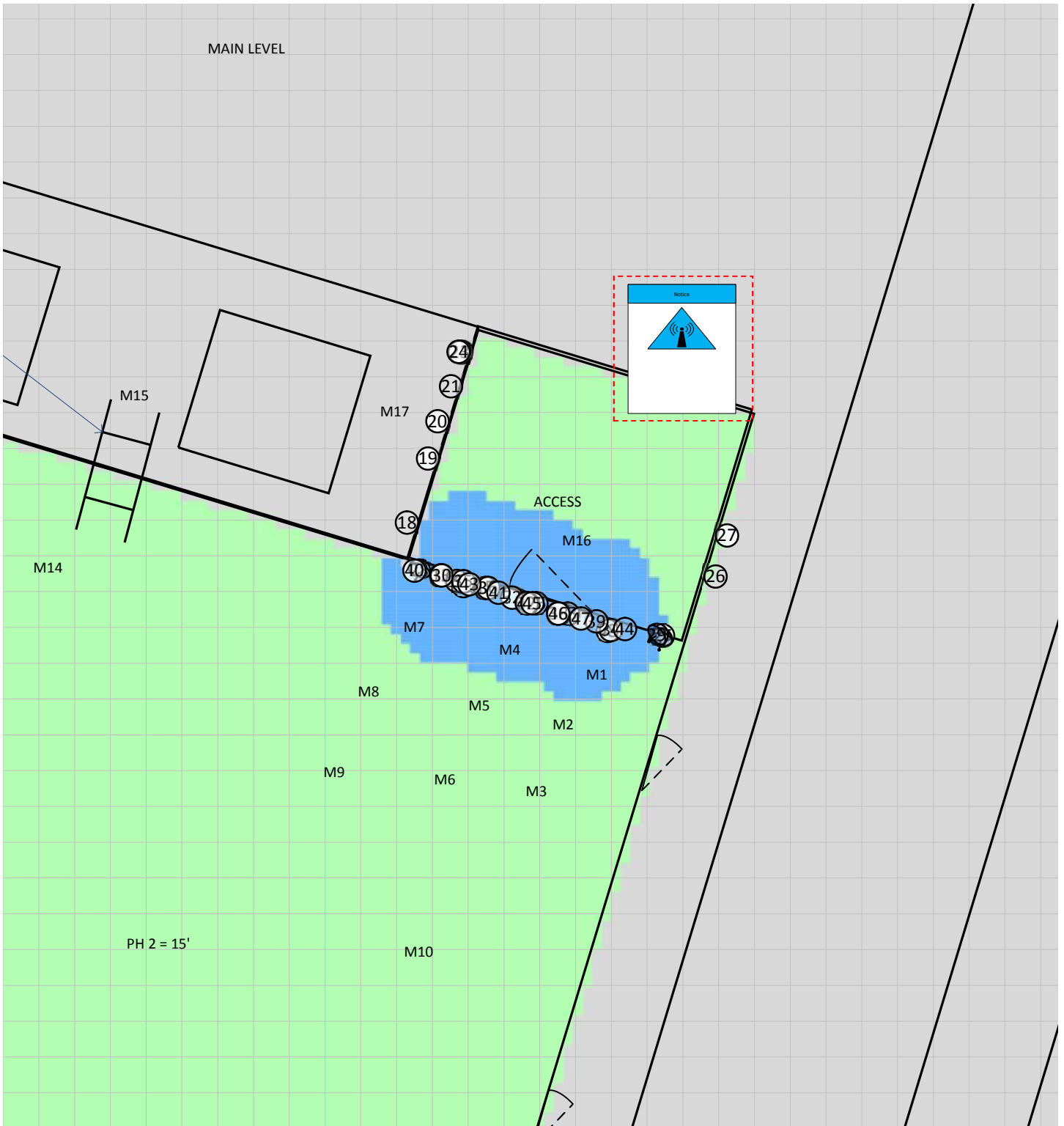
(Feet)

0 38 75.9

www.sitesafe.com
Site Name: EOF Prime Site
8/29/2018 8:52:38 AM

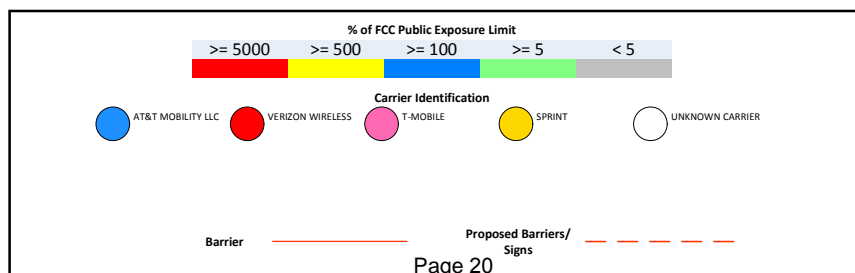
Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: EOF Prime Site Proposed Configuration— Detail View



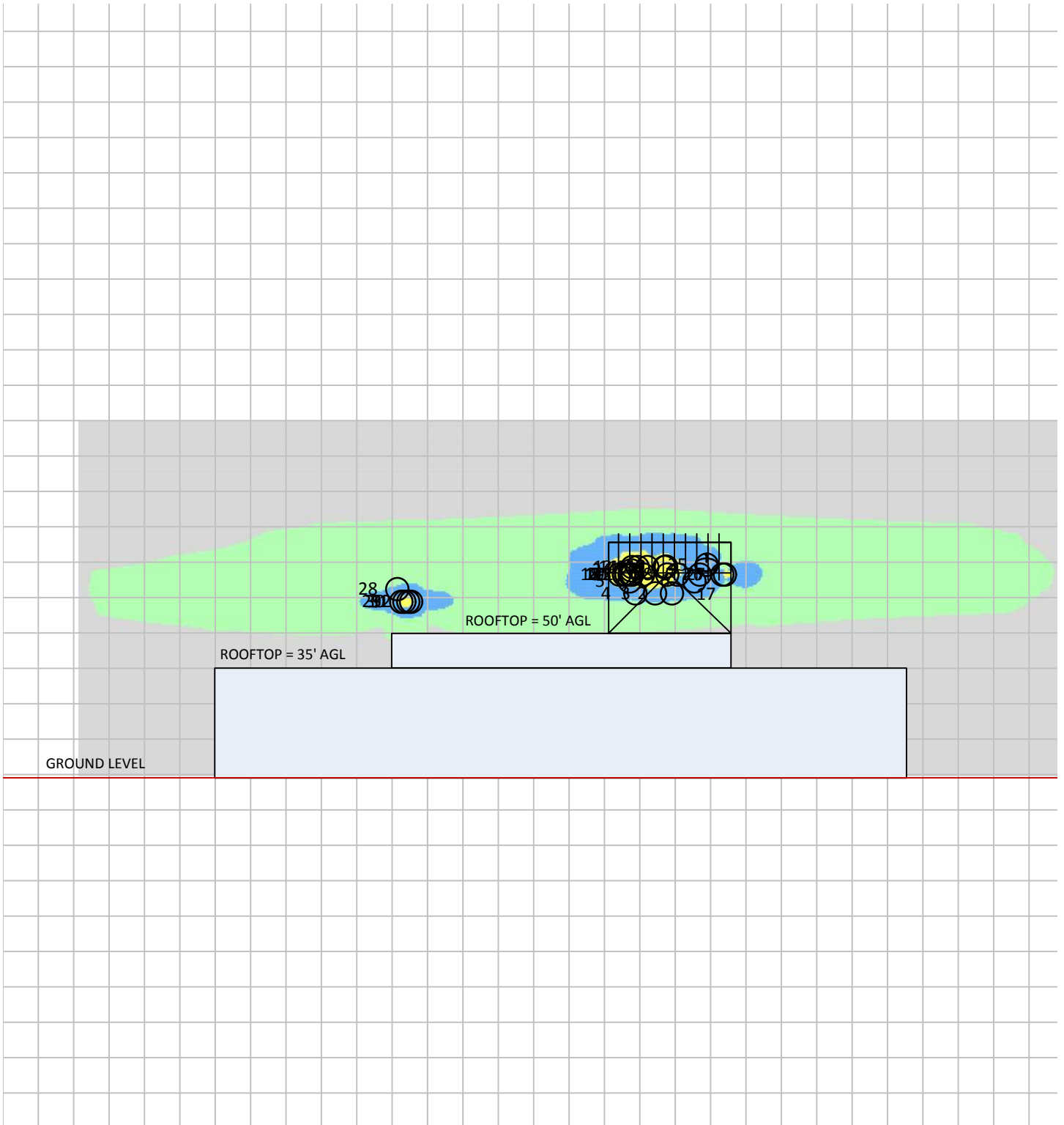
% of FCC Public Exposure Limit
Spatial average 0' - 6'

(Feet)
0 7.8 15.7
www.sitesafe.com
Site Name: EOF Prime Site
8/28/2018 9:48:23 AM

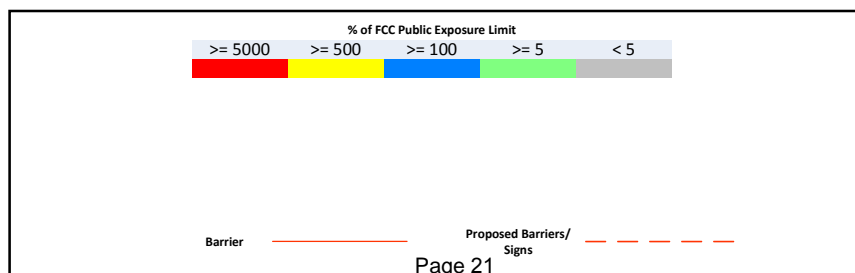


Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

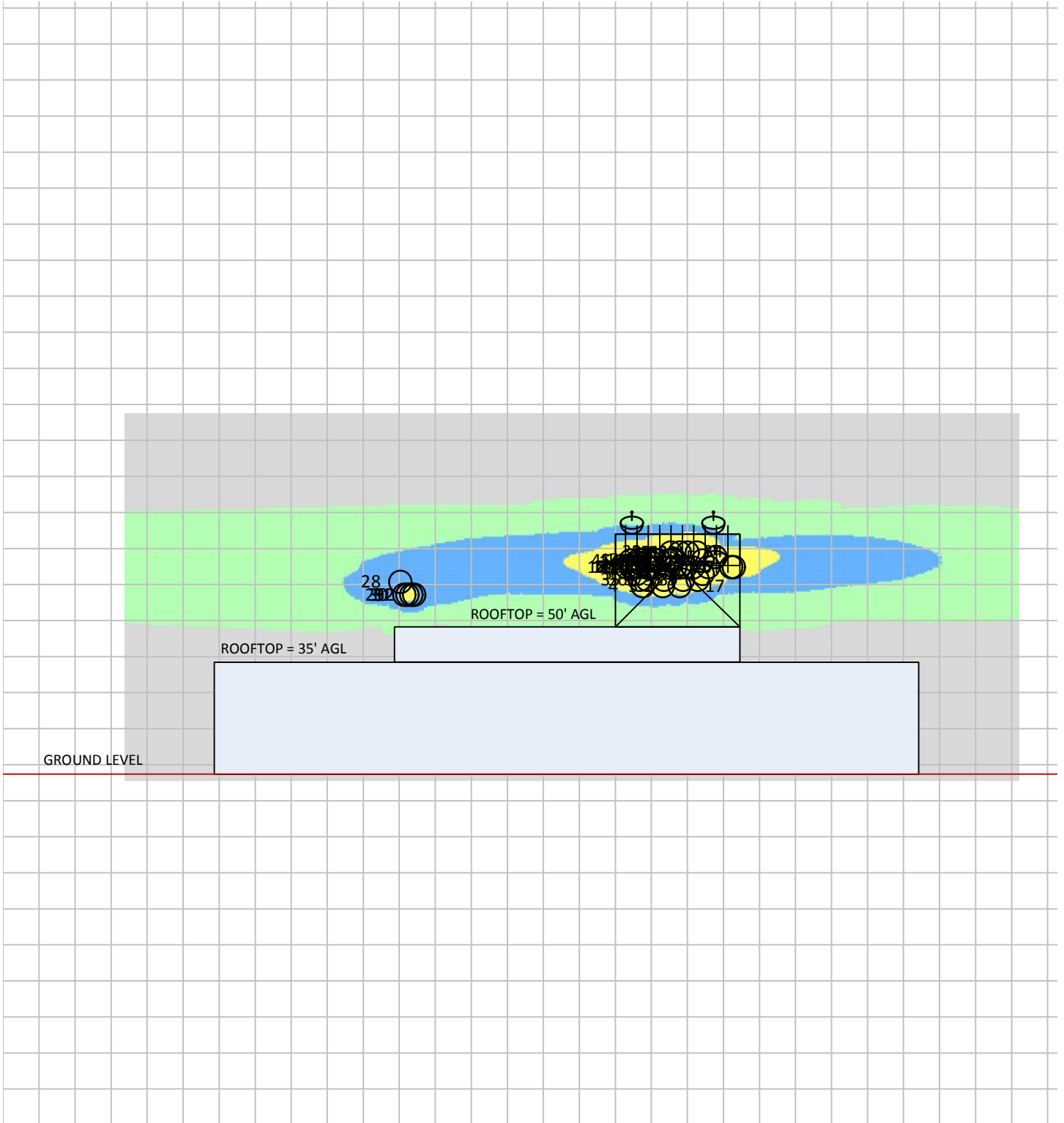
RF Exposure Simulation For: EOF Prime Site Elevation View – Existing Configuration



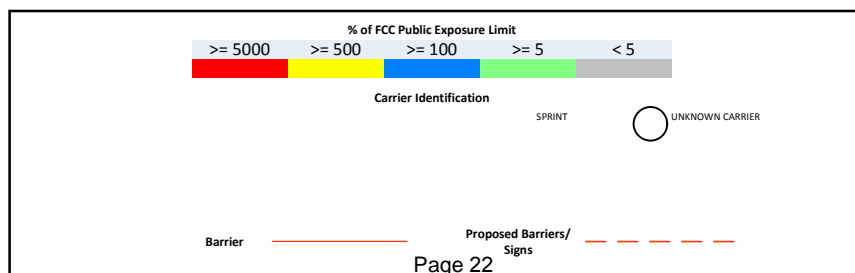
% of FCC Public Exposure Limit



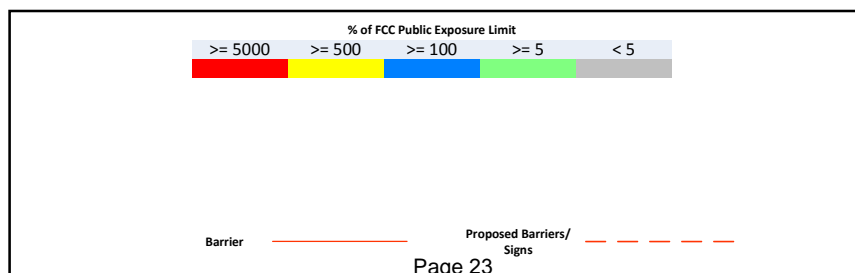
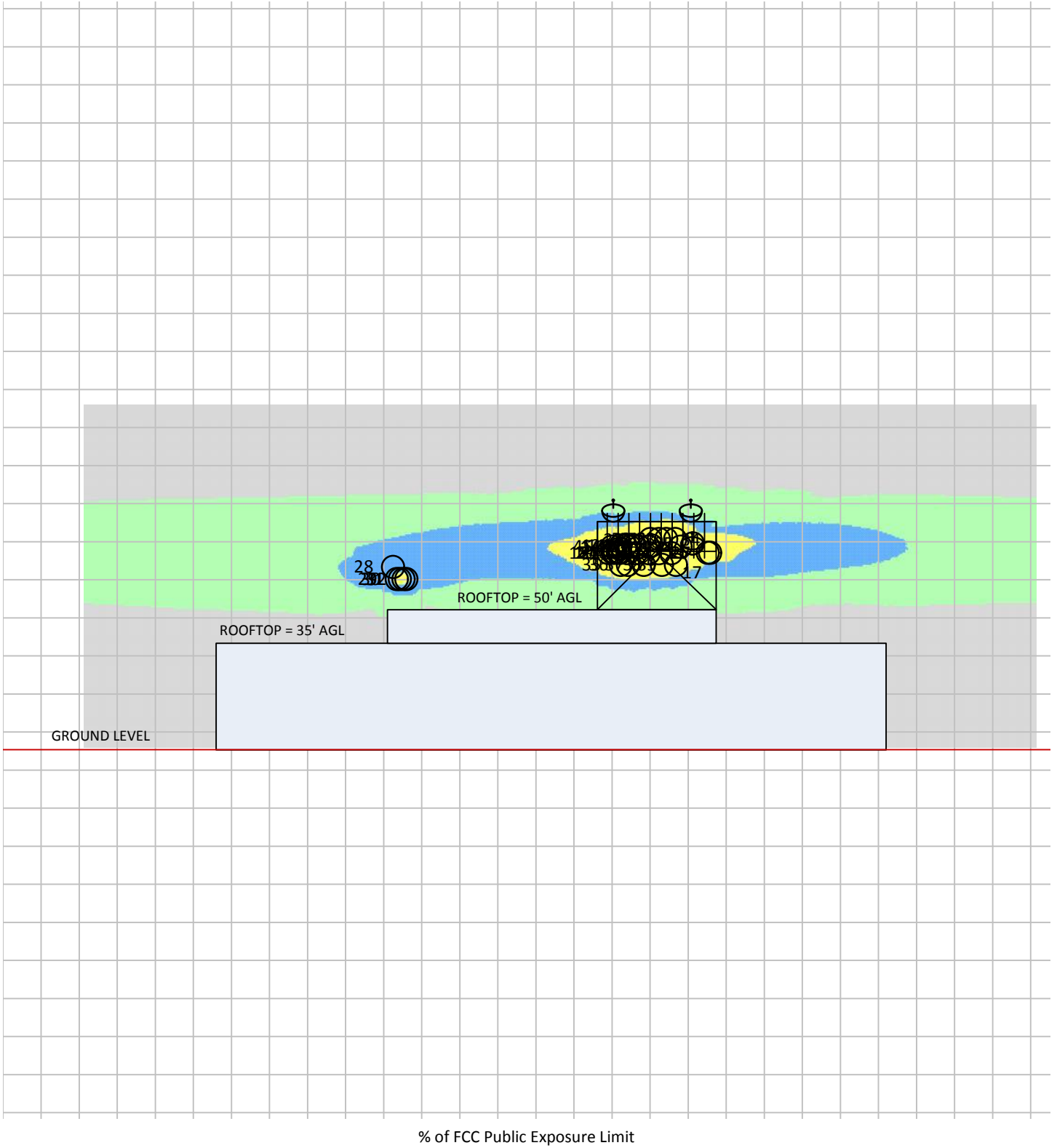
RF Exposure Simulation For: EOF Prime Site Elevation View – All Antennas On Air



% of FCC Public Exposure Limit



RF Exposure Simulation For: EOF Prime Site Elevation View – Final Configuration



3.4 Site Measurements

This section provides a summary of the measurements collected at the site. Actual measurements locations at which these data points were collected are included in the RF emission diagram provided in Section 3.3 of this report. Two types of measurements were collected at each measurement location: maximum (peak) and spatial average. The spatial average measurement consists of a collection of ten (10) measurements within a ten (10) second time interval taken from zero (0) to six (6) feet in height. The purpose of this measurement technique is to identify the average power density over the dimensions of a typical human body.

Table 1 below contains all the measurements collected from accessible areas located at the site at the time of Sitesafe's visit. Whenever possible, measurements are taken in front of the antenna in the transmitting direction. However, because of the antenna configuration at this site, specific emissions could not be discerned from nearby facilities, and no attempt was made to determine power density levels from a specific transmitting antenna.

Highest Measured Occupational Level: <1%

This value is equal to:

Highest General Public Level: <5%.

Table 1: Spatial Average and Maximum Occupational Measurements					
Measurements Points	Spatial Average	Maximum	Measurements Points	Spatial Average	Maximum
M1	<1 %	<1 %	M11	<1 %	<1 %
M2	<1 %	<1 %	M12	<1 %	<1 %
M3	<1 %	<1 %	M13	<1 %	<1 %
M4	<1 %	<1 %	M14	<1 %	<1 %
M5	<1 %	<1 %	M15	<1 %	<1 %
M6	<1 %	<1 %	M16	<1 %	<1 %
M7	<1 %	<1 %	M17	<1 %	<1 %
M8	<1 %	<1 %	M18	<1 %	<1 %
M9	<1 %	<1 %	M19	<1 %	<1 %
M10	<1 %	<1 %	M20	<1 %	<1 %

RF meters and probes have been calibrated and used according to the manufacturer's specifications. Measurements provide a view of the MPE percentage levels at the site at the time of Sitesafe's site visit and are used to validate modeling results. Theoretical modeling is used for determining compliance and the percentage of MPE contributions.

An RF Emission diagram has been included in section 3.3 of this document. All measurement locations are identified in this diagram. The locations of measurements in the RF Emission diagram can be cross referenced with Table 1 (above) to determine the actual spatial average and maximum measurement value per location.

3.5 Antenna Inventory

The Antenna Inventory shows all transmitting antennas at the site. This inventory was verified on site, and was utilized by Sitesafe to perform theoretical modeling of RF emissions. The inventory coincides with the site diagrams in this report, identifying each antenna's location at 1 - EOF Prime Site. The antenna information collected includes the following information:

- Licensee or wireless operator name
- Frequency or frequency band
- Transmitter power – Effective Radiated Power ("ERP"), or Equivalent Isotropic Radiated Power ("EIRP") in Watts
- Antenna manufacturer make, model, and gain

For other operators at this site, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.



The following antenna inventory and representative photographs were obtained or verified during the site visit and were utilized to create the site model diagrams:

Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
1	E1	Generic	Yagi	1.2	450	190	9.97	60	100	ERP	Watt	1	100	23.7	0	0
2	E2	Generic	Yagi	1.2	450	190	9.97	60	100	ERP	Watt	1	100	23.7	0	0
3	E3	Generic	Yagi	1.2	450	190	9.97	60	100	ERP	Watt	1	100	23.7	0	0
4	E4	Generic	Yagi	1.2	450	190	9.97	60	100	ERP	Watt	1	100	23.7	0	0
5	E5	Generic	Yagi	1.2	450	190	9.97	60	100	ERP	Watt	1	100	27.5	0	0
6	E6	Generic	Yagi	1.2	450	190	9.97	60	100	ERP	Watt	1	100	27.5	0	0
7	E7	Generic	Yagi	1.2	450	190	9.97	60	100	ERP	Watt	1	100	29.7	0	0
8	E8	Generic	Yagi	1.2	450	190	9.97	60	100	ERP	Watt	1	100	29.7	0	0
9	E9	Generic	Yagi	1.2	450	190	9.97	60	100	ERP	Watt	1	100	29.7	0	0
10	E10	Generic	Yagi	1.2	450	190	9.97	60	100	ERP	Watt	1	100	29.7	0	0
11	E11	Generic	Yagi	1.2	450	190	9.97	60	100	ERP	Watt	1	100	29.7	0	0
12	E12	Generic	Yagi	1.2	450	190	9.97	60	100	ERP	Watt	1	100	32.2	0	0
13	E13	Generic	Omni	1.5	850	0	0.01	360	1000	ERP	Watt	1	1000	32	0	0
14	E14	Generic	Omni	2	2400	0	9.51	360	4	ERP	Watt	1	4	32	0	0
15	E16	Generic	Omni	20	450	0	10.81	360	100	ERP	Watt	1	100	32	0	0
16	E17	Generic	Omni	1.5	850	0	0.01	360	1000	ERP	Watt	1	1000	32	0	0
17	E18	Generic	Aperture	0	11000	190	37.66	0	0.01	TPO	Watt	1	58.3	32.8	0	0
18	UNKNOWN OPERATOR	Generic	Omni	3	450	0	0	360	100	ERP	Watt	1	100	29.7	0	0
19	UNKNOWN OPERATOR	Generic	Yagi	1.2	450	290	9.97	60	100	ERP	Watt	1	100	29.7	0	0
20	UNKNOWN OPERATOR	Generic	Yagi	1.2	450	290	9.97	60	100	ERP	Watt	1	100	29.7	0	0
21	UNKNOWN OPERATOR	Generic	Yagi	1.2	450	290	9.97	60	100	ERP	Watt	1	100	29.7	0	0
22	UNKNOWN OPERATOR	Generic	Yagi	1.2	450	290	9.97	60	100	ERP	Watt	1	100	29.7	0	0
23	UNKNOWN OPERATOR	Generic	Yagi	1.2	450	290	9.97	60	100	ERP	Watt	1	100	29.7	0	0
24	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	100	ERP	Watt	1	100	31	0	0



Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
25	UNKNOWN OPERATOR	Generic	Omni	20	450	0	10.81	360	100	ERP	Watt	1	100	32.8	0	0
26	UNKNOWN OPERATOR	Generic	Yagi	1.2	450	110	9.97	60	100	ERP	Watt	1	100	29.7	0	0
27	UNKNOWN OPERATOR	Generic	Yagi	1.2	450	110	9.97	60	100	ERP	Watt	1	100	29.7	0	0
28	UNKNOWN OPERATOR	Generic	Omni	12.5	150	0	2.87	360	100	ERP	Watt	1	100	25	0	0
29	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	21	0	0
30	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	21	0	0
31	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	21	0	0
32	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	21	0	0
33	P1	Generic	Aperture	6	6000	201.7	36.36	2	0.01	TPO	Watt	1	43.3	43.5	0	0
34	P2	Generic	Aperture	4	11000	230.7	37.66	2	0.01	TPO	Watt	1	58.3	43.5	0	0
35	P3	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	25.7	0	0
36	P4	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	25.7	0	0
37	P5	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	25.7	0	0
38	P6	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	25.7	0	0
39	P7	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	25.7	0	0
40	P8	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	29.5	0	0
41	P9	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	29.5	0	0
42	P10	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	29.5	0	0
43	P11	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	29.5	0	0
44	P12	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	29.5	0	0
45	P13	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	31.7	0	0
46	P14	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	31.7	0	0
47	P15	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	31.7	0	0
48	P16	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	31.7	0	0
49	P17	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	31.7	0	0
50	P18	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	34.2	0	0



Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
51	P19	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	34.2	0	0
52	P20	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	34.2	0	0
53	P21	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	TPO	Watt	1	4036.5	34.2	0	0

NOTE: Z indicates relative position of the antenna to the origin location on the site, displayed in the model results diagram. The Z reference indicates antenna height above the main site level unless otherwise indicated. ERP values provided by the client and used in the modeling may be greater than are currently deployed. For other operators at this site the use of "Generic" as an antenna model or "Unknown" for a wireless operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.

3.6 Site Pictures



Figure 1: Antenna Structure Facing East



Figure 2: Antenna Structure Facing North



Figure 3: Antennas 28 through 32

4 Civic Center



Marin Emergency Radio Authority Site Name – Civic Center Site ID: 2 Site Compliance Report

**3501 Civic Center Dr.
San Rafael, CA 94903**

Site visit date: August 21, 2018
Site visit time: 8:12 PM
Site survey by: Jeff Desira

Latitude: N37-59-56.60
Longitude: W122-31-52.70
Structure Type: Rooftop

Report generated date: March 28, 2019
Report by: Sam Cosgrove
Customer Contact: David Mortimer

**This site will be compliant upon
completion of the remediation identified
in Section 4.2.2.**



4.1 Site Summary

The County of Marin on behalf of Marin Emergency Radio Authority has contracted with Sitesafe, LLC. (Sitesafe), an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine the RF conditions at the communications site, 2 - Civic Center, located at 3501 Civic Center Dr., San Rafael, CA, in relation to Federal Communications Commission (FCC) Rules and Regulations for RF emissions.

Sitesafe's field personnel visited 2 - Civic Center on August 21, 2018. This section contains a detailed summary of the RF environment at the site including:

- Site compliance determination;
- Photographs of the site;
- Diagram of the site;
- Inventory of the make / model of all transmitting antennas found on the site (where possible);
- Record of any Maximum Permissible Exposure ("MPE") measurements taken on the site, as applicable; and
- Theoretical MPE based on modeling.

RF emissions exceed MPE limits near the areas that the omni directional antennas area installed. The RF emissions exceed the limits in the center of the roof, the west side, and the east side due to the height of the antennas from the rooftop, the powers used, and the amount of antennas existing and proposed. Signage should be posted in areas where it will be clearly visible to anyone approaching the antenna mount structures.



4.2 Site Compliance

4.2.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, and a thorough review of site access procedures, RF hazard signage and visible antenna locations, Sitesafe has determined that:

The site is compliant with the FCC rules and regulations, as described in OET Bulletin 65, and will remain compliant upon implementation of the proposed changes. The site has compliance issues that are not the result of, and therefore not the responsibility of, Marin Emergency Radio Authority.

The compliance determination is based on General Public MPE levels due to theoretical modeling and/or physical measurements, RF signage placement, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the Marin Emergency Radio Authority's proposed deployment plan could result in the site being rendered non-compliant. Measurements have also been performed to validate the assumptions used in our theoretical modeling of this site.

Modeling is used for determining compliance and the percentage of MPE contribution. Measurements provide a view of MPE percentage levels at the site at the time of Sitesafe's visit and are used to validate modeling results.

4.2.2 Actions for Site Compliance

Based on common industry practice and our understanding of FCC and OSHA requirements, this section provides a statement of recommendations for site compliance. RF alert signage recommendations have been proposed based on existing measurements and theoretical analysis of MPE levels. Sitesafe has documented the locations of any RF signs and barriers that are required for compliance. Barriers can consist of locked doors, fencing, railing, rope, chain, paint striping or tape, combined with RF alert signage.

This site will be compliant with the FCC rules and regulations.

Remediation needed on site:

Install a Notice sign at antennas 31-35.

Install a Caution sign at antennas 18-30 and 8-12.

NOTE: The area that exceeds MPE limits near antennas 18-30 is a sloped roof. The Area that exceeds Occupational limits near antennas 8-12 is less than 2'x2'. Barriers are not required in these areas.

4.3 RF Emissions Diagram

The RF diagram(s) below display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix B.

The key at the bottom of each diagram indicates if percentages displayed are referenced to FCC General Population Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Gray represents areas predicted to be at 5% of the MPE limits, or below.
- Green represents areas predicted to be between 5% and 100% of the MPE limits.
- Blue represents areas predicted to be between 100% and 500% of the MPE limits.
- Yellow represents areas predicted to be between 500% and 5000% of the MPE limits.
- Red areas indicated predicted levels greater than 5000% of the MPE limits.

The theoretical analysis identified the maximum predicted MPE levels on the rooftop to be:

Maximum Cumulative Theoretical General Public MPE level (Existing Antennas) : 2,677.3%
Maximum Cumulative Theoretical General Public MPE level (All Antennas): 2,677.3%
Maximum Cumulative Theoretical General Public MPE level (Proposed Antennas): 2,677.3%

General Population diagrams are specified when an area is accessible to the public; i.e. personnel that do not meet Occupational or RF Safety trained criteria, could gain access.

If trained occupational personnel require access to areas that are delineated as **Blue** or above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the operators to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

The key at the bottom also indicates the level or height of the modeling with respect to the main level. The origin is typically referenced to the main rooftop level, or ground level for a structure without access to the antenna level. For example:

Average from 0 feet above to 6 feet above origin

and

Average from 20 feet above to 26 feet above origin

The first indicates modeling at the main rooftop (or ground) level averaged over 6 feet. The second indicates modeling at a higher level (possibly a penthouse level) of 20 feet averaged over 6 feet.

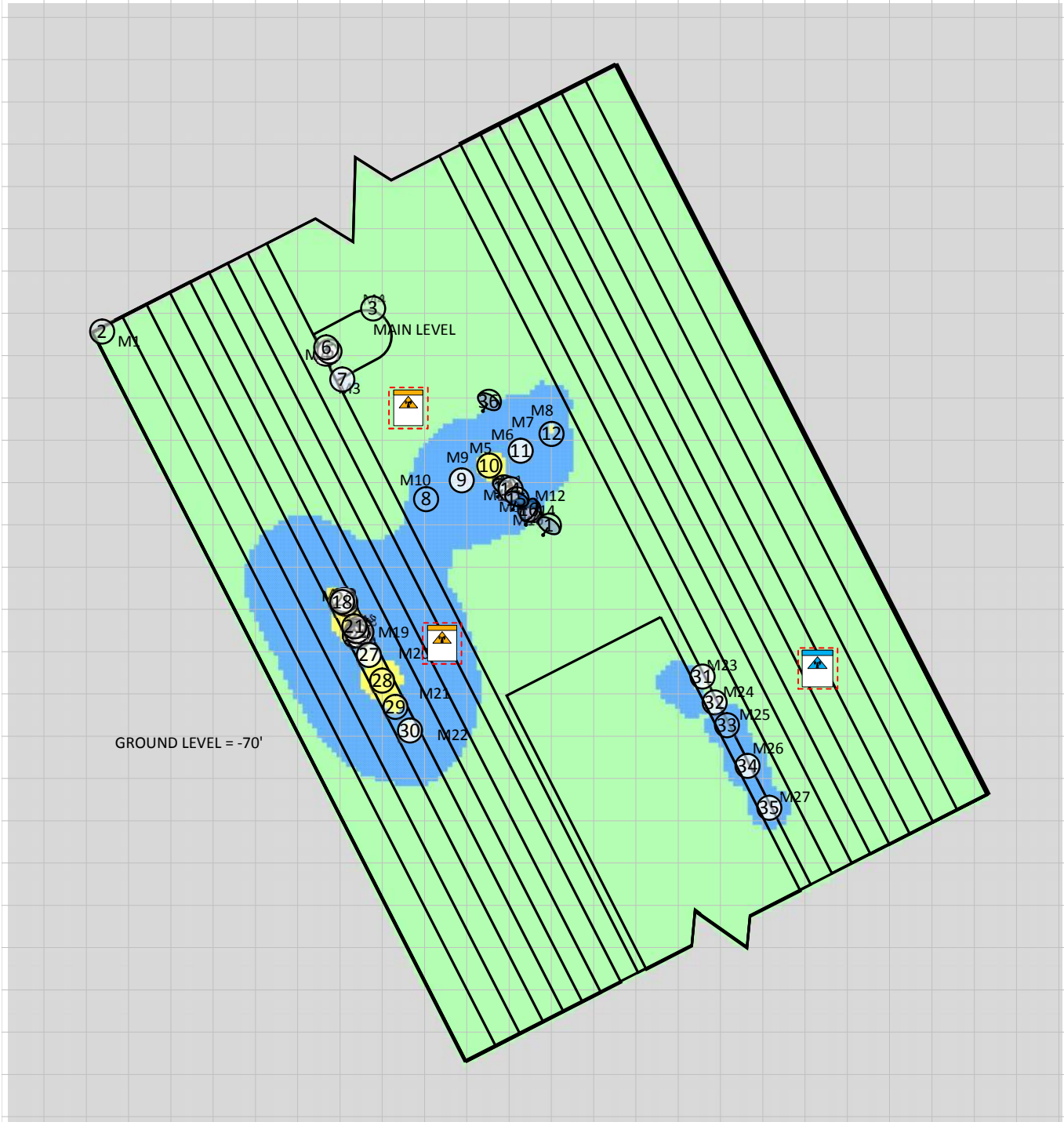


Abbreviations used in the RF Emissions Diagrams

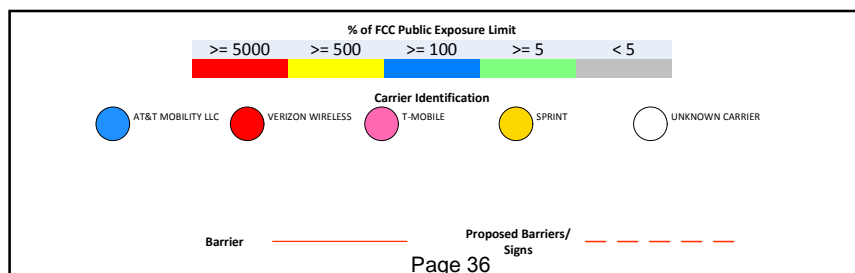
PH=##'	Penthouse at ## feet above main roof
M##	Measurement ## taken during a site visit

As discussed in Section 4.4, site measurement locations for spatial average measurements collected at the time of Sitesafe's visit have been added to the RF emissions diagram. While the theoretical modeling represents worst case MPE levels based on the assumption(s) detailed above, the measurement data is a snapshot of MPE levels at the time of our visit, and dependent on transmitter duty cycle, system implementation and emissions from other RF sources at nearby antenna sites.

RF Exposure Simulation For: Civic Center Existing Antennas Only On Air



% of FCC Public Exposure Limit
Spatial average 0' - 6'



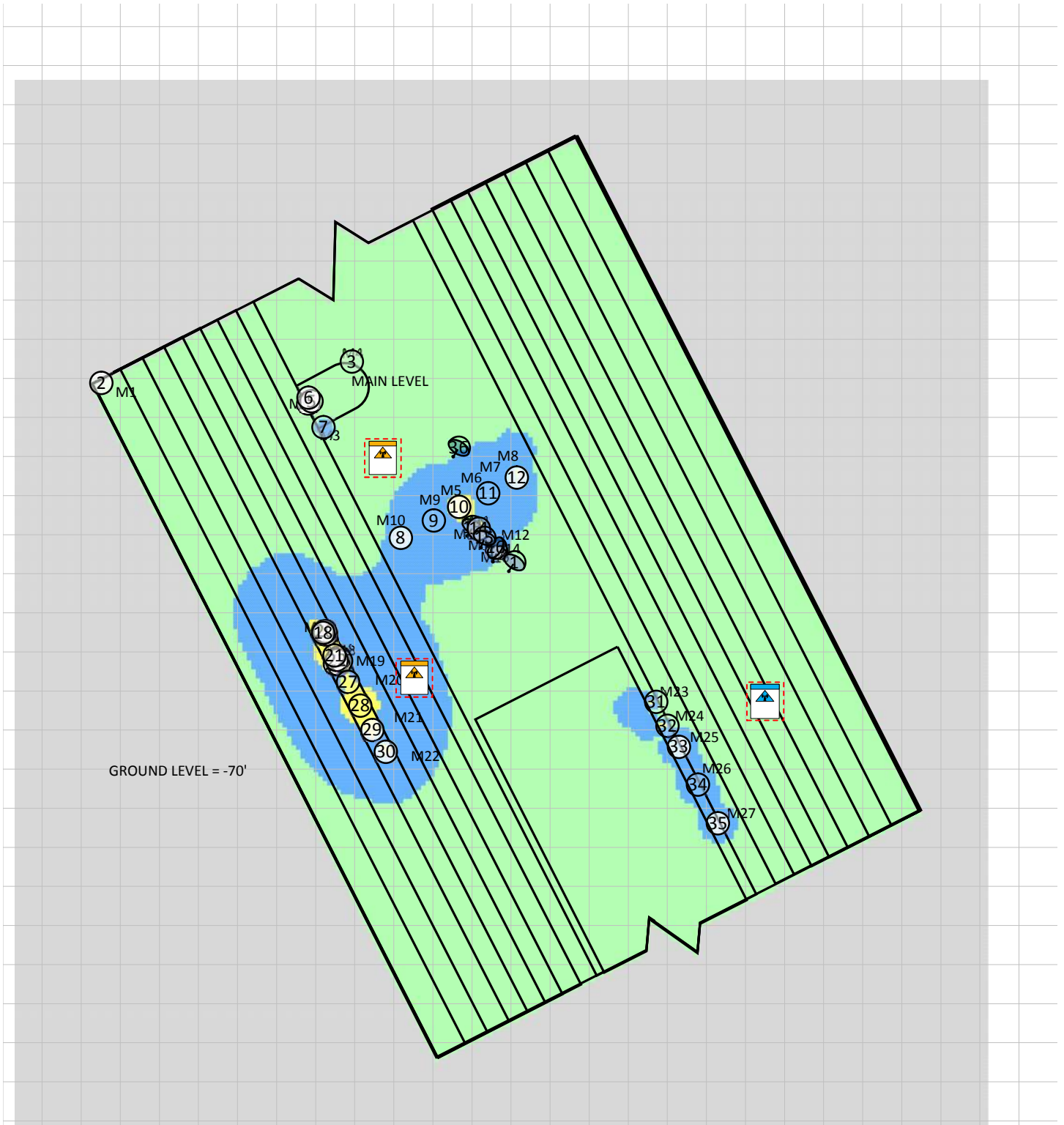
(Feet)

0 16.6 33.1

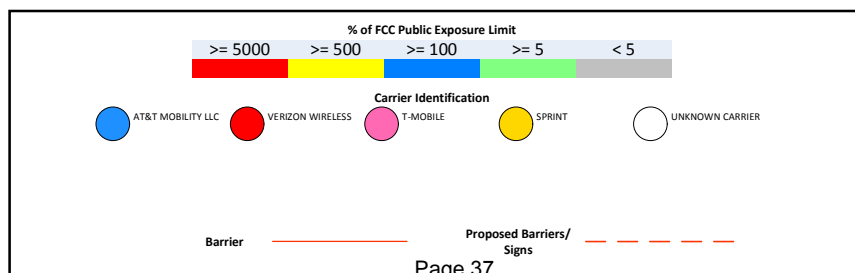
www.sitesafe.com
Site Name: Civic Center
8/28/2018 8:59:02 AM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Civic Center All Antennas On Air



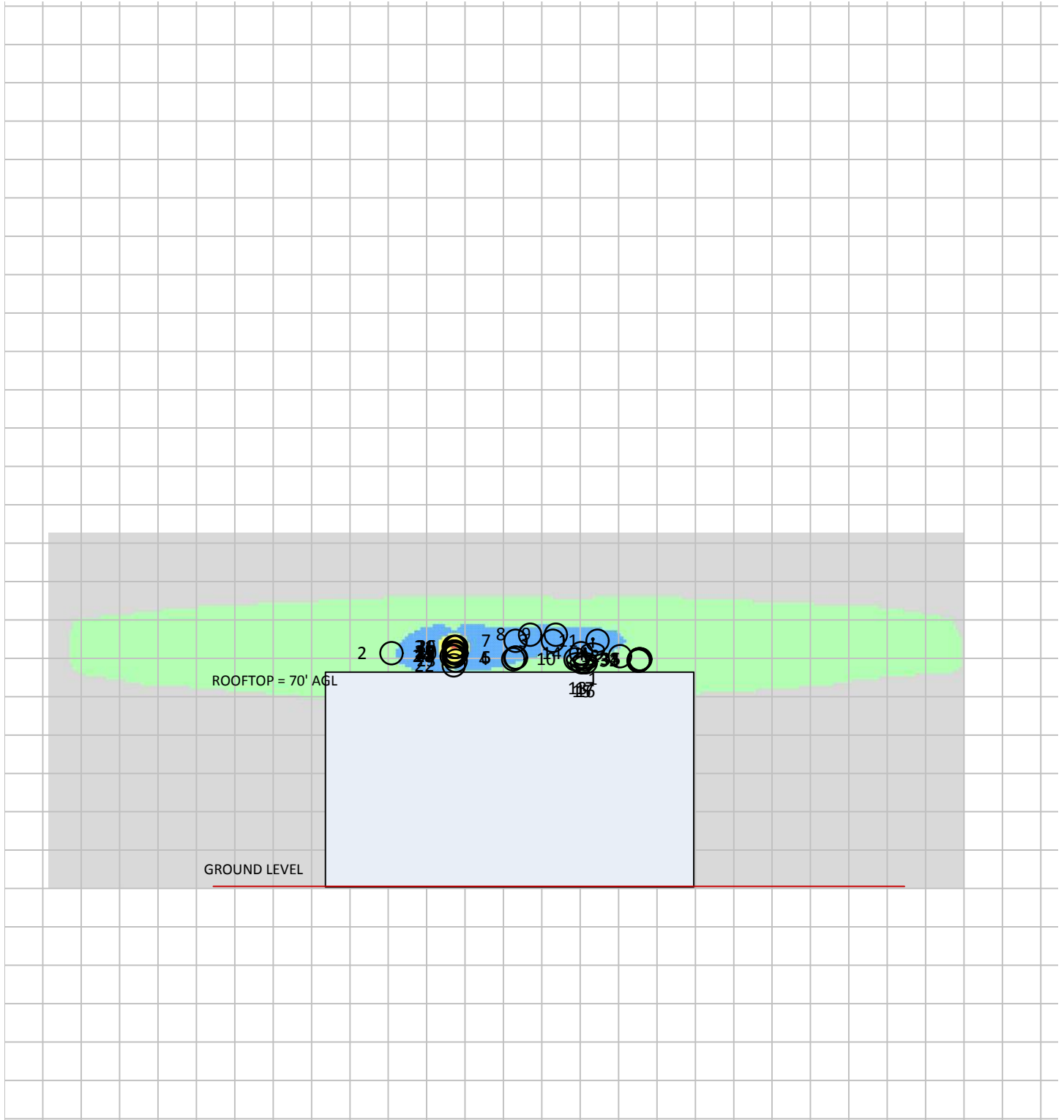
% of FCC Public Exposure Limit
Spatial average 0' - 6'



(Feet)
0 16.7 33.5
www.sitesafe.com
Site Name: Civic Center
8/28/2018 9:01:28 AM

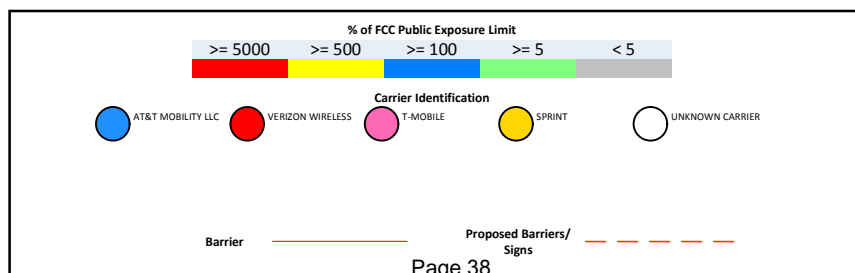
Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Civic Center Elevation View – Existing Configuration



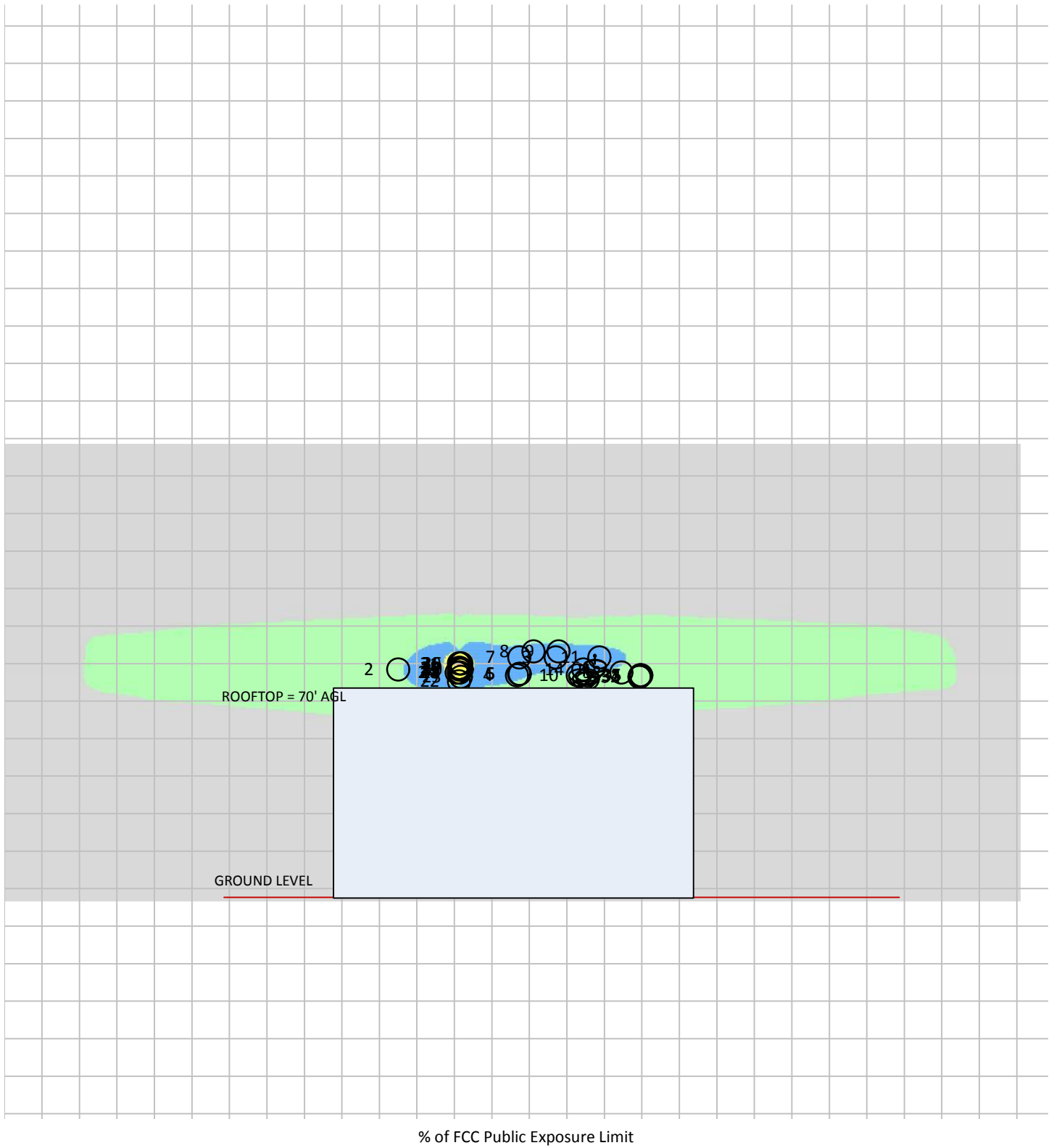
% of FCC Public Exposure Limit
Spatial average 0' - 6'

(Feet)
0 22.9 45.8
www.sitesafe.com
Site Name: Civic Center
11/5/2018 8:51:04 AM

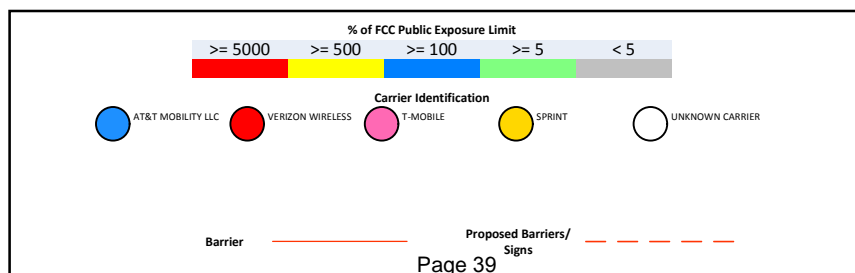


Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Single Level (0)

RF Exposure Simulation For: Civic Center Elevation View – All Antennas On Air



% of FCC Public Exposure Limit



4.4 Site Measurements

This section provides a summary of the measurements collected at the site. Actual measurements locations at which these data points were collected are included in the RF emission diagram provided in Section 4.3 of this report. Two types of measurements were collected at each measurement location: maximum (peak) and spatial average. The spatial average measurement consists of a collection of ten (10) measurements within a ten (10) second time interval taken from zero (0) to six (6) feet in height. The purpose of this measurement technique is to identify the average power density over the dimensions of a typical human body.

Table 1 below contains all the measurements collected from accessible areas located at the site at the time of Sitesafe's visit. Whenever possible, measurements are taken in front of the antenna in the transmitting direction. However, because of the antenna configuration at this site, specific emissions could not be discerned from nearby facilities, and no attempt was made to determine power density levels from a specific transmitting antenna.

Highest Measured Occupational Level: 1%

This value is equal to:

Highest General Public Level: 5%.

Table 1: Spatial Average and Maximum Occupational Measurements					
Measurements Points	Spatial Average	Maximum	Measurements Points	Spatial Average	Maximum
M1	<1 %	<1 %	M19	<1 %	<1 %
M2	<1 %	<1 %	M20	<1 %	<1 %
M3	<1 %	<1 %	M21	<1 %	<1 %
M4	<1 %	<1 %	M22	<1 %	<1 %
M5	<1 %	1 %	M23	<1 %	<1 %
M6	<1 %	<1 %	M24	<1 %	<1 %
M7	<1 %	<1 %	M25	<1 %	<1 %
M8	<1 %	<1 %	M26	<1 %	<1 %
M9	<1 %	<1 %	M27	<1 %	<1 %
M10	<1 %	<1 %	M28	<1 %	<1 %
M11	<1 %	1 %	M29	<1 %	<1 %
M12	<1 %	<1 %	M30	<1 %	<1 %
M13	<1 %	<1 %	M31	<1 %	<1 %
M14	1 %	1 %	M32	<1 %	<1 %
M15	<1 %	<1 %	M33	<1 %	<1 %
M16	<1 %	<1 %	M34	<1 %	<1 %
M17	<1 %	<1 %	M35	<1 %	<1 %
M18	<1 %	<1 %			



RF meters and probes have been calibrated and used according to the manufacturer's specifications. Measurements provide a view of the MPE percentage levels at the site at the time of Sitesafe's site visit and are used to validate modeling results. Theoretical modeling is used for determining compliance and the percentage of MPE contributions.

An RF Emission diagram has been included in section 4.3 of this document. All measurement locations are identified in this diagram. The locations of measurements in the RF Emission diagram can be cross referenced with Table 1 (above) to determine the actual spatial average and maximum measurement value per location.

4.5 Antenna Inventory

The following antenna inventory and representative photographs were obtained or verified during the site visit and were utilized to create the site model diagrams:

Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
1	Marin Emergency Radio Authority	Generic	Aperture	4	11000	212.2	37.66	2	61.4	EIRP	dBmW	1	841.5	7.2	0	0
2	UNKNOWN OPERATOR	Generic	Yagi	0.5	2400	0	13.37	27.5	4	ERP	Watt	1	4	6	0	0
3	UNKNOWN OPERATOR	Generic	Omni	8	154	0	2.61	360	82	ERP	Watt	1	82	10	0	0
4	UNKNOWN OPERATOR	Generic	Yagi	0.5	2400	0	13.37	27.5	4	ERP	Watt	1	4	4	0	0
5	UNKNOWN OPERATOR	Generic	Aperture	3	5800	0	29.06	2	20	ERP	Watt	1	20	4.5	0	0
6	UNKNOWN OPERATOR	Generic	Panel	3	450	0	15.51	32	4	ERP	Watt	1	4	4.5	0	0
7	CALIFORNIA, STATE OF	Generic	Omni	8	159	0	2.61	360	100	ERP	Watt	1	100	10	0	0
8	CALIFORNIA, STATE OF	Generic	Omni	12.5	159	0	2.87	360	100	ERP	Watt	1	100	12	0	0
9	CALIFORNIA, STATE OF	Generic	Omni	8	153	0	2.61	360	94	ERP	Watt	1	94	12	0	0
10	UNKNOWN OPERATOR	Generic	Omni	3	155	0	0	360	47	ERP	Watt	1	47	4	0	0
11	CALIFORNIA, STATE OF	Generic	Omni	8	153	0	2.61	360	330	ERP	Watt	1	330	10	0	0
12	UNKNOWN OPERATOR	Generic	Yagi	1.2	450	0	9.97	60	100	ERP	Watt	1	100	5	0	0
13	MARIN, COUNTY OF	Generic	Aperture	4	11545	212	37.66	2	58.1	ERP	Watt	1	58.1	4	0	0
14	MARIN, COUNTY OF	Generic	Omni	3	458	0	0	360	47	ERP	Watt	1	47	6	0	0
15	MARIN, COUNTY OF	Generic	Aperture	4	11305	200	37.66	2	58.1	ERP	Watt	1	58.1	3	0	0
16	MARIN, COUNTY OF	Generic	Aperture	4	11215	300	37.66	2	56.6	ERP	Watt	1	56.6	3	0	0
17	UNKNOWN OPERATOR	Generic	Aperture	3	5800	200	29.06	2	20	ERP	Watt	1	20	4	0	0
18	UNKNOWN OPERATOR	Generic	Yagi	1.2	450	310	9.97	60	100	ERP	Watt	1	100	5	0	0
19	UNKNOWN OPERATOR	Generic	Yagi	1.2	450	310	9.97	60	100	ERP	Watt	1	100	6.5	0	0
20	UNKNOWN OPERATOR	Generic	Yagi	1.2	450	300	9.97	60	100	ERP	Watt	1	100	8	0	0
21	MARIN, COUNTY OF	Generic	Omni	3	159	0	0	360	120	ERP	Watt	1	120	8	0	0
22	UNKNOWN OPERATOR	Generic	Yagi	1.2	450	270	9.97	60	100	ERP	Watt	1	100	2	0	0
23	UNKNOWN OPERATOR	Generic	Yagi	1.2	450	310	9.97	60	100	ERP	Watt	1	100	3.5	0	0
24	UNKNOWN OPERATOR	Generic	Yagi	1.2	450	310	9.97	60	100	ERP	Watt	1	100	5	0	0



Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
25	UNKNOWN OPERATOR	Generic	Yagi	1.2	450	310	9.97	60	100	ERP	Watt	1	100	6.5	0	0
26	UNKNOWN OPERATOR	Generic	Yagi	1.2	450	310	9.97	60	100	ERP	Watt	1	100	8	0	0
27	MARIN, COUNTY OF	Generic	Omni	8	155	0	2.61	360	110	ERP	Watt	1	110	6	0	0
28	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	100	ERP	Watt	1	100	5	0	0
29	MARIN, COUNTY OF	Generic	Omni	8	155	0	2.61	360	110	ERP	Watt	1	110	6	0	0
30	MARIN, COUNTY OF	Generic	Omni	8	155	0	2.61	360	110	ERP	Watt	1	110	6	0	0
31	UNKNOWN OPERATOR	Generic	Yagi	1.2	450	270	9.97	60	100	ERP	Watt	1	100	3.5	0	0
32	UNKNOWN OPERATOR	Generic	Yagi	1.2	450	270	9.97	60	100	ERP	Watt	1	100	3.5	0	0
33	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	4	0	0
34	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	4	0	0
35	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	4	0	0
36	P1	Generic	Aperture	4	11000	212.2	37.66	2	61.4	EIRP	dBmW	1	841.5	7	0	0

NOTE: Z indicates relative position of the antenna to the origin location on the site, displayed in the model results diagram. The Z reference indicates antenna height above the main site level unless otherwise indicated. ERP values provided by the client and used in the modeling may be greater than are currently deployed. For other operators at this site the use of "Generic" as an antenna model or "Unknown" for a wireless operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.

4.6 Site Pictures



Figure 4: Antenna 2



Figure 5: Antennas 3 through 7



Figure 6: Antennas 8 through 12



Figure 7: Antennas 1 and 13 through 17

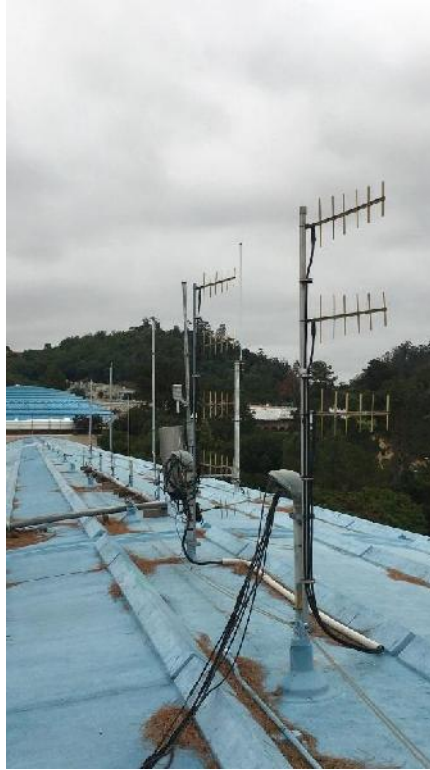


Figure 8: Antennas 18 through 30



Figure 9: Antennas 31 through 35

5 Big Rock



Marin Emergency Radio Authority

Site Name – Big Rock

Site ID: 3

Site Compliance Report

325 H Ranch Rd.
San Rafael, CA 94947

Site visit date: August 22, 2018
Site visit time: 2:00 PM
Site survey by: Jeff Desira

Latitude: N38-3-33.10
Longitude: W122-36-15.30
Structure Type: Self-Support

Report generated date: March 28, 2019
Report by: Sam Cosgrove
Customer Contact: David Mortimer

This site is compliant and will remain complaint upon implementation of the proposed changes.



5.1 Site Summary

The County of Marin on behalf of Marin Emergency Radio Authority has contracted with Sitesafe, LLC. (Sitesafe), an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine the RF conditions at communications site, Big Rock, located at 325 H Ranch Rd., San Rafael, CA, in relation to Federal Communications Commission (FCC) Rules and Regulations for RF emissions.

Sitesafe's field personnel visited 3 - Big Rock on August 22, 2018. This section contains a detailed summary of the RF environment at the site including:

- Site compliance determination;
- Photographs of the site;
- Diagram of the site;
- Inventory of the make / model of all transmitting antennas found on the site (where possible);
- Record of any Maximum Permissible Exposure ("MPE") measurements taken on the site, as applicable; and
- Theoretical MPE based on modeling.

RF emissions exceed MPE limits on the inaccessible rooftops on this site. Since these areas are not accessible to the general public, signage is not required. RF emissions levels on the ground level are less than 100% and do not pose a danger to workers in these areas.



5.2 Site Compliance

5.2.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, and a thorough review of site access procedures, RF hazard signage and visible antenna locations, Sitesafe has determined that:

Marin Emergency Radio Authority is compliant with the FCC rules and regulations, as described in OET Bulletin 65, and will remain compliant upon implementation of the proposed changes.

The compliance determination is based on General Public MPE levels due to theoretical modeling and/or physical measurements, RF signage placement, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the Marin Emergency Radio Authority's proposed deployment plan could result in the site being rendered non-compliant. Measurements have also been performed to validate the assumptions used in our theoretical modeling of this site.

Modeling is used for determining compliance and the percentage of MPE contribution. Measurements provide a view of MPE percentage levels at the site at the time of Sitesafe's visit and are used to validate modeling results.

5.2.2 Actions for Site Compliance

Based on common industry practice and our understanding of FCC and OSHA requirements, this section provides a statement of recommendations for site compliance. RF alert signage recommendations have been proposed based on existing measurements and theoretical analysis of MPE levels. Sitesafe has documented the locations of any RF signs and barriers that are required for compliance. Barriers can consist of locked doors, fencing, railing, rope, chain, paint striping or tape, combined with RF alert signage.

This site is compliant with the FCC rules and regulations.

5.3 RF Emissions Diagram

The RF diagram(s) below display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix B.

The key at the bottom of each diagram indicates if percentages displayed are referenced to FCC General Population Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Gray represents areas predicted to be at 5% of the MPE limits, or below.
- Green represents areas predicted to be between 5% and 100% of the MPE limits.
- Blue represents areas predicted to be between 100% and 500% of the MPE limits.
- Yellow represents areas predicted to be between 500% and 5000% of the MPE limits.
- Red areas indicated predicted levels greater than 5000% of the MPE limits.

The theoretical analysis identified the maximum predicted MPE levels on the Rooftop to be:

Maximum Cumulative Theoretical General Public MPE level (Existing Antennas): 786.21%
Maximum Cumulative Theoretical General Public MPE level (All Antennas): 786.21%
Maximum Cumulative Theoretical General Public MPE level (Proposed Antennas): 786.21%

General Population diagrams are specified when an area is accessible to the public; i.e. personnel that do not meet Occupational or RF Safety trained criteria, could gain access.

If trained occupational personnel require access to areas that are delineated as **Blue** or above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the operators to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

The key at the bottom also indicates the level or height of the modeling with respect to the main level. The origin is typically referenced to the main rooftop level, or ground level for a structure without access to the antenna level. For example:

Average from 0 feet above to 6 feet above origin

and

Average from 20 feet above to 26 feet above origin



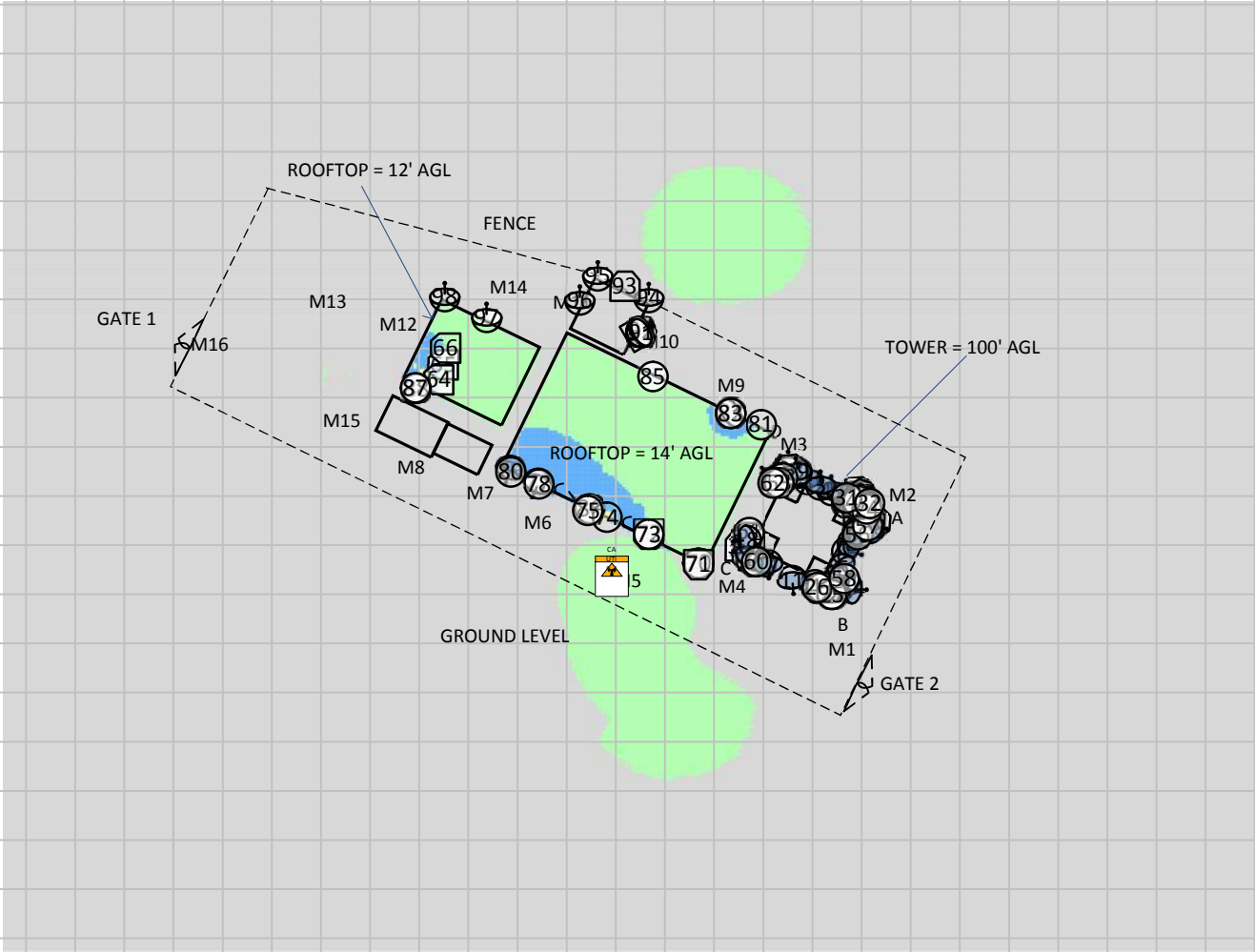
The first indicates modeling at the main rooftop (or ground) level averaged over 6 feet. The second indicates modeling at a higher level (possibly a penthouse level) of 20 feet averaged over 6 feet.

Abbreviations used in the RF Emissions Diagrams

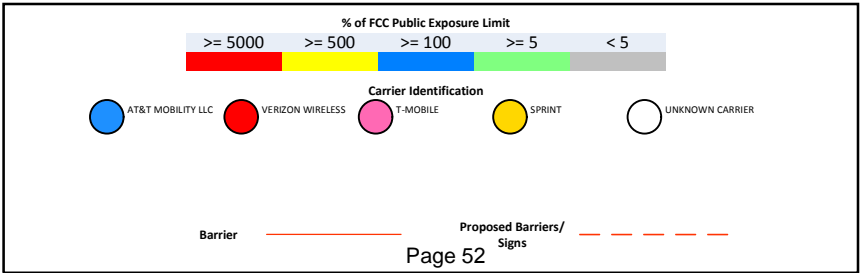
PH=##'	Penthouse at ## feet above main roof
M##	Measurement ## taken during a site visit

As discussed in Section 5.4, site measurement locations for spatial average measurements collected at the time of Sitesafe's visit have been added to the RF emissions diagram. While the theoretical modeling represents worst case MPE levels based on the assumption(s) detailed above, the measurement data is a snapshot of MPE levels at the time of our visit, and dependent on transmitter duty cycle, system implementation and emissions from other RF sources at nearby antenna sites.

RF Exposure Simulation For: Big Rock
Existing Configuration



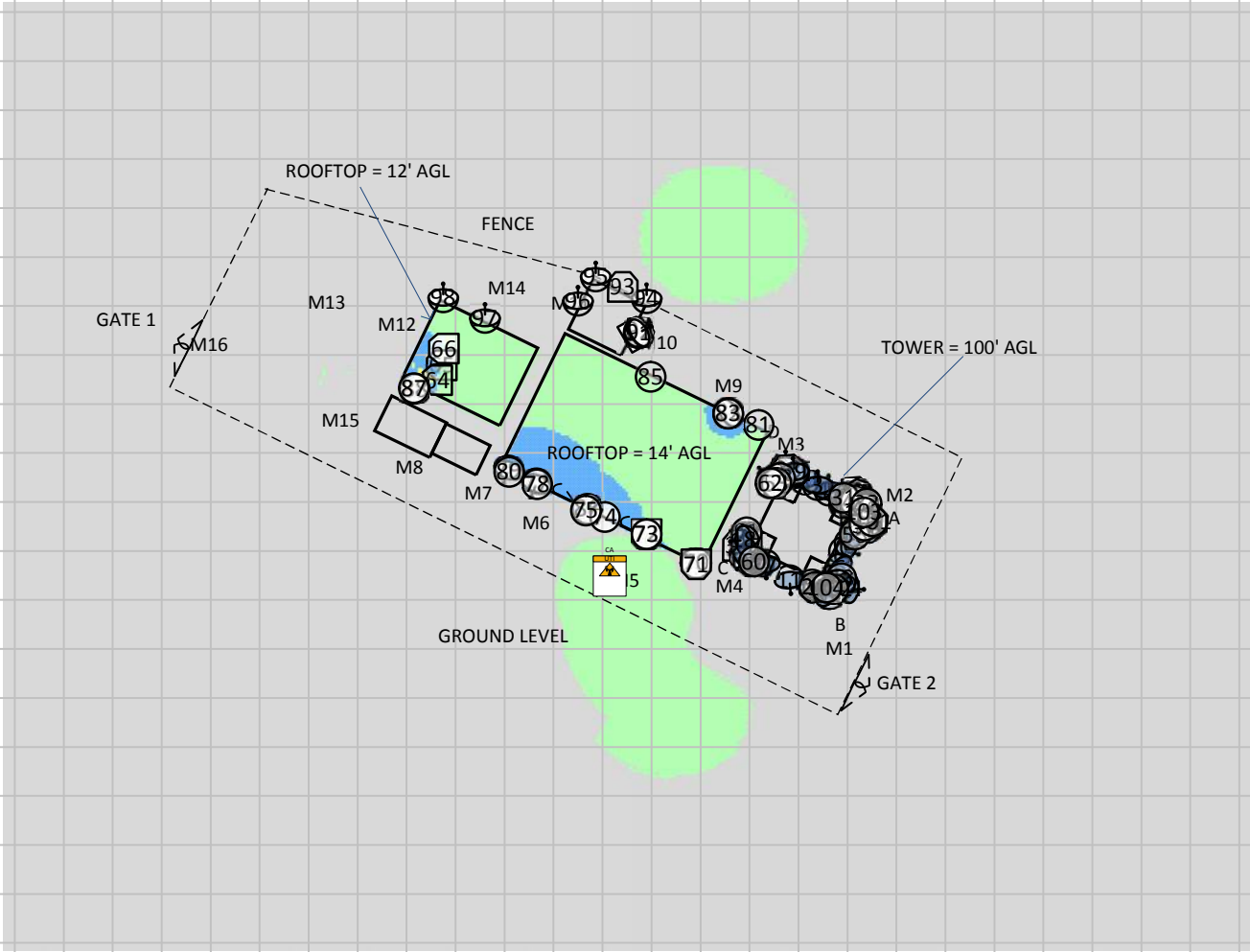
% of FCC Public Exposure Limit
Spatial average 0' - 6'



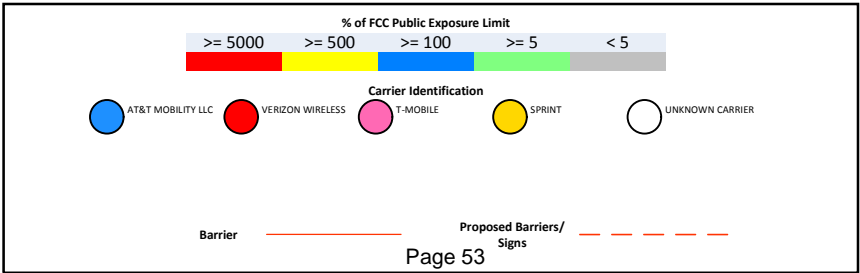
(Feet)
0 16.3 32.6
www.sitesafe.com
Site Name: Big Rock
11/5/2018 9:10:54 AM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Big Rock
All Antennas On Air



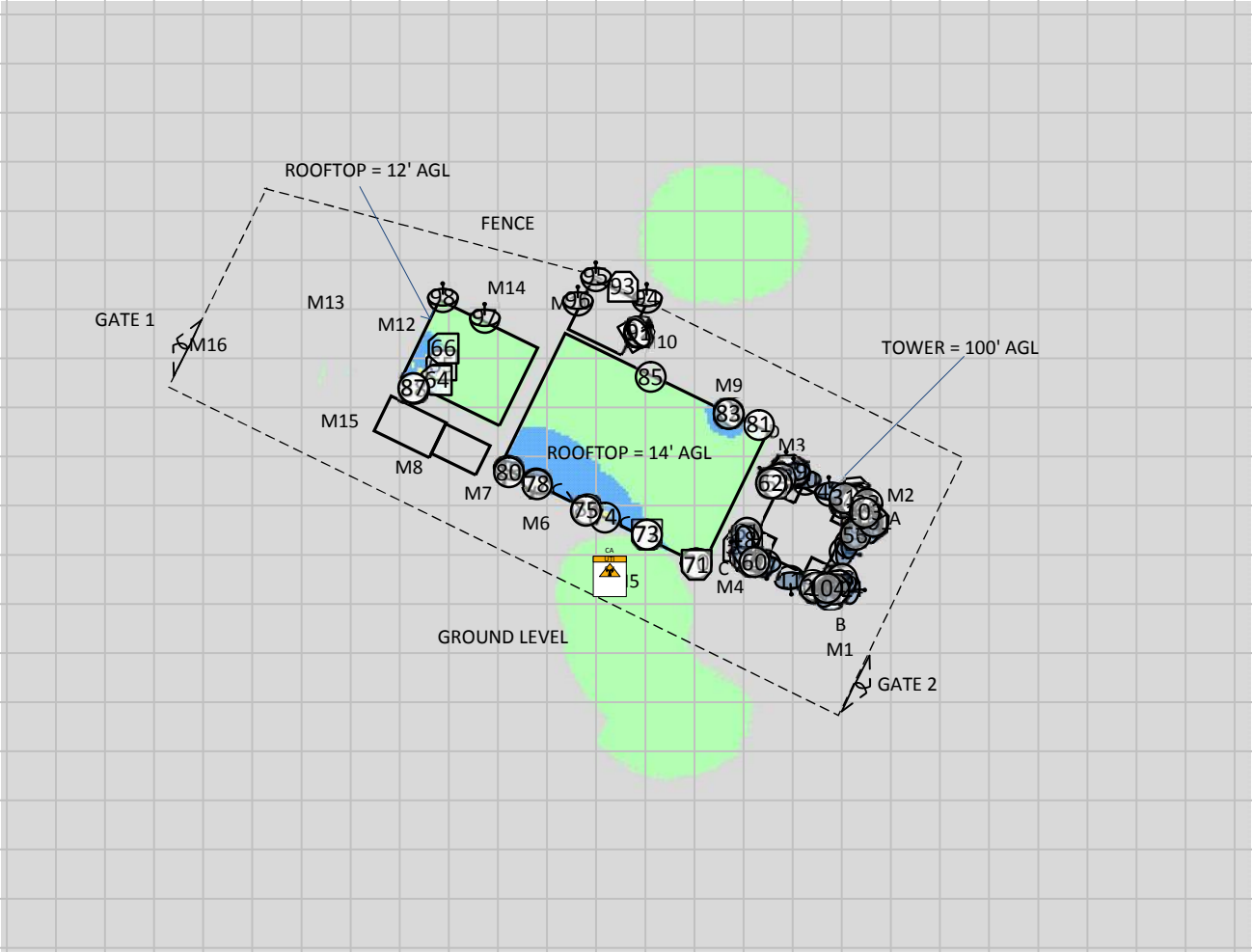
% of FCC Public Exposure Limit
Spatial average 0' - 6'



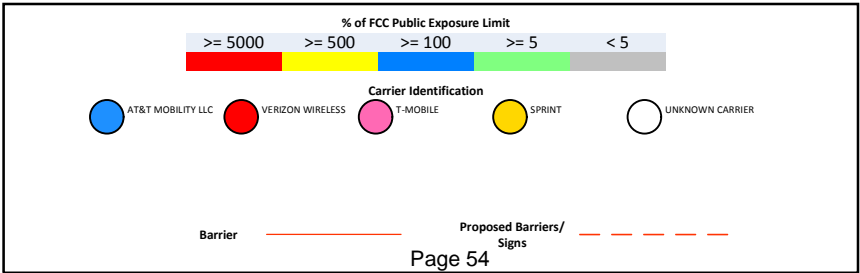
(Feet)
0 16.4 32.9
www.sitesafe.com
Site Name: Big Rock
11/5/2018 9:16:02 AM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Big Rock
Final Configuration



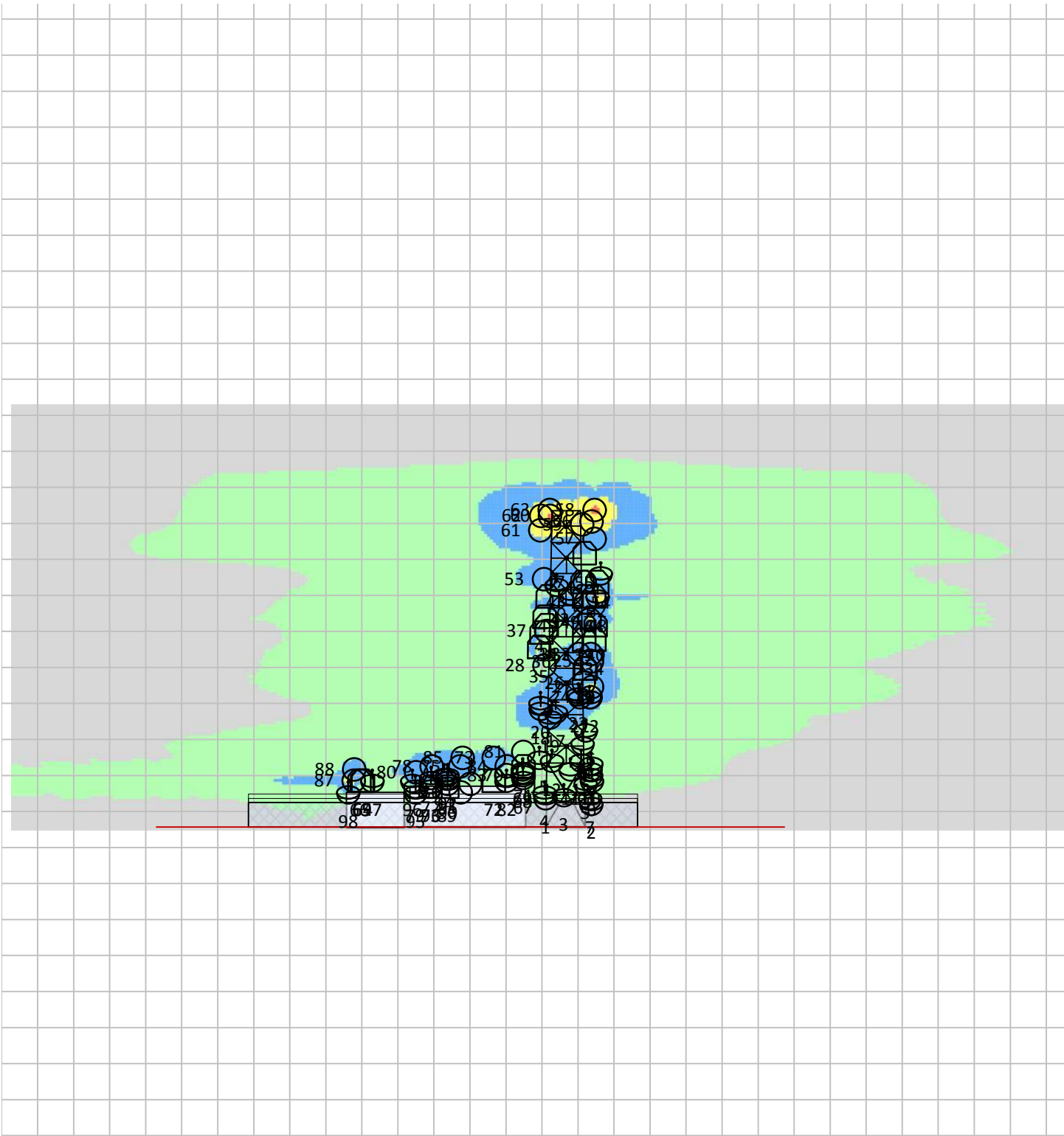
% of FCC Public Exposure Limit
Spatial average 0' - 6'



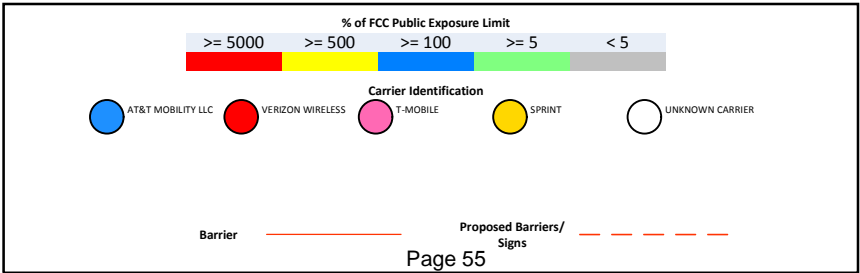
(Feet)
0 16.5 33
www.sitesafe.com
Site Name: Big Rock
11/5/2018 9:19:41 AM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Big Rock
Elevation View – Existing Configuration

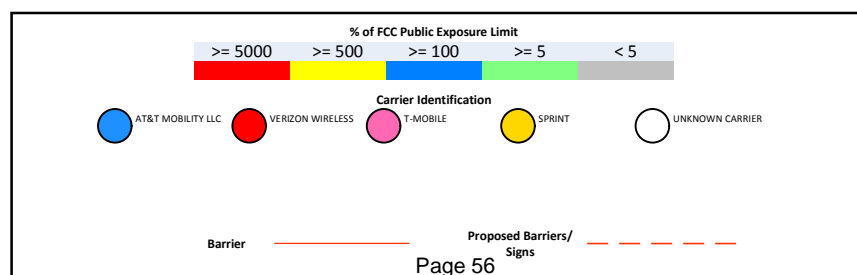
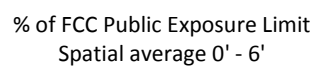


% of FCC Public Exposure Limit
Spatial average 0' - 6'



(Feet)
0 24.6 49.2
www.sitesafe.com
Site Name: Big Rock
11/5/2018 9:36:40 AM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Single Level (0)



Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Single Level (0)

5.4 Site Measurements

This section provides a summary of the measurements collected at the site. Actual measurements locations at which these data points were collected are included in the RF emission diagram provided in Section 5.3 of this report. Two types of measurements were collected at each measurement location: maximum (peak) and spatial average. The spatial average measurement consists of a collection of ten (10) measurements within a ten (10) second time interval taken from zero (0) to six (6) feet in height. The purpose of this measurement technique is to identify the average power density over the dimensions of a typical human body.

Table 1 below contains all the measurements collected from accessible areas located at the site at the time of Sitesafe's visit. Whenever possible, measurements are taken in front of the antenna in the transmitting direction. However, because of the antenna configuration at this site, specific emissions could not be discerned from nearby facilities, and no attempt was made to determine power density levels from a specific transmitting antenna.

Highest Measured Occupational Level: 1.00%

This value is equal to:

Highest General Public Level: 5.00%.

Measurements Points	Spatial Average	Maximum	Measurements Points	Spatial Average	Maximum
M1	<1 %	<1 %	M14	1 %	1 %
M2	<1 %	<1 %	M15	<1 %	<1 %
M3	<1 %	<1 %	M16	<1 %	<1 %
M4	<1 %	<1 %	M17	<1 %	<1 %
M5	1 %	1 %	M18	<1 %	<1 %
M6	1 %	1 %	M19	<1 %	<1 %
M7	1 %	1 %	M20	<1 %	<1 %
M8	1 %	1 %	M21	<1 %	<1 %
M9	<1 %	<1 %	M22	<1 %	<1 %
M10	<1 %	1 %	M23	<1 %	<1 %
M11	1 %	1 %	M24	<1 %	<1 %
M12	1 %	1 %	M25	<1 %	<1 %
M13	1 %	1 %			

RF meters and probes have been calibrated and used according to the manufacturer's specifications. Measurements provide a view of the MPE percentage levels at the site at the time of Sitesafe's site visit and are used to validate modeling results. Theoretical modeling is used for determining compliance and the percentage of MPE contributions.

An RF Emission diagram has been included in section 5.3 of this document. All measurement locations are identified in this diagram. The locations of measurements in the RF Emission diagram can be cross referenced with Table 1 (above) to determine the actual spatial average and maximum measurement value per location.

5.5 Antenna Inventory

The Antenna Inventory shows all transmitting antennas at the site. This inventory was verified on site, and was utilized by Sitesafe to perform theoretical modeling of RF emissions. The inventory coincides with the site diagrams in this report, identifying each antenna's location at 3 - Big Rock. The antenna information collected includes the following information:

- Licensee or wireless operator name
- Frequency or frequency band
- Transmitter power – Effective Radiated Power ("ERP"), or Equivalent Isotropic Radiated Power ("EIRP") in Watts
- Antenna manufacturer make, model, and gain

For other operators at this site, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.



The following antenna inventory and representative photographs were obtained or verified during the site visit and were utilized to create the site model diagrams:

Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
1	E1	Generic	Aperture	0	11000	220	37.66	0	64.7	EIRP	dBmW	1	1799.4	10	0	0
2	E2	Generic	Aperture	0	11000	100	31.16	0	64.7	EIRP	dBmW	1	1799.4	8	0	0
3	E3	Generic	Aperture	0	11000	0	37.66	0	64.7	EIRP	dBmW	1	1799.4	11	0	0
4	E4	Generic	Aperture	0	6000	0	36.36	0	72.3	EIRP	dBmW	1	10354.9	12	0	0
5	E5	Generic	Aperture	0	11000	5	37.66	0	64.7	EIRP	dBmW	1	1799.4	15	0	0
6	E6	Generic	Aperture	0	11000	130	37.66	0	64.7	EIRP	dBmW	1	1799.4	16	0	0
7	E7	Generic	Aperture	0	6000	100	39.06	0	72.3	EIRP	dBmW	1	10354.9	10	0	0
8	E8	Generic	Aperture	0	6000	100	32.86	0	72.3	EIRP	dBmW	1	10354.9	18	0	0
9	E9	Generic	Aperture	0	6000	100	32.86	0	72.3	EIRP	dBmW	1	10354.9	22	0	0
10	E10	Generic	Aperture	0	18000	40	37.66	0	65.3	EIRP	dBmW	1	2065.9	20	0	0
11	E11	Generic	Aperture	0	6000	175	36.36	0	72.3	EIRP	dBmW	1	10354.9	20	0	0
12	E12	Generic	Aperture	0	11000	220	37.66	0	64.7	EIRP	dBmW	1	1799.4	23	0	0
13	E13	Generic	Aperture	0	11000	40	37.66	0	64.7	EIRP	dBmW	1	1799.4	23	0	0
14	E14	Generic	Aperture	0	5800	40	29.06	0	20	ERP	Watt	1	20	29	0	0
15	E15	Generic	Aperture	0	11000	310	37.66	0	64.7	EIRP	dBmW	1	1799.4	24	0	0
16	E16	Generic	Aperture	0	11000	130	37.66	0	64.7	EIRP	dBmW	1	1799.4	33.5	0	0
17	E17	Generic	Omni	10	450	175	0	360	100	ERP	Watt	1	100	40	0	0
18	E18	Generic	Omni	12.5	150	265	2.87	360	100	ERP	Watt	1	193.6	41	0	0
19	E19	Generic	Omni	4.7	450	355	2.97	360	100	ERP	Watt	1	198.2	38	0	0
20	E20	Generic	Aperture	0	6000	310	36.36	0	72.3	EIRP	dBmW	1	10354.9	43	0	0
21	E21	Generic	Panel	4.6	1900	355	15.43	65	60	TPO	Watt	1	2094.8	45	0	0
22	E22	Generic	Panel	4.6	1900	95	15.43	65	60	TPO	Watt	1	2094.8	45	0	0
23	E23	Generic	Panel	2	1900	355	8.6	65	60	TPO	Watt	1	434.7	46	0	0
24	E24	Generic	Omni	8	150	95	2.61	360	100	ERP	Watt	1	100	45	0	0
25	E25	Generic	Omni	12.5	150	95	2.87	360	100	ERP	Watt	1	100	57.5	0	0
26	E26	Generic	Omni	8	150	175	2.61	360	100	ERP	Watt	1	100	50	0	0



Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
27	E27	Generic	Omni	1.5	850	175	0.01	360	60	TPO	Watt	1	60.1	48.6	0	0
28	E28	Generic	Omni	12.5	150	355	2.87	360	100	ERP	Watt	1	100	56	0	0
29	E29	Generic	Panel	4.6	1900	330	15.43	65	60	TPO	Watt	1	2094.8	55	0	0
30	E30	Generic	Panel	4.6	1900	330	15.43	65	60	TPO	Watt	1	2094.8	55	0	0
31	E31	Generic	Omni	4.7	450	355	2.97	360	100	ERP	Watt	1	100	60	0	0
32	E32	Generic	Omni	4.7	450	95	2.97	360	100	ERP	Watt	1	100	60	0	0
33	E33	Generic	Panel	4.6	1900	355	15.43	65	60	TPO	Watt	1	2094.8	65	0	0
34	E34	Generic	Panel	4.6	1900	95	15.43	65	60	TPO	Watt	1	2094.8	65	0	0
35	E35	Generic	Panel	4.6	1900	0	15.43	65	60	TPO	Watt	1	2094.8	62.5	0	0
36	E36	Generic	Panel	4.6	1900	0	15.43	65	60	TPO	Watt	1	2094.8	67.5	0	0
37	E37	Generic	Omni	4.7	450	355	2.97	360	100	ERP	Watt	1	100	68	0	0
38	E38	Generic	Omni	10	150	355	0	360	100	ERP	Watt	1	100	70	0	0
39	E39	Generic	Panel	4.6	1900	355	15.43	65	60	TPO	Watt	1	2094.8	70	0	0
40	E40	Generic	Panel	4.6	1900	95	15.43	65	60	TPO	Watt	1	2094.8	70	0	0
41	E41	Generic	Panel	4.6	1900	220	15.43	65	60	TPO	Watt	1	2094.8	73	0	0
42	E42	Generic	Omni	4.7	450	95	2.97	360	100	ERP	Watt	1	100	72	0	0
43	E43	Generic	Omni	4.7	450	95	2.97	360	100	ERP	Watt	1	100	78	0	0
44	E44	Generic	Panel	4.6	1900	130	15.43	65	60	TPO	Watt	1	2094.8	80	0	0
45	E45	Generic	Panel	4.6	1900	220	15.43	65	60	TPO	Watt	1	2094.8	80	0	0
46	E46	Generic	Panel	4.6	1900	355	15.43	65	60	TPO	Watt	1	2094.8	80	0	0
47	E47	Generic	Omni	10	150	95	0	360	100	ERP	Watt	1	100	85	0	0
48	E48	Generic	Aperture	0	23000	95	32.66	0	63.8	EIRP	dBmW	1	1462.2	80	0	0
49	E49	Generic	Aperture	0	18000	355	37.66	0	60.9	EIRP	dBmW	1	750	81	0	0
50	E50	Generic	Aperture	0	23000	355	32.66	0	63.8	EIRP	dBmW	1	1462.2	84	0	0
51	E51	Generic	Panel	4.6	1900	355	15.43	65	60	TPO	Watt	1	2094.8	85	0	0
52	E52	Generic	Panel	4.6	1900	95	15.43	65	60	TPO	Watt	1	2094.8	85	0	0
53	E53	Generic	Omni	1.5	850	355	0.01	360	1000	ERP	Watt	1	1000	86	0	0
54	E54	Generic	Aperture	0	18000	95	37.66	0	60.9	EIRP	dBmW	1	750	88	0	0



Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
55	E55	Generic	Panel	4.6	1900	355	15.43	65	60	TPO	Watt	1	2094.8	95	0	0
56	E56	Generic	Omni	12.5	150	355	2.87	360	100	ERP	Watt	1	100	106	0	0
57	E57 (Rx)	Generic	Omni	12.5	150	95	2.87	360	0	ERP	Watt	1	0	100	0	0
58	E58	Generic	Omni	1.5	850	95	0.01	360	1000	ERP	Watt	1	1000	110	0	0
59	E59	Generic	Omni	10	150	175	0	360	100	ERP	Watt	1	100	105	0	0
60	E60	Generic	Omni	1.5	850	175	0.01	360	1000	ERP	Watt	1	1000	108	0	0
61	E61	Generic	Omni	4.7	450	265	2.97	360	100	ERP	Watt	1	100	103	0	0
62	E62	Generic	Omni	1.5	850	265	0.01	360	1000	ERP	Watt	1	1000	108	0	0
63	E63	Generic	Omni	10	150	355	0	360	100	ERP	Watt	1	100	110	0	0
64	UNKNOWN OPERATOR	Generic	Panel	6.3	1900	270	16.26	65	60	TPO	Watt	1	2536	16	0	0
65	UNKNOWN OPERATOR	Generic	Panel	6.3	1900	270	16.26	65	60	TPO	Watt	1	2536	16	0	0
66	UNKNOWN OPERATOR	Generic	Panel	6.3	1900	270	16.26	65	60	TPO	Watt	1	2536	16	0	0
67	UNKNOWN OPERATOR	Generic	Aperture	0	5800	180	29.06	0	20	ERP	Watt	1	20	17	0	0
68	UNKNOWN OPERATOR	Generic	Aperture	0	5800	180	29.06	0	20	ERP	Watt	1	20	19	0	0
69	UNKNOWN OPERATOR	Generic	Aperture	0	5800	180	29.06	0	20	ERP	Watt	1	20	20	0	0
70	UNKNOWN OPERATOR	Generic	Aperture	0	5800	180	29.06	0	20	ERP	Watt	1	20	18	0	0
71	UNKNOWN OPERATOR	Generic	Yagi	0.5	850	180	9.97	60	1000	ERP	Watt	1	1000	21	0	0
72	UNKNOWN OPERATOR	Generic	Panel	4.6	1900	180	15.43	65	60	TPO	Watt	1	2094.8	16	0	0
73	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	24	0	0
74	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	15	0	0
75	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	21	0	0
76	UNKNOWN OPERATOR	Generic	Aperture	0	6000	200	32.86	0	72.3	EIRP	dBmW	1	10354.9	14	0	0
77	UNKNOWN OPERATOR	Generic	Aperture	0	2400	200	22.96	0	4	ERP	Watt	1	4	17	0	0
78	UNKNOWN OPERATOR	Generic	Omni	8	150	0	2.61	360	100	ERP	Watt	1	100	21	0	0
79	UNKNOWN OPERATOR	Generic	Aperture	0	6000	200	36.36	0	72.3	EIRP	dBmW	1	10354.9	14	0	0
80	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	19	0	0
81	UNKNOWN OPERATOR	Generic	Omni	8	150	0	2.61	360	100	ERP	Watt	1	100	26	0	0
82	UNKNOWN OPERATOR	Generic	Aperture	0	2400	60	22.96	0	4	ERP	Watt	1	4	16	0	0



Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
83	UNKNOWN OPERATOR	Generic	Yagi	0.5	850	0	9.97	60	1000	ERP	Watt	1	1000	18	0	0
84	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	21	0	0
85	UNKNOWN OPERATOR	Generic	Omni	8	150	0	2.61	360	100	ERP	Watt	1	100	24	0	0
86	UNKNOWN OPERATOR	Generic	Yagi	1.2	450	160	9.97	60	100	ERP	Watt	1	100	12	0	0
87	UNKNOWN OPERATOR	Generic	Yagi	1.2	450	270	9.97	60	100	ERP	Watt	1	100	16	0	0
88	UNKNOWN OPERATOR	Generic	Omni	3	450	0	0	360	25	ERP	Watt	1	25	20	0	0
89	UNKNOWN OPERATOR	Generic	Panel	1.1	2400	60	10.01	90	4	ERP	Watt	1	4	14	0	0
90	UNKNOWN OPERATOR	Generic	Aperture	0	5800	40	29.06	0	20	ERP	Watt	1	20	15	0	0
91	UNKNOWN OPERATOR	Generic	Aperture	0	18000	60	30.96	0	60.9	EIRP	dBmW	1	750	17	0	0
92	UNKNOWN OPERATOR	Generic	Aperture	0	18000	70	30.96	0	60.9	EIRP	dBmW	1	750	18	0	0
93	UNKNOWN OPERATOR	Generic	Panel	1.1	2400	0	10.01	90	4	ERP	Watt	1	4	14	0	0
94	UNKNOWN OPERATOR	Generic	Aperture	0	6000	0	39.06	0	72.3	EIRP	dBmW	1	10354.9	18	0	0
95	UNKNOWN OPERATOR	Generic	Aperture	0	5800	0	29.06	0	20	ERP	Watt	1	20	12	0	0
96	UNKNOWN OPERATOR	Generic	Aperture	0	23000	0	32.66	0	63.8	EIRP	dBmW	1	1462.2	16	0	0
97	UNKNOWN OPERATOR	Generic	Aperture	0	6000	0	39.06	0	72.3	EIRP	dBmW	1	10354.9	16	0	0
98	UNKNOWN OPERATOR	Generic	Aperture	0	18000	0	30.96	0	60.9	EIRP	dBmW	1	750	12	0	0
99	P1	Generic	Aperture	0	11000	132.5	37.66	0	64.7	EIRP	dBmW	1	1799.4	21	0	0
100	P2	Generic	Aperture	4.6	11000	146.8	41.86	61	64.7	EIRP	dBmW	1	1799.4	15.8	0	0
101	P3	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	58.5	0	0
102	P4	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	58.5	0	0
103	P5 (Rx)	Sinclair SC479-HF1LDF(D06)	Omni	14.5	700	0	9.5	360	0	TPO	Watt	1	0	102.3	0	0
104	P6 (Rx)	Sinclair SC479-HF1LDF(D06)	Omni	14.5	700	0	9.5	360	0	TPO	Watt	1	0	102.3	0	0
105	7P	Generic	Aperture	0	6000	5.5	36.36	0	72.3	EIRP	dBmW	1	10354.9	16	0	0

NOTE: Z indicates relative position of the antenna to the origin location on the site, displayed in the model results diagram. The Z reference indicates antenna height above the main site level unless otherwise indicated. ERP values provided by the client and used in the modeling may be greater than are currently deployed. For other operators at this site the use of "Generic" as an antenna model or "Unknown" for a wireless operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.

5.6 Site Pictures



Figure 10: Site Overview – East Facing



Figure 11: Tower Overview West Facing



Figure 12: Tower Overview South Facing



Figure 13: Tower Overview Southwest Facing



Figure 14: Tower Overview Northeast Facing



Figure 15: Tower Base Overview



Figure 16: North Tower Overview



Figure 17: Overview Facing South



Figure 18: Overview Facing North

6 Mt. Tamalpais



Marin Emergency Radio Authority

Site Name – Mt. Tamalpais

Site ID: 4

Site Compliance Report

**2001 Ridgecrest Blvd.
Mill Valley, CA 94941**

Site visit date: August 24, 2018

Site visit time: 1:00 PM

Site survey by: Jeff Desira

Latitude: N37-55-44.42

Longitude: W122-35-13.50

Structure Type: Self-Support

Report generated date: March 28, 2019

Report by: Sam Cosgrove

Customer Contact: David Mortimer

Marin Emergency Radio Authority is compliant and will remain complaint upon implementation of the proposed changes. The site has compliance issues that are not the result of, and therefore not the responsibility of, Marin Emergency Radio Authority.

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6.1 Site Summary

The County of Marin on behalf of Marin Emergency Radio Authority has contracted with Sitesafe, LLC. (Sitesafe), an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine the RF conditions at communications site, 4 - Mt. Tamalpais, located at 2001 Ridgecrest Blvd., Mill Valley, CA, in relation to Federal Communications Commission (FCC) Rules and Regulations for RF emissions.

Sitesafe's field personnel visited 4 - Mt. Tamalpais on August 24, 2018. This section contains a detailed summary of the RF environment at the site including:

- Site compliance determination;
- Photographs of the site;
- Diagram of the site;
- Inventory of the make / model of all transmitting antennas found on the site (where possible);
- Record of any Maximum Permissible Exposure ("MPE") measurements taken on the site, as applicable; and
- Theoretical MPE based on modeling.

RF emissions exceed MPE limits in the areas near antennas 104/105 and 114-117 (as shown in the diagram below). These areas should be reviewed by the unknown operator and mitigation should be put in place in the form of signage or an RF safety plan. The areas that exceed MPE limits are not regularly accessed by the general public since the site is gated and locked. The proposed antenna configuration does not create any significant change to the RF emissions in the area. The emissions on the ground level near the monopoles does not pose any danger to workers in the area.

6.2 Site Compliance

6.2.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, and a thorough review of site access procedures, RF hazard signage and visible antenna locations, Sitesafe has determined that:

Marin Emergency Radio Authority is compliant with the FCC rules and regulations, as described in OET Bulletin 65, and will remain compliant upon implementation of the proposed changes. The site has compliance issues that are not the result of, and therefore not the responsibility of, Marin Emergency Radio Authority.

The compliance determination is based on General Public MPE levels due to theoretical modeling and/or physical measurements, RF signage placement, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the Marin Emergency Radio Authority's proposed deployment plan could result in the site being rendered non-compliant. Measurements have also been performed to validate the assumptions used in our theoretical modeling of this site.

Modeling is used for determining compliance and the percentage of MPE contribution. Measurements provide a view of MPE percentage levels at the site at the time of Sitesafe's visit and are used to validate modeling results.

6.2.2 Actions for Site Compliance

Based on common industry practice and our understanding of FCC and OSHA requirements, this section provides a statement of recommendations for site compliance. RF alert signage recommendations have been proposed based on existing measurements and theoretical analysis of MPE levels. Sitesafe has documented the locations of any RF signs and barriers that are required for compliance. Barriers can consist of locked doors, fencing, railing, rope, chain, paint striping or tape, combined with RF alert signage.

This site will be compliant with the FCC rules and regulations.

Remediation for other operators (Marin Emergency Radio Authority is not responsible for the actions below):

Operator #1

The carriers at antennas 104-105 & 114-117 should review their antennas and raise centerlines or lower the power of the antennas.

6.3 RF Emissions Diagram

The RF diagram(s) below display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix B.

The key at the bottom of each diagram indicates if percentages displayed are referenced to FCC General Population Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Gray represents areas predicted to be at 5% of the MPE limits, or below.
- Green represents areas predicted to be between 5% and 100% of the MPE limits.
- Blue represents areas predicted to be between 100% and 500% of the MPE limits.
- Yellow represents areas predicted to be between 500% and 5000% of the MPE limits.
- Red areas indicated predicted levels greater than 5000% of the MPE limits.

The theoretical analysis identified the maximum predicted MPE levels on the ground to be:

Maximum Cumulative Theoretical General Public MPE level (Existing Antennas) : 2,418.3%
Maximum Cumulative Theoretical General Public MPE level (All Antennas): 2,418.3%
Maximum Cumulative Theoretical General Public MPE level (Proposed Antennas): 2,418.3%

General Population diagrams are specified when an area is accessible to the public; i.e. personnel that do not meet Occupational or RF Safety trained criteria, could gain access.

If trained occupational personnel require access to areas that are delineated as **Blue** or above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the operators to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

The key at the bottom also indicates the level or height of the modeling with respect to the main level. The origin is typically referenced to the main rooftop level, or ground level for a structure without access to the antenna level. For example:

Average from 0 feet above to 6 feet above origin

and

Average from 20 feet above to 26 feet above origin

The first indicates modeling at the main rooftop (or ground) level averaged over 6 feet. The second indicates modeling at a higher level (possibly a penthouse level) of 20 feet averaged over 6 feet.

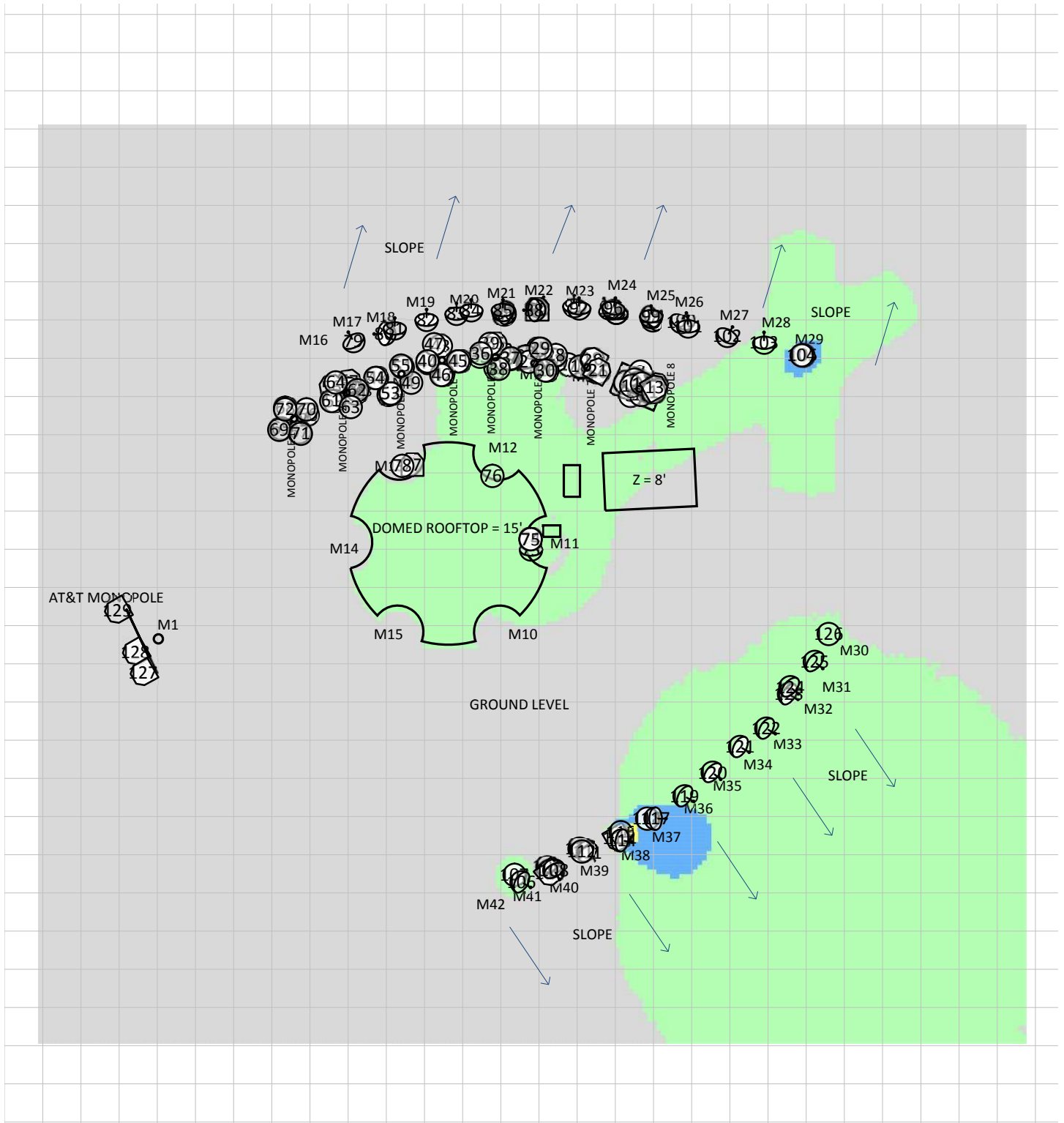


Abbreviations used in the RF Emissions Diagrams

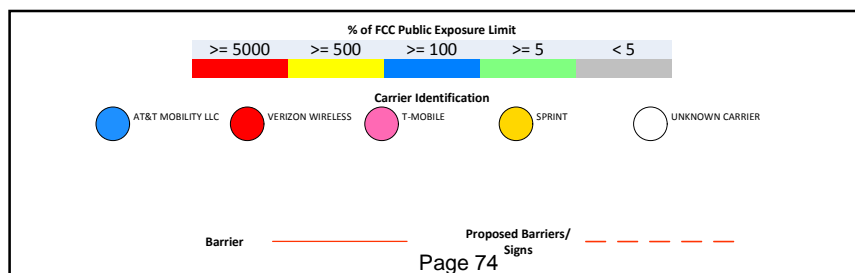
PH=##'	Penthouse at ## feet above main roof
M##	Measurement ## taken during a site visit

As discussed in Section 6.4, site measurement locations for spatial average measurements collected at the time of Sitesafe's visit have been added to the RF emissions diagram. While the theoretical modeling represents worst case MPE levels based on the assumption(s) detailed above, the measurement data is a snapshot of MPE levels at the time of our visit, and dependent on transmitter duty cycle, system implementation and emissions from other RF sources at nearby antenna sites.

RF Exposure Simulation For: Mt. Tamalpais Existing Antennas Only On Air



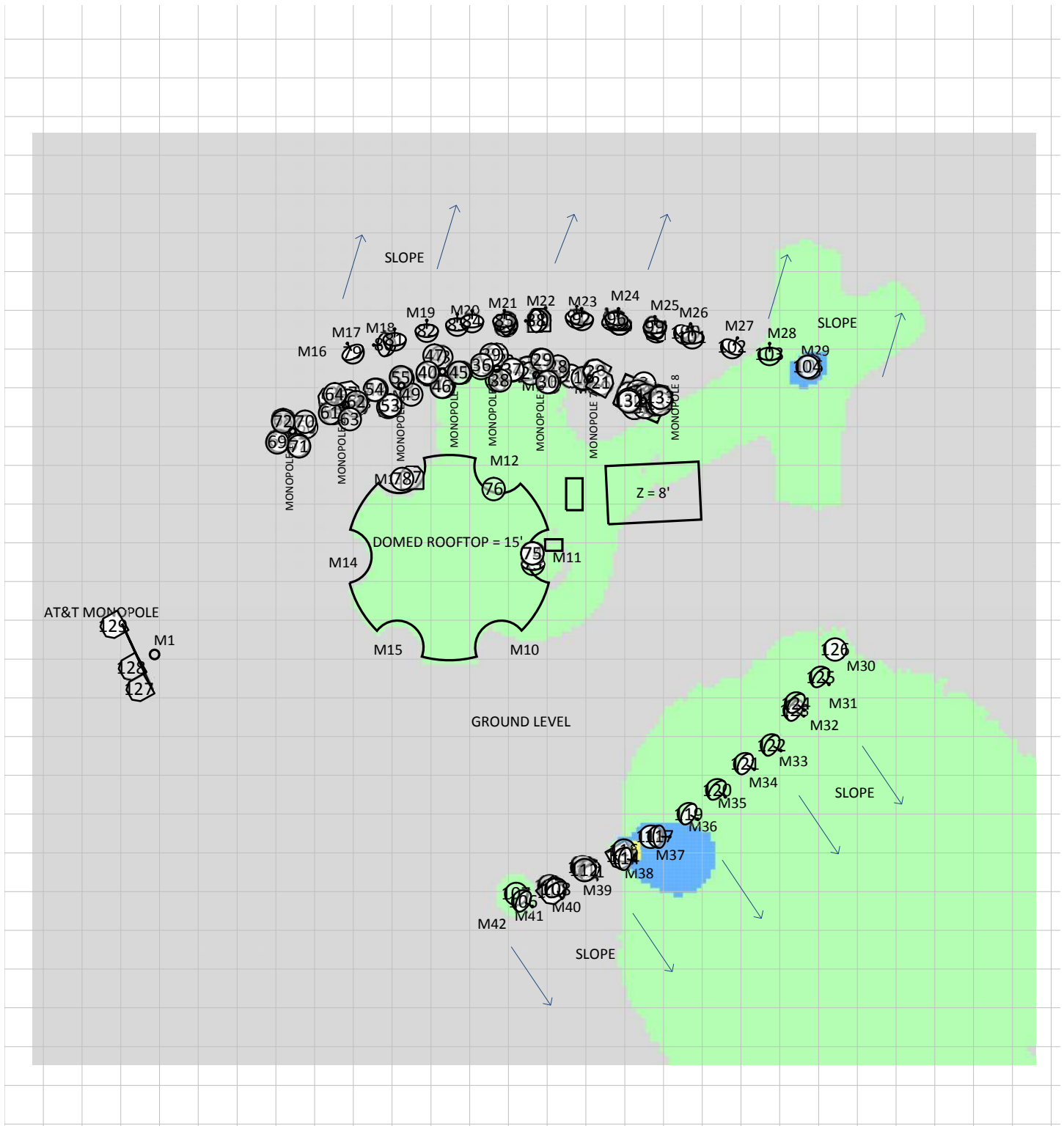
% of FCC Public Exposure Limit
Spatial average 0' - 6'



(Feet)
0 23 46
www.sitesafe.com
Site Name: Mt. Tamalpais
8/28/2018 11:09:58 AM

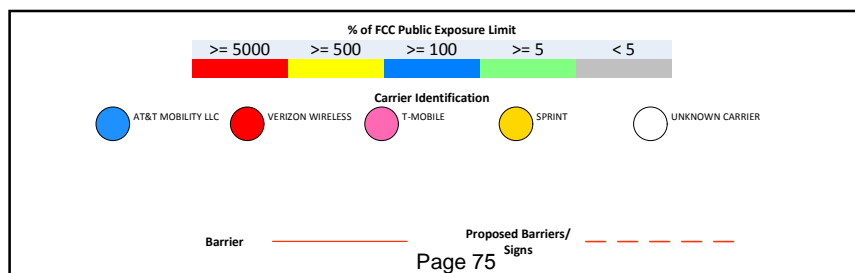
Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Mt. Tamalpais All Antennas On Air



% of FCC Public Exposure Limit
Spatial average 0' - 6'

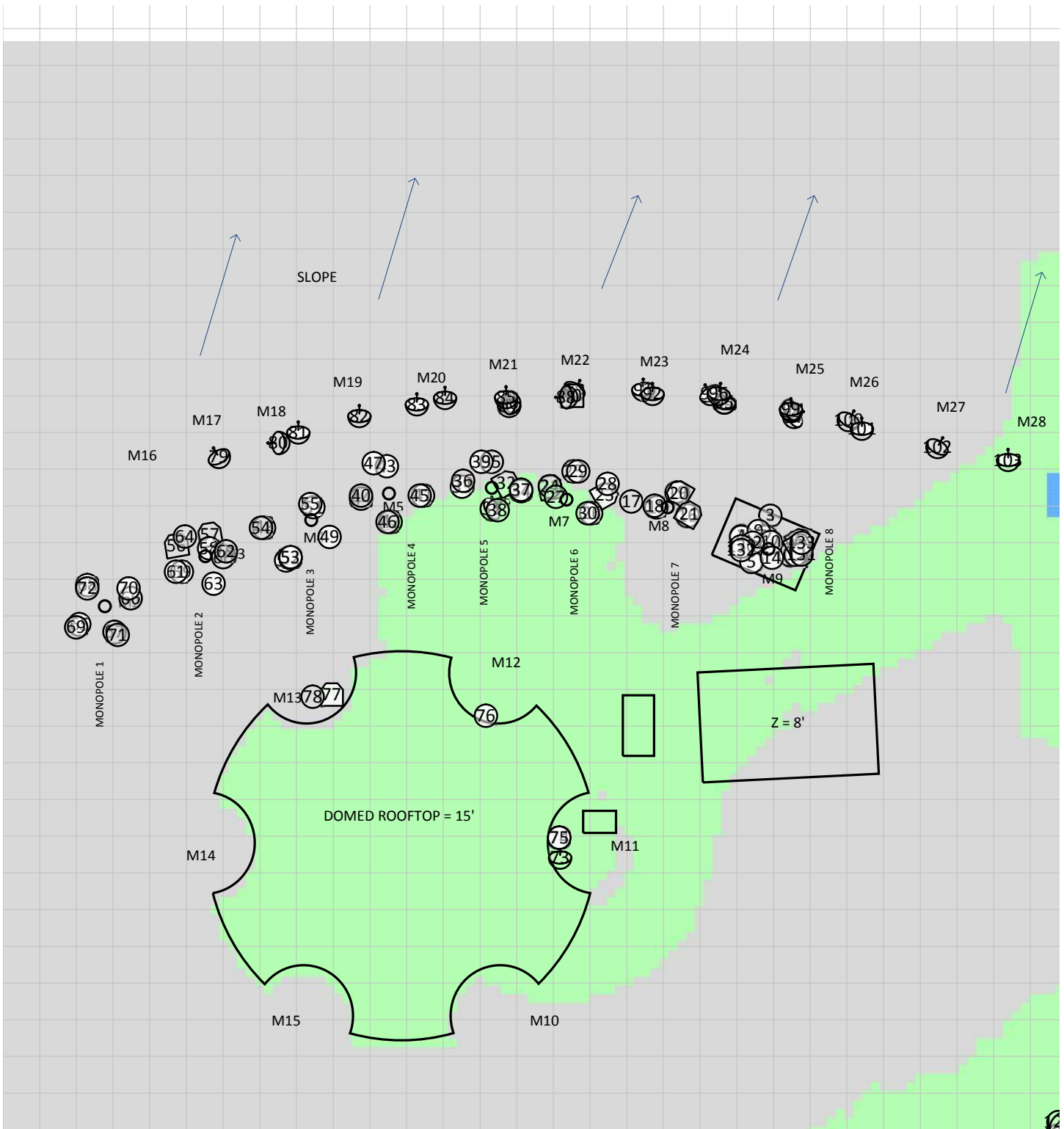
(Feet)
0 22.7 45.4
www.sitesafe.com
Site Name: Mt. Tamalpais
8/28/2018 11:06:55 AM



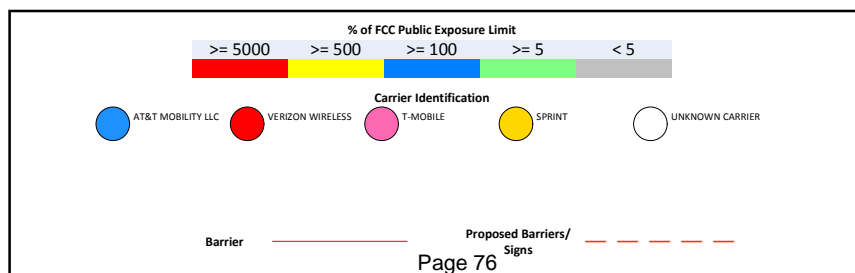
Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Mt. Tamalpais

All Antennas On Air – Monopoles Detail View



% of FCC Public Exposure Limit
Spatial average 0' - 6'



(Feet)
0 12 24
www.sitesafe.com
Site Name: Mt. Tamalpais
8/28/2018 11:07:27 AM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

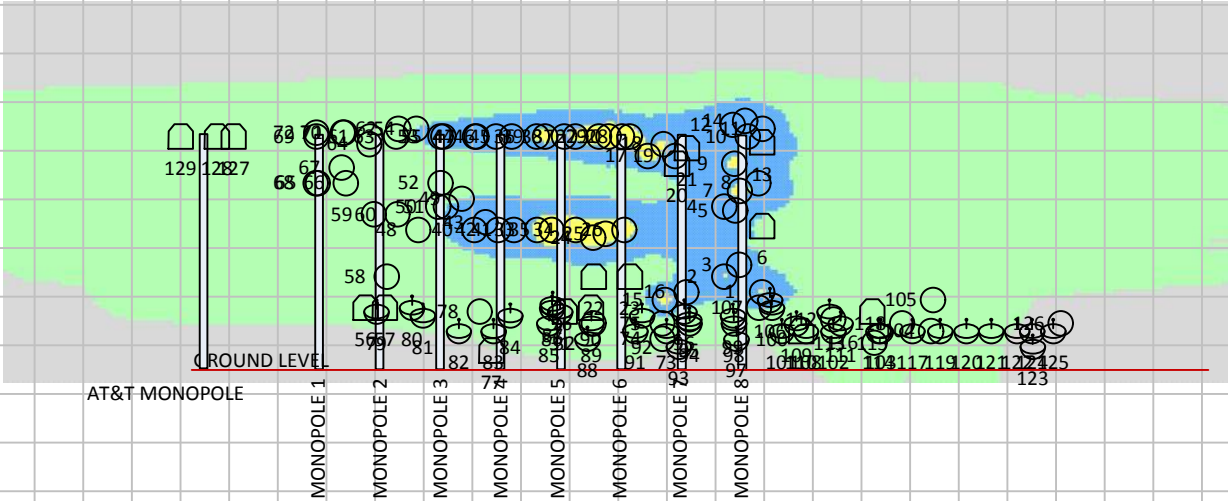
RF Exposure Simulation For: Mt. Tamalpais Proposed Configuration On Air



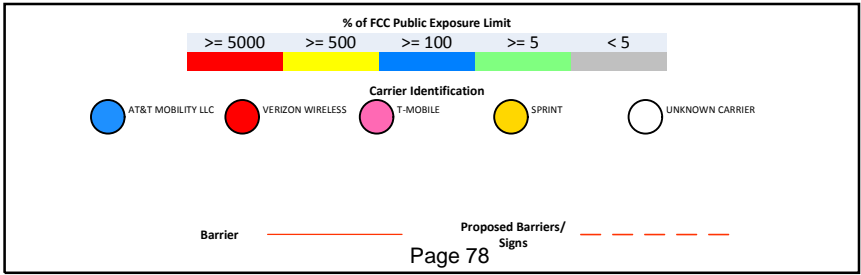
(Feet)
0 23.6 47.2
www.sitesafe.com
Site Name: Mt. Tamalpais
8/28/2018 11:27:54 AM

RF Exposure Simulation For: Mt. Tamalpais

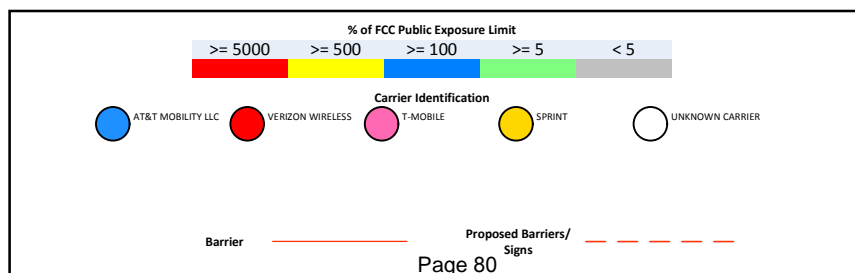
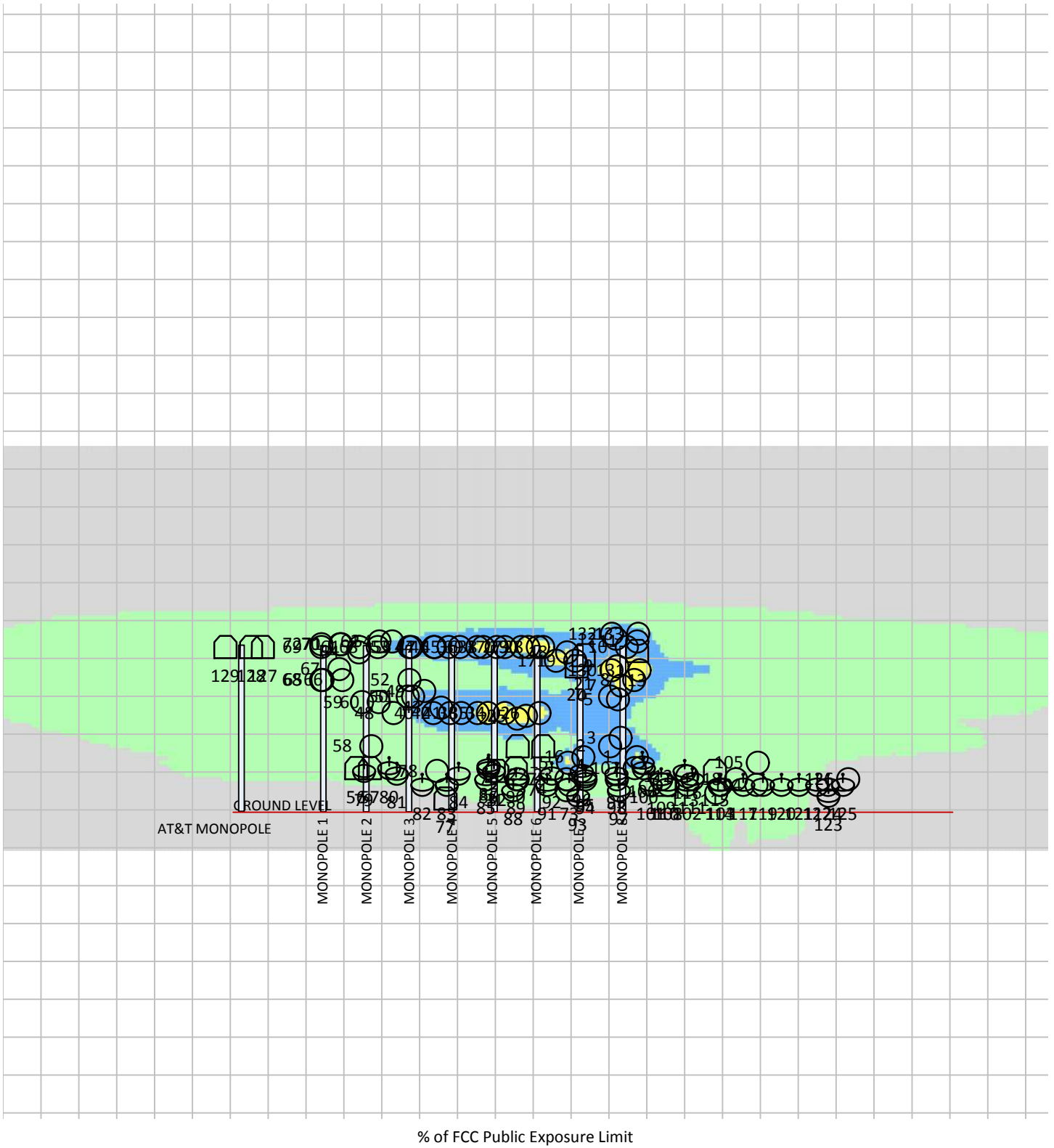
Existing Antennas Only On Air – Elevation View



% of FCC Public Exposure Limit



RF Exposure Simulation For: Mt. Tamalpais Elevation View – Final Configuration



6.4 Site Measurements

This section provides a summary of the measurements collected at the site. Actual measurements locations at which these data points were collected are included in the RF emission diagram provided in Section 6.3 of this report. Two types of measurements were collected at each measurement location: maximum (peak) and spatial average. The spatial average measurement consists of a collection of ten (10) measurements within a ten (10) second time interval taken from zero (0) to six (6) feet in height. The purpose of this measurement technique is to identify the average power density over the dimensions of a typical human body.

Table 1 below contains all the measurements collected from accessible areas located at the site at the time of Sitesafe's visit. Whenever possible, measurements are taken in front of the antenna in the transmitting direction. However, because of the antenna configuration at this site, specific emissions could not be discerned from nearby facilities, and no attempt was made to determine power density levels from a specific transmitting antenna.

Highest Measured Occupational Level: 17.00%

This value is equal to:

Highest General Public Level: 85.00%.

Measurements Points	Spatial Average	Maximum	Measurements Points	Spatial Average	Maximum
M1	<1 %	<1 %	M23	1 %	1 %
M2	1 %	1 %	M24	1 %	1 %
M3	1 %	1 %	M25	2 %	2 %
M4	1 %	1 %	M26	2 %	2 %
M5	1 %	3 %	M27	3 %	4 %
M6	1 %	2 %	M28	4 %	5 %
M7	1 %	1 %	M29	17 %	23 %
M8	1 %	1 %	M30	1 %	1 %
M9	2 %	2 %	M31	1 %	1 %
M10	<1 %	<1 %	M32	<1 %	<1 %
M11	<1 %	<1 %	M33	<1 %	<1 %
M12	<1 %	<1 %	M34	<1 %	<1 %
M13	<1 %	1 %	M35	<1 %	<1 %
M14	<1 %	<1 %	M36	<1 %	<1 %
M15	<1 %	<1 %	M37	<1 %	<1 %
M16	2 %	2 %	M38	<1 %	<1 %
M17	1 %	1 %	M39	<1 %	<1 %
M18	1 %	1 %	M40	<1 %	<1 %
M19	1 %	1 %	M41	<1 %	1 %
M20	1 %	1 %	M42	<1 %	<1 %
M21	1 %	1 %	M43	<1 %	<1 %
M22	1 %	1 %			



RF meters and probes have been calibrated and used according to the manufacturer's specifications. Measurements provide a view of the MPE percentage levels at the site at the time of Sitesafe's site visit and are used to validate modeling results. Theoretical modeling is used for determining compliance and the percentage of MPE contributions.

An RF Emission diagram has been included in section 6.3 of this document. All measurement locations are identified in this diagram. The locations of measurements in the RF Emission diagram can be cross referenced with Table 1 (above) to determine the actual spatial average and maximum measurement value per location.

6.5 Antenna Inventory

The Antenna Inventory shows all transmitting antennas at the site. This inventory was verified on site, and was utilized by Sitesafe to perform theoretical modeling of RF emissions. The inventory coincides with the site diagrams in this report, identifying each antenna's location at 4 - Mt. Tamalpais. The antenna information collected includes the following information:

- Licensee or wireless operator name
- Frequency or frequency band
- Transmitter power – Effective Radiated Power ("ERP"), or Equivalent Isotropic Radiated Power ("EIRP") in Watts
- Antenna manufacturer make, model, and gain

For other operators at this site, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.



The following antenna inventory and representative photographs were obtained or verified during the site visit and were utilized to create the site model diagrams:

Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
1	E1	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	20	0	0
2	E2	Generic	Omni	12.5	150	90	2.87	360	100	ERP	Watt	1	100	24	0	0
3	E3	Generic	Omni	14	850	270	9.97	360	1000	ERP	Watt	1	1000	27	0	0
4	E4	Generic	Omni	14	850	60	9.97	360	1000	ERP	Watt	1	1000	42	0	0
5	E5	Generic	Omni	14	850	60	9.97	360	1000	ERP	Watt	1	1000	41	0	0
6	E6	Generic	Panel	1.1	2400	60	10.01	90	4	ERP	Watt	1	4	37	0	0
7	E7	Generic	Omni	3	150	60	0	360	25	ERP	Watt	1	25	46	0	0
8	E8	Generic	Omni	12.5	150	240	2.87	360	100	ERP	Watt	1	100	48	0	0
9	E9	Generic	Omni	3	150	60	0	360	25	ERP	Watt	1	25	53	0	0
10	E10	Generic	Omni	9.5	450	240	5.97	360	100	ERP	Watt	1	100	60	0	0
11	E11	Generic	Omni	14	850	240	9.97	360	1000	ERP	Watt	1	1000	62	0	0
12	E12	Generic	Omni	14	850	60	9.97	360	1000	ERP	Watt	1	1000	63	0	0
13	E13	Generic	Panel	1.1	2400	60	10.01	90	4	ERP	Watt	1	4	58.5	0	0
14	E14	Generic	Omni	9.5	450	60	5.97	360	100	ERP	Watt	1	100	64	0	0
15	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	18	0	0
16	UNKNOWN OPERATOR	Generic	Omni	9.5	450	0	5.97	360	100	ERP	Watt	1	100	20	0	0
17	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	55	0	0
18	UNKNOWN OPERATOR	Generic	Omni	14	850	0	9.97	360	1000	ERP	Watt	1	1000	58	0	0
19	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	55	0	0
20	UNKNOWN OPERATOR	Generic	Panel	1.7	2400	300	12.01	90	4	ERP	Watt	1	4	53	0	0
21	UNKNOWN OPERATOR	Generic	Panel	3.3	2400	30	15.01	90	4	ERP	Watt	1	4	57	0	0
22	UNKNOWN OPERATOR	Generic	Panel	1.7	2400	350	12.01	90	4	ERP	Watt	1	4	24	0	0
23	UNKNOWN OPERATOR	Generic	Panel	1.7	2400	60	12.01	90	4	ERP	Watt	1	4	24	0	0
24	UNKNOWN OPERATOR	Generic	Omni	8	150	0	2.61	360	100	ERP	Watt	1	100	34	0	0
25	UNKNOWN OPERATOR	Generic	Omni	8	150	0	2.61	360	100	ERP	Watt	1	100	35	0	0
26	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	100	ERP	Watt	1	100	36	0	0



Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
27	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	60	0	0
28	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	60	0	0
29	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	60	0	0
30	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	60	0	0
31	UNKNOWN OPERATOR	Generic	Aperture	3	5800	60	29.06	2	20	ERP	Watt	1	20	15	0	0
32	UNKNOWN OPERATOR	Generic	Panel	2.2	5800	60	16.01	90	20	ERP	Watt	1	20	15	0	0
33	UNKNOWN OPERATOR	Generic	Omni	14	850	0	9.97	360	1000	ERP	Watt	1	1000	36	0	0
34	UNKNOWN OPERATOR	Generic	Omni	8	150	0	2.61	360	100	ERP	Watt	1	100	36	0	0
35	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	100	ERP	Watt	1	100	36	0	0
36	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	60	0	0
37	UNKNOWN OPERATOR	Generic	Omni	8	150	0	2.61	360	100	ERP	Watt	1	100	60	0	0
38	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	60	0	0
39	UNKNOWN OPERATOR	Generic	Omni	3	450	0	0	360	25	ERP	Watt	1	25	60	0	0
40	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	36	0	0
41	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	36	0	0
42	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	36	0	0
43	UNKNOWN OPERATOR	Generic	Omni	8	150	0	2.61	360	100	ERP	Watt	1	100	38	0	0
44	UNKNOWN OPERATOR	Generic	Omni	3	450	0	0	360	25	ERP	Watt	1	25	60	0	0
45	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	60	0	0
46	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	60	0	0
47	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	60	0	0
48	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	36	0	0
49	UNKNOWN OPERATOR	Generic	Omni	14	850	0	9.97	360	25	ERP	Watt	1	25	44	0	0
50	UNKNOWN OPERATOR	Generic	Omni	14	850	0	9.97	360	25	ERP	Watt	1	25	42	0	0
51	UNKNOWN OPERATOR	Generic	Omni	14	850	0	9.97	360	25	ERP	Watt	1	25	42	0	0
52	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	48	0	0
53	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	60	0	0
54	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	62	0	0



Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
55	UNKNOWN OPERATOR	Generic	Omni	3	450	0	0	360	25	ERP	Watt	1	25	60	0	0
56	UNKNOWN OPERATOR	Generic	Panel	4.6	1900	350	15.43	65	60	TPO	Watt	1	2094.8	16	0	0
57	UNKNOWN OPERATOR	Generic	Panel	4.6	1900	350	15.43	65	60	TPO	Watt	1	2094.8	16	0	0
58	UNKNOWN OPERATOR	Generic	Omni	12.5	150	0	2.87	360	100	ERP	Watt	1	100	24	0	0
59	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	40	0	0
60	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	40	0	0
61	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	60	0	0
62	UNKNOWN OPERATOR	Generic	Omni	9.5	450	0	5.97	360	100	ERP	Watt	1	100	62	0	0
63	UNKNOWN OPERATOR	Generic	Omni	8	150	0	2.61	360	100	ERP	Watt	1	100	60	0	0
64	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	58	0	0
65	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	48	0	0
66	UNKNOWN OPERATOR	Generic	Omni	3	450	0	0	360	25	ERP	Watt	1	25	48	0	0
67	UNKNOWN OPERATOR	Generic	Omni	9.5	450	0	5.97	360	100	ERP	Watt	1	100	52	0	0
68	UNKNOWN OPERATOR	Generic	Omni	3	450	0	0	360	25	ERP	Watt	1	25	48	0	0
69	UNKNOWN OPERATOR	Generic	Omni	3	450	0	0	360	25	ERP	Watt	1	25	60	0	0
70	UNKNOWN OPERATOR	Generic	Omni	3	450	0	0	360	25	ERP	Watt	1	25	61	0	0
71	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	61	0	0
72	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	61	0	0
73	UNKNOWN OPERATOR	Generic	Aperture	3	5800	0	29.06	2	20	ERP	Watt	1	20	10	0	0
74	UNKNOWN OPERATOR	Generic	Yagi	0.5	850	0	9.97	60	1	TPO	Watt	1	9.9	8	0	0
75	UNKNOWN OPERATOR	Generic	Omni	8	150	0	2.61	360	100	ERP	Watt	1	100	12	0	0
76	UNKNOWN OPERATOR	Generic	Yagi	3	150	0	9.11	76	100	ERP	Watt	1	100	12	0	0
77	UNKNOWN OPERATOR	Generic	Panel	1.1	2400	0	10.01	90	4	ERP	Watt	1	4	5	0	0
78	UNKNOWN OPERATOR	Generic	Omni	2	2400	0	9.51	360	4	ERP	Watt	1	4	15	0	0
79	UNKNOWN OPERATOR	Generic	Aperture	2	11000	330	31.16	2	64.5	EIRP	dBmW	1	1718.3	15	0	0
80	UNKNOWN OPERATOR	Generic	Aperture	1	18000	270	30.96	2	56.4	EIRP	dBmW	1	265.9	16	0	0
81	UNKNOWN OPERATOR	Generic	Aperture	1	18000	0	30.96	2	56.4	EIRP	dBmW	1	265.9	14	0	0
82	UNKNOWN OPERATOR	Generic	Aperture	4.6	11000	0	41.86	61	64.5	EIRP	dBmW	1	1718.3	10	0	0



Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
83	UNKNOWN OPERATOR	Generic	Aperture	4	2400	0	22.96	2	4	TPO	Watt	1	790.8	10	0	0
84	UNKNOWN OPERATOR	Generic	Aperture	3	5800	0	29.06	2	20	TPO	Watt	1	16107.6	14	0	0
85	UNKNOWN OPERATOR	Generic	Aperture	6	6000	0	36.36	2	65	EIRP	dBmW	1	1928	12	0	0
86	UNKNOWN OPERATOR	Generic	Aperture	3	5800	270	29.06	2	20	TPO	Watt	1	16107.6	16	0	0
87	UNKNOWN OPERATOR	Generic	Aperture	3	5800	0	29.06	2	20	TPO	Watt	1	16107.6	17	0	0
88	UNKNOWN OPERATOR	Generic	Aperture	4	6000	270	32.86	2	65	EIRP	dBmW	1	1928	8	0	0
89	UNKNOWN OPERATOR	Generic	Aperture	4	2400	30	22.96	2	4	TPO	Watt	1	790.8	12	0	0
90	UNKNOWN OPERATOR	Generic	Panel	1.1	2400	0	10.01	90	4	TPO	Watt	1	40.1	16	0	0
91	UNKNOWN OPERATOR	Generic	Aperture	4	11000	0	37.66	2	64.5	EIRP	dBmW	1	1718.3	10	0	0
92	UNKNOWN OPERATOR	Generic	Aperture	4	11000	0	37.66	2	64.5	EIRP	dBmW	1	1718.3	14	0	0
93	UNKNOWN OPERATOR	Generic	Aperture	4	6000	330	32.86	2	65	EIRP	dBmW	1	1928	6	0	0
94	UNKNOWN OPERATOR	Generic	Aperture	3	5800	10	29.06	2	20	TPO	Watt	1	16107.6	12	0	0
95	UNKNOWN OPERATOR	Generic	Aperture	3	5800	10	29.06	2	20	TPO	Watt	1	16107.6	13	0	0
96	UNKNOWN OPERATOR	Generic	Aperture	4	11000	10	37.66	2	64.5	EIRP	dBmW	1	1718.3	15	0	0
97	UNKNOWN OPERATOR	Generic	Aperture	4	11000	60	37.66	2	64.5	EIRP	dBmW	1	1718.3	8	0	0
98	UNKNOWN OPERATOR	Generic	Aperture	6	6000	60	36.36	2	65	EIRP	dBmW	1	1928	12	0	0
99	UNKNOWN OPERATOR	Generic	Aperture	4	11000	0	37.66	2	64.5	EIRP	dBmW	1	1718.3	14	0	0
100	UNKNOWN OPERATOR	Generic	Aperture	6	6000	30	36.36	2	65	EIRP	dBmW	1	1928	16	0	0
101	UNKNOWN OPERATOR	Generic	Aperture	2	18000	0	37.66	2	56.4	EIRP	dBmW	1	265.9	10	0	0
102	UNKNOWN OPERATOR	Generic	Aperture	4.6	11000	30	41.86	61	64.5	EIRP	dBmW	1	1718.3	10	0	0
103	UNKNOWN OPERATOR	Generic	Aperture	0	6000	0	39.06	2	65	EIRP	dBmW	1	1928	10	0	0
104	UNKNOWN OPERATOR	Generic	Omni	3	150	60	0	360	100	ERP	Watt	1	100	10	0	0
105	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	100	ERP	Watt	1	100	18	0	0
106	UNKNOWN OPERATOR	Generic	Aperture	4	11000	120	37.66	2	64.5	EIRP	dBmW	1	1718.3	18	0	0
107	UNKNOWN OPERATOR	Generic	Omni	8	150	0	2.61	360	100	TPO	Watt	1	182.4	16	0	0
108	UNKNOWN OPERATOR	Generic	Aperture	4	6000	150	32.86	2	65	EIRP	dBmW	1	1928	10	0	0
109	UNKNOWN OPERATOR	Generic	Aperture	3	5800	150	29.06	2	20	TPO	Watt	1	16107.6	12	0	0
110	UNKNOWN OPERATOR	Generic	Panel	1.1	2400	140	10.01	90	4	TPO	Watt	1	40.1	10	0	0



Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
111	UNKNOWN OPERATOR	Generic	Aperture	4.6	2400	140	19.16	61	4	TPO	Watt	1	329.7	12	0	0
112	UNKNOWN OPERATOR	Generic	Yagi	0.5	850	150	9.97	60	1	TPO	Watt	1	9.9	13	0	0
113	UNKNOWN OPERATOR	Generic	Aperture	3	5800	160	29.06	2	20	TPO	Watt	1	16107.6	15	0	0
114	UNKNOWN OPERATOR	Generic	Aperture	6	6000	100	36.36	2	65	EIRP	dBmW	1	1928	10	0	0
115	UNKNOWN OPERATOR	Generic	Panel	1.1	2400	150	10.01	90	4	TPO	Watt	1	40.1	15	0	0
116	UNKNOWN OPERATOR	Generic	Yagi	3	150	90	9.11	76	100	TPO	Watt	1	814.7	7	0	0
117	UNKNOWN OPERATOR	Generic	Aperture	8	6000	90	39.06	2	65	EIRP	dBmW	1	1928	10	0	0
118	UNKNOWN OPERATOR	Generic	Yagi	3	150	120	9.11	76	100	TPO	Watt	1	814.7	12	0	0
119	UNKNOWN OPERATOR	Generic	Aperture	6	6000	120	36.36	2	65	EIRP	dBmW	1	1928	10	0	0
120	UNKNOWN OPERATOR	Generic	Aperture	6	6000	130	36.36	2	65	EIRP	dBmW	1	1928	10	0	0
121	UNKNOWN OPERATOR	Generic	Aperture	8	11000	120	44.96	2	64.5	EIRP	dBmW	1	1718.3	10	0	0
122	UNKNOWN OPERATOR	Generic	Aperture	8	11000	120	44.96	2	64.5	EIRP	dBmW	1	1718.3	10	0	0
123	UNKNOWN OPERATOR	Generic	Aperture	3	5800	120	29.06	2	20	TPO	Watt	1	16107.6	6	0	0
124	UNKNOWN OPERATOR	Generic	Aperture	3	5800	130	29.06	2	20	TPO	Watt	1	16107.6	10	0	0
125	UNKNOWN OPERATOR	Generic	Aperture	8	6000	130	39.06	2	65	EIRP	dBmW	1	1928	10	0	0
126	UNKNOWN OPERATOR	Generic	Yagi	0.5	2400	140	13.37	27.5	4	TPO	Watt	1	86.9	12	0	0
127	UNKNOWN OPERATOR	Generic	Panel	4.6	1900	240	15.43	65	60	TPO	Watt	1	2094.8	60	0	0
128	UNKNOWN OPERATOR	Generic	Panel	4.6	1900	240	15.43	65	60	TPO	Watt	1	2094.8	60	0	0
129	UNKNOWN OPERATOR	Generic	Panel	4.6	1900	240	15.43	65	60	TPO	Watt	1	2094.8	60	0	0
130	P1	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	51.5	0	0
131	P2	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	51.5	0	0
132	P3 (Rx)	Rfi CC807-08	Omni	9.5	800	0	8	360	0	ERP	Watt	1	0	64.8	0	0
133	P4 (Rx)	Rfi CC807-08	Omni	9.5	800	0	8	360	0	ERP	Watt	1	0	64.8	0	0

NOTE: Z indicates relative position of the antenna to the origin location on the site, displayed in the model results diagram. The Z reference indicates antenna height above the main site level unless otherwise indicated. ERP values provided by the client and used in the modeling may be greater than are currently deployed. For other carriers at this site the use of "Generic" as an antenna model or "Unknown" for a wireless operator means the information with regard to carrier, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.

6.6 Site Pictures



Figure 19: Monopoles 1 & 2



Figure 20: Monopoles 3 & 4



Figure 21: Monopoles 5 & 6



Figure 22: Monopoles 7 & 8



Figure 23: Monopoles Overview



Figure 24: Northwestern Microwaves



Figure 25: Northern Microwaves



Figure 26: Northeastern Microwaves



Figure 27: Antennas 104 & 105



Figure 28: Southwestern Microwaves



Figure 29: Southern Microwaves



Figure 30: Southeastern Microwaves (1)



Figure 31: Southeastern Microwaves (2)



Figure 32: Dome Overview Facing West



Figure 33: Dome Overview Facing South



Figure 34: Dome Overview Facing Southwest



Figure 35: AT&T Monopole

7 Mt. Barnabe



Marin Emergency Radio Authority

Site Name – Mt. Barnabe

Site ID: 5

Site Compliance Report

**1 Barnabe Peak Ave.
Lagunitas, CA 94938**

Site visit date: August 23, 2018
Site visit time: 11:23 PM
Site survey by: Jeff Desira

Latitude: N38-1-36.30
Longitude: W122-42-58.76
Structure Type: Self-Support

Report generated date: March 28, 2019
Report by: Sam Cosgrove
Customer Contact: David Mortimer

Marin Emergency Radio Authority is compliant and will remain compliant upon implementation of the proposed changes. The site has compliance issues that are not the result of, and therefore not the responsibility of, Marin Emergency Radio Authority.

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7.1 Site Summary

The County of Marin on behalf of Marin Emergency Radio Authority has contracted with Sitesafe, LLC. (Sitesafe), an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine the RF conditions at the communications site, 5 - Mt. Barnabe, located at 1 Barnabe Peak Ave., Lagunitas, CA, in relation to Federal Communications Commission (FCC) Rules and Regulations for RF emissions.

Sitesafe's field personnel visited 5 - Mt. Barnabe on August 23, 2018. This section contains a detailed summary of the RF environment at the site including:

- Site compliance determination;
- Photographs of the site;
- Diagram of the site;
- Inventory of the make / model of all transmitting antennas found on the site (where possible);
- Record of any Maximum Permissible Exposure ("MPE") measurements taken on the site, as applicable; and
- Theoretical MPE based on modeling.

RF emissions on the rooftop and outside walkway of the fire lookout tower exceed MPE limits. The unknown operators in this area should review their antennas and make changes to the configuration accordingly. These areas are regularly accessed by fire lookout personnel, so signage or RF safety plans would not be sufficient. The RF emissions on the ground level do not pose a danger to anyone accessing the area. The proposed antennas do not change the RF emissions on the ground or rooftop levels significantly.



7.2 Site Compliance

7.2.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, and a thorough review of site access procedures, RF hazard signage and visible antenna locations, Sitesafe has determined that:

Marin Emergency Radio Authority is compliant with the FCC rules and regulations, as described in OET Bulletin 65, and will remain compliant upon implementation of the proposed changes. The site has compliance issues that are not the result of, and therefore not the responsibility of, Marin Emergency Radio Authority.

The compliance determination is based on General Public MPE levels due to theoretical modeling and/or physical measurements, RF signage placement, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the Marin Emergency Radio Authority's proposed deployment plan could result in the site being rendered non-compliant. Measurements have also been performed to validate the assumptions used in our theoretical modeling of this site.

Modeling is used for determining compliance and the percentage of MPE contribution. Measurements provide a view of MPE percentage levels at the site at the time of Sitesafe's visit and are used to validate modeling results.

7.2.2 Actions for Site Compliance

Based on common industry practice and our understanding of FCC and OSHA requirements, this section provides a statement of recommendations for site compliance. RF alert signage recommendations have been proposed based on existing measurements and theoretical analysis of MPE levels. Sitesafe has documented the locations of any RF signs and barriers that are required for compliance. Barriers can consist of locked doors, fencing, railing, rope, chain, paint striping or tape, combined with RF alert signage.

This site will be compliant with the FCC rules and regulations.

Remediation for other operators (Marin Emergency Radio Authority is not responsible for the actions below):

Operators #1

The antennas on the Lookout Tower Rooftop, Lookout Tower Deck, and lower area of the tower should be relocated or an RF Safety Plan should be implemented for the site.

NOTE: The areas that are predicted to have emissions above MPE limits are in public areas accessed by site personnel.

7.3 RF Emissions Diagram

The RF diagram(s) below display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix B.

The key at the bottom of each diagram indicates if percentages displayed are referenced to FCC General Population Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Gray represents areas predicted to be at 5% of the MPE limits, or below.
- Green represents areas predicted to be between 5% and 100% of the MPE limits.
- Blue represents areas predicted to be between 100% and 500% of the MPE limits.
- Yellow represents areas predicted to be between 500% and 5000% of the MPE limits.
- Red areas indicated predicted levels greater than 5000% of the MPE limits.

The theoretical analysis identified the maximum predicted MPE levels on the rooftop to be:

Maximum Cumulative Theoretical General Public MPE level (Existing Antennas) : 889.7%
Maximum Cumulative Theoretical General Public MPE level (All Antennas): 967.6%
Maximum Cumulative Theoretical General Public MPE level (Proposed Antennas): 967.6%

General Population diagrams are specified when an area is accessible to the public; i.e. personnel that do not meet Occupational or RF Safety trained criteria, could gain access.

If trained occupational personnel require access to areas that are delineated as **Blue** or above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the operators to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

The key at the bottom also indicates the level or height of the modeling with respect to the main level. The origin is typically referenced to the main rooftop level, or ground level for a structure without access to the antenna level. For example:

Average from 0 feet above to 6 feet above origin

and

Average from 20 feet above to 26 feet above origin

The first indicates modeling at the main rooftop (or ground) level averaged over 6 feet. The second indicates modeling at a higher level (possibly a penthouse level) of 20 feet averaged over 6 feet.

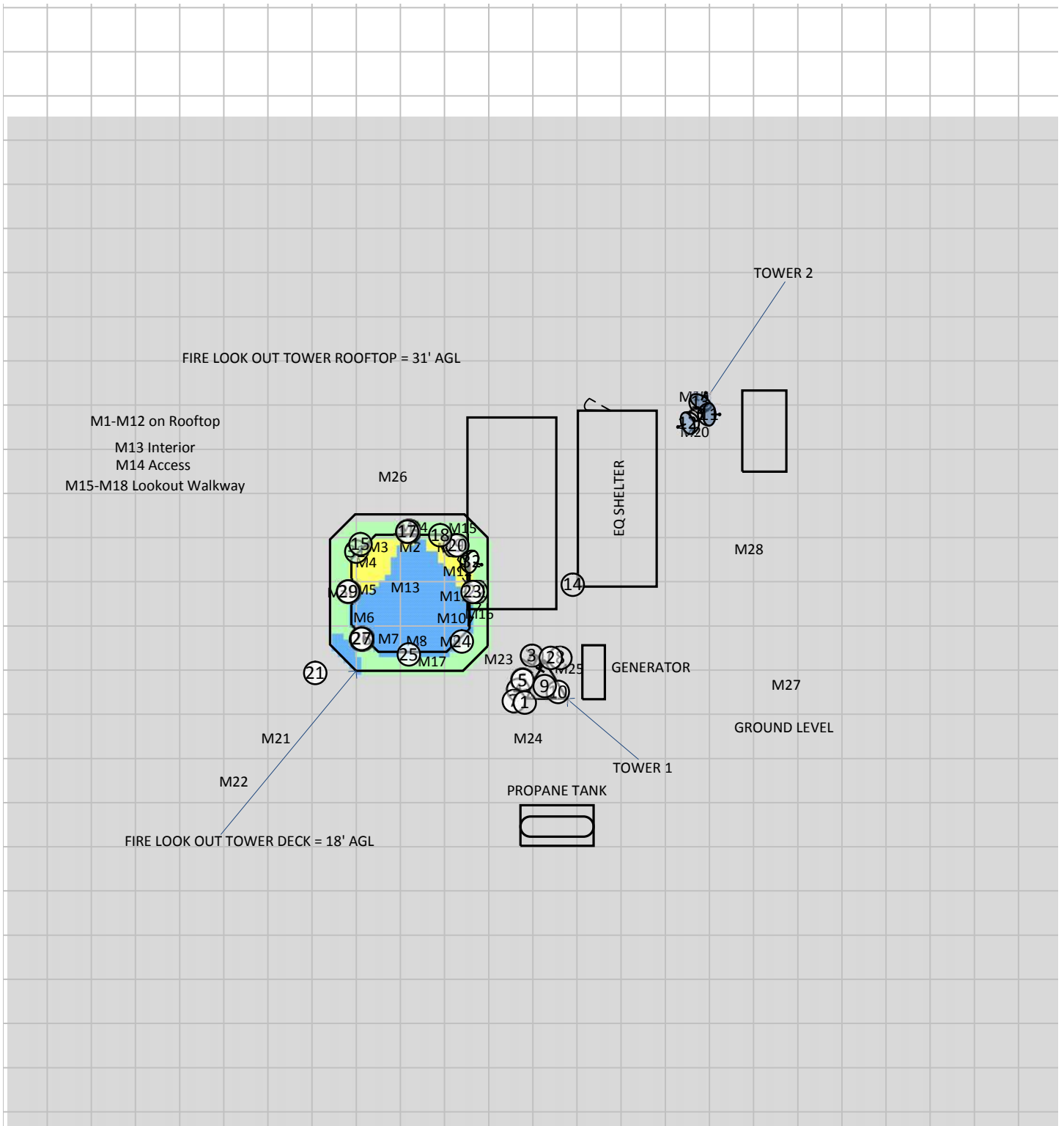


Abbreviations used in the RF Emissions Diagrams

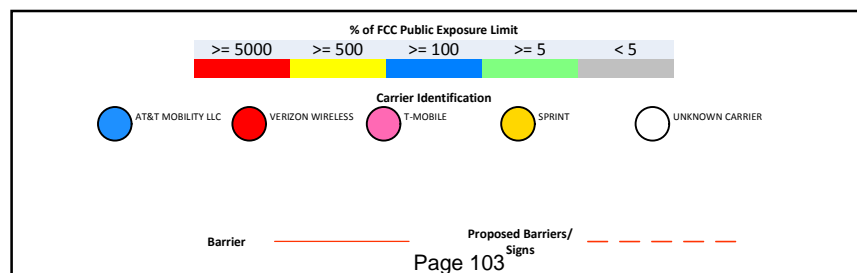
PH=##'	Penthouse at ## feet above main roof
M##	Measurement ## taken during a site visit

As discussed in Section 7.4, site measurement locations for spatial average measurements collected at the time of Sitesafe's visit have been added to the RF emissions diagram. While the theoretical modeling represents worst case MPE levels based on the assumption(s) detailed above, the measurement data is a snapshot of MPE levels at the time of our visit, and dependent on transmitter duty cycle, system implementation and emissions from other RF sources at nearby antenna sites.

RF Exposure Simulation For: Mt. Barnabe Existing Configuration



% of FCC Public Exposure Limit
Spatial average 0' - 6'



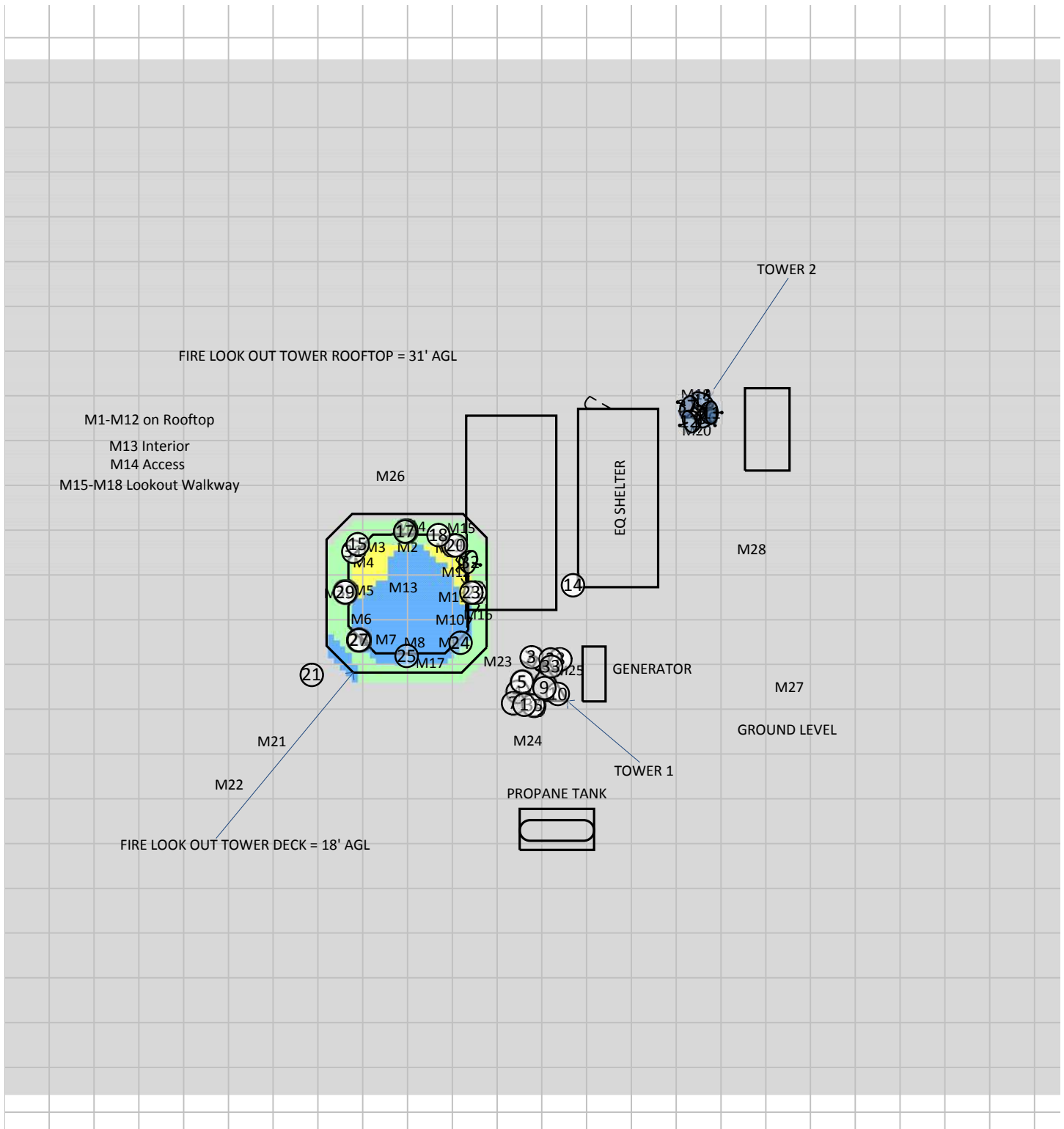
(Feet)

0 6 12

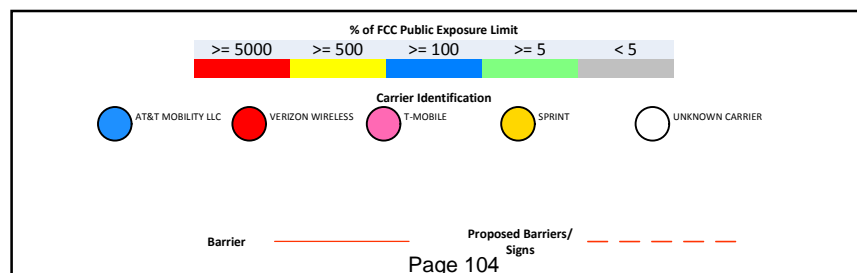
www.sitesafe.com
Site Name: Mt. Barnabe
11/5/2018 9:57:44 AM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Mt. Barnabe All Antennas On Air



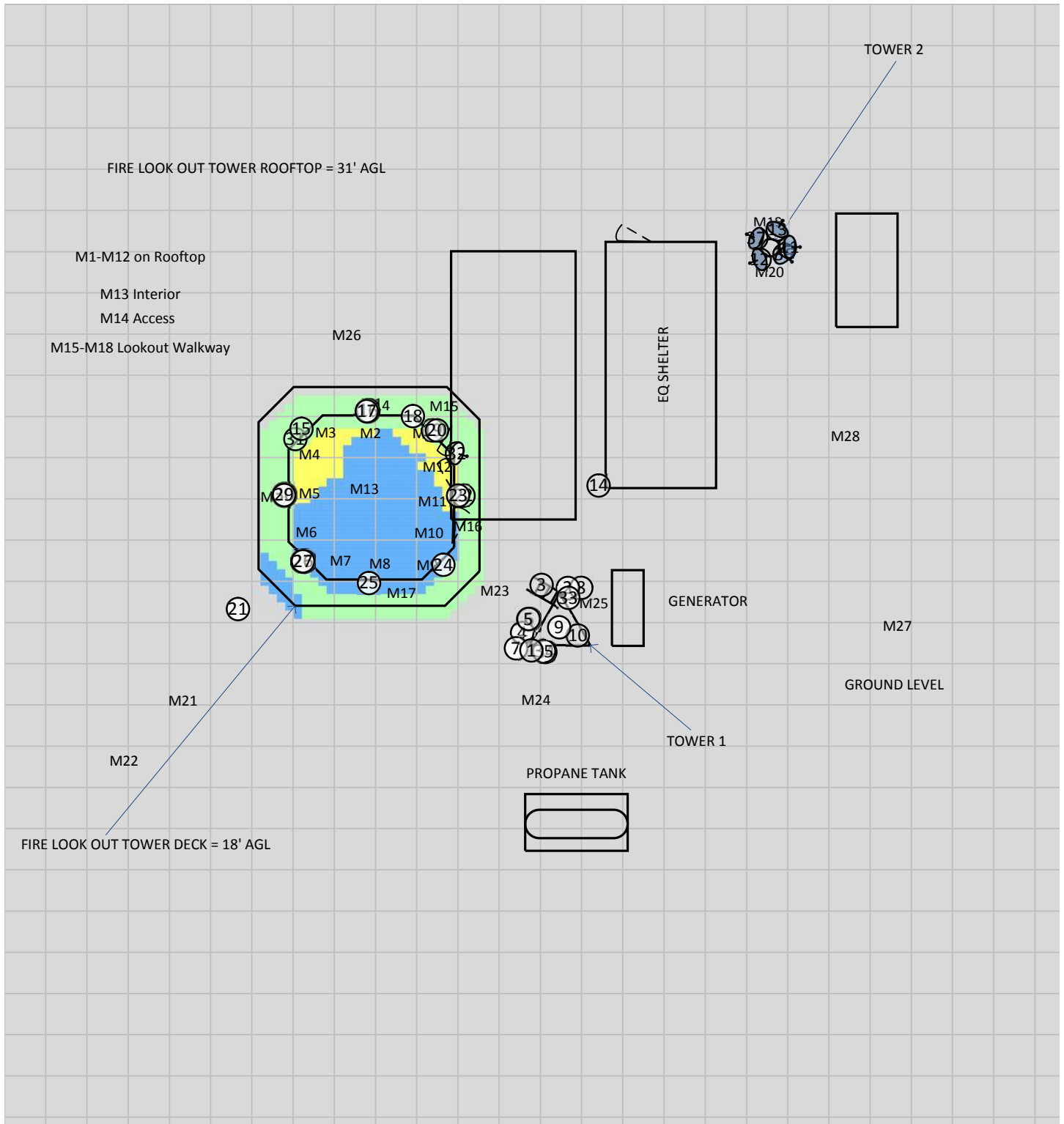
% of FCC Public Exposure Limit
Spatial average 0' - 6'



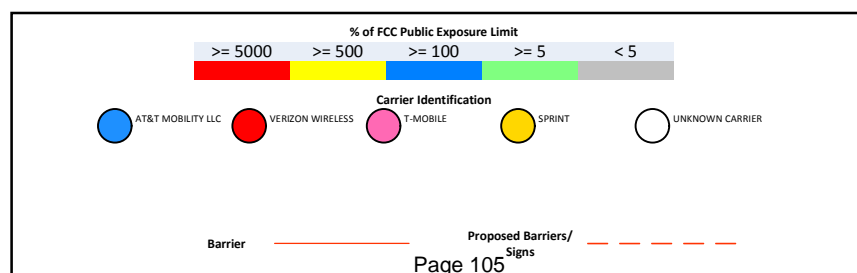
(Feet)
0 5.9 11.8
www.sitesafe.com
Site Name: Mt. Barnabe
11/5/2018 9:54:01 AM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Mt. Barnabe All Antennas On Air – Detail View



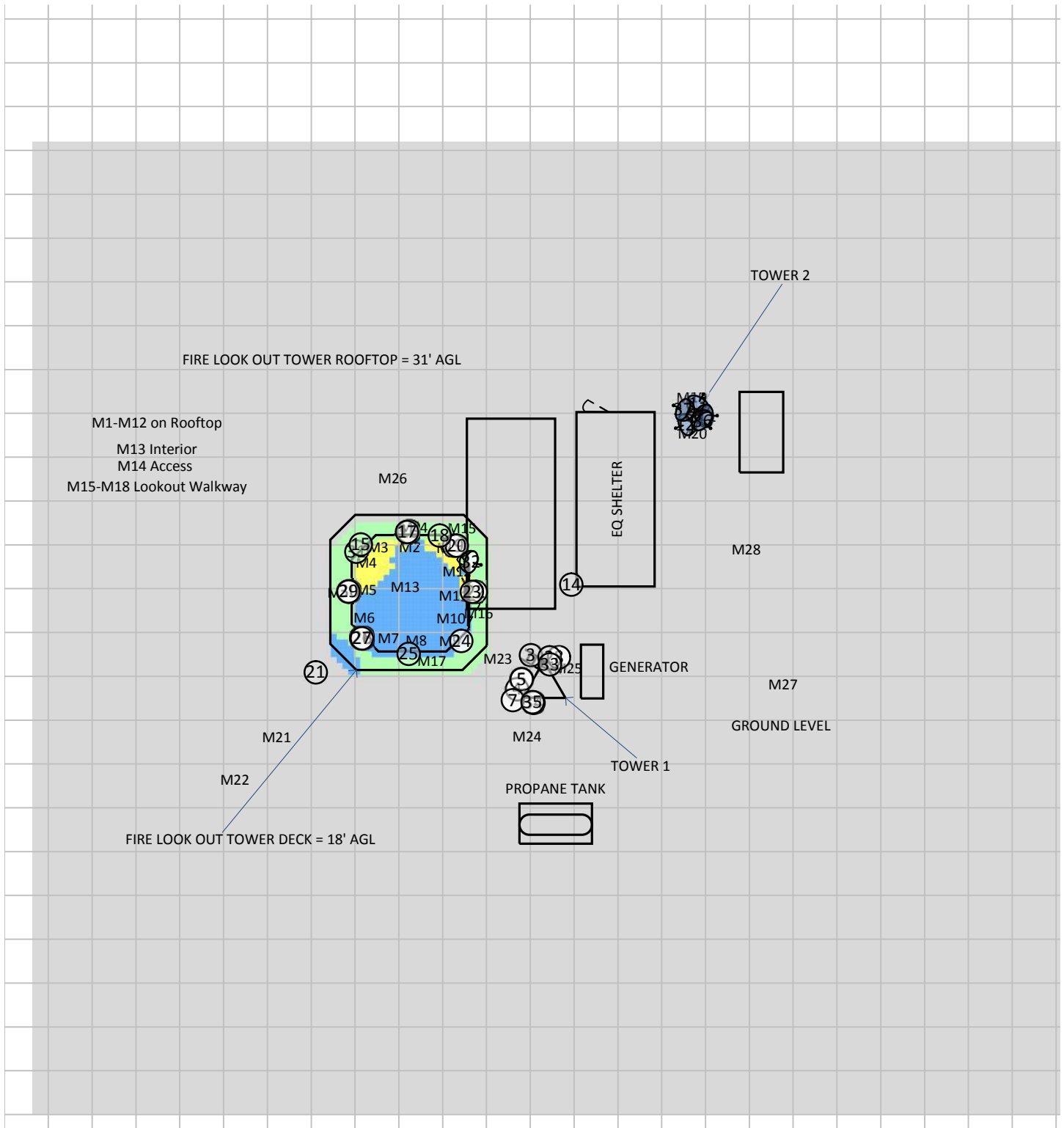
% of FCC Public Exposure Limit
Spatial average 0' - 6'



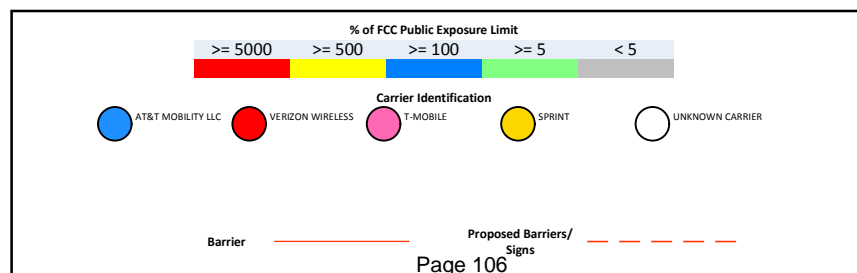
(Feet)
0 4.3 8.5
www.sitesafe.com
Site Name: Mt. Barnabe
11/5/2018 9:56:15 AM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Mt. Barnabe Final Configuration



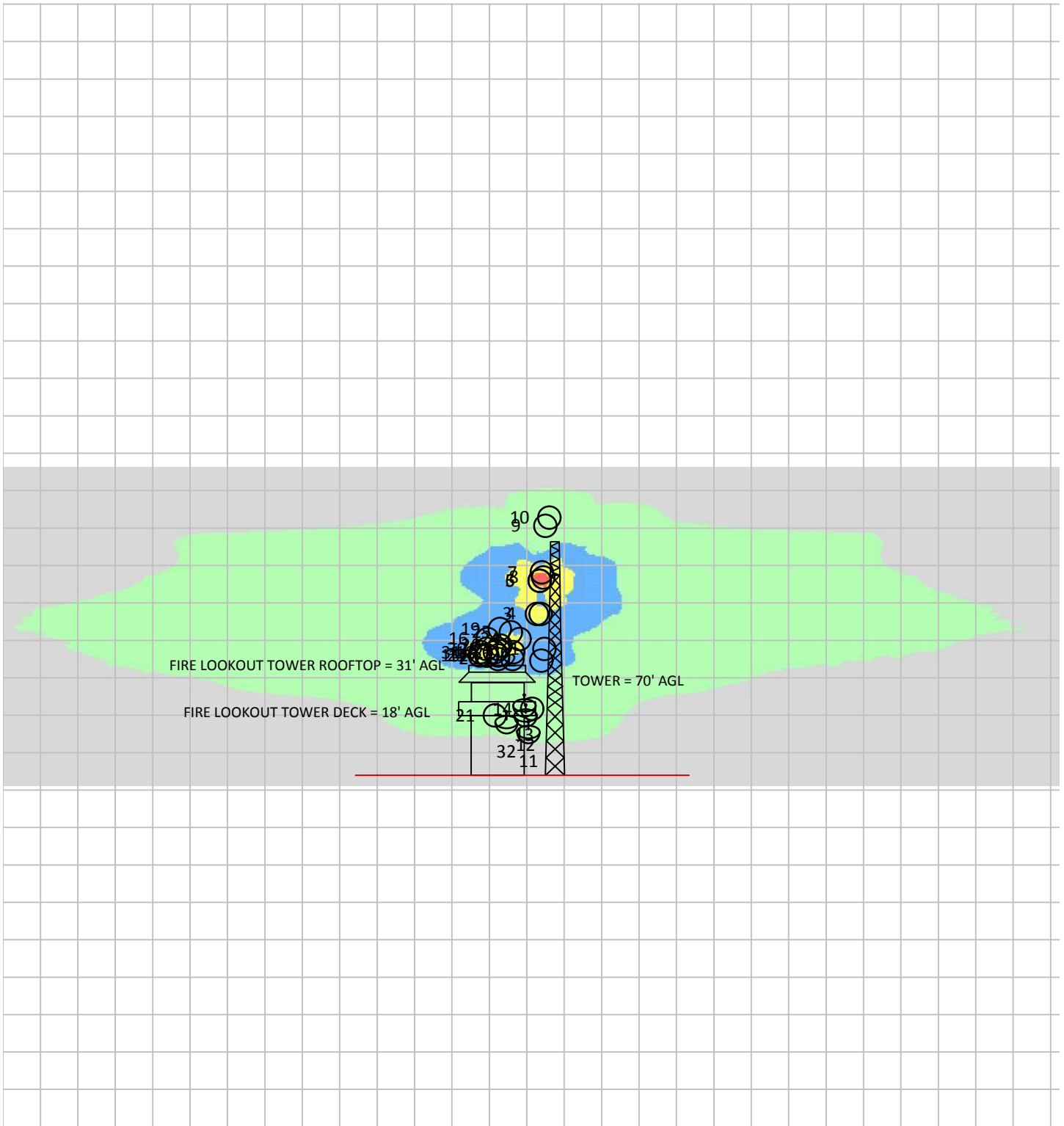
% of FCC Public Exposure Limit
Spatial average 0' - 6'



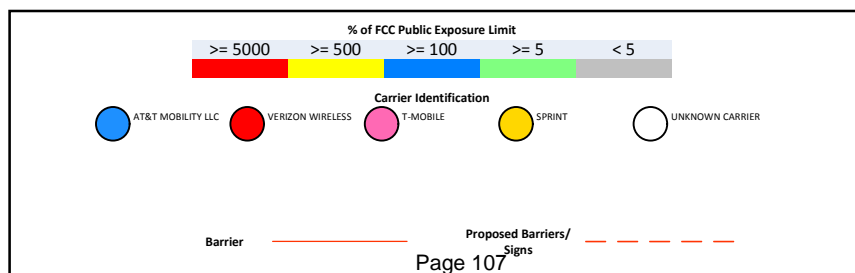
(Feet)
0 6 12
www.sitesafe.com
Site Name: Mt. Barnabe
11/5/2018 9:59:19 AM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

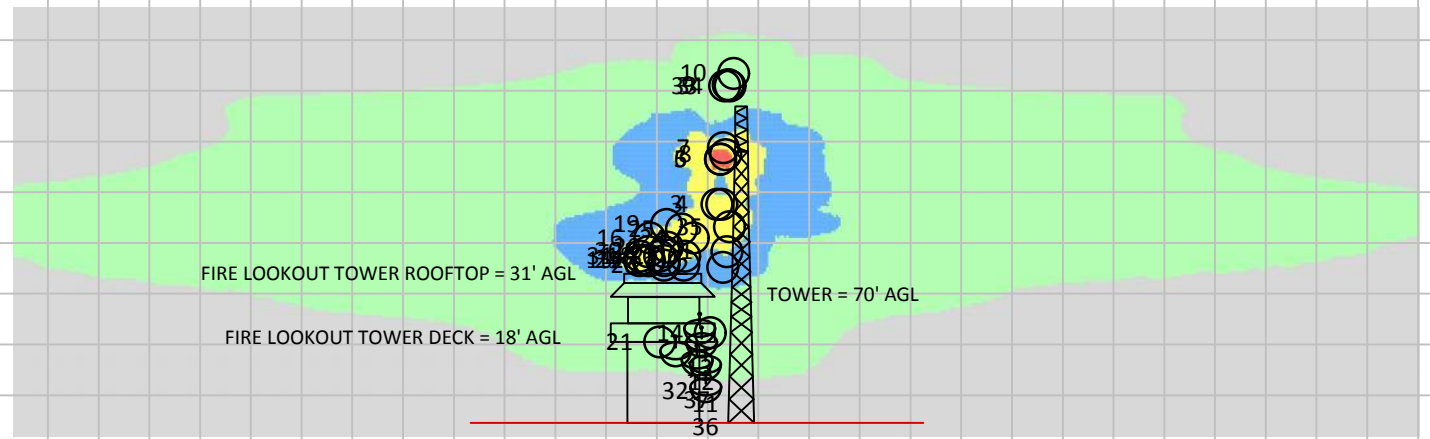
RF Exposure Simulation For: Mt. Barnabe Elevation View – Existing Configuration



% of FCC Public Exposure Limit
Spatial average 0' - 6'



RF Exposure Simulation For: Mt. Barnabe Elevation View – All Antennas On Air



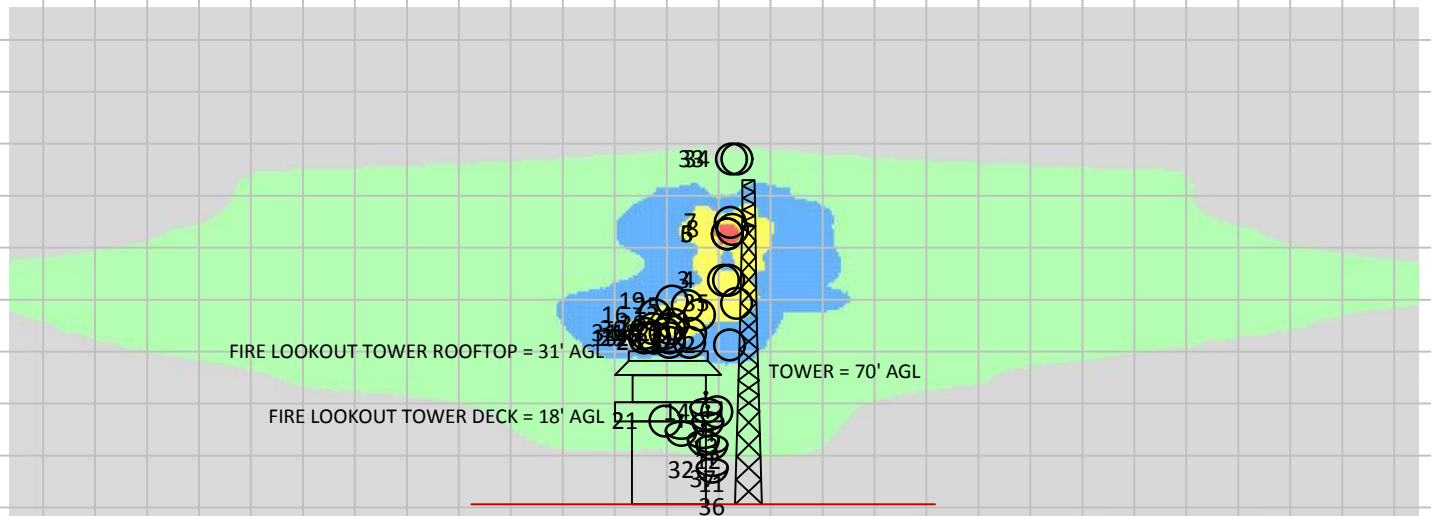
% of FCC Public Exposure Limit



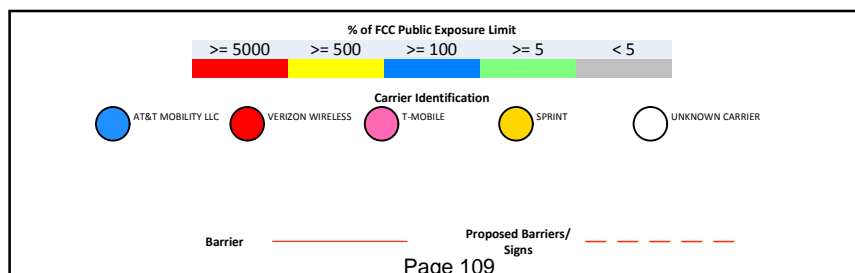
Barrier

Proposed Barriers/
Signs

RF Exposure Simulation For: Mt. Barnabe Elevation View – Final Configuration



% of FCC Public Exposure Limit



7.4 Site Measurements

This section provides a summary of the measurements collected at the site. Actual measurements locations at which these data points were collected are included in the RF emission diagram provided in Section 7.3 of this report. Two types of measurements were collected at each measurement location: maximum (peak) and spatial average. The spatial average measurement consists of a collection of ten (10) measurements within a ten (10) second time interval taken from zero (0) to six (6) feet in height. The purpose of this measurement technique is to identify the average power density over the dimensions of a typical human body.

Table 1 below contains all the measurements collected from accessible areas located at the site at the time of Sitesafe's visit. Whenever possible, measurements are taken in front of the antenna in the transmitting direction. However, because of the antenna configuration at this site, specific emissions could not be discerned from nearby facilities, and no attempt was made to determine power density levels from a specific transmitting antenna.

Highest Measured Occupational Level: 11.00%

This value is equal to:

Highest General Public Level: 55.00%.

Measurements Points	Spatial Average	Maximum	Measurements Points	Spatial Average	Maximum
M1	2 %	3 %	M16	1 %	2 %
M2	1 %	2 %	M17	<1 %	2 %
M3	1 %	1 %	M18	<1 %	1 %
M4	1 %	1 %	M19	<1 %	1 %
M5	1 %	1 %	M20	<1 %	<1 %
M6	1 %	2 %	M21	<1 %	<1 %
M7	3 %	7 %	M22	<1 %	<1 %
M8	1 %	2 %	M23	1 %	1 %
M9	3 %	6 %	M24	<1 %	<1 %
M10	11 %	15 %	M25	<1 %	<1 %
M11	9 %	12 %	M26	<1 %	1 %
M12	5 %	6 %	M27	<1 %	<1 %
M13	<1 %	1 %	M28	<1 %	<1 %
M14	<1 %	<1 %	M29	<1 %	<1 %
M15	<1 %	<1 %	M30	<1 %	<1 %

RF meters and probes have been calibrated and used according to the manufacturer's specifications. Measurements provide a view of the MPE percentage levels at the site at the time of Sitesafe's site visit and are used to validate modeling results. Theoretical modeling is used for determining compliance and the percentage of MPE contributions.

An RF Emission diagram has been included in section 7.3 of this document. All measurement locations are identified in this diagram. The locations of measurements in the RF Emission diagram can be cross referenced with Table 1 (above) to determine the actual spatial average and maximum measurement value per location.

7.5 Antenna Inventory

The Antenna Inventory shows all transmitting antennas at the site. This inventory was verified on site, and was utilized by Sitesafe to perform theoretical modeling of RF emissions. The inventory coincides with the site diagrams in this report, identifying each antenna's location at 5 - Mt. Barnabe. The antenna information collected includes the following information:

- Licensee or wireless operator name
- Frequency or frequency band
- Transmitter power – Effective Radiated Power ("ERP"), or Equivalent Isotropic Radiated Power ("EIRP") in Watts
- Antenna manufacturer make, model, and gain

For other operators at this site, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.



The following antenna inventory and representative photographs were obtained or verified during the site visit and were utilized to create the site model diagrams:

Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
1	E1	Generic	Omni	14	850	144	9.97	360	1000	ERP	Watt	1	1000	38	0	0
2	E2	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	34.5	0	0
3	E3	Generic	Omni	8	150	0	2.61	360	100	ERP	Watt	1	100	48.5	0	0
4	E4	Generic	Omni	8	150	204	2.61	360	100	ERP	Watt	1	100	48.5	0	0
5	E5	Generic	Omni	1.5	850	204	0.01	360	1000	ERP	Watt	1	1000	58.5	0	0
6	E6	Generic	Omni	1.5	850	204	0.01	360	1000	ERP	Watt	1	1000	58.5	0	0
7	E7	Generic	Omni	8	150	124	2.61	360	100	ERP	Watt	1	100	61	0	0
8	E8	Generic	Omni	4.7	450	84	2.97	360	100	ERP	Watt	1	100	59.5	0	0
9	E9 (Rx)	Generic	Omni	9.5	450	144	5.97	360	0	ERP	Watt	1	0	75	0	0
10	E10	Generic	Omni	9.5	450	264	5.97	360	100	ERP	Watt	1	100	77.5	0	0
11	E11	Generic	Aperture	4	11435	90	37.66	2	64.7	EIRP	dBmW	1	1799.4	13	0	0
12	E12	Generic	Aperture	4	11415	250	37.66	2	64.7	EIRP	dBmW	1	1799.4	18	0	0
13	E13	Generic	Aperture	4	11693	30	37.66	2	64.7	EIRP	dBmW	1	1799.4	21	0	0
14	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	20	0	0
15	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	36	0	0
16	UNKNOWN OPERATOR	Generic	Omni	8	150	0	2.61	360	100	ERP	Watt	1	100	41	0	0
17	UNKNOWN OPERATOR	Generic	Yagi	1.2	450	300	9.97	60	100	ERP	Watt	1	100	36	0	0
18	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	37	0	0
19	UNKNOWN OPERATOR	Generic	Omni	12.5	150	0	2.87	360	0	TPO	Watt	1	0	44	0	0
20	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	39	0	0
21	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	18	0	0
22	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	37	0	0
23	UNKNOWN OPERATOR	Generic	Omni	9	92	90	0	360	10	TPO	Watt	1	10	35	0	0
24	UNKNOWN OPERATOR	Generic	Omni	9.5	450	0	5.97	360	100	ERP	Watt	1	100	41	0	0
25	UNKNOWN OPERATOR	Generic	Omni	8	150	0	2.61	360	100	ERP	Watt	1	100	43	0	0
26	UNKNOWN OPERATOR	Generic	Panel	3	450	210	15.51	32	100	ERP	Watt	1	100	35	0	0



Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
27	UNKNOWN OPERATOR	Generic	Yagi	1.2	450	260	9.97	60	100	ERP	Watt	1	100	36	0	0
28	UNKNOWN OPERATOR	Generic	Panel	3	450	270	15.51	32	100	ERP	Watt	1	100	38	0	0
29	UNKNOWN OPERATOR	Generic	Yagi	3	150	300	9.11	76	100	ERP	Watt	1	100	36	0	0
30	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	38	0	0
31	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	37	0	0
32	UNKNOWN OPERATOR	Generic	Aperture	0	6635	105.9	39.06	0	66.3	EIRP	dBmW	1	2600.6	16	0	0
33	P1 (Rx)	Rfi CC807-08	Omni	9.5	800	0	8	360	0	ERP	Watt	1	0	74.8	0	0
34	P2 (Rx)	Rfi CC807-08	Omni	9.5	800	0	8	360	0	ERP	Watt	1	0	74.8	0	0
35	P3	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	43.5	0	0
36	P4	Generic	Aperture	4	11000	133.8	37.66	2	64.7	EIRP	dBmW	1	1799.4	8	0	0
37	P5	Generic	Aperture	4	11000	294	37.66	2	64.7	EIRP	dBmW	1	1799.4	14	0	0

NOTE: Z indicates relative position of the antenna to the origin location on the site, displayed in the model results diagram. The Z reference indicates antenna height above the main site level unless otherwise indicated. ERP values provided by the client and used in the modeling may be greater than are currently deployed. For other operators at this site the use of "Generic" as an antenna model or "Unknown" for a wireless operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.

7.6 Site Pictures



Figure 36: Overview Facing South



Figure 37: Overview Facing Southwest



Figure 38: Overview Facing Northwest



Figure 39: Ground Level Overview



Figure 40: Tower Overview Facing South



Figure 41: Lower Tower Overview Facing Southeast



Figure 42: Upper Tower Overview Facing Southeast

8 Point Reyes



Marin Emergency Radio Authority

Site Name – Point Reyes

Site ID: 8

Site Compliance Report

**3 Mt. Vision Rd.
Inverness, CA 94937**

Site visit date: August 23, 2018
Site visit time: 3:48 PM
Site survey by: Jeff Desira

Latitude: N38-4-47.24
Longitude: W122-52-00.70
Structure Type: Self-Support

Report generated date: March 28, 2019
Report by: Sam Cosgrove
Customer Contact: David Mortimer

The site is compliant and will remain complaint upon implementation of the proposed changes.

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8.1 Site Summary

The County of Marin on behalf of Marin Emergency Radio Authority has contracted with Sitesafe, LLC. (Sitesafe), an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine the RF conditions at the communications site, 8 - Point Reyes, located at 3 Mt. Vision Rd., Inverness, CA, in relation to Federal Communications Commission (FCC) Rules and Regulations for RF emissions.

Sitesafe's field personnel visited 8 - Point Reyes on August 23, 2018. This section contains a detailed summary of the RF environment at the site including:

- Site compliance determination;
- Photographs of the site;
- Diagram of the site;
- Inventory of the make / model of all transmitting antennas found on the site (where possible);
- Record of any Maximum Permissible Exposure ("MPE") measurements taken on the site, as applicable; and
- Theoretical MPE based on modeling.

The RF emissions on site do not exceed MPE limits. The levels measured on site and the theoretical predictions come close to the MPE limit, but do not exceed. The RF emissions shown are mainly due to the FM transmitter on site (antenna #2).



8.2 Site Compliance

8.2.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, and a thorough review of site access procedures, RF hazard signage and visible antenna locations, Sitesafe has determined that:

The site is compliant with the FCC rules and regulations, as described in OET Bulletin 65, and will remain compliant upon implementation of the proposed changes.

The compliance determination is based on General Public MPE levels due to theoretical modeling and/or physical measurements, RF signage placement, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the Marin Emergency Radio Authority's proposed deployment plan could result in the site being rendered non-compliant. Measurements have also been performed to validate the assumptions used in our theoretical modeling of this site.

Modeling is used for determining compliance and the percentage of MPE contribution. Measurements provide a view of MPE percentage levels at the site at the time of Sitesafe's visit and are used to validate modeling results.

8.2.2 Actions for Site Compliance

Based on common industry practice and our understanding of FCC and OSHA requirements, this section provides a statement of recommendations for site compliance. RF alert signage recommendations have been proposed based on existing measurements and theoretical analysis of MPE levels. Sitesafe has documented the locations of any RF signs and barriers that are required for compliance. Barriers can consist of locked doors, fencing, railing, rope, chain, paint striping or tape, combined with RF alert signage.

This site will be compliant with the FCC rules and regulations.

8.3 Emissions Diagram

The RF diagram(s) below display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix B.

The key at the bottom of each diagram indicates if percentages displayed are referenced to FCC General Population Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Gray represents areas predicted to be at 5% of the MPE limits, or below.
- Green represents areas predicted to be between 5% and 100% of the MPE limits.
- Blue represents areas predicted to be between 100% and 500% of the MPE limits.
- Yellow represents areas predicted to be between 500% and 5000% of the MPE limits.
- Red areas indicated predicted levels greater than 5000% of the MPE limits.

The theoretical analysis identified the maximum predicted MPE levels on the ground to be:

Maximum Cumulative Theoretical General Public MPE level (Existing Antennas): 21.3%
Maximum Cumulative Theoretical General Public MPE level (All Antennas): 21.5%
Maximum Cumulative Theoretical General Public MPE level (Proposed Antennas): 16.2%

General Population diagrams are specified when an area is accessible to the public; i.e. personnel that do not meet Occupational or RF Safety trained criteria, could gain access.

If trained occupational personnel require access to areas that are delineated as **Blue** or above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the operators to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

The key at the bottom also indicates the level or height of the modeling with respect to the main level. The origin is typically referenced to the main rooftop level, or ground level for a structure without access to the antenna level. For example:

Average from 0 feet above to 6 feet above origin

and

Average from 20 feet above to 26 feet above origin

The first indicates modeling at the main rooftop (or ground) level averaged over 6 feet. The second indicates modeling at a higher level (possibly a penthouse level) of 20 feet averaged over 6 feet.

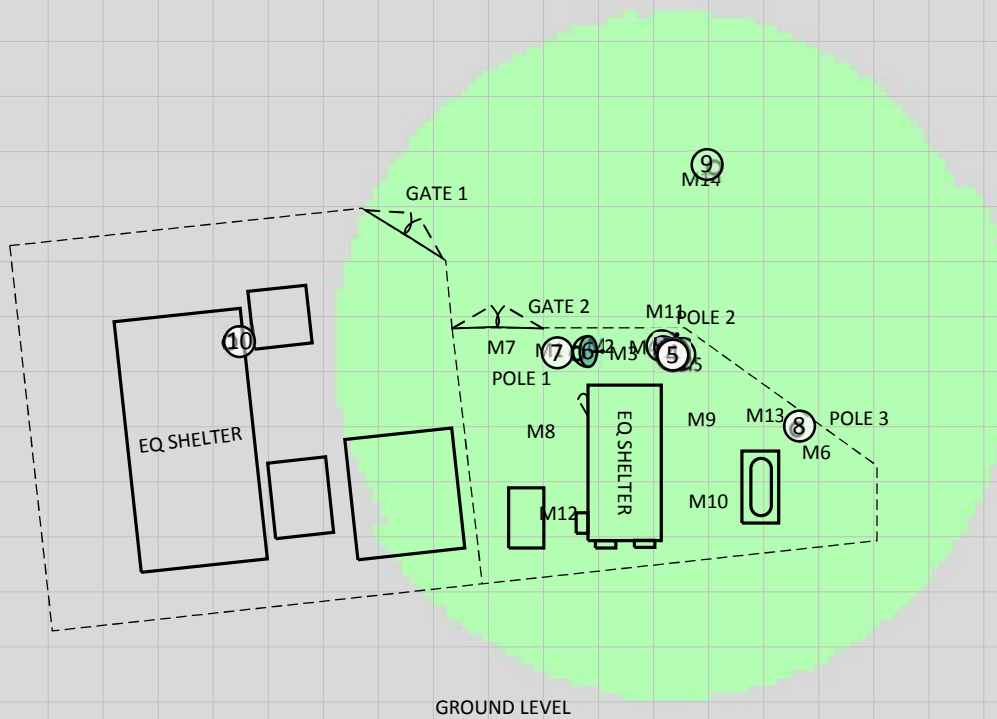


Abbreviations used in the RF Emissions Diagrams

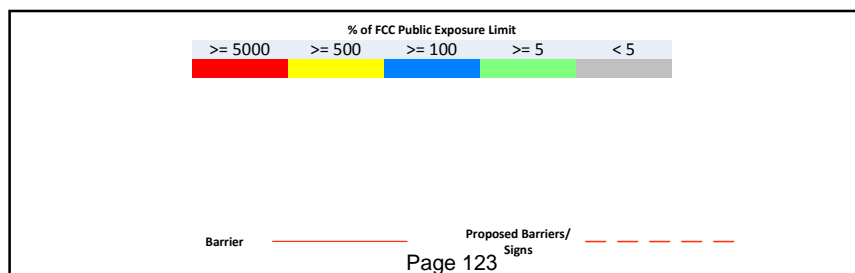
PH=##'	Penthouse at ## feet above main roof
M##	Measurement ## taken during a site visit

As discussed in Section 8.4, site measurement locations for spatial average measurements collected at the time of Sitesafe's visit have been added to the RF emissions diagram. While the theoretical modeling represents worst case MPE levels based on the assumption(s) detailed above, the measurement data is a snapshot of MPE levels at the time of our visit, and dependent on transmitter duty cycle, system implementation and emissions from other RF sources at nearby antenna sites.

RF Exposure Simulation For: Point Reyes Existing Configuration



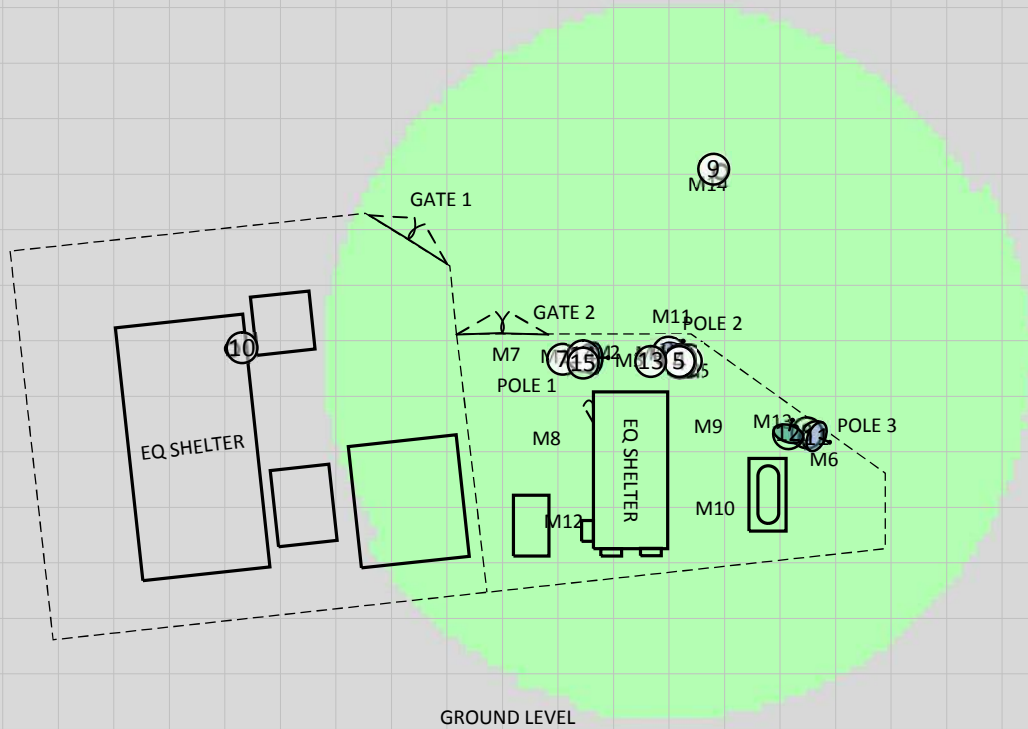
% of FCC Public Exposure Limit
Spatial average 0' - 6'



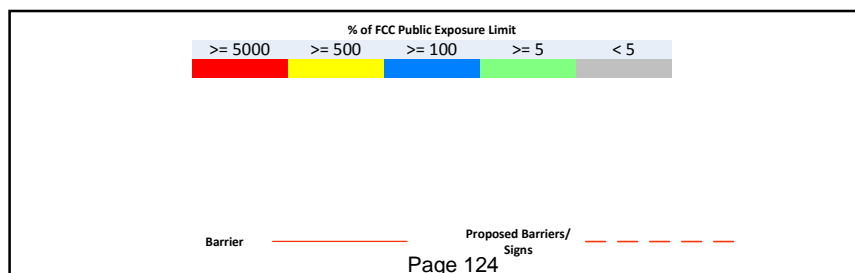
(Feet)
0 13.1 26.2
www.sitesafe.com
Site Name: Point Reyes
11/5/2018 10:19:46 AM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Point Reyes All Antennas On Air



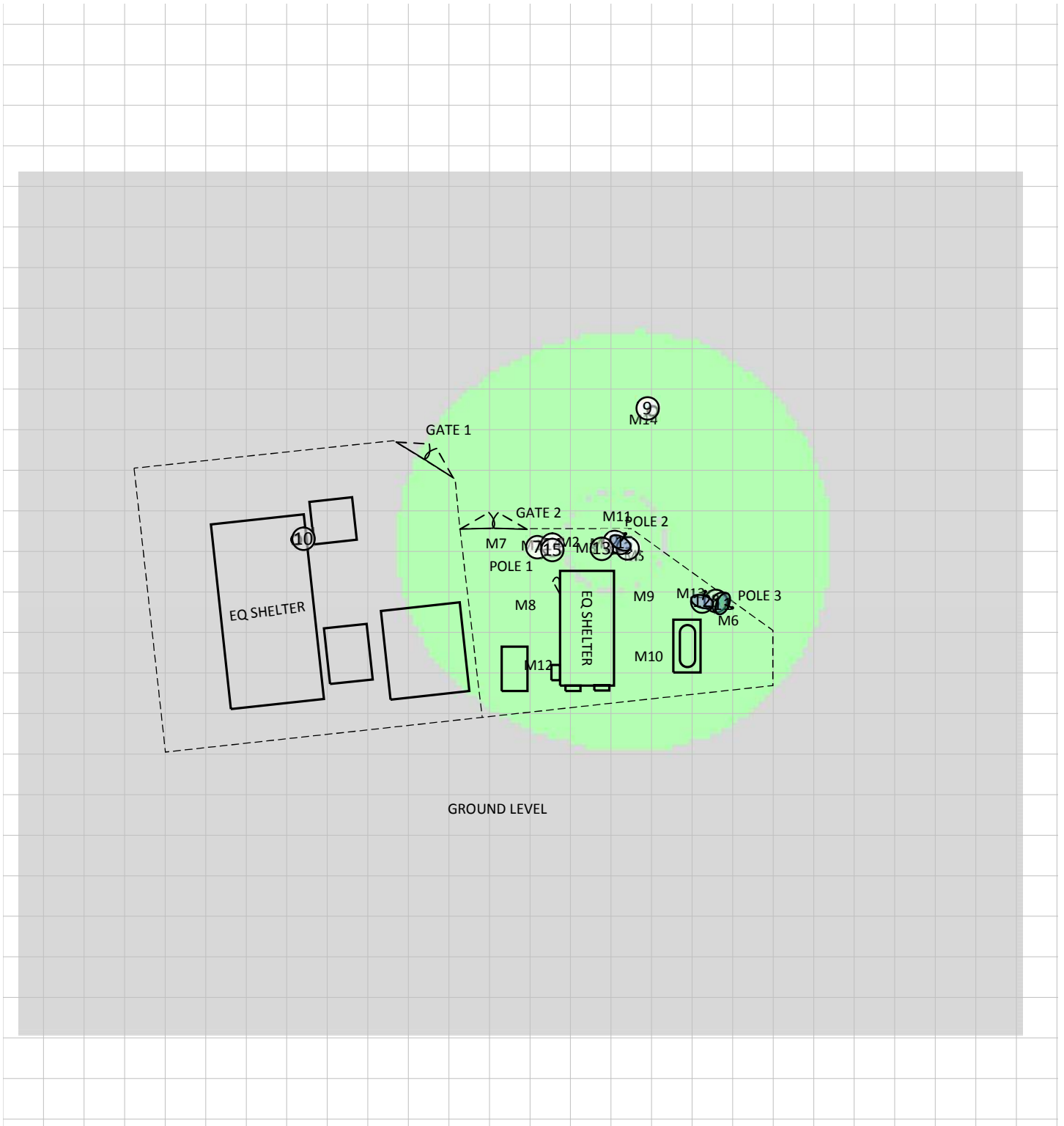
% of FCC Public Exposure Limit
Spatial average 0' - 6'



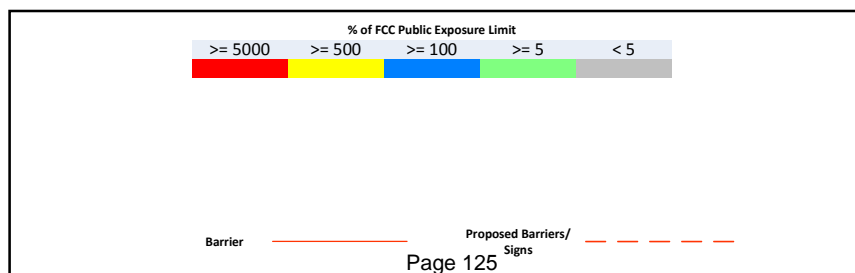
(Feet)
0 13 25.9
www.sitesafe.com
Site Name: Point Reyes
11/5/2018 10:16:46 AM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Point Reyes Final Configuration



% of FCC Public Exposure Limit
Spatial average 0' - 6'



(Feet)
0 13 26
www.sitesafe.com
Site Name: Point Reyes
11/5/2018 10:18:31 AM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

MONOPOLE = 40' AGL

FENCE

GROUND LEVEL

TOWERS = 17' AGL

EQ SHELTER = 12' AGL

10

1 2 3 4 5 6 7 8 9

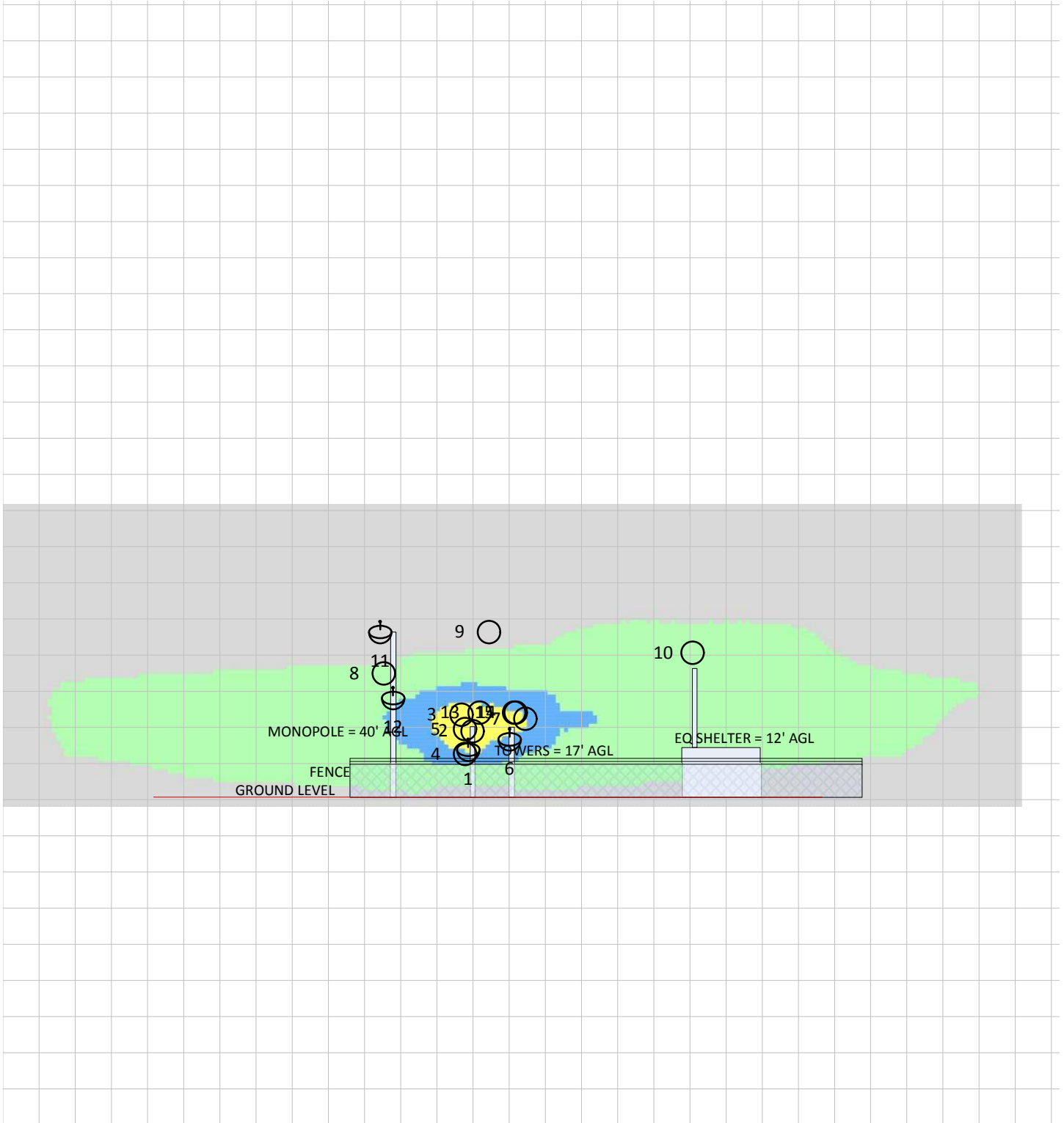
% of FCC Public Exposure Limit

>= 5000	>= 500	>= 100	>= 5	< 5

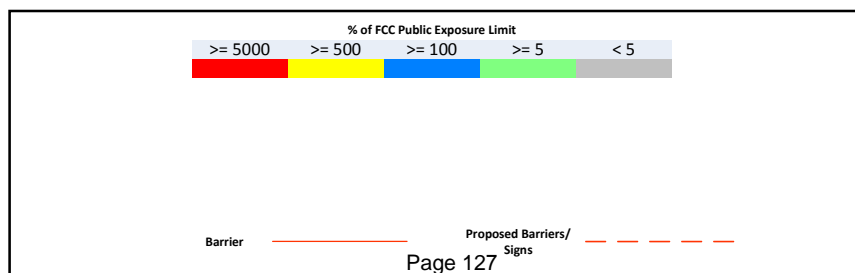
Barrier _____ Proposed Barriers/
Signs _____

Page 126

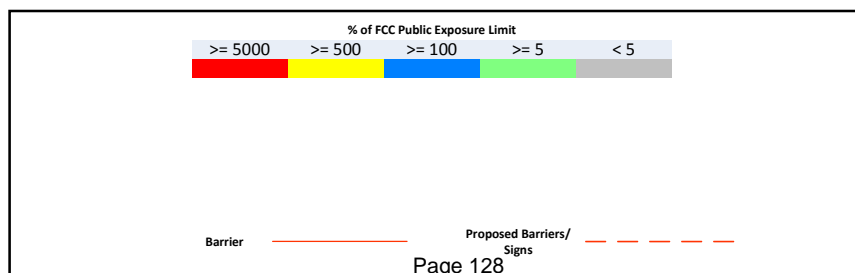
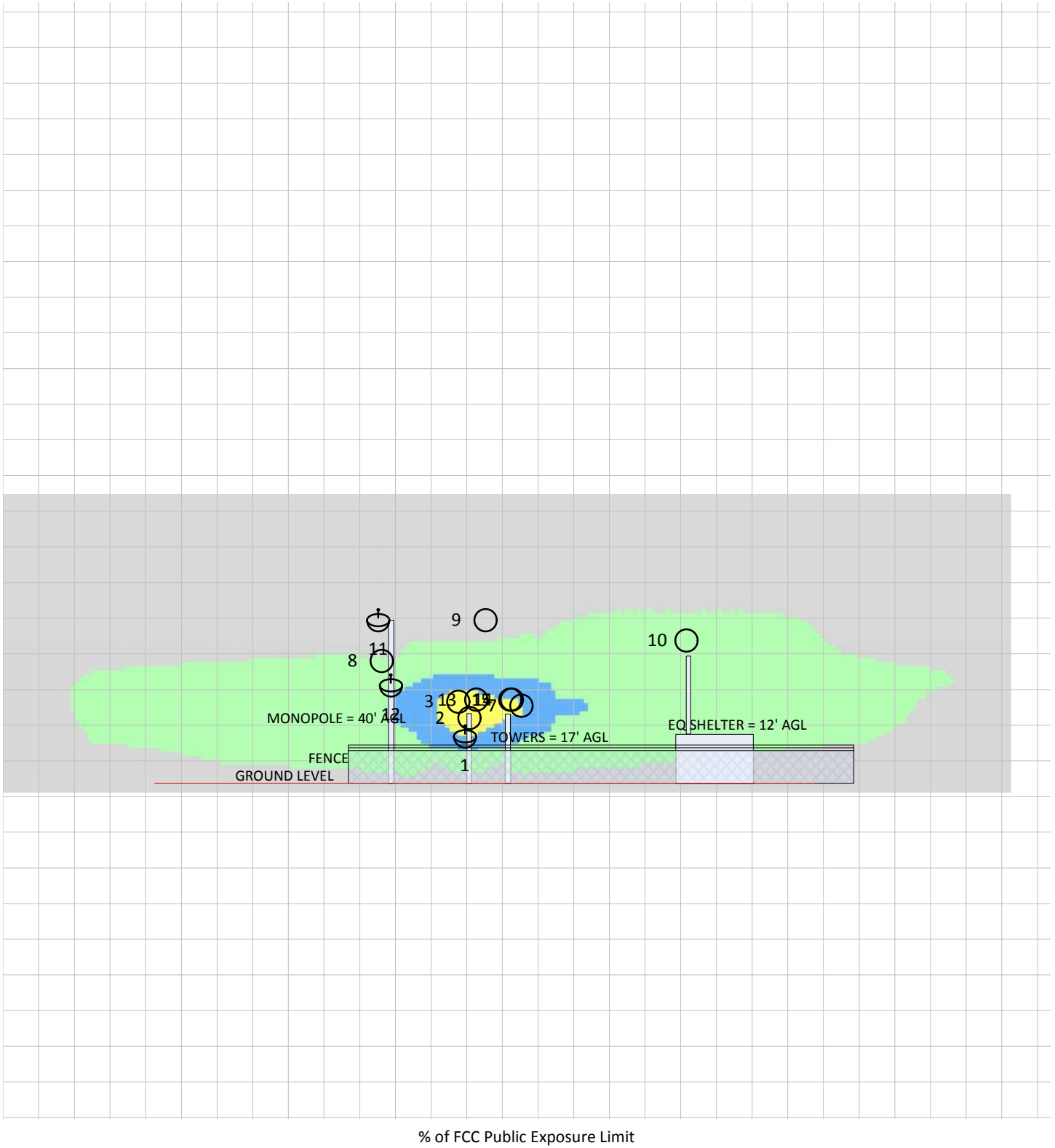
RF Exposure Simulation For: Point Reyes Elevation View – All Antennas On Air



% of FCC Public Exposure Limit



RF Exposure Simulation For: Point Reyes Elevation View – Final Configuration



8.4 Site Measurements

This section provides a summary of the measurements collected at the site. Actual measurements locations at which these data points were collected are included in the RF emission diagram provided in Section 8.3 of this report. Two types of measurements were collected at each measurement location: maximum (peak) and spatial average. The spatial average measurement consists of a collection of ten (10) measurements within a ten (10) second time interval taken from zero (0) to six (6) feet in height. The purpose of this measurement technique is to identify the average power density over the dimensions of a typical human body.

Table 1 below contains all the measurements collected from accessible areas located at the site at the time of Sitesafe's visit. Whenever possible, measurements are taken in front of the antenna in the transmitting direction. However, because of the antenna configuration at this site, specific emissions could not be discerned from nearby facilities, and no attempt was made to determine power density levels from a specific transmitting antenna.

Highest Measured Occupational Level: 7.00%

This value is equal to:

Highest General Public Level: 35.00%.

Measurements Points	Spatial Average	Maximum	Measurements Points	Spatial Average	Maximum
M1	1 %	2 %	M14	7 %	8 %
M2	6 %	17 %	M15	<1 %	<1 %
M3	4 %	9 %	M16	<1 %	<1 %
M4	6 %	12 %	M17	<1 %	<1 %
M5	4 %	7 %	M18	<1 %	<1 %
M6	2 %	2 %	M19	<1 %	<1 %
M7	1 %	2 %	M20	<1 %	<1 %
M8	<1 %	1 %	M21	<1 %	<1 %
M9	2 %	4 %	M22	<1 %	<1 %
M10	1 %	1 %	M23	<1 %	<1 %
M11	3 %	7 %	M24	<1 %	<1 %
M12	<1 %	<1 %	M25	<1 %	<1 %
M13	2 %	2 %	M26	<1 %	<1 %

RF meters and probes have been calibrated and used according to the manufacturer's specifications. Measurements provide a view of the MPE percentage levels at the site at the time of Sitesafe's site visit and are used to validate modeling results. Theoretical modeling is used for determining compliance and the percentage of MPE contributions.

An RF Emission diagram has been included in section 8.3 of this document. All measurement locations are identified in this diagram. The locations of measurements in the RF Emission diagram can be cross referenced with Table 1 (above) to determine the actual spatial average and maximum measurement value per location.

8.5 Antenna Inventory

The Antenna Inventory shows all transmitting antennas at the site. This inventory was verified on site, and was utilized by Sitesafe to perform theoretical modeling of RF emissions. The inventory coincides with the site diagrams in this report, identifying each antenna's location at 8 - Point Reyes. The antenna information collected includes the following information:

- Licensee or wireless operator name
- Frequency or frequency band
- Transmitter power – Effective Radiated Power ("ERP"), or Equivalent Isotropic Radiated Power ("EIRP") in Watts
- Antenna manufacturer make, model, and gain

For other operators at this site, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.



The following antenna inventory and representative photographs were obtained or verified during the site visit and were utilized to create the site model diagrams:

Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
1	E1	Generic	Aperture	0	2400	30	22.96	0	4	ERP	Watt	1	4	11.5	0	0
2	E2	Generic	Omni	9	90	30	0	360	235	TPO	Watt	1	235	16	0	0
3	E3	Generic	Omni	8	150	30	2.61	360	100	TPO	Watt	1	182.4	20	0	0
4	E4 (Rx)	Generic	Omni	1.5	850	150	0.01	360	0	ERP	Watt	1	0	10.5	0	0
5	E5	Generic	Omni	1.5	850	150	0.01	360	230	ERP	Watt	1	230	16.5	0	0
6	E6	Generic	Aperture	4	11000	90	37.66	2	64.9	EIRP	dBmW	1	1884.1	14	0	0
7	E7	Antel BCD-7506-EDIN-X-25	Omni	6.6	770	270	5.4	360	230	TPO	Watt	1	797.5	19	0	0
8	UNKNOWN OPERATOR	Generic	Yagi	0.5	2400	270	13.37	27.5	4	ERP	Watt	1	4	30	0	0
9	UNKNOWN OPERATOR	Generic	Yagi	0.5	850	300	9.97	60	1	TPO	Watt	1	9.9	40	0	0
10	UNKNOWN OPERATOR	Generic	Omni	12.5	150	0	2.87	360	100	ERP	Watt	1	100	35	0	0
11	P1	Generic	Aperture	4	11000	114	37.66	2	64.9	EIRP	dBmW	1	1884.1	31	0	0
12	P2	Generic	Aperture	4	11000	17	37.66	2	64.9	EIRP	dBmW	1	1884.1	24	0	0
13	P3	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	20.5	0	0
14	P5 (Rx)	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	0	ERP	Watt	1	0	20.5	0	0
15	P6 (Rx)	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	0	ERP	Watt	1	0	20.5	0	0

8.6 Site Pictures



Figure 43: Pole 1 Overview



Figure 44: Pole 2 Overview



Figure 45: Pole 3 Overview



Figure 46: Antenna 9



Figure 47: Antenna 10



Figure 48: Overview Facing West

9 Dollar Hill



Marin Emergency Radio Authority

Site Name – Dollar Hill

Site ID: 10

Site Compliance Report

Robert Dollar Dr.
San Rafael, CA 94945

Site visit date: August 21, 2018
Site visit time: 1:39 PM
Site survey by: Jeff Desira

Latitude: N37-58-48.94
Longitude: W122-31-45.67
Structure Type: Self-Support

Report generated date: March 28, 2019
Report by: Sam Cosgrove
Customer Contact: David Mortimer

The site is compliant and will remain compliant upon implementation of the proposed changes.

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9.1 Site Summary

The County of Marin on behalf of Marin Emergency Radio Authority has contracted with Sitesafe, LLC. (Sitesafe), an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine the RF conditions at the communications site, 10 - Dollar Hill, located at Robert Dollar Dr., San Rafael, CA, in relation to Federal Communications Commission (FCC) Rules and Regulations for RF emissions.

Sitesafe's field personnel visited 10 - Dollar Hill on August 21, 2018. This section contains a detailed summary of the RF environment at the site including:

- Site compliance determination;
- Photographs of the site;
- Diagram of the site;
- Inventory of the make / model of all transmitting antennas found on the site (where possible);
- Record of any Maximum Permissible Exposure ("MPE") measurements taken on the site, as applicable; and
- Theoretical MPE based on modeling.

RF emissions do not exceed MPE limits on this site. The levels measured and predicted on site do not pose a danger to personnel working in the area. The emissions predicted on the ground level are due to the antennas with the lowest height from ground level.



9.2 Site Compliance

9.2.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, and a thorough review of site access procedures, RF hazard signage and visible antenna locations, Sitesafe has determined that:

The site is compliant with the FCC rules and regulations, as described in OET Bulletin 65, and will remain compliant upon implementation of the proposed changes.

The compliance determination is based on General Public MPE levels due to theoretical modeling and/or physical measurements, RF signage placement, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the Marin Emergency Radio Authority's proposed deployment plan could result in the site being rendered non-compliant. Measurements have also been performed to validate the assumptions used in our theoretical modeling of this site.

Modeling is used for determining compliance and the percentage of MPE contribution. Measurements provide a view of MPE percentage levels at the site at the time of Sitesafe's visit and are used to validate modeling results.

9.2.2 Actions for Site Compliance

Based on common industry practice and our understanding of FCC and OSHA requirements, this section provides a statement of recommendations for site compliance. RF alert signage recommendations have been proposed based on existing measurements and theoretical analysis of MPE levels. Sitesafe has documented the locations of any RF signs and barriers that are required for compliance. Barriers can consist of locked doors, fencing, railing, rope, chain, paint striping or tape, combined with RF alert signage.

This site is compliant with the FCC rules and regulations.

9.3 RF Emissions Diagram

The RF diagram(s) below display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix B.

The key at the bottom of each diagram indicates if percentages displayed are referenced to FCC General Population Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Gray represents areas predicted to be at 5% of the MPE limits, or below.
- Green represents areas predicted to be between 5% and 100% of the MPE limits.
- Blue represents areas predicted to be between 100% and 500% of the MPE limits.
- Yellow represents areas predicted to be between 500% and 5000% of the MPE limits.
- Red areas indicated predicted levels greater than 5000% of the MPE limits.

The theoretical analysis identified the maximum predicted MPE levels on the ground to be:

Maximum Cumulative Theoretical General Public MPE level (Existing Antennas) : 71.7%
Maximum Cumulative Theoretical General Public MPE level (All Antennas): 73.7%
Maximum Cumulative Theoretical General Public MPE level (Proposed Antennas): 73.7%

General Population diagrams are specified when an area is accessible to the public; i.e. personnel that do not meet Occupational or RF Safety trained criteria, could gain access.

If trained occupational personnel require access to areas that are delineated as **Blue** or above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the operators to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

The key at the bottom also indicates the level or height of the modeling with respect to the main level. The origin is typically referenced to the main rooftop level, or ground level for a structure without access to the antenna level. For example:

Average from 0 feet above to 6 feet above origin

and

Average from 20 feet above to 26 feet above origin

The first indicates modeling at the main rooftop (or ground) level averaged over 6 feet. The second indicates modeling at a higher level (possibly a penthouse level) of 20 feet averaged over 6 feet.

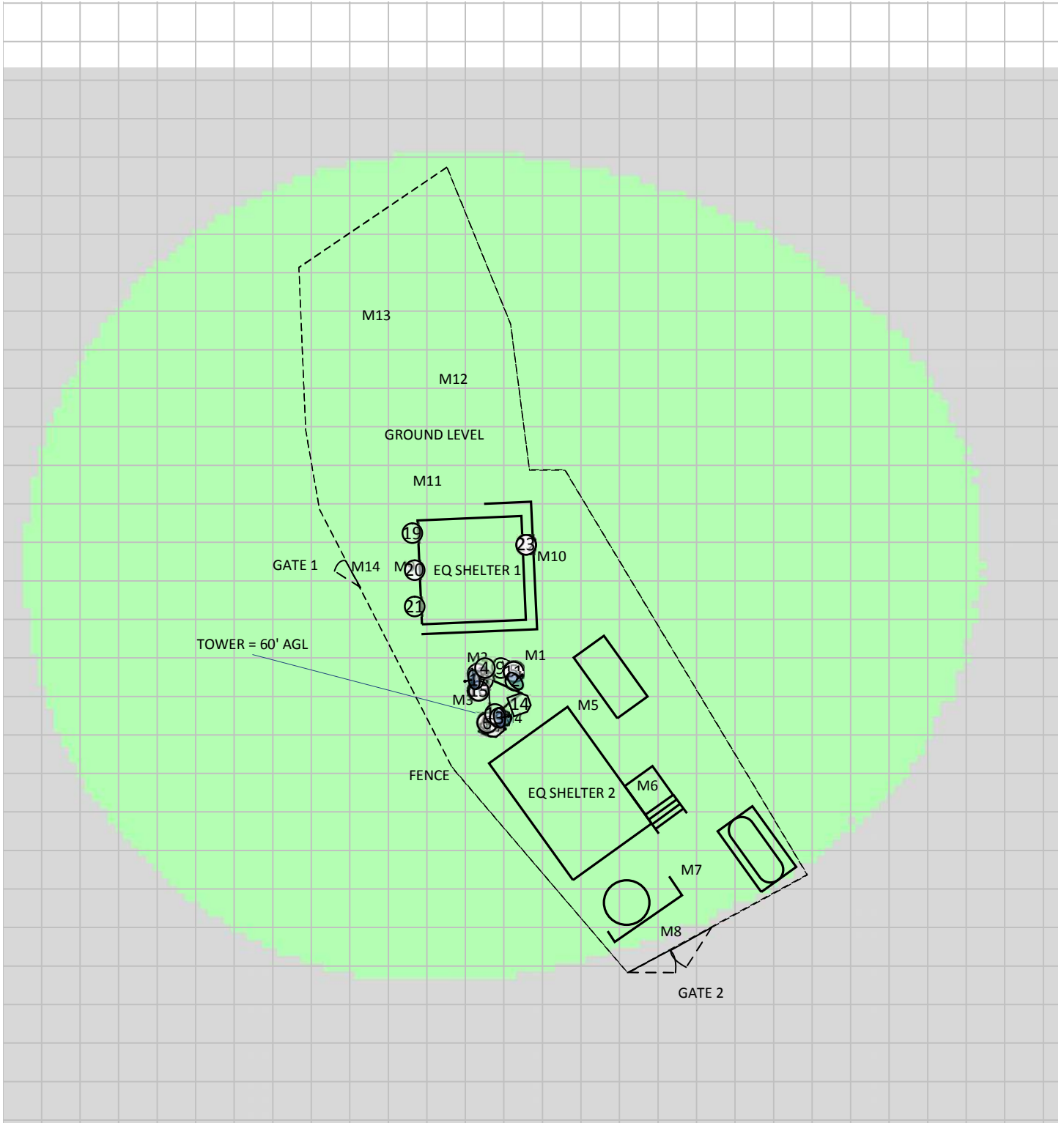


Abbreviations used in the RF Emissions Diagrams

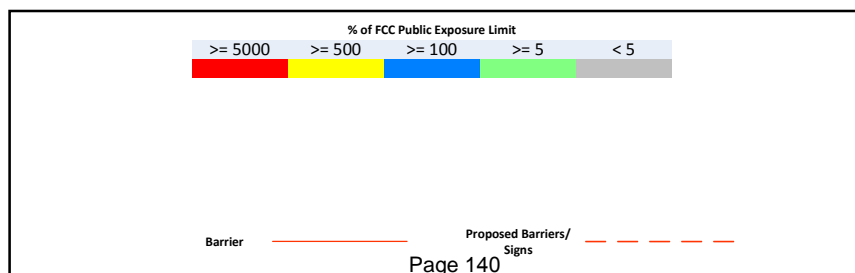
PH=##'	Penthouse at ## feet above main roof
M##	Measurement ## taken during a site visit

As discussed in Section 9.4, site measurement locations for spatial average measurements collected at the time of Sitesafe's visit have been added to the RF emissions diagram. While the theoretical modeling represents worst case MPE levels based on the assumption(s) detailed above, the measurement data is a snapshot of MPE levels at the time of our visit, and dependent on transmitter duty cycle, system implementation and emissions from other RF sources at nearby antenna sites.

RF Exposure Simulation For: Dollar Hill Existing Antennas On Air



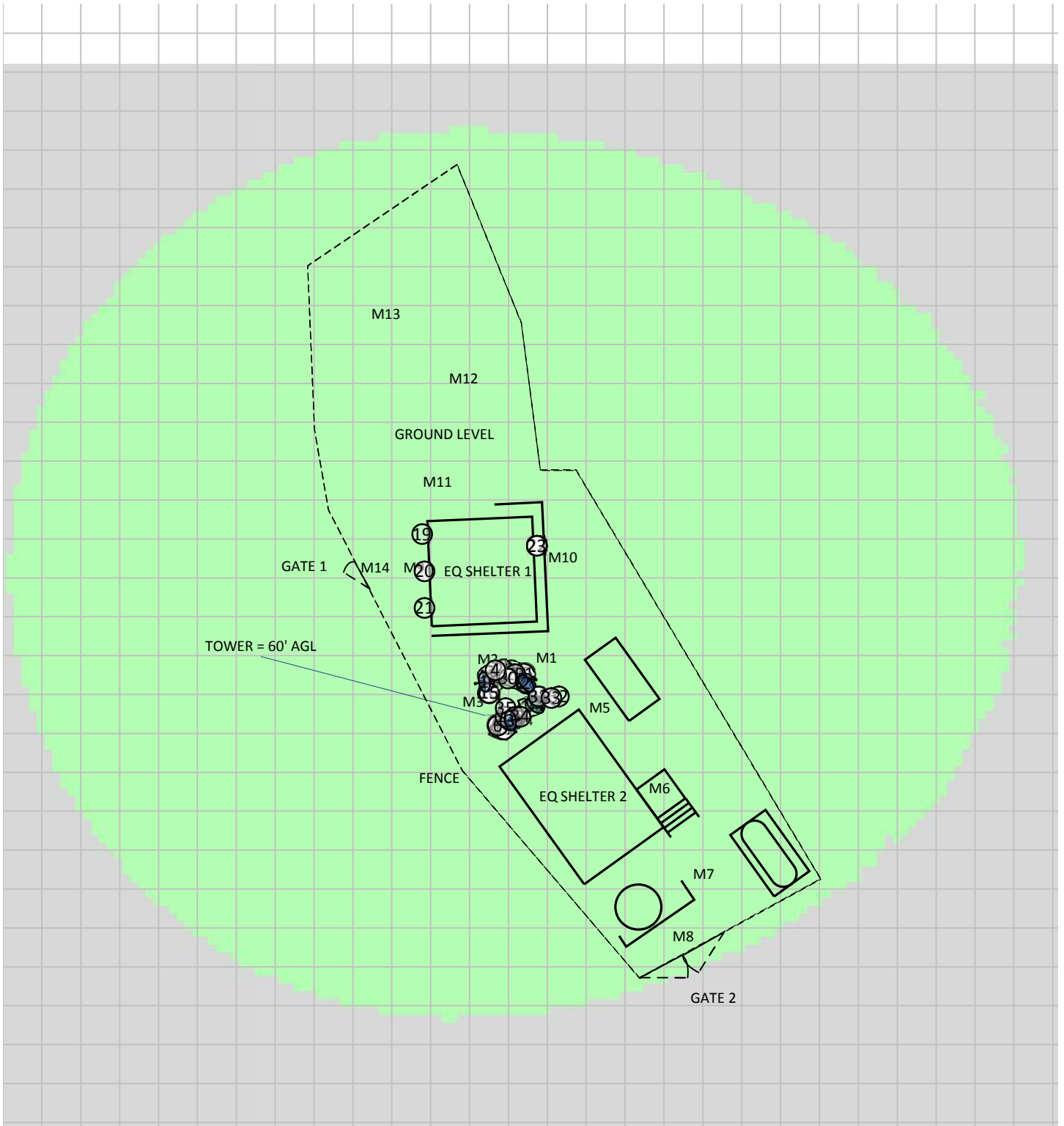
% of FCC Public Exposure Limit
Spatial average 0' - 6'



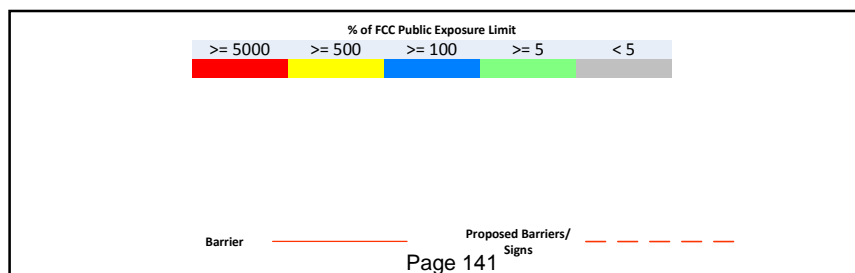
(Feet)
0 9.7 19.4
www.sitesafe.com
Site Name: Dollar Hill
3/27/2019 2:16:30 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Dollar Hill All Antennas On Air



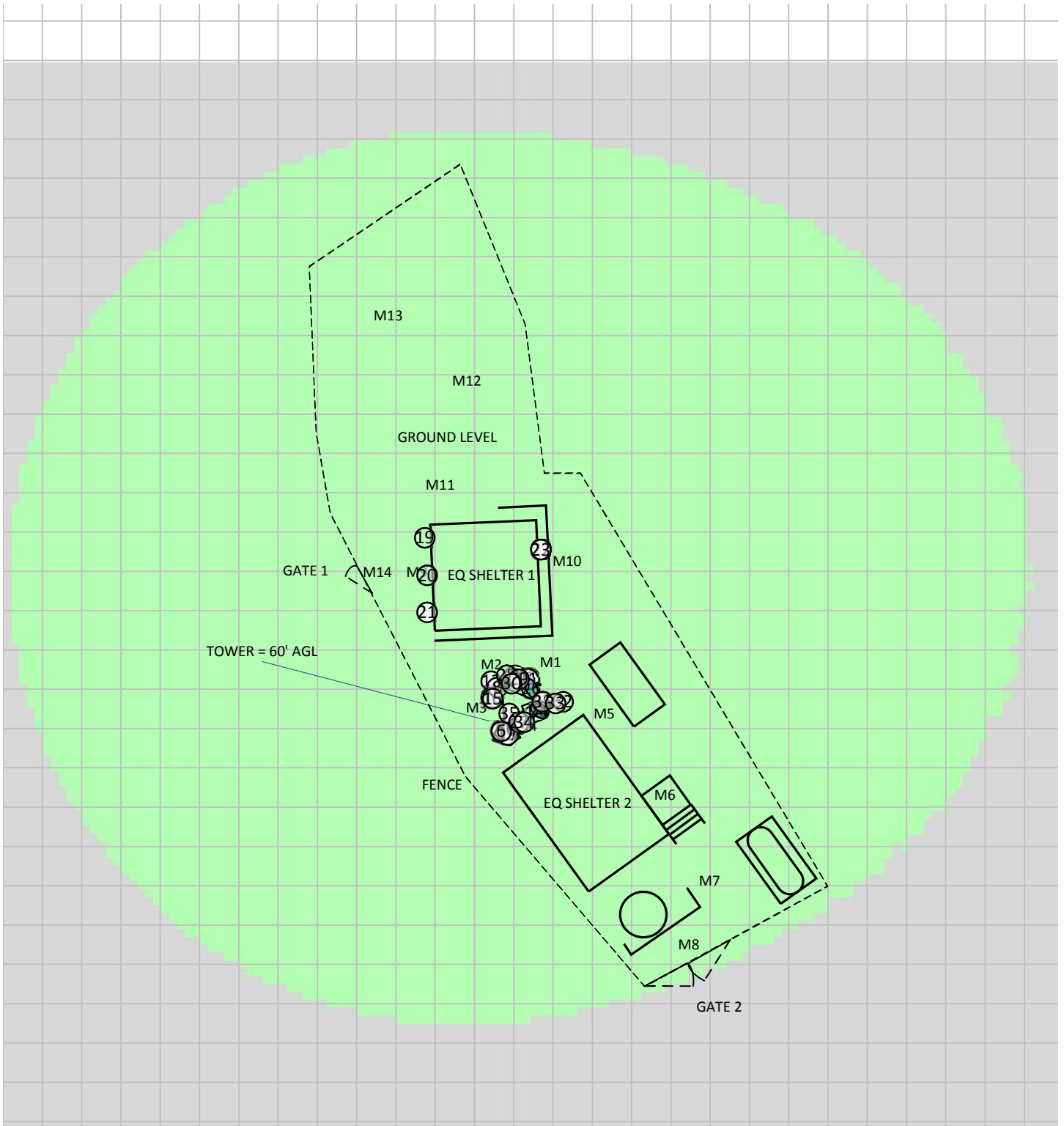
% of FCC Public Exposure Limit
Spatial average 0' - 6'



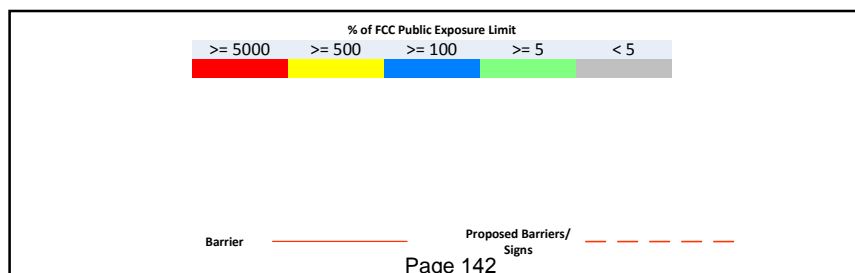
(Feet)
0 9.6 19.2
www.sitesafe.com
Site Name: Dollar Hill
3/27/2019 2:14:42 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Dollar Hill Final Configuration



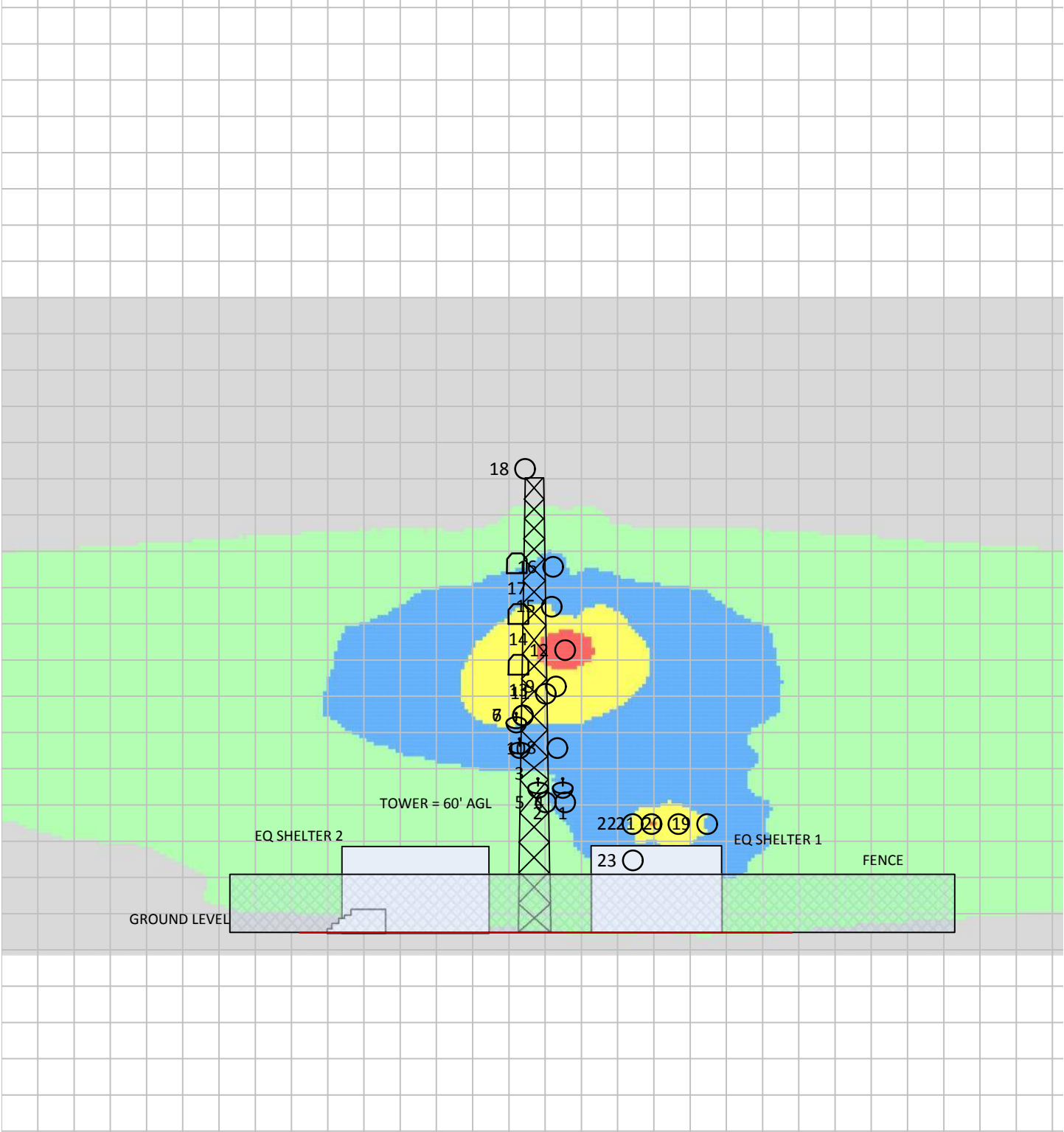
% of FCC Public Exposure Limit
Spatial average 0' - 6'



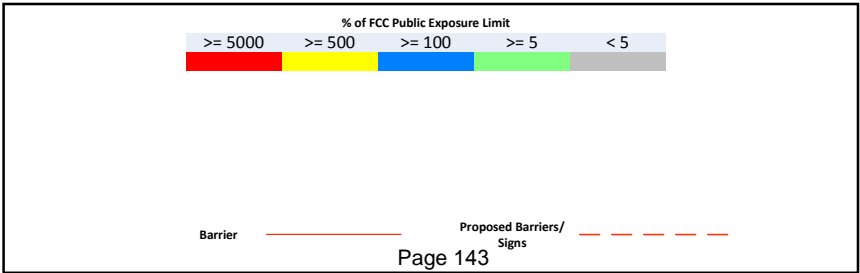
(Feet)
0 9.5 19
www.sitesafe.com
Site Name: Dollar Hill
3/27/2019 2:11:16 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Dollar Hill
Elevation View – Existing Antennas On Air

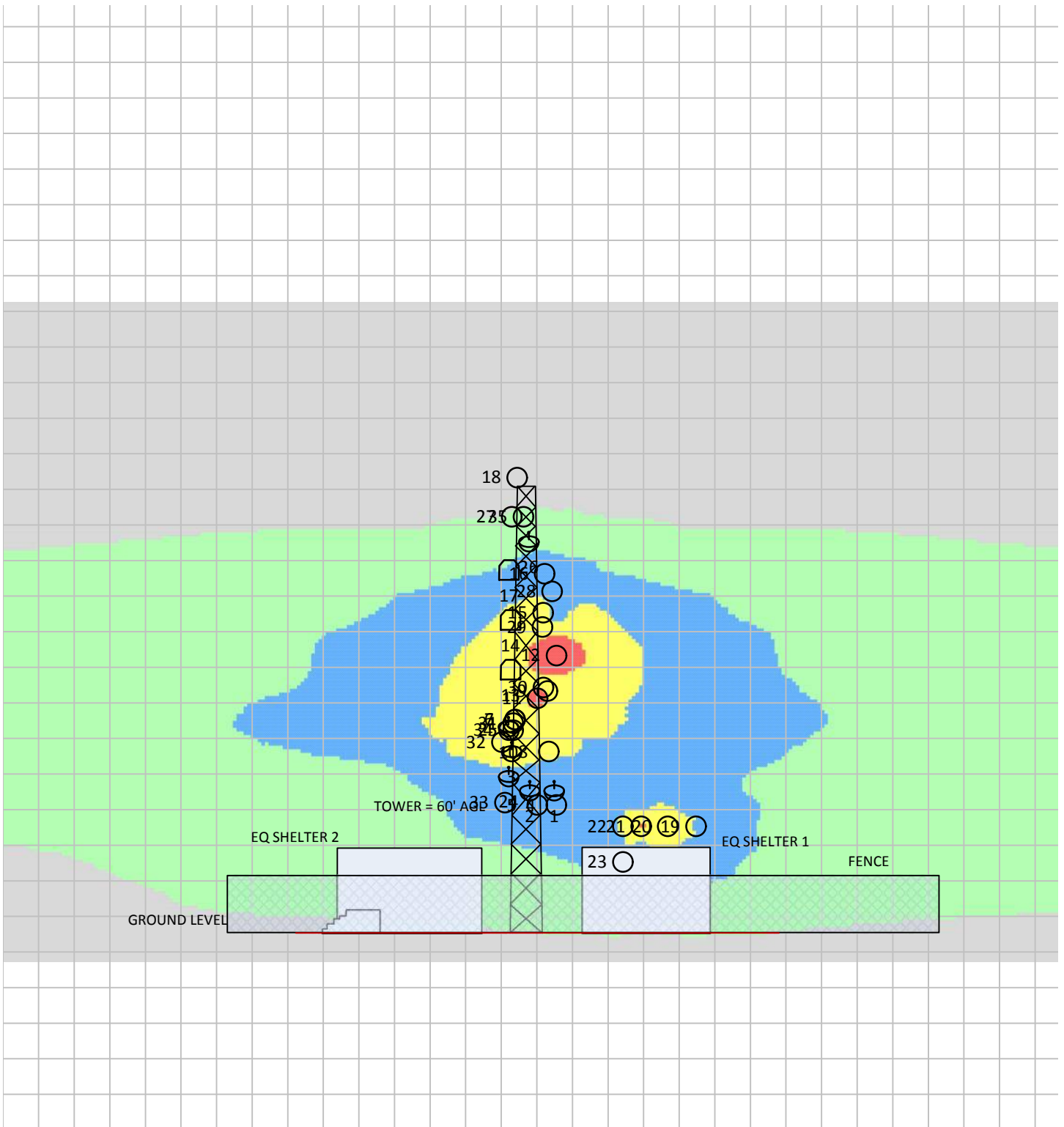


% of FCC Public Exposure Limit

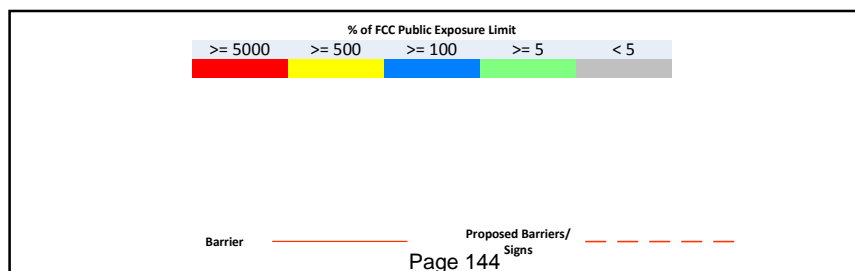


RF Exposure Simulation For: Dollar Hill

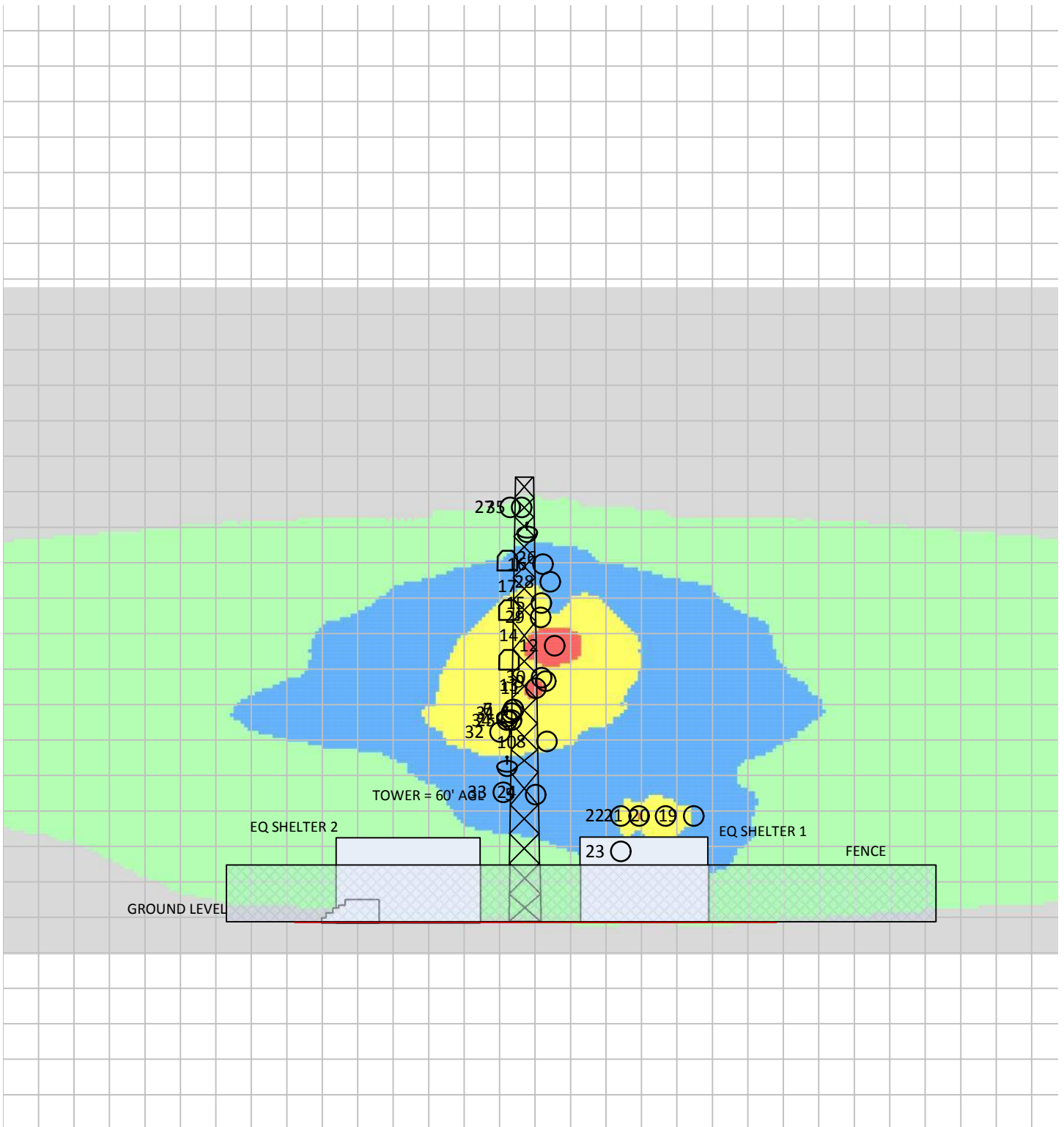
Elevation View – All Antennas On Air



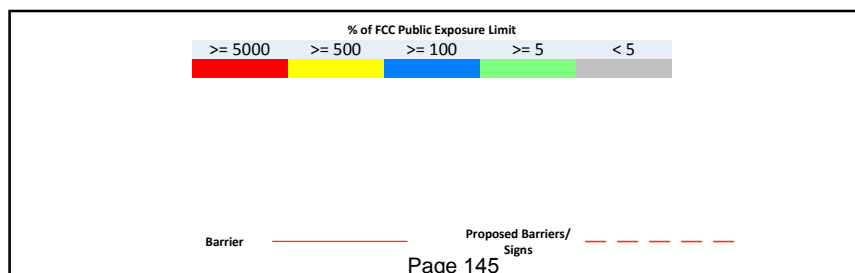
% of FCC Public Exposure Limit



RF Exposure Simulation For: Dollar Hill Elevation View – Final Configuration



% of FCC Public Exposure Limit



9.4 Site Measurements

This section provides a summary of the measurements collected at the site. Actual measurements locations at which these data points were collected are included in the RF emission diagram provided in Section 9.3 of this report. Two types of measurements were collected at each measurement location: maximum (peak) and spatial average. The spatial average measurement consists of a collection of ten (10) measurements within a ten (10) second time interval taken from zero (0) to six (6) feet in height. The purpose of this measurement technique is to identify the average power density over the dimensions of a typical human body.

Table 1 below contains all the measurements collected from accessible areas located at the site at the time of Sitesafe's visit. Whenever possible, measurements are taken in front of the antenna in the transmitting direction. However, because of the antenna configuration at this site, specific emissions could not be discerned from nearby facilities, and no attempt was made to determine power density levels from a specific transmitting antenna.

Highest Measured Occupational Level: 2.00%

This value is equal to:

Highest General Public Level: 10.00%.

Table 1: Spatial Average and Maximum Occupational Measurements					
Measurements Points	Spatial Average	Maximum	Measurements Points	Spatial Average	Maximum
M1	<1 %	<1 %	M10	1 %	2 %
M2	1 %	1 %	M11	<1 %	<1 %
M3	1 %	1 %	M12	<1 %	<1 %
M4	<1 %	1 %	M13	<1 %	<1 %
M5	2 %	3 %	M14	2 %	2 %
M6	<1 %	<1 %	M15	<1 %	<1 %
M7	1 %	2 %	M16	<1 %	<1 %
M8	<1 %	<1 %	M17	<1 %	<1 %
M9	1 %	2 %			

RF meters and probes have been calibrated and used according to the manufacturer's specifications. Measurements provide a view of the MPE percentage levels at the site at the time of Sitesafe's site visit and are used to validate modeling results. Theoretical modeling is used for determining compliance and the percentage of MPE contributions.

An RF Emission diagram has been included in section 9.3 of this document. All measurement locations are identified in this diagram. The locations of measurements in the RF Emission diagram can be cross referenced with Table 1 (above) to determine the actual spatial average and maximum measurement value per location.

9.5 Antenna Inventory

The Antenna Inventory shows all transmitting antennas at the site. This inventory was verified on site, and was utilized by Sitesafe to perform theoretical modeling of RF emissions. The inventory coincides with the site diagrams in this report, identifying each antenna's location at 10 - Dollar Hill. The antenna information collected includes the following information:

- Licensee or wireless operator name
- Frequency or frequency band
- Transmitter power – Effective Radiated Power ("ERP"), or Equivalent Isotropic Radiated Power ("EIRP") in Watts
- Antenna manufacturer make, model, and gain

For other operators at this site, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.



The following antenna inventory and representative photographs were obtained or verified during the site visit and were utilized to create the site model diagrams:

Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
1	E1	Generic	Aperture	4	11000	260	37.66	2	55.3	EIRP	dBmW	1	206.1	20	0	0
2	E2	Generic	Aperture	4	11000	50	37.66	2	50.3	EIRP	dBmW	1	65.2	20	0	0
3	E3	Generic	Aperture	1	22075	80	32.66	2	57.2	EIRP	dBmW	1	319.5	25.5	0	0
4	E4	Generic	Omni	20	482	200	10.81	360	200	ERP	Watt	1	200	18	0	0
5	E5	Generic	Omni	20	482	30	10.81	360	200	ERP	Watt	1	200	18	0	0
6	E6	Generic	Omni	9.5	483	110	5.97	360	200	ERP	Watt	1	200	30	0	0
7	E7	Generic	Yagi	0.5	850	110	9.97	60	200	ERP	Watt	1	200	30	0	0
8	E8	Generic	Omni	20	488	280	10.81	360	200	ERP	Watt	1	200	25.5	0	0
9	E9	Generic	Omni	4.7	489	280	2.97	360	200	ERP	Watt	1	200	34	0	0
10	E10	Generic	Aperture	1	22125	160	32.66	2	57.2	EIRP	dBmW	1	319.5	29	0	0
11	E11	Generic	Omni	3	484	320	0	360	1000	ERP	Watt	1	1000	33	0	0
12	E12	Generic	Omni	3	490	80	0	360	1000	ERP	Watt	1	1000	39	0	0
13	E13	Generic	Panel	2.2	5800	110	16.01	90	20	ERP	Watt	1	20	37	0	0
14	E14	Generic	Panel	1.7	2400	70	12.01	90	4	ERP	Watt	1	4	44	0	0
15	E15	Antel BCD-7506-EDIN-X-25	Omni	6.6	769	310	5.4	360	118	ERP	Watt	1	118	45	0	0
16	E16	Antel BCD-7506-EDIN-X-25	Omni	6.6	770	310	5.4	360	118	ERP	Watt	1	118	50.5	0	0
17	E17	Generic	Panel	2.2	5800	140	16.01	90	20	ERP	Watt	1	20	51	0	0
18	E18 (Rx)	Generic	Omni	9.5	489	80	5.97	360	0	ERP	Watt	1	0	64	0	0
19	UNKNOWN OPERATOR	Generic	Omni	1.5	850	0	0.01	360	200	ERP	Watt	1	200	15	0	0
20	UNKNOWN OPERATOR	Generic	Omni	1.5	850	0	0.01	360	200	ERP	Watt	1	200	15	0	0
21	UNKNOWN OPERATOR	Generic	Omni	1.5	850	0	0.01	360	200	ERP	Watt	1	200	15	0	0
22	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	100	ERP	Watt	1	100	15	0	0
23	UNKNOWN OPERATOR	Generic	Yagi	3	150	90	9.11	76	100	ERP	Watt	1	100	10	0	0
24	P1	Generic	Aperture	6	6000	221	36.36	2	0.01	TPO	Watt	1	43.3	22	0	0
25	P2	Sinclair SC476-HF1LDF	Omni	7	800	0	6.06	360	1000	ERP	Watt	1	1000	28.5	0	0
26	P3	Generic	Aperture	6	6000	67	36.36	2	0.01	TPO	Watt	1	43.3	55	0	0



Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
27	P4 (Rx)	Rfi CC807-08	Omni	9.5	800	0	8	360	0	ERP	Watt	1	0	58.5	0	0
28	P5	Andrew DB404	Omni	5	450	0	3.81	360	100	ERP	Watt	1	100	48	0	0
29	P6	Generic	Omni	10	450	0	0	360	100	ERP	Watt	1	100	43	0	0
30	P7	Andrew DB404	Omni	5	450	0	3.81	360	100	ERP	Watt	1	100	34.5	0	0
31	P8	Generic	Omni	10	450	0	0	360	100	ERP	Watt	1	100	29.5	0	0
32	P9	Andrew DB404	Omni	5	450	0	3.81	360	100	ERP	Watt	1	100	26.8	0	0
33	P10	Generic	Omni	10	450	0	0	360	100	ERP	Watt	1	100	18.3	0	0
34	P11	Sinclair SC476-HF1LDF	Omni	7	800	0	6.06	360	1000	ERP	Watt	1	1000	28.5	0	0
35	P12 (Rx)	Rfi CC807-08	Omni	9.5	800	0	8	360	0	ERP	Watt	1	0	58.5	0	0

NOTE: Z indicates relative position of the antenna to the origin location on the site, displayed in the model results diagram. The Z reference indicates antenna height above the main site level unless otherwise indicated. ERP values provided by the client and used in the modeling may be greater than are currently deployed. For other operators at this site the use of "Generic" as an antenna model or "Unknown" for a wireless operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.

9.6 Site Pictures



Figure 49: Site Overview Facing South



Figure 50: Site Overview Facing Southeast



Figure 51: Tower Overview Facing West



Figure 52: Tower Overview Facing South



Figure 53: Tower Overview Facing Southeast



Figure 54: Equipment Shelter Overview

10 San Pedro



Marin Emergency Radio Authority

Site Name – San Pedro

Site ID: 11

Site Compliance Report

3000 Bayhills Dr.

San Rafael, CA 94903

Site visit date: August 21, 2018

Site visit time: 11:01 PM

Site survey by: Jeff Desira

Latitude: N37-59-24.74

Longitude: W122-30-00.50

Structure Type: Self-Support

Report generated date: March 28, 2019

Report by: Sam Cosgrove

Customer Contact: David Mortimer

The site is compliant and will remain complaint upon implementation of the proposed changes.

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10.1 Site Summary

The County of Marin on behalf of Marin Emergency Radio Authority has contracted with Sitesafe, LLC. (Sitesafe), an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine the RF conditions at the communications site, 11 - San Pedro, located at 3000 Bayhills Dr., San Rafael, CA, in relation to Federal Communications Commission (FCC) Rules and Regulations for RF emissions.

Sitesafe's field personnel visited 11 - San Pedro on August 21, 2018. This section contains a detailed summary of the RF environment at the site including:

- Site compliance determination;
- Photographs of the site;
- Diagram of the site;
- Inventory of the make / model of all transmitting antennas found on the site (where possible);
- Record of any Maximum Permissible Exposure ("MPE") measurements taken on the site, as applicable; and
- Theoretical MPE based on modeling.

RF emissions do not exceed MPE limits on the ground level. The area that does exceed MPE limits is located on an inaccessible rooftop and does not require signage.



10.2 Site Compliance

10.2.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, and a thorough review of site access procedures, RF hazard signage and visible antenna locations, Sitesafe has determined that:

The site is compliant with the FCC rules and regulations, as described in OET Bulletin 65, and will remain compliant upon implementation of the proposed changes.

The compliance determination is based on General Public MPE levels due to theoretical modeling and/or physical measurements, RF signage placement, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the Marin Emergency Radio Authority's proposed deployment plan could result in the site being rendered non-compliant. Measurements have also been performed to validate the assumptions used in our theoretical modeling of this site.

Modeling is used for determining compliance and the percentage of MPE contribution. Measurements provide a view of MPE percentage levels at the site at the time of Sitesafe's visit and are used to validate modeling results.

10.2.2 Actions for Site Compliance

Based on common industry practice and our understanding of FCC and OSHA requirements, this section provides a statement of recommendations for site compliance. RF alert signage recommendations have been proposed based on existing measurements and theoretical analysis of MPE levels. Sitesafe has documented the locations of any RF signs and barriers that are required for compliance. Barriers can consist of locked doors, fencing, railing, rope, chain, paint striping or tape, combined with RF alert signage.

This site will be compliant with the FCC rules and regulations.

10.3 RF Emissions Diagram

The RF diagram(s) below display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix B.

The key at the bottom of each diagram indicates if percentages displayed are referenced to FCC General Population Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Gray represents areas predicted to be at 5% of the MPE limits, or below.
- Green represents areas predicted to be between 5% and 100% of the MPE limits.
- Blue represents areas predicted to be between 100% and 500% of the MPE limits.
- Yellow represents areas predicted to be between 500% and 5000% of the MPE limits.
- Red areas indicated predicted levels greater than 5000% of the MPE limits.

The theoretical analysis identified the maximum predicted MPE levels on the rooftop to be:

Maximum Cumulative Theoretical General Public MPE level (Existing Antennas) : 192.9%
Maximum Cumulative Theoretical General Public MPE level (All Antennas): 192.9%
Maximum Cumulative Theoretical General Public MPE level (Proposed Antennas): 192.9%

General Population diagrams are specified when an area is accessible to the public; i.e. personnel that do not meet Occupational or RF Safety trained criteria, could gain access.

If trained occupational personnel require access to areas that are delineated as **Blue** or above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the operators to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

The key at the bottom also indicates the level or height of the modeling with respect to the main level. The origin is typically referenced to the main rooftop level, or ground level for a structure without access to the antenna level. For example:

Average from 0 feet above to 6 feet above origin

and

Average from 20 feet above to 26 feet above origin

The first indicates modeling at the main rooftop (or ground) level averaged over 6 feet. The second indicates modeling at a higher level (possibly a penthouse level) of 20 feet averaged over 6 feet.



Abbreviations used in the RF Emissions Diagrams

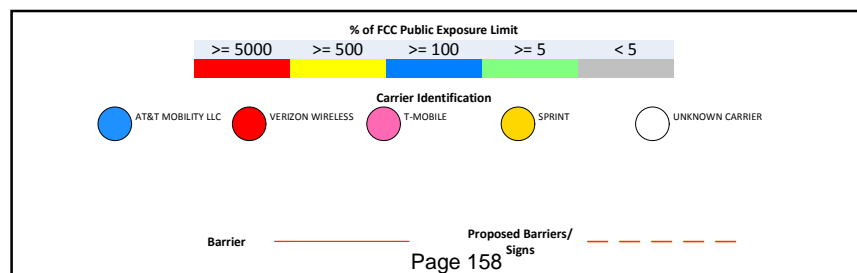
PH=##'	Penthouse at ## feet above main roof
M##	Measurement ## taken during a site visit

As discussed in Section 10.4, site measurement locations for spatial average measurements collected at the time of Sitesafe's visit have been added to the RF emissions diagram. While the theoretical modeling represents worst case MPE levels based on the assumption(s) detailed above, the measurement data is a snapshot of MPE levels at the time of our visit, and dependent on transmitter duty cycle, system implementation and emissions from other RF sources at nearby antenna sites.

RF Exposure Simulation For: San Pedro Existing Antennas Only On Air



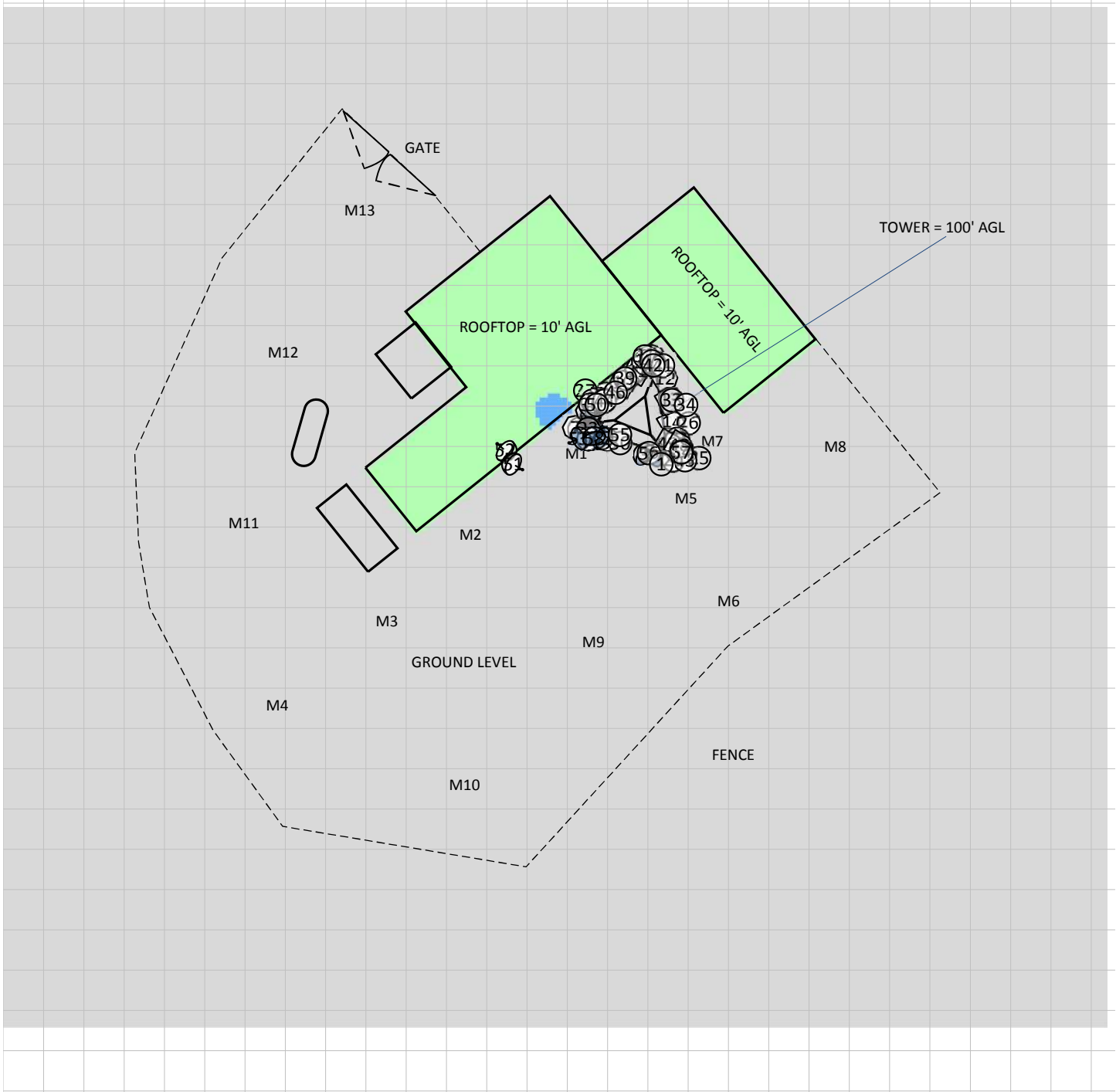
% of FCC Public Exposure Limit
Spatial average 0' - 6'



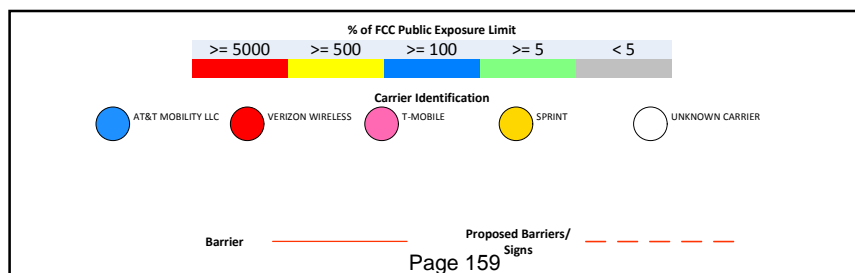
(Feet)
0 9.3 18.5
www.sitesafe.com
Site Name: San Pedro
8/28/2018 12:45:46 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: San Pedro All Antennas On Air



% of FCC Public Exposure Limit
Spatial average 0' - 6'



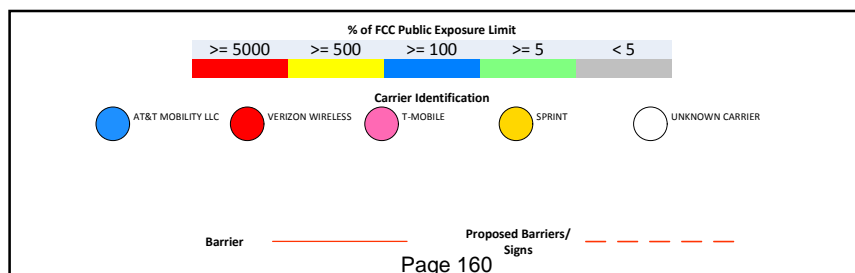
(Feet)
0 9.2 18.4
www.sitesafe.com
Site Name: San Pedro
8/28/2018 12:43:51 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: San Pedro Final Configuration On Air



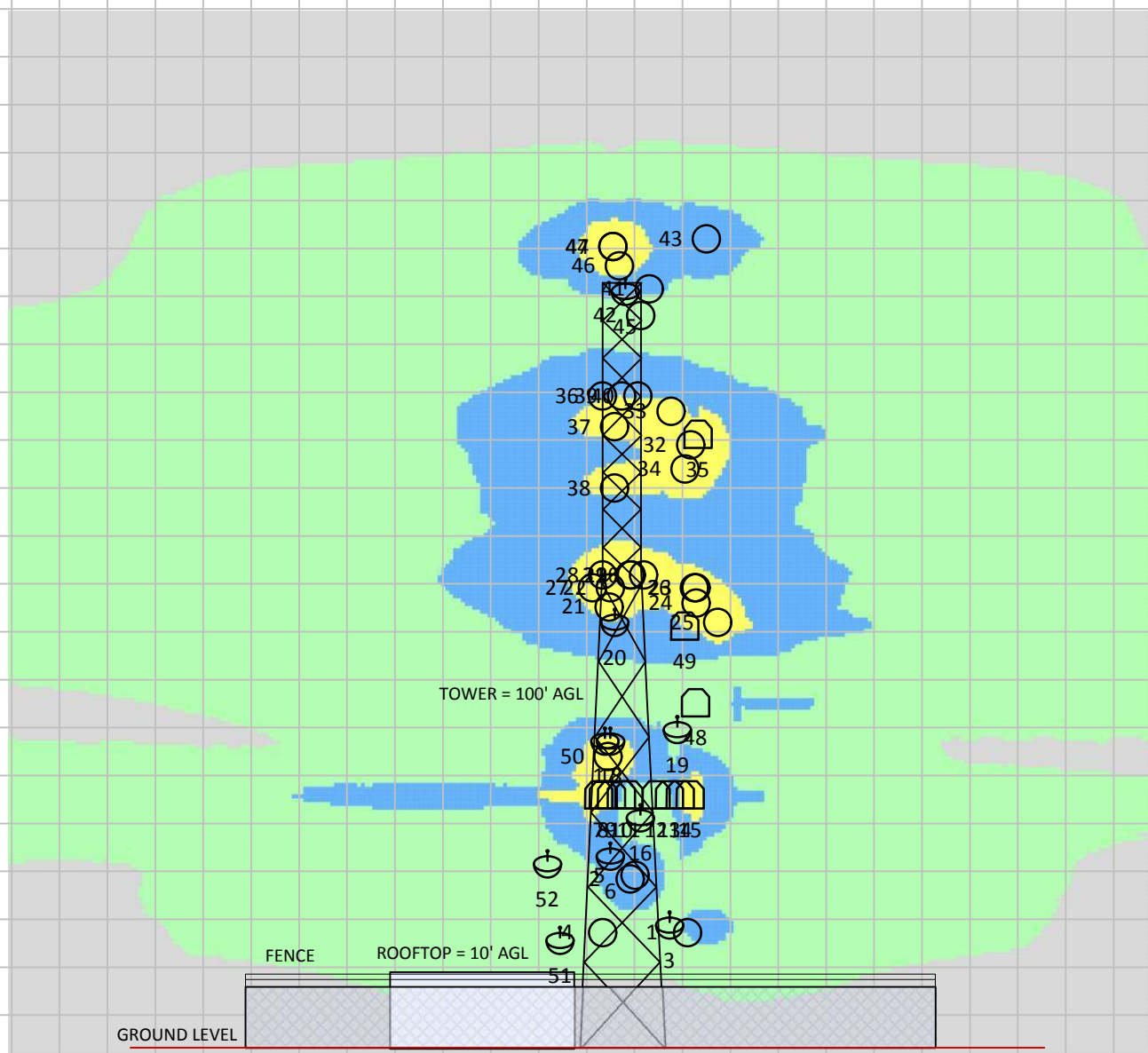
% of FCC Public Exposure Limit
Spatial average 0' - 6'



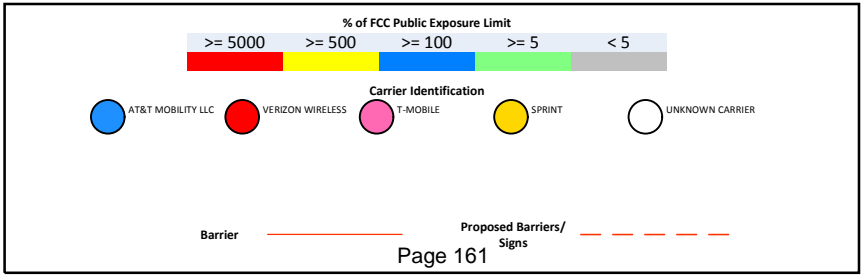
(Feet)
0 9.4 18.7
www.sitesafe.com
Site Name: San Pedro
8/28/2018 12:48:27 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

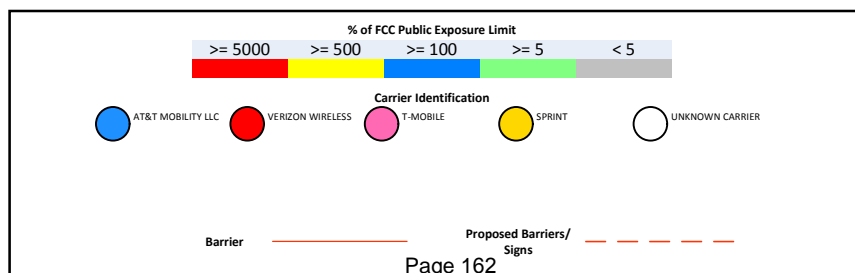
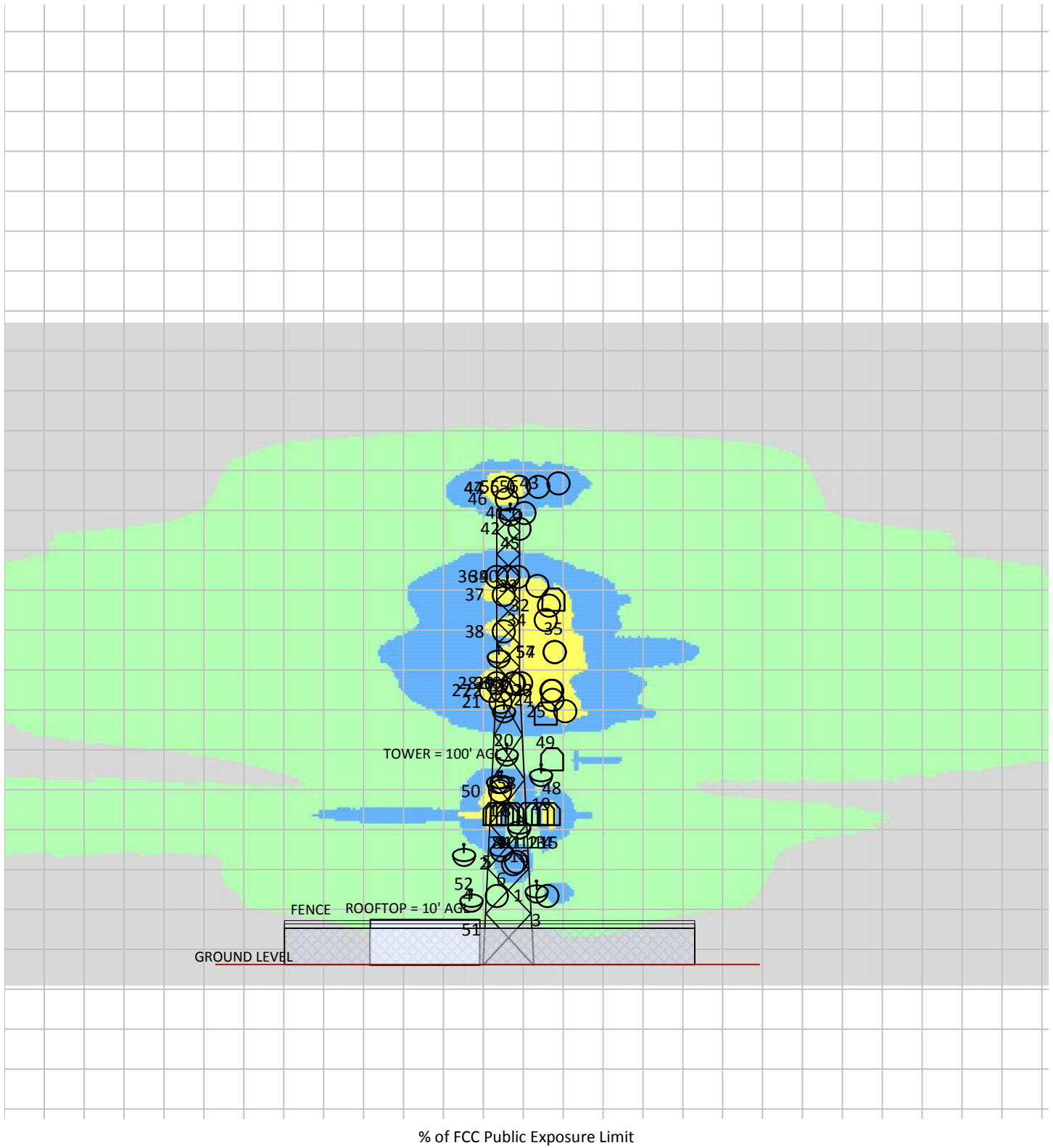
RF Exposure Simulation For: San Pedro Existing Antennas Only On Air – Elevation View



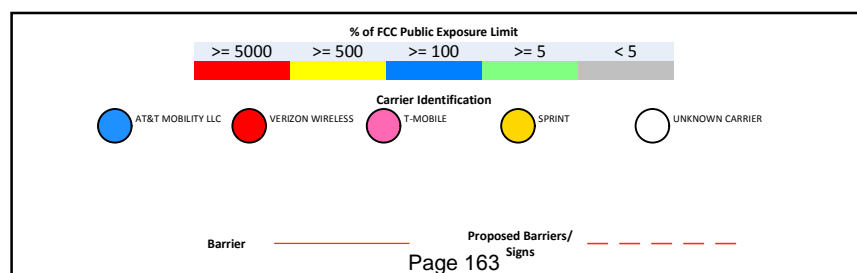
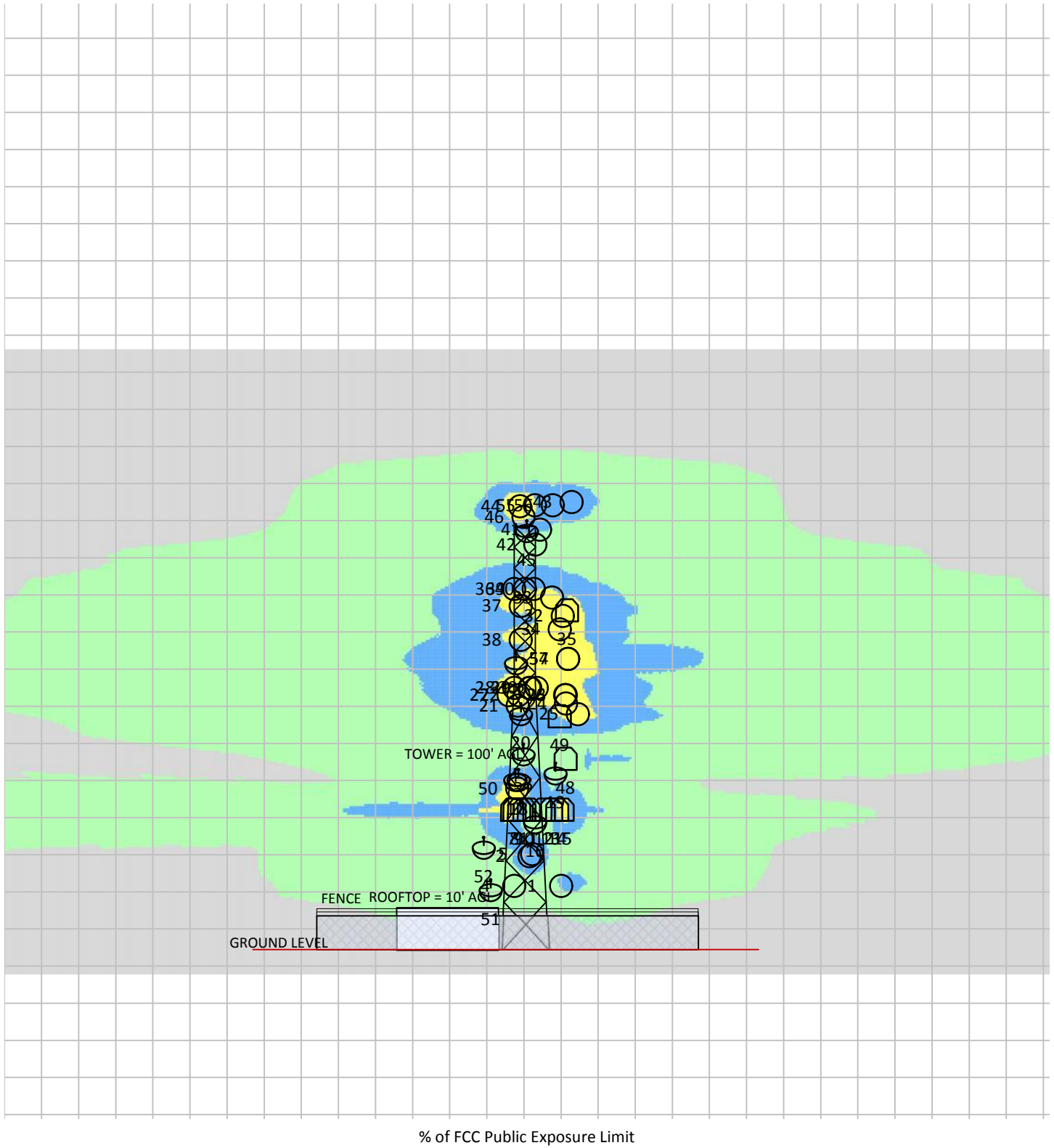
% of FCC Public Exposure Limit



RF Exposure Simulation For: San Pedro Elevation View – All Antennas on Air



RF Exposure Simulation For: San Pedro Elevation View – Final Configuration



10.4 Site Measurements

This section provides a summary of the measurements collected at the site. Actual measurements locations at which these data points were collected are included in the RF emission diagram provided in Section 10.3 of this report. Two types of measurements were collected at each measurement location: maximum (peak) and spatial average. The spatial average measurement consists of a collection of ten (10) measurements within a ten (10) second time interval taken from zero (0) to six (6) feet in height. The purpose of this measurement technique is to identify the average power density over the dimensions of a typical human body.

Table 1 below contains all the measurements collected from accessible areas located at the site at the time of Sitesafe's visit. Whenever possible, measurements are taken in front of the antenna in the transmitting direction. However, because of the antenna configuration at this site, specific emissions could not be discerned from nearby facilities, and no attempt was made to determine power density levels from a specific transmitting antenna.

Highest Measured Occupational Level: <1%

This value is equal to:

Highest General Public Level: <5%.

Table 1: Spatial Average and Maximum Occupational Measurements					
Measurements Points	Spatial Average	Maximum	Measurements Points	Spatial Average	Maximum
M1	<1 %	<1 %	M12	<1 %	<1 %
M2	<1 %	<1 %	M13	<1 %	<1 %
M3	<1 %	<1 %	M14	<1 %	<1 %
M4	<1 %	<1 %	M15	<1 %	<1 %
M5	<1 %	<1 %	M16	<1 %	<1 %
M6	<1 %	<1 %	M17	<1 %	<1 %
M7	<1 %	<1 %	M18	<1 %	<1 %
M8	<1 %	<1 %	M19	<1 %	<1 %
M9	<1 %	<1 %	M20	<1 %	<1 %
M10	<1 %	<1 %	M21	<1 %	<1 %
M11	<1 %	<1 %	M22	<1 %	<1 %

RF meters and probes have been calibrated and used according to the manufacturer's specifications. Measurements provide a view of the MPE percentage levels at the site at the time of Sitesafe's site visit and are used to validate modeling results. Theoretical modeling is used for determining compliance and the percentage of MPE contributions.

An RF Emission diagram has been included in section 10.3 of this document. All measurement locations are identified in this diagram. The locations of measurements in the RF Emission diagram can be cross referenced with Table 1 (above) to determine the actual spatial average and maximum measurement value per location.

10.5 Antenna Inventory

The Antenna Inventory shows all transmitting antennas at the site. This inventory was verified on site, and was utilized by Sitesafe to perform theoretical modeling of RF emissions. The inventory coincides with the site diagrams in this report, identifying each antenna's location at 11 - San Pedro. The antenna information collected includes the following information:

- Licensee or wireless operator name
- Frequency or frequency band
- Transmitter power – Effective Radiated Power ("ERP"), or Equivalent Isotropic Radiated Power ("EIRP") in Watts
- Antenna manufacturer make, model, and gain

For other operators at this site, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.



The following antenna inventory and representative photographs were obtained or verified during the site visit and were utilized to create the site model diagrams:

Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
1	E1	Generic	Yagi	1.2	450	60	9.97	60	100	ERP	Watt	1	100	15	0	0
2	E2	Generic	Omni	12.5	150	60	2.87	360	100	ERP	Watt	1	100	22	0	0
3	E3	Generic	Aperture	3	5800	130	29.06	2	20	ERP	Watt	1	20	16	0	0
4	E4	Generic	Yagi	1.2	450	300	9.97	60	100	ERP	Watt	1	100	15	0	0
5	E5	Generic	Omni	12.5	150	300	2.87	360	100	ERP	Watt	1	100	22.5	0	0
6	E6	Generic	Aperture	4	11000	180	37.66	2	0.01	TPO	Watt	1	58.3	25	0	0
7	E7	Generic	Panel	6.3	1900	300	16.26	65	60	TPO	Watt	1	2536	33	0	0
8	E8	Generic	Panel	4.6	1900	300	15.43	65	60	TPO	Watt	1	2094.8	33	0	0
9	E9	Generic	Panel	6.3	1900	300	16.26	65	60	TPO	Watt	1	2536	33	0	0
10	E10	Generic	Panel	6.3	1900	300	16.26	65	60	TPO	Watt	1	2536	33	0	0
11	E11	Generic	Panel	4.6	1900	300	15.43	65	60	TPO	Watt	1	2094.8	33	0	0
12	E12	Generic	Panel	6.3	1900	60	16.26	65	60	TPO	Watt	1	2536	33	0	0
13	E13	Generic	Panel	4.6	1900	60	15.43	65	60	TPO	Watt	1	2094.8	33	0	0
14	E14	Generic	Panel	6.3	1900	60	16.26	65	60	TPO	Watt	1	2536	33	0	0
15	E15	Generic	Panel	4.6	1900	60	15.43	65	60	TPO	Watt	1	2094.8	33	0	0
16	E16	Generic	Aperture	4	2400	300	22.96	2	4	ERP	Watt	1	4	30	0	0
17	E17	Generic	Aperture	2	18000	320	37.66	2	0.01	TPO	Watt	1	58.3	40	0	0
18	E18	Generic	Aperture	4	11000	170	37.66	2	0.01	TPO	Watt	1	58.3	40	0	0
19	E19	Generic	Aperture	4	11000	240	37.66	2	0.01	TPO	Watt	1	58.3	41.5	0	0
20	E20	Generic	Aperture	4	11000	180	37.66	2	0.01	TPO	Watt	1	58.3	55.5	0	0
21	E21	Generic	Omni	8	150	60	2.61	360	100	ERP	Watt	1	100	57.5	0	0
22	E22	Generic	Omni	9.5	450	60	5.97	360	100	ERP	Watt	1	100	60	0	0
23	E23	Generic	Omni	9.5	450	60	5.97	360	100	ERP	Watt	1	100	60	0	0
24	E24	Generic	Yagi	1.2	450	60	9.97	60	100	ERP	Watt	1	100	58	0	0
25	E25	Generic	Omni	3	150	60	0	360	100	ERP	Watt	1	100	55.5	0	0
26	E26	Generic	Omni	10	450	60	0	360	100	ERP	Watt	1	100	60	0	0



Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
27	E27	Generic	Omni	12.5	150	300	2.87	360	100	ERP	Watt	1	100	60	0	0
28	E28	Generic	Omni	4.7	450	300	2.97	360	100	ERP	Watt	1	100	61.7	0	0
29	E29	Generic	Omni	4.7	450	300	2.97	360	100	ERP	Watt	1	100	61.7	0	0
30	E30	Generic	Omni	12.5	150	300	2.87	360	100	ERP	Watt	1	100	61.7	0	0
31	E31	Generic	Omni	12.5	150	300	2.87	360	100	ERP	Watt	1	100	61.7	0	0
32	E32	Generic	Yagi	1.2	450	60	9.97	60	100	ERP	Watt	1	100	78.7	0	0
33	E33	Generic	Omni	4.7	450	60	2.97	360	100	ERP	Watt	1	100	83	0	0
34	E34	Generic	Omni	3	150	60	0	360	100	ERP	Watt	1	100	75.5	0	0
35	E35	Generic	Panel	6.3	1900	60	16.26	65	60	TPO	Watt	1	2536	80	0	0
36	E36	Generic	Omni	4.7	450	180	2.97	360	100	ERP	Watt	1	100	85	0	0
37	E37	Generic	Omni	1.5	850	180	0.01	360	1000	ERP	Watt	1	1000	81	0	0
38	E38	Generic	Omni	1.5	850	180	0.01	360	1000	ERP	Watt	1	1000	73	0	0
39	E39	Generic	Omni	20	450	300	10.81	360	100	ERP	Watt	1	100	85	0	0
40	E40	Generic	Omni	20	450	300	10.81	360	100	ERP	Watt	1	100	85	0	0
41	E41	Generic	Yagi	1.2	450	60	9.97	60	100	ERP	Watt	1	100	99	0	0
42	E42	Generic	Yagi	1.2	450	60	9.97	60	100	ERP	Watt	1	100	95.5	0	0
43	E43	Generic	Omni	4.7	450	60	2.97	360	100	ERP	Watt	1	100	105.5	0	0
44	E44	Generic	Omni	3	150	300	0	360	100	ERP	Watt	1	100	104.5	0	0
45	E45	Generic	Aperture	4	2400	300	22.96	2	4	ERP	Watt	1	4	98.7	0	0
46	E46	Generic	Omni	4.7	450	300	2.97	360	100	ERP	Watt	1	100	102	0	0
47	E47	Generic	Omni	4.7	450	180	2.97	360	100	ERP	Watt	1	100	104.5	0	0
48	UNKNOWN OPERATOR	Generic	Panel	4.6	1900	120	15.43	65	60	TPO	Watt	1	2094.8	45	0	0
49	UNKNOWN OPERATOR	Generic	Panel	4.6	1900	120	15.43	65	60	TPO	Watt	1	2094.8	55	0	0
50	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	100	ERP	Watt	1	100	38	0	0
51	UNKNOWN OPERATOR	Generic	Aperture	8	6000	120	39.06	2	0.01	TPO	Watt	1	80.5	14	0	0
52	UNKNOWN OPERATOR	Generic	Aperture	3	5800	310	29.06	2	20	TPO	Watt	1	16107.6	24	0	0
53	P1	Generic	Aperture	6	6000	246.8	36.36	2	0.01	TPO	Watt	1	43.3	67.5	0	0
54	P2	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	68.5	0	0



Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
55	P3 (Rx)	Rfi CC807-08	Omni	9.5	800	0	8	360	0	ERP	Watt	1	0	104.8	0	0
56	P4 (Rx)	Rfi CC807-08	Omni	9.5	800	0	8	360	0	ERP	Watt	1	0	104.8	0	0
57	P5	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	68.5	0	0
58	P6	Generic	Aperture	4	11000	164.3	37.66	2	0.01	TPO	Watt	1	58.3	46	0	0

NOTE: Z indicates relative position of the antenna to the origin location on the site, displayed in the model results diagram. The Z reference indicates antenna height above the main site level unless otherwise indicated. ERP values provided by the client and used in the modeling may be greater than are currently deployed. For other operators at this site the use of "Generic" as an antenna model or "Unknown" for a wireless operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.

10.6 Site Pictures



Figure 55: Ground Level Overview Facing North



Figure 56: Tower Overview North



Figure 57: Tower Overview South



Figure 58: Tower Overview West



Figure 59: Tower Overview East

11 Tiburon



Marin Emergency Radio Authority Site Name – Tiburon Site ID: 14 Site Compliance Report

**99 1/2 Mt. Tiburon Rd
Tiburon, CA 94920**

Latitude: N37-53-25.58
Longitude: W122-27-53.27
Structure Type: Monopole

Report generated date: March 28, 2019
Report by: Sam Cosgrove
Customer Contact: David Mortimer

**This site will be compliant upon
completion of the remediation
identified in Section 11.2.2.**

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11.1 Site Summary

The County of Marin on behalf of Marin Emergency Radio Authority has contracted with Sitesafe, LLC. (Sitesafe), an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine the RF conditions at the proposed communications site, 14 - Tiburon, located at 99 1/2 Mt. Tiburon Rd, Tiburon, CA, is in compliance with Federal Communications Commission (FCC) Rules and Regulations for RF emissions.

This section contains a detailed summary of the RF environment at the site including:

- Diagram of the site
- Inventory of the make / model of all antennas
- Theoretical MPE based on modeling

RF emissions exceed MPE limits on this top of the water tank located near the monopole. The ground level is predicted have less than 5% of MPE limits. RF alerting signage should be installed at the access of the water tank.



11.2 Site Compliance

11.2.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, and a thorough review of site access procedures, RF hazard signage and visible antenna locations, Sitesafe has determined that:

The site will be compliant with the FCC rules and regulations, as described in OET Bulletin 65 upon implementation of the proposed remediation. The corrective actions needed to make this site compliant are located in Section 11.2.2.

The compliance determination is based on General Public MPE levels due to theoretical modeling and/or physical measurements, RF signage placement, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the Marin Emergency Radio Authority's proposed deployment plan could result in the site being rendered non-compliant. Measurements have also been performed to validate the assumptions used in our theoretical modeling of this site.

Modeling is used for determining compliance and the percentage of MPE contribution. Measurements provide a view of MPE percentage levels at the site at the time of Sitesafe's visit and are used to validate modeling results.

11.2.2 Actions for Site Compliance

Based on common industry practice and our understanding of FCC and OSHA requirements, this section provides a statement of recommendations for site compliance. RF alert signage recommendations have been proposed based on existing measurements and theoretical analysis of MPE levels. Sitesafe has documented the locations of any RF signs and barriers that are required for compliance. Barriers can consist of locked doors, fencing, railing, rope, chain, paint striping or tape, combined with RF alert signage.

The site will be made compliant if the following changes are implemented:

Water Tank Access

Install a Notice sign.

11.3 RF Emissions Diagram

The RF diagram(s) below display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix B.

The key at the bottom of each diagram indicates if percentages displayed are referenced to FCC General Population Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Gray represents areas predicted to be at 5% of the MPE limits, or below.
- Green represents areas predicted to be between 5% and 100% of the MPE limits.
- Blue represents areas predicted to be between 100% and 500% of the MPE limits.
- Yellow represents areas predicted to be between 500% and 5000% of the MPE limits.
- Red areas indicated predicted levels greater than 5000% of the MPE limits.

The theoretical analysis identified the maximum predicted MPE levels on the water tank to be:

Maximum Cumulative Theoretical General Public MPE level (Existing Antennas): 9.28%
 Maximum Cumulative Theoretical General Public MPE level (All Antennas): 10.07%
 Maximum Cumulative Theoretical General Public MPE level (Proposed Antennas): 2.15%

General Population diagrams are specified when an area is accessible to the public; i.e. personnel that do not meet Occupational or RF Safety trained criteria, could gain access.

If trained occupational personnel require access to areas that are delineated as **Blue** or above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the operators to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

The key at the bottom also indicates the level or height of the modeling with respect to the main level. The origin is typically referenced to the main rooftop level, or ground level for a structure without access to the antenna level. For example:

Average from 0 feet above to 6 feet above origin

and

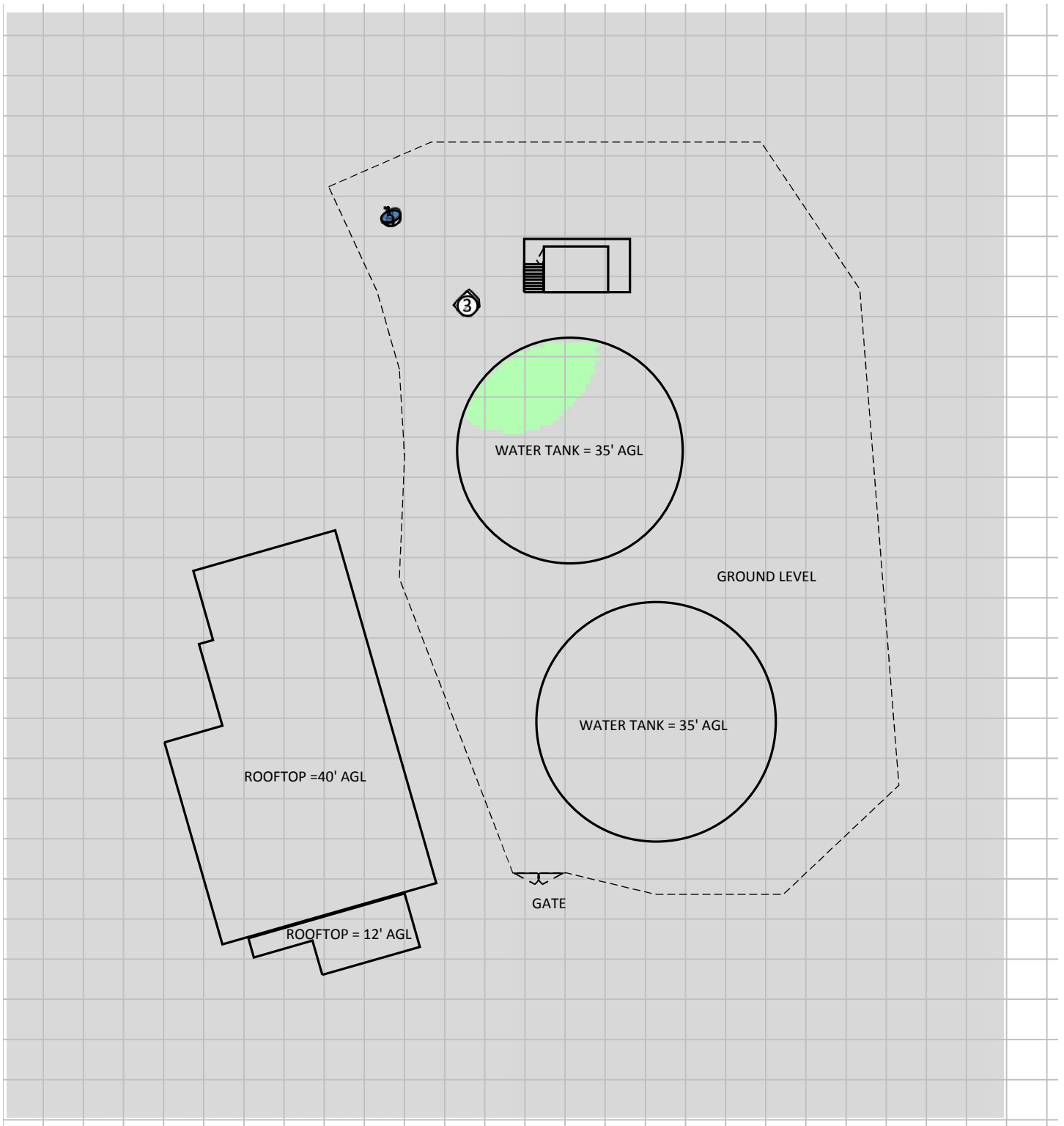
Average from 20 feet above to 26 feet above origin

The first indicates modeling at the main rooftop (or ground) level averaged over 6 feet. The second indicates modeling at a higher level (possibly a penthouse level) of 20 feet averaged over 6 feet.

Abbreviations used in the RF Emissions Diagrams

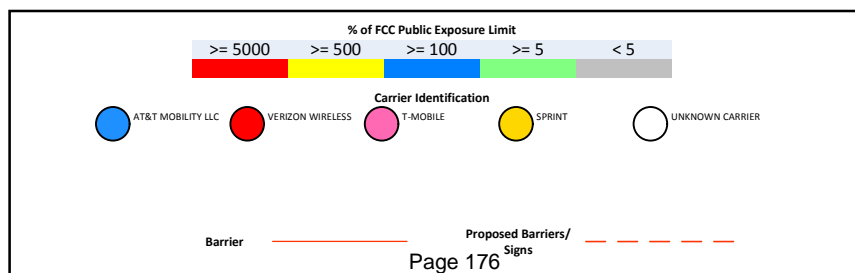
PH=# #'	Penthouse at ## feet above main roof
---------	--------------------------------------

RF Exposure Simulation For: Tiburon Existing Antennas On Air



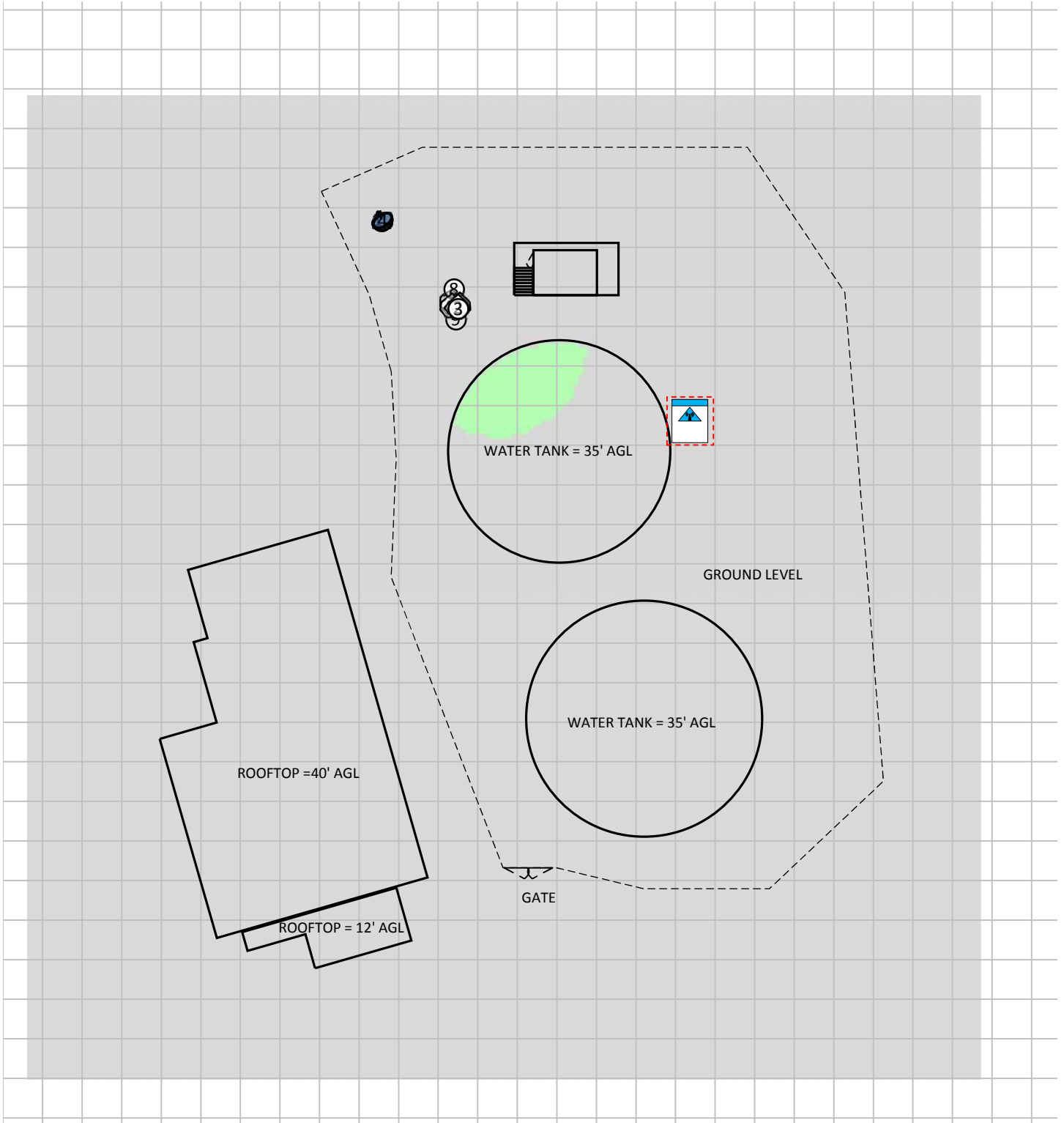
% of FCC Public Exposure Limit
Spatial average 0' - 6'

(Feet)
0 16.3 32.6
www.sitesafe.com
Site Name:Tiburon
3/27/2019 3:01:20 PM



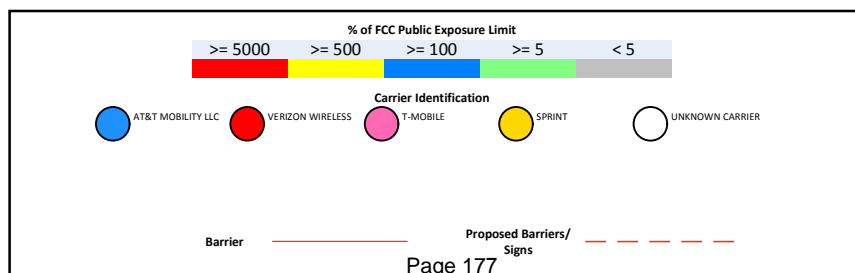
Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Tiburon All Antennas On Air



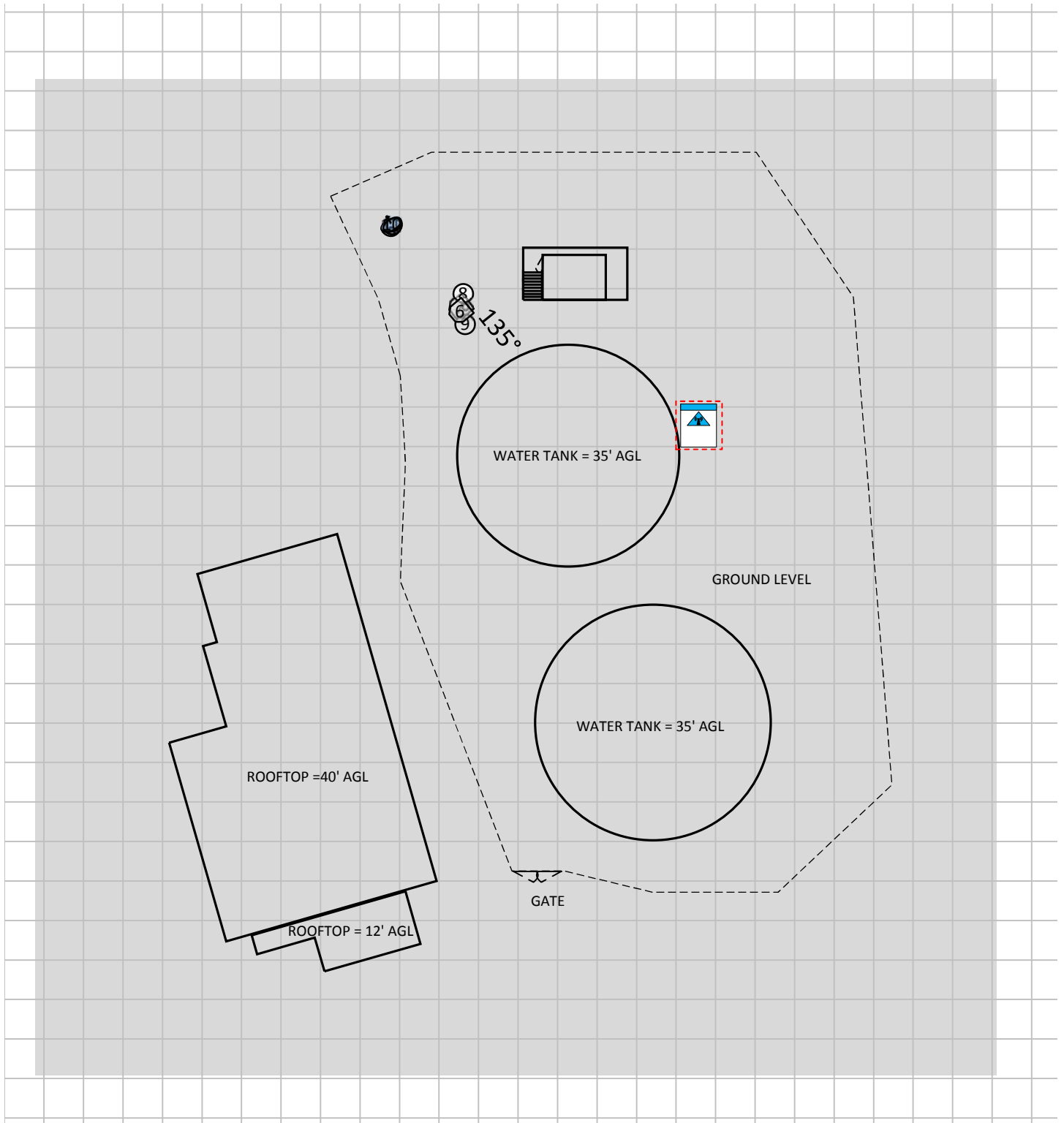
% of FCC Public Exposure Limit
Spatial average 0' - 6'

(Feet)
0 16.5 33
www.sitesafe.com
Site Name:Tiburon
3/28/2019 9:33:49 AM



Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Tiburon Final Configuration

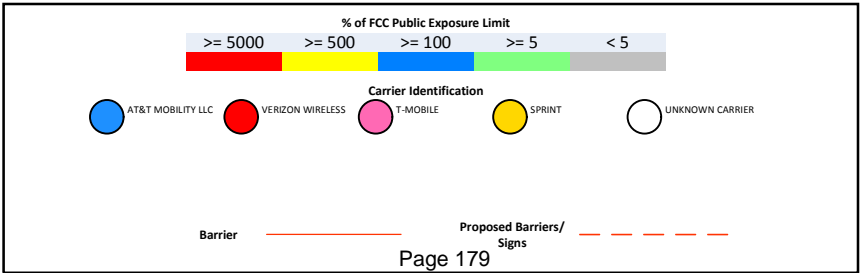
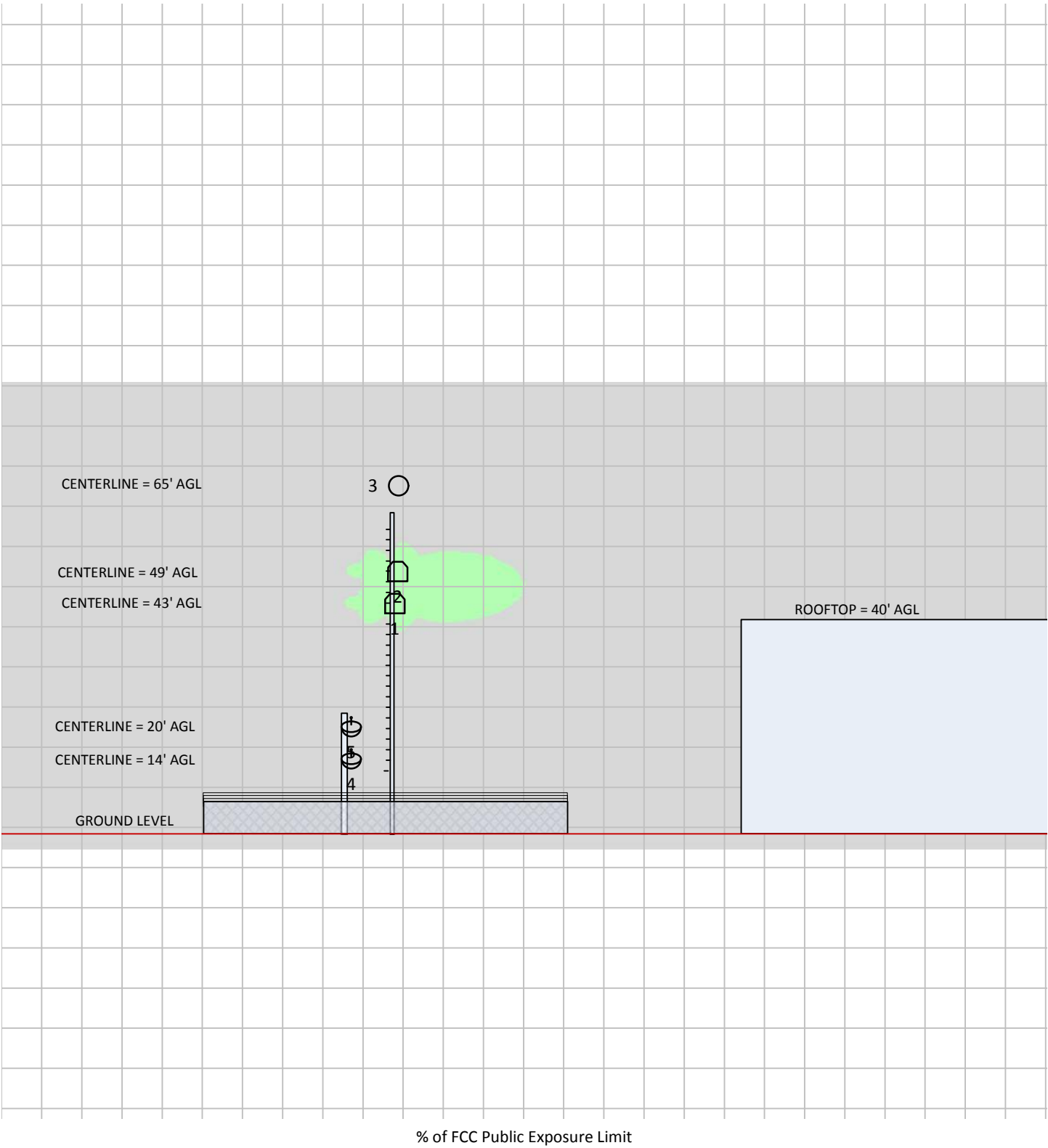


(Feet)

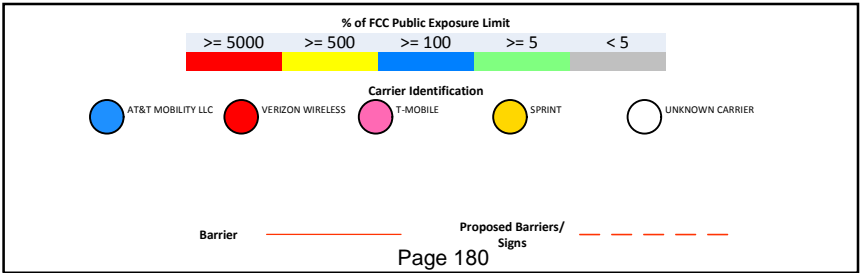
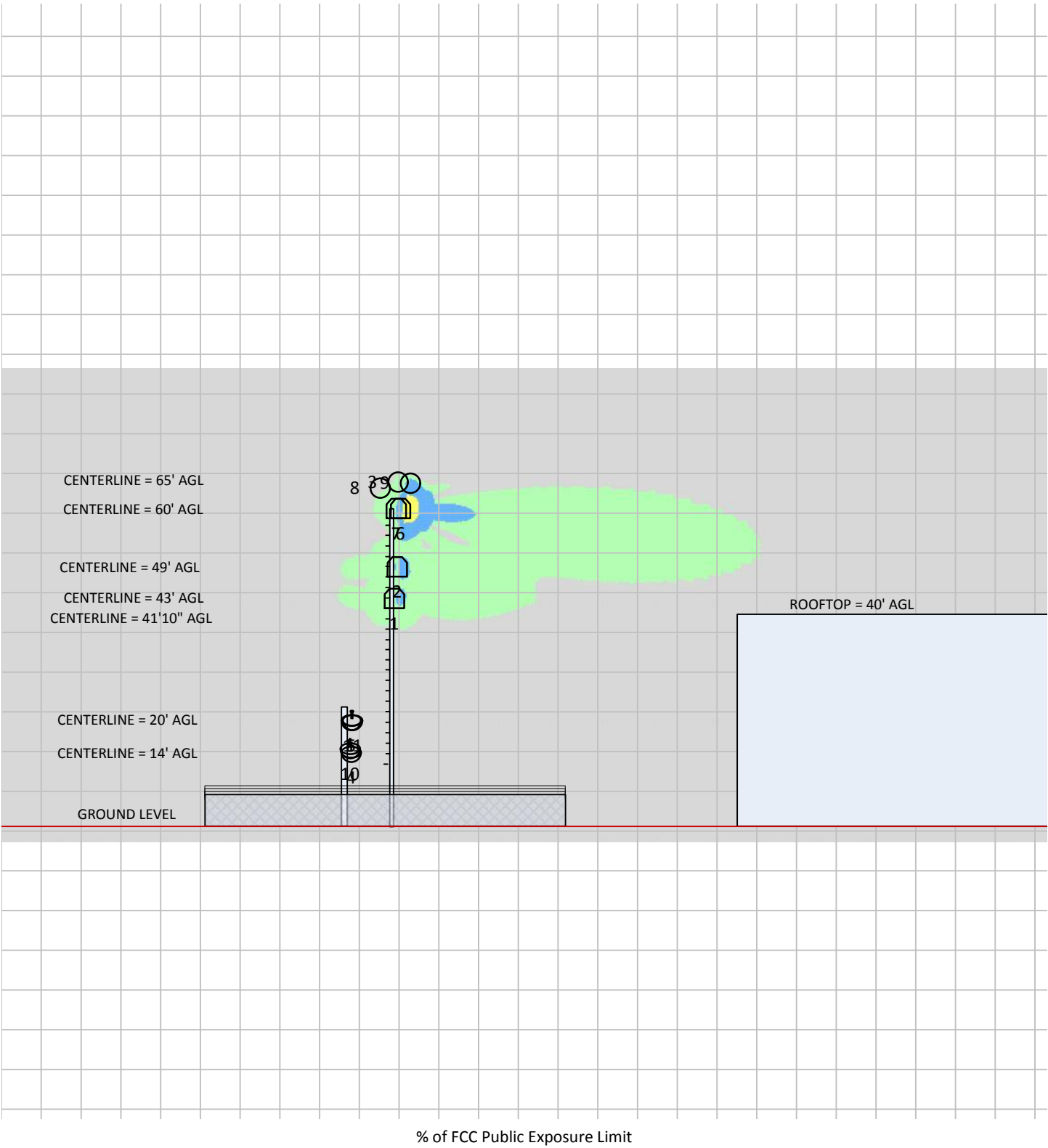
0 16.5 33

www.sitesafe.com
Site Name: Tiburon
3/28/2019 9:29:35 AM

RF Exposure Simulation For: Tiburon
Elevation View – Existing Antennas On Air



RF Exposure Simulation For: Tiburon
Elevation View – All Antennas On Air



CENTERLINE = 65' AGL
CENTERLINE = 60' AGL

8 9 6 10

CENTERLINE = 20' AGL
CENTERLINE = 14' AGL

GROUND LEVEL

ROOFTOP = 40' AGL

% of FCC Public Exposure Limit

Exposure Limit	Carrier
>= 5000	AT&T MOBILITY LLC
>= 500	VERIZON WIRELESS
>= 100	T-MOBILE
>= 5	SPRINT
< 5	UNKNOWN CARRIER

Carrier Identification

Barrier ————— Proposed Barriers/Signs

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11.4 Antenna Inventory

The Antenna Inventory shows all transmitting antennas at the site. This inventory was provided by the customer, and was utilized by Sitesafe to perform theoretical modeling of RF emissions. The inventory coincides with the site diagrams in this report, identifying each antenna's location at 14 - Tiburon. The antenna information collected includes the following information:

- Licensee or wireless operator name
- Frequency or frequency band
- Transmitter power – Effective Radiated Power ("ERP"), or Equivalent Isotropic Radiated Power ("EIRP") in Watts
- Antenna manufacturer make, model, and gain

For other operators at this site, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.



The following antenna inventory was provided by the customer and was utilized to create the site model diagrams:

Ant #	Operated By	Antenna Model	Ant Type	Len (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	POWER	POWER TYPE	POWER UNITS	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
1	E1	Andrew DB682H120-AD	Panel	4	450	180	8.01	120	100	ERP	Watt	1	100	43	0	0
2	E2	Andrew DB682H120-AD	Panel	4	450	180	8.01	120	100	ERP	Watt	1	100	49	0	0
3	E3	Generic (Rx)	Omni	10	450	225	0	360	0	ERP	Watt	1	0	65	0	0
4	E1	Generic	Aperture	4	18000	0	42.46	2	64.7	EIRP	dBmW	1	1799.4	14	0	0
5	E2	Generic	Aperture	4	18000	15	42.46	2	65.2	EIRP	dBmW	1	2018.9	20	0	0
6	P1	Sinclair SE414-SWBPALDF(D00) A=160	Panel	4.4	746	180	8.06	160	375	ERP	Watt	1	1000	41.8	0	0
7	P2	Sinclair SE414-SWBPALDF(D00) A=160	Panel	4.4	746	180	8.06	160	375	ERP	Watt	1	1000	41.8	0	0
8	P3	Rfi CC807-08 (Rx)	Omni	9.5	800	225	8	360	0	ERP	Watt	1	0	63.8	0	0
9	P4	Rfi CC807-08 (Rx)	Omni	9.5	800	45	8	360	0	ERP	Watt	1	0	64.8	0	0
10	P1	Generic	Aperture	4	11000	326.8	37.66	2	64.3	EIRP	dBmW	1	1640.9	14.7	0	0
11	P2	Generic	Aperture	4	11000	344.3	37.66	2	68.7	EIRP	dBmW	1	4520.1	20	0	0

NOTE: Z indicates relative position of the antenna to the origin location on the site, displayed in the model results diagram. The Z reference indicates antenna height above the main site level unless otherwise indicated. ERP values provided by the client and used in the modeling may be greater than are currently deployed. For other operators at this site the use of "Generic" as an antenna model or "Unknown" for a wireless operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.

12 Sonoma Mountain



Marin Emergency Radio Authority

Site Name – Sonoma Mountain

Site ID: 18

Site Compliance Report

**Near 2430 Sonoma Mt. Rd
Petaluma, CA 94954**

Site visit date: August 21, 2018

Site visit time: 4:20 PM

Site survey by: Jeff Desira

Latitude: N38-20-54.40

Longitude: W122-34-41.40

Structure Type: Self-Support

Report generated date: March 28, 2019

Report by: Sam Cosgrove

Customer Contact: David Mortimer

The site is compliant and will remain compliant upon implementation of the proposed changes.

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12.1 Site Summary

The County of Marin on behalf of Marin Emergency Radio Authority has contracted with Sitesafe, LLC. (Sitesafe), an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine the RF conditions at the proposed communications site, 18 - Sonoma Mountain, located at Near 2430 Sonoma Mt. Rd, Petaluma, CA, is in compliance with Federal Communications Commission (FCC) Rules and Regulations for RF emissions.

Sitesafe's field personnel visited 18 - Sonoma Mountain on August 21, 2018. This section contains a detailed summary of the RF environment at the site including:

- Site compliance determination;
- Photographs of the site;
- Diagram of the site;
- Inventory of the make / model of all transmitting antennas found on the site (where possible);
- Record of any Maximum Permissible Exposure ("MPE") measurements taken on the site, as applicable; and
- Theoretical MPE based on modeling.

RF emissions on the ground level do not exceed MPE limits. The area on the rooftop that does exceed MPE limits is in an inaccessible area. The emissions in that area are due to the height of the antennas (#37-#46) from the rooftop, the power levels used, and the amount of antennas. Since the area is not accessible to the general public, signage is not required. The RF emissions levels on the ground do not pose a danger to personnel in the area.



12.2 Site Compliance

12.2.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, and a thorough review of site access procedures, RF hazard signage and visible antenna locations, Sitesafe has determined that:

The site is compliant with the FCC rules and regulations, as described in OET Bulletin 65, and will remain compliant upon implementation of the proposed changes.

The compliance determination is based on General Public MPE levels due to theoretical modeling and/or physical measurements, RF signage placement, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the Marin Emergency Radio Authority's proposed deployment plan could result in the site being rendered non-compliant. Measurements have also been performed to validate the assumptions used in our theoretical modeling of this site.

Modeling is used for determining compliance and the percentage of MPE contribution. Measurements provide a view of MPE percentage levels at the site at the time of Sitesafe's visit and are used to validate modeling results.

12.2.2 Actions for Site Compliance

Based on common industry practice and our understanding of FCC and OSHA requirements, this section provides a statement of recommendations for site compliance. RF alert signage recommendations have been proposed based on existing measurements and theoretical analysis of MPE levels. Sitesafe has documented the locations of any RF signs and barriers that are required for compliance. Barriers can consist of locked doors, fencing, railing, rope, chain, paint striping or tape, combined with RF alert signage.

This site will be compliant with the FCC rules and regulations.

12.3 RF Emissions Diagram

The RF diagram(s) below display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix B.

The key at the bottom of each diagram indicates if percentages displayed are referenced to FCC General Population Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Gray represents areas predicted to be at 5% of the MPE limits, or below.
- Green represents areas predicted to be between 5% and 100% of the MPE limits.
- Blue represents areas predicted to be between 100% and 500% of the MPE limits.
- Yellow represents areas predicted to be between 500% and 5000% of the MPE limits.
- Red areas indicated predicted levels greater than 5000% of the MPE limits.

The theoretical analysis identified the maximum predicted MPE levels on the rooftop to be:

Maximum Cumulative Theoretical General Public MPE level (Existing Antennas) : 9,765.9%
Maximum Cumulative Theoretical General Public MPE level (All Antennas): 9,765.9%
Maximum Cumulative Theoretical General Public MPE level (Proposed Antennas): 9,765.9%

General Population diagrams are specified when an area is accessible to the public; i.e. personnel that do not meet Occupational or RF Safety trained criteria, could gain access.

If trained occupational personnel require access to areas that are delineated as **Blue** or above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the operators to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

The key at the bottom also indicates the level or height of the modeling with respect to the main level. The origin is typically referenced to the main rooftop level, or ground level for a structure without access to the antenna level. For example:

Average from 0 feet above to 6 feet above origin

and

Average from 20 feet above to 26 feet above origin

The first indicates modeling at the main rooftop (or ground) level averaged over 6 feet. The second indicates modeling at a higher level (possibly a penthouse level) of 20 feet averaged over 6 feet.

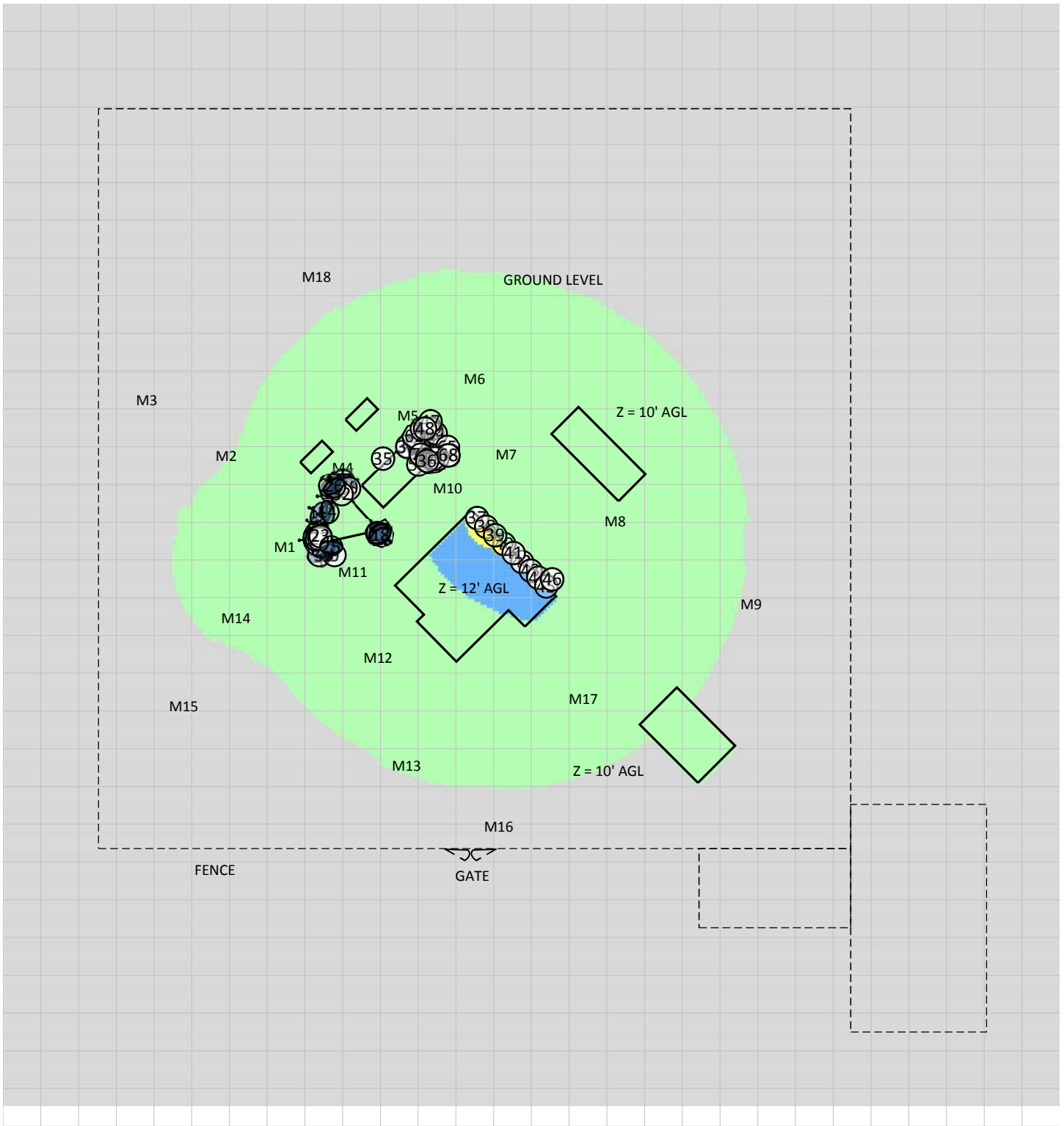


Abbreviations used in the RF Emissions Diagrams

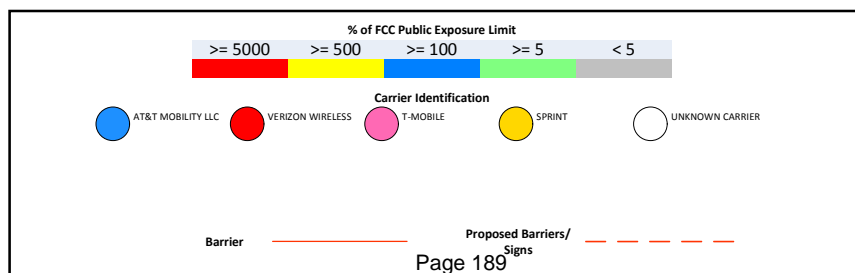
PH=##'	Penthouse at ## feet above main roof
M##	Measurement ## taken during a site visit

As discussed in Section 12.4, site measurement locations for spatial average measurements collected at the time of Sitesafe's visit have been added to the RF emissions diagram. While the theoretical modeling represents worst case MPE levels based on the assumption(s) detailed above, the measurement data is a snapshot of MPE levels at the time of our visit, and dependent on transmitter duty cycle, system implementation and emissions from other RF sources at nearby antenna sites.

RF Exposure Simulation For: Sonoma Mountain Existing Antennas Only On Air



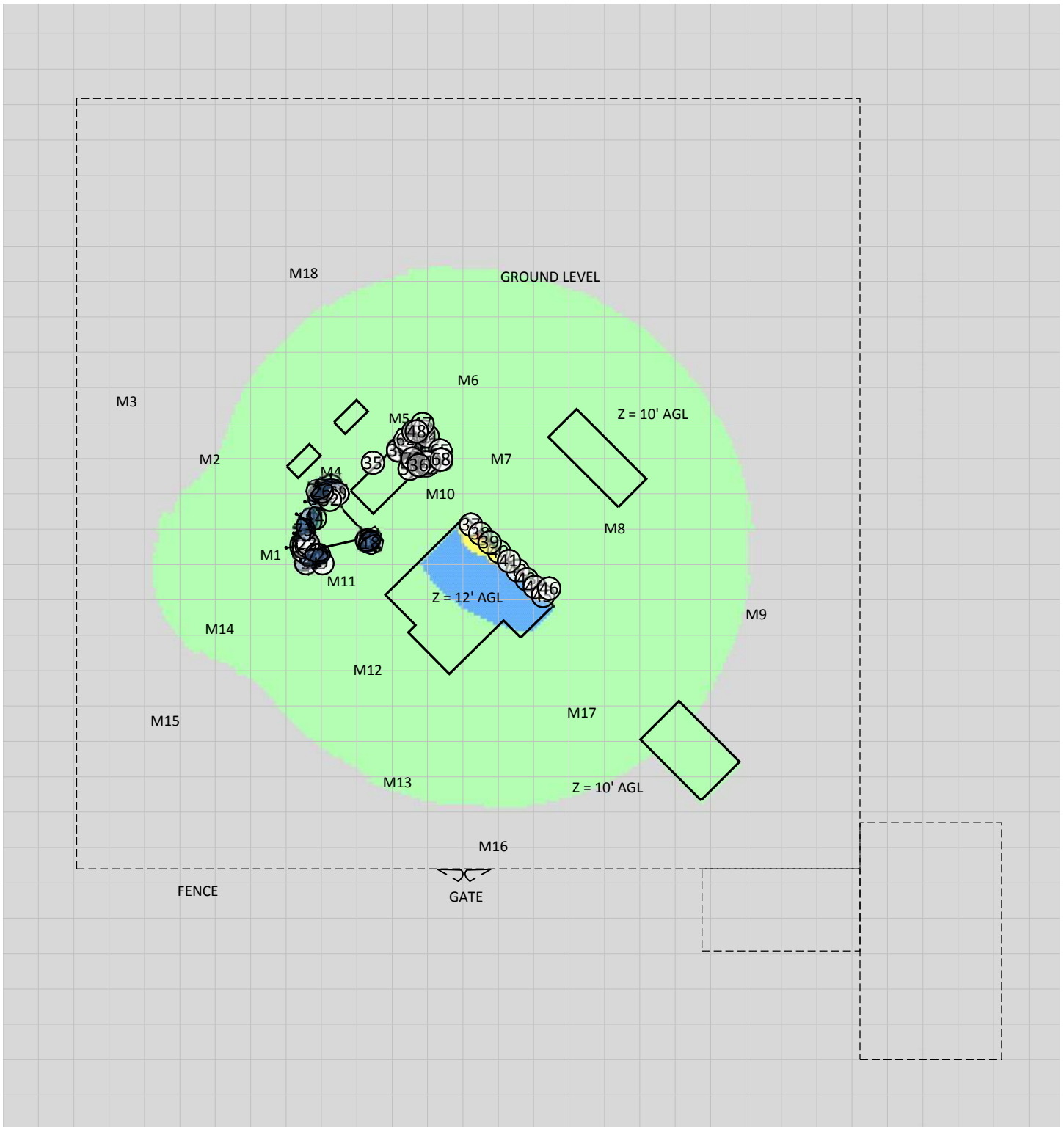
% of FCC Public Exposure Limit
Spatial average 0' - 6'



(Feet)
0 24.8 49.6
www.sitesafe.com
Site Name: Sonoma Mountain
8/28/2018 1:20:27 PM

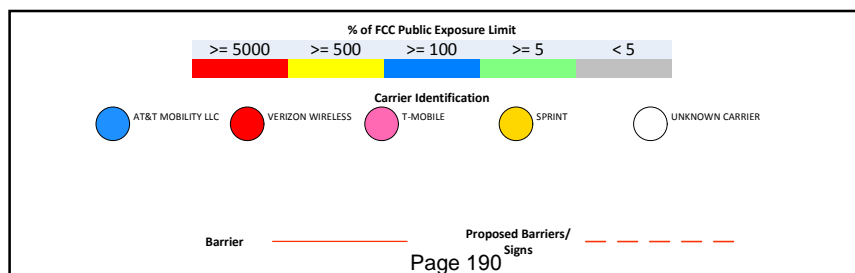
Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Sonoma Mountain All Antennas On Air



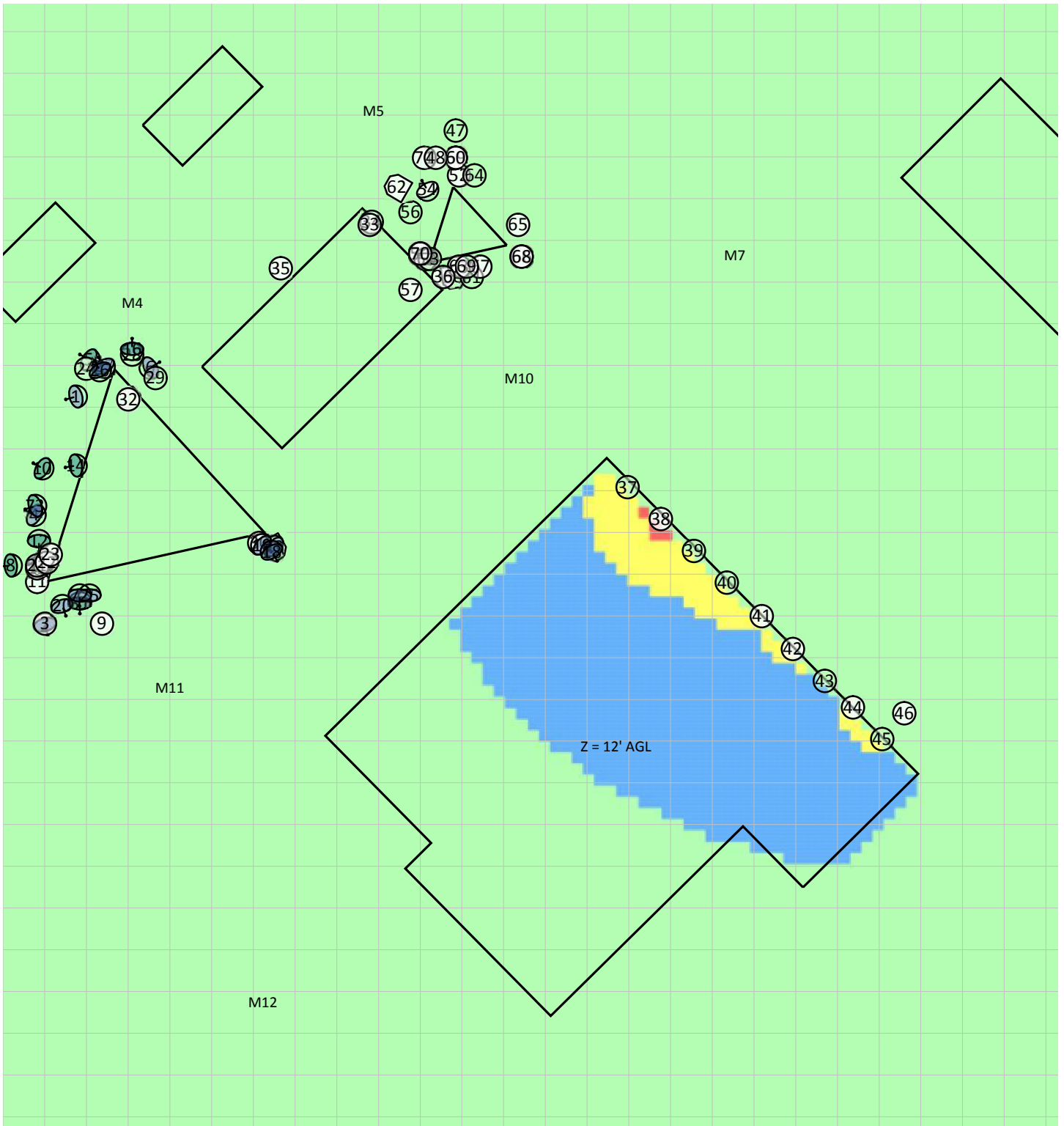
% of FCC Public Exposure Limit
Spatial average 0' - 6'

(Feet)
0 23.8 47.6
www.sitesafe.com
Site Name: Sonoma Mountain
8/28/2018 1:16:44 PM



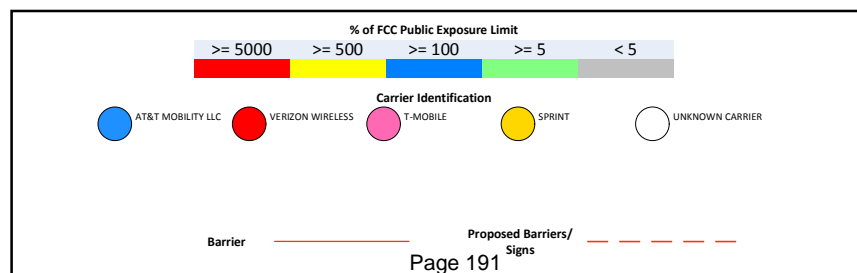
Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Sonoma Mountain All Antennas On Air – Detail View



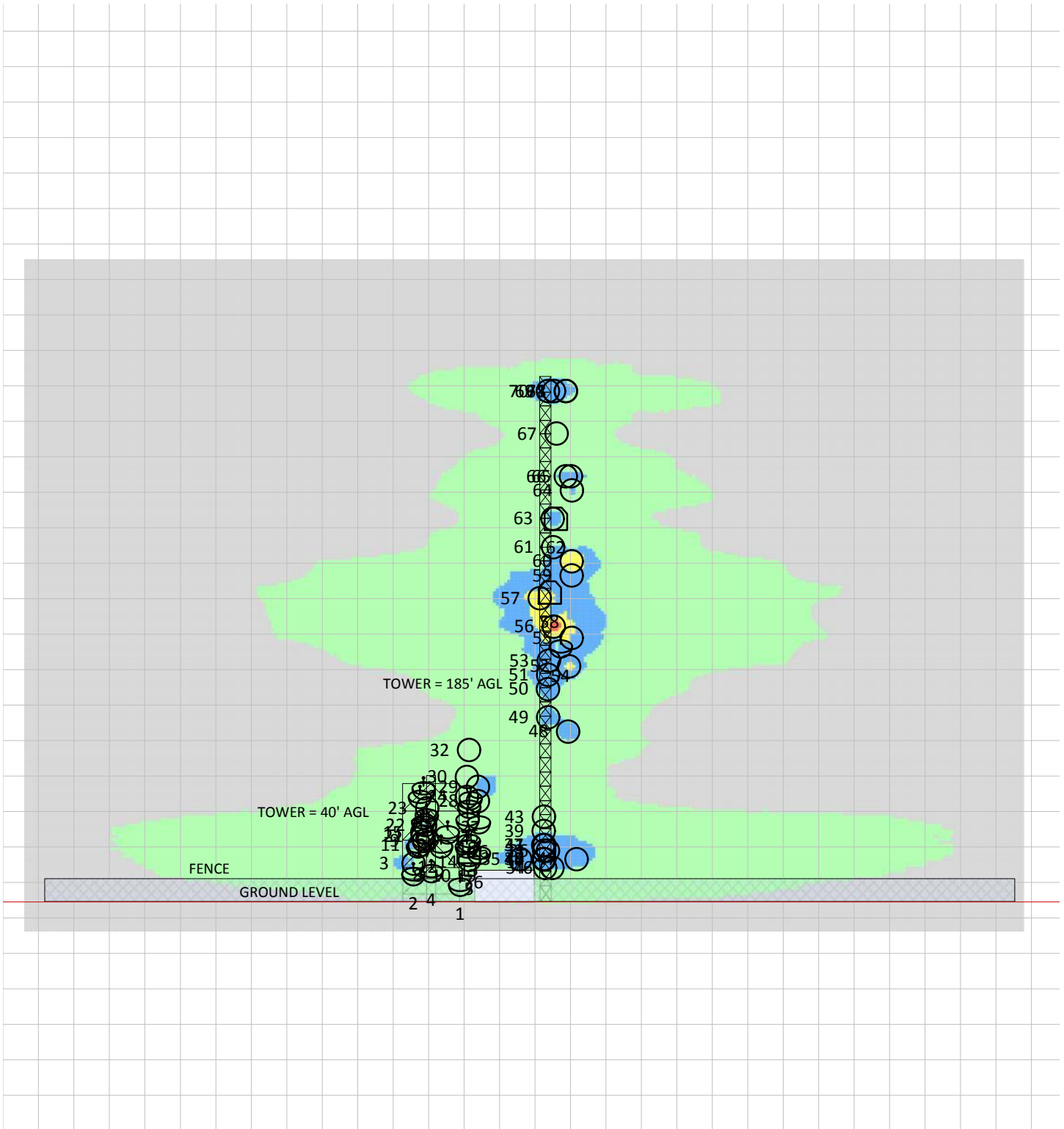
% of FCC Public Exposure Limit
Spatial average 0' - 6'

(Feet)
0 6.7 13.4
www.sitesafe.com
Site Name: Sonoma Mountain
8/28/2018 1:17:24 PM

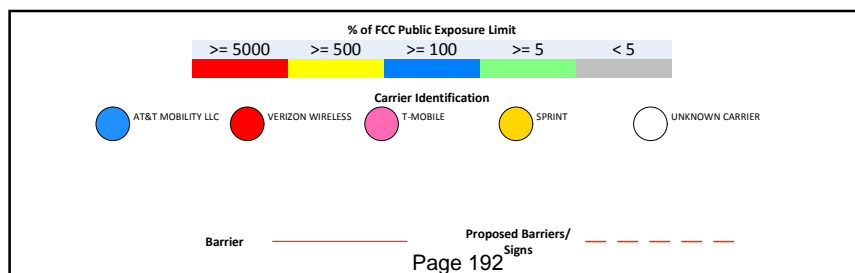


Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

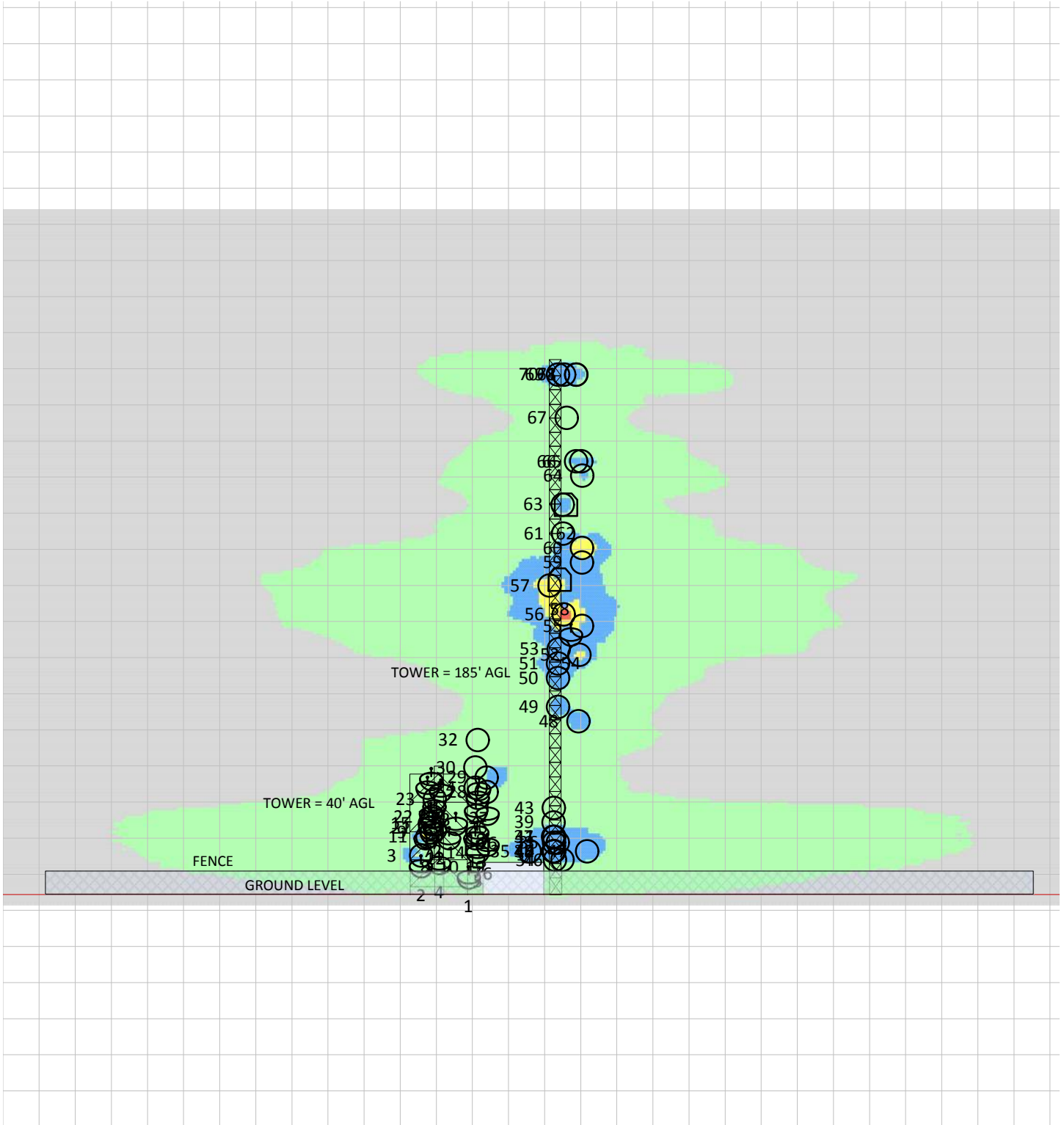
RF Exposure Simulation For: Sonoma Mountain Existing Antennas Only On Air



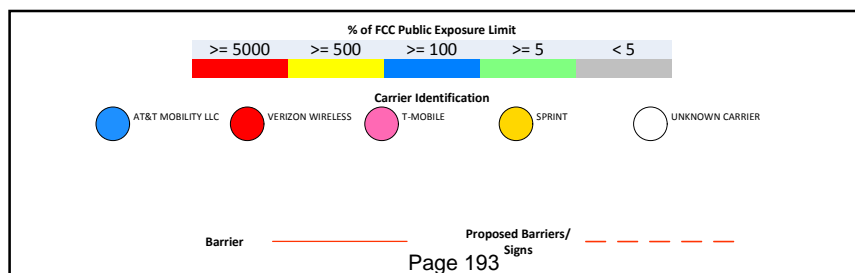
% of FCC Public Exposure Limit



RF Exposure Simulation For: Sonoma Mountain All Antennas On Air – Elevation View



% of FCC Public Exposure Limit



12.4 Site Measurements

This section provides a summary of the measurements collected at the site. Actual measurements locations at which these data points were collected are included in the RF emission diagram provided in Section 12.3 of this report. Two types of measurements were collected at each measurement location: maximum (peak) and spatial average. The spatial average measurement consists of a collection of ten (10) measurements within a ten (10) second time interval taken from zero (0) to six (6) feet in height. The purpose of this measurement technique is to identify the average power density over the dimensions of a typical human body.

Table 1 below contains all the measurements collected from accessible areas located at the site at the time of Sitesafe's visit. Whenever possible, measurements are taken in front of the antenna in the transmitting direction. However, because of the antenna configuration at this site, specific emissions could not be discerned from nearby facilities, and no attempt was made to determine power density levels from a specific transmitting antenna.

Highest Measured Occupational Level: <1%

This value is equal to:

Highest General Public Level: <5%.

Measurements Points	Spatial Average	Maximum	Measurements Points	Spatial Average	Maximum
M1	<1 %	<1 %	M14	<1 %	<1 %
M2	<1 %	<1 %	M15	<1 %	<1 %
M3	<1 %	<1 %	M16	<1 %	<1 %
M4	<1 %	<1 %	M17	<1 %	<1 %
M5	<1 %	<1 %	M18	<1 %	<1 %
M6	<1 %	<1 %	M19	<1 %	<1 %
M7	<1 %	<1 %	M20	<1 %	<1 %
M8	<1 %	<1 %	M21	<1 %	<1 %
M9	<1 %	<1 %	M22	<1 %	<1 %
M10	<1 %	<1 %	M23	<1 %	<1 %
M11	<1 %	<1 %	M24	<1 %	<1 %
M12	<1 %	<1 %	M25	<1 %	<1 %
M13	<1 %	<1 %	M26	<1 %	<1 %

RF meters and probes have been calibrated and used according to the manufacturer's specifications. Measurements provide a view of the MPE percentage levels at the site at the time of Sitesafe's site visit and are used to validate modeling results. Theoretical modeling is used for determining compliance and the percentage of MPE contributions.

An RF Emission diagram has been included in section 12.3 of this document. All measurement locations are identified in this diagram. The locations of measurements in the RF Emission diagram can be cross referenced with Table 1 (above) to determine the actual spatial average and maximum measurement value per location.

12.5 Antenna Inventory

The Antenna Inventory shows all transmitting antennas at the site. This inventory was verified on site, and was utilized by Sitesafe to perform theoretical modeling of RF emissions. The inventory coincides with the site diagrams in this report, identifying each antenna's location at 18 - Sonoma Mountain. The antenna information collected includes the following information:

- Licensee or wireless operator name
- Frequency or frequency band
- Transmitter power – Effective Radiated Power ("ERP"), or Equivalent Isotropic Radiated Power ("EIRP") in Watts
- Antenna manufacturer make, model, and gain

For other operators at this site, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.



The following antenna inventory and representative photographs were obtained or verified during the site visit and were utilized to create the site model diagrams:

Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBi)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
1	E1	Generic	Aperture	6	6615	255	36.36	2	71.1	EIRP	dBmW	1	7854.9	6	0	0
2	E2	Generic	Aperture	6	6585	165	36.36	2	62.3	EIRP	dBmW	1	1035.4	9.8	0	0
3	E3	Generic	Yagi	1.2	450	260	9.97	60	100	ERP	Watt	1	100	13.5	0	0
4	E4	Generic	Aperture	6	6675	300	36.36	2	71.3	EIRP	dBmW	1	8225	10.8	0	0
5	E5	Generic	Aperture	6	6655	300	36.36	2	58	EIRP	dBmW	1	384.1	14.8	0	0
6	E6	Generic	Aperture	6	6550	60	36.36	2	61	EIRP	dBmW	1	767.1	17.3	0	0
7	E7	Generic	Panel	2.2	5800	150	16.01	90	20	ERP	Watt	1	20	17.6	0	0
8	E8	Generic	Aperture	6	6645	265	36.36	2	61.3	EIRP	dBmW	1	822	19.5	0	0
9	E9	Generic	Yagi	1.2	450	140	9.97	60	100	ERP	Watt	1	100	21.5	0	0
10	E10	Generic	Aperture	8	6550	300	39.06	2	61	EIRP	dBmW	1	767.1	19.5	0	0
11	E11	Generic	Yagi	1.2	450	180	9.97	60	100	ERP	Watt	1	100	20	0	0
12	E12	Generic	Aperture	2	10705	180	31.16	2	56.9	EIRP	dBmW	1	298.2	22.5	0	0
13	E13	Generic	Aperture	6	6655	130	36.36	2	58	EIRP	dBmW	1	384.1	21.5	0	0
14	E14	Generic	Aperture	4	2400	260	22.96	2	4	ERP	Watt	1	4	24.5	0	0
15	E15	Generic	Yagi	1.2	450	0	9.97	60	100	ERP	Watt	1	100	24.5	0	0
16	E16	Generic	Aperture	4	11000	0	37.66	2	0.01	TPO	Watt	1	58.3	28	0	0
17	E17	Generic	Aperture	4	2400	270	22.96	2	4	ERP	Watt	1	4	28	0	0
18	E18	Generic	Aperture	6	6550	150	36.36	2	61	EIRP	dBmW	1	767.1	29	0	0
19	E19	Generic	Aperture	4	6655	130	32.86	2	58	EIRP	dBmW	1	384.1	19.5	0	0
20	E20	Generic	Aperture	4	6695	160	32.86	2	54.3	EIRP	dBmW	1	164	37	0	0
21	E21	Generic	Yagi	1.2	450	270	9.97	60	100	ERP	Watt	1	100	23	0	0
22	E22	Generic	Yagi	1.2	450	270	9.97	60	100	ERP	Watt	1	100	27	0	0
23	E23	Generic	Yagi	1.2	450	270	9.97	60	100	ERP	Watt	1	100	33	0	0
24	E24	Generic	Yagi	1.2	450	270	9.97	60	100	ERP	Watt	1	100	37	0	0
25	E25	Generic	Aperture	6	6034	180	32.86	2	65.9	EIRP	dBmW	1	2372	30.5	0	0
26	E26	Generic	Aperture	6	6063	330	36.36	2	65.8	EIRP	dBmW	1	2317.7	33.5	0	0



Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
27	E27	Generic	Aperture	6	6034	330	36.36	2	64.5	EIRP	dBmW	1	1718.3	36.5	0	0
28	E28	Generic	Yagi	1.2	450	90	9.97	60	100	ERP	Watt	1	100	35.5	0	0
29	E29	Generic	Yagi	1.2	450	90	9.97	60	100	ERP	Watt	1	100	40.5	0	0
30	E30	Generic	Omni	10	150	90	0	360	100	ERP	Watt	1	100	44	0	0
31	E31	Generic	Aperture	6	6063	180	36.36	2	64.5	EIRP	dBmW	1	1718.3	40	0	0
32	E32	Generic	Omni	20	450	330	10.81	360	100	ERP	Watt	1	100	53.5	0	0
33	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	18	0	0
34	UNKNOWN OPERATOR	Generic	Yagi	0.5	850	90	9.97	60	1	TPO	Watt	1	9.9	12	0	0
35	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	15	0	0
36	UNKNOWN OPERATOR	Generic	Omni	8	150	0	2.61	360	100	ERP	Watt	1	100	18	0	0
37	UNKNOWN OPERATOR	Generic	Omni	8	150	0	2.61	360	100	ERP	Watt	1	100	20	0	0
38	UNKNOWN OPERATOR	Generic	Omni	1.5	850	0	0.01	360	1000	ERP	Watt	1	1000	15	0	0
39	UNKNOWN OPERATOR	Generic	Omni	14	850	0	9.97	360	1000	ERP	Watt	1	1000	25	0	0
40	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	15	0	0
41	UNKNOWN OPERATOR	Generic	Omni	8	150	0	2.61	360	100	ERP	Watt	1	100	20	0	0
42	UNKNOWN OPERATOR	Generic	Omni	8	150	0	2.61	360	100	ERP	Watt	1	100	15	0	0
43	UNKNOWN OPERATOR	Generic	Omni	24	850	0	11.97	360	1000	ERP	Watt	1	1000	30	0	0
44	UNKNOWN OPERATOR	Generic	Omni	8	150	0	2.61	360	100	ERP	Watt	1	100	15	0	0
45	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	15	0	0
46	UNKNOWN OPERATOR	Generic	Yagi	0.5	850	0	9.97	60	1	TPO	Watt	1	9.9	12	0	0
47	UNKNOWN OPERATOR	Generic	Omni	14	850	0	9.97	360	1000	ERP	Watt	1	1000	15	0	0
48	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	60	0	0
49	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	65	0	0
50	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	75	0	0
51	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	80	0	0
52	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	83	0	0
53	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	85	0	0
54	UNKNOWN OPERATOR	Generic	Aperture	3	5800	330	29.06	2	20	ERP	Watt	1	20	90	0	0



Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
55	UNKNOWN OPERATOR	Generic	Omni	9.5	450	0	5.97	360	100	ERP	Watt	1	100	93	0	0
56	UNKNOWN OPERATOR	Generic	Omni	1.5	850	0	0.01	360	1000	ERP	Watt	1	1000	97	0	0
57	UNKNOWN OPERATOR	Generic	Omni	1.5	850	0	0.01	360	1000	ERP	Watt	1	1000	107	0	0
58	UNKNOWN OPERATOR	Generic	Panel	1.1	2400	170	10.01	90	4	ERP	Watt	1	4	109	0	0
59	UNKNOWN OPERATOR	Generic	Omni	9.5	450	0	5.97	360	100	ERP	Watt	1	100	115	0	0
60	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	100	ERP	Watt	1	100	120	0	0
61	UNKNOWN OPERATOR	Generic	Yagi	0.5	850	160	9.97	60	1	TPO	Watt	1	9.9	125	0	0
62	UNKNOWN OPERATOR	Generic	Panel	1.7	2400	300	12.01	90	4	ERP	Watt	1	4	135	0	0
63	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	135	0	0
64	UNKNOWN OPERATOR	Generic	Omni	9.5	450	0	5.97	360	100	ERP	Watt	1	100	145	0	0
65	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	150	0	0
66	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	150	0	0
67	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	165	0	0
68	UNKNOWN OPERATOR	Generic	Omni	9.5	450	0	5.97	360	100	ERP	Watt	1	100	180	0	0
69	UNKNOWN OPERATOR	Generic	Omni	20	450	0	10.81	360	100	ERP	Watt	1	100	180	0	0
70	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	180	0	0
71	UNKNOWN OPERATOR	Generic	Omni	9.5	450	0	5.97	360	100	ERP	Watt	1	100	180	0	0
72	P1	Generic	Aperture	6	6000	183.4	36.36	2	65	EIRP	dBmW	1	1928	25	0	0
73	P2	Generic	Aperture	6	6000	251.3	36.36	2	65	EIRP	dBmW	1	1928	36	0	0

NOTE: Z indicates relative position of the antenna to the origin location on the site, displayed in the model results diagram. The Z reference indicates antenna height above the main site level unless otherwise indicated. ERP values provided by the client and used in the modeling may be greater than are currently deployed. For other carriers at this site the use of "Generic" as an antenna model or "Unknown" for a wireless operator means the information with regard to carrier, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.

12.6 Site Pictures



Figure 60: 40' Tower Overview Southeast



Figure 61: 40' Tower Overview West



Figure 62: 40' Tower Overview Northeast



Figure 63: 40' Tower Overview North



Figure 64: 185' Tower Overview North



Figure 65: 185' Tower Overview West



Figure 66: Equipment Overview Northeast

13 Stewart Point



Marin Emergency Radio Authority

Site Name – Stewart Point

Site ID: 19

Site Compliance Report

**315 Paradise Valley Rd
Bolinas, CA 94924**

Site visit date: August 23, 2018
Site visit time: 1:00 PM
Site survey by: Jeff Desira

Latitude: N37-55-49.40
Longitude: W122-43-12.70
Structure Type: Monopole

Report generated date: March 28, 2019
Report by: Sam Cosgrove
Customer Contact: David Mortimer

The site is compliant and will remain complaint upon implementation of the proposed changes.

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13.1 Site Summary

The County of Marin on behalf of Marin Emergency Radio Authority has contracted with Sitesafe, LLC. (Sitesafe), an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine whether the proposed communications site, 19 - Stewart Point, located at 315 Paradise Valley Rd, Bolinas, CA, is in compliance with Federal Communications Commission (FCC) Rules and Regulations for RF emissions.

Sitesafe's field personnel visited 19 - Stewart Point on August 23, 2018. This section contains a detailed summary of the RF environment at the site including:

- Site compliance determination;
- Photographs of the site;
- Diagram of the site;
- Inventory of the make / model of all transmitting antennas found on the site (where possible);
- Record of any Maximum Permissible Exposure ("MPE") measurements taken on the site, as applicable; and
- Theoretical MPE based on modeling.

RF emissions do not exceed MPE limits on the ground level. The area that exceeds MPE limits is on an inaccessible rooftop. Since the area is not accessed by general public, signage is not required. The RF emissions on the ground level do not pose a danger to personnel in the area.



13.2 Site Compliance

13.2.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, and a thorough review of site access procedures, RF hazard signage and visible antenna locations, Sitesafe has determined that:

The site is compliant with the FCC rules and regulations, as described in OET Bulletin 65, and will remain compliant upon implementation of the proposed changes.

The compliance determination is based on General Public MPE levels due to theoretical modeling and/or physical measurements, RF signage placement, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the Marin Emergency Radio Authority's proposed deployment plan could result in the site being rendered non-compliant. Measurements have also been performed to validate the assumptions used in our theoretical modeling of this site.

Modeling is used for determining compliance and the percentage of MPE contribution. Measurements provide a view of MPE percentage levels at the site at the time of Sitesafe's visit and are used to validate modeling results.

13.2.2 Actions for Site Compliance

Based on common industry practice and our understanding of FCC and OSHA requirements, this section provides a statement of recommendations for site compliance. RF alert signage recommendations have been proposed based on existing measurements and theoretical analysis of MPE levels. Sitesafe has documented the locations of any RF signs and barriers that are required for compliance. Barriers can consist of locked doors, fencing, railing, rope, chain, paint striping or tape, combined with RF alert signage.

This site will be compliant with the FCC rules and regulations.

13.3 RF Emissions Diagram

The RF diagram(s) below display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix B.

The key at the bottom of each diagram indicates if percentages displayed are referenced to FCC General Population Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Gray represents areas predicted to be at 5% of the MPE limits, or below.
- Green represents areas predicted to be between 5% and 100% of the MPE limits.
- Blue represents areas predicted to be between 100% and 500% of the MPE limits.
- Yellow represents areas predicted to be between 500% and 5000% of the MPE limits.
- Red areas indicated predicted levels greater than 5000% of the MPE limits.

The theoretical analysis identified the maximum predicted MPE levels on the rooftop to be:

Maximum Cumulative Theoretical General Public MPE level (Existing Antennas) : 144.2%
Maximum Cumulative Theoretical General Public MPE level (All Antennas): 165.9%
Maximum Cumulative Theoretical General Public MPE level (Proposed Antennas): 150.9%

General Population diagrams are specified when an area is accessible to the public; i.e. personnel that do not meet Occupational or RF Safety trained criteria, could gain access.

If trained occupational personnel require access to areas that are delineated as **Blue** or above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the operators to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

The key at the bottom also indicates the level or height of the modeling with respect to the main level. The origin is typically referenced to the main rooftop level, or ground level for a structure without access to the antenna level. For example:

Average from 0 feet above to 6 feet above origin

and

Average from 20 feet above to 26 feet above origin

The first indicates modeling at the main rooftop (or ground) level averaged over 6 feet. The second indicates modeling at a higher level (possibly a penthouse level) of 20 feet averaged over 6 feet.

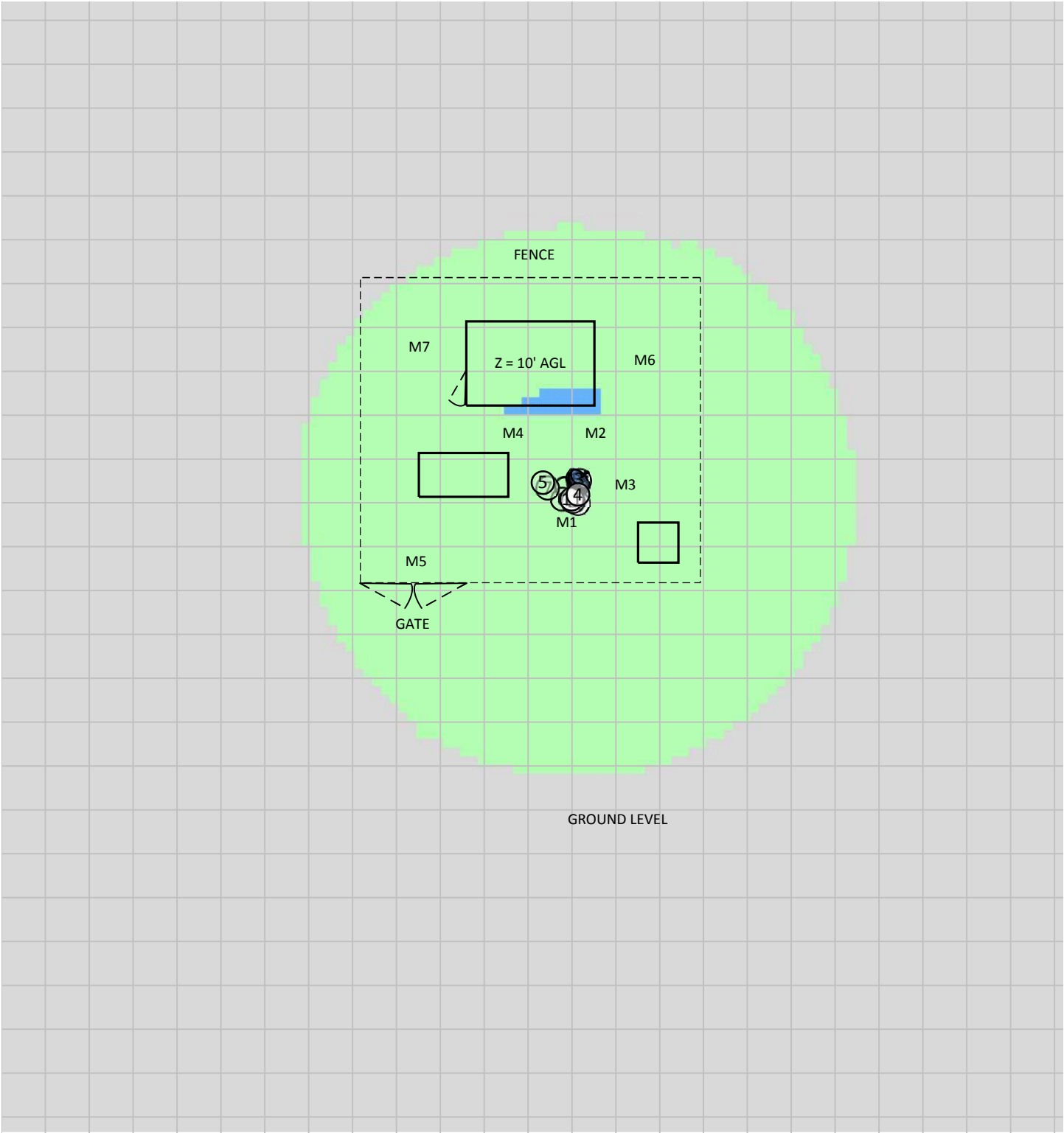


Abbreviations used in the RF Emissions Diagrams

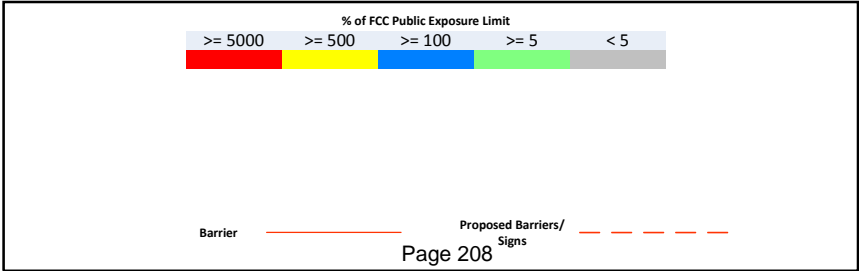
PH=##'	Penthouse at ## feet above main roof
M##	Measurement ## taken during a site visit

As discussed in Section 13.4, site measurement locations for spatial average measurements collected at the time of Sitesafe's visit have been added to the RF emissions diagram. While the theoretical modeling represents worst case MPE levels based on the assumption(s) detailed above, the measurement data is a snapshot of MPE levels at the time of our visit, and dependent on transmitter duty cycle, system implementation and emissions from other RF sources at nearby antenna sites.

RF Exposure Simulation For: Stewart Point
Existing Configuration



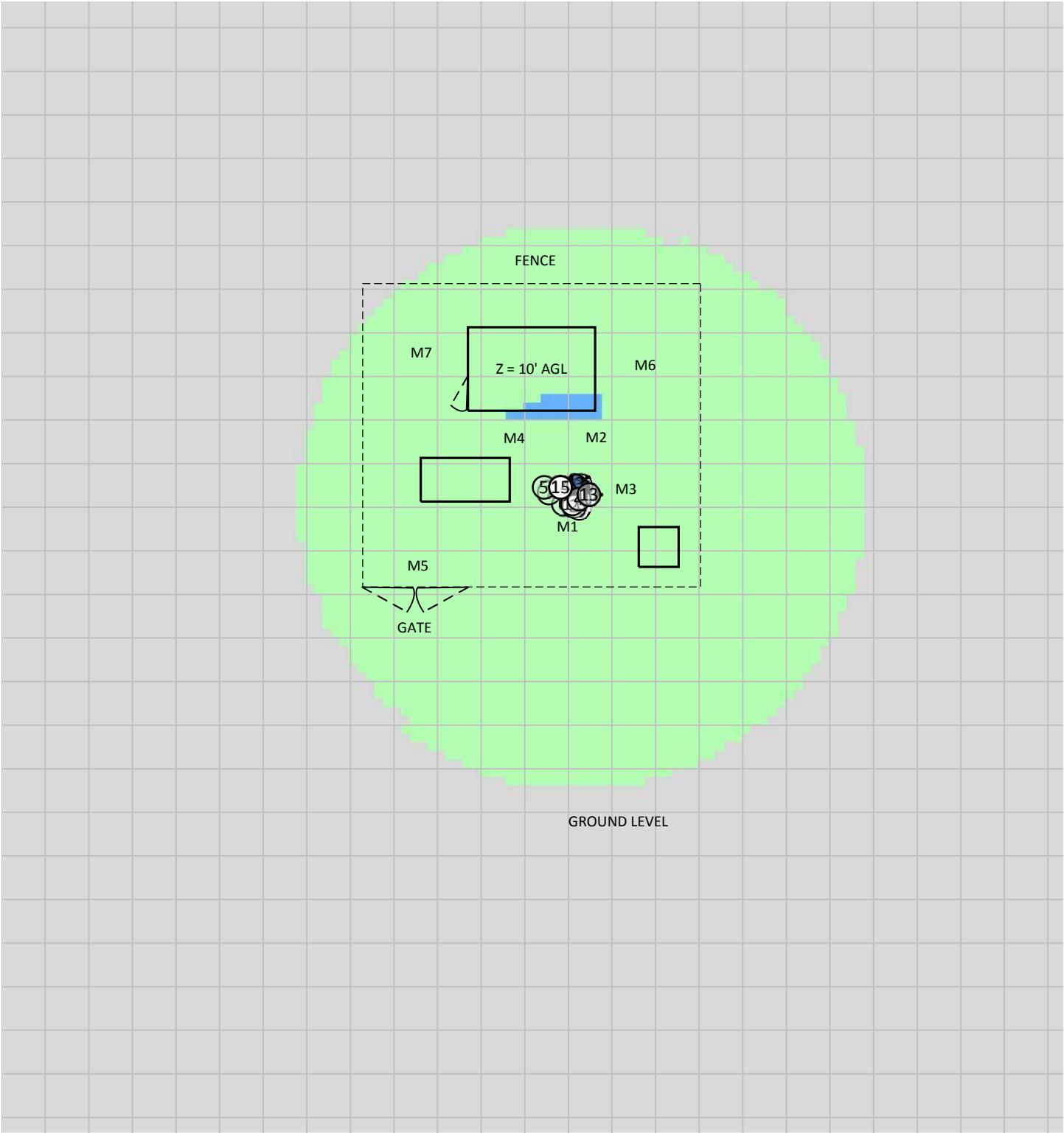
% of FCC Public Exposure Limit
Spatial average 0' - 6'



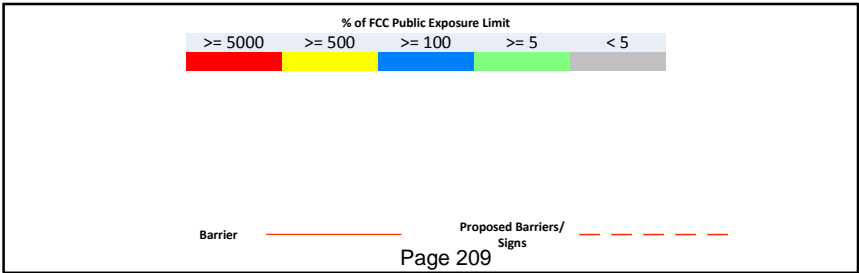
(Feet)
0 8.6 17.1
www.sitesafe.com
Site Name:Stewart Point
11/5/2018 1:33:54 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Stewart Point
All Antennas On Air



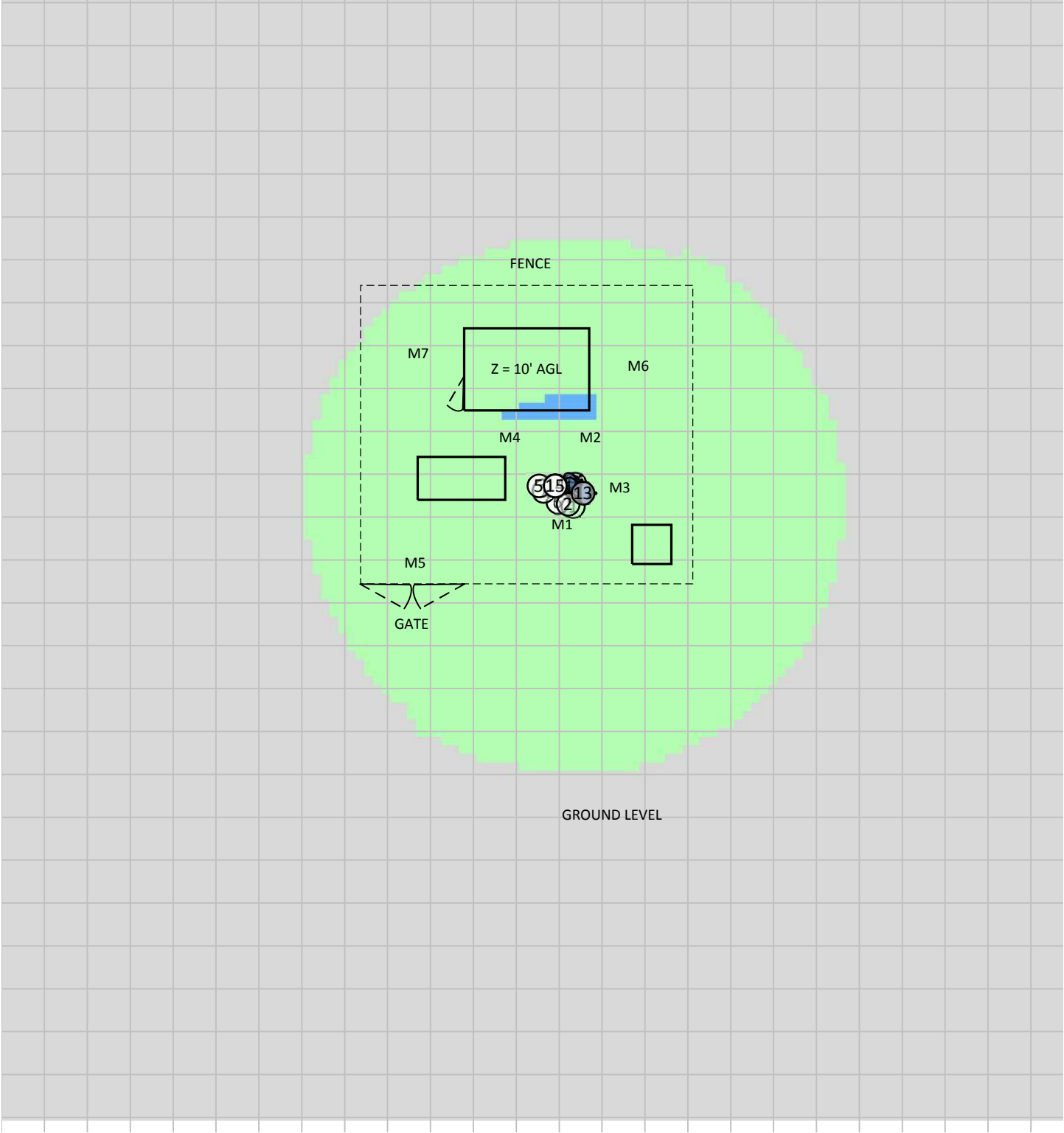
% of FCC Public Exposure Limit
Spatial average 0' - 6'



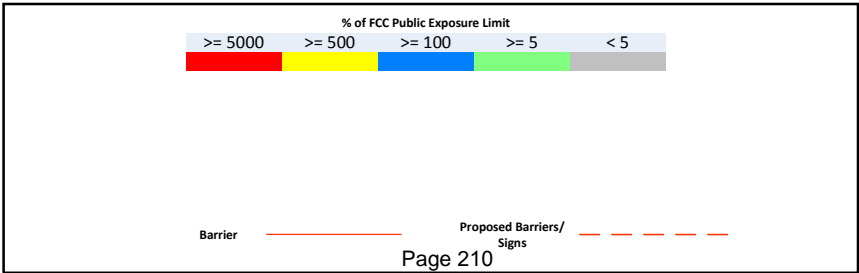
(Feet)
0 8.6 17.2
www.sitesafe.com
Site Name:Stewart Point
11/5/2018 1:38:54 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Stewart Point
Final Configuration



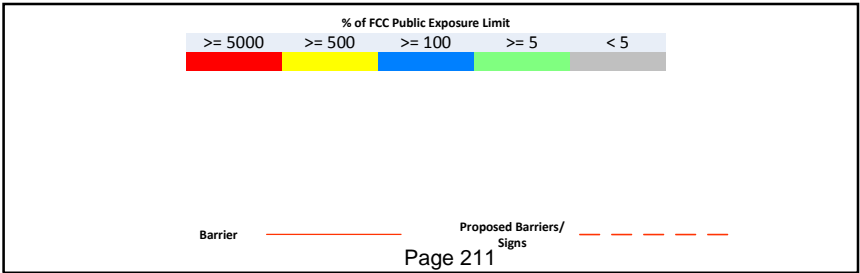
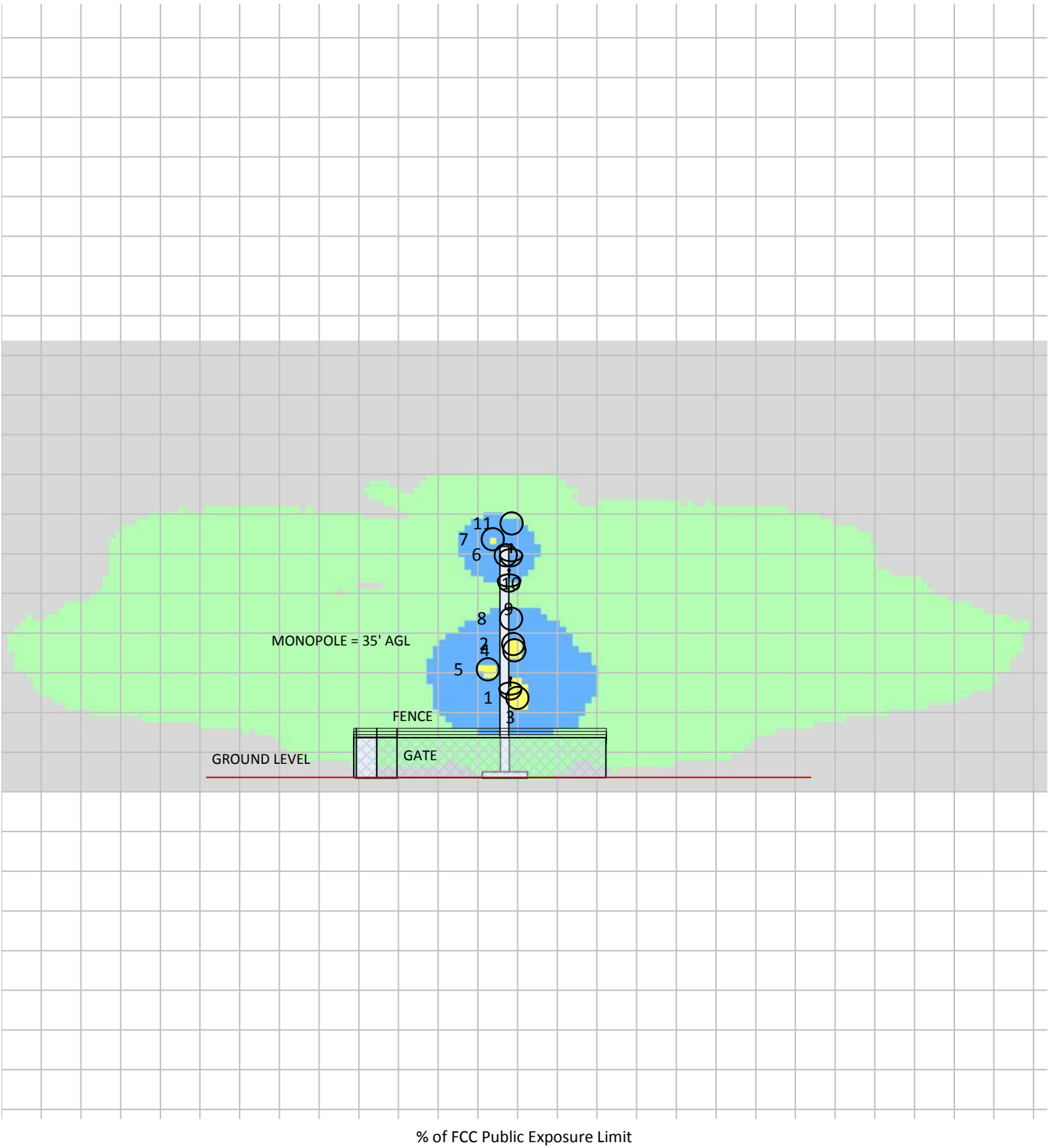
% of FCC Public Exposure Limit
Spatial average 0' - 6'



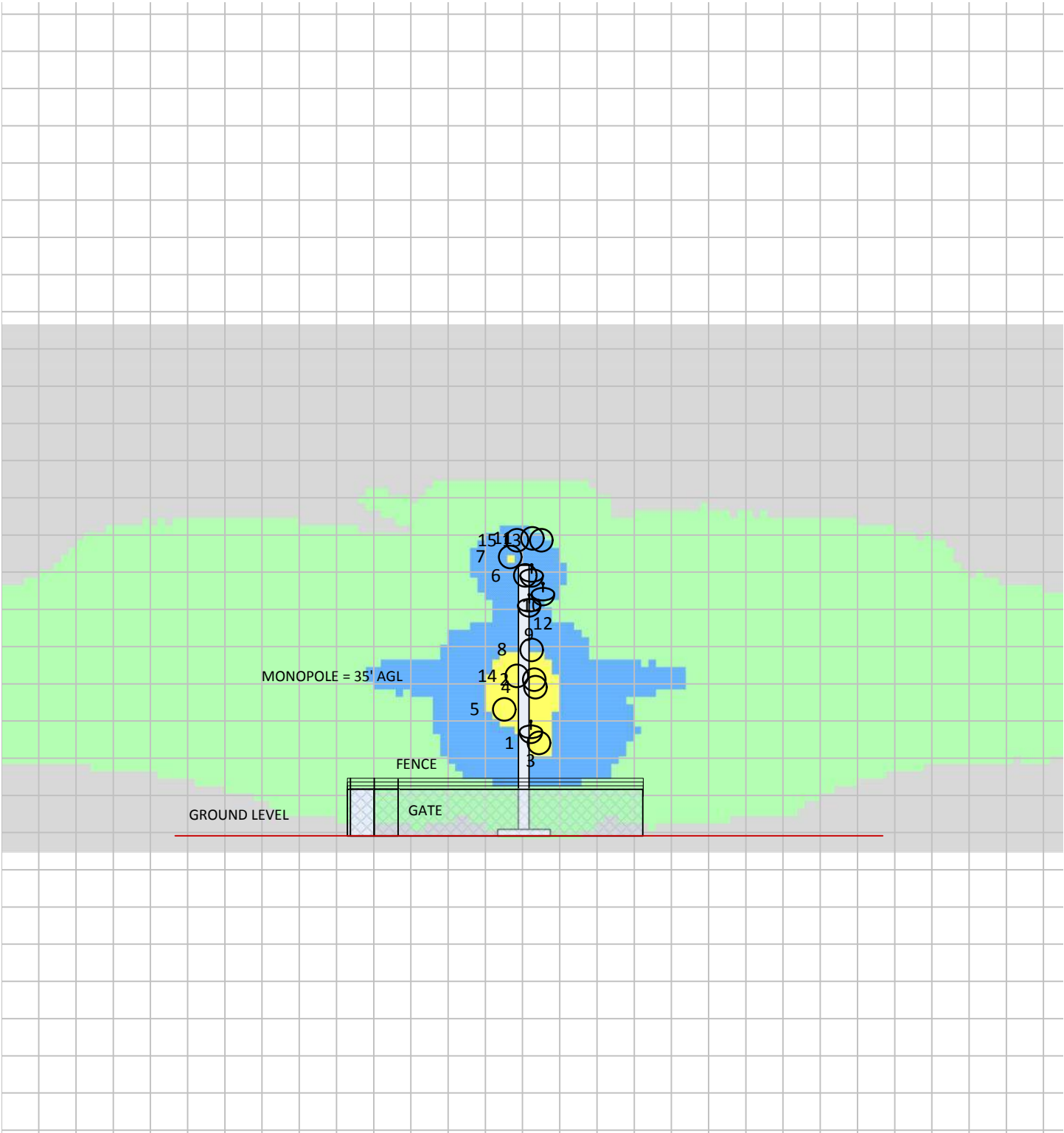
(Feet)
0 8.8 17.5
www.sitesafe.com
Site Name:Stewart Point
11/5/2018 1:40:11 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

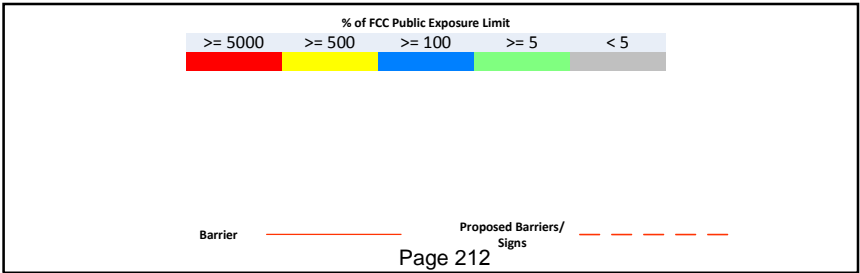
RF Exposure Simulation For: Stewart Point
Elevation View – Existing Configuration



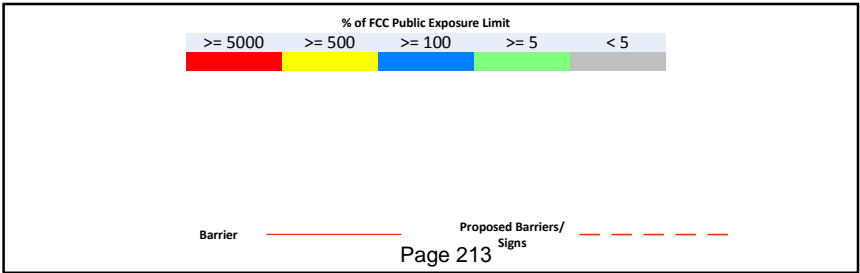
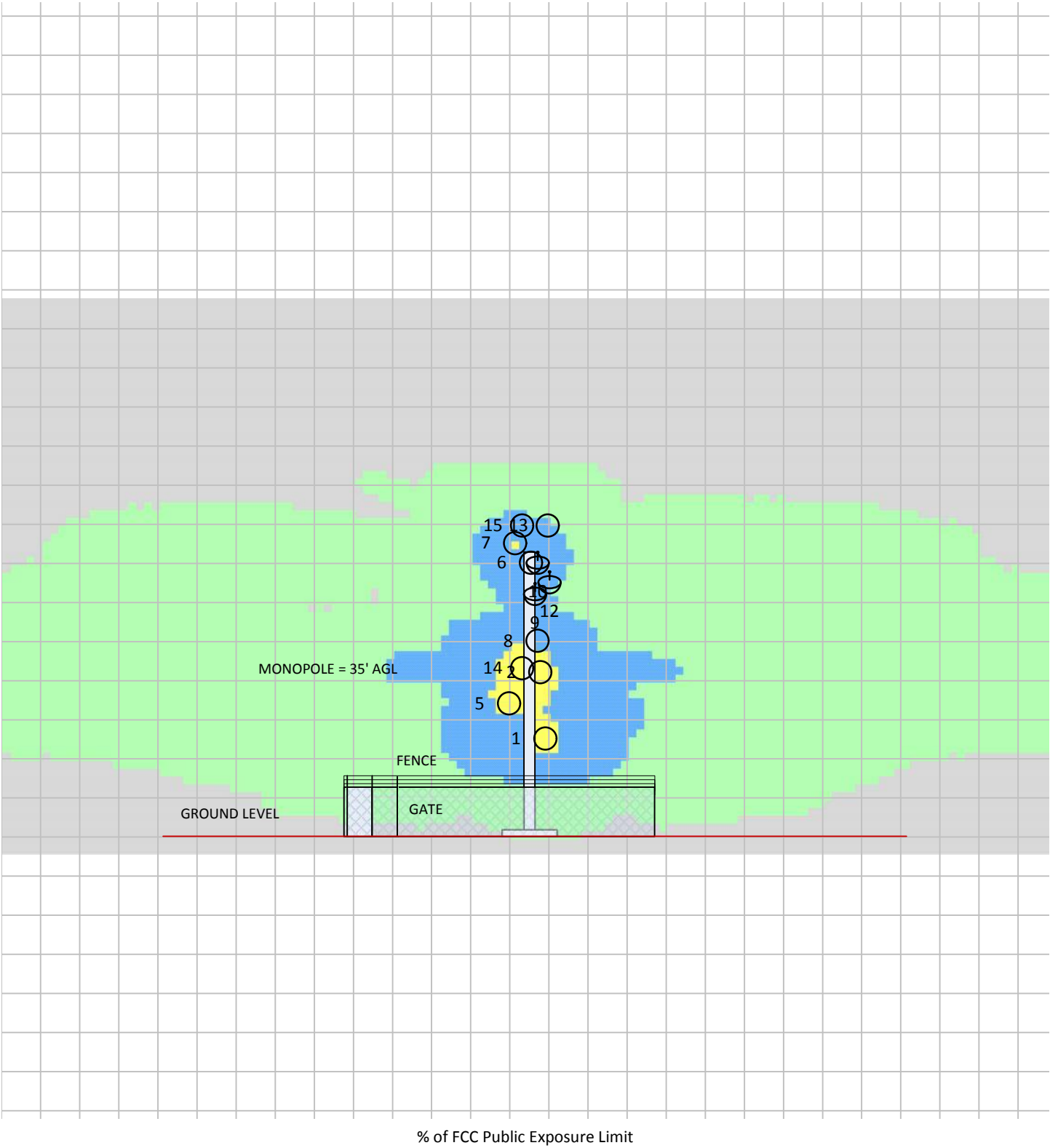
RF Exposure Simulation For: Stewart Point
Elevation View – All Antennas On Air



% of FCC Public Exposure Limit



RF Exposure Simulation For: Stewart Point
Elevation View – Final Configuration



13.4 Site Measurements

This section provides a summary of the measurements collected at the site. Actual measurements locations at which these data points were collected are included in the RF emission diagram provided in Section 13.3 of this report. Two types of measurements were collected at each measurement location: maximum (peak) and spatial average. The spatial average measurement consists of a collection of ten (10) measurements within a ten (10) second time interval taken from zero (0) to six (6) feet in height. The purpose of this measurement technique is to identify the average power density over the dimensions of a typical human body.

Table 1 below contains all the measurements collected from accessible areas located at the site at the time of Sitesafe's visit. Whenever possible, measurements are taken in front of the antenna in the transmitting direction. However, because of the antenna configuration at this site, specific emissions could not be discerned from nearby facilities, and no attempt was made to determine power density levels from a specific transmitting antenna.

Highest Measured Occupational Level: 4.00%

This value is equal to:

Highest General Public Level: 20.00%.

Table 1: Spatial Average and Maximum Occupational Measurements					
Measurements Points	Spatial Average	Maximum	Measurements Points	Spatial Average	Maximum
M1	1 %	1 %	M16	<1 %	<1 %
M2	1 %	3 %	M17	<1 %	<1 %
M3	1 %	1 %	M18	<1 %	<1 %
M4	4 %	5 %	M19	<1 %	<1 %
M5	<1 %	1 %	M20	<1 %	<1 %
M6	<1 %	1 %	M21	<1 %	<1 %
M7	<1 %	1 %	M22	<1 %	<1 %
M8	<1 %	<1 %	M23	<1 %	<1 %
M9	<1 %	<1 %	M24	<1 %	<1 %
M10	<1 %	<1 %	M25	<1 %	<1 %
M11	<1 %	<1 %	M26	<1 %	<1 %
M12	<1 %	<1 %	M27	<1 %	<1 %
M13	<1 %	<1 %	M28	<1 %	<1 %
M14	<1 %	<1 %	M29	<1 %	<1 %
M15	<1 %	<1 %			



RF meters and probes have been calibrated and used according to the manufacturer's specifications. Measurements provide a view of the MPE percentage levels at the site at the time of Sitesafe's site visit and are used to validate modeling results. Theoretical modeling is used for determining compliance and the percentage of MPE contributions.

An RF Emission diagram has been included in section 13.3 of this document. All measurement locations are identified in this diagram. The locations of measurements in the RF Emission diagram can be cross referenced with Table 1 (above) to determine the actual spatial average and maximum measurement value per location.

13.5 Antenna Inventory

The Antenna Inventory shows all transmitting antennas at the site. This inventory was verified on site, and was utilized by Sitesafe to perform theoretical modeling of RF emissions. The inventory coincides with the site diagrams in this report, identifying each antenna's location at 19 - Stewart Point. The antenna information collected includes the following information:

- Licensee or wireless operator name
- Frequency or frequency band
- Transmitter power – Effective Radiated Power ("ERP"), or Equivalent Isotropic Radiated Power ("EIRP") in Watts
- Antenna manufacturer make, model, and gain

For other carriers at this site, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information with regard to carrier, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.



The following antenna inventory and representative photographs were obtained or verified during the site visit and were utilized to create the site model diagrams:

Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
1	E1	Generic	Omni	9	90	160	2	360	100	TPO	Watt	1	100	12.5	0	0
2	E2	Generic	Omni	12.5	150	160	2.87	360	100	ERP	Watt	1	100	21	0	0
3	E3	Generic	Aperture	4	11000	50	37.66	0	63.4	EIRP	dBmW	1	1333.5	14	0	0
4	E4	Generic	Omni	9.5	450	100	5.97	360	200	ERP	Watt	1	200	20	0	0
5	E5	Generic	Omni	9.5	450	300	5.97	360	200	ERP	Watt	1	200	17	0	0
6	E6	Generic	Omni	9.5	450	180	5.97	360	200	ERP	Watt	1	200	35	0	0
7	E7	Generic	Omni	9.5	450	320	5.97	360	200	ERP	Watt	1	200	37.5	0	0
8	E8	Generic	Yagi	1.2	450	60	9.97	60	100	ERP	Watt	1	100	25	0	0
9	E9	Generic	Aperture	3	5800	50	29.06	0	20	ERP	Watt	1	20	31	0	0
10	E10	Generic	Aperture	4	2400	50	22.96	0	4	ERP	Watt	1	4	35	0	0
11	E11	Generic (Rx)	Omni	10	450	60	2	360	0	ERP	Watt	1	0	40	0	0
12	P1	Generic	Aperture	4	11000	90.7	37.66	0	63.4	EIRP	dBmW	1	1333.5	32.5	0	0
13	P2 (Rx)	Rfi CC807-08	Omni	9.5	800	0	8	360	0	ERP	Watt	1	0	39.8	0	0
14	P3	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	21.5	0	0
15	P5 (Rx)	Rfi CC807-08	Omni	9.5	800	0	8	360	0	ERP	Watt	1	0	39.8	0	0

NOTE: Z indicates relative position of the antenna to the origin location on the site, displayed in the model results diagram. The Z reference indicates antenna height above the main site level unless otherwise indicated. ERP values provided by the client and used in the modeling may be greater than are currently deployed. For other operators at this site the use of "Generic" as an antenna model or "Unknown" for a wireless operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.

13.6 Site Pictures



Figure 67: Monopole Overview South



Figure 68: Monopole Overview East



Figure 69: Monopole Base



Figure 70: Equipment

14 Tomales



Marin Emergency Radio Authority

Site Name – Tomales

Site ID: 20

Site Compliance Report

**28775 Shoreline Hwy
Tomales, CA 94971**

Latitude: N38-15-39.71

Longitude: W122-54-12.94

Structure Type: Monopole

Report generated date: March 28, 2019

Report by: Sam Cosgrove

Customer Contact: David Mortimer

The site is compliant and will remain compliant upon implementation of the proposed changes.

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14.1 Site Summary

The County of Marin on behalf of Marin Emergency Radio Authority has contracted with Sitesafe, LLC. (Sitesafe), an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine the RF conditions at the proposed communications site, 20 - Tomales, located at 28775 Shoreline Hwy, Tomales, CA, in relation to Federal Communications Commission (FCC) Rules and Regulations for RF emissions.

This section contains a detailed summary of the RF environment at the site including:

- Diagram of the site
- Inventory of the make / model of all antennas
- Theoretical MPE based on modeling

RF emissions do not exceed MPE limits on the ground level. The area that exceeds MPE limits is on an inaccessible rooftop. Since the area is not accessed by general public, signage is not required. The RF emissions on the ground level do not pose a danger to personnel in the area.



14.2 Site Compliance

14.2.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, Sitesafe has determined that:

The site is compliant with the FCC rules and regulations, as described in OET Bulletin 65 and will remain compliant upon implementation of the proposed changes.

The compliance determination is based on theoretical modeling, RF signage placement recommendations, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the Marin Emergency Radio Authority's proposed deployment plan could result in the site being rendered non-compliant.

14.2.2 Actions for Site Compliance

Based on common industry practice and our understanding of FCC and OSHA requirements, this section provides a statement of recommendations for site compliance. RF alert signage recommendations have been proposed based on theoretical analysis of MPE levels. Barriers can consist of locked doors, fencing, railing, rope, chain, paint striping or tape, combined with RF alert signage.

The site is compliant with the FCC rules and regulations and will remain compliant upon implementation of the proposed changes.

14.3 RF Emissions Diagram

The RF diagram(s) below display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix B.

The key at the bottom of each diagram indicates if percentages displayed are referenced to FCC General Population Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Gray represents areas predicted to be at 5% of the MPE limits, or below.
- Green represents areas predicted to be between 5% and 100% of the MPE limits.
- Blue represents areas predicted to be between 100% and 500% of the MPE limits.
- Yellow represents areas predicted to be between 500% and 5000% of the MPE limits.
- Red areas indicated predicted levels greater than 5000% of the MPE limits.

The theoretical analysis identified the maximum predicted MPE levels on the rooftop to be:

Maximum Cumulative Theoretical General Public MPE level (All Antennas): 196.8%
Maximum Cumulative Theoretical General Public MPE level (Proposed Antennas): 196.8%

General Population diagrams are specified when an area is accessible to the public; i.e. personnel that do not meet Occupational or RF Safety trained criteria, could gain access.

If trained occupational personnel require access to areas that are delineated as **Blue** or above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the operators to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

The key at the bottom also indicates the level or height of the modeling with respect to the main level. The origin is typically referenced to the main rooftop level, or ground level for a structure without access to the antenna level. For example:

Average from 0 feet above to 6 feet above origin

and

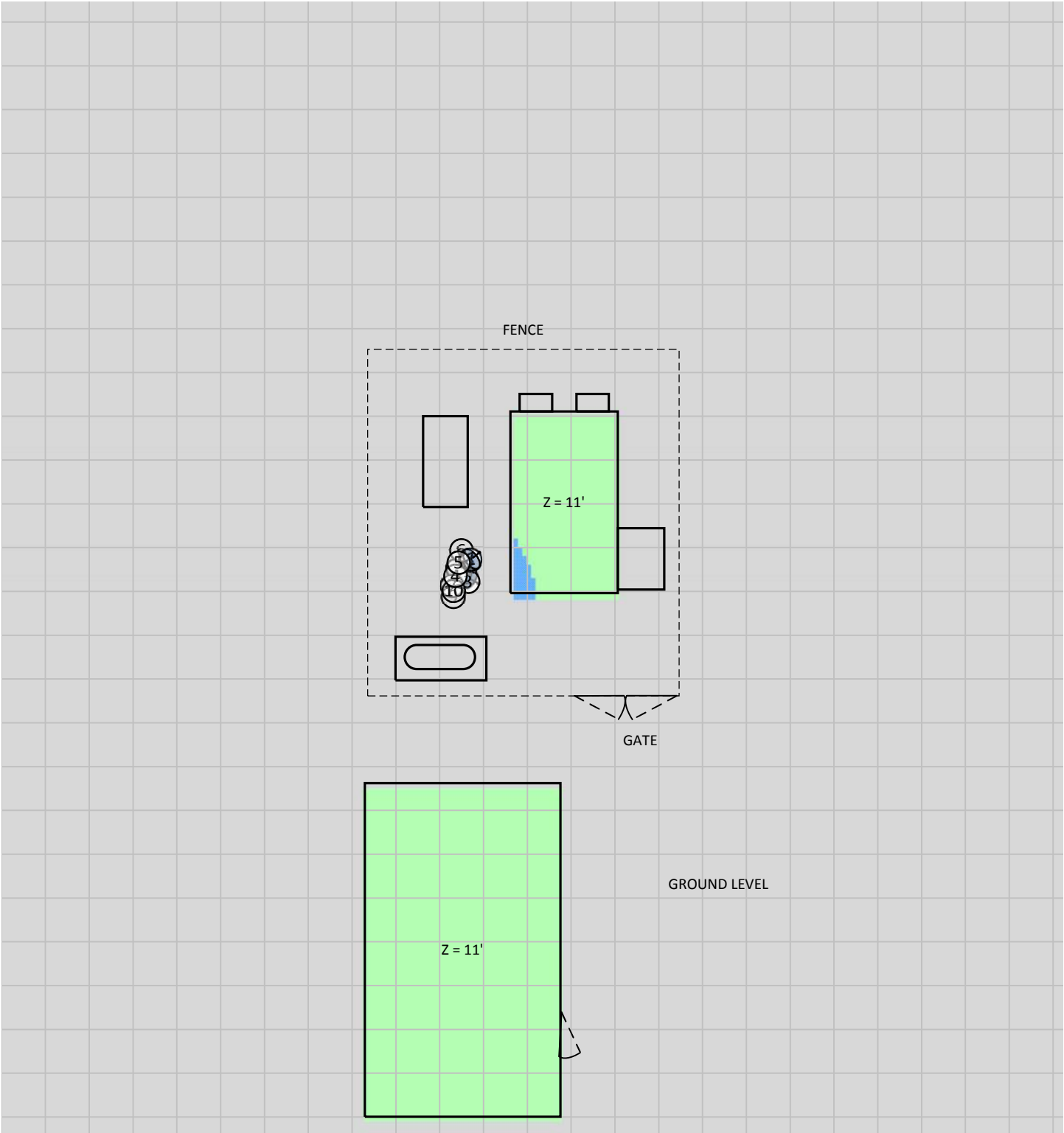
Average from 20 feet above to 26 feet above origin

The first indicates modeling at the main rooftop (or ground) level averaged over 6 feet. The second indicates modeling at a higher level (possibly a penthouse level) of 20 feet averaged over 6 feet.

Abbreviations used in the RF Emissions Diagrams

PH=##'	Penthouse at ## feet above main roof
--------	--------------------------------------

RF Exposure Simulation For: Tomales
Final Configuration



% of FCC Public Exposure Limit
Spatial average 0' - 6'

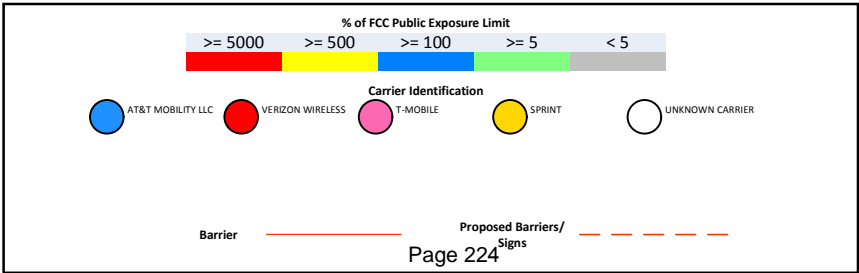
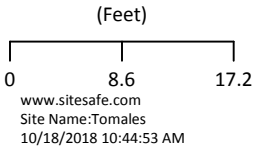


Diagram illustrating a vertical wellbore structure with various components and labels:

- Wellbore Structure:** A vertical shaft with a central yellow core and a blue annulus, surrounded by a green region.
- Labels and Dimensions:**
 - CENTERLINE = 74' 9"**
 - CENTERLINE = 58' 6"**
 - CENTERLINE = 40'**
 - CENTERLINE = 29'**
 - CENTERLINE = 26'**
 - CENTERLINE = 20' 9"**
 - CENTERLINE = 17' 9"**
 - CENTERLINE = 15'**
- Ground Level:** Indicated by a horizontal line at the bottom.
- Wellbore Depth:** Labeled as **Z = 11' AGL** (Above Ground Level).
- Wellbore Segments:** Labeled with numbers 1 through 10, indicating different sections of the wellbore.

% of FCC Public Exposure Limit

Carrier	Exposure Limit Range
AT&T MOBILITY LLC	>= 5000
VERIZON WIRELESS	>= 500
T-MOBILE	>= 100
SPRINT	>= 5
UNKNOWN CARRIER	< 5

Carrier Identification

AT&T MOBILITY LLC VERIZON WIRELESS T-MOBILE SPRINT UNKNOWN CARRIER

Barrier ————— Proposed Barriers/Signs ————

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14.4 Antenna Inventory

The Antenna Inventory shows all transmitting antennas at the site. This inventory was provided by the customer, and was utilized by Sitesafe to perform theoretical modeling of RF emissions. The inventory coincides with the site diagrams in this report, identifying each antenna's location at 20 - Tomales. The antenna information collected includes the following information:

- Licensee or wireless operator name
- Frequency or frequency band
- Transmitter power – Effective Radiated Power ("ERP"), or Equivalent Isotropic Radiated Power ("EIRP") in Watts
- Antenna manufacturer make, model, and gain

For other operators at this site, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.



The following antenna inventory was provided by the customer and was utilized to create the site model diagrams:

Ant #	Operated By	Antenna Model	Ant Type	Len (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	POWER	POWER TYPE	POWER UNITS	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
1	P1	Generic	Aperture	6	6000	71	36.36	2	0.01	TPO	Watt	1	43.3	15	0	0
2	P2	Generic	Aperture	4	11000	140	37.66	2	0.01	TPO	Watt	1	58.3	40	0	0
3	P3	Sinclair SC476-HF1LDF	Omni	7	746	0	6.06	360	1000	ERP	Watt	1	1000	58.5	0	0
4	P5	Rfi CC807-08 (Rx)	Omni	9.5	800	0	8	360	0	ERP	Watt	1	0	74.8	0	0
5	P6	Rfi CC807-08 (Rx)	Omni	9.5	800	0	8	360	0	ERP	Watt	1	0	74.8	0	0
6	P7	Andrew DB404	Omni	5	450	0	3.81	360	100	ERP	Watt	1	100	29	0	0
7	P8	Andrew DB404	Omni	5	450	0	3.81	360	100	ERP	Watt	1	100	29	0	0
8	P9	Generic	Omni	10	450	0	0	360	100	ERP	Watt	1	100	20.8	0	0
9	P10	Antel BCD-7506-EDIN-X-25	Omni	6.6	746	0	5.4	360	1000	ERP	Watt	1	1000	17.8	0	0
10	P11	Antel BCD-7506-EDIN-X-25	Omni	6.6	746	0	5.4	360	1000	ERP	Watt	1	1000	26	0	0

NOTE: Z indicates relative position of the antenna to the origin location on the site, displayed in the model results diagram. The Z reference indicates antenna height above the main site level unless otherwise indicated. ERP values provided by the client and used in the modeling may be greater than are currently deployed. For other operators at this site the use of "Generic" as an antenna model or "Unknown" for a wireless operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.

15 Coyote Peak



Marin Emergency Radio Authority Site Name – Coyote Peak Site ID: 21 Site Compliance Report

**Near 1700 Marshall Petaluma Rd
Petaluma, CA 94954**

Latitude: N38-11-09.00
Longitude: W122-49-30.60
Structure Type: Monopole

Report generated date: March 28, 2019
Report by: Sam Cosgrove
Customer Contact: David Mortimer

**The site is compliant and will remain
compliant upon implementation of
the proposed changes.**

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15.1 Site Summary

The County of Marin on behalf of Marin Emergency Radio Authority has contracted with Sitesafe, LLC. (Sitesafe), an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine the RF conditions at the proposed communications site, 21 - Coyote Peak, located at Near 1700 Marshall Petaluma Rd, Petaluma, CA, in relation to Federal Communications Commission (FCC) Rules and Regulations for RF emissions.

This section contains a detailed summary of the RF environment at the site including:

- Diagram of the site
- Inventory of the make / model of all antennas
- Theoretical MPE based on modeling

RF emissions are predicted to be below 1% MPE in all areas on this site.



15.2 Site Compliance

15.2.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, Sitesafe has determined that:

The site is compliant with the FCC rules and regulations, as described in OET Bulletin 65 and will remain compliant upon implementation of the proposed changes.

The compliance determination is based on theoretical modeling, RF signage placement recommendations, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the Marin Emergency Radio Authority's proposed deployment plan could result in the site being rendered non-compliant.

15.2.2 Actions for Site Compliance

Based on common industry practice and our understanding of FCC and OSHA requirements, this section provides a statement of recommendations for site compliance. RF alert signage recommendations have been proposed based on theoretical analysis of MPE levels. Barriers can consist of locked doors, fencing, railing, rope, chain, paint striping or tape, combined with RF alert signage.

The site is compliant with the FCC rules and regulations.

15.3 RF Emissions Diagram

The RF diagram(s) below display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix B.

The key at the bottom of each diagram indicates if percentages displayed are referenced to FCC General Population Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Gray represents areas predicted to be at 5% of the MPE limits, or below.
- Green represents areas predicted to be between 5% and 100% of the MPE limits.
- Blue represents areas predicted to be between 100% and 500% of the MPE limits.
- Yellow represents areas predicted to be between 500% and 5000% of the MPE limits.
- Red areas indicated predicted levels greater than 5000% of the MPE limits.

The theoretical analysis identified the maximum predicted MPE levels on the ground to be:

Maximum Cumulative Theoretical General Public MPE level (All Antennas): <1%
Maximum Cumulative Theoretical General Public MPE level (Proposed Antennas): <1%

General Population diagrams are specified when an area is accessible to the public; i.e. personnel that do not meet Occupational or RF Safety trained criteria, could gain access.

If trained occupational personnel require access to areas that are delineated as **Blue** or above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the operators to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

The key at the bottom also indicates the level or height of the modeling with respect to the main level. The origin is typically referenced to the main rooftop level, or ground level for a structure without access to the antenna level. For example:

Average from 0 feet above to 6 feet above origin

and

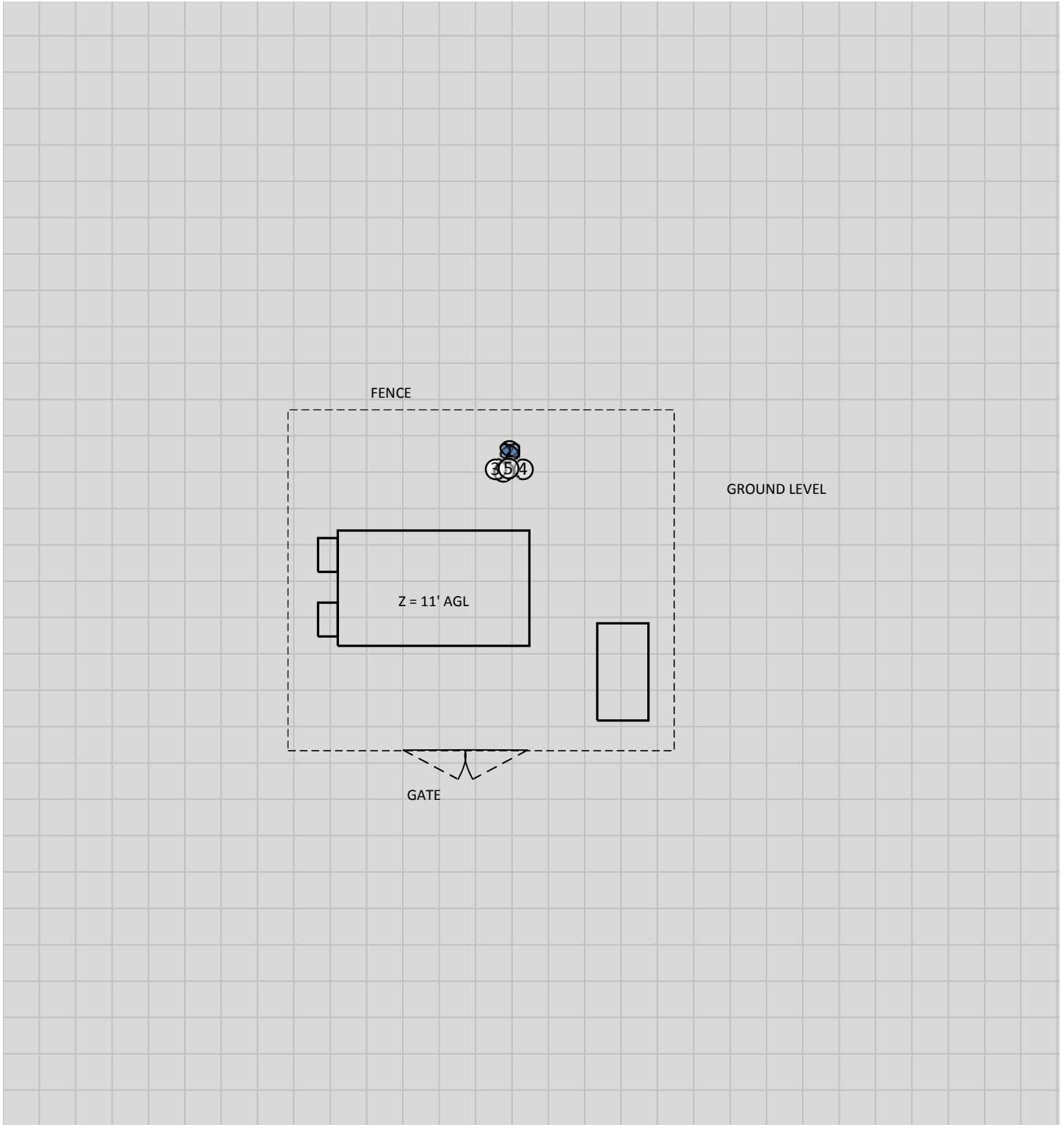
Average from 20 feet above to 26 feet above origin

The first indicates modeling at the main rooftop (or ground) level averaged over 6 feet. The second indicates modeling at a higher level (possibly a penthouse level) of 20 feet averaged over 6 feet.

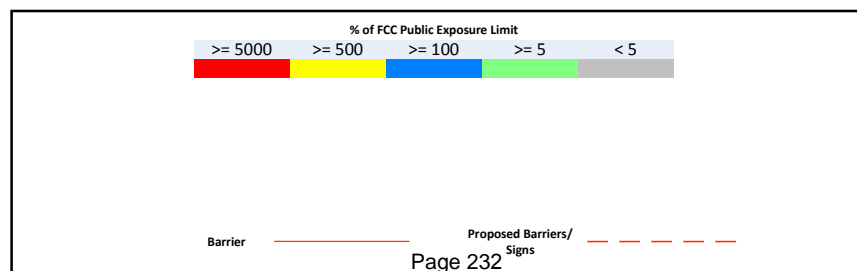
Abbreviations used in the RF Emissions Diagrams

PH=##'	Penthouse at ## feet above main roof
--------	--------------------------------------

RF Exposure Simulation For: Coyote Peak Final Configuration



% of FCC Public Exposure Limit
Spatial average 0' - 6'



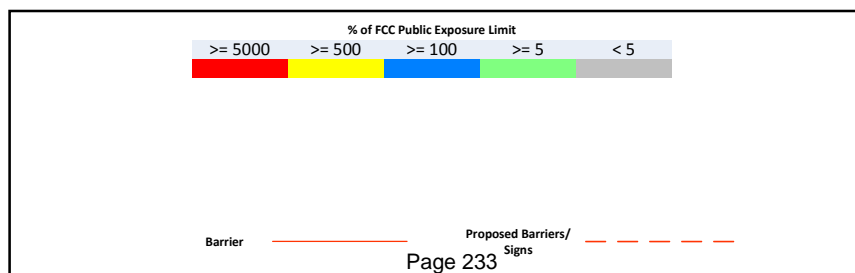
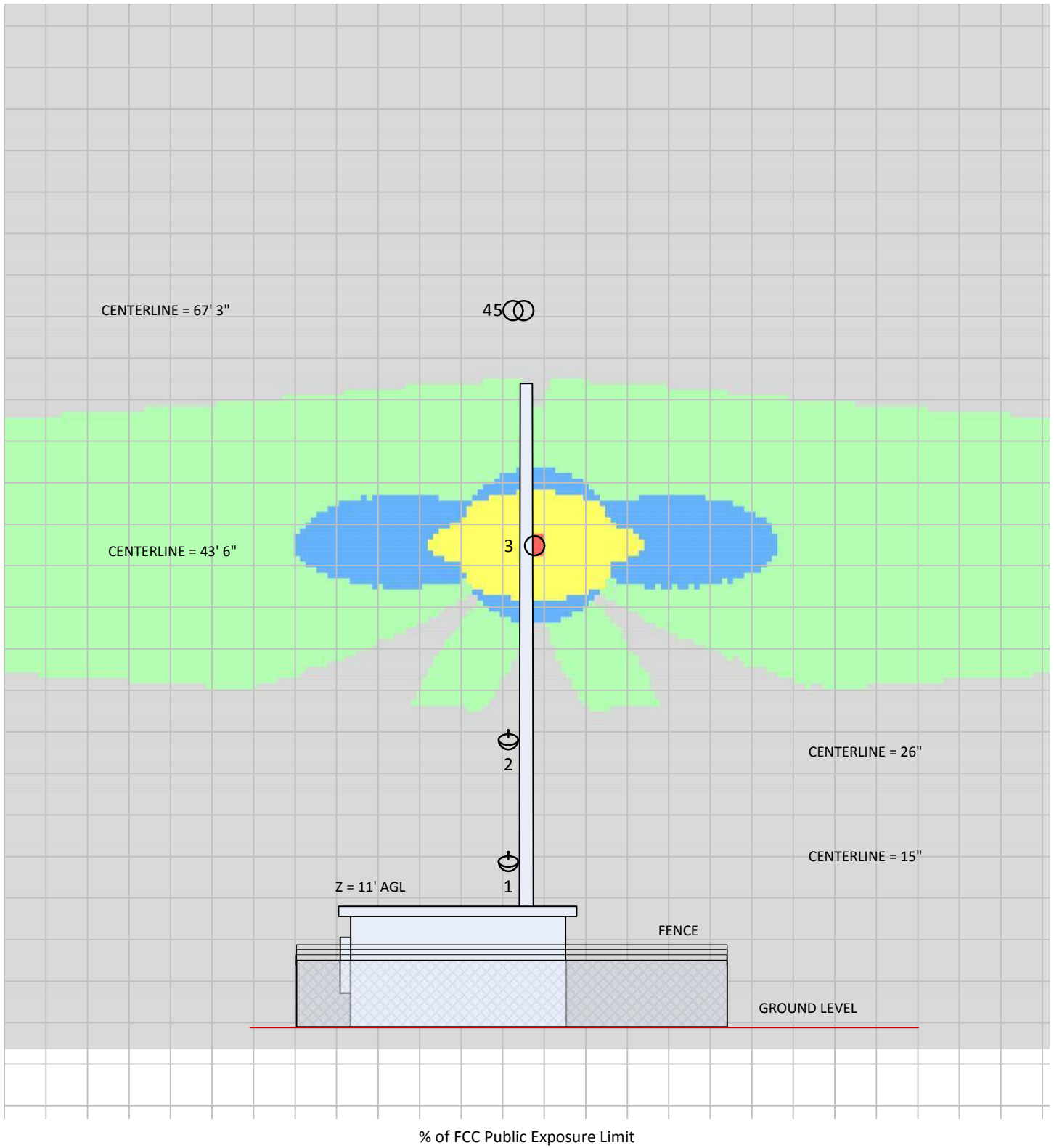
(Feet)

0 7.3 14.5

www.sitesafe.com
Site Name: Coyote Peak
3/27/2019 2:33:00 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Coyote Peak Elevation View – Final Configuration



15.4 Antenna Inventory

The Antenna Inventory shows all transmitting antennas at the site. This inventory was provided by the customer, and was utilized by Sitesafe to perform theoretical modeling of RF emissions. The inventory coincides with the site diagrams in this report, identifying each antenna's location at 21 - Coyote Peak. The antenna information collected includes the following information:

- Licensee or wireless operator name
- Frequency or frequency band
- Transmitter power – Effective Radiated Power ("ERP"), or Equivalent Isotropic Radiated Power ("EIRP") in Watts
- Antenna manufacturer make, model, and gain

For other operators at this site, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.



The following antenna inventory was provided by the customer and was utilized to create the site model diagrams:

Ant #	Operated By	Antenna Model	Ant Type	Len (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	POWER	POWER TYPE	POWER UNITS	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
1	P1	Generic	Aperture	3	11000	197.3	37.66	2	0.01	TPO	Watt	1	58.3	15	0	0
2	AMERA	Generic	Aperture	3	11000	320.5	37.66	2	0.01	TPO	Watt	1	58.3	26	0	0
3	AMERA	Generic	Omni	4.7	450	0	2.97	360	1000	ERP	Watt	1	1000	43.5	0	0
4	AMERA (Rx)	Rfi CC807-08	Omni	9.5	800	0	8	360	0	ERP	Watt	1	0	64.8	0	0
5	AMERA (Rx)	Rfi CC807-08	Omni	9.5	800	0	8	360	0	ERP	Watt	1	0	64.8	0	0

16 Skyview Terrace



Marin Emergency Radio Authority

Site Name – Skyview Terrace

Site ID: 22

Site Compliance Report

**Near 70 Skyview Terrace
San Rafael, CA 94903**

Latitude: N38-1-01.20

Longitude: W122-32-45.60

Structure Type: Monopole

Report generated date: March 28, 2019

Report by: Sam Cosgrove

Customer Contact: David Mortimer

The site is compliant and will remain compliant upon implementation of the proposed changes.

© 2019 Sitesafe, LLC., Vienna, VA



16.1 Site Summary

The County of Marin on behalf of Marin Emergency Radio Authority has contracted with Sitesafe, LLC. (Sitesafe), an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine whether the proposed communications site, 22 - Skyview Terrace, located at Near 70 Skyview Terrace, San Rafael, CA, is in compliance with Federal Communications Commission (FCC) Rules and Regulations for RF emissions.

This section contains a detailed summary of the RF environment at the site including:

- Diagram of the site
- Inventory of the make / model of all antennas
- Theoretical MPE based on modeling

RF emissions are predicted to be below 1% MPE in all areas on this site.



16.2 Site Compliance

16.2.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, Sitesafe has determined that:

The site is compliant with the FCC rules and regulations, as described in OET Bulletin 65 and will remain compliant upon implementation of the proposed changes.

The compliance determination is based on theoretical modeling, RF signage placement recommendations, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the Marin Emergency Radio Authority's proposed deployment plan could result in the site being rendered non-compliant.

16.2.2 Actions for Site Compliance

Based on common industry practice and our understanding of FCC and OSHA requirements, this section provides a statement of recommendations for site compliance. RF alert signage recommendations have been proposed based on theoretical analysis of MPE levels. Barriers can consist of locked doors, fencing, railing, rope, chain, paint striping or tape, combined with RF alert signage.

The site is compliant with the FCC rules and regulations and will remain compliant upon implementation of the proposed changes.

16.3 RF Emissions Diagram

The RF diagram(s) below display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix B.

The key at the bottom of each diagram indicates if percentages displayed are referenced to FCC General Population Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Gray represents areas predicted to be at 5% of the MPE limits, or below.
- Green represents areas predicted to be between 5% and 100% of the MPE limits.
- Blue represents areas predicted to be between 100% and 500% of the MPE limits.
- Yellow represents areas predicted to be between 500% and 5000% of the MPE limits.
- Red areas indicated predicted levels greater than 5000% of the MPE limits.

The theoretical analysis identified the maximum predicted MPE levels on the ground to be:

Maximum Cumulative Theoretical General Public MPE level (All Antennas): <1%

General Population diagrams are specified when an area is accessible to the public; i.e. personnel that do not meet Occupational or RF Safety trained criteria, could gain access.

If trained occupational personnel require access to areas that are delineated as **Blue** or above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the operators to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

The key at the bottom also indicates the level or height of the modeling with respect to the main level. The origin is typically referenced to the main rooftop level, or ground level for a structure without access to the antenna level. For example:

Average from 0 feet above to 6 feet above origin
and

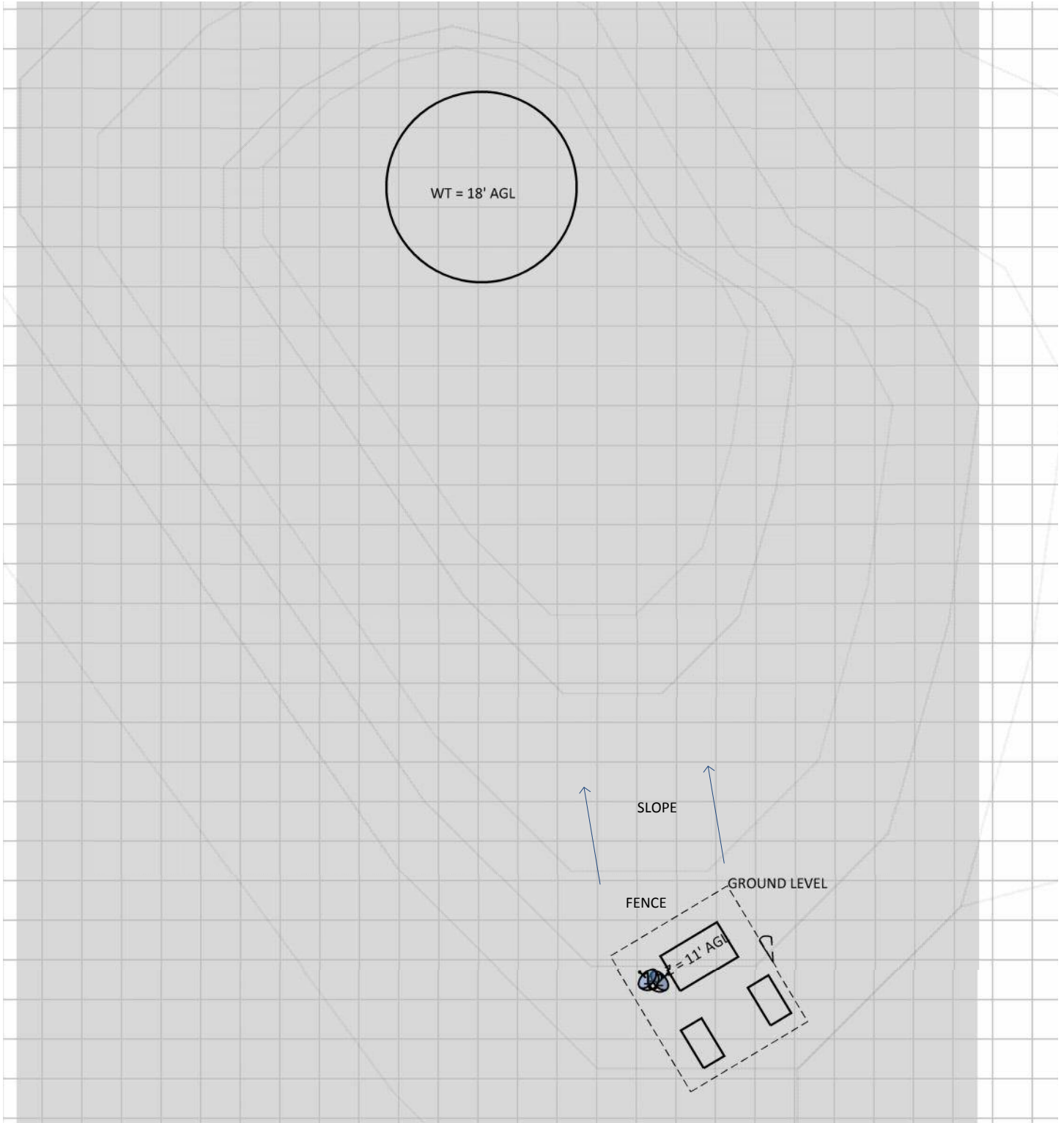
Average from 20 feet above to 26 feet above origin

The first indicates modeling at the main rooftop (or ground) level averaged over 6 feet. The second indicates modeling at a higher level (possibly a penthouse level) of 20 feet averaged over 6 feet.

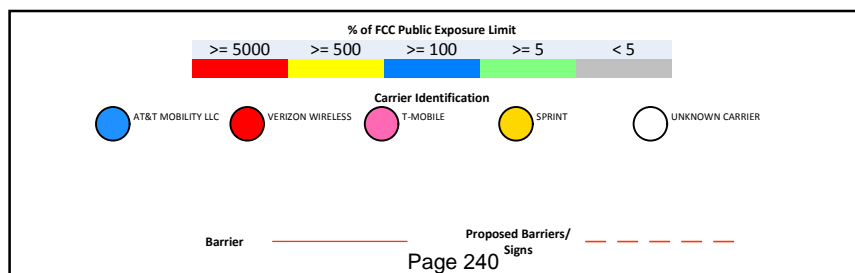
Abbreviations used in the RF Emissions Diagrams

PH=##'	Penthouse at ## feet above main roof
--------	--------------------------------------

RF Exposure Simulation For: Skyview Terrace



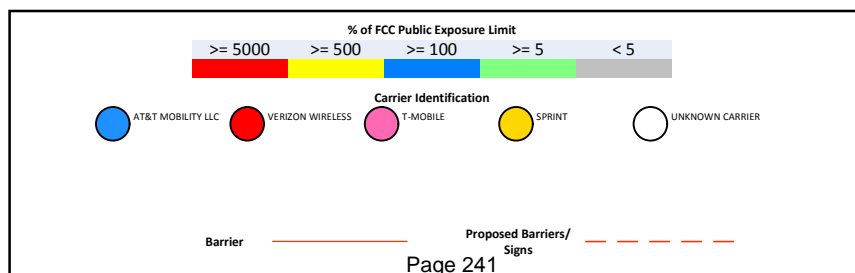
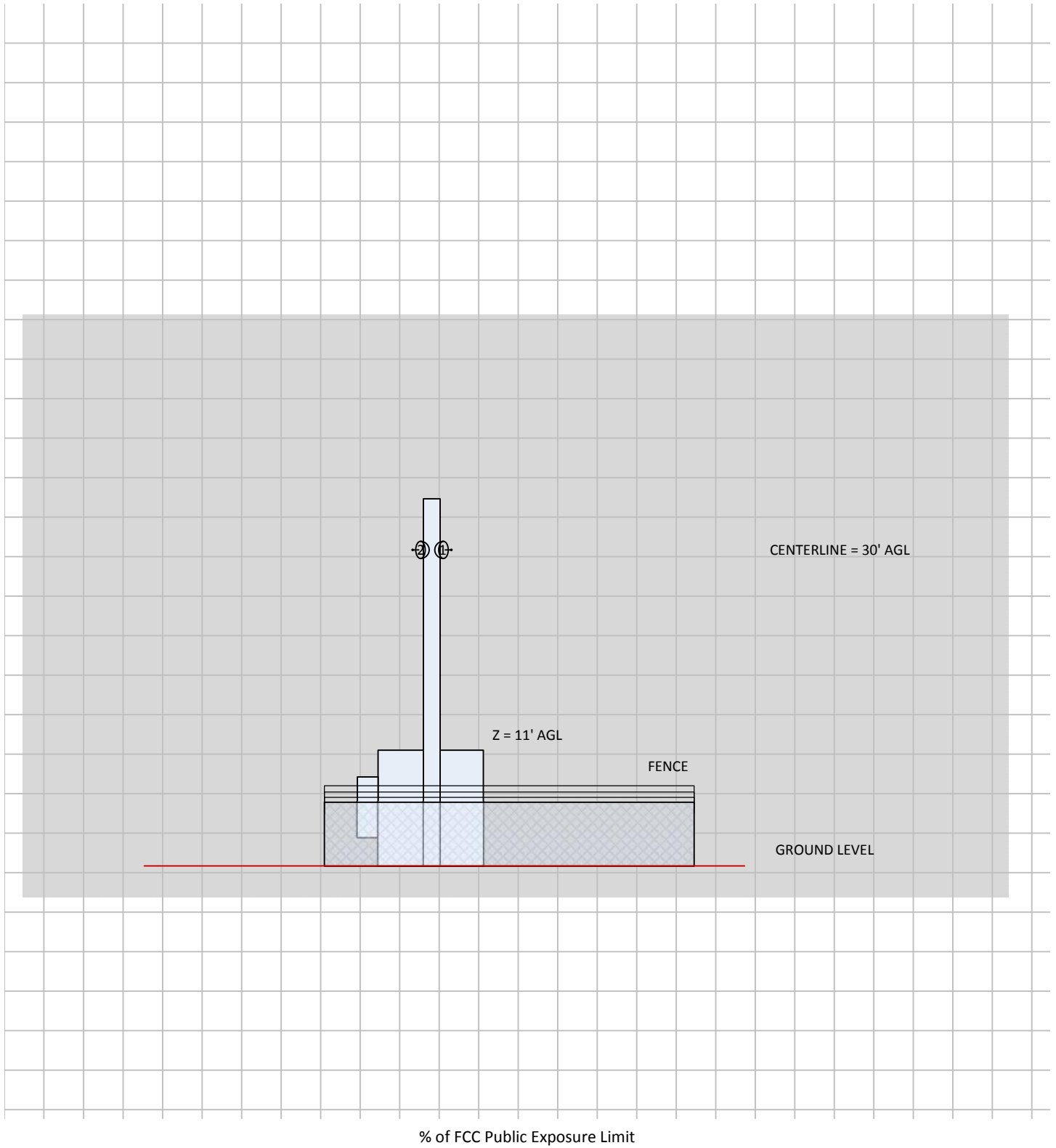
% of FCC Public Exposure Limit
Spatial average 0' - 6'



(Feet)
0 16.5 33.1
www.sitesafe.com
Site Name: Skyview Terrace
8/13/2018 1:56:58 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Skyview Terrace Elevation View



16.4 Antenna Inventory

The Antenna Inventory shows all transmitting antennas at the site. This inventory was provided by the customer, and was utilized by Sitesafe to perform theoretical modeling of RF emissions. The inventory coincides with the site diagrams in this report, identifying each antenna's location at 22 - Skyview Terrace. The antenna information collected includes the following information:

- Licensee or wireless operator name
- Frequency or frequency band
- Transmitter power – Effective Radiated Power ("ERP"), or Equivalent Isotropic Radiated Power ("EIRP") in Watts
- Antenna manufacturer make, model, and gain

For other operators at this site, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.



The following antenna inventory was provided by the customer and was utilized to create the site model diagrams:

Ant #	Operated By	Antenna Model	Ant Type	Len (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	POWER	POWER TYPE	POWER UNITS	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
1	P1	Generic	Aperture	4	11000	312	37.66	2	0.01	TPO	Watt	1	58.3	30	0	0
2	P2	Generic	Aperture	4	11000	50.7	37.66	2	0.01	TPO	Watt	1	58.3	30	0	0

NOTE: Z indicates relative position of the antenna to the origin location on the site, displayed in the model results diagram. The Z reference indicates antenna height above the main site level unless otherwise indicated. ERP values provided by the client and used in the modeling may be greater than are currently deployed. For other operators at this site the use of "Generic" as an antenna model or "Unknown" for a wireless operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.

17 Muir Beach



Marin Emergency Radio Authority

Site Name – Muir Beach

Site ID: 23

Site Compliance Report

Muir Beach Overlook
Muir Beach, CA 94965

Latitude: N37-51-47.84
Longitude: W122-35-07.84
Structure Type: Water Tank

Report generated date: March 28, 2019
Report by: Sam Cosgrove
Customer Contact: David Mortimer

The site is compliant and will remain compliant upon implementation of the proposed changes.

© 2019 Sitesafe, LLC., Vienna, VA



17.1 Site Summary

The County of Marin on behalf of Marin Emergency Radio Authority has contracted with Sitesafe, LLC. (Sitesafe), an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine the RF conditions at the proposed communications site, 23 - Muir Beach, located at Muir Beach Overlook, Muir Beach, CA, in relation to Federal Communications Commission (FCC) Rules and Regulations for RF emissions.

This section contains a detailed summary of the RF environment at the site including:

- Diagram of the site
- Inventory of the make / model of all antennas
- Theoretical MPE based on modeling

RF emissions are predicted to be below 1% MPE in all areas on this site.



17.2 Site Compliance

17.2.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, Sitesafe has determined that:

The site is compliant with the FCC rules and regulations, as described in OET Bulletin 65 and will remain compliant upon implementation of the proposed changes.

The compliance determination is based on theoretical modeling, RF signage placement recommendations, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the Marin Emergency Radio Authority's proposed deployment plan could result in the site being rendered non-compliant.

17.2.2 Actions for Site Compliance

Based on common industry practice and our understanding of FCC and OSHA requirements, this section provides a statement of recommendations for site compliance. RF alert signage recommendations have been proposed based on theoretical analysis of MPE levels. Barriers can consist of locked doors, fencing, railing, rope, chain, paint striping or tape, combined with RF alert signage.

Marin Emergency Radio Authority is compliant with the FCC rules and regulations and will remain compliant upon implementation of the proposed changes.

17.3 RF Emissions Diagram

The RF diagram(s) below display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix B.

The key at the bottom of each diagram indicates if percentages displayed are referenced to FCC General Population Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Gray represents areas predicted to be at 5% of the MPE limits, or below.
- Green represents areas predicted to be between 5% and 100% of the MPE limits.
- Blue represents areas predicted to be between 100% and 500% of the MPE limits.
- Yellow represents areas predicted to be between 500% and 5000% of the MPE limits.
- Red areas indicated predicted levels greater than 5000% of the MPE limits.

The theoretical analysis identified the maximum predicted MPE levels on the ground to be:

Maximum Cumulative Theoretical General Public MPE level (All Antennas): <1%

General Population diagrams are specified when an area is accessible to the public; i.e. personnel that do not meet Occupational or RF Safety trained criteria, could gain access.

If trained occupational personnel require access to areas that are delineated as **Blue** or above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the operators to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

The key at the bottom also indicates the level or height of the modeling with respect to the main level. The origin is typically referenced to the main rooftop level, or ground level for a structure without access to the antenna level. For example:

Average from 0 feet above to 6 feet above origin

and

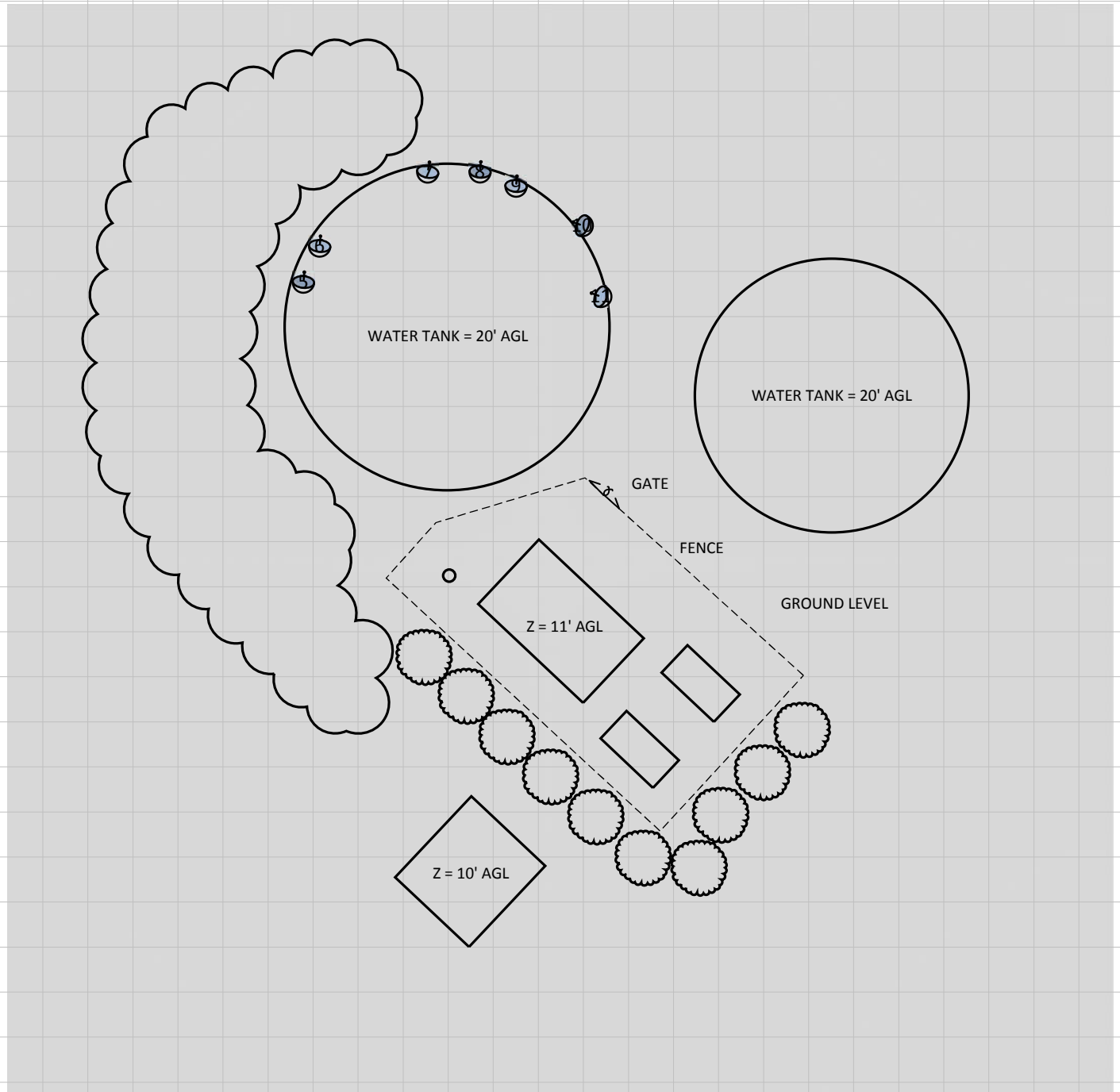
Average from 20 feet above to 26 feet above origin

The first indicates modeling at the main rooftop (or ground) level averaged over 6 feet. The second indicates modeling at a higher level (possibly a penthouse level) of 20 feet averaged over 6 feet.

Abbreviations used in the RF Emissions Diagrams

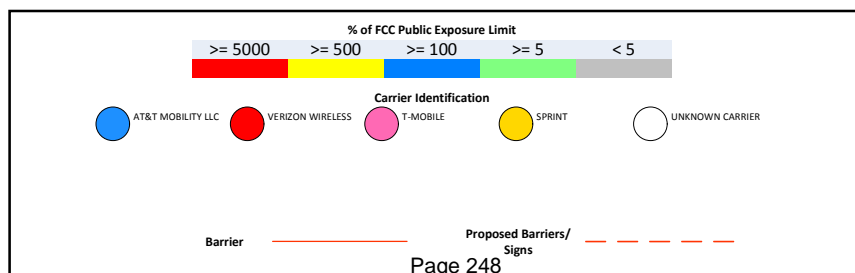
PH=##'	Penthouse at ## feet above main roof
--------	--------------------------------------

RF Exposure Simulation For: Muir Beach Existing Configuration



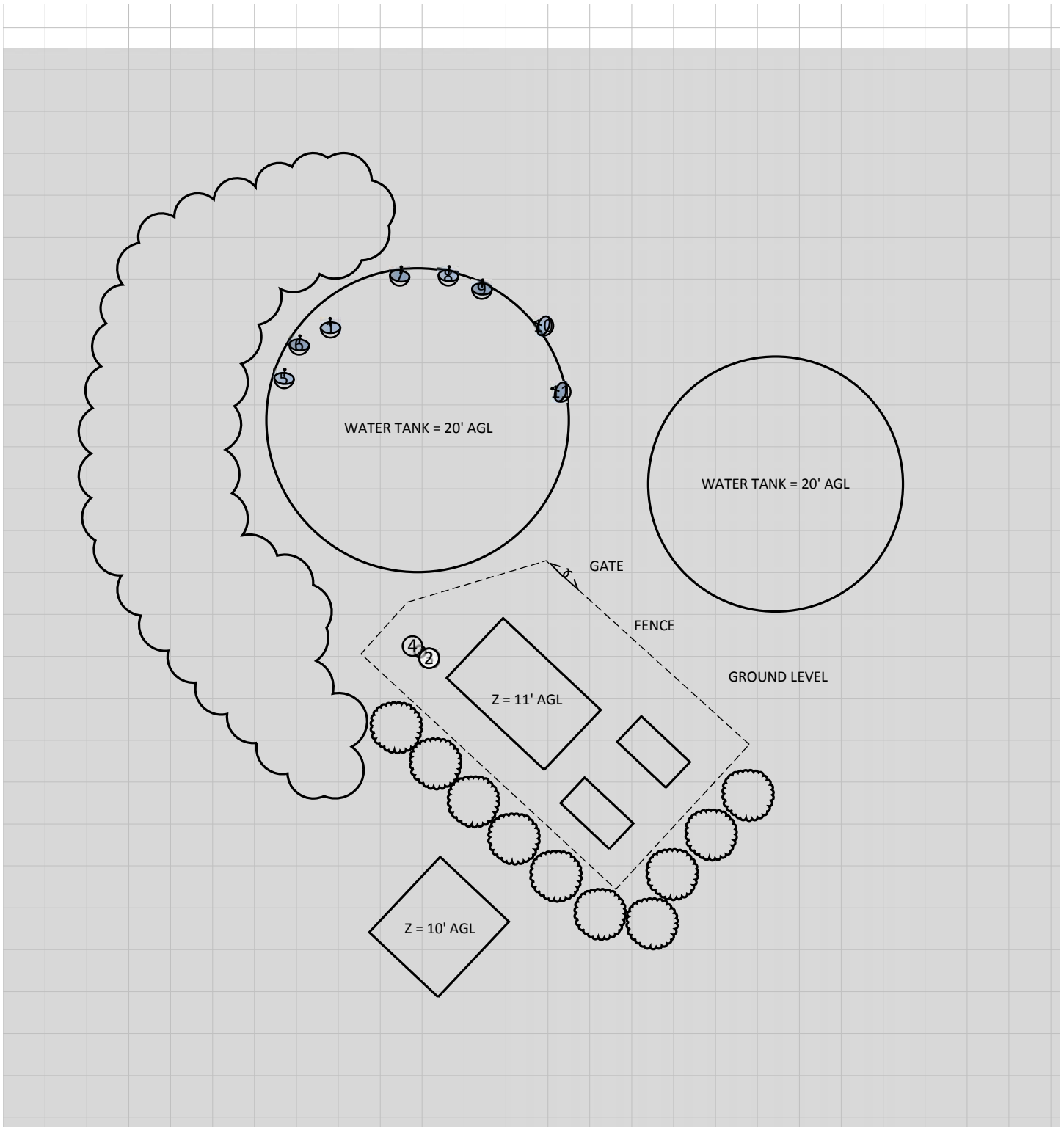
% of FCC Public Exposure Limit
Spatial average 0' - 6'

(Feet)
0 11.2 22.5
www.sitesafe.com
Site Name: Muir Beach
3/27/2019 2:46:50 PM



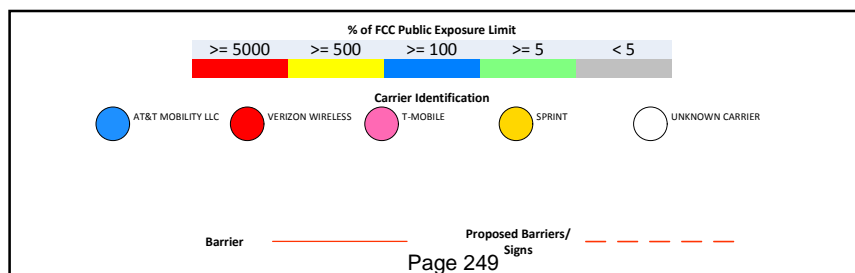
Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Muir Beach All Antennas On Air



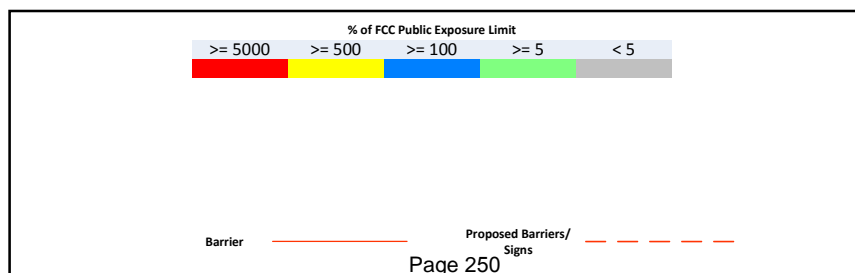
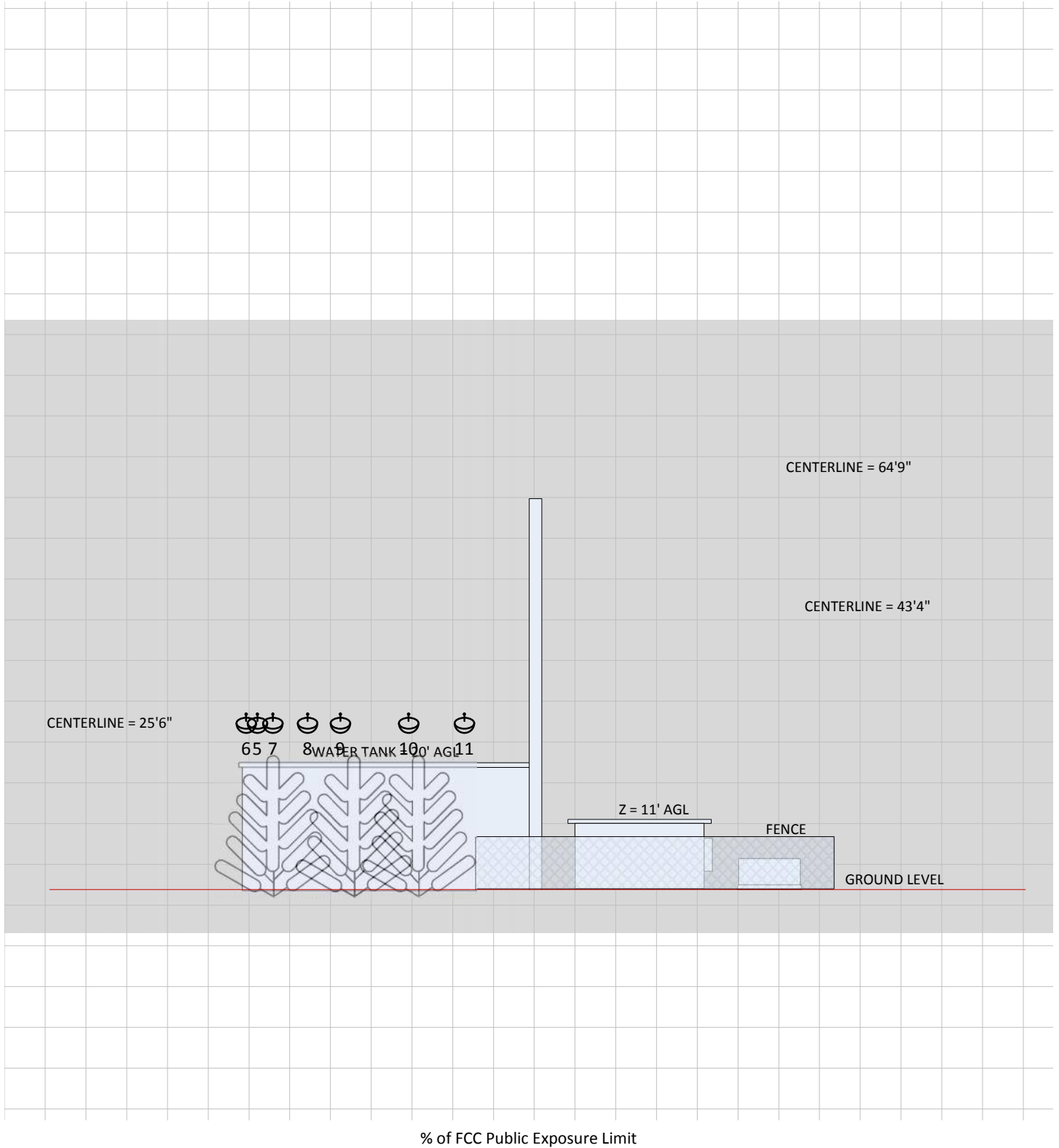
% of FCC Public Exposure Limit
Spatial average 0' - 6'

(Feet)
0 11.2 22.3
www.sitesafe.com
Site Name: Muir Beach
3/27/2019 2:44:54 PM

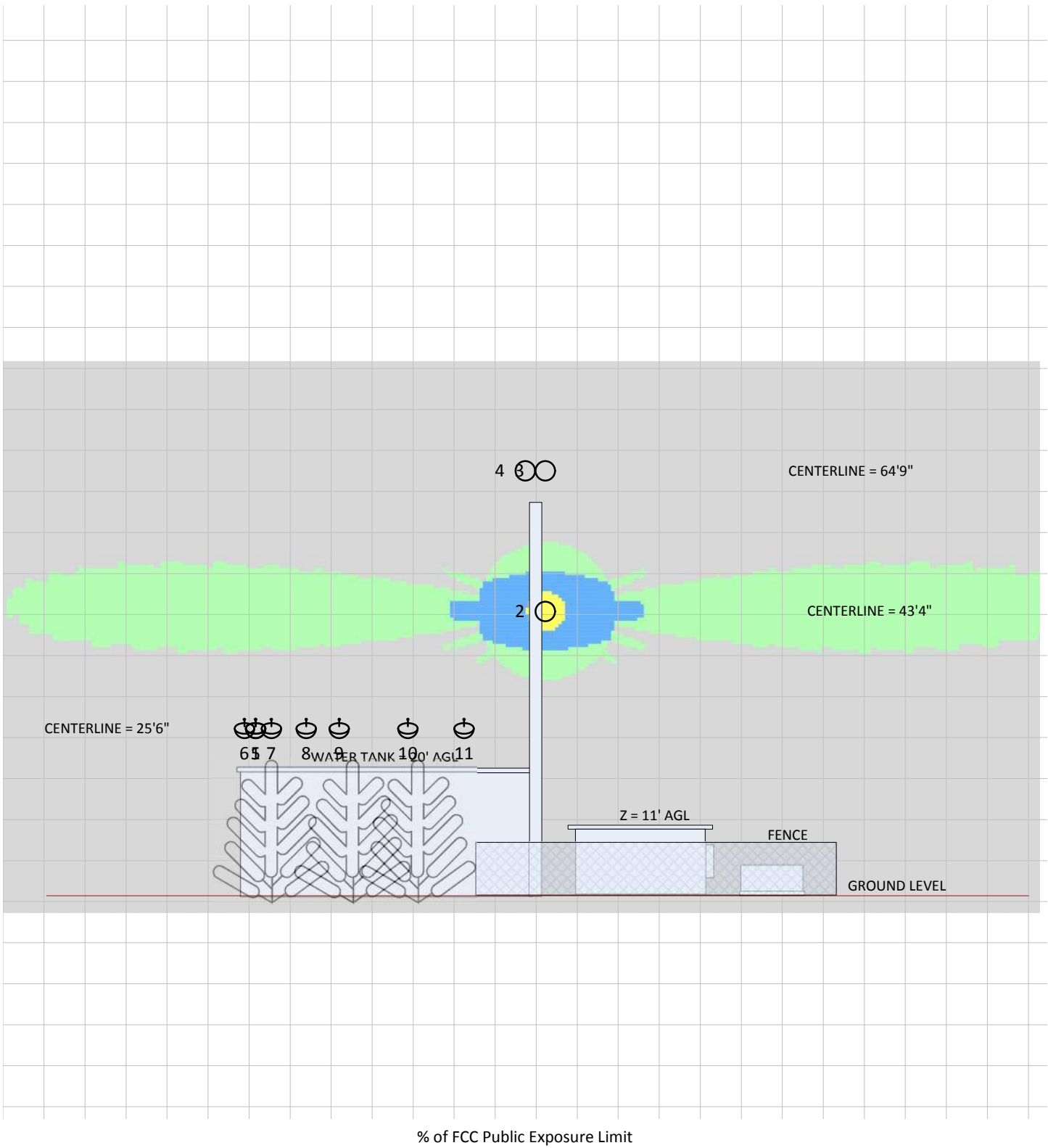


Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

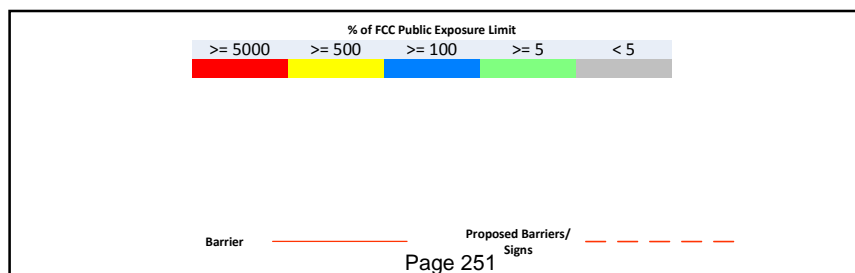
RF Exposure Simulation For: Muir Beach Elevation View – Existing Configuration



RF Exposure Simulation For: Muir Beach Elevation View – All Antennas On Air



% of FCC Public Exposure Limit



17.4 Antenna Inventory

The Antenna Inventory shows all transmitting antennas at the site. This inventory was provided by the customer, and was utilized by Sitesafe to perform theoretical modeling of RF emissions. The inventory coincides with the site diagrams in this report, identifying each antenna's location at 23 - Muir Beach. The antenna information collected includes the following information:

- Licensee or wireless operator name
- Frequency or frequency band
- Transmitter power – Effective Radiated Power ("ERP"), or Equivalent Isotropic Radiated Power ("EIRP") in Watts
- Antenna manufacturer make, model, and gain

For other operators at this site, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.



The following antenna inventory was provided by the customer and was utilized to create the site model diagrams:

Ant #	Operated By	Antenna Model	Ant Type	Len (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	POWER	POWER TYPE	POWER UNITS	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
1	NERA	Generic	Aperture	4	11000	358	37.66	2	0.01	TPO	Watt	1	58.3	25.5	0	0
2	NERA	Sinclair SC476-HF1LDF	Omni	7	746	0	6.06	360	1200	ERP	Watt	1	1200	43.3	0	0
3	NERA (Rx)	Rfi CC807-08	Omni	9.5	800	0	8	360	0	TPO	Watt	1	0	64.8	0	0
4	NERA (Rx)	Rfi CC807-08	Omni	9.5	800	0	8	360	0	TPO	Watt	1	0	64.8	0	0
5	Muir Beach Community Services District	Generic	Aperture	2	11245	5.1	31.16	2	60	EIRP	dBmW	1	609.8	25.5	0	0
6	Muir Beach Community Services District	Generic	Aperture	2	11245	5.1	31.16	2	66	EIRP	dBmW	1	2427.4	25.5	0	0
7	Muir Beach Community Services District	Generic	Aperture	4	6000	10	32.86	2	1	TPO	Watt	1	2.4	25.5	0	0
8	Muir Beach Community Services District	Generic	Aperture	2	11245	5.1	31.16	2	54	EIRP	dBmW	1	153	25.5	0	0
9	Muir Beach Community Services District	Generic	Aperture	2	11245	5.1	31.16	2	57	EIRP	dBmW	1	305.5	25.5	0	0
10	Muir Beach Community Services District	Generic	Aperture	4	11485	290.5	37.66	2	61.5	EIRP	dBmW	1	861	25.5	0	0
11	Muir Beach Community Services District	Generic	Aperture	2	11485	290.5	31.16	2	67.5	EIRP	dBmW	1	3428.7	25.5	0	0

NOTE: Z indicates relative position of the antenna to the origin location on the site, displayed in the model results diagram. The Z reference indicates antenna height above the main site level unless otherwise indicated. ERP values provided by the client and used in the modeling may be greater than are currently deployed. For other operators at this site the use of "Generic" as an antenna model or "Unknown" for a wireless operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.

18 Wolfback Ridge



Marin Emergency Radio Authority

Site Name – Wolfback Ridge

Site ID: 24

Site Compliance Report

200 Sundial Rd
Sausalito, CA 94965

Site visit date: August 24, 2018
Site visit time: 5:46 PM
Site survey by: Jeff Desira

Latitude: N37-51-03.91
Longitude: W122-29-54.15
Structure Type: Self-Support

Report generated date: March 28, 2019
Report by: Sam Cosgrove
Customer Contact: David Mortimer

Marin Emergency Radio Authority is compliant and will remain complaint upon implementation of the proposed changes. The site has compliance issues that are not the result of, and therefore not the responsibility of, Marin Emergency Radio Authority.

© 2019 Sitesafe, LLC. Arlington, VA

18.1 Site Summary

The County of Marin on behalf of Marin Emergency Radio Authority has contracted with Sitesafe, LLC. (Sitesafe), an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine the RF conditions at the proposed communications site, 24 - Wolfback Ridge, located at 200 Sundial Rd, Sausalito, CA, in relation to Federal Communications Commission (FCC) Rules and Regulations for RF emissions.

Sitesafe's field personnel visited 24 - Wolfback Ridge on August 24, 2018. This section contains a detailed summary of the RF environment at the site including:

- Site compliance determination;
- Photographs of the site;
- Diagram of the site;
- Inventory of the make / model of all transmitting antennas found on the site (where possible);
- Record of any Maximum Permissible Exposure ("MPE") measurements taken on the site, as applicable; and
- Theoretical MPE based on modeling.

RF emissions exceed MPE limits in the areas near Towers 3 and 4. These towers have FM transmitters mounted on them at heights as low as 25' from the ground level. The powers being run on them are producing emission levels that may pose danger to personnel without RF safety training and RF safety equipment. The operators of this equipment should review the site and take appropriate action to create a safe environment for workers that require access to the area. The proposed antennas will not make a significant difference in RF emissions on site.



18.2 Site Compliance

18.2.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, and a thorough review of site access procedures, RF hazard signage and visible antenna locations, Sitesafe has determined that:

Marin Emergency Radio Authority is compliant with the FCC rules and regulations, as described in OET Bulletin 65, and will remain compliant upon implementation of the proposed changes. The site has compliance issues that are not the result of, and therefore not the responsibility of, Marin Emergency Radio Authority.

The compliance determination is based on General Public MPE levels due to theoretical modeling and/or physical measurements, RF signage placement, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the Marin Emergency Radio Authority's proposed deployment plan could result in the site being rendered non-compliant. Measurements have also been performed to validate the assumptions used in our theoretical modeling of this site.

Modeling is used for determining compliance and the percentage of MPE contribution. Measurements provide a view of MPE percentage levels at the site at the time of Sitesafe's visit and are used to validate modeling results.

18.2.2 Actions for Site Compliance

Based on common industry practice and our understanding of FCC and OSHA requirements, this section provides a statement of recommendations for site compliance. RF alert signage recommendations have been proposed based on existing measurements and theoretical analysis of MPE levels. Sitesafe has documented the locations of any RF signs and barriers that are required for compliance. Barriers can consist of locked doors, fencing, railing, rope, chain, paint striping or tape, combined with RF alert signage.

This site will be compliant with the FCC rules and regulations.

Remediation for other carriers (Marin Emergency Radio Authority is not responsible for the actions below):

FM Broadcast Antennas

The FM antennas on site should have their power lowered or there should be an RF Safety Plan implemented for anyone accessing this site.

NOTE: The site is regularly accessed by site personnel. Due to the centerline height of the lower of the FM Transmitters, the EME levels on the ground may exceed General Public MPE levels and levels in the building may exceed 5000% MPE levels.

18.3 RF Emissions Diagram

The RF diagram(s) below display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix B.

The key at the bottom of each diagram indicates if percentages displayed are referenced to FCC General Population Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Gray represents areas predicted to be at 5% of the MPE limits, or below.
- Green represents areas predicted to be between 5% and 100% of the MPE limits.
- Blue represents areas predicted to be between 100% and 500% of the MPE limits.
- Yellow represents areas predicted to be between 500% and 5000% of the MPE limits.
- Red areas indicated predicted levels greater than 5000% of the MPE limits.

The theoretical analysis identified the maximum predicted MPE levels on the rooftop to be:

Maximum Cumulative Theoretical General Public MPE level (Existing Antennas) : 50,141.5%
Maximum Cumulative Theoretical General Public MPE level (All Antennas): 50,141.5%
Maximum Cumulative Theoretical General Public MPE level (Proposed Antennas): 50,141.5%

General Population diagrams are specified when an area is accessible to the public; i.e. personnel that do not meet Occupational or RF Safety trained criteria, could gain access.

If trained occupational personnel require access to areas that are delineated as **Blue** or above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the operators to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

The key at the bottom also indicates the level or height of the modeling with respect to the main level. The origin is typically referenced to the main rooftop level, or ground level for a structure without access to the antenna level. For example:

Average from 0 feet above to 6 feet above origin

and

Average from 20 feet above to 26 feet above origin

The first indicates modeling at the main rooftop (or ground) level averaged over 6 feet. The second indicates modeling at a higher level (possibly a penthouse level) of 20 feet averaged over 6 feet.

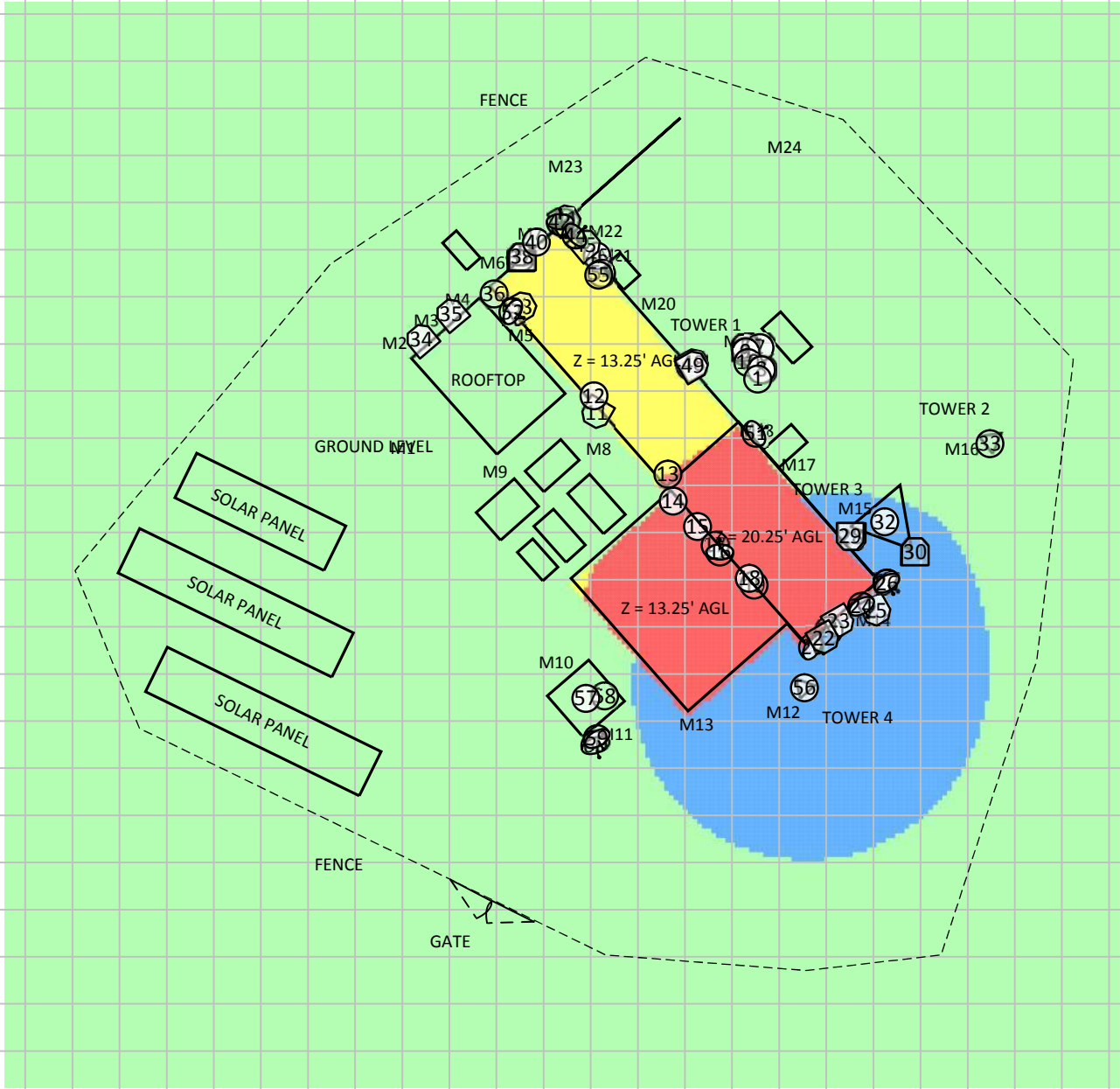


Abbreviations used in the RF Emissions Diagrams

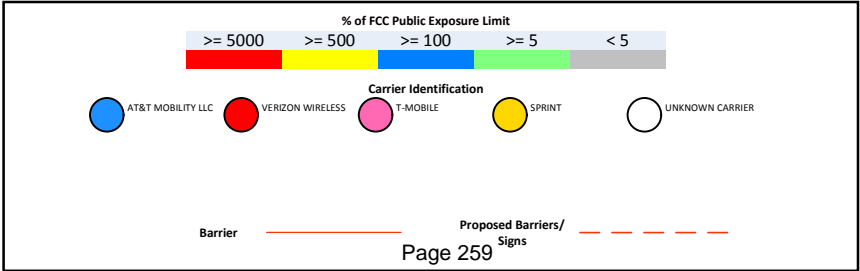
PH=##'	Penthouse at ## feet above main roof
M##	Measurement ## taken during a site visit

As discussed in Section 18.4, site measurement locations for spatial average measurements collected at the time of Sitesafe's visit have been added to the RF emissions diagram. While the theoretical modeling represents worst case MPE levels based on the assumption(s) detailed above, the measurement data is a snapshot of MPE levels at the time of our visit, and dependent on transmitter duty cycle, system implementation and emissions from other RF sources at nearby antenna sites.

RF Exposure Simulation For: Wolfback Ridge
Existing Antennas Only On Air



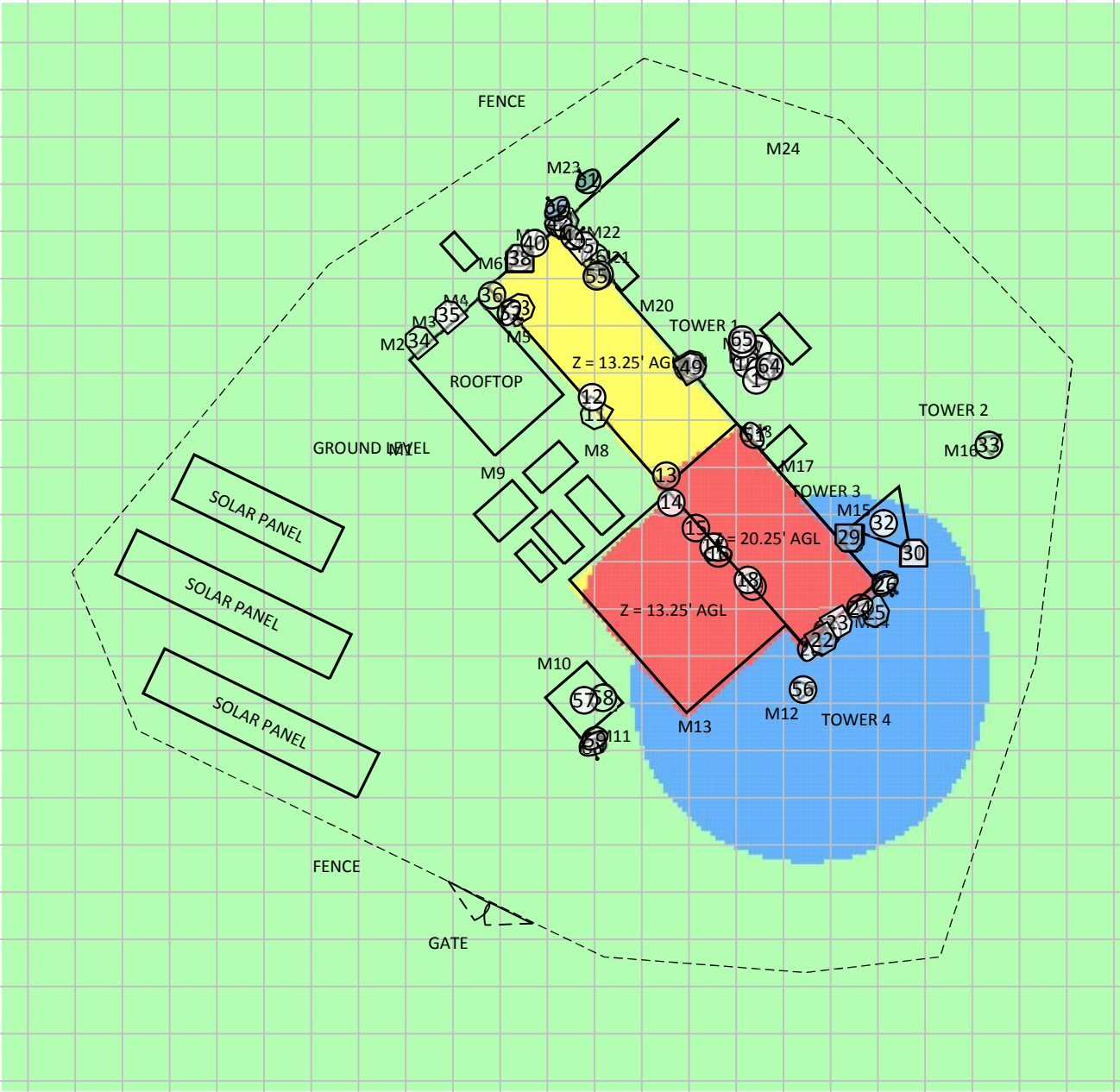
% of FCC Public Exposure Limit
Spatial average 0' - 6'



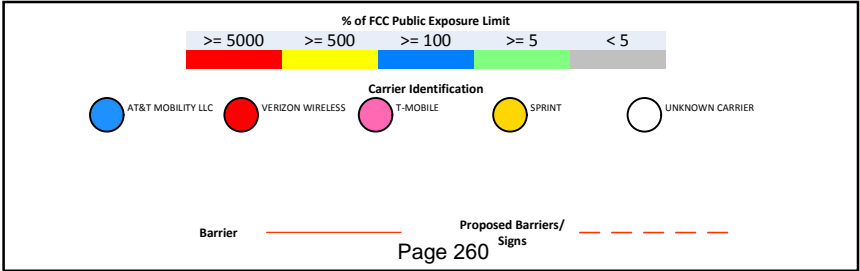
(Feet)
0 17.8 35.6
www.sitesafe.com
Site Name: Wolfback Ridge
8/29/2018 1:53:48 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Wolfback Ridge
All Antennas On Air



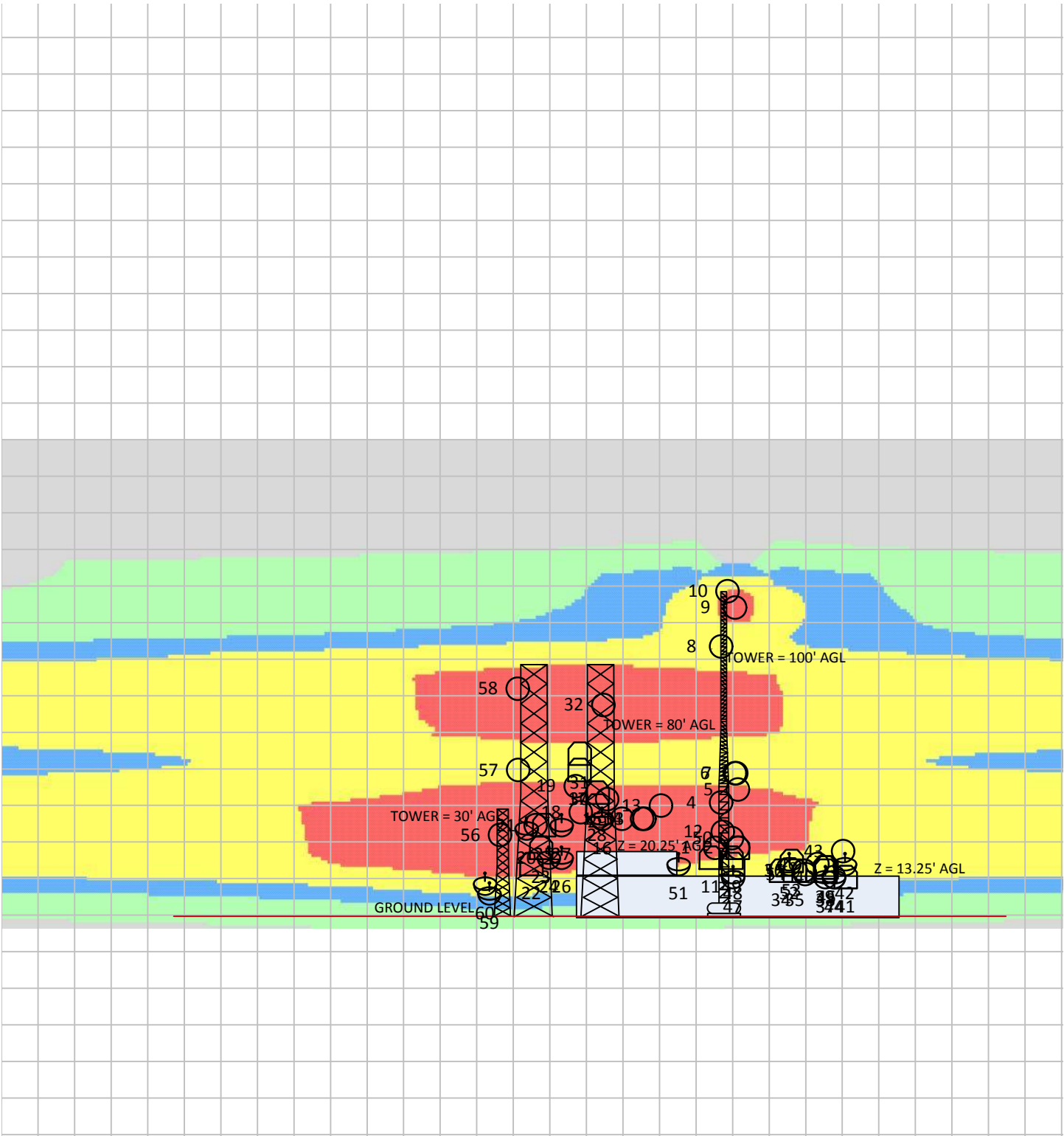
% of FCC Public Exposure Limit
Spatial average 0' - 6'



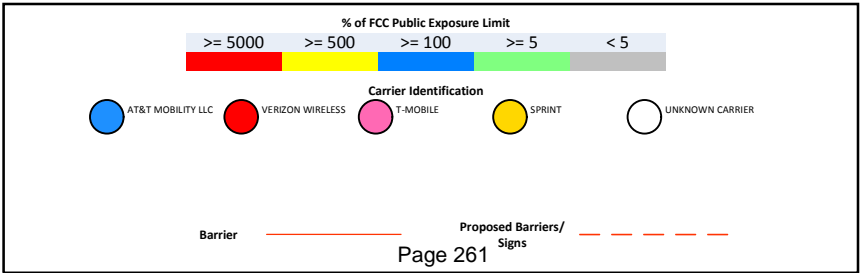
(Feet)
0 17.5 35.1
www.sitesafe.com
Site Name: Wolfback Ridge
8/29/2018 1:52:14 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Wolfback Ridge
Existing Antennas Only On Air – Elevation View



% of FCC Public Exposure Limit



The diagram illustrates a cross-sectional view of a coastal or wetland environment. The background consists of a light grey grid. A horizontal band across the middle contains several distinct color-coded regions: a wide grey band at the top, followed by a thin green layer, a large blue body of water, a central yellow patch, another thin green layer, and a bottom-most brownish-grey layer. Annotations include:

- A dimension of "555'" spanning the left portion of the grey band.
- A dimension of "580'" spanning from the center towards the right edge.
- A cluster of handwritten-style notes in the center-right, overlapping the water and yellow areas, including:
 - To 10
 - 58 d
 - 57 d
 - 56 d
 - NH
 - Lt 22
 - Vt 22
 - L
 - VEG
- A red horizontal line runs through the lower part of the yellow and blue areas.
- A black bracket is positioned above the right side of the yellow area.
- Several small circles are drawn around specific points in the central cluster.

% of FCC Public Exposure Limit

Exposure Level	Carrier
>= 5000	Verizon Wireless
>= 500	T-Mobile
>= 100	AT&T Mobility LLC
>= 5	Sprint
< 5	Unknown Carrier

Carrier Identification

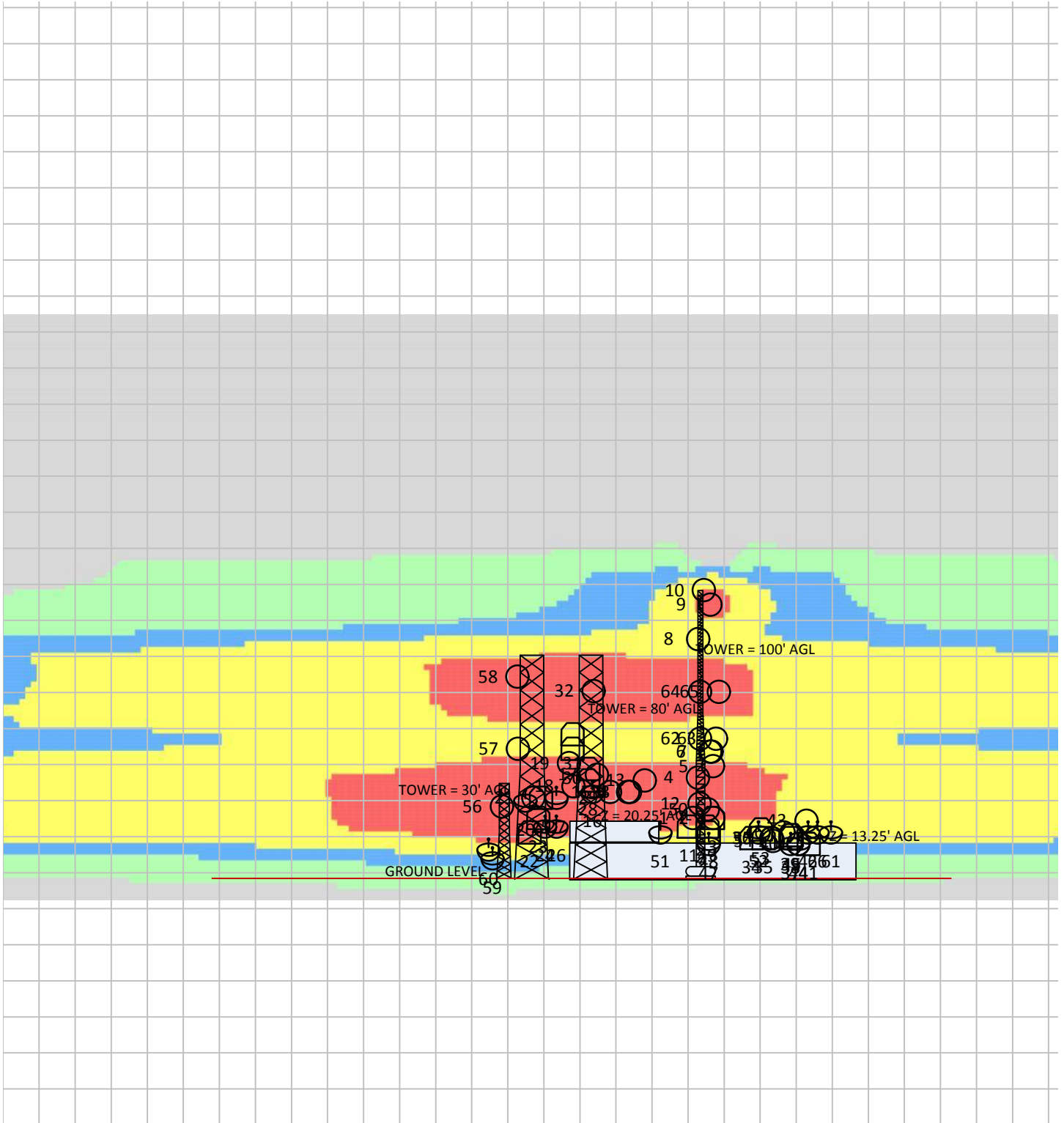
- AT&T MOBILITY LLC
- VERIZON WIRELESS
- T-MOBILE
- SPRINT
- UNKNOWN CARRIER

Barrier ————— **Proposed Barriers/Signs** - - - - -

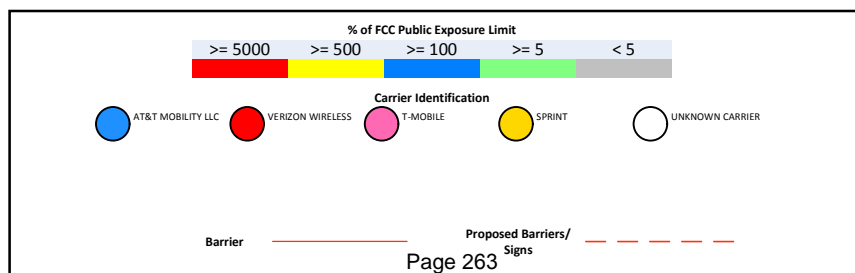
Page 262

www.sitesafe.com
Site Name: Wolfback Ridge
10/18/2018 10:49:46 AM

RF Exposure Simulation For: Wolfback Ridge Elevation View – All Antennas on Air (Detail View)



% of FCC Public Exposure Limit



18.4 Site Measurements

This section provides a summary of the measurements collected at the site. Actual measurements locations at which these data points were collected are included in the RF emission diagram provided in Section 18.3 of this report. Two types of measurements were collected at each measurement location: maximum (peak) and spatial average. The spatial average measurement consists of a collection of ten (10) measurements within a ten (10) second time interval taken from zero (0) to six (6) feet in height. The purpose of this measurement technique is to identify the average power density over the dimensions of a typical human body.

Table 1 below contains all the measurements collected from accessible areas located at the site at the time of Sitesafe's visit. Whenever possible, measurements are taken in front of the antenna in the transmitting direction. However, because of the antenna configuration at this site, specific emissions could not be discerned from nearby facilities, and no attempt was made to determine power density levels from a specific transmitting antenna.

Highest Measured Occupational Level: 28.00%

This value is equal to:

Highest General Public Level: 140.00%.

Measurements Points	Spatial Average	Maximum	Measurements Points	Spatial Average	Maximum
M1	4 %	6 %	M16	11 %	18 %
M2	3 %	4 %	M17	5 %	13 %
M3	2 %	3 %	M18	9 %	14 %
M4	1 %	2 %	M19	28 %	49 %
M5	3 %	4 %	M20	8 %	11 %
M6	<1 %	<1 %	M21	12 %	18 %
M7	<1 %	<1 %	M22	21 %	31 %
M8	17 %	39 %	M23	13 %	17 %
M9	20 %	25 %	M24	11 %	17 %
M10	11 %	13 %	M25	<1 %	<1 %
M11	9 %	13 %	M26	<1 %	<1 %
M12	10 %	15 %	M27	<1 %	<1 %
M13	9 %	10 %	M28	<1 %	<1 %
M14	7 %	11 %	M29	<1 %	<1 %
M15	5 %	7 %			

RF meters and probes have been calibrated and used according to the manufacturer's specifications. Measurements provide a view of the MPE percentage levels at the site at the time of Sitesafe's site visit and are used to validate modeling results. Theoretical modeling is used for determining compliance and the percentage of MPE contributions.

An RF Emission diagram has been included in section 18.3 of this document. All measurement locations are identified in this diagram. The locations of measurements in the RF Emission diagram can be cross referenced with Table 1 (above) to determine the actual spatial average and maximum measurement value per location.

18.5 Antenna Inventory

The Antenna Inventory shows all transmitting antennas at the site. This inventory was verified on site, and was utilized by Sitesafe to perform theoretical modeling of RF emissions. The inventory coincides with the site diagrams in this report, identifying each antenna's location at 24 - Wolfback Ridge. The antenna information collected includes the following information:

- Licensee or wireless operator name
- Frequency or frequency band
- Transmitter power – Effective Radiated Power ("ERP"), or Equivalent Isotropic Radiated Power ("EIRP") in Watts
- Antenna manufacturer make, model, and gain

For other operators at this site, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.



The following antenna inventory and representative photographs were obtained or verified during the site visit and were utilized to create the site model diagrams:

Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
1	E1	Generic	Yagi	3	150	90	9.11	76	100	ERP	Watt	1	100	21	0	0
2	E2	Generic	Omni	9.5	450	0	5.97	360	100	ERP	Watt	1	100	21	0	0
3	E3	Generic	Panel	1.7	2400	0	12.01	90	4	ERP	Watt	1	4	21	0	0
4	E4	Generic	Omni	10	450	0	0	360	100	ERP	Watt	1	100	35	0	0
5	E5	Generic	Omni	8	150	0	2.61	360	100	ERP	Watt	1	100	39	0	0
6	E6	Generic	Omni	9.5	450	0	5.97	360	100	ERP	Watt	1	100	44	0	0
7	E7	Generic	Yagi	3	150	45	9.11	76	100	ERP	Watt	1	100	44	0	0
8	E8	Generic	Omni	9	90	330	0	360	1000	TPO	Watt	1	1000	83	0	0
9	E9	Generic	Omni	9	107	30	0	360	3000	TPO	Watt	1	3000	95	0	0
10	E10	Generic	Omni	9.5	450	0	5.97	360	100	ERP	Watt	1	100	100	0	0
11	UNKNOWN OPERATOR	Generic	Panel	1.1	2400	210	10.01	90	4	ERP	Watt	1	4	18	0	0
12	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	100	ERP	Watt	1	100	26	0	0
13	UNKNOWN OPERATOR	Generic	Omni	12.5	150	0	2.87	360	100	ERP	Watt	1	100	34	0	0
14	UNKNOWN OPERATOR	Generic	Omni	8	150	0	2.61	360	100	ERP	Watt	1	100	30	0	0
15	UNKNOWN OPERATOR	Generic	Omni	12.5	150	0	2.87	360	100	ERP	Watt	1	100	30	0	0
16	UNKNOWN OPERATOR	Generic	Aperture	0	2400	0	22.96	2	4	ERP	Watt	1	4	30	0	0
17	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	36	0	0
18	UNKNOWN OPERATOR	Generic	Omni	8	150	0	2.61	360	100	ERP	Watt	1	100	32	0	0
19	UNKNOWN OPERATOR	Generic	Omni	8	150	0	2.61	360	100	ERP	Watt	1	100	40	0	0
20	UNKNOWN OPERATOR	Generic	Aperture	4	2400	120	22.96	2	4	ERP	Watt	1	4	27	0	0
21	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	28	0	0
22	UNKNOWN OPERATOR	Generic	Panel	1.1	2400	150	10.01	90	4	ERP	Watt	1	4	16	0	0
23	UNKNOWN OPERATOR	Generic	Panel	1.1	2400	150	10.01	90	4	ERP	Watt	1	4	21	0	0
24	UNKNOWN OPERATOR	Generic	Aperture	2	18000	150	37.66	2	64	EIRP	dBmW	1	1531.1	18	0	0
25	UNKNOWN OPERATOR	Generic	Aperture	4	2400	150	22.96	2	4	ERP	Watt	1	4	28	0	0
26	UNKNOWN OPERATOR	Generic	Aperture	4	2400	150	22.96	2	4	ERP	Watt	1	4	18	0	0



Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
27	UNKNOWN OPERATOR	Generic	Aperture	4	2400	130	22.96	2	4	ERP	Watt	1	4	28	0	0
28	UNKNOWN OPERATOR	Generic	Panel	1.1	2400	180	10.01	90	4	ERP	Watt	1	4	34	0	0
29	UNKNOWN OPERATOR	Generic	Panel	1.7	2400	180	12.01	90	4	ERP	Watt	1	4	38	0	0
30	UNKNOWN OPERATOR	Generic	Panel	4.6	1900	0	15.43	65	60	TPO	Watt	1	2094.8	45	0	0
31	UNKNOWN OPERATOR	Generic	Panel	4.6	1900	0	15.43	65	60	TPO	Watt	1	2094.8	50	0	0
32	UNKNOWN OPERATOR	Generic	FM Broadcast	15	97	0	4.51	360	82000	TPO	Watt	1	231640.2	65	0	0
33	UNKNOWN OPERATOR	Generic	FM Broadcast	15	107	0	4.51	360	80000	TPO	Watt	1	225990.4	30	0	0
34	UNKNOWN OPERATOR	Generic	Panel	4.6	1900	320	15.43	65	60	TPO	Watt	1	2094.8	14	0	0
35	UNKNOWN OPERATOR	Generic	Panel	4.6	1900	320	15.43	65	60	TPO	Watt	1	2094.8	14	0	0
36	UNKNOWN OPERATOR	Generic	Yagi	3	150	320	9.11	76	100	ERP	Watt	1	100	14	0	0
37	UNKNOWN OPERATOR	Generic	Aperture	3	5800	0	29.06	2	20	ERP	Watt	1	20	12	0	0
38	UNKNOWN OPERATOR	Generic	Panel	1.1	2400	0	10.01	90	4	ERP	Watt	1	4	14	0	0
39	UNKNOWN OPERATOR	Generic	Panel	1.1	2400	0	10.01	90	4	ERP	Watt	1	4	15	0	0
40	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	12	0	0
41	UNKNOWN OPERATOR	Generic	Panel	1.1	2400	60	10.01	90	4	ERP	Watt	1	4	12	0	0
42	UNKNOWN OPERATOR	Generic	Aperture	3	5800	0	29.06	2	20	ERP	Watt	1	20	16	0	0
43	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	20	0	0
44	UNKNOWN OPERATOR	Generic	Aperture	4	11000	50	37.66	2	67.5	EIRP	dBmW	1	3428.7	12	0	0
45	UNKNOWN OPERATOR	Generic	Panel	1.1	2400	50	10.01	90	4	ERP	Watt	1	4	15	0	0
46	UNKNOWN OPERATOR	Generic	Yagi	3	150	330	9.11	76	100	ERP	Watt	1	100	16	0	0
47	UNKNOWN OPERATOR	Generic	Aperture	3	5800	60	29.06	2	20	ERP	Watt	1	20	12	0	0
48	UNKNOWN OPERATOR	Generic	Panel	1.1	2400	60	10.01	90	4	ERP	Watt	1	4	16	0	0
49	UNKNOWN OPERATOR	Generic	Panel	1.1	2400	60	10.01	90	4	ERP	Watt	1	4	18	0	0
50	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	100	ERP	Watt	1	100	24	0	0
51	UNKNOWN OPERATOR	Generic	Aperture	4	2400	60	22.96	2	4	ERP	Watt	1	4	16	0	0
52	UNKNOWN OPERATOR	Generic	Aperture	4	2400	120	22.96	2	4	ERP	Watt	1	4	16	0	0
53	UNKNOWN OPERATOR	Generic	Panel	1.1	2400	60	10.01	90	4	ERP	Watt	1	4	17	0	0
54	UNKNOWN OPERATOR	Generic	Yagi	0.5	850	60	9.97	60	1	TPO	Watt	1	9.9	13	0	0



Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
55	UNKNOWN OPERATOR	Generic	Omni	3	150	0	0	360	25	ERP	Watt	1	25	14	0	0
56	UNKNOWN OPERATOR	Generic	FM Broadcast	15	98	0	4.51	360	75000	TPO	Watt	1	211866	25	0	0
57	UNKNOWN OPERATOR	Generic	FM Broadcast	15	98	0	4.51	360	18000	TPO	Watt	1	50847.8	45	0	0
58	UNKNOWN OPERATOR	Generic	FM Broadcast	15	102	0	4.51	360	16000	TPO	Watt	1	45198.1	70	0	0
59	UNKNOWN OPERATOR	Generic	Aperture	0	2400	150	22.96	0	4	ERP	Watt	1	4	7	0	0
60	UNKNOWN OPERATOR	Generic	Aperture	0	2400	160	22.96	0	4	ERP	Watt	1	4	10	0	0
57	P1	Generic	Aperture	6	6000	317.9	36.36	2	65	EIRP	dBmW	1	1928	16	0	0
58	P2	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	48.5	0	0
59	P3	Sinclair SC476-HF1LDF	Omni	7	700	0	6.06	360	1000	ERP	Watt	1	1000	48.5	0	0
60	P4 (Rx)	Rfi CC807-08	Omni	9.5	800	0	8	360	0	ERP	Watt	1	0	64.8	0	0
61	P5 (Rx)	Rfi CC807-08	Omni	9.5	800	0	8	360	0	ERP	Watt	1	0	64.8	0	0
62	P6	Generic	Aperture	4	11000	317.9	37.66	2	67.5	EIRP	dBmW	1	3428.7	16	0	0

NOTE: Z indicates relative position of the antenna to the origin location on the site, displayed in the model results diagram. The Z reference indicates antenna height above the main site level unless otherwise indicated. ERP values provided by the client and used in the modeling may be greater than are currently deployed. For other operators at this site the use of "Generic" as an antenna model or "Unknown" for a wireless operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.

18.6 Site Pictures



Figure 71: Overview East Side of Rooftop



Figure 72: Overview North Side of Rooftop



Figure 73: Overview Northwest Side of Rooftop



Figure 74: Overview Northeast Side of Rooftop



Figure 75: Overview South Side of Rooftop



Figure 76: Overview West Side of Rooftop



Figure 77: Overview East Tower



Figure 78: Overview North Tower



Figure 79: Overview Northeast



Figure 80: Overview North



Figure 81: Overview Northeast (From Southeast)



Figure 82: Overview Northeast (From Southwest)



Figure 83: South Tower Base



Figure 84: South Tower Overview



Figure 85: West Tower Overview

19 OTA Broadcasting



Marin Emergency Radio Authority

Site Name – OTA Broadcasting

Site ID – 25

Site Compliance Report

Mt. Burdell
Novato, CA 94945

Site visit date: August 22, 2018
Site visit time: 11:15 PM
Site survey by: Jeff Desira

Latitude: N38-8-59.60
Longitude: W122-35-35.66
Structure Type: Monopole

Report generated date: March 28, 2019
Report by: Sam Cosgrove
Customer Contact: David Mortimer

The site is compliant and will remain compliant upon implementation of the proposed changes.

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19.1 Site Summary

The County of Marin on behalf of Marin Emergency Radio Authority has contracted with Sitesafe, LLC. (Sitesafe), an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine the RF conditions at the proposed communications site, 25 - OTA Broadcasting, located at Mt. Burdell, Novato, CA, is in compliance with Federal Communications Commission (FCC) Rules and Regulations for RF emissions.

Sitesafe's field personnel visited 25 - OTA Broadcasting on August 22, 2018. This section contains a detailed summary of the RF environment at the site including:

- Site compliance determination;
- Photographs of the site;
- Diagram of the site;
- Inventory of the make / model of all transmitting antennas found on the site (where possible);
- Record of any Maximum Permissible Exposure ("MPE") measurements taken on the site, as applicable; and
- Theoretical MPE based on modeling.

RF emissions on this site do not exceed MPE limits. The area near the top floor access is predicted to have the highest RF emission levels due to the height and power levels of antenna #9. The levels predicted are still far below MPE. The proposed antenna configuration will lower the MPE percentage predicted on site.



19.2 Site Compliance

19.2.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, and a thorough review of site access procedures, RF hazard signage and visible antenna locations, Sitesafe has determined that:

The site is compliant with the FCC rules and regulations, as described in OET Bulletin 65, and will remain compliant upon implementation of the proposed changes.

The compliance determination is based on General Public MPE levels due to theoretical modeling and/or physical measurements, RF signage placement, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the Marin Emergency Radio Authority's proposed deployment plan could result in the site being rendered non-compliant. Measurements have also been performed to validate the assumptions used in our theoretical modeling of this site.

Modeling is used for determining compliance and the percentage of MPE contribution. Measurements provide a view of MPE percentage levels at the site at the time of Sitesafe's visit and are used to validate modeling results.

19.2.2 Actions for Site Compliance

Based on common industry practice and our understanding of FCC and OSHA requirements, this section provides a statement of recommendations for site compliance. RF alert signage recommendations have been proposed based on existing measurements and theoretical analysis of MPE levels. Sitesafe has documented the locations of any RF signs and barriers that are required for compliance. Barriers can consist of locked doors, fencing, railing, rope, chain, paint striping or tape, combined with RF alert signage.

This site will be compliant with the FCC rules and regulations.

19.3 RF Emissions Diagram

The RF diagram(s) below display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix B.

The key at the bottom of each diagram indicates if percentages displayed are referenced to FCC General Population Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Gray represents areas predicted to be at 5% of the MPE limits, or below.
- Green represents areas predicted to be between 5% and 100% of the MPE limits.
- Blue represents areas predicted to be between 100% and 500% of the MPE limits.
- Yellow represents areas predicted to be between 500% and 5000% of the MPE limits.
- Red areas indicated predicted levels greater than 5000% of the MPE limits.

The theoretical analysis identified the maximum predicted MPE levels on the site to be:

Maximum Cumulative Theoretical General Public MPE level (Existing Antennas) : 8.7%
Maximum Cumulative Theoretical General Public MPE level (All Antennas): 9.1%
Maximum Cumulative Theoretical General Public MPE level (Proposed Antennas): 9.1%

General Population diagrams are specified when an area is accessible to the public; i.e. personnel that do not meet Occupational or RF Safety trained criteria, could gain access.

If trained occupational personnel require access to areas that are delineated as **Blue** or above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the operators to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

The key at the bottom also indicates the level or height of the modeling with respect to the main level. The origin is typically referenced to the main rooftop level, or ground level for a structure without access to the antenna level. For example:

Average from 0 feet above to 6 feet above origin

and

Average from 20 feet above to 26 feet above origin

The first indicates modeling at the main rooftop (or ground) level averaged over 6 feet. The second indicates modeling at a higher level (possibly a penthouse level) of 20 feet averaged over 6 feet.

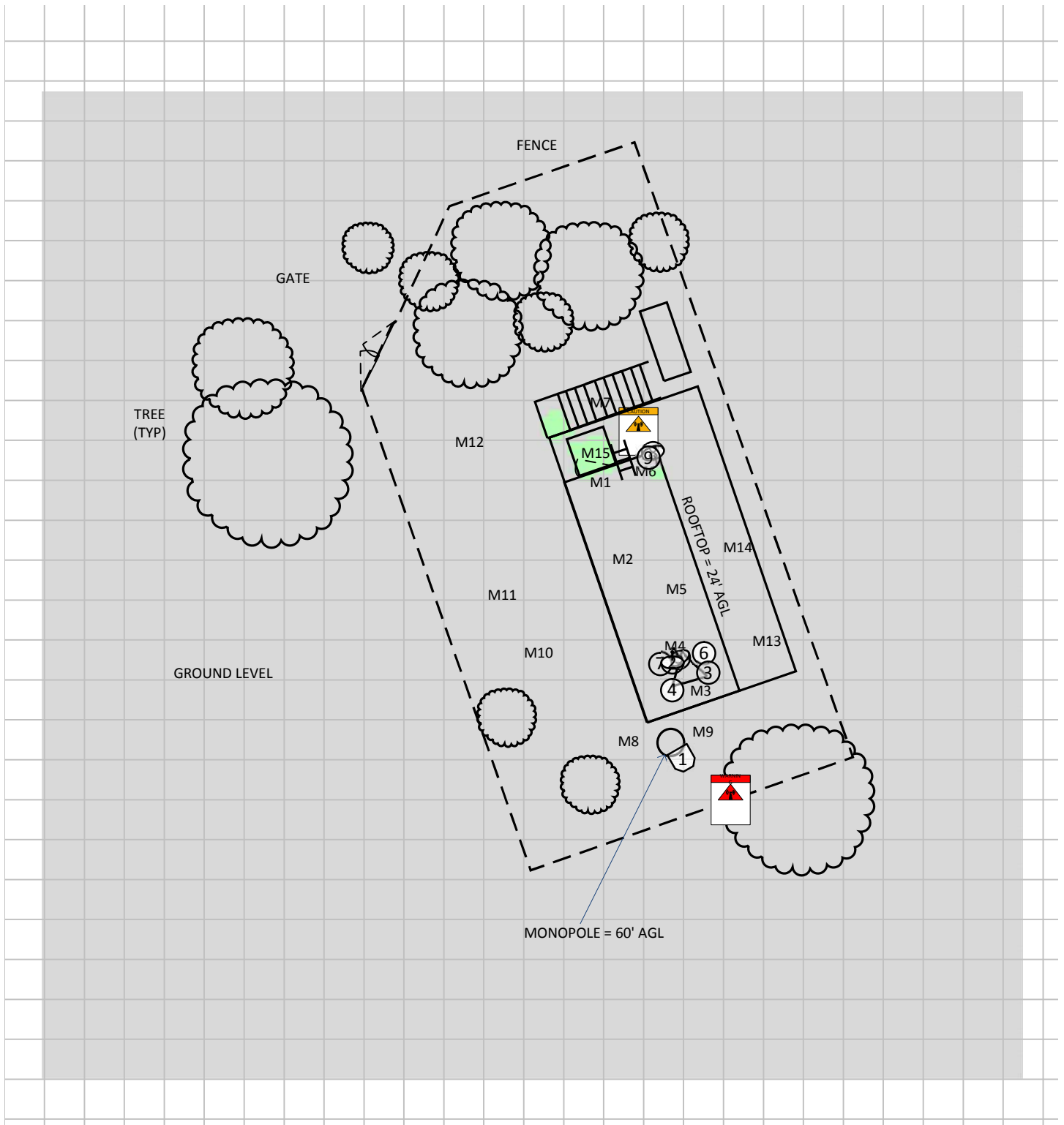


Abbreviations used in the RF Emissions Diagrams

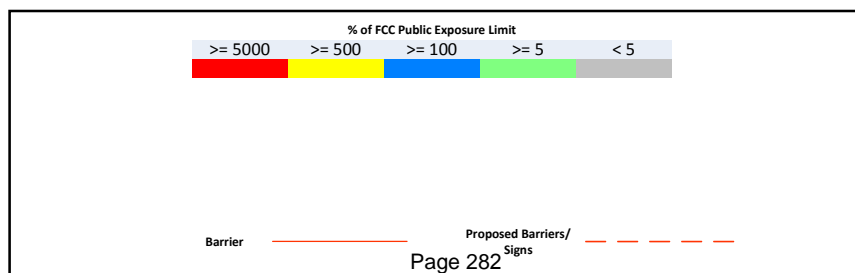
PH=##'	Penthouse at ## feet above main roof
M##	Measurement ## taken during a site visit

As discussed in Section 19.4, site measurement locations for spatial average measurements collected at the time of Sitesafe's visit have been added to the RF emissions diagram. While the theoretical modeling represents worst case MPE levels based on the assumption(s) detailed above, the measurement data is a snapshot of MPE levels at the time of our visit, and dependent on transmitter duty cycle, system implementation and emissions from other RF sources at nearby antenna sites.

RF Exposure Simulation For: OTA Broadcasting Existing Antennas Only On Air



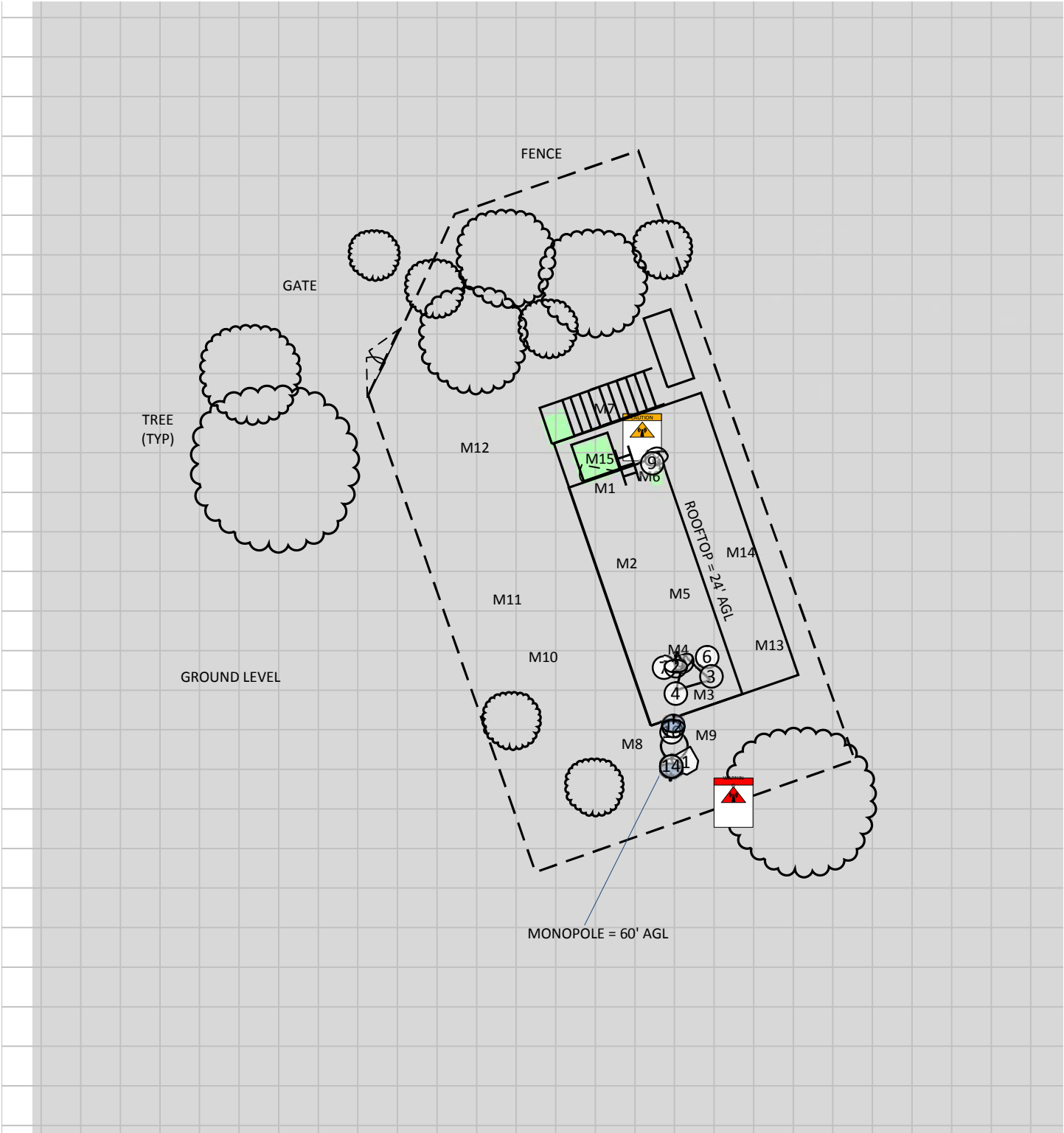
% of FCC Public Exposure Limit
Spatial average 0' - 6'



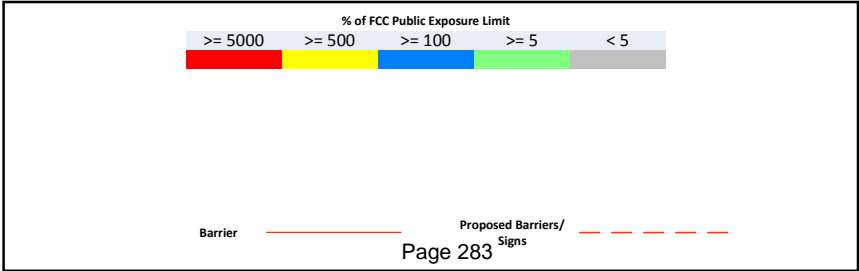
(Feet)
0 11.7 23.4
www.sitesafe.com
Site Name: OTA Broadcasting
10/4/2018 1:23:46 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: OTA Broadcasting
All Antennas On Air



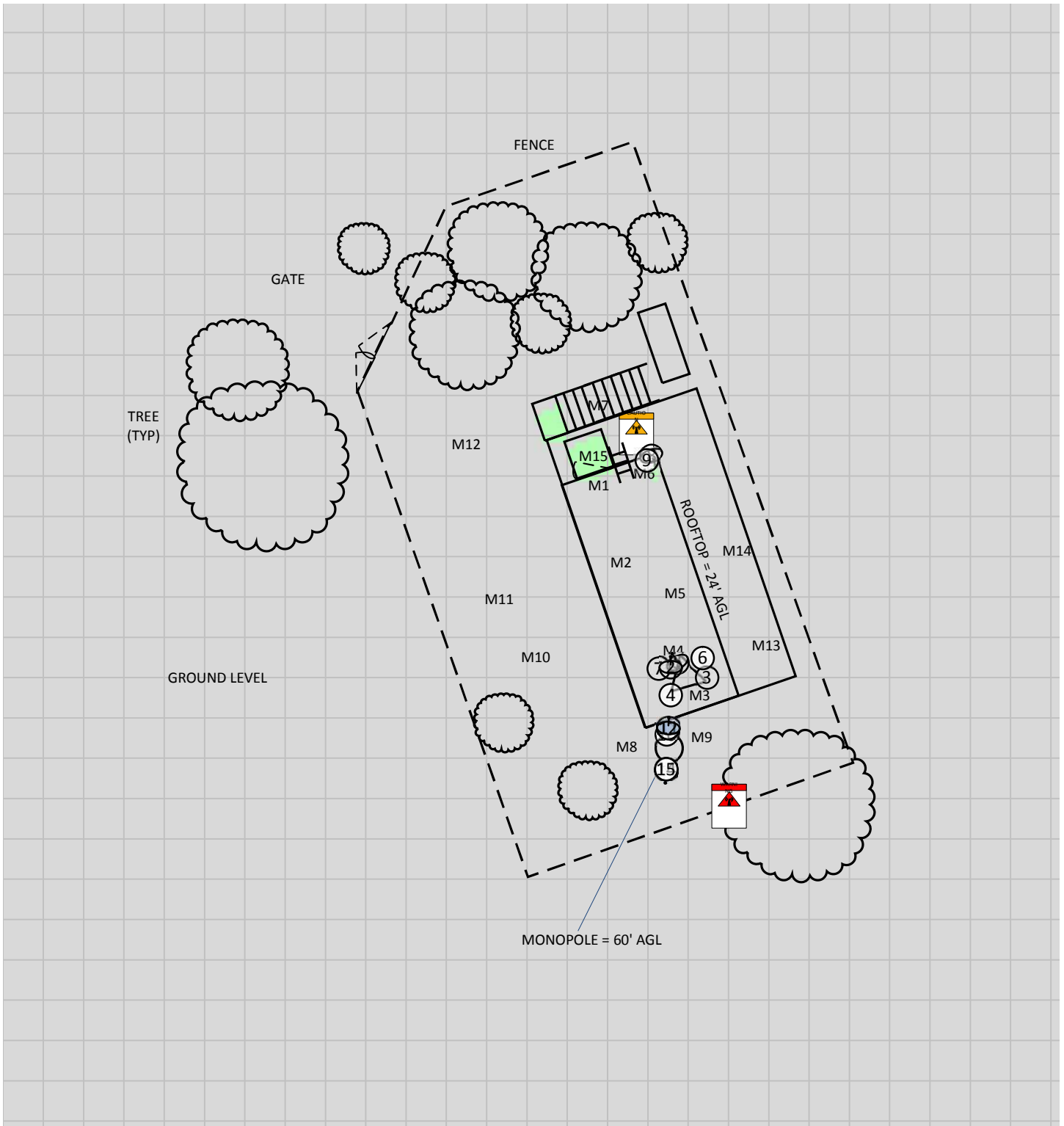
% of FCC Public Exposure Limit
Spatial average 0' - 6'



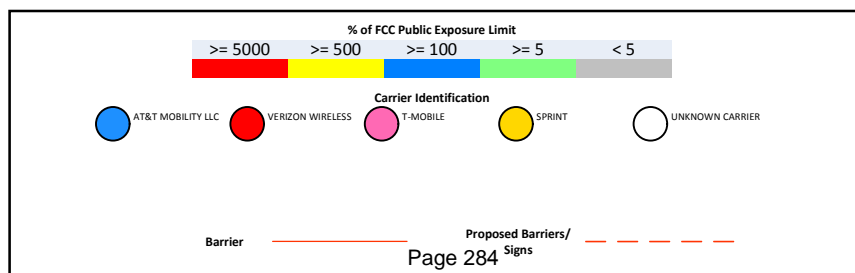
(Feet)
0 11.9 23.7
www.sitesafe.com
Site Name:OTA Broadcasting
10/4/2018 1:30:26 PM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: OTA Broadcasting Proposed Configuration On Air



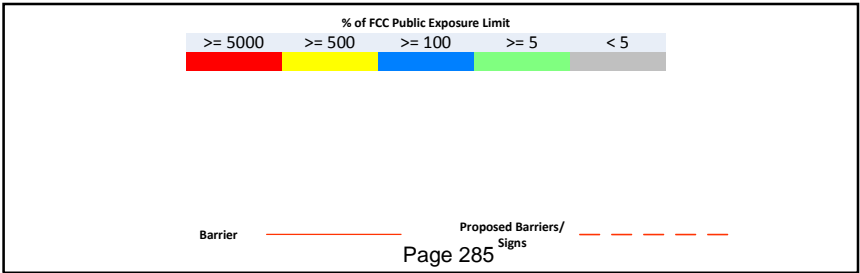
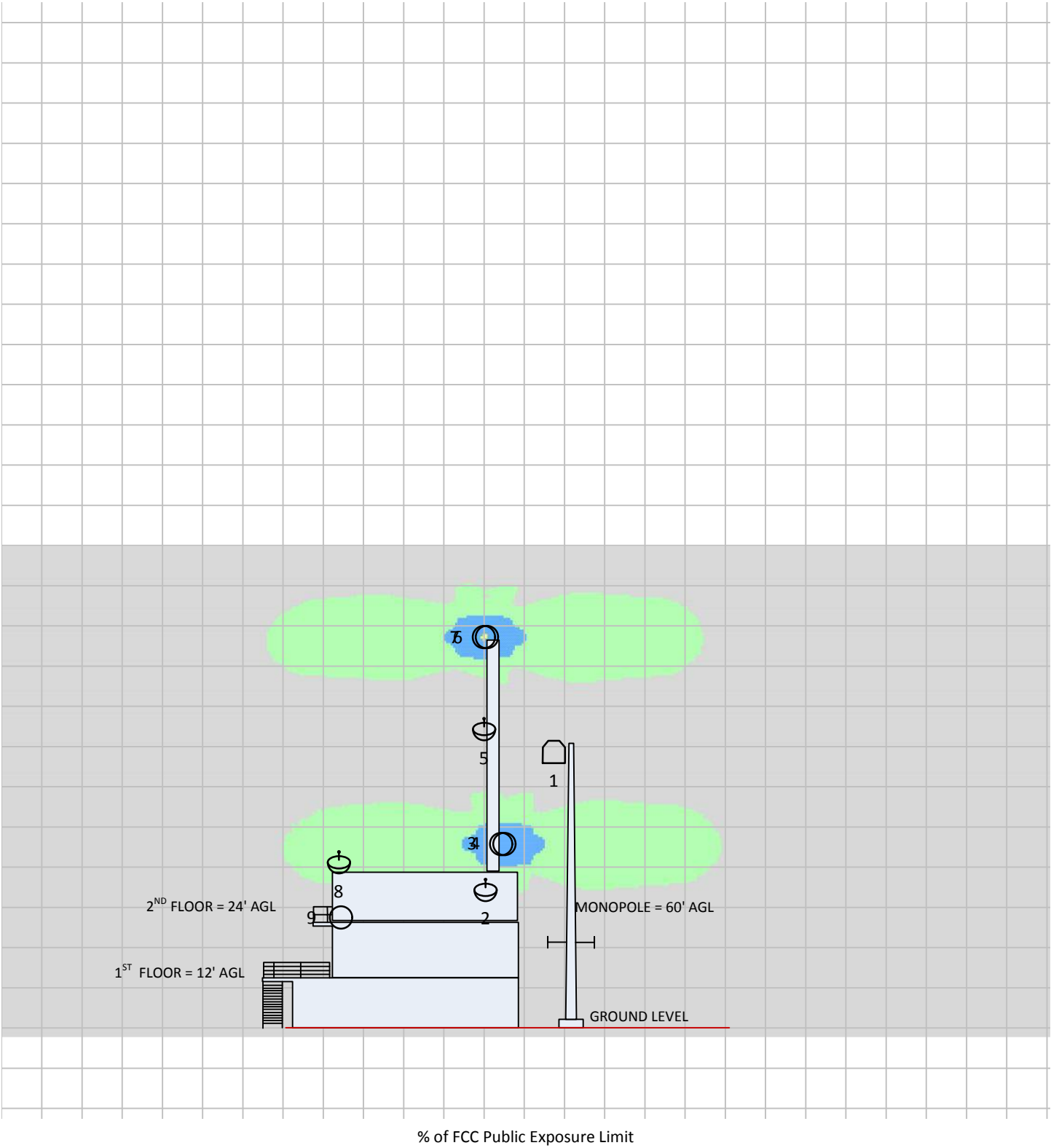
% of FCC Public Exposure Limit
Spatial average 0' - 6'



(Feet)
0 11.6 23.2
www.sitesafe.com
Site Name: OTA Broadcasting
8/28/2018 11:55:11 AM

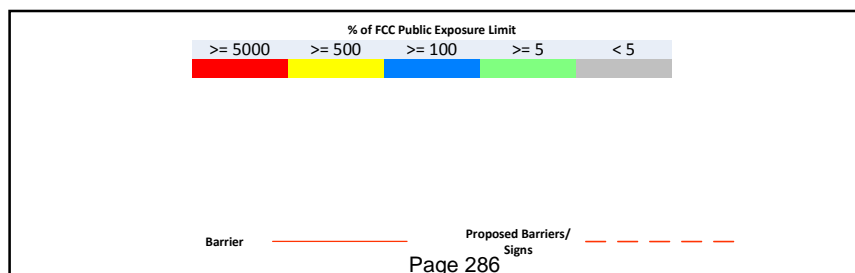
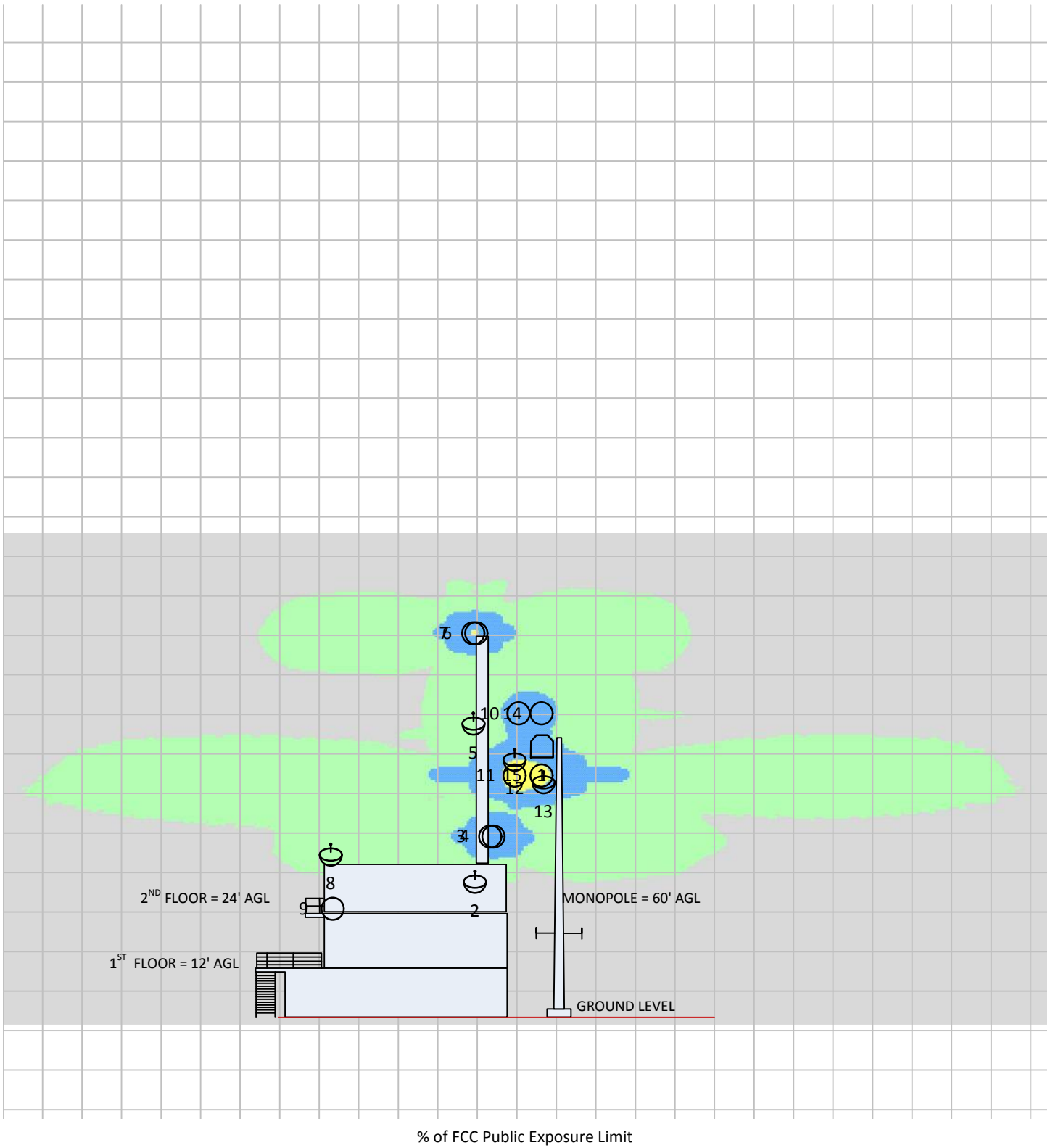
Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: OTA Broadcasting
Elevation View – Existing Antennas Only On Air

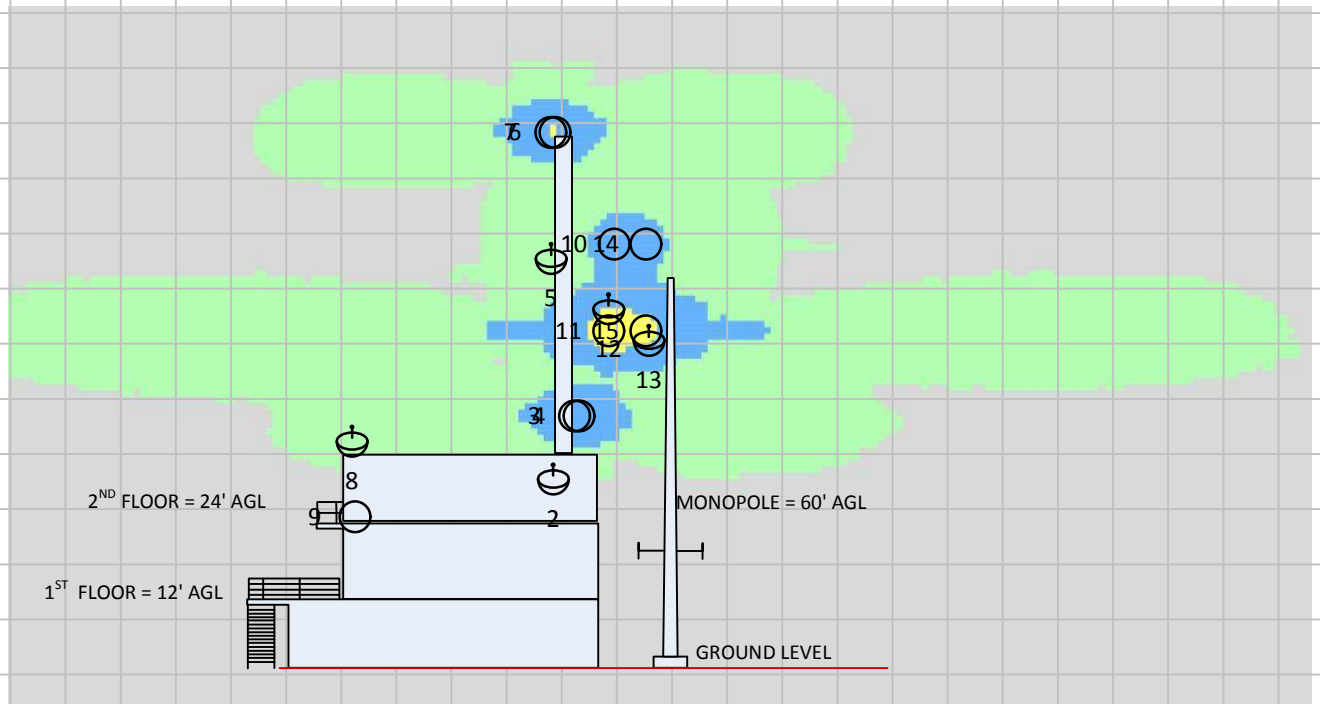


RF Exposure Simulation For: OTA Broadcasting

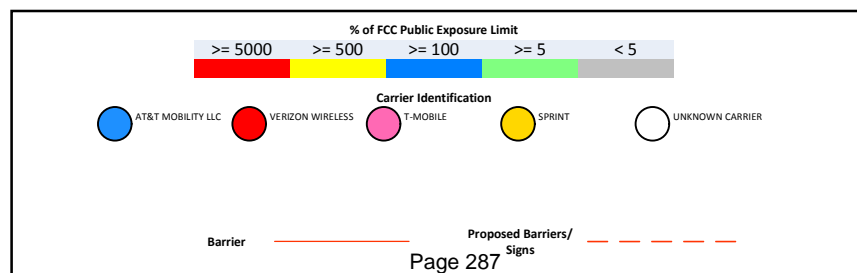
Elevation View – All Antennas On Air



RF Exposure Simulation For: OTA Broadcasting Proposed Configuration On Air – Elevation View



% of FCC Public Exposure Limit



19.4 Site Measurements

This section provides a summary of the measurements collected at the site. Actual measurements locations at which these data points were collected are included in the RF emission diagram provided in Section 19.3 of this report. Two types of measurements were collected at each measurement location: maximum (peak) and spatial average. The spatial average measurement consists of a collection of ten (10) measurements within a ten (10) second time interval taken from zero (0) to six (6) feet in height. The purpose of this measurement technique is to identify the average power density over the dimensions of a typical human body.

Table 1 below contains all the measurements collected from accessible areas located at the site at the time of Sitesafe's visit. Whenever possible, measurements are taken in front of the antenna in the transmitting direction. However, because of the antenna configuration at this site, specific emissions could not be discerned from nearby facilities, and no attempt was made to determine power density levels from a specific transmitting antenna.

Highest Measured Occupational Level: <1%

This value is equal to:

Highest General Public Level: <5%.

Table 1: Spatial Average and Maximum Occupational Measurements					
Measurements Points	Spatial Average	Maximum	Measurements Points	Spatial Average	Maximum
M1	<1 %	<1 %	M10	<1 %	<1 %
M2	<1 %	<1 %	M11	<1 %	<1 %
M3	<1 %	1 %	M12	<1 %	<1 %
M4	<1 %	1 %	M13	<1 %	<1 %
M5	<1 %	<1 %	M14	<1 %	<1 %
M6	<1 %	<1 %	M15	<1 %	<1 %
M7	<1 %	<1 %	M16	<1 %	<1 %
M8	<1 %	<1 %	M17	<1 %	<1 %
M9	<1 %	<1 %	M18	<1 %	<1 %

RF meters and probes have been calibrated and used according to the manufacturer's specifications. Measurements provide a view of the MPE percentage levels at the site at the time of Sitesafe's site visit and are used to validate modeling results. Theoretical modeling is used for determining compliance and the percentage of MPE contributions.

An RF Emission diagram has been included in section 19.3 of this document. All measurement locations are identified in this diagram. The locations of measurements in the RF Emission diagram can be cross referenced with Table 1 (above) to determine the actual spatial average and maximum measurement value per location.

19.5 Antenna Inventory

The Antenna Inventory shows all transmitting antennas at the site. This inventory was verified on site, and was utilized by Sitesafe to perform theoretical modeling of RF emissions. The inventory coincides with the site diagrams in this report, identifying each antenna's location at 25 - OTA Broadcasting. The antenna information collected includes the following information:

- Licensee or wireless operator name
- Frequency or frequency band
- Transmitter power – Effective Radiated Power ("ERP"), or Equivalent Isotropic Radiated Power ("EIRP") in Watts
- Antenna manufacturer make, model, and gain

For other operators at this site, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.



The following antenna inventory and representative photographs were obtained or verified during the site visit and were utilized to create the site model diagrams:

Ant #	Operated By	Antenna Model	Ant Type	Length (ft)	TX Freq (MHz)	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	Power	Power Type	Power Units	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
1	E1 (Decommissioned)	Generic	TV Broadcast	30	668	150	10.67	116	0	TPO	Watt	1	0	60	0	0
2	UNKNOWN OPERATOR	Generic	Aperture	4.6	11000	0	41.86	61	0.01	TPO	Watt	1	153.5	30	0	0
3	UNKNOWN OPERATOR	Generic	Omni	8	150	0	2.61	360	100	ERP	Watt	1	100	40	0	0
4	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	40	0	0
5	UNKNOWN OPERATOR	Generic	Aperture	4.6	11000	330	41.86	61	0.01	TPO	Watt	1	153.5	65	0	0
6	UNKNOWN OPERATOR	Generic	Omni	8	150	0	2.61	360	100	ERP	Watt	1	100	85	0	0
7	UNKNOWN OPERATOR	Generic	Omni	4.7	450	0	2.97	360	100	ERP	Watt	1	100	85	0	0
8	UNKNOWN OPERATOR	Generic	Aperture	0	5800	160	29.06	0	20	ERP	Watt	1	20	36	0	0
9	UNKNOWN OPERATOR	Generic	Yagi	0.5	850	160	9.97	60	1	TPO	Watt	1	9.9	24	0	0
10	P1 (Rx)	Sinclair SC479-HF1LDF(D06)	Omni	14.5	700	90	9.5	360	0	ERP	Watt	1	0	67.3	0	0
11	P2	Sinclair SC476-HF1LDF	Omni	7	800	270	6.06	360	1000	ERP	Watt	1	1000	53.5	0	0
12	P3	Generic	Aperture	6	6000	3.34	36.36	2	0.01	TPO	Watt	1	43.3	57	0	0
13	P4	Generic	Aperture	6	6000	185.54	36.36	2	0.01	TPO	Watt	1	43.3	52	0	0
14	P6 (Rx)	Sinclair SC479-HF1LDF(D06)	Omni	14.5	700	90	9.5	360	0	ERP	Watt	1	0	67.3	0	0
15	P7	Sinclair SC476-HF1LDF	Omni	7	800	270	6.06	360	1000	ERP	Watt	1	1000	53.5	0	0

NOTE: Z indicates relative position of the antenna to the origin location on the site, displayed in the model results diagram. The Z reference indicates antenna height above the main site level unless otherwise indicated. ERP values provided by the client and used in the modeling may be greater than are currently deployed. For other operators at this site the use of "Generic" as an antenna model or "Unknown" for a wireless operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.

19.6 Site Pictures



Figure 86: 2nd Floor Access



Figure 87: 2nd floor Overview Facing South



Figure 88: 2nd Floor Tower Overview (1)



Figure 89: 2nd Floor Tower Overview (2)



Figure 90: 2nd Floor Tower Overview (3)

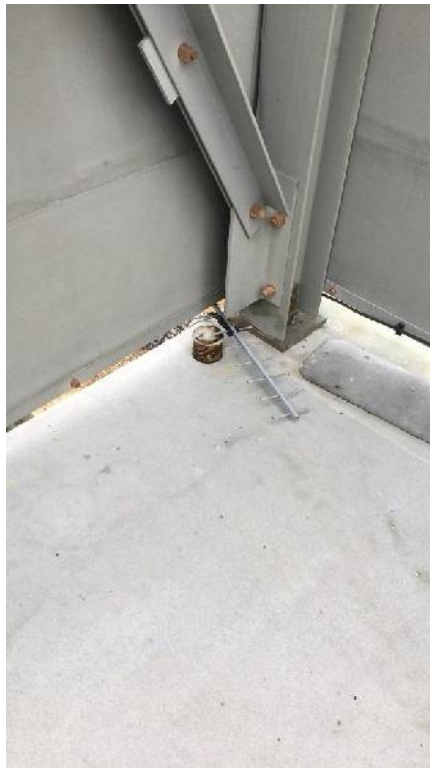


Figure 91: Antenna 9



Figure 92: Monopole Base



Figure 93: Monopole Overview



Figure 94: Antenna 1

20 Mill Valley



Marin Emergency Radio Authority

Site Name – Mill Valley

Site ID: 26

Site Compliance Report

Mill Valley Reservoir
Mill Valley, CA 94941

Latitude: N37-54-10.77
Longitude: W122-33-27.74
Structure Type: Monopole

Report generated date: March 28, 2019
Report by: Sam Cosgrove
Customer Contact: David Mortimer

The site is compliant and will remain compliant upon implementation of the proposed changes.

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20.1 Site Summary

The County of Marin on behalf of Marin Emergency Radio Authority has contracted with Sitesafe, LLC. (Sitesafe), an independent Radio Frequency (RF) regulatory and engineering consulting firm, to determine the RF conditions at the proposed communications site, 26 - Mill Valley, located at Mill Valley Reservoir, Mill Valley, CA, in relation to Federal Communications Commission (FCC) Rules and Regulations for RF emissions.

This section contains a detailed summary of the RF environment at the site including:

- Diagram of the site
- Inventory of the make / model of all antennas
- Theoretical MPE based on modeling

RF emissions are predicted to be below 1% MPE in all areas on this site.



20.2 Site Compliance

20.2.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, Sitesafe has determined that:

The site is compliant with the FCC rules and regulations, as described in OET Bulletin 65 and will remain compliant upon implementation of the proposed changes.

The compliance determination is based on theoretical modeling, RF signage placement recommendations, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the Marin Emergency Radio Authority's proposed deployment plan could result in the site being rendered non-compliant.

20.2.2 Actions for Site Compliance

Based on common industry practice and our understanding of FCC and OSHA requirements, this section provides a statement of recommendations for site compliance. RF alert signage recommendations have been proposed based on theoretical analysis of MPE levels. Barriers can consist of locked doors, fencing, railing, rope, chain, paint striping or tape, combined with RF alert signage.

The site is compliant with the FCC rules and regulations and will remain compliant upon implementation of the proposed changes.

20.3 RF Emissions Diagram

The RF diagram(s) below display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix B.

The key at the bottom of each diagram indicates if percentages displayed are referenced to FCC General Population Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Gray represents areas predicted to be at 5% of the MPE limits, or below.
- Green represents areas predicted to be between 5% and 100% of the MPE limits.
- Blue represents areas predicted to be between 100% and 500% of the MPE limits.
- Yellow represents areas predicted to be between 500% and 5000% of the MPE limits.
- Red areas indicated predicted levels greater than 5000% of the MPE limits.

The theoretical analysis identified the maximum predicted MPE levels on the ground to be:

Maximum Cumulative Theoretical General Public MPE level (All Antennas): 4.3%
Maximum Cumulative Theoretical General Public MPE level (Proposed Antennas): 4.3%

General Population diagrams are specified when an area is accessible to the public; i.e. personnel that do not meet Occupational or RF Safety trained criteria, could gain access.

If trained occupational personnel require access to areas that are delineated as **Blue** or above 100% of the limit, Sitesafe recommends that they utilize the proper personal protection equipment (RF monitors), coordinate with the operators to reduce or shutdown power, or make real-time power density measurements with the appropriate power density meter to determine real-time MPE levels. This will allow the personnel to ensure that their work area is within exposure limits.

The key at the bottom also indicates the level or height of the modeling with respect to the main level. The origin is typically referenced to the main rooftop level, or ground level for a structure without access to the antenna level. For example:

Average from 0 feet above to 6 feet above origin

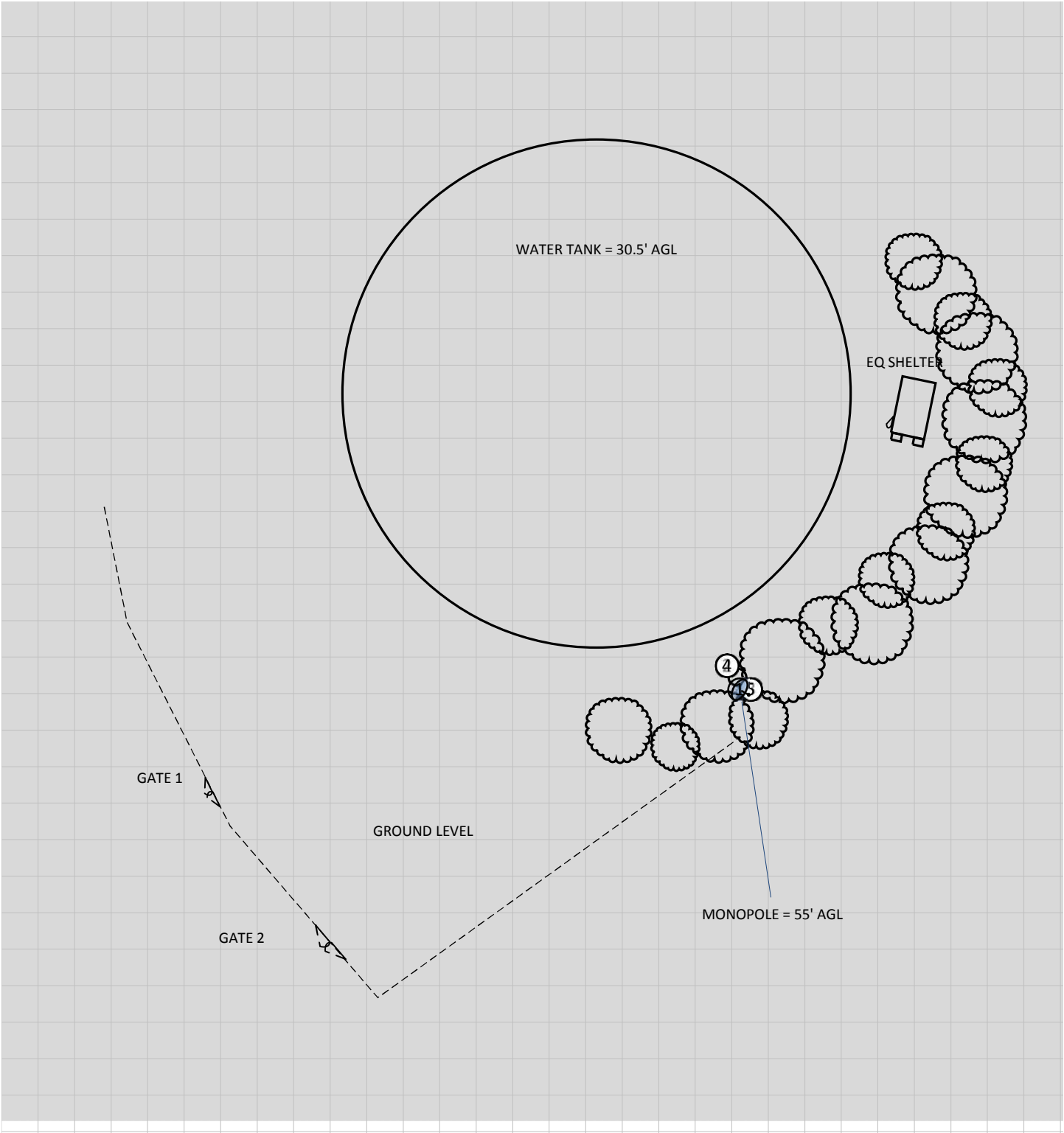
and

Average from 20 feet above to 26 feet above origin

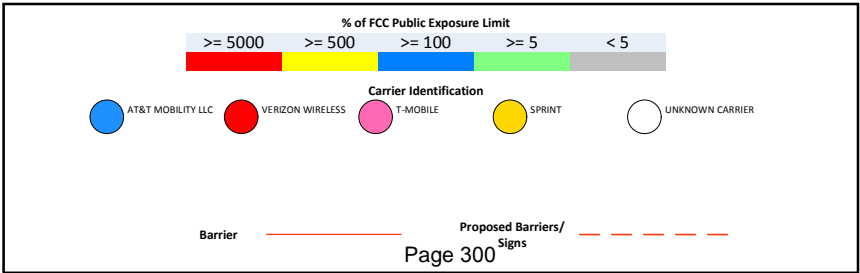
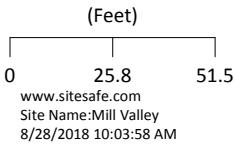
The first indicates modeling at the main rooftop (or ground) level averaged over 6 feet. The second indicates modeling at a higher level (possibly a penthouse level) of 20 feet averaged over 6 feet.

Abbreviations used in the RF Emissions Diagrams

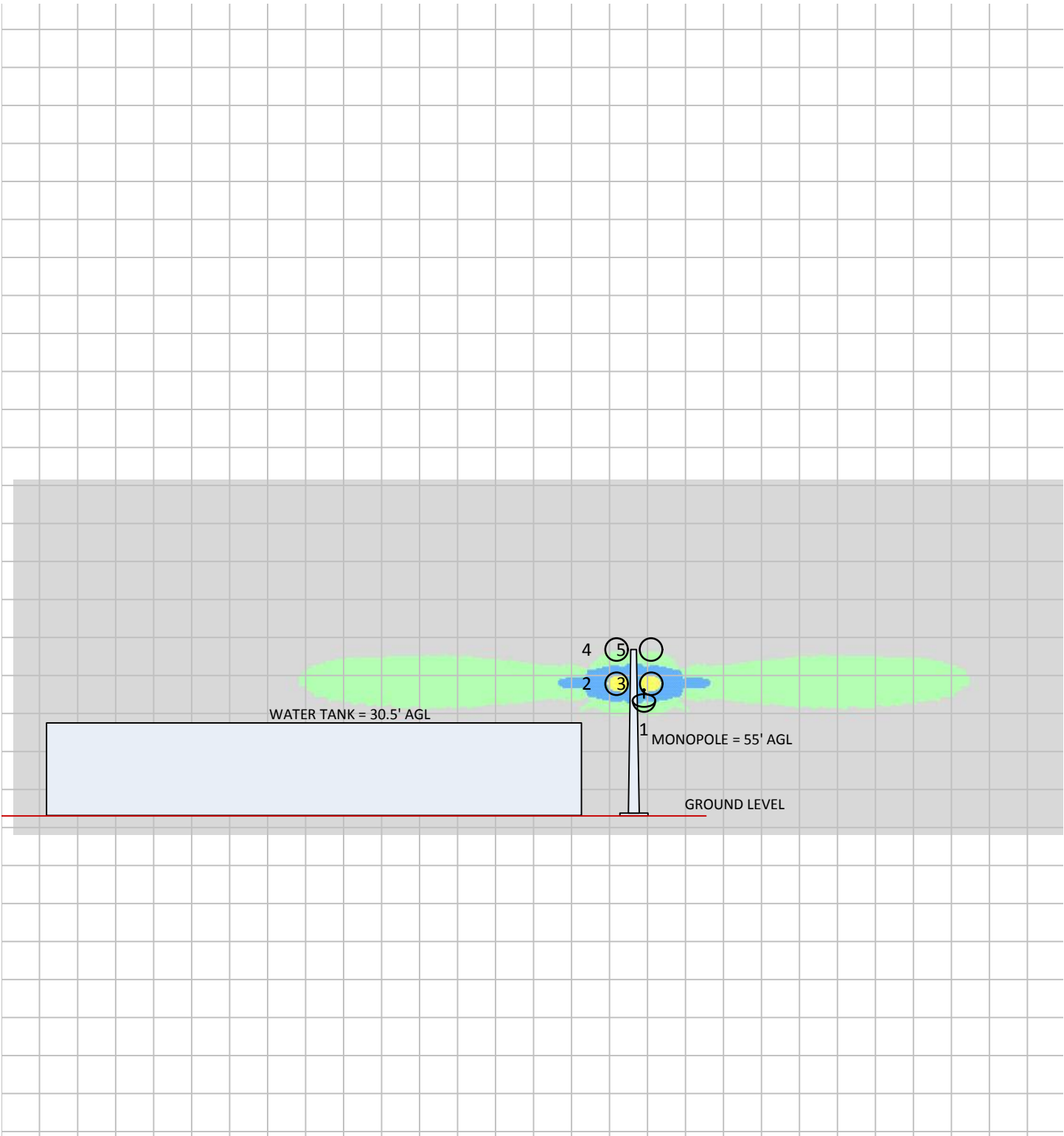
PH=##'	Penthouse at ## feet above main roof
--------	--------------------------------------



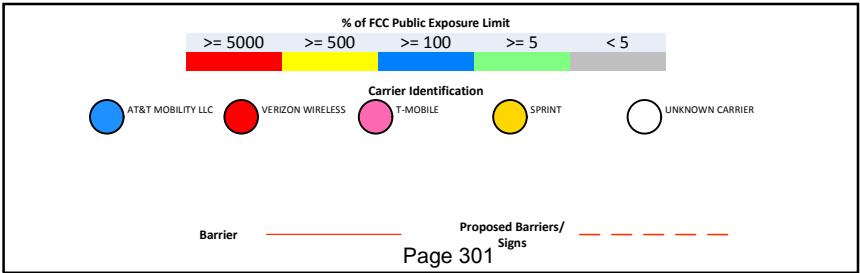
% of FCC Public Exposure Limit
Spatial average 0' - 6'



RF Exposure Simulation For: Mill Valley
Elevation View – Final Configuration



% of FCC Public Exposure Limit



20.4 Antenna Inventory

The Antenna Inventory shows all transmitting antennas at the site. This inventory was provided by the customer, and was utilized by Sitesafe to perform theoretical modeling of RF emissions. The inventory coincides with the site diagrams in this report, identifying each antenna's location at 26 - Mill Valley. The antenna information collected includes the following information:

- Licensee or wireless operator name
- Frequency or frequency band
- Transmitter power – Effective Radiated Power ("ERP"), or Equivalent Isotropic Radiated Power ("EIRP") in Watts
- Antenna manufacturer make, model, and gain

For other operators at this site, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.



The following antenna inventory was provided by the customer and was utilized to create the site model diagrams:

Table 3: Antenna Inventory

Ant #	Operated By	Antenna Model	Ant Type	Len (ft)	TX Freq (MHz)	TECH	Az (Deg)	Antenna Gain (dBd)	Horizontal Half Power Beamwidth (Deg)	POWER	POWER TYPE	POWER UNITS	# of Trans	ERP (Watts)	Z (ft)	DT	EDT
1	P1	Generic	Aperture	4	11000		120	37.66	2	0.01	TPO	Watt	1	58.3	38	0	0
2	P2	Sinclair SC476-HF1LDF	Omni	7	700		0	6.06	360	1000	ERP	Watt	1	1000	43.5	0	0
3	P3	Sinclair SC476-HF1LDF	Omni	7	700		0	6.06	360	1000	ERP	Watt	1	1000	43.5	0	0
4	P4 (Rx)	Rfi CC807-08	Omni	9.5	800		0	8	360	0	ERP	Watt	1	0	54.8	0	0
5	P5 (Rx)	Rfi CC807-08	Omni	9.5	800		0	8	360	0	ERP	Watt	1	0	54.8	0	0

NOTE: Z indicates relative position of the antenna to the origin location on the site, displayed in the model results diagram. The Z reference indicates antenna height above the main site level unless otherwise indicated. ERP values provided by the client and used in the modeling may be greater than are currently deployed. For other operators at this site the use of "Generic" as an antenna model or "Unknown" for a wireless operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Equipment, antenna models and nominal transmit power were used for modeling, based on past experience with radio service providers.

21 Frequency Hazards Table

Existing Sites Proposed for Next Gen System		RF Threshold* Existing System (at 485 MHz Operating Frequency)		Existing System RF emissions		Next Gen Temporary Change Over Condition		Next Gen Long-term Condition		Public Safety Arc
EIR No.	Site Name	Controlled	Uncontrolled	Controlled (% Threshold)	Uncontrolled (% Threshold)	Controlled (% Threshold)	Uncontrolled (% Threshold)	Controlled (% Threshold)	Uncontrolled (% Threshold)	Minimum Distance (ft)
1	Prime Site (new location at EOF)	Existing Background RF		553.56	<5	577.10	<5	553.18	<5	0
2	Civic Center	1.6mW/cm ²	0.32mW/cm ²	2677.29	<5	2677.29	<5	2677.29	<5	0
3	Big Rock	1.6mW/cm ²	0.32mW/cm ²	786.21	8.67	786.21	8.67	786.21	8.67	0
4	Mt. Tamalpais	1.6mW/cm ²	0.32mW/cm ²	2418.3	<5	2418.3	<5	2418.27	<5	0
5	Mt. Barnabe	1.6mW/cm ²	0.32mW/cm ²	889.74	<5	967.56	<5	967.56	<5	0
6	Bolinas Fire Station									
7	Bolinas Ridge									
8	Point Reyes Hill	1.6mW/cm ²	0.32mW/cm ²	21.26	20.99	21.45	21.59	16.17	14.36	0
9	Forbes Hill	1.6mW/cm ²	0.32mW/cm ²							
10	Dollar Hill	1.6mW/cm ²	0.32mW/cm ²	71.65	34.79	73.72	35.69	73.72	35.12	0
11	San Pedro Ridge	1.6mW/cm ²	0.32mW/cm ²	192.93	<5	192.93	<5	192.93	<5	0
12	Old Mt.Burdell Site (see #25 for OTA site)									
13	Novato Police Dept									
14	Mt. Tiburon	1.6mW/cm ²	0.32mW/cm ²	9.28	<5	10.07	<5	2.15	<5	0
15	Mill Valley City Hall									
16	Mill Valley Police Station									
17	Bay Hill Road									
18	Sonoma Mountain	1.6mW/cm ²	0.32mW/cm ²	9765.91	<5	9765.91	<5	9765.91	<5	0

Existing Sites Proposed for Next Gen System		RF Threshold* Existing System (at 485 MHZ Operating Frequency)		Existing System RF emissions		Next Gen Temporary Change Over Condition		Next Gen Long-term Condition		Public Safety Arc
EIR No.	Site Name	Controlled	Uncontrolled	Controlled (% Threshold)	Uncontrolled (% Threshold)	Controlled (% Threshold)	Uncontrolled (% Threshold)	Controlled (% Threshold)	Uncontrolled (% Threshold)	Minimum Distance (ft)
19	Stewart Point (Approved with CEQA Amendment)	1.6mW/cm ²	0.32mW/cm ²	144.24	16.18	165.85	16.39	150.93	16.07	0
New Sites Proposed for Next Gen System										
20	Tomales (Approved with CEQA Categorical Exemption)	<i>Existing Background RF</i>		-	-	196.78	<5	196.78	<5	0
21	Coyote Peak (new power to follow Ranch Road)			<5	<5	<5	<5	<5	<5	0
22	Skyview Terrace (EOF Water Tank)			-	-	<5	<5	<5	<5	0
23	Muir Beach			-	-	<5	<5	<5	<5	0
24	Wolfback Ridge	<i>Existing Background RF</i>		50141.5	87.03	50141.5	87.03	50141.5	87.03	0
25	Mt Burdell OTA	<i>Existing Background RF</i>		8.70	<5	9.14	<5	9.14	<5	0
26	Mill Valley Water Tank			-	-	4.31	<5	4.31	<5	0

** Hammett Edison Inc. data source for Next Gen Radio Frequency safety thresholds (TBD)

Notes:

- On sites where percentages do not change a substantial amount or do not change at all between the existing conditions, temporary change over conditions, and next gen long-term conditions, there are other operators responsible for the emissions.
- The percentages listed in the uncontrolled columns are accessible to the general public on the ground level outside of the fences (where existing). Percentages listed in the Controlled column are accessible only to workers in the areas and are inside the fences or on rooftops.



22 Field Technician Certification

I, Jeff Desira, state:

That I am an employee of Sitesafe, LLC., in Vienna, Virginia, which provides RF compliance services to clients in the wireless communications industry; and

That I have successfully completed RF Safety Awareness training, am aware of the hazards and, therefore, can be exposed to RF fields classified for "Occupational" exposure;

That I am familiar with the Rules and Regulations of the Federal Communications Commission (FCC) as well as the regulations of the Occupational Safety and Health Administration (OSHA), both in general and specifically as they apply to the FCC Guidelines for Human Exposure to Radio-frequency Radiation; and

That I have been trained in the proper use of measurement equipment, and have successfully completed Sitesafe training in policy, procedure and proper site measurement and modeling; and

That I performed survey measurements of the RF environment at the site identified as 1 customized report for 18 sites on August 28, 2018 at 5:17 PM in order to determine where there might be electromagnetic energy that is in excess of both the Controlled Environment and Uncontrolled Environment levels; and

That the survey measurements were performed with measurement equipment, model Narda NBM-550 2401-01B field intensity meter (serial number E-0538) and model Narda EA 5091 2402-07B field intensity probe, (serial number 01066) calibrated on 6/6/2017; and

That I have prepared this Site Compliance Report and believe it to be true and accurate to the best of my knowledge and based on data gathered.

By: Jeff Desira



23 Engineer Certification

The professional engineer whose seal appears on the cover of this document hereby certifies and affirms:

That I am registered as a Professional Engineer in the jurisdiction indicated in the professional engineering stamp on the cover of this document; and

That I, Michael A McGuire, am currently and actively licensed to provide (in this state/jurisdiction as indicated within the professional electrical engineering seal on the cover of this document) professional electrical engineering services, as an employee of Hurricane Hill Development Company, PLLC , a duly authorized/registered engineering firm (in this state, as applicable) on behalf of SiteSafe, LLC; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission (FCC) as well as the regulations of the Occupational Safety and Health Administration (OSHA), both in general and specifically as they apply to the FCC Guidelines for Human Exposure to Radio-frequency Radiation; and

That survey measurements of the site environment of the site identified as 1 customized report for 18 sites have been performed in order to determine where there might be electromagnetic energy that is in excess of both the Controlled Environment and Uncontrolled Environment levels; and

That I have thoroughly reviewed this Site Compliance Report and believe it to be true and accurate to the best of my knowledge as assembled by and attested to by Klaus Bender.

March 28, 2019



24 Appendix A – Statement of Limiting Conditions

Sitesafe field personnel visited the site and collected data with regard to the RF environment. Sitesafe will not be responsible for matters of a legal nature that affect the site or property. The property was visited under the premise that it is under responsible ownership and management and our client has the legal right to conduct business at this facility.

Due to the complexity of some wireless sites, Sitesafe performed this visit and created this report utilizing best industry practices and due diligence. Sitesafe cannot be held accountable or responsible for anomalies or discrepancies due to actual site conditions (i.e., mislabeling of antennas or equipment, inaccessible cable runs, inaccessible antennas or equipment, etc.) or information or data supplied by Marin Emergency Radio Authority, the site manager, or their affiliates, subcontractors or assigns.

Sitesafe has provided computer generated model(s) in this Site Compliance Report to show approximate dimensions of the site, and the model is included to assist the reader of the compliance report to visualize the site area, and to provide supporting documentation for Sitesafe's recommendations.

Sitesafe may note in the Site Compliance Report any adverse physical conditions, such as needed repairs, observed during the survey of the subject property or that Sitesafe became aware of during the normal research involved in performing this survey. Sitesafe will not be responsible for any such conditions that do exist or for any engineering or testing that might be required to discover whether such conditions exist. Because Sitesafe is not an expert in the field of mechanical engineering or building maintenance, the Site Compliance Report must not be considered a structural or physical engineering report.

Sitesafe obtained information used in this Site Compliance Report from sources that Sitesafe considers reliable and believes them to be true and correct. Sitesafe does not assume any responsibility for the accuracy of such items that were furnished by other parties. When conflicts in information occur between data provided by a second party and physical data collected by Sitesafe, the physical data will be used.

25 Appendix B – Assumptions and Definitions

25.1 General Model Assumptions

In this site compliance report, it is assumed that all antennas are operating at **full power at all times**. Software modeling was performed for all transmitting antennas located on the site. Sitesafe has further assumed a 100% duty cycle and maximum radiated power.

The site has been modeled with these assumptions to show the maximum RF energy density. Sitesafe believes this to be a worst-case analysis, based on best available data. Areas modeled to predict emissions greater than 100% of the applicable MPE level may not actually occur, but are shown as a worst-case prediction that could be realized real time. Sitesafe believes these areas to be safe for entry by occupationally trained personnel utilizing appropriate personal protective equipment (in most cases, a personal monitor).

Thus, at any time, if power density measurements were made, we believe the real-time measurements would indicate levels below those depicted in the RF emission diagram(s) in this report. By modeling in this way, Sitesafe has conservatively shown exclusion areas – areas that should not be entered without the use of a personal monitor, carriers reducing power, or performing real-time measurements to indicate real-time exposure levels.

25.2 Use of Generic Antennas

For the purposes of this report, the use of “Generic” as an antenna model, or “Unknown” for an operator means the information about a carrier, their FCC license and/or antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use our industry specific knowledge of equipment, antenna models, and transmit power to model the site. If more specific information can be obtained for the unknown measurement criteria, Sitesafe recommends remodeling of the site utilizing the more complete and accurate data. Information about similar facilities is used when the service is identified and associated with a particular antenna. If no information is available regarding the transmitting service associated with an unidentified antenna, using the antenna manufacturer’s published data regarding the antenna’s physical characteristics makes more conservative assumptions.

Where the frequency is unknown, Sitesafe uses the closest frequency in the antenna’s range that corresponds to the highest Maximum Permissible Exposure (MPE), resulting in a conservative analysis.

25.3 Definitions

5% Rule – The rules adopted by the FCC specify that, in general, at multiple transmitter sites actions necessary to bring the area into compliance with the guidelines are the shared responsibility of all licensees whose transmitters produce field strengths or power density levels at the area in question in excess of 5% of the exposure limits. In other words, any wireless operator that contributes 5% or greater of the MPE limit in an area that is identified to be greater than 100% of the MPE limit is responsible taking corrective actions to bring the site into compliance.

Compliance – The determination of whether a site is safe or not with regards to Human Exposure to Radio Frequency Radiation from transmitting antennas.

Decibel (dB) – A unit for measuring power or strength of a signal.

Duty Cycle – The percent of pulse duration to the pulse period of a periodic pulse train. Also, may be a measure of the temporal transmission characteristic of an intermittently transmitting RF source such as a paging antenna by dividing average transmission duration by the average period for transmission. A duty cycle of 100% corresponds to continuous operation.

Effective (or Equivalent) Isotropic Radiated Power (EIRP) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna.

Effective Radiated Power (ERP) – In a given direction, the relative gain of a transmitting antenna with respect to the maximum directivity of a half wave dipole multiplied by the net power accepted by the antenna from the connecting transmitter.

Gain (of an antenna) – The ratio of the maximum intensity in a given direction to the maximum radiation in the same direction from an isotropic radiator. Gain is a measure of the relative efficiency of a directional antennas as compared to an omni directional antenna.

General Population/Uncontrolled Environment – Defined by the FCC, as an area where RFR exposure may occur to persons who are **unaware** of the potential for exposure and who have no control of their exposure. General Population is also referenced as General Public.

Generic Antenna – For the purposes of this report, the use of "Generic" as an antenna model means the antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use our industry specific knowledge of antenna models to select a worst case scenario antenna to model the site.

Isotropic Antenna – An antenna that is completely non-directional. In other words, an antenna that radiates energy equally in all directions.

Maximum Measurement – This measurement represents the single largest measurement recorded when performing a spatial average measurement.

Maximum Permissible Exposure (MPE) – The rms and peak electric and magnetic field strength, their squares, or the plane-wave equivalent power densities associated with these fields to which a person may be exposed without harmful effect and with acceptable safety factor.



Occupational/Controlled Environment – Defined by the FCC, as an area where Radio Frequency Radiation (RFR) exposure may occur to persons who are **aware** of the potential for exposure as a condition of employment or specific activity and can exercise control over their exposure.

OET Bulletin 65 – Technical guideline developed by the FCC's Office of Engineering and Technology to determine the impact of Radio Frequency radiation on Humans. The guideline was published in August 1997.

OSHA (Occupational Safety and Health Administration) – Under the Occupational Safety and Health Act of 1970, employers are responsible for providing a safe and healthy workplace for their employees. OSHA's role is to promote the safety and health of America's working men and women by setting and enforcing standards; providing training, outreach and education; establishing partnerships; and encouraging continual process improvement in workplace safety and health. For more information, visit www.osha.gov.

Radio Frequency Radiation – Electromagnetic waves that are propagated from antennas through space.

Spatial Average Measurement – A technique used to average a minimum of ten (10) measurements taken in a ten (10) second interval from zero (0) to six (6) feet. This measurement is intended to model the average energy an average sized human body will absorb while present in an electromagnetic field of energy.

Transmitter Power Output (TPO) – The radio frequency output power of a transmitter's final radio frequency stage as measured at the output terminal while connected to a load.

26 Appendix C – Rules & Regulations

26.1 Explanation of Applicable Rules and Regulations

The FCC has set forth guidelines in OET Bulletin 65 for human exposure to radio frequency electromagnetic fields. Specific regulations regarding this topic are listed in Part 1, Subpart I, of Title 47 in the Code of Federal Regulations. Currently, there are two different levels of MPE - General Public MPE and Occupational MPE. An individual classified as Occupational can be defined as an individual who has received appropriate RF training and meets the conditions outlined below. General Public is defined as anyone who does not meet the conditions of being Occupational. FCC and OSHA Rules and Regulations define compliance in terms of total exposure to total RF energy, regardless of location of or proximity to the sources of energy.

It is the responsibility of all licensees to ensure these guidelines are maintained at all times. It is the ongoing responsibility of all licensees composing the site to maintain ongoing compliance with FCC rules and regulations. Individual licensees that contribute less than 5% MPE to any total area out of compliance are not responsible for corrective actions.

OSHA has adopted and enforces the FCC's exposure guidelines. A building owner or site manager can use this report as part of an overall RF Health and Safety Policy. It is important for building owners/site managers to identify areas in excess of the General Population MPE and ensure that only persons qualified as Occupational are granted access to those areas.

26.2 Occupational Environment Explained

The FCC definition of Occupational exposure limits apply to persons who:

- are exposed to RF energy as a consequence of their employment;
- have been made aware of the possibility of exposure; and
- can exercise control over their exposure.

OSHA guidelines go further to state that persons must complete RF Safety Awareness training and must be trained in the use of appropriate personal protective equipment.

In order to consider this site an Occupational Environment, the site must be controlled to prevent access by any individuals classified as the General Public. Compliance is also maintained when any non-occupational individuals (the General Public) are prevented from accessing areas indicated as Red or Yellow in the attached RF Emissions diagram. In addition, a person must be aware of the RF environment into which they are entering. This can be accomplished by an RF Safety Awareness class, and by appropriate written documentation such as this Site Compliance Report.

All Marin Emergency Radio Authority employees who require access to this site must complete RF Safety Awareness training and must be trained in the use of appropriate personal protective equipment.

27 Appendix D – General Safety Recommendations

The following are *general recommendations* appropriate for any site with accessible areas in excess of 100% General Public MPE. These recommendations are not specific to this site. These are safety recommendations appropriate for typical site management, building management, and other tenant operations.

1. All individuals needing access to the main site (or the area indicated to be in excess of General Public MPE) should wear a personal RF Exposure monitor, successfully complete proper RF Safety Awareness training, and have and be trained in the use of appropriate personal protective equipment.
2. All individuals needing access to the main site should be instructed to read and obey all posted placards and signs.
3. The site should be routinely inspected and this or similar report updated with the addition of any antennas or upon any changes to the RF environment including:
 - adding new antennas that may have been located on the site
 - removing of any existing antennas
 - changes in the radiating power or number of RF emitters
4. Post the appropriate **NOTICE**, **CAUTION**, or **WARNING** sign at the main site access point(s) and other locations as required. Note: Please refer to RF Exposure Diagrams in Section 5, to inform everyone who has access to this site that beyond posted signs there may be levels in excess of the limits prescribed by the FCC. In addition to RF Advisory Signage, a RF Guideline Signage is recommended to be posted at the main site access point(s). The signs below are examples of signs meeting FCC guidelines.



5. Ensure that the site door remains locked (or appropriately controlled) to deny access to the general public if deemed as policy by the building/site owner.
6. For a General Public environment the five color levels identified in this analysis can be interpreted in the following manner:
 - Gray represents area at below 5% of the General Public MPE limits or below. This level is safe for the General Public to be in for any amount of time.



- Green represents areas predicted to be between 5% and 100% of the General Public MPE limits. This level is safe for the General Public to be in for any amount of time.
- Blue represents areas predicted to be between 100% and 500% of the General Public MPE limits. This level is not safe for the General Public to be in.
- Yellow represents areas predicted to be between 500% and 5000% of the General Public MPE limits. This level is not safe for the General Public to be in.
- Red areas indicated predicted levels greater than 5000% of the General Public MPE limits. This level is not safe for the General Public to be in.

7. For an Occupational environment the five color levels identified in this analysis can be interpreted in the following manner:

- Areas indicated as Gray are at 5% of the Occupational MPE limits or below. This level is safe for a worker to be in at any time.
- Green represents areas predicted to be between 5% and 20% of the Occupational MPE limits. This level is safe for a worker to be in at any time.
- Blue represents areas predicted to be between 20% and 100% of the Occupational MPE limits. This level is safe for a worker to be in at any time.
- Yellow represents areas predicted to be between 100% and 500% of the Occupational MPE limits. Only individuals that have been properly trained in RF Health and Safety should be allowed to work in this area. This is not an area that is suitable for the General Public to be in.
- Red areas indicated predicted levels greater than 500% of the Occupational MPE limits. This level is not safe for the Occupational worker to be in for prolonged periods of time. Special procedures must be adhered to such as lock out tag out procedures to minimize the workers exposure to EME.

8. Use of a Personal Protective Monitor: When working around antennas, Sitesafe strongly recommends the use of a Personal Protective Monitor (PPM). Properly wearing a PPM will forewarn the individual prior to entering an RF exposure area.

Keep a copy of this report available for all persons who must access the site. They should read this report and be aware of the potential hazards with regards to RF and MPE limits.

27.1 Safety Plan and Procedures

The following items are general safety recommendations that should be administered on a site by site basis as needed by the carrier.

General Maintenance Work: Any maintenance personnel required to work immediately in front of antennas and / or in areas indicated as above 100% of the Occupational MPE limits should coordinate with the wireless operators to disable transmitters during their work activities.

Training and Qualification Verification: All personnel accessing areas indicated as exceeding the General Population MPE limits should have a basic understanding of EME awareness and RF Safety procedures when working around transmitting antennas. Awareness training increases a workers understanding to potential RF exposure scenarios. Awareness can be achieved in a number of ways (e.g. videos, formal classroom lecture or internet based courses).



Physical Access Control: Access restrictions to transmitting antennas locations is the primary element in a site safety plan. Examples of access restrictions are as follows:

- Locked door or gate
- Alarmed door
- Locked ladder access
- Restrictive Barrier at antenna (e.g. Chain link with posted RF Sign)

RF Signage: Everyone should obey all posted signs at all times. RF signs play an important role in properly warning a worker prior to entering into a potential RF Exposure area.

Assume all antennas are active: Due to the nature of telecommunications transmissions, an antenna transmits intermittently. Always assume an antenna is transmitting. Never stop in front of an antenna. If you have to pass by an antenna, move through as quickly and safely as possible thereby reducing any exposure to a minimum.

Maintain a 3 foot clearance from all antennas: There is a direct correlation between the strength of an EME field and the distance from the transmitting antenna. The further away from an antenna, the lower the corresponding EME field is.

Site RF Emissions Diagram: Section 5 of this report contains an RF Diagram that outlines various theoretical Maximum Permissible Exposure (MPE) areas at the site. The modeling is a worst case scenario assuming a duty cycle of 100% for each transmitting antenna at full power. This analysis is based on one of two access control criteria: General Public criteria means the access to the site is uncontrolled and anyone can gain access. Occupational criteria means the access is restricted and only properly trained individuals can gain access to the antenna locations.

27.1.1 Additional Information

Additional RF information is available by visiting both www.Sitesafe.com and www.fcc.gov/oet/rfsafety. OSHA has additional information available at: <http://www.osha-slc.gov/SLTC/radiofrequencyradiation>.