From:	Paul Albritton
To:	Alvarez, Eddie; Stapp, Mark; MacDonald, Dianna; Fleming, Victoria; Rogers, Chris; Okrepkie, Jeff; Rogers, Natalie
Cc:	_CityCouncilListPublic; Stricker, Teresa; Crocker, Ashle; Marko, Kathryn; Jones, Jessica; Murray, Susie; Hartman, Suzanne; Pinto, Yvonne M
Subject:	[EXTERNAL] Verizon Wireless Response to Appeal, CUP23-043, 244 Colgan Ave. – City Council Agenda March 26 [Yolanda]
Date:	Monday, March 18, 2024 1:10:51 PM
Attachments:	Verizon Wireless Letter 03.18.24.pdf

Dear Council Members, attached please find our letter prepared on behalf of Verizon Wireless responding to an appeal of the conditional use permit for a proposed wireless facility approved by the Planning Commission. The appeal will be heard at your March 26 meeting.

The Design Review Board's approval was not appealed.

If you would like an individual site visit, or have any questions, please contact Verizon Wireless representative Yvonne Pinto at Yvonne.Pinto@verizonwireless.com, (916) 990-7308, or simply reply to this email.

Thank you.

Paul Albritton
Mackenzie & Albritton, LLP
155 Sansome Street, Suite 800
San Francisco, California 94104
(415) 288-4000
pa@mallp.com

MACKENZIE & ALBRITTON LLP
155 SANSOME STREET, SUITE 800
SAN FRANCISCO, CALIFORNIA 94104

TELEPHONE 415 / 288-4000
FACSIMILE 415 / 288-4010

March 18, 2024

VIA EMAIL

Mayor Natalie Rogers
Vice Mayor Mark Stapp
Council Members Eddie Alvarez,
Dianna MacDonald, Victoria Fleming,
Chris Rogers, and Jeff Okrepkie
City Council
City of Santa Rosa
100 Santa Rosa Avenue
Santa Rosa, California 95404

Re: Verizon Wireless Response to Appeal of Conditional Use Permit
Telecommunications Facility, 244 Colgan Avenue, CUP23-043
City Council Agenda, March 26, 2024

Dear Mayor Rogers, Vice Mayor Stapp, and Council Members:

We write on behalf of Verizon Wireless to ask that you uphold the Planning Commission's approval of a conditional use permit for proposed wireless facility in southeast Santa Rosa (the "Approved Facility"). Located at the rear of an industrially-zoned parcel, next to a large shopping center and over 300 feet from homes, the Approved Facility will increase Verizon Wireless's network capacity to meet rapidly-escalating demand in the area. The Approved Facility satisfies all requirements of the Santa Rosa Code of Ordinances (the "Code"), including the findings for a conditional use permit. The Design Review Board approved a monopole design for the Approved Facility, and its decision was not appealed (DR23-023).

The appeal of the conditional use permit filed by Paul-Andre Schabracq *et al.* ("Appellants") raises numerous irrelevant topics and does not uncover any contradictions with the Code. Accordingly, Appellants have not presented any substantial evidence to warrant denial of the Approved Facility, as required by the federal Telecommunications Act. Further, denial of the Approved Facility would constitute a prohibition of service in violation of the Telecommunications Act, according to both established federal case law and Federal Communications Commission ("FCC") regulations. We urge you to reject the appeal and approve the Approved Facility.

I. The Approved Facility

The Approved Facility has been thoughtfully designed to minimize any impact to the surrounding area. As approved by the Design Review Board, Verizon Wireless will place its antennas on a 69-foot slimline monopole. The monopole will be installed within a 900-square foot lease area, secure within a chain link fence topped with barbed wire totaling 7 feet 2 inches in height. The lease area will also contain network cabinets and a backup generator to provide continued service during power outages and emergencies. There will be space on the tower for future collocation of antennas by another wireless carrier. The Approved Facility will be placed at the rear of a 1.45-acre parcel, behind a warehouse building. New utilities will be routed underground to the closest utility pole along Colgan Avenue.

Photosimulations of the Approved Facility are attached as Exhibit A. The radio frequency ("RF") exposure reports prepared by an independent consulting engineering firm, Waterford Consultants, attached as Exhibit B, confirm that the Approved Facility will operate well below FCC radio frequency exposure limits.

II. The Approved Facility Satisfies All Requirements for Approval.

As confirmed by the Planning Commission, the Approved Facility satisfies all Code requirements. The facility will be located in an IL–Light Industrial zone, placed on the rear half of the parcel as required. Code § 20-44.060(F)(3). In fact, the Approved Facility will be located next to the rear property line, with a 5-foot setback, and adjacent to the rear of the Costco parcel, which is in a CG–General Commercial zone. The Approved Facility will be located well over 75 feet from any off-site habitable structures, with the closest residence over 300 feet north. Code § 20-44.060(F)(19). The monopole height of 69 feet is "the minimum height necessary without compromising reasonable reception or transmission," and is required for adequate service coverage while providing sufficient vertical space for future collocation of antennas by another carrier, as required. Code §§ 20-44.030(G), 20-44.060(G)(3).

The Approved Facility also satisfies the findings for a conditional use permit. Code § 20-52.050(F). Of note, its design, location, size, and operating characteristics will be compatible with existing and future land uses in the vicinity, which include light industrial uses to the north and a major shopping center to the south. Located in the undeveloped rear corner of the property, the Approved Facility will have a small footprint of 900 square feet, occupying only 1.5 percent of the 1.45-acre parcel. There is already a suitable access route leading across the property to the Approved Facility, and new power and fiberoptic conduit will be routed underneath, connecting to the closest utility pole. Therefore, the site is physically suitable for the type, density, and intensity of the use being proposed.

Additionally, the Approved Facility will not constitute a nuisance nor be detrimental to public interest, health, safety, convenience, or welfare, as it will comply with the FCC's radio frequency exposure guidelines and City noise regulations. In fact,

the Approved Facility will provide an important public benefit through improved wireless connectivity for local business customers, workers, residents, and emergency personnel.

In sum, the Approved Facility satisfies all City requirements for approval.

III. The Appeal Does Not Raise Any Substantial Evidence to Support Denial.

Denial of a wireless facility application must be based on substantial evidence. 47 U.S.C. §332(c)(7)(B)(iii). As interpreted by federal courts, this means that a local government's decision to deny a wireless facility application must be based on requirements set forth in the local code and supported by evidence in the record. *See Metro PCS, Inc. v. City and County of San Francisco,* 400 F.3d 715, 725 (9th Cir. 2005) (denial of application must be "authorized by applicable local regulations and supported by a reasonable amount of evidence.")

Appellants' claims are either irrelevant to Code requirements, or do not provide substantial evidence of any contradiction of the Code. We respond to Appellants' claims as follows.

A. The Approved Facility Complies with the City's Code and General Plan.

As described above, the Approved Facility satisfies the findings for a conditional use permit and complies with the Code standards for telecommunications facilities. Notably, the Approved Facility will be located on the rear half of the subject property, adjacent to the rear property line outside setbacks, and well over 75 feet from off-site habitable structures, with the closest residence over 300 feet north. Code §§ 20-44.060(F)(3), (19).

Appellants cite the Zoning Code's purpose clauses, but those do not serve as standards or findings for approval, and instead express the intent of the Zoning Code. Code Chapter 20-10. As to Chapter 20-30, *Standards for All Development and Land Uses,* the Approved Facility will be located over 150 feet from any above-ground creek, the barbed wire fence is allowed in an industrial area, and LED lights will be hooded and directed downward. Code §§ 20-30.040, 20-30.060(G), 20-30.080. The facility will be set back five feet from the rear and side property lines, consistent with IL–Light Industrial Zone standards. Code §§ 20-30.110, 20-24.040. The height of wireless facilities is regulated by Code Chapter 20-44, requiring the minimum height necessary for adequate coverage while providing space for collocation of additional antennas. Code §§ 20-44.030(G), 20-44.060(G)(3).

The Approved Facility is also consistent with the *Santa Rosa General Plan 2035* land use designation of Light Industry, and it will not impact manufacturing or heavy commercial uses. By enhancing communications for nearby business customers, workers,

residents, and emergency personnel, the Approved Facility will promote livability, economic vitality, and public safety. *See, e.g.,* General Plan Goal EV-D.

Appellants do not uncover any contradiction with the Code or General Plan, so these grounds for appeal must be dismissed.

B. The Approved Facility Will Not Impact Local Waterways, and It Is Exempt from the California Environmental Quality Act.

Appellants vaguely claim that the Approved Facility will pose an "environmental threat," mentioning several local waterways without describing any particular impact. With a footprint of only 900 square feet, the Approved Facility will be located on a previously-disturbed area of the property used for parking, over 150 feet from any above-ground stretch of a creek. The Design Review Board approved a monopole with no faux foliage, and the Approved Facility will not be connected to a water supply nor produce any wastewater. The proposed emergency generator will include a double-walled fuel tank that complies with the UL-142 standard for above-ground liquid fuel storage, as required by the National Fire Protection Association. With no new source of water runoff or waste discharge, the Approved Facility will not pose an impact to surface water quality.

With respect to the California Environmental Quality Act ("CEQA"), the Planning Commission determined that the Approved Facility qualifies for the Class 3 categorical exemption for "construction and location of limited numbers of new, small facilities or structures." 14 Cal. Code Regs. § 15303. State courts have upheld the Class 3 exemption for a wide variety of wireless facilities. *See Don't Cell Our Parks v. City of San Diego* (2018) 21 Cal.App.5th 338 (faux tree telecommunications pole in public park); *Aptos Residents Ass'n v. County of Santa Cruz* (2018) 20 Cal.App.5th 1039 (10 microcell transmitter units on existing utility poles); *Robinson v. City and County of San Francisco* (2012) 208 Cal.App.4th 950 (40 wireless equipment cabinets on existing utility poles). None of the potential exceptions to the Class 3 exemption apply because there is no risk of significant environmental impacts due to unusual circumstances. 14 Cal. Code Regs. § 15300.2(c).

The Planning Commission also determined that the Approved Facility is eligible for a streamlining measure as it is consistent with *General Plan 2035*, for which an Environmental Impact Report was certified by the City Council in 2009. 14 Cal. Code Regs. § 15183.

Appellant's vague claim of environmental impact has no merit and must be rejected.

C. The Approved Facility Will Comply with the FCC's Radio Frequency Exposure Guidelines.

Pursuant to the federal Telecommunications Act, the City cannot consider the environmental effects of radio frequency emissions in its decision because the Approved

Facility will comply with the FCC's exposure guidelines. 47 U.S.C. § 332(c)(7)(B)(iv). The independent reports prepared by Waterford Consultants, attached as Exhibit B, confirm that the maximum radio frequency exposure at ground level from the Approved Facility will be only 11.79 percent – or over eight times below – the FCC's public exposure limit. The maximum exposure at any nearby commercial rooftop will be 93.02 percent of the FCC's public exposure limit.

Appellants questioned the Waterford Consultants reports, specifically a measure that will ensure compliance with the FCC's radio frequency exposure guidelines. The *Radio Frequency Exposure FCC Compliance Assessment,* included in Exhibit B, determined that an engineering control is required to ensure compliance with the FCC's exposure limits on the roofs of nearby 30-foot buildings to the north and south: a 3 dB power reduction (loss) for the C-Band radios/antennas in the alpha (north-facing) and gamma (south-facing) sectors. This is a customary mitigation to achieve compliance. Upon activation of the facility, the radios are set to the power indicated by the independent consultant's radio frequency exposure report. This parameter is reviewed by both Verizon Wireless's network operations team and the system performance team. The radio frequency engineering team also performs regular audits to confirm compliance.

With this mitigation measure, the Approved Facility will fully comply with the FCC's radio frequency exposure guidelines, as detailed by the Waterford Consultants report. Pursuant to federal law, the Council cannot consider radio frequency emissions when rendering a decision. 47 U.S.C. § 332(c)(7)(B)(iv). This ground for appeal does not raise any non-compliance with FCC or City standards and must be dismissed.

D. Property Values Are Not a Decision Factor.

Appellants speculate that the Approved Facility would result in decreased property values in the vicinity, but that is not a factor of the Code's findings for a conditional use permit. Moreover, federal law bars efforts to circumvent preemption of RF emissions concerns through proxy concerns such as property values. *See, e.g., AT&T Wireless Servs. of Cal. LLC v. City of Carlsbad,* 308 F. Supp. 2d 1148, 1159 (S.D. Cal. 2003) ("Thus, direct or indirect concerns over the health effects of RF emissions may not serve as substantial evidence to support the denial of an application"); *Calif. RSA No. 4, d/b/a Verizon Wireless v. Madera County,* 332 F. Supp. 2d 1291, 1311 (E.D. Cal. 2003). This irrelevant ground for appeal must be rejected.

E. The Approved Facility Will Pose Minimal Aesthetic Impact.

Contrary to Appellants' claim, the Approved Facility will not cause a substantial adverse aesthetic impact. Appellants allege an impact to the "aesthetics and character" of surroundings, but those vague criteria are not factors of the Code's use permit findings. Such generalized concerns or opinions about aesthetics or compatibility with a neighborhood do not constitute substantial evidence upon which a local government can deny a wireless facility permit. *See City of Rancho Palos Verdes v. Abrams*, 101 Cal. App. 4th 367, 381 (2002).

As described above, the Approved Facility has been carefully located and designed to minimize any aesthetic impact, with a height of 69 feet, similar to evergreen trees and utility poles in the vicinity, and a footprint of only 900 square feet. As to location, the Approved Facility will be installed in a light industrial zone behind the site of an automotive repair shop. The facility will be surrounded by industrial and commercial development in all four directions. The closest residential neighborhood is over 300 feet north, separated from the subject property by Colgan Avenue. Appellants overstate any aesthetic impact to surroundings, and this ground for appeal must be dismissed.

F. Hypothetical Future Changes to the Facility Are Beyond the Scope of the Present Application.

Appellants assume that there will be a future height increase with no zoning approval. However, the project plans confirm that there will be vertical space on the tower underneath Verizon Wireless's antennas available for future collocation by another carrier, as encouraged by the Code, so a height increase would be unnecessary. Code § 20-44.060(G)(3). Appellants wrongly claim that a future change would not require zoning review. The Zoning Code requires approval of minor design review for a wireless facility modification application filed pursuant to Section 6409 of the federal *Middle Class Tax Relief and Job Creation Act of 2012,* providing Planning Division staff with an opportunity to confirm that there is no "substantial change." Code § 20-44.060(D). Speculation over future modifications is beyond the scope of the present use permit application, and unrelated to the findings for a conditional use permit. This irrelevant ground for appeal must be rejected.

G. Structural and Fire Safety Will Be Evaluated During the Building Permit Application Process.

In another irrelevant claim, Appellants worry that the Approved Facility could fall onto the Costco building on the property to the south. The structural integrity of the monopole and its foundation will be confirmed by Building Division staff before issuance of a building permit, with compliance confirmed by inspections during construction. Similarly, the Fire Department can evaluate the building permit application to confirm compliance with the 2022 California Fire Code. The project plans have been prepared in compliance with the Fire Code, the 2022 California Building Code, and the 2022 California Electrical Code, all cited on plans Sheet T-1.1. The plans were prepared in compliance with applicable structural design standards for seismic and wind loads. 2022 California Building Code §§ 1609, 1613. These safety codes are not decision factors for the zoning application, and the Building Division will confirm compliance with all relevant building, fire, and electrical codes. Appellants again raise an irrelevant topic, and these grounds for appeal must be dismissed.

H. The Approved Facility Will Not Result in Proliferation of Wireless Facilities.

Appellants raise concern over proliferation of wireless facilities. The Code encourages co-location of wireless facilities, where possible, to minimize the number of facilities. Code § 20-44.060(G)(3). Verizon Wireless determined that there are no existing wireless facilities nearby where collocation could meet its service objective, and therefore a new facility is required to meet rapidly increasing demand in the area. This ground for appeal uncovers no non-compliance with the Code and must be dismissed.

I. The Code Does Not Require Demonstration of the Need for a New Wireless Facility or Information Regarding a Service Gap.

Appellants repeatedly allege that the Approved Facility would not close any service or capacity gaps, and that Verizon Wireless has not provided evidence of a gap. However, such evidence is irrelevant. The Code's permit findings and telecommunications standards do not require demonstration of a gap in service, a lack of capacity, or the need for a new wireless facility. These concepts are therefore inapplicable to the City's decision. Regardless, Verizon Wireless has demonstrated a significant gap in service in this case.

The service gap, capacity, dropped call, and drive test data referenced by Appellants are concepts drawn from federal court decisions, but those apply only if a wireless facility is denied, and an applicant files a lawsuit against a city claiming a prohibition of service in violation of the federal Telecommunications Act. *See* 47 U.S.C. § 332(c)(7)(B)(i)(II); *see also American Tower Corp. v. City of San Diego,* 763 F.3d 1035, 1056 (9th Cir. 2014). Among other submittals, Verizon Wireless provides an RF engineer's justification statement describing the significant gap in network capacity in southeast Santa Rosa, attached as Exhibit C, in order to inform the Council that denial of the Approved Facility would constitute a prohibition of service, as discussed below.

Lastly, Appellants charge that Verizon Wireless has not investigated the "least intrusive" locations—another federal case law concept. The Alternatives Analysis attached as Exhibit D describes the site selection process and confirms that the Approved Facility is the least intrusive feasible alternative, based on Code requirements.

In sum, Appellants raise no evidence—let alone the substantial evidence required by federal law—to warrant denial of the Approved Facility. In contrast, Verizon Wireless has supplied ample evidence to support approval of a conditional use permit. The Council should dismiss the appeal and approve the facility.

IV. <u>Denial Would Constitute an Unlawful Prohibition of Service.</u>

The Telecommunication Act provides that local government regulation of wireless facilities "shall not prohibit or have the effect of prohibiting" the provision of personal wireless service. 47 U.S.C. § 332(c)(7)(B)(i)(II). Under long-established Ninth Circuit

case law, a local government's denial of a wireless facility permit violates the "effective prohibition" clause of the act if a wireless provider can show (1) that it has a "significant gap" in service, and (2) that a facility is the "least intrusive means," in relation to the land use values embodied in local regulations, to address the gap. *See T-Mobile USA, Inc. v. City of Anacortes,* 572 F.3d 987 (9th Cir. 2009). If a provider proves both elements, the local government *must* approve the facility, even if there is substantial evidence to deny the permit under local regulations (which there is not). This is because federal law preempts local regulations when denial of the permit would effectively prohibit the provision of personal wireless services. *Id.,* 572 F.3d at 999.

As confirmed in the *Statement of Verizon Wireless Radio Frequency Design Engineer Pablo Sanchez* attached as Exhibit C, Verizon Wireless has identified a significant gap in network capacity in the southeast Santa Rosa area. The existing Verizon Wireless facilities in the greater area cannot meet rapidly-increasing demand generated by the adjacent Santa Rosa Marketplace shopping center, the Santa Rosa Avenue business corridor, developing residential areas in the vicinity, and high-traffic roadways such as Highway 101 and Santa Rosa Avenue.

The *Alternatives Analysis* attached as Exhibit D reviews 14 alternatives and confirms that the Approved Facility is the least intrusive, feasible means to fill the significant gap. For wireless carriers to establish a prohibition case, federal case law does not require that a proposed facility be the "only" alternative, but rather that no feasible alternative is less intrusive based on local regulations. *See Metro PCS, Inc. v. San Francisco,* 400 F.3d at 734-35. To avoid federal preemption, the City would need to show that another alternative is available, technologically feasible, and less intrusive than the Approved Facility, then provide Verizon Wireless an opportunity to review that alternative. *T-Mobile v. Anacortes*, 572 F.3d at 998-999.

In a 2018 order, the FCC determined that the Ninth Circuit's two-part test is too narrow and confirmed that a wireless carrier need not show an insurmountable barrier, or even a significant gap, to prove a prohibition of service. *See Accelerating Wireless Broadband Deployment by Removing Barriers to Infrastructure Investment,* Declaratory Ruling and Third Report and Order, 33 FCC Rcd. 9088, ¶¶ 35, 38 (September 27, 2018). Instead, "a state or local legal requirement constitutes an effective prohibition if it 'materially limits or inhibits the ability of any competitor or potential competitor to compete in a fair and balanced legal and regulatory environment.'" *Id.*, ¶ 35. State or local regulations are preempted if they materially inhibit "densifying a wireless network, introducing new services, or otherwise improving service capabilities." *Id.,* ¶ 37. The FCC determined that the coverage gap approach is incompatible where new wireless facilities are installed to add network capacity. *Id.,* ¶ 40.

In adopting and applying the FCC's "materially inhibit" standard to a monopole facility, a federal appeals court recently confirmed, "not only does 'insufficiency in coverage' ordinarily entitle a provider to a variance but so does insufficiency in network capacity, 5G services, or new technology." *Cellco Partnership v. White Deer Township Zoning Hearing Board*, 74 F.4th 96, 106 (3rd Cir. 2023).

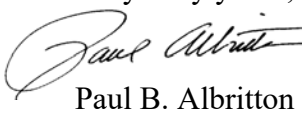
Because Verizon Wireless has satisfied the two-part test to prove a prohibition of service, it has necessarily met the more flexible standard set forth in the FCC's order. The evidence proves at a minimum that the Approved Facility will improve service in the area, densify the network with another facility, and add network capacity. Thus, denial of the application would "materially inhibit" Verizon Wireless's ability to compete in a fair and balanced legal and regulatory environment, effectively prohibiting service in violation of the Telecommunications Act.

In sum, according to both Ninth Circuit and FCC standards, Verizon Wireless has established that denial of the Approved Facility would constitute an unlawful prohibition of service.

V. Conclusion

Verizon Wireless has worked diligently to identify the ideal location and design for a new wireless facility to serve the southeast Santa Rosa area. The Approved Facility will pose minimal visual impact, and it is consistent with all City standards and the findings for a conditional use permit. It also will enhance Verizon Wireless service in the local area, benefitting business customers, workers, residents, and emergency personnel. We strongly encourage the Council to reject the appeal, and to uphold the Planning Commission's approval of the conditional use permit.

Very truly yours,



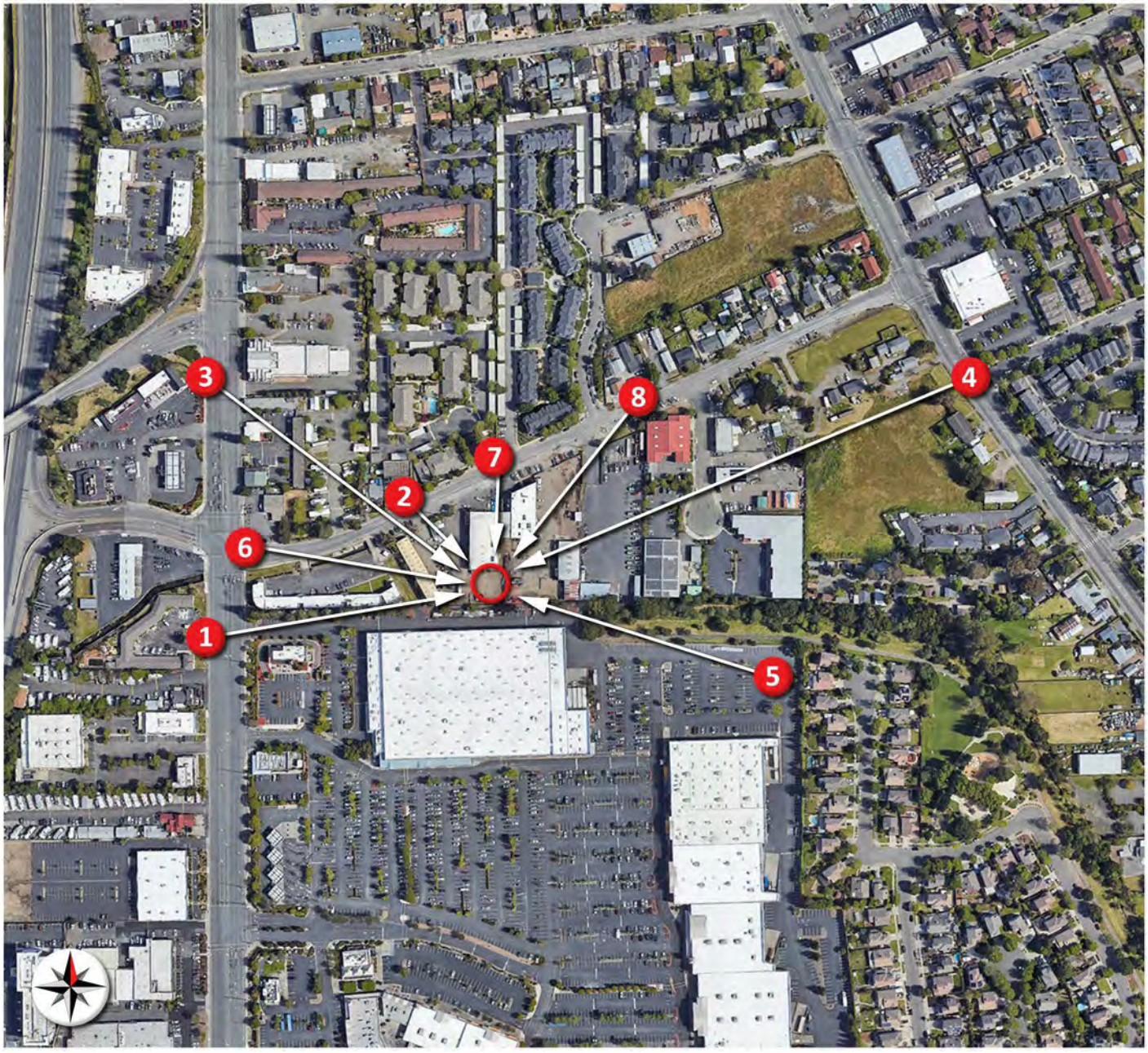
Paul B. Albritton

cc: Teresa L. Stricker, Esq.
Ashle Crocker, Esq.
Kathryn Marko, Esq
Jessica Jones
Susie Murray
Suzanne Hartman

Schedule of Exhibits

Exhibit A: Photosimulations
Exhibit B: Waterford Consultants Radio Frequency Exposure Compliance Reports
Exhibit C: Statement of Verizon Wireless Radio Frequency Design Engineer Pablo Sanchez
Exhibit D: Alternatives Analysis

Exhibit A



verizon

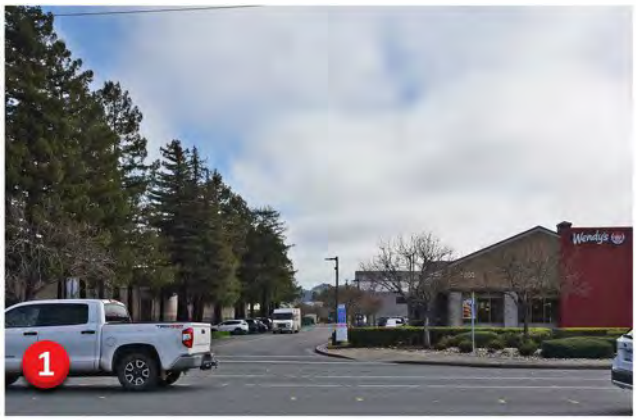
Yolanda Ave. Site #: 616927972

Aerial Map

244 Colgan Ave.
Santa Rosa, CA

2/23/24

insight photosim (707) 315-1585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verizon

Yolanda Ave. Site #: 616927972

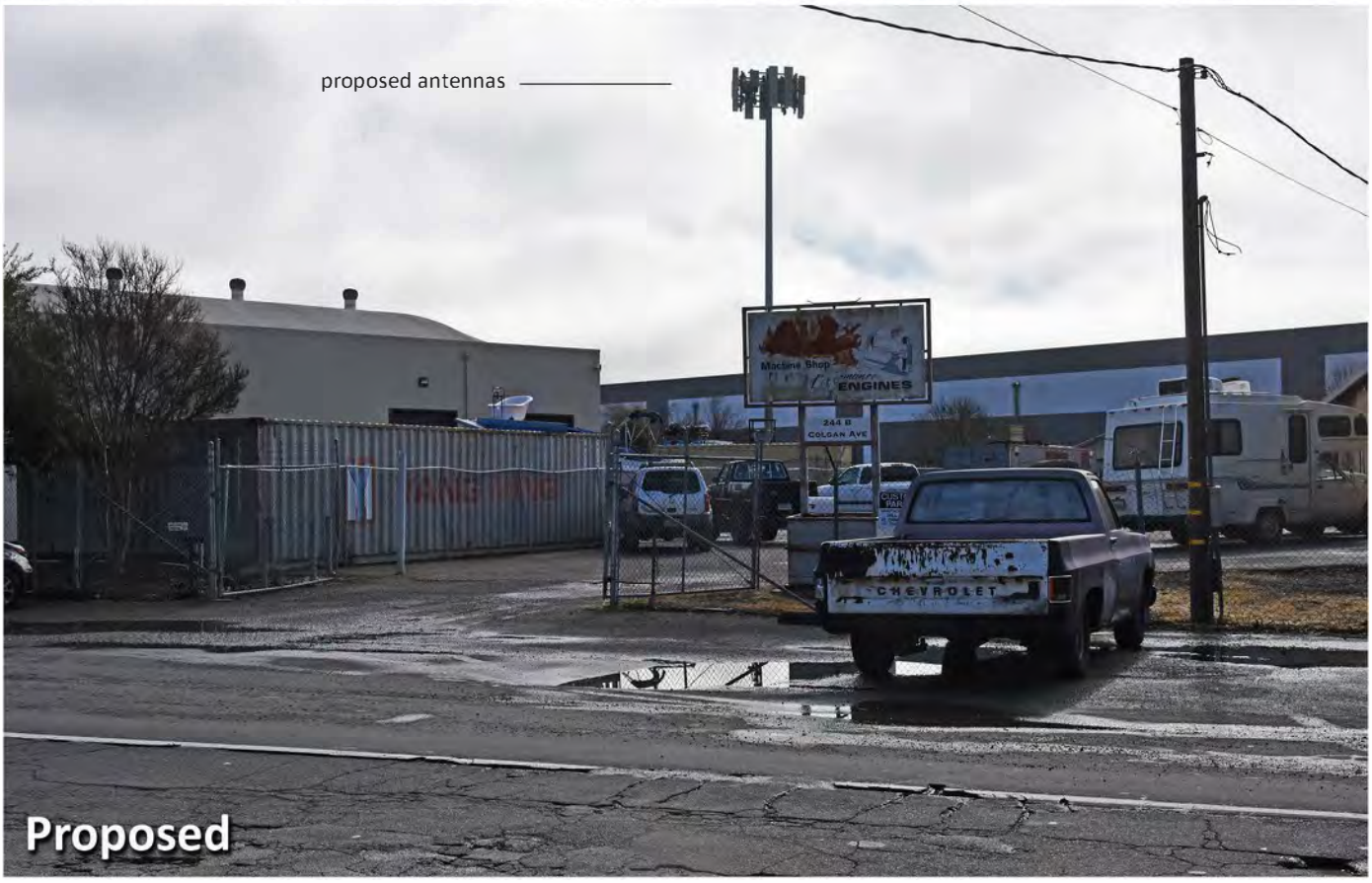
244 Colgan Ave.
Santa Rosa, CA

Looking Northeast from Santa Rosa Ave.

View #1

2/23/24

insight photosim (707) 315-1585



verizon

Yolanda Ave. Site #: 616927972

244 Colgan Ave.
Santa Rosa, CA

2/23/24

Looking Southeast from Colgan Ave.

View #2

insight photosim (707) 315-1585

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Yolanda Ave. Site #: 616927972

244 Colgan Ave.
Santa Rosa, CA

2/23/24

Looking Southeast from Santa Rosa Ave.

View #3

insight photosim (707) 315-1585

verizon

Yolanda Ave. Site #: 616927972

244 Colgan Ave.
Santa Rosa, CA

2/23/24

Looking Southwest from Petaluma Hill Rd.

View #4

insight photosim (707) 315-1585

verizon

Yolanda Ave Site #: 616927972

244 Colgan Ave.
Santa Rosa, CA

6/29/23

Looking Northwest from Costco parking lot

View #5

insight photosim (707) 315-1585

verizon

Yolando Ave. Site #: 616972927

244 Colgan Ave.
Santa Rosa, CA

Looking Southeast from Colgan Ave.

View #6

2/23/24

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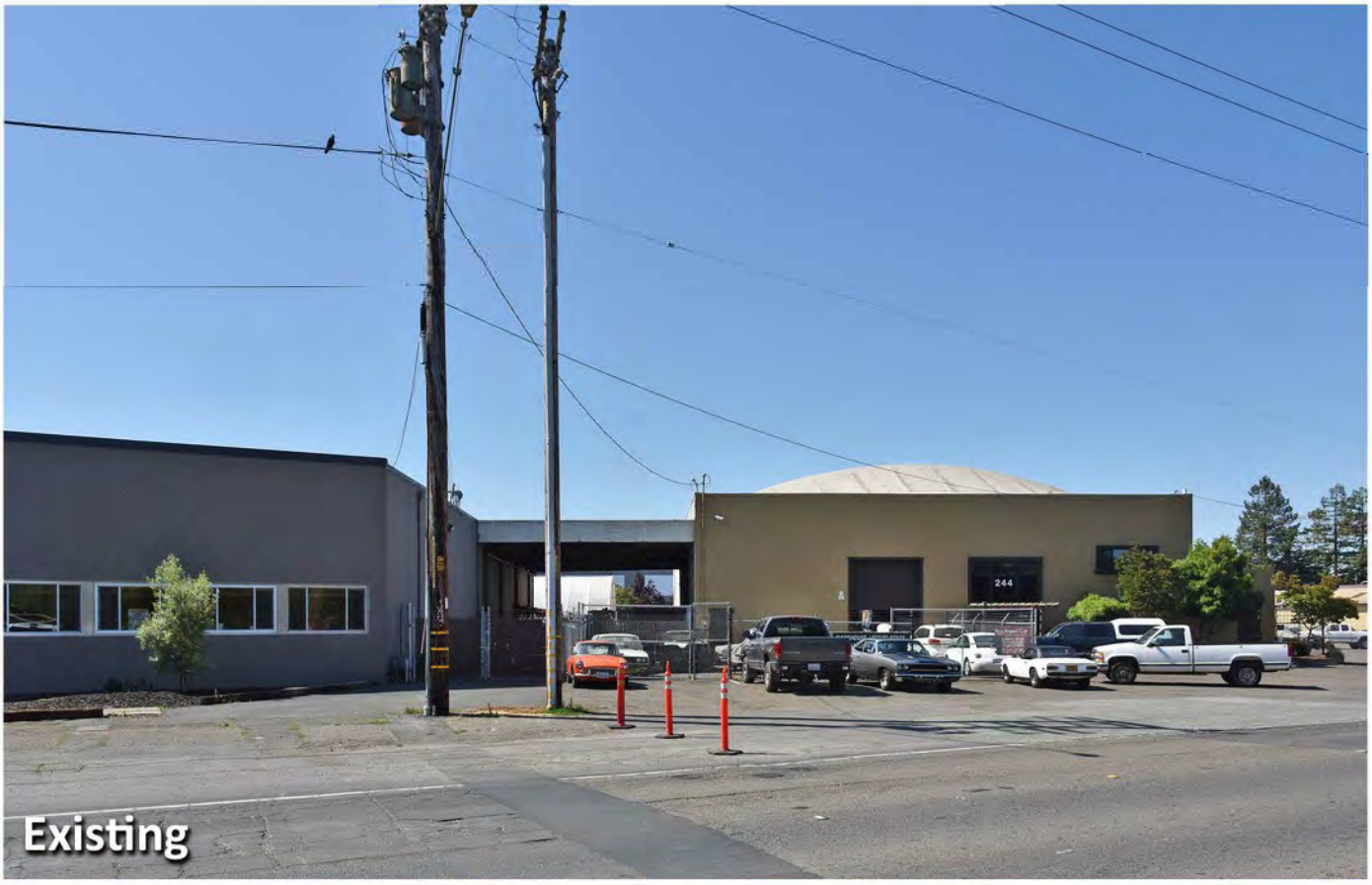

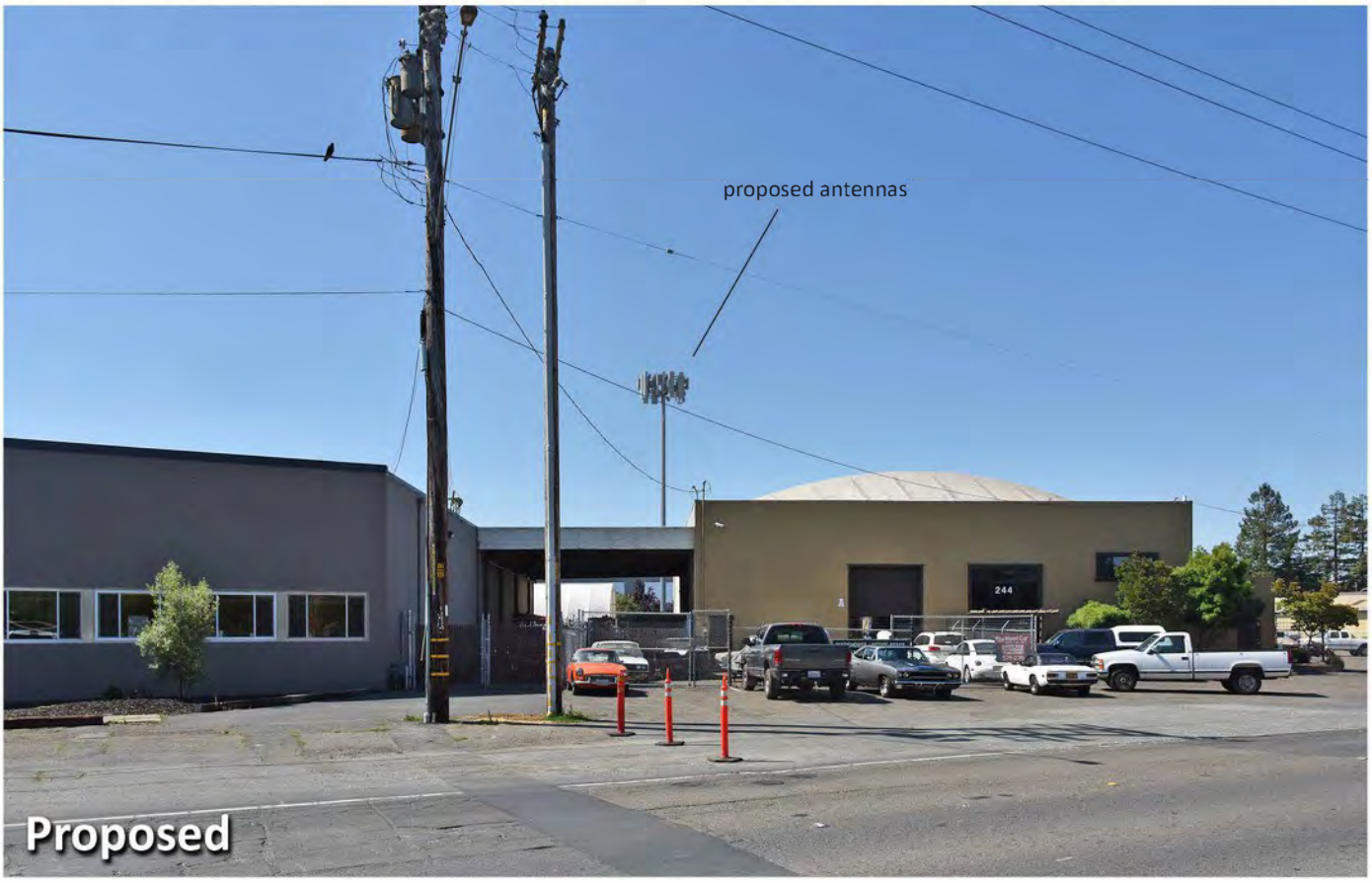

verizon

Yolando Ave. Site #: 616972927

244 Colgan Ave.
Santa Rosa, CA

Looking Southwest from Colgan Ave.

View #7

2/23/24

insight photosim (707) 315-1585

verizon

Yolando Ave. Site #: 616972927

244 Colgan Ave.
Santa Rosa, CA

Looking Southwest from Colgan Ave.

View #8

2/23/24

insight photosim (707) 315-1585

Exhibit B

WATERFORD

Radio Frequency Emissions Compliance Report for Verizon Wireless

Site Name:	**YOLANDA AVE**	**Site Structure Type:**	**Monopine**
Address:	**244 Colgan Avenue**	**Latitude:**	**38.420864**
	Santa Rosa CA, 95404	**Longitude:**	**-122.711361**
Report Date:	**May 24, 2023**	**Project:**	**New Build**

Compliance Statement

Based on information provided by Verizon Wireless and predictive modeling, the YOLANDA AVE installation proposed by Verizon Wireless will be compliant with Radiofrequency Radiation Exposure Limits of 47 C.F.R. §§ 1.1307(b)(3) and 1.1310. The proposed operation will not expose members of the General Public to hazardous levels of RF energy at ground level or in adjacent buildings. As predicted RF power densities will not exceed the FCC General Population limits, no mitigation action other than restricting access to the tower is required to achieve or maintain compliance.

Certification

I, David H. Kiser, am the reviewer and approver of this report and am fully aware of and familiar with the Rules and Regulations of both the Federal Communications Commissions (FCC) and the Occupational Safety and Health Administration (OSHA) with regard to Human Exposure to Radio Frequency Radiation, specifically in accordance with FCC's OET Bulletin 65. I have reviewed this Radio Frequency Exposure Assessment report and believe it to be both true and accurate to the best of my knowledge.

General Summary

The compliance framework is derived from the Federal Communications Commission (FCC) Rules and Regulations for preventing human exposure in excess of the applicable Maximum Permissible Exposure ("MPE") limits. At any location at this site, the power density resulting from each transmitter may be expressed as a percentage of the frequency-specific limits and added to determine if 100% of the exposure limit has been exceeded. The FCC Rules define two tiers of permissible exposure differentiated by the situation in which the exposure takes place and/or the status of the individuals who are subject to exposure. General Population / Uncontrolled exposure limits apply to those situations in which persons may not be aware of the presence of electromagnetic energy, where exposure is not employment-related, or where persons cannot exercise control over their exposure. Occupational / Controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment, have been made fully aware of the potential for exposure, and can exercise control over their exposure. Based on the criteria for these classifications, the FCC General Population limit is considered to be a level that is safe for continuous exposure time. The FCC General Population limit is 5 times more restrictive than the Occupational limits.

In situations where the predicted MPE exceeds the General Population threshold in an accessible area as a result of emissions from multiple transmitters, FCC licensees that contribute greater than 5% of the aggregate MPE share responsibility for mitigation.

7430 New Technology Way, Suite 150 Frederick, Maryland 21703 (703) 596-1022 Phone www.waterfordconsultants.com

Table 1: FCC Limits

Frequency (MHz)	*Limits for General Population/ Uncontrolled Exposure*		*Limits for Occupational/ Controlled Exposure*	
	Power Density (mW/cm^2)	**Averaging Time (minutes)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
30-300	0.2	30	1	6
300-1500	f/1500	30	f/300	6
1500-100,000	1.0	30	5.0	6

f=Frequency (MHz)

Based on the computational guidelines set forth in FCC OET Bulletin 65, Waterford Consultants, LLC has developed software to predict the overall Maximum Permissible Exposure possible at any location given the spatial orientation and operating parameters of multiple RF sources. The power density in the Far Field of an RF source is specified by OET-65 Equation 5 as follows:

$$S = \frac{EIRP}{4 \cdot \pi \cdot R^2} \ (\mathrm{mW/cm^2})$$

where EIRP is the Effective Radiated Power relative to an isotropic antenna and R is the distance between the antenna and point of study. Additionally, consideration is given to the manufacturers' horizontal and vertical antenna patterns as well as radiation reflection. At any location, the predicted power density in the Far Field is the spatial average of points within a 0 to 6-foot vertical profile that a person would occupy. Near field power density is based on OET-65 Equation 20 stated as

$$S = \left(\frac{180}{\theta_{BW}}\right) \cdot \frac{100 \cdot P_{in}}{\pi \cdot R \cdot h} \ (\mathrm{mW/cm^2})$$

where P_{in} is the power input to the antenna, θ_{BW} is the horizontal pattern beamwidth and h is the aperture length.

Some antennas employ beamforming technology where RF energy allocated to each customer device is dynamically directed toward their location. In the analysis presented herein, predicted exposure levels are based on all beams at full utilization (i.e. full power) simultaneously focused in any direction. As this condition is unlikely to occur, the actual power density levels at ground and at adjacent structures are expected to be less that the levels reported below. These theoretical results represent maximum-case predictions as all RF emitters are assumed to be operating at 100% duty cycle.

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Analysis

Verizon Wireless proposes the following installation at this location:

- INSTALL (12) (N) ANTENNAS
- INSTALL (8) (N) RADIO UNITS @ ANTENNAS

The antennas will be mounted on a 64-foot Monopine with centerlines 52.9 & 65 feet above ground level. Proposed antenna operating parameters are listed in Appendix A. Other appurtenances such as GPS antennas, RRUs and hybrid cable below the antennas are not sources of RF emissions. No other antennas are known to be operating in the vicinity of this site.

Figure 1: Antenna Locations

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Power density decreases significantly with distance from any antenna. The panel-type antennas to be employed at this site are highly directional by design and the orientation in azimuth and mounting elevation, as documented, serves to reduce the potential to exceed MPE limits at any location other than directly in front of the antennas. For accessible areas at ground level, the maximum predicted power density level resulting from all Verizon Wireless operations is 11.7934% of the FCC General Population limits. Incident at adjacent buildings depicted in Figure 1, the maximum predicted power density level resulting from all Verizon Wireless operations is 93.0289% of the FCC General Population limits. The proposed operation will not expose members of the General Public to hazardous levels of RF energy at ground level or in adjacent buildings. As predicted RF power densities will not exceed the FCC General Population limits, no mitigation action other than operating as depicted in Appendix A and restricting access to the tower is required to achieve or maintain compliance.

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Appendix A: Operating Parameters Considered in this Analysis

Antenna #:	Carrier:	Manufacturer	Pattern:	Band (MHz):	Mech Az (deg):	Mech DT (deg):	H BW (deg):	Length (ft):	TPO (W):	Channels:	Loss (dB):	Gain (dBd):	ERP (W):	EIRP (W):	Rad Center (ft):
1	Verizon	QUINTEL	QS6456-5 V3 02DT	700	0	0	49	6	60	2	0	13.05	2422	3974	65
1	Verizon	QUINTEL	QS6456-5 V3 02DT	850	0	0	46	6	60	2	0	13.05	2422	3974	65
1	Verizon	QUINTEL	QS6456-5 V3 00DT	1900	0	0	44	6	60	4	0	16.35	10356	16991	65
2	Verizon	QUINTEL	QS6456-5 V3 02DT	700	0	0	49	6	60	2	0	13.05	2422	3974	65
2	Verizon	QUINTEL	QS6456-5 V3 02DT	850	0	0	46	6	60	2	0	13.05	2422	3974	65
2	Verizon	QUINTEL	QS6456-5 V3 00DT	2100	0	0	43	6	30	4	0	16.35	5178	8495	65
2	Verizon	QUINTEL	QS6456-5 V3 00DT	2100	0	0	43	6	30	4	0	16.35	5178	8495	65
3	Verizon	ERICSSON	SON_AIR6449 NR TB 03.24.21 3700 VZW	3700	0	0	11	2.8	320	1	3	23.55	36320	59587	65
4	Verizon	QUINTEL	QS6456-5 V3 02DT	700	90	0	49	6	60	2	0	13.05	2422	3974	65
4	Verizon	QUINTEL	QS6456-5 V3 02DT	850	90	0	46	6	60	2	0	13.05	2422	3974	65
4	Verizon	QUINTEL	QS6456-5 V3 00DT	1900	90	0	44	6	60	4	0	16.35	10356	16991	65
5	Verizon	QUINTEL	QS6456-5 V3 02DT	700	90	0	49	6	60	2	0	13.05	2422	3974	65
5	Verizon	QUINTEL	QS6456-5 V3 02DT	850	90	0	46	6	60	2	0	13.05	2422	3974	65
5	Verizon	QUINTEL	QS6456-5 V3 00DT	2100	90	0	43	6	30	4	0	16.35	5178	8495	65
5	Verizon	QUINTEL	QS6456-5 V3 00DT	2100	90	0	43	6	30	4	0	16.35	5178	8495	65
6	Verizon	ERICSSON	SON_AIR6449 NR TB 03.24.21 3700 VZW	3700	90	0	11	2.8	320	1	0	23.55	72469	118891	65
7	Verizon	QUINTEL	QS6456-5 V3 02DT	700	180	0	49	6	60	2	0	13.05	2422	3974	65
7	Verizon	QUINTEL	QS6456-5 V3 02DT	850	180	0	46	6	60	2	0	13.05	2422	3974	65
7	Verizon	QUINTEL	QS6456-5 V3 00DT	1900	180	0	44	6	60	4	0	16.35	10356	16991	65
8	Verizon	QUINTEL	QS6456-5 V3 02DT	700	180	0	49	6	60	2	0	13.05	2422	3974	65
8	Verizon	QUINTEL	QS6456-5 V3 02DT	850	180	0	46	6	60	2	0	13.05	2422	3974	65
8	Verizon	QUINTEL	QS6456-5 V3 00DT	2100	180	0	43	6	30	4	0	16.35	5178	8495	65
8	Verizon	QUINTEL	QS6456-5 V3 00DT	2100	180	0	43	6	30	4	0	16.35	5178	8495	65
9	Verizon	ERICSSON	SON_AIR6449 NR TB 03.24.21 3700 VZW	3700	180	0	11	2.8	320	1	3	23.55	36320	59587	65
10	Verizon	QUINTEL	QS6456-5 V3 02DT	700	270	0	49	6	60	2	0	13.05	2422	3974	65
10	Verizon	QUINTEL	QS6456-5 V3 02DT	850	270	0	46	6	60	2	0	13.05	2422	3974	65
10	Verizon	QUINTEL	QS6456-5 V3 00DT	1900	270	0	44	6	60	4	0	16.35	10356	16991	65
11	Verizon	QUINTEL	QS6456-5 V3 02DT	700	270	0	49	6	60	2	0	13.05	2422	3974	65
11	Verizon	QUINTEL	QS6456-5 V3 02DT	850	270	0	46	6	60	2	0	13.05	2422	3974	65
11	Verizon	QUINTEL	QS6456-5 V3 00DT	2100	270	0	43	6	30	4	0	16.35	5178	8495	65
11	Verizon	QUINTEL	QS6456-5 V3 00DT	2100	270	0	43	6	30	4	0	16.35	5178	8495	65
12	Verizon	ERICSSON	SON_AIR6449 NR TB 03.24.21 3700 VZW	3700	270	0	11	2.8	320	1	0	23.55	72469	118891	65
13	Verizon	ANDREW	VHLP4-11	11000	0	0	1.5	4	0.2	1	0	38.7	1483	2432	52.9

Notes: Table depicts recommended operating parameters for Verizon Wireless proposed operations.

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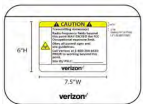
Radio Frequency Exposure
FCC Compliance Assessment

Pre

SITE-SPECIFIC-INFORMATION			
Site Name	**YOLANDA AVE**	**Multi-Licensee Facility**	**☐ YES ☒ NO**
Street Address	**244 Colgan Avenue**	**Is Verizon a Significant Contributor To Co-Locator Areas Requiring Mitigation?**	**☐ YES ☐ NO ☒ N/A**
City, State, Zip	**Santa Rosa, CA 95404**		
Verizon's Max % MPE (Measured – General Population)	**N/A**	**Verizon's Max % MPE (Predicted – General Population)**	**127.83% at 30ft Adjacent Building**
Structure Type	**Monopine**	**Assessment Date**	**May 24, 2023**
Broadcast (AM/FM/TV) Co-Locators	**No**	**Assessment Purpose**	**New Site Build**
Total Access Points	**N/A**	**Total Report Revisions**	**N/A**
Original Report Date	**N/A**	**Report Revision Date**	**N/A**
Compliance Status	**☐ COMPLIANT AS DESIGNED, no additional mitigation required** **☒ MITIGATION IS REQUIRED (Barriers, Signs, RF Safety Plan, etc, see below)**		

VERIZON'S WORST-CASE RF EMISSIONS IN ACCESSIBLE AREAS AT THIS FACILITY	
☐	BELOW the General Population MPE limit
☒	ABOVE the General Population MPE limit and BELOW the Occupational MPE limit
☐	ABOVE the Occupational MPE limit and BELOW 10x the Occupational MPE limit
☐	ABOVE 10x the Occupational MPE limit

Final Compliant Configuration							
	GUIDELINES	**NOTICE**	**CAUTION**	**WARNING**	**NOC INFO**	**BARRIER/MARKER**	
Access Point(s)	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐	N/A
Alpha	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐	N/A
Beta	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐	N/A
Gamma	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐	N/A
Delta	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐	N/A

NOTE: The table above represents EVERY compliance item that MUST be implemented at this location; Also in Sec. 4 (B)

☐ RF Safety Plan required **☒ Engineering Controls required**

Description of all Compliance Requirements(s): See recommended mitigation in Section 4			
Items to be Installed	Access: No action required, other than restricting access to the tower Alpha: No action required Beta: No action required Gamma: No action required Delta: No action required		
Items to be Removed	N/A		
Items to be Repaired/Replaced	N/A		
Consultant Legal Name	Waterford Consultants, LLC	**Phone/Fax**	(703) 596-1022
Email Contact	support@waterfordconsultants.com		
Address	7430 New Technology Way Suite 150, Frederick, Maryland 21703		

SPECIAL OPERATING MITIGATION INSTRUCTIONS	
Alpha	3 dB power reduction below maximum for C-Band antenna to avoid impact at 30ft adjacent building
Beta	N/A
Gamma	3 dB power reduction below maximum for C-Band antenna to avoid impact at 30ft adjacent building
Delta	N/A

Contents

1. Introduction

Verizon Wireless has contracted with Waterford Consultants, LLC, an independent Radio Frequency consulting firm, to conduct a **Radio Frequency Exposure (RFE) FCC Compliance Assessment** of the **YOLANDA AVE** cell site. The following report contains a detailed summary of the Radio Frequency environment as it relates to Federal Communications Commission (FCC) and Occupational Safety & Health Administration (OSHA) Rules and Regulations for all individuals.

The **Verizon Wireless antenna data** was provided by:

Name	Peter Hilliard
Title	Project Manager
Date	May 9, 2023
Sub-Market	NorCal

This compliance assessment and report has been **prepared** and **reviewed** by:

	Preparer	**Reviewer**
Name	Jassmine Aldrich	David H. Kiser
Title	RF Technical Analyst	RF Engineer
Date	May 24, 2023	May 25, 2023

This report utilizes the following **for predictive modeling of the ambient RF environment**:
MPE Modeling Program: RoofMaster™ (See Section 7)
Required Modeling Assumptions: 100% Duty Cycle and Maximum Total Power Output.

Additional Modeling Assumptions:

Antenna radiation pattern files that characterize directivity and energy suppression values have been utilized to model each RF emitter at this location. If a manufacturer's antenna pattern is not available or the actual antenna model is unknown, Waterford Consultants, LLC has utilized a generic antenna pattern from a library of panel, omnidirectional, microwave and broadcast patterns that are representative of the actual antenna. Similarly, the effective radiated power values for each antenna, if not provided, has been assumed based on antenna type, carrier and region. Refer to the antenna inventory table for a listing of the emitter properties utilized in this report.

Documents utilized in this analysis:

Verizon-YolandaAve-5000169536-NSB-ZD100-05-01-23.pdf

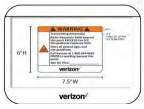
RFDS_YOLANDAAVE_8079985_2842023115234.pdf

2. Existing Site Characteristics

a. Structure

Physical Description	The Verizon Wireless antennas are mounted to a 64ft monopine.
Single-Family Home	No
Latitude (NAD 83)	38.420864
Longitude (NAD 83)	-122.711361
Total Analyzed Elevations (Roof Levels)	5

b. Existing Verizon Observations - based on Site Visit or Information Received

Existing Observations							
	GUIDELINES	**NOTICE**	**CAUTION**	**WARNING**	**NOC INFO**	**BARRIER/MARKER**	
Access Point(s)	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐	N/A
Alpha	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐	N/A
Beta	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐	N/A
Gamma	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐	N/A
Delta	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐	N/A

NOTE: The table above represents EXISTING compliance items implemented at this location.

c. Antenna Inventory

Z-height represents the distance from the nearest walking surface to the _____ of the antenna.	☐ **Bottom** ☒ **Centerline** ☐ **Top**
NON-Verizon Co-locator Data	☐ **Estimates** ☐ **Actual Data** ☒ **N/A**

Roof Master™ Antenna Inventory with Client Provided Parameters

Ant #	Operator	Antenna Make	Antenna Model	Type	Frequency (MHz)	Az (Deg)	Downtilt (Deg)	Horizontal Beam Width (Deg)	Ant (ft)	TPO (W)	# of Ch	Loss (dB)	Ant Gain (dBd)	Total ERP (W)	Total EIRP (W)	Antenna Centerline Ground Level (0 ft)
1	Verizon	QUINTEL	QS6456-5 V3 02DT	Panel	700	0	0	49	6	60	2	0	13.05	2422	3974	65
1	Verizon	QUINTEL	QS6456-5 V3 02DT	Panel	850	0	0	46	6	60	2	0	13.05	2422	3974	65
1	Verizon	QUINTEL	QS6456-5 V3 00DT	Panel	1900	0	0	44	6	60	4	0	16.35	10356	16991	65
2	Verizon	QUINTEL	QS6456-5 V3 02DT	Panel	700	0	0	49	6	60	2	0	13.05	2422	3974	65
2	Verizon	QUINTEL	QS6456-5 V3 02DT	Panel	850	0	0	46	6	60	2	0	13.05	2422	3974	65
2	Verizon	QUINTEL	QS6456-5 V3 00DT	Panel	2100	0	0	43	6	30	4	0	16.35	5178	8495	65
2	Verizon	QUINTEL	QS6456-5 V3 00DT	Panel	2100	0	0	43	6	30	4	0	16.35	5178	8495	65
3	Verizon	ERICSSON	SON_AIR6449 NR TB 03.24.21 3700 VZW	Panel	3700	0	0	11	2.8	320	1	0	23.55	72469	118891	65
4	Verizon	QUINTEL	QS6456-5 V3 02DT	Panel	700	90	0	49	6	60	2	0	13.05	2422	3974	65
4	Verizon	QUINTEL	QS6456-5 V3 02DT	Panel	850	90	0	46	6	60	2	0	13.05	2422	3974	65
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7	Verizon	QUINTEL	QS6456-5 V3 02DT	Panel	700	180	0	49	6	60	2	0	13.05	2422	3974	65
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13	Verizon	ANDREW	VHLP4-11	Microwave	11000	0	0	1.5	4	0.2	1	0	38.7	1483	2432	52.9

Note 1: Operating parameters depicted in above table have been provided by client.

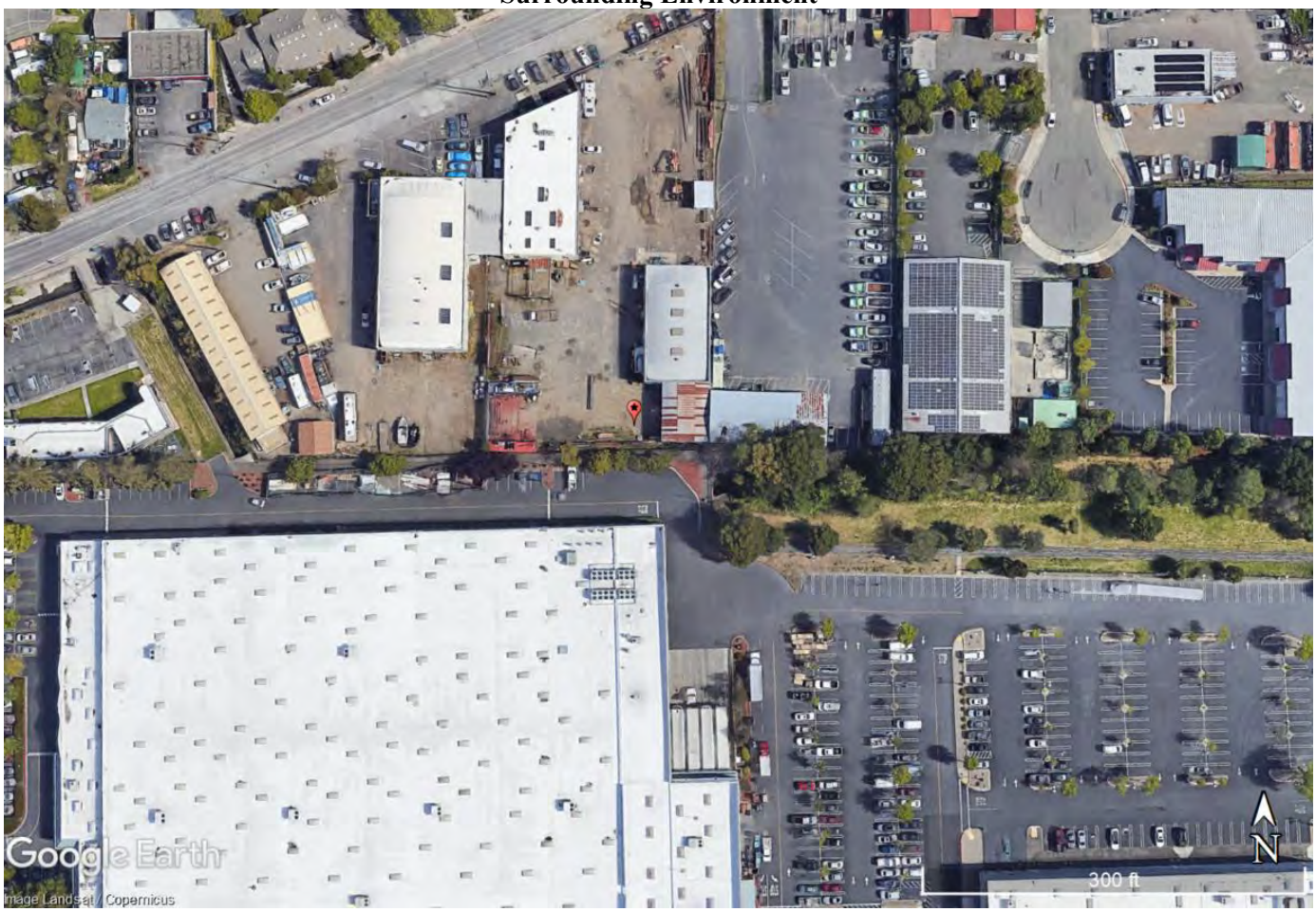
Note 2: Some antennas identified by the SON designation may employ beamsteering technology where RF energy allocated to each customer device is dynamically directed toward their location. In the analysis presented herein, predicted exposure levels are based on all beams at full utilization (i.e. full power) simultaneously focused in any direction. As this condition is unlikely to occur, the actual power density levels at ground and at adjacent structures will be less than the levels reported below.

Note 3: No other transmitting antennas are known to be operating in the vicinity of this site.

3. Analysis

Could field measurements be taken in areas with Verizon antennas?	**☐ YES ☐ NO ☒ N/A**
Describe why measurements could not be taken - if applicable.	**N/A**
Adjacent Structure(s)	**☐ Touching ☒ Potential Concern ☐ No Concern**
If the structure is a Single-Family Residential Home, were measurements taken inside the residence?	**☐ YES ☐ NO ☒ N/A**
Field Measurement Equipment	**☐ Broadband ☐ Narrowband ☒ N/A**
Field Measurement Start Time	**☒ N/A**
Field Measurement End Time	**☒ N/A**
Location Broadband Equipment Zeroed	**☒ N/A**

Surrounding Environment



a. Predictive Modeling

Predictive Modeling shall include models of the following:

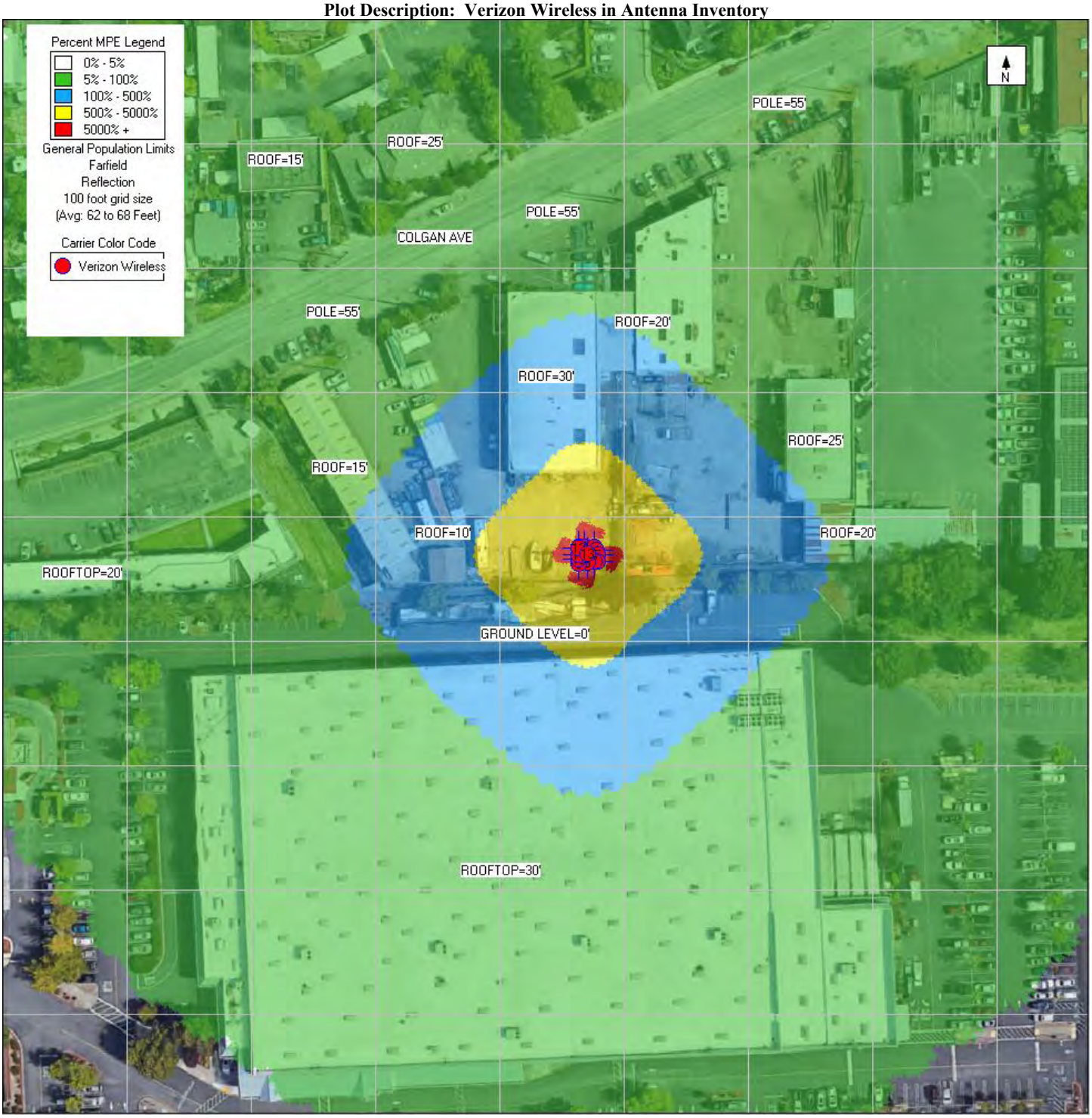
- All known transmitters model
- Verizon transmitters only model

All plots will need to show the extent of the exposure with appropriate scaling to make engineering decisions. Multiple plots at different scales may be required to reflect the total exposure and to make engineering decisions. All areas accessed by the general public in which the MPE is above the FCC General Population limits will need to be mitigated.

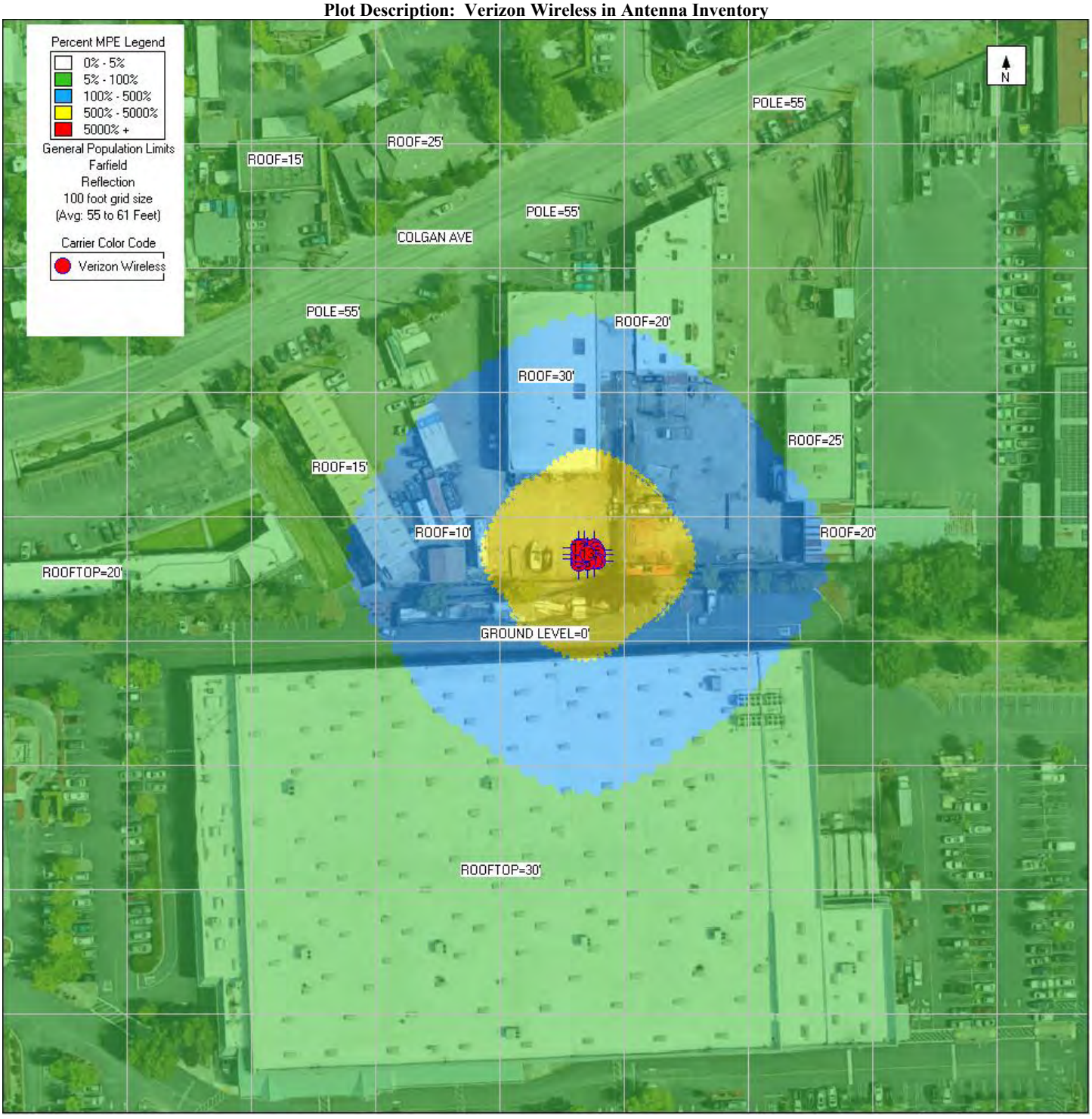
b. Predictive Model: Verizon Transmitters

Is the area being modeled completely INACCESSIBLE to members of the general population (including untrained maintenance workers)?	**☐ YES ☒ NO**

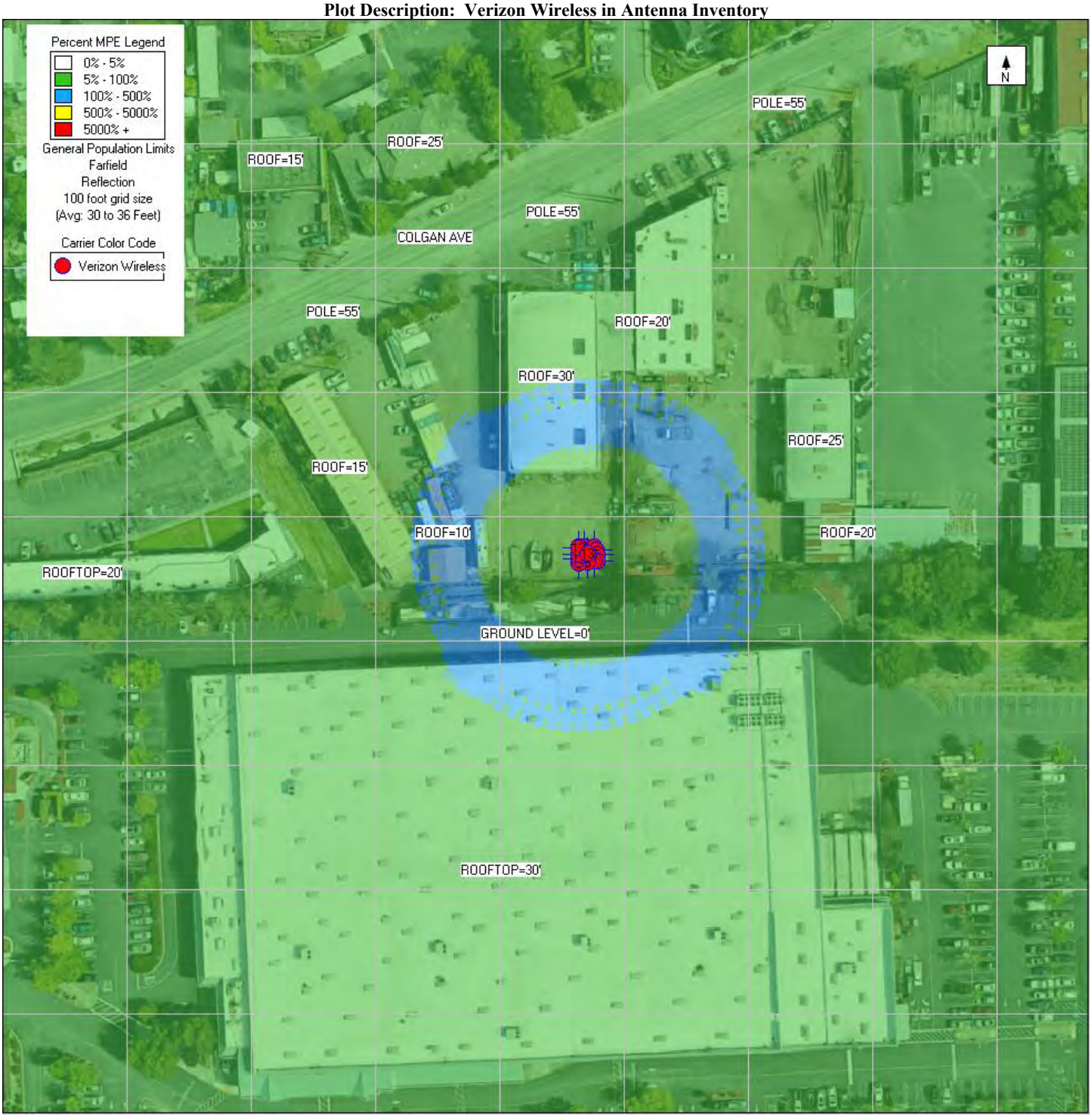
Reference Plane: 62 ft (Antenna Level)
Plot Description: Verizon Wireless in Antenna Inventory



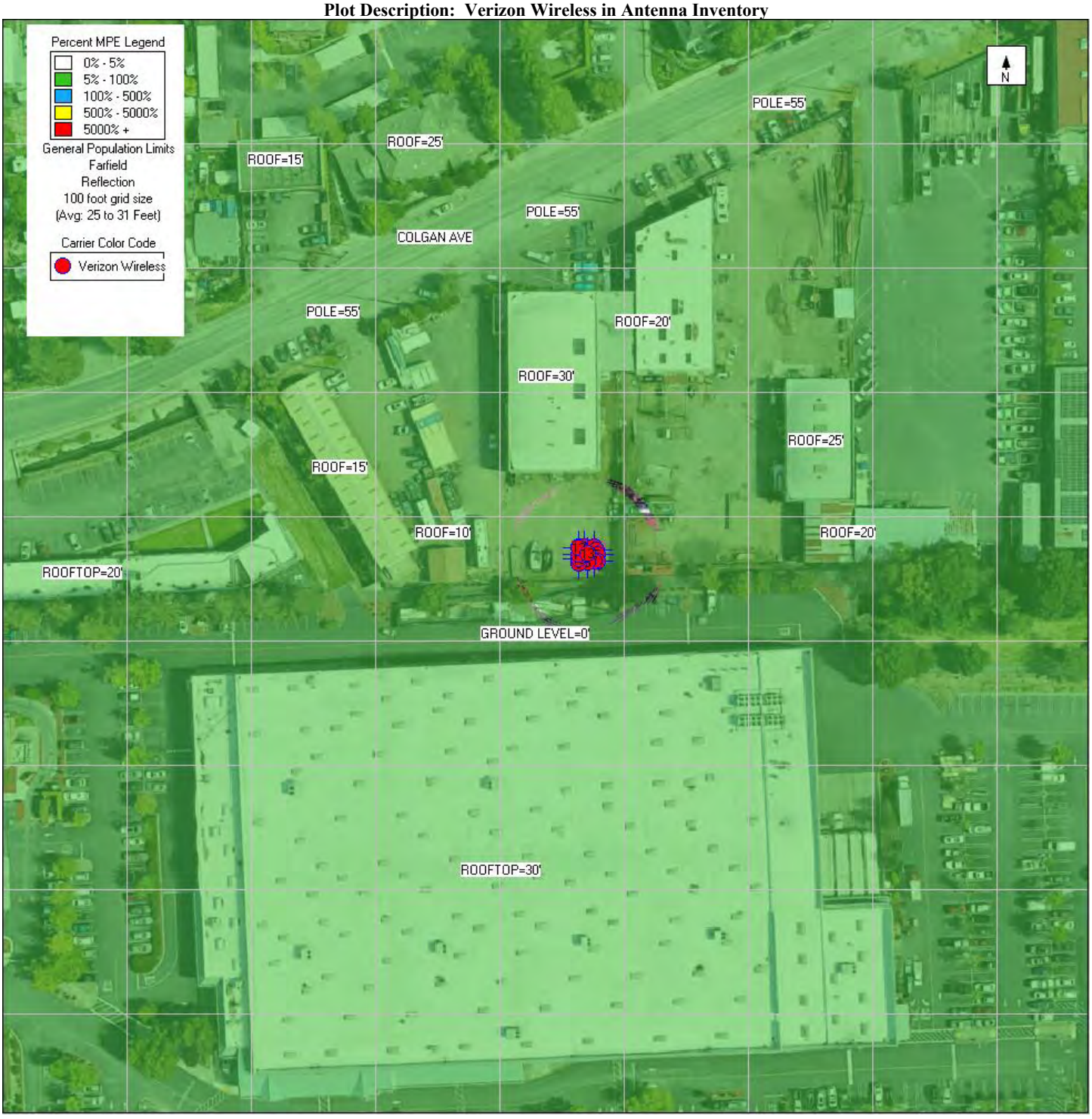
Reference Plane: 55 ft (Adjacent Electric Pole Level)
Plot Description: Verizon Wireless in Antenna Inventory



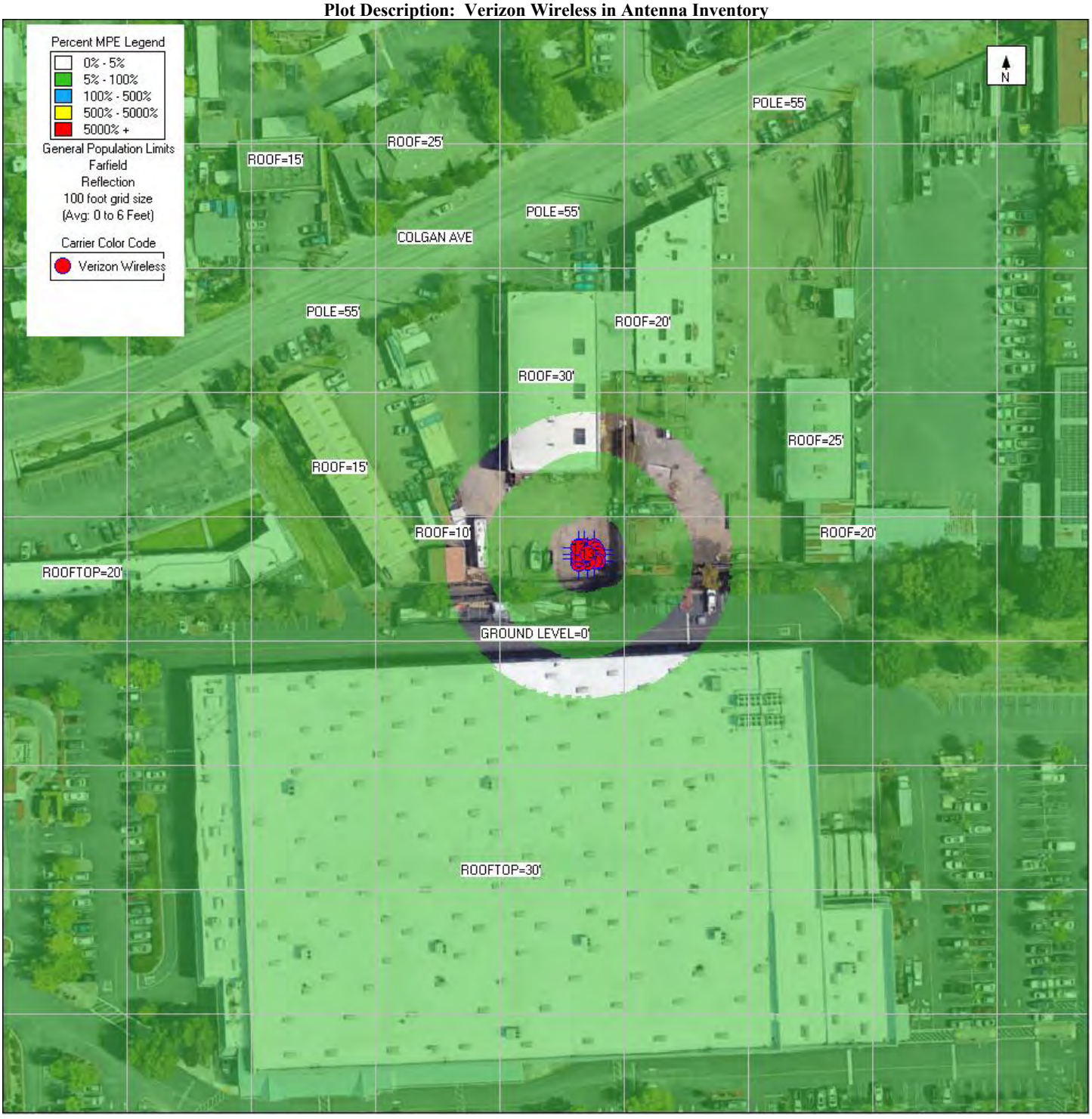
Reference Plane: 30 ft (Adjacent Building Level)
Plot Description: Verizon Wireless in Antenna Inventory



Reference Plane: 25 ft (Adjacent Building Level)
Plot Description: Verizon Wireless in Antenna Inventory



Reference Plane: 0 ft (Ground Level)
Plot Description: Verizon Wireless in Antenna Inventory



Roof Master™ Antenna Inventory with Recommended Operating Parameters

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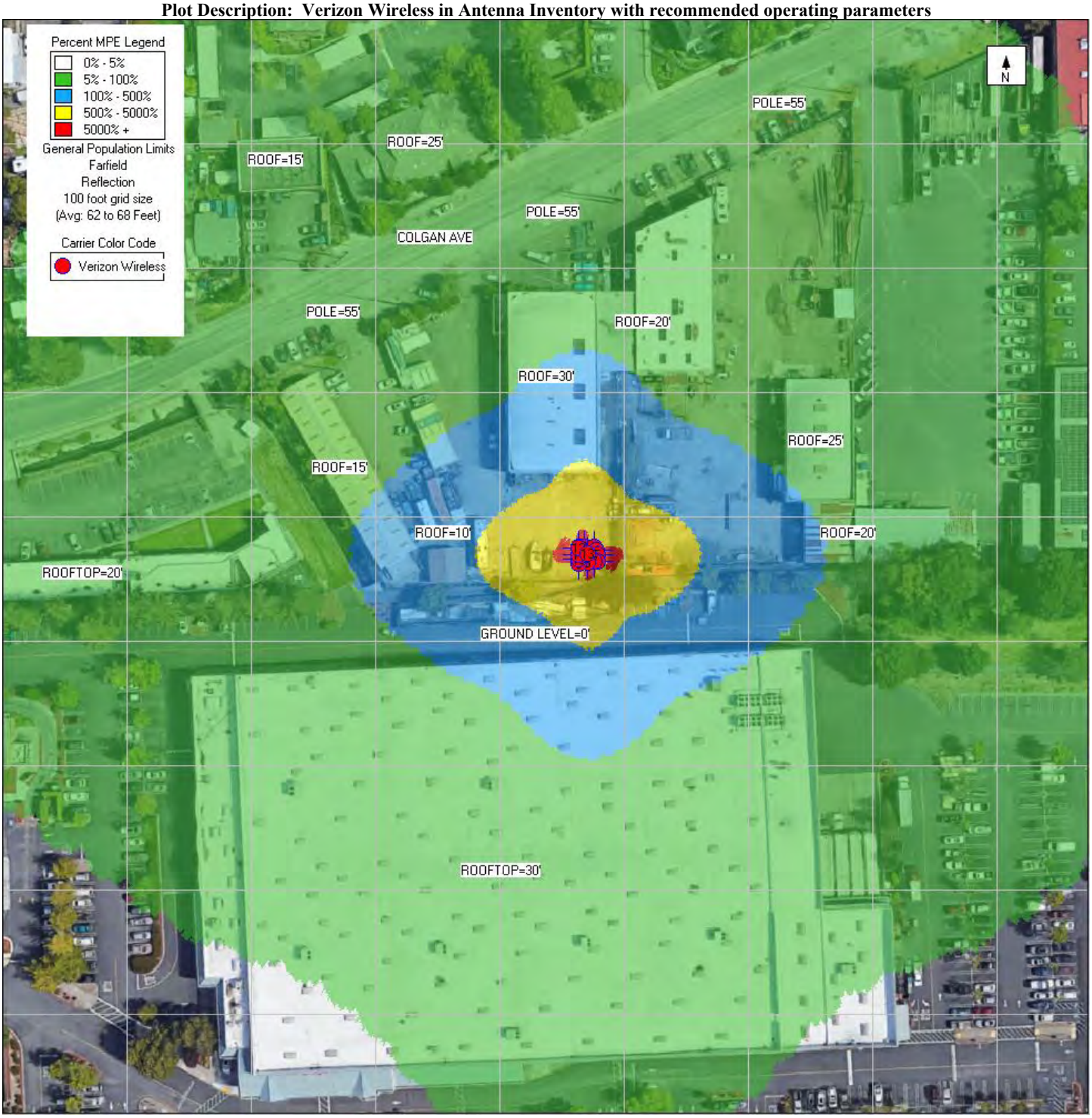
2	Verizon	QUINTEL	QS6456-5 V3 00DT	Panel	2100	0	0	43	6	30	4	0	16.35	5178	8495	65
2	Verizon	QUINTEL	QS6456-5 V3 00DT	Panel	2100	0	0	43	6	30	4	0	16.35	5178	8495	65
3	Verizon	ERICSSON	SON_AIR6449 NR TB 03.24.21 3700 VZW	Panel	3700	0	0	11	2.8	320	1	3	23.55	36320	59587	65
4	Verizon	QUINTEL	QS6456-5 V3 02DT	Panel	700	90	0	49	6	60	2	0	13.05	2422	3974	65
4	Verizon	QUINTEL	QS6456-5 V3 02DT	Panel	850	90	0	46	6	60	2	0	13.05	2422	3974	65
4	Verizon	QUINTEL	QS6456-5 V3 00DT	Panel	1900	90	0	44	6	60	4	0	16.35	10356	16991	65
5	Verizon	QUINTEL	QS6456-5 V3 02DT	Panel	700	90	0	49	6	60	2	0	13.05	2422	3974	65
5	Verizon	QUINTEL	QS6456-5 V3 02DT	Panel	850	90	0	46	6	60	2	0	13.05	2422	3974	65
5	Verizon	QUINTEL	QS6456-5 V3 00DT	Panel	2100	90	0	43	6	30	4	0	16.35	5178	8495	65
5	Verizon	QUINTEL	QS6456-5 V3 00DT	Panel	2100	90	0	43	6	30	4	0	16.35	5178	8495	65
6	Verizon	ERICSSON	SON_AIR6449 NR TB 03.24.21 3700 VZW	Panel	3700	90	0	11	2.8	320	1	0	23.55	72469	118891	65
7	Verizon	QUINTEL	QS6456-5 V3 02DT	Panel	700	180	0	49	6	60	2	0	13.05	2422	3974	65
7	Verizon	QUINTEL	QS6456-5 V3 02DT	Panel	850	180	0	46	6	60	2	0	13.05	2422	3974	65
7	Verizon	QUINTEL	QS6456-5 V3 00DT	Panel	1900	180	0	44	6	60	4	0	16.35	10356	16991	65
8	Verizon	QUINTEL	QS6456-5 V3 02DT	Panel	700	180	0	49	6	60	2	0	13.05	2422	3974	65
8	Verizon	QUINTEL	QS6456-5 V3 02DT	Panel	850	180	0	46	6	60	2	0	13.05	2422	3974	65
8	Verizon	QUINTEL	QS6456-5 V3 00DT	Panel	2100	180	0	43	6	30	4	0	16.35	5178	8495	65
8	Verizon	QUINTEL	QS6456-5 V3 00DT	Panel	2100	180	0	43	6	30	4	0	16.35	5178	8495	65
9	Verizon	ERICSSON	SON_AIR6449 NR TB 03.24.21 3700 VZW	Panel	3700	180	0	11	2.8	320	1	3	23.55	36320	59587	65
10	Verizon	QUINTEL	QS6456-5 V3 02DT	Panel	700	270	0	49	6	60	2	0	13.05	2422	3974	65
10	Verizon	QUINTEL	QS6456-5 V3 02DT	Panel	850	270	0	46	6	60	2	0	13.05	2422	3974	65
10	Verizon	QUINTEL	QS6456-5 V3 00DT	Panel	1900	270	0	44	6	60	4	0	16.35	10356	16991	65
11	Verizon	QUINTEL	QS6456-5 V3 02DT	Panel	700	270	0	49	6	60	2	0	13.05	2422	3974	65
11	Verizon	QUINTEL	QS6456-5 V3 02DT	Panel	850	270	0	46	6	60	2	0	13.05	2422	3974	65
11	Verizon	QUINTEL	QS6456-5 V3 00DT	Panel	2100	270	0	43	6	30	4	0	16.35	5178	8495	65
11	Verizon	QUINTEL	QS6456-5 V3 00DT	Panel	2100	270	0	43	6	30	4	0	16.35	5178	8495	65
12	Verizon	ERICSSON	SON_AIR6449 NR TB 03.24.21 3700 VZW	Panel	3700	270	0	11	2.8	320	1	0	23.55	72469	118891	65
13	Verizon	ANDREW	VHLP4-11	Microwave	11000	0	0	1.5	4	0.2	1	0	38.7	1483	2432	52.9

SPECIAL OPERATING MITIGATION INSTRUCTIONS	
Alpha	3 dB power reduction below maximum for C-Band antenna to avoid impact at 30ft adjacent building
Beta	N/A
Gamma	3 dB power reduction below maximum for C-Band antenna to avoid impact at 30ft adjacent building
Delta	N/A

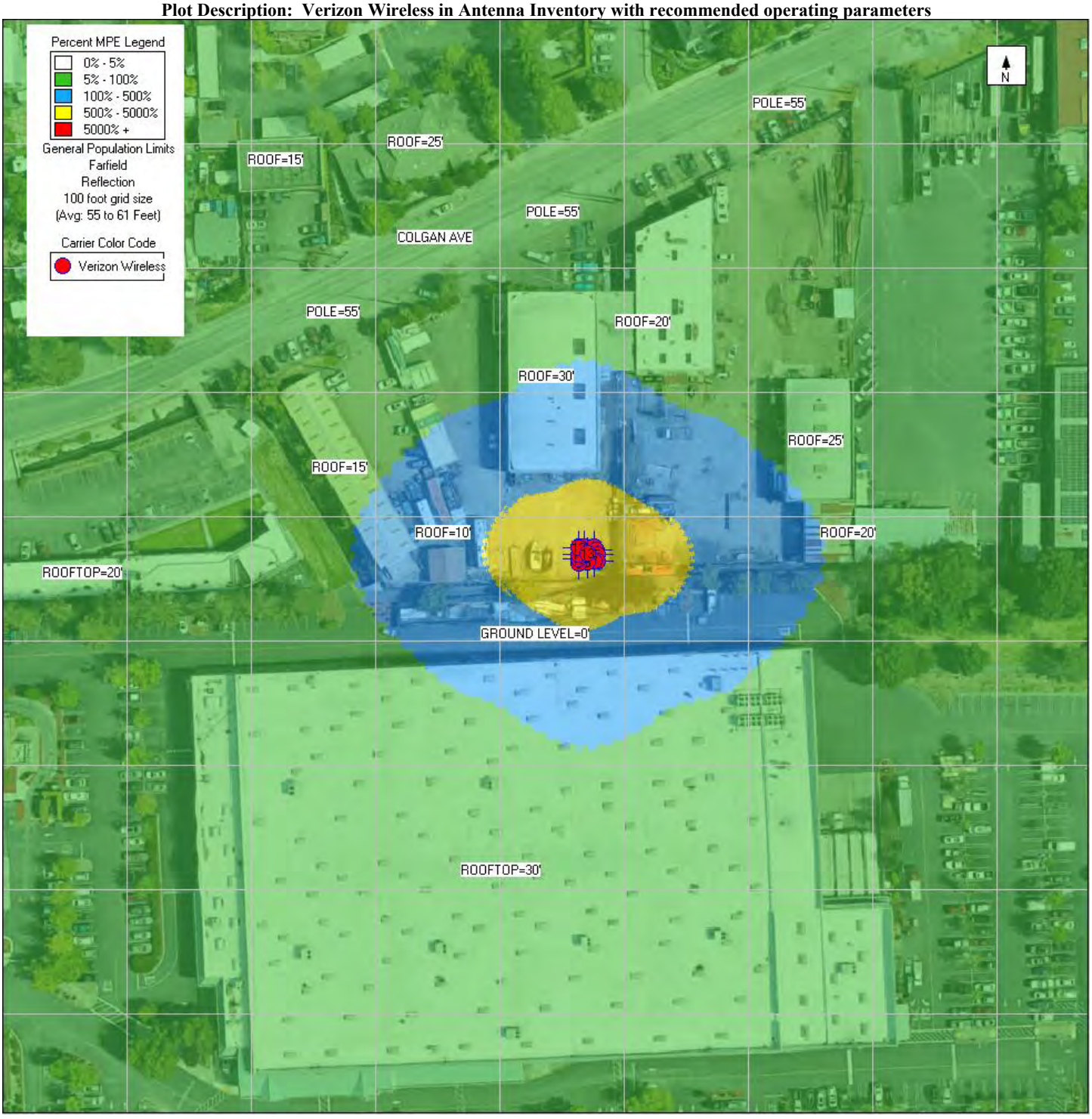
c. Predictive Model: Verizon Transmitters with Recommended Parameters

Is the area being modeled completely INACCESSIBLE to members of the general population (including untrained maintenance workers)?	**☐ YES ☒ NO**

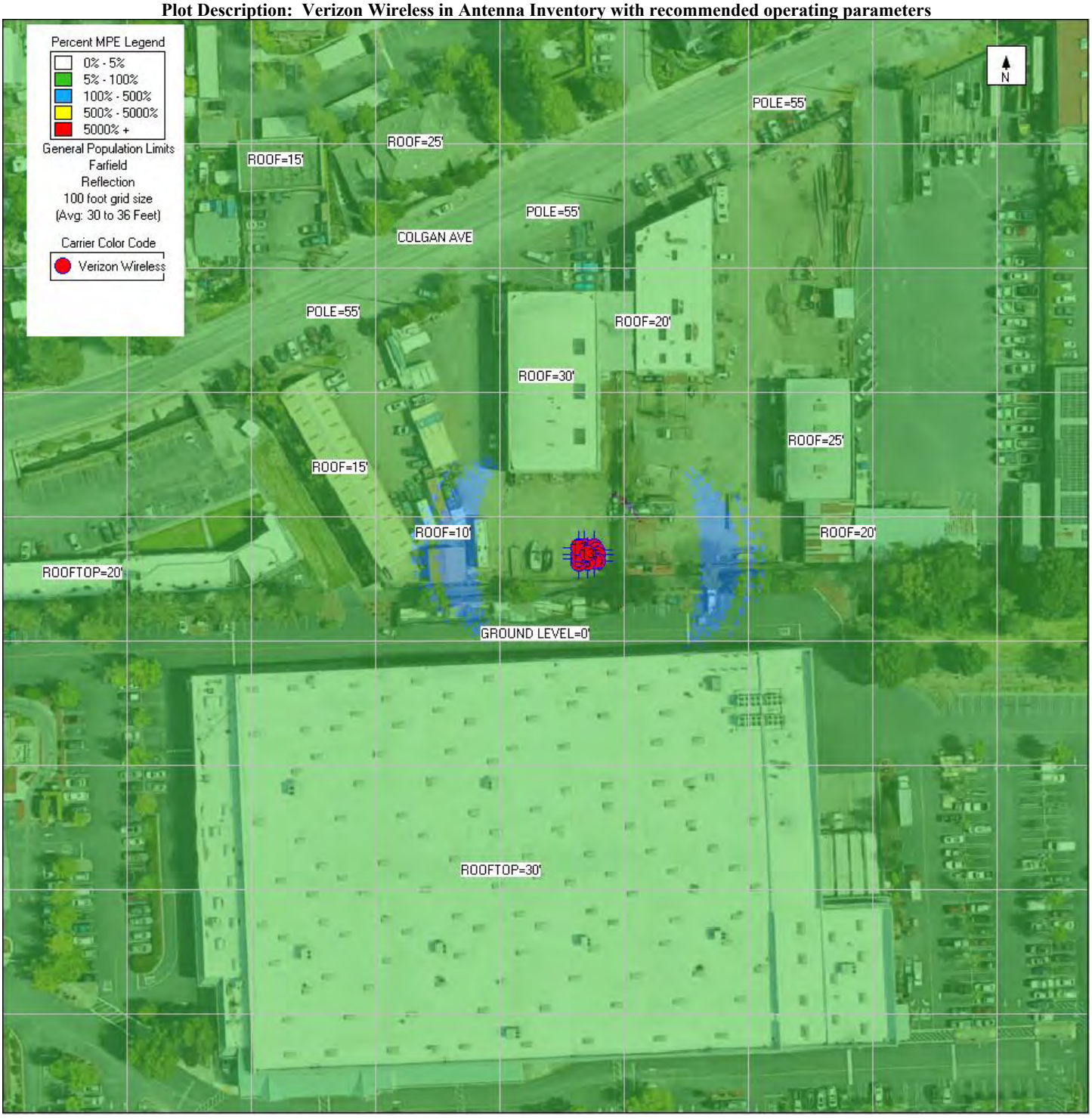
Reference Plane: 62 ft (Antenna Level)
Plot Description: Verizon Wireless in Antenna Inventory with recommended operating parameters



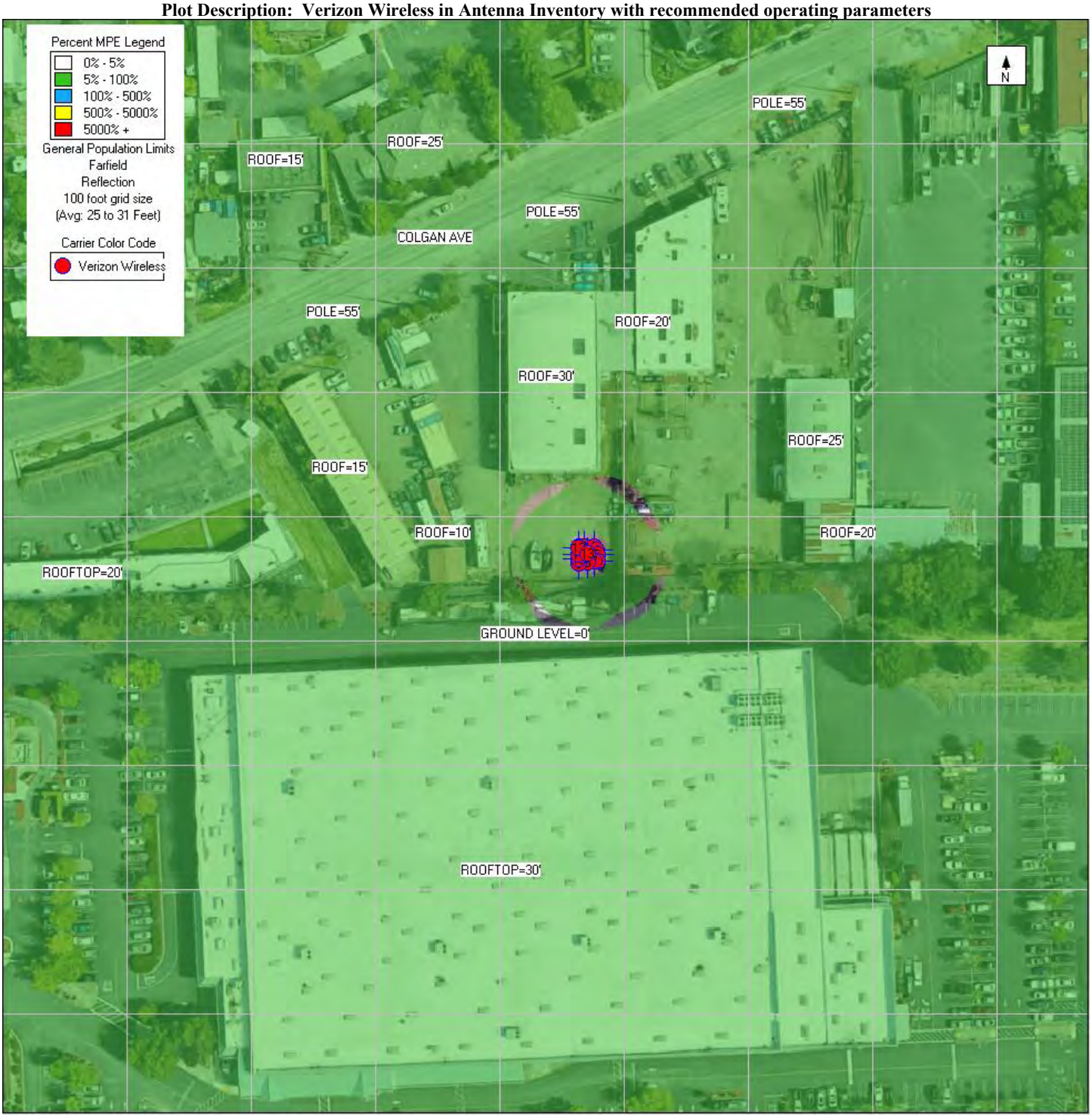
Reference Plane: 55 ft (Adjacent Electric Pole Level)
Plot Description: Verizon Wireless in Antenna Inventory with recommended operating parameters



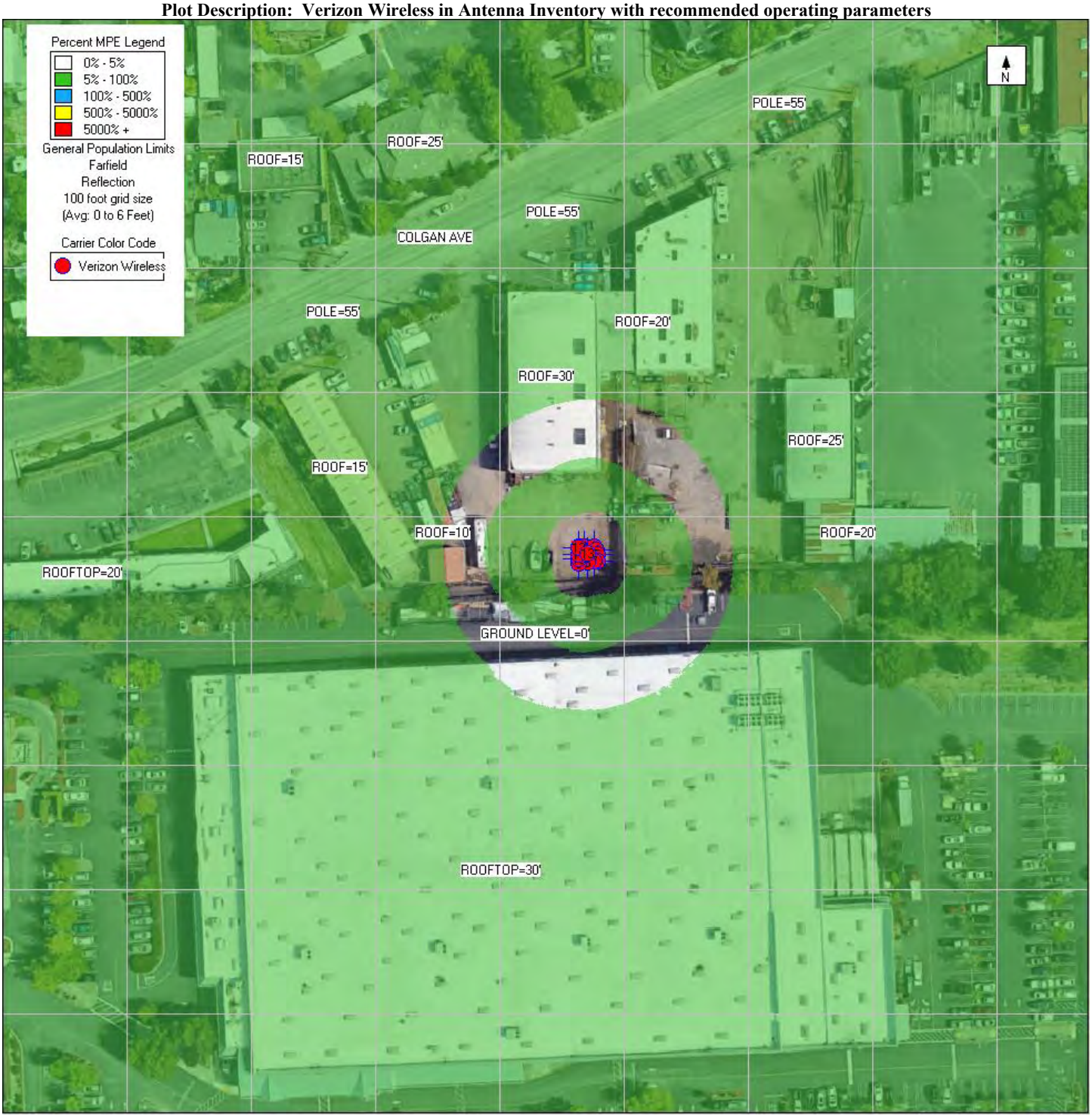
Reference Plane: 30 ft (Adjacent Building Level)
Plot Description: Verizon Wireless in Antenna Inventory with recommended operating parameters



Reference Plane: 25 ft (Adjacent Building Level)
Plot Description: Verizon Wireless in Antenna Inventory with recommended operating parameters



Reference Plane: 0 ft (Ground Level)
Plot Description: Verizon Wireless in Antenna Inventory with recommended operating parameters



4. Conclusion

a. Conclusion Narrative

Description of MPE-Limit Exceeding Areas:

Electric Pole Level 55 ft Assessment

- Antenna Inventory Configuration: Below General Population limits
- Recommended Configuration: Below General Population limits

Adjacent Building Level 30 ft Assessment

Verizon Wireless Antennas #1 through #3 and #7 through #9

- Antenna Inventory Configuration: Above General Population limits, Below Occupational limits
- Recommended Configuration: Below General Population limits

Adjacent Building Level 25 ft Assessment

- Antenna Inventory Configuration: Below General Population limits
- Recommended Configuration: Below General Population limits

Ground Level 0 ft Assessment

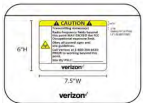
- Antenna Inventory Configuration: Below General Population limits
- Recommended Configuration: Below General Population limits

Potentially Non-Compliant Co-Locator Areas: Verizon Responsibility

The following table represents potentially non-compliant co-locators for which Verizon is a 5% General Population MPE (1% Occupational MPE) contributor.

AT&T	T-Mobile	Other (name)	Other (name)	Unknown	Other
☐	☐	☐	☐	☐	Insert Co-Locator
					Insert Co-Locator
					Insert Co-Locator
					Insert Co-Locator

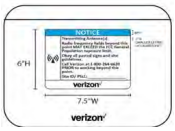
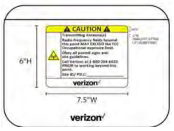
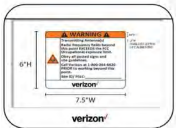
b. Signage/Barrier Diagram (Access Point)

Final Compliant Configuration						
	GUIDELINES	NOTICE	CAUTION	WARNING	NOC INFO	BARRIER/MARKER
Access Point(s)	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ N/A

Proposed Signs/Barriers ●——— Existing Signs/Barriers ●———

NOTE: The table above represents EVERY compliance item that MUST be implemented at this location.

c. Signage/Barrier Installation Detail

Mitigation Actions Required/Taken												
	GUIDELINES		NOTICE		CAUTION		WARNING		NOC INFO		BARRIER/MARKER	
Access Point(s)	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐	N/A
Alpha	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐	N/A
Beta	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐	N/A
Gamma	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐	N/A
Delta	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐ [#]	☐	N/A
	ADD	**REM**	**ADD**	**REM**	**ADD**	**REM**	**ADD**	**REM**	**ADD**	**REM**	**ADD ONLY**	

NOTE: The table represents either the signage/barriers installed / removed OR items required by the market (if mitigation is not installed by consultant/vendor).

SPECIAL MITIGATION INSTRUCTIONS	
Items to be Installed	Access: No action required, other than restricting access to the tower Alpha: No action required Beta: No action required Gamma: No action required Delta: No action required
Items to be Removed	N/A
Items to be Repaired/Replaced	N/A

5. Appendix C: RF Consultant Certifications

a. Preparer Certification

I, Jassmine Aldrich, the preparer of this report, am fully aware of and familiar with the Rules and Regulations of both the Federal Communications Commissions (FCC) and the Occupational Safety and Health Administration (OSHA) with regard to Human Exposure to Radio Frequency Radiation. I am also fully aware of and familiar with the Verizon Wireless Signage & Demarcation Policy. I have reviewed this Radio Frequency Exposure Assessment report and believe it to be both true and accurate to the best of my knowledge.

Jassmine Aldrich

b. Reviewer Certification

I, David H. Kiser, the reviewer and approved of this report, am fully aware of and familiar with the Rules and Regulations of both the Federal Communications Commissions (FCC) and the Occupational Safety and Health Administration (OSHA) with regard to Human Exposure to Radio Frequency Radiation. I am also fully aware of and familiar with the Verizon Wireless Signage & Demarcation Policy. I have reviewed this Radio Frequency Exposure Assessment report and believe it to be both true and accurate to the best of my knowledge.

6. Appendix D: Reference Information

a. FCC Rules & Regulations

The Federal Communications Commission (FCC) has established safety guidelines relating to RF exposure from cell sites. The FCC developed those standards, known as Maximum Permissible Exposure (MPE) limits, in consultation with numerous other federal agencies, including the Environmental Protection Agency, the Food and Drug Administration, and the Occupational Safety and Health Administration. The standards were developed by expert scientists and engineers after extensive reviews of the scientific literature related to RF biological effects. The FCC explains that its standards "incorporate prudent margins of safety." The following represents explanations of the most applicable information:

Two Classifications for Exposure Limits

Occupational – Applies to situations in which persons are "exposed as a consequence of their *employment*" and are "*fully aware* of the potential for exposure and can *exercise control* over their exposure".	General Population – Applies to situations in which persons are "exposed as a consequence of their employment *may not be made fully aware* of the potential for exposure or *cannot exercise control* over their exposure". Generally speaking, those without significant and documented RF Safety & Awareness training would be in the General Population classification.

Environment Classification

Controlled – Applies to environments that are restricted or "controlled" in order to prevent access from members of the General Population classification.	Uncontrolled – Applies to environments that are unrestricted or "uncontrolled" that allow access from members of the General Population classification.

Limits for Occupational/Controlled Exposure		
Frequency Range (MHz)	**Power Density (S) (mW/cm^2)**	**Averaging Time $\|E\|^2$, $\|H\|^2$, or S (minutes)**
300-1500	f/300	6
1500-100,000	5	6
Limits for General Population/Uncontrolled Exposure		
Frequency Range (MHz)	**Power Density (S) (mW/cm^2)**	**Averaging Time $\|E\|^2$, $\|H\|^2$, or S (minutes)**
300-1500	f/1500	30
1500-100,000	1	30
f = frequency in MHz		

Significant Contribution to the RF Environment

Any carrier contributing an aggregate MPE percentage of *5* or more (to the applicable RF Environment Classification) is defined as a significant contributor. This means that if any area is determined to be out of compliance with FCC rules, all significant contributors are jointly responsible for correcting any deficiencies.

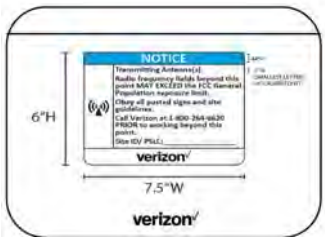
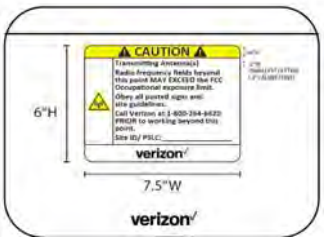
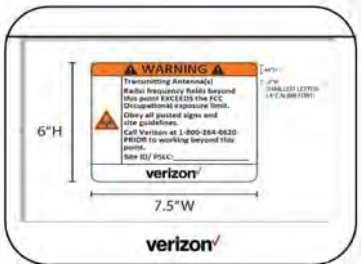
b. Occupational Safety and Health Administration (OSHA) Requirements

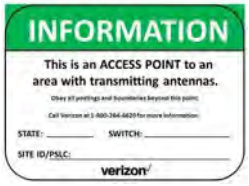
A formal adopter of FCC Standards, OSHA stipulates that those in the Occupational classification must complete training in the following: RF Safety, RF Awareness, and Utilization of Personal Protective Equipment. OSHA also provides options for Hazard Prevention and Control:

Hazard Prevention	Control
• Utilization of good equipment • Enact control of hazard areas • Limit exposures • Employ medical surveillance and accident response	• Employ Lockout/Tag out • Utilize personal alarms & protective clothing • Prevent access to hazardous locations • Develop or operate an administrative control program

c. RF Signage

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

GUIDELINES	Category Two - Notice	Category Three - Caution	Category Four - Warning
This sign will inform anyone of the basic precautions to follow when entering an area with transmitting radiofrequency equipment.	This sign indicates that RF emissions may exceed the FCC General Population MPE limit. ● Sign Color Blue ● Sign Signal Word "Notice"	This sign indicates that RF emissions may exceed the FCC Occupational MPE limit. ● Sign Color Yellow ● Sign Signal Word "Caution"	This sign indicates that RF emissions may exceed at least 10x the FCC Occupational MPE limit. ● Sign Color Orange for Warning ● Sign Signal Word "Warning"
			

Category One - Information	
Information signs are used as a means to provide contact information for any questions or concerns. They will include specific cell site identification information and the Verizon Wireless Network Operations Center phone number. ● Sign Color Green ● Sign Signal Word "Information"	

Signs for Category Two through Four must have the following:

- Appropriate signal word, associated color {i.e., {DANGER" (red), "WARNING" (orange), "CAUTION," (yellow) "NOTICE" (blue)};
- RF energy advisory symbol;
- An explanation of the RF source;
- Behavior necessary to comply with the exposure limits; and
- Up-to-date contact information.

Signage Design features.

- All signs shall be furnished with rounded or blunt corners and shall be free from sharp edges, burrs, splinters, or other sharp projections. The ends or heads of bolts or other fastening devices shall be located in such a way that they do not constitute a hazard.

d. Physical Barriers

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

e. Indicative Markers

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

7. Appendix E: Roofmaster™

RoofMaster™ is the software package that Waterford Consultants created to model RF environments associated with multiple emitters where the potential exists for human exposure. Based on the computational guidelines set forth in OET Bulletin 65 from the Federal Communications Commission (FCC), RoofMaster™ considers the operating parameters of specified RF sources to predict the overall Maximum Permissible Exposure possible at a given location. These theoretical results represent worst-case predictions as emitters are assumed to be operating at 100% duty cycle.

From the FCC document:

> *"The revised OET Bulletin 65 has been prepared to provide assistance in determining whether proposed or existing transmitting facilities, operations or devices comply with limits for human exposure to radiofrequency (RF) fields adopted by the Federal Communications Commission (FCC). The bulletin offers guidelines and suggestions for evaluating compliance."*

http://transition.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet65/oet65.pdf

8. Appendix F: Qualifications of Waterford Consultants, LLC

Waterford Consultants, LLC [Waterford] provides technical consulting services to clients in the Radio Communications and antenna locating industry. Waterford retains professional engineers who are placed in responsible charge of the processes for analysis.

Waterford is familiar with 47 C.F.R. § § 1.1307(b)(3) and 1.1310 along with the general Rules, Regulations and policies of the FCC. Waterford work processes incorporate all specifications of FCC Office of Engineering and Technology, Bulletin 65 ("OET65"), from the website: www.fcc.gov/oet/rfsafety and follow criteria detailed in 47 CFR § 1.1310 "Radiofrequency radiation exposure Limits".

Within the technical and regulatory framework detailed above, Waterford developed tools according to recognized and generally accepted good engineering practices. Permissible exposure limits are band specific, and the Waterford computerized modeling tools correctly calculate permissible exposure based on the band(s) specified in the input data. Only clients and client representatives are authorized to provide input data through the Waterford web portal. In securing that authorization, clients and client representatives attest to the accuracy of all input data.

Waterford Consultants, LLC attests to the accuracy of the engineering calculations computed by those modeling tools. Furthermore, Waterford attests that the results of those engineering calculations are correctly summarized in this report

9. Appendix G: Statement of Limiting Conditions

Waterford Consultants, LLC field personnel have visited the site and collected only data with regard to the MPE environment. Waterford Consultants will not be responsible for matters of a legal nature that affect the site or property. The property has been analyzed 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, Waterford Consultants has created this report utilizing best industry practices and due diligence. Waterford Consultants 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 Wireless Carrier, the site manager, or their affiliates, subcontractors or assigns.

Waterford Consultants has provided the results of a computer generated model in this MPE Site Compliance Report to show approximate dimensions of the site, and the model results is included to assist the reader of the compliance report to visualize the site area, and to provide supporting documentation for Waterford Consultants' recommendations.

Waterford Consultants will not be responsible for any existing conditions or for any engineering or testing that might be required to discover whether adverse safety conditions exist. Because Waterford Consultants is not an expert in the field of mechanical engineering or building maintenance, this MPE Site Compliance Report must not be considered a structural or physical engineering report.

Waterford Consultants obtained information used in this MPE Site Compliance Report from sources that Waterford Consultants considers reliable and believes them to be true and correct. Waterford Consultants does not assume any responsibility for the accuracy of such items that were furnished by other parties.

verizon

Exhibit C

2785 Mitchell Drive
Walnut Creek, CA 94598

March 15, 2024

To: Santa Rosa City Council

From: Pablo Sanchez, Radio Frequency Design Engineer
Verizon Wireless Network Engineering Department

Subject: Statement in Support of Verizon Wireless's Proposed Facility
244 Colgan Avenue, Santa Rosa

Executive Summary

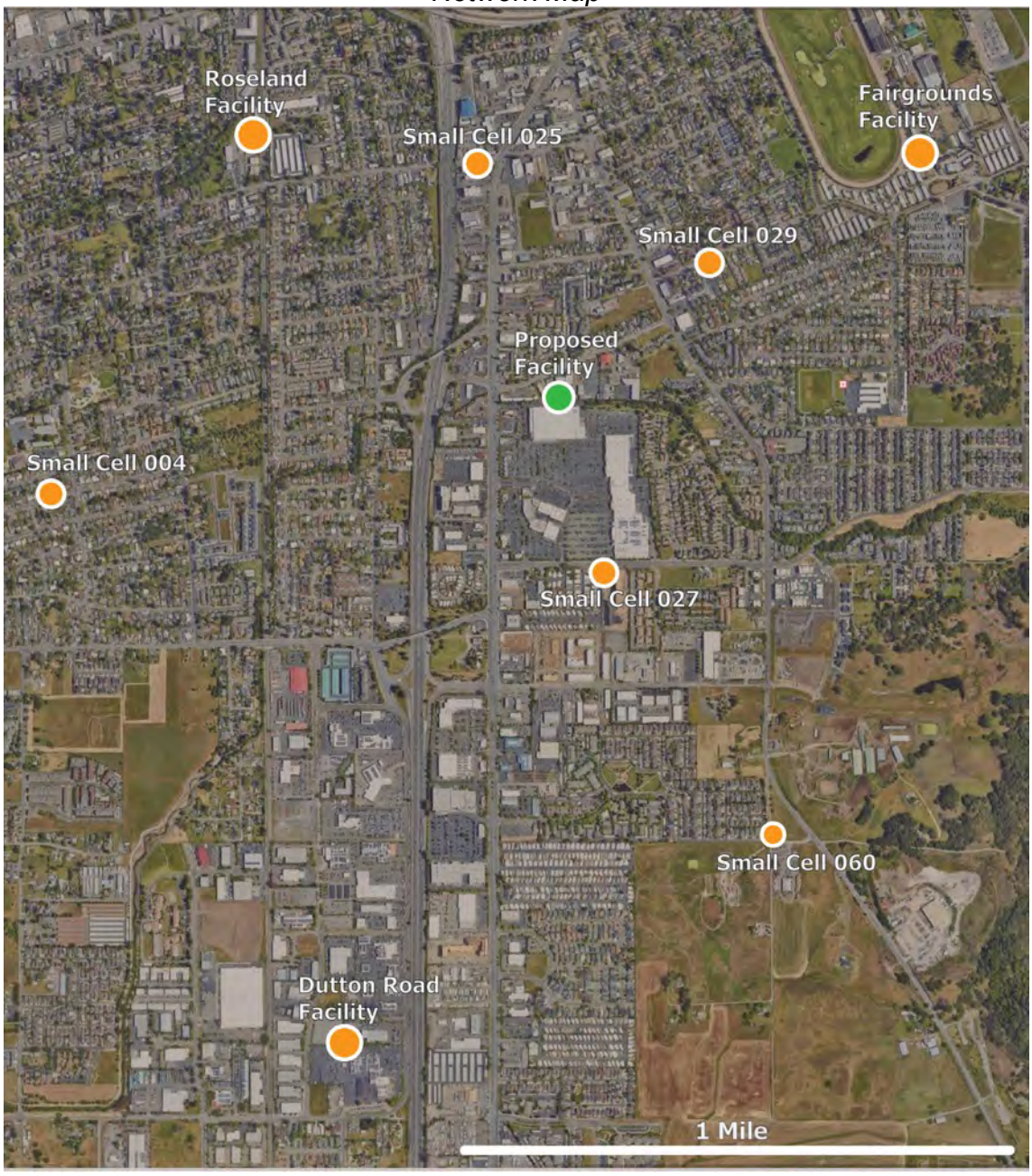
Verizon Wireless has identified a significant gap in service in southeast Santa Rosa, along and east of Highway 101 and south of Highway 12. This area currently receives inadequate service from Verizon Wireless's existing Roseland macro facility 0.75 miles northwest of the Proposed Facility, the Fairgrounds macro facility 0.8 miles northeast, and the Dutton Road macro facility 1.25 miles southwest, as well as three small cell facilities: Small Cell 025 0.45 miles northwest, Small Cell 027 0.3 miles southeast, and Small Cell 029 0.4 miles northeast. Nearby Small Cell 004 is 1.0 miles west of the Proposed Facility. A network map is shown on the following page.

Due to distance of the existing macro facilities, the limited service area of the small cells, and high demand from network users, there is a gap in Verizon Wireless network capacity in southeast Santa Rosa. This area includes the Santa Rosa Marketplace shopping center, the Santa Rosa Avenue business corridor, and residential areas north, east and south, as well as Highway 101 and local roadways.

In the Santa Rosa area, over 80 percent of Verizon Wireless's bandwidth currently in use is in the mid-band AWS, PCS, and C-Band frequencies, with the remaining portion in the low-band 700 and 850 MHz frequencies. The mid-band frequencies provide much greater data capacity. However, the mid-band frequencies do not travel as far as low-band frequencies, and require facilities closer together and closer to the end users to provide reliable service.

I describe below the significant gap in network capacity that Verizon Wireless seeks to remedy (the "Significant Gap"). To provide new, reliable dominant signal and broadband-level data speeds, the Significant Gap must be remedied through construction of a new Verizon Wireless facility (the "Proposed Facility").

Network Map



Verizon Wireless Services

Verizon Wireless provides personal wireless services, a category of "telecommunications services," which include voice services that allow users of mobile, handheld telephones to place and receive calls to other mobile and landline telephone users through the national, switched telephone network using conventional telephone numbers. This includes the ability of such users to connect to emergency personnel by dialing 911. Verizon Wireless's network also provides information services through its wireless facilities, which will include the Proposed Facility. These information services include wireless broadband, mobile data networks, and connection to the internet, which Verizon Wireless provides using the same infrastructure as its personal wireless services.

Verizon Wireless Bandwidth by Frequency Band – Santa Rosa Area

Band	FCC Designation	Frequency Band	Bandwidth	Bandwidth Percentage
700 MHz	UHF Low Band	700 MHz	22 MHz	8.2 %
850 MHz	Cellular	850 MHz	25 MHz	9.4 %
PCS	Personal Communications Service	1900 MHz	20 MHz	7.5 %
AWS	Advanced Wireless Service	2100 MHz	60 MHz	22.5 %
C-Band	C-Band	3700 MHz	140 MHz	52.4 %

Gap Area

The Significant Gap in service results from a lack of network capacity in southeast Santa Rosa, including business and residential areas east of Highway 101 and south of Highway 12. There is rapidly-increasing demand for network data capacity generated by users in the Santa Rosa Marketplace and Village Shops due south of the Proposed Facility, with over 540,000 square feet of retail space and 2,100 parking spots, the Santa Rosa Avenue business corridor, dense multi-family residential development north of Colgan Avenue, residential areas along Petaluma Hill Road and other areas east, and existing and developing multi-family residential developments south of the shopping center.

There is also high demand from users on high-traffic roadways such as the Highway 101 freeway one-quarter mile west of the Proposed Facility with 140,000 average vehicle trips per day, Santa Rosa Avenue with 24,100 trips per day, and other local roads. CalTrans *2021 Traffic Volumes,* Santa Rosa *Active Daily Totals 2019.*

Dominant Signal

The identified gap area receives insufficient dominant signal from distant Verizon Wireless macro facilities and local small cell facilities, which have a limited signal footprint.

Dominant signal is the strongest signal from a particular Verizon Wireless facility that is received by a user's wireless device in a particular area. This is apparent in the following best server maps, which depict the areas of dominant signal from each facility. For the macro facilities, the dominant signal of each antenna sector is shown in a different color. For the small cells, the dominant signal the entire facility is shown in a single color. The maps have been prepared for each the low-band 700 MHz and mid-band AWS frequencies.

Signal from the macro and small cell facilities is intermixed in the gap area, demonstrating a lack of strong dominant signal, which compromises network performance, including for users in transit. The distant macro facilities must serve large areas with many faraway users, who demand more of a facility's data resources because

of increased transmission time and error correction. For example, the south-facing antenna sector of the Roseland macro facility 0.75 miles northwest of the Proposed Facility serves a very large area, particularly in the low-band frequencies, notably a long stretch of Highway 101. The northeast-facing sector of the Dutton Road macro facility 1.25 miles southwest serves a large area in the mid-band frequencies, stretching well northeast beyond Petaluma Hill Road.

The second best server maps show how the Proposed Facility will provide new dominant signal to the local business and residential areas and busy roadways described above. The Proposed Facility is strategically located to provide strong, new dominant signal to the Significant Gap, including the Santa Rosa Marketplace, Santa Rosa Avenue business corridor, and the local residential areas north, east, and south. It will also provide dominant signal to significant stretches of Highway 101, Santa Rosa Avenue, and other local roadways.

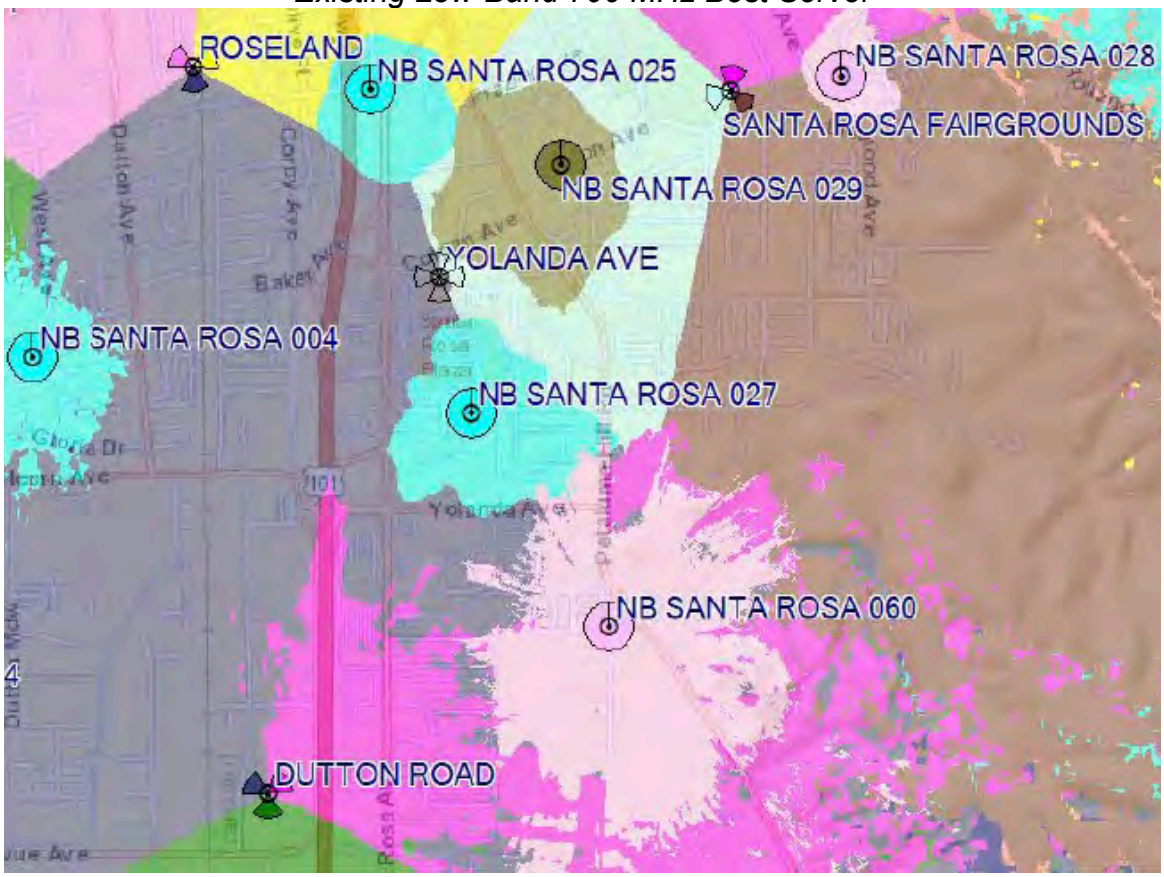
Placing a new facility closer to users in the gap area will improve local network performance. The Proposed Facility will increase network data capacity in the gap area, ensuring reliable service, faster data speeds and an improved user experience during times of high demand. This will benefit business customers, workers, local residents, and emergency personnel.

Additionally, the Proposed Facility will reduce the dominant signal footprint of the surrounding macro and small cell facilities, including the overextended Roseland, Dutton Road and Fairgrounds macro facilities. The Sonoma County Fairgrounds serves as a Red Cross evacuation center, used several times over the last decade. The Proposed Facility will relieve demand on the surrounding facilities so they can allocate their data resources to the intended users within the coverage area closer to their locations. This will improve network performance in a greater area.

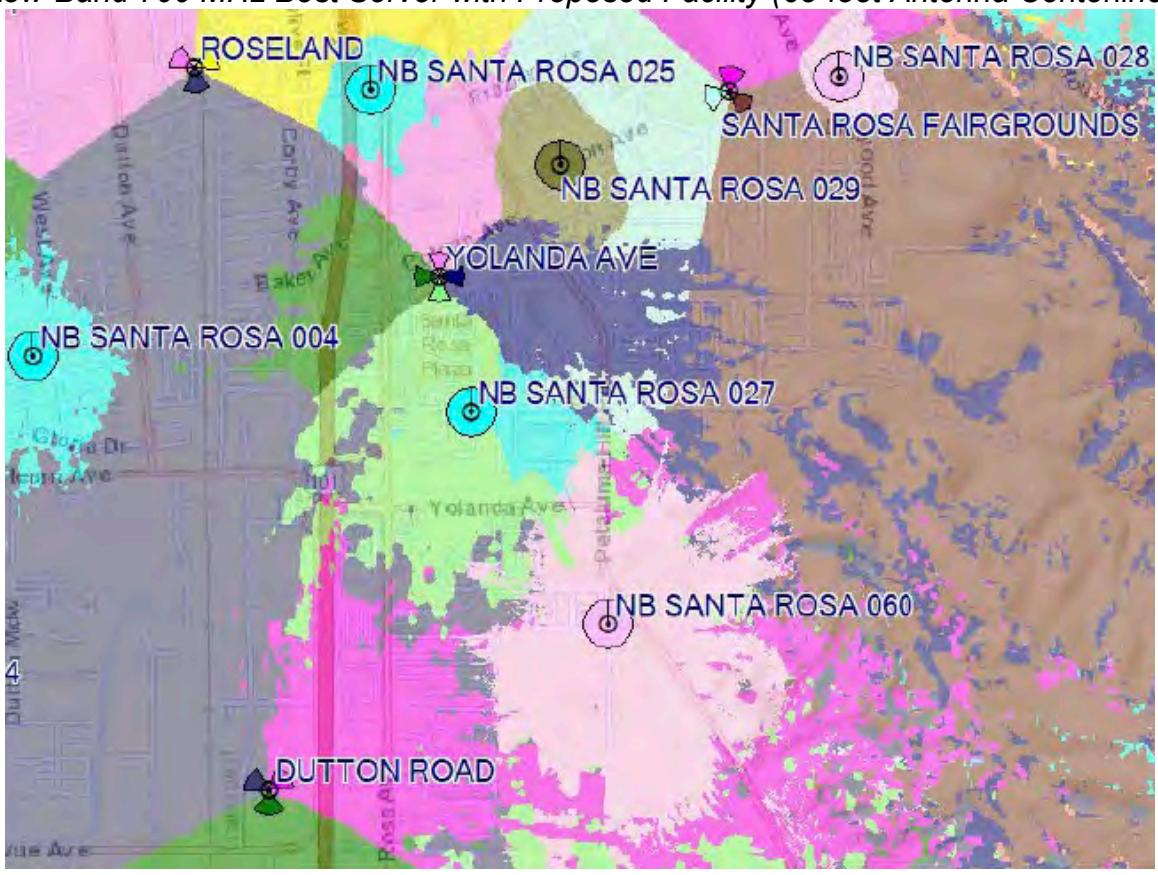
The lack of strong, reliable dominant signal degrades network performance, resulting in unreliable service, particularly during busy hours. This affects the reliability of Verizon Wireless service for residents, workers and visitors as well as for critical communications with emergency service personnel. According to the National Emergency Number Association, there are an estimated 240 million 911 calls each year nationwide, with 80 percent or more from wireless devices in many areas. In emergencies, first responder agencies increasingly rely on dependable Verizon Wireless service.

At times of high data traffic, the service area of Verizon Wireless facilities shrinks to accommodate an increasing number of mobile devices closer to each facility. As a result, the gap area expands and is exacerbated during times of high usage. The contraction of service areas during times of high usage has become more relevant as the demand for wireless services has increased rapidly over time. According to CTIA's *2023 Annual Survey Highlights*, the data traffic on wireless networks in the United States increased 38 percent from 2021 to 2022—double the prior year's increase. The number of active 5G devices nearly doubled from 2021 to 2022. Such devices include smartphones, tablets, medical devices, building security systems, and vehicle navigation and alert systems.

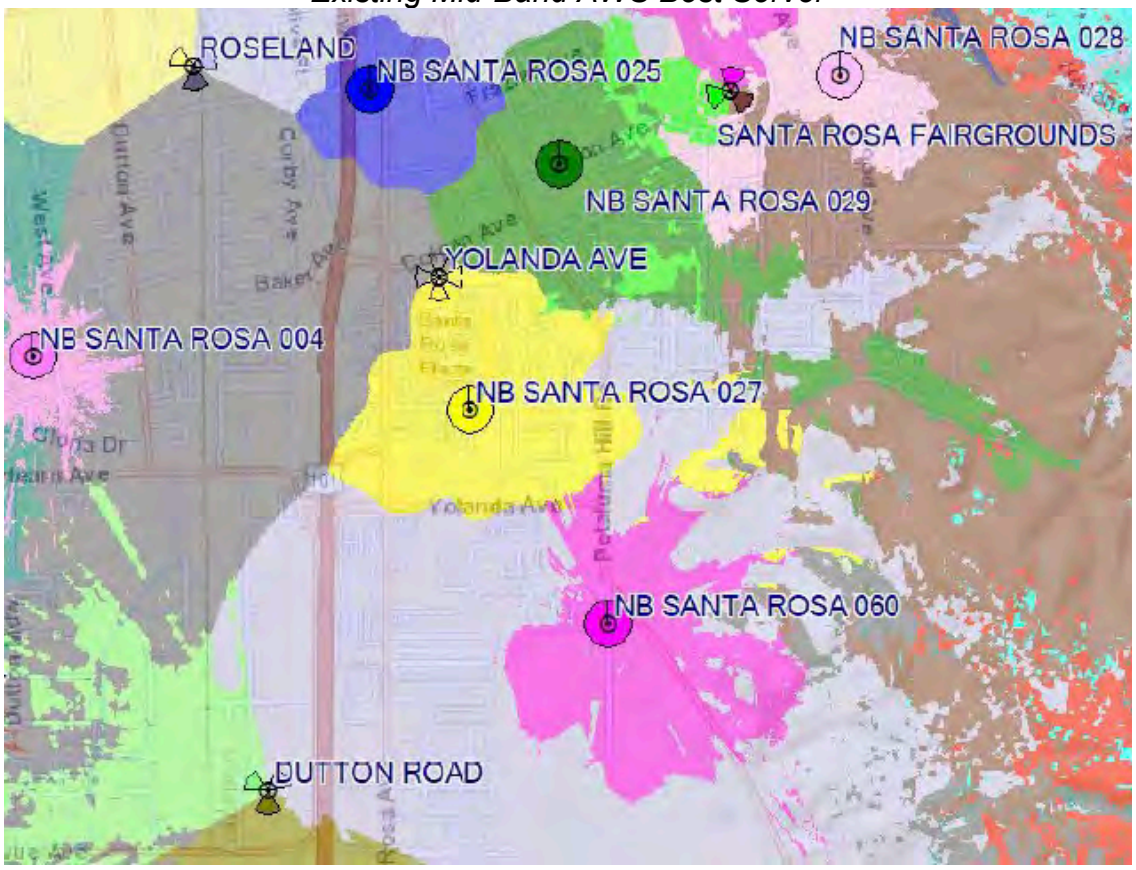
Existing Low-Band 700 MHz Best Server



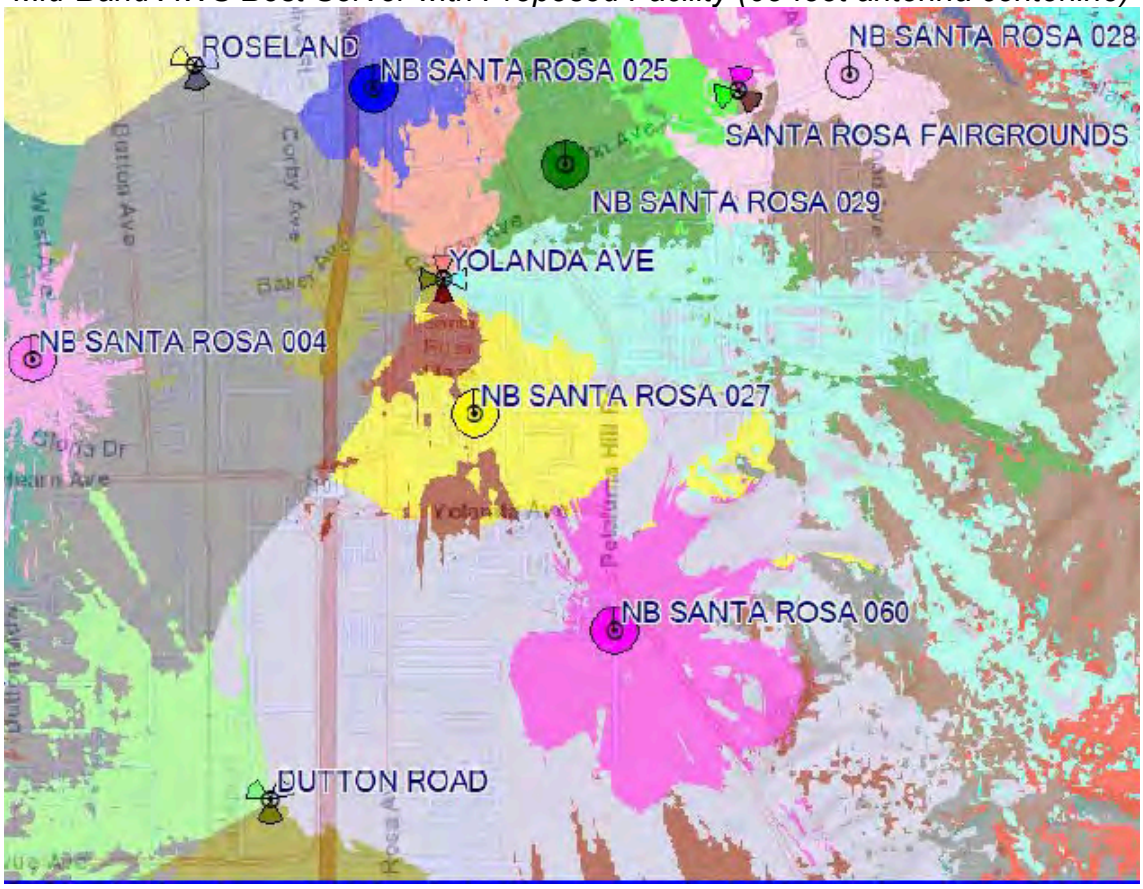
Low-Band 700 MHz Best Server with Proposed Facility (65-foot Antenna Centerline)



Existing Mid-Band AWS Best Server



Mid-Band AWS Best Server with Proposed Facility (65-foot antenna centerline)



Capacity Demand

The existing Verizon Wireless facilities that currently serve the gap area are experiencing capacity exhaustion, which compromises network performance. When there is high usage of network data during times of great demand, there are fewer resource blocks available per user, as shown by the charts on the following page.

The following charts compare the channel TTI occupancy of certain frequencies of surrounding facilities with their data throughput during a two-week period from February 6-19, 2024.

— ***Downlink Channel TTI Occupancy (red line, left axis).*** This shows the hourly average of the transmission time interval (TTI) occupancy, which is the percentage of an antenna sector's data resource blocks that is in use within a fixed timeframe (one millisecond). When TTI occupancy exceeds 80 percent, the number of data blocks available per customer is reduced, and data throughput is significantly reduced. When TTI occupancy reaches 100 percent, the data resources are fully exhausted. With high TTI occupancy, existing connections are severely degraded, voice calls may drop, and users attempting to connect to the network are rejected.

— ***Downlink Data Throughput (green line, right axis).*** This shows the hourly average downlink data throughput (download speed) provided to network users, measured in megabits/second. The FCC defines broadband speed as downlink throughput above 25 megabits/second.

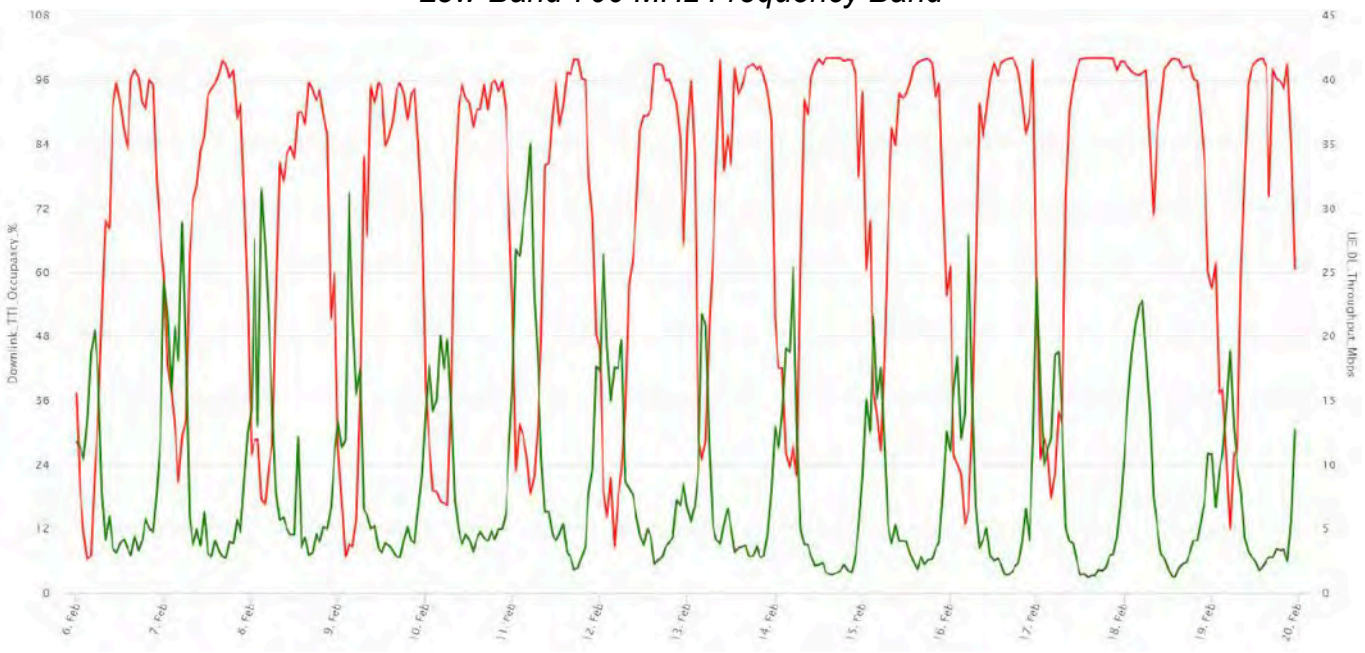
The TTI occupancy of certain frequency bands of the surrounding macro facilities spiked over 80 percent during daytime hours every day, reaching 100 percent on many days. The Roseland facility south-facing antenna sector experienced high TTI occupancy in the low-band frequency bands. The Fairgrounds facility southwest-facing antenna sector and the Dutton Road facility northeast-facing antenna sector experienced high TTI occupancy in both low-band and mid-band frequency bands. Data throughput for users connected to the Roseland and Fairgrounds macro facilities correspondingly fell well under 5 megabits/second every day, less than 20 percent of broadband speed. Throughput of the Dutton Road facility fell under 5 megabits/second in low-band frequencies, and under 10 in mid-band.

Small Cells 025 and 027 experienced high TTI occupancy in the low-band 700 MHz frequency most days. Throughput of Small Cell 025 fell below 10 megabits/second every day, and Small Cell 027 fell below 5 megabits/second every day.

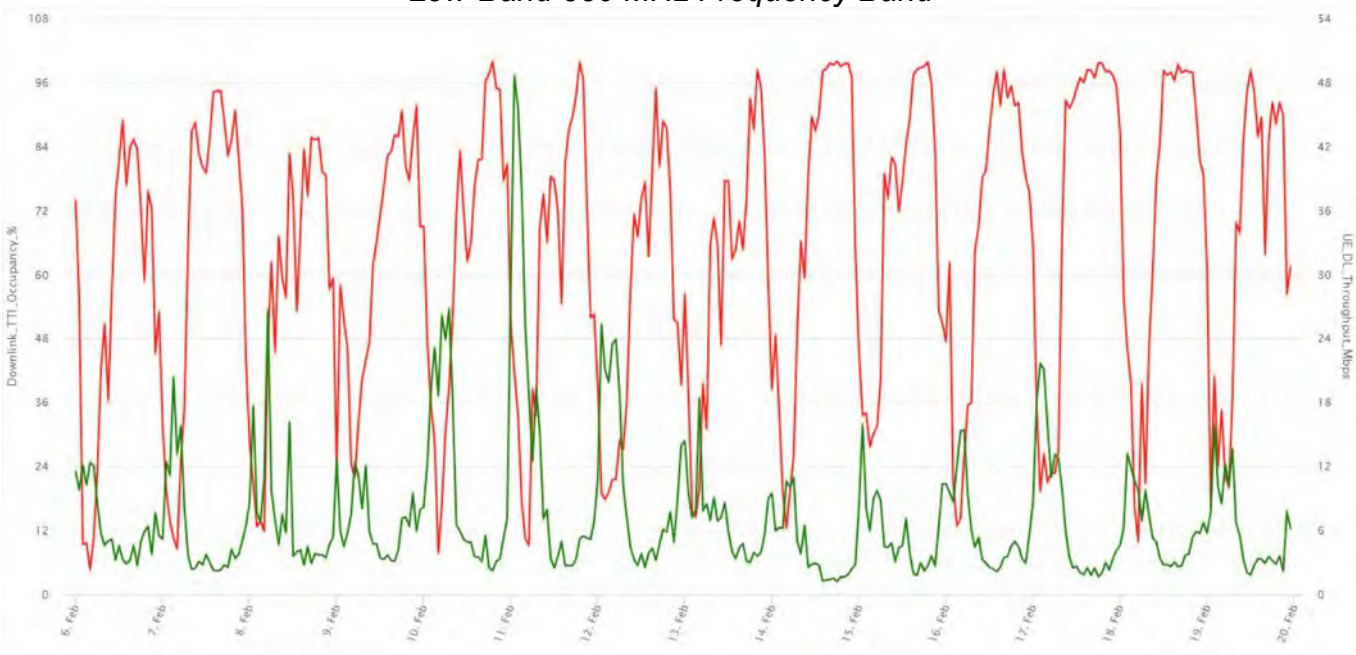
Lower frequency bands travel farther and generally serve the most distant network users. They also are the bands most likely to experience high TTI occupancy during times of high usage, when higher frequency bands are already allocated to providing reliable service to local users. When the low-band frequencies experience high occupancy, the serving facility no longer has the capacity to provide reliable service to all connected users, and data throughput is reduced for users who remain on the low-band frequencies, unable to access higher-capacity frequencies. This inadequate capacity is further exacerbated when both low-band and mid-band frequencies experience high occupancy, and even more users experience low data throughput.

TTI Occupancy versus Data Throughput
February 6-19, 2024

Roseland Facility South-Facing (Beta) Antenna Sector
Low-Band 700 MHz Frequency Band



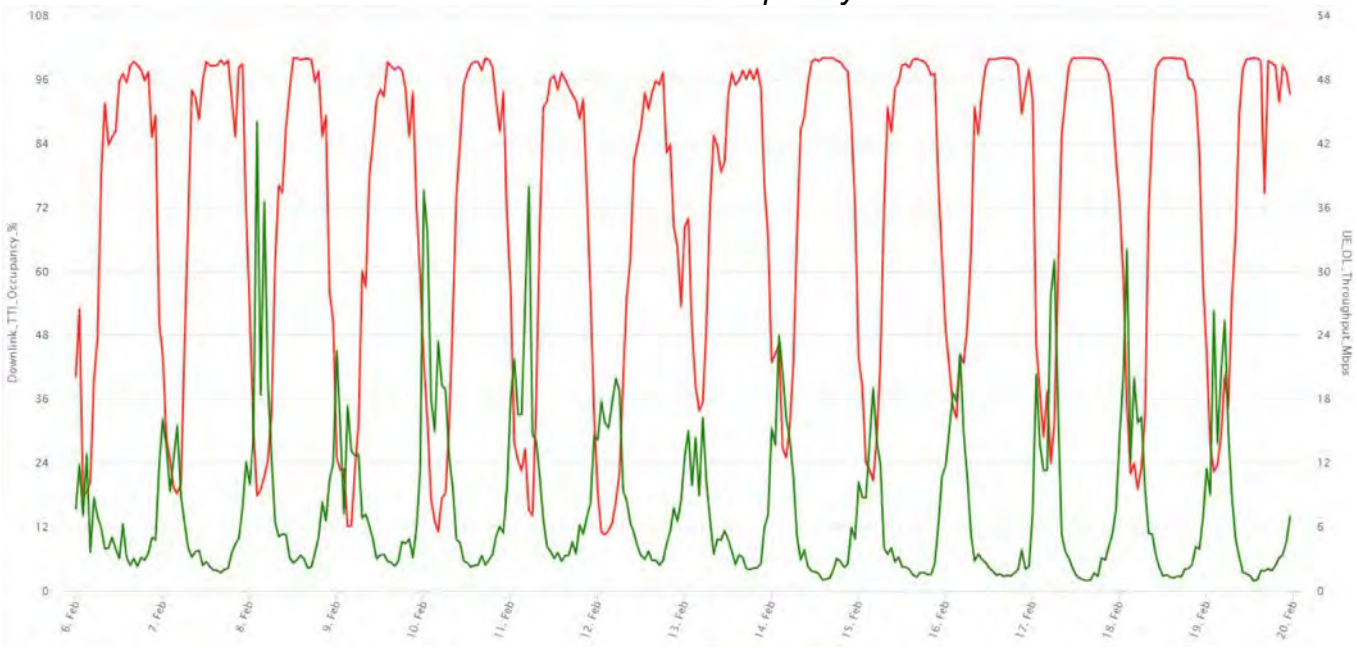
Low-Band 850 MHz Frequency Band



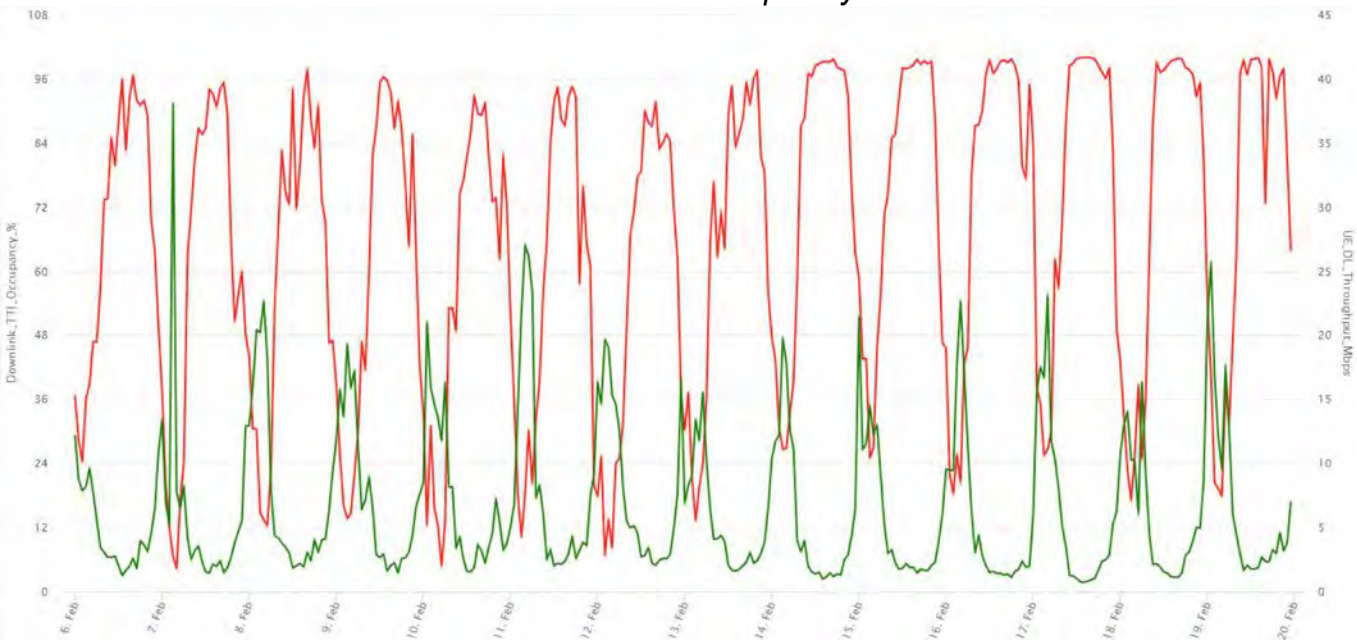
TTI Occupancy % (left axis)
Downlink Throughput (Megabits/sec, right axis)

Fairgrounds Facility Southwest-Facing (Gamma) Antenna Sector

Low-Band 700 MHz Frequency Band



Low-Band 850 MHz Frequency Band

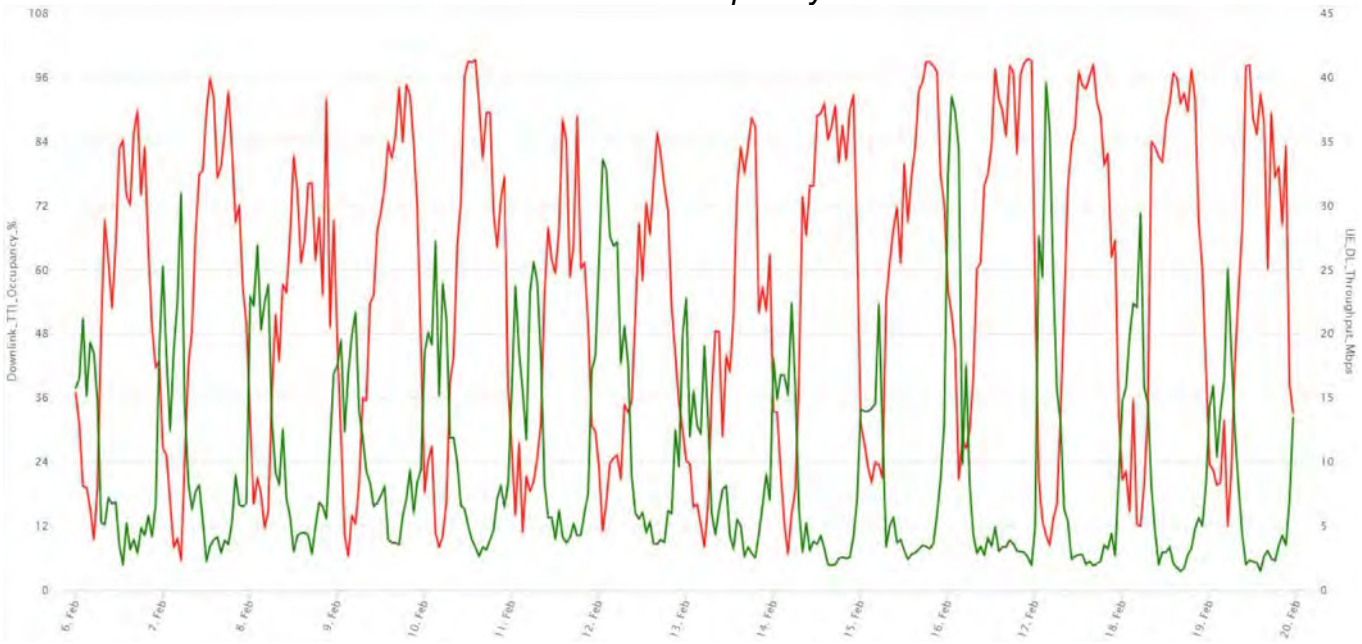


TTI Occupancy % (left axis)

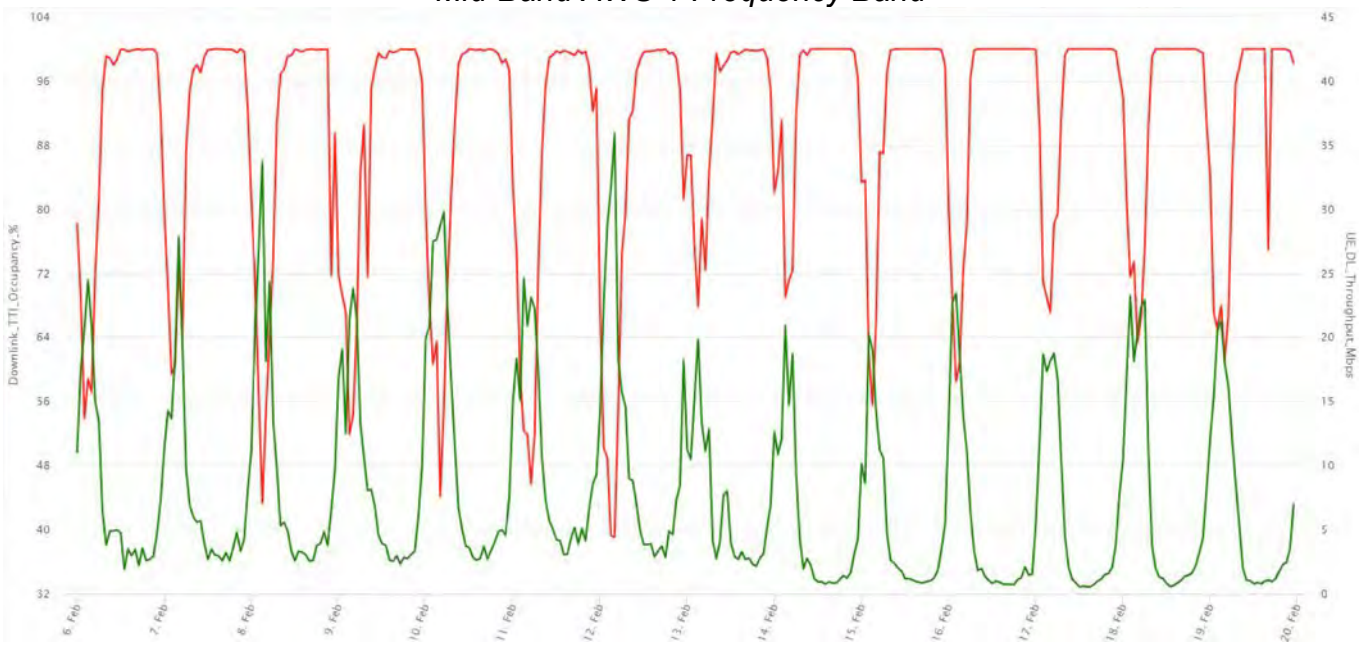
Downlink Throughput (Megabits/sec, right axis)

Fairgrounds Facility Southwest-Facing (Gamma) Antenna Sector

Mid-Band PCS Frequency Band



Mid-Band AWS-1 Frequency Band

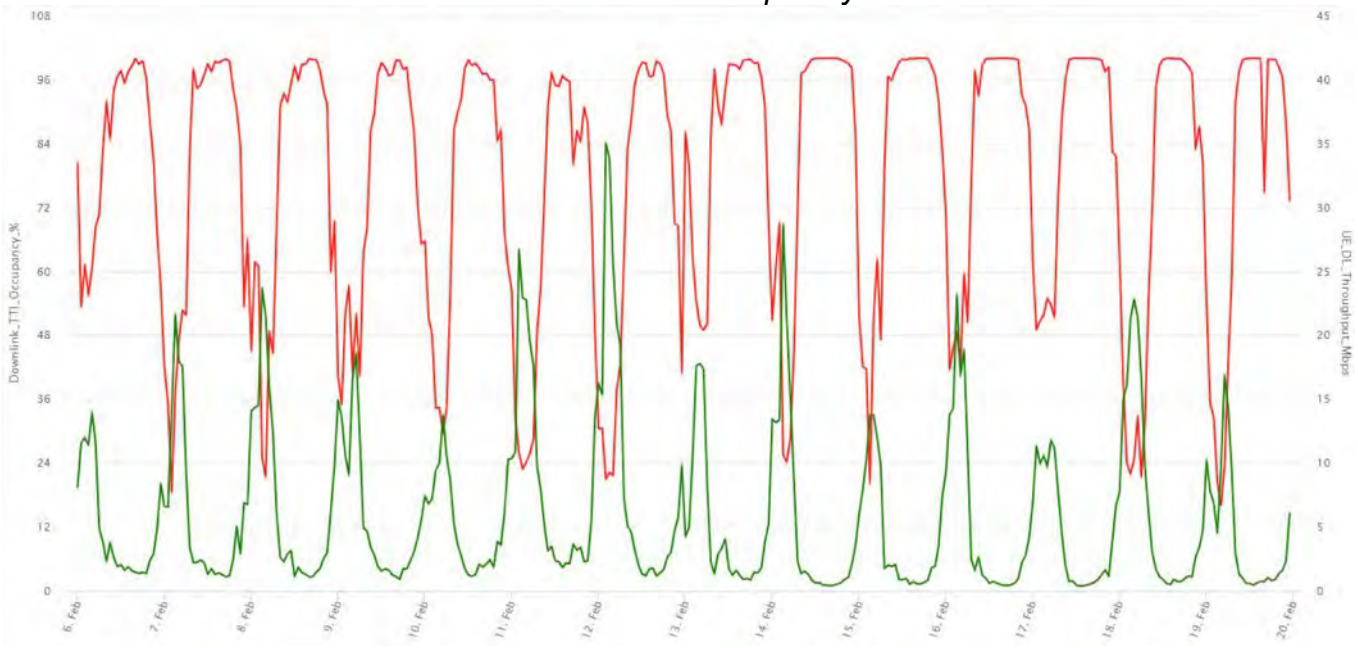


TTI Occupancy % (left axis)

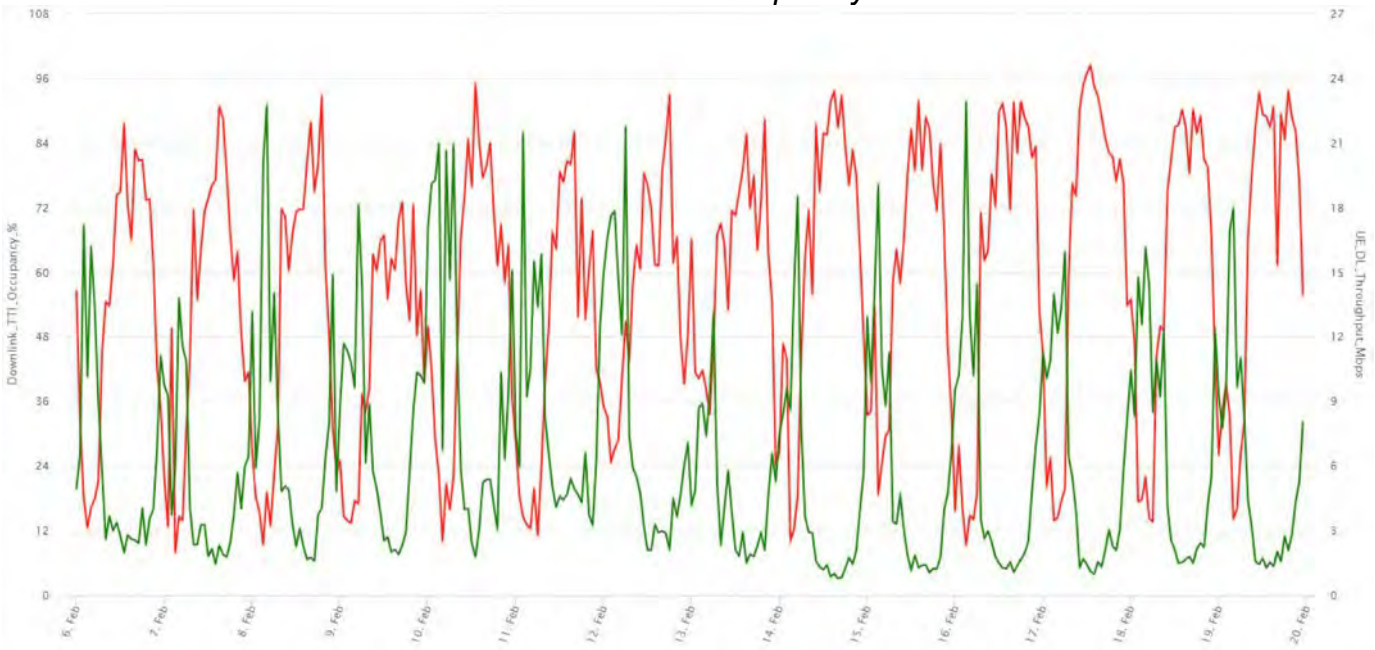
Downlink Throughput (Megabits/sec, right axis)

Dutton Road Facility Northeast-Facing (Alpha) Antenna Sector

Low-Band 700 MHz Frequency Band



Low-Band 850 MHz Frequency Band

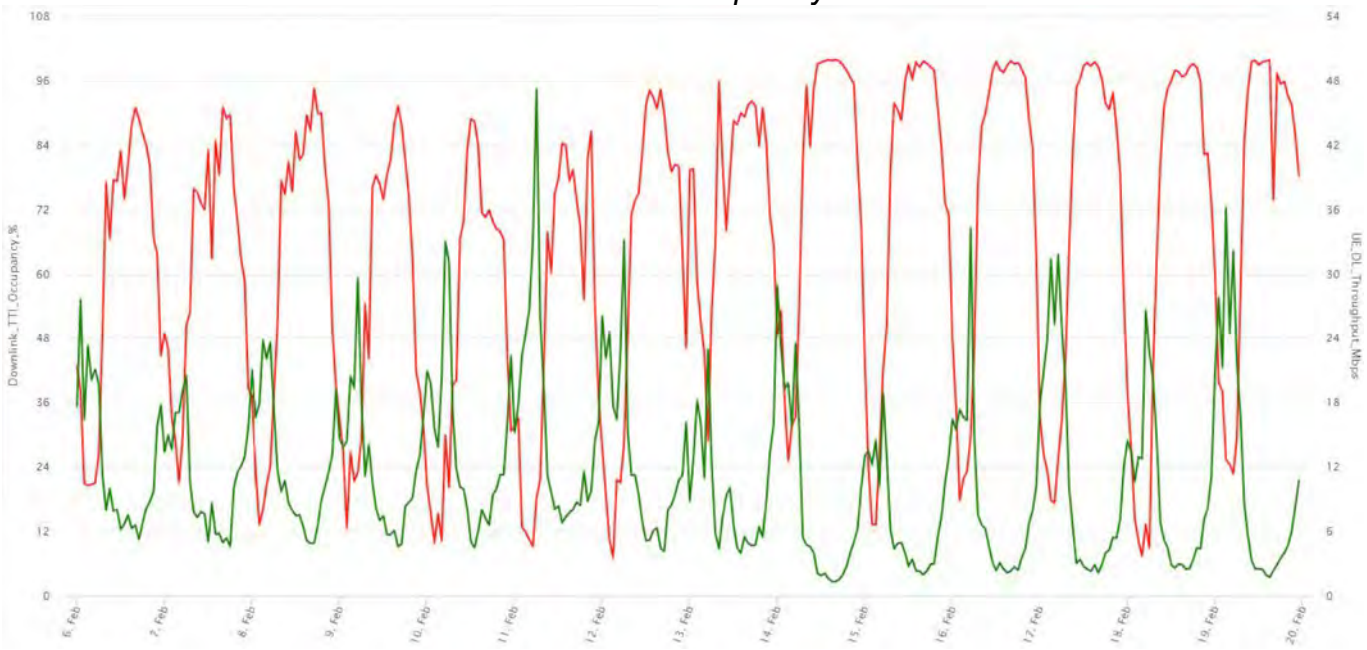


TTI Occupancy % (left axis)

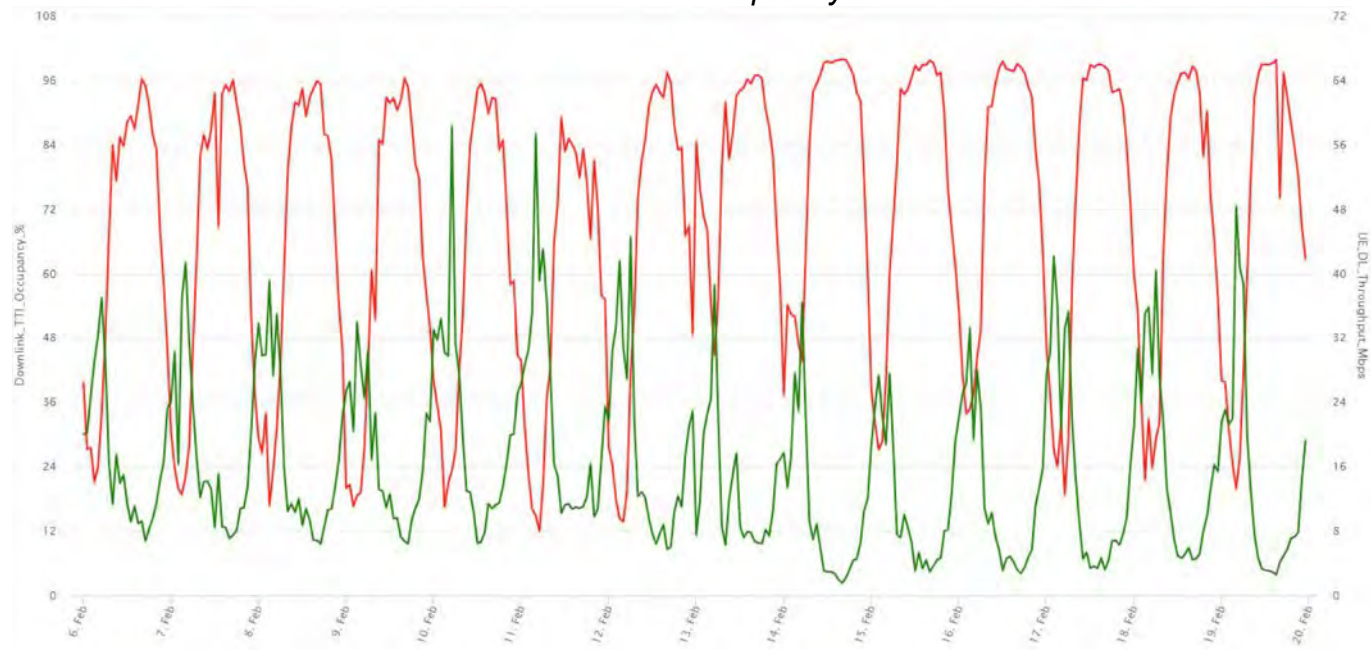
Downlink Throughput (Megabits/sec, right axis)

Dutton Road Facility Northeast-Facing (Alpha) Antenna Sector

Mid-Band PCS Frequency Band



Mid-Band AWS-1 Frequency Band

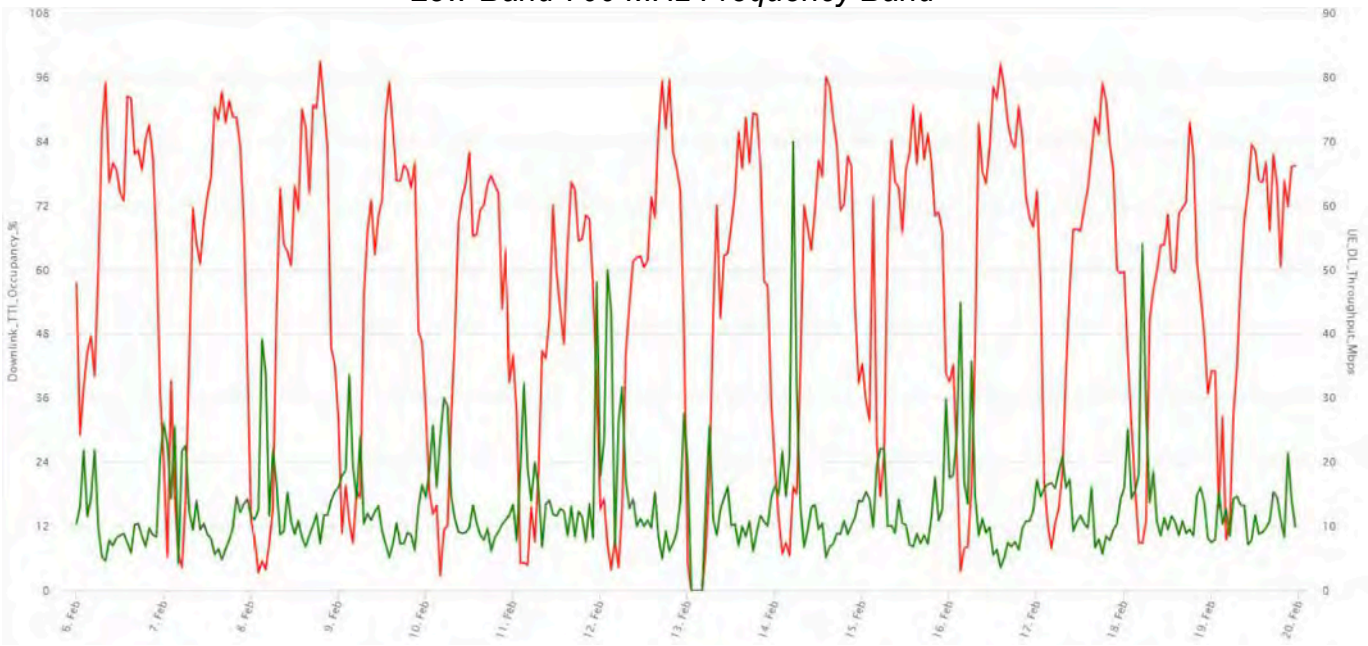


TTI Occupancy % (left axis)

Downlink Throughput (Megabits/sec, right axis)

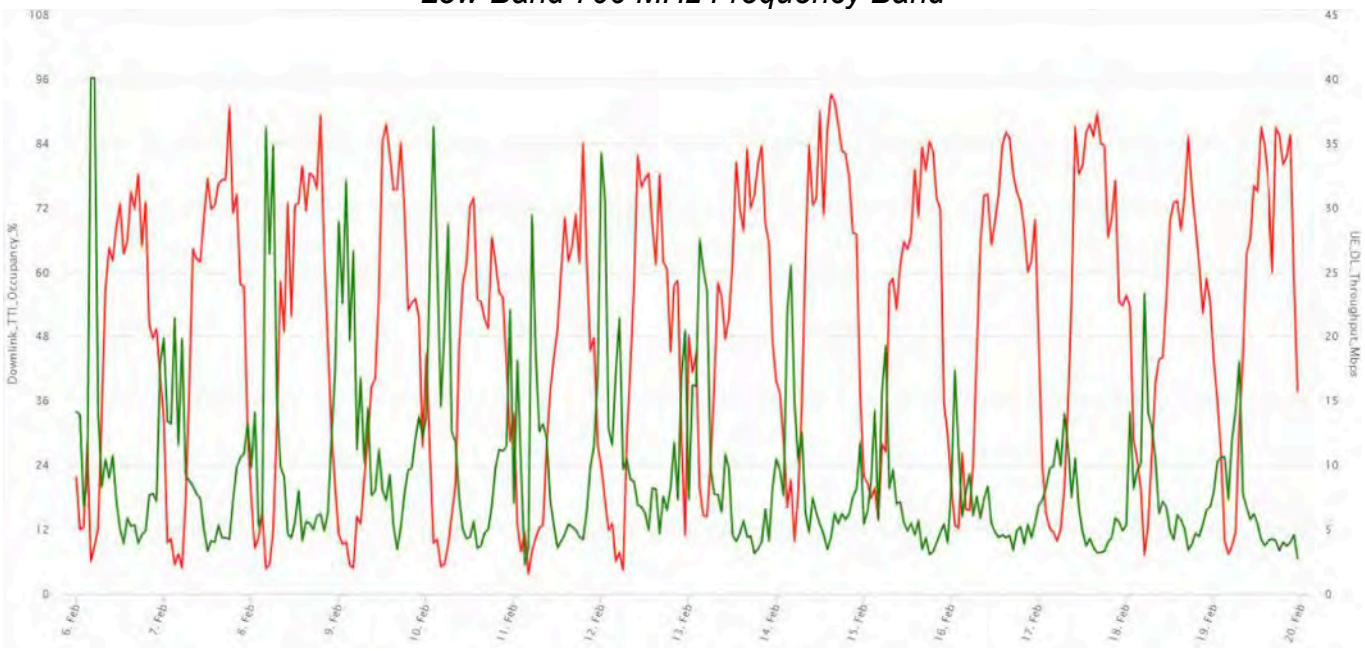
Small Cell 025

Low-Band 700 MHz Frequency Band



Small Cell 027

Low-Band 700 MHz Frequency Band



TTI Occupancy % (left axis)

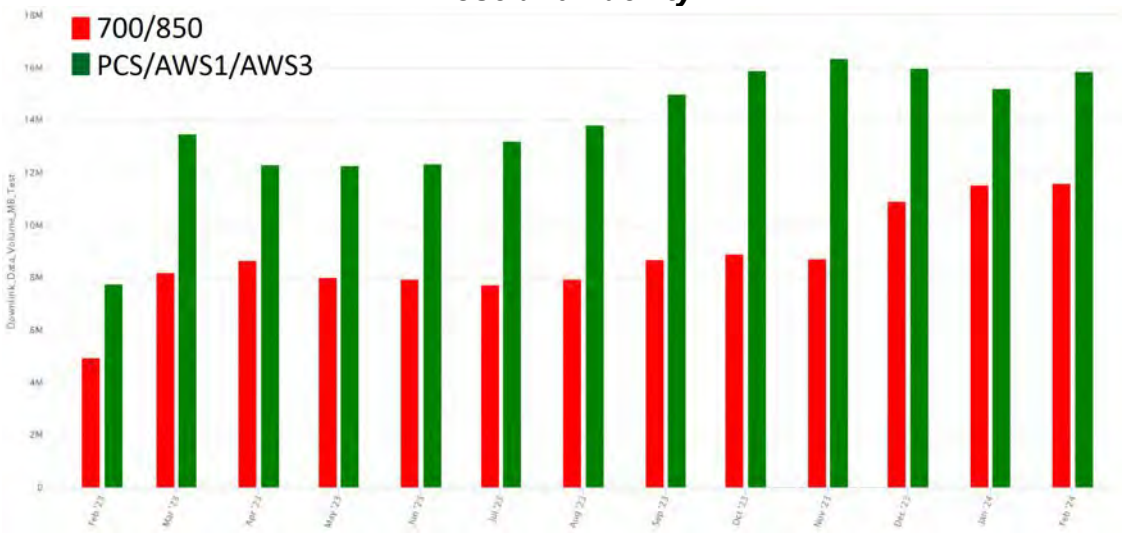
Downlink Throughput (Megabits/sec, right axis)

Increasing Demand

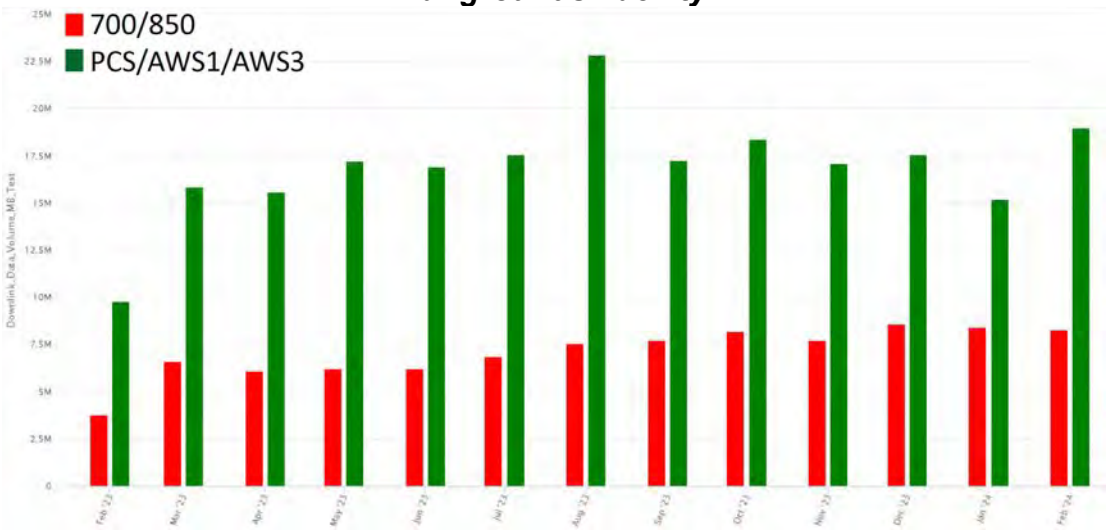
There is increasing demand on the existing Verizon Wireless facilities in the area. The following charts show the total monthly downlink data volume of surrounding macro and small cell facilities in millions of megabytes from February 2023 through February 2024. For the macro facilities, the charts distinguish data volume of the low-band 700/850 MHz and mid-band PCS/AWS frequency bands. For the small cells, the charts show total data volume of the designated frequencies operating on that facility.

The charts demonstrate the consistent and steadily increasing demand from network users in the gap area over the last year, which has led to the high TTI occupancy of certain frequency bands. Overall, the monthly downlink data volume of these facilities increased from 137.6 terabytes in March 2023 to 149.9 terabytes in February 2024. With demand trending higher, even more frequency bands will experience high TTI occupancy, resulting in low data throughput and insufficient service for even more users in the gap area.

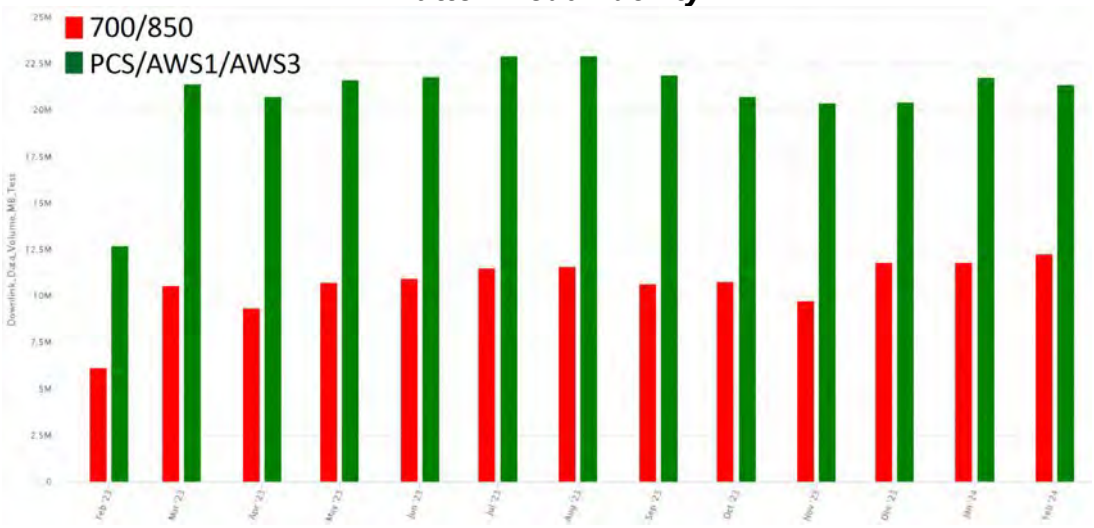
Downlink Data Volume, Millions of Megabytes
February 2023–February 2024
Roseland Facility



Fairgrounds Facility

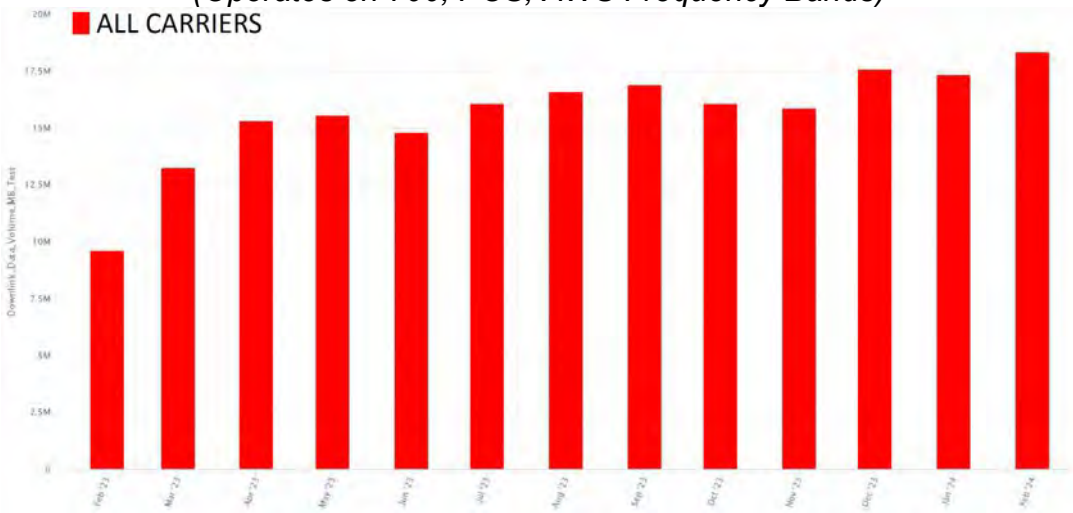


Dutton Road Facility



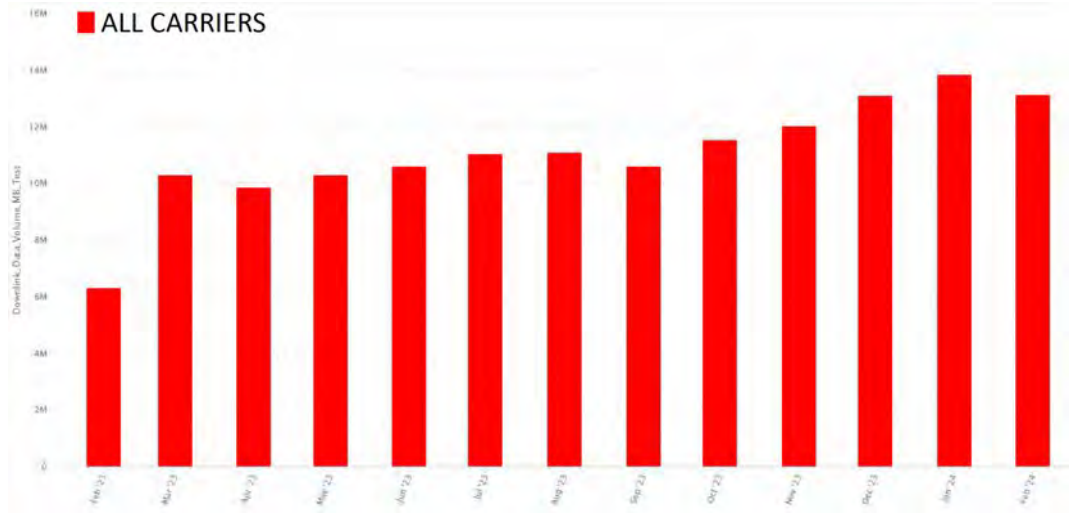
Small Cell 004

(Operates on 700, PCS, AWS Frequency Bands)



Small Cell 025

(Operates on 700 MHz, PCS, AWS Frequency Bands)



Small Cell 027

(Operates on 700, AWS Frequency Bands)

Small Cell 029

(Operates on 700, PCS, AWS Frequency Bands)

Conclusion

As the Verizon Wireless network matures, the network must be supplemented with more sites closer to customers, in large measure due to the increase in demand from network users. New wireless technology requires facilities closer to users, and this service cannot be provided adequately by the existing Verizon Wireless facilities, which provide insufficient dominant signal to the gap area and are experiencing high occupancy in many frequency bands. These network challenges have led to the Significant Gap in Verizon Wireless voice and data service in the southeast Santa Rosa area. Verizon Wireless must deploy the Proposed Facility to provide reliable service to customers, and to avoid further degradation of its network in the area of the Significant Gap.

Please feel free to contact me with any questions or comments regarding Verizon Wireless's proposed facility.

Respectfully submitted,

Pablo Sanchez
RF Design Engineer
Network Engineering Department
Verizon Wireless

My responsibilities include planning, design and implementation of improvements to network infrastructure to provide reliable service. I have 34 years of experience in the wireless telecommunications industry. I received my Bachelor of Science in Electronics & Communications Engineering degree in Manila at the University of Santo Tomas.

Exhibit D

Alternatives Analysis

Yolanda Facility

244 Colgan Avenue, Santa Rosa

March 18, 2024

Summary of Site Evaluations
Conducted by Verizon Wireless

TABLE OF CONTENTS

I. Executive Summary

Verizon Wireless must fill and significant gap in service in southeast Santa Rosa. Based on the review of 14 alternatives set forth in the following analysis, Verizon Wireless believes that placing antennas on a monopole facility at the rear of an industrial property (the "Proposed Facility") constitutes the least intrusive feasible alternative to serve the identified gap in network service based on the values expressed in the Santa Rosa Code of Ordinances (the "Code").

II. Significant Gap

There is a significant gap in Verizon Wireless network data capacity in southeast Santa Rosa, along and east of Highway 101 and south of Highway 12. Existing Verizon Wireless facilities in the greater area lack sufficient capacity to meet rapidly-increasing demand generated by network users at the adjacent Santa Rosa Marketplace shopping center, the Santa Rosa Avenue business corridor, residential areas to the north, east and south of the Proposed Facility, and heavily-trafficked roadways such as Highway 101 and Santa Rosa Avenue.

To remedy the Significant Gap, Verizon Wireless must place a new facility to ensure reliable network service. Ideally located near the center of the gap, the Proposed Facility will provide strong new dominant signal, increased network data capacity and faster data speeds to surrounding commercial and residential areas as well as busy roadways. A detailed description of the Significant Gap and the improved service to be provided by the Proposed Facility is found in the *Statement of Verizon Wireless Radio Frequency Design Engineer Pablo Sanchez.*

III. Methodology

Once a significant gap has been determined, Verizon Wireless seeks to identify a location and design that will provide required network service through the "least intrusive means" based upon the values expressed by local regulations. In addition to seeking the least intrusive alternative, sites proposed by Verizon Wireless must be feasible. In this regard, Verizon Wireless reviews the available height, local terrain, radio frequency propagation, proximity to end users, equipment space, access, and other factors such as a willing landlord in completing its site analysis.

Code Requirements

The Code requires an alternatives analysis finding that a proposed facility results in the least potentially adverse impacts of any feasible alternative. Code §§ 20-44.060(E)(2), 20-44.060(G)(1).

A new minor facility requires a minor conditional use permit in the following locations: (with respect to zones in and near the gap area)

- Building-mounted antennas on non-residential parcels within R or PD zones, within C zones, or within office/commercial/industrial areas of a PD zone.
- Towers up to 45 feet in CG, CV, IL, IG zones, or within office/commercial/industrial areas of a PD zone.

All other facilities are considered major facilities and require a conditional use permit. Code §§ 20-44.060(B), (C). Major facilities are prohibited in R zones and residential areas of a PD zone. Code § 20-44.060(F)(18). Design review is required for any facility. Code § 20-44.020.

Co-location is encouraged if possible. Code § 20-44.060(G)(3). Building-mounted facilities are encouraged over towers. Code § 20-44.060(F)(6).

Facilities should be located on the rear half of a property or structure if that does not impair signal and visual impacts are reduced. Code § 20-44.060(F)(3). Major facilities should be located at least 75 feet from off-site habitable structures (e.g., residences). Code § 20-44.060(F)(19).

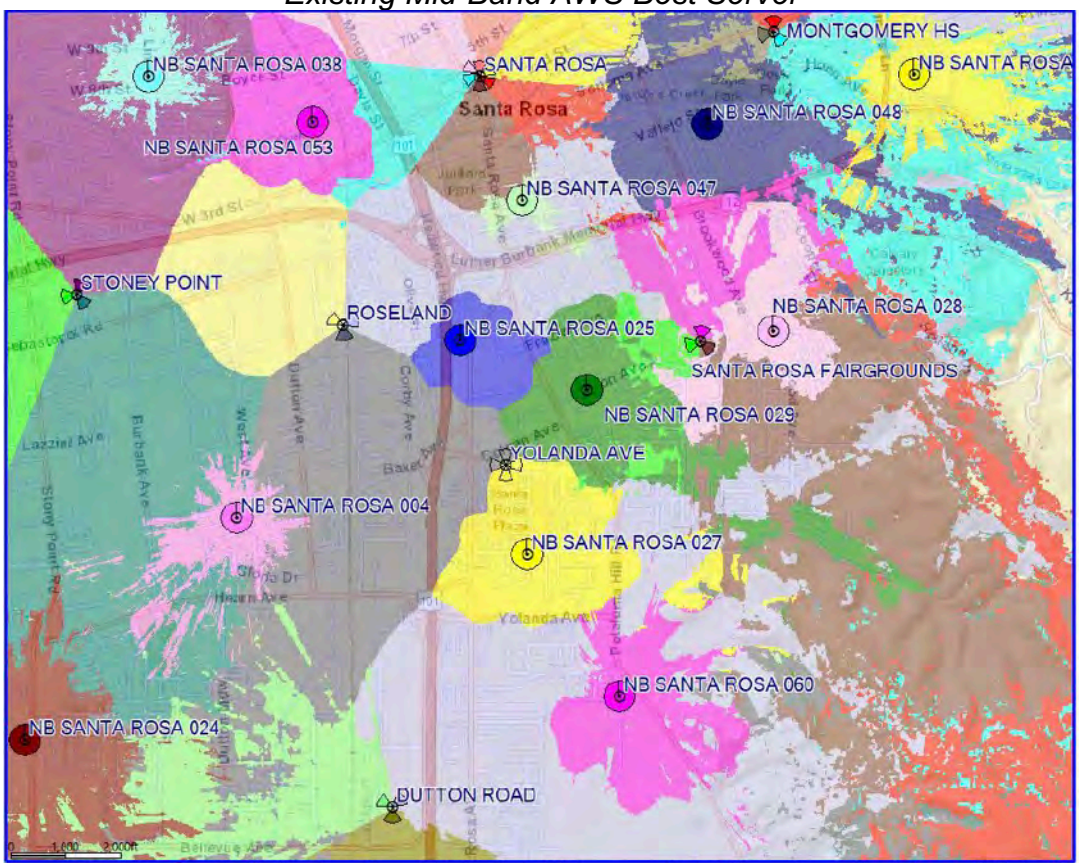
Explanation of Best Server Maps

The following best server maps depict the areas of dominant signal from each Verizon Wireless facility. Dominant signal is the strongest signal from a particular Verizon Wireless facility that is received by a user's wireless device in a particular area. The maps have been prepared for the mid-band AWS frequency. Mid-band frequency bands provide the most data capacity.

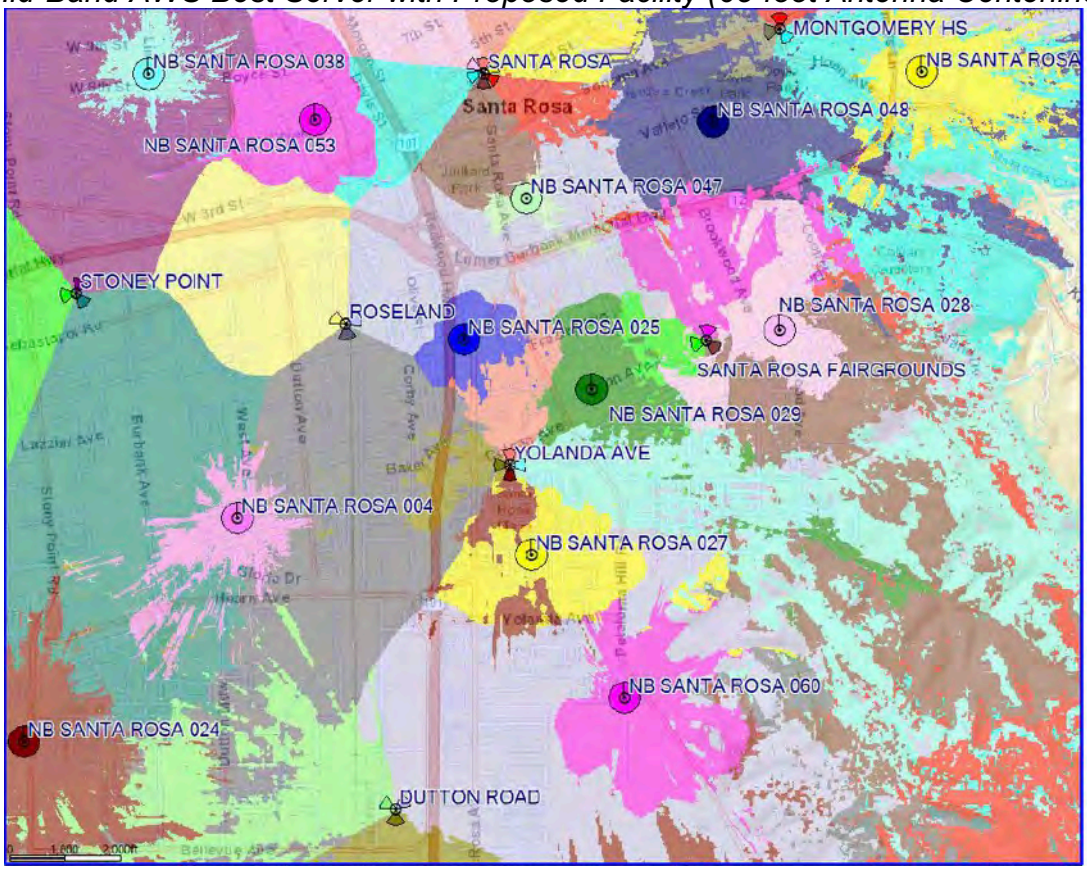
For macro facilities, the dominant signal from each antenna sector is shown in a different color. For small cell facilities, the entire facility is shown in one color.

The first map shows existing network conditions, depicting the dominant signal of the surrounding macro and small cell facilities serving the gap area. The second map adds the Proposed Facility, which will provide an AWS dominant signal footprint of 1.11 square miles, providing strong new dominant signal to the gap area and relieving existing facilities. Best server maps have also been prepared for certain alternatives in this analysis.

Existing Mid-Band AWS Best Server



Mid-Band AWS Best Server with Proposed Facility (65-foot Antenna Centerline)



Summary of Site Selection Process

Verizon Wireless first sought opportunities to collocate with existing wireless carrier facilities in the vicinity of the Significant Gap, but the two existing facilities identified in the greater area were too low in height and/or too distant to serve the gap area (Alternatives 1-2).

Next, Verizon Wireless investigated locations where a new facility could qualify for a minor conditional use permit, examining nearby non-residential buildings which are of insufficient height to elevate antennas to an antenna centerline sufficient to serve the gap. (Alternatives 3-4). A tower limited to 45 feet in height likewise could not sufficiently elevate antennas.

Next, Verizon Wireless considered properties where a new tower facility over 45 feet could be approved with a major conditional use permit, readily identifying the Proposed Facility location in an IL–Light Industrial zone (Alternative 5). Much of the area north and east of the Proposed Facility is zoned residential or PD–Planned Development with residential uses, and therefore unavailable for a major wireless facility such as a tower, though Verizon Wireless evaluated a church property to the east much closer to residences (Alternative 6). Verizon Wireless originally considered an industrial area well to the southeast around Yolanda Avenue, but ultimately determined that that area is too distant for a facility to serve the gap (Alternatives 7-14).

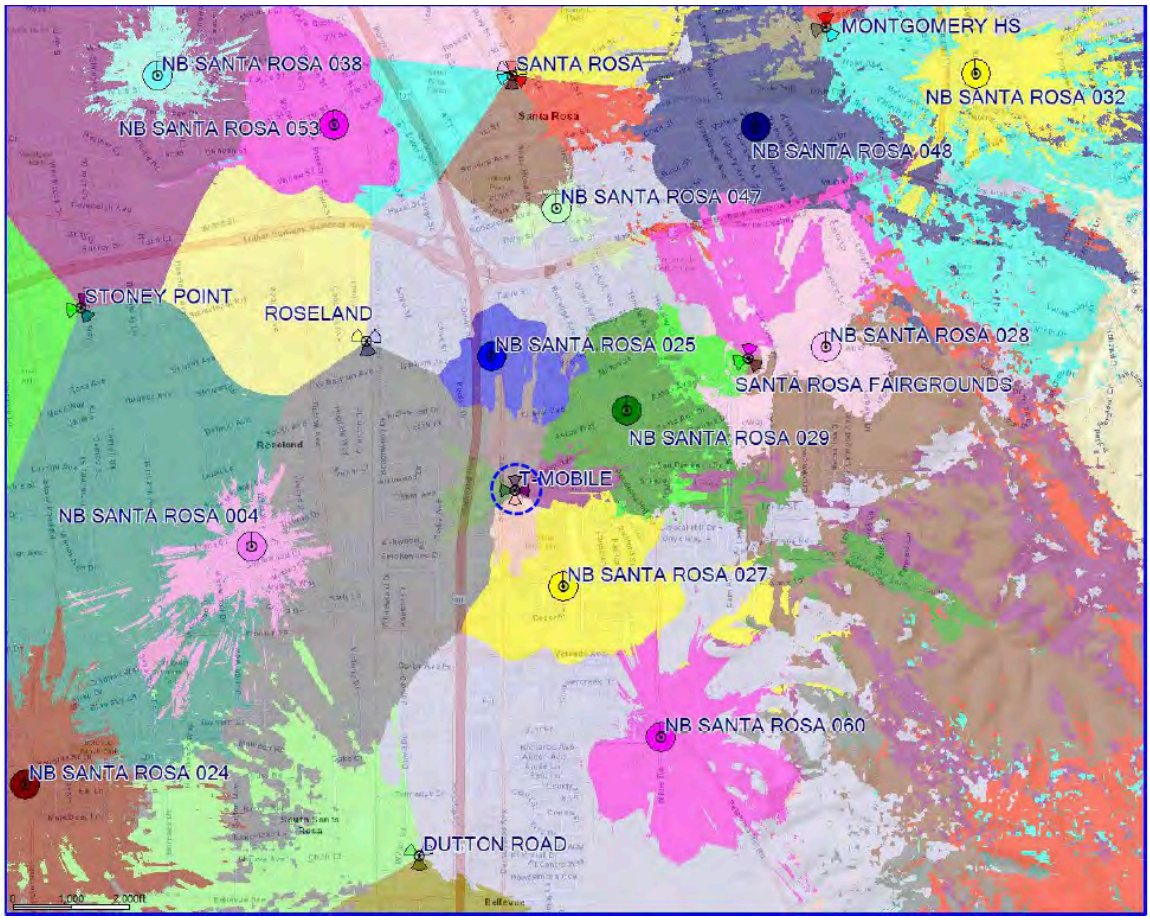
Collocation Review

Verizon Wireless investigated the greater area around the Significant Gap for existing wireless facilities, identifying the following two facilities.

1. T-Mobile at Americas Best Value Inn
Address: 1800 Santa Rosa Avenue
Zoning: CG–General Commercial
Elevation: 150 Feet

Verizon Wireless considered collocating on the roof of this two-story, approximately 20-foot hotel building located 0.05 miles west of the Proposed Facility. There has been a T-Mobile facility located in the small screened enclosure on the rooftop. In 2022, the City issued Building Permit B22-3378 to T-Mobile to remove its telecommunications facility, which would render the building not to be a collocation site. Verizon Wireless engineers determined that a rooftop facility at this location with a 28-foot antenna centerline cannot serve the Significant Gap due to low height. As shown on the following best server map, the dominant signal footprint of this alternative would be 0.57 square miles, which would be 0.54 square miles less than the Proposed Facility, notably with less new dominant signal to the south and east. This is not a feasible alternative.

Mid-Band AWS Best Server at T-Mobile Collocation Alternative
28-foot Antenna Centerline

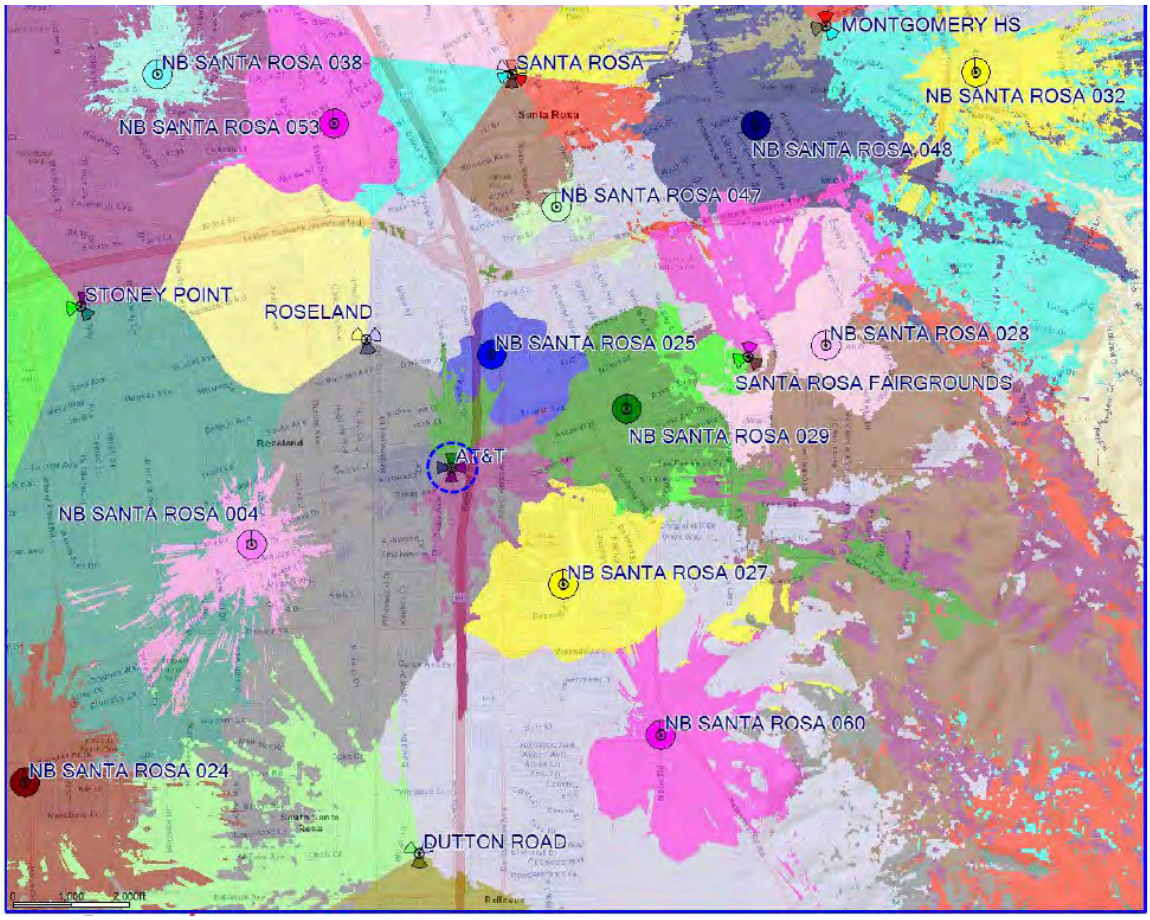


2. AT&T at Electrical Training Center

Address: 1726 Corby Avenue
Zoning: PD–Planned Development
Elevation: 145 Feet

Verizon Wireless considered collocating on the roof of this two-story, approximately 30-foot office building located 0.3 miles west of the Proposed Facility. There is already a significant amount of mechanical and wireless facility equipment on this rooftop, leaving little additional space for an additional rooftop wireless facility with multiple screened antenna areas near the edges of the roof, plus a network equipment area. Verizon Wireless engineers determined that a rooftop facility at this location with a 38-foot antenna centerline cannot serve the Significant Gap due to low height and distance. As shown on the following best server map, the dominant signal footprint of this alternative would be 0.62 square miles, which would be 0.49 square miles less than the Proposed Facility, notably with less new dominant signal to the south and east. This is not a feasible alternative.

Mid-Band AWS Best Server at AT&T Collocation Alternative
38-foot Antenna Centerline



Building-Mounted Facilities

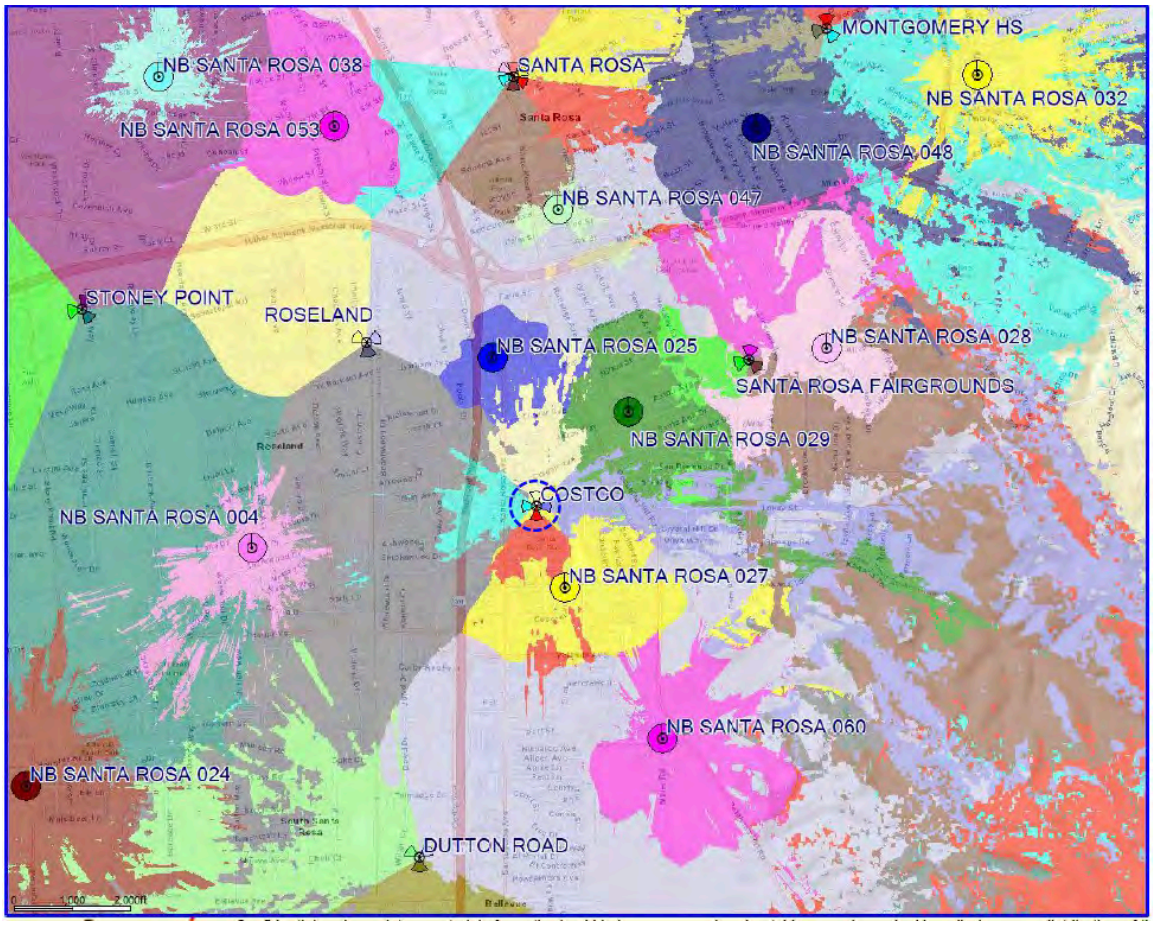
With no feasible collocation opportunity, Verizon Wireless next considered placement of a facility on nearby non-residential buildings, evaluating the taller buildings at the Santa Rosa Marketplace.

3. Costco

Address: 1900 Santa Rosa Avenue
Zoning: CG–General Commercial
Elevation: 150 Feet

Verizon Wireless considered this commercial building due south of the Proposed Facility, approximately 29 feet in height. Verizon Wireless engineers determined that a rooftop facility at this location with a 37-foot antenna centerline cannot serve the Significant Gap due to low height. As shown on the following best server map, the dominant signal footprint of this alternative would be 0.83 square miles, which would be 0.28 square miles less than the Proposed Facility, with less new dominant signal to the east. This is not a feasible alternative.

Mid-Band AWS Best Server at Costco Alternative
37-foot Antenna Centerline

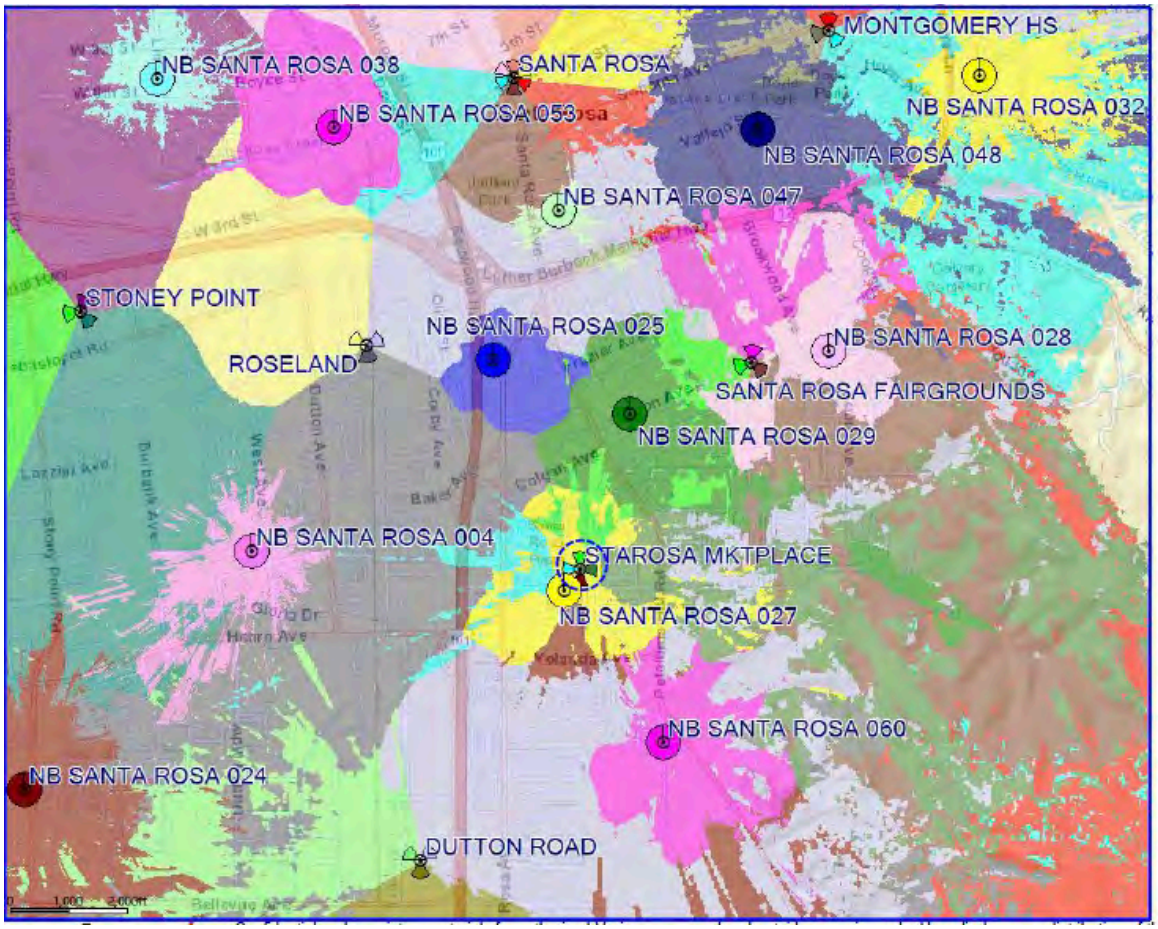


4. Santa Rosa Marketplace

Address: 1950-2100 Santa Rosa Avenue
Zoning: CG–General Commercial
Elevation: 135-140 Feet

Verizon Wireless considered the commercial buildings within the Santa Rosa Marketplace and Village Shops shopping center, located between 0.1 to 0.3 miles south and southeast of the Proposed Facility. The tallest rooftop at the shopping center is on the Target building at approximately 26 feet, 0.3 miles southeast. Verizon Wireless engineers determined that a rooftop facility at this location with a 34-foot antenna centerline cannot serve the Significant Gap due to low height and distance. As shown on the following best server map, the dominant signal footprint of this alternative would be 0.9 square miles, which would be 0.21 square miles less than the Proposed Facility, with less new dominant signal to Highway 101 to the west and to residential areas east of Petaluma Hill Road. The Target building is only 250 feet northeast of Verizon Wireless's existing Small Cell 027, so a facility here would constitute inefficient network design for this area. This is not a feasible alternative.

Mid-Band AWS Best Server at Santa Rosa Marketplace Alternative
34-foot Antenna Centerline



New Tower Facilities

With no feasible alternative where a new facility could qualify for a minor conditional use permit, Verizon Wireless explored placement of a new tower facility over 45 feet, which would require a major conditional use permit. Verizon Wireless readily identified the following location near the center of the Significant Gap, and examined nine other locations.

5. Proposed Facility
Address: 244 Colgan Avenue
Zoning: IL–Light Industrial
Elevation: 150 Feet

The Proposed Facility has been located to minimize any impact on the surrounding area. Verizon Wireless proposes to place its antennas on a 69-foot monopole, the design approved by the City's Design Review Board. The monopole will be installed within a 900-square foot lease area, secure within a chain link fence topped with barbed wire totaling 7 feet 2 inches in height. The lease area will also contain network cabinets and a backup generator to provide continued service during power outages and emergencies. There will be space on the tower for future collocation of antennas by another wireless carrier. The Approved Facility will be placed at the rear of a 1.45-acre parcel, behind a warehouse building. New utilities will be routed underground to the closest utility pole along Colgan Avenue.

With panel antennas elevated at a 65-foot centerline at this optimal location near the center of the Significant Gap, the Proposed Facility will provide strong, new dominant signal to an area of 1.11 square miles, as shown in the best server maps on Page 5, and it will increase network data capacity and data speeds for users in the gap area. This is Verizon Wireless's preferred location and design for the Proposed Facility.

While the area along Petaluma Hill Road east of the Proposed Facility and Santa Rosa Marketplace is zoned almost entirely residential or planned development residential, including the Jehovah's Witness Church at 2035 Petaluma Hill Road, there is a planned development parcel with a non-residential use, as follows.

6. Redemption Hill Church
Address: 2100 Petaluma Hill Road
Zoning: PD–Planned Development
Elevation: 165 Feet

Verizon Wireless considered this church property located 0.4 miles east of the Proposed Facility. The one-story building is of insufficient height to elevate antennas to the 65-foot centerline required for service, so a tower facility would be required. As a major telecommunications facility, a tower would be subject to setbacks of 75 feet from surrounding residences, leaving little room for a 30' x 30' wireless facility compound in the undeveloped area of the property, which is the rear parking lot. A new tower facility at this location would be surrounded by residences, posing more visual impact than the Proposed Facility, which is surrounded by industrial and commercial buildings and over 300 feet from residences. This is not a less intrusive alternative.

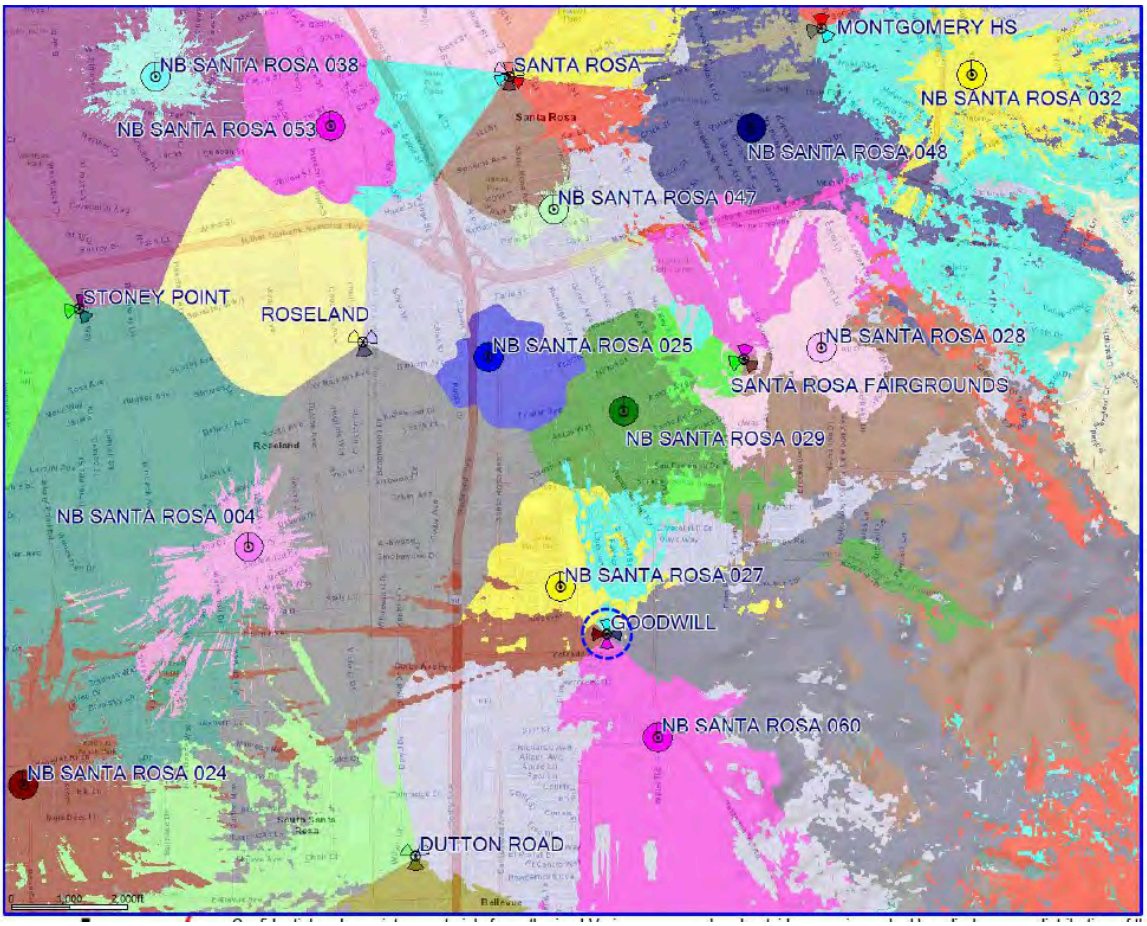
Verizon Wireless originally considered locations in industrial and commercial areas southeast along Yolanda Avenue. However, this area is too distant to provide sufficient dominant signal to the gap area, and it is southeast beyond Verizon Wireless's existing Small Cell 027.

7. Goodwill

Address: 463-467 Yolanda Avenue
Zoning: CG–General Commercial
Elevation: 155 Feet

Verizon Wireless considered this property 0.55 miles southeast of the Proposed Facility. Verizon Wireless engineers determined that a tower facility at this location with the same 65-foot centerline as the Proposed Facility cannot serve the Significant Gap due to distance. The dominant signal footprint would be well southeast of the Proposed Facility footprint, and would not include the Santa Rosa Marketplace and residential areas north of Colgan Avenue. After negotiation, the Goodwill ultimately declined a lease proposal at this location. This is not a feasible alternative.

Mid-Band AWS Best Server at Goodwill Alternative
65-foot Antenna Centerline



8. Wyatt Family Trust

Address: 747 Yolanda Avenue
Zoning: IL–Light Industrial
Elevation: 155 Feet

Verizon Wireless considered this property 0.55 miles southeast of the Proposed Facility. Verizon Wireless engineers determined that a tower facility at this location with the same 65-foot centerline as the Proposed Facility cannot serve the Significant Gap due to distance. This property is even farther southeast than the Goodwill (Alternative 7), so would provide even less dominant signal to the Significant Gap. This is not a feasible alternative.

9. Watt

Address: 2823 Petaluma Hill Road
Zoning: IL–Light Industrial
Elevation: 160 Feet

Verizon Wireless considered this property located 0.6 miles southeast of the Proposed Facility. Verizon Wireless engineers determined that a tower facility at this location with the same 65-foot centerline as the Proposed Facility cannot serve the Significant Gap due to distance. This property is even farther southeast than the Goodwill (Alternative 7), so would provide even less dominant signal to the Significant Gap. This is not a feasible alternative.

10. Nessinger Properties

Address: 444 Yolanda Avenue
Zoning: IL–Light Industrial
Elevation: 150 Feet

Verizon Wireless considered this property with several one-story buildings located 0.55 miles southeast of the Proposed Facility. With the remaining areas of the property occupied by parking and driveways, there is limited space for a wireless facility equipment area. Verizon Wireless engineers determined that a tower facility at this location with the same 65-foot centerline as the Proposed Facility cannot serve the Significant Gap due to distance. This property is even farther southeast than the Goodwill (Alternative 7), so would provide even less dominant signal to the Significant Gap. This is not a feasible alternative.

11. Ulicny

Address: 468 Yolanda Avenue
Zoning: IL–Light Industrial
Elevation: 150 Feet

Verizon Wireless considered this property with several one-story buildings located 0.55 miles southeast of the Proposed Facility. With the remaining areas of the property occupied by parking and driveways, there is limited space for a wireless facility equipment area. Verizon Wireless engineers determined that a tower facility at this location with the same 65-foot centerline as the Proposed Facility cannot serve the Significant Gap due to distance. This property is even farther southeast than the Goodwill (Alternative 7), so would provide even less dominant signal to the Significant Gap. This is not a feasible alternative.

12. 800 Yolanda LLC

Address: 800 Yolanda Avenue
Zoning: IL–Light Industrial
Elevation: 155 Feet

Verizon Wireless considered this large, mostly vacant property located 0.6 miles southeast of the Proposed Facility. Verizon Wireless engineers determined that a tower facility at this location with the same 65-foot centerline as the Proposed Facility cannot serve the Significant Gap due to distance. This property is even farther southeast than the Goodwill (Alternative 7), so would provide even less dominant signal to the Significant Gap. This is not a feasible alternative.

13. Rogers

Address: 3015 Petaluma Hill Road
Zoning: R-1–Residential
Elevation: 150 Feet

Verizon Wireless considered this property located 0.65 miles southeast of the Proposed Facility. A major wireless facility is not allowed in a residential zone, so a tower over 45 feet could not be permitted at this location. This is not a feasible alternative.

14. Cunningham

Address: 3018 Petaluma Hill Road
Zoning: N/A (Sonoma County jurisdiction)
Elevation: 155 Feet

Verizon Wireless considered this property located 0.75 miles southeast of the Proposed Facility. Verizon Wireless engineers determined that a tower facility at this location with the same 65-foot centerline as the Proposed Facility cannot serve the Significant Gap due to distance. This property is even farther southeast than the Goodwill (Alternative 7), so would provide even less dominant signal to the Significant Gap. This is not a feasible alternative.

V. Conclusion

Verizon Wireless has considered 14 specific alternatives to fill the Significant Gap in service in southeast Santa Rosa. Based upon the values expressed in the Santa Rosa Code of Ordinances, the Proposed Facility clearly constitutes the least intrusive feasible location for Verizon Wireless's new facility.

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Yolanda Facility
Alternative Site Locations