“Freshwater Road”

Alternative Sites Analysis

In support of a proposed wireless telecommunications facility

By Verizon Wireless and TowerCo

at

250 Misty Hills Lane

Eureka, California

APN: 431-081-013

Date: February 20, 2025

Applicant Agent:

COMPLETE
Wireless Consulting, Inc.

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History

Verizon Wireless ("Verizon") has been trying to provide service to the City of Eureka for over four years. This portion of the City of Eureka and Humbolt County lacks sufficient wireless coverage and high-speed broadband internet services resulting in a coverage gap. Additionally, the existing Verizon facilities surrounding this area are overloaded, leading to a 'stressed' less reliable network and a capacity gap. TowerCo and Verizon are proposing a 150' tall monopole at 250 Misty Hills Lane in the mountain ranges near the City of Eureka to help alleviate this condition by providing extra network coverage and capacity.

Methodology

Selecting a location for a wireless telecommunications facility needed to improve service and provide reliable coverage depends on many factors, such as: topography, zoning regulations, existing structures, co-location opportunities, available utilities, site access, and a willing landlord. Wireless communication utilizes a line-of-sight technology that requires facilities to be in a relatively close proximity to the wireless handsets to be served. Each proposed candidate is unique and must be investigated and evaluated on its own merits.

The proposed coverage area includes residential, commercial, retail, and recreational uses in the City of Eureka and Humboldt County, as well as highways and arterial roads leading to and from The City of Eureka. Providing service to this area is particularly challenging due to the diverse topography and dense morphology. This proposed location, situated atop a mountain, provides an ideal location for wireless signals to reach greater distances. The parcels on the mountain are typically 5 to 20 acres, providing opportunities to meet setbacks. The large parcels also create a natural buffer that reduces visual impact from neighboring parcels. Given the heavily varied terrain in this part of the county, having sufficient elevation is crucial to avoid the need for multiple towers at lower elevations to achieve the same coverage. More towers in the lower elevations would be more visually intrusive. In addition, the parcel size for the land uses in the lower elevations are generally smaller with greater structure density than the parcels in the hills where our site is proposed. Due to the smaller, more dense parcels, the lower elevation offers extraordinarily little opportunity to meet setbacks from buildings and property lines for a new telecommunications structure.

Current Coverage

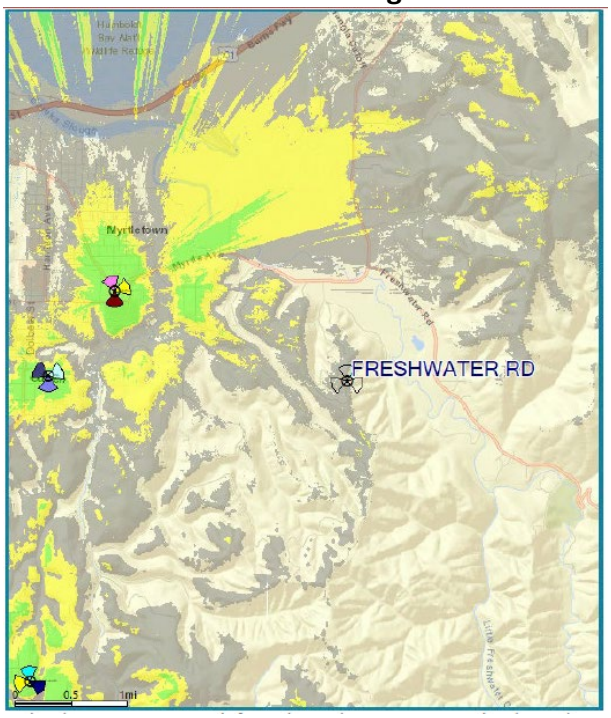
To analyze the coverage and capacity solutions that drive network design, Verizon Wireless uses a proprietary radio frequency propagation prediction tool and a variety of topography, morphology and clutter data sets to predict the coverage and signal strength and analyze network design. These tools are extensive and sophisticated but can still only produce a computer-generated model of how a frequency may propagate and cannot accurately present incremental changes in antenna heights on a structure. For this reason, we have provided two propagation maps below at 35' and 150' which is the height that Verizon radio frequency engineers have determined, in their professional opinion and experience, will satisfy the coverage and capacity gaps their network is currently experiencing.

a) Green: until -85 dBm. This signal threshold represents a level of service adequate for providing reliable coverage inside a building. It provides good indoor and outdoor service.

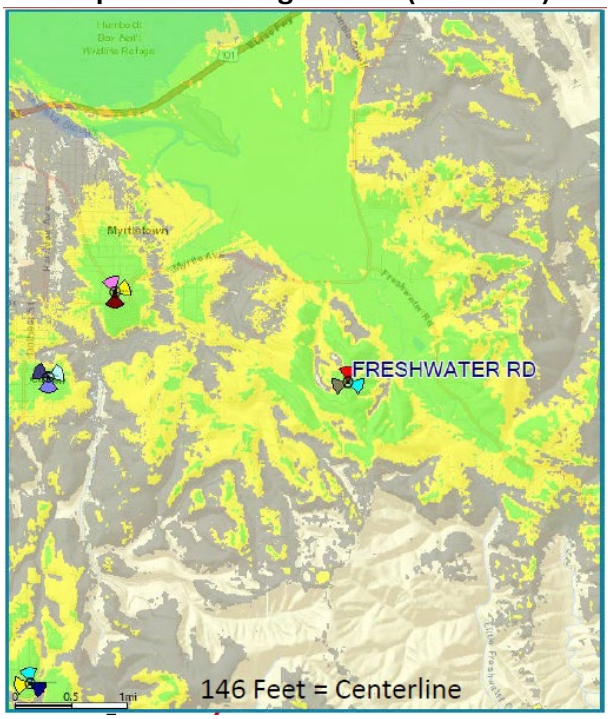
b) Yellow: until -95 dBm. This signal threshold represents a level of service adequate for providing reliable coverage outdoors or inside a car, but indoor or in-building coverage is unreliable. It provides good outdoor and in-car service but inadequate indoor service as QOS will be (or start getting) hampered.

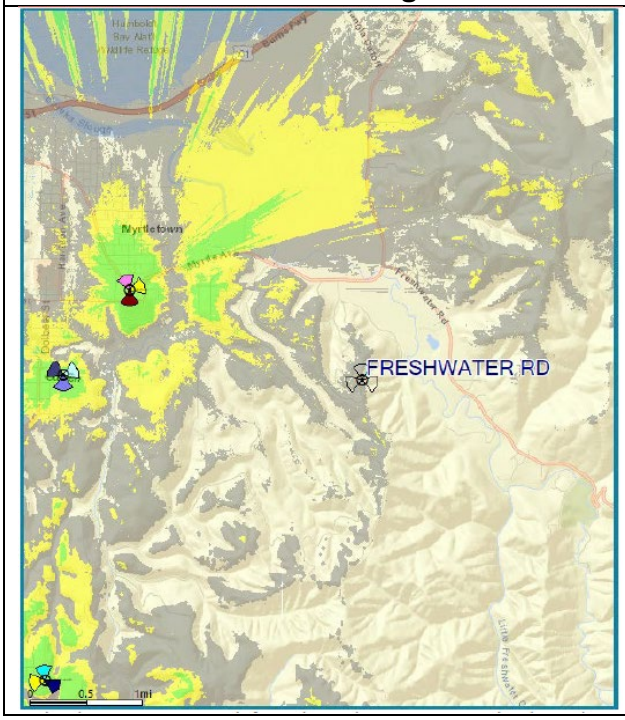
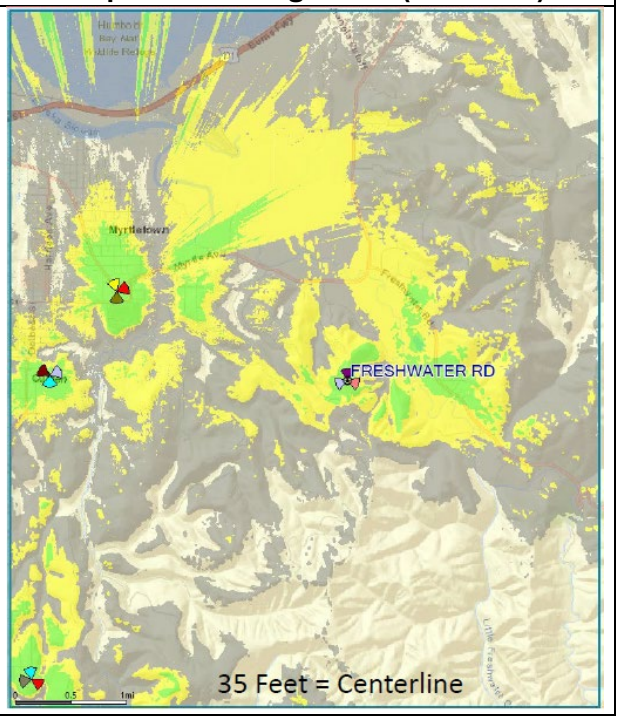
c) Light Grey: until -120 dBm. This signal threshold represents a signal quality that is unreliable when making and/or holding a call. Very slow latency and data speeds. Both outdoor and indoor QOS will be unreliable.

Current Coverage



Proposed Coverage at 146' (Activated)



Current Coverage	Proposed Coverage at 35' (Activated)
	

Selection Process

In 2021, Verizon determined that the service objectives discussed above must be met. After establishing the need for the proposed facility, Verizon set out to identify the least intrusive means of achieving the necessary service objective. A total of nine candidates were considered in the process of selecting the proposed location. Verizon radio frequency engineers begin their process by a search area parameter and a required structure height for the antennas to provide coverage to the service area needed. Properties outside this "search ring" cannot be considered because they are outside the engineering parameter that would meet the coverage objectives.

The following factors are considered when identifying the need and location of a new wireless facility.

1. Coverage. An antenna site must be located where the radio frequency broadcasts provide adequate coverage within any significant coverage gap. The RF engineer must consider the coverage objectives for the site and the terrain in and around the area to be covered. Since radio frequency broadcasts travel in a straight line and diminish as they travel further away from the antennas, placing an antenna site near the center of the desired coverage area is generally best. However, in some instances, the search ring may be located away from the center of the desired coverage area due to the existing coverage, the surrounding terrain, or other features that might affect the radio frequency broadcasts, like buildings or sources of electrical interference.

2. Capacity. Capacity refers to the technological limitation of a wireless communication facility to provide communication. Mobile phones and wireless devices transmit to and receive radio frequency signals from antennas at wireless communication facilities. Antennas can transmit and receive a finite amount of signal – the capacity. When capacity is reached, busy signals on phones result, and data transmission is lost. Monitoring of each wireless facility is continuous, and the data collected is analyzed for planning to prevent overloading. Projections based on the data allow Verizon to plan, design, permit, and construct new facilities or modify existing wireless communication facilities before reaching or exceeding capacity, which can result in a loss of coverage.

3. Clutter. Verizon's antennas must "clear the clutter" in the area. Trees, buildings, and other natural and built obstacles adversely affect the radio frequencies used in Verizon's systems. Radio frequencies do not penetrate mountains, hills, rocks, or metal. Therefore, antennas must be installed above the "clutter" to provide high-quality communications services in the desired coverage areas. In addition, if the local code requires us to accommodate additional carriers on the structure, the structure must be even higher to allow the other carriers' antennas to clear the clutter.

4. Call Handoff. The antenna site must be located where the radio broadcasts from this site will allow seamless call handoff with adjacent sites. "Call handoff" is a feature of a wireless communications system that allows an ongoing telephone conversation to continue uninterrupted as the user travels from the coverage area of one antenna site into the coverage area of an adjacent antenna site. This requires coverage overlap for a sufficient distance and time to support the handoff mechanism.

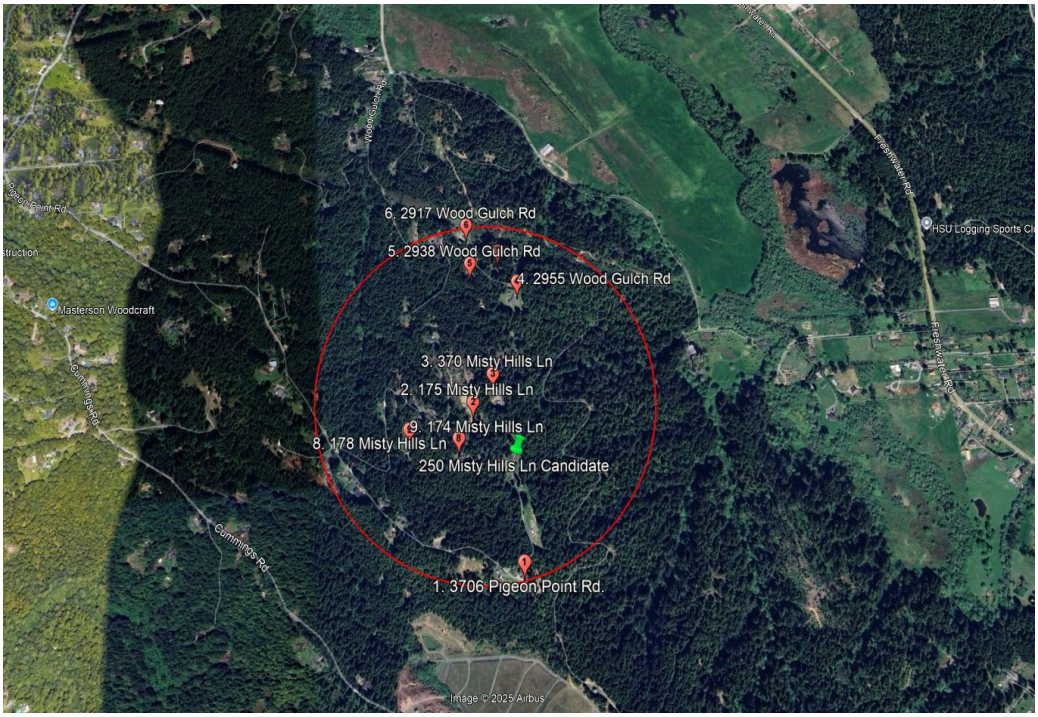
5. Quality of Service. Wireless communications users want to use their services where they live, work, commute, and play, including indoors. Verizon's coverage objectives include providing indoor coverage in areas with residences, businesses, and indoor recreational facilities.

6. Radio Frequencies Used by System. The designs of telecommunications systems will vary significantly based on the radio frequencies used by the carrier. If the carrier uses radio frequencies in the 850 to 950 MHz range, the radio signals will travel further and penetrate buildings better than the radio frequencies in the 1900 MHz band. Thus, Verizon needs more antennas in a given area to support technologies that use the 1900 MHz band.

7. Enhanced 911 (E911) Requirements. In addition to providing improved service to Verizon customers, the proposed antenna location is needed to meet FCC requirements for Enhanced 911 (E911) service. The wireless E911 program is divided into two phases. Phase I requires wireless carriers, upon request from a local Public Safety Answering Point (PSAP), to report the telephone number of a wireless 911 caller and the location of the antenna that received the call. Phase II of the E911 program requires wireless carriers to provide far more precise location information, within 50 to 100 meters in most cases.

The proposed facility aims to address and mitigate Verizon's significant service coverage gap within the Eureka area and the surrounding communities of Myrtletown, Freshwater, and Bracut, which are bounded by Highway 101 and Myrtle Avenue. Additionally, this facility will enhance and provide new service coverage for the communities along Highway 101, Myrtle Avenue, and Freshwater Road, extending southward past Freshwater Park near Neeland Road. This includes the homes located near Misty Hills Lane and Wood Gulch Avenue, as well as the intersection of Myrtletown Road and Freshwater Road. According to the California Department of Transportation's (Caltrans) Average Annual Daily Traffic (AADT) data, the Highway 101 corridor near Myrtle Avenue experiences over 23,400 daily trips, amounting to approximately 8,541,000 trips annually. Furthermore, the proposed communication site will extend coverage to Murray Field Airport and the commercial properties bordering Highway 101, ranging from just west of the airport eastward to the Redwood Coast RV Resort.

Search Ring and Alternative Candidates



The search area circled in red represents the area within which a facility can be located to produce the desired coverage objective. The centerline with an average height of 147' represents the required height of the antennas to produce the desired coverage objective. After evaluating the County's zoning regulations, the next step is to identify any existing towers within the search ring that could allow for a collocation. In this case, Verizon determined there are no existing towers or buildings to collocate on in this area. This TowerCo facility will be the first and is designed to hold up to three additional carriers.

Our chosen candidate was selected due to their uniquely shaped parcel, which allows for the construction of a structure of 150' according to Verizon's radio frequency engineers. The ground elevation of 460 AMSL feet contributes to a higher coverage level achievement, enabling wider coverage and reducing the need for additional towers at lower elevations. Tree removal is not proposed, as the parcels residential home are distanced from the tower.

We opted for a monopole structure instead of a monotree design. This choice ensures that future wireless carriers can collocate on this facility, providing more space for vertical lease area on the structure. Moreover, the monopole structure results in a lower overall height for the facility, as a monotree design would require approximately 10% additional height, making it a total of 165' to account for the "natural" looking tree crown.

Verizon identified nine potential alternatives sites prior to selecting the presently proposed location. Below is a list of candidate properties that were considered for the proposed facility, as well as an explanation as to why each site was not selected.

1. <u>3706 Pigeon Point Rd, Zone AG, 21.30 Acres, APN 403-081-023-000, 500' AMSL</u>

Verizon evaluated and selected this candidate site for a new facility due to the size of the parcel and Verizon's ability to situate the proposed site to meet setbacks and height requirements. The property owner responded and was interested in entering into a lease agreement. While the project was in motion, the landowner rescind his interest in July 2024 and the project died. This candidate is no longer viable.

2. <u>175 Misty Hills Ln, Zone RS, 17.98 Acres, APN 403-081-014-000, 367' AMSL</u>

This candidate sits on a large 17-acre parcel and was considered for a wireless facility. However, due to the lower natural elevation, this site would require a tower 80' taller than the 150' tall monopole proposed at 250 Misty Hills Lane to provide the same service. Furthermore, the landowner did not respond to interest letters submitted in March 2023 via US mail. This candidate is not viable.

3. <u>370 Misty Hills Ln, Zone RS, 4.61 Acres, APN 403-081-012-000, 360' AMSL</u>

Verizon investigated this parcel for a potential facility. The dynamic terrain would necessitate significant grading, tree removal and retaining walls that would scar the natural landscape. Additionally, this site is less preferred by Verizon engineers as it sits at a lower elevation than our current candidate. The property owner did not respond to attempts of contact in March 2023 via US mail. This candidate is not viable or less intrusive than our proposed site.

4. **<u>2955 Wood Gutch Rd, Zone RS, 2.82 Acres, APN 403-071-035-000, 330' AMSL</u>**

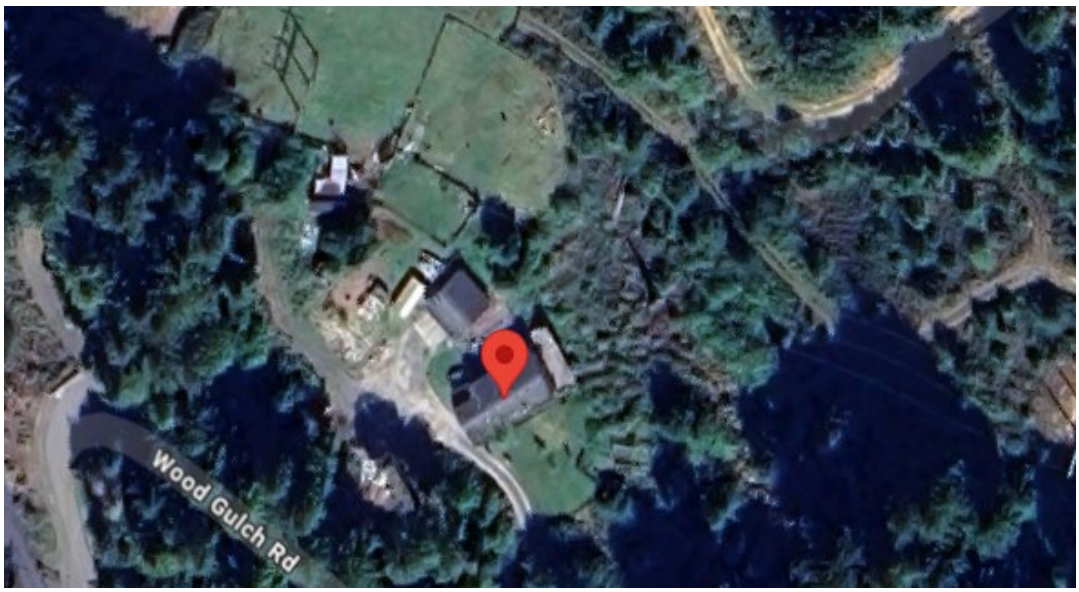
Verizon evaluated this parcel as a potential site for a new facility. However, its location would not provide coverage to alleviate the current capacity strain on the surrounding towers. Due to the unusual shape of the parcel and the orientation of the dwelling, any feasible tower locations would not meet the County's required setback from the nearest residential parcel. Additionally, a site at this location would involve invasive tree removal. Lastly, this site is less preferred by Verizon engineers as it sits at a lower elevation than our current candidate. This candidate is neither viable nor less intrusive than our current proposed site.

5. <u>2938 Wood Gutch Rd, Zone RS, 2.82 Acres, APN 403-071-043-000, 287' AMSL</u>

Verizon evaluated this smaller 0.2-acre parcel as a potential site for a new facility. However, this location would not alleviate the current capacity strain on the surrounding towers. Due to the lower natural elevation, this site would require a tower 65' taller than the proposed site to provide the same service. This would not be less intrusive than our currently proposed location. Additionally, as this parcel is densely wooded with heavy terrain, a new installation would be too invasive to be viable. Lastly, the property owner did not respond to attempts of contact in March 2023 via US mail. This candidate is not viable.

6. <u>2917 Wood Gutch Rd, Zone RS, 4.92 Acres, APN 403-071-036-000, 292' AMSL</u>

Verizon evaluated this parcel as a potential site for a new facility. However, its location would not provide better coverage than our proposed site or alleviate the current capacity strain on the surrounding towers. This parcel is burdened with diverse terrain, and construction for a new site here would cause invasive visual impact to the area's aesthetics. Furthermore, this site is less preferred by Verizon engineers as it sits at a lower elevation than our current candidate. Lastly, the property owner did not respond to attempts of contact in March 2023 via US mail. This candidate is not viable.

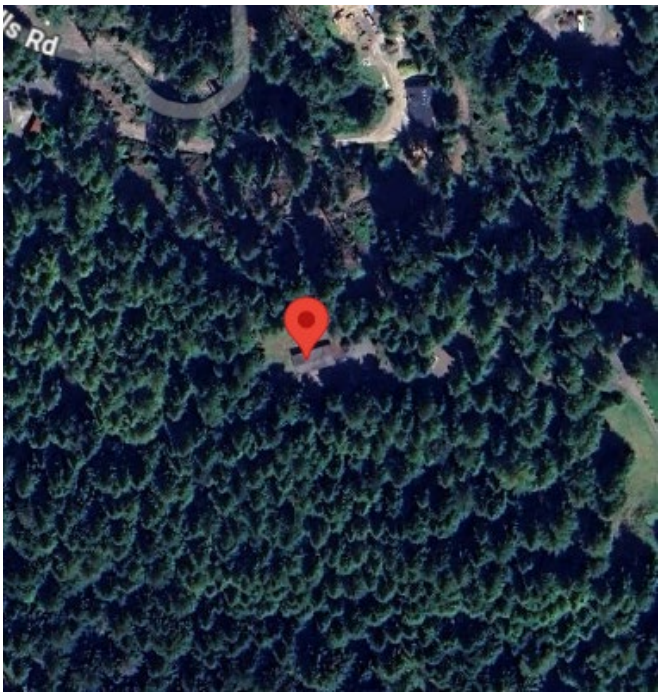


7. **<u>2939 Wood Gutch Rd, Zone RS, 4.92 Acres, APN 403-071-036-000, 305' AMSL</u>**

Verizon evaluated this parcel as a potential site for a new facility. However, its location would not alleviate the current capacity strain on the surrounding towers. This site is less preferred by Verizon engineers as it sits at a substantially lower elevation than our current candidate and would require a much more substantial tower to meet the same coverage objective. The property owner did not respond to attempts of contact in March 2023 via US mail. This candidate is not viable.

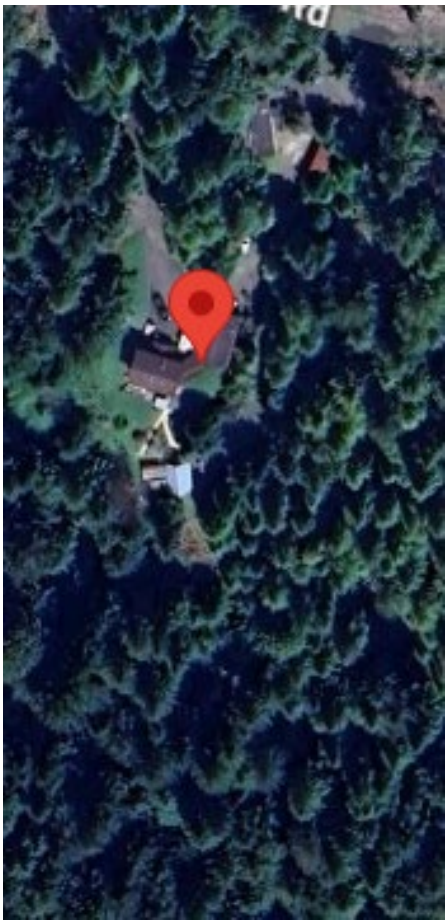
8. <u>178 Misty Hills Ln, Zone RS, 5.0 Acres, APN 403-081-016-000, 385' AMSL</u>

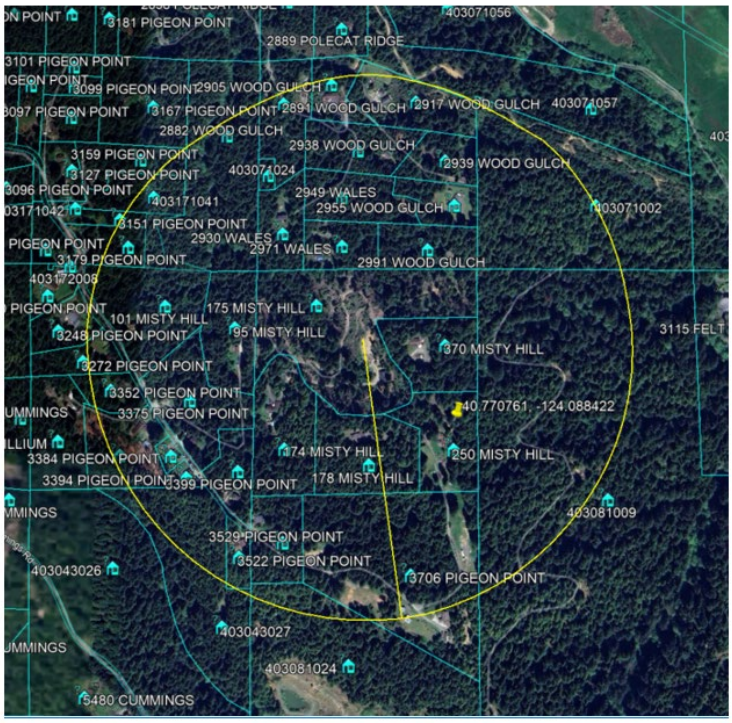
Verizon investigated this parcel for a potential facility. The property owner expressed interest in working with Verizon; however, a facility at this location would not meet the County's required setback from the nearest residential parcel. Furthermore, the parcel is heavily forested and a facility at this location would require invasive tree removal and grading for the access road. This candidate is not viable.



9. **<u>174 Misty Hills Ln, Zone RS, 4.38 Acres, APN 403-081-015-000, 335' AMSL</u>**

Verizon investigated this parcel for a potential facility. The property owner expressed interest in working with Verizon. However, due to this parcel's lower elevation and challenging terrain, a site at this location would not provide coverage to alleviate the current capacity strain on the surrounding towers. Furthermore, a site at this location would involve invasive tree removal. This candidate is neither viable nor less intrusive than our current proposed site.





In addition to the parcels already considered and reviewed above, we also examined every parcel within the search area and have identified the following details. There are 13 properties that have not been contacted, due to the following reasons:

- Insufficient elevation that fails to meet Verizon's radio frequency engineer requirements
- Inability to meet setback requirements from the nearest residential parcel
- Lack of utilities
- Lack of existing access roads
- Dynamic topography necessitating significant tree removal

Please refer to the map above, circled in yellow, for 13 additional alternatives considered, but not contacted because they are not suitable for a proposed wireless facility. Below is a list of candidate properties that were considered for the proposed facility, as well as an explanation as to why each site was not selected.

10. 3522 Pigeon Point Rd, 4.0 Acres, APN 403-081-019, 387' AMSL

Due to the small size of the parcel, a site at this location would not meet the County's required setbacks from the nearest residential property boundary. Furthermore, any signal from a site located on this segment of Pigeon Point Rd will be obstructed and create a radio frequency "shadow" and provide inferior coverage to the town of Freshwater. For these reasons, this candidate is neither viable nor less intrusive than the candidate proposed.

11. 529 Pigeon Point Rd, 4.0 Acres, APN 403-081-006, 387' AMSL

This location is too low to provide adequate coverage to alleviate the current capacity strain on the surrounding towers. Furthermore, a site at this location would involve invasive tree removal. Lastly, a site at this location would have to be substantially taller than the proposed site and would not be less intrusive.

12. 3399 Pigeon Point Rd, 4.21 Acres, APN 403-043-042, 344' AMSL

This location would not provide adequate coverage to alleviate the current capacity strain on the surrounding towers. Additionally, without access to commercial power service, a site at this location would not be viable. Furthermore, a site at this location would involve invasive tree removal. This candidate is neither viable nor less intrusive than our current proposed site.

13. 3394 Pigeon Point Rd, 0.60 Acres, APN 403-043-017, 344' AMSL

Due to the small size of the parcel, a site at this location would not meet the County's required setbacks from the nearest residential parcel boundary. Additionally, a site at this location would not provide adequate coverage to alleviate the current capacity strain on the surrounding towers.

14. <u>3384 Pigeon Point Rd, 0.60 Acres, APN 403-043-016, 326' AMSL</u>

Due to the small size of the parcel, a site at this location would not meet the County's required setbacks from the nearest residential parcel boundary. Additionally, a site at this location would not provide adequate coverage to alleviate the current capacity strain on the surrounding towers. A site at this location would have to be substantially taller than the proposed site and would not be less intrusive.

15. <u>3372 Pigeon Point Rd, 5.05 Acres, APN 403-081-013, 322' AMSL</u>

A site at this location would not provide adequate coverage to alleviate the current capacity strain on the surrounding towers. A site at this location would have to be substantially taller than the proposed site and would not be less intrusive. This candidate is neither viable nor less intrusive than our current proposed site.

16. <u>3348 Pigeon Point Rd, 2.4 Acres, APN 403-043-039, 340' AMSL</u>

A site at this location would not provide adequate coverage to alleviate the current capacity strain on the surrounding towers. A site at this location would have to be substantially taller than the proposed site and would not be less intrusive. Furthermore, any site at this location would need to be situated in the back portion of the parcel, and would involve invasive tree removal.

17. <u>3719 Pigeon Point Rd, 21.3 Acres, APN 403-081-023, 348' AMSL</u>

A site at this location would not provide adequate coverage to alleviate the current capacity strain on the surrounding towers. A site at this location would have to be substantially taller than the proposed site and would not be less intrusive. Furthermore, any site located on this segment of Pigeon Point Road will be shadowed by the terrain, and provide inferior coverage to the town of Freshwater. For these reasons, this candidate is not less intrusive than the candidate proposed.

18. <u>3151 Pigeon Point Rd, 1 Acre, APN: 403-171-008, 368' AMSL</u>

Due to the narrow shape of the parcel, this location would not meet the County's required setbacks from the nearest residential property boundary.

19. <u>195 Misty Hills Ln, 6.5 Acres, APN 403-043-049, 182' AMSL</u>

A site at this location would not provide adequate coverage to alleviate the current capacity strain on the surrounding towers. Additionally, without access to commercial power service, a site at this location would not be viable. Lastly, a site at this location would involve invasive tree removal. This candidate is neither viable nor less intrusive than our current proposed site.

20. <u>2949 Wales Ln, 4.3 Acres, APN 403-071-039, 253' AMSL</u>

A site at this location would not provide adequate coverage to alleviate the current capacity strain on the surrounding towers. Furthermore, this location is over 100' lower in natural elevation than the current accepted location, providing inferior coverage to the area. Additionally, without access to commercial power service, a site at this location would not be viable. Lastly, a site at this location would involve invasive tree removal. This candidate is neither viable nor less intrusive than our current proposed site.

21. <u>2917 Wales Ln, 4.30 Acres, APN 403-071-043, 291' AMSL</u>

A site at this location would not provide adequate coverage to alleviate the current capacity strain on the surrounding towers. Additionally, this location is over 100' lower in natural elevation than the current accepted location, providing inferior coverage to the area. Furthermore, a site at this location would involve invasive tree removal.

22. <u>2949 Wales Ln, 4.3 Acres, APN 403-071-039, 270' AMSL</u>

A site at this location would not provide adequate coverage to alleviate the current capacity strain on the surrounding towers. Furthermore, this location is over 100' lower in natural elevation than the current accepted location, providing inferior coverage to the area. Additionally, without access to commercial power service, a site at this location would not be viable. Lastly, a site at this location would involve invasive tree removal. This candidate is neither viable nor less intrusive than our current proposed site.

Conclusion

Overall, a total of 23 candidates were identified in the prescribed search area. Due to the extreme terrain, which require taller tower heights than our proposed location and long access roads with the need for tree removal, many of the potential candidates were eliminated due to being more visible and difficult to construct. Additionally, many of the property owners in the area were not responsive or not interested in entertaining a lease for a telecommunications facility. Lastly, many of the identified parcels were too small to comply with the County's requirements to setback the tower by its height from the nearest residential property lines. Due to the reasons provided above, the current proposed candidate at 250 Misty Hill Lane is the least intrusive means to fill this significant gap in coverage and capacity.