PD31 Bethany Crest
RF Justification

November 2025

Exhibit H.3

SERVICE OBJECTIVES & TARGETED SERVICE AREA

AT&T is proposing to build a new wireless communication facility ("WCF" or "facility"), PD31 Bethany Crest, located at 13937 NW Springville Rd (45.569894/ -122.825297) in Multnomah County.

Service Objectives—Generally

AT&T strives for a network design that provides high radio frequency ("RF") signal strength and signal-to-interference-plus-noise ratio ("SINR") resulting in quality service inside buildings and vehicles. To support this network design there are two main drivers that prompt the need for a new cell site—coverage and capacity.

"Coverage" is the need to expand wireless service into an area that either has no service or bad service. "Capacity" is the need for more wireless resources. Cell sites have a limited number of resources to handle voice calls, data connections, and data volume. When these capacity limits are reached, user experience quickly degrades. Capacity issues for LTE networks are identified by using SINR metrics to measure the network's signal quality when there is a high traffic load condition. High traffic areas in the network experience poor SINR due to the increased amount of signal noise/interference generated by the interfering strength of the simultaneous transmissions (*i.e.* too many users accessing the network in a given area).

Service Objectives & Targeted Service Area—Proposed New Facility

This proposed facility is intended to fill a significant gap in AT&T's 4G LTE (voice and data) network coverage and mobility experienced by its customers in the "Target Area," especially enhancing in-building coverage and capacity along NW Kaiser Rd, NW Springville Rd, and NW Laidlaw Rd, including the residences in the North Bethany and Bethany neighborhoods. AT&T's 4G LTE service over the 700 MHz frequency band is AT&T's primary layer of service in and around Bethany. This Facility will also include AT&T's 850MHz *low-band* 5th Generation ("5G") technology. AT&T's 850MHz low-band 5G technology is further explained at the end of this document. This service objective and Targeted Service Area were determined by AT&T's RF engineers through a combined analysis of market demand, customer complaints, service requests, and RF engineering design (including SINR metrics). In addition to AT&T 4G LTE commercial facilities, this proposed WCF will include facilities to support FirstNet. As a FirstNet site, this proposed WCF is part of a more significant initiative by AT&T to upgrade existing wireless sites and to build new sites to support FirstNet and deploy the new frequency band for first responders ("Band 14").

As determined by AT&T's RF engineers, the proposed new Facility meets AT&T's service objectives to provide sufficient continuous and uninterrupted outdoor, in-vehicle, and in-building wireless service (voice and data) within the Targeted Service Area, resulting in fewer dropped calls, improved call quality, and improved access to additional wireless services the public now demands (this includes emergency 911 calls).

SEARCH RING & PREFERRED LOCATION

SEARCH RING

AT&T's RF engineers performed an RF engineering study—considering multiple objectives—to determine the approximate site location and antenna height required to best fulfill the noted service objectives within the Targeted Service Area. From this study, AT&T's RF engineers identified a "search ring" area, identified in **Figure A—Search Ring,** where a new wireless facility may be located to provide effective service in the Targeted Service Area. A discussion of the general methodology AT&T's RF engineers used to identify the Search Ring is included at the end of this RF Justification document. **The original search ring (outlined in red) had to be expanded because no viable candidate was found in the original search ring. The blue outline indicates the expanded search ring, and the light blue (dashed) ellipse indicates the extended search area used by AT&T's team to conservatively consider additional parcels outside but near the search ring.**

PREFERRED LOCATION

Radio frequency broadcasts travel in a straight line and diminish as they travel further away from the antennas; therefore, it is generally best to locate a facility near the center of the identified Search Ring and Targeted Service Area. Accordingly, the location of the proposed new WCF is centered geographically within the expanded Search Ring to maximize the coverage and signal dominance within the Targeted Service Area.

ANTENNA HEIGHT & SIGNAL STRENGTH

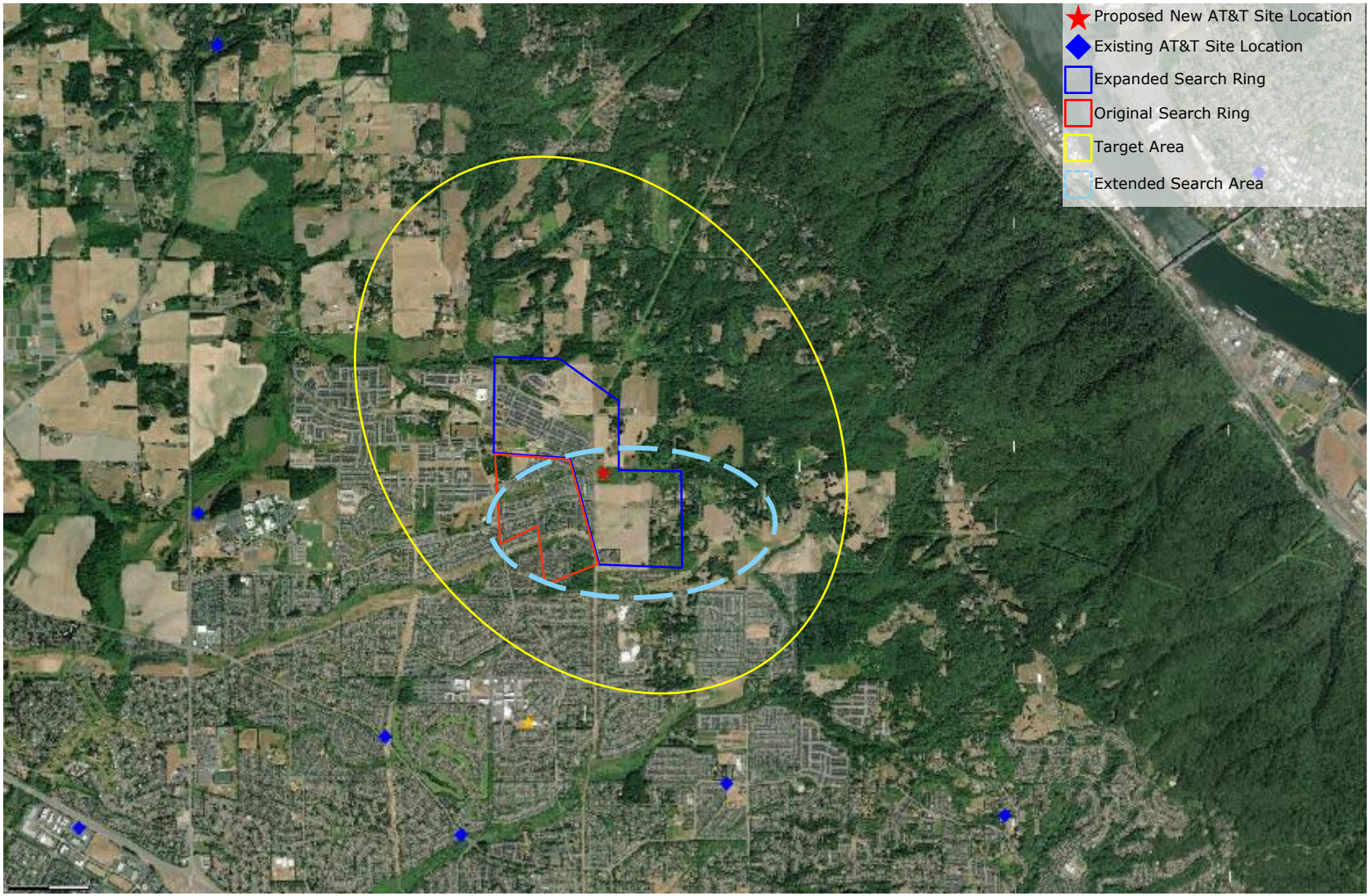
ANTENNA HEIGHT

Antenna height plays an equally important role in meeting the service objectives within the Targeted Service Area. The proposed antenna tip height of 140ft was determined by considering various factors such as the height of surrounding wireless sites, ground elevation, obstructions to the signal, and the surrounding terrain. Based upon these factors, AT&T's RF engineers determined that the proposed 140ft antenna tip height is the minimum necessary to best meet AT&T's service objectives to provide dominant coverage and enhanced capacity within the Targeted Service Area. The proposed antenna tip height is also the height where an AT&T wireless device can be reliably used to make and receive telephone calls and use data service in the presence of varying signals. As further detailed in this document, a lower antenna tip height at the proposed location would not provide as effective dominant coverage and capacity improvement within the Targeted Service Area and would not meet AT&T's service objectives for the proposed Facility.

SIGNAL STRENGTH

To provide adequate, reliable, and high-quality wireless services in any given area, AT&T must have continuous and uninterrupted outdoor, in-vehicle, and in-building wireless service coverage in that area. A stronger signal is required for reliable in-building wireless service, as compared to in-vehicle or outdoor service. This is due primarily to the signal strength attenuation that occurs when wireless signals pass through solid materials. AT&T seeks to provide a wireless signal strong enough to make and sustain reliable connections to the AT&T network from the ground floor of a typical building. This is an industry standard service objective. Signal strength is commonly measured and expressed in terms of decibel milliwatts (dBm), with higher numbers representing stronger signals. Here, AT&T determined that this requires a signal strength of at least -98 dBm to provide indoor and outdoor 4G LTE coverage in the targeted service area.

Figure A—Search Rings



PROPOSED NEW AT&T FACILITY

ANTENNAS AND EQUIPMENT

To meet the above coverage objectives, this proposed site will contain up to 9 panel antenna and 18 RRH units (together with all associated accessory equipment).

PROJECTED NEW COVERAGE

Figure B—Existing AT&T Coverage shows existing AT&T wireless services in the general area of the proposed new site, which demonstrates the current gap in coverage in the targeted service area. The red star indicates the location of the proposed new WCF. The blue diamond indicates the location of existing AT&T WCF sites; coverage from AT&T's existing WCF sites is shaded in green. As can be seen, there is a coverage gap in all areas not shaded in green. Currently, the target coverage area has minimal to no 4G or 5G voice service and does not have adequate 4G or 5G LTE service. Specifically, along NW Kaiser Rd, NW Springville Rd, NW Laidlaw Rd and residences of North Bethany and Bethany neighborhoods.

Figure C—Projected New AT&T Coverage identifies the projected coverage from the proposed new WCF with the requested antenna tip height of 140ft. The proposed antenna tip height is the minimum necessary to help fill the coverage gap relative to nearby complementary wireless facilities and to support the FirstNet Network. This is also the height where an AT&T wireless device can be reliably used to make and receive telephone calls and use data service in the presence of varying signals.

Figure B—Existing AT&T 4G LTE (700 MHz) Coverage

Targeted Service Area BEFORE Addition of Proposed New WCF

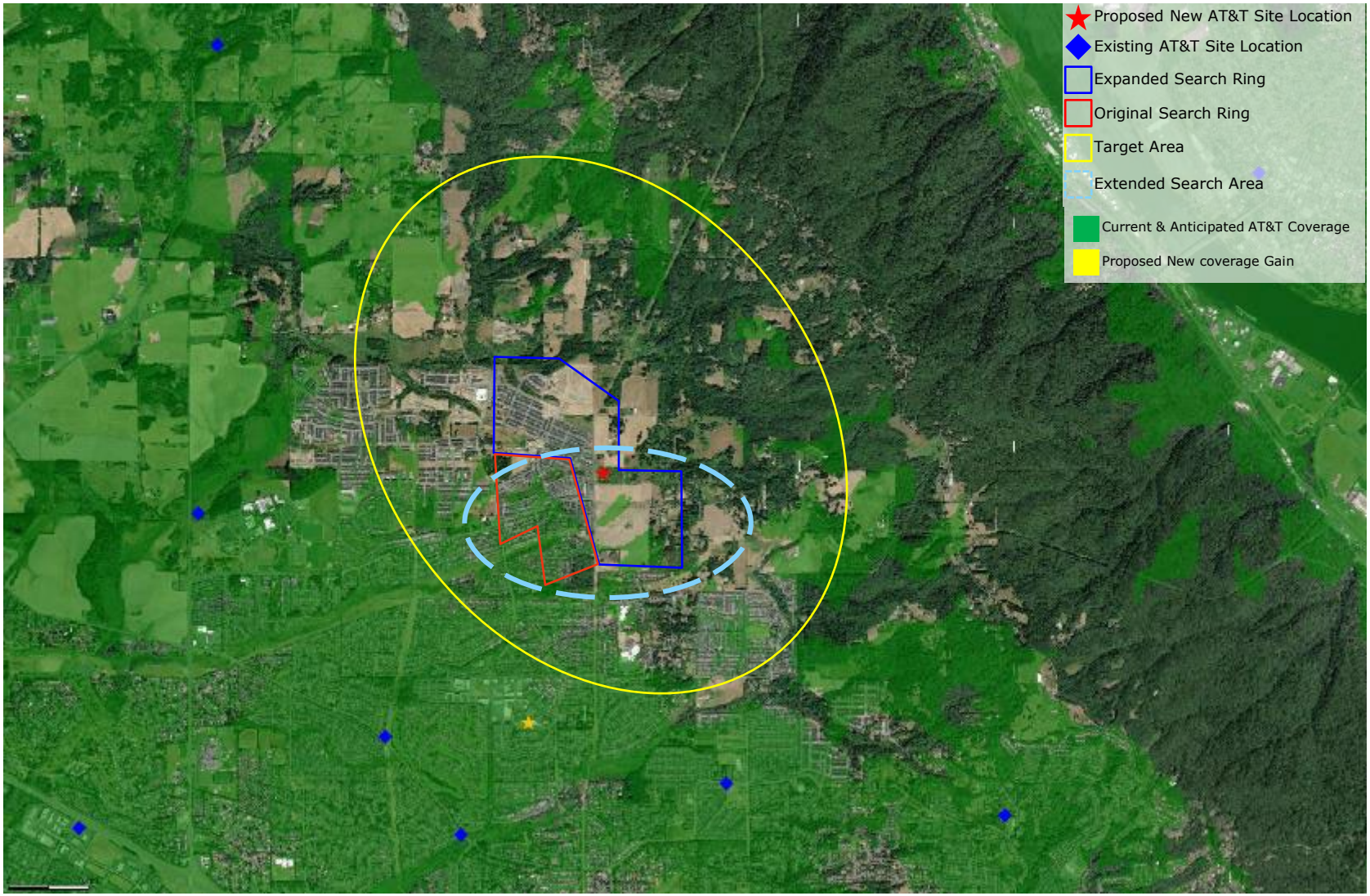
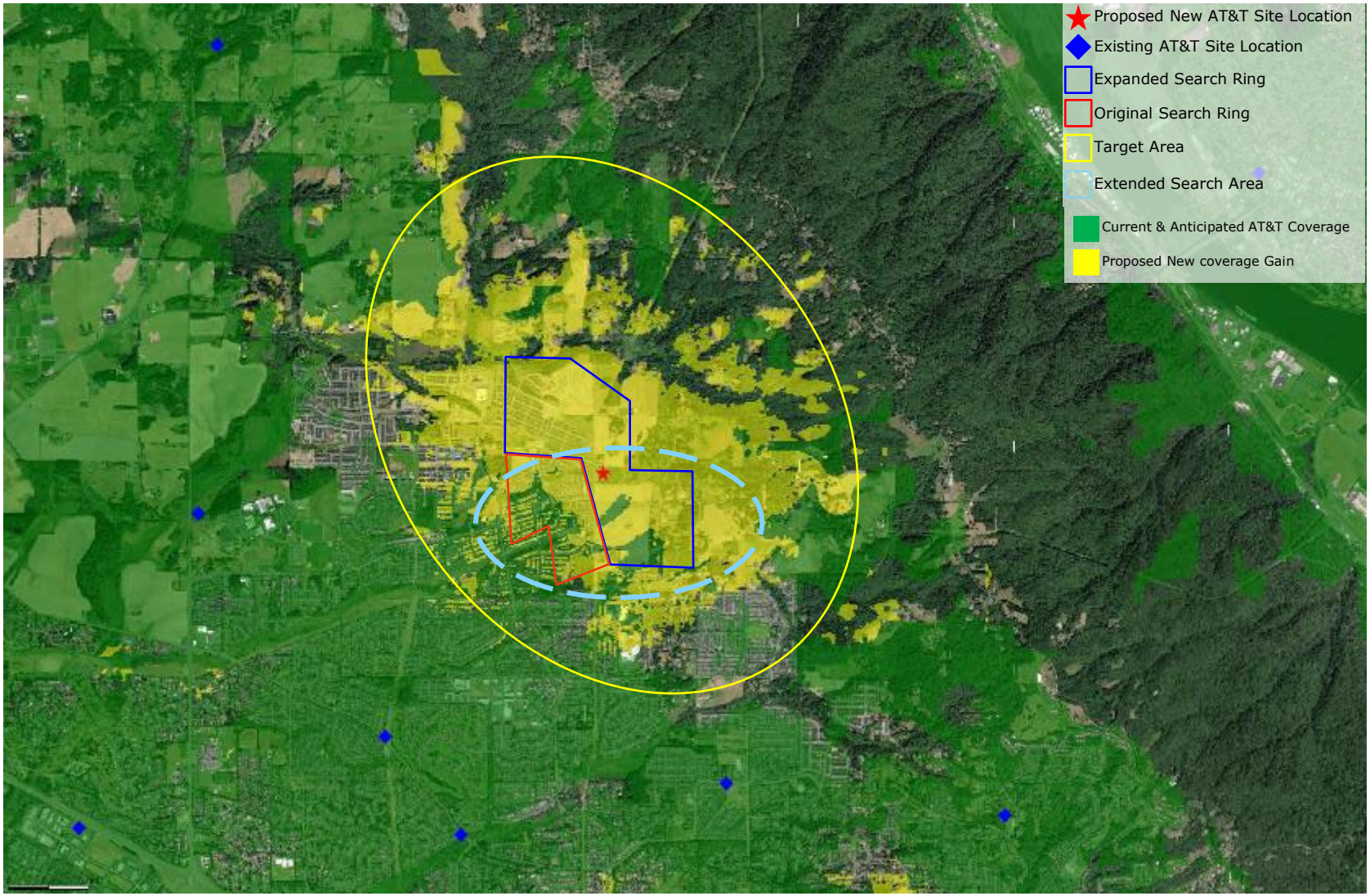


Figure C—New AT&T 4G LTE (700 MHz) Coverage

Projected New AT&T Coverage AFTER Proposed New WCF On-Air—140ft Antenna Tip Height



Alternative Site Analysis

AT&T considers all siting possibilities within, and adjacent to, a search ring to determine the best location for a new facility to meet AT&T's service objectives for the Targeted Service Area. AT&T will first attempt to utilize an existing tower or structure for collocation at the desired antenna height. If an existing tower or structure is not available or determined to be infeasible, AT&T will then propose a new tower. For this proposed Facility, AT&T's RF engineers generally evaluated the following alternative location as a possible location for the proposed new WCF.

Figure D—Alternative Site Locations –

- **Potential Collocation on SBA Tower** shows the location of the SBA Tower in relation to the proposed new site location (45.552695/ -122.833005). This existing tower is a 55ft tower owned by SBA Towers located approximately 1.25 miles southwest of the proposed new WCF. The SBA Tower is located outside of both search rings, as well as the targeted service area.
- **Potential Raw Land site at 45.568972, -122.8195** shows the potential location of a raw land site allowing a new tower with a 120-foot antenna tip height, the height allowed in the County's MUA zone.
- **Potential Raw Land site at 45.568583, -122.815194** shows the potential location of a raw land site allowing a new tower with a 120-foot antenna tip height, the height allowed in the County's MUA zone.

• **Figure E—Alternative Site #1— Available 30-foot Tip Height - New AT&T Coverage Comparison** demonstrates the projected new additional coverage from an approximate 30ft antenna tip height on the existing SBA tower (shaded in blue) versus the projected new coverage from the proposed new WCF with a 140ft antenna tip height (the *additional* coverage from the proposed new WCF is shaded in yellow). As can be clearly seen by the propagation map, Alternative Site #1 does not provide sufficient coverage within the Targeted Service Area. This alternative location does not enhance coverage and signal dominance in the Target Service Area. Furthermore, this alternative location is also very close to an existing AT&T site and due to the short tip height, it is completely overwhelmed with existing AT&T sites that are taller.

Alternative Site Analysis, continued.

• **Figure F—Alternative Site #2— Potential 75-foot Tip Height - New AT&T Coverage Comparison** demonstrates the projected new additional coverage from an approximate 75ft antenna tip height if the existing SBA tower were to be increased in height by 20 feet (shaded in blue) versus the projected new coverage from the proposed new WCF with a 140ft antenna tip height (the *additional* coverage from the proposed new WCF is shaded in yellow). As can be clearly seen by the propagation map, Alternative Site #2 also does not provide sufficient coverage within the Targeted Service Area. This alternative location does not enhance coverage and signal dominance in the Target Service Area. Furthermore, this alternative location is also very close to an existing AT&T site and due to the short tip height, it is completely overwhelmed with existing AT&T sites that are taller.

• The SBA Tower is located outside of both search rings, as well as the targeted service area, and does not meet AT&T's coverage objectives.

• **Figure G — Alternative Site #3 – Potential Raw Land site at 45.568972, -122.8195** shows the potential location of a raw land site allowing a new tower with a 120-foot antenna tip height. This figure demonstrates the projected additional new coverage from a 120ft antenna tip height at an alternative location in the MUA zone (shaded in blue) versus the projected new coverage from the proposed new WCF with a 140ft antenna tip height (the *additional* coverage from the proposed new WCF is shaded in yellow). As can be clearly seen by the propagation map, Alternative Site #3 also does not provide sufficient coverage within the Targeted Service Area.

• **Figure H — Alternative Site #4 – Potential Raw Land site at 45.568583, -122.815194** shows the potential location of a raw land site allowing a new tower with a 120-foot antenna tip height. This figure demonstrates the projected additional new coverage from a 120ft antenna tip height at an alternative location in the MUA zone (shaded in blue) versus the projected new coverage from the proposed new WCF with a 140ft antenna tip height (the *additional* coverage from the proposed new WCF is shaded in yellow). As can be clearly seen by the propagation map, Alternative Site #4 also does not provide sufficient coverage within the Targeted Service Area.

Figure D—Alternative Site Locations

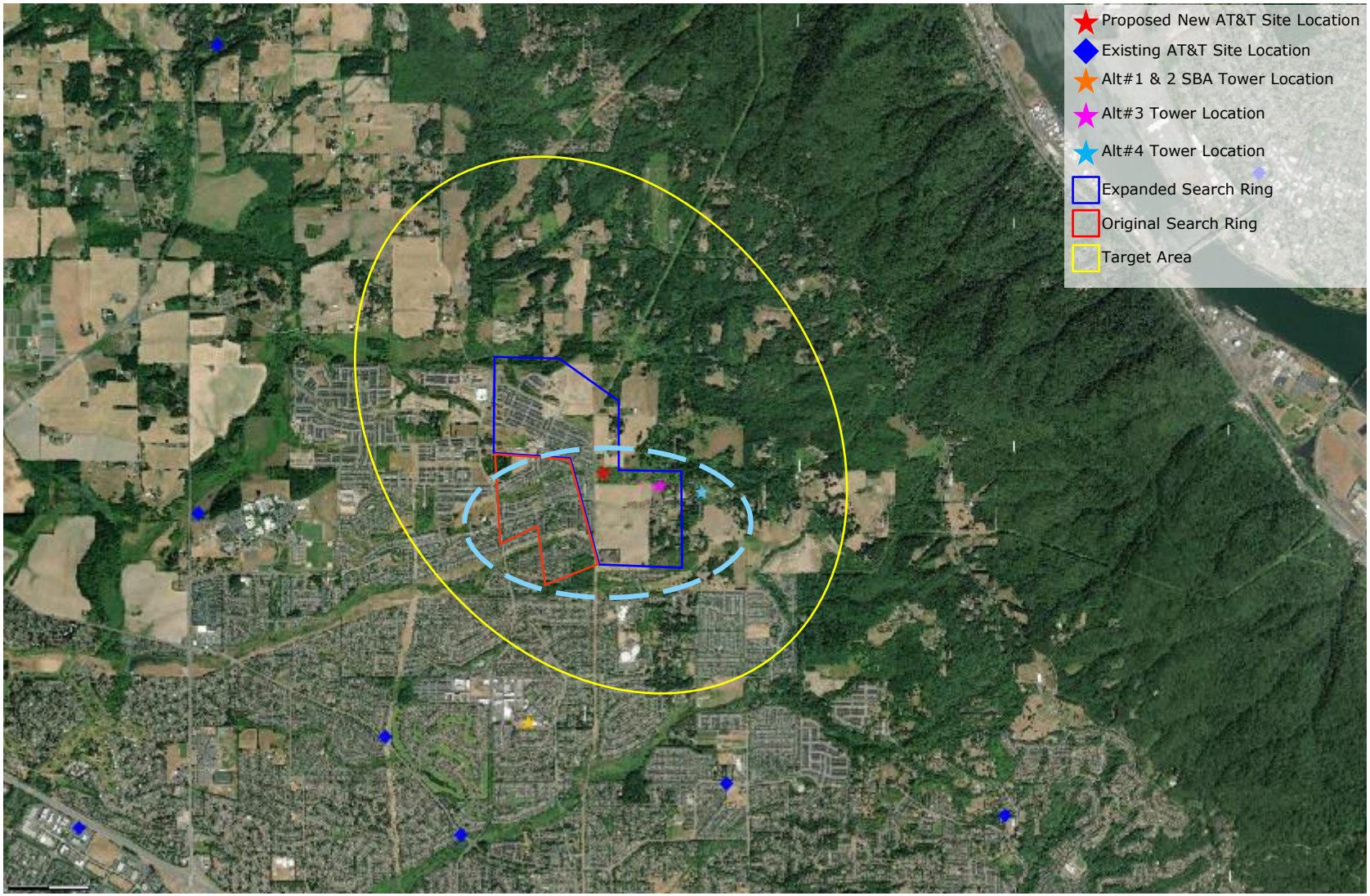


Figure E—Alternative Site #1—Available 30-foot Tip Height - New AT&T Coverage Comparison

Projected New AT&T Coverage from Alt. Site #1 @ 30ft vs. Proposed New WCF @ 140ft

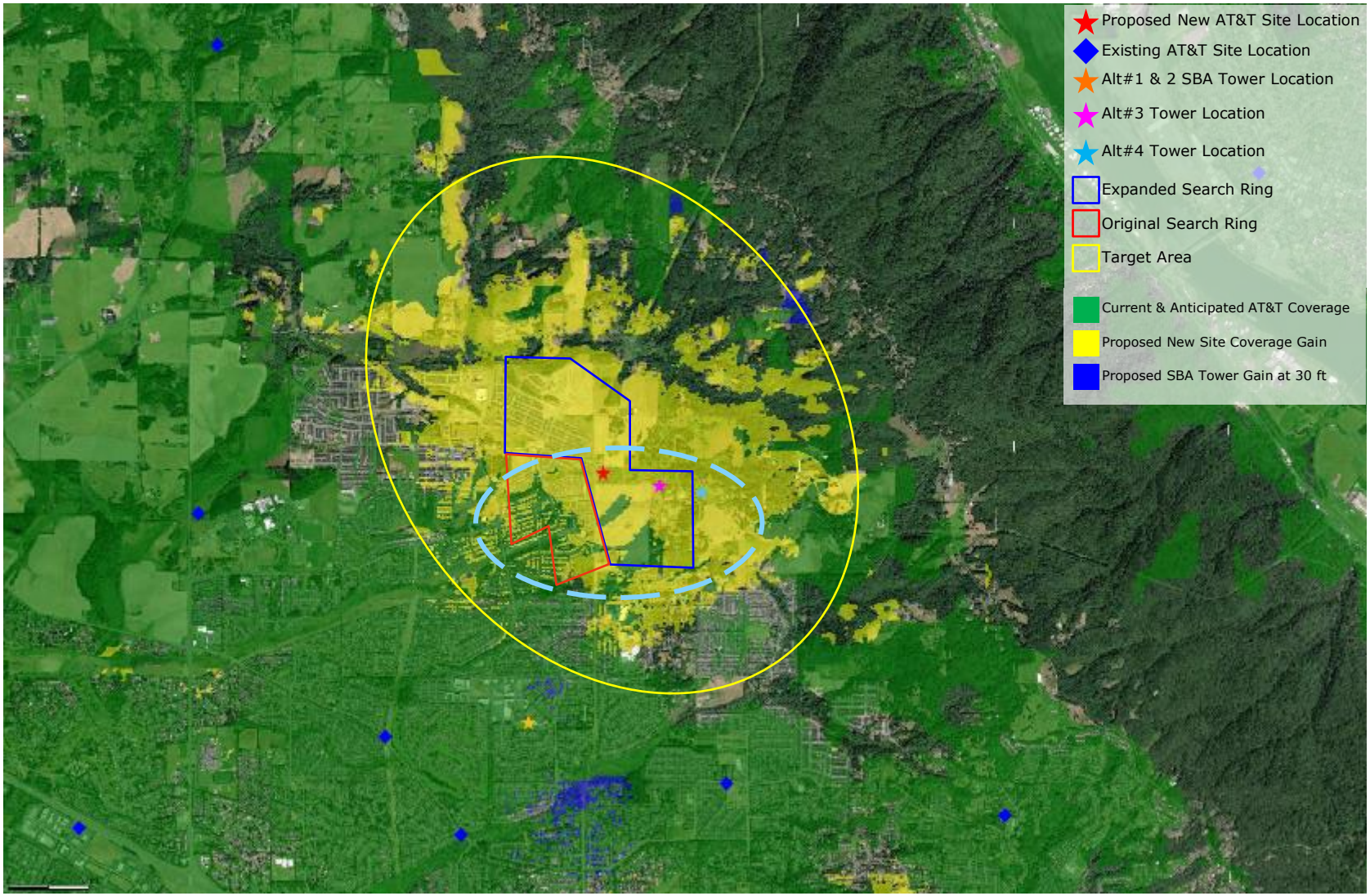


Figure F—Alternative Site #2—Potential 75-foot Tip Height - New AT&T Coverage Comparison

Projected New AT&T Coverage from Alt. Site #1 @ 75ft vs. Proposed New WCF @ 140ft

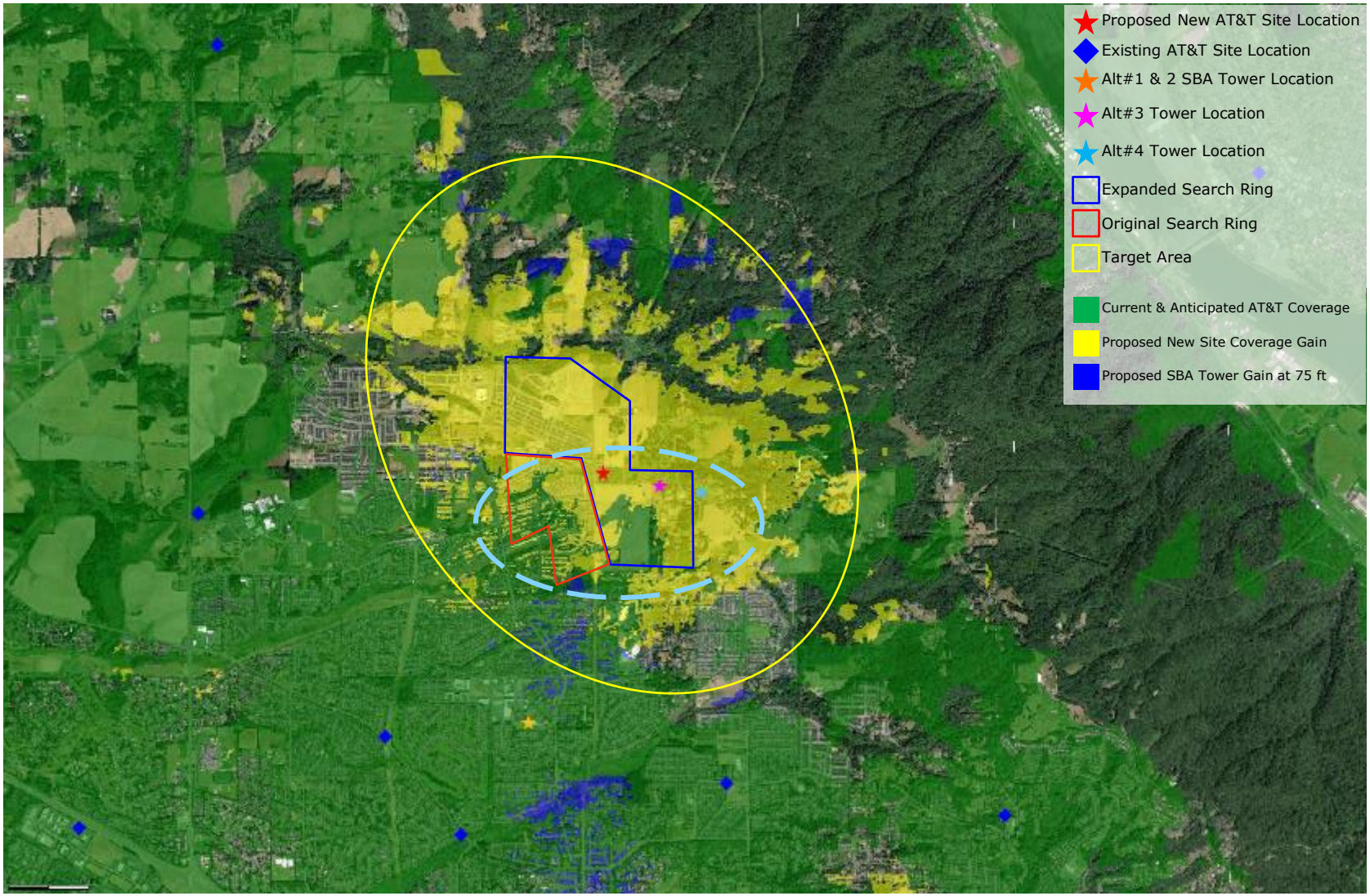


Figure G—Alternative Site #3—Potential Raw Land Alt - New AT&T Coverage Comparison
Projected New AT&T Coverage from Alt. Site #2 @ 120ft vs. Proposed New WCF @ 140ft

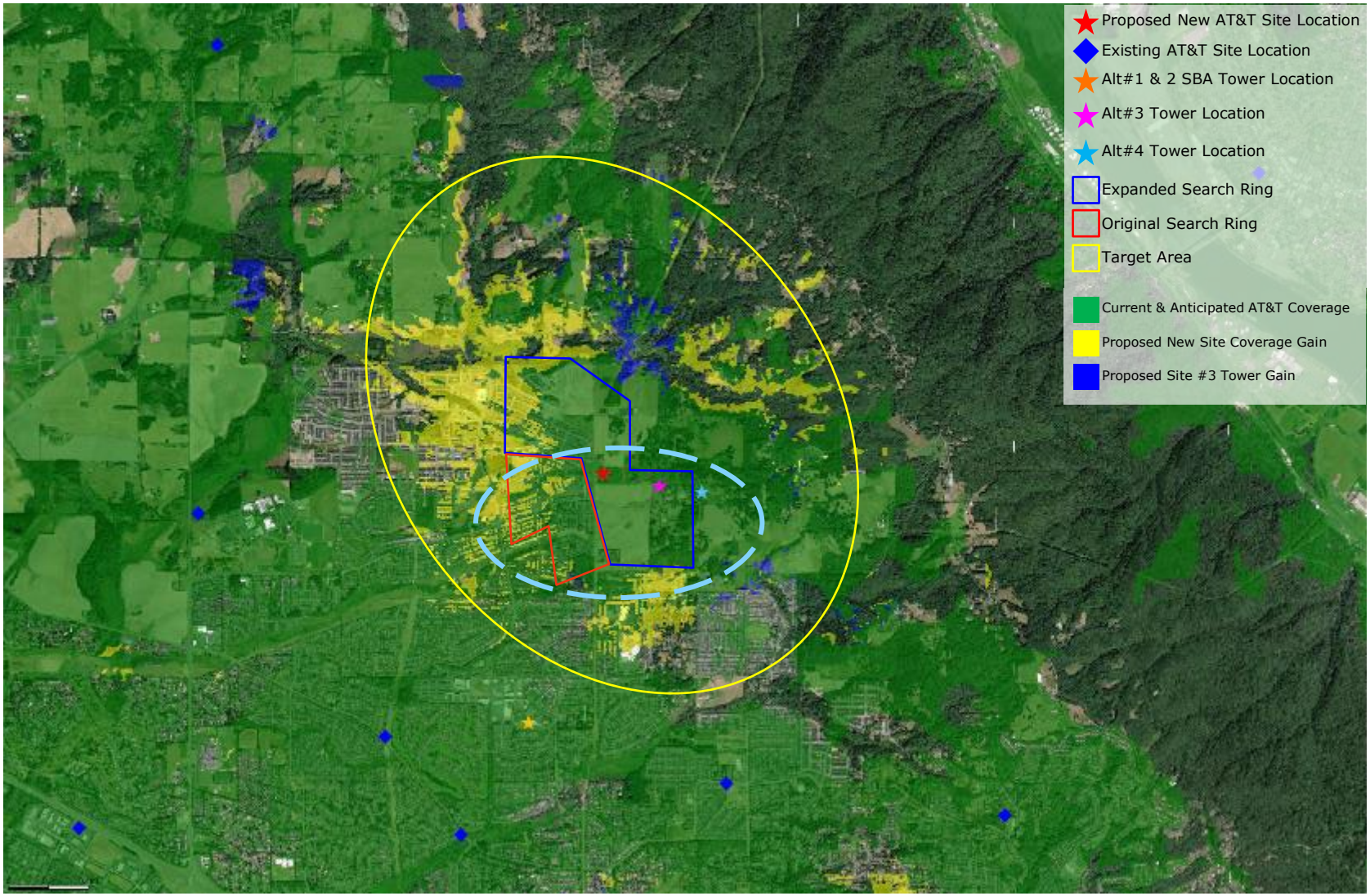
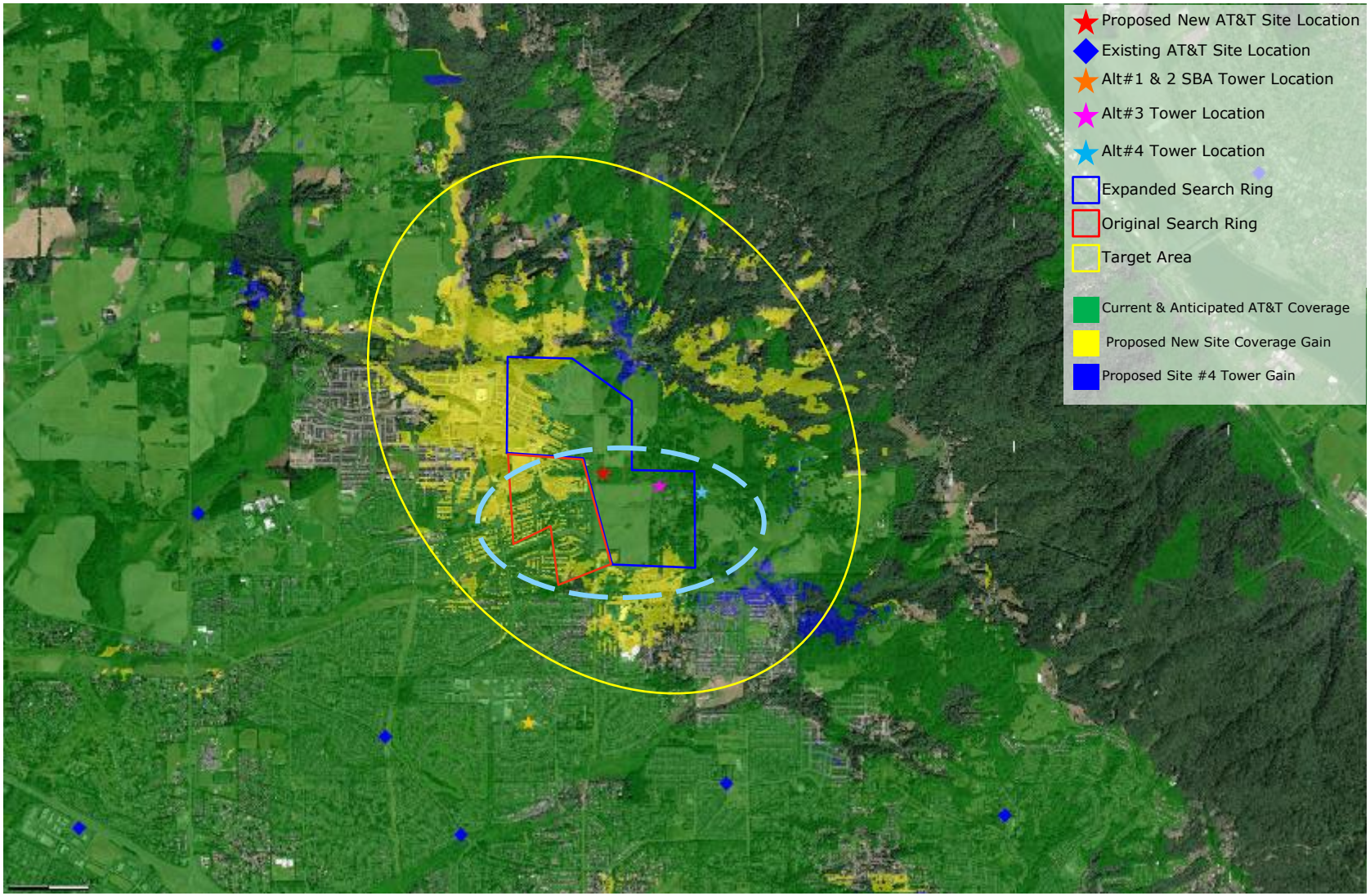


Figure H—Alternative Site #4—Potential Raw Land Alt - New AT&T Coverage Comparison
Projected New AT&T Coverage from Alt. Site #3 @ 120ft vs. Proposed New WCF @ 140ft



AT&T's 5G NETWORK

AT&T is upgrading and expanding its wireless communications network to support the latest 5G technology. 5G stands for "5th Generation". This acronym refers to the ongoing process of improving wireless technology standards, which is now in its 5th generation. With each generation comes improvement in speed and functionality—4G LTE offers speeds up to ten times faster than 3G and 5G offers speeds up to 1-gigabit per second.

This technology is the next step in increasing broadband speeds to meet the demands of uses and the variety of content accessed over mobile networks and is necessary to facilitate capabilities that are being designed into the latest devices (*i.e.* Samsung Galaxy S20, iPhone 12). 5G, specifically, is the next generation of wireless technology expected to deliver latency and capacity enhancements that will help enable revolutionary new capabilities for consumers and businesses.

There are several components of 5G wireless technology and three separate bands of wavelength spectrum used to build a 5G network—low-band (<2 GHz), mid-band (3-10 GHz), and high-band millimeter wave (mmWave) (20-100 GHz):

- **Low-band 5G.** Low-band 5G frequencies (generally below 2GHz) are the oldest cellular (and TV) frequencies and are being used by AT&T to provide widely-available 5G service in residential, suburban, and rural areas. This is the same spectrum used for 3G and 4G cellular services today. The low-band 850MHz 5G frequency is proposed for this Facility.

  Low-band 5G frequencies are a tradeoff of download speed versus distance and service area—they are slower than the high-band mmWave and mid-band frequencies, but they travel the farthest and can pass through more obstacles to provide a better, more reliable indoor and outdoor signal for a larger service area (i.e., miles, not feet).

- **Mid-band 5G**. Mid-band 5G frequencies (generally 3-10GHz) cover most current cellular and WiFi frequencies and provide broader coverage than high-band mmWaves (typically a half a mile), but with slower speeds. Use of these frequencies is not as prevalent for building a 5G network as much of the bandwidth in this range is currently unavailable.

AT&T's 5G NETWORK—Cont.

- **High-band 5G+ mmWave.** High-band millimeter wave (mmWave) frequencies (generally 20-100GHz) are the new FCC-approved frequencies most associated with 5G service—"5G+" is AT&T's name for 5G service delivered using high-band mmWave spectrum. AT&T offers an enhanced wireless experience on 5G+ with mmWave service though with more limited coverage. Results continue to be impressive, with peak download speeds up to 1 gigabit per second (Gbps)—fast enough to stream 4K movies.

  High-band mmWave frequencies deliver this unprecedented performance by transmitting a large amount of data more efficiently than 4G LTE, but the higher frequencies used means that mmWaves can only travel short distances (~1,000ft). Accordingly, high-band 5G+ mmWave sites need to be in close proximity to one another and are typically used in dense, high trafficked areas such as urban areas, stadiums/arenas, airports, manufacturing and healthcare centers, etc.

5G wireless technology, across all frequencies, also includes enhanced network radio protocols and other improvements in data transmission that allow the network to more efficiently use the same frequencies currently used today for 4G. As noted, AT&T is proposing to deploy low-band 850MHz 5G at this Facility. Upon completion, the Facility will become part of AT&T's statewide and nationwide communications networks.

COMPARISON TO ONLINE COVERAGE MAPS

AT&T continually assesses the state of its wireless network to identify and address network conditions that may adversely affect the service of AT&T customers. AT&T's RAN Engineers use sophisticated, industry-standard tools and methods, including a network modeling software program called **Atoll**, to evaluate conditions on, and the performance of, AT&T's wireless network.

Service problems can and do occur for wireless telephone customers even in locations where the coverage maps on AT&T's "Coverage Viewer" website and coverage maps available from the FCC appear to indicate that coverage is available. As the legend to AT&T's online Coverage Viewer maps indicates, those maps display **"approximate" outdoor** coverage. Actual coverage in an area may differ from the website map graphics, however, and may be affected by such things as terrain, weather, network changes, foliage, buildings, construction, high-usage periods, customer equipment, and other factors. The FCC website with maps depicting wireless service provider coverage is also limited to depicting **approximate levels of outdoor** coverage. **These maps do not depict in-building or in-vehicle service levels, and they do not indicate the service levels that AT&T needs to attain to close a specific coverage gap**.

Signal losses, slow data rates, and other service problems can and do occur for AT&T customers, even if certain other customers in the same vicinity may not experience any such problems on AT&T's network. These problems can also occur even when certain customers' wireless phones indicate a certain level of coverage bars on the handset. The bars of signal strength that an individual customer may see on their wireless phone is an imprecise and slow-to-update estimate of service quality. In other words, a customer's wireless phone might show coverage bars of signal strength, but that customer will still, at times, be unable to initiate voice calls, complete calls, or download data reliably and without service interruption.

Search Ring Methodology

AT&T's RF engineers used coverage propagation software systems to predict the coverage provided by the proposed new WCF. The software and AT&T's RF engineers considered the general factors outlined below, as well as more project-specific factors such as the type of antenna, antenna tilt, etc.

Coverage. The antenna site must be located in an area where the radio frequency broadcasts will provide adequate coverage within the targeted service area. The RF engineer must take into consideration the coverage objectives for the site as well as the terrain in and around the area to be covered. Because radio frequency broadcasts travel in a straight line and diminish as they travel further away from the antennas, it is generally best to place an antenna site near the center of the desired coverage area. However, in certain cases, 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 which might affect the radio frequency broadcasts, *e.g.* buildings or sources of electrical interference.

Clutter. AT&T's WCFs must "clear the clutter"—the WCF site must be installed above or close to RF obstructions (the "clutter") to enable the RF to extend beyond and clear the clutter. AT&T's radio frequencies do not penetrate mountains, hills, rocks, or metal, and are diminished by trees, brick and wood walls, and other structures. Accordingly, AT&T's antennas must be installed above or close to the "clutter" to provide high quality communications services in the desired coverage areas. Additionally, if the local code requires us to accommodate additional carriers on the support structure, the structure must be even taller to also allow the other carriers' antennas to clear the clutter.

Call Handoff. The WCF site must be in an area where the radio broadcasts from the site will allow seamless "call handoff" with adjacent WCF 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/or period of time to support the mechanism of the call handoff.

Quality of Service. Users of wireless communications services want to use their services where they live, work, commute and play, including when they are indoors. AT&T's coverage objectives include the ability to provide indoor coverage in areas where there are residences, businesses and indoor recreational facilities.

Search Ring Methodology—Cont.

Radio Frequencies used by System. The designs of wireless communications systems vary greatly based upon the radio frequencies that are used by the carrier. If the carrier uses radio frequencies in the 850 MHz to 950 MHz range, the radio signals will travel further and will penetrate buildings better than the radio frequencies in the 1900 MHz band. As a result, wireless communications systems that use lower radio frequencies will need fewer sites than wireless communications systems that use higher radio frequencies. AT&T's system in Sunnyside uses only frequencies in the 1900 MHz so AT&T's system requires more sites in order to achieve the same coverage that is provided by the carriers which use the 850 MHz to 950 MHz frequency band.

Land Use Classifications. A&T's ability to construct a WCF site on any particular property is affected by state and local regulations, including zoning and comprehensive plan classifications, goals, and policies. AT&T's search rings take these laws and regulations into consideration.