



THURSTON PUD

BROADBAND FEASIBILITY STUDY & OUTREACH  
SUMMARY

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April 12, 2022

## TABLE OF CONTENTS

Executive Summary.....	4
General Manager Summary Findings and Recommendation .....	5
Scope and Purpose.....	6
Preliminary Activities .....	6
Thurston PUD Resolution 21-24 .....	6
Partnership with NoaNet .....	7
Survey Launch preparation .....	7
Thurston County Broadband Action Team .....	8
Thurston PUD Broadband Survey .....	9
Outreach Efforts.....	10
School Districts .....	10
PUD Customers.....	11
Libraries .....	12
Area Municipalities, Civic Organizations, and Others.....	12
Fire Districts .....	13
The Nisqually Tribe .....	14
The General Public.....	15
The Broadband Action Team and Key Partners .....	16
Project Focus.....	17
Broadband Needs and Goals .....	17
Existing Broadband Infrastructure Assets.....	17
Gap Analysis.....	18
Proposed Network Designs.....	19
Vision Statement.....	23

Key Documents and Existing Efforts .....	24
Potential Community Anchor Institutions and Businesses.....	25
Education Benefits .....	26
School-Aged Children.....	26
Served or Underserved .....	27
The Community Survey.....	27
Results Summary .....	28
Survey Stats At-A-Glance .....	32
Appendices.....	33
Appendix A: Broadband Action Team Attendees .....	34
Appendix B: Notes, Agendas, and Attendees of Broadband Action Team Meetings .....	35
Appendix C: Champion Questionnaire Responses.....	43
Appendix D: Proposed Network Design Maps.....	45
Appendix E: School District Presentation Example.....	54
Appendix F: School District Communications Toolkit Examples.....	57
Appendix G: Envelopes for PUD Customers in Thurston County.....	64
Appendix H: Letters To Internet Service Providers.....	65
Appendix I: List of Identified Stakeholders .....	67
Appendix J: High-Level Timeline .....	70
appendix K: Resolution 21-04 .....	72
Appendix L: NoaNet Thurston PUD Broadband Feasibility Assessment .....	74

This document is a summary of the Thurston PUD Broadband Feasibility Assessment written and compiled for the review and consideration of the Thurston PUD Board of Commissioners. The full report provides analysis of the current state of broadband infrastructure and services in Thurston County, examines future broadband uses and needs and a potential series of improvements in broadband infrastructure, including proposed fixed-point broadband networks and select areas for a fiber network.

The Thurston County Public Utility District (PUD) has considered the pursuit, creation and development of telecommunication services throughout rural Thurston County in response to the inequities in access to broadband services, devices and digital literacy revealed by the COVID-19 pandemic. The PUD recognizes the existence of broadband services facilitates the delivery of a broader range of services, promotes investment, and provides internet access at affordable rates to both existing and new users in underserved and unserved communities. The PUD also recognized the significant increase in the percentage of students participating in online education courses during the COVID-19 pandemic in response to public health risks. Protective health mandates constrained school districts to make schooling for students throughout Thurston County available virtually which exposed the inequities to internet accessibility throughout the county, especially for those rural school districts. In recognition of the existence of a digital divide that contributes to inequities that prohibit access to public services, employment opportunities, educational resources, entrepreneurship, and other growth opportunities, basic liberties and rights, the Thurston PUD Board of Commissioners authorized PUD General Manager John Weidenfeller to engage representatives from local rural and urban school districts, rural municipalities, neighboring tribal communities, fire districts, rural businesses, civic associations and libraries to conduct a survey of the needs.

Thurston PUD selected Northwest Open Access Network (NoaNet), a public-benefit wholesale telecommunications organization formed by public utility districts, to assist in engaging stakeholders and collect data through a robust surveying tool, the COS systems, that would determine the telecommunication services needs of Thurston County residents. NoaNet was tasked with the following actions steps created by the Thurston PUD Board of Commissioners:

- Action 1: Coordinate with Thurston County School Districts to identify what is needed to support students through education and potentially address inequities and provide greater access to broadband and other telecommunications technologies.
- Action 2: Coordinate with other entities including but not limited to the county, cities, towns, tribes, libraries, fire districts, tribes, parks, medical services, small businesses, higher education and the needs of Thurston County citizens.

With its vast knowledge and experience developing telecommunication networks throughout rural communities in Washington State, NoaNet created the Thurston PUD Broadband Survey which yielded over 1,400 responses that overwhelmingly acknowledges Thurston County residents' experiences with current broadband speeds, accessibility and affordability. The PUD used these data points to evaluate the feasibility of the PUD contributing to the delivery of high-speed broadband for residential, commercial, governmental and municipal subscribers in the PUD's service territory, in particular the Griffin School District area, Maytown and Scott Lake.

#### GENERAL MANAGER SUMMARY FINDINGS AND RECOMMENDATION

***The overall findings of the survey coupled with service maps provided by current and future providers suggest that the county's urban areas are adequately served, but customers are unsatisfied with the cost of services provided. The studies also suggest that rural areas would benefit from infrastructure upgrades to support increased accessibility and bandwidth, but current providers in the area plan for upgrades to their current infrastructure, and new providers have pre-engineered most targeted areas the PUD surveyed. The cost of deploying services, even highly subsidized, with moderate customer take-rates is unlikely to be financially sustainable for the organization.***

***With these summarized findings in mind, I recommend that the PUD not pursue a broadband line of business. This report summarizes our outreach and engagement efforts that helped us arrive to this conclusion.***

## SCOPE AND PURPOSE

The scope of services for this feasibility assessment is to prepare the PUD to make informed decisions to determine the next steps for potential telecommunications infrastructure deployment and fulfill the requirements of the CERB broadband planning program.

The Scope of Services agreed upon by NoaNet and Thurston PUD has been completed, and the resulting findings are presented in this document. With the conclusions outlined in this document, the PUD will understand the current market conditions in their defined jurisdictional area, the public feedback collected, cost estimates for network construction in identified areas of concern, potential business case thresholds, and various broadband study conclusions. These findings will provide the data to explore the PUD's possible roles to support increased broadband availability in the area, broadband business planning and risk analysis, and threshold criteria for future funding applications.

## PRELIMINARY ACTIVITIES

### THURSTON PUD RESOLUTION 21-24

In February 2021, the Thurston PUD Board of Commissioners adopted Resolution 21-04 (Appendix K) which was created to support a needs assessment in pursuit of evaluating and determining the telecommunication accessibility gaps throughout Thurston County, and in what way, if any, Thurston PUD could assist in mitigating those issues. PUD Commissioners Russell E. Olsen, Linda Oosterman and Chris Stearns were deeply concerned with the state of telecommunication and broadband availability throughout Thurston County in response to the COVID-19 pandemic declared in March 2020. Their greatest concerns were with school-aged children in rural school districts who had limited to no access to adequate internet access to attend school online as required by law. Resolution 21-04 was passed unanimously by the PUD Commission on February 9, 2021. The resolution directed General Manager (GM) John Weidenfeller to engage representatives from local rural and urban school districts, rural municipalities, neighboring tribal communities, fire districts, rural businesses, civic associations and libraries. GM Weidenfeller assigned Administrative Services Manager (ASM) Ruth Clemens to oversee this effort. The PUD Commissioners provided two actions steps that were to act as guiding principles through the outreach and engagement portion of the project.

- **Action 1:** Coordinate with Thurston County School Districts to identify what is needed to support students through education and potentially address inequities and provide greater access to broadband and other telecommunications technologies.
- **Action 2:** Coordinate with other entities including but not limited to the county, cities, towns, tribes, libraries, fire districts, tribes, parks, medical services, small businesses, higher education and the needs of Thurston County citizens.

Also, in the resolution, the Board of Commissioners also committed the allocation of \$30,000 for technical support, not to exceed \$50,000, and to support all grant applications pursued by the District.

#### PARNTERSHIP WITH NOANET

In March, ASM Clemens met with a NoaNet representative to discuss the upcoming project and the possibility of employing NoaNet's services to create, develop and launch outreach and engagement to identified stakeholders. NoaNet's proven success with rural communities and its relation to public utility districts, made it a natural choice for a working partnership.

NoaNet uses the robust COS system to deliver and collect surveys. Surveys are configurable and customizable according to the needs of each client and are engineered to map addresses provided by respondents and to compile and provide data in easily discernable ways. NoaNet provided a manager to work directly with the ASM and to assist in accomplishing outreach and engagement tasks associated with the project.

NoaNet also provided invaluable assistance with drafting, reviewing and supporting Thurston PUD's Community Economic Revitalization Board (CERB) grant application and presentation. NoaNet has created a feasibility report that will be submitted on behalf of the District to satisfy CERB grant requirements. NoaNet's charter for this study was to evaluate the feasibility of Thurston PUD facilitating high-speed broadband infrastructure and services to residential and commercial customers while maintaining financial viability for the PUD.

An interlocal agreement was created and signed by both parties which authorized Thurston PUD to use NoaNet's COS system license for the purposes of hosting the survey. By including Thurston PUD in its license use, NoaNet saved the District tens of thousands of dollars.

#### SURVEY LAUNCH PREPARATION

In preparation for the survey launch, the PUD collaborated with NoaNet on the creation and development of the survey questions, a communications plan and outreach objectives. Although the survey was our main source of feedback, NoaNet created and made available printed surveys that could be mailed to interested parties as well as a dedicated phone line. Both methods were created in the event potential respondents did not have access to online resources. A robust list of outreach stakeholders was created to determine who in Thurston County would be most interested in the expansion of broadband infrastructure (Appendix I). NoaNet and Thurston PUD used the action steps directed from the Thurston PUD Board of Commissioners to guide their outreach efforts beginning with rural school districts and later engaging libraries, fire districts, tribes, parks, small businesses, higher education, and civic associations. A communications plan was created in order to solidify consistent messaging and to create deliverables. We created a plan of action and how each stakeholder should be approached and determined who the appropriate PUD representative should be. During this period of

preparation, we also created boilerplate content, graphics and takeaway items for stakeholders to assist in distributing (Appendix F).

Throughout this process, the PUD prioritized small rural school districts as the group most impacted by the lack of access to high-speed internet. Prior to the launch of the survey, representatives from Thurston PUD and NoaNet met with Superintendents and applicable staff members from the following rural school districts:

- Rochester School District
- Rainier School District
- Tenino School District
- Yelm School District
- Griffin School District

During our meetings, we informed representatives of our project and its goals, and gave them an opportunity to share experiences of their faculty, staff, students and student families. We documented and collected this information for possible later use when sharing experience narratives for grant purposes. We worked directly with district communicators and collected best communications practices for each school district to prepare messaging and create documents for distribution amongst the student population and their families. Our communications approach was created to streamline efforts and deliver effective and efficient products that most resonated with each audience.

We collected data regarding the general location/region with that clusters of students who experienced poor or no access to internet service.

We provided school districts a diverse collection of communications tools to share with families. Our goal was to partner with school districts to share survey information and encourage families to take the survey. Our goal was to garner as much survey participation as possible to help illustrate the need in these rural communities, specifically amongst school-aged children.

#### THURSTON COUNTY BROADBAND ACTION TEAM

In an effort to amass support and gain more perspective on the state of broadband in the county, Thurston PUD joined several other entities in the formation of the Thurston County Broadband Action Team (BAT). The BAT consisted of representatives from Thurston County, the Port of Olympia, the Nisqually Tribe, the Thurston Regional Planning Council and the Thurston Economic Development Council (Appendix A). The BAT was created to guide the area's engagement in the feasibility analysis of the potential roles of area municipalities to address the area's lack of quality high-speed broadband available.



Thurston PUD's role was to inform the group of our broadband intention, learn about and support other projects that might be simultaneously occurring. We heard from each BAT team member and their constituents' desires to bring high-speed internet to their communities and businesses.

Because no BAT had existed prior, our team dedicated considerable time to the thoughtful formation of the Team's framework and its responsibilities, all with the end goal of modernizing and expanding Thurston County's broadband infrastructure in mind. (Appendix B)

The Team was then formed at the request of the Washington State Broadband Office (WSBO) which used the Team to preliminarily support or oppose WSBO grant applications through a supplemental letter of support in the grant application. Because of our own broadband projects and the appearance of a conflict of interest, Thurston PUD and the Nisqually Tribe abstained from voting on all requests of support.

#### THURSTON PUD BROADBAND SURVEY

The Thurston PUD Broadband Survey officially launched on June 1, 2021. The focus for the PUD Broadband Planning Study was to determine the current levels of service available and utilized, the satisfaction with those services, determine the needs of the community, how those needs may be met, and the financial feasibility of facilitating the desired services.

The county-wide survey collected and mapped data from the Thurston community to understand the community's current broadband experience and gauge their support of PUD involvement. Public meetings were held to keep the public informed of the survey process at every step, including kick-off, progress, and follow-up. While outreach efforts were impactful and brought in nearly 1,500 survey responses, the community was only moderately enthusiastic about engaging to spreading the word of this effort, with no champion individuals or organizations stepping up to lead the charge.

We engaged a multitude of stakeholders and created partnerships with organizations eager and motivated to bring broadband to the communities they served:

- Rural and urban school districts
- Timberland Regional Libraries
- Cities and Towns
- Fire Districts
- Civic Associations
- Business Associations
- Higher Education
- Media
- Public Transit

- Internet Service Providers

One of our goals was to inform these stakeholders of the broadband survey we were conducting and harness their methods of communications in order to share survey information with their constituents, followers, customers, patrons or clients.

## OUTREACH EFFORTS

As serving the community is at the heart of the PUD's mission, vision, and purpose, the PUD engaged in an extensive community outreach process as part of this study effort. The PUD saw the challenges faced by rural school districts as they pivoted to online schooling in response to the COVID-19 pandemic in 2020. In response to that, the PUD started with the school districts in their outreach efforts. From this point, the PUD's outreach efforts extended to PUD customers, area municipalities, tribal entities, libraries, economic development groups, fire districts, colleges, ISPs, civic associations, faith institutions, and the general public.

Paper surveys were available in both English and Spanish for people who could not access the survey online. Additionally, a phone line was made public during business hours to take the survey verbally for people who did not have Internet, technology, or another barrier to accessing the community survey online.

The flyer features the Thurston PUD logo at the top left. To the right, it asks, "Do you have adequate, affordable Internet? We want to know!". The main headline reads "THURSTON PUD IS CONDUCTING A BROADBAND SURVEY". Below this, it says "Take the survey:" followed by the URL "HTTP://NOANET.SERVICEZONES.NET/THURSTONPUD". A green banner states "No Internet? Call us at (360) 602-1522 and we'll take the survey over the phone with you." The body text explains the survey's purpose: "Thurston PUD has launched a county-wide survey to better understand our area's need for high-speed Internet services. Please take five minutes to let us know about Internet access at your home or business so we can assess if there is a need for additional infrastructure investment." It includes a "Thank you for your participation!" message and a disclaimer: "\*\*This is only a survey to gather information about broadband availability. There is absolutely no obligation to sign up or buy services. Your information will never be used for marketing purposes." A "Contact Us" section lists three individuals: Thurston PUD (1230 Ruddell Rd., Lacey, WA 98603, (360) 357-8783), Ruth Clemens (Telecommunications & Broadband Program Manager, (360) 515-6118), and Claire Ward (Community Survey Manager, (360) 602-1522).

## SCHOOL DISTRICTS

Using the action steps provided by the PUD Board of Commissioners, outreach efforts were first directed toward rural school districts beginning in June 2021 with the Tenino, Yelm, Griffin, Rainier and Rochester School Districts. In August, once data was thoroughly collected from rural schools, we shifted our focus to gather data from the Tumwater, Olympia, and North Thurston School Districts. Our goals for all school districts were to meet with district leadership to educate them on the project, give a link to the survey, answer any question they may have had and invite them to ongoing project update meetings. We worked with school district communications teams to get survey notices out to the families of students through school newsletters, social media efforts, and other existing avenues utilized by the school districts.

We met directly with school superintendents, IT professionals and communicators who we identified as the greatest influencers of change within their sphere of control. Our presentations and survey were met with great enthusiasm and each attendee believed in the importance of such an undertaking. We created and delivered school-district specific power point presentations that provided the following information (Appendix E):

- Information about the PUD
- PUD presence in their communities
  - The number of water systems we own and operate in their school district.
  - The number of customers we have in their school district.
- Why are we doing this?
- High-level timeline
- Data collected from the State Broadband Office
- Internet Service Providers in their area
- Reported speeds to the FCC by service providers from their area
- NoaNet information
- How can we help you?
- Project next steps

We created and provided the following to each school district:

- Printed flyers
- Tear-away flyers
- Social media advertisements
- Letter templates to send home with students
- Social media messaging

## PUD CUSTOMERS

In July, we began the next phase of our outreach efforts by connecting with Thurston PUD customers from Thurston County. Because the survey could only be measured by submissions from Thurston County residents, we excluded out-of-county customers from our outreach efforts. Because of the specific nature of these stakeholders, we worked closely with vendors to create special and targeted communications. After vetting through many options, we determined the most cost-effective and efficient manner to communicate with this targeted audience was to create a special envelop that would grab their attention and succinctly convey our objectives (Appendix G). We used our traditional channels of communication through the PUD's website, monthly newsletter and bill messages.

## LIBRARIES

While rural school districts were an important partner in spreading information about the survey, the Timberland Regional Library (TRL) systems proved to be a strong partnership in circulating information effectively and efficiently. Although TRL has its own broadband access project concurrently happening with the PUD's survey, they provided enthusiastic support from every level of their organization and proved to be a champion amongst state agencies with our effort.

We worked directly with area libraries to develop a bookmark for distribution at selected Thurston County and nearby library locations to capture the feedback of a population who may utilize the library for computer/internet access. Bookmarks were bilingual, with English on one side and Spanish on the other to capture folks whose primary language may not be English (see right). Paper surveys were also distributed to the libraries available in both English and Spanish. The libraries were educated on the project underway, given the link to the survey, and invited to project update meetings.



## AREA MUNICIPALITIES, CIVIC ORGANIZATIONS, AND OTHERS

Area municipalities and organizations including Thurston County, cities, towns, the Port of Olympia, fire districts, higher education institutions, economic development and regional planning groups, public transit, and faith institutions were educated on the PUD's broadband feasibility study project. These groups were given a link to the community survey, were invited to all project update meetings, and encouraged to share the effort with the audiences they serve to help us gain participation.

The PUD contacted Mayors and other leaders of Tenino, Rainier, Yelm, Bucoda, Tumwater, Olympia and Lacey. We also sent communications and attempted to schedule meetings with higher education leaders and communicators.

We communicated with faith institution associations to discuss getting information out to their member churches in hopes of garnering more support.

We contacted each local Chamber of Commerce in order to get on an agenda to deliver a short presentation on our survey. The Thurston Chamber of Commerce heeded the call and invited us to host a display table at a major forum. In November, we hosted a table at the Challenge Seattle event at the Red Lion Hotel in Olympia. Our table displayed four (4) large posters with preliminary survey results. We handed out business cards, survey bookmarks and free gifts like water timers, envelope openers and cups for those who stopped by the table.

We also contacted the following groups:

- Thurston County Chamber of Commerce
- Lacey South Sound Chamber of Commerce
- Yelm Chamber of Commerce
- Thurston Economic Development Council
- Tenino Area Chamber of Commerce
- Lacey Rotary Club
- Rotary Club of Olympia
- Rotary Club of West Olympia
- Boys and Girls Clubs of Thurston County
- Rotary Club of Yelm
- Yelm Lions Club
- Olympia Capital Centennial Rotary Club
- Tumwater Rotary Club
- South Puget Sound Rotary Club
- Hawk's Prairie Rotary Club
- Gateway - North Thurston Rotary Club
- United Way Thurston County
- Thurston County Food Bank

We also reached out Higher Education groups such as Evergreen State College, South Puget Sound College, and Centralia College. Our goals with higher education were to not only to inform them of our survey, but to understand the needs of students attending classes online and through their distance degree programs.

#### FIRE DISTRICTS

Most of the fire districts in Thurston County are found in rural corners of the county and have fair to poor internet speeds and connections. We reached out to fire districts to better understand what the most difficult aspects of their connections were.

Lacey Fire District's IT Administrator returned our message and asked to collaborate should the District provide broadband services. Lacey's Administrator acts as an unofficial IT administrator for all neighboring fire districts as his position is not widely needed for small stations.

We reached out directly to the following fire districts:

- TCFD NO. 1, Rochester Fire Rescue
- TCFD NO. 2, Yelm Fire Department
- TCFD NO. 3, Lacey Fire District
- TCFD NO. 4, Rainier Fire Department
- TCFD NO. 5, McLane Black Lake Fire Department
- TCFD NO. 6, East Olympia Fire Department
- TCFD NO. 7, North Olympia Fire Department
- TCFD NO. 8, South Bay Fire Department
- TCFD NO. 9, McLane Fire Department
- TCFD NO. 11, West Thurston Fire District
- TCFD NO. 12, Tenino Fire Department
- TCFD NO. 13, Griffin Fire Department
- TCFD NO. 15, Tumwater Fire Department
- TCFD NO. 16, Gibson Valley Fire Department
- TCFD NO. 17, Bald Hills Fire Department

The Nisqually Tribe is currently undergoing a major broadband effort throughout Thurston County. Their project began in 2017 when they created a robust fiber-optic network on their Tribal lands intended to connect their Tribal members. Since then, the tribe's motivations to connect Tribal members has expanded to include other tribes through an inter-Tribal network beginning with the Chehalis Tribe. Recognizing the potential impacts of such an endeavor, many municipalities, governmental entities, entrepreneurial associations and residents have expressed their support of, and many have sought to partner with the Tribe to bring critical broadband access to their communities and businesses.

One such important partnership is the Thurston County Broadband Action Team (BAT). Hosted and led by Thurston County, the PUD and the Nisqually Tribe participate in the Thurston County BAT along with the Thurston Regional Planning Council, the Port of Olympia, and the Thurston County Economic Development Council. Through the collaborative environment of the BAT, all entities keep apprised of the efforts of the participating organizations to ensure a collaborative environment moving forward. They also served to make decisions on whether to support groups applying for grants through the State Broadband Office. The Tribe has received all-around support from BAT participating members for their project. The Thurston County Commission has agreed to commit \$500,000 to support the Tribe's broadband efforts in Thurston County.

The Tribe's multi-phased project would guarantee five gigabytes per second (5gbps) download speeds and 1gbps upload speed to thousands of Thurston County residents. The Tribe has commissioned the help of Redline Communications and Wave Broadband which plan to offer an affordable 1gbps upload speed starting at \$69.00 a month.

In 2017, the Tribe created Nisqually Communications, a fiber-optic construction service that works with large internet providers on the installation of arial and underground fiber-optic lines. The creation of this enterprise has resulted in the establishment of a robust fiber network throughout the Tribal land, and the Tribe will use this line of business to assist in their current broadband ventures. The fiber-optic construction component of their enterprises, similar to the PUD's field operations team, allows the Tribe to install networks in-house which is a major cost-savings approach.

As part of the multi-phase plan, the Tribe has applied and/or secured major state and federal funding for their broadband project that will support the first phase of their project slated to build 42 miles of fiber connecting their Tribal networks to the Chehalis Tribe. The project would require the Tribe to weave their networks through Lacey and Tumwater which will provide high-speed internet access to an estimated 1,200 residential homes, 29 businesses and 16 anchor institutions.

The second phase of their project would connect Nisqually Tribal land to a property along Marvin Road, just north of Interstate 5, and will supply high-speed internet service to more Tribal members, several Tribal anchor institutions and businesses. During the third phase of the project, the Tribe envisions

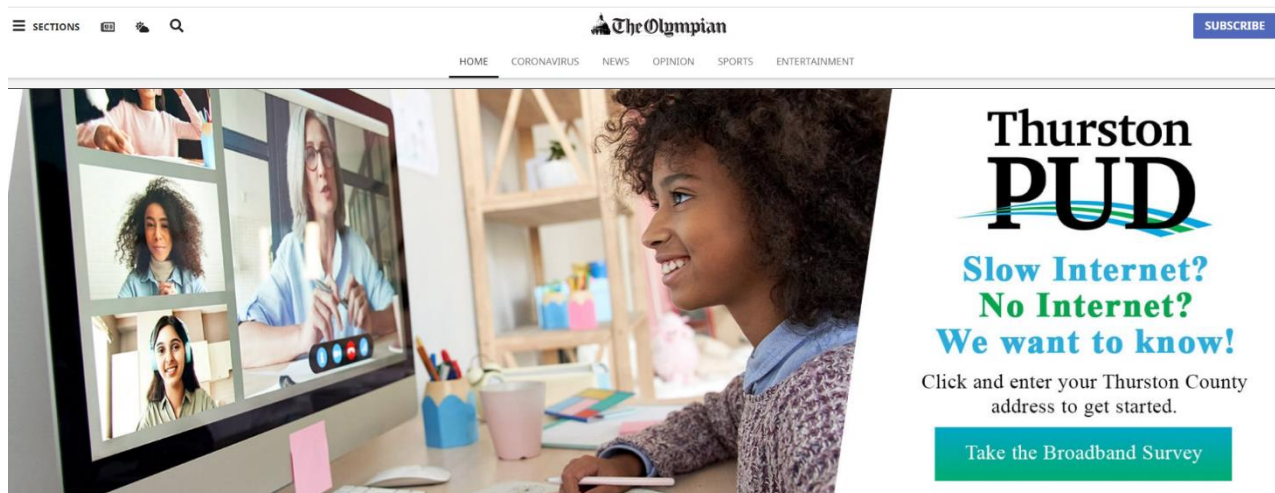
building fiber connections from Rochester to Littlerock. This phase stands to connect 860 residents, a library, a school, multiple farms and businesses. The Tribe secured a sizable grant from the State Broadband Office in the amount of \$6.775 million as well as a \$2 million CERB grant that will greatly assist in supporting their vision.

Over the course of the last year, Thurston PUD has collaborated and communicated extensively with the Nisqually Tribe about our respective broadband projects. The Tribe has openly communicated their intentions, pre-engineered areas and shovel-ready projects with Thurston PUD. Both entities have widely discussed potential partnership and explored a range of interests where both stand to benefit mutually. Both parties agree to keep the discussion of broadband open for potential collaboration in the futures, and to continue the PUD and Tribe’s longstanding and amicable water relationship and interests first and foremost.

#### THE GENERAL PUBLIC

NoaNet created and maintained a Thurston PUD Broadband Survey Facebook page which generated a lot of survey responses due to its accessibility, popularity and ease of use. The survey Facebook page was set up to advertise the survey to the Thurston County public and inform them of progress updates. Survey posters, pull-tab flyers, and FAQ sheets were developed and distributed with an embedded QR code that brought users to the survey, which were available through the survey website and in paper form distributed to public organizations. A phone line was established to take surveys orally for those who did not have access to the technology to take an online survey.

The PUD also partnered with The Olympian to do a one-day ad takeover that informed the public of the survey effort and encouraged participants. An ad takeover means that our survey link and advertisement was splashed on every page of the Olympian website for an entire day.



The general public was informed of the public meetings and encouraged to participate.

#### THE BROADBAND ACTION TEAM AND KEY PARTNERS

The Thurston County PUD's Broadband Key Partners meetings were held on the survey launch day, shortly after the community survey was closed, and a final session will be held to review the final results. At all meetings, community feedback and guidance were received. This group was open to the public and helped drive the strategic direction during the community survey portion and provided personal experience feedback to community leaders. The meeting was accessible in-person and remotely due to COVID-19 distancing considerations.

The formal Broadband Action Team meets monthly as needed. Members of the Thurston County Broadband Action Team are noted in Appendix A. Agendas with attendees for these meetings are located in Appendix B. Questionnaires required by CERB from attendees are attached as Appendix C.



## PROJECT FOCUS

### BROADBAND NEEDS AND GOALS

The project focus for the PUD Broadband Planning Study was to determine the current levels of service available and utilized, the satisfaction with those services, determine the needs of the community, how those needs may be met, and the financial feasibility of facilitating the desired services.

***31% OF SPEED TESTS RECEIVED WERE LESS THAN 25MBPS DOWNLOAD AND 75% WERE BELOW 150MBPS DOWNLOAD.***

The FCC has defined broadband as a minimum of 25 megabytes per second (25mbps) download and 3mbps upload speeds, the threshold for obtaining many federal grant/loan programs for improving broadband infrastructure. Washington State has its own set of deployment goals, culminating in statewide 150/150mbps service to every home and business in Washington State by 2028. Current legislation is in review in Washington state to raise the broadband threshold to 100/20, also the benchmark used by several federal funding programs.

***THERE ARE TWO DISTINCT ASPECTS OF DIGITAL INCLUSION, WHICH ARE AVAILABILITY AND ACCESSIBILITY. AVAILABILITY MEANS WHETHER OR NOT THE INFRASTRUCTURE EXISTS. ACCESSIBILITY MEANS WHETHER OR NOT THE SERVICES ARE AFFORDABLE AND THE COMMUNITY HAS THE TECHNOLOGY AND EDUCATION TO MAKE USE OF IT.***

According to the survey results from the PUD's demand aggregation survey, many in Thurston County are still experiencing difficulty accessing high-speed internet services. The organization of speed tests received noted that frequently adequate speed tests were located right next door to inadequate tests. These speed tests were frequently taken from subscribers using two different service providers when investigated. The one offering a more expensive service was a higher quality service, while the lower-cost service was much lower in quality. This shows that while in many areas of Thurston County, high-speed internet services are available, a cost barrier may impact the ability of residents to access them.

### EXISTING BROADBAND INFRASTRUCTURE ASSETS

Thurston PUD is a water utility and does not have any telecommunications network plant. As a water utility, the PUD does not have poles that might facilitate wireline broadband deployment as many other PUDs in the state do. The current electric service provider in this area is Puget Sound Energy, which is not currently sharing pole data with municipalities. This barrier to a knowledge of area poles would be a significant barrier if the PUD would choose to move forward with an aerial network plant. However, as a water utility, they do have conduit they have placed throughout their construction areas that could be leveraged to bring fiber service in the future.

## GAP ANALYSIS

The Olympia metro area appears to have access to more robust services than any other study area. The areas in Thurston County outside of the more urban regions are limited in their service options that cannot reliably meet today's broadband bandwidth needs. Over time, these areas will need a complete telecommunications infrastructure update.

Our community outreach study and evaluations have concluded that the County's urban areas do have high-speed broadband available, however, significant portions of residents are unsatisfied with the costs of services being provided by the incumbent providers. The satisfaction levels reported, coupled with consumer-generated speed test data and our market research, suggests that cost, rather than infrastructure availability, is the primary barrier to access in the urban communities of Thurston County.

Areas with low population density do have less robust services available to them and would benefit from infrastructure upgrades to support future bandwidth needs. Thurston County is experiencing a sustained period of growth and urbanization. Since 2010, the county's total population has grown by more than 20%, making it the fifth fastest-growing county in the State. Increasing population and population density is a positive indicator of infrastructure investment continuing to invest.

We have learned through this process that an area's provider plans network updates for the metro area, and some rural areas are being targeted by other entities engaged in supporting broadband access. With the information known at this time, the broadband landscape will likely improve significantly in the near future.

Public and private investment into telecommunications infrastructure may not overcome the cost barrier to adoption found in this area. However, subsidization programs could bring the cost of services into reach for lower-income households. These programs are evaluated further in this document.

Though much of the county's rural communities need significant infrastructure investment, it was found through our public engagement that many of these areas will be upgraded shortly through investment from other public and private organizations. Three sites facing unique challenges were selected for

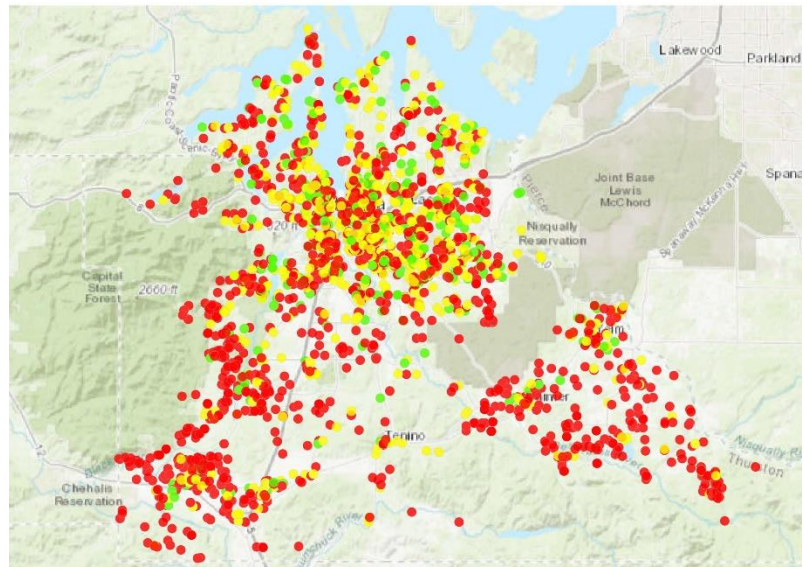


Figure 1 Speed Tests

Red= Less than 25/3mbps    Yellow= < 150/150mbps    Green= > 150/150mbps

infrastructure and business analysis: The Griffin School District, Maytown, and Scott Lake. These designs, costs, and all associated data are reviewed in the next section.

## PROPOSED NETWORK DESIGNS

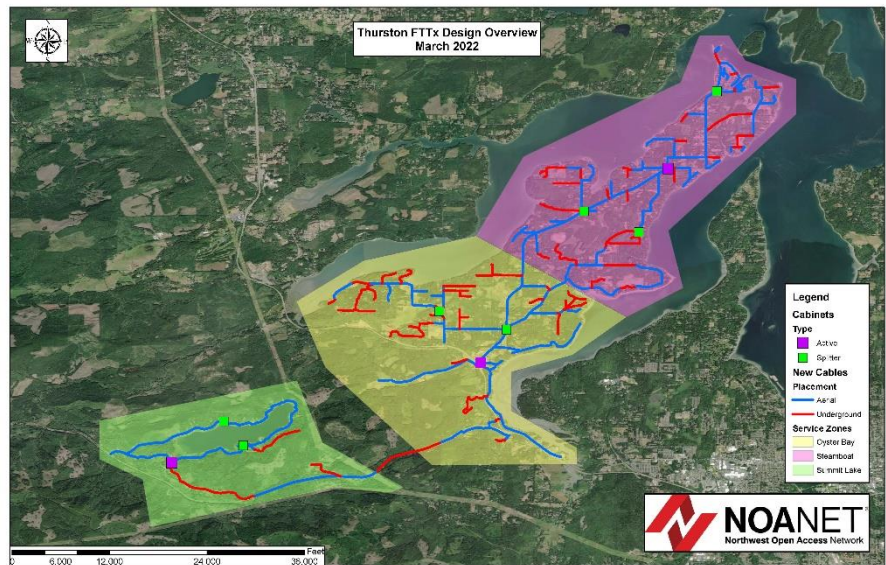
NoaNet's charter for this study was to evaluate the feasibility of the PUD engaging in the delivery of high-speed broadband for residential and commercial subscribers in the PUD's serving territory and provide value to the county while maintaining financial viability for the PUD.

Three areas were selected to evaluate the costs and impact of network deployment. The first is the Griffin School District area, for which we assessed a Fiber to the Home (FTTH) network design. The other two areas, for which a wireless deployment was modeled, are Maytown, a rural community off a highway offramp that is a mix of industrial and residential, and Scott Lake, a dense residential neighborhood.

### THE GRIFFIN SCHOOL DISTRICT FTTH

The Griffin School District Service Area is located northwest of Olympia on a peninsula that extends northward into Puget Sound. Its southernmost connection to the mainland connects near Highway 101 to extend out to the Olympia Peninsula. For this area, we have designed a full fiber to the home network design to serve the residents and businesses of the area. The primary construction methodology is strand and lash aerial (blue lines) deployment. For the underground portion (red lines), a combination of trench, plow, and directional bore will be utilized depending on ground conditions.

Figure 2- The Griffin School District Network



The Griffin network is a fiber-based passive optical network (PON) divided into three districts "Service Zones" that delivers high-speed broadband with the capacity to serve the community at speeds more than 150mbps symmetrical and can support 10gbps services based on customer requirements. Every subscriber will have access to these services through their selected RSP. The RSP will have a physical and logical connection through the PUD PON architecture deployed from this project.

This zone has three active cabinets (purple boxes). It deploys a combination of 288 and 144 count loose-tube backbone fibers servicing seven splitter cabinets (green boxes). We recommend utilizing 96 or 48 count loose tube fibers for the laterals extending off the backbone. For the deployment to the home, we recommend using multi-service terminals (MSTs), which would be a combination of four (4) and eight (8) port depending on the density of homes in the area. In totality, this network passes 3,835 residential and 94 commercial customers.

The Service Area has been divided into three (3) Service Zones for this evaluation to facilitate potential future grant applications: Summit Lake, Oyster Bay, and Steamboat.

- There is one (1) active cabinet and two (2) splitter cabinets in the Summit Zone network design. The total customer count for this service zone is 787 and would require approximately 130 MSTs for the deployment of drops to the premise.
- There is one (1) active cabinet and two (2) splitters cabinets in the Oyster Bay Zone network design. The total customer count for this service zone is 1,163 and would require approximately 194 MSTs for the deployment of drops to the premise.
- There is one (1) active cabinet and three (3) splitter cabinets in the Steamboat Zone network design. The total customer count for this service zone is 1,989 and would require approximately 332 MSTs for the deployment of drops to the premise.

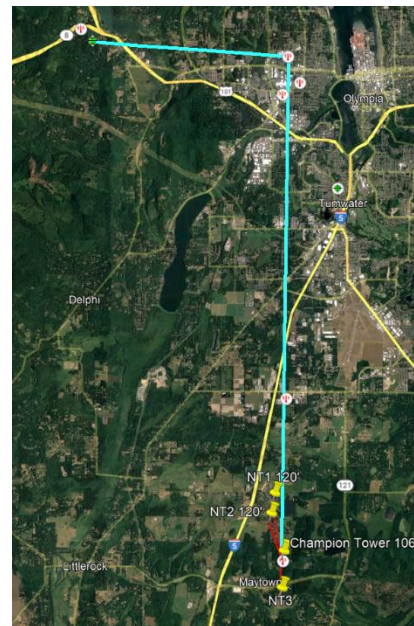


Figure 3 - Backhaul Route

For the entire project, we estimate that the average cost per home passed would be \$2,011. At a 30% take rate, the average cost per home activated would be \$10,220. The deployment of construction would be approximately 67 percent utilizing aerial construction methodology, with the remaining 33 percent consisting of underground construction methodology.

***There local and large, private ISPs in this region with established infrastructure currently used by residents in this region.***

A full-page map of proposed designs is included in a larger format as Appendix D of this document.

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#### MAYTOWN AND SCOTT LAKE WIRELESS CBRS NETWORKS

For Maytown and Scott Lake, a wireless network deployment has been modeled. These areas do have services available, but cost appears to be a significant factor. We developed network plans to provide a high-speed wireless option to these areas. Wireless does not offer the same capacity as a fiber network but is less expensive to deploy; therefore, it could potentially provide lower-cost services to these

customers. It would also offer a more competitive free-market environment, which may cause wireline providers to upgrade their networks or create more competitive service package pricing options.

A two-hop link is required to reach the target backhaul fiber link in Griffin. The first link is four (4) miles, and the second is 10 miles. This link could provide up to 2.5gbps however spectrum may be at a premium in the area. A shorter, one-hop link (with fiber access) would be preferable. This backhaul route works for both wireless districts of Maytown and Scott Lake. The towers themselves are the bulk of the cost for this deployment at \$1,000,000. The equipment for this high-capacity backhaul that would be attached to the poles cost \$500,000 from our vendor quoting process. Leasing space for the towers to be built on was quoted at \$700 per tower per month, making a \$2100 per month lease cost. The CBRS radios are \$15k each and to serve the Maytown and Scott Lake areas requires 8 for a price of \$180,000. This deployment's installation and engineering were estimated at \$300,000, making the two regions \$1,980,000 for the initial infrastructure and

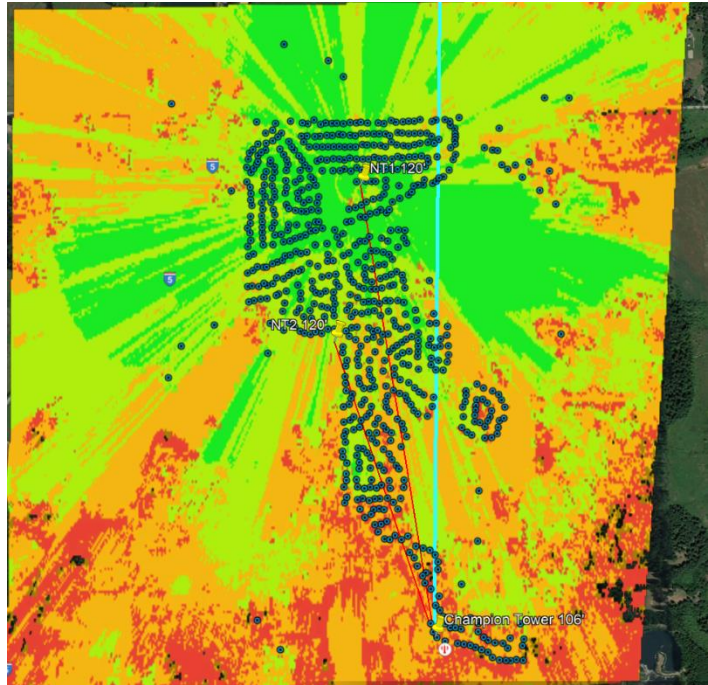


Figure 3 - Maytown Wireless Coverage

\$2100 per month in recurring land lease costs. Full-size maps are included in Appendix D of this document.

Maytown consists of about 70 residences and some industrial warehouses and facilities. This area

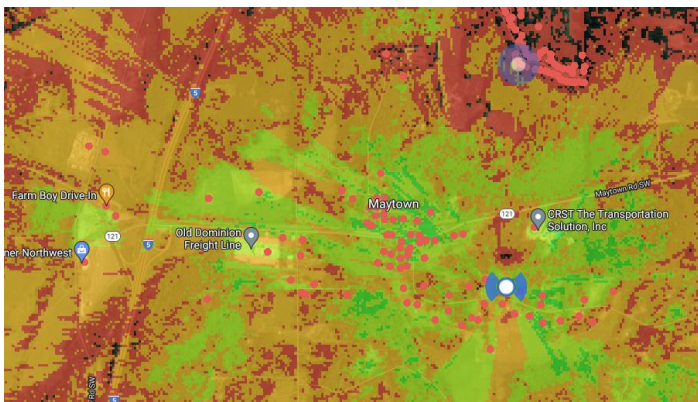


Figure 4 - Scott Lake Wireless Coverage

would require a new tower/ pole to cover the area effectively. Areas shaded in green would have a good connection to the wireless bandwidth. Orange would be slightly degraded access, and red areas would not be areas that would have access to a reliable connection through this tower.

Bringing CBRS wireless services to the Scott Lake neighborhood that would service about 700 homes would require two additional

towers/ poles (100' min) to achieve ~100% coverage due to CBRS's reduced power. These new towers

would backhaul to the existing Champion tower. The existing Champion tower would need to be improved to accommodate new hardware and raised to cover this entire area.

The total cost for deploying a wireless solution to Maytown and Scott Lake would be \$1,980,000 for the initial buildout, with a \$2100/month charge for space on existing wireless towers. These costs are broken down further in the financials section of this document.

***It is important to note that state and federal funding has been committed to ISPs to support the installation of new and the upgrade and expansion of existing broadband infrastructure in this region.***

## VISION STATEMENT

The Thurston County PUD Broadband Champions Vision Statement was created with input from the community Champion stakeholders to set a direction for the PUD's broadband feasibility assessment.

This statement conforms to existing PUD visioning efforts as it seeks to meet the infrastructure needs of the Thurston County community. The PUD currently serves the community with water services. Recognizing that broadband access is the new critical infrastructure of our time, the PUD outlined a vision to explore how to best meet the needs of the area.

***THURSTON PUD'S VISION IS TO EVALUATE THE PUD'S ROLE IN FACILITATING AFFORDABLE HIGH-SPEED BROADBAND SERVICES TO THE SCHOOLS, HOMES, AND BUSINESSES OF THURSTON COUNTY.***

## KEY DOCUMENTS AND EXISTING EFFORTS

### DOES THE MUNICIPALITY USE BROADBAND TO DELIVER MUNICIPAL SERVICES?

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No. Thurston PUD does not currently participate in any broadband efforts internally or externally.

### ARE THERE LOCAL OR REGIONAL ECONOMIC DEVELOPMENT PLANS IN WHICH BROADBAND COULD PLAY A ROLE? IF SO, PROVIDE A LIST OF THESE DOCUMENTS.

---

The Thurston County Economic Development Council, Thurston Regional Planning Cooperative, and Thurston County Chamber of Commerce could serve as supportive partners in deploying broadband infrastructure in Thurston PUD's service area. The Thurston Regional Planning Cooperative is a regular participant in the Thurston County Broadband Action Team meetings. They do not currently have any published broadband vision or efforts underway.

### ARE THERE ANY ONGOING COMMUNITY PROJECTS FOCUSING ON THE DIGITAL DIVIDE OR INFORMATION TECHNOLOGY (PUBLIC ACCESS THROUGH SCHOOLS OR LIBRARIES, TRAINING, IMPROVING ACCESS TO BROADBAND, ETC.?)

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Libraries throughout Washington State, including Thurston County, have had free Wi-Fi access in their parking lots since the start of the pandemic. Due to COVID-19 restrictions, any programs facilitating technology support through the library system have been suspended.



**Community Anchor Institutions:**

Griffin School District  
Global Alliance for Community  
Empowerment  
Griffin Fire Station 02

St. Christopher's Community Church  
Scott Lake Fire Station  
Scott Lake Community Center

**Businesses:**

Indigo Farms Olympia  
Steamboat Island Goat Farm  
Case Inlet Oyster  
Schirm Loop Lavender Farm  
Crawlin' Dirt  
Steamboat General Store  
Northwoods Falconry  
Promix Equipment  
Rugid Computer  
Honda Import Auto Repair  
Griffin Athletic Fields  
Cox Molded Sails  
Rainbow Water Company  
Olympic Ribbon Art  
Oyster Bay Fine Home Finishing  
Queen See Art Cottage  
Island Market

Tin Cup Golf  
Steamboat Grill & Greens  
K&M Mobile Repair  
Griffinwood Stables  
Boulder Equipment  
Lot Hauling  
Farm Boy Drive-In  
Freightliner Northwest  
Old Dominion Freight Line  
CRST The Transportation Solution, Inc.  
Sandstone Distillery  
Hillside Farms  
Premier Stone & Quartz  
Scott Lake Gold Course  
Auto Elements NW  
Granite Construction Co.

## EDUCATION BENEFITS

### SCHOOL-AGED CHILDREN

There are many ways that a lack of Internet access can affect a student's academic performance. Students without the Internet can't connect with teachers or classmates, do independent research, or get online homework help. For families, not having internet access can mean missing out on information or losing out on direct communication with schools and teachers.

The COVID-19 pandemic has shown us a timely real-life example of how this type of infrastructure impacts the availability of education for our students. With schools being closed for weeks to curb the spread of the virus, teachers and students have had to pause their schoolwork until schools re-open. If ubiquitous broadband access was available to their students, schools might have maintained a modified curriculum while away from the physical classroom.

Of the residential respondents in Thurston County who engaged in the community survey, 27 percent reported having school-aged children in their homes. Even outside of the COVID-19 pandemic, an increasing amount of schoolwork requires the Internet. Now, in the current uncertainty about how the school will look for the upcoming school year and beyond, students must have access to a reliable and sufficient broadband connection outside of school hours. Without reliable Internet access at home, students are limited to doing homework that requires online engagement to times when they are at school or when the library is open or leaving them to access the Internet through their phones if they need to get online late at night.

In 2015, the Pew Research Center analyzed data from studies on Internet access and found that students lacking Internet access at home strongly correlate with household income. Among households with an annual income under \$50,000, 31.4 percent do not have broadband Internet access. For families with a yearly income over \$50,000, the number is much smaller—only 8.4 percent lack access to broadband Internet.

From the survey data collected, it is clear that 27 percent of households that reported having school-aged children in their homes need to have access to enhanced broadband services to overcome these educational obstacles. With increased infrastructure, the PUD could also consider creative solutions to give students more time to complete their online homework outside of school hours, such as Wi-Fi on school buses or in public areas.

THE COMMUNITY SURVEY

An online portal for community feedback on broadband access was activated on June 30, 2021, providing residents and businesses the opportunity to log their current broadband service levels, costs associated with services, and their satisfaction with their current service's price, speed, and reliability. Paper surveys were also available at the PUD offices and area libraries, food banks, and community meetings.

An extensive community outreach effort was conducted to inform residents and businesses about the survey effort. This was accomplished through custom envelopes for their PUD bills, direct email outreach to companies, social media posts on the Thurston County PUD's Facebook page and other community social pages, and via the PUD's website. A phone hotline was created for residents or businesses who didn't have access to good Internet to engage in the online survey, and the survey could be taken over the phone. The PUD made this option available between 8 am and 5 pm Monday through Friday to ensure that the survey feedback could be collected from accessibility for those who did not have Internet or computer access.

Community institutions and the general public were also reached out to at length, outlined in the preceding community outreach portion of this document.

Thurston PUD collected one thousand four hundred and eighty-eight (1,488) survey responses. One thousand and thirty-eight (1,038) of those speed tests included speed-test data.

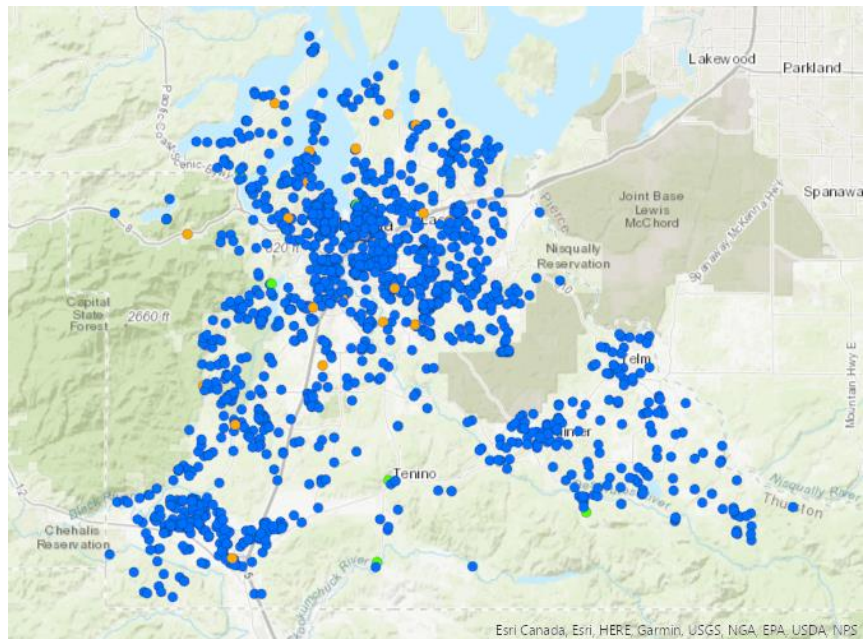


Figure 4 - Survey Response Locations

RESULTS SUMMARY

Of the 1,488 responses, 1,369 of the surveys obtained came from single-family homes, 11 from commercial locations, and 112 were from multi-family residences such as apartments and condos. 45 percent of respondents reported being dissatisfied with the speed of their services, 28 percent of respondents rated in the unsatisfied spectrum for reliability, and 75 percent were unhappy with the price of their services. The satisfaction ratings for these metrics were not consistent across the entire survey area. In the Olympia metro, the satisfaction for the speed and reliability of their services is substantially more optimistic. However, the dissatisfaction with the cost of services is stable across the

entire county, with only one in four respondents being satisfied with the cost of their services.

Out of the 1,488 surveys completed, nearly 97 percent (1,439/1,488) indicated they considered Internet access an essential utility. Only 49 respondents (3.3 percent) stated that

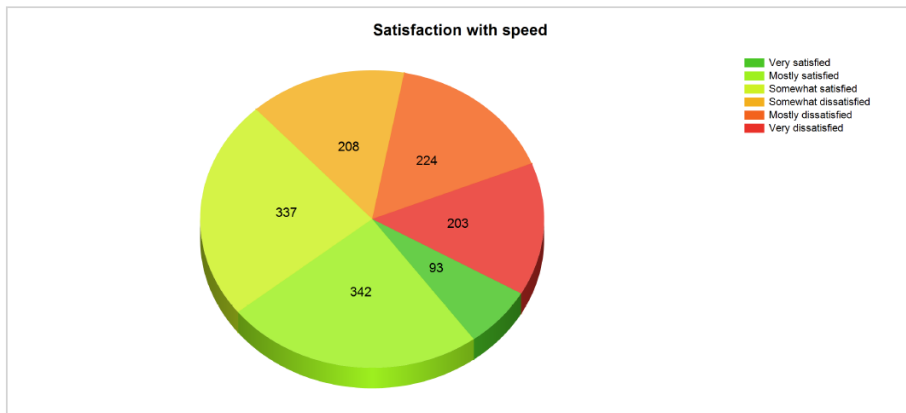
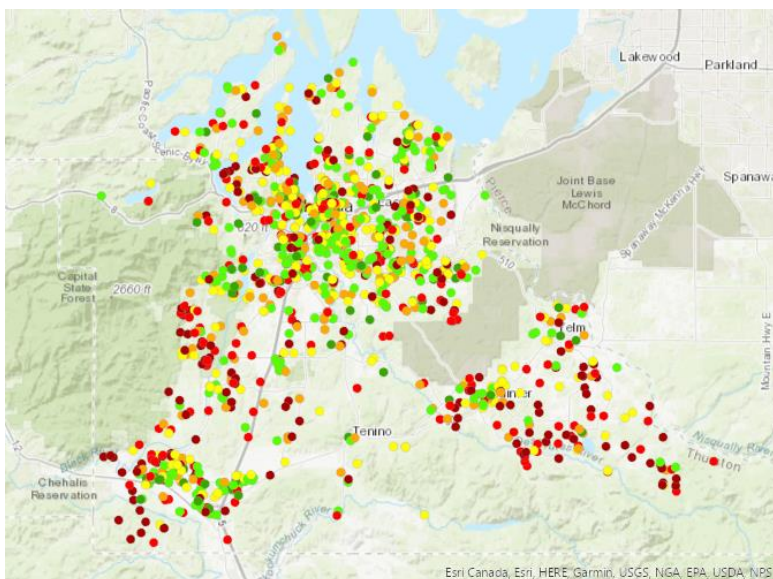


Figure 5 - Pie Chart - Speed Satisfaction

they did not consider internet access a vital utility service. This data point shows that this community views broadband access as a utility service.

It was noted that many of the survey takers commented that they did not consider Internet access a utility service until the COVID-19 pandemic when it became a requirement to work and attend

education outside of the traditional in-person environment. 73.4 percent of respondents reported that someone in their household worked from home. 43.6 percent said they had school-aged children in their homes. While lack of adequate access had been a nuisance before the pandemic, access became the difference between working or not working and attending classes or not, which was impactful to many area families.



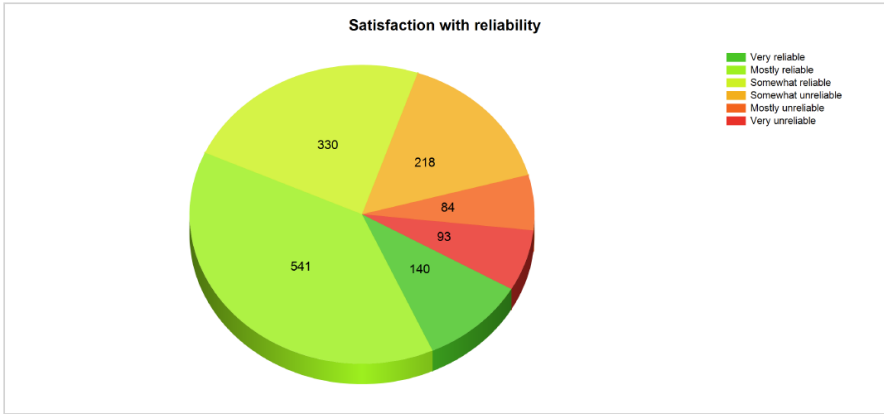


Figure 6 Pie Chart - Reliability Satisfaction

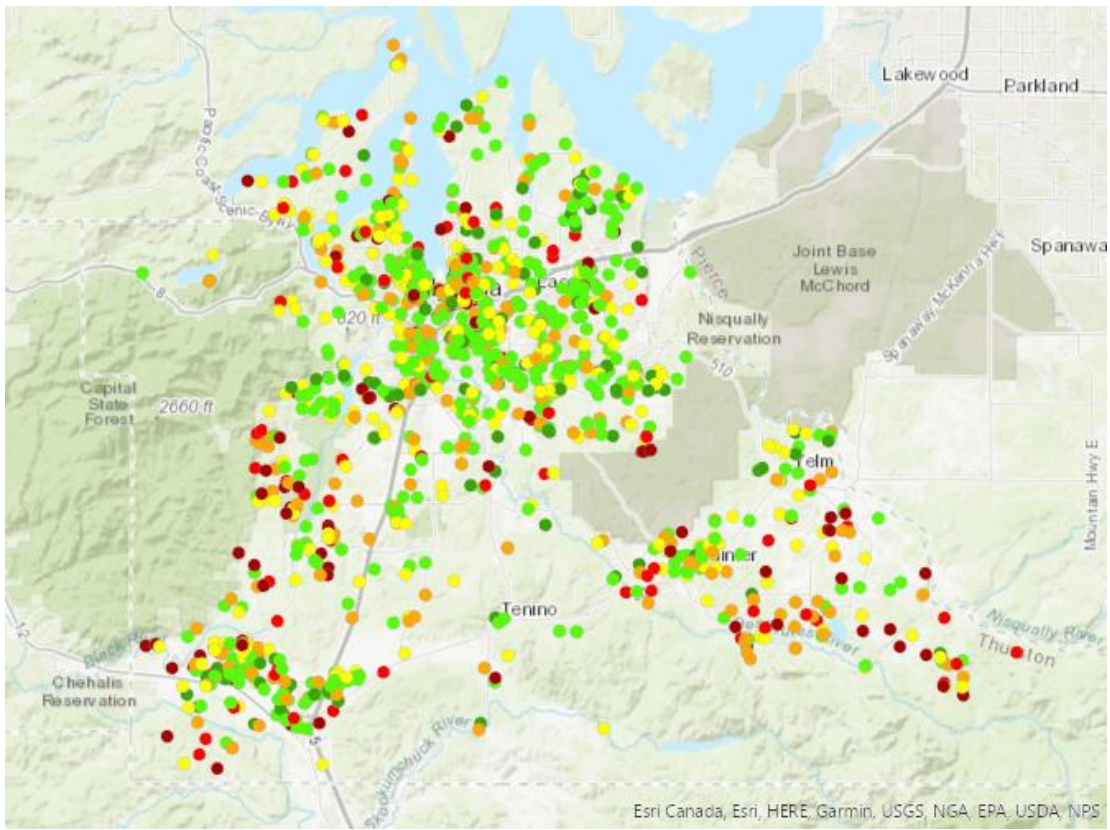


Figure 7 - Survey Locations - Reliability Satisfaction

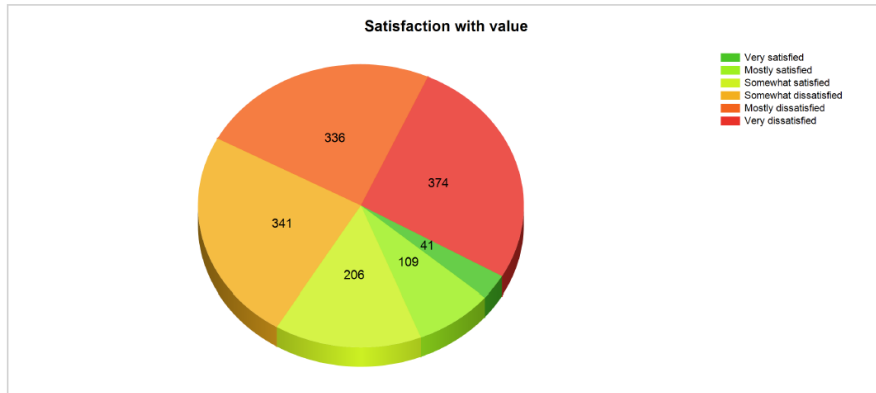


Figure 8 - Pie Chart - Value Satisfaction

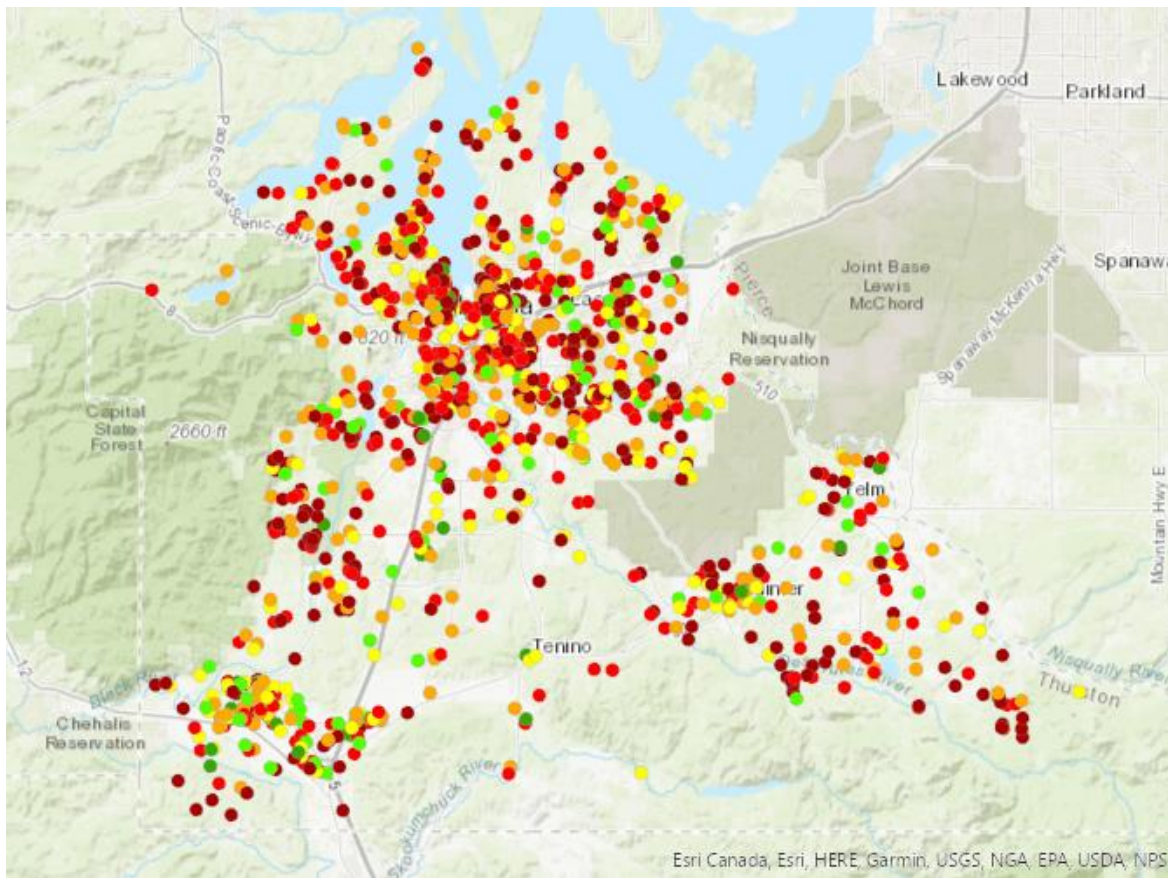


Figure 9 - Survey Locations - Value Satisfaction

Current Cost of Services:

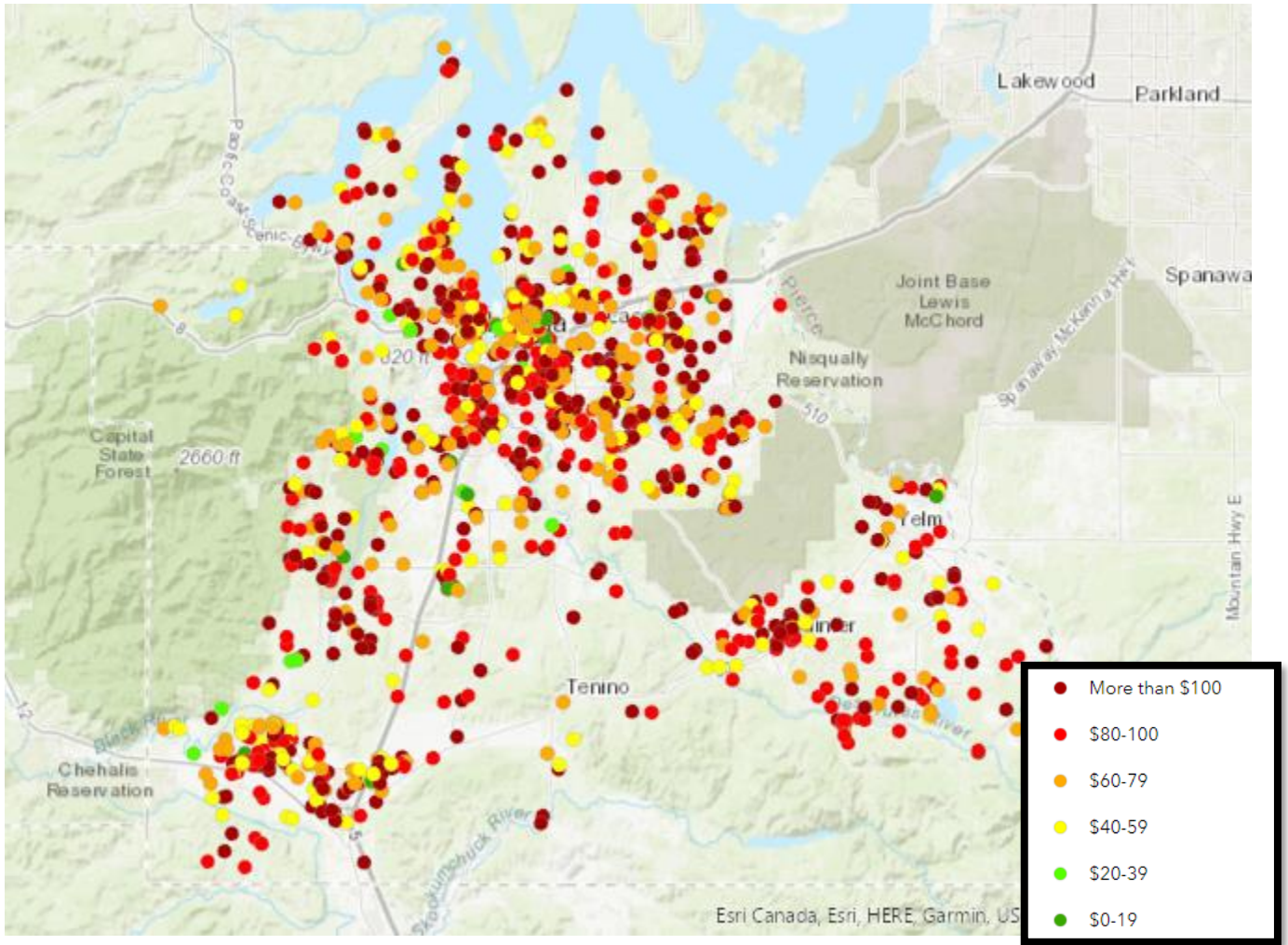
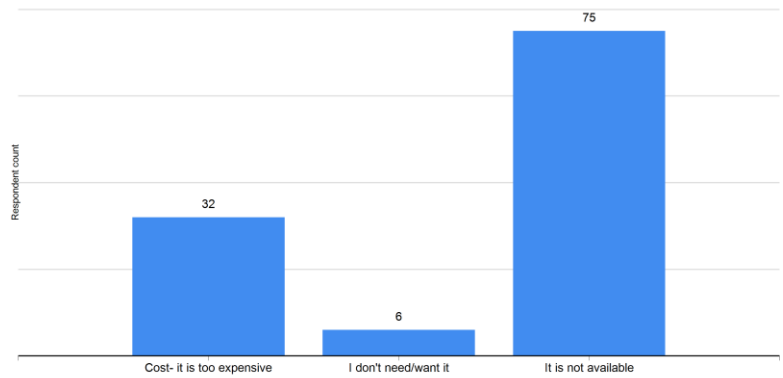


Figure 10 - Survey Locations - Current Cost of Services

Figure 11 - Survey Data -Why don't you have service?



## SURVEY STATS AT-A-GLANCE

1,488 Total Surveys Received | 1,038 Speed tests completed

### DOWNLOAD SPEED TEST RESULTS

<b>32%</b>	Less than 25mbps .....	(333/1,038)
<b>74.7%</b>	Less than 150mbps .....	(776/1,038)
<b>25.1%</b>	More than 150mbps .....	(261/1,038)

### UPLOAD SPEED TEST RESULTS

<b>21.8%</b>	Less than 3mbps .....	(227/1,038)
<b>99.6%</b>	Less than 150mbps .....	(1,034/1,038)
<b>0.3%</b>	More than 150mbps .....	(3/1,038)

### IF YOU DON'T HAVE INTERNET, WHY NOT?

<b>28.3%</b>	Cost .....	(32/113)
<b>5.3%</b>	Don't need/want it .....	(6/113)
<b>66.4%</b>	Not available at my location .....	(75/113)

### SATISFACTION WITH PRICE:

<b>74.9%</b>	Unsatisfied .....	(1,048/1,403)
<b>25.3%</b>	Satisfied .....	(355/1,403)

### SATISFACTION WITH RELIABILITY:

<b>28%</b>	Unsatisfied .....	(393/1,403)
<b>72%</b>	Satisfied .....	(1,010/1,403)

### SATISFACTION WITH SPEED:

<b>45.1%</b>	Unsatisfied .....	(633/1,403)
<b>54.9%</b>	Satisfied .....	(770/1,403)

### DOES ANYONE IN YOUR HOUSEHOLD WORK FROM HOME?

<b>73.4%</b>	Yes .....	(1,045/1,424)
<b>26.6%</b>	No .....	(379/1,424)

### ARE THERE ANY SCHOOL AGED CHILDREN IN YOUR HOUSEHOLD?

<b>43.6%</b>	Yes .....	(649/1,487)
<b>56.4%</b>	No .....	(838/1,487)

### IS BROADBAND A UTILITY (LIKE WATER AND POWER)?

<b>96.7%</b>	Yes .....	(1,439/1,488)
<b>3.3%</b>	No .....	(49/1,488)



## APPENDICES

APPENDIX A: BROADBAND ACTION TEAM ATTENDEES

Name	Organization
Paul Walk	Nisqually Tribe
Mike Mason	Nisqually Tribe
John Weidenfeller	Thurston PUD
Julie Parker	Thurston PUD
Michael Cade	EDC
Jennica Machado	Thurston County
Marc Daily	TRPC
Sam Gibboney	Port of Olympia
Chris Olin	Nisqually Tribe
EJ Zita	Port of Olympia
Bill McGregor	Port of Olympia
Rudy Rudolph	Port of Olympia
Bob Iyall	Nisqually Medicine Creek Enterprise Corporation
Gary Vervalin	Wave Broadband
Kevin Stamey	Wave Broadband
Ruth Clemens	Thurston PUD

## Broadband Stakeholder

Meeting Agenda

**April 13, 2021**

**1:00-2:00pm**

<https://us02web.zoom.us/j/4482480998>

Participants: Michael Cade- EDC, Jennica Machado- Thurston County, Marc Daily- TRPC, Sam Gibboney- Port of Olympia, Paul Walk- Nisqually Tribe, Chris Olin – Nisqually Tribe, Mike Mason – Nisqually Tribe, John Weidenfeller- Thurston PUD, Ruth Clemens – Thurston PUD

**Agenda:**

- I. Welcome + Introductions
  - a) Include brief statement on current broadband efforts
- II. Defining the problem
- III. Discussion Thurston County broadband strategy
  - a) Approach/coordination model
  - b) Stakeholder group function
- IV. Concerns/obstacles
- V. Next steps & follow-up

# Broadband Stakeholder

Meeting Agenda

**May 27, 2021**

**3:00-4:00pm**

<https://us02web.zoom.us/j/4482480998>

Participants: Michael Cade- EDC, Jennica Machado- Thurston County, Marc Daily- TRPC, Sam Gibboney- Port of Olympia, Paul Walk- Nisqually Tribe, Chris Olin – Nisqually Tribe, Mike Mason – Nisqually Tribe, John Weidenfeller- Thurston PUD, Ruth Clemens – Thurston PUD

## **Agenda:**

- I. Welcome + Updates
  - b) Include an update on any recent organizational broadband efforts
- II. Broadband Action Team Update
- III. Understanding the Thurston County broadband landscape
  - A) How extensive are partner access/coverage studies? Are additional studies needed?
- IV. Broadband Funding List
  - A) Additional known funding sources current or upcoming?
- V. Legislative Update
- VI. Next steps & follow-up
  - a) Communication with the Community
    - i. How can we educate our community on broadband needs, benefits, and partner efforts to encourage engagement/ participation in future efforts?
  - B) Nisqually Tribe Project Update

# Broadband Stakeholder

## Meeting Agenda

**June 24, 2021**

**3:00-4:00pm**

<https://us02web.zoom.us/j/84658279116>

Participants: Michael Cade- EDC, Jennica Machado- Thurston County, Marc Daily- TRPC, Sam Gibboney- Port of Olympia, Paul Walk- Nisqually Tribe, Chris Olin – Nisqually Tribe, Mike Mason – Nisqually Tribe, John Weidenfeller- Thurston PUD, Julie Parker – Thurston PUD

Guest Attendees: Commissioner EJ Zita – Port of Olympia, Commissioner Bill McGregor– Port of Olympia, Rudy Rudolph – Port of Olympia, Bob Iyall – Nisqually Medicine Creek Enterprise Corporation, Gary Vervalin – Wave Broadband, Kevin Stamey – Wave Broadband

### **Agenda:**

- VII. Welcome + Introductions
- VIII. Nisqually ISP Partner Introduction
  - Wave Broadband
- IX. Nisqually Tribe Open Access Fiber Line Project Update
  - Nisqually Tribe and Thurston PUD update
  - Q & A opportunity
- X. Next steps & follow-up
  - A) Next meeting:
    - i. Work Session: Mission, Vision, Strategy

# Broadband Stakeholder Meeting Agenda

August 26, 2021

3:00-4:00pm

## Agenda:

- I. Welcome + Introductions/Updates
- II. Broadband Action Team Formalization
  - A) Intent, Mission, Strategy
    - i. Intent: Thurston County will be positioned to secure and capture significant resources for building out a broadband network that closes the digital divide.
    - ii. Mission: Ensure access to reliable and quality broadband for all Thurston County citizens and businesses.
    - iii. Strategy
      - 1. Partnerships – foster collaboration to increase planning
      - 2. Plan – identify service gaps and ready projects
      - 3. Fund – we identify all funding sources and maximize our access to
      - 4. Build – networks to meet Thurston County goals that are in alignment with the State's
      - 5. Adopt – support digital equity and inclusion initiatives
  - B) Results
    - i. Examples: Increased local stakeholder engagement, Establishment of public/private partnerships, Improved support of robust entrepreneurial efforts, improved local business recruitment and retention efforts, Increased countywide job and industry growth, Increased access to education and health services
- III. BAT Participation
  - A) Who is missing representation within group?
- IV. Discussion/Action Items
  - A) MOU
  - B) Using a unified BAT voice for support letters
- V. Next steps & follow-up
  - A) Next meeting: BAT Activities

# Broadband Action Team

## Meeting Agenda

**September 23, 2021**

**3:00-4:00pm**

### Agenda:

- I. Welcome + Quick Updates
- II. Extended Partner Updates
  - A) Thurston PUD
  - B) Nisqually Tribe
- III. Discussion/Action Items
  - A) Final review and approval of Thurston BAT Model: *Attached in email*
  - B) MOU: *Attached in email*
    - i. Review & email requested revisions
  - C) Broadband Construction Labor Shortage: *Paul Walk*
  - D) Low Inventory- Product & Construction Equipment: *Paul Walk*
- IV. Next steps & follow-up
  - A) Next meeting:

**Broadband Action Team**

**Meeting Agenda**

**October 28, 2021**

**3:00-4:00pm**

**Agenda:**

- I. Welcome + Quick Updates (*5mins*)
- II. BAT support letter discussion (*15mins*)
  - i. How does our BAT make group decisions? (consensus/majority/etc.)
  - ii. What is our approach to providing support letters?
  - iii. How do we address potential conflicts of interest?
- III. Broadband Project Presentations
  - A) Tenino Telephone (*10mins*)
  - B) Nisqually Tribe (*10mins*)
- IV. Discussion/Action Items (*20mins*)
  - A) Decision on two pending support letter requests
  - B) General BAT coordination discussion
    - i. Who can be identified as a broadband project "implementer" in Thurston County?
      1. How are we supporting coordination between groups?
    - ii. How do we navigate additional external interest in participating in the Thurston BAT?
- V. Open Forum
- VI. Next steps & follow-up
  - A) Next meeting:
    - i. Frequency of meetings? November and December meeting reschedule.



## **Broadband Action Team Meeting Agenda**

**January 27, 2022 3:00-4:00pm**

- I. Welcome & Roundtable Updates
- II. Nisqually Tribe Update
- III. Open Forum
- IV. Next steps & follow-up
- A) Next meeting:

## **Broadband Action Team**

### **Meeting Agenda**

February 24, 2022

3:00-4:00pm

Agenda:

I. Welcome & Roundtable Updates

II. Nisqually Tribe Update

III. Communications

A) Does our BAT want to promote work to the community? How?

B) Support outreach and communication of upcoming partner projects

IV. Open Forum

V. Next steps & follow-up

A) Next meeting:

Thurston PUD Broadband Questionnaire

---

Q1 Name, Title, and Organization

Marc Daily, Executive Director

Q2 Which providers are currently serving your community?

Comcast

Q3 Which providers attended your meeting(s)?

Comcast

Q4 How do the mapping results compare with members' actual experiences?

I wasn't terribly surprised, but good to have data.

Q5 Does existing broadband access meet your needs?

Faster speeds are needed

Q6 If it is inadequate, in what ways does it fall short?

Speeds noticeable suffer during peak periods, which has become more prominent throughout the work day as more people are working from home.

Q7 If you have broadband, how do you use it now?

Work and personal.

**Q1 Name, Title, and Organization**

John Weidenfeller, General Manager, Thurston PUD

**Q2 Which providers are currently serving your community?**

Comcast

**Q3 Which providers attended your meeting(s)?**

Comcast

**Q4 How do the mapping results compare with members' actual experiences?**

Yes

**Q5 Does existing broadband access meet your needs?**

Yes, most of the time at our office

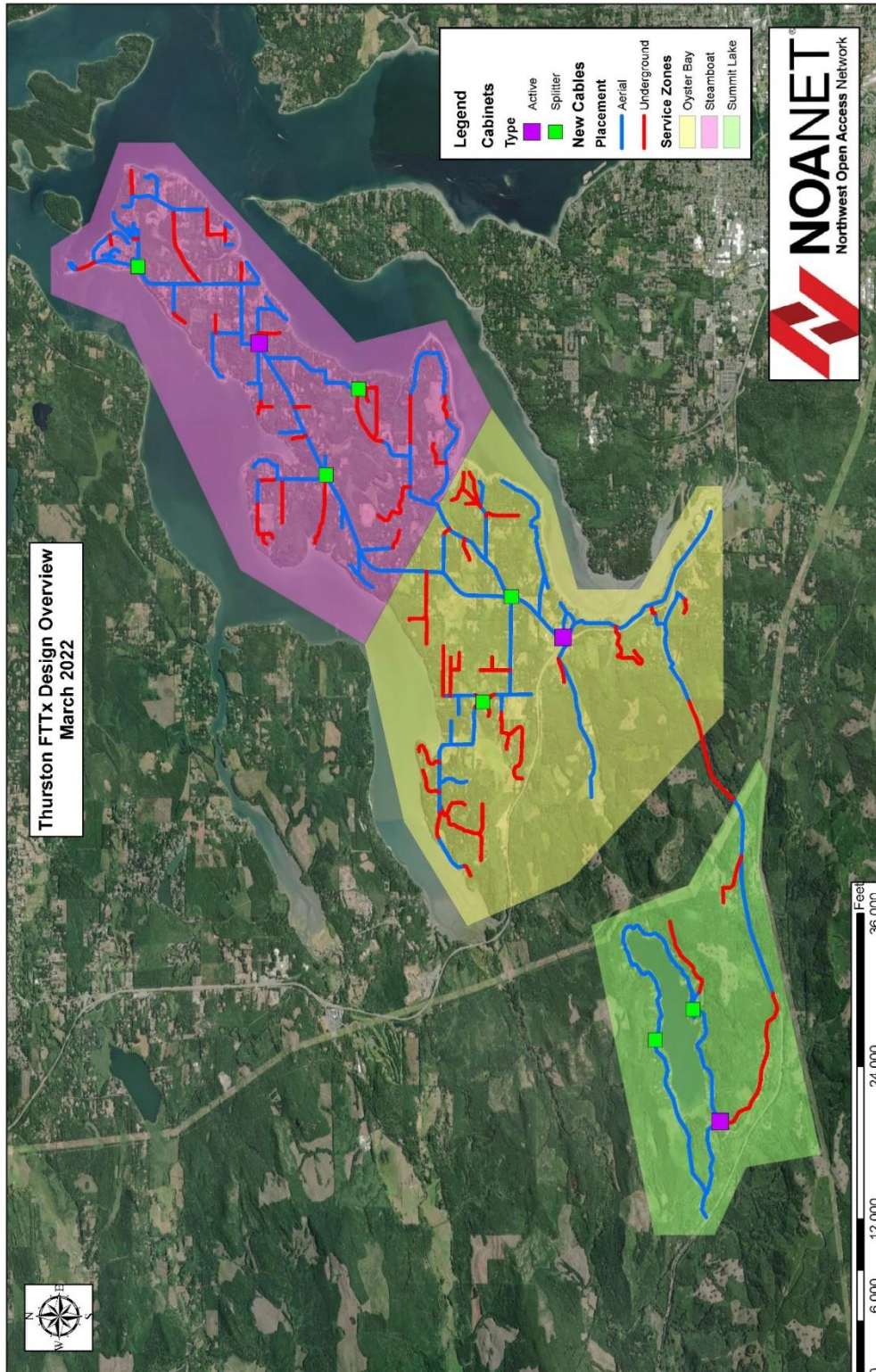
**Q6 If it is inadequate, in what ways does it fall short?**

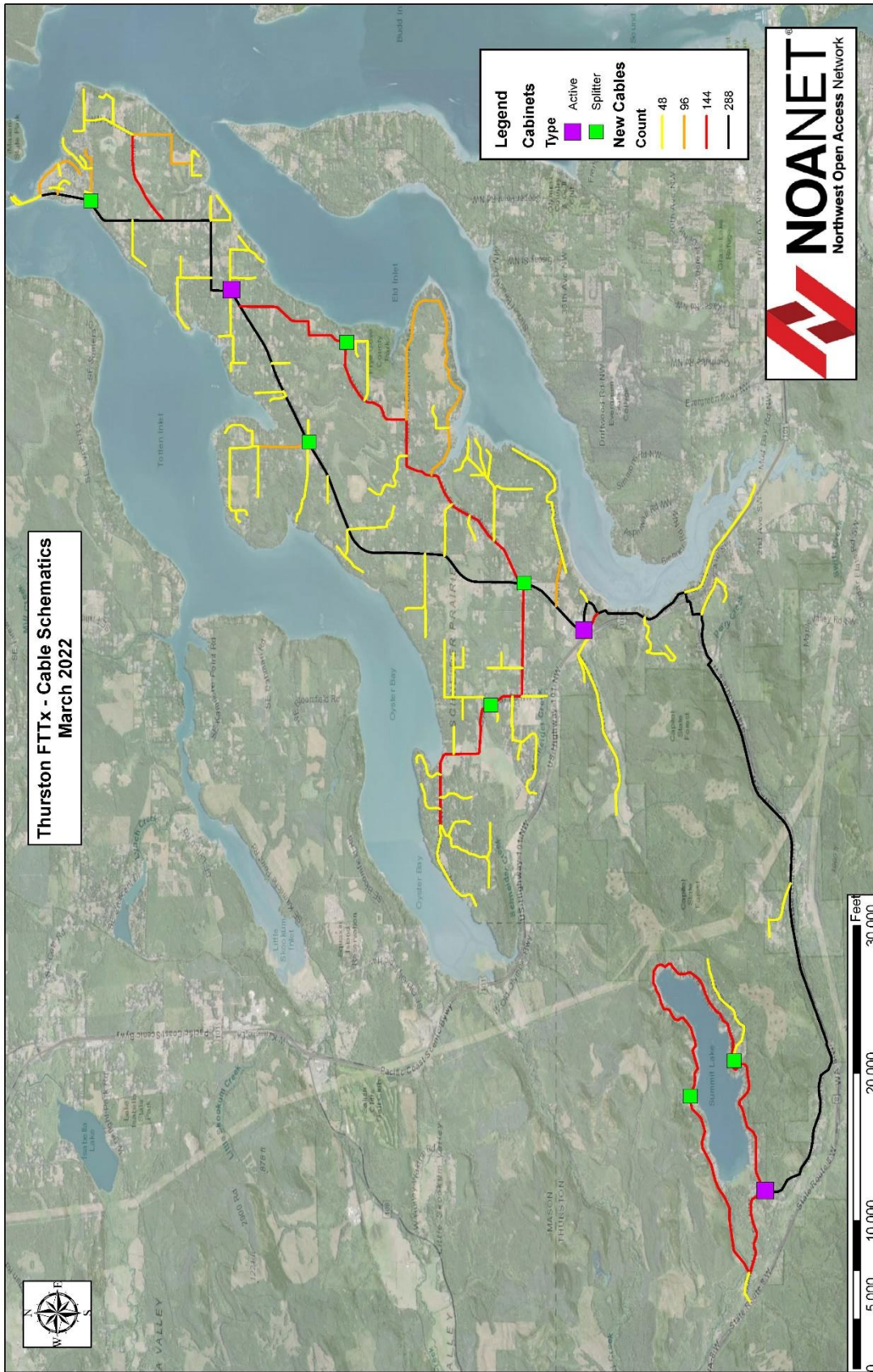
Some outages and speed issues

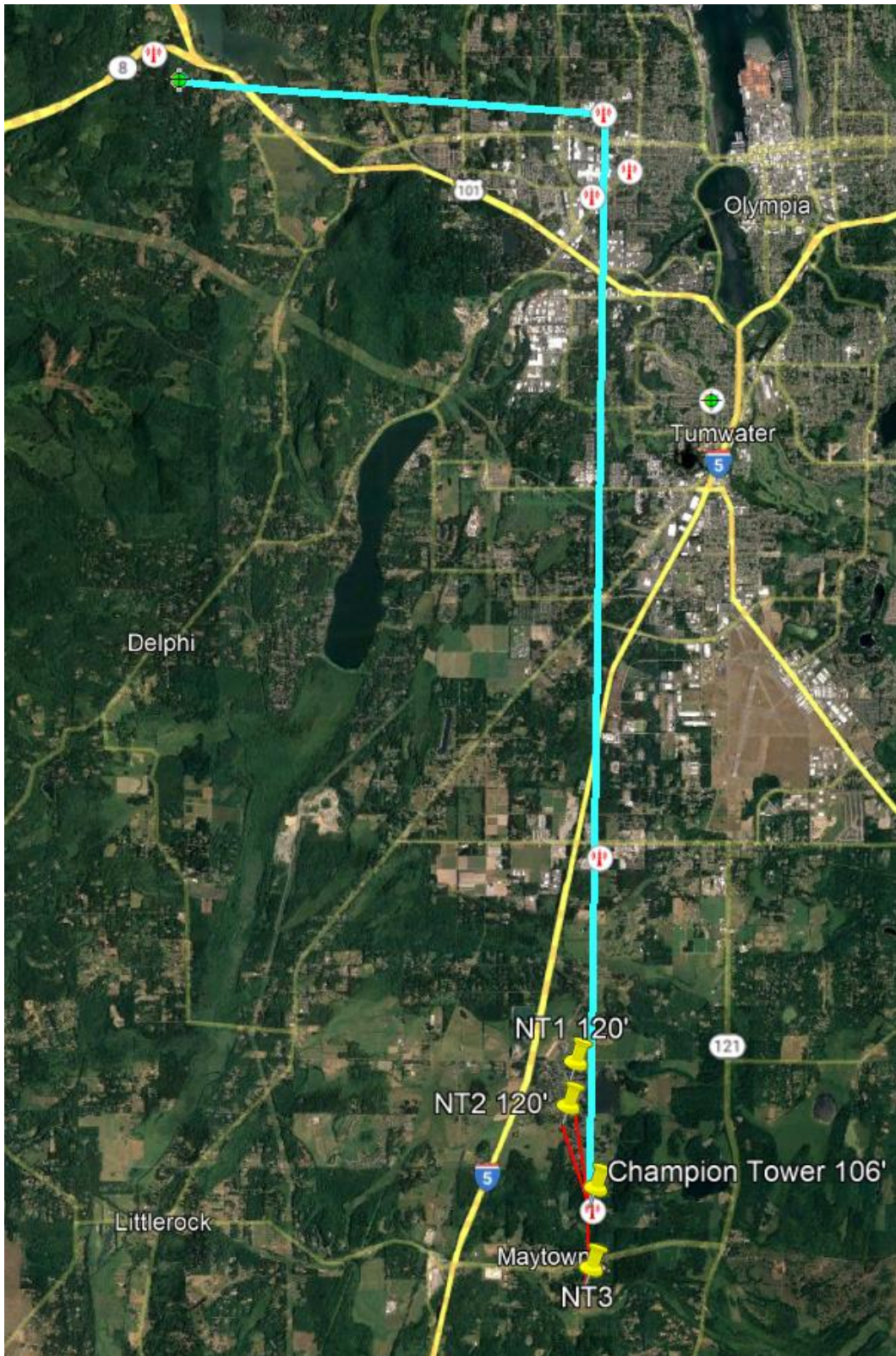
**Q7 If you have broadband, how do you use it now?**

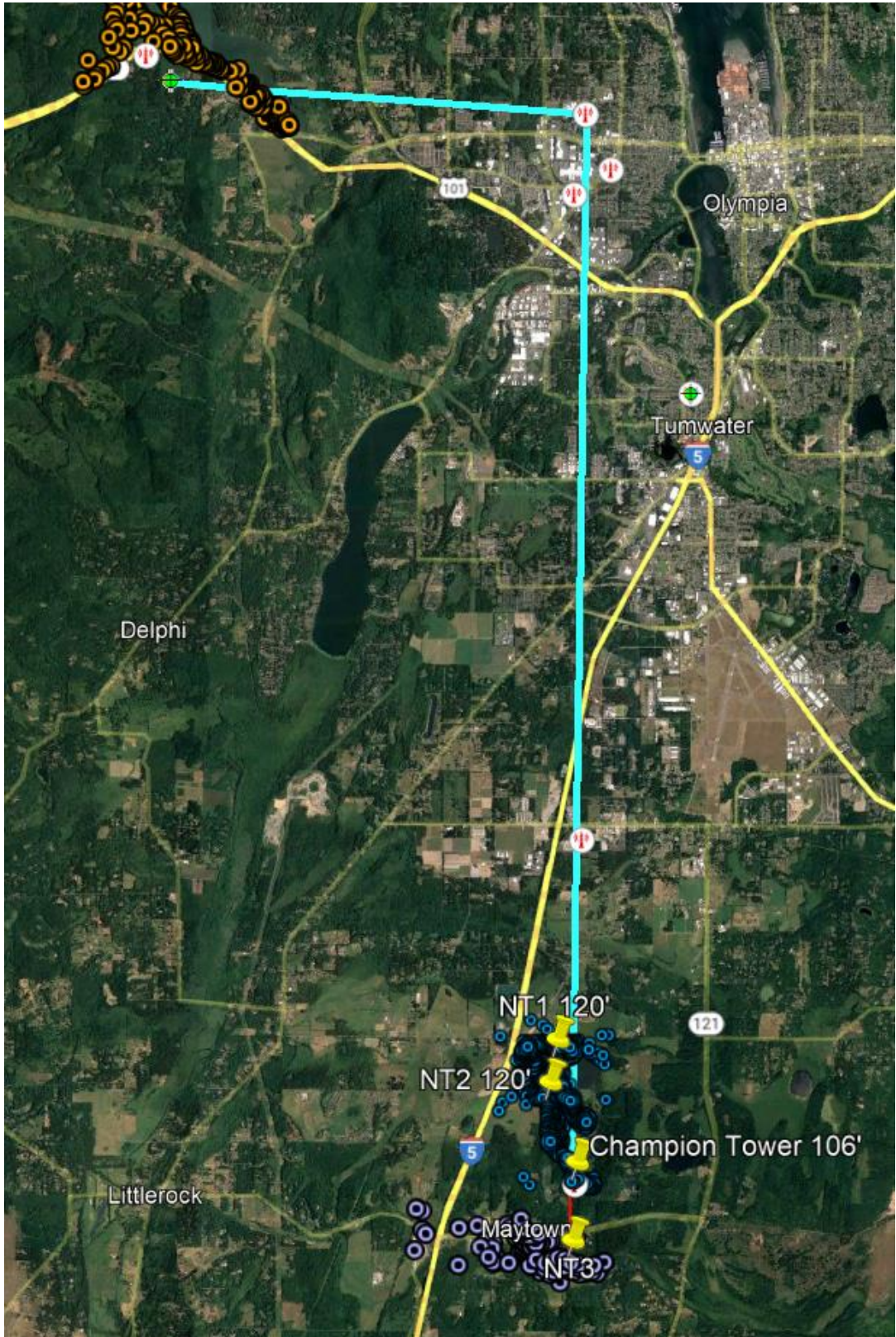
For work

APPENDIX D: PROPOSED NETWORK DESIGN MAPS

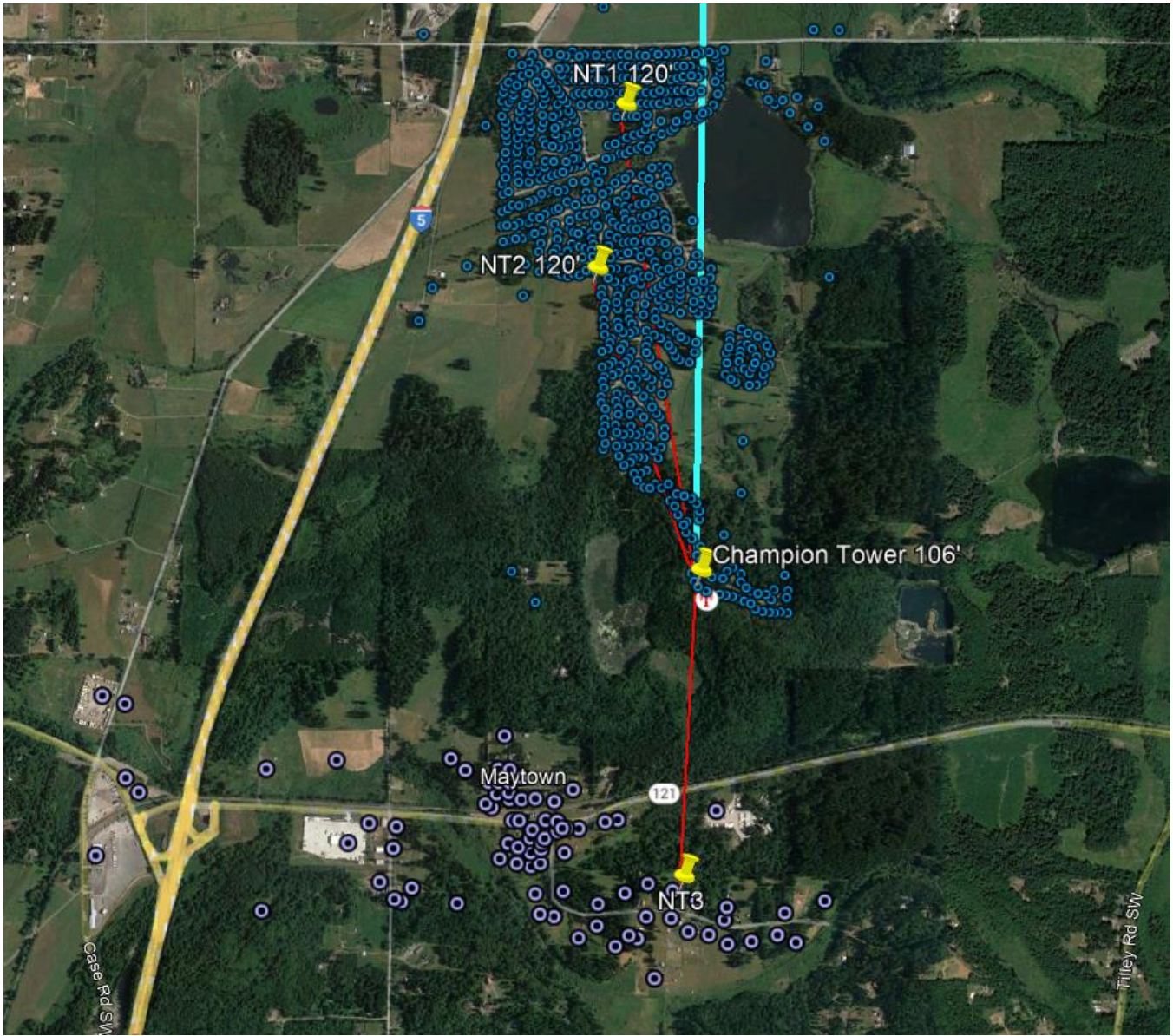
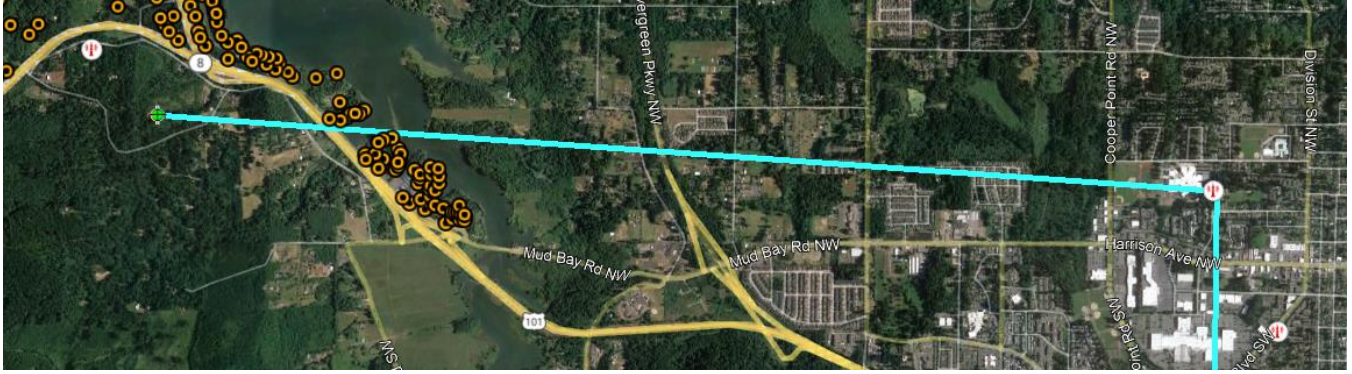


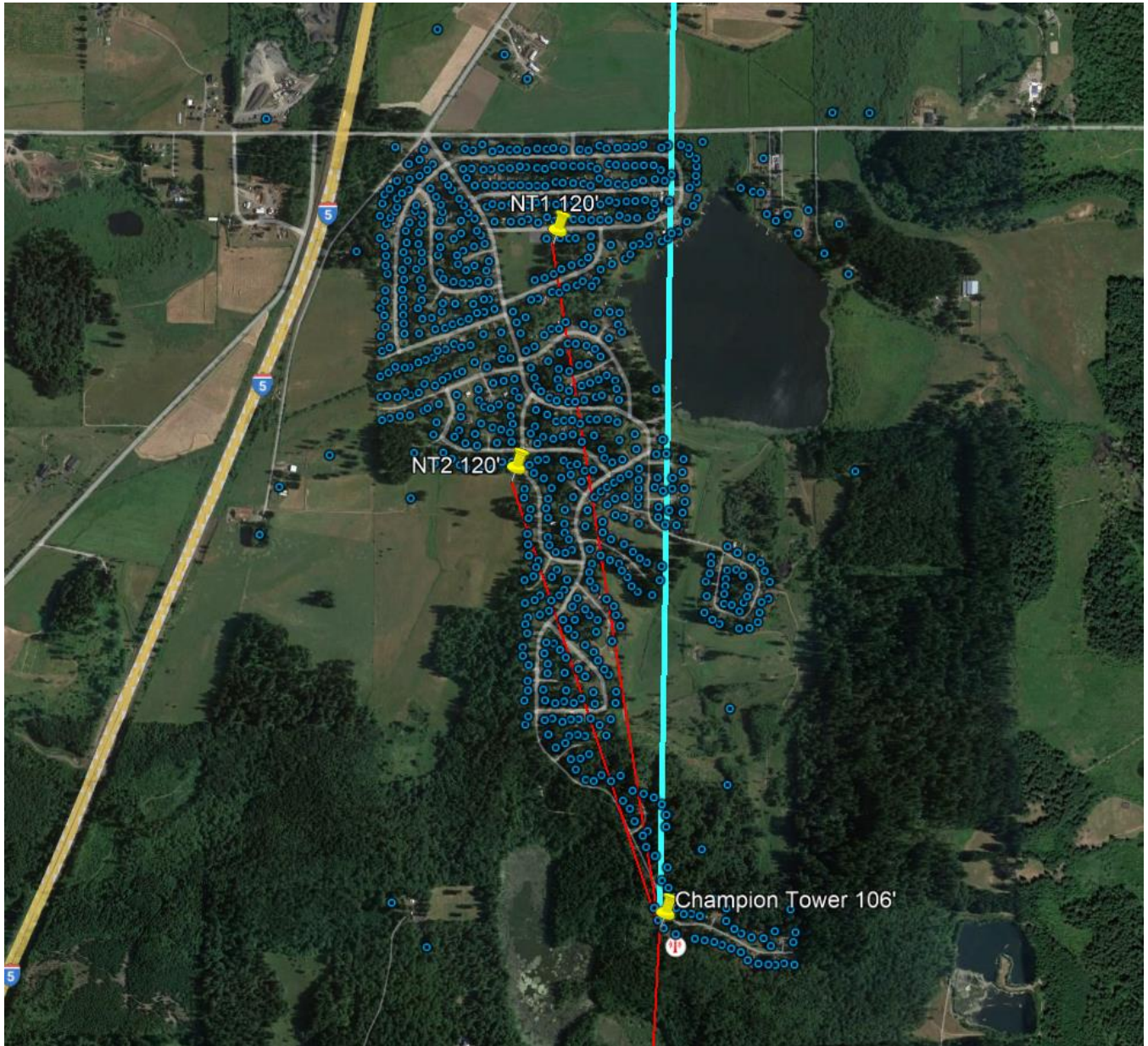


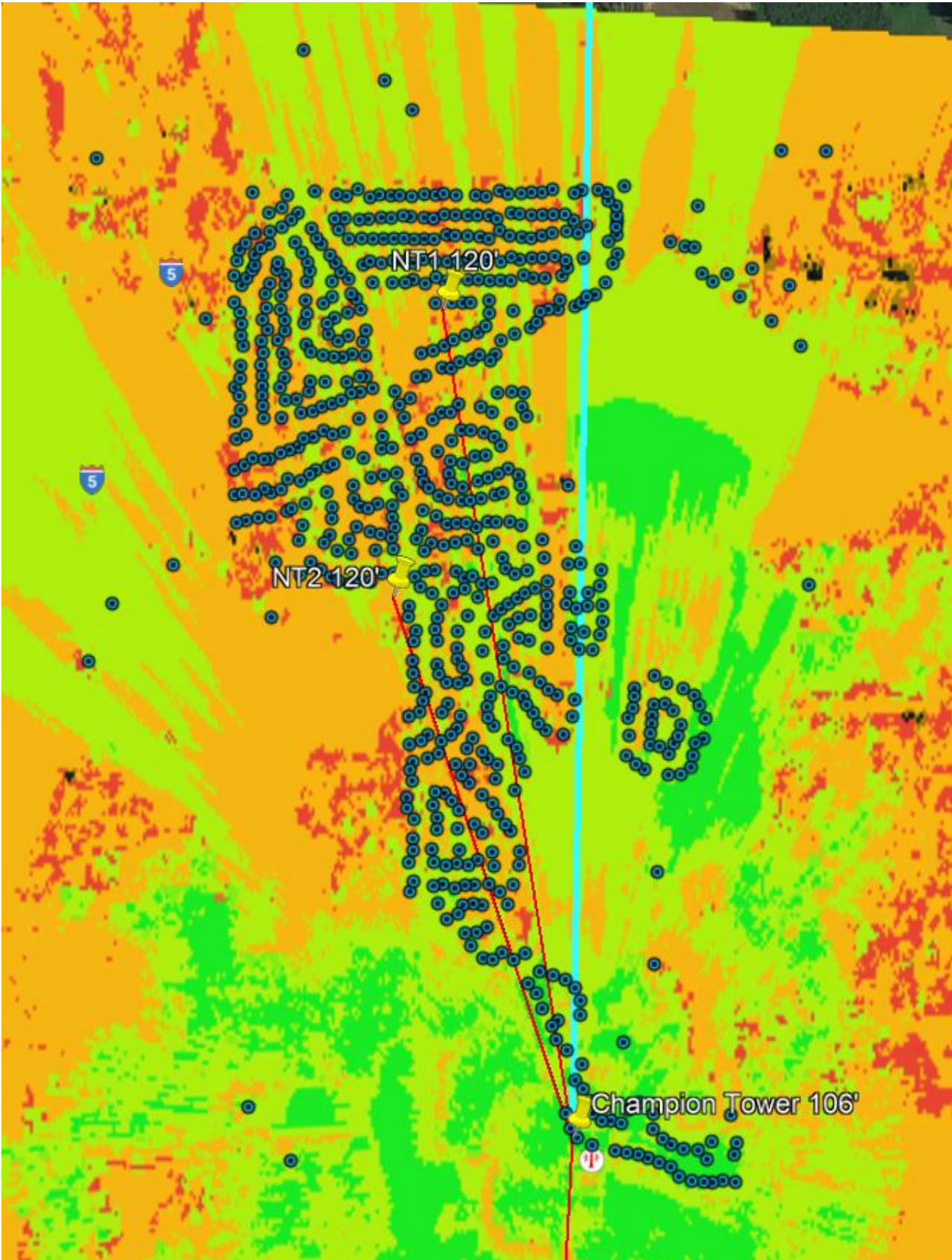


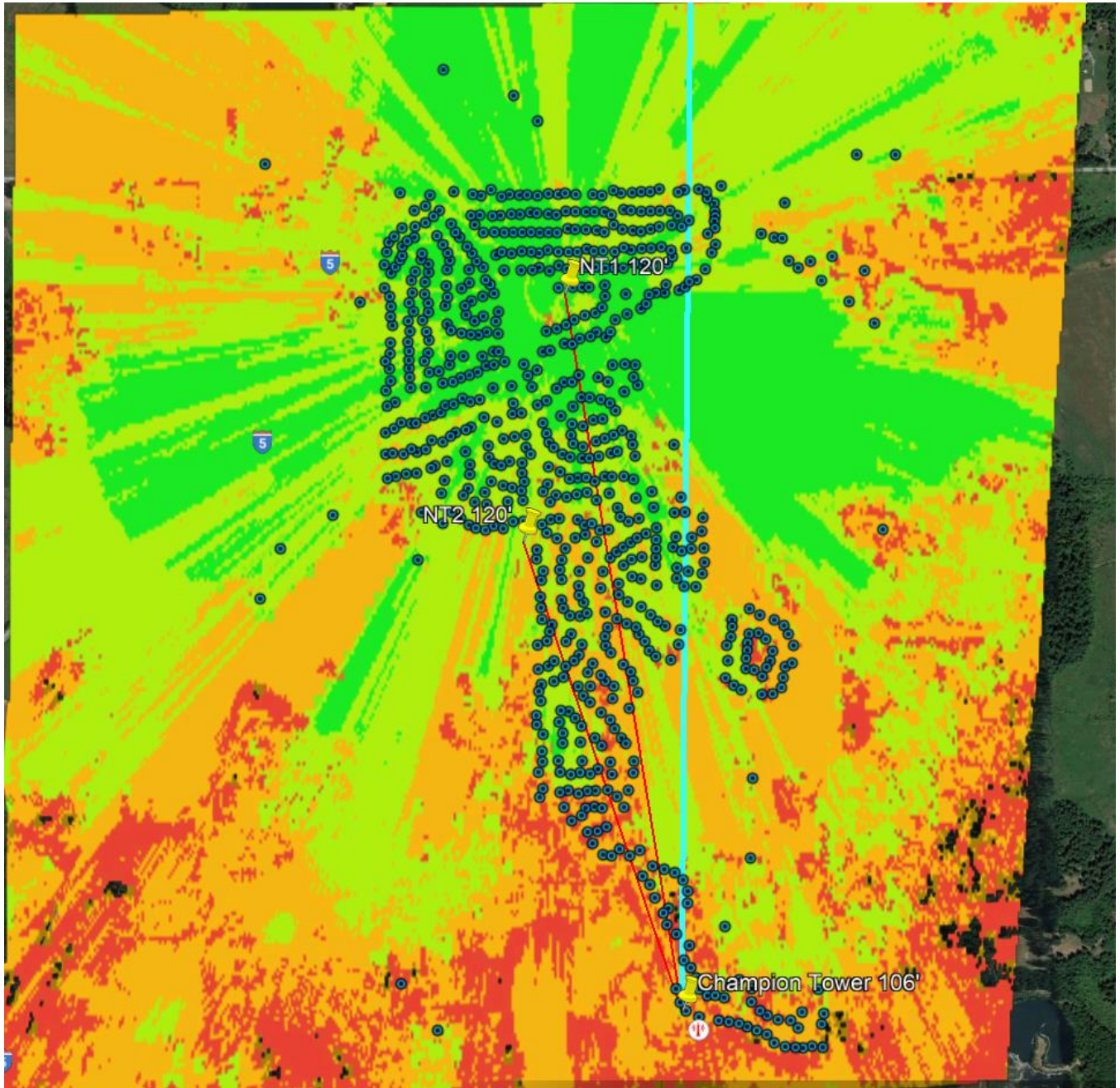


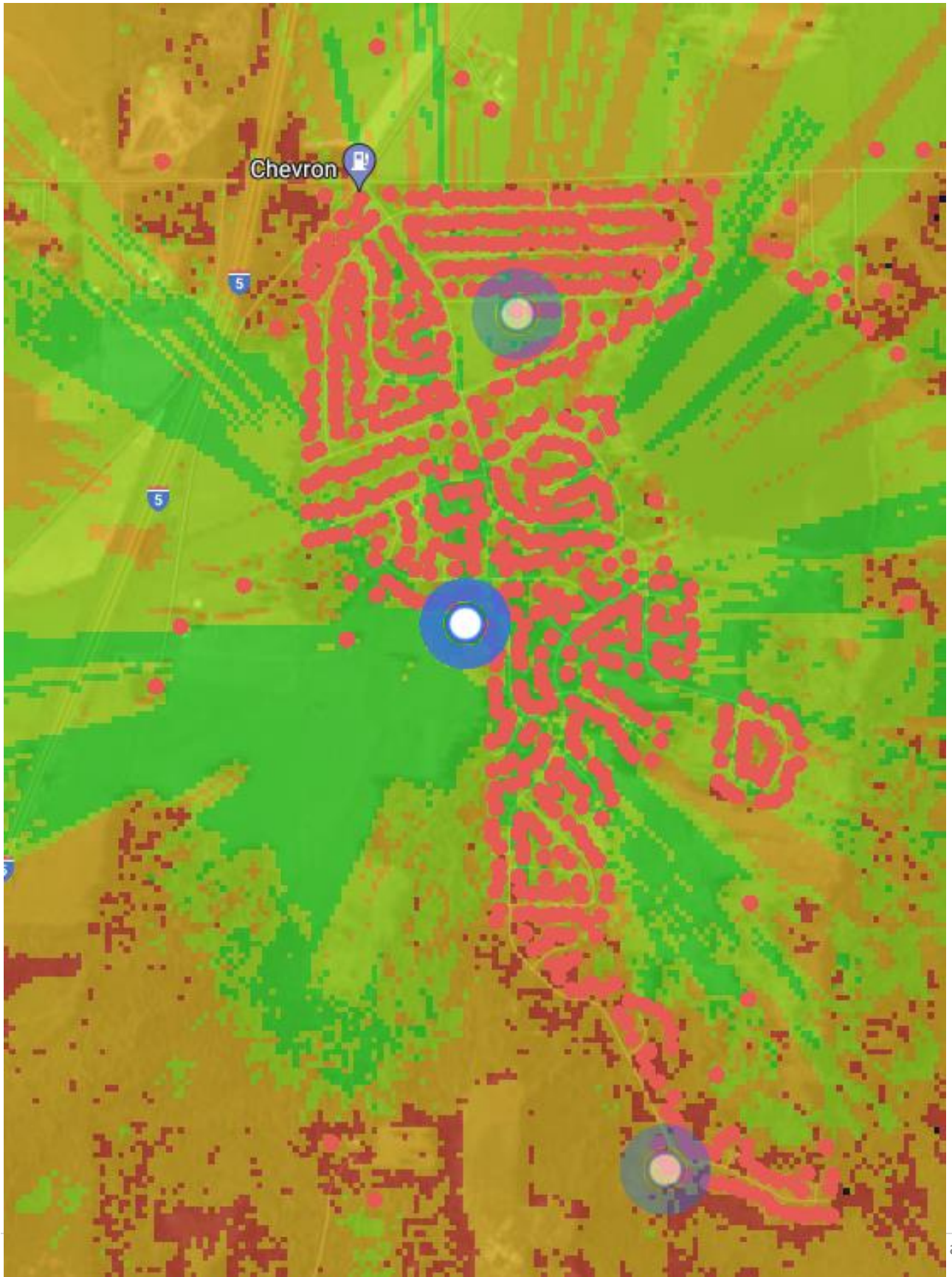
















# THURSTON PUD BROADBAND PROJECT

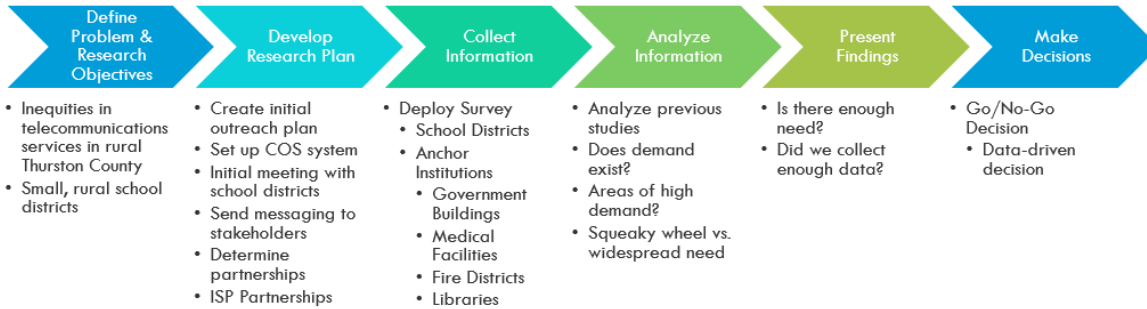
PRESENTATION FOR THE ROCHESTER SCHOOL DISTRICT SUPERINTENDENT KIM FRY  
MAY 12, 2021



## THURSTON PUBLIC UTILITY DISTRICT

- Special Purpose District that serves water
- PUDs can provide
  - Water
  - Wholesale Telecommunications & Broadband
  - Hydrogen
  - Electricity (with a vote of the people)
  - Sewer (with a vote of the people)
- We own and operate 50 water systems in Rochester
  - 363 families
  - Estimated 907 Rochester community members live on our water systems

# THE ROAD TO BROADBAND



## DATA COLLECTED SO FAR FOR ROCHESTER

(STATE BROADBAND OFFICE)



## BROADBAND SPEEDS FOR ROCHESTER (FCC 2020)

Internet Service Provider	Technology	Download Speeds (Mbps)	Upload Speeds (Mbps)
Comcast	Cable	987	35
Century Link	ADSL	140	20
ViaSat	Satellite	35	3
Hughes Network	Satellite	25	3
Century Link	Fiber	20	0.896
Century Link	ADSL	6	0.5
VSAT Systems	Satellite	2	1.3





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## Email Template

### Subject: Participation Needed for Broadband Survey

Dear Families,

Some people believe that Telecommunications and Broadband are essential utility services. After the last year, we know it is. The COVID-19 pandemic revealed some inequities in our county like struggle for some students to connect to the internet to attend classes and do homework online. Our school district and its technology professionals worked tirelessly and creatively to get families the technical support they needed. However, there is still more work to be done so that students in rural parts of the county like ours can have access to the internet.

### Letting the Data Speak

Thurston Public Utility District (PUD) is working with Northwest Open Access Network (NoaNet) to **conduct a survey and internet speed test** of the homes in our county's rural school districts and their families. **[Enter School District]** School District supports Thurston PUD's research on broadband access for our students and families and assessing practical solutions to barriers that are found to exist. Please spread the word about this effort! The more people we can get to take the survey, the more the data will help us understand where the need for broadband is in our community.

### About the Survey

The survey will take about 5 minutes and asks questions about your current internet service availability and cost. There is also an internet speed test to find out what your current download and upload speeds are.

You can access the survey here: <http://noanet.servicezones.net/thurstonpud>

If you don't have Internet service capable of accessing the survey online, can take the survey over the phone by calling **360-602-1522** during business hours (8:00 a.m. – 4:30 p.m.), or you can call (360) 515-6118 and we can mail you a survey with a pre-paid envelope to return your survey. You can mail your survey to:

**Thurston PUD – Broadband Survey**  
1230 Ruddell Road SE  
Lacey, WA 98503

If you have any questions about the survey, Thurston PUD or NoaNet, please contact Telecommunications and Broadband Manager Ruth Clemens at 360-515-6118.

Five minutes is all you'll need to take the survey. Let's work together to understand the need for reliable internet service and solve the problem together! Thanks!

## Email Template

### Subject: Por Favor Complete La Encuesta De Banda Ancha

Queridas familias,

Algunas personas creen que las telecomunicaciones y la banda ancha son importantes. Después del último año, sabemos que lo es. La pandemia de COVID-19 reveló algunas desigualdades en nuestro condado, como la lucha de algunos estudiantes para conectarse a Internet para asistir a clases y hacer tareas en línea. Nuestro distrito escolar y sus profesionales de tecnología trabajaron incansable y creativamente para ayudar a las familias. Sin embargo, todavía hay más trabajo por hacer para nuestros estudiantes para que puedan tener acceso a Internet.

#### Dejar que los datos hablen

Thurston Public Utility District (PUD) está trabajando con Northwest Open Access Network (NoaNet) para realizar una encuesta y una prueba de velocidad de Internet de los hogares en los distritos escolares rurales de nuestro condado y sus familias. El Distrito Escolar **[Enter School District]** apoya la investigación de Thurston PUD sobre el acceso de banda ancha para nuestros estudiantes y familias y evalúa soluciones prácticas a las barreras que se encuentran existentes. ¡Cuénteles a otros sobre nuestra encuesta! Si tenemos muchos datos, sabremos dónde está el problema.

#### Acerca de la encuesta

La encuesta durará unos 5 minutos. Le hará preguntas sobre su servicio de Internet y el costo. También hay una prueba de velocidad de Internet para averiguar cuáles son sus velocidades actuales de velocidad de Internet.

Complete la encuesta aquí: <http://noanet.servicezones.net/thurstonpud>

Si no puede completar la encuesta en línea, puede completar la encuesta por teléfono. Llame al 360-602-1522 durante el horario comercial (de 8:00 a. M. A 4:30 p. M.), O puede llamar al (360) 515-6118 y podemos enviarle una encuesta por correo. Puede enviar su encuesta a:

Thurston PUD – Broadband Survey  
1230 Ruddell Road SE  
Lacey, WA 98503

Si tiene alguna pregunta sobre la encuesta, Thurston PUD o NoaNet, comuníquese con la Gerente de Telecomunicaciones y Broadband, Ruth Clemens, al 360-515-6118.

La encuesta dura cinco minutos. ¡Comprendamos la necesidad de un servicio de Internet confiable y solucionemos el problema juntos! ¡Gracias!



## Broadband Survey

# FAQs

[HTTP://NOANET.SERVICEZONES.NET/THURSTONPUD](http://noanet.servicezones.net/thurstonpud)

**Q: WHAT IS A BROADBAND CHAMPION?**

A: Champions are local enthusiasts who are excited to spread the word about the community survey to their neighborhoods or community. Their role is to help encourage community members to take the survey, keep up to date on project progress and act as a liaison between community leadership and your friends and family.

**Q: I CAN'T ACCESS THE SURVEY ONLINE. HOW DO I TAKE IT?**

A: Paper surveys are available at your local schools and the PUD office (address below). You can also call (360) 602-1522 during regular business hours and someone will take the survey over the phone with you. Due to a high volume of calls, you may need to leave a message. Your call will be returned as soon as possible.

**Q: CAN I SUBMIT MULTIPLE SURVEYS FROM THE SAME ADDRESS?**

A: Only one survey per household or business will be accepted. If you live in an apartment building, please make sure to include your unit number so we will know that your survey is from a separate residence at the same address. If you run a business out of your home, you can submit a survey as a resident of the address as well as an additional survey for the needs of your business.

**Q: HOW WILL MY SURVEY INFORMATION BE USED?**

A: Data collected will be used to understand the broadband needs and opinions of the community. Any information from this survey presented publicly will be aggregated data and will not include any personally identifying details.

**Q: IS THERE AN OBLIGATION TO PURCHASE SERVICE IF I EXPRESS INTEREST THROUGH THE SURVEY?**

A: Absolutely not! The survey is for informational use only to identify areas that are unserved or underserved by current Internet services. There is absolutely no commitment or obligation attached.

**Q: DOES THIS SURVEY MEAN THURSTON PUD IS GOING TO BUILD A FIBER BROADBAND NETWORK?**

A: This survey is only a data collection tool to understand your community's broadband needs and if they are being met as part of a larger assessment of network buildout feasibility. It does not mean that the PUD has any plans to build new infrastructure at this time.

**DID YOU KNOW?**

RESEARCH COMMISSIONED BY THE  
FIBER TO THE HOME COUNCIL SHOWS THAT HOMES  
INCREASED IN VALUE BY ABOUT 3% JUST BY HAVING  
A FIBER OPTIC CONNECTION AVAILABLE

**Contact Us:**

Thurston County PUD  
1230 Ruddell Rd.  
Lacey, WA 98503  
(360) 357-8783

Ruth Clemens  
Telecommunications &  
Broadband Program Manager  
(360) 515-6118

Claire Ward  
Community Survey Manager  
cward@noanet.net  
(360) 602-1522



## Broadband Survey

# FAQs

[HTTP://NOANET.SERVICEZONES.NET/THURSTONPUD](http://noanet.servicezones.net/thurstonpud)

**Q: WHY IS THURSTON PUD EVALUATING BROADBAND AVAILABILITY IN MY AREA?**

A: Thurston County community members have requested Thurston PUD to evaluate broadband infrastructure and services in your area to ensure adequate services are available. Thurston PUD has partnered with Northwest Open Access Network (NoaNet) to identify and record the level of need for broadband access in our community. If the broadband survey finds that broadband access needs are not being met or are unreliable the leadership team will evaluate the feasibility of expanding infrastructure.

**Q: WHY DO I HAVE TO PROVIDE MY ADDRESS?**

A: Your address is needed so we can be sure that you live or work in an area where we are collecting survey information. Knowing your location also helps us identify areas of high need and make good cost estimates for building local network.

**Q: IF I CAN'T FIND MY ADDRESS, WHAT SHOULD I DO?**

A: If you can't find your address on the survey map, you can "drop a pin" on the map where your home or business is located. Our staff will review your survey and approve it if your pin is located within the survey area.

**Q: CAN I USE A SMARTPHONE OR TABLET TO TAKE THE SURVEY?**

A: Yes, of course! If you use your phone, please connect to your home WiFi so the speed test will reflect your home Internet speeds.

**Q: HOW LONG WILL THE SURVEY TAKE TO COMPLETE?**

A: The survey will only take about 5 minutes to complete and the information will help Thurston PUD evaluate if the Internet needs of the community are being met.

**Q: CAN I CHANGE THE ANSWERS TO MY SURVEY AFTER SUBMITTING?**

A: Yes! If you need to resubmit your survey after having completed it, just go ahead and take the survey again from the beginning and submit it. The new submission will replace your previous submission in the data portal.

### COMMON BROADBAND TERMS

*It's not just you. Talking about broadband feels like talking another language for many people. These terms are a good place to start.*

**INTERNET**

The Internet is the largest computer network in the world, connecting millions of computers. A network is a group of two or more computer systems linked together. Access to this mega-network is what is sold as a Internet Service.

**BROADBAND**

Broadband is a fixed, ground-based telecommunication network that enables access to internet services at speeds greater than 25mbps download and 3mbps upload.

**FIBER OPTICS**

Optical fiber is a hair-thin strand of glass, specially designed to trap and transmit light pulses. The fiber uses light instead of electricity to carry a signal. It is unique because it can carry high bandwidth signals over long distances without signal degradation.

**COPPER WIRE**

Copper wire can also carry high bandwidth, but only for a few hundred yards – after which the signal begins to degrade and bandwidth narrows.

**FIBER TO THE HOME (FTTH)**

When fiber optic cable connects directly into a residence, it is called Fiber To The Home (FTTH)

**OPEN ACCESS**

Open Access is the term used to describe a network where any Internet Service Provider (ISP) may provide service to the end-user (residence or business) over that network.



Do you have adequate,  
affordable Internet?  
We want to know!

# THURSTON PUD IS CONDUCTING A BROADBAND SURVEY

[HTTP://NOANET.SERVICEZONES.NET/THURSTONPUD](http://noanet.servicezones.net/thurstonpud)

Thurston PUD has launched a county-wide survey to better understand our area's need for high-speed Internet services. Please take five minutes to let us know about Internet access at your home or business so we can assess if there is a need for additional infrastructure investment. Thank you for your participation!

\*\*This is only a survey to gather information about broadband availability. There is absolutely no obligation to sign up or buy services. Your information will never be used for marketing purposes.

**Thurston  
PUD**

<http://noanet.servicezones.net/thurstonpud>  
Search for your address and take the  
community broadband survey.  
Ask your friends to take it too!

**Thurston  
PUD**

<http://noanet.servicezones.net/thurstonpud>  
Search for your address and take the  
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Do you have adequate,  
affordable Internet?  
We want to know!

# THURSTON PUD IS CONDUCTING A BROADBAND SURVEY

Take the survey:

[HTTP://NOANET.SERVICEZONES.NET/THURSTONPUD](http://NOANET.SERVICEZONES.NET/THURSTONPUD)

No Internet? Call us at (360) 602-1522 and we'll take the survey over the phone with you.

Thurston PUD has launched a county-wide survey to better understand our area's need for high-speed Internet services. Please take five minutes to let us know about Internet access at your home or business so we can assess if there is a need for additional infrastructure investment.

Thank you for your participation!

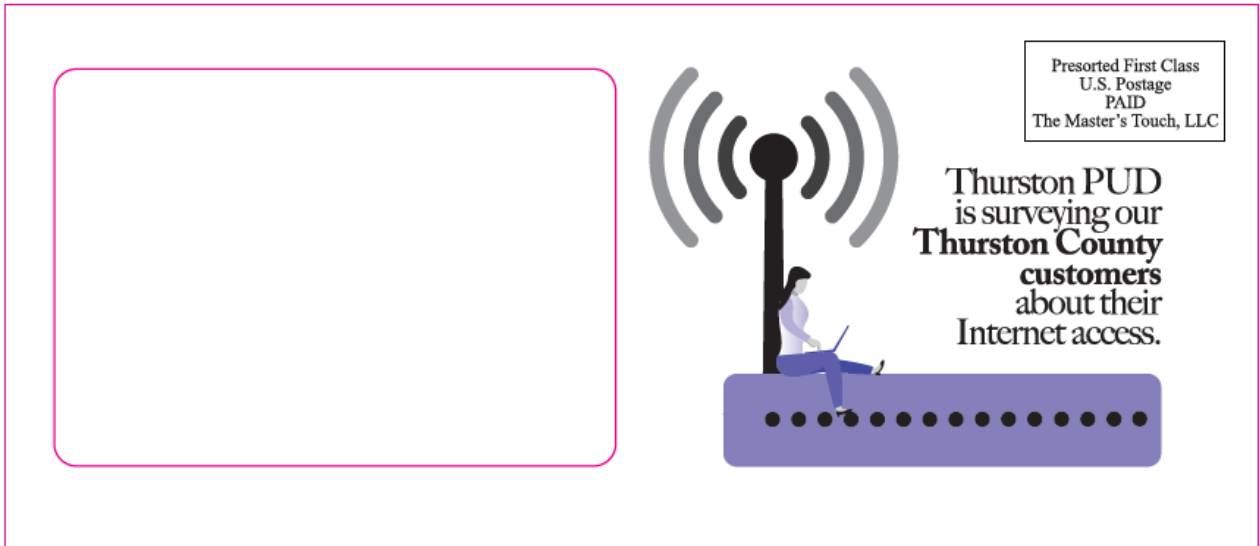
\*\*This is only a survey to gather information about broadband availability. There is absolutely no obligation to sign up or buy services. Your information will never be used for marketing purposes.

## Contact Us

Thurston PUD  
1230 Ruddell Rd.  
Lacey, WA 98503  
(360) 357-8783

Ruth Clemens  
Telecommunications &  
Broadband Program Manager  
(360) 515-6118

Claire Ward  
Community Survey Manager  
(360) 602-1522





**Commissioners**

Linda Oosterman – District 1  
Russell E. Olsen – District 2  
Chris Stearns – District 3



Providing safe, reliable, affordable, and sustainable service.

May 14, 2021

**Subject: Broadband Coverage for Rural Thurston County**

Company Name  
Address  
City, State Zip

Dear Representatives at [Enter Name],

Thurston PUD, a special district water utility serving Thurston County, Washington is launching an assessment of broadband needs of rural Thurston County and intends to apply for grants to expand broadband infrastructure within our county.

One of our core goals is to contact internet service providers in the proposed project areas. We are interested in the following information:

1. Do you have any plans to provide or upgrade broadband service in the underserved and/or unserved rural areas of Thurston County to speeds that meets or exceeds the states broadband speed as defined in Washington State RCW 43.33.530 by 2024?

Thurston PUD will assess the current status of broadband access, adoption and use in rural Thurston County to improve the quality of life and economic potential across Thurston County. The assessment may reveal the gaps in access, inequities and hurdles residents and businesses face in providing services. The Commissioners of Public Utility District No. 1 of Thurston County (Thurston PUD) would like an evaluation as to the role the PUD should play, if any, in the pursuit, creation and development of broadband and other telecommunication services throughout rural Thurston County.

The Project includes the following core elements:

- **GOAL:** COVID-19 has exposed inequities in access to broadband service, devices, and digital literacy training. It is an appropriate time to evaluate the ability of Thurston PUD to provide Broadband/Telecom Services to Thurston County to minimize the inequities and provide greater access to broadband.
- **ACTION STEP 1:** Coordinate with Thurston County School Districts to identify what is needed to support students through education and potentially address inequities and provide greater access to broadband and other telecommunications technologies.
- **ACTION STEP 2:** Coordination with other entities including but not limited to libraries, fire districts, tribes, parks, medical services, small businesses, higher education, and the needs of Thurston County citizens.

Our intention with this communication is to get a sense if a public-private partnership can be created to serve the citizen in rural Thurston County. This letter is also to provide notice to you, a service provider, to request your plans to upgrade or expand broadband service for areas in and around the following

1230 Ruddell Rd. SE, Lacey, WA 98503  
(866) 357-8783 • Fax (360) 357-1172 • [www.thurstonpud.org](http://www.thurstonpud.org)

school districts:

- Griffin School District, 6530 33rd Ave NW, Olympia, WA 98502
- Rochester School District, 9917 Hwy 12 SW, Rochester, WA 98579
- Tenino School District, 301 Old Hwy 99 North, Tenino, WA 98589
- Rainier School District, PO Box 98 Rainier, WA 98576
- Yelm School District, 107 1st North Yelm, WA 98597

Your response will become part of our application documents and will be included in our proposal.

Please send your response to our offices no later than [enter date] to the following:

Ruth Clemens  
Thurston Public Utility District – Telecommunications & Broadband  
1230 Ruddell Road SE  
Lacey, WA 98503

Or you can email your response to [rclemens@thurstonpud.org](mailto:rclemens@thurstonpud.org)

The PUD has already begun reaching out to various school districts, municipalities, tribes, and other interested parties in **May**.

Whether or not you have plans to upgrade or provide broadband service to our proposed areas, we would appreciate a response to assist with our planning process.

Sincerely,

John Weidenfeller  
General Manager

Attachment: PUD Commission Resolution 04-21, Telecommunications and Broadband

APPENDIX I: LIST OF IDENTIFIED STAKEHOLDERS

Association	Thurston County Chamber of Commerce
Association	Lacey South Sound Chamber of Commerce
Association	Yelm Chamber of Commerce
Association	Thurston Economic Development Council
Association	Tenino Area Chamber of Commerce
City	City of Olympia
City	City of Lacey
City	City of Tumwater
City	City of Yelm
City	Nisqually Indian Tribe
City	Rochester
City	City of Tenino
City	Town of Bucoda
City	Grand Mound
City	City of Rainier
City	Tanglewilde Park and Recreation District
City	Chehalis Tribe
County	Thurston County
Fire District	TCFD NO. 1, Rochester Fire Rescue
Fire District	TCFD NO. 2, Yelm Fire Department
Fire District	TCFD NO. 3, Lacey Fire District
Fire District	TCFD NO. 4, Rainier Fire Department
Fire District	TCFD NO. 5, McLane Black Lake Fire Department
Fire District	TCFD NO. 6, East Olympia Fire Department
Fire District	TCFD NO. 7, North Olympia Fire Department
Fire District	TCFD NO. 8, South Bay Fire Department
Fire District	TCFD NO. 9, McLane Fire Department
Fire District	TCFD NO. 11, West Thurston Fire District
Fire District	TCFD NO. 12, Tenino Fire Department
Fire District	TCFD NO. 13, Griffin Fire Department
Fire District	TCFD NO. 15, Tumwater Fire Department
Fire District	TCFD NO. 16, Gibson Valley Fire Department
Fire District	TCFD NO. 17, Bald Hills Fire Department
	South Thurston Fire
Fire District	Olympia Fire Department
Higher Education	South Puget Sound Community College
Higher Education	The Evergreen State College
Library	Timberland Regional Library - Lacey
Library	Timberland Regional Library - Olympia
Library	Timberland Regional Library - Tenino

Library	Timberland Regional Library - Tumwater
Library	Timberland Regional Library Yelm
Library	Nisqually Tribal Library
Media	Nisqually Valley News
Media	Thurston Talk
Media	The Olympian
School District	Educational Service District 113
School District	Griffin School District
School District	North Thurston Public Schools
School District	Olympia School District
School District	Rainier School District
School District	Rochester School District
School District	Tenino School District
School District	Tumwater School District
School District	Wa He Lut Indian School
School District	Yelm School District
State Agency	Washington State Parks
State Agency	Department of Commerce - Office of Broadband
ISP	Tenino Telephone Company
ISP	AT&T Mobility
ISP	Cellco Partnership DBA Verizon Wireless
ISP	CenturyLink
ISP	Charter Communications
ISP	City of Tacoma
ISP	Clarity Telecom
ISP	Comcast Cable Communications
ISP	Comcast IP Services
ISP	Comcast/Xfinity
ISP	Consolidated_Communications
ISP	Frontier Communications
ISP	Gorge Networks
ISP	Hood Canal Communications
ISP	Hughes Network Systems
ISP	LocalTel Communications
ISP	Mediacom Communications
ISP	Rainier Connect
ISP	Scatter Creek InfoNet
ISP	Sprint Communications
ISP	State of Washington

ISP	T-Mobile USA
ISP	TSS Systems
ISP	UNITED STATES CELLULAR TELEPHONE COMPANY (GREATER KNOXVILLE)
ISP	ViaSat
ISP	Washington State Department of Transportation
ISP	Washington State Dept. of Trade and Economic Development
ISP	Washington State K-20 Telecommunications Network
ISP	Wave Broadband
ISP	Windstream Communications
ISP	Yakima County
ISP	Yelm Telephone Company
ISP	Ziplay Fiber
Conservation District	Thurston Conservation District
Port	Port of Olympia
Transit	Intercity Transit
Civic Associations	Lacey Rotary Club
Civic Associations	Rotary Club of Olympia
Civic Associations	Rotary Club of West Olympia
Civic Associations	Boys and Girls Clubs of Thurston County
Civic Associations	Rotary Club of Yelm
Civic Associations	Yelm Lions Club
Civic Associations	Olympia Capital Centennial Rotary Club
Civic Associations	Tumwater Rotary Club
Civic Associations	South Puget Sound Rotary Club
Civic Associations	Hawk's Prairie Rotary Club
Civic Associations	Gateway - North Thurston Rotary Club
Civic Associations	United Way Thurston County
Civic Associations	Thurston County Food Bank

APPENDIX J: HIGH-LEVEL TIMELINE

Activity	Timeline	Target Audience
1. Initiate COS Survey	June 1 – Aug 30	Griffin, Rainier, Yelm, Rochester and Tenino SDs
2. Reach out to and inform leaders of local Anchor institutions in 5 rural school districts areas (Yelm, Tenino, Rainier, Griffin, Rochester)	June 21- August	City Mayors, Yelm Chamber of Commerce libraries, fire districts, faith institutions, colleges campus with distant learning locations
3. Reach out to larger, urban school districts	June - August	· North Thurston School District;
		· Tumwater School District;
		· Olympia School District
4. Share survey with Timberland Regional Libraries (TRL) in rural communities	June 21-25	Library patrons, TRL-owned computer labs, kiosks; Tenino, Rainier, Oakville and McCleary
5. Share survey with Thurston County BAT team	24-Jun	Port of Olympia, Nisqually Tribe, TRPC, EDC, Thurston County,
6. Create Champions Team (Only in 5 rural school district areas)	June 21- July 15	IT, Communicators, Social Media experts from <b>all</b> anchor institutions from rural areas
7. Survey to Thurston PUD Customers	July, Aug, Sept	PUD customers in Thurston County only
8. Open survey to all Thurston County residents and businesses	August – November 30	· Small businesses
		· County residents
		· Chamber of Commerce
		· EDC
		· Higher Education
		· Fire Districts
		· Small School Districts
9. Close Survey	30-Nov	Closed to everyone
10. Analyze Data, Develop Potential Projects, Prioritize Recommendations	Dec – March 2022	Small School Districts
		· Other Stakeholders (not identified yet, may be based on need)

11. Discussion with PUD Board and potential projects funding; recommendation to the Board	March 2022 – May 2022	PUD Commissioners
12. Commissioners approve projects to be presented to the public	May 2022-July 2022	PUD Commissioners
13. Present recommended projects to Public	July 2022 – Sept 2022	Everyone
14. IF the Commissioners approve a levy or another funding source, determine dates of the levy	May 2022 – Sept 2022	PUD Commissioners
		PUD Staff

**CERTIFIED COPY OF RESOLUTION  
ADOPTED AT A MEETING OF THE COMMISSIONERS  
OF  
PUBLIC UTILITY DISTRICT NO. 1 OF THURSTON COUNTY**

We, the undersigned, being the President and Secretary of Public Utility District No. 1 of Thurston County (the District), do hereby certify that the following Resolution was adopted by a majority of the Commissioners of the District in attendance at the meeting held on Tuesday, February 9, 2021, and that said Resolution has not been revoked.

**RESOLUTION NO. 21-04**

The Commission of Public Utility District No. 1 of Thurston County is considering its role in the pursuit, creation and development of telecommunication services throughout rural Thurston County.

COVID-19 has exposed inequities in access to broadband services, devices and digital literacy training.

The existence of broadband capacity facilitates the delivery of a broader range of services, promotes investment and provide internet access at affordable rates to both existing and new users in underserved and unserved communities.

The District recognizes the existence of a digital divide that contributes to inequities that prohibit access to public services, employment opportunities, educational resources, entrepreneurship, and other growth opportunities, basic liberties and rights.

The District recognizes the percentage of students enrolled in online education courses significantly increased during the COVID-19 pandemic and Thurston County school districts have made remote and online learning for the 2020-2021 academic year available and/or mandatory to avoid public health risks.

The PUD Commissioners have established a goal of evaluating the ability of Thurston PUD to provide Broadband/Telecommunication services to Thurston County to minimize the inequities and provide greater access to broadband and furthermore established two action steps:

Action 1: Coordinate with Thurston County School Districts to identify what is needed to support students through education and potentially address inequities and provide greater access to broadband and other telecommunications technologies.

Action 2: Coordinate with other entities including but not limited to the county, cities, towns, tribes, libraries, fire districts, tribes, parks, medical services, small businesses, higher education and the needs of Thurston County citizens.

NOW, THEREFORE, THE COMMISSIONERS OF THE DISTRICT DO HEREBY RESOLVE AS FOLLOWS:

Section 1. The Board resolves that it is an appropriate time to evaluate the ability of Thurston PUD to provide telecommunication services to Thurston County to minimize the inequities and provide greater access to broadband.



---

Section 2. The Board resolves that the Thurston PUD should support, encourage to create, and promote widespread affordable access to broadband communication infrastructure by coordinating the reasonable use of District resources in the context of various projects and tasks aimed at the promotion, creation, development and deployment of telecommunication services in underserved or unserved communities throughout Thurston County.

Section 3. The General Manager shall be empowered to lead, build upon and pursue funding opportunities, stakeholder outreach, infrastructure development, and affordable access to fixed broadband services to bridge the digital divide in Thurston County. The General Manager shall coordinate with other entities where coordination is deemed fitting or necessary.

Section 4. The District shall prioritize stakeholders and partners according to greatest need beginning with rural school districts and underserved communities first and including, but not limited to, libraries, fire districts, small businesses, parks, the county, cities, towns, tribes and the needs of Thurston County citizens.

Section 5. The District shall allocate \$30,000 for technical support, not to exceed \$50,000 and to pursue and apply for planning and implementations grants.

Section 6. Beginning May 1, 2021, the General Manager will direct and support District staff to commence telecommunications and broadband project-related activities.

This Resolution was approved and adopted by a majority vote of the Commissioners present.

As the President and Secretary of the District, we additionally certify that this meeting was attended by at least two of the three Commissioners of the District and that this resolution was adopted by a majority of the Commissioners of the District in attendance at the meeting.

\_\_\_\_\_  
Russell E. Olsen  
Commissioner and President of  
Public Utility District No. 1 of Thurston County

ATTEST:

\_\_\_\_\_  
Linda Oosterman  
Commissioner and Secretary  
Public Utility District No. 1 of Thurston County



THURSTON PUD  
BROADBAND FEASIBILITY ASSESSMENT - DRAFT

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March 8th, 2022



Prepared by

## TABLE OF CONTENTS

Executive Summary.....	4
Introduction.....	4
Scope and Purpose .....	4
Summary.....	4
Community Support.....	6
Outreach Efforts .....	6
The Broadband Action Team and Key Partners .....	8
Project Focus.....	9
Broadband Needs and Goals .....	9
Existing Broadband Infrastructure Assets.....	9
Gap Analysis.....	10
Proposed Network Designs.....	11
Digital Inclusion.....	15
Vision Statement.....	17
Assessment of Existing Policies.....	18
Financial Commitment and Budget.....	19
Capital Expenditures .....	19
Operating and Maintenance Expenses .....	21
Revenues .....	23
Budget Matrix .....	24
Potential Sources of Funding for Broadband Infrastructure .....	25
Key Documents and Existing Efforts .....	28
Potential Community Anchor Institutions and Businesses.....	29

Proposed Network and Management Plan .....	30
Year Zero - Implementation Stage:.....	30
Year One – Customer Acquisition .....	32
Initial Service Offerings.....	33
Health and Safety Benefits .....	34
First Responders .....	34
Remote Consultations .....	34
Telehealth Services .....	34
Education Benefits .....	35
School-Aged Children.....	35
Senior Citizens .....	36
Cutting the Cord .....	36
Served or Underserved .....	38
The Community Survey.....	38
Results Summary .....	38
Survey Stats At-A-Glance .....	43
Appendix A: Broadband action team Attendees .....	45
Appendix B: Notes, Agendas, and Attendees of Broadband action team meetings.....	46
Appendix C: Champion Questionnaire Responses .....	54
Appendix D: Proposed Network Design Maps.....	56
Appendix E: Full Budget Documents.....	68
Appendix F: Readiness Self-Assessment.....	76

## EXECUTIVE SUMMARY

### INTRODUCTION

The Scope of Services agreed upon by NoaNet and Thurston PUD has been completed, and the resulting findings are presented in this document. With the conclusions outlined in this document, the PUD will understand the current market conditions in their defined jurisdictional area, the public feedback collected, cost estimates for network construction in identified areas of concern, potential business case thresholds, and various broadband study conclusions. These findings will provide the data to explore the PUD's possible roles to support increased broadband availability in the area, broadband business planning and risk analysis, and threshold criteria for future funding applications.

### SCOPE AND PURPOSE

The scope of services for this feasibility assessment is to prepare the PUD to make informed decisions to determine the next steps for potential telecommunications infrastructure deployment and fulfill the requirements of the CERB broadband planning program.

### SUMMARY

Our community outreach study and evaluations have concluded that the county's urban areas do have high-speed broadband available, however, significant portions of residents are unsatisfied with the costs of services being provided by the incumbent providers. The satisfaction levels reported coupled with consumer-generated speed test data, and our market research suggests that cost, rather than infrastructure availability, is the primary barrier to access in the urban communities of Thurston County.

Areas with low population density do have less robust services available to them and would benefit from infrastructure upgrades to support future bandwidth needs. Thurston County is experiencing a sustained period of growth and urbanization. Since 2010, the county's total population has grown by more than 20%, making it the fifth fastest-growing county in the State. Increasing population and population density is a positive indicator that incumbent providers will continue to make infrastructure investments.

There is currently a lack of consumer choice in most areas of this county, so services costs are not adequately controlled by free-market competition. We have learned through this process that the area's major provider plans network updates for the metro area, and many rural areas are being targeted by other entities engaged in supporting broadband access. With the information known at this time, the broadband landscape will likely improve significantly in the near future.

Public and private investment into telecommunications infrastructure may not overcome the cost barrier to adoption found in this area. However, subsidization programs could bring the cost of services into reach for lower-income households. These programs are evaluated further in this document.

NoaNet's charter for this study was to evaluate the feasibility of Thurston PUD facilitating high-speed broadband infrastructure and services to residential and commercial customers while maintaining financial viability for the PUD. With subsidization and significant community support that translates into high service take-rates, the project has the possibility of being sustainable. However, with existing service providers in the area, and knowledge of deployment efforts and upgrades underway, this scenario appears unlikely. The cost of deploying services, even highly subsidized, with moderate customer take-rates is unlikely to be financially sustainable for the organization. There is potential for a supportive role to encourage adoption of end-user subsidization programs to bring the cost of services within reach to low-income subscribers.

In the following document, you will find the data gathered during our analysis to support this conclusion, as well as information required by the CERB broadband planning program.

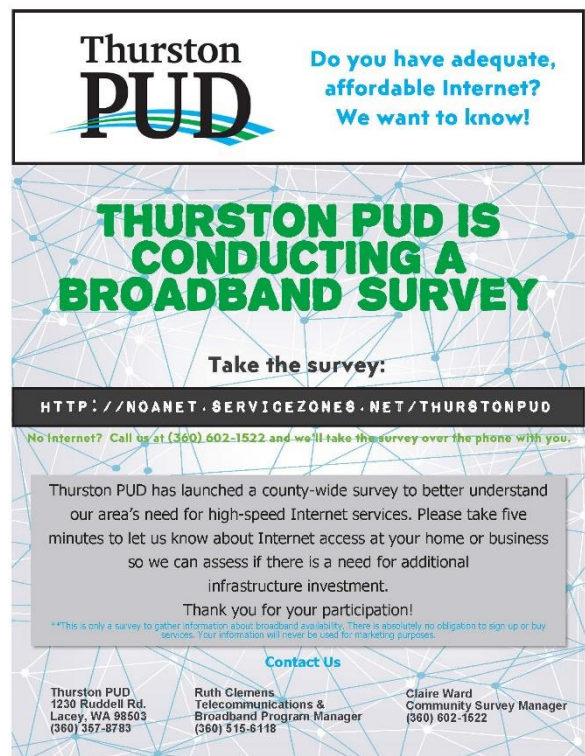
## COMMUNITY SUPPORT

A county-wide survey was launched to collect and map data from the Thurston community to understand the community's current broadband experience and gauge their support of PUD involvement. Public meetings were held to keep the public informed of the survey process at every step, including kick-off, progress, and follow-up. While outreach efforts were impactful and brought in nearly 1500 survey responses, the community was only moderately enthusiastic about engaging to spreading the word of this effort, with no champion individuals or organizations stepping up to lead the charge.

## OUTREACH EFFORTS

As serving the community is at the heart of the PUD's mission, vision, and purpose, the PUD engaged in an extensive community outreach process as part of this study effort. The PUD saw the challenges faced by rural school districts as they pivoted to online schooling in response to the COVID-19 pandemic in 2020. In response to that, the PUD started with the school districts in their outreach efforts. From this point, the PUD's outreach efforts extended to PUD customers, area municipalities, tribal entities, libraries, economic development groups, fire districts, colleges, ISPs, civic associations, faith institutions, and the general public.

Paper surveys were available in both English and Spanish for people who could not access the survey online. Additionally, a phone line was made public during business hours to take the survey verbally for people who did not have Internet, technology, or another barrier to accessing the community survey online.



The flyer features the Thurston PUD logo at the top left. To the right, it asks, "Do you have adequate, affordable Internet? We want to know!". The main headline reads "THURSTON PUD IS CONDUCTING A BROADBAND SURVEY". Below this, it says "Take the survey:" followed by the URL "HTTP://NOANET.SERVICEZONE9.NET/THURSTONPUD". A note states, "No Internet? Call us at (360) 602-1522 and we'll take the survey over the phone with you." The body text explains the survey's purpose: "Thurston PUD has launched a county-wide survey to better understand our area's need for high-speed Internet services. Please take five minutes to let us know about Internet access at your home or business so we can assess if there is a need for additional infrastructure investment. Thank you for your participation!" A disclaimer at the bottom reads, "This is only a survey to gather information about broadband availability. There is absolutely no obligation to sign up or buy devices. Your information will never be used for marketing purposes." A "Contact Us" section lists: "Thurston PUD, 1230 Ruddlell Rd, Lacey, WA 98603, (360) 357-8783"; "Ruth Clemens, Telecommunications & Broadband Program Manager, (360) 515-6118"; and "Claire Ward, Community Survey Manager, (360) 602-1522".

## SCHOOL DISTRICTS

Tenino, Yelm, Griffin, Rochester, Tumwater, Olympia, and North Thurston districts were met with individually to educate on the project, given a link to the survey, and invited to ongoing project update meetings. We worked with school district communications teams to get survey notices out to the families of students through school newsletters, social media efforts, and other existing avenues utilized by the school districts.

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## PUD CUSTOMERS

The PUD's customers were notified of the survey and broadband planning effort through several avenues. Custom envelopes were utilized for mailing the PUD invoices for two months. A prominent banner was placed on the PUD website linked to the survey and progress updates for the planning effort. A monthly email newsletter was also sent to customers, giving survey information and updates to the readers.

---

## THE NISQUALLY TRIBE

The PUD and the Nisqually Tribe participated in the Thurston County BAT together. Through the collaborative environment of the BAT, all entities were kept apprised of the efforts of the participating organizations to ensure a collaborative environment moving forward. The tribe has done feasibility studies to evaluate their network deployment efforts and formed a fiber optic installation company called Nisqually Communications. They have been awarded funds from the Washington State Broadband Office to allow the tribe to install fiber north of Rochester to Little Rock.

---

## LIBRARIES

The PUD worked with area libraries to develop a bookmark for distribution at all library locations to capture the feedback of a population who may utilize the library for computer/internet access. Bookmarks were bilingual, with English on one side and Spanish on the other to capture folks whose primary language may not be English. Paper surveys were also distributed to the libraries available in both English and Spanish. The libraries were educated on the project underway, given the link to the survey, and invited to project update meetings.



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## AREA MUNICIPALITIES, CIVIC ORGANIZATIONS, AND OTHERS

Area municipalities and organizations including Thurston County, cities, towns, the Port of Olympia, fire districts, higher education institutions, economic development and regional planning groups, public transit, and faith institution were educated on the PUD's broadband feasibility study project. These groups were given a link to the community survey, were invited to all project update meetings, and encouraged to share the effort with the audiences they serve to help us gain participation.

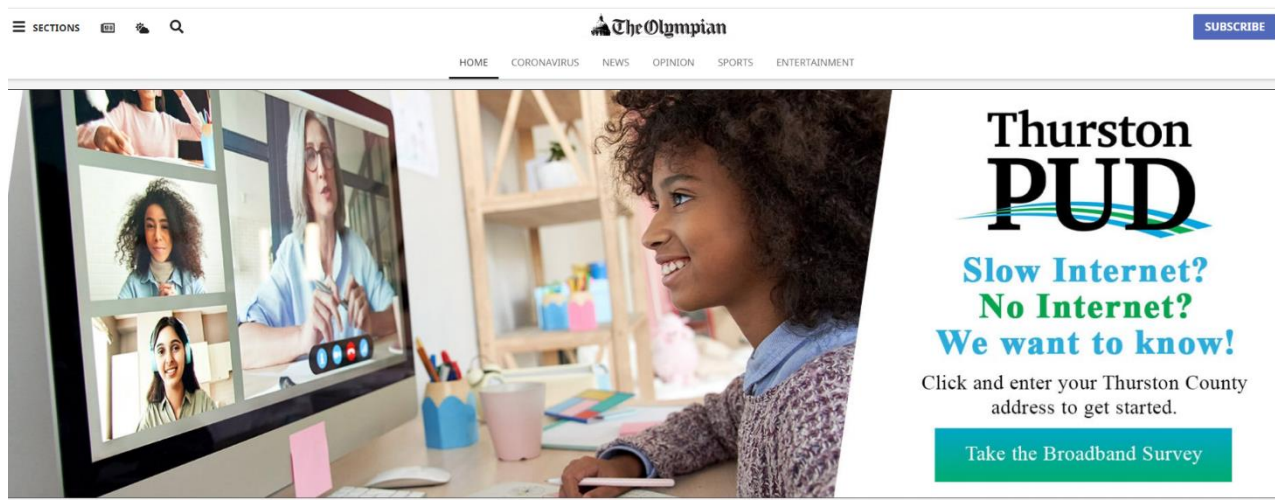
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## THE GENERAL PUBLIC



A PUD survey Facebook page was set up to advertise the survey to the Thurston County public and inform them of progress updates. Survey posters, pull-tab flyers, and FAQ sheets were developed and distributed with an embedded QR code that brought users to the survey, which were available through the survey website and in paper form distributed to public organizations. A phone line was established to take surveys orally for those who did not have access to the technology to take an online survey.

The PUD also partnered with The Olympian to do a one-day ad takeover that informed the public of the survey effort and encouraged participants. The general public was informed of the public meetings and encouraged to participate.



## THE BROADBAND ACTION TEAM AND KEY PARTNERS

A Broadband Action Team (BAT), consisting of Thurston County broadband stakeholders, was formed in 2021 to guide the area's engagement in the feasibility analysis of the potential roles of area municipalities to address the area's lack of quality high-speed broadband available.

The Thurston County PUD's Broadband Key Partners meetings were held on the survey launch day, shortly after the community survey was closed, and a final session will be held to review the final results. At all meetings, community feedback and guidance were received. This group was open to the public and helped drive the strategic direction during the community survey portion and provided personal experience feedback to community leaders. The meeting was accessible in-person and remotely due to COVID-19 distancing considerations.

The formal Broadband Action Team meets monthly as needed. Members of the Thurston County Broadband Action Team are noted in Appendix A. Agendas with attendees for these meetings are located in Appendix B. Questionnaires required by CERB from attendees are attached as Appendix C.

## PROJECT FOCUS

### BROADBAND NEEDS AND GOALS

The project focus for the PUD Broadband Planning Study was to determine the current levels of service available and utilized, the satisfaction with those services, determine the needs of the community, how those needs may be met, and the financial feasibility of facilitating the desired services.

***31% OF SPEED TESTS RECEIVED WERE LESS THAN 25MBPS DOWNLOAD AND 75% WERE BELOW 150MBPS DOWNLOAD.***

The FCC has defined broadband as a minimum of 25mbps download and 3mbps upload speeds, the threshold for obtaining many federal grant/loan programs for improving broadband infrastructure. Washington State has its own set of deployment goals, culminating in statewide 150/150mbps service to every home and business in Washington State by 2028. Current legislation is in review in Washington state to raise the broadband threshold to 100/20, also the benchmark used by several federal funding programs.

***THERE ARE TWO DISTINCT ASPECTS OF DIGITAL INCLUSION, WHICH ARE AVAILABILITY AND ACCESSIBILITY. AVAILABILITY MEANS WHETHER OR NOT THE INFRASTRUCTURE EXISTS. ACCESSIBILITY MEANS WHETHER OR NOT THE SERVICES ARE AFFORDABLE AND THE COMMUNITY HAS THE TECHNOLOGY AND EDUCATION TO MAKE USE OF IT.***

According to the survey results from the PUD's demand aggregation survey, many in Thurston County are still experiencing difficulty accessing high-speed Internet services. The organization of speed tests received noted that frequently adequate speed tests were located right next door to inadequate tests. These speed tests were frequently taken from subscribers using two different service providers when investigated. The one offering a more expensive service was a higher quality service, while the lower-cost service was much lower in quality. This shows that while in many areas of Thurston County, high-speed internet services are available, a cost barrier may impact the ability of residents to access them.

### EXISTING BROADBAND INFRASTRUCTURE ASSETS

Thurston County PUD is a water utility and does not have any telecommunications network plant. As a water utility, the PUD does not have poles that might facilitate wireline broadband deployment as many other PUDs in the state do. The current electric service provider in this area is Puget Sound Energy, which is not currently sharing pole data with municipalities. This barrier to a knowledge of area poles would be a significant barrier if the PUD would choose to move forward with an aerial network plant.

However, as a water utility, they do have conduit they have placed throughout their construction areas that could be leveraged to bring fiber service

## GAP ANALYSIS

The Olympia metro area appears to have access to more robust services than any other study area. The areas in Thurston County outside of the more urban regions are limited in their service options that cannot reliably meet today's broadband bandwidth needs. Over time, these areas will need a complete telecommunications infrastructure update.

Our community outreach study and evaluations have concluded that the county's urban areas do have high-speed broadband available, significant portions of residents are unsatisfied with the costs of services being provided by the incumbent providers. The satisfaction levels reported coupled with consumer-generated speed test data, and our market research suggests that cost, rather than infrastructure availability, is the primary barrier to access in the urban communities of Thurston County.

Areas with low population density do have less robust services available to them and would benefit from infrastructure upgrades to support future bandwidth needs. Thurston County is experiencing a sustained period of growth and urbanization. Since 2010, the county's total population has grown by more than 20%, making it the fifth fastest-growing county in the State. Increasing population and population density is a positive indicator of infrastructure investment continuing to invest.

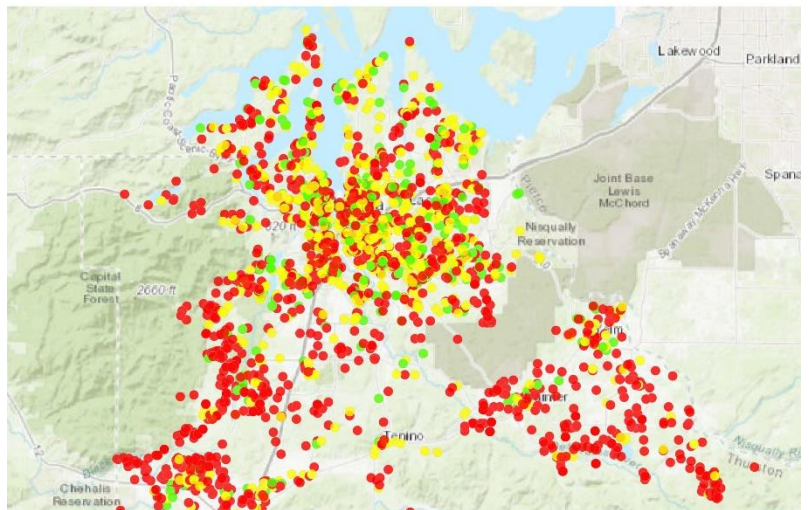


Figure 12 Speed Tests

Red= Less than 25/3mbps    Yellow= < 150/150mbps    Green= > 150/150mbps

We have learned through this process that an area's provider plans network updates for the metro area, and some rural areas are being targeted by other entities engaged in supporting broadband access. With the information known at this time, the broadband landscape will likely improve significantly in the near future.

Public and private investment into telecommunications infrastructure may not overcome the cost barrier to adoption found in this area. However, subsidization programs could bring the cost of services into reach for lower-income households. These programs are evaluated further in this document.

Though much of the county's rural communities need significant infrastructure investment, it was found through our public engagement that many of these areas will be upgraded shortly through investment from other public and private organizations. Three sites facing unique challenges were selected for infrastructure and business analysis: The Griffin School District, Maytown, and Scott Lake. These designs, costs, and all associated data are reviewed in the next section.

## PROPOSED NETWORK DESIGNS

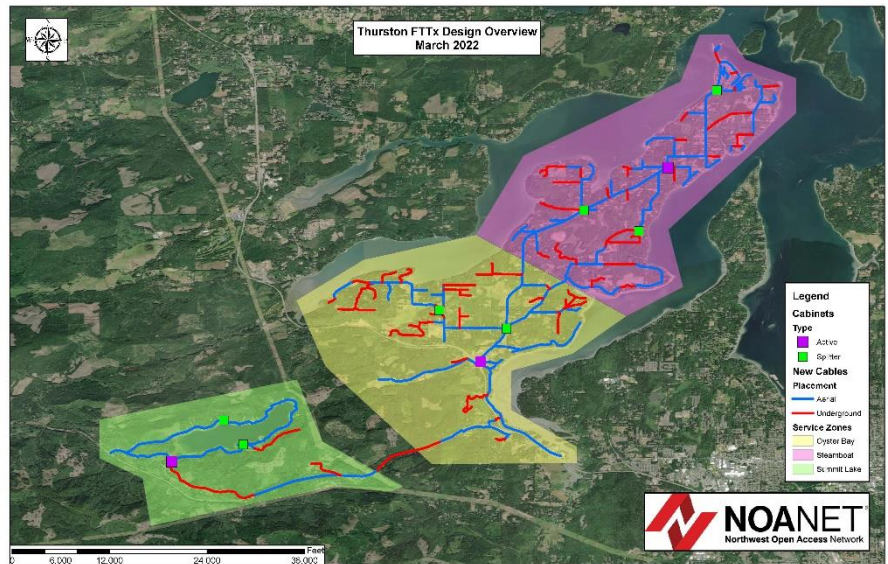
NoaNet's charter for this study was to evaluate the feasibility of the PUD engaging in the delivery of high-speed broadband for residential and commercial subscribers in the PUD's serving territory and provide value to the county while maintaining financial viability for the PUD.

Three areas were selected to evaluate the costs and impact of network deployment. The first is the Griffin School District area, for which we assessed a Fiber to the Home (FTTH) network design. The other two areas, for which a wireless deployment was modeled, are Maytown, a rural community off a highway offramp that is a mix of industrial and residential, and Scott Lake, a dense residential neighborhood.

### THE GRIFFIN SCHOOL DISTRICT FTTH

The Griffin School District Service Area is located northwest of Olympia on a peninsula that extends northward into Puget Sound. Its southernmost connection to the mainland connects near Highway 101 to extend out to the Olympia Peninsula. For this area, we have designed a full fiber to the home network design to serve the residents and businesses of the area. The primary construction methodology is strand and lash aerial (blue lines) deployment. For the underground portion (red lines), a combination of trench, plow, and directional bore will be utilized depending on ground conditions.

Figure 13- The Griffin School District Network



The Griffin network is a fiber-based passive optical network (PON) divided into three districts "Service Zones" that delivers high-speed broadband with the capacity to serve the community at speeds more

than 150Mb/s symmetrical and can support 10Gb/s services based on customer requirements. Every subscriber will have access to these services through their selected RSP. The RSP will have a physical and logical connection through the PUD PON architecture deployed from this project.

This zone has three active cabinets (purple boxes). It deploys a combination of 288 and 144 count loose-tube backbone fibers servicing seven splitter cabinets (green boxes). We recommend utilizing 96 or 48 count loose tube fibers for the laterals extending off the backbone. For the deployment to the home, we recommend using multi-service terminals (MSTs), which would be a combination of 4 and 8 port depending on the density of homes in the area. In totality, this network passes 3,835 residential and 94 commercial customers.

The Service Area has been divided into three (3) Service Zones for this evaluation to facilitate potential future grant applications: Summit Lake, Oyster Bay, and Steamboat.

- There is one active cabinet and two splitter cabinets in the Summit Zone network design. The total customer count for this service zone is 787 and would require approximately 130 MSTs for the deployment of drops to the premise.
- There is one active cabinet and two splitters cabinets in the Oyster Bay Zone network design. The total customer count for this service zone is 1163 and would require approximately 194 MSTs for the deployment of drops to the premise.
- There is one active cabinet and 3 splitter cabinets in the Steamboat Zone network design. The total customer count for this service zone is 1989 and would require approximately 332 MSTs for the deployment of drops to the premise.

For the entire project, we estimate that the average cost per home passed would be \$2,011. At a 30% take rate, the average cost per home activated would be \$10,220. The deployment of construction would be approximately 67% utilizing aerial construction methodology, with the remaining 33% consisting of underground construction methodology.

A full-page map of proposed designs is included in a larger format as Appendix D of this document.

For Maytown and Scott Lake, a wireless network deployment has been modeled. These areas do have services available, but cost appears to be a significant factor. We developed network plans to provide a high-speed wireless option to these areas. Wireless does not offer the same capacity as a fiber network but is less expensive to deploy; therefore, it could potentially provide lower-cost services to these customers. It would also offer a more competitive free-market environment, which may cause wireline providers to upgrade their networks or create more competitive service package pricing options.

A two-hop link is required to reach the target backhaul fiber link in Griffin. The first link is 4 miles, and the second is 10 miles. This link could provide up to 2.5Gbps however spectrum may be at a premium in the area. A shorter, one-hop link (with fiber access) would be preferable. This backhaul route works for both wireless districts of Maytown and Scott Lake. The towers themselves are the

bulk of the cost for this deployment at \$1,000,000. The equipment for this high-capacity backhaul that would be attached to the poles cost \$500,000 from our vendor quoting process. Leasing space for the towers to be built on was quoted at \$700 per tower per month, making a \$2100 per month lease cost. The CBRS radios are \$15k each and to serve the Maytown and Scott Lake areas requires 8 for a price of \$180,000. This deployment's installation and engineering were estimated at \$300,000, making the two regions \$1,980,000 for the initial infrastructure and \$2100 per month in recurring land lease costs. Full-size maps are included in Appendix D of this document.

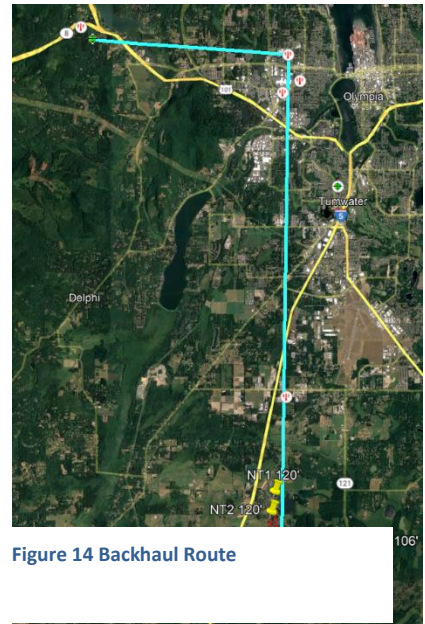


Figure 14 Backhaul Route

Maytown consists of about 70 residences and some industrial warehouses and facilities. This area

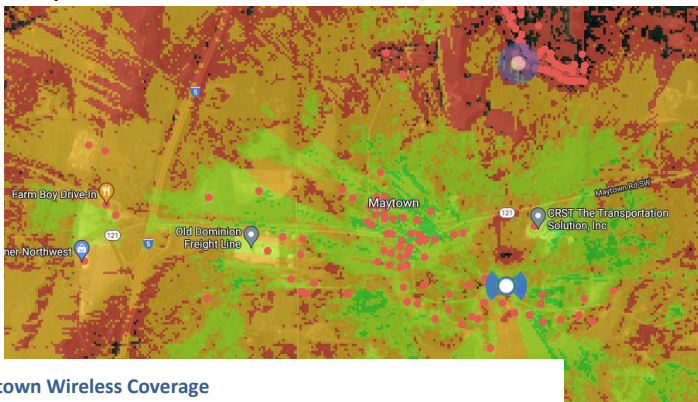


Figure 3- Maytown Wireless Coverage

would require a new tower/ pole to cover the area effectively. Areas shaded in green would have a good connection to the wireless bandwidth. Orange would be slightly degraded access, and red areas would not be areas that would have access to a reliable connection through this tower.

Bringing CBRS wireless services to the Scott Lake neighborhood that would service about 700 homes would require two additional towers/ poles (100' min) to achieve ~100% coverage due to CBRS's reduced power. These new towers would backhaul to the existing Champion tower. The existing Champion tower would need to be improved to accommodate new hardware and raised to cover this entire area.

The total cost for deploying a wireless solution to Maytown and Scott Lake would be \$1,980,000 for the initial buildout, with a \$2100/month charge for space on existing wireless towers. These costs are broken down further in the financials section of this document.

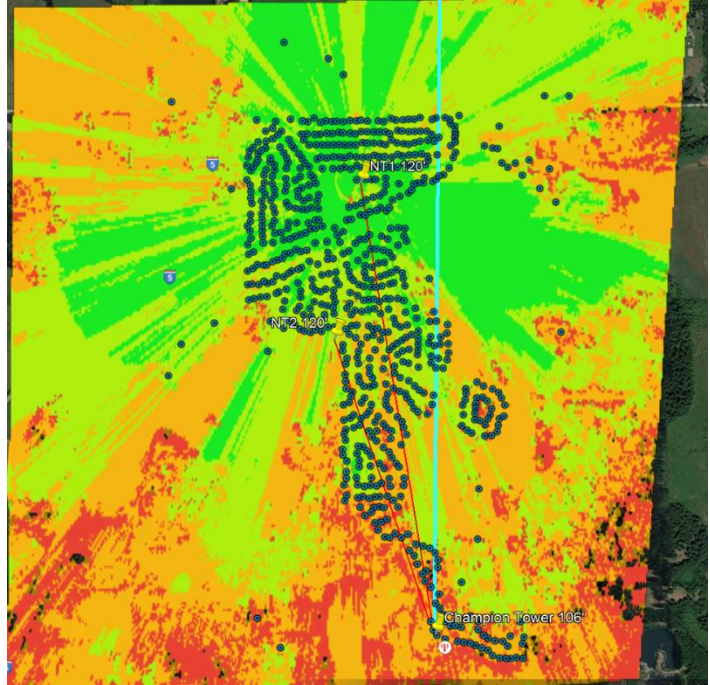
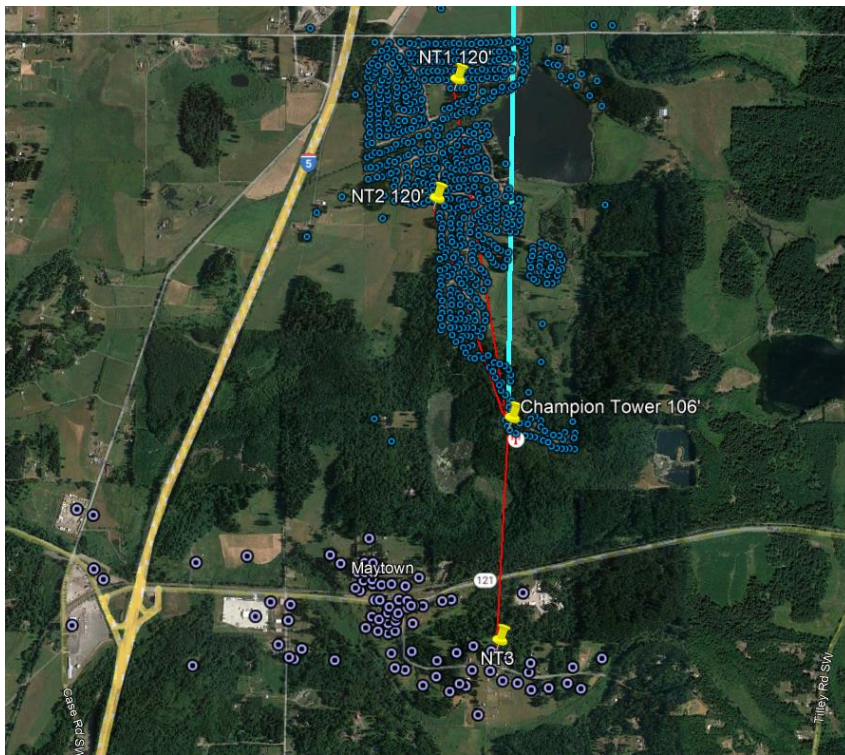



Figure 4- Scott Lake Wireless Coverage

Full-page maps of the proposed designs are included in a larger format as Appendix D of this document.



AFFORDABLE INTERNET

There is not currently a widely accepted metric for the affordable cost of broadband. For the Affordable Connectivity Program out of the FCC (a longer-term replacement for the Emergency Broadband Benefit program that subsidized broadband during the Covid-19 pandemic), a household income lower than 200% of the Federal Poverty Guidelines would qualify for bill assistance. For a family of four, that would be an income of less than \$55,500 for the household. There are several areas in the Thurston PUD serving area whose median income would qualify for this subsidy, which would provide a \$30 per month discount on services. A public information campaign to inform consumers about this opportunity could help reach broadband access for many households struggling to afford these services.



**Affordable Connectivity Program**  
*Helping Households Get  
Access to Broadband*

Find out if you qualify and how to participate. Visit: [fcc.gov/ACP](https://fcc.gov/ACP)

The Lifeline program provides a \$9.25 monthly benefit for income-eligible subscribers on the monthly telephone, broadband, or voice-broadband bundled services. Households on federally recognized Tribal lands can receive up to \$25 per month in addition to the standard benefit of \$9.25. The household income is 135% or less of the federal poverty guidelines.

Additionally, open-access infrastructure would bring a more competitive retail environment into the region, which has been shown to increase the quality of services while decreasing the prices from the free market at play. This would benefit this community, especially in areas with only one service provider operating in a monopolistic environment.



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#### AFFORDABLE EQUIPMENT

Some grant and loan programs allow customer premise and lighting equipment to be included in the infrastructure cost. If available, these costs should be included in future funding opportunities to lower the threshold to entry for customers and service providers. If grant funds are not available to cover the cost of in-home equipment, the total cost of the ONT and in-home managed Wi-Fi equipment may fall onto the end-user or ISP. It will be essential to consider these costs and scenarios while selecting the equipment utilized in the network deployment.

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#### DIGITAL LITERACY TRAINING

Access is only one piece of the puzzle for seeing the widespread benefits of Internet access for our community. The population must know how to leverage the Internet to maximize their access uses. If network expansion is completed, the PUD could partner with the local library and community center to provide digital literacy classes. Public classes would support community members who do not yet know how to make the most of this lifeline infrastructure, including training programs and tech support for basic Internet-based skills such as internet searches and email setup and use.

---

#### PUBLIC COMPUTER ACCESS

Ensuring that students have access to a public computer and broadband access has never been more critical than the strain that Covid-19 placed upon our educational and workforce resources. With many classes and meetings being held online since the Spring of 2020, many students and professionals did not have access to adequate Internet at their homes to engage in their schoolwork or remote meetings. This reality has prompted efforts statewide to focus on supporting systems to bridge these inequities. Libraries have emerged as a leader in these programs. A strategic partnership with the Thurston County Library System could prove a valuable resource for the community.

## VISION STATEMENT

The Thurston County PUD Broadband Champions Vision Statement was created with input from the community Champion stakeholders to set a direction for the PUD's broadband feasibility assessment.

This statement conforms to existing PUD visioning efforts as it seeks to meet the infrastructure needs of the Thurston County community. The PUD currently serves the community with water services. Recognizing that broadband access is the new critical infrastructure of our time, the PUD outlined a vision to explore how to best meet the needs of the area.

***THURSTON PUD'S VISION IS TO EVALUATE THE PUD'S ROLE IN FACILITATING AFFORDABLE HIGH-SPEED BROADBAND SERVICES TO THE SCHOOLS, HOMES, AND BUSINESSES OF THURSTON COUNTY.***

## ASSESSMENT OF EXISTING POLICIES

Thurston PUD does not have utility poles as a water provider, so many common policies impacting broadband development are not applicable. However, the PUD has already been proactive in getting conduit into the ground when they have the road dug up for pipe installs, repairs, or replacements. These conduits can be of tremendous value for broadband delivery as it minimizes the cost to deploy new infrastructure, especially when available in areas where poles are not available, or in high-cost situations such as under a major intersection, overpass, or body of water.

When roads are going to be opened up, notice to area providers of the opportunity to install their own conduit could encourage continued broadband development in the PUDs serving area.

Detailed records and GIS mapping of all available conduit should be maintained.

## FINANCIAL COMMITMENT AND BUDGET

The proposed plan for the Thurston PUD's community telecommunications network is separated into three categories: capital expenditures, operating and maintenance expenses, and revenues. Each of these three categories is described below.

These categories are also further captured in the financial data, as shown in Appendix E.

### CAPITAL EXPENDITURES

#### FIBER NETWORK DESIGN

The fiber network design provides connectivity to community subscribers and generally follows existing utility right of ways and would be deployed in a manner that would maximize the ability to extend to residential and commercial customers. The fiber network would comprise the backbone system that would provide the central transport systems and the distribution system that would connect individual properties. The core aggregation point is at an outdoor cabinet.

The fiber network would be deployed with conduit sizing and fiber counts that allow for the growth of services and connections as required. The proposed conduit is specifically selected to provide adequate breakout points and room to accommodate the deployment of additional fiber cable. The fiber network would have fibers sufficient to accommodate an aggregated fiber-to-the-premise network, dedicated point-to-point connections, and support carrier/service provider connections as required.

The financial analysis divided the infrastructure into three categories, backbone, distribution, and drop. Each category of fiber optic systems is separated to manage the facilities' engineering, construction, and deployment. The backbone constitutes the infrastructure associated with the high-capacity fiber counts to connect to the Griffin area. The distribution network extends the backbone network closer to the consumer and prepares the network for the service drops. This actual connection goes either to the residence or the business.

#### FIBER NETWORK SERVICES

The service network or home category provides the customer premise electronics that connect back to the core network electronics located on a network aggregation site. Presently, this is designed to be a single site, but dual sites could be established to accommodate redundancy. The proposed architecture will support both GPON and Active Ethernet deployments, with GPON as the primary service delivery mechanism for traditional residential and commercial subscribers.

---

## GPON

The GPON system modeled can combine up to 32 customer fibers in the field utilizing a single fiber to the aggregation site. The system can provide end-users with Gigabit interfaces and provide varying levels of speeds and levels of service. The system is capable of 10 Gigabit capacity on the fiber. GPON systems efficiently create a large, shared bandwidth pool and are a superior technology for addressing residential and small business services. The network aggregation device would be proposed with redundant modules and connections into the router network to minimize service outages.

---

## ACTIVE ETHERNET

The Active Ethernet system utilizes a dedicated fiber linking each premise to the aggregation site. This system can provide full symmetrical line rates in increments of 100 Megabits per second, 1 Gigabit per second, and, if needed, upgraded to 10 Gigabits per second. Generally, Active Ethernet systems are deployed for commercial customers who require higher bandwidth than residential users. The customer premise electronics are predictably more expensive than GPON systems. This solution could serve as an add-on to the PON network for customers requiring these services.

Each system can address customers' requirements in a detailed design. Depending on the service scenarios, a hybrid network consisting of GPON and Active Ethernet is possible. The Access Network can be deployed in a bandwidth-only wholesale model, where RSPs lease bandwidth from the PUD for their customers. In addition to the network electronics, infrastructure to support routing, security, and operational management are required, as outlined below.

---

## ROUTING AND SECURITY NETWORK

The routing and security network provides the functionality to interconnect to the service providers and delivers the necessary security to protect the broadband network and, to a certain extent, the customers from outside threats/outages. A high availability router and firewall would be leveraged to provide adequate capacity for expansion. Routing and security require specialized skill sets to continually optimize and secure the infrastructure.

This Service Zone Summary table above includes the cost of each service zone project and is divided between the cost to build the backbone and the cost to connect and activate the customers based on

the 30% take rate model. The total number of premises this network passes is 4,578, which creates a 30% take rate of 1,831 premises. This 30% take rate is a mix of residential and commercial customers.

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#### CITIZENS BROADBAND RADIO SERVICE

Citizens Broadband Radio Service (CBRS) is a 150 MHz wide broadcast band of the 3.5 GHz band (3550 MHz to 3700 MHz). In 2017, the US Federal Communications Commission (FCC) completed a process which began in 2012 to establish rules for commercial use of this band, while reserving parts of the band for the US Federal Government to limit interference with US Navy radar systems and aircraft communications. On January 27, 2020, the FCC authorized full use of the CBRS band for wireless service provider commercialization without the restrictions to prevent interference with military use of the spectrum. Under the new rules, wireless carriers using CBRS might be able to deploy 5G mobile networks without having to acquire spectrum licenses. This can make CBRS a cost-effective and viable option for wireless broadband deployment.

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#### WIRELESS NETWORK DESIGN

The wireless network design leverages wireless backhubs through a series of towers. The local services in the methods provided here would be facilitated through a CBRS radio system. In these designs, the wireless system feeds back to the fiber network for the Griffin School District design for backhaul. The total cost for the wireless infrastructure deployment is \$1,967,500.00. This does not include the monthly rental fee for the tower property of \$2100/month or the service connection charges outlined in the table located in Appendix E.

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### OPERATING AND MAINTENANCE EXPENSES

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#### NETWORK OPERATING EXPENSE

The overall network operating expenses include the internal personnel time, outsourced firms, circuits, and machinery necessary to implement and operate the network daily. Managing a broadband business for the PUD will require various skills and support systems. For the wireless network, there is also the consideration of leasing space on existing poles and the recurring fees associated with that effort. The associated expenses of these operations are outlined in the comprehensive budget documents included in Appendix E.

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#### SALES AND MARKETING BROADBAND MANAGER

Managing a broadband business for the PUD will require a full-time employee for the foreseeable future. This person will act as the liaison between the customer, the Retail Services Provider, and the PUD to ensure successful project management of the system and its service offerings. They will work closely with outsourcing agencies and internal staff to ensure customer acquisition, sales and marketing, execution of new services, and customer service are maintained at the highest level.

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#### DEMONSTRATION CENTER

A demonstration center is a valuable communication tool for communities with municipal broadband programs. This is for the setup of a center to showcase the services offered to the customers of this project to demonstrate the PUD service offerings and capabilities of high-speed broadband. In addition, we would showcase telehealth and smart home applications, to name a few, that will encourage customer acquisition. Suppose state mandates around Covid-19 continue to disallow community events like this. In that case, we recommend creating a social-distancing implementation of this service which might include printed packets of information or small-group demonstrations with appropriate hygienic practices and social distancing precautions being observed.

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#### ONLINE MARKETPLACE

As the project advances, customers could use an online system and portal to acquire broadband services from local and regional service providers, select types of services desired, and allow the customer to manage the connection phase for their new services. This fully integrated system would enable customers to manage their service and their service provider and supply seamless invoicing between the PUD and the RSPs.

One of the main features of management platforms is the Service Providers' ability to work themselves in the systems from their user profile. They can create new service offerings and change prices and terms by themselves. This opens competition between providers, making sure the cost of services on your network will be kept affordable and contract terms reasonable. The benefit is also that Service Providers already set up in the platform will have minimum barriers to enter new networks, meaning operators don't have to spend any effort trying to attract service providers. They can enter the system and become an RSP on the network through this service. Other PUDs are using platforms like this, and there are already several Service Providers ready to serve the PUD community. As operations services are expanded and more subscribers get connected, it will be even more attractive for service providers to connect since they will reach all these networks and subscribers from one single system.

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#### MARKETING, BRANDING, AND COLLATERAL

The key to a successful project is customer service, branding, and consumer loyalty. This project will leverage the Customer Services Zones Portal, advertising, social media, marketing collateral, and local champions to engage the community and proactively solicit support across all community members for the PUD public benefit network. This project will develop branding and broadband logo solutions to encourage citizen engagement. The PUD network and its story are also one that we will want to be told to the nation further to support public benefit networks across our rural neighbors.

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#### BUSINESS ADMINISTRATION

This category of expenses includes general office requirements, managing the grant process over time, maintaining and operating client billing and low-cost programs, and includes the debt service necessary to support the grant match process.

#### REVENUES

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#### ASSUMPTIONS

With this program, revenues to support the significant operational expenses of the network are critical to success. We predict a 30% take rate due to the feedback received from the demand aggregation portion of this assessment. We anticipate that the first five-year market share will be aggressive, with subsequent years tapering off due to market saturation. Revenue shortfalls are possible as the consumers in this area do have alternatives to services, which means that it is possible that they would elect not to use the services and churn.

---

#### RESIDENTIAL

The homeowners in the proposed service areas are in high need of broadband services with high capacity at prices that they can afford. While consumers may have services available, the costs of those services may make them inaccessible. Keeping costs down will be an essential metric to ensure sufficient take-rate and minimize churn.



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## COMMERCIAL

The marketplace consists of small to medium businesses that rely on broadband and access to the Internet to support business operations. These can be point-of-sale organizations that require access to the cloud and Internet of things solutions or generally require a more reliable service than what is usually seen in the residential marketplace.

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## HIGH CAP SERVICES

These services will occur when a commercial entity requires high-capacity bandwidth with service level agreements that support and require 100% uptime. These circuits are likely to be equal to or more than 1Gbps and generally are for longer terms than other less costly services. In rural communities, these services can occur with large industrial or technical firms, cell tower connections, schools, public safety organizations, or government offices.

## BUDGET MATRIX

Thurston PUD's service area has been divided into three distinct Service Zones to facilitate a phased network deployment and has three projects shovel ready for potential future funding opportunities.

The project expects a 30% adoption rate during the first five years of service. Each year after that for 2% growth is anticipated. That translates to 767 residential and 94 commercial fiber customers in the Griffin area and 792 residential and 15 commercial wireless customers in Maytown and Scott Lake. Revenues accrued annually take into recognizable initial take rate with modest growth.

Currently, the financial analysis also considers such items as churn, affordability programs, and default payments. These appear as expenses in the O&M Model included in Appendix E. The overall revenues from non-recurring and monthly recurring revenue are represented in the 12-year roll-up located in Appendix E.

The network expenses after initial construction consist of those items listed in the O&M model, including labor, network expenses, call center, operational outsourcing, and debt service. These are also summarized in the 12-year roll-up; however, the project sees a reduction in expenditures as additional phases and long-term development spread costs.

Budget for proposed plan aligned to significant project plan milestones, costs, and tasks may be found as Appendix E of this document.

## POTENTIAL SOURCES OF FUNDING FOR BROADBAND INFRASTRUCTURE

NoaNet has reviewed available funding mechanisms to support a future capitalization of the network plan. If it is determined that grant solutions are viable, NoaNet staff are available to manage, draft, and apply for any suitable broadband grants necessary to reach the agency's goals.

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### COMMUNITY ECONOMIC REVITALIZATION BOARD RURAL BROADBAND PROGRAM:

CERB provides funding for construction and planning for broadband projects in Washington State in rural counties and rural communities only.

Eligible projects are those that encourage, foster, develop, and improve broadband within the state to:

- Drive job creation, promote innovation, and expand markets for local businesses; or
- Serve the ongoing and growing needs of local education systems, health care systems, public safety systems, industries and businesses, governmental operations, and citizens.
- And Improve accessibility for underserved communities and populations.

Thurston County PUD has obtained its planning dollars through the CERB program and appears to meet the program qualifications for their grant/loan program for broadband infrastructure development.

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### THE WASHINGTON STATE DEPARTMENT OF COMMERCE PUBLIC WORKS BOARD

As part of the 2019 legislative session, SB 5511 created a statewide Broadband Office under the Department of Commerce Public Works Board to disseminate state and federal funds to facilitate broadband expansion projects in unserved areas of Washington State. Their most recent award cycle closed in December of 2021, but they have another cycle opening up on February 22<sup>nd</sup> and running through April 26<sup>th</sup>, 2022.

Thurston County PUD does not qualify as a severely distressed county for this program. However, NoaNet recommends that the PUD follow this program as a possible ongoing funding mechanism for broadband infrastructure development.

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### THE WASHINGTON STATE BROADBAND OFFICE

The Washington State Broadband office has an Acceleration Grant program that funded projects up to \$25 million and requires a 10% cash match of the total project costs. This matching requirement may be waived if the entity can demonstrate financial hardship. An additional funding round is expected for

Spring of 2022. If the PUD is interested in pursuing funding in this cycle, close collaboration with the existing Thurston County BAT is advised.

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THE USDA RECONNECT PROGRAM FOR BROADBAND INFRASTRUCTURE:

The Reconnect Program offers unique federal financing and funding options in the form of loans, grants, and loan/grant combinations to facilitate broadband deployment in areas of rural America that don't currently have sufficient access to broadband, defined by the law as 25 Mbps (megabits per second) downstream and 3 Mbps upstream. Infrastructure must support 100/100mbps symmetrical service.

This program aims to generate investment to deploy broadband infrastructure to provide high-speed internet e-Connectivity to as many rural premises as possible, including homes, community facilities for healthcare and public safety, schools, libraries, farms, ranches, factories, and other production sites. Awards are made in tiers of 100% grant, 50% Grant/50% loan, and 100% loan.

A new application window opens for ReConnect on February 22, 2022. USDA has continued to re-establish this program over time, which will likely continue.

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LOCAL UTILITY/IMPROVEMENT DISTRICTS TO FUND BROADBAND INFRASTRUCTURE:

Long before the FCC recognized broadband as a utility, citizens and communities found high-speed Internet access necessary to their well-being and future success. Broadband telecommunications are increasingly becoming how people communicate, conduct business, access government services and distance education opportunities.

Kitsap Public Utility District recognized that broadband is a utility in their community and has expanded their fiber-optic network to increase access to all residents of Kitsap County using Local Utility Districts (LUDs). Below is an outline of how the LUD model in Kitsap County, Washington is formed to fund broadband infrastructure:

1. Homeowners petition the Public Utility District to form a Local Utility District. The LUD is created if a majority (50% + 1) of the homeowner's petition.
2. Once the LUD is formed, the PUD begins the process to construct the infrastructure
3. When construction is complete, the homeowners are provided a final assessment amount
  - a. The assessment can be paid:
    - i. Upfront or over a determined period
    - ii. Or a combination of the two with some upfront and the rest over the determined period

4. The county administers the assessment, and homeowners receive a tax bill for their assessed amount annually

Thurston County PUD could leverage LUDs as a funding mechanism for telecommunications infrastructure as KPUD has done. NoaNet recommends keeping this model in mind for persistently unserved areas such as locations that are exceedingly difficult and costly to access to help mitigate costs if future engagement in broadband is of interest to the PUD.

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#### "FIBERHOODS" WITH CONSTRUCTION ADDERS:

Mason PUD #3 in Mason County is running a "Fiberhood" program where residential areas have an opportunity to show interest in fiber broadband connectivity in a defined build area. If that area reaches a 75% interest rate, the PUD builds an open-access network out to their homes. Each month, in addition to their service fee from their selected Internet Service Provider, they pay a \$25 "construction adder" to pay for the cost to build the network to their homes. That fee is paid for 12 years and then retired after covering the build cost to the premise. Customers also have the option to pay the \$3600 total cost upfront to lower their monthly bill, qualify for seasonal service, or write the cost off as a business expense.

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#### CAPITAL FROM PRIVATE INVESTMENT FIRMS:

Private investment firms are funding community networks that are either unable or unwilling to use bonds to support network investments. Private Investment firms partner with real estate developers, municipal, county, other governmental entities, and various private partners to deploy last-mile fiber-optic network infrastructure. One such example of an organization deploying utilizing this method is Lit Communities.

There are many funding opportunities available through state and federal programs at this time. These avenues of project funding where grants are available would be a preferable mechanism to considering private equity investment options.

## KEY DOCUMENTS AND EXISTING EFFORTS

### DOES THE MUNICIPALITY USE BROADBAND TO DELIVER MUNICIPAL SERVICES?

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No. Thurston PUD does not currently participate in any broadband efforts internally or externally.

### ARE THERE LOCAL OR REGIONAL ECONOMIC DEVELOPMENT PLANS IN WHICH BROADBAND COULD PLAY A ROLE? IF SO, PROVIDE A LIST OF THESE DOCUMENTS.

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The Thurston County Economic Development Council, Thurston Regional Planning Cooperative, and Thurston County Chamber of Commerce could serve as supportive partners in deploying broadband infrastructure in Thurston PUD's service area. The Thurston Regional Planning Cooperative is a regular participant in the Thurston County Broadband Action Team meetings. They do not currently have any published broadband vision or efforts underway.

### ARE THERE ANY ONGOING COMMUNITY PROJECTS FOCUSING ON THE DIGITAL DIVIDE OR INFORMATION TECHNOLOGY (PUBLIC ACCESS THROUGH SCHOOLS OR LIBRARIES, TRAINING, IMPROVING ACCESS TO BROADBAND, ETC.?)

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Libraries throughout Washington State, including Thurston County, have had free Wi-Fi access in their parking lots since the start of the pandemic. Due to COVID-19 restrictions, any programs facilitating technology support through the library system have been suspended.

**Community Anchor Institutions:**

Griffin School District  
Global Alliance for Community  
Empowerment  
Griffin Fire Station 02

St. Christopher's Community Church  
Scott Lake Fire Station  
Scott Lake Community Center

**Businesses:**

Indigo Farms Olympia  
Steamboat Island Goat Farm  
Case Inlet Oyster  
Schirm Loop Lavender Farm  
Crawlin' Dirt  
Steamboat General Store  
Northwoods Falconry  
Promix Equipment  
Rugid Computer  
Honda Import Auto Repair  
Griffin Athletic Fields  
Cox Molded Sails  
Rainbow Water Company  
Olympic Ribbon Art  
Oyster Bay Fine Home Finishing  
Queen See Art Cottage  
Island Market

Tin Cup Golf  
Steamboat Grill & Greens  
K&M Mobile Repair  
Griffinwood Stables  
Boulder Equipment  
Lot Hauling  
Farm Boy Drive-In  
Freightliner Northwest  
Old Dominion Freight Line  
CRST The Transportation Solution, Inc.  
Sandstone Distillery  
Hillside Farms  
Premier Stone & Quartz  
Scott Lake Gold Course  
Auto Elements NW  
Granite Construction Co.



Below are the next steps the PUD could take toward addressing the broadband issues in its community as part of the modeling from the study. In doing so, we begin with the implementation stage, which we call Year Zero. Year Zero is when the PUD leadership develops a broadband business plan and concludes when the business serves its first customer. NoaNet recommends the following outline of Year Zero preparation steps:

#### Broadband Management Staff

If the PUD decides to move forward with a full-scale deployment, they should consider hiring a full-time broadband manager/administrator to create and execute a detailed business plan. The broadband manager acts as the champion of the goals and objectives of the broadband plan. Even if doing smaller, case-by-case solutions, at least a .5 FTE in-house staff person to manage those efforts is recommended.

#### Transition Feasibility Study Materials into an approved Business Plan

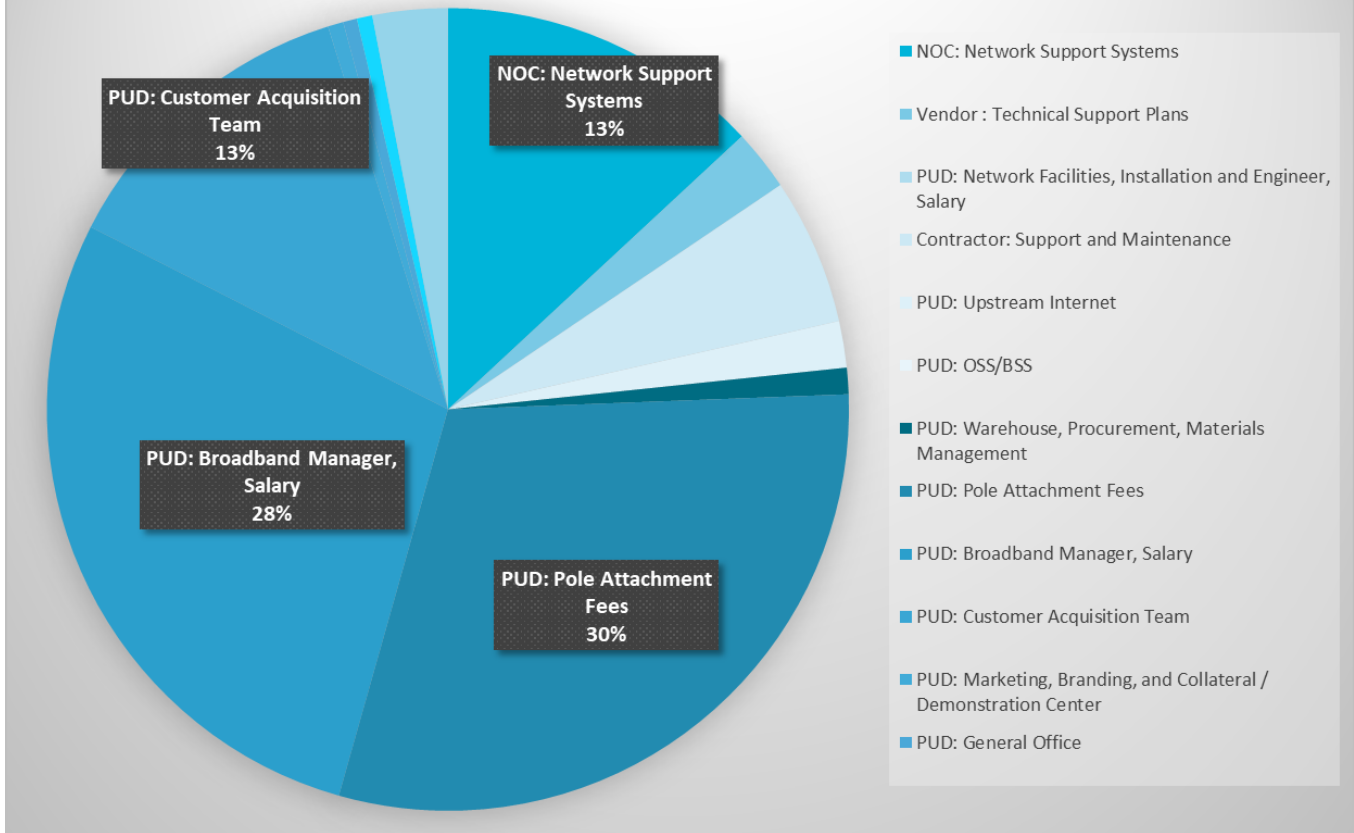
The feasibility study and associated financial statements are a model. It is necessary to expand upon the assumptions and develop decisions that best suit the needs of the PUD, the local community, and any participating retail service providers. The business plan should cover detailed items such as per connection pricing and service offerings, marketing and sales strategies, financing and accounting, construction and installation mechanics, and network operations and staffing assignments are the next levels of executable detail required to move forward. NoaNet can assist Thurston PUD with the development of a broadband business plan.

#### Develop Network Operations

Establish network operations systems and procedures, either by leveraging outsourced services, such as how this model is structured, or by establishing internal resources to support the ongoing network needs of this system. This includes but is not limited to system and electronics management, trouble ticketing and reporting, alarm and restoration management, network management, repair and restore, and installation and provisioning services.



## Operating Expense Year 5



### YEAR ONE – CUSTOMER ACQUISITION

Below are the next steps the PUD would take toward operating as a wholesale broadband provider. These steps years are designed to manage the day-to-day operations of a fiber to the premise (FTTP) network to support PUD operations and their customers:

#### Customer Service and Provisioning

The PUD will have new customer orders to support. With those orders, a workflow will need to be established to work with technicians who perform installations, provisioners who manage the network connectivity, and billing and service activation administrative agents.

#### The Service Network

Simultaneously, the PUD will manage new network connections during deployment, completing the remaining fiber cable service drops as infrastructure is deployed throughout the first four years. This will be a busy time as the intent is to acquire a 30% market share within the fifth year of operations. This will be accomplished using the energy created by the newly established business unit, the

aggressive sales and marketing campaign, promotional installation rates, and community recognition of the project's importance.

## INITIAL SERVICE OFFERINGS

The outlined model supports typical service connections in residential, business (commercial and small to medium businesses), and high-capacity commercial services. The model includes 100Mbps symmetrical service to residential and business customers. High-capacity bandwidth customers would be managed on an individual case basis.

The following services could be valuable services to the community in addition to high-capacity Internet. These could be provided by the PUD on a wholesale basis and sold to participating Retail Service Providers or delivered independently by the RSPs.

### *Managed Wi-Fi*

A system to allow a customer to subscribe to a service offered by the PUD that supplies one or more Wi-Fi routers depending on the end user's requirements.

### *Voice over IP Line*

One or more voice lines that would operate over the public network. This is an excellent solution for those customers who want a traditional landline without the traditional expense.

### *Access and Surveillance*

Over-the-top (OTT) solutions needed by the business community could include security access systems, digital video surveillance, and cloud data storage.

### *Cloud Storage*

Remote storage for business applications that need disaster recovery or other cloud storage services to support business operations will be possible additional services.

### *Utility-Based Applications*

Services governmental agencies and other public-serving agencies would find helpful, such as SCADA, electric smart grids, early warning detection systems, smart pole lighting, and traffic management.

## HEALTH AND SAFETY BENEFITS

### FIRST RESPONDERS

Investment in high-capacity broadband network infrastructure will significantly impact Thurston County public safety. Broadband is vital to improving the communications between first responder agencies. Broadband can enable faster response times, an increased ability for first responders to share important information about events, and even allow the public to access 911 services through data-enabled services such as VoIP. With improved telecommunications services, Thurston County residents could benefit from these improved first responder communications.

### REMOTE CONSULTATIONS

High-capacity broadband will break the Internet bottleneck and allow healthcare providers to deliver lifesaving telecommunications-enabled services in real-time. Like those in Thurston County, rural community healthcare systems cannot afford to staff experts for every situation. Through high-capacity connections, like the ones proposed for Thurston County, healthcare providers can seek the assistance of subject matter experts through remote consultations. This lifesaving expertise should not only be available to residents of our state's largest cities. Telecommunications infrastructure investment would put it within reach of Thurston County.

### TELEHEALTH SERVICES

Broadband enables access to telehealth services for Thurston County's residents. When getting to the doctors is a cumbersome task, many will choose not to engage in the healthcare they need. Through the implementation of telehealth services, which Apple Health now covers in Washington, patients can log in via their phones or computers and have a remote consultation with doctors to get the medical assessments they need, many times without going into the clinic at all. This would allow Thurston County residents to take the best care of themselves as possible.

## EDUCATION BENEFITS

### SCHOOL-AGED CHILDREN

There are many ways that a lack of Internet access can affect a student's academic performance. Students without the Internet can't connect with teachers or classmates, do independent research, or get online homework help. For families, not having internet access can mean missing out on information or losing out on direct communication with schools and teachers.

The Covid-19 pandemic has shown us a timely real-life example of how this type of infrastructure impacts the availability of education for our students. With schools being closed for weeks to curb the spread of the virus, teachers and students have had to pause their schoolwork until schools re-open. If ubiquitous broadband access was available to their students, schools might have maintained a modified curriculum while away from the physical classroom.

Of the residential respondents in Thurston County who engaged in the community survey, 27% reported having school-aged children in their homes. Even outside of the Covid-19 pandemic, an increasing amount of schoolwork requires the Internet. Now, in the current uncertainty about how the school will look for the upcoming school year and beyond, students must have access to a reliable and sufficient broadband connection outside of school hours. Without reliable Internet access at home, students are limited to doing homework that requires online engagement to times when they are at school or when the library is open or leaving them to access the Internet through their phones if they need to get online late at night.

In 2015, the Pew Research Center analyzed data from studies on Internet access and found that students lacking Internet access at home strongly correlate with household income. Among households with an annual income under \$50,000, 31.4% do not have broadband Internet access. For families with a yearly income over \$50,000, the number is much smaller—only 8.4% lack access to broadband Internet.

From the survey data collected, it is clear that 27% of households that reported having school-aged children in their homes need to have access to enhanced broadband services to overcome these educational obstacles. With increased infrastructure, the PUD could also consider creative solutions to give students more time to complete their online homework outside of school hours, such as WIFI on school buses or in public areas.

## SENIOR CITIZENS

While the Internet is understood as a valuable resource for many community members, for many seniors, it often proves a challenging and frustrating technology whose value is easy to dismiss. In communications with especially the senior community, it was clear that this population did not understand the importance of high-speed Internet at home. Introducing and familiarizing what the online world has to offer will give them access to greater control over their daily lives through online shopping, telemedicine services, communication with distant relatives, or research. However, fusing every day with technology is no simple task for many seniors.

These issues shape the senior influence on technology - with physical challenges, lack of services, education, and technology challenges keeping these men and women from experiencing the value that the Internet could bring to their lives.

We recommend that the PUD explore launching an educational initiative in conjunction with the library, and community center to create programs to increase confidence, skills, and online safety for older community members who are not currently utilizing the value of digital technology.

According to a study by the Pew Research Organization, those 65 and older express these key doubts about the Internet:

*Physical Challenges:* Pew Research reports that two out of every five seniors suffer from a physical handicap (including chronic pain or disease). These individuals are 20% less likely to use the Internet than those in good health, and they're also 18% less likely to have broadband access.

However, with access to the Internet and utilizing search engines, social media, and entertainment that the web offers, seniors can connect to current events to stay engaged with developing information, engage others through social media, and maintain a link to the world when physical barriers make physical connections more difficult.

*Services Education:* Pew Research notes that 35% of seniors believe that the Internet offers little to no value, unsure of the accuracy of the information it provides. They claim that a lack of access has no adverse effect on their daily lives. This leads them to avoid logging on to engines, news portals, and other social hubs.

This apathy toward broadband access is often due to a lack of knowledge of utilizing the Internet. Grocery delivery services, online banking, social media engagement, Skype with family on the opposite coast, and online games are often considered valuable once senior citizens are informed about the opportunities available for free once connected.

*Technology Challenges:* Pew Research discovered that a staggering 77% of seniors feel unprepared to adopt new technology (such as desktop computers, smartphones, or tablets). 56% of these individuals also admit to an inability to utilize online sites actively - including Facebook or Twitter - without guidance. This creates a surge of uncertainty, with those living alone unable to understand the Internet entirely.

## CUTTING THE CORD

We are seeing an increase in consumers who are "cutting the cord" and moving away from traditional cable TV options. Instead, we are switching to streaming content services such as Netflix and Hulu for their video entertainment needs. Traditional cable providers have also made a move to offer streaming content with the surge in content apps available from HBO, Cinemax, NFL, Disney, and others which allow consumers to pay a la carte for programming they want rather than cable TV packages. Industry experts expect to see streaming content continue to emerge as a consumer-favorite way to engage with TV content into the future. "Triple Play" packages will likely evolve into all Internet-based products with IP-based phone service, Internet access, and streaming video content that the consumer selects.

Community education on streaming services could help residents and businesses cut costs and bring services into the reach of more customers. A demonstration center or classes at the local library could prove helpful to assist in this community awareness and education process.

## SERVED OR UNDERSERVED

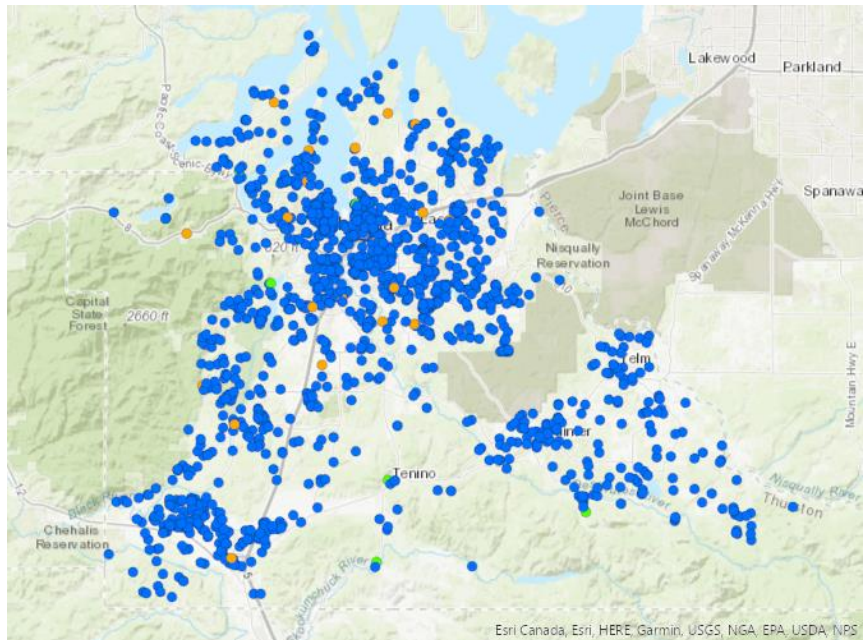
### THE COMMUNITY SURVEY

An online portal for community feedback on broadband access was activated on June 30<sup>th</sup>, 2021, providing residents and businesses the opportunity to log their current broadband service levels, costs associated with services, and their satisfaction with their current service's price, speed, and reliability. Paper surveys were also available at the PUD offices and area libraries, food banks, and community meetings.

An extensive community outreach effort was conducted to inform residents and businesses about the survey effort. This was accomplished through custom envelopes for their PUD bills, direct email outreach to companies, social media posts on the Thurston County PUD's Facebook page and other community social pages, and via the PUD's website. A phone hotline was created for residents or businesses who didn't have access to good Internet to engage in the online survey, and the survey could be taken over the phone. The PUD made this option available between 8 am and 5 pm Monday through Friday to ensure that the survey feedback could be collected from accessibility for those who did not have Internet or computer access.

Community institutions and the general public were also reached out to at length, outlined in the preceding community outreach portion of this document.

Thurston PUD collected one thousand four hundred and eighty-eight (1488) survey responses. One thousand and thirty-eight (1,038) of those speed tests included speed-test data.



### RESULTS SUMMARY

Of the 1488 responses, 1369 of the surveys obtained came from single-family homes, 11 from commercial locations, and 112 were from multi-family residences such as apartments and condos. 45%

Figure 15 Survey Response Locations

of respondents reported being dissatisfied with the speed of their services, 28% of respondents rated in the unsatisfied spectrum for reliability, and 75% were unhappy with the price of their services. The satisfaction ratings for these metrics were not consistent across the entire survey area. In the Olympia metro, the satisfaction for the speed and reliability of their services is substantially more optimistic. However, the dissatisfaction with the cost of services is stable across the entire county, with only one in four respondents being satisfied with the cost of their services.

Out of the 1488 surveys completed, nearly 97% (1439/1488) indicated they considered Internet access an essential utility. Only 49 respondents (3.3%) stated that they did not consider Internet Access a vital utility service. This data point shows that this community views broadband access as a utility service.

It was noted that many of the survey takers commented that they did not consider Internet access a utility service until the Covid-19 pandemic when it became a requirement to work and attend education outside of the traditional in-person environment. 73.4% of respondents reported that someone in their household worked from home. 43.6% said they had school-aged children in their

homes. While lack of adequate access had been a nuisance before the pandemic, access became the difference between working or not working and attending classes or not, which was impactful to many area families.

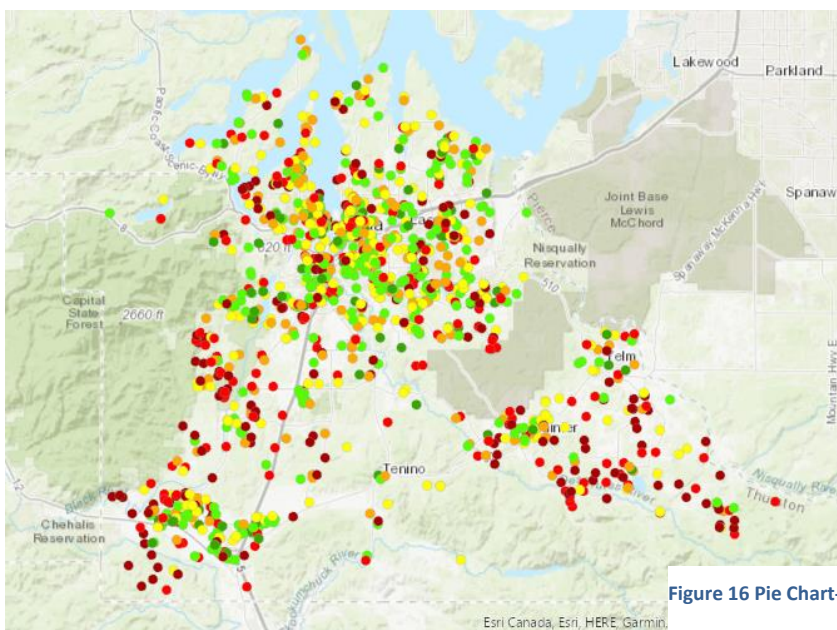
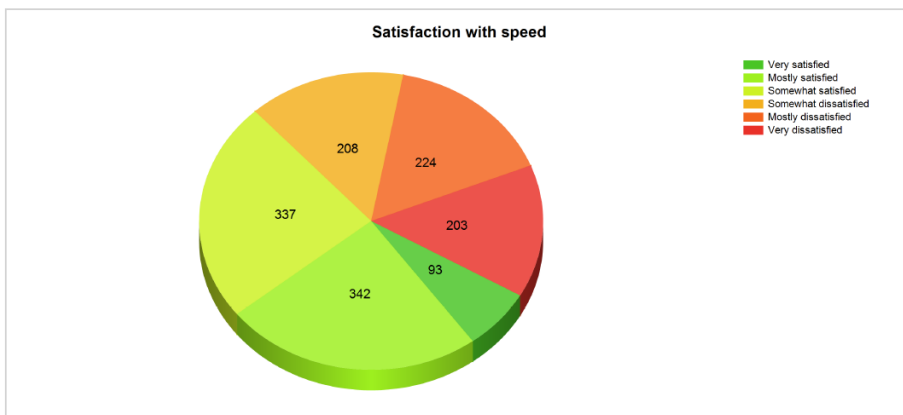


Figure 16 Pie Chart- Speed Satisfaction



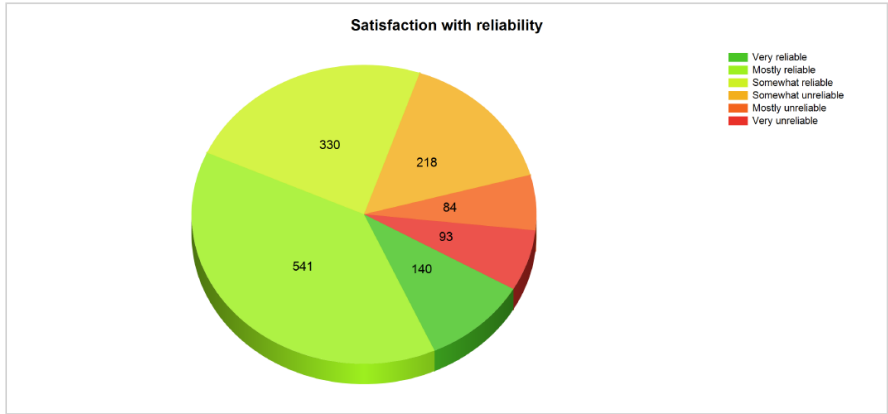


Figure 17 Pie Chart - Reliability Satisfaction

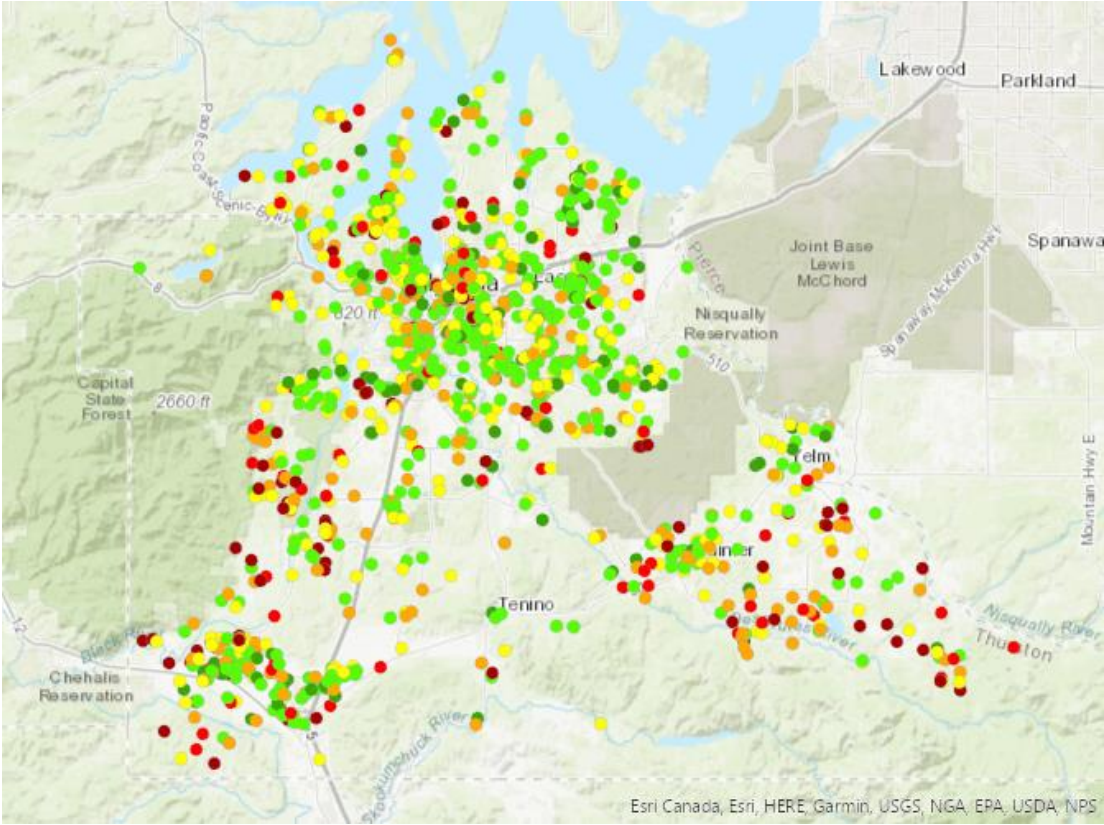


Figure 18 Survey Locations - Reliability Satisfaction

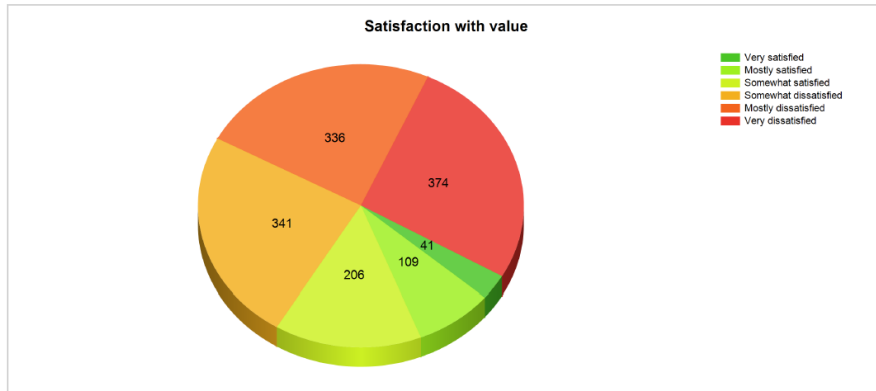


Figure 19 Pie Chart - Value Satisfaction

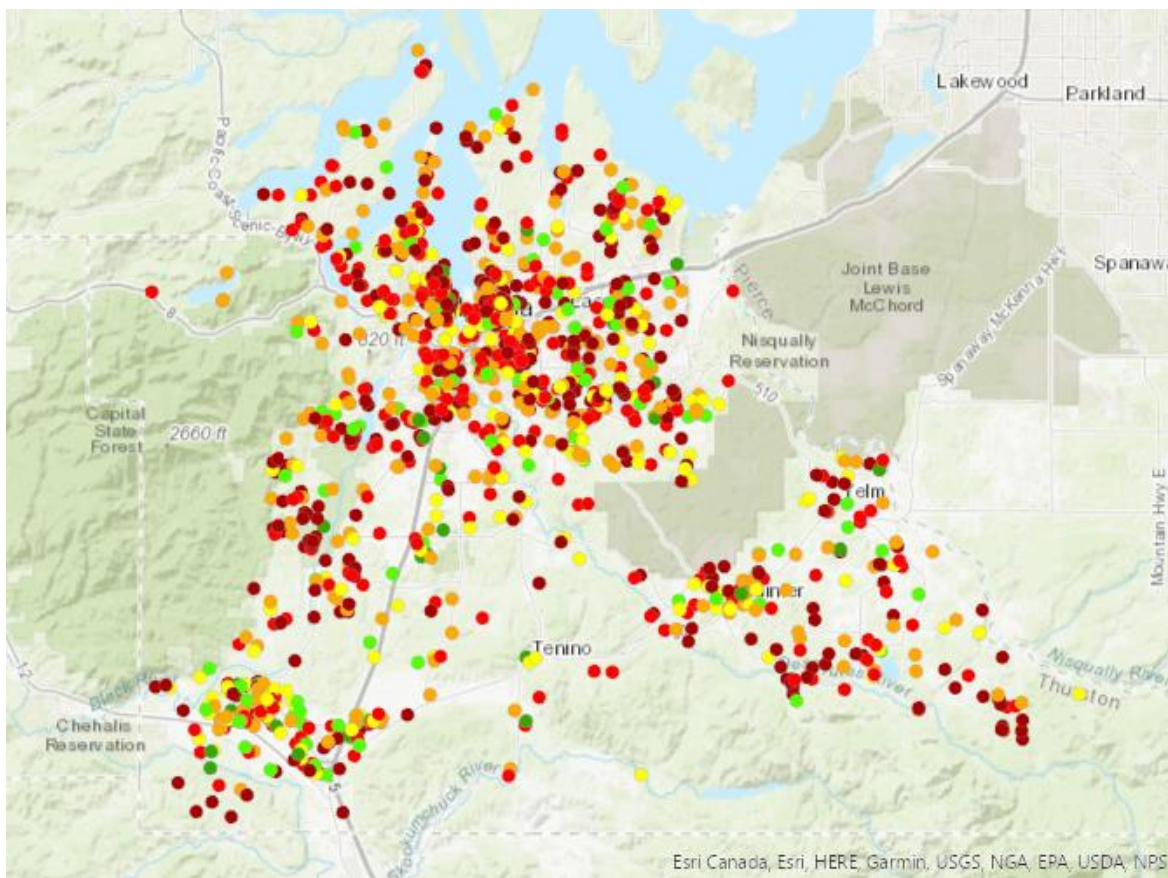


Figure 20 Survey Locations - Value Satisfaction

Current Cost of Services:

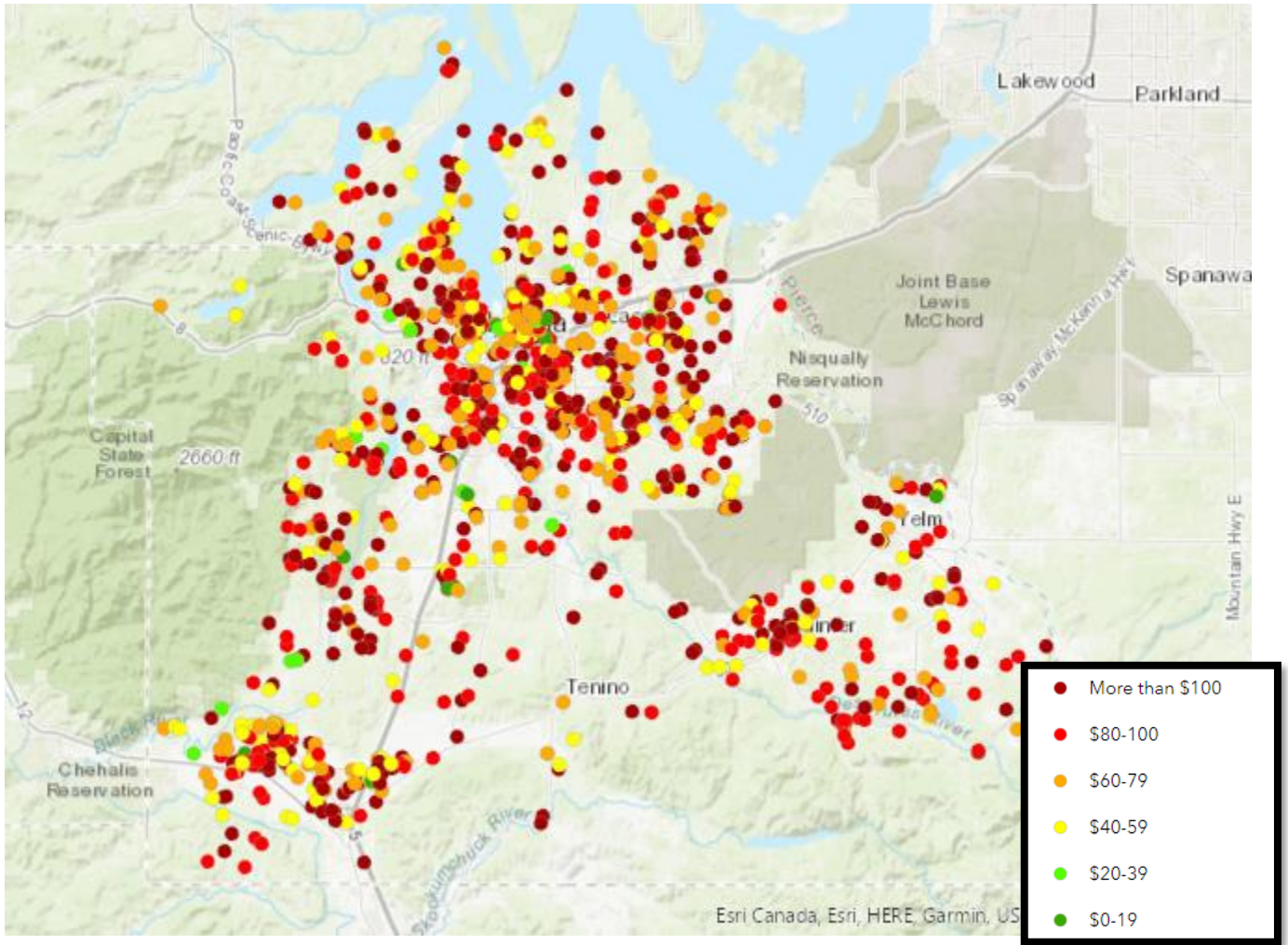
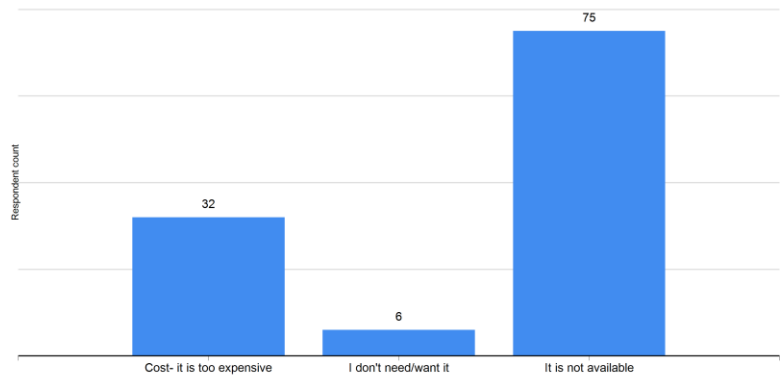


Figure 21 Survey Locations - Current Cost of Services

Figure 22 Survey Data -Why don't you have service



## SURVEY STATS AT-A-GLANCE

1488 Total Surveys Received | 1038 Speed tests completed

### DOWNLOAD SPEED TEST RESULTS

<b>32%</b>	Less than 25mbps .....	(333/1038)
<b>74.7%</b>	Less than 150mbps .....	(776/1038)
<b>25.1%</b>	More than 150mbps .....	(261/1038)

### UPLOAD SPEED TEST RESULTS

<b>21.8%</b>	Less than 3mbps .....	(227/1038)
<b>99.6%</b>	Less than 150mbps .....	(1034/1038)
<b>0.3%</b>	More than 150mbps .....	(3/1038)

### IF YOU DON'T HAVE INTERNET, WHY NOT?

<b>28.3%</b>	Cost .....	(32/113)
<b>5.3%</b>	Don't need/want it .....	(6/113)
<b>66.4%</b>	Not available at my location .....	(75/113)

### SATISFACTION WITH PRICE:

<b>74.9%</b>	Unsatisfied .....	(1048/1403)
<b>25.3%</b>	Satisfied .....	(355/1403)

### SATISFACTION WITH RELIABILITY:

<b>28%</b>	Unsatisfied .....	(393/1403)
<b>72%</b>	Satisfied .....	(1010/1403)

### SATISFACTION WITH SPEED:

<b>45.1%</b>	Unsatisfied .....	(633/1403)
<b>54.9%</b>	Satisfied .....	(770/1403)

### DOES ANYONE IN YOUR HOUSEHOLD WORK FROM HOME?

<b>73.4%</b>	Yes .....	(1045/1424)
<b>26.6%</b>	No .....	(379/1424)

### ARE THERE ANY SCHOOL AGED CHILDREN IN YOUR HOUSEHOLD?

<b>43.6%</b>	Yes .....	(649/1487)
<b>56.4%</b>	No .....	(838/1487)

### IS BROADBAND A UTILITY (LIKE WATER AND POWER)?

<b>96.7%</b>	Yes .....	(1439/1488)
<b>3.3%</b>	No .....	(49/1488)



APPENDIX A: BROADBAND ACTION TEAM ATTENDEES

Name	Organization
Paul Walk	Nisqually Tribe
Mike Mason	Nisqually Tribe
John Weidenfeller	Thurston PUD
Julie Parker	Thurston PUD
Michael Cade	EDC
Jennica Machado	Thurston County
Marc Daily	TRPC
Sam Gibboney	Port of Olympia
Chris Olin	Nisqually Tribe
EJ Zita	Port of Olympia
Bill McGregor	Port of Olympia
Rudy Rudolph	Port of Olympia
Bob Iyall	Nisqually Medicine Creek Enterprise Corporation
Gary Vervalin	Wave Broadband
Kevin Stamey	Wave Broadband
Ruth Clemens	Thurston PUD

## Broadband Stakeholder

Meeting Agenda

**April 13, 2021**

**1:00-2:00pm**

<https://us02web.zoom.us/j/4482480998>

Participants: Michael Cade- EDC, Jennica Machado- Thurston County, Marc Daily- TRPC, Sam Gibboney- Port of Olympia, Paul Walk- Nisqually Tribe, Chris Olin – Nisqually Tribe, Mike Mason – Nisqually Tribe, John Weidenfeller- Thurston PUD, Ruth Clemens – Thurston PUD

**Agenda:**

- VI. Welcome + Introductions
  - c) Include brief statement on current broadband efforts
- VII. Defining the problem
- VIII. Discussion Thurston County broadband strategy
  - c) Approach/coordination model
  - d) Stakeholder group function
- IX. Concerns/obstacles
- X. Next steps & follow-up

# Broadband Stakeholder

Meeting Agenda

**May 27, 2021**

**3:00-4:00pm**

<https://us02web.zoom.us/j/4482480998>

Participants: Michael Cade- EDC, Jennica Machado- Thurston County, Marc Daily- TRPC, Sam Gibboney- Port of Olympia, Paul Walk- Nisqually Tribe, Chris Olin – Nisqually Tribe, Mike Mason – Nisqually Tribe, John Weidenfeller- Thurston PUD, Ruth Clemens – Thurston PUD

## **Agenda:**

- XI. Welcome + Updates
  - d) Include an update on any recent organizational broadband efforts
- XII. Broadband Action Team Update
- XIII. Understanding the Thurston County broadband landscape
  - A) How extensive are partner access/coverage studies? Are additional studies needed?
- XIV. Broadband Funding List
  - A) Additional known funding sources current or upcoming?
- XV. Legislative Update
- XVI. Next steps & follow-up
  - b) Communication with the Community
    - i. How can we educate our community on broadband needs, benefits, and partner efforts to encourage engagement/ participation in future efforts?
  - B) Nisqually Tribe Project Update



# Broadband Stakeholder

## Meeting Agenda

**June 24, 2021**

**3:00-4:00pm**

<https://us02web.zoom.us/j/84658279116>

Participants: Michael Cade- EDC, Jennica Machado- Thurston County, Marc Daily- TRPC, Sam Gibboney- Port of Olympia, Paul Walk- Nisqually Tribe, Chris Olin – Nisqually Tribe, Mike Mason – Nisqually Tribe, John Weidenfeller- Thurston PUD, Julie Parker – Thurston PUD

Guest Attendees: Commissioner EJ Zita – Port of Olympia, Commissioner Bill McGregor– Port of Olympia, Rudy Rudolph – Port of Olympia, Bob Iyall – Nisqually Medicine Creek Enterprise Corporation, Gary Vervalin – Wave Broadband, Kevin Stamey – Wave Broadband

### **Agenda:**

- XVII. Welcome + Introductions
- XVIII. Nisqually ISP Partner Introduction
  - Wave Broadband
- XIX. Nisqually Tribe Open Access Fiber Line Project Update
  - Nisqually Tribe and Thurston PUD update
  - Q & A opportunity
- XX. Next steps & follow-up
  - A) Next meeting:
    - i. Work Session: Mission, Vision, Strategy

# Broadband Stakeholder Meeting Agenda

August 26, 2021

3:00-4:00pm

## Agenda:

- VI. Welcome + Introductions/Updates
- VII. Broadband Action Team Formalization
  - A) Intent, Mission, Strategy
    - i. Intent: Thurston County will be positioned to secure and capture significant resources for building out a broadband network that closes the digital divide.
    - ii. Mission: Ensure access to reliable and quality broadband for all Thurston County citizens and businesses.
    - iii. Strategy
      - 1. Partnerships – foster collaboration to increase planning
      - 2. Plan – identify service gaps and ready projects
      - 3. Fund – we identify all funding sources and maximize our access to
      - 4. Build – networks to meet Thurston County goals that are in alignment with the State's
      - 5. Adopt – support digital equity and inclusion initiatives
  - B) Results
    - i. Examples: Increased local stakeholder engagement, Establishment of public/private partnerships, Improved support of robust entrepreneurial efforts, improved local business recruitment and retention efforts, Increased countywide job and industry growth, Increased access to education and health services
- VIII. BAT Participation
  - A) Who is missing representation within group?
- IX. Discussion/Action Items
  - A) MOU
  - B) Using a unified BAT voice for support letters
- X. Next steps & follow-up
  - A) Next meeting: BAT Activities

## Broadband Action Team

### Meeting Agenda

**September 23, 2021**

**3:00-4:00pm**

### Agenda:

- V. Welcome + Quick Updates
- VI. Extended Partner Updates
  - A) Thurston PUD
  - B) Nisqually Tribe
- VII. Discussion/Action Items
  - A) Final review and approval of Thurston BAT Model: *Attached in email*
  - B) MOU: *Attached in email*
    - i. Review & email requested revisions
  - C) Broadband Construction Labor Shortage: *Paul Walk*
  - D) Low Inventory- Product & Construction Equipment: *Paul Walk*
- VIII. Next steps & follow-up
  - A) Next meeting:

**Broadband Action Team**

**Meeting Agenda**

**October 28, 2021**

**3:00-4:00pm**

**Agenda:**

- VII. Welcome + Quick Updates *(5mins)*
- VIII. BAT support letter discussion *(15mins)*
  - i. How does our BAT make group decisions? (consensus/majority/etc.)
  - ii. What is our approach to providing support letters?
  - iii. How do we address potential conflicts of interest?
- IX. Broadband Project Presentations
  - A) Tenino Telephone *(10mins)*
  - B) Nisqually Tribe *(10mins)*
- X. Discussion/Action Items *(20mins)*
  - A) Decision on two pending support letter requests
  - B) General BAT coordination discussion
    - i. Who can be identified as a broadband project "implementer" in Thurston County?
      - 1. How are we supporting coordination between groups?
    - ii. How do we navigate additional external interest in participating in the Thurston BAT?
- XI. Open Forum
- XII. Next steps & follow-up
  - A) Next meeting:
    - i. Frequency of meetings? November and December meeting reschedule.

## **Broadband Action Team Meeting Agenda**

**January 27, 2022 3:00-4:00pm**

- I. Welcome & Roundtable Updates
- II. Nisqually Tribe Update
- III. Open Forum
- IV. Next steps & follow-up
- A) Next meeting:

## **Broadband Action Team**

### **Meeting Agenda**

February 24, 2022

3:00-4:00pm

Agenda:

I. Welcome & Roundtable Updates

II. Nisqually Tribe Update

III. Communications

A) Does our BAT want to promote work to the community? How?

B) Support outreach and communication of upcoming partner projects

IV. Open Forum

V. Next steps & follow-up

A) Next meeting:

Thurston PUD Broadband Questionnaire

---

Q1 Name, Title, and Organization

Marc Daily, Executive Director

Q2 Which providers are currently serving your community?

Comcast

Q3 Which providers attended your meeting(s)?

Comcast

Q4 How do the mapping results compare with members' actual experiences?

I wasn't terribly surprised, but good to have data.

Q5 Does existing broadband access meet your needs?

Faster speeds are needed

Q6 If it is inadequate, in what ways does it fall short?

Speeds noticeable suffer during peak periods, which has become more prominent throughout the work day as more people are working from home.

Q7 If you have broadband, how do you use it now?

Work and personal.

**Q1 Name, Title, and Organization**

John Widenfeller, General Manager, Thurston PUD

**Q2 Which providers are currently serving your community?**

Comcast

**Q3 Which providers attended your meeting(s)?**

Comcast

**Q4 How do the mapping results compare with members' actual experiences?**

Yes

**Q5 Does existing broadband access meet your needs?**

Yes.. most of the time at our office

**Q6 If it is inadequate, in what ways does it fall short?**

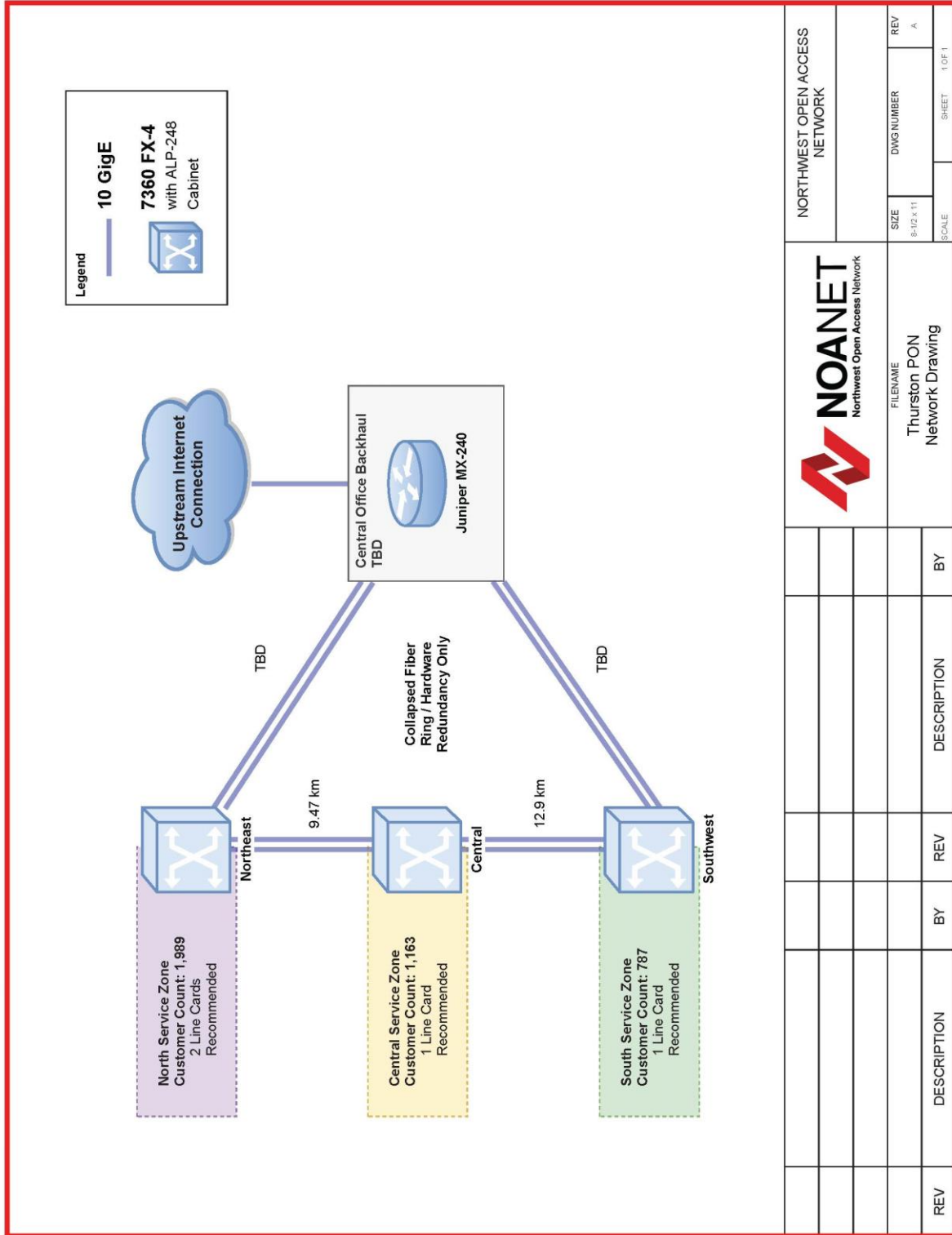
Some outages and speed issues

**Q7 If you have broadband, how do you use it now?**

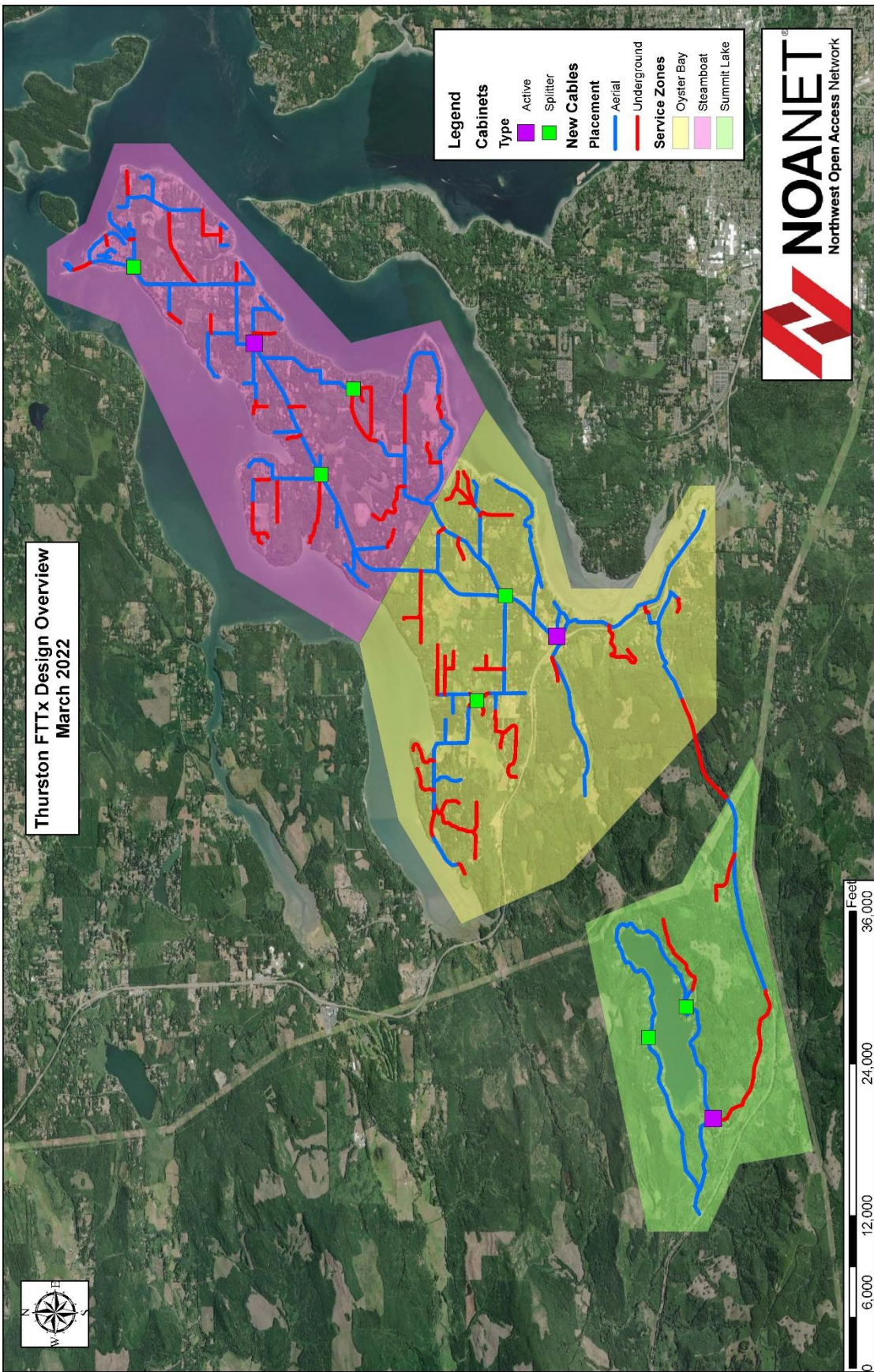
For work



APPENDIX D: PROPOSED NETWORK DESIGN MAPS

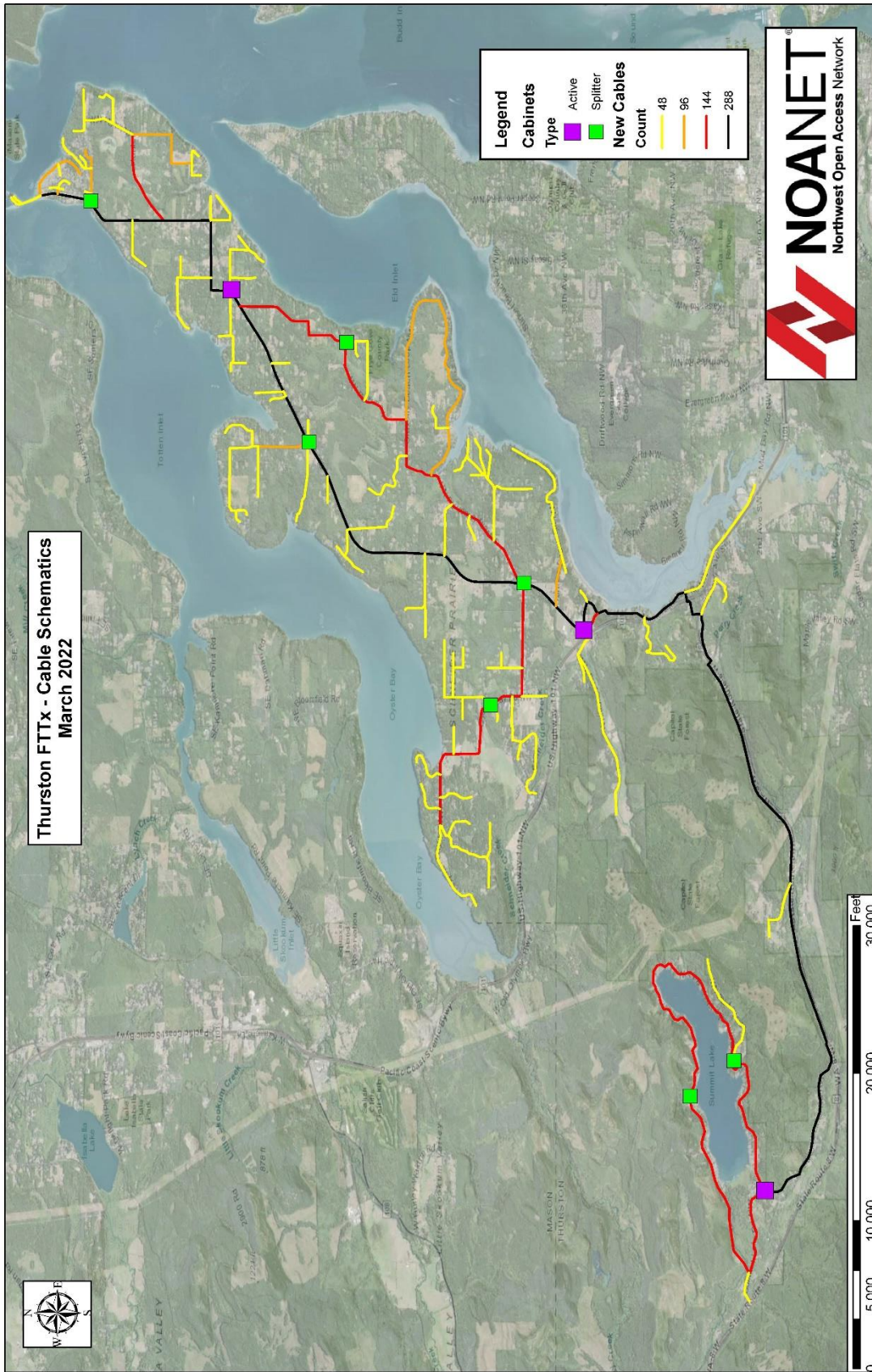


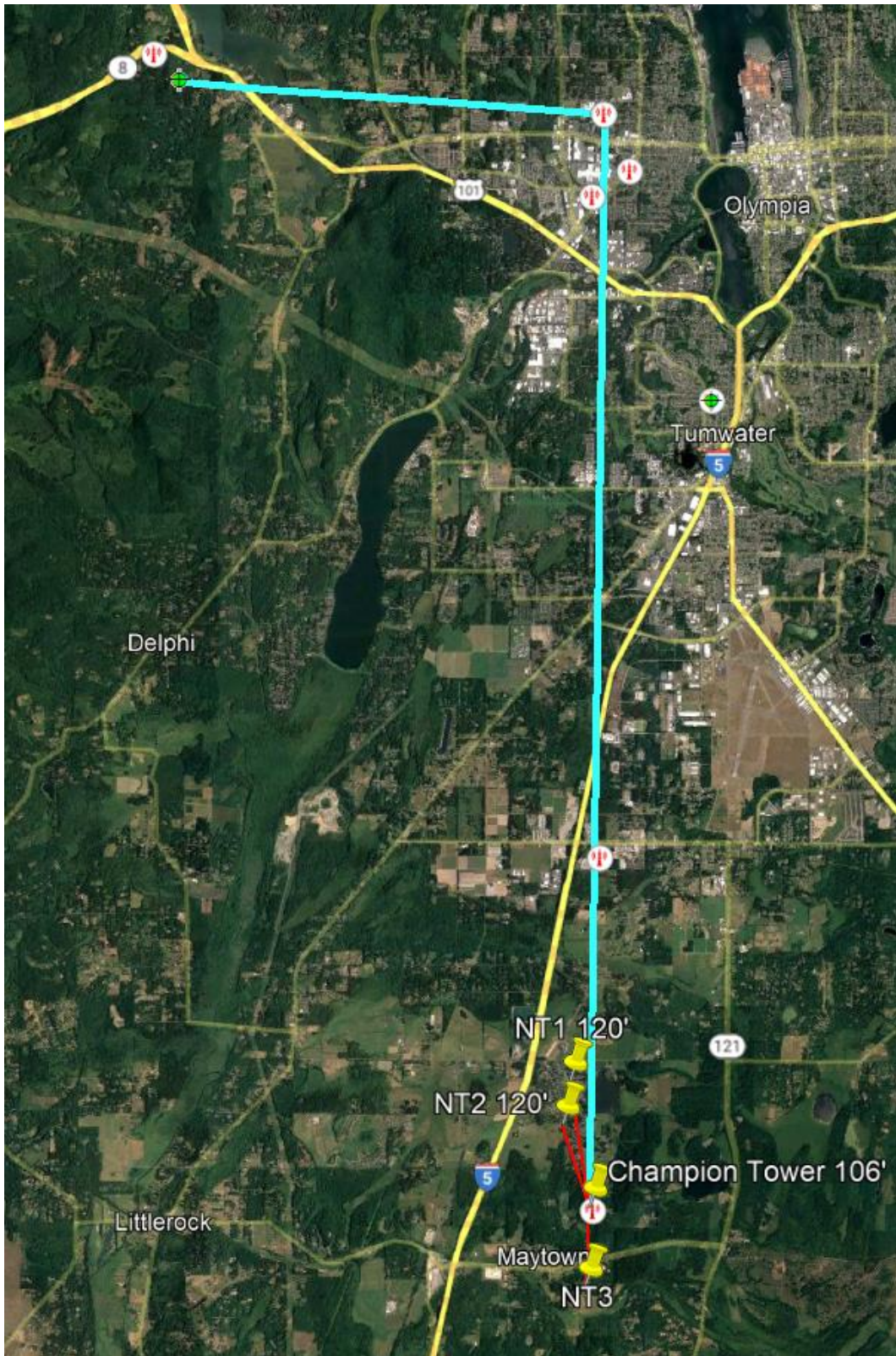
Thurston FTTx Design Overview  
March 2022

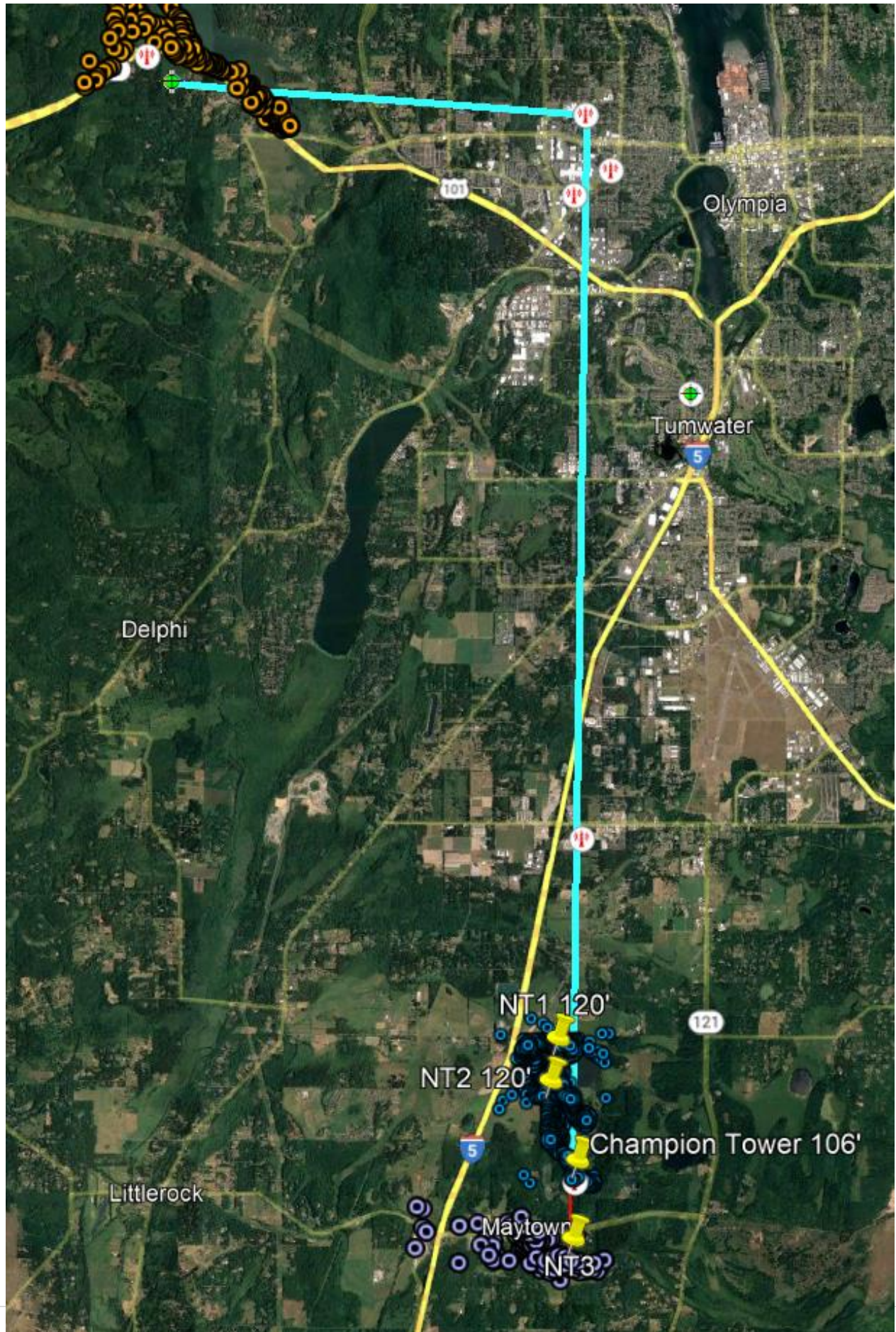


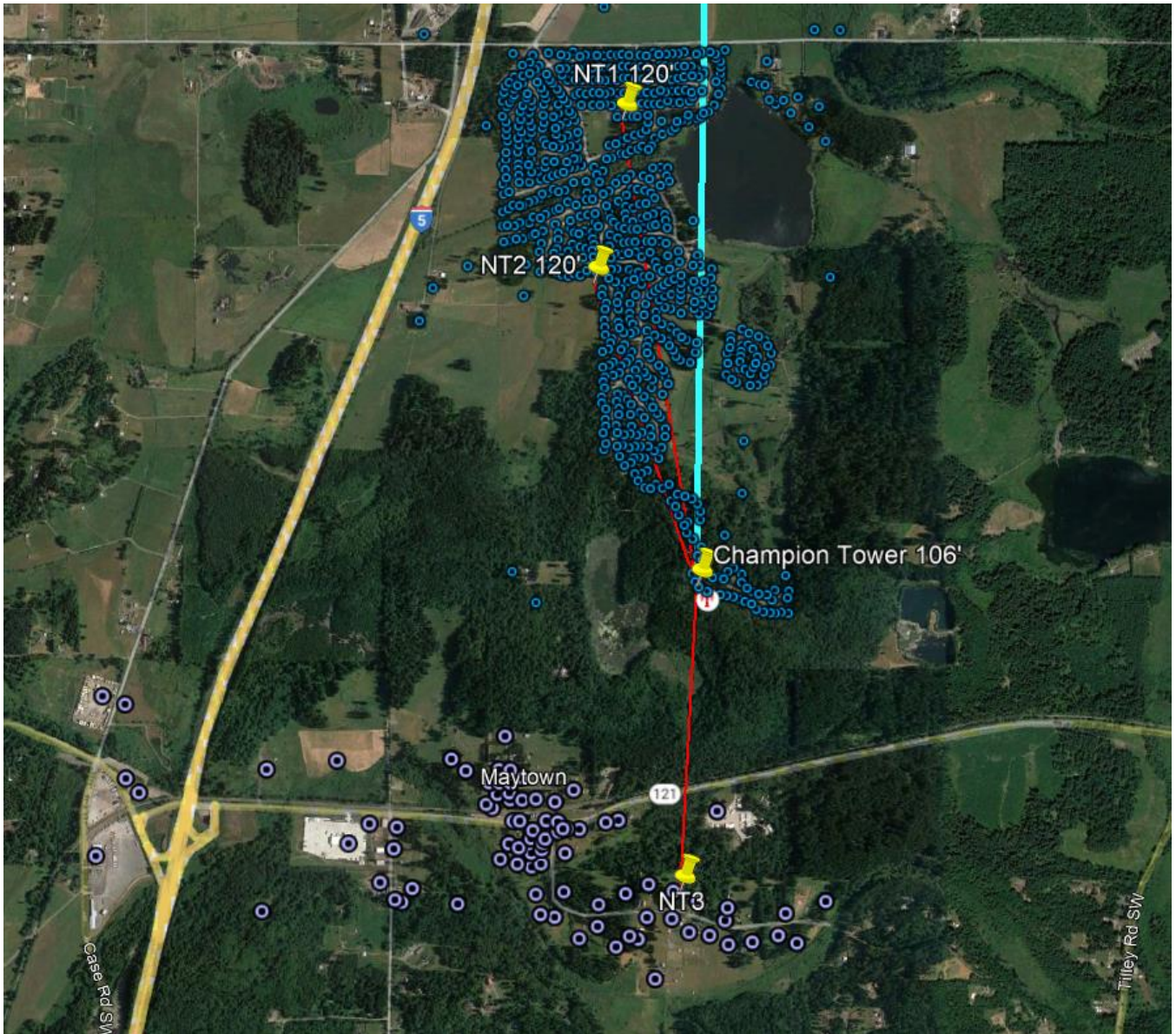
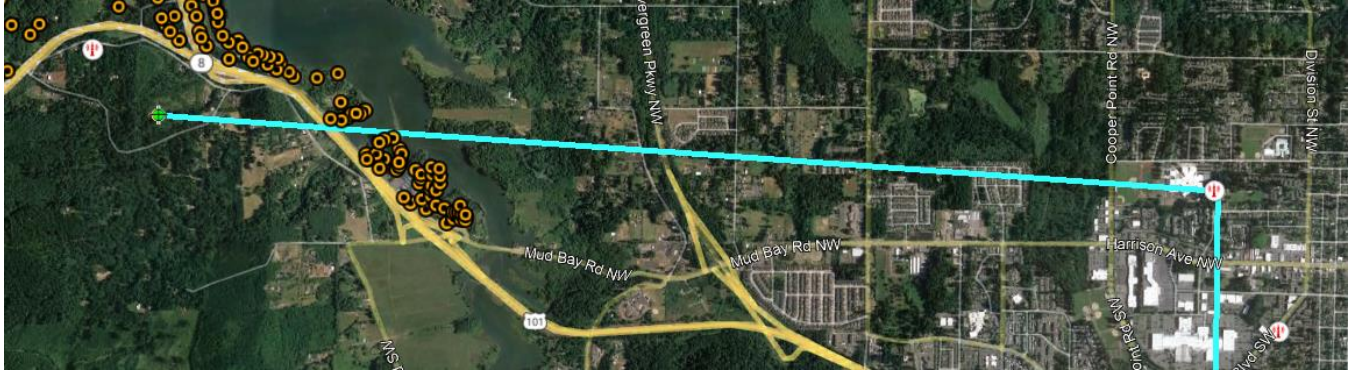
Legend	
<b>Cabinets</b>	
Type	
Active	<span style="color: purple;">■</span>
Splitter	<span style="color: green;">■</span>
<b>New Cables</b>	
Placement	
Aerial	<span style="color: blue;">—</span>
Underground	<span style="color: red;">—</span>
<b>Service Zones</b>	
Oyster Bay	<span style="background-color: #d8bfd8;"> </span>
Steamboat	<span style="background-color: #ffff00;"> </span>
Summit Lake	<span style="background-color: #90ee90;"> </span>

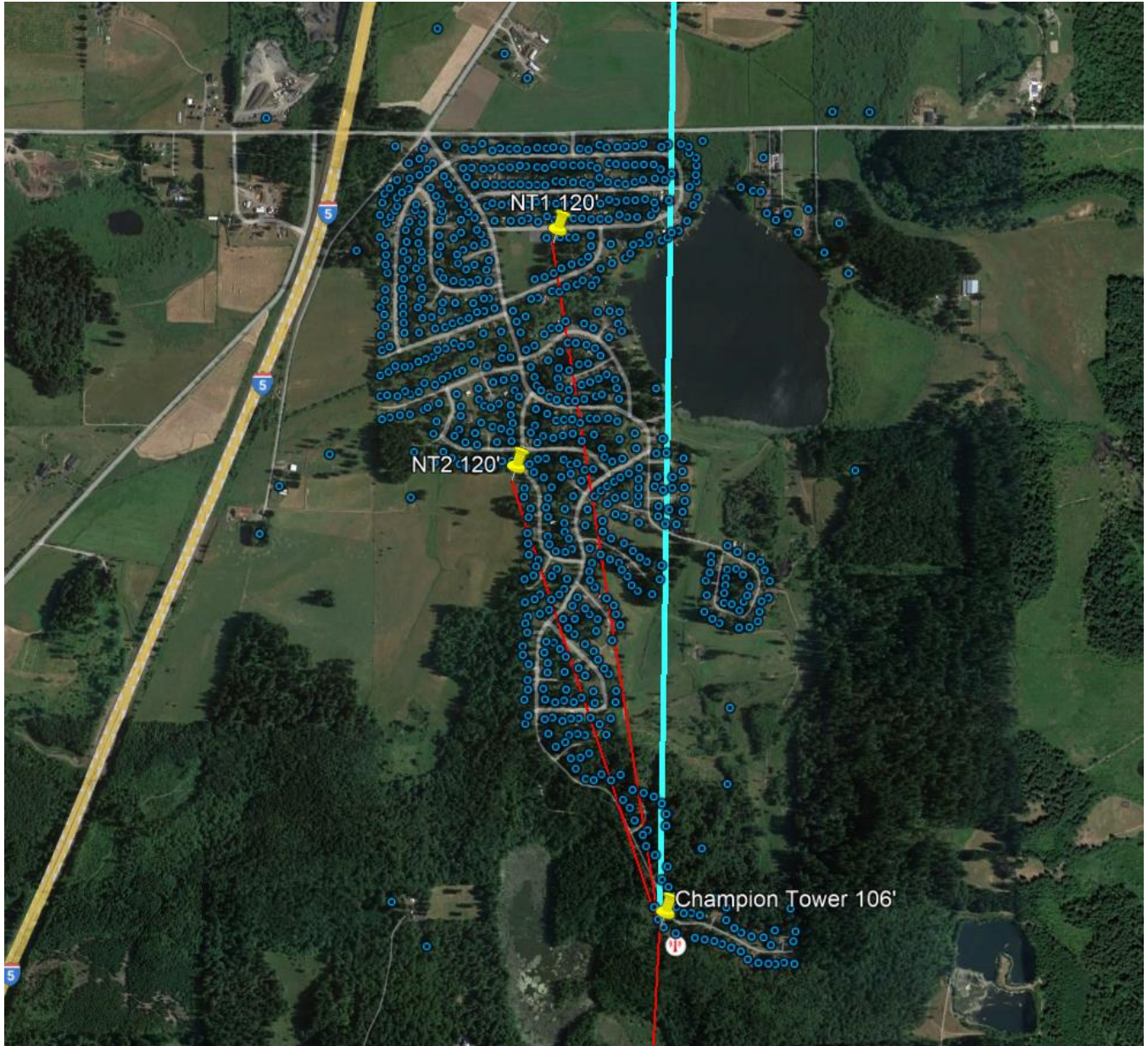


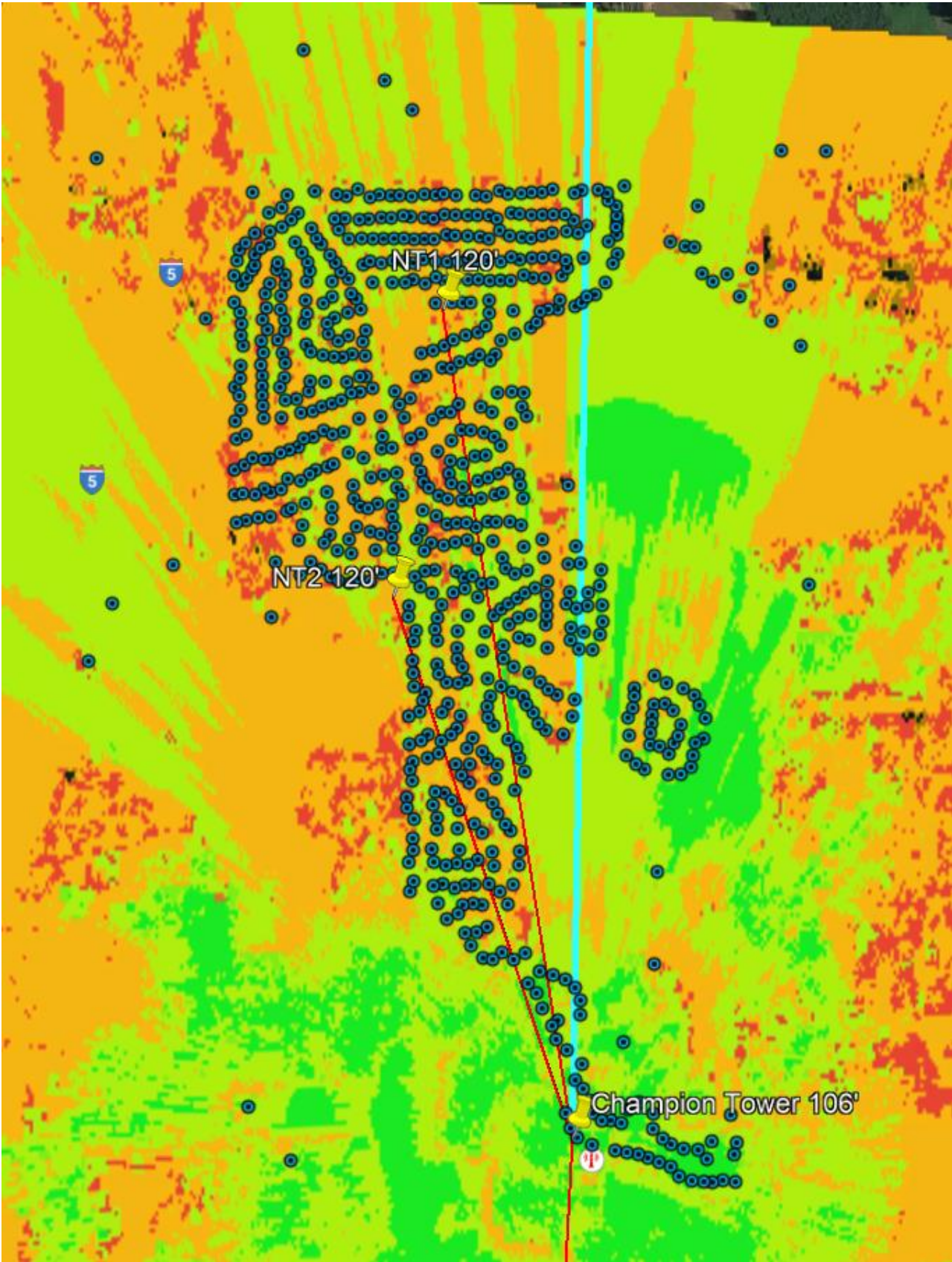




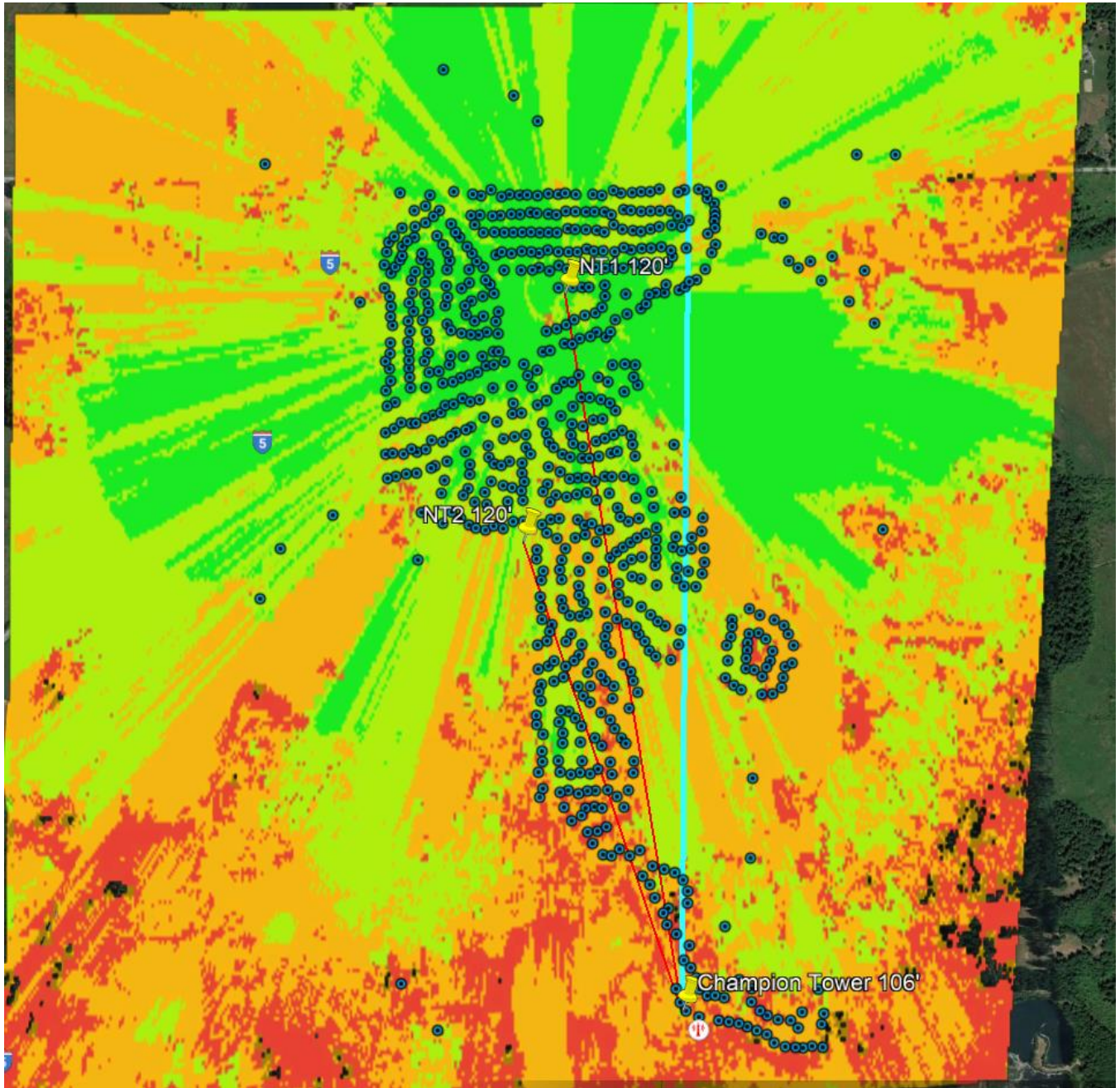


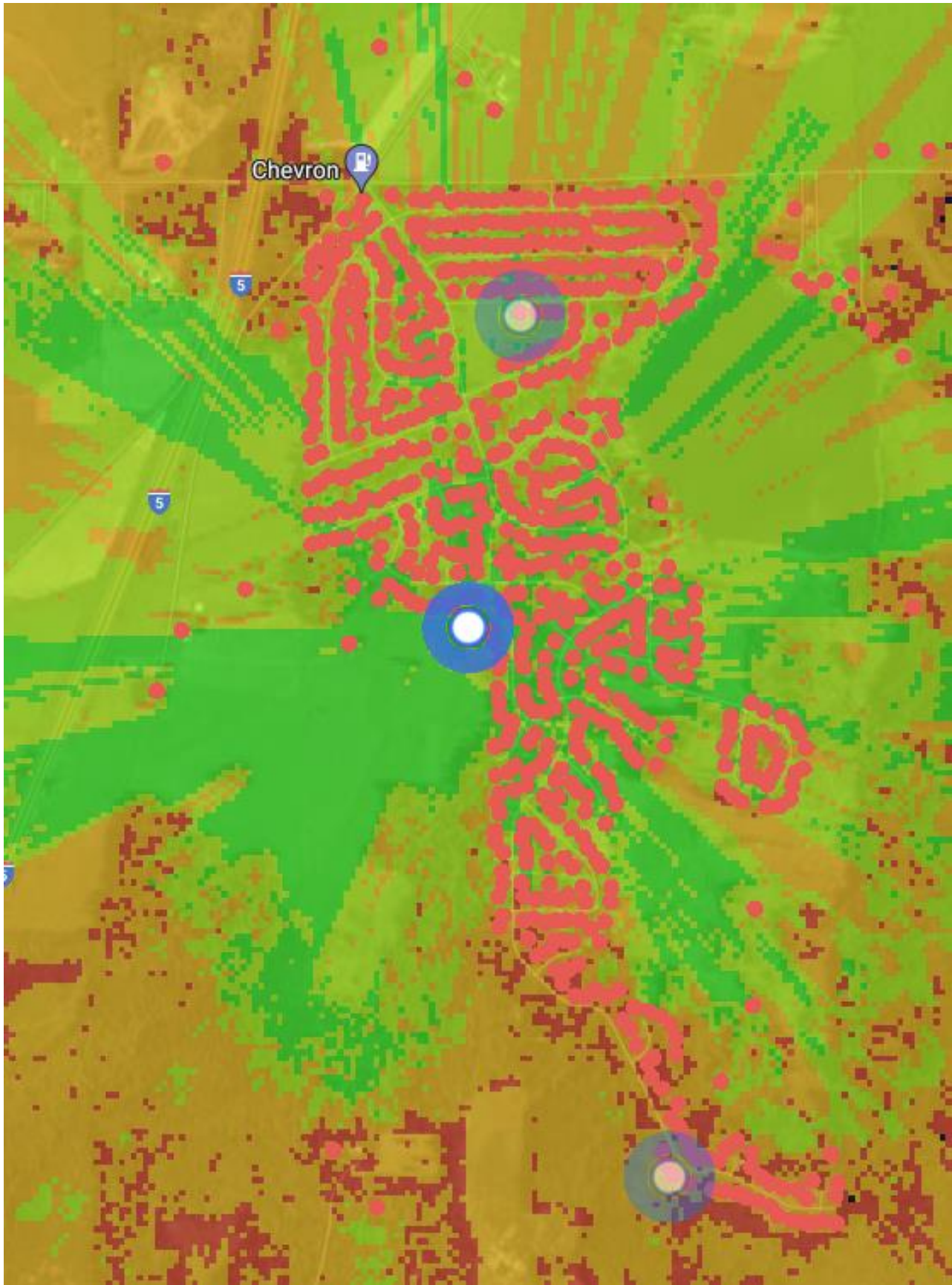


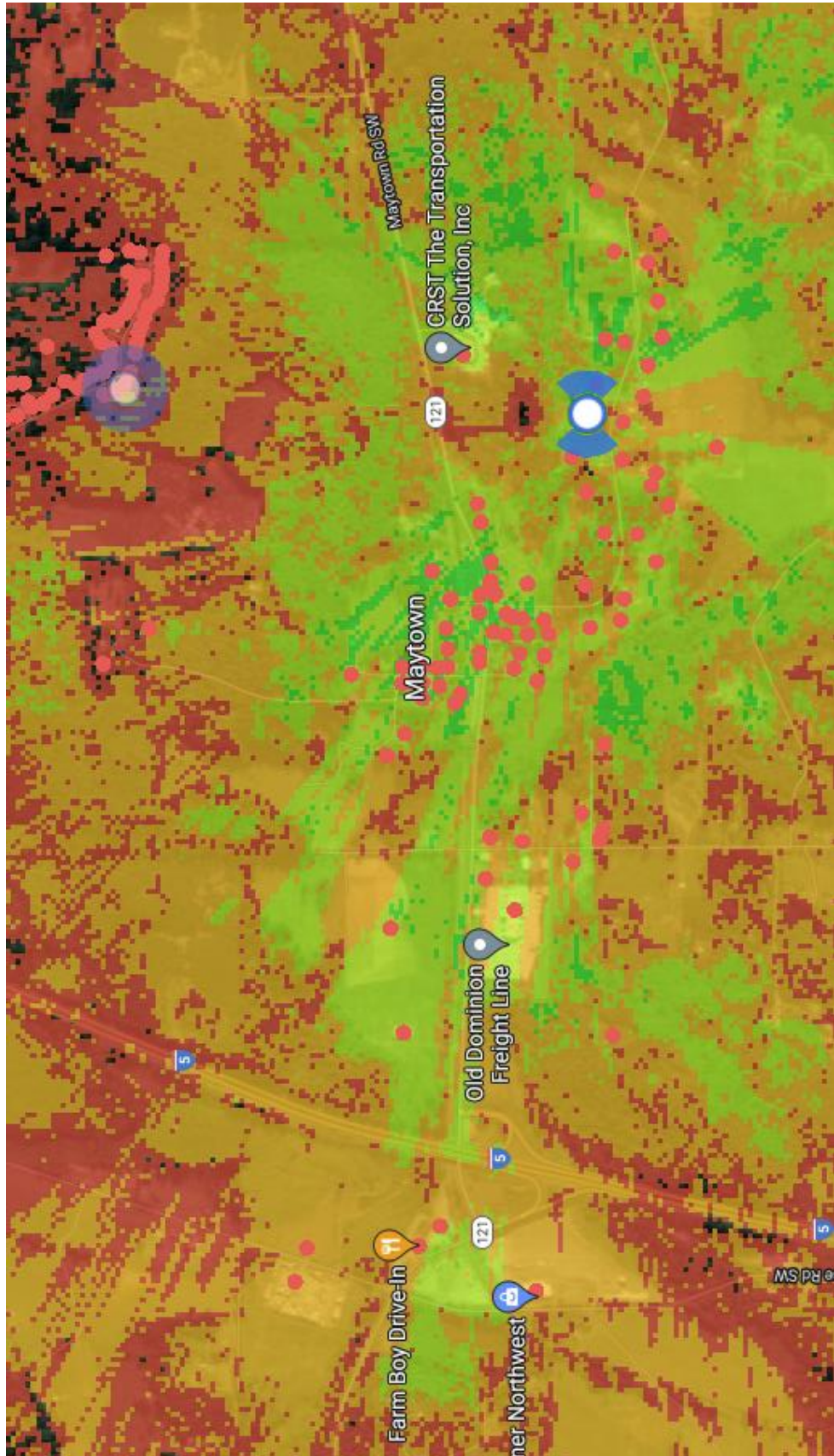


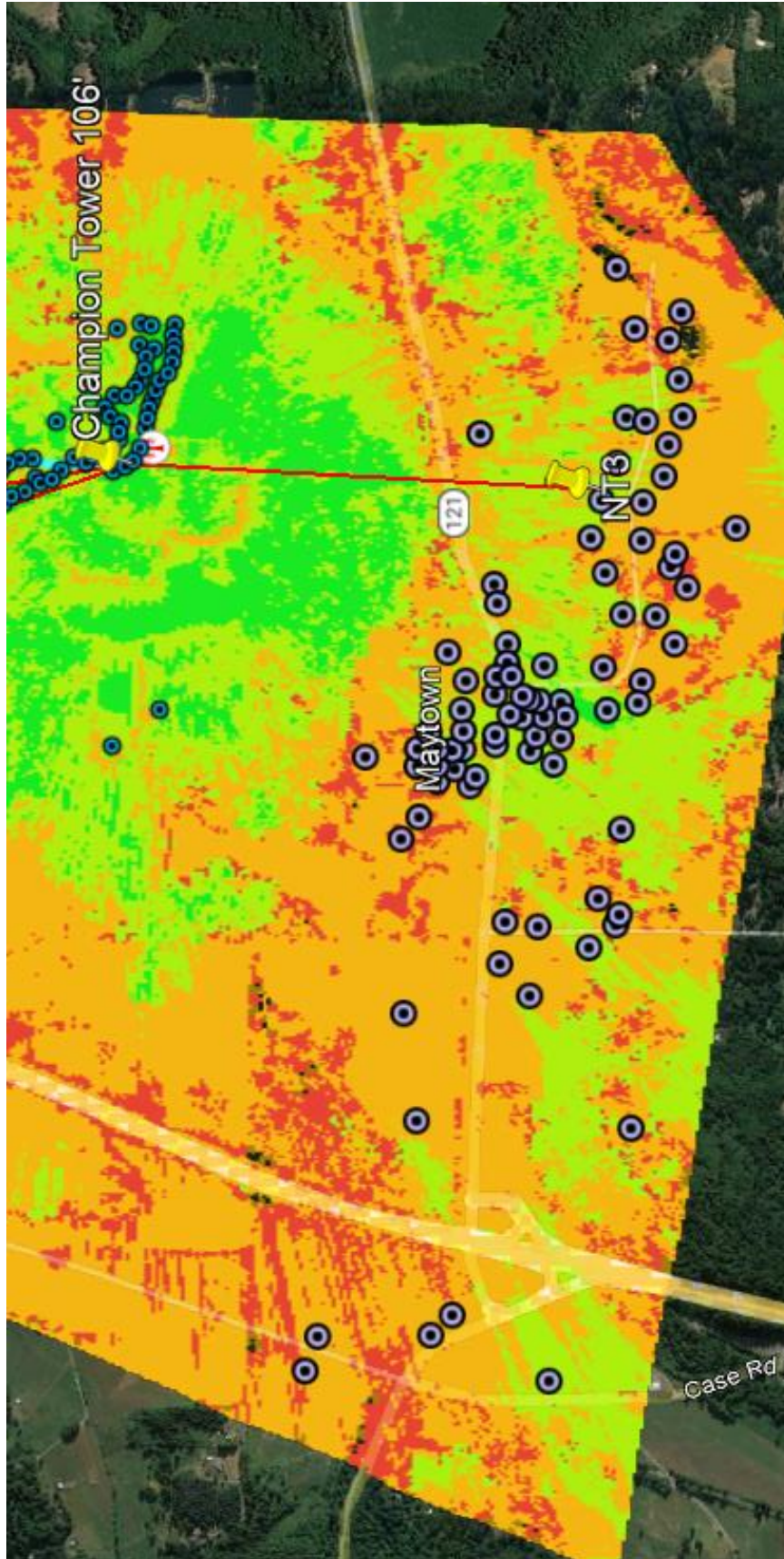












<b>Cash Flow Model</b>																										
	Yr 0	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	Yr 11	Yr 12													
<b>Revenues</b>																										
Residential Recurring	\$	135,299	\$	270,598	\$	405,896	\$	541,195	\$	676,494	\$	708,064	\$	739,633	\$	771,203	\$	802,773	\$	834,343	\$	865,912	\$	897,482		
Residential NRC	\$	57,525	\$	57,525	\$	57,525	\$	57,525	\$	57,525	\$	57,525	\$	57,525	\$	57,525	\$	57,525	\$	57,525	\$	57,525	\$	57,525	\$	57,525
Wireless Recurring	\$	28,471	\$	56,942	\$	85,413	\$	113,884	\$	142,355	\$	142,355	\$	142,355	\$	142,355	\$	142,355	\$	142,355	\$	142,355	\$	142,355	\$	142,355
Wireless NRC	\$	12,105	\$	12,105	\$	12,105	\$	12,105	\$	12,105	\$	12,105	\$	12,105	\$	12,105	\$	12,105	\$	12,105	\$	12,105	\$	12,105	\$	12,105
Business Class Recurring	\$	4,140	\$	8,280	\$	12,420	\$	16,560	\$	20,700	\$	21,790	\$	22,879	\$	23,969	\$	25,059	\$	26,148	\$	27,238	\$	28,328	\$	29,418
Business Class NRC	\$	1,250	\$	1,250	\$	1,250	\$	1,250	\$	1,250	\$	1,250	\$	1,250	\$	1,250	\$	1,250	\$	1,250	\$	1,250	\$	1,250	\$	1,250
High Cap Services Recurring	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-
High Cap Services NRC	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-
3rd Party Network Recurring	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-
4th Party Network NRC	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-
Capital Proceeds	\$	4,142,017	\$	4,075,712	\$	3,091,962	\$	3,039,391	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-
<b>Total Revenues</b>	\$	4,142,017	\$	4,314,501	\$	3,496,661	\$	3,619,900	\$	747,919	\$	915,829	\$	891,360	\$	924,019	\$	956,678	\$	989,338	\$	1,021,997	\$	1,054,657	\$	1,087,316
<b>Operating and Maintenance Expenses</b>																										
Network Operations Expenses	\$	105,787	\$	203,409	\$	306,578	\$	370,877	\$	435,291	\$	439,822	\$	453,017	\$	466,607	\$	480,606	\$	495,024	\$	509,875	\$	525,171	\$	540,867
Sales and Marketing Expenses	\$	305,000	\$	303,700	\$	312,661	\$	321,891	\$	331,398	\$	341,189	\$	351,425	\$	361,968	\$	372,827	\$	384,012	\$	395,532	\$	407,398	\$	420,607
Business Administration Expenses	\$	9,500	\$	9,500	\$	9,500	\$	9,500	\$	9,500	\$	9,500	\$	9,785	\$	10,079	\$	10,381	\$	10,692	\$	11,013	\$	11,343	\$	11,683
3rd Party Network Expenses Recurring	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-
3rd Party Network Expenses NRC	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-
<b>O&amp;M Total</b>	\$	420,287	\$	516,609	\$	628,739	\$	702,268	\$	776,189	\$	790,512	\$	814,227	\$	838,654	\$	863,814	\$	889,728	\$	916,420	\$	943,912	\$	972,231
<b>Capital Expenditures</b>																										
Minimum Viable Product	\$	93,760	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-
Wireless Service Zones	\$	983,750	\$	1,011,204	\$	27,454	\$	27,454	\$	27,454	\$	27,454	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-
PON Service Zones 1 through 3	\$	52,570	\$	52,570	\$	52,570	\$	52,570	\$	52,570	\$	52,570	\$	52,570	\$	52,570	\$	52,570	\$	52,570	\$	52,570	\$	52,570	\$	52,570
Service Zones 1 through 3	\$	3,011,937	\$	3,011,937	\$	3,011,937	\$	3,011,937	\$	3,011,937	\$	3,011,937	\$	3,011,937	\$	3,011,937	\$	3,011,937	\$	3,011,937	\$	3,011,937	\$	3,011,937	\$	3,011,937
Renewal and Replacement / Equipment	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-
Infrastructure Repair / Outside Plant	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-
Debt Services	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-
<b>Total Capital</b>	\$	4,142,017	\$	4,162,319	\$	3,225,487	\$	3,175,825	\$	170,326	\$	146,434	\$	150,249	\$	154,337	\$	158,720	\$	163,422	\$	168,468	\$	173,888	\$	179,800
<b>Total O&amp;M and Capital</b>	\$	4,142,017	\$	4,582,606	\$	3,742,096	\$	3,804,564	\$	869,266	\$	946,515	\$	936,945	\$	964,476	\$	992,991	\$	1,022,533	\$	1,053,150	\$	1,084,888	\$	1,117,800
<b>Net Cash</b>	\$	-	\$	(268,104)	\$	(243,439)	\$	(184,663)	\$	(121,347)	\$	(30,686)	\$	(45,586)	\$	(40,457)	\$	(36,312)	\$	(31,152)	\$	(26,762)	\$	(22,223)	\$	(17,684)
													<b>12 Year Cash Flow Total</b>		<b>\$ (1,095,654)</b>											

Revenue Model Internal Operations									
		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6 +		
<b>Residential:</b>	<b>Customers</b>	767							
	<b>Rate</b>	\$49							
	<b>Rolling Annual Take Rate :</b>	20%	20%	20%	20%	20%	2%		
	<i>New Residential</i>	153	153	153	153	153	61		
	<i>NRC Revenue per subscriber</i>	\$250	\$250	\$250	\$250	\$250	\$250		
	<i>Revenue</i>	\$128,549	\$128,549	\$128,549	\$128,549	\$128,549	\$51,420		
	<b>Rolling Annual Take Rate :</b>	20%	20%	20%	20%	20%	2%		
<b>Wireless:</b>	<b>Customers</b>	161							
	<b>Rate</b>	\$49							
	<b>Rolling Annual Take Rate :</b>	20%	20%	20%	20%	20%	2%		
	<i>New Residential</i>	32	32	32	32	32	0		
	<i>NRC Revenue per subscriber</i>	\$250	\$250	\$250	\$250	\$250	\$250		
	<i>Revenue</i>	\$27,051	\$27,051	\$27,051	\$27,051	\$27,051	\$0		
	<b>Rolling Annual Take Rate :</b>	20%	20%	20%	20%	20%	2%		
<b>Commercial:</b>	<b>Customers</b>	16							
	<b>Rate</b>	\$69							
	<b>Rolling Annual Take Rate :</b>	20%	20%	20%	20%	20%	2%		
	<i>New Business</i>	3	3	3	3	3	2		
	<i>NRC Revenue per subscriber</i>	\$250	\$250	\$250	\$250	\$250	\$250		
	<i>Revenue</i>	\$3,450	\$3,450	\$3,450	\$3,450	\$3,450	\$1,621		
	<b>Rolling Annual Take Rate :</b>	20%	20%	20%	20%	20%	0%		
<b>Commercial Fiber:</b>	<b>Customers</b>	1							
	<b>Rate</b>	\$99							
	<b>Rolling Annual Take Rate :</b>	20%	20%	20%	20%	20%	0%		
	<i>New Business</i>	0	0	0	0	0	0		
	<i>NRC Revenue per subscriber</i>	\$250	\$250	\$250	\$250	\$250	\$250		
	<i>Revenue</i>	\$0	\$0	\$0	\$0	\$0	\$0		
	<b>Rolling Annual Take Rate :</b>	20%	20%	20%	20%	20%	0%		
<b>High Cap Fiber:</b>	<b>Customers</b>	1							
	<b>Rate</b>	\$450							
	<b>Rolling Annual Take Rate :</b>	20%	20%	20%	20%	20%	0%		
	<i>New Business</i>	0	0	1	0	0	0		
	<i>NRC Revenue per subscriber</i>	\$500	\$500	\$500	\$500	\$500	\$500		
	<i>Revenue</i>	\$0	\$0	\$5,900	\$0	\$0	\$0		
	<b>Rolling Annual Take Rate :</b>	20%	20%	20%	20%	20%	0%		
Premises Activated	Total	3,835						Remaining Customers	
PON Residential		94						Customers	
PON Commercial		792						767	
Wireless Residential		15						19	
Wireless Commercial								158	
								3	
								3,068	
								75	
								634	
								12	

## Operations and Expense Model

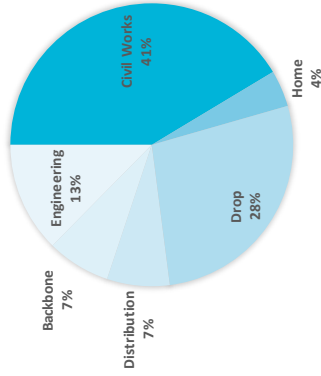
LINE ITEM DESCRIPTION	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6+
<b>Operating Expenses</b>						
Network Operating Expense	\$105,786.52	\$203,408.82	\$306,577.52	\$370,877.25	\$435,291.15	\$439,822.29
NOC: Network Support Systems	\$ 32,915.52	\$ 65,831.04	\$ 99,744.00	\$ 102,237.60	\$ 104,793.54	\$ 107,413.38
Vendor : Technical Support Plans	\$ 17,871.00	\$ 18,317.78	\$ 18,775.72	\$ 19,245.11	\$ 19,726.24	\$ 20,219.40
PUD: Network Facilities, Installation and Engineer, Salary	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Contractor: Support and Maintenance	\$ 42,000.00	\$ 43,260.00	\$ 44,557.80	\$ 45,894.53	\$ 47,271.37	\$ 48,689.51
PUD: Upstream Internet	\$ 4,500.00	\$ 7,500.00	\$ 15,000.00	\$ 15,000.00	\$ 15,000.00	\$ 15,000.00
PUD: OSS/BSS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
PUD: Warehouse, Procurement, Materials Management	\$ 8,500.00	\$ 8,500.00	\$ 8,500.00	\$ 8,500.00	\$ 8,500.00	\$ 8,500.00
PUD: Pole Attachment Fees	\$ -	\$ 60,000.00	\$ 120,000.00	\$ 180,000.00	\$ 240,000.00	\$ 240,000.00
<b>Sales and Marketing</b>	<b>\$305,000.00</b>	<b>\$303,700.00</b>	<b>\$312,661.00</b>	<b>\$321,890.83</b>	<b>\$331,397.55</b>	<b>\$341,189.48</b>
PUD: Broadband Manager, Salary	\$ 200,000.00	\$ 206,000.00	\$ 212,180.00	\$ 218,545.40	\$ 225,101.76	\$ 231,854.81
PUD: Customer Acquisition Team	\$ 90,000.00	\$ 92,700.00	\$ 95,481.00	\$ 98,345.43	\$ 101,295.79	\$ 104,334.67
PUD: Marketing, Branding, and Collateral / Demonstration Center	\$ 15,000.00	\$ 5,000.00	\$ 5,000.00	\$ 5,000.00	\$ 5,000.00	\$ 5,000.00
<b>Business Administration</b>	<b>\$ 9,500.00</b>	<b>\$ 9,500.00</b>	<b>\$ 9,500.00</b>	<b>\$ 9,500.00</b>	<b>\$ 9,500.00</b>	<b>\$ 9,500.00</b>
PUD: General Office	\$ 4,500.00	\$ 4,500.00	\$ 4,500.00	\$ 4,500.00	\$ 4,500.00	\$ 4,500.00
PUD: Churn, Billing Disputes, Non-Payment, Low Income Programs	\$ 5,000.00	\$ 5,000.00	\$ 5,000.00	\$ 5,000.00	\$ 5,000.00	\$ 5,000.00
PUD: Legal and Administrative Fees	\$ 21,500.00	\$ 22,145.00	\$ 22,809.35	\$ 23,493.63	\$ 24,198.44	\$ 24,924.39

<b>Network Operations Summary Report</b>																				
	Devices	Per Month	Per Year																	
MVP / Core	1	\$76.00	\$2,412.00																	
PON	3	\$76.00	\$2,736.00																	
Wireless Radios	8	\$76.00	\$7,296.00																	
CPE Business	1	\$30.50	\$366.00																	
CPE	16	\$6.50	\$1,248.00																	
CPE NBD	767	\$3.00	\$27,612.00																	
Management Fee	12	\$1,500.00	\$18,000.00																	
Tower Space Renta	12	\$2,100.00	\$25,200.00																	
COS	0	\$1,500.00	\$0.00																	
Total			<u>\$84,870.00</u>																	
Upstream Internet																				
Per Meg	1,000	\$0.25	\$4,500.00																	
	2,000	\$0.25	\$7,500.00																	
	10,000	\$0.25	\$31,500.00																	
	40,000	\$0.25	\$121,500.00																	
<b>Network Technical Support Plans</b>																				
IXR Support-Nokia			Annual																	
OLT,ONT, AMS Support			\$7,869.00																	
Total			<u>\$10,002.00</u>																	
			<u>\$17,871.00</u>																	



Thurston Cost Sheet

	HP	HA	Total	%
Civil Works	\$4,986,200.00	\$0.00	\$4,986,200.00	41%
Home	\$0.00	\$502,912.00	\$502,912.00	4%
Drop	\$0.00	\$3,300,360.00	\$3,300,360.00	27%
Distribution	\$863,535.00	\$0.00	\$863,535.00	7%
Backbone	\$875,526.00	\$0.00	\$875,526.00	7%
Engineering	\$1,176,920.68	\$342,294.48	\$1,519,215.16	13%
<b>Totals</b>	<b>\$7,902,181.68</b>	<b>\$4,145,566.48</b>	<b>\$12,047,748.16</b>	



HP/HA

Calculated Cost

	Material Cost	Labor Cost	Total	Volume	Total Cost	HP/HA
Civil Works	\$1.00	\$34.25	\$35.25	20,000	\$705,000.00	HP
Civil Works	\$1.00	\$9.00	\$10.00	30,000	\$300,000.00	HP
Civil Works	\$1.00	\$15.50	\$16.50	140,000	\$2,310,000.00	HP
Civil Works	\$0.00	\$2.00	\$2.00	100,000	\$200,000.00	HP
Civil Works	\$0.35	\$3.15	\$3.50	300,000	\$1,050,000.00	HP
Civil Works	\$0.00	\$180.00	\$180.00	2,340	\$421,200.00	HP
Home	\$200.00	\$120.00	\$320.00	1,572	\$502,912.00	HA
Drop	\$400.00	\$1,700.00	\$2,100.00	1,572	\$3,300,360.00	HA
Distribution	\$350.00	\$375.00	\$725.00	655	\$474,875.00	HP
Distribution	\$2,750.00	\$2,250.00	\$5,000.00	7	\$35,000.00	HP
Distribution	\$0.00	\$11,000.00	\$11,000.00	3	\$33,000.00	HP
Distribution	\$460.00	\$532.00	\$992.00	80	\$79,360.00	HP
Distribution	\$460.00	\$550.00	\$1,010.00	200	\$202,000.00	HP
Distribution	\$0.00	\$30.00	\$30.00	1,310	\$39,300.00	HP
Backbone	\$0.68	\$0.00	\$0.68	220,000	\$149,600.00	HP
Backbone	\$0.78	\$0.00	\$0.78	40,000	\$31,200.00	HP
Backbone	\$1.17	\$0.00	\$1.17	100,000	\$117,000.00	HP
Backbone	\$2.00	\$0.00	\$2.00	105,000	\$210,000.00	HP
Backbone	\$845.00	\$750.00	\$1,595.00	100	\$159,500.00	HP
Backbone	\$460.00	\$532.00	\$992.00	103	\$102,176.00	HP
Backbone	\$0.00	\$30.00	\$30.00	3,535	\$106,050.00	HP

### Calculation Information

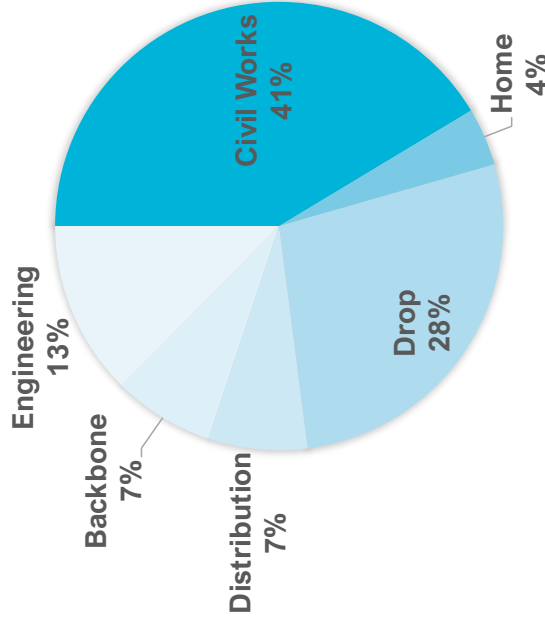
Area Name	Thurston FTTx March 2022
Design Rules	Thurston PUD Design 2022
Number of Homes Activated	1179
Number of Homes Passed	3929
Number of Active Cabinets	1
Overall Adoption Rate	30%
Activated # P2P Customers	N/A
Household Density (hh/sqkm)	N/A

### Results

Total Cost of Project	\$12,047,748.16
Total Cost of Backbone	\$7,902,181.68
Total Cost of Activation	\$4,145,566.48
Backbone Cost per Home Passed	\$2,011.25
Backbone Cost per Home Activate	\$3,090.40
Activation Cost per Home	\$426.67
Average Cost per Home Activated	\$10,221.22
Total Expected Revenue (12m)	\$0.00
PON Monthly Revenue	\$0.00
P2P Monthly Revenue	\$0.00

### Cost Breakdown

	HP	HA	Total	%
Civil Works	\$4,986,200.00	\$0.00	\$4,986,200.00	41%
Home	\$0.00	\$502,912.00	\$502,912.00	4%
Drop	\$0.00	\$3,300,360.00	\$3,300,360.00	27%
Distribution	\$863,535.00	\$0.00	\$863,535.00	7%
Backbone	\$875,526.00	\$0.00	\$875,526.00	7%
Engineering	\$1,176,920.68	\$342,294.48	\$1,519,215.16	13%
<b>Total Cost</b>	<b>\$7,902,181.68</b>	<b>\$4,145,566.48</b>	<b>\$12,047,748.16</b>	<b>100%</b>



## Equipment Summary

Equipment Summary					
<b>ISAM FX OLT</b>					
Part Number	MNEM	Description	Item Price	QTY	Extended Price
<b>FX-4 Shelf Starter Kit</b>	<b>Kit</b>	<b>Redundant FX-4/FANT-H Starter Kit w/ 16-port XGS PON Card for cabinet</b>	<b>\$20,000.00</b>	<b>3</b>	<b>\$60,000.00</b>
3FE74981AA	FWLT-C	ISAM FX 16port Multi-PON Line board	\$10,500.00	0	\$0.00
<b>Additional FX Line Cards and PON Optics</b>					
3FE47581AD	MPM	XGS-PON/GPON MPM B+ (28 dBm), I-temp	\$399.00	48	\$19,152.00
<b>Additional Uplink Optics</b>					
3FE62600AA	SFP+	Pluggable Optical Module, 10GE LR SM 1310nm, -40°C to +85°C, Duplex LC connector, 10km (11dB)	\$99.00	1	\$99.00
3FE65831AA	10GBase-ER	SFP+ Pluggable Optical Module, 10GE ER SM 1550nm, -40°C to +85°C, Duplex LC connector, 40km (11dB)	\$225.00	2	\$450.00
3FE65832AA	SFP+	SFP+ Pluggable Optical Module, 10GE ZR SM 1550nm, -40°C to +85°C, Duplex LC connector, 80km (24dB)	\$490.00	4	\$1,960.00
<b>Cabinets</b>					
Part Number	MNEM	Description	Item Price	QTY	Extended Price
<b>Standard FX-4 Cabinet Kit</b>					
3MV00579AA		ALP-248, 7360 FX-4, W2E1, 576 dist, Tan kit. Eack kit includes	<b>\$19,500.00</b>	<b>3</b>	<b>\$58,500.00</b>
		(1) ALP-248, 7360 FX-4, W2E1		1	
		(1) 7360 FX-4 Shelf		1	
		(1) Door Mounted Heat exchanger		1	
		(1) Mini Power System		1	
		(2) 1000W power module		2	
		(1) AC Load center, 60A main, 30A SPD, 2x15A AC receptacles		1	
		(1) Battery Base incl fan, 60A brkr, 6AWG battery cables, temp probe		1	
		(1) 144 back to back fiber distribution panel		1	
<b>Additional Cabinet Items</b>					
3EM21145AA		Batt heater pad	\$525.00	3	\$1,575.00
3EM21496AB		ALP-248 Cabinet concrete anchor template kit	\$825.00	3	\$2,475.00
1AF21968AAAA		Batteries	\$4,500.00	3	\$13,500.00
<b>ONTs</b>					
Part Number	MNEM	Description	Item Price	QTY	Extended Price
3FE55691AA	G-240G-A	Hardened 2 POTS, 4GE, fits universal Enclosure	\$89.00	500	\$44,500.00
3FE48114AB	XS-250X-A	XGSPON SFU 2POTS,4x 1GE,1x 10GE,Nokia logo	\$205.00	0	\$0.00
<b>Router</b>					
Item		Description	Item Price	QTY	Extended Price
Juniper MX-240		Head-End Router for aggregating internet traffic (1-year support included)	\$93,759.80	1	\$93,759.80
<b>Miscellaneous Items</b>					
Item		Description	Item Price	QTY	Extended Price
Misc. Items		Jumpers, fuses, cables, optic attenuators, optics, etc.	\$10,000.00	1	\$10,000.00
<b>Network Management Server</b>					
Item		Description	Item Price	QTY	Extended Price
Hardware (Physical Server)		A physical server to run the network management server software.	\$10,000.00	1	\$10,000.00
Software (OS, 5520/5529 AMS, misc.)		Software required to run the Network Management Server, software includes operating system licensing, Nokia AMS and other miscellaneous server functions like DNS, speedtest, etc.	\$30,000.00	1	\$30,000.00
<b>Total for PON and ONT Equipment</b>					<b>\$345,970.80</b>
Total for PON Only x 3 sites					\$157,711.00
Total for PON x 1 site					\$52,570.33
Total for Router					\$93,759.80

Backbone		Capital	Labor
Wireless Back Haul		\$500,000.00	\$87,500.00
Tower and Facilities		\$900,000.00	\$0.00
Champion Tower Upgrade		\$100,000.00	\$0.00
CBRS Radios		\$180,000.00	\$200,000.00
	Sub-Total	\$1,680,000.00	\$287,500.00
		Total	\$1,967,500.00
Service Connection		Capital	Labor
Customer Radio		\$342.00	\$225.00
	Sub-Total	\$342.00	\$225.00
		Total	\$567.00
Installs		Cost	
Cost Installs Per Year		\$567.00	
Installs Per Year		32	
	Total	\$18,302.76	

Link sent to John Weidenfeller with this report for completion.