



City Hall remains closed during Governor Inslee’s “Healthy Washington - Recovery Roadmap” order, a consequence of the Covid-19 pandemic. The public is invited to attend the meeting virtually by using the ZOOM Meeting access information below -

Please click the link below to join the webinar:

<https://sumnerwa-gov.zoom.us/j/89237240670>

Or One tap mobile : US: +12532158782,,89237240670# or +13462487799,,89237240670#

Or Telephone: 1 253 215 8782

Webinar ID: 892 3724 0670

CALL TO ORDER

Roll Call: Bitetto, Brown, Cole, Hochstatter, Neuman, Reed and Stuard

REGULAR BUSINESS

1. Fiber Study
2. White River Project Update
3. Parks Master Plan (Seibenthaler Park and the old Bennett property)

CITY ADMINISTRATOR REPORT

AGENDA SETTING

1. Council Meeting Agenda Calendar
2. Council Committee Meeting Calendar

EXECUTIVE SESSION

ADJOURNMENT

This meeting is accessible to persons with disabilities. For individuals who may require special accommodations, please contact the City Clerk at (253) 299-5590, 24 hours in advance.

SUBJECT: Fiber Study

CATEGORY: Information Only

BUDGET IMPACT:

Expenditure Required: None

Within Budget Allocation: N/A

ATTACHMENTS:

1. Fiber Study Council Presentation
 2. City of Sumner Fiber Optics Infrastructure Study
-

STAFF CONTACT: Brian Cunningham, IT Manager

SUMMARY BACKGROUND:

The City has contracted with DunnCo Diversified Services LLC to provide a Fiber Optics Infrastructure Study. The presentation will inform City Council about fiber optic technology as well as review its various construction methods. The study reviewed existing fiber technology in neighboring jurisdictions as well as school districts. Council will also be provided with a planned fiber network in Sumner as well as DunnCo's construction cost estimates to build the network. Staff will be looking for some direction from the Council to decide if establishing a fiber network in Sumner is something that they feel is a priority and should be given budgetary consideration in the upcoming biennium.

The consultant has provided printed copies of the study which will be in your council box at City Hall.

COUNCIL COMMITTEE/STUDY SESSION: MEETING/STUDY SESSION DATE: 2/28/2022 COMMITTEE RECOMMENDATION:
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STAFF RECOMMENDATIONS/MOTION:

This is informational only.

SUMNER FIBER OPTICS INFRASTRUCTURE STUDY

PREPARED FOR THE SUMNER CITY COUNCIL

SUMMARY

- City IT and Public Works Departments teamed to investigate the feasibility of constructing a fiber optic data network to serve the City of Sumner.
- This report is prepared to inform the City Council on:
 - Fiber Optic Technology
 - Fiber Network Construction Methods
 - Sumner Neighbor Cities and School Districts' Fiber Optic Operations
 - Planned Fiber Network in Sumner
 - Construction Cost Estimates to Build the Network
 - Recommendations and Conclusions

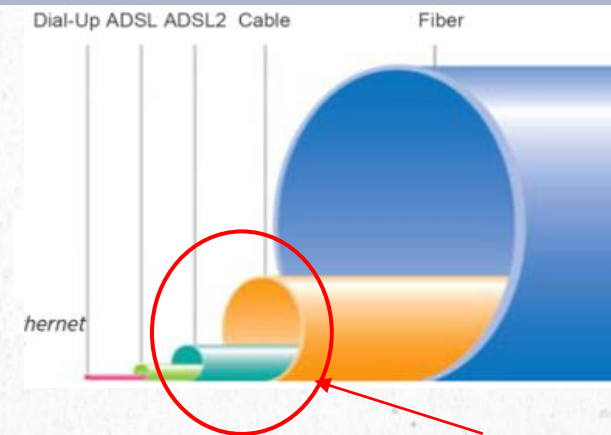
FIBER OPTIC INFRASTRUCTURE IS AN ASSET

- Installed Fiber Optic Cables have a forecasted lifespan of 20 – 25 years
- Owned fiber optic cable between city facilities provides high security communications
- A fiber optic infrastructure opens opportunities for other new technologies:
 - Intelligent Traffic Systems (ITS)
 - Redundant communications path for SCADA Systems – Well Sites – WWTP
 - High Bandwidth connections for CCTV cameras
 - Central control of building security and management systems

FIBER OPTIC TECHNOLOGY

- Since the 1990's, use of Fiber Optic Technology has grown rapidly.
- The data carrying capacity (Bandwidth) of fiber is exponentially higher than older technologies:

Technology	Capacity
Dial Up	56 Kbps
DSL	1.5 Mbps
Cable (DOCSIS 2)	10 Mbps
ADSL	10 Mbps
ADSL 2	24 Mbps
Cable (DOCIS 3)	150 Mbps
PON - Fiber Optic	1 Gbps
DWDM - Fiber Optic	100 Gbps

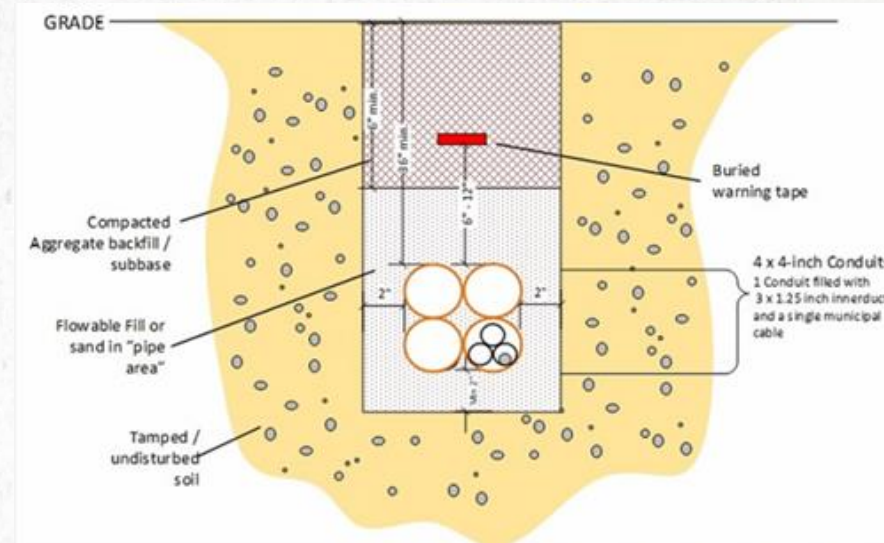


Sumner's Existing Capacity

- Fiber Optic is today's primary mode of data connectivity

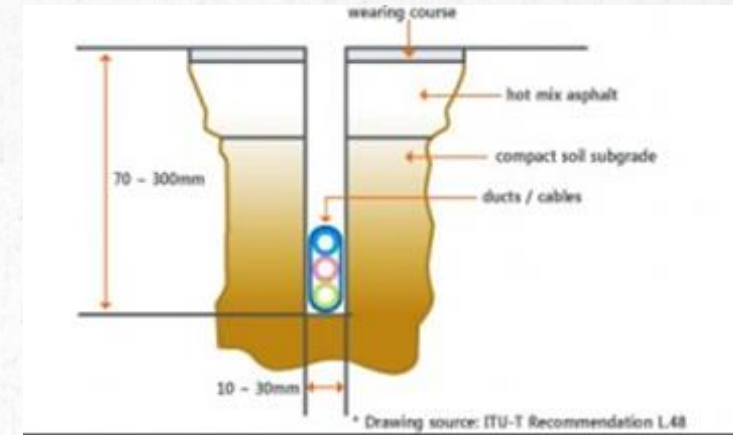
FIBER NETWORK CONSTRUCTION METHODS

- Standard Plow or Trench
 - “Traditional” Conduit Installation Method
 - Highest cost of available methods
Can be as high as \$300/ft in Medium Density Urban Areas



FIBER NETWORK CONSTRUCTION METHODS

- Micro Trench
 - Gaining acceptance nationally
 - Los Angeles and New York City have adopted ordinances to accept Microtrenching. In some areas of New York City, it is the only allowed construction method.
 - The Pennsylvania Turnpike is installing a new network along turnpike ROW with the majority of construction as microtrenched.
 - Costs per foot can be up to 40% lower than traditional trenching methods
 - Faster and less impactful than standard trenching



FIBER NETWORK CONSTRUCTION METHODS

- Aerial
 - Lowest cost construction method
 - More vulnerable to environmental hazards
 - Vehicle Accidents
 - Weather
 - Trees and tree trimming
 - Pole use arrangements add an annual cost and sometimes lengthy process to secure Pole Use Agreements



FIBER NETWORK CONSTRUCTION METHODS

- Horizontal Directional Boring
 - Can be the highest cost construction method based on the project scope and number of bores needed.
 - Least intrusive, but highest cost construction method
 - Often the only option when construction passes under streets or intersections



SUMNER'S IT NETWORK TODAY

- Sumner Relies on commercial carriers for data communications to the internet and between city facilities

Facility	Connection Vendor	Technology	Bandwidth (Down/Up)
City Hall Internet	Comcast	MOE	300/25
City Hall	Comcast	MOE	100/100
City Shops	Comcast	DOCSIS 3	100/15
Wastewater Plant	Comcast	DOCSIS 3	150/20
Animal Control	Comcast	DOCSIS 3	25/5
Senior Center	Lumen	DSL	12/2
Central Well	Lumen	DSL	7/2
Daffodil Field	Lumen	DSL	20/2
Cemetery Office	Lumen	DSL	20/2
Cemetery Shops	T-Mobile	4G	40/12
Shops Crew	T-Mobile	4G	40/12

- Sumner has incorporated conduit construction in new projects:
 - Traffic Avenue – Cannery Way Bridge
 - East Main – Puyallup Bridge
 - BNSF Rail Crossing at Main StreetThese installations represent what would otherwise be very expensive to implement later.

SUMNER'S IT NETWORK TODAY

- Goals
 - Establish resilient and sustainable connections to the Internet
 - Provision secure high speed connectivity between city facilities
 - Reduce data connectivity costs
 - Partner with adjacent agencies and cities to establish connectivity

SUMNER'S NEIGHBORS

- City of Bonney Lake
- City of Puyallup
- City of Auburn
- Sumner – Bonney Lake School District
- Puyallup School District
- Community Connectivity Consortium

BONNEY LAKE

- Bonney Lake operates its own fiber network that serves all city facilities.
- The city has entered into asset sharing agreements with Zayo for segments of their network. These arrangements have mutually benefitted both parties.
- Bonney Lake's long term goals focus on increasing network resiliency and increased use of cloud-based resources.

PUYALLUP

- Puyallup's IT Department manages the city's telecommunications, fiber optic network and traffic signal communications infrastructure.
- Puyallup contracts with Zayo and UPN for dark fiber connectivity where city-owned infrastructure is not present.
- The city has worked collaboratively with Zayo and UPN to share resources. This practice has reduced their overall data communications spend.

AUBURN

- The city has grown their fiber optic network over the years, and now operates 36 miles of fiber optic network, serving their Data Communications, Traffic Signal Management, and Public Works facilities management.
- The city places \$300,000 annually in a Capital Fund Reserve for fiber optic maintenance and new projects.
- When new projects are planned, funding for fiber related costs are transferred from the reserve into the project budget.
- Auburn leases a limited amount of fiber optics and conduit to telecommunications companies.
- As a member of the Community Connectivity Consortium (C3), Auburn contributes 5.9 miles of fiber optic cable to the C3 regional fiber network.

SUMNER – BONNEY LAKE SCHOOL DISTRICT

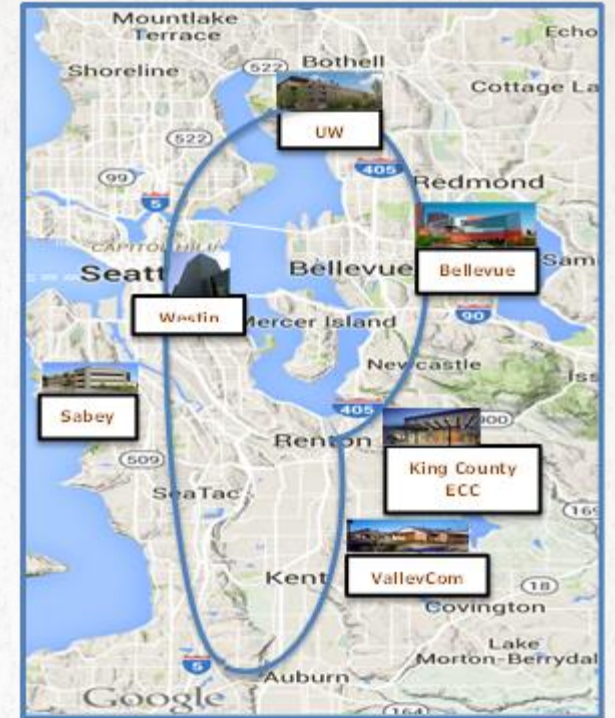
- The School District has 4 schools and 2 program locations, and the Administrative Offices within Sumner.
- In 2016, SBLSD completed a build out of a leased fiber network with WAVE that connects all schools and facilities in a high speed fiber network. The initial cost was 1.32 Million Dollars.
- In 2021, the school district spent \$157,315 for data services.
- Through E-Rate, the district recaptures about 50% of their communications spend.

PUYALLUP SCHOOL DISTRICT

- The school district has 34 schools and 6 support facilities.
- Most of their Wide Area Network (WAN) is leased from Unite Private Networks.
- The network has been in operation for about 12 years.
- The school district receives about 50% re-imbursement through E-Rate.

THE COMMUNITY CONNECTIVITY CONSORTIUM (C3)

- With 26 Member Cities and Agencies, C3 Operates a High Speed, Redundant Fiber Optic Ring around Lake Washington.
- Through Project Agreements, C3 members have installed over 265 miles of fiber optics infrastructure in King County
- C3 is planning expansion into Pierce County and Tacoma, with a planned node site at South Sound 911
- C3 Members realize significant data transport savings over commercial providers
- C3 Fiber optic “reserves” allow members to directly connect between their sites and to C3 Node sites
Ex: ValleyCom to Norcom
Bellevue to King County RCECC
Kirkland to Evergreen Hospital
Valley Medical Center to RCECC Node

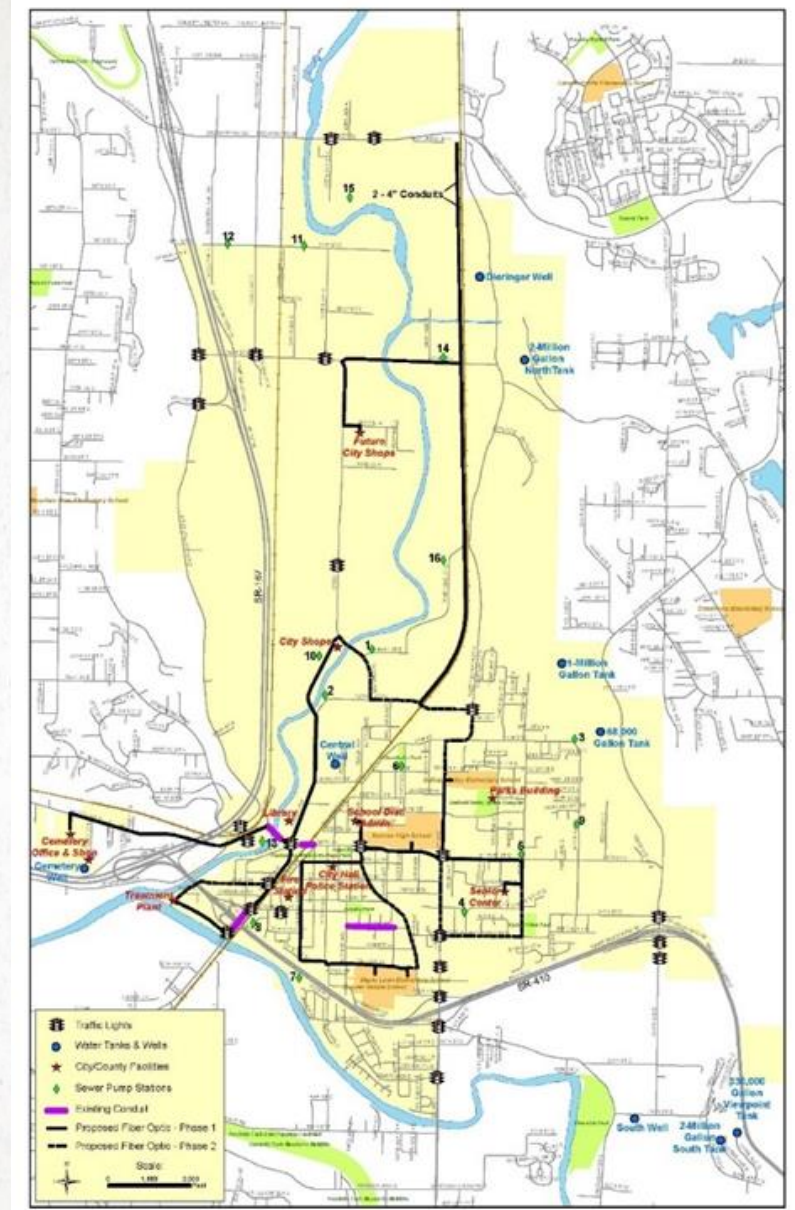


FRANCHISES

- Sumner currently holds Franchise Agreements with 6 telecommunications companies.
- Most of the agreements are to allow the companies to operate and manage long-haul data lines through the city.
- Zayo and Wave currently have operating infrastructure in Sumner to serve data communications customers.
- Comcast's agreement allows Comcast to operate a non-exclusive cable TV and Internet Service Provider (ISP) network to all points within Sumner.

SUMNER'S FIBER OPTIC PLAN

- Initially developed in 2019
- The plan was designed to implement in two phases;
 1. Connect most city facilities
 2. Connect the Wastewater Treatment Plant and Traffic Signals
- Represents approximately 10.2 miles of fiber network

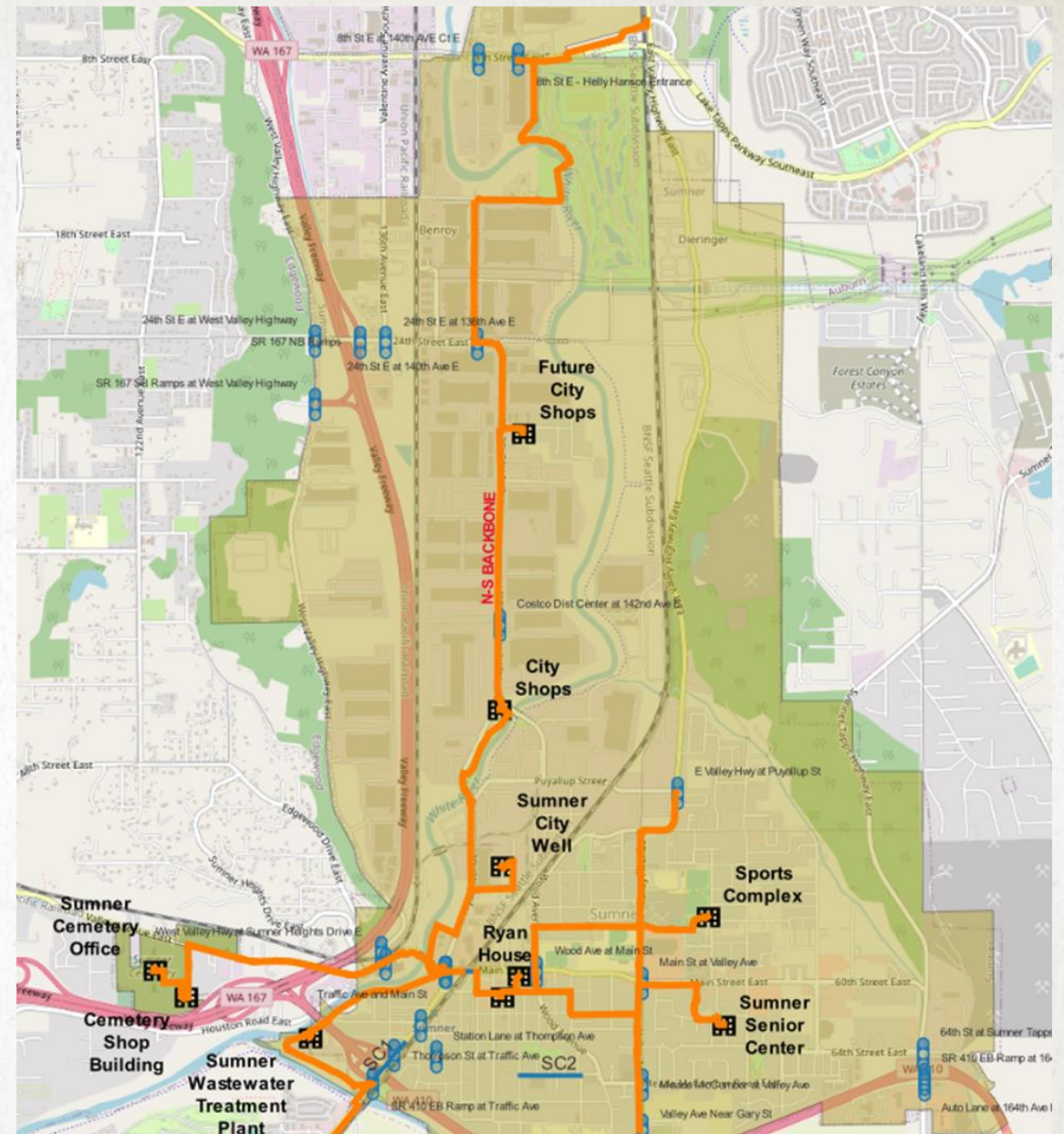


REFINING THE PLAN

- Using a GIS Model and working with Sumner's Public Works Department, discussions on network construction and routing, we developed a three phase plan.
- This plan was developed based on the following assumptions:
 1. Construction along trail right of way will be less intrusive and less expensive than using streets right of way.
 2. Micro Trenching on trail or street right of way can lower costs significantly.
 3. Aerial installation is the least expensive construction technique.
 4. All Sumner Traffic Signals should be connected for Central ITS management

THE SUMNER NETWORK

- 9.1 Miles total
- Phase 1 3.3 Miles
- Phase 2 3.3 Miles
- Phase 3 2.5 Miles
- 2 Miles on Trail Right of Way
- 5 Miles of Aerial Path are Available



PHASE 1

- Connects Priority City Facilities
- Builds the core of the North-South Backbone
- Utilizes Micro Trench and Aerial Construction where feasible
- Construction cost estimate \$505K



Aerial —————
Underground —————

PHASE 2

- Connects Remaining City Facilities
- Uses Micro Trench and Aerial Construction where feasible
- Construction Cost Estimate \$860K

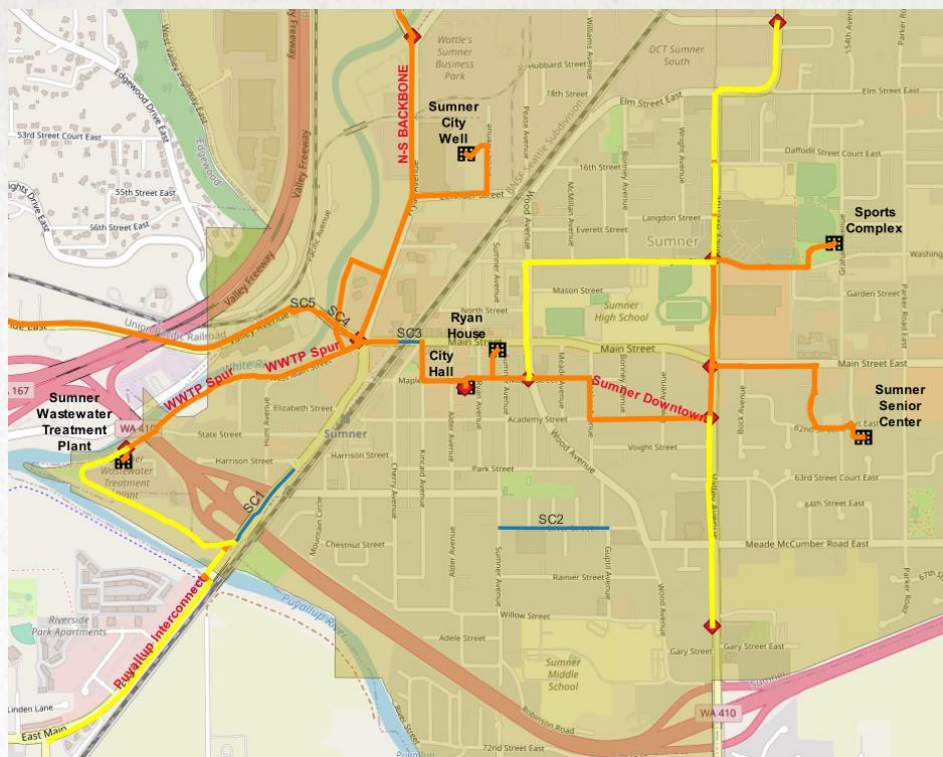


Phase 1 Built

Phase 2 Added Segments

PHASE 3

- Establishes connectivity to neighbors
- Completes connections to all traffic signals
- Segments can be built independently
- Uses Micro Trenching and Aerial where feasible
- Construction cost estimate \$1.03M



Individual Projects

- N-S Backbone Extension
- Auburn Interconnect
- Puyallup Interconnect
- Sumner Schools Loop
- Valley Ave N-S Backbone Extension
- Stewart Ave West Spur

P1 and 2 Built

P3 Added

\$794K
\$81K
\$230K
\$361K
\$748K
\$119K

RECOMMENDATIONS

- Three Categories
 - Standards and Practices for Development and Construction
 - Funding Strategies
 - Collaboration and Public/Private Partnerships

STANDARDS AND PRACTICES

- Consider developing a Fiber Optic Master Plan
- Adopt Standards for Micro Trenching Construction Techniques
- Develop a Projects/Permits Review Process to include City Departments in Planning
- Adopt a Dig-Once Policy or Philosophy
- Consider Incorporating Conduit Installation in any planned Public Works Project
- Review Franchise Agreements

FIBER OPTIC NETWORK FUNDING STRATEGIES

- City Budget
 - Investigate Rate Models (WWTP)
 - General Fund
- Long Term Capital Projects Reserve for Construction and Maintenance
- Consider Fiber Leasing Opportunities
- Evaluate Grant Opportunities
- Work with the PWB to include Fiber Optic Networks as Funding-Eligible Infrastructure

COLLABORATION AND PUBLIC/PRIVATE PARTNERSHIPS

- Expand Partnerships Between Sumner and Local Cities and Agencies
- Become involved in the Community Connectivity Consortium
- Investigate Public/Private Partnerships to Share Network Construction Costs

CONCLUSIONS

- Long term fiber leases can supplement funding for projects.
- Existing franchisees may want to expand within Sumner.
- While grant funding for this project may be limited, there are some opportunities open (UASI).
- Micro Trenching offers a viable lower construction cost alternative.
- Aerial Construction is the least expensive, yet most vulnerable construction method.
- Construction on Trail Right of Way offers a lower cost construction alternative.
- Dig Once policies pay off over time.
- ROI for this project vs Commercial Carriers is between 25 and 30 years. Consider the other benefits and overall value of the network as an asset.
- Staying with the status quo will cost more over time

NEXT STEPS

- Adopt Standards and Practices
 - Fiber Master Plan
 - Dig Once
- Research Funding Strategies in the 2023- 2024 budget
- Explore collaboration public/private partnerships

QUESTIONS - DISCUSSION



CITY OF
SUMNER
WASHINGTON

City of Sumner Fiber Optics Infrastructure Study

Prepared for the City of Sumner by DunnCo Diversified Services LLC

January 26, 2022

Final Draft for Stakeholder Review



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Introduction

This report is prepared for the City of Sumner IT and Public Works Departments to review and inform the city's plans for implementation and operation of a fiber optic data communications infrastructure to serve the city's facilities and data communications requirements.

In June, 2021 the City of Sumner engaged DunnCo Diversified Services to examine the city's data communications plans and policies, and to prepare a study outlining options and estimates for implementation of a city-managed fiber optic data communications network.

This study reviews fiber optic technology, construction methods, costs, City Franchise Agreements and provides implementation cost estimates. Estimates include four construction methods; Traditional Trenched, Micro Trenched, Aerial and mixed Trenched/Micro Trench/Aerial (Pole Mounted).

Executive Summary

The City of Sumner IT and Public Works Departments are researching the costs of construction of a fiber optic network to serve city buildings. This report is written to inform the reader on the nature of fiber optic data communications, the technologies used, the construction methods used and the costs of building and maintaining a city-owned fiber optic network.

The primary use to the city for this network will be to facilitate computer network connectivity between city sites and eventually the internet through possible connections to the neighboring cities of Auburn and Puyallup. Extending the fiber network to these neighboring cities would allow the City to connect to the Connected Communities Consortium's (C3) fiber optic ring. Using the C3 fiber optic ring would allow Sumner to gain direct connection to the internet through connections at either the Westin Data Center in Seattle or the Sabey Intergate facility in Tukwila.

Other uses envisioned for the network include:

- Real time video surveillance of critical infrastructure sites.
- Interconnection of roadway traffic signal controllers.
- A partnership with the Sumner School District to provide internet connectivity at their sites.

Background

Since the early 1990's, fiber optic data communications have been rapidly replacing copper wiring in nearly every facet of telecommunications. Fiber optics carry more data at higher speeds than copper wiring. Cities and school districts who have invested in fiber optic infrastructure have over time realized savings in their data communications spends. Fiber optic networks have also allowed the provisioning of services that would be prohibitively costly using commercial data vendors.

Neighboring Cities and School Districts

This report examines Sumner's neighbor cities and school districts to inform where fiber optic infrastructure has played a major role in their operations.

The City of Auburn has one of the most extensive city-owned fiber optic infrastructures in the region. The city's network has grown organically, meaning that for every capital project in the city, all city departments have an opportunity to weigh in on the project. This has allowed Auburn's IT department to recommend additions or modifications to planned conduit installations as part of major projects. Consequently, the city now operates a fiber optic network of 36 miles, connecting street lighting, traffic signals, cameras, and sensors, city buildings and facilities, and providing connection to regional partners and to the internet.

Both the Puyallup School District and the Bonney Lake – Sumner School District have completed connection of all their schools and administrative facilities using fiber optics. Technology in the classroom and the growth in bandwidth to support it has grown rapidly in the last 10 years, and the need for robust, high speed data communications has grown along with it. School districts have for years benefited from E-Rate funding through the federal universal service fund for schools and libraries.

In the case of the Sumner - Bonney Lake School District, 50% of their fiber optic network build-out was funded through E-Rate. While cities are not eligible for E-Rate funding, this report discusses other methods and funding sources to assist the City of Sumner in a fiber optic network build-out.

Planning and Cost Estimates

Sumner's IT and Public Works departments developed an early conceptual plan for a fiber optic network, to build in three phases. This network design was built to make use of city trails wherever possible, since fiber optic conduit construction costs in the trail right of way are lower.

Discussions with IT and Public Works developed a three phased plan for the network. The first phase represents the minimum investment necessary to begin operation of a communication path between City facilities thereby providing benefits from investments made to date. This phase connects city facilities with the highest IT needs to City Hall. Phase two adds additional city facilities and fiber optic segments. Phase three is detailed to show estimates for a number of individual projects that will improve the capabilities of the network; The Auburn Interconnection, Puyallup Interconnection, extension of the Valley Ave South Backbone to connect traffic signals, and a loop to connect to Sumner Schools.

Developing construction cost estimates required a GIS model to measure fiber optic network segment distances, construction methods, geographic considerations and existing infrastructure. Four major construction methods were considered in developing this report: Trenched Conduit, Micro Trenched Conduit, Horizontal Direct Boring and Aerial Pole Mount. Each of these methods are described in detail in the report. The report concludes that a combination of pole mounted aerial and micro trenched conduit would deliver Phase 1 of the project for about \$500,000. Total Phase 2 construction costs are estimated at about \$633,000 using a combination of micro trench and aerial where available. Total Phase 3 construction costs are estimated at just over 1 million dollars.

Aerial construction is the least expensive method of construction, and while there are certainly cost advantages, it is noted that aerial construction relies on pole use agreements with the utility pole owners, and in some cases, sharing agreements with other pole users. Aerial construction is also more vulnerable to environmental and external damage. The city should carefully consider these vulnerabilities when choosing construction methods and developing the project budget.

Sumner has a well-developed trail system, and should the city decide to construct the network primarily on trail right of way, the costs of micro trenching can deliver the lowest cost of trenched construction.

During GIS analysis, we investigated various route alternatives using the city's trail system. These GIS files are made available to the city as part of this report.

Franchisees

Sumner has granted a number of telecommunications franchises, and one non-exclusive Cable TV and Internet Service Provider (ISP) franchise to Comcast. Franchise agreements have the potential for the City to negotiate for the franchisee to provide network segments for the city's use.

In the telecommunications franchises, the franchisees have received franchises for new construction to serve customers. Wave (Astound Broadband) entered into their franchise agreement to allow the build out of their network to serve the Sumner – Bonney Lake School District. Zayo, and Level 3 (Lumen) have franchise agreements to place fiber optics that pass through Sumner as part of their long-haul networks, and to provide backhaul service to cellular service towers.

Discussions with representatives of Wave and Zayo have shown that they are both interested in partnerships that serve the interests of both parties. For example, the City of Bonney Lake worked with Zayo to provide a large portion of their fiber optic network. In one instance, Zayo needed to cross State Highway 410, and the Washington State DOT would not approve plans for Zayo to horizontally bore under the highway. The city had extra conduit space at a nearby crossing point, and engaged with Zayo for joint use of the conduit in return for dark fiber provided by Zayo.

Recommendations

There are a number of recommendations in this report that the city should consider when embarking on a fiber infrastructure initiative. These recommendations break down into three main categories:

- 1) Standards and Practices for Fiber Optic Network Development and Construction,
- 2) Fiber Optic Network Funding Strategies,
- 3) Collaboration and Public/Private Partnerships.

Standards and Practices focuses on “Fiber Friendly” initiatives to support fiber network construction projects. The city can prepare for future fiber optic networking by instituting practices and policies that support new construction techniques, and policies such as “Dig Once”, that support more effective use of conduit and trench space in right of way projects.

Fiber Optic Network Funding Strategies introduces possible funding avenues to build the network.

Appropriation of a capital budget allocation from the City’s general fund appears to be the most straightforward approach to funding this network. By having budgeted monies available for this purpose, the city would be able to install the conduits concurrent with city utility projects or as other opportunities arise. City funds are also necessary to prepare grant applications and, in some cases, to serve as matching funds when required by outside funding agencies. Finally, the City will need a long-term annual budget allocation for repairs and maintenance of installed facilities and annual pole use fees in the case of aerial installation.

The federal government’s broadband opportunity grants offer funding for entities who work to expand high speed broadband to underserved communities and regions. None of these grants are likely to be applicable for the City of Sumner’s network as currently envisioned. There are limited grant opportunities for a municipality to expand their own infrastructure. One grant opportunity available is the Urban Area Security Initiative (UASI) grant program funded by the US Department of Homeland Security. The state legislature and Public Works Board could possibly offer loan opportunities for fiber optic network infrastructure if the existing state law can be revised. Long term fiber leasing to commercial carriers could provide a source of revenue to offset investments made previously.

Collaboration and Public/Private Partnerships discusses the successes that other cities and organizations have experienced in their fiber network build-outs, and introduces opportunities for Sumner.

Data Sources

There are a number of appendices that detail cost estimates, sources used for the estimates, and detailed information on the fiber segments described in the report. There are also case studies showing where municipalities have seen success in funding their own infrastructure while providing internet services to their citizens.

Fiber Optic Infrastructure is an Asset

As the growth of fiber optic technology expanded, cities and agencies who were early adopters of fiber optic technology have realized the benefits of in-place fiber optic communications. In many cases, utilization of traffic signal conduit installations has allowed extension of fiber optic networks without the costs of new trenching. Dig-Once policies and ordinances have allowed for the installation of underground conduit at a significantly lower cost than if performed independently. Communications franchise agreements often require the franchisees to allow cities to add conduit to their projects when trenches are open.

Taking advantage of these methods for expansion over time has allowed cities to grow their fiber optic infrastructure and provide high speed data communications between city facilities.

In 2017, the City of San Leandro, California¹ published an RFP for experienced “Smart Cities” consultants to develop a Fiber Optic Master Plan to inform them on the best uses of their fiber optic assets in a nearly 20-mile city-owned fiber optic network. A major question is “What funding opportunities exist, and what options are available for the city to monetize its fiber optic assets?” The Master Plan², released in late 2018, included recommendations to; Establish the city as a POP (Point of Presence) on the internet, allowing them to potentially offer wholesale data transport services; Work with community anchor institutions such as hospitals, libraries and schools to investigate common needs, and to investigate public-private partnership opportunities.

Cooperation between cities and agencies like school districts and hospitals can benefit all with a robust fiber optic infrastructure. In the early 2000’s The City of Kirkland and the Lake Washington School District teamed to share resources and create a fiber optic network serving the school district. Kirkland shares conduit space and fiber optic strands (pairs) to complete the school district’s fiber optic network. The City of Renton and the Renton School District have also collaborated in sharing agreements to allow the school district to connect all their schools with fiber optics.

In 2017, the Community Connectivity Consortium (a chartered governmental organization under Washington law) completed construction and deployment of a high-speed fiber optic ring that circles Lake Washington and allow members to complete connections from their networks to internet resources available at the Westin Data Center in Seattle and the Sabey Intergate facility in Tukwila.³ Under a project-based umbrella agreement, the Consortium operates and maintains approximately 265 miles of fiber optic infrastructure in the central Puget Sound region. The collaborative model has allowed consortium members to significantly reduce their data communications costs.

Since Sumner is only now considering construction of a fiber optic network, the examples of other cities in the region help to show how their networks have grown and how they serve their cities and school districts.

Building a city-owned fiber optics network is an investment in the future. Reducing Sumner’s reliance on outside data services providers will enhance reliability, and security, and deliver the data traffic capacity that the city needs today and in the future. Intangible benefits of a fiber network deliver

¹ <https://sanleandronext.com/city-of-san-leandro-launches-rfp-for-fiber-optics-master-plan/>

² <https://www.sanleandro.org/civicax/filebank/blobdload.aspx?BlobID=29084>

³ Community Connectivity Consortium Project Agreement 70

services not previously possible, or those that were simply too expensive to consider using commercial data carriers; Intelligent traffic control, traffic cameras, central control of building management systems, and highly available cloud-based applications and services.

Eliminating Sumner's current data networking costs by building the fiber network does not deliver a breakeven for well beyond a 25-30 year planning horizon. Securing other funding mechanisms will be critical to making the network financially feasible to the city.

Fiber Optic Technology – An Introduction

The use of data technologies has grown exponentially over the past 20 years and adoption of fiber optic technology has increased to meet the need.

Beginning with long-haul fiber optic networks, built by major communications carriers and service providers, growth of fiber optic networks has extended to meet the “middle mile” requirements of businesses, cities, schools and agencies.

Internal adoption of private fiber optic networks has grown to serve the data communication needs of organizations. Internally, the amount of network bandwidth needed to support an organization’s requirements has grown exponentially. Software applications running on the desktop require robust bandwidth to communicate with servers, databases, and centrally operated data services. Video conferencing, telephone services, chat-based messaging systems for collaboration and desktop sharing (Microsoft Teams, Slack, etc.) add to this burden. Local Area Networks (LANs) are restricted in available bandwidth between facilities. For example, Sumner’s building networks operate at 1Gb bandwidth within the building, however, the inter-facility connections using the Comcast Metropolitan Optical Ethernet (MOE) and even lower speed data services like DSL limit the inter-facility bandwidth. Even with network configurations such as Quality of Service (QoS) to give priority to voice and video traffic, these bottlenecks create disruptions to high-bandwidth services.

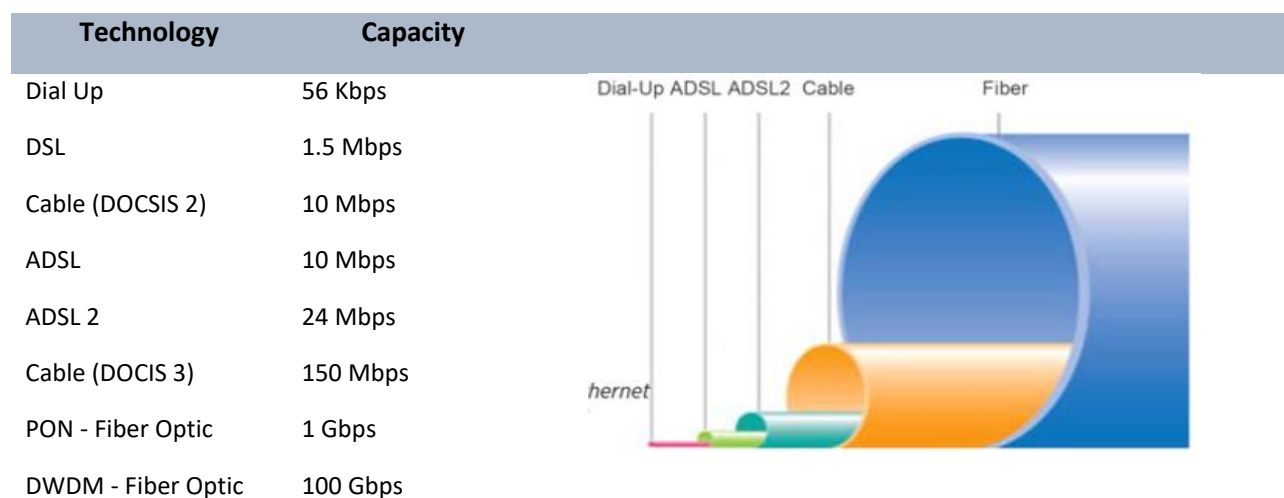


Figure 1 - Data Speeds Comparison

“Dark” Fiber

The term “Dark Fiber” refers to fiber optic cable routes or “strands” that directly connect two or more discrete sites with a fiber optic connection that is controlled by the owner/manager with no service provider electronics present in the circuit.

“Lit” Fiber

“Lit” Fiber refers to data network services provided to a customer by a service provider using the provider’s hardware to hand off a data connection to the customer. Comcast’s MOE services to the city are an example of Lit Fiber.

Fiber Optic Cable

A fiber-optic cable, also known as an optical-fiber cable, is an assembly similar to an electrical cable, but contains one or more optical fibers that are used to carry light. The optical fiber elements are typically individually coated with plastic layers and contained in a protective tube suitable for the environment where the cable is used. Different types of cable are used for different applications, for example, long distance telecommunication, or providing a high-speed data connection between different parts of a building or between buildings.



Figure 2 - Fiber Optic Cable

Fiber optic cables used in enterprise WAN applications typically carry from 24 to 288 strands of fiber. A data connection using fiber optics typically uses one pair for each point-to-point connection; one strand for transmitted data and one strand for received data.

Construction Methods for Fiber Optic Infrastructure

Underground Conduits, Vaults, and Handholds

Underground installation of fiber optic cable between locations involves the use of Conduit, which is usually PVC pipe with a typical diameter of 2 or 4 inches. Spans of installed conduit pass through Handholds (also known as pull boxes), which are installed along the conduit's route for the purpose of access to the cable for installation, maintenance or repair, vaults which are larger, generally contain splice cases to connect multiple cables to different conduit routes.



Figure 3 - Vault

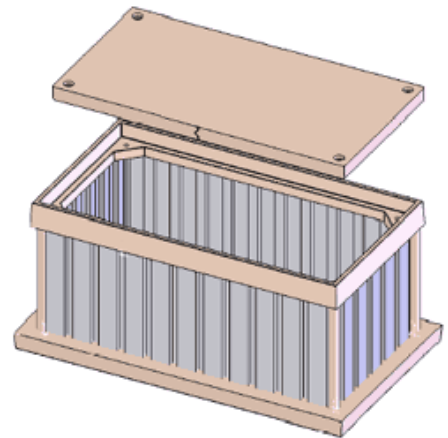


Figure 4 - Handhold



Figure 6 - Innerduct with Fiber Cable



Figure 5 - Splice Case

Fiber optic cable is generally installed inside an innerduct within the conduit. Innerduct is used to provide additional protection to the cable and to isolate the cable from other cables occupying the conduit.

Trenching

Underground cables are pulled in conduit that is buried underground, usually 1-1.2 meters (3-4 feet) deep to reduce the likelihood of accidentally being dug up⁴. The process usually begins with digging a trench to bury the conduit which is generally PVC plastic pipe, sometimes with pre-installed innerduct (also called duct liner) with a pulling tape to facilitate the actual cable pulling process. Horizontal Directional Boring can also be used to avoid digging up the surface, for example in crossing under streets or sidewalks.

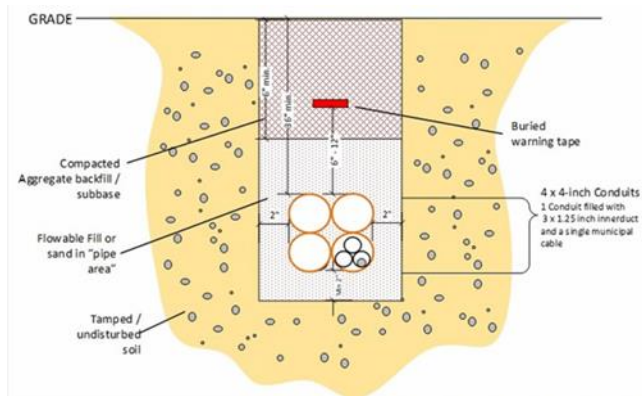


Figure 7 - Open Trench Construction

Open trench construction is the most costly and disruptive conduit construction technique, requiring street lane closures, displacement and replacement of fill materials, and can run as high as \$300 per foot for construction in a small to medium size city.

Horizontal Directional Boring

Horizontal Directional Boring is a drilling process where a drill head is steered underground. This method is generally sub-contracted to specialists. Horizontal Directional Boring is the preferred method to cross under roads, highways, railway lines, rivers and all other services that may prove to be too dangerous or costly to cross using conventional methods like trenching and/or plowing. Rigs capable of drilling up to 1000 feet in one drill are available and various sizes of ducts can be installed with this equipment.



Figure 8 - Horizontal Boring

⁴ Fiber Optic Association – Underground Cable Plant Construction
https://www.thefoa.org/tech/ref/OSP_Construction/Underground_Construction.html

Horizontal Boring costs vary widely, depending on the length of the run, the composition of the soils, and the number of bores contracted as part of the project.

Micro Trenching

The traditional method of burying ducts involves digging trenches with a backhoe or manual labor. Alternative methods of deploying underground fiber cables include using storm water drains and sewers, while another is micro-trenching, which involves using a machine to cut a narrow slot in the road surface. The benefits of micro-trenching are less disruption to roads and sidewalks, faster deployment and between 30 - 70% cost savings.

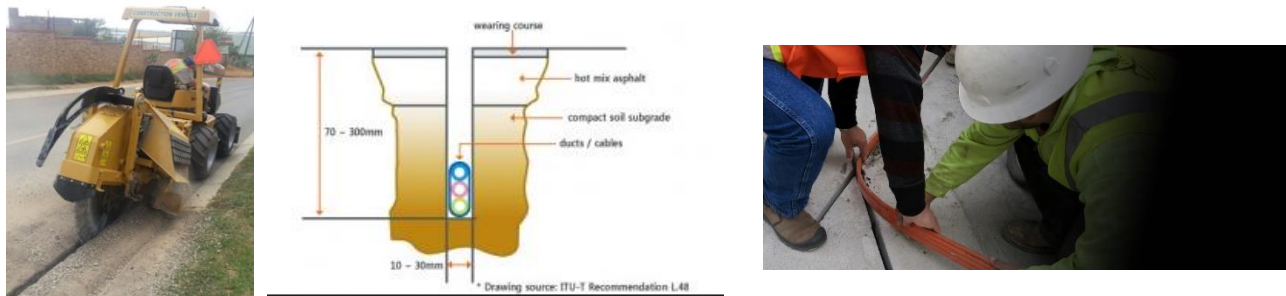


Figure 9 - Micro Trench Construction

Microtrenching is also highly effective with micro ducts and blown micro cables. A single groove can hold a 6-duct micro duct that can allow installation of 144 or 288 fiber strands. If only one cable is needed at the time of construction, adding cables in the future can be done without additional construction. The micro ducts are designed to accept high pressure air used to blow cable through the duct instead of physically pulling it through.

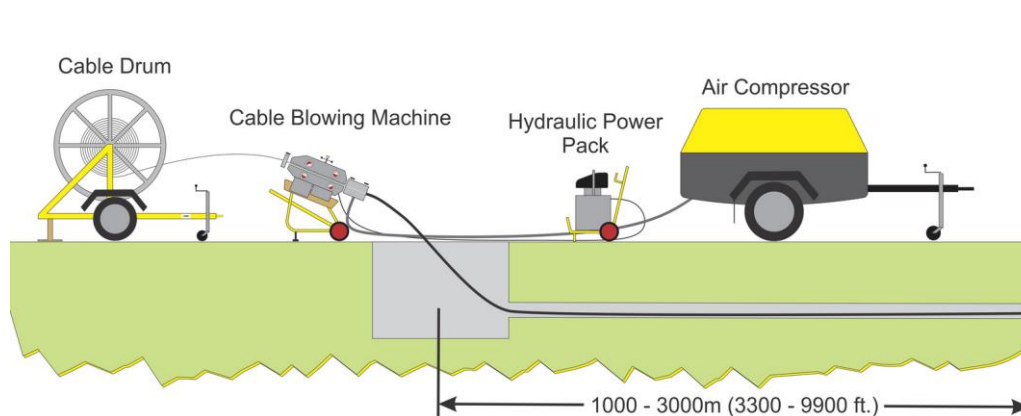


Figure 10 - Blown Micro Cable

Depending on the type of road and the depth of existing services, the micro-trench can be anywhere from 1 to 2.5 inches wide and, 12 to 20 inches deep, usually near the edge of the roadway. The machine has a blade in front (much like a giant angle grinder) which cuts into the road surface.

Following placement of the micro duct, restoration of the micro trench is performed by filling with materials specially designed for micro trenching applications, and a top cover of epoxy/asphalt to provide a durable seal at the roadway surface.

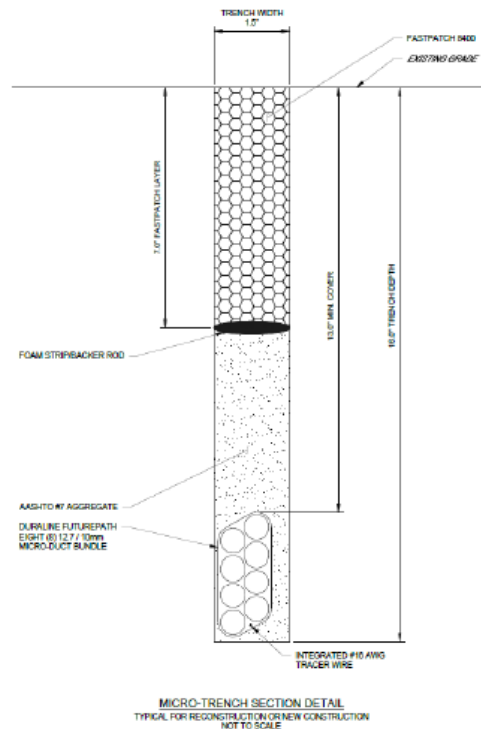


Figure 11 - Typical Micro Trench Detail

As the technology has matured, it has proven to be an excellent solution for installing last mile and middle mile fiber optic network spans. Los Angeles⁵, San Francisco, and New York City have all adopted ordinances supporting Micro Trenched fiber optic network installations. The Pennsylvania Turnpike engaged a major project to construct a fiber optic network along its entire length in 2019, with planned completion in late 2021.⁶ The majority of this project will use Micro Trench construction. In their report to the California Public Utilities Commission⁷, Crown Castle Corporation, a major fiber optic network construction contractor and operator recommended that the state of California permitting authorities

⁵ Los Angeles Ordinance 19-0986

⁶ Constructing the Pennsylvania Turnpike's Fiber Optic Network – Construction Innovation Conference 2021

⁷ Crown Castle Report to CPUC

encourage swifter adoption of new installation methods, citing that “Microtrenching costs an estimated 42% of the cost of open trenching.”

Pole Mount (Aerial)

Deploying fiber above ground on poles or towers removes the need for underground digging and is common in areas where utility poles are already installed. Aerial installation is generally much less costly than underground construction. There are a number of reasons for choosing an aerial solution, such as:

- Aerial fibers are typically much faster and less expensive to install than buried networks.
- Existing utility poles are in place along the planned fiber optic route.

Pole sharing reduces installation costs and speeds up deployment. If poles exist already, it is required to have proper permits for adding communications cables and the poles must be “made ready” by the owner of the poles or authorized parties. This may take considerable time which must be factored in the planning of the project. Sometimes, lightweight fiber cable may be lashed to previously installed cables such as older copper phone cables or CATV hardline coax, but proper permissions must be obtained⁸.

Prior to installation, the location of splice points and storage of slack cables must be determined and noted in the design. Splice locations should be chosen with the need for parking a splice truck, van or trailer nearby. Spare lengths of cable and splice cases to allow a “drop” to the ground for splicing are stored between “snowshoes” placed along the cable.



Figure 12- Aerial Cable with Splice Case and Snowshoe

Types of Aerial Mount Fiber Optic Cable

There are three major types of Aerial Cable; Figure 8 Self-Supporting, Loose Tube, and All-Dielectric Self Supporting (ADSS).

⁸ Utilities Telecom Council White Paper on Joint Use Pole Agreements

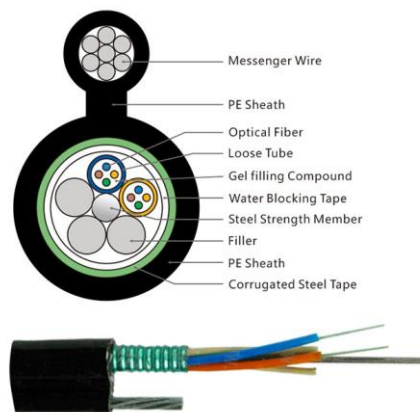


Figure 13 - Figure 8 Type Aerial Cable

Figure 8 type cable is commonly used in aerial installation where lashing to a messenger wire or an existing cable is either not available or desired. The messenger wire is an integral part of the cable assembly, and is mounted at each pole attachment.



Figure 14 - Loose Tube Aerial Cable

Loose Tube cable is used in aerial installations where it can be lashed to a messenger wire or an existing cable. When comparing project costs, the higher labor and materials costs of lashing often outweigh the higher costs of self-supporting figure 8 type cable.

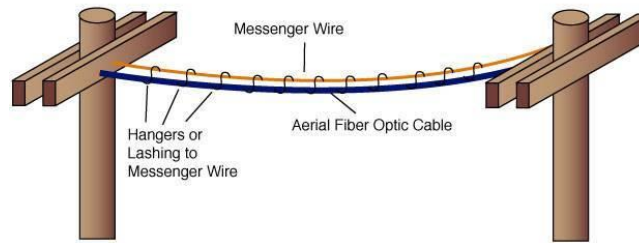


Figure 15 - Aerial Lashed Cable Installation

We recommend using a Figure 8 Self Supporting type cable for aerial fiber optic installations. Installation is much cleaner and does not require attachment of a support wire with lashing. Maintenance costs are lower since lashings fail and place additional stress on the fiber optic cable.



Figure 16 - Failed Aerial Lashing

There will be areas in the aerial infrastructure where lashing to an existing cable may be required due to installation capacity limitations. Lashing to existing cable presents additional challenges⁹ due to the length of time it takes to negotiate with the original cable owner *and* the utility. Additionally, the lashed cable is subject to additional strain when it sags due to lash failures, and it is subject to damage if it spans a roadway and sags below traffic clearances.

⁹ Utilities Telecom Council White Paper on Joint Use Pole Agreements -

Sumner's Current Operating Environment

The City of Sumner's Information Technology Department manages the city's technology infrastructure, including their data communications and telecommunications networks.

Sumner IT Department Networking Goals

- **Establish resilient and sustainable connections to the internet**
Construction of a fiber optic network will allow Sumner to make connections to other ISP's or Internet Points of Presence (POP's). As Sumner moves more applications into the Cloud, high speed and highly available internet connections are essential.
- **Provision high speed data connectivity between city facilities requiring high bandwidth**
Some city facilities are running on connections that are limited in their connection bandwidth – ex: the Cemetery Offices, running at a maximum of 20 Mbps. Fiber networking will provide 1 Gbps service to all connected city facilities.
- **Reduce data connectivity costs**
Sumner currently spends approximately \$30,000 annually for data communications. Implementing a fiber optic network will all but eliminate these expenses. In the long term, these costs of service from outside providers will increase, leaving the city at the mercy of the providers. A fiber network lays the foundation for a self-managed environment that can scale to meet the city's requirements for the foreseeable future.
- **Partner with adjacent agencies and municipalities to establish connectivity**
Connectivity over city owned fiber optics can provide Sumner's neighbors an opportunity to share data, resources, and backup network routes with one another.

Data Communications

Connectivity between Sumner City Hall and city facilities is maintained using Metropolitan Optical Ethernet (MOE) services provided by Comcast Business, Lumen (formerly CenturyLink), and T-Mobile.

Facility	Connection Vendor	Technology	Bandwidth (Down/Up)
City Hall Internet	Comcast	DOCSIS 3	300/25
City Hall	Comcast	MOE	100/100
City Shops	Comcast	DOCSIS 3	100/15
Wastewater Plant	Comcast	DOCSIS 3	150/20
Animal Control	Comcast	DOCSIS 3	25/5
Senior Center	Lumen	DSL	12/2
Central Well	Lumen	DSL	7/2
Daffodil Field	Lumen	DSL	20/2
Cemetery Office	Lumen	DSL	20/2
Cemetery Shops	T-Mobile	4G	40/12
Shops Crew	T-Mobile	4G	40/12

Table 1 - Sumner Facilities Data Connection Speeds

Police Department vehicles are connected to data services using a 4G (Cellular Service) vehicle VPN connection to city data services and South Sound 911.

Connection to the internet is via a connection using Comcast Business Services with bandwidth of 300 Mbps download and 25 Mbps upload.

Sumner's IT Department spends nearly \$30,000 annually for data communications services.

Telecommunications

City telephones operate on a VOIP system from Mitel/ShoreTel to connect city facilities and provide outside telephone services. This system relies on the city's data network to operate.

IT Operations

The city's IT Department operates and maintains the data network (LAN), telephone system, PC's, software and network security.

Neighbor Agencies and School Districts

Sumner - Bonney Lake School District

The School District serves the cities of Sumner and Bonney Lake. 4 schools, 2 program locations, and the district's Administrative Offices are within the City of Sumner.

In 2016, the district went live with a Wide Area Network (WAN) that connects 14 schools, support services offices, and the district's Administrative Offices. In 2014, the district issued a Request for Proposal (RFP), and ultimately contracted with WAVE (Astound Networks) for a 1.32 million dollar build to implement the WAN. In late 2020, the district issued an RFP for WAN services following the expiration of their 60-month term with WAVE.

In 2021, the school district's spend for the network provided by Wave is forecasted at \$157,315.

The school district is able to recapture approximately 50 % of the contract costs through E-Rate funding.

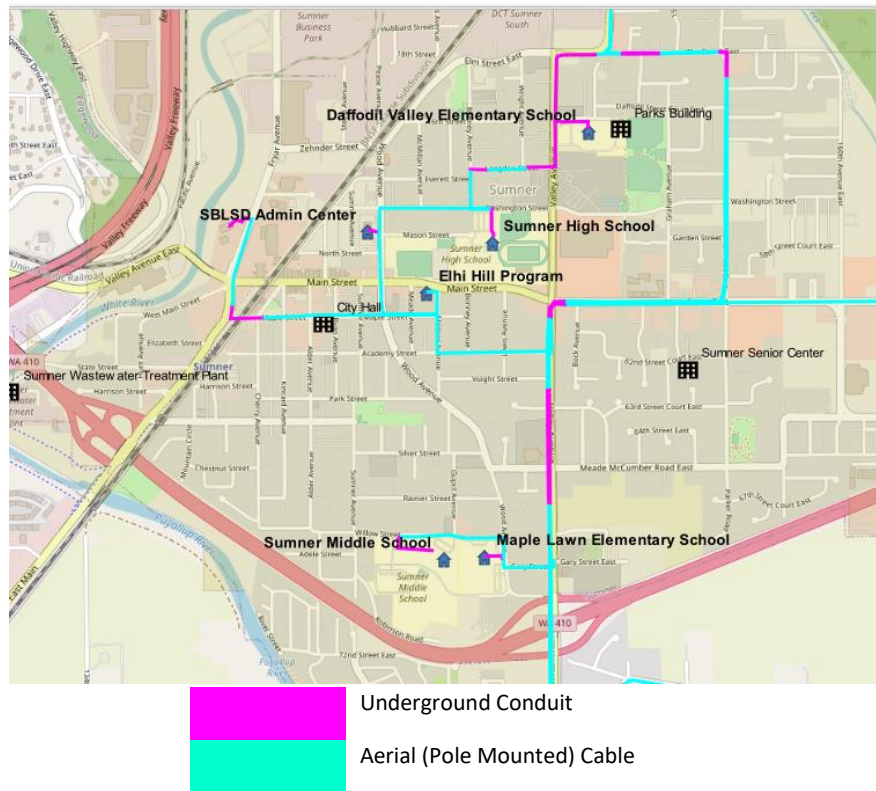


Figure 17- Sumner Schools Served by Wave Broadband

Puyallup School District

The school district has 34 schools and 6 support facilities. The majority of their dark fiber wide area network is leased from Unite Private Network (UPN). The network has been in operation for about years, and receives 50% cost reimbursement through the E-Rate program.



Figure 18 - UPN Network Serving Puyallup Schools

The school district is served by K20 and Rainier Connect for internet connections. The K20 connection is provided under state contract by Lumen. The school district spends \$492,000 per year for the network and internet connection. Through the E-Rate program, the district receives a 50% reimbursement for these costs.

City of Bonney Lake

The City of Bonney Lake currently operates its own fiber optic network serving all city facilities. Over the last ten years, the city has entered into asset sharing agreements with Zayo, which have benefitted both parties. The city's facilities are connected in a hub-spoke configuration that terminates at the city's Public Works Facility.

The Bonney Lake IT Department has included fiber optic route redundancy and resiliency as a priority in their long-term plans. The September, 2020 Sumner Grade Fire severely disrupted internet and telecommunications to the Bonney Lake, Buckley, Lake Tapps, and Unincorporated areas of the plateau when fiber optic cables along Meyers Road were destroyed by the fire. The city lost their primary internet connection from Comcast Business for three days during a critical period of need.

Bonney Lake's long term IT plans focus on utilization of cloud-based services that will place an urgent need for resiliency in their internet connections. The city is presently engaged in a project to incorporate a backup microwave-based connection to the internet in order to provide a bandwidth-scalable backup connection.

City of Auburn

The City of Auburn operates fiber optic networks and segments for the purposes of Data Communications, Traffic Signal Management, Street Lighting and Public Works facilities management. Overall, the city manages 36 miles of fiber optic networks.

Auburn's Franchise Agreements have "Dig Once" provisions for franchisees' projects.

The City places \$300,000 per year in Capital Fund reserves for fiber optic conduit or cabling projects. Auburn City Policy requires a project and permit review workflow to allow city departments to have input on project designs so that city strategic goals and departmental priorities can be considered. When new projects are planned, any fiber optic conduit costs are added to the project budget, and funded from the \$300,000 reserves. Maintenance and Operations costs are also funded from this reserve. This practice has allowed Auburn to complete 36 miles of city-owned underground fiber optic conduit, and to implement their own WAN serving all city facilities.

Auburn leases fiber optic and conduit resources to telecommunications companies.

Auburn is a member of the Community Connectivity Consortium (C3), and provides 5.9 miles of high-speed fiber optic backbone to the Consortium using city-owned fiber optic resources.

City of Puyallup

The City's IT Department manages the city telecommunications, fiber optics network and traffic signal communications infrastructure. Police Headquarters, the Downtown Library, Courts, Recreation Center, Public Works Operations Center and the Benaroya/Centeris Data Center on South Hill are all centrally connected by fiber optics to City Hall.

Puyallup contracts with Isofusion for internet services/access.

The city contracts with Zayo and Unite Private Network (UPN) for dark fiber connectivity where city-owned fiber optic infrastructure is not present. Zayo, Wave and UPN hold franchises with the city, and

in some cases, the city has worked collaboratively with these vendors to share resources (Conduit, Fiber Optic Cable). These measures help to lower the city's overall IT communications spend.

Puyallup's IT Department works closely with their Planning and Public Works Departments to coordinate transportation and signal improvement projects to provision data communications services

The city does not have a Dig Once ordinance or standard policy, although their franchise agreements have terms requiring franchisees to offer the chance for the city to collocate conduit in construction projects.

East Pierce Fire and Rescue

EPFR operates 6 Staffed Fire Stations, 2 Volunteer Stations, 1 Water Rescue Facility, 1 Logistics Facility and is constructing a new station in Edgewood. Station 113 is the only EPFR facility located within Sumner's City Limits.

EPFR contracts for MOE services with Comcast, and does not operate a fiber optic wide area network.

Communications Franchises

The table below lists currently active franchises granted by the City of Sumner and their terms:

Franchisee	Franchise Type	Sumner Ordinance	Date	Term	Expires	Renewal Terms/Comments
WorldCom Network Services - Now part of Verizon	Long Distance Communication	1789	3/4/1997	1 Year	3/4/1998	Expired - Replaced by MCI-metro franchise
Metricom	ROW	1799	6/17/1997	5 Years	6/17/2002	2 additional 5-year terms. Metricom has ceased business operations.
Level 3 Communications	Long Distance Communications	1895	9/20/1999	10 Years		
Zayo	ROW/Data Services	2425	4/13/2013	10 Years	4/13/2023	Month to month if not formally renewed - 180 day notice to terminate
Astound Broadband LLC (Wave Broadband)	ROW/Data Services	2518	5/18/2015	10 Years	5/18/2025	Month to month if not formally renewed - 180 day notice to terminate
Comcast	Cable Services/ROW	2600			8/14/2022	5 Years On agreement by both parties
MCImetro - DBA Verizon	ROW	2601	6/5/2017	10 Years	6/5/2027	Month to month if not formally renewed - 180-day notice to terminate

Table 2 - Sumner Data Communications/Cable Franchises

WorldCom Network Services/Verizon

WorldCom/Verizon's franchise permits the franchisee to operate long distance data communications network infrastructure within Sumner. This fiber optic installation is primarily to serve cellular towers in Sumner with the data backhaul to operate their network.

At the city's request, MCImetro provided a basic network facilities map and fiber optic plant information. The map provided in their response is deemed by MCImetro to be confidential and proprietary, so it is not included in this document.

MCImetro has 20,885 feet of aerially installed fiber optics, and 21,470 feet of underground installed fiber optics within Sumner. Nearly the entire length of MCImetro's underground conduit is on BNSF Railroad right-of-way.

MCImetro's fiber serves at least 2 cell towers inside Sumner City Limits; 1) At 64th St and Sumner Tapps Highway, and 2) Near Pease and Hubbard Streets. Both these towers are on private property.

Comcast

Comcast is the primary provider of Cable TV *and* Internet Services to all of Sumner. Comcast offers 1 GB internet services to all subscribers in Sumner. Based on information provided by Comcast, their

infrastructure is a fairly equal mix of aerial and underground conduit.¹⁰ Comcast did not provide overall mileage information for their installation.

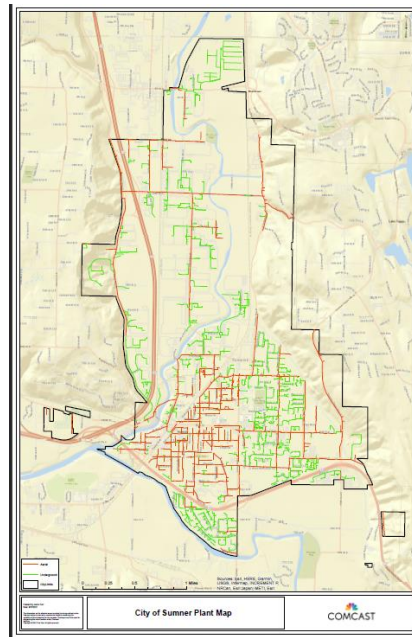


Figure 19 - Comcast Installed Network in Sumner

Comcast’s current Franchise Agreement has provisions for joint-use trenching and conduit installation. The City and Comcast are currently negotiating a new Franchise Agreement to replace their existing agreement, which expires in August 2022. The City in cooperation with the RCC has developed a master franchise agreement template¹¹ which includes joint use provisions for conduit installations. As part of the agreement, we observed that section 7.3 can be enhanced by added language requesting that maps and records be provided “in a standard GIS format (shapefile) including relevant attribute data such as type of fiber or facility, access points, conduit or structure type and size, manhole and handhole locations and elevation, pole locations, etc.”

Section 10.13 of the agreement requires the franchisee to underground at their cost when projects move other utilities underground.

Level 3/Lumen

Level 3/Lumen’s franchise permits the franchisee to operate long distance data communications network infrastructure within Sumner. Level 3’s network presence in Sumner is limited to their Seattle, Tacoma, Portland long-haul, high speed fiber optic link.

At the time of writing, the city has not received any detailed information from the franchisee.

Zayo

At the time of writing, the city has not received any detailed information from the franchisee.

¹⁰ Comcast Sumner Route Map – September 2021

¹¹ RCC – Comcast Model Franchise (Final 1-19-21)

Wave Broadband (Astound Networks)

Wave serves Sumner with dark and lit fiber services under the terms of its franchise. A majority of the fiber optic infrastructure that Wave maintains within Sumner is serving the Sumner - Bonney Lake School District, and the Sumner Library. Most of Wave's fiber is installed aerially, with 6.34 miles on 32 aerial segments. Underground installed fiber mileage is 1.46 miles in 17 segments, with an average length of 454 feet.

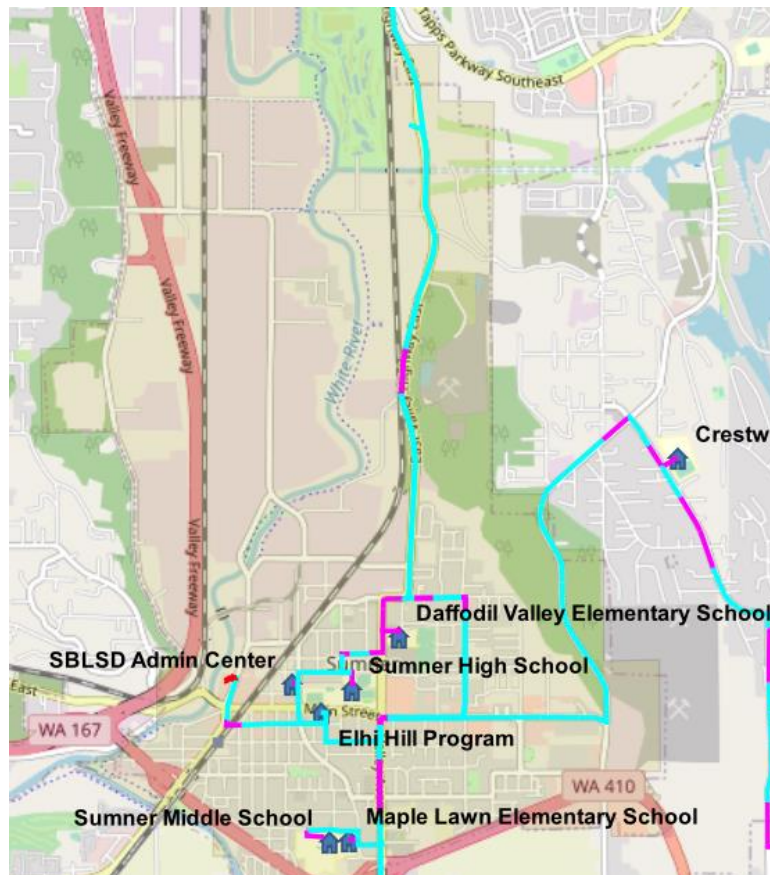


Figure 20 - Wave's Network within Sumner

Fiber Optic Installations Within Sumner

The majority of existing underground conduit within the Sumner city limits was installed and is maintained by cable and telecommunications franchisees. Known underground conduit installations are mainly in neighborhoods served by Comcast.

The majority of Wave Broadband's fiber is installed aerially, with 6.34 miles on 32 aerial segments. Underground installed fiber mileage is 1.46 miles in 17 segments, with an average length of 454 feet.

MCImetro Access has 3.95 miles of aerial fiber, and 4.06 miles underground, primarily within the BNSF Railroad right of way.

Zayo At the time of writing, the city has not received any detailed information from the franchisee.

Sumner's Fiber Optic Network Plan

The City of Sumner developed a pro-forma fiber optic plan designed to connect city facilities to Sumner City Hall. This two-phase plan would connect most city facilities in phase one, with later work to connect the Wastewater Treatment Facility and a number of traffic signals.

Together, the two conceptual implementations represent approximately 10.18 miles of fiber optic cable. Sumner has very limited underground conduit space, so the city's options for build-out of a fiber optic plant will involve trenching or boring for new conduit or utilization of aerial (pole mounted) fiber.

We used GIS Mapping tools to develop fiber optic routes and options for implementation of Sumner's envisioned Phase 1 and Phase 2 fiber optic network routes.

In discussions with the IT and Public Works Departments, we developed alternate routes for some sections of the routes. These decisions were based on Sumner's planned projects, available aerial routes, and considerations such as available bridges and railroad right of way crossings.

Further discussions arrived at a three-phase plan, with Phase 1 connecting City Hall to the Wastewater Treatment Plant, City Shops, and the planned New City Shops facility.

Phase 2 adds The Senior Center, City Well, Sports Facility, The City Cemetery and The Ryan House.

Phase 3 completes the network build-out by completing the North-South Backbone, the Auburn Interconnect, and the Puyallup Interconnect, and adds a short spur westbound on Stewart Ave to allow joining to networks in Pacific west of the White River.

The city is in the planning stage for some projects that may provide an opportunity to implement some elements detailed in Phase 2 before launching all of Phase 2. The planning for all three phases addresses each network segment and details the estimated costs for each segment individually.

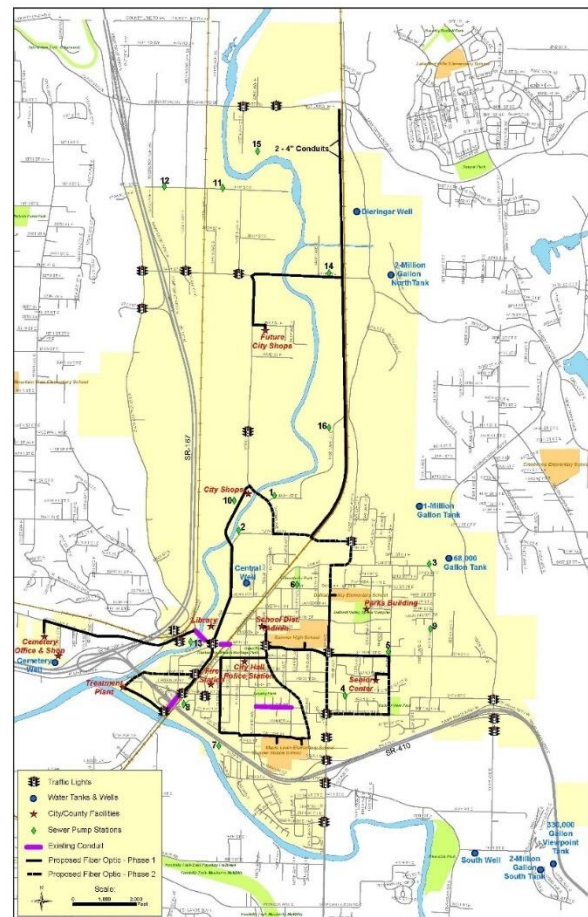


Figure 21 - Sumner's Conceptual Fiber Plan

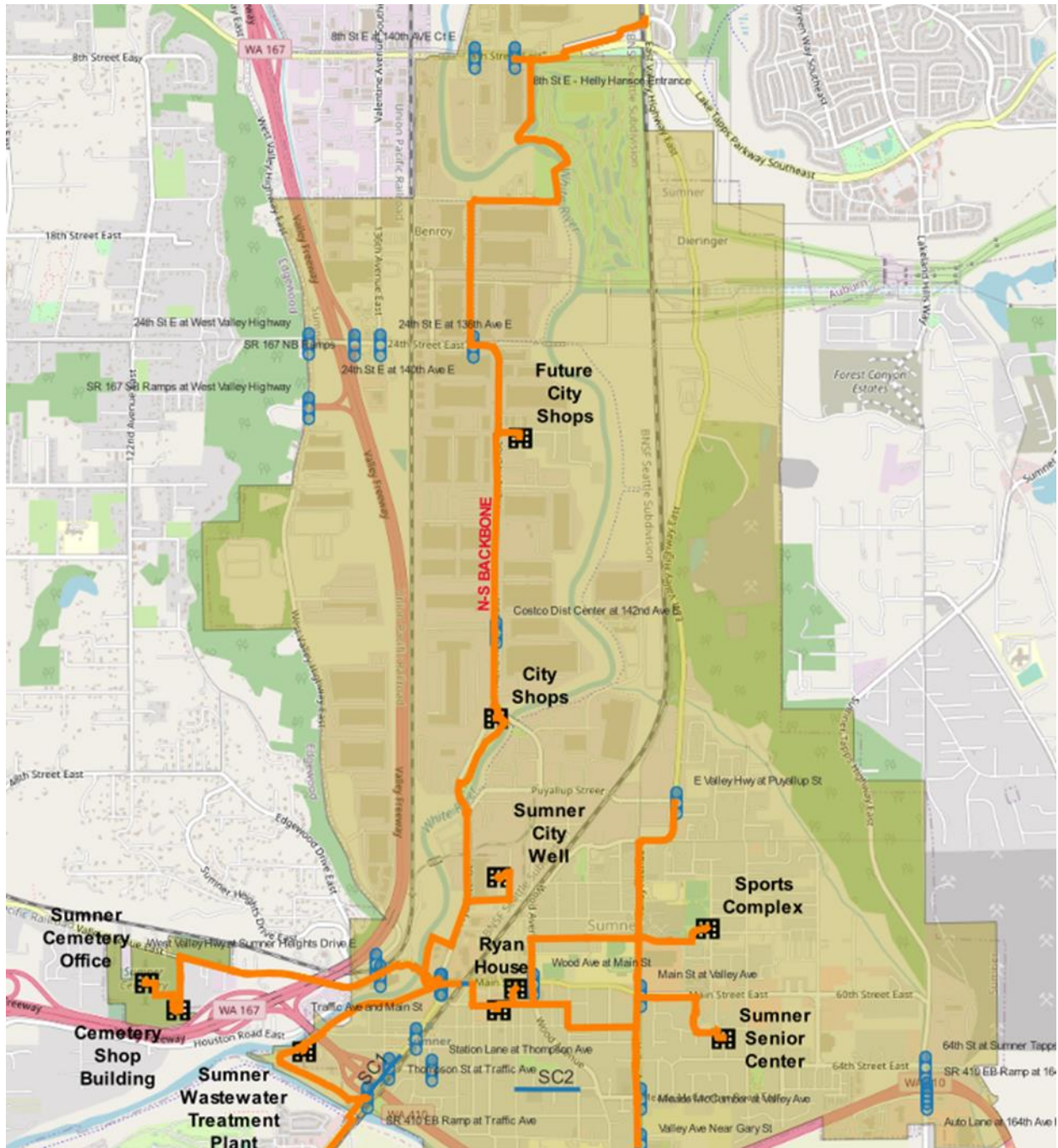


Figure 22- Designed Network - All Phases

Construction Standards Used in Planning

Where Standard Trenching techniques are estimated, 2 four-inch conduits are installed, one of the two conduits contains two 1.25-inch inner ducts, with one of the inner ducts containing one 288 strand fiber optic cable.

Where Micro Trenching techniques are estimated, 6 micro ducts are installed. 2 of the micro ducts will have a 144-strand fiber optic cable installed.

All splice points in the project will be contained in splice cases that make all fiber optic cable strands contained at the splice point available within 1 splice case. The planned design does not splice all strands available in the splice case. This allows for future assignment and routing of unused strands for new purposes.

Aerial construction uses 144 strand Figure 8 cable for backbone segments instead of the 288-strand standard for trenched or micro trenched construction. While aerial construction is significantly less expensive than underground, we detailed only 144 strand cables due to their lighter weight in consideration of potential restrictions by pole owners.

All splice points will contain a splice case to make all fiber cables passing the point available for interconnection in one splice case.

Phase 1 Planning

Phase 1 represents the minimum level of investment necessary to build an initial network that the city can begin to realize benefit from the investment. The plan utilizes right-of-way on the city's trails wherever possible. Phase 1 implements the core of the N-S Backbone to serve the City Shops and the New City Shops site, and provides a spur connection to the Wastewater Treatment Plant.

Phase 1 Route Summary

The table below lists all mapped Phase 1 route segments, their lengths and geography/construction type. A significant portion of the N-S Backbone is available for aerial construction. Planning for the backbone moved nearly 3000 feet to the trail parallel to Fryar Ave, which also alleviated the need to bore under Traffic Ave by passing under the bridge on trail right-of-way. Planning and cost estimates show route costs for the alternate routes listed. A portion of the Sumner Downtown Segment passes under BNSF Railroad right of way in conduit installed by the City, and uses fiber cable already installed in that segment.

Segment Name	Overall Length	Aerial Ft Avail	Length Minus Aerial	ROW	TRAIL	BRIDGE	UNDER STREET
N- S Backbone Phase 1	12297	8566	3730	8890	2929	218	259
Sumner Downtown Phase 1	1376	1155	220	1226	0	0	150
New City Shops Spur	456	456	0	456	0	0	0
WWTP Spur	2925	0	2925	1179	1613	0	133
Totals	17053	10178	6876	11750	4542	218	543

Table 3 – Phase 1 Network Segment Lengths and Construction Methods



Figure 23 - Phase 1 Network – Segments in Blue Represent Aerial Construction

Phase 1 – Individual Segment Descriptions

During planning discussions, a few options for design of the North – South Backbone were reviewed. While not all sections of the North – South Backbone are implemented in Phase 1, they are included in the report here in order to inform the reader on the final design decisions for the backbone.

North – South Backbone – First Round Design

This is the longest segment of the Sumner fiber network. This section provides core connectivity to City Hall and city facilities. Allocated fiber on the backbone can also be used to provide pass-through transmission to neighboring cities (Auburn, Puyallup). The segment begins at the North Sumner Terminus Splice Point. The Backbone segment ends at the Traffic Avenue Splice Point. A North - South Backbone extension shown as the Puyallup Interconnect is documented in Phase 3 of this plan. This section carries a 288-strand fiber optic cable. Where the segment is constructed in Micro Duct, 288 strands will be provided in two 144 strand cables. In Sumner's conceptual plan, the majority of the backbone runs along Sumner's trails. Construction costs in the trail geography are lower and cause less impact to traffic.

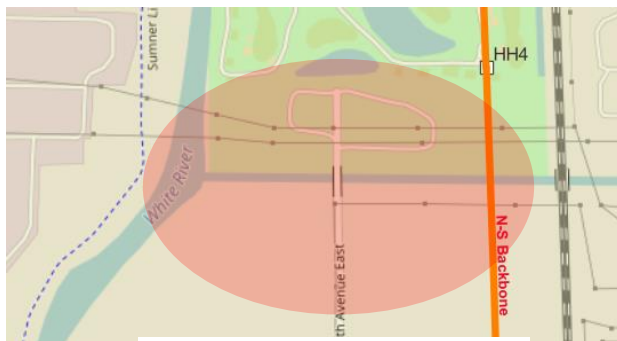


Figure 25 - Deringer Outfall Area

Major concerns on this route are planned road and revetment work at the Deringer power plant outfall channel. The river crossing at 24th street that contains power and gas utilities is also deemed impractical.



Figure 24 - Original Designed N-S Backbone

Discussion with Public Works arrived at an alternate route for sections of the North – South Backbone and the New City Shops Spur. This routing avoids the Deringer outfall area and the river crossing at 24th St.

North – South Backbone Alternate

The concerns over construction in the Deringer outfall area and the river crossing at 24th Street developed an alternate route for a section of the North – South Backbone. This section crosses the White River further north at the trail bridge crossing into Riverbend Park, enters right of way on 16th St E, turns south on 140th Ave E, takes a short run on 24th St E to join 142nd Ave E, and continues south on right of way to join the original North – South Backbone route at Tacoma Avenue. This routing also reduces the length of the City Shops Spur from 5,865 feet to 492 feet, by merging what was a spur route into the main North – South Backbone.

An evaluation of potential cost differences should be performed in planning, since the alternate route presented here is primarily located on right of way. While most of this route has aerial mounting available, trenching or micro trenching on this route will be significantly more expensive than trail construction.

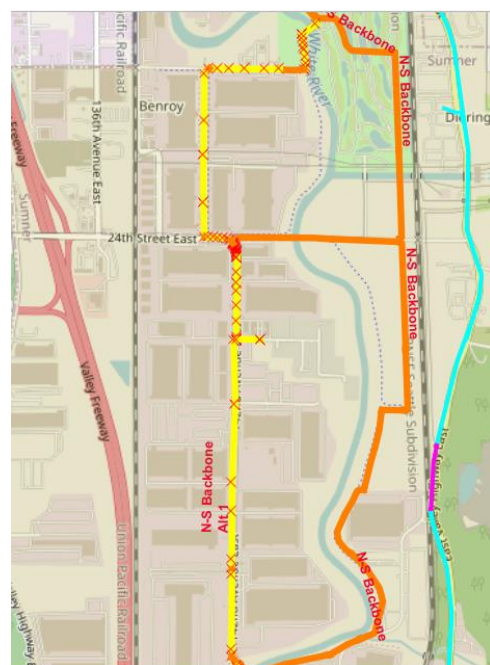


Figure 26- N-S Backbone Alternate

Depending on the timing of City projects, the N-S backbone segment from 24th St East south to the Tacoma Ave Bridge and connecting to the City Shops could be constructed along Trail right-of-way at lower cost than trenching or Microtrenching along 142nd Ave.

North – South Backbone Fryar Trail Alternate

This segment uses about 1600 feet of trail instead of aerial attachments along the North-South Backbone Fryar Ave section. Leaving Fryar Ave at the NE corner of the current Sumner Library, the route continues on trail to the Traffic Avenue Bridge Splice Point.

There are two advantages to this alternate; a) Using the section of trail will reduce the length of the aerial span on Fryar Avenue and; b) Because this alternate passes under the Traffic Ave Bridge, it eliminates one under-street boring project. The Traffic Avenue intersection presents a challenge to any horizontal drilling or boring due to the high number of conduits and utilities already passing through this location to traverse the bridge.

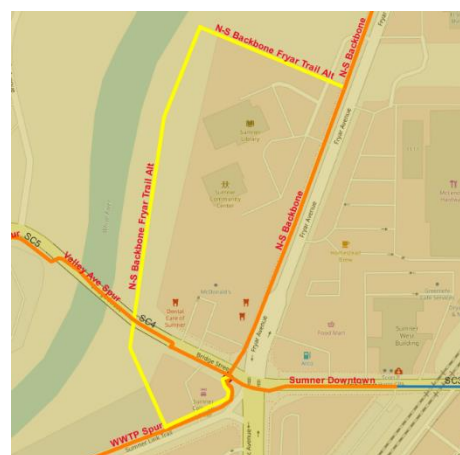


Figure 27 - Fryar Trail Alternate Route

Final Design for the North – South Backbone

Evaluation of the original plans to use a majority of trail construction in the northern section and the potential for costly construction in the Deringer Outfall and the routing of the backbone along the Fryar Ave Trail segment arrived at the design shown here. The backbone begins at the North Sumner Terminus and ends at the Traffic Ave Splice point.

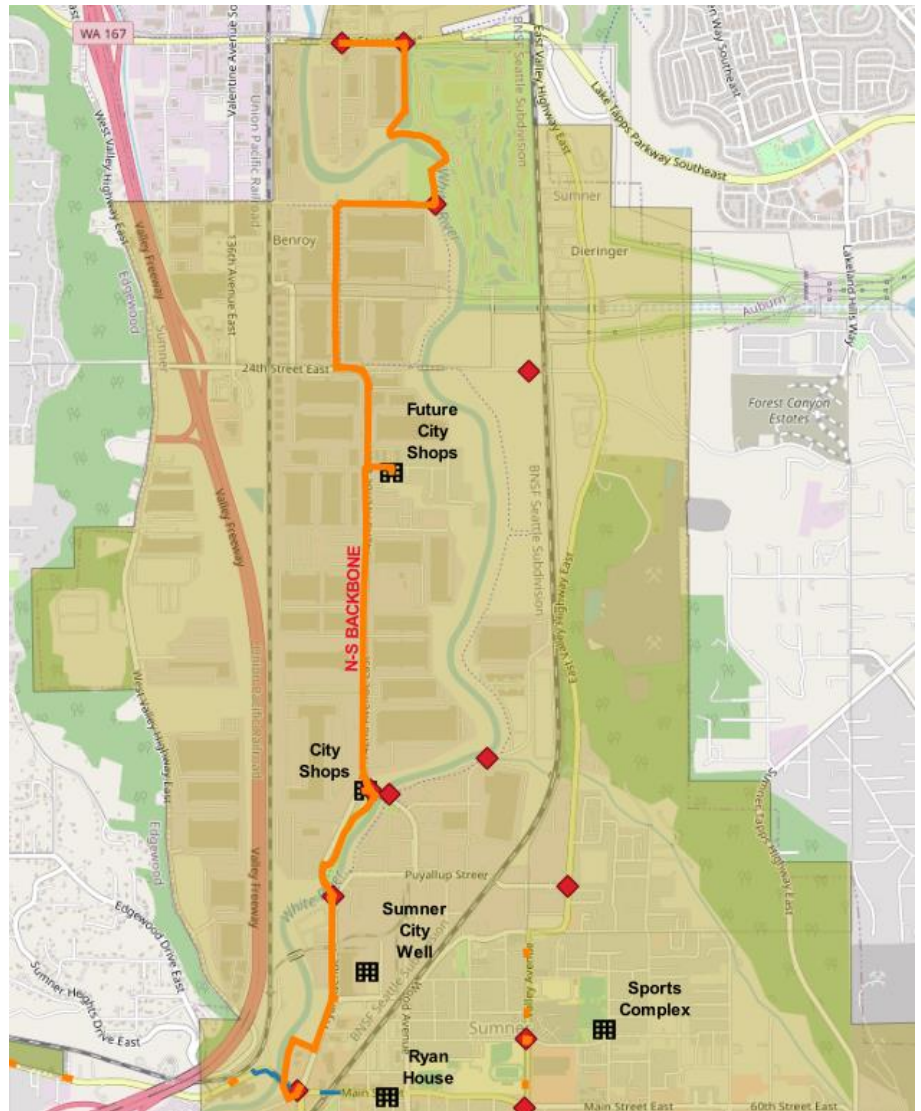


Figure 28 - Final Design N-S Backbone

North South Backbone Phase 1

During planning, it was decided to construct sections of the North – South Backbone in two stages; In Phase 1, only the segments of the backbone needed to serve facilities planned in Phase 1 are built, and in Phase 3, the backbone is completed. A majority of this route can be aerially constructed, so there is limited use of trail right of way.



Figure 29 - N-S Backbone Phase 1 – Aerial in Blue

New City Shops Spur

This spur connection connects to the North South Backbone at the intersection of 142nd Ave East at 29th Street East. Aerial construction is available on this spur, however underground construction could be considered as part of the planned new construction.

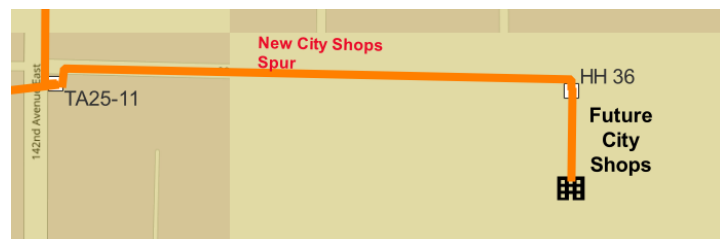


Figure 30 - New City Shops Spur

Shops Entry

This short spur connects the N-S Backbone to the City Shops site. This spur is on city property, and underground construction can be completed with little impact.

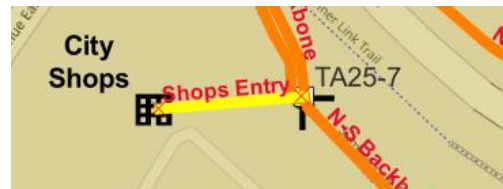


Figure 31 - City Shops Entry Spur

WWTP Spur

Beginning at the Traffic Ave Splice Point, the WWTP spur travels on the Sumner Link Trail and provides service to the Wastewater Treatment Plant. Though this is detailed as a Spur Route, Phase 3 expansion to provide the Puyallup Interconnect passes on this route, so this spur link is detailed to carry 288 strands in its fiber cables. A splice point at the entry point on the trail is provided to allow connection to the Puyallup Interconnect.



Figure 32 - WWTP Spur

Phase 2 Planning

Phase 2 adds connections to the City Well, Sports Complex, Senior Center, Cemetery and the Ryan House, and completes the Sumner Downtown Segment and a portion of the Valley Ave South Backbone.

Segment Name	Overall Length	Aerial Ft Avail	Length Minus Aerial	ROW	TRAIL	BRIDGE	UNDER STREET
Sumner Downtown Phase 2	3170	3020	150	3020	0	0	150
Valley Ave South Backbone Phase 2	1717	1717	0	1529	0	0	188
City Well Spur	1446	1241	205	1479	0	0	40
Sports Complex Spur	1446	937	509	1219	185	0	42
Senior Center Spur	2416	923	1493	2215	0	0	201
Valley Avenue Spur	5020	3360	1660	4585	0	369	66
Sumner Cemetery Entry Spur	2080	931	1149	930	1107	0	43
Ryan House Spur	309	309	0	309	0	0	0
Totals	17604	12438	5166	15286	1292	369	730

Table 4 – Phase 2 Segment Lengths and Construction Methods



Figure 33 - Phase 2 Network Segments (Yellow)

Phase 2 – Individual Segment Descriptions

Sumner Downtown - East

The Sumner Downtown East segment provides an East – West backbone that serves Sumner City Hall and spur connections to the Ryan House, Sumner Senior Center, and the Sumner Parks

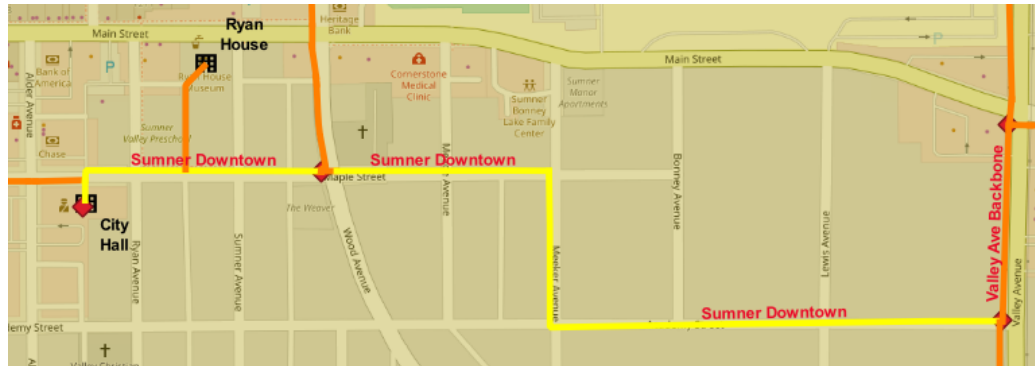


Figure 34 - Sumner Downtown East (Yellow)

Building. The Sumner Downtown Segment also passes the new Sumner Library site, allowing for future connection to the segment. Starting at the Traffic Ave splice point, the route proceeds east on Main Street, south on Kincaid Ave to Maple Street, east on Maple Street, connects to City Hall, then continues east on Maple Street, south on Meeker Ave, then east on Academy Street and joining the Valley Ave South Backbone in a splice case at Valley Ave.

Valley Avenue South Backbone

In Phase 2, only the backbone segments required to connect the Sports Complex and the Senior Center are planned. Splice points are provided on the segments built in Phase 2 for final expansion of the backbone in Phase 3.



Figure 35 - Valley Avenue South Backbone – Phase 2 (Yellow)

City Well Spur

The City Well Spur provides connectivity to the network and connects on the west to the N-S Backbone at Fryar Ave, runs eastbound on Zehnder St, to Steel Ave and north to the City Well Site. Aerial attachments are available from Fryar Ave all the way to the site entrance. Current plans show a conduit on city property to enter the building, although a city installed and owned pole on the property could be used to reduce construction costs.



Figure 36 - City Well Spur (Yellow)

Sports Complex Spur

The Sports Complex Spur connects on its West side at the Valley Avenue Backbone and travels along Washington Street and enters and crosses the Sports Complex parking lot. The segments crossing the parking lot are planned as trail-type micro trench construction.

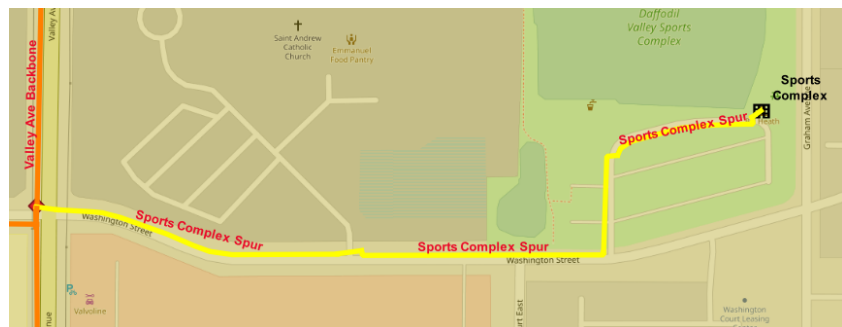


Figure 37 - Sports Complex Spur (Yellow)

Senior Center Spur

The Senior Center Spur extends from the Valley Avenue N-S Backbone East along Main Street East, then south on 153rd Ave East, then east on 62nd St Ct East, and entering the Senior Center property. On-property undergrounding is planned to use micro-trenching.



Figure 38 - Senior Center Spur (Yellow)

Valley Avenue West Spur

The Valley Ave West Spur begins at the Traffic Ave Splice Point and proceeds westbound across the Traffic Ave Bridge, along Cannery Way towards Valley Ave East, and ends at the Sumner Cemetery Entry. A splice case is provided at the western terminus for the spur to allow for interconnection to City of Puyallup networks. A portion of this route passes through Pierce County right-of-way.

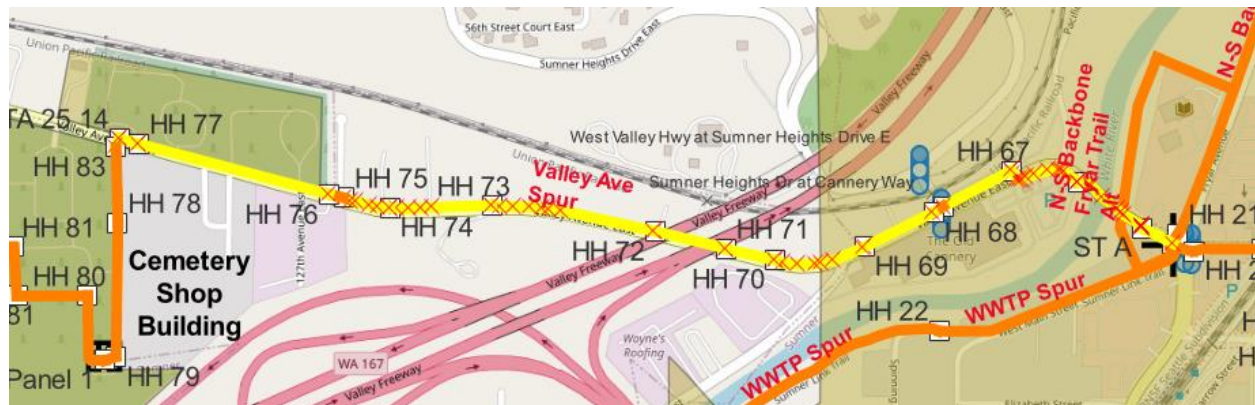


Figure 39 - Valley Ave West Spur (Yellow)

Cemetery Entry

This spur connects to the Valley Ave West spur to allow connection of the Cemetery Shops Building and Cemetery Office to the network. The geography type for this spur while on cemetery grounds is listed as Trail, and will use trail-like construction techniques, modified to suit the special requirements for conduit construction on the cemetery grounds. Aerial cable installation is available on 124th Ave Court East.



Figure 40 - Cemetery Entry Spur

Ryan House Spur

This spur connects to the Sumner Downtown segment and provides a data path to City Hall. Aerial construction is available along the entire length.



Figure 41- Ryan House Spur (Yellow)

Phase 3 Planning

Phase 3 completes the build-out. Completion of the North South Backbone allows connection to the Auburn and Puyallup Interconnects, and the Valley Ave Backbone running from Gary Street to Puyallup Street connects to Sumner's traffic signals along Valley Ave.

Segment Name	Overall Length	Aerial Ft Avail	Length Minus Aerial	ROW	TRAIL	BRIDGE	UNDER STREET
N-S Backbone Extension Phase 3	9776	3067	6709	5657	3674	274	172
Auburn Interconnect Phase 3	2454	0	2454	0	2398	0	56
Puyallup Interconnect Phase 3	5376	0	5376	633	4351	308	29
Sumner Schools Loop Phase 3	3229	3060	169	3060	0	0	169
Valley Ave Backbone Phase 3	6768	6768	0	6293	0	0	475
Stewart West Spur	1020	0	1020	1020	0	0	0
Totals	28623	12895	15728	16663	10423	582	900

Table 5 - Phase 3 Segment Lengths and Construction Methods

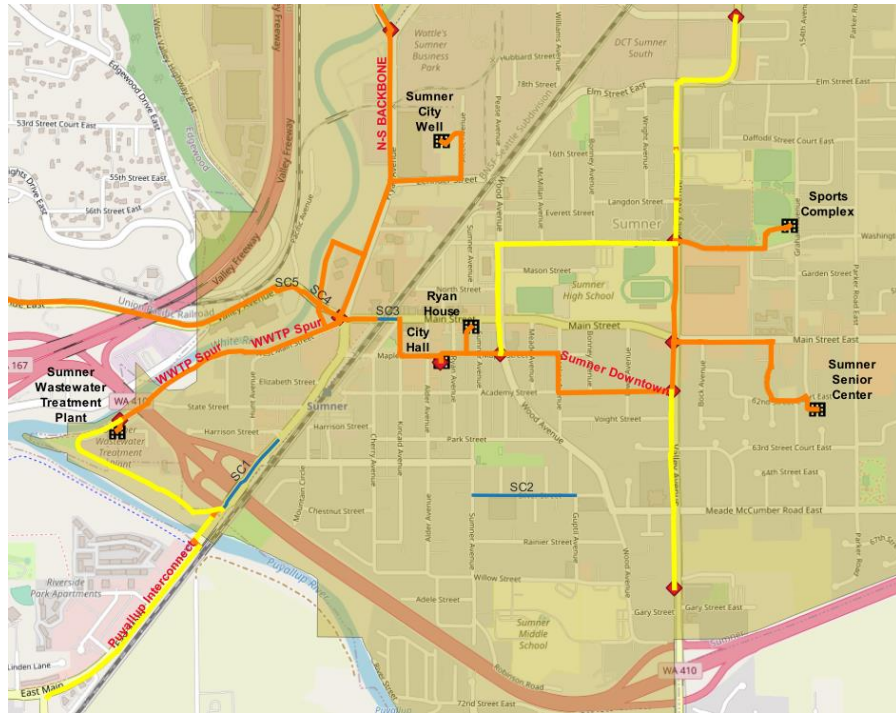


Figure 42 - Phase 3 Southern Sumner (Yellow)



Figure 43 – Phase 3 Northern Sumner (Yellow)

Phase 3 – Individual Segment Descriptions

Valley Avenue North South Backbone – Phase 3

This backbone provides connectivity to traffic signals along Valley Ave South from the northernmost signal at East Valley Highway and Puyallup Street and Gary Street at the south. Splice cases at each end of the route are planned to provide connection to future network extensions. If a conduit path under BNSF Railroad at Puyallup street is available, a redundant network path to connect to the N-S Backbone can be implemented. The highlighted segments here show Phase 3 completion of the backbone's construction.



Figure 44 - Valley Ave South Backbone – Phase 3 (Yellow)

Auburn Interconnect

This is the northernmost element of the Sumner fiber network. Crossing under the BNSF Railroad using the trail underpass and continuing on trail to cross 8th Ave East, it joins the North Sumner Terminus of the North-South backbone. The segment provides a connection to the City of Auburn's ITS Fiber Network. The planning for this segment assumes that BNSF Railroad will approve a micro trench installation through/under the pedestrian railroad underpass near the intersection located at East Valley Highway and Terrace View Drive SE.



Figure 45- BNSF Railroad Underpass

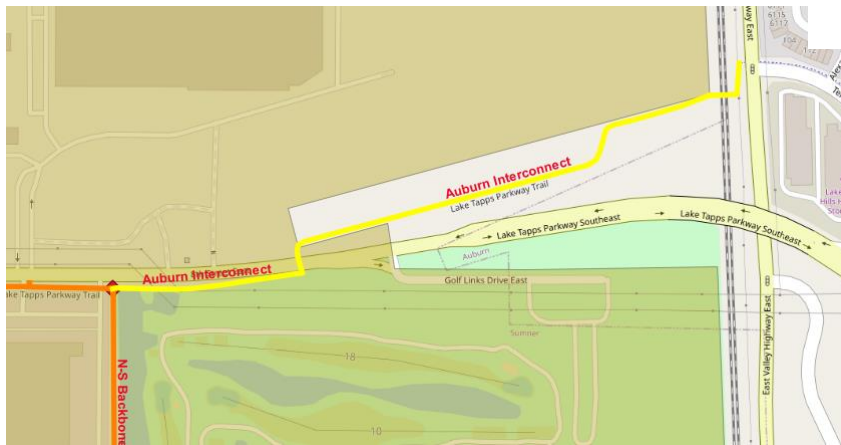


Figure 46 - Auburn Interconnect (Yellow)

Puyallup Interconnect (North – South Backbone South Extension)

This segment is planned for future expansion should the cities of Sumner and Puyallup decide to connect their fiber optic networks. This segment continues the 288 strand Wastewater Treatment Spur at the splice point outside the Wastewater Treatment Plant using trail to continue across the Puyallup river, and then on Puyallup right of way on East Main St and trail to reach Puyallup's fiber optic network at the intersection of East Main Street and Shaw Road.

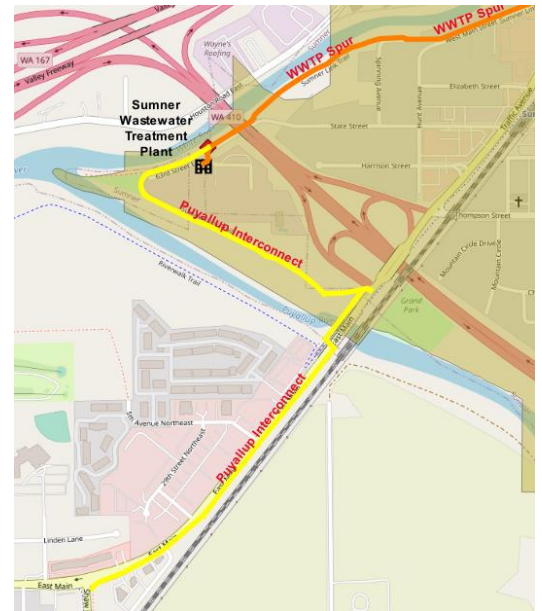


Figure 47 - Puyallup Interconnect (Yellow)

Stewart West Spur

Starting at the terminus of the North – South Backbone, this spur provides service to two traffic signals on 8th St E, and delivers a splice case to allow connection for future fiber cable as the Stewart Ave Improvement Project continues.



Figure 48- Stewart West Spur (Yellow)

Construction Cost Estimate Methodology

Based on the city's high-level Phase 1 and Phase 2 concepts we developed the Scenarios described in this report; Scenario 1 is based on traditional Outside Plant (OSP) construction methods using trenching, horizontal boring to cross under streets. Scenario 2 is based on the use of Micro Trenching to replace the traditional "dig and cover" trenching for conduit. There are sections of each phase where there is an option to install conduit or install aerial cable. Each scenario describes the estimated costs of aerial and trenching/micro trenching, horizontal boring (Under street intersections), and bridges or bridge attachments.

Using a GIS model, potential fiber optic routes and alternatives, length computations¹², handhole and fiber vault locations were placed along the route¹³. In the cases where aerial installations were available, costs of aerial make-ready work, splice case locations, slack loops and risers were assumed to be equal to those of placement of underground handholes, vaults and splice cases along the route. The City of Sumner standards¹⁴ require handholds to be located at 600 to 1000 feet apart with a maximum of two 90-degree bends between fiber pull points. There are locations along the projected routes where these design limits were exceeded. In these cases, un-numbered handholes have been added to the route computations to allow the construction cost estimates to reflect handholds or vaults needed to meet the city's design specifications.

Construction costs were estimated using a number of open-source records from public contract fiber optic installations. These estimates took into account the geography of the construction (Urban Medium Density, Rural, and Urban Medium Density Aerial). For each geography type, low, medium and high-cost numbers were established.¹⁵ There is less information available for Microtrenching installations, so some assumptions were used in computing construction costs in the Trail Geography. These are noted in Appendix A - Construction Cost Calculations and Summary.

Construction estimates assume that trenched conduit installations will install two 4" conduits, with one conduit carrying two 1.25" Innerducts, and a 288-strand fiber optic cable. In any segment considered to be part of the Backbone, a 288-strand fiber optic cable is the standard.

Installation Type	Fiber Optic Cable Type (Typical)	Number Of Strands
Backbone – Trail Conduit	Corning Single Mode Gel-Filled	288
Backbone – Trail Microtrenched	Corning MiniXtend – Single Mode	144/144
Backbone – ROW Conduit	Corning Single Mode Gel-Filled	288

¹² Construction Costs – Final for Report.xlsx - Spreadsheet

¹³ Fiber Optic Association Underground Cable Plant Construction - https://www.thefoa.org/tech/ref/OSP_Construction/Underground_Construction.html

¹⁴ City of Sumner Conduit Design Standards Memorandum, December 18, 2017

¹⁵ Reference spreadsheet Construction Costs – Final for Report.xlsx – Included in reference document set

Installation Type	Fiber Optic Cable Type (Typical)	Number Of Strands
Backbone – ROW Microtrenched	Corning MiniXtend – Single Mode	144/144
Backbone - Aerial	Corning ALTOS Figure-8 Loose Tube Gel Free – Single Mode	144
Spur to Site - Conduit	Corning Single Mode Gel-Filled	48
Spur to Site – Micro trench	Corning MiniXtend – Single Mode	48
Spur to Site – Aerial	Corning ALTOS Figure-8 Loose Tube Gel Free – Single Mode	48

Table 6 - Fiber Optic Cable Types by Construction Method

Microtrenched conduit installations assume that 6 micro ducts will be installed in each trench, with 1 144 strand micro cable installed in two of the six micro ducts, leaving four micro ducts for future use.

Aerial installations are estimated at 41.4 poles per mile, with an annual pole attachment fee of \$26.49/Year per pole.¹⁶

Fiber splicing labor and materials costs were computed using an average of \$40.45 labor per splice, and \$600 per splice case. Splicing costs shown represent the costs researched for low-quantity splice jobs. For each splice case, there are costs for setup and mobilization, and these costs will be lower in a larger project. The costs for splice cases shown at \$600 per case represent high-side retail costs for quantity 1 purchases. Under a project bill of materials, the cost per splice case will be lower.

In developing the Outside Plant construction cost estimates, we examined current construction costs, labor rates, and availability, and municipal fiber optic projects of similar scope. We developed 3 cost models; Low, Medium, and High. A full breakdown of costing estimates is shown in Appendix A.

¹⁶ TPU Pole Attachment Presentation 2017

Network Construction Scenarios

Phase 1 - Connect Priority City Facilities

This plan uses only segments required to interconnect all City Facilities. It does not extend the N-S Backbone to the northern terminus of the network, and does not extend the Sumner Downtown Segment to the east past City Hall.



Figure 49 - Phase 1 Network

Construction Cost Estimate Summary – Phase 1

Standard Trenching	Micro Trenching (Where Feasible)	Standard Trenching Using Aerial Where Available	Micro trenching Using Aerial Where Available
\$2,009,635	\$1,347,748	\$629,927	\$505,431

Table 7 – Phase 1 Construction Cost Summary by Method

Detail By Segment Using Standard Trenching Techniques

Two 4-inch conduits, one with 1.25" innerduct, 288 Strand Cable in all segments;

Phase 1 – Project Detail Using Standard Trenching

Segment/ Item	Length	Construction	Fiber Cable (Including Slack)	Hardware (Splice Cases)	Splicing Labor	Segment Total
N-S Backbone Phase 1	12297	\$1,104,977	\$39,236	\$2,400	\$6,310	1,152,923
Sumner Downtown Phase 1	1375.64	\$142,847	\$4,929	\$2,751	\$1,000	151,527
New City Shops Spur	456	\$51,528	\$880	\$0	\$0	52,408
WWTP Spur	2925.16	\$185,462	\$9,797	\$600	\$324	196,182
					<i>Subtotal</i>	<i>1,553,041</i>
20% Contingency		\$310,608			WSST (9.4%)	145,986
					Project Design	155,304
					Project Management	155,304
					Project Total	2,009,635

Table 8 - Phase 1 Cost Detail - Using Standard Trenching

Phase 1 Project Detail Using Micro Trenching

Segment/ Item	Length	Construction	Fiber Cable (Including Slack)	Hardware (Splice Cases)	Splicing Labor	Segment Total
N-S Backbone Phase 1	12297	\$722,915	\$32,266	\$2,400	\$6,310	\$763,891
Sumner Downtown Phase 1	1375.64	\$92,596	\$4,054	\$2,751	\$1,000	\$100,400
New City Shops Spur	456	\$32,832	\$423	0	0	\$33,255
WWTP Spur	2925.16	\$127,453	\$15,613	\$600	\$324	\$143,990
					Subtotal	\$1,041,536
20% Contingency		\$208,307			WSST (9.4%)	\$97,904
					Project Design	\$104,154
					Project Management	\$104,154
					Project Total	\$1,347,748

Table 9 - Phase 1 Cost Detail Using Micro Trenching

Phase 1 Project Detail Using Standard Trenching and Aerial Attachments

Cost calculations for Trenching and Aerial used 144 Strands for Backbone and Sumner Downtown Segments due to Aerial cable size considerations.

Pole use fees for the first year are included as part of the project cost calculations.

Segment/ Item	Length	Construction	Fiber Cable (Including Slack)	Hardware (Splice Cases)	Splicing Labor	Segment Total
N-S Backbone Phase 1	12297	\$222,654	\$24,770	\$2,400	\$6,310	\$256,134
Sumner Downtown Phase 1	1305.35	\$15,904	\$7,869	\$2,751	\$1,000	\$27,523
New City Shops Spur	456	\$4,560	\$751	\$0	\$0	\$5,311
WWTP Spur	2925.36	\$185,484	\$9,796	\$600	\$324	\$196,204
					Subtotal	\$485,172
20% Contingency		\$96,144			WSST (9.4%)	\$45,606
					Project Design	\$48,517
					Project Management	\$48,517
					First Year Pole Use	\$2,114
					Project Total	\$629,927

Table 10 - Phase 1 Cost Detail Using Standard Trenching and Aerial

Phase 1 – Project Detail Using Micro Trenching and Aerial Attachments

Cost calculations for Trenching and Aerial used 144 Strands for Backbone and Sumner Downtown Segments due to Aerial cable size considerations.

Pole use fees for the first year are included as part of the project cost calculations.

Segment/ Item	Length	Construction	Fiber Cable (Including Slack)	Hardware (Splice Cases)	Splicing Labor	Segment Total
N-S Backbone Phase 1	12296	\$191,799	\$21,055	\$2,400	\$6,310	\$221,564
Sumner Downtown Phase 1	1305.35	\$15,904	\$7,869	\$2,751	\$1,000	\$27,523
New City Shops Spur	456	\$4,560	\$751	\$0	\$0	\$5,311
WWTP Spur	2925.36	\$127,467	\$7,807	\$600	\$324	\$136,198
					<i>Subtotal</i>	\$390,596
20% Contingency		\$78,119			WSST (9.4%)	\$36,716
					Project Design	\$39,060
					Project Management	\$39,060
					First Year Pole Use	\$2,114
					Project Total	\$505,431

Table 11 – Phase 1 Cost Detail Using Micro Trenching and Aerial

Phase 2 – Construction Cost Scenarios to Connect Remaining City Facilities

Phase 2 Construction Cost Estimate Summary

Standard Trenching	Micro Trenching (Where Feasible)	Standard Trenching Using Aerial Where Available	Micro trenching Using Aerial Where Available
\$2,522,884	\$1,579,664	\$860,137	\$860,137

Table 12 - Phase 2 Construction Cost Summary by Construction Method

Phase 2 Project Detail Using Standard Trenching

Segment/ Item	Length	Construction	Fiber Cable (Including Slack)	Hardware (Splice Cases)	Splicing Labor	Segment Total
Sumner Downtown Phase 2	3170	\$345,604	\$10,566	\$3,600	\$3,074	\$362,844
Valley Ave South Backbone Phase 2	1717	\$178,192	\$6,001	0	0	\$184,194
Sumner City Well Spur	1519	\$168,287	\$2,571	0	\$162	\$171,020
Sports Complex Spur	1446	\$144,515	\$2,455	0	0	\$146,970
Senior Center Spur	2416	\$256,124	\$3,999	0	0	\$260,123
Valley Ave Spur	5020	\$540,314	\$11,744	0	0	\$552,058
Sumner Cemetery Spur	2080	\$231,428	\$5,122	8	\$600	\$237,158
Ryan House Spur	309	34,917	\$395	0	0	\$35,312
					Subtotal	\$1,949,679
					WSST (9.4%)	\$183,270
20% Contingency		\$389,936			Project Design	\$194,968
					Project Management	\$194,968
					Project Total	\$2,522,884

Table 13 - Phase 2 Using Standard Trenching

Phase 2 Project Detail Using Micro Trenching

Segment/ Item	Length	Construction	Fiber Cable (Including Slack)	Hardware (Splice Cases)	Splicing Labor	Segment Total
Sumner Downtown Phase 2	3170	\$221,786	\$16,878	\$3,600	\$3,074	\$245,339
Valley Ave South Backbone Phase 2	1717	\$115,519	\$9,370	0	0	\$124,889
Sumner City Well Spur	1519	\$107,648	\$1,236	0	\$162	\$109,045
Sports Complex Spur	1446	\$94,536	\$1,180	0	0	\$95,716
Senior Center Spur	2416	\$165,309	\$1,921	0	0	\$167,230
Valley Ave Spur	5020	\$352,329	\$6,734	0	0	\$359,063
Sumner Cemetery Spur	2080	\$94,775	\$1,706	8	\$600	\$97,089
Ryan House Spur	309	\$22,248	\$140	0	0	\$22,388
					Subtotal	\$1,220,760
				WSST (9.4%)		\$114,751
20% Contingency		\$244,152			Project Design	\$122,076
					Project Management	\$122,076
					Project Total	\$1,579,664

Table 14 - Phase 2 Using Micro Trench

Phase 2 Using Standard Trenching and Aerial Where Available

Cost calculations for Trenching and Aerial used 144 Strands for Backbone and Sumner Downtown Segments due to Aerial cable size considerations.

Pole use fees for the first year are included as part of the project cost calculations.

Segment/ Item	Length	Construction	Fiber Cable (Including Slack)	Hardware (Splice Cases)	Splicing Labor	Segment Total	
Sumner Downtown Phase 2	3020	\$30,200	\$5,844	\$3,600	\$3,074	\$42,718	
Valley Ave South Backbone Phase 2	1717	\$17,168	\$3,474	0	0	\$20,643	
Sumner City Well Spur	1522	\$44,163	\$2,172	0	\$162	\$46,497	
Sports Complex Spur	1404	\$62,141	\$2,135	0	0	\$64,276	
Senior Center Spur	2316	\$158,155	\$3,488	0	0	\$161,643	
Valley Ave Spur	4960	\$175,736	\$10,285	0	0	\$186,021	
Sumner Cemetery Spur	2081	\$135,648	\$3,216	8	\$600	\$139,472	
Ryan House Spur	309	\$3,090	\$352	0	0	\$3,442	
					Subtotal	\$664,712	
				WSST (9.4%)		\$62,483	
				20% Contingency	\$132,942	Project Design	\$66,471
						Project Management	\$66,471
						First Year Pole Use	\$2,583
						Project Total	\$860,137

Table 15 – Phase 2 Standard Trenching and Aerial

Phase 2 Using Micro Trenching and Aerial Where Available

Cost calculations for Trenching and Aerial used 144 Strands for Backbone and Sumner Downtown Segments due to Aerial cable size considerations.

Pole use fees for the first year are included as part of the project cost calculations.

Segment/ Item	Length	Construction	Fiber Cable (Including Slack)	Hardware (Splice Cases)	Splicing Labor	Segment Total
Sumner Downtown Phase 2	3020	\$30,200	\$5,844	\$3,600	\$3,074	\$42,718
Valley Ave South Backbone Phase 2	1717	\$17,168	\$3,474	\$0	\$0	\$20,643
Sumner City Well Spur	1522	\$32,642	\$1,860	\$0	\$162	\$34,664
Sports Complex Spur	1404	\$42,994	\$1,669	\$0	\$0	\$44,663
Senior Center Spur	2316	\$105,183	\$2,256	\$0	\$0	\$107,439
Valley Ave Spur	4960	\$127,930	\$8,654	\$0	\$0	\$136,584
Sumner Cemetery Spur	2081	\$90,261	\$3,216	\$8	\$600	\$94,085
Ryan House Spur	309	\$3,090	\$352	\$0	\$0	\$3,442
					Subtotal	\$484,238
				WSST (9.4%)		\$45,518
20% Contingency		\$96,848			Project Design	\$48,424
					Project Management	\$48,424
					First Year Pole Use	\$2,114
					Project Total	\$626,604

Table 16 - Phase 2 Using Micro Trench and Aerial

Phase 3 – Construction Cost Scenarios –Auburn and Puyallup Interconnects, Sumner Schools Loop, Valley Ave Backbone Extension

Phase 3 adds segments to interconnect with Auburn and Puyallup city networks, adds a loop to connect to the Sumner Schools Administration Center and also provides a redundant route to serve city facilities. This phase also connects the Valley Ave Backbone to Puyallup Street on the North and near Gary Street on the south.

These additions are projects that can stand alone since they are not part of the Phase 1 or 2 objectives of connecting all city facilities.

Phase 3 Construction Cost Summary

Standard Trenching	Micro Trenching (Where Feasible)	Standard Trenching Using Aerial Where Available	Micro trenching Using Aerial Where Available
\$2,825,825	\$2,116,253	\$1,350,036	\$1,034,368

Table 17 - Phase 3 Construction Cost Summary by Construction Method

Phase 3 – Project Detail Standard Trench Construction

Segment/ Item	Length	Construction	Fiber Cable (Including Slack)	Hardware (Splice Cases)	Splicing Labor	Segment Total
N-S Backbone Extension Phase 3	9776	\$760,731	\$31,319	\$600	\$1,942	\$794,592
Auburn Interconnect	2454	\$73,564	\$8,317	\$0	\$0	\$81,881
Puyallup Interconnect	5376	\$211,616	\$17,497	\$0	\$971	\$230,083
Sumner Schools Loop	3229	\$350,689	\$10,751	\$0	\$485	\$361,926
Valley Ave N-S Backbone Extension	6768	\$724,892	\$21,868	\$1,200	\$485	\$748,445
Stewart Ave West Spur	1020	\$115,214	\$3,811	\$600	\$0	\$119,625
				Subtotal		\$2,336,551
20% Contingency		\$467,310			WSST (9.4%)	\$21,964
					Project Design	\$233,655
					Project Management	\$233,655
					Project Total	\$2,825,825

Table 18 - Phase 3 Project Detail - Standard Trench

Phase 3 – Project Detail Micro Trench Construction

Segment/ Item	Length	Construction	Fiber Cable (Including Slack)	Hardware (Splice Cases)	Splicing Labor	Segment Total
N-S Backbone extension Phase 3	9776	\$555,192	\$31,319	\$600	\$1,942	\$589,053
Auburn Interconnect	2454	\$59,176	\$6,590	\$0	\$0	\$65,766
Puyallup Interconnect	5376	\$159,544	\$14,139	\$0	\$971	\$174,654
Sumner Schools Loop	3229	\$225,225	\$8,592	\$0	\$485	\$234,302
Valley Ave N-S Backbone Extension	6768	\$466,872	\$17,733	\$1,200	\$485	\$486,291
Stewart Ave West Spur	1020	\$73,410	\$3,811	\$600	\$0	\$77,821
				Subtotal		\$1,627,887
20% Contingency		\$325,577			WSST (9.4%)	\$162,789
					Project Design	\$162,789
					Project Management	\$162,789
					Project Total	\$2,116,253

Table 19 - Phase 3 Project Detail - Micro Trenching

Phase 3 – Project Detail Standard Trench with Aerial Where Available

Cost calculations for Trenching and Aerial used 144 Strands for Backbone and Sumner Downtown Segments due to Aerial cable size considerations.

Pole use fees for the first year are included as part of the project cost calculations.

Segment/ Item	Length	Construction	Fiber Cable (Including Slack)	Hardware (Splice Cases)	Splicing Labor	Segment Total
N-S Backbone Extension Phase 3	9716	\$451,806	\$31,128	\$600	\$1,942	\$485,475
Auburn Interconnect	2454	\$73,564	\$8,317	\$0	\$0	\$81,881
Puyallup Interconnect	5376	\$211,616	\$17,497	\$0	\$971	\$230,083
Sumner Schools Loop	3227	\$35,441	\$6,221	\$0	\$485	\$42,147
Valley Ave N-S Backbone Extension	6768	\$67,678	\$12,660	\$1,200	\$485	\$82,024
Stewart Ave West Spur	1020	\$115,214	\$3,811	\$600	\$0	\$119,625
				Subtotal		\$1,041,234
				WSST (9.4%)		\$97,876
				Project Design		\$104,123
				Project Management		\$104,123
				First Year Pole Use		\$2,678
				Project Total		\$1,350,036
20% Contingency		\$208,247				

Table 20 - Phase 3 Cost Detail - Standard Trench and Aerial

Phase 3 – Project Detail Micro Trench with Aerial Where Available

Cost calculations for Trenching and Aerial used 144 Strands for Backbone and Sumner Downtown Segments due to Aerial cable size considerations.

Pole use fees for the first year are included as part of the project cost calculations.

Segment/ Item	Length	Construction	Fiber Cable (Including Slack)	Hardware (Splice Cases)	Splicing Labor	Segment Total
N-S Backbone Extension Phase 3	9716	\$323,580	\$31,128	\$600	\$1,942	\$357,249
Auburn Interconnect	2454	\$59,176	\$6,590	\$0	\$0	\$65,766
Puyallup Interconnect	5376	\$159,544	\$14,139	\$0	\$971	\$174,654
Sumner Schools Loop	3227	\$35,441	\$5,917	\$0	\$485	\$41,843
Valley Ave N-S Backbone Extension	6768	\$67,678	\$12,660	\$1,200	\$485	\$82,024
Stewart Ave West Spur	1020	\$73,410	\$3,811	\$600	\$0	\$77,821
				Subtotal		\$799,357
20% Contingency		\$159,871			WSST (9.4%)	\$75,140
				Project Design		\$79,936
				Project Management		\$79,936
				First Year Pole Use		\$2,678
				Project Total		\$1,034,368

Table 21 - Phase 3 Cost Detail - Micro Trench and Aerial

Recommendations

Our recommendations fall into three main categories; Standards and Practices for Fiber Optic Network Development and Construction, Fiber Optic Network Funding Strategies, and Collaboration and Public/Private Partnerships.

Standards and Practices for Fiber Optic Network Development and Construction

Consider Developing a Fiber Optic Master Plan

Many areas of this report describe funding strategies, opportunities for public/private partnership, collaboration between Sumner and other cities and school districts. Considering that a Fiber Optic Network could be a long-term asset of the city, a Master Plan would answer the questions of how the network will benefit the city, and identify a path towards completion of a fiber optic network that can serve the city, its citizens and other regional partners.

Ideally, such a plan would address in detail actions and projects needed in the next five years, with less detailed but strategic goals for the network at 10 years and 20 years. Fiber optic networks have a “rated life” of 30 years, so part of the 20-year vision should be aimed at strategic maintenance or replacement of the network.

Adopt Standards for Micro Trenching Construction Techniques in Sumner

Because Micro Trenching is gaining acceptance as a construction technique, the city can realize significant savings by using micro trenching to construct its fiber network. Realizing that any conduit construction in the city’s Right of Way has the potential to reduce the service life of the pavement, the city can adopt standards to mitigate long term damages.¹⁷

The following considerations should be taken into account when developing these standards:

- Identify which streets the city will consider permitting micro trenching for; residential, arterial, current age, planned projects.
- Adopt a standard for the number of micro trenches and their placement
- Establish a maximum trench width standard
- Establish standards for micro trench construction;
 - Bedding, fill, cover and sealing materials
 - Minimum cover above and below conduit
 - Minimum distances from any public utility assets and existing conduit installations
 - Utility line crossing angles
 - Placement of Handholds and Vaults

Additional considerations should account for third party construction by franchisees, and whether to offer leasing or allow their use of existing spare duct capacity in Sumner-owned micro ducts before proceeding with additional construction.

¹⁷ Harrisonburg, VA Microtrenching Construction Installation Standards

Develop a Projects / Permits Review Process to Include City Departments in Planning

When a communications provider applies for permits to install fiber optic or conduit infrastructure, the City should follow an established workflow in the permit review and approval process. Including city departments in this review will identify opportunities for installation of infrastructure to serve the city.

Adopt a Dig Once Policy or Philosophy for Sumner

Dig Once refers to a set of practices and policies that can reduce costs to a city for installation of underground conduit. The incremental costs of adding additional conduit to a telecommunications or cable franchise conduit build are much lower than the costs of new construction, saving up to 75%.

Installation of additional conduit in a closely spaced bank would alleviate the need to physically space later conduit installations to prevent damage to already installed conduit. In crowded environments where already installed conduit banks, water, sewer, gas, and power exist, there may not be room to install additional conduit for the city's benefit.

The City of Bellevue does not have a dig once ordinance, but as part of an excavator's permit and planning process, the city requires that conduit for the city is provided for the length of the project, along with possible lighting and traffic control conduit. Any new sidewalk projects require installation of conduit.

As part of Pierce County's broadband support initiative, the county is currently developing a Dig Once Policy to require buried conduits to be installed with road projects and other construction in the right of way to enable future providers to more easily install fiber optic cable.¹⁸

A Dig Once policy for Sumner will have many benefits;

- Enhance the utilization of underground conduit installations by adding conduit for the city in already opened trenches under construction in the Right of Way.
- Leverage of construction by third parties for implementation of city conduit that could be made available to other commercial entities.

A Dig Once Policy or Ordinance for Sumner should include the following terms:

A set of design standards for Permit Applicants seeking to install underground conduit that will allow installation of additional conduit for the city.

Establish a list of priorities for locations within the city where conduit installations will most benefit the city.

Require permit applicants and franchisees to notify the city at least 90 days prior to planned construction and allow the city to choose whether to participate in conduit installation.

In city projects such as water or sewer installations or renovations, the city should install conduit for its use, and additional conduit available for lease to cable or telecommunications carriers. In conjunction with terms of franchise agreements, this can provide additional long-term revenue to the city. Future users of underground conduit could be offered the opportunity to lease existing conduit from the city before being allowed to conduct their own underground conduit installation.

¹⁸ Boosting broadband in Pierce County <https://www.piercecountywa.gov/7172/Broadband-support>

Incorporate Conduit Installation in Any Planned Public Works Project

When planning any public works infrastructure projects, the city should consider adding underground conduit as part of these projects. In many areas of the city where franchisees operate aerial fiber optics and power, offering the opportunity to underground their plants will deliver a more sustainable and aesthetically pleasing result.

Review Franchise Agreements

Sumner's franchise agreements have evolved over the years. Older agreements may not reflect the changing requirements of the city. We recommend a city committee or working group be convened periodically to review franchise agreements through the lens of the city's comprehensive plans, goals and future development. Equipped with this information, the city will be in a better position to re-negotiate franchise agreements to better represent the city's needs.

A major requirement in any telecommunications franchise should be a requirement to "include in a standard GIS format (shapefile) including relevant attribute data such as type of fiber or facility, access points, conduit or structure type and size, manhole and handhole locations and elevation, and pole locations" operated by the franchisee. Having this data will assist the City's planning processes by allowing the city to overlay franchisees' data to reference the existing operating plant.

Another area to focus on is the joint use of conduit space. Most standard conduit installations in 4-inch conduits have extra space within them. By use of additional innerduct and secured splice and access points, the city can install fiber optic cable in existing conduit with no impact to the existing installation. In a leasing or shared maintenance model, both parties can benefit through shared use of conduit space.

Most telecommunications carriers have "spare" or "reserved" fiber optic strands in their cables. Franchise agreements should include the option to lease some of this capacity to the city under IRU for a minimum term of ten years. If such an arrangement can be made, either in a franchise agreement or a separate lease, the city can gain use of needed fiber optic strands while it proceeds to build its own infrastructure over a number of years.

Fiber Optic Network Funding Strategies

City Budget

Appropriation of a budget allocation from the city's general fund appears to be the most straightforward approach to funding this network. By having budgeted monies available for this purpose, the city would be able to install the conduits concurrent with city utility projects or as other opportunities arise. City funds are also necessary to prepare grant applications along with providing matching funds when required by outside funding agencies.

Develop a Long-Term Capital Projects Reserve for Fiber Optic Construction and Maintenance

Setting aside capital reserves for fiber optic network builds or improvement and maintenance will allow the city to be ready when opportunities for fiber optic projects present themselves. Sewer line or water main projects could add underground fiber optic conduit in many situations. While a minimum of five

feet of separation is required, having a project reserve to install conduit while the project is underway accomplishes conduit installation at a lower cost than a separate trenching project.

Over time, as the network grows, a reserve will also allow the city to fund emergency repairs and normal maintenance on the network.

Consider Fiber Leasing Opportunities

Long term leases of fiber optic assets can help reduce the costs of building the network and provide sustainable long-term revenues. For example, the North-South Backbone alternate route along 142nd Ave E could provide fiber optic connection opportunities to Wave and Zayo. Because the 142nd Ave E corridor passes a number of businesses, leased fiber to an ISP or carrier could provide connectivity alternatives. Currently this corridor is served by Lumen and Comcast.

A review of currently installed fiber by Wave, Zayo and Comcast shows that many areas of Sumner are served only by Lumen and Comcast. Leasing fiber to other carriers could offer additional competitive opportunities to customers on these routes.

Long term fiber optic leases generally lease fiber optics in metropolitan middle mile applications at rates of \$750 - \$1500 per strand mile in a 20-year IRU with annual maintenance rates of \$200- \$500 per mile.¹⁹ A large IRU lump sum payment could offset network construction costs.

Using the North – South Backbone as a model, a fiber optic lease of 24 strands to a carrier could generate from \$5,500 to \$93,600 annually in long term IRU leases, with \$1,300 annually in fiber optic maintenance fees.²⁰

Assuming a fully underground network using Microtrenching and a rate of \$2018 per strand mile, the project would be fully funded by the IRU lease.

The benefit of offering long-term IRU's with up front costs is that this model is familiar to most customers from an accounting and tax standpoint, and will deliver a substantial amount of funds in the early years of operation rather than spreading these costs over time.²¹

Further, cost sharing arrangements in construction in return for preferred rates in long term fiber optic leasing can reduce the project's overall construction costs.

Investigate Grant Funding for Fiber Optic Projects

Many municipal fiber optic projects have been fully or partially funded by state or federal grants. Most available grant opportunities require a project to be in a near-final state of planning, so that the granting entity can best evaluate the grant application. Depending on the grant, the costs and time to prepare a grant application may outweigh the reward. Many grants require strict regular reporting that may be viewed as too burdensome by the recipient.

Nearly all of the broadband grant opportunities today are aimed at improving internet service to consumers in underserved areas of the state. Because Sumner does not have plans to enter the Internet Service Provider (ISP) market, only some of these grant opportunities would become attractive should

¹⁹ Dark Fiber Lease Considerations - CTC

²⁰ Calculations of Long-Term Fiber Lease Milage and Maintenance Costs – Appendix D

²¹ Dark Fiber Lease Considerations – Columbia Telecom Corporation

Sumner enter into Public/Private partnerships to deliver internet service to the city. Since Sumner is not designated as an underserved area, the city is unlikely to benefit from a Public/Private Partnership grant opportunity.

UASI (Urban Areas Security Initiative)

The Urban Areas Security Initiative (UASI)²² Program assists high-threat, high-density Urban Areas in efforts to build and sustain the capabilities necessary to prevent, protect against, mitigate, respond to, and recover from acts of terrorism.

Awards are made to State Administrative Agencies (SAAs) that house identified urban areas. State agencies, local law enforcement agencies, and other nonprofit organizations may apply to states for sub-grants. The SAA for Washington State is the Washington State Military Department. (WSMD)²³. UASI grant applications are forwarded to the WSMD as part of each county's Emergency Department's recommendation. Each SAA must submit their state's application by Mid-May each year.

UASI grants have funded a number of fiber optic projects in the last 10 – 15 years in King County.

In FY 2021 UASI offered up to \$615,000,000 nationwide in grants.

To qualify for a UASI funded grant, a city or agency must first have the approval and backing of their county's emergency department, and then pass the approval process for the SAA. If the grant request is approved, there are strict financial reporting requirements due quarterly. Any contracts let for the project must meet federal government contracting standards, which may add additional terms over and above those used and required in Washington State.

While at first glance it appears that seeking and managing a UASI grant may be "too much," these grants could provide a significant portion of the project's budget.

The process of applying for a UASI grant will take at least 2 years from start to finish, but the potential rewards are high.

Justification for UASI funds must include a tangible benefit to Public Safety or Law Enforcement Operations. Examples of projects that could be UASI funded are: Direct, secure connections to other public safety departments or 911 PSAP's, Implementation of camera networks for surveillance of facilities, Implementation of traffic signal controls to interoperate with AVL routing from 911 centers to clear response routes of traffic.

²² <https://www.fema.gov/grants/preparedness/homeland-security>

²³ <https://mil.wa.gov/preparedness-grants>

Work with the State Legislature and the Public Works Board to Include Fiber Optic Networks as Funding-Eligible Infrastructure

The Public Works Board (PWB) is authorized by state statute (RCW 43.155), to loan money to counties, cities, and special purpose districts to repair, replace, or create domestic water systems, sanitary sewer systems, storm water sewer systems, roads, streets, solid waste and recycling facilities, and bridges.

Presently, the Washington State Public Works Board's (PWB) Construction Loan Program for Infrastructure Projects does not include fiber optic projects as eligible for their loan program. Were a fiber optic project such as the one considered in this report eligible, the city could apply for a loan package of up to 10 million dollars to cover the planning, pre-construction, and construction of the project. Depending on other funding sources, the loan can be 5 years or 20 years at attractive interest rates.

Nominally, the city could claim that "(F) Efficiency in delivery of goods and services and transportation; and (G) Reduction of the overall cost of public infrastructure"²⁴ are supported by the project, however it is a long shot that the project could be approved under the PWB's current criteria.

Collaboration and Public/Private Partnerships

Expand Partnerships Between Sumner and Local Cities and Agencies

Neighboring cities and agencies can realize the benefits of joining together in fiber optic projects. We recommend that Sumner engage with neighboring cities and Pierce County to discuss long term needs and opportunities to collaborate on fiber optic network projects.

In the early 2000's the Lake Washington School District and the City of Kirkland collaborated in a number of fiber optic projects, sharing city conduit routes and fiber optic cables. The collaboration grew to include Evergreen Hospital, the City of Bellevue, and the University of Washington. Eventually, this collaboration grew to become the Community Connectivity Consortium (C3) which connects 26 member cities, fire departments, and schools on a high-speed fiber optic ring circling Lake Washington. Currently, the consortium is investigating a southern section of the ring to reach South Sound 911 in Tacoma. Cities that could benefit from this extension include Tacoma, Fife, Sumner, Milton and Puyallup.

In Southern California, the South Bay Cities Council of Governments worked with the South Bay Workforce Investment Board (SBWIB) to develop a regional broadband, fiber-optic network. A fiber-optic master plan was prepared to address the feasibility of a regional broadband network that would connect to at least one city facility in each of the South Bay cities and play a pivotal

²⁴ RCW 43.155.070

role in the region's future.²⁵ As of summer 2021, thirty-six south bay cities are connected to the network.

Investigate Public/Private Partnerships to Share Costs of Building the Network

The city should consider a longer-term fiber optic network strategy. Some of the construction and maintenance costs of a city fiber optic network could be absorbed by a public/private project to deliver broadband internet services to Sumner. Many of these partnerships deliver ownership (or long-term lease rights) of the network to cities.

If the city and a broadband internet provider engage in a partnership, it could deliver a high-speed broadband alternative to the citizens and businesses in Sumner. Today, Comcast is the leading provider of these services to Sumner.

The Washington State Broadband Office (WSBO) supports the efforts of public/private partnerships to deliver services to the public.

"Washington has for several years committed substantial state resources to support broadband access and assessment, using a variety of program-specific investment priorities that evolve with the needs of our communities. In evaluating applications and awarding funds, the state seeks to give priority to applications that:

- i) Provide assistance to public-private partnerships deploying broadband infrastructure from areas currently served with broadband service to areas currently lacking access to broadband services;
- (ii) Demonstrate project readiness to proceed;
- (iii) Construct infrastructure that is open access, meaning that during the useful life of the infrastructure, service providers may use network services and facilities at rates, terms, and conditions that are not discriminatory or preferential between providers, and employing accountable interconnection arrangements published and available publicly; ...
- (viii) Offer new or substantially upgraded broadband service to important community anchor institutions including, but not limited to, libraries, educational institutions, public safety facilities, and health care facilities; ...
- (xvii) Consider leveraging existing broadband infrastructure and other unique solutions;
- (xviii) Benefit public safety and fire preparedness: ²⁶

According to the Pierce County Fiber Broadband Study, published in April, 2019,

"Currently, Pierce County and the cities within it lease substantial broadband capacity at retail rates from various service providers. The County and the cities also operate and maintain fiber optic network facilities of their own to interconnect city and County buildings and for other purposes including traffic management. Thus, the cities and the County have experience with fiber networking. The cities and County could use this experience with fiber-optic network

²⁵ <https://southbaycities.org/programs/south-bay-fiber-network/>

²⁶ Washington State – Broadband in Washington 2019 <https://data.wa.gov/stories/s/Broadband-in-Washington/irv9-b275/>

operation to place their own conduit/fiber facilities and achieve significant lifetime savings, compared to paying continued annual or monthly lease payments to current providers. Investment in long term assets will reduce monthly costs and budgets. The conduit/dark fiber could also be used by other parties to expand broadband availability and affordability. Leveraging County and city purchasing power as an anchor tenant on a fiber network would drive widespread deployment of dark fiber in the long term to catalyze economic development. Diverse paths and redundancy would be created over time as well.”²⁷

²⁷ Pierce County Broadband Connectivity and Access Evaluation Report – Magellan Advisors, April 2019

Conclusions

- Project funding could be supplemented using long term fiber leases to commercial carriers. Wave Broadband is a good potential lease customer since the bulk of their infrastructure in Sumner is aerial, and undergrounding of infrastructure would provide route redundancy, the opportunity to reach additional customers, and less vulnerable underground routes.
- Franchisees have already built infrastructure in Sumner, but they may desire to expand their footprint.
- Grant funding for municipal fiber projects without offering services to the public are very limited. One ongoing grant program is the UASI program. A successful application to UASI could deliver a substantial piece of funding for a fiber optic network project.
- Microtrenching construction offers the opportunity to construct a network at significant savings over traditional techniques. Many cities have adopted ordinances and policies to support this construction method in urban right of ways.
- Aerial construction is the least expensive yet most vulnerable infrastructure. While aerial construction is less expensive, Aerial plant is vulnerable to weather, vehicle collisions, vandalism and damage during tree pruning operations.
- Construction on trail right of way represents a cost-effective method to build infrastructure. Standard trenching or Microtrenching on trail right of way is less expensive, and handholds and vaults on a trail route are also less expensive since they do not need to meet requirements for traffic ratings.
- Dig once policies pay off over time. Adopting the practice of “Dig Once” allows the city to “build as you go” to deliver underground conduit capacity.
- Return on Investment based on internet service cost savings shows a break even at between 25 and 30 years depending on CPI averages. Consideration of the other benefits of a fiber optic network contribute more heavily to the value of the network than reduced data communications costs alone.

Appendix A – References

This report was prepared using a wide number of sources; White papers, public contract documents, web pages, consultant reports and vendor price quotes. All documents referenced here are provided on the CD/DVD provided with this report.

Footnote References:

1. <https://sanleandronext.com/city-of-san-leandro-launches-rfp-for-fiber-optics-master-plan/>
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Appendix B

Case Studies in Public/Private Partnerships

Case Study - Westminster, Maryland

Westminster, Maryland is a city of 18,950 located in northern Maryland, and is a suburb of Baltimore.

In 2015, Ting Networks (An ISP serving many areas of the country) engaged with the City of Westminster, MD to build out a FTTP network serving the city. As part of this agreement,²⁸ the city owns the fiber optics and Ting leases the fiber to provide services to their customers. As of the first quarter of 2019²⁹, 3 of the 4 construction phases for the project had been completed.

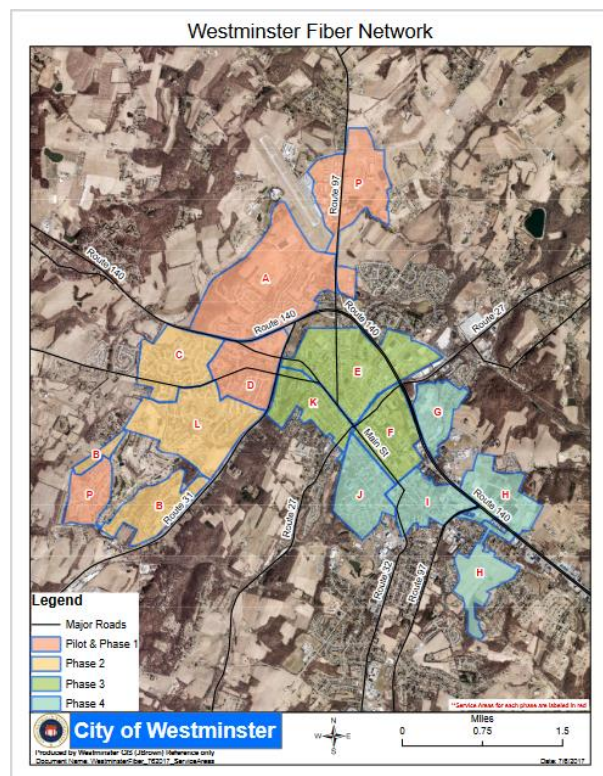


Figure 50 - Westminster, MD Fiber Network

In accordance with the contract between the City and Ting Internet, Ting pays the City \$6.00 per month for each service point passed by the Network. The city also receives \$17.00 per month for each subscriber. In 2020, the city received \$689,151 in lease and miscellaneous fiber optic revenues.

²⁸ Executed Ting Networks Contract – February 2015

²⁹ Westminster MD FY 2020 Restated Audited Financial Statements

Overall, Ting sees a nearly 20% take rate of passed premises citywide, and conducts an active marketing campaign to grow their subscriber base.

The city is transitioning maintenance of the fiber optic network from an outside contractor to their own internal fiber optic maintenance team.

Case Study – Morristown, Tennessee FiberNET

Morristown, Tennessee has a population of 29,304 with 11,200 households. Morristown was an early adopter of fiber to the home technology. Their initial goal was to improve television service. As planning progressed, the opportunity to present world-class internet service became evident. In 2004, the city council asked Morristown Utility Systems (MUS) to research the feasibility of offering broadband network services.

The network connects all county libraries and several of the hospitals and is developing a new traffic control system which will use the network.

MUS began signing customers in 2006 and by late 2008 had a residential take rate of 33%, with a take rate of 44% in July of 2015, and a larger percentage of business customers. 80% of residents now have their choice of at least two internet service providers.

FiberNET generated \$8.9 million in revenue in 2014.

Case Study – Fullerton, California

Fullerton, CA is located in northern Orange County, and has a population of 135,161.

In 2019 SiFi Networks began construction of the Fullerton Fiber project, which will offer services from Ting and GigaBit Now (A division of IsoFusion). The City of Fullerton will realize benefits of this build out with connections to all city facilities, lighting and traffic systems.

SiFi (Which stands for Sewer Infrastructure Fiber Internet) constructed the bulk of this network using proprietary methods and materials to build a majority of the network within the city's sewer network, thus substantially lowering their construction costs. SiFi has engaged in several other municipal fiber optic projects, and now incorporates Micro Trenching as a primary construction method.

Appendix C

Construction Cost Calculations and Summary

A number of sources were used for calculation of construction costs. In developing the figures used for this report, the costs of engineering, planning, mobilization, labor and materials were rolled up to provide an estimate of total costs per mile and per foot. These estimates were further evaluated to provide costs based on the geography/construction type. The tables below show these costs:

Fiber Optic Cable Cost Averages

Cost Averages Per Foot - Duct/Aerial Lashed	
24 Strand	\$1.10
48 Strand	\$1.54
144 Strand	\$2.18
288 Strand	\$3.04
Cost Averages ADSS, Aerial	
12 Strand	\$1.23
24 Strand	\$0.98
48 Strand	\$1.06
144 Strand	\$1.76
Cost Averages MicroDuct, Armored	
24 Strand	\$41.40
48 Strand	\$62.47
72 Strand	\$70.00
Cost Averages Microduct, Direct Burial	
12 Strand	\$18.60
24 Strand	\$27.60
48 Strand	\$52.06
96 Strand	\$67.20
Cost Averages Microduct, Ribbon	

72 Strand	\$2.22
144 Strand	\$2.08
288 Strand	\$2.35
Cost Averages Microduct, Loose Tube	
12 Strand	\$0.37
24 Strand	\$0.39
48 Strand	\$0.74
72 Strand	\$0.65
96 Strand	\$0.96
144 Strand	\$1.25

Cost Averages Per Foot - Duct/Aerial Lashed	
24 Strand	\$1.10
48 Strand	\$1.54
144 Strand	\$2.18
288 Strand	\$3.04
Cost Averages ADSS, Aerial	
12 Strand	\$1.23
24 Strand	\$0.98
48 Strand	\$1.06
144 Strand	\$1.76
Cost Averages MicroDuct, Armored	
24 Strand	\$41.40
48 Strand	\$62.47
72 Strand	\$70.00
Cost Averages Microduct, Direct Burial	
12 Strand	\$18.60
24 Strand	\$27.60
48 Strand	\$52.06
96 Strand	\$67.20
Cost Averages Microduct, Ribbon	
72 Strand	\$2.22
144 Strand	\$2.08
288 Strand	\$2.35

Cost Averages Microduct, Loose Tube	
12 Strand	\$0.37
24 Strand	\$0.39
48 Strand	\$0.74
72 Strand	\$0.65
96 Strand	\$0.96
144 Strand	\$1.25

Phase 1 Cost Calculations by Construction Type and Segment

The tables on the following pages detail construction (by type) and fiber optic cable costs for each documented construction type; *Standard Trenching, Microtrenching, Standard Trenching Using Aerial Where Available, Micro Trenching Using Aerial Where Available.*

Standard Trenching

N- S Backbone Phase 1							
Construction Method Standard Trenching							
	Feet	Cost/Foot	Total				
TRAIL	2929	30	\$87,874				
BRIDGE	218	23	\$5,023				
ROW	8890	113	\$1,004,564				
UNDER STR	259	29	\$7,517				
	12297	Total	\$1,104,977				
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already built and has conduit				Uses Fryar Trail Alternate - Northern segment terminates at New City Shops Spur, Terminates at Traffic Ave Splice Point			
Fiber Length							
288 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total		
	12296.64	610	12907	3.04	\$39,236		
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults							
Sumner Downtown Phase 1							
Construction Method Standard Trenching							
	Feet	Cost/Foot	Total				
ROW	1225.64	113	\$138,497				
UNDER STR	150	29	\$4,350				

Fiber Length	1375.64	Total	\$142,847				
288 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total		
	1376	246	1621	3.04	\$4,929		
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults							
New City Shops Spur							
Construction Method Standard Trenching							
Const Type	Feet	Cost/Foot	Total				
ROW	456	113	\$51,528				
Fiber Length	456	Total	\$51,528				
48 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total		
	456	115	571	1.54	\$880		
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults							
WWTP Spur							
Construction Method Standard Trenching							
	Feet	Cost/Foot	Total				
TRAIL	1613.03	30	\$48,391				
BRIDGE	0	23	\$0				
ROW	1178.8	113	\$133,204				
UNDER STR	133.33	29	\$3,867				
	2925.16	Total	\$185,462				
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already built and has conduit							
Fiber Length							
288 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total		
Duct	2925.16	298	3223	3.04	\$9,797		
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults							

Micro Trenching

N- S Backbone Phase 1					
Construction Method Micro Trenching					
	Feet	Cost/Foot	Total		
TRAIL	2929	24	\$70,299		
BRIDGE	218	23	\$5,023		
ROW	8890	72	\$640,076		
UNDER STR	259	29	\$7,517		
	12297	Total	\$722,915		
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit				Uses Fryar Trail Alternate - Northern segment terminates at New City Shops Spur, Terminates at Traffic Ave Splice Point	
Fiber Length					
144/144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total
	12296.64	610	12907	2.5	\$32,266
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults					
Sumner Downtown Phase 1					
Construction Micro Trenching					
	Feet	Cost/Foot	Total		
ROW	1225.64	72	\$88,246		
UNDER STR	150	29	\$4,350		
Fiber Length	1375.64		\$92,596		
144/144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total
	1376	246	1621	2.5	\$4,054
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults					
New City Shops Spur					
Construction Method Micro Trenching					
Const Type	Feet	Cost/Foot	Total		
ROW	456	72	\$32,832		
Fiber Length	456	Total	\$32,832		
48 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total
	456	115	571	0.74	\$423
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults					

WWTP Spur						
Construction Micro Trenching						
	Feet	Cost/Foot	Total			
TRAIL	1613.03	24	\$38,713			
BRIDGE	0	23	\$0			
ROW	1178.8	72	\$84,874			
UNDER STR	133.33	29	\$3,867			
	2925.16	Total	\$127,453			
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already built and has conduit						
Fiber Length						
144/144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
Micro Duct	5850.32	395	12491	1.25	\$15,613	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						

Standard Trenching with Aerial

N- S Backbone Phase 1						
Construction Method Standard Trenching and Aerial						
	Feet	Cost/Foot	Total			
TRAIL	2929	30	\$87,874			
BRIDGE	218	23	\$5,023			
ROW TRENCH	323.7	113	\$36,578			
ROW AERIAL	8566.25	10	\$85,663			
UNDER STR	259.209	29	\$7,517			
	12296.65	Total	\$222,654	Uses Fryar Trail Alternate - Northern segment terminates at New City Shops Spur, Terminates at Traffic Ave Splice Point		
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit						
Fiber Length						
144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
ADSS	8566.25	486	9052	1.76	\$15,931	
Duct	3730	324	4055	2.18	\$8,839	
	12296.65	Total		Total	\$24,770	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						

Annual Aerial Pole Attachment Fees			Poles	67	\$1,779	
Sumner Downtown Phase 1						
Construction Method Standard Trenching and Aerial						
	Feet	Cost/Foot	Total			
TRAIL	0	30	\$0			
BRIDGE	0	23	\$0			
ROW TRENCH	0	113	\$0			
ROW AERIAL	1155.35	10	\$11,554			
UNDER STR	150	29	\$4,350			
	1305.35	Total	\$15,904			
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit						
Fiber Length						
144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
ADSS	4133	338	4471	1.76	\$7,869	
Duct	0		0	2.18	\$0	
				Total	\$7,869	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Annual Aerial Pole Attachment Fees			Poles	9	\$240	
New City Shops Spur						
Construction Method Standard Trenching and Aerial						
	Feet	Cost/Foot	Total			
TRAIL	0	30	\$0			
BRIDGE	0	23	\$0			
ROW TRENCH	0	113	\$0			
ROW AERIAL	456	10	\$4,560			
UNDER STR	0	0	\$0			
	456	Total	\$4,560			
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit						
Fiber Length						
48 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
ADSS	492	216	708	1.06	\$751	
Duct	0		0	1.54	\$0	
				Total	\$751	

Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Annual Aerial Pole Attachment Fees			Poles	4	\$95	
WWTP Spur						
Construction Method Trenching						
	Feet	Cost/Foot	Total			
TRAIL	1613.03	30	\$48,391			
BRIDGE	0	23	\$0			
ROW	1179	113	\$133,227			
UNDER STR	133.33	29	\$3,867			
	2925.36	Total	\$185,484			
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already built and has conduit						
Fiber Length						
288 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
Duct	2925	298	3223	3.04	\$9,796	
There is no aerial footage available on this Spur - These Costs are the same as Std trench construction costs						
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Total Annual Pole Attachment Fees			Poles	80	\$2,114	

Micro Trenching with Aerial

N- S Backbone Phase 1					
Construction Micro Trenching and Aerial					
	Feet	Cost/Foot	Total		
TRAIL MICRO TRENCH	2929	24	\$70,299		
BRIDGE	218	23	\$5,014		
ROW MICRO TRENCH	323.7	72	\$23,306		
ROW AERIAL	8566.25	10	\$85,663		
UNDER STR	259.209	29	\$7,517		
	12296.28	Total	\$191,799	Uses Fryar Trail Alternate - Northern segment terminates at New City Shops Spur, Terminates at Traffic Ave Splice Point	
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit					
Fiber Length					

144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total
ADSS	9798	527	10325	1.76	\$18,171
Micro Duct	2039	268	2307	1.25	\$2,884
				Total	\$21,055
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults					
Annual Aerial Pole Attachment Fees			Poles	67	\$1,779
Sumner Downtown Phase 1					
Construction Method Micro Trenching and Aerial					
	Feet	Cost/Foot	Total		
TRAIL MICRO TRENCH	0	24	\$0		
BRIDGE	0	23	\$0		
ROW MICRO TRENCH	0	72	\$0		
ROW AERIAL	1155.35	10	\$11,554		
UNDER STR	150	29	\$4,350		
	1305.35	Total	\$15,904		
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit					
Fiber Length					
144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total
ADSS	4133	338	4471	1.76	\$7,869
Duct	0		0	1.25	\$0
				Total	\$7,869
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults					
Annual Aerial Pole Attachment Fees			Poles	9	\$240
New City Shops Spur					
Construction Method Micro Trenching and Aerial					
	Feet	Cost/Foot	Total		
TRAIL MICRO TRENCH	0	24	\$0		
BRIDGE	0	23	\$0		
ROW MICRO TRENCH	0	72	\$0		
ROW AERIAL	456	10	\$4,560		
UNDER STR	0	29	\$0		
	456	Total	\$4,560		
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit					

Fiber Length					
48 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total
ADSS	492	216	708	1.06	\$751
Micro Duct	0		0	0.74	\$0
				Total	\$751
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults					
Annual Aerial Pole Attachment Fees			Poles	4	\$95
WWTP Spur					
Construction Method Micro Trenching					
	Feet	Cost/Foot	Total		
TRAIL MICROTRENCH	1613.03	24	\$38,713		
BRIDGE	0	23	\$0		
ROW MICROTRENCH	1179	72	\$84,888		
UNDER STR	133.33	29	\$3,867		
	2925.36	Total	\$127,467		
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already built and has conduit					
Fiber Length					
288 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total
Micro duct (144/144)	5850.72	395	6246	1.25	\$7,807
There is no aerial footage available on this Spur - These Costs are the same as micro trench construction costs					
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults					
Total Annual Pole Attachment Fees			Poles	80	\$2,114

Phase 2 Cost Calculations by Construction Type and Segment

The tables on the following pages detail construction (by type) and fiber optic cable costs for each documented construction type; *Standard Trenching, Microtrenching, Standard Trenching Using Aerial Where Available, Micro Trenching Using Aerial Where Available.*

Standard Trenching

Sumner Downtown Phase 2						
Construction Method Standard Trenching						
	Feet	Cost/Foot	Total			
ROW	3019.95	113	\$341,254			
UNDER STR	150	29	\$4,350			
Fiber Length	3169.95	Total	\$345,604			
288 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
Duct	3170	306	3476	3.04	\$10,566	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Valley Ave South Backbone Phase 2						
Construction Method Standard Trenching						
	Feet	Cost/Foot	Total			
ROW	1528.62	113	\$172,734			
Under STR	188.22	29	\$5,458			
Fiber Length	1716.84	Total	\$178,192			
288 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
	1717	257	1974	3.04	\$6,001	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
City Well Spur						
Construction Std Trenching						
Const Type	Feet	Cost/Foot	Total			
ROW	1479	113	\$167,127			
UNDER STR	40	29	\$1,160			
Fiber Length	1519		\$168,287			

48 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
	1519	151	1670	1.54	\$2,571	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Sports Complex Spur						
Construction Method Standard Trenching						
Const Type	Feet	Cost/Foot	Total			
ROW	1219	113	\$137,747			
TRAIL	185	30	\$5,550			
UNDER STR	42	29	\$1,218			
Fiber Length	1446		\$144,515			
48 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
	1446	148	1594	1.54	\$2,455	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Senior Center Spur						
Construction Method Standard Trenching						
Const Type	Feet	Cost/Foot	Total			
ROW	2215	113	\$250,295			
UNDER STR	201	29	\$5,829			
Fiber Length	2416		\$256,124			
48 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
	2416	181	2597	1.54	\$3,999	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Valley Avenue Spur						
Construction Method Standard Trenching						
Const Type	Feet	Cost/Foot	Total			
ROW	4585	113	\$518,105			
UNDER STR	66	29	\$1,914			
BRIDGE	369	55	\$20,295			
Fiber Length	5020		\$540,314			
144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
Duct	5020	367	5387	2.18	\$11,744	

Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Sumner Cemetery Entry Spur						
Construction Std Trenching						
Const Type	Feet	Cost/Foot	Total			
ROW	930	113	\$105,090			
UNDER STR	43	29	\$1,247			
CEMETERY	1107	113	\$125,091			
Fiber Length	2080		\$231,428			
48 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
	2080	269	2349	2.18	\$5,122	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Cemetery Grounds Trenching Quoted at Urban ROW Rates						
Ryan House Spur						
Construction Std Trenching						
	Feet	Cost/Foot	Total			
TRAIL	0	30	\$0			
BRIDGE	0	23	\$0			
ROW	309	113	\$34,917			
UNDER STR	0	29	\$0			
	309	Total	\$34,917			
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already built and has conduit						
Fiber Length						
24 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
	309	50	359	1.1	\$395	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						

Micro Trenching

Sumner Downtown Phase 2							
Construction Method Micro Trenching							
	Feet	Cost/Foot	Total				
ROW	3019.95	72	\$217,436				
UNDER STR	150	29	\$4,350				
Fiber Length	3169.95		\$221,786				
144/144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total		
Micro Duct	6340	411	6751	2.5	\$16,878		
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults							
Valley Ave South Backbone Phase 2							
Construction Method Micro Trench							
	Feet	Cost/Foot	Total				
ROW	1528.62	72	\$110,061				
UNDER STR	188.22	29	\$5,458				
Fiber Length	1716.84	Total	\$115,519				
144/144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total		
	3434	314	3748	2.5	\$9,370		
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults							
City Well Spur							
Construction Micro Trenching							
Const Type	Feet	Cost/Foot	Total				
ROW	1479	72	\$106,488				
UNDER STR	40	29	\$1,160				
Fiber Length	1519		\$107,648				
48 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total		
	1519	151	1670	0.74	\$1,236		
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults							
Sports Complex Spur							

Construction Micro Trenching							
Const Type	Feet	Cost/Foot	Total				
ROW	1219	72	\$87,768				
TRAIL	185	30	\$5,550				
UNDER STR	42	29	\$1,218				
Fiber Length	1446		\$94,536				
48 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total		
	1446	148	1594	0.74	\$1,180		
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults							
Senior Center Spur							
Construction Method Micro Trenching							
Const Type	Feet	Cost/Foot	Total				
ROW	2215	72	\$159,480				
UNDER STR	201	29	\$5,829				
Fiber Length	2416		\$165,309				
48 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total		
	2416	181	2597	0.74	\$1,921		
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults							
Valley Avenue Spur							
Construction Method Micro Trenching							
Const Type	Feet	Cost/Foot	Total				
ROW	4585	72	\$330,120				
UNDER STR	66	29	\$1,914				
BRIDGE	369	55	\$20,295				
Fiber Length	5020		\$352,329				
144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total		
	5020	367	5387	1.25	\$6,734		
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults							
Sumner Cemetery Entry Spur							
Construction Micro Trenching							
Const Type	Feet	Cost/Foot	Total				

ROW	930	72	\$66,960				
UNDER STR	43	29	\$1,247				
CEMETERY	1107	24	\$26,568				
Fiber Length	2080		\$94,775				
48 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total		
	2038	268	2306	0.74	\$1,706		
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults							
Cemetery Grounds Trenching Quoted at Urban ROW Rates							
Ryan House Spur							
Construction Micro Trenching							
	Feet	Cost/Foot	Total				
TRAIL	0	24	\$0				
BRIDGE	0	23	\$0				
ROW	309	72	\$22,248				
UNDER STR	0	29	\$0				
	309	Total	\$22,248				
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit							
Fiber Length							
24 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total		
	309	50	359	0.39	\$140		
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults							

Standard Trenching and Aerial

Sumner Downtown Phase 2						
Construction Method Standard Trenching and Aerial						
	Feet	Cost/Foot	Total			
TRAIL	0	30	\$0			
BRIDGE	0	23	\$0			

ROW TRENCH	0	113	\$0			
ROW AERIAL	3019.95	10	\$30,200			
UNDER STR	0	29	\$0			
	3019.95	Total	\$30,200			
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit						
Fiber Length						
144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
ADSS	3019.95	301	3321	1.76	\$5,844	
Duct	0		0	2.18	\$0	
				Total	\$5,844	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Annual Aerial Pole Attachment Fees			Poles	24	\$627	
Valley Ave South Backbone Phase 2						
Construction Method Standard Trenching and Aerial						
	Feet	Cost/Foot	Total			
TRAIL	0	30	\$0			
BRIDGE	0	23	\$0			
ROW TRENCH	0	113	\$0			
ROW AERIAL	1716.84	10	\$17,168			
UNDER STR	0	29	\$0			
	1716.84	Total	\$17,168			
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit						
Fiber Length						
144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
ADSS	1716.84	257	1974	1.76	\$3,474	
Duct	0	0	0	2.18	\$0	
	1716.84			Total	\$3,474	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Annual Aerial Pole Attachment Fees			Poles	13	\$357	
Sumner City Well Spur						
Construction Method Standard Trenching and Aerial						

	Feet	Cost/Foot	Total			
TRAIL	0	30	\$0			
BRIDGE	0	23	\$0			
ROW TRENCH	281	113	\$31,753			
ROW AERIAL	1241	10	\$12,410			
UNDER STR	0	0	\$0			
	1522	Total	\$44,163			
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit						
Fiber Length						
48 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
ADSS	1241	241	1482	1.06	\$1,571	
Duct	281	109	390	1.54	\$601	
				Total	\$2,172	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Annual Aerial Pole Attachment Fees			Poles	10	\$258	
Sports Complex Spur						
Construction Method Trenching and Aerial						
	Feet	Cost/Foot	Total			
TRAIL	0	30	\$0			
BRIDGE	0	23	\$0			
ROW TRENCH	467	113	\$52,771			
ROW AERIAL	937	10	\$9,370			
UNDER STR	0	0	\$0			
	1404	Total	\$62,141			
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit						
Fiber Length						
48 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
ADSS	937	231	1168	1.06	\$1,238	
Duct	467	116	583	1.54	\$897	
				Total	\$2,135	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Annual Aerial Pole Attachment Fees			Poles	7	\$195	

Senior Center Spur						
Construction Method Standard Trenching and Aerial						
Const Type	Feet	Cost/Foot	Total			
ROW TRENCH	1292	113	\$145,996			
ROW AERIAL	923	10	\$9,230			
UNDER STR	101	29	\$2,929			
Fiber Length	2316	Total	\$158,155			
48 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
DUCT	1393	146	1539	1.54	\$2,371	
ADSS AERIAL	923	131	1054	1.06	\$1,117	
				Total	\$3,488	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Annual Aerial Pole Attachment Fees			Poles	7	\$192	
Valley Avenue Spur						
Construction Method Standard Trenching and Aerial						
	Feet	Cost/Foot	Total			
TRAIL	0	30	\$0			
BRIDGE	368	23	\$8,464			
ROW TRENCH	1166	113	\$131,758			
ROW AERIAL	3360	10	\$33,600			
UNDER STR	66	29	\$1,914			
	4960	Total	\$175,736			
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit						
Fiber Length						
144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
ADSS	3360	312	3672	1.76	\$6,463	
Duct	1600	153	1753	2.18	\$3,822	
				Total	\$10,285	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Annual Aerial Pole Attachment Fees			Poles	26	\$698	

Sumner Cemetery Spur						
Construction Method Standard Trenching and Aerial						
	Feet	Cost/Foot	Total			
TRAIL	0	30	\$0			
BRIDGE	0	23	\$0			
ROW TRENCH	1107	113	\$125,091			
ROW AERIAL	931	10	\$9,310			
UNDER STR	43	29	\$1,247			
	2081	Total	\$135,648			
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit						
Fiber Length						
48 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
ADSS	931	231	1162	1.06	\$1,232	
Duct	1150	138	1288	1.54	\$1,984	
				Total	\$3,216	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Annual Aerial Pole Attachment Fees			Poles	7	\$193	
Ryan House Spur						
Construction Method Standard Trenching and Aerial						
	Feet	Cost/Foot	Total			
TRAIL	0	30	\$0			
BRIDGE	0	23	\$0			
ROW TRENCH	0	113	\$0			
ROW AERIAL	309	10	\$3,090			
UNDER STR	0	29	\$0			
	309	Total	\$3,090			
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit						
Fiber Length						

24 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
ADSS	309	50	359	0.98	\$352	
Duct	0	0	0	1.1	\$0	
				Total	\$352	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Annual Aerial Pole Attachment Fees			Poles	2	\$64	
Total Annual Pole Attachment Fees			Poles	98	\$2,583	

Micro Trenching and Aerial

Sumner Downtown Phase 2							
Construction Method Micro Trenching and Aerial							
	Feet	Cost/Foot	Total				
TRAIL MICRO TRENCH	0	24	\$0				
BRIDGE	0	23	\$0				
ROW MICRO TRENCH	0	72	\$0				
ROW AERIAL	3019.95	10	\$30,200				
UNDER STR	0	29	\$0				
	3019.95	Total	\$30,200				
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit							
Fiber Length							
144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total		
ADSS	3019.95	301	3321	1.76	\$5,844		
Micro Duct	0		0	1.25	\$0		
				Total	\$5,844		
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults							
Annual Aerial Pole Attachment Fees				Poles	24	\$627	
Valley Ave South Backbone Phase 2							
Construction Micro Trenching and Aerial							
	Feet	Cost/Foot	Total				
TRAIL MICRO TRENCH	0	24	\$0				
BRIDGE	0	23	\$0				

ROW MICRO TRENCH	0	72	\$0			
ROW AERIAL	1716.84	10	\$17,168			
UNDER STR	0	29	\$0			
	1716.84	Total	\$17,168			
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit						
Fiber Length						
144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
ADSS	1716.84	257	1974	1.76	\$3,474	
Micro Duct	0	0	0	1.25	\$0	
				Total	\$3,474	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Annual Aerial Pole Attachment Fees			Poles	13	\$357	
Sumner City Well Spur						
Construction Method Micro Trenching and Aerial						
	Feet	Cost/Foot	Total			
TRAIL MICRO TRENCH	0	24	\$0			
BRIDGE	0	23	\$0			
ROW MICRO TRENCH	281	72	\$20,232			
ROW AERIAL	1241	10	\$12,410			
UNDER STR	0	29	\$0			
	1522	Total	\$32,642			
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit						
Fiber Length						
48 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
ADSS	1241	241	1482	1.06	\$1,571	
Micro Duct	281	109	390	0.74	\$289	
				Total	\$1,860	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Annual Aerial Pole Attachment Fees			Poles	10	\$258	
Sports Complex Spur						
Construction Method Micro Trenching and Aerial						

	Feet	Cost/Foo t	Total			
TRAIL MICRO TRENCH	0	24	0			
BRIDGE	0	23	0			
ROW MICRO TRENCH	467	72	33,624			
ROW AERIAL	937	10	9,370			
UNDER STR	0	29	0			
	1404	Total	42,994			
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit						
Fiber Length						
48 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
ADSS	937	231	1168	1.06	1,238	
Micro Duct	467	116	583	0.74	431	
				Total	1,669	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Annual Aerial Pole Attachment Fees			Poles	7	\$195	
Senior Center Spur						
Construction Micro Trenching and Aerial						
Const Type	Feet	Cost/Foo t	Total			
ROW MICRO TRENCH	1292	72	\$93,024			
ROW AERIAL	923	10	\$9,230			
UNDER STR	101	29	\$2,929			
Fiber Length	2316	Total	\$105,183			
48 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
MICRO DUCT	1393	146	1539	0.74	\$1,139	
ADSS AERIAL	923	131	1054	1.06	\$1,117	
				Total	\$2,256	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Annual Aerial Pole Attachment Fees			Poles	7	\$192	
Valley Avenue Spur						
Construction Method Micro Trenching and Aerial						
	Feet	Cost/Foo t	Total			

TRAIL MICRO TRENCH	0	24	0			
BRIDGE	368	23	8,464			
ROW MICRO TRENCH	1166	72	83,952			
ROW AERIAL	3360	10	33,600			
UNDER STR	66	29	1,914			
	4960	Total	127,930			
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit						
Fiber Length						
144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
ADSS	3360	312	3672	1.76	6,463	
Micro Duct	1600	153	1753	1.25	2,192	
				Total	8,654	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Annual Aerial Pole Attachment Fees			Poles	26	\$698	
Sumner Cemetery Spur						
Construction Micro Trenching and Aerial						
	Feet	Cost/Foot	Total			
TRAIL MICRO TRENCH	0	24	\$0			
BRIDGE	0	23	\$0			
ROW MICRO TRENCH	1107	72	\$79,704			
ROW AERIAL	931	10	\$9,310			
UNDER STR	43	29	\$1,247			
	2081	Total	\$90,261			
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit						
Fiber Length						
48 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
ADSS	931	231	1162	1.06	\$1,232	
Duct	1150	138	1288	1.54	\$1,984	
				Total	\$3,216	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Annual Aerial Pole Attachment Fees			Poles	7	\$193	

Ryan House Spur						
Construction Method Micro Trenching and Aerial			Total			
TRAIL MICRO TRENCH	0	24	\$0			
BRIDGE	0	23	\$0			
ROW MICRO TRENCH	0	72	\$0			
ROW AERIAL	309	10	\$3,090			
UNDER STR	0	29	\$0			
	309	Total	\$3,090			
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit						
Fiber Length						
24 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Cost	
ADSS	309	50	359	0.98	\$352	
Micro Duct	0	0	0	0.39	\$0	
				Total	\$352	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Annual Aerial Pole Attachment Fees			Poles	2	\$64	
Total Annual Pole Attachment Fees			Poles	98	\$2,583	

Phase 3 Cost Calculations by Construction Type and Segment

The tables on the following pages detail construction (by type) and fiber optic cable costs for each documented construction type; *Standard Trenching, Microtrenching, Standard Trenching Using Aerial Where Available, Micro Trenching Using Aerial Where Available.*

Standard Trenching

N-S Backbone Extension Phase 3							
Construction Method Standard Trenching							
	Feet	Cost/Foot	Total				
TRAIL	3674.36	30	\$110,231				
BRIDGE	273.68	23	\$6,295				
ROW	5656.92	113	\$639,232				
UNDER STR	171.5	29	\$4,974				
	9776.46	Total	\$760,731				

Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already built and has conduit							
Fiber Length							
288 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total		
DUCT	9776.46	526	10302	3.04	\$31,319		
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults							
Auburn Interconnect Phase 3							
Construction Method Standard Trenching							
	Feet	Cost/Foot	Total				
TRAIL	2398	30	\$71,940				
BRIDGE	0	23	\$0				
ROW	0	113	\$0				
UNDER STR	56	29	\$1,624				
	2454	Total	\$73,564				
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already built and has conduit							
Fiber Length							
288 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total		
DUCT	2454	282	2736	3.04	\$8,317		
Note: BNSF may not approve a standard trench using the pedestrian underpass							
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults							
Puyallup Interconnect Phase 3							
Construction Method Standard Trenching							
	Feet	Cost/Foot	Total				
TRAIL	4351	30	\$130,521				
BRIDGE	308	23	\$7,090				
ROW	633	113	\$71,567				
UNDER STR	84	29	\$2,437				
	5376	Total	\$211,616				
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already built and has conduit							
Fiber Length							

288 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total		
DUCT	5376.34	379	5756	3.04	\$17,497		
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults							
Sumner Schools Loop Phase 3							
Construction Method Standard Trenching							
	Feet	Cost/Foot	Total				
TRAIL	0	30	\$0				
BRIDGE	0	23	\$0				
ROW	3060	113	\$345,791				
UNDER STR	169	29	\$4,898				
	3228.98	Total	\$350,689				
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already built and has conduit							
Fiber Length							
288 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total		
DUCT	3228.98	308	3537	3.04	\$10,751		
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults							
Valley Ave Backbone Phase 3							
Construction Method Standard Trenching							
	Feet	Cost/Foot	Total				
TRAIL	0	30	\$0				
BRIDGE	0	23	\$0				
ROW	6293	113	\$711,128				
UNDER STR	475	29	\$13,764				
	6767.79	Total	\$724,892				
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already built and has conduit							
Fiber Length							
288 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total		
DUCT	6767.79	426	7193	3.04	\$21,868		
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults							

Stewart West Spur							
Construction Method Standard Trenching							
	Feet	Cost/Foot	Total				
TRAIL	0	30	\$0				
BRIDGE	0	23	\$0				
ROW	1020	113	\$115,214				
UNDER STR	0	29	\$0				
	1019.59	Total	\$115,214				
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already built and has conduit							
Fiber Length							
288 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total		
DUCT	1019.59	234	1254	3.04	\$3,811		
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults							

Micro Trenching

N-S Backbone Extension Phase 3								
Construction Method Micro Trenching								
		Feet	Cost/Foot	Total				
	TRAIL	3674.36	24	\$88,185				
	BRIDGE	273.68	200	\$54,736				
	ROW	5656.92	72	\$407,298				
	UNDER STR	171.5	29	\$4,974				
		9776.46	Total	\$555,192				
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already built and has conduit								
Fiber Length								
	288 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total		
	DUCT	9776.46	526	10302	3.04	\$31,319		
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults								
Auburn Interconnect Phase 3								
Construction Method Micro Trenching								
		Feet	Cost/Foot	Total				

	TRAIL	2398	24	\$57,552				
	BRIDGE	0	23	\$0				
	ROW	0	113	\$0				
	UNDER STR	56	29	\$1,624				
		2454	Total	\$59,176				
	Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already built and has conduit							
	Fiber Length							
	144/144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total		
	MICRO DUCT	4908	364	5272	1.25	\$6,590		
	Note: BNSF may not approve a micro trench using the pedestrian underpass							
	Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults							
	Puyallup Interconnect Phase 3							
	Construction Method Micro Trenching							
		Feet	Cost/Foot	Total				
	TRAIL	4351	24	\$104,417				
	BRIDGE	308	23	\$7,090				
	ROW	633	72	\$45,600				
	UNDER STR	84	29	\$2,437				
		5376	Total	\$159,544				
	Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already built and has conduit							
	Fiber Length							
	144/144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total		
	MICRODUCT	10752.68	558	11311	1.25	\$14,139		
	Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults							
	Sumner Schools Loop Phase 3							
	Construction Method Micro Trenching							
		Feet	Cost/Foot	Total				
	TRAIL	0	30	\$0				
	BRIDGE	0	23	\$0				

	ROW	3060	72	\$220,327				
	UNDER STR	169	29	\$4,898				
		3228.98	Total	\$225,225				
	Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already built and has conduit							
	Fiber Length							
	144/144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total		
	MICRODUCT	6457.96	415	6873	1.25	\$8,592		
	Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults							
	Valley Ave Backbone Phase 3							
	Construction Method Micro Trenching							
		Feet	Cost/Foot	Total				
	TRAIL	0	30	\$0				
	BRIDGE	0	23	\$0				
	ROW	6293	72	\$453,108				
	UNDER STR	475	29	\$13,764				
		6767.79	Total	\$466,872				
	Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already built and has conduit							
	Fiber Length							
	144/144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total		
	MICRO DUCT	13535.58	651	14187	1.25	\$17,733		
	Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults							
	Stewart West Spur							
	Construction Method Micro Trenching							
		Feet	Cost/Foot	Total				
	TRAIL	0	24	\$0				
	BRIDGE	0	23	\$0				
	ROW	1020	72	\$73,410				
	UNDER STR	0	29	\$0				
		1019.59	Total	\$73,410				
	Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already built and has conduit							
	Fiber Length							

288 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total			
DUCT	1019.59	234	1254	3.04	\$3,811			
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults								

Standard Trenching with Aerial

N-S Backbone Extension Phase 3								
Construction Method Standard Trenching and Aerial								
	Feet	Cost/Foot	Total					
TRAIL	3674.36	30	\$110,231					
BRIDGE	273.68	55	\$15,052					
ROW TRENCH	2589.76	113	\$292,643					
ROW AERIAL	3067.16	10	\$30,672					
UNDER STR	110.63	29	\$3,208					
	9715.59	Total	\$451,806					
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit								
Fiber Length								
288 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total			
DUCT	9715.59	524	10239	3.04	\$31,128			
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults								
Annual Aerial Pole Attachment Fees			Poles	24	\$637			
Auburn Interconnect Phase 3								
Construction Method Standard Trenching and Aerial								
	Feet	Cost/Foot	Total	Note: There are no aerial Segments Available on this route - cost shown is the same as Standard Trenching				
TRAIL	2398	30	\$71,940					
BRIDGE	0	23	\$0					
ROW TRENCH	0	113	\$0					
ROW AERIAL	0	10	\$0					
UNDER STR	56	29	\$1,624					
	2454	Total	\$73,564					
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit								
Fiber Length								

288 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total			
DUCT	2454	282	2736	3.04	\$8,317			
Note: BNSF may not approve a standard trench using the pedestrian underpass								
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults								
Puyallup Interconnect Phase 3								
Construction Method Standard Trenching and Aerial								
	Feet	Cost/Foot	Total					
TRAIL	4351	30	\$130,521	Note: There are no aerial Segments Available on this route - cost shown is the same as Standard Trenching				
BRIDGE	308	23	\$7,090					
ROW	633	113	\$71,567					
UNDER STR	84	29	\$2,437					
	5376	Total	\$211,616					
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already built and has conduit								
Fiber Length								
288 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total			
DUCT	5376.34	379	5756	3.04	\$17,497			
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults								
Sumner Schools Loop Phase 3								
Construction Method Standard Trenching and Aerial								
	Feet	Cost/Foot	Total					
TRAIL	0	30	\$0					
BRIDGE	0	23	\$0					
ROW TRENCH	0	113	\$0					
ROW AERIAL	3060.1	10	\$30,601					
UNDER STR	166.88	29	\$4,840					
	3226.98	Total	\$35,441					
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower,								

and Traffic Ave Bridge is already build and has conduit								
Fiber Length								
144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total			
ADSS AERIAL	3226.98	308	3535	1.76	\$6,221			
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults								
Annual Aerial Pole Attachment Fees			Poles	24	\$636			
Valley Ave Backbone Phase 3								
Construction Method Standard Trenching and Aerial								
	Feet	Cost/Foot	Total					
TRAIL	0	30	\$0					
BRIDGE	0	23	\$0					
ROW TRENCH	0	113	\$0					
ROW AERIAL	6767.79	10	\$67,678					
UNDER STR	0	29	\$0					
	6767.79	Total	\$67,678					
Fiber Length								
144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total			
ADSS AERIAL	6767.79	426	7193	1.76	\$12,660			
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults								
Annual Aerial Pole Attachment Fees			Poles	53	\$1,406			
Stewart West Spur								
Construction Method Standard Trenching and Aerial								
	Feet	Cost/Foot	Total					
TRAIL	0	30	\$0					
BRIDGE	0	23	\$0					
ROW	1020	113	\$115,214					
UNDER STR	0	29	\$0					
	1019.59	Total	\$115,214					

Fiber Length								
288 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total			
DUCT	1019.59	234	1254	3.04	\$3,811			
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults								
Annual Aerial Pole Attachment Fees			Poles	101	\$2,678			

Micro Trenching with Aerial

N-S Backbone Extension Phase 3						
Construction Method Micro Trenching and Aerial						
	Feet	Cost/Foot	Total			
TRAIL	3674.36	24	\$88,185			
BRIDGE	273.68	55	\$15,052			
ROW TRENCH	2589.76	72	\$186,463			
ROW AERIAL	3067.16	10	\$30,672			
UNDER STR	110.63	29	\$3,208			
	9715.59	Total	\$323,580			
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit						
Fiber Length						
288 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
DUCT	9715.59	524	10239	3.04	\$31,128	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Annual Aerial Pole Attachment Fees			Poles	24	\$637	
Auburn Interconnect Phase 3						
Construction Method Micro Trenching and Aerial						
	Feet	Cost/Foot	Total	Note: There are no aerial Segments Available on this route - cost shown is the same as Micro Trenching		
TRAIL	2398	24	\$57,552			
BRIDGE	0	23	\$0			
ROW TRENCH	0	113	\$0			
ROW AERIAL	0	10	\$0			
UNDER STR	56	29	\$1,624			
	2454	Total	\$59,176			

Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already build and has conduit						
Fiber Length						
144/144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
MICRO DUCT	4908	364	5272	1.25	\$6,590	
Note: BNSF may not approve a standard trench using the pedestrian underpass						
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Puyallup Interconnect Phase 3						
Construction Method Micro Trenching and Aerial						
	Feet	Cost/Foot	Total			
TRAIL	4351	24	\$104,417	Note: There are no aerial Segments Available on this route - cost shown is the same as Micro Trenching		
BRIDGE	308	23	\$7,090			
ROW	633	72	\$45,600			
UNDER STR	84	29	\$2,437			
	5376	Total	\$159,544			
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are lower, and Traffic Ave Bridge is already built and has conduit						
Fiber Length						
144/144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
MICRODUCT	10752.68	558	11311	1.25	\$14,139	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Sumner Schools Loop Phase 3						
Construction Method Micro Trenching and Aerial						
	Feet	Cost/Foot	Total			
TRAIL	0	30	\$0	Note - This segment has no trenching		
BRIDGE	0	23	\$0			
ROW MICRO TRENCH	0	72	\$0			
ROW AERIAL	3060.1	10	\$30,601			
UNDER STR	166.88	29	\$4,840			
	3226.98	Total	\$35,441			
Construction Costs Shown Show High - End Estimate except for Bridges - where costs on trail bridges are						

lower, and Traffic Ave Bridge is already build and has conduit						
Fiber Length						
144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
ADSS AERIAL	3060.1	302	3362	1.76	\$5,917	
ADSS Aerial						
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Annual Aerial Pole Attachment Fees			Poles	24	\$636	
Valley Ave Backbone Phase 3						
Construction Methond Micro Trenching and Aerial						
	Feet	Cost/Foot	Total			
TRAIL	0	30	\$0			
BRIDGE	0	23	\$0			
ROW TRENCH	0	113	\$0			
ROW AERIAL	6767.79	10	\$67,678			
UNDER STR	0	29	\$0			
	6767.79	Total	\$67,678			
Construction Costs Shown Show High - End Estimates						
Fiber Length						
144 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
ADSS AERIAL	6767.79	426	7193	1.76	\$12,660	
Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Annual Aerial Pole Attachment Fees			Poles	53	\$1,406	
Stewart West Spur						
Construction Methond Micro Trenching and Aerial						
	Feet	Cost/Foot	Total			
TRAIL	0	24	\$0			
BRIDGE	0	23	\$0			
ROW	1020	72	\$73,410			
UNDER STR	0	29	\$0			
	1019.59	Total	\$73,410			
Fiber Length						
288 Strand	Feet	Slack Feet	Total Feet	Cost/Foot	Total	
DUCT	1019.59	234	1254	3.04	\$3,811	

Fiber Slack Footage computed at 20' for every 600 feet (handholds) and 50 feet for Splice Vaults						
Annual Aerial Pole Attachment Fees			Poles	101	\$2,678	

Appendix D

Summary of Rates for Long Term Fiber Optic Leases

Dark Fiber pricing in a range of markets (based on per mile calculation) – Source CTC

	Term (years)	Up-front cost per strand	Maintenance cost per route mile per year	Price per month	Price per year	Effective price per month per pair	Effective price per year per pair	Effective price per month per strand (assumes purchase of pair)	Effective price per year per strand (assumes purchase of pair)
Long-Haul Routes									
CA rural/suburban	20	\$1,000	\$250			\$9.37	\$112.50	\$4.68	\$56.25
IL rural	20	\$750	\$150			\$6.87	\$82.50	\$3.44	\$41.25
IL rural/suburban	20	\$1,500	\$250			\$13.54	\$162.50	\$6.77	\$81.25
NC rural	20 to 25	\$750	\$250			\$7.29	\$87.50	\$3.65	\$43.75
MD rural	-	-	-	\$45		\$90	\$1,080	\$45	\$540
Metro-Area Routes									
IL suburban/small town	20	\$1,500	\$300			\$13.75	\$165	\$6.87	\$82.50
Burbank	5 15	-	-	\$14.58 \$11.25		\$29 \$22.50	\$350 \$270	\$14.58 \$11.25	\$175 \$135
TN small town	-	-	-		\$500	\$83	\$1,000	\$41.60	\$500
TN small town	-	-	-		\$1,000	\$166	\$2,000	\$83	\$1,000
Large Urban Routes									
Palo Alto	-	-	-	\$177 to \$295		\$355 to \$591	\$4,360 to \$7,092	\$177 to \$295	\$2,124 to \$3,540
CA large urban	-	-	-	\$120 to \$300		\$320 to \$600	\$2,880 to \$7,200	\$120-\$300	\$1,440 to \$3,600
IL urban	20	\$3,000	\$600			\$27.50	\$330	\$13.75	\$165
VA urban	20	\$1,500 to \$2,000 (includes full construction cost)	-			\$100 to \$550	\$1,200+	\$50 to \$275	\$600+

Eugene Water and Electric Board Eugene, OR – “public purpose” rate \$21.72 per strand mile, \$44.40 per strand mile for commercial.

Glossary

Term	Definition
Bandwidth	A circuit's speed, usually expressed in Bits Per Second (bps)
Collocation	The placement of several entities in a single location
Dark Fiber	Segments of fiber optic networks where both ends of the circuit are controlled by the owning entity
Demarcation	
DOCSIS	Data Over Cable Service
DWDM	Dense Wavelength Division Multiplex
E-Rate	The federal universal service Schools and Libraries Program
Ethernet	A family of wired computing technologies commonly used in LANS, WANS, and high-volume data transmission networks.
FTTP	Fiber to the premises
GIS	
Handhold	
Horseshoe - AKA Snowshoe	Mechanism that secures a fiber slack loop on an aerial network.
IRU	Indefeasible Right of Use
ISP	Internet Service Provider
K20	K20 is a statewide network connecting all state schools to one another and the to the internet
LAN	Local Area Network.
Lit Fiber	Fiber optic where a provider's electronics are connected to the network to provide networking services
MDF	Main Distribution Facility. Typically used to describe the room in a building or facility where cables and networks from the outside "land" and connect to the cables and network inside the building.
MOE	Metropolitan Optical Ethernet

Term	Definition
OSP	Outside Plant. Generally used to describe cable or wire facilities outside of buildings.
Passing	A premise where internet service is available
PON	Passive Optical Ethernet
Pull Box	Also known as a handhold. A small box placed in a fiber optic network installation where the cable can be accessed for installation, service of maintenance.
QoS	Quality of Service. Network configurations used to prioritize certain types of network traffic, such as Voice or Video.
RFP	
Snowshoe - AKA Horseshoe	Mechanism that secures a fiber slack loop on an aerial network.
Take Rate	The number of connected customers compared to the number of Passings
USAC	Universal Service Administrative Company - administers E-Rate contracts
VPN	Virtual Private Network. A networking term to describe an end-to-end encrypted connection.
WAN	Wide Area Network. Used to describe and enterprise network that connect several buildings or locations under the control of one entity.

SUBJECT: White River Project Update

CATEGORY: Presentation

BUDGET IMPACT:

Expenditure Required: None

Within Budget Allocation: N/A

ATTACHMENTS:

1. White River Project Update Presentation

STAFF CONTACT: Andrea Marquez, City Attorney, Mike Dahlem, Public Works Director, Doug Beagle, Development Services Director, Robert Wright, Environmental & Sustainability Specialist

SUMMARY BACKGROUND:

The White River Restoration project (CIP 14-10) is ongoing, and staff has prepared a short presentation to update the City Council on the current status of the habitat portion of the project and the various associated legal agreements. Some of the milestones the habitat project has reached include: Complete submittal of USACE Permits, 90% design presented to the Dialogue Group, and Council acceptance of the \$14.6 Million PSAR Grant. With these milestones reached and project construction expected in the near future, the legal agreements between the City and various partners will come before the Council at future meetings. A primer on what these agreements consist of, and why they are necessary, is included in the presentation.

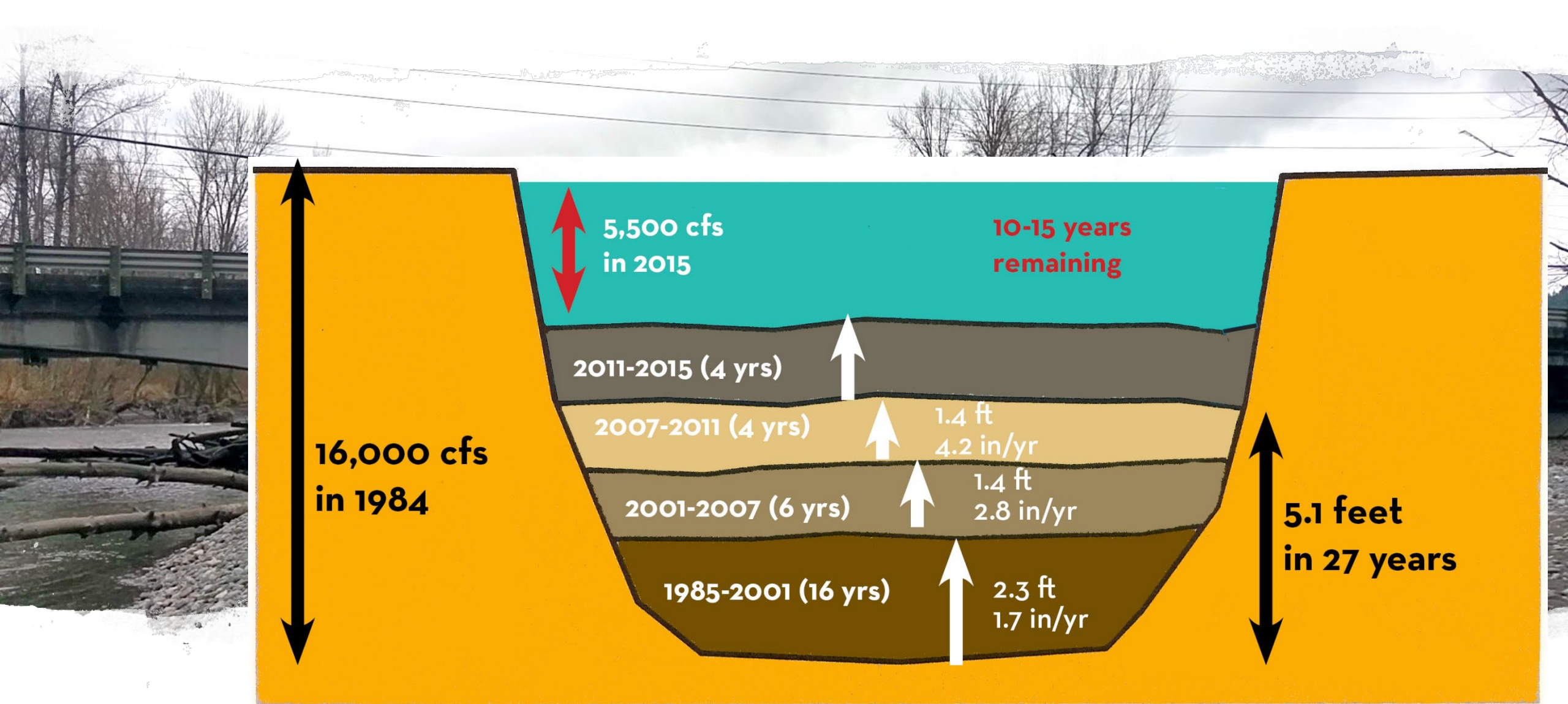
COUNCIL COMMITTEE/STUDY SESSION: Study Session MEETING/STUDY SESSION DATE: 2/28/2022 COMMITTEE RECOMMENDATION:
--

STAFF RECOMMENDATIONS/MOTION:

This is informational only.

SUMNER'S WHITE RIVER RESTORATION





Rising Flood Risk

Four projects

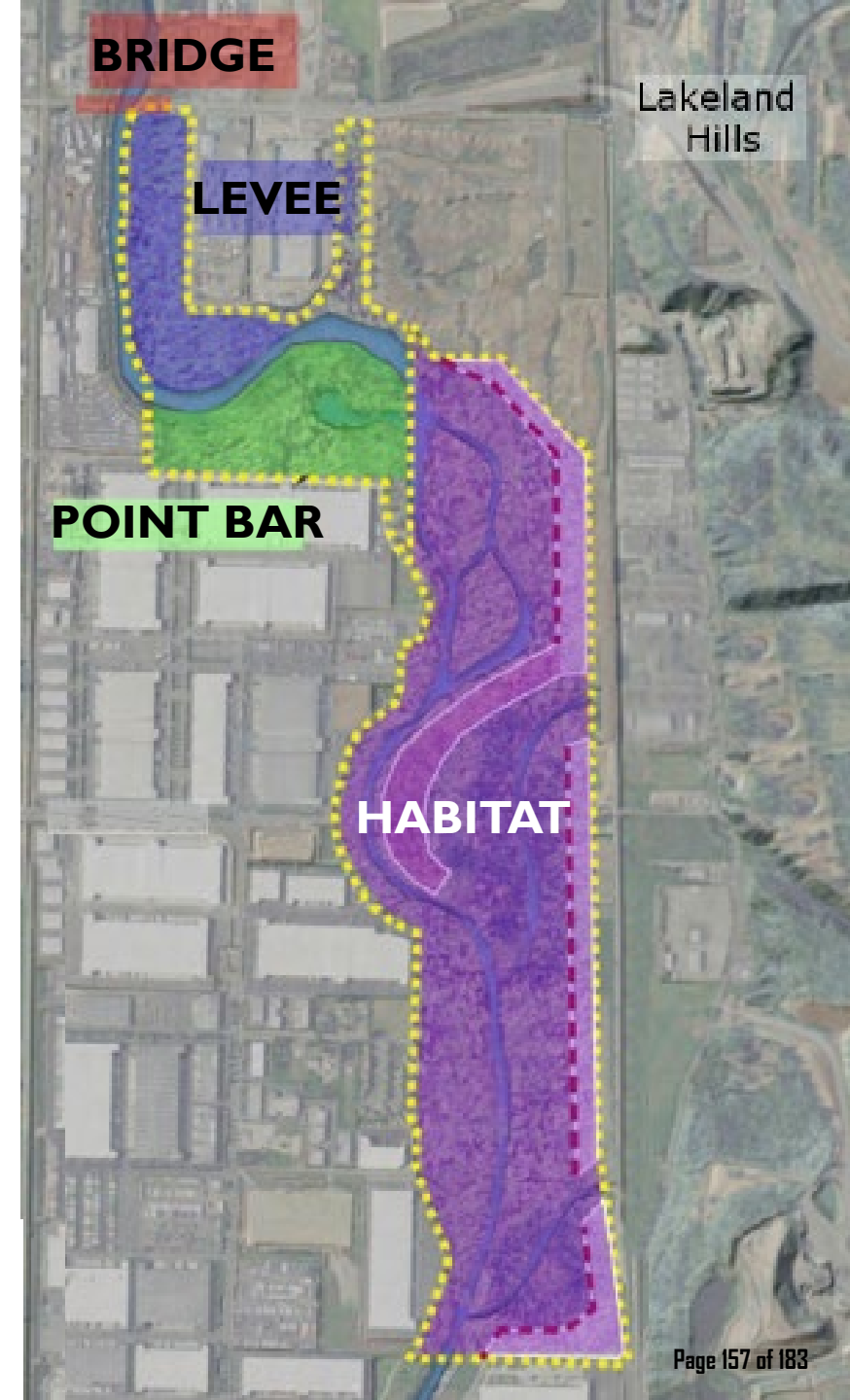
The Bridge

Setback Levee

Point Bar

Habitat

**SUMNER'S WHITE RIVER
RESTORATION**



Four Projects for a Full Solution

The Bridge

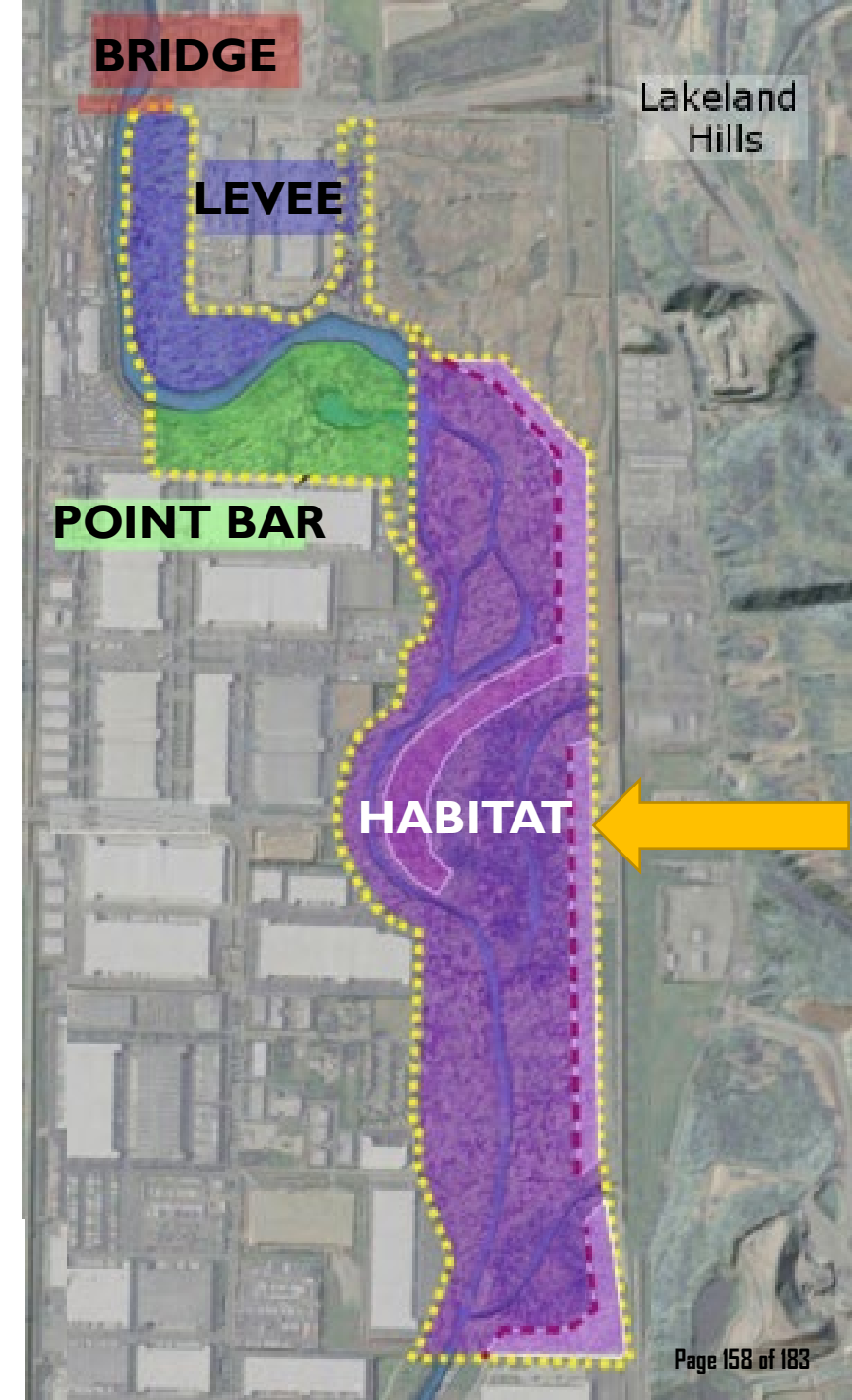
Setback Levee

Point Bar

Habitat

Restores 170 acres, creating side-channels and wetlands as large storage area for floodwaters and sediment plus additional habitat for endangered salmon.

SUMNER'S WHITE RIVER
RESTORATION



Enhance Critical Habitat

- **Chinook** – critical food source for southern resident Orcas
- **Steelhead**
- **Bull Trout**
- Chum
- Pink
- Coho



SUMNER'S WHITE RIVER
RESTORATION



Protect jobs, homes & environment from flooding

Protect Supply Chains



WHERE QUALITY AND
FRESHNESS MATTER





Habitat - Now

**SUMNER'S WHITE RIVER
RESTORATION**



Habitat – When Funded

**SUMNER'S WHITE RIVER
RESTORATION**



Habitat - Now

**SUMNER'S WHITE RIVER
RESTORATION**



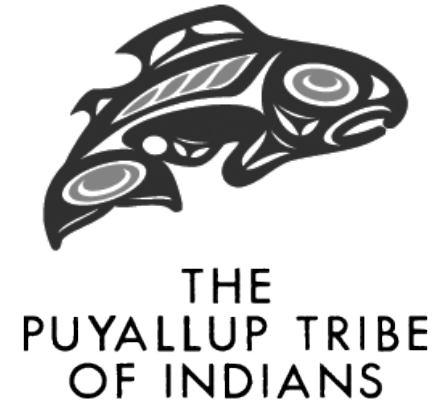


Habitat – When Funded

**SUMNER'S WHITE RIVER
RESTORATION**



Breakdown of Project Areas



Floodplains By Design |
Pierce Conservation District | Port of Tacoma
The Nature Conservancy | Forterra |
Integrated Management Group (Pierce County)
American Rivers | Puget Sound Partners |
City of Pacific | WDFW

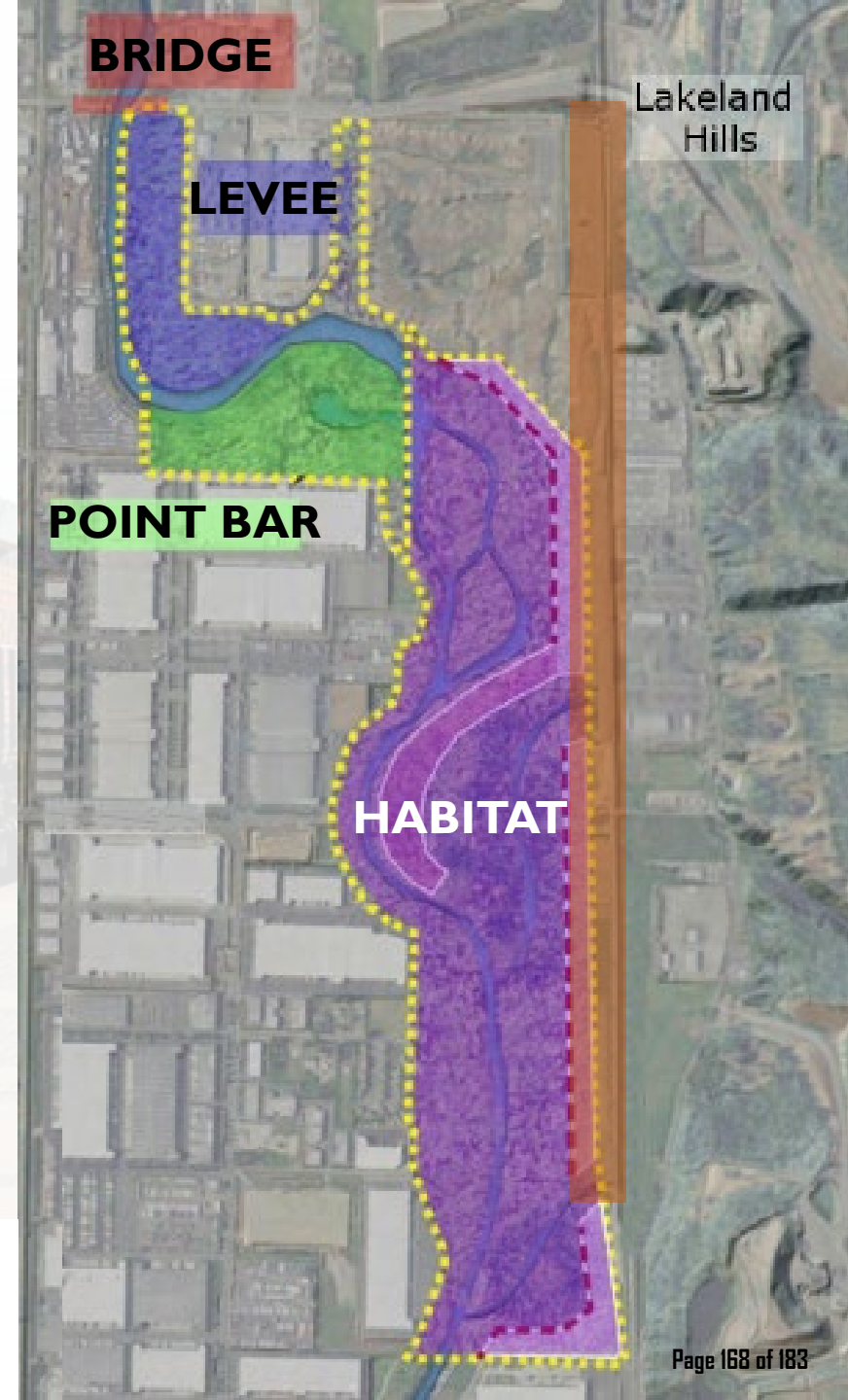
Dialogue Group Updates

BNSF Partnership

I0 Track Project

- Purchase City Property
- 1 million yards of excavation
- Contour Habitat project
- Joint application to U.S. Army Corps of Engineers

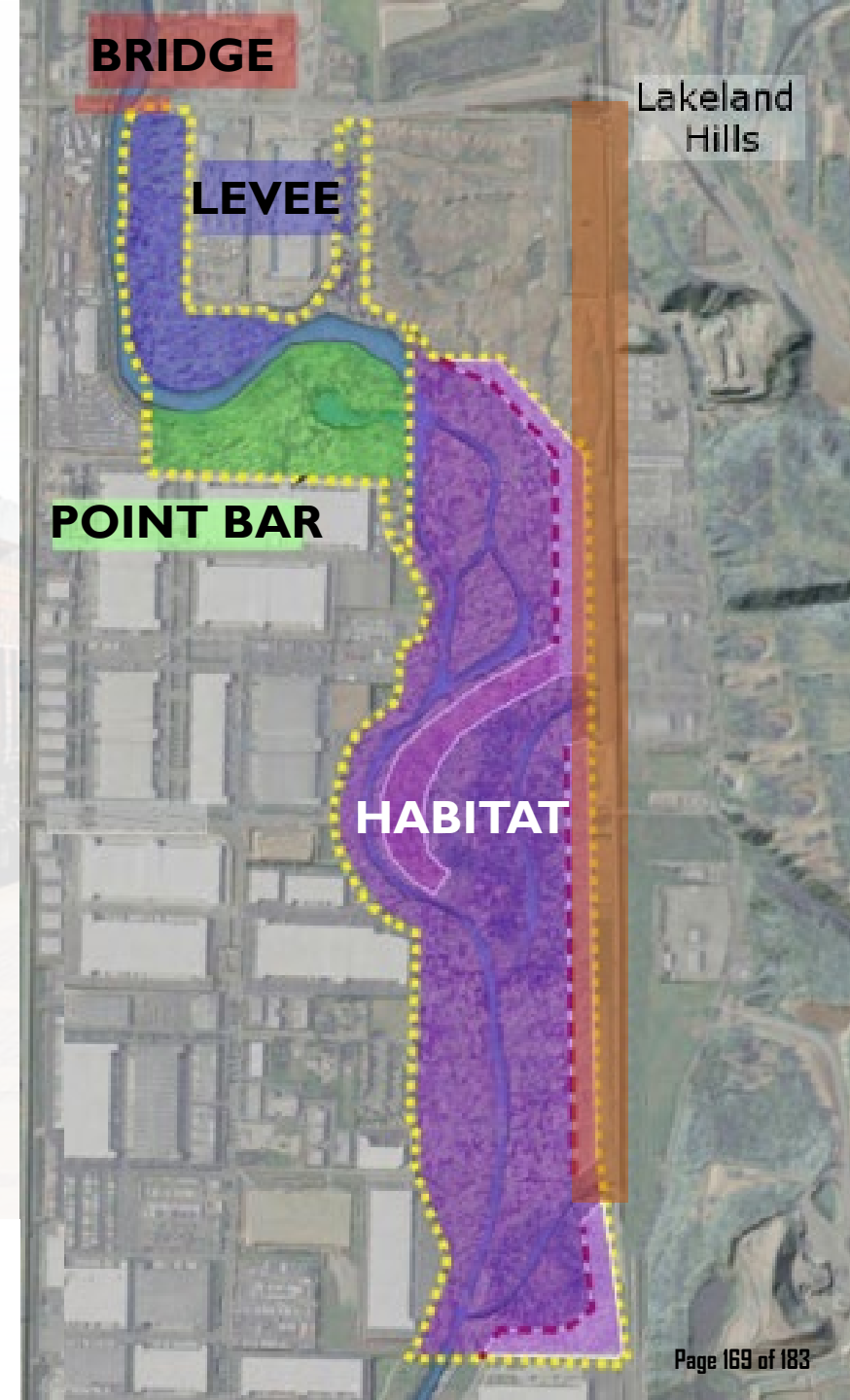
**SUMNER'S WHITE RIVER
RESTORATION**

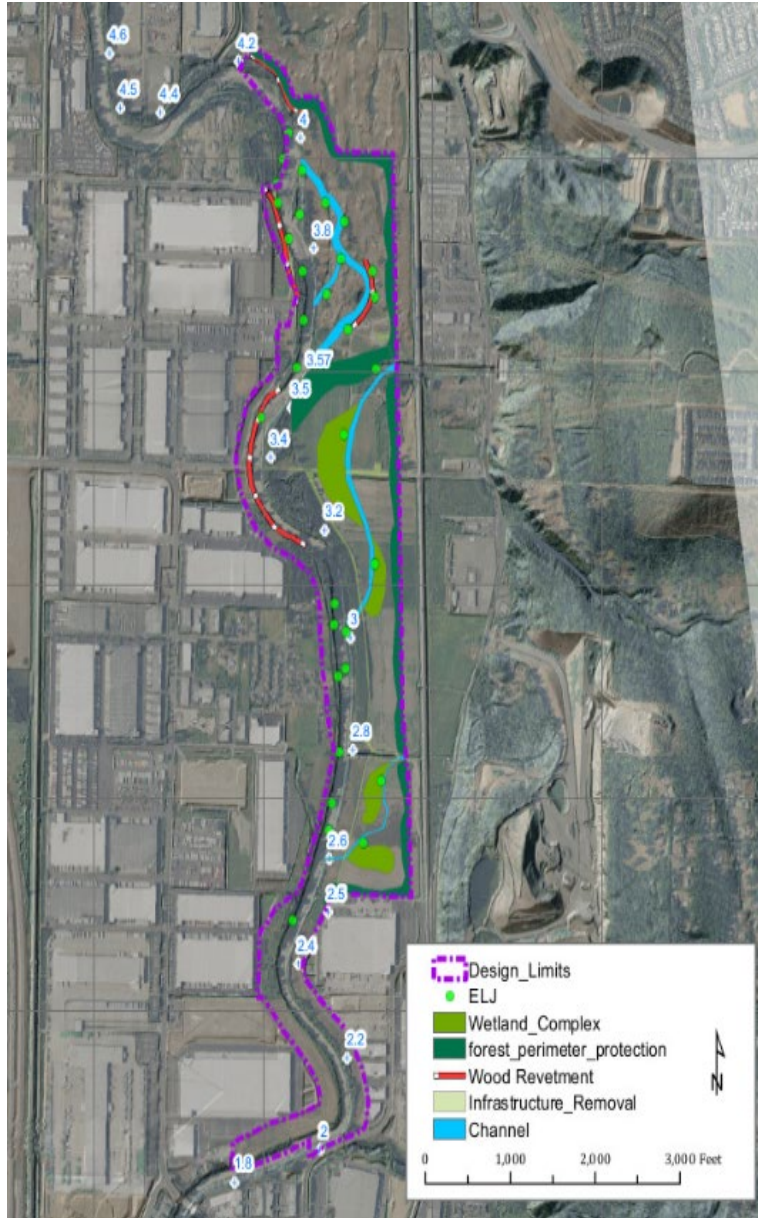


Cascade Water Alliance Partnership

- Sell City and BNSF Property (details on later slide)
- Sell City portion of water right for purposes of hydrating newly created wetland areas
- Authorize submittal of Corp permit over property currently owned by CWA
- Allow City to re-locate the tailrace channel
 - Improved habitat
 - Tailrace to join main river stem significantly further down river to mitigate backwater and flood risk

**SUMNER'S WHITE RIVER
RESTORATION**





Current Status

- Complete USACE Permit Submitted September 2021
 - Permit expected within 12-18 months.
- SEPA noticing for the Habitat project September, 2021
- City's 90% designs complete and under review
 - Construction planned for Spring 2023
- Completing utility relocation designs
 - Construction planned for Spring/Summer of 2022



So, how do we keep moving forward?

- Property Conveyances
- Agreements upon Agreements

AGREEMENT 1

PURCHASE AND SALE AGREEMENT

- **Parties:** Sumner and BNSF
- **Purpose:** Sumner to sell ~250 foot strip east of current BNSF tracks for the side track project. From Stewart Road south to GSA building. (image next slide)
- **Details:**
 - City to convey property and all soil excavated from City's flood project to build up BNSF's side tracks.
 - BNSF to provide all work necessary to excavate soil and complete rough grading of City channels, including in-kind contribution of logs.
 - Both parties receiving fair value. Zero cash exchange.
- **Timeline:** Closing on property conveyances expected upon receipt of Corp permit and *prior to* Site Work Agreement (next slide).

STAGING AREA / DEVELOPMENT

~250FT BNSF TRACKS

Site
Work
Areas

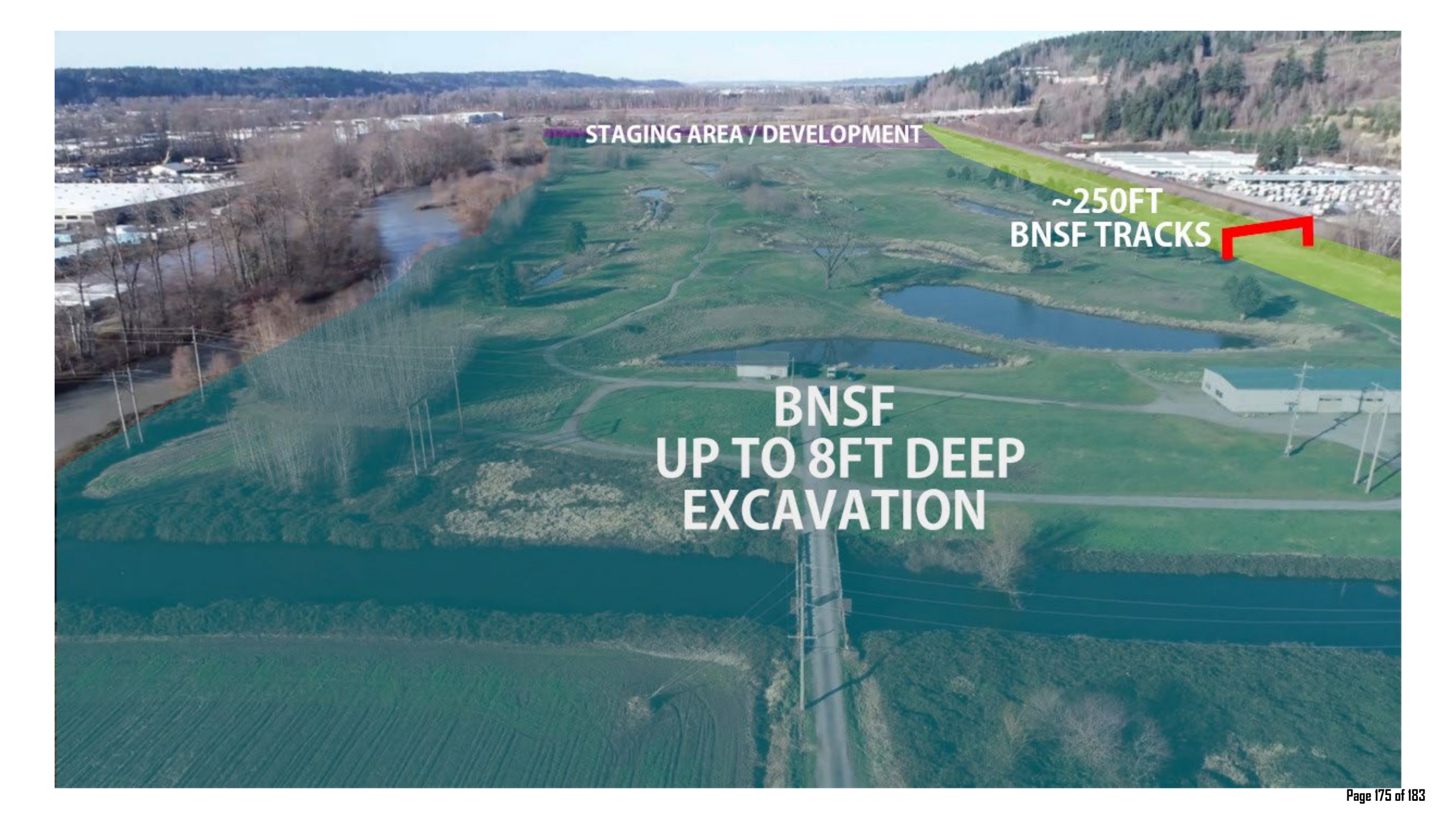
BNSF
UP TO 8FT DEEP
EXCAVATION

LOGS PROVIDED BY BNSF, INSTALLED BY CITY



AGREEMENT 2 SITE WORK AGREEMENT

- **Parties:** Sumner and BNSF
- **Purpose:** Outlining the permit obligations, construction obligations, inspection rights, and remedies of the Parties related to the construction of the White River project and BNSF side track project.
- **Details:** BNSF to excavate approximately 1million cubic yards of dirt to build up the stage for their 10 side tracks. BNSF will also conduct 'rough grading' consistent with Sumner's project design. Upon completion and final inspection, Sumner to take over and conduct rough grading of the excavated side channels.
- **Timeline:** To begin upon receipt of Corp permit and any other local permits required to begin construction, and *after* closing on property conveyances to BNSF and from Cascade Water Alliance.



STAGING AREA / DEVELOPMENT

**~250FT
BNSF TRACKS**

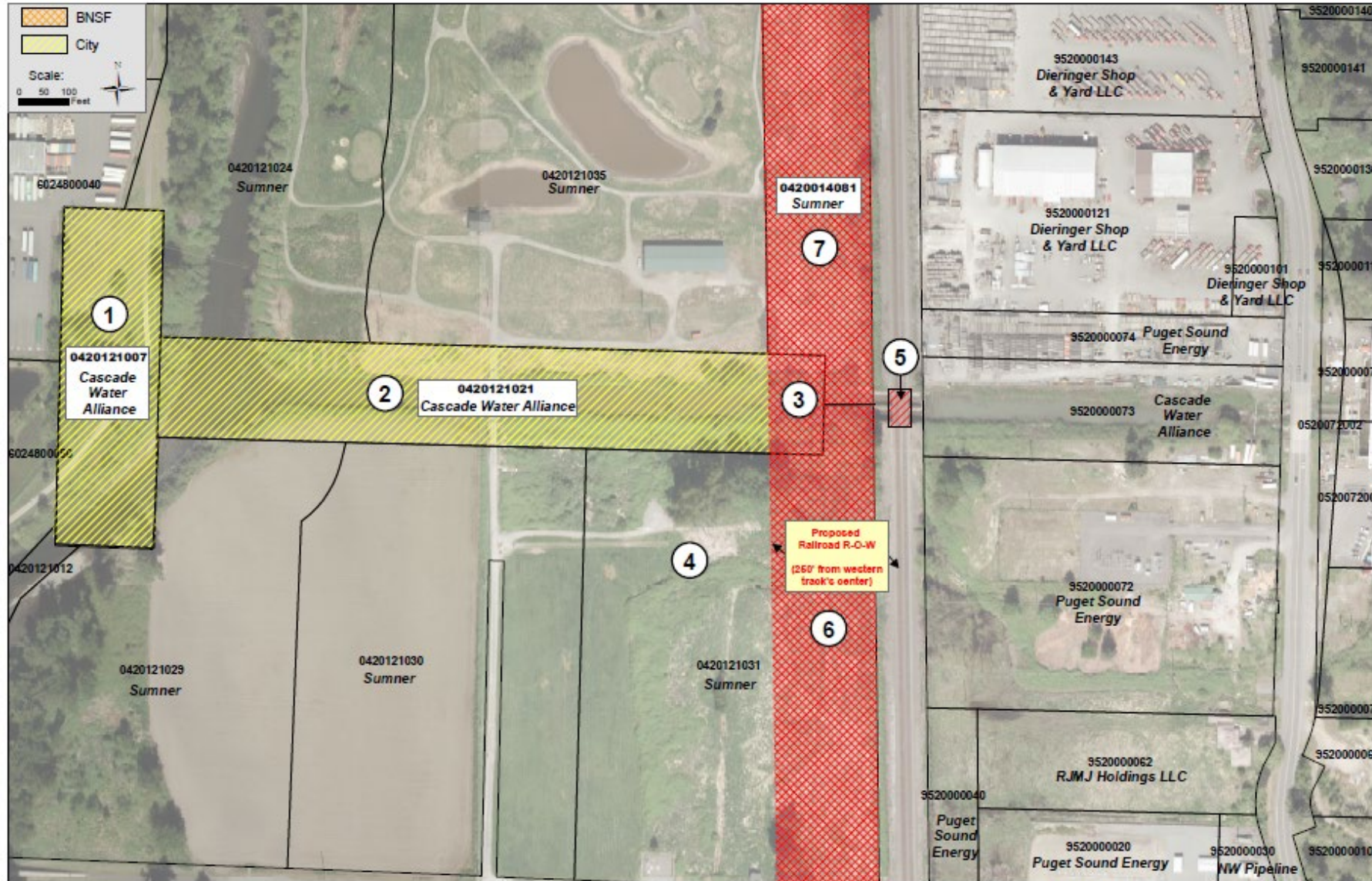
**BNSF
UP TO 8FT DEEP
EXCAVATION**



AGREEMENT 3 “THREE PARTY” AGREEMENT

- **Parties:** Sumner, BNSF, Cascade Water Alliance (CWA)
- **Purpose:** Property conveyances, temporary and permanent easement rights, ongoing maintenance obligations, indemnities, etc.
- **Details:** (next slide)
 - Property transactions
 - Re-located tailrace with temporary and permanent easements from City to CWA
 - New BNSF bridge and release of CWA obligations to build/maintain the same.
- **Timing:** Concurrent with Sumner/BNSF Purchase and Sale Agreement

PROPERTY CONVEYANCES



SUBJECT: Parks Master Plan (Seibenthaler Park and the old Bennett property)

CATEGORY: Presentation

BUDGET IMPACT:

Expenditure Required: None

Within Budget Allocation: N/A

ATTACHMENTS:

1. Seibenthaler and Bennett Master Plans

STAFF CONTACT: Derek Barry, Community Services Manager

SUMMARY BACKGROUND:

In May of 2021, the City of Sumner and HBB began a community outreach effort in order to develop master plans for Seibenthaler Park and the old Bennett property. These efforts included a 'Kickoff' survey, gathering 253 responses, an Open House video and survey discussing the concepts with 58 responses, an HOA meeting, and 201 responses to the Preferred Concepts survey. The outcome is two independent, yet complimentary, master plans for underserved areas of Sumner. The master plans will be broken into phases in order to provide worthwhile improvements that are more affordable, along with funding assistance.

This item is scheduled for council consideration on April 4, 2022.

Staff looks forward to presenting and discussing the preferred master plans.

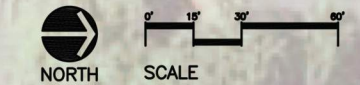
COUNCIL COMMITTEE/STUDY SESSION: February 28th Study Session MEETING/STUDY SESSION DATE: 2/28/2022 COMMITTEE RECOMMENDATION:
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STAFF RECOMMENDATIONS/MOTION:



City of Sumner | Seibenthaler Park Final Master Plan

February 2022





CITY COUNCIL AGENDA CALENDAR**Updated February 23, 2022**

CA – CONSENT AGENDA	ES – EXECUTIVE SESSION	NB – NEW BUSINESS
UB – UNFINISHED BUSINESS	P – PRESENTATION	PH – PUBLIC HEARING PR - PROCLAMATION

MARCH 5 COUNCIL RETREAT *(Saturday 9-3)***MARCH 7 RCM**CA Purchase and Sale Agreement 14415 29th St. E.

NB Ordinance No. 2800 – Authorizing Condemnation for New PW Operations Facility (from 2/7)

MARCH 7 SSS (6:15pm)

- Senior Housing Amendments
- MFTE Expansion

MARCH 14 SS

- EPIC Update / Lahar Evacuation Drill Briefing
- Body Worn Camera Update
- Six-Year TIP
- PW Project Update

MARCH 21 RCM

PH Six-Year TIP

CA Consultant Svcs. Agreement – Maple Street Ped. Signal and Backplates Installation

NB Ordinance No. XXXX – Budget Amendment ARPA

NB Ordinance No. XXXX – Senior Housing Amendments

NB Ordinance No. XXXX - Amending the 2022 Comp Schedule

NB Ordinance No. XXXX – Budget Amendment

MARCH 21 SSS (6:30pm)

- Social Media / PRA Training

MARCH 28 SS

- White River project update
- Transit in Sumner
- Cultural Arts Commission Work Program

APRIL 4 RCM

PR Arbor Day

UB Resolution No. XXXX - 6-Year TIP

CA Parks Master Plan Approval

NB Agreement with City of Puyallup for Salvation Army Shelter Space

APRIL 11 SS

- Development Services Update
- Council Rules

APRIL 18 RCM

APRIL 25 SS

- Review and Presentation of Documents for White River project
- Council DEI Training

MAY 2 RCM

MAY 9 SS

- Legislative Session Re-Cap

MAY 16 SS

MAY 23 SS

Pending

MISC.	MISC.	WHITE RIVER RESTORATION PROJECT
ROW Vacation Code Amendment		PH - Surplus Utility Property South of 24 th Street East
Community Float Discussion	Bond Issuance for Operations Facility	UB - Resolution No. XXXX - Surplus Utility Property South of 24 th St E
	Temporary Use Permit – Food Trucks	
Sign Code Update		BNSF Agreement
	Update electronic signatures code	
CTR Ordinance Update		CA - Water Rights Acquisition Agreement
Development Agreement Code updates	Houston Road Annexation	
	Heritage Park Expansion property acquisition	

MARCH 2022

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2	3	4	5
	4:00 PM Public Works Committee (Virtual)	5:30PM Finance Committee (Virtual)	CANCELLED 6:00PM Planning Commission (Virtual)		9:00AM Council Retreat (Virtual)
7	8	9	10	11	12
6:00PM Regular Council Meeting (Virtual) 6:15PM Special Study Session (Virtual)		5:30 PM American Rescue Plan Comm. (Virtual) 6:30PM Design Commission (Virtual)	4:30PM Forestry/Parks Commission (Virtual)		
14	15	16	17	18	19
6:00PM Study Session (Virtual)		5:30PM Public Safety Committee (Virtual)			
21	22	23	24	25	26
6:00PM Regular Council Meeting (Virtual) 6:30PM Special Study Session (Virtual)		5:00PM CD Committee (Virtual)	5:30PM Cultural Arts Commission (Virtual)		
28	29	30	31		
6:00PM Study Session (Virtual)					

Meeting dates and times may change. Please contact City Hall to confirm this information prior to any meeting you plan to attend. **These meetings are accessible to persons with disabilities.** For individuals who require special accommodations, please contact City Hall at (253) 299-5500, 24 hours in advance.

Name: Michelle Converse, CMC
Title: City Clerk

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