

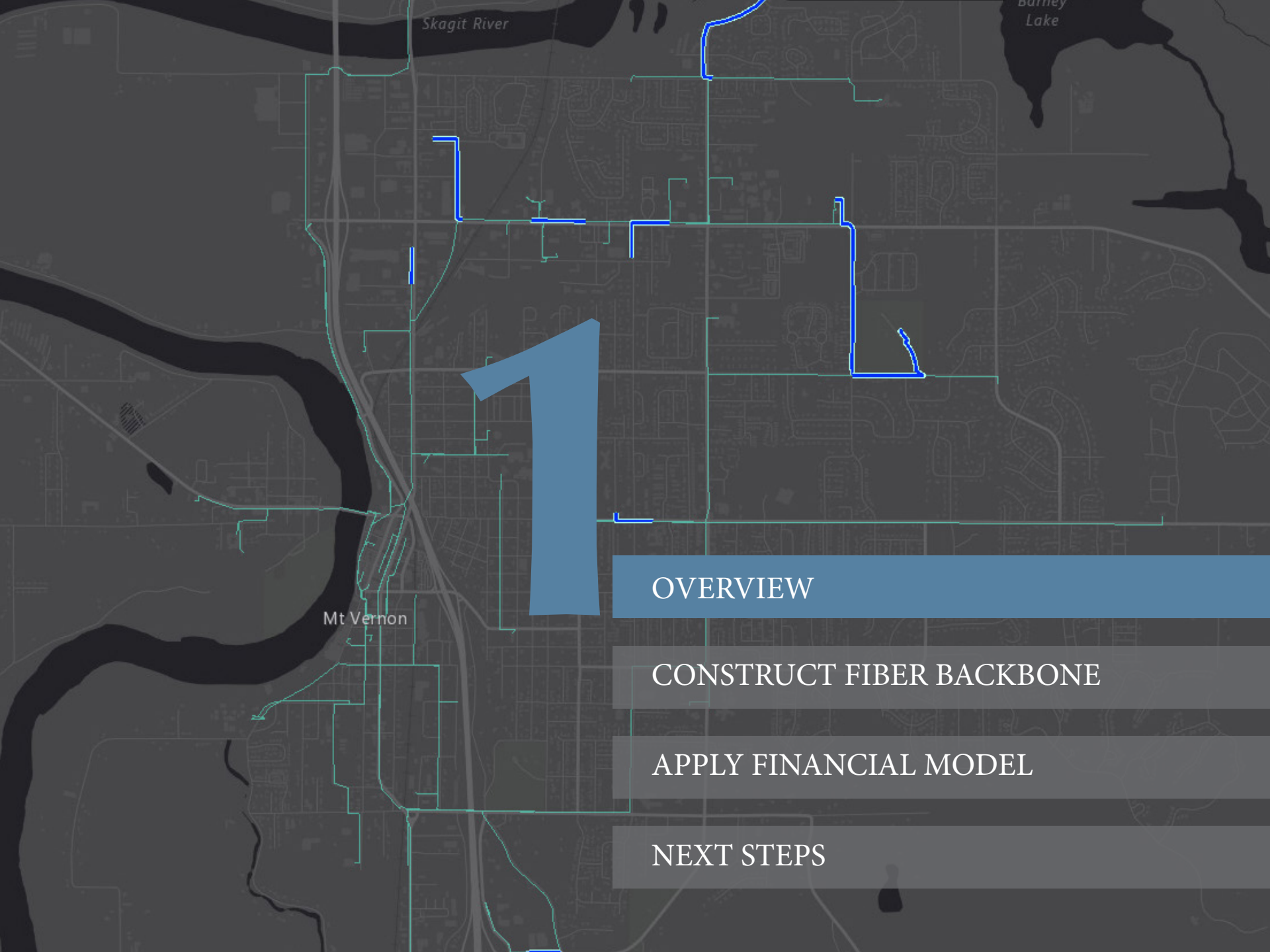


Port of Skagit



SKAGIT COUNTY COMMUNITY FIBER OPTIC NETWORK STRATEGIC PLAN

March 10, 2017



Skagit River

Burney Lake

Mt Vernon

1

OVERVIEW

CONSTRUCT FIBER BACKBONE

APPLY FINANCIAL MODEL

NEXT STEPS

INTRODUCTION

Skagit County, the Port of Skagit, and the Economic Development Alliance of Skagit County (EDASC) have jointly prepared this Community Fiber Optic Network Strategic Plan to serve as a guiding document for a publically owned, wholesale transport service network in Skagit County.

The primary goal is to guide development of a countywide, carrier grade, open access fiber optic network that will deliver affordable high speed internet access to the citizens of Skagit County for the purposes of economic development, education, public health and safety, and transportation. It is our goal to deliver carrier grade fiber optic infrastructure from Anacortes to Concrete.

The network will be operated as an open access, multi-provider environment, such that private telecommunications providers are allowed access to the system, providing consumer choice and competitive pricing for customers.

BACKGROUND

Skagit County is currently served by a telecommunications system that includes both private and publicly owned elements. Several governmental organizations within the county own and individually manage an interconnected fiber optic network. These organizations include the Port of Skagit, City of Mount Vernon, City of Burlington, and the Skagit PUD.

Construction of the system began in 1999 and Skagit County has used 0.09 economic development grant funds to support the development of this network. In addition, several private telecommunications companies provide varying levels of broadband service to residences, schools, businesses, and other customers around the county.

Skagit County has prepared a GIS based [Story Map](#) of the Skagit County Fiber Optic history.

STATEMENT OF PROBLEM

1. Currently, the collective municipalities and public organizations lack a coordinated strategy for fiber optic deployment countywide.
2. As a result, local communities and municipal organizations are proceeding independently to develop their own strategy.
 - City of Anacortes:** Constructing a fiber optic connection to serve their water system telemetry needs and is exploring a community fiber network within their city limits.
 - Town of La Conner:** No room to expand their UGA. Exploring a fiber-to-the-home project.

STATEMENT OF PROBLEM

3. Several rural areas and east county communities including Lyman, Hamilton, and Concrete lack access to fiber optics in significant ways and are desperately in need of economic opportunity growth.
4. In addition, the infrastructure that is currently in place has been built according to varying standards and specifications, and individual installations have been constructed to serve specific purposes rather than a broader network objective.

STRATEGIC GOAL



Countywide Fiber Network

Carrier grade, open access fiber optic network.



Consumer Choice

Affordable high speed internet access to the citizens and businesses of Skagit County.



Opportunity Growth

Economic development, education, public health and safety, and transportation.



Port of Skagit





2

OVERVIEW

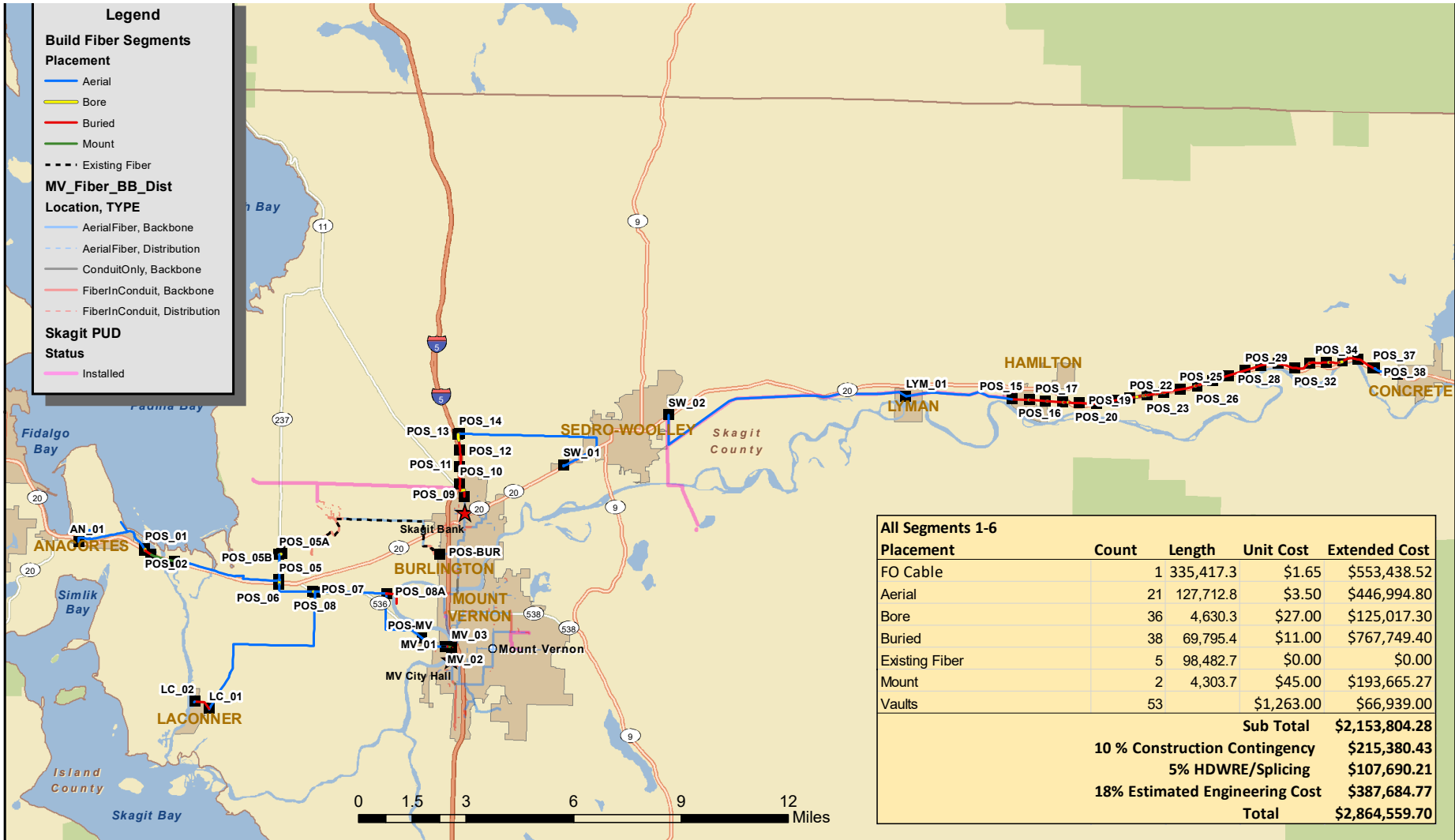
CONSTRUCT FIBER BACKBONE

APPLY FINANCIAL MODEL

NEXT STEPS

Construct Fiber Backbone

BACKBONE (ALL SEGMENTS 1-6)



See Appendix A for route model by segment.

Construct Fiber Backbone

PARTNER SEGMENT GROUP

| Municipality | Demographics* | Segment |
|---------------|--|--------------------------------|
| Anacortes | 3,897 – Employed in Selection Area, Live Outside 4,255 – Live in Selection Area, Employed Outside 1,966 – Employed and Live in Selection Area | 1: Anacortes to Burlington |
| Mt. Vernon | 10,299 – Employed in Selection Area, Live Outside 9,483 – Live in Selection Area, Employed Outside 3,290 – Employed and Live in Selection Area | 2: Anacortes to Mt. Vernon |
| La Conner | 668 – Employed in Selection Area, Live Outside 323 – Live in Selection Area, Employed Outside 19 – Employed and Live in Selection Area | 3. Anacortes to La Conner |
| Burlington | 7,370 – Employed in Selection Area, Live Outside 3,151 – Live in Selection Area, Employed Outside 482 – Employed and Live in Selection Area | 4. Burlington to Sedro-Woolley |
| Sedro-Woolley | 2,698– Employed in Selection Area, Live Outside 3,999 – Live in Selection Area, Employed Outside 590 – Employed and Live in Selection Area | 5. Sedro-Woolley to Hamilton |
| Hamilton | 110– Employed in Selection Area, Live Outside 1,248– Live in Selection Area, Employed Outside 50– Employed and Live in Selection Area | 6. Hamilton to Concrete |
| Concrete | 146– Employed in Selection Area, Live Outside 294– Live in Selection Area, Employed Outside 9 – Employed and Live in Selection Area | End. |

*Target Cities Employment Dynamics (Source: U.S. Census Bureau, OnTheMap Application and LEHD Origin-Destination Employment Statistics). See Appendix B.

Construct Fiber Backbone

FIBER BACKBONE



The fiber backbone solely provides carrier grade wholesale transport services; it does not provide retail service in any capacity.



Each internet service provider (ISP) owns its own customer relationships, directly selling, marketing, and billing its customers.



Competitive pricing for customers.

3

OVERVIEW

CONSTRUCT FIBER BACKBONE

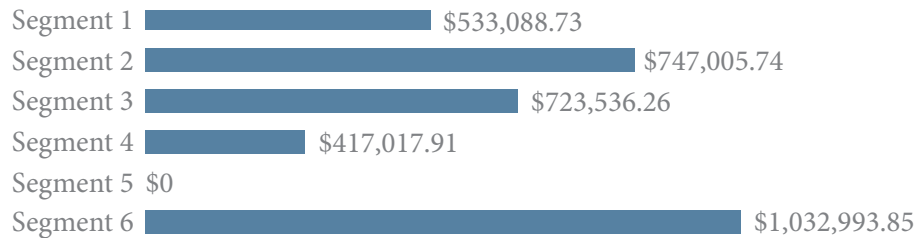
APPLY FINANCIAL MODEL

NEXT STEPS

Apply Financial Model

EXPENSES

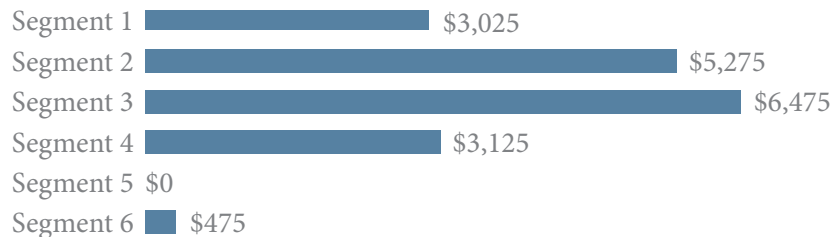
Construction Costs by Segment



Total Construction Cost by Segment:
\$2,864,559.70

See Appendix C for a complete breakdown of fiber plant construction costs by segment (placement of fiber optic (FO) cable, aerial, bore, buried, existing fiber, bridge mount, and vaults.)

Annual Operating Cost by Segment



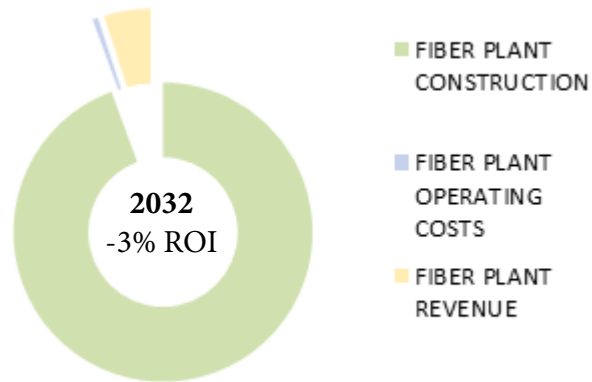
Total Annual Operating Cost by Segment:
\$18,375.00

Existing fiber construction pole counts are not calculated into operational costs. No as built drawings were provided as a deliverable from the entities who own the fiber. It is beyond the scope of this project to design existing plant.

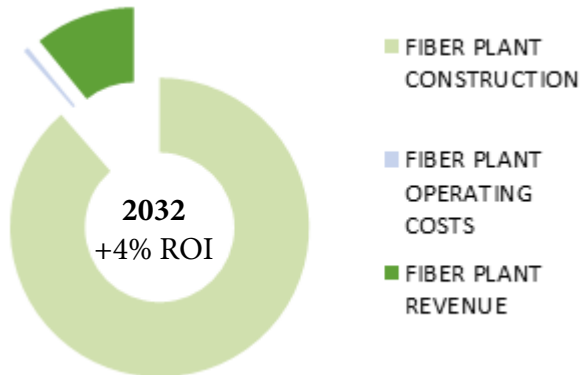
Apply Financial Model

REVENUE MODEL

Fiber Plant Model (Backbone)



Fiber Plant Community Model (Backbone + Cities + Towns)



DATA ANALYSIS

Reasonable Return Over 15 Years

The financial model shows a positive return on fiber investments over a 15 year period.

The Fiber Plant Community Model estimates revenue potential from both proposed fiber optic backbone and community fiber networks and demonstrates a positive ROI by year 2032.

SEE FINANCIAL MODEL - APPENDIX D



4

OVERVIEW

CONSTRUCT FIBER BACKBONE

APPLY FINANCIAL MODEL

NEXT STEPS

Next Steps

POLICY RECOMMENDATIONS

The following policies are recommended for adoption by Skagit County and all partners receiving county grant funds for construction of publically owned fiber optic networks in the county.



Dig Once Policy

Decrease the cost of laying fiber by organizing fiber and conduit installation with other capital projects or in joint trenching with other entities.



Efficient and Effective Use of Public Funds

Public investments in infrastructure in Skagit County should be used efficiently for the benefit of the community.



Consistent Business Plan and Return on Investment

A consistent business approach using an open access dark fiber optic lease model and partnership approach will enable all communities to meet their individual goals, while supporting build out of a stronger network over time.



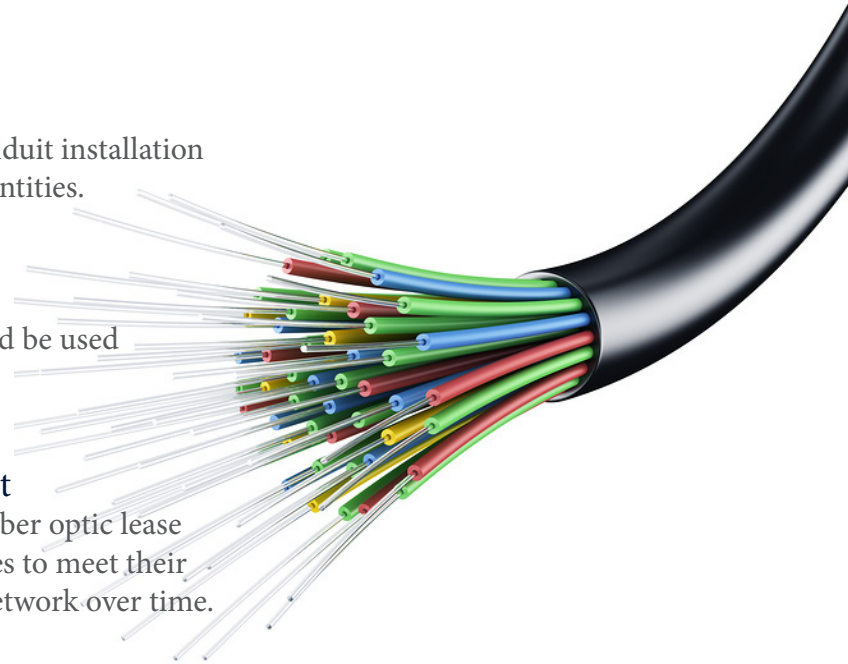
Carrier Grade System

Commit to building to consistent standards (documentation, accessibility, maintenance and operations, support, response time, as-built drawings, strand count) to the level of service as prescribed by the carrier.



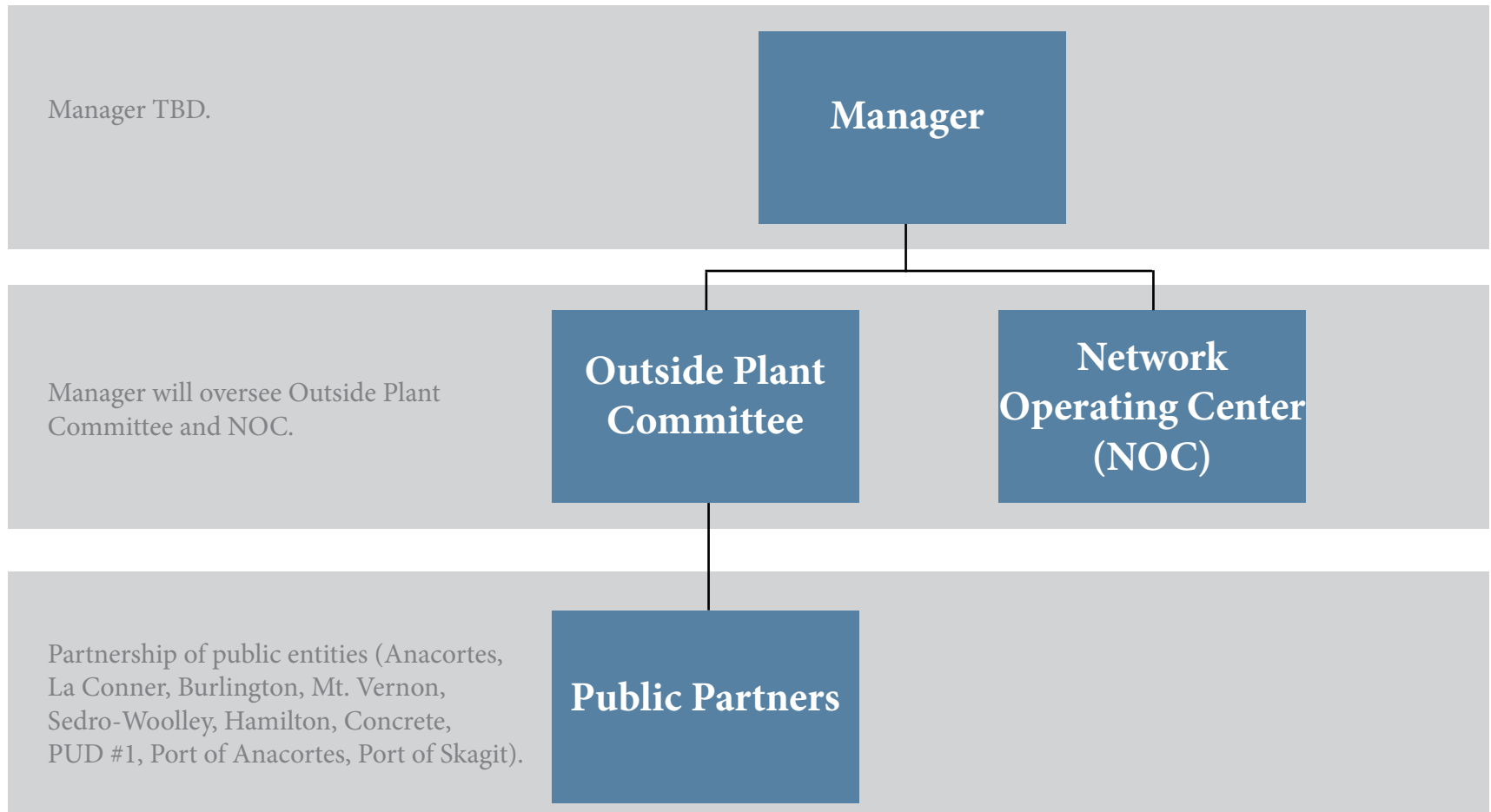
Network Management Structure

A partnership of public entities has potential to be an important catalyst in expanding access to telecommunications.



Next Steps

NETWORK MANAGEMENT STRUCTURE



Next Steps

ACTION ITEMS

The following action items are recommended as next steps in the Strategic Plan.

1. Adopt Interlocal and see Scope of Work (Appendix E,F).
2. CERB Planning Grant will be used to refine business model inside communities.
3. Construct fiber network consistent with plan.
4. Incorporate strategic planning recommendations into partnership comprehensive planning documents.



Port of Skagit

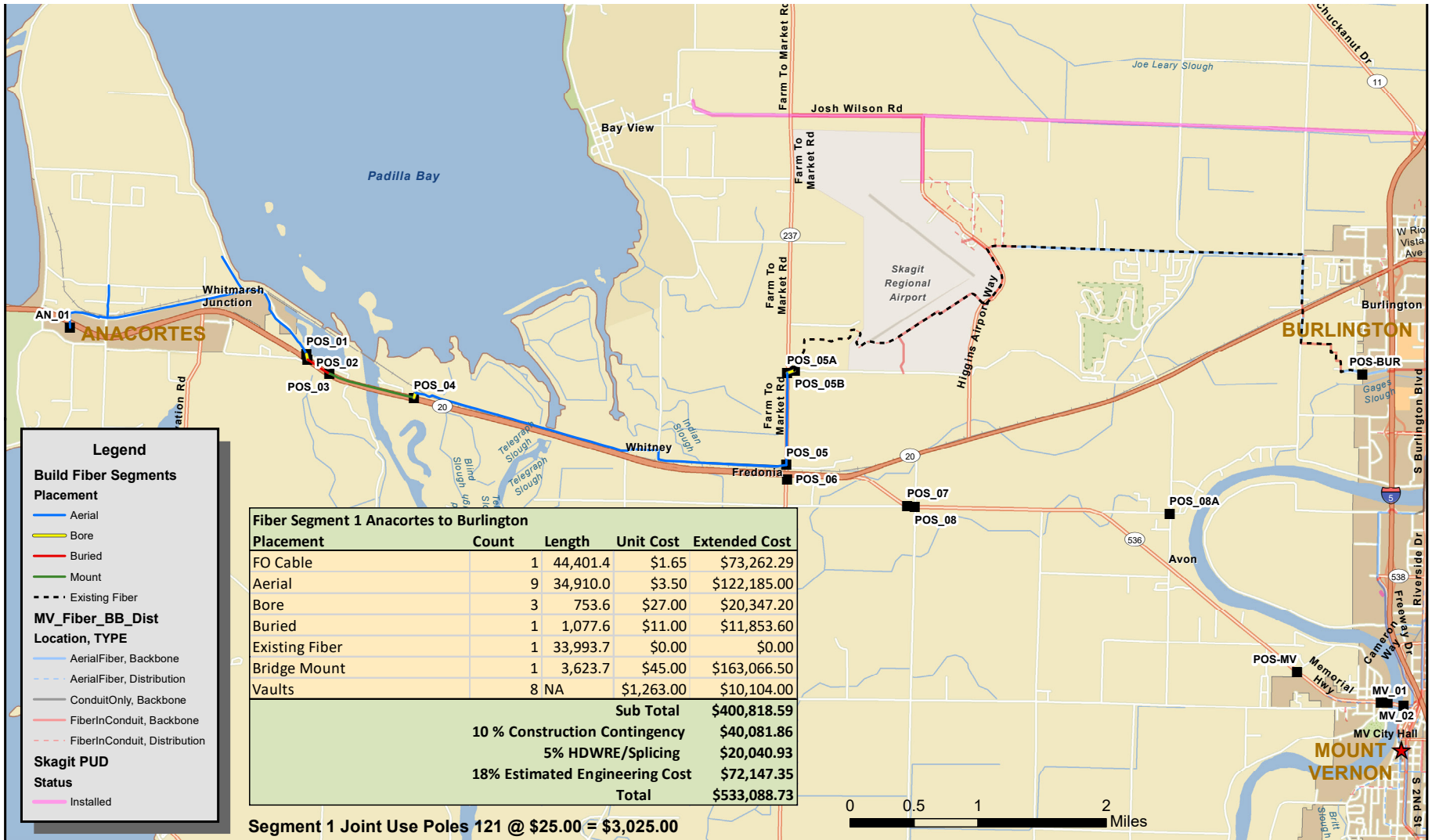


SKAGIT COUNTY COMMUNITY FIBER OPTIC NETWORK STRATEGIC PLAN

March 10, 2017

Appendix A

SEGMENT 1



Legend

Build Fiber Segments Placement

- Aerial
- Bore
- Buried
- Mount
- Existing Fiber

MV_Fiber_BB_Dist Location, TYPE

- AerialFiber, Backbone
- AerialFiber, Distribution
- ConduitOnly, Backbone
- FiberInConduit, Backbone
- FiberInConduit, Distribution

Skagit PUD Status

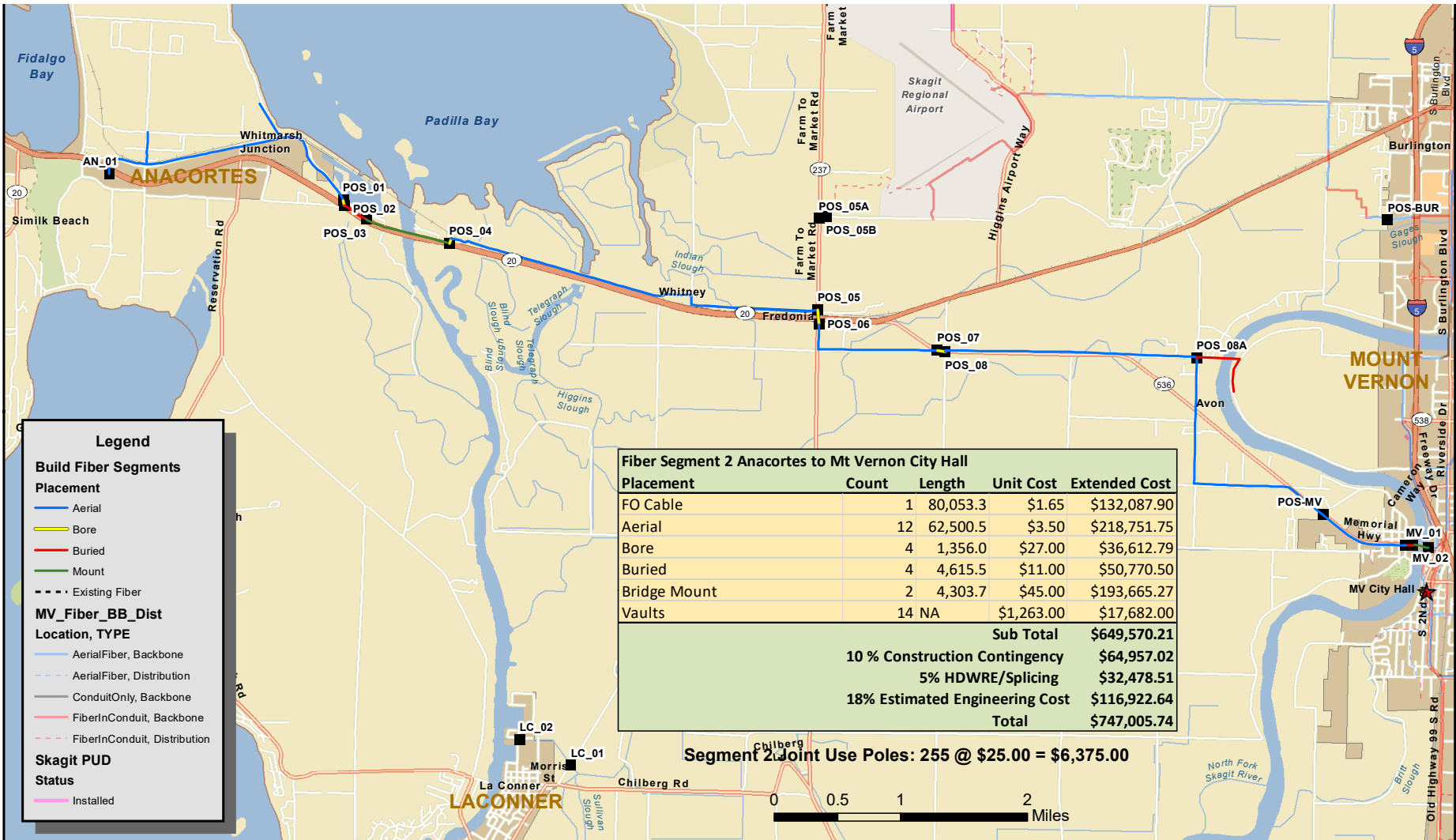
- Installed

| Fiber Segment 1 Anacortes to Burlington | | | | |
|---|-------|----------|---------------------------------------|---------------------|
| Placement | Count | Length | Unit Cost | Extended Cost |
| FO Cable | 1 | 44,401.4 | \$1.65 | \$73,262.29 |
| Aerial | 9 | 34,910.0 | \$3.50 | \$122,185.00 |
| Bore | 3 | 753.6 | \$27.00 | \$20,347.20 |
| Buried | 1 | 1,077.6 | \$11.00 | \$11,853.60 |
| Existing Fiber | 1 | 33,993.7 | \$0.00 | \$0.00 |
| Bridge Mount | 1 | 3,623.7 | \$45.00 | \$163,066.50 |
| Vaults | 8 | NA | \$1,263.00 | \$10,104.00 |
| | | | Sub Total | \$400,818.59 |
| | | | 10 % Construction Contingency | \$40,081.86 |
| | | | 5% HDWRE/Splicing | \$20,040.93 |
| | | | 18% Estimated Engineering Cost | \$72,147.35 |
| | | | Total | \$533,088.73 |

Segment 1 Joint Use Poles 121 @ \$25.00 = \$3,025.00

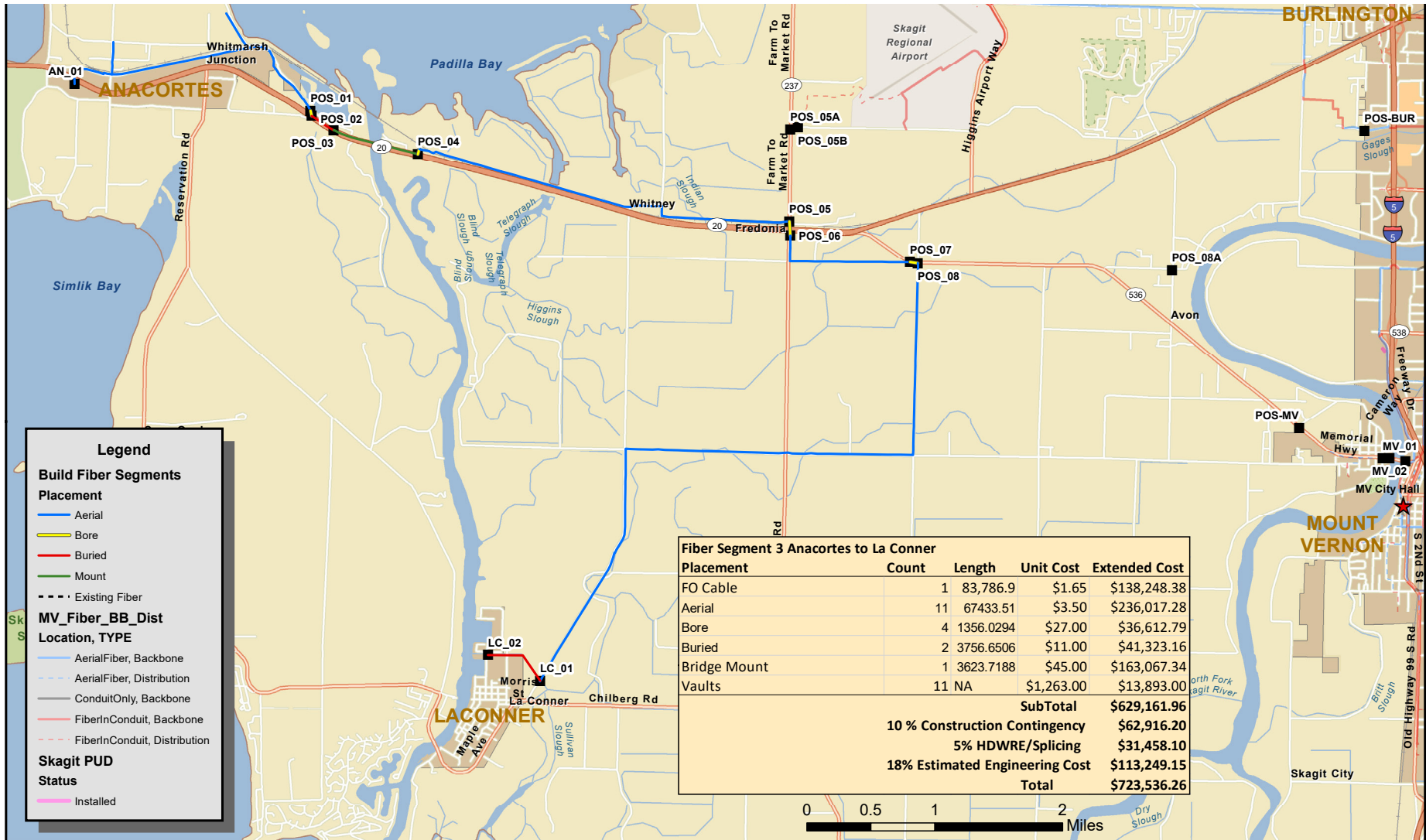
Appendix A

SEGMENT 2



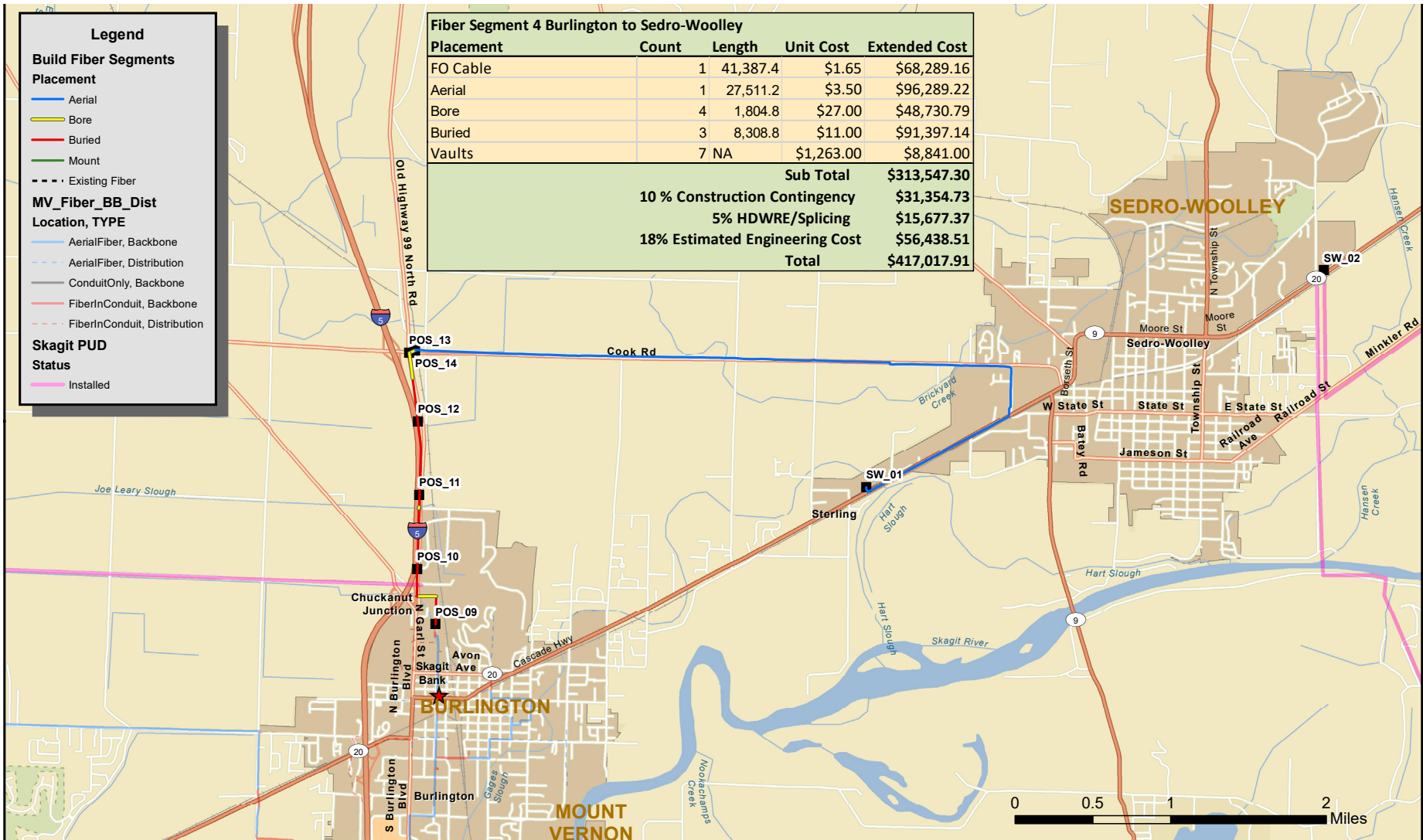
Appendix A

SEGMENT 3



Appendix A

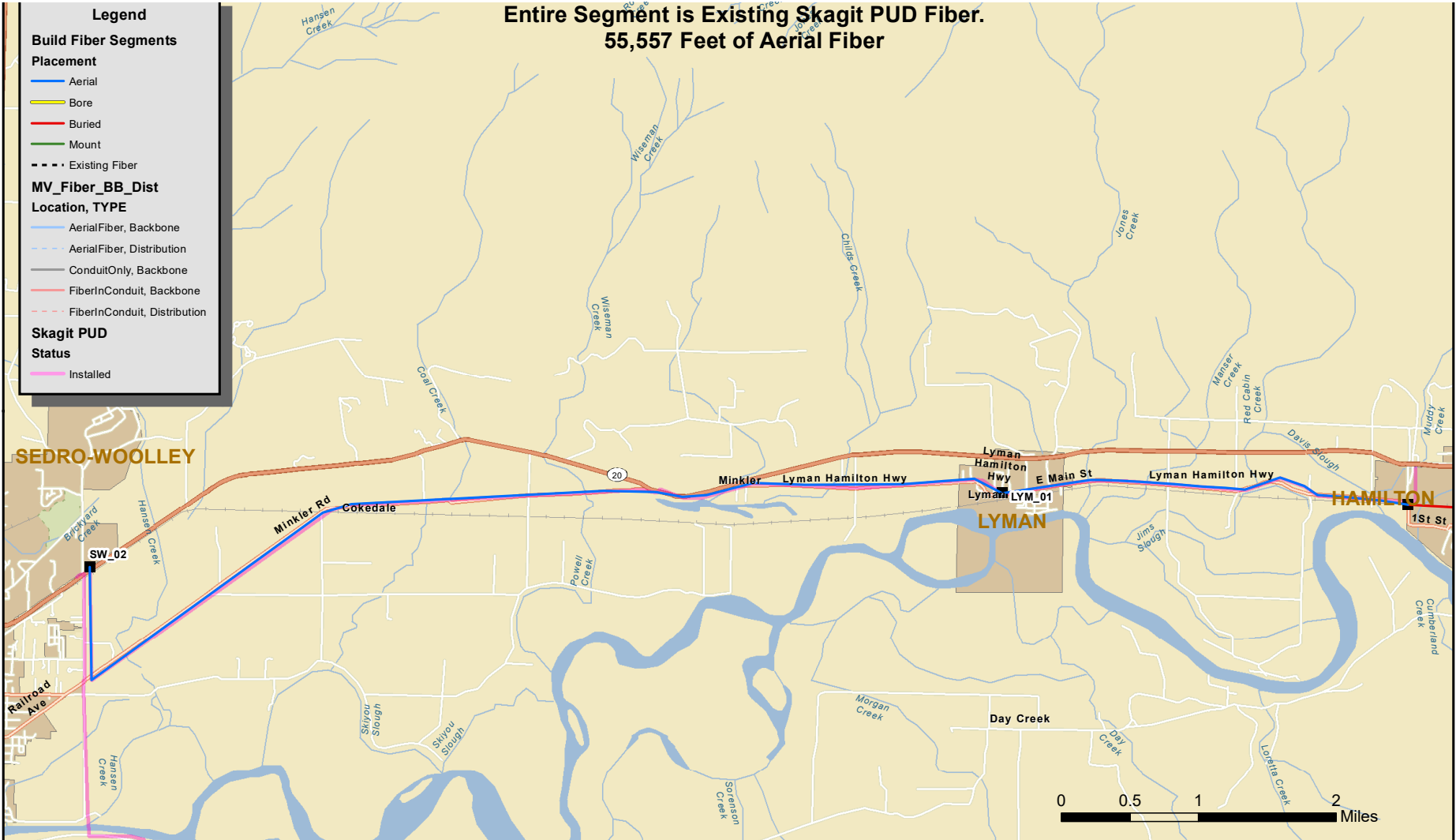
SEGMENT 4



Appendix A

SEGMENT 5

Entire Segment is Existing Skagit PUD Fiber.
55,557 Feet of Aerial Fiber



Appendix A

SEGMENT 6

| Fiber Segment 6 Hamilton to Concrete | | | | |
|--------------------------------------|-------|----------|------------|-----------------------|
| Placement | Count | Length | Unit Cost | Extended Cost |
| FO Cable | 1 | 64,651.2 | \$1.65 | \$106,674.55 |
| Aerial | 3 | 3,508.6 | \$3.50 | \$12,279.96 |
| Bore | 27 | 1,140.0 | \$27.00 | \$30,778.91 |
| Buried | 30 | 54,125.3 | \$11.00 | \$595,378.69 |
| Vaults | 25 | NA | \$1,263.00 | \$31,575.00 |
| Sub Total | | | | \$776,687.10 |
| 10 % Construction Contingency | | | | \$77,668.71 |
| 5% HDWRE/Splicing | | | | \$38,834.36 |
| 18% Estimated Engineering Cost | | | | \$139,803.68 |
| Total | | | | \$1,032,993.85 |

Legend

Build Fiber Segments

Placement

- Aerial
- Bore
- Buried
- Mount

--- Existing Fiber

MV_Fiber_BB_Dist

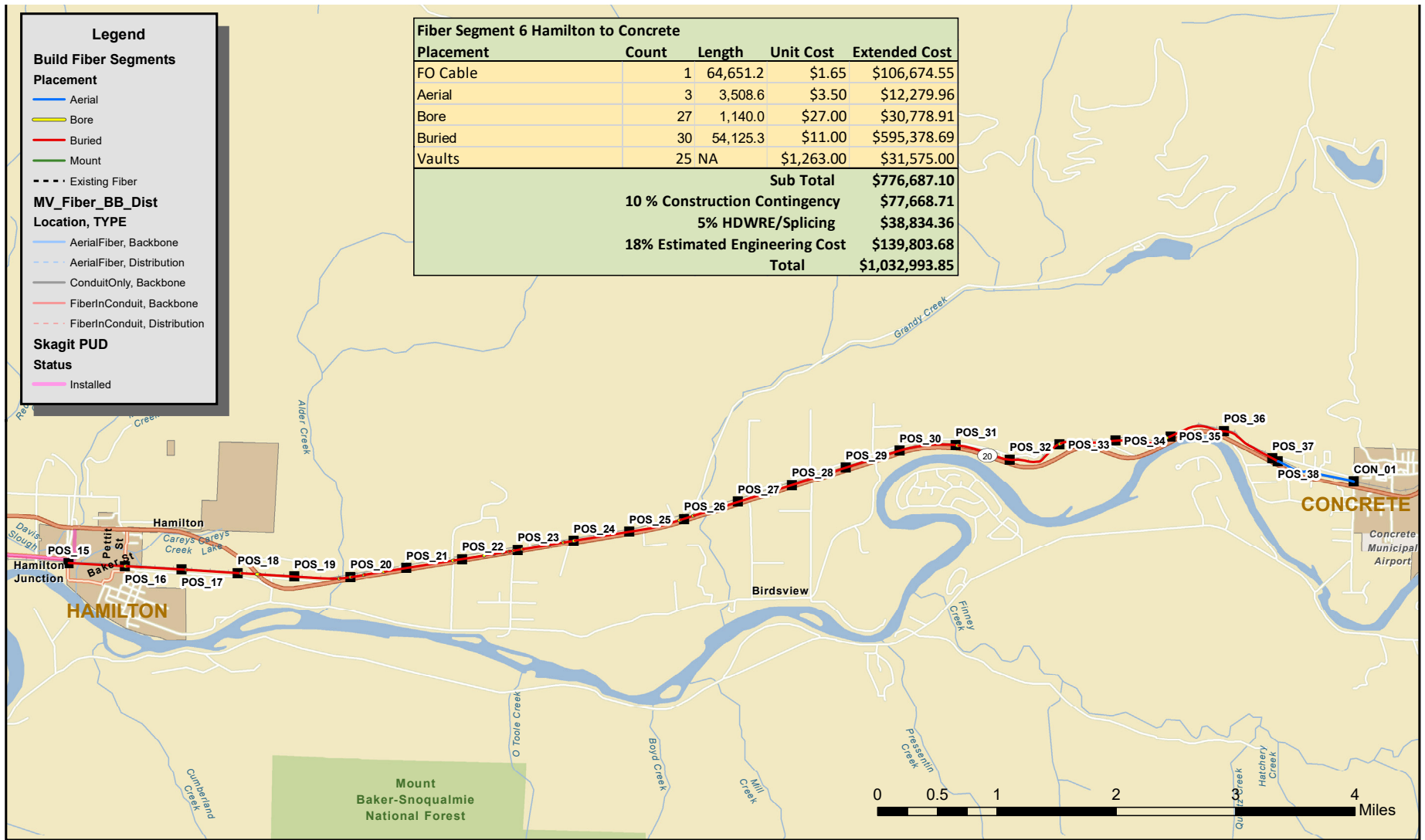
Location, TYPE

- AerialFiber, Backbone
- AerialFiber, Distribution
- ConduitOnly, Backbone
- FiberInConduit, Backbone
- FiberInConduit, Distribution

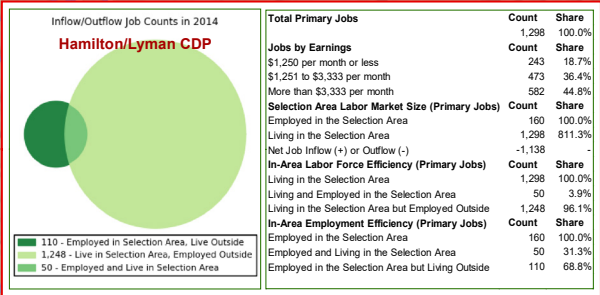
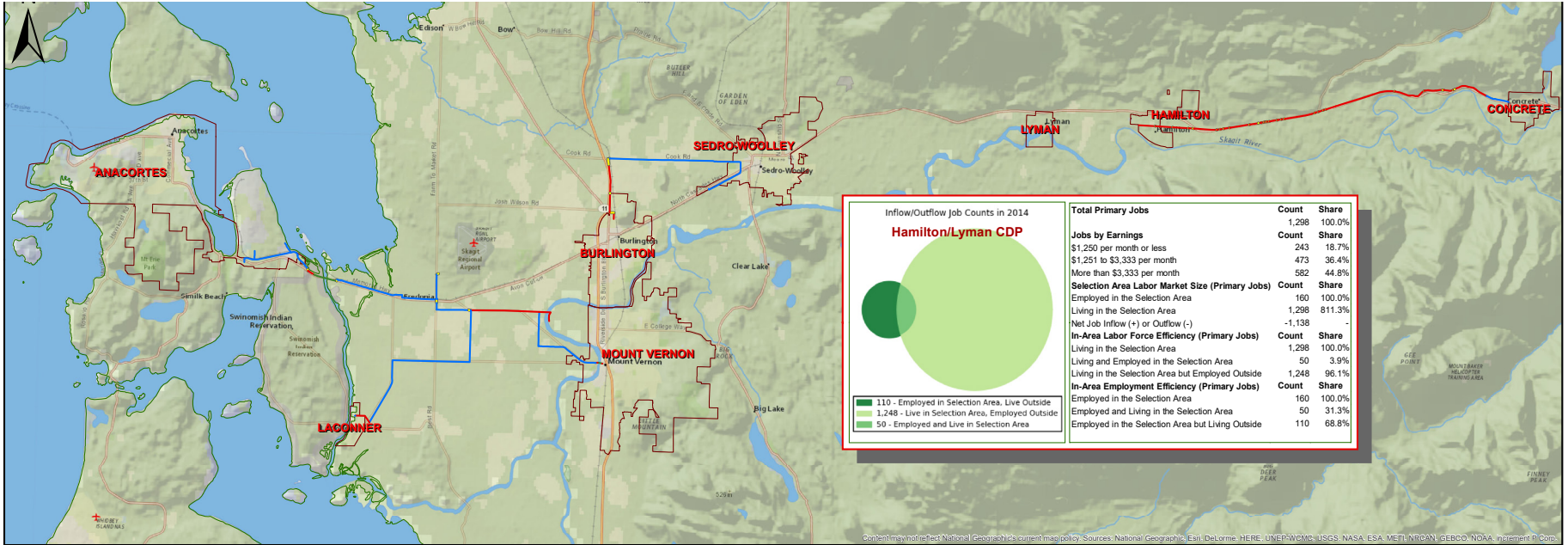
Skagit PUD

Status

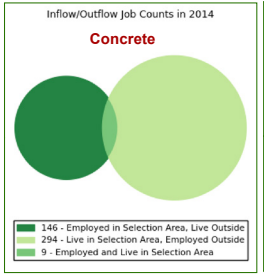
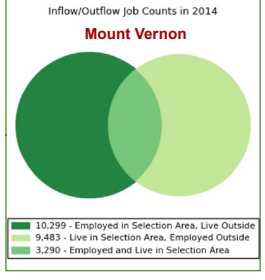
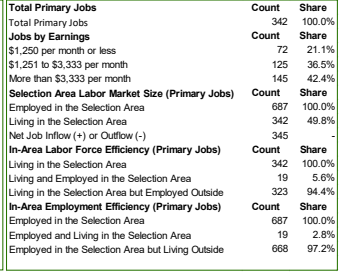
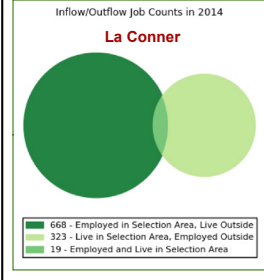
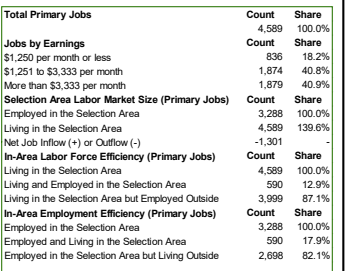
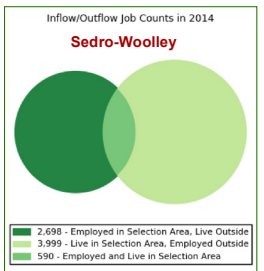
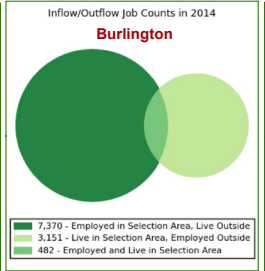
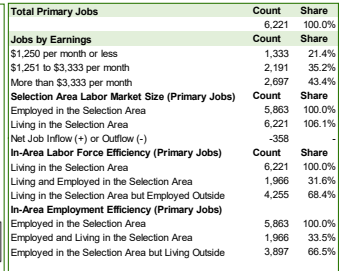
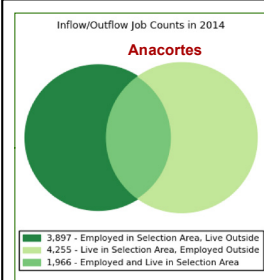
- Installed



Appendix B



Content may reflect National Geographic's current map policy. Sources: National Geographic, Esri, DeLorme, HERE, UNEP-FWMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment, Corp.



Appendix C

| Fiber Segment 1 Anacortes to Burlington | | | | |
|--|--------------|---------------|------------------|----------------------|
| Placement | Count | Length | Unit Cost | Extended Cost |
| FO Cable | 1 | 44,401.4 | \$1.65 | \$73,262.29 |
| Aerial | 9 | 34,910.0 | \$3.50 | \$122,185.00 |
| Bore | 3 | 753.6 | \$27.00 | \$20,347.20 |
| Buried | 1 | 1,077.6 | \$11.00 | \$11,853.60 |
| Existing Fiber | 1 | 33,993.7 | \$0.00 | \$0.00 |
| Bridge Mount | 1 | 3,623.7 | \$45.00 | \$163,066.50 |
| Vaults | 8 | NA | \$1,263.00 | \$10,104.00 |
| SubTotal | | | | \$400,818.59 |
| 10 % Construction Contingency | | | | \$40,081.86 |
| 5% HDWRE/Splicing | | | | \$20,040.93 |
| 18% Estimated Engineering Cost | | | | \$72,147.35 |
| Total | | | | \$533,088.73 |
| Fiber Segment 2 Anacortes to Mt. Vernon City Hall | | | | |
| Placement | Count | Length | Unit Cost | Extended Cost |
| FO Cable | 1 | 80,053.3 | \$1.65 | \$132,087.94 |
| Aerial | 12 | 62,500.5 | \$3.50 | \$218,751.75 |
| Bore | 4 | 1,356.0 | \$27.00 | \$36,612.79 |
| Buried | 4 | 4,615.5 | \$11.00 | \$50,770.50 |
| Bridge Mount | 2 | 4,303.7 | \$45.00 | \$193,665.27 |
| Vaults | 14 | NA | \$1,263.00 | \$17,682.00 |
| Sub Total | | | | \$649,570.21 |
| 10 % Construction Contingency | | | | \$64,957.02 |
| 5% HDWRE/Splicing | | | | \$32,478.51 |
| 18% Estimated Engineering Cost | | | | \$116,922.64 |
| Total | | | | \$747,005.74 |

Appendix C

| Fiber Segment 3 Anacortes to La Conner | | | | |
|--|--------------|---------------|------------------|----------------------|
| Placement | Count | Length | Unit Cost | Extended Cost |
| FO Cable | 1 | 83,786.9 | \$1.65 | \$138,248.38 |
| Aerial | 11 | 67433.51 | \$3.50 | \$236,017.28 |
| Bore | 4 | 1356.0294 | \$27.00 | \$36,612.79 |
| Buried | 2 | 3756.6506 | \$11.00 | \$41,323.16 |
| Bridge Mount | 1 | 3623.7188 | \$45.00 | \$163,067.34 |
| Vaults | 11 | NA | \$1,263.00 | \$13,893.00 |
| SubTotal | | | | \$629,161.96 |
| 10% Construction Contingency | | | | \$62,916.20 |
| 5% HDWRE/Splicing | | | | \$31,458.10 |
| 18% Estimated Engineering Cost | | | | \$113,249.15 |
| Total | | | | \$723,536.26 |
| Fiber Segment 4 Burlington to Sedro-Woolley | | | | |
| Placement | Count | Length | Unit Cost | Extended Cost |
| FO Cable | 1 | 41,387.4 | \$1.65 | \$68,289.16 |
| Aerial | 1 | 27,511.2 | \$3.50 | \$96,289.22 |
| Bore | 4 | 1,804.8 | \$27.00 | \$48,730.79 |
| Buried | 3 | 8,308.8 | \$11.00 | \$91,397.14 |
| Vaults | 7 | NA | \$1,263.00 | \$8,841.00 |
| Sub Total | | | | \$313,547.30 |
| 10 % Construction Contingency | | | | \$31,354.73 |
| 5% HDWRE/Splicing | | | | \$15,677.37 |
| 18% Estimated Engineering Cost | | | | \$56,438.51 |
| Total | | | | \$417,017.91 |

Appendix C

Fiber Segment 5 Sedro-Woolley to Hamilton

| Placement | Count | Length | Unit Cost | Extended Cost |
|-----------|-------|--------|-----------|---------------|
|-----------|-------|--------|-----------|---------------|

**Entire Segment is Existing Skagit PUD Fiber
55,557 Feet of Buried Fiber**

| | |
|--------------------------------|---------------|
| Sub Total | \$0.00 |
| 10 % Construction Contingency | \$0.00 |
| 5% HDWRE/Splicing | \$0.00 |
| 18% Estimated Engineering Cost | \$0.00 |
| Total | \$0.00 |

Fiber Segment 6 Hamilton to Concrete

| Placement | Count | Length | Unit Cost | Extended Cost |
|-----------|-------|--------|-----------|---------------|
|-----------|-------|--------|-----------|---------------|

| | | | | |
|----------|----|----------|------------|--------------|
| FO Cable | 1 | 64,651.2 | \$1.65 | \$106,674.55 |
| Aerial | 3 | 3,508.6 | \$3.50 | \$12,279.96 |
| Bore | 27 | 1,140.0 | \$27.00 | \$30,778.91 |
| Buried | 30 | 54,125.3 | \$11.00 | \$595,378.69 |
| Vaults | 25 | NA | \$1,263.00 | \$31,575.00 |

| | |
|--------------------------------|-----------------------|
| Sub Total | \$776,687.10 |
| 10 % Construction Contingency | \$77,668.71 |
| 5% HDWRE/Splicing | \$38,834.36 |
| 18% Estimated Engineering Cost | \$139,803.68 |
| Total | \$1,032,993.85 |

Appendix C

| All Segments 1-6 | | | | |
|--------------------------------|--------------|---------------|------------------|-----------------------|
| Placement | Count | Length | Unit Cost | Extended Cost |
| FO Cable | 1 | 335,417.4 | \$1.65 | \$553,438.65 |
| Aerial | 21 | 127,712.8 | \$3.50 | \$446,994.80 |
| Bore | 36 | 4,630.3 | \$27.00 | \$125,017.30 |
| Buried | 38 | 69,795.4 | \$11.00 | \$767,749.40 |
| Existing Fiber | 5 | 98,482.7 | \$0.00 | \$0.00 |
| Mount | 2 | 4,303.7 | \$45.00 | \$193,665.27 |
| Vaults | 53 | | \$1,263.00 | \$66,939.00 |
| Sub Total | | | | \$2,153,804.28 |
| 10 % Construction Contingency | | | | \$215,380.43 |
| 5% HDWRE/Splicing | | | | \$107,690.21 |
| 18% Estimated Engineering Cost | | | | \$387,684.77 |
| Total | | | | \$2,864,559.70 |

Pole Attachments Yearly

| Pole Attachment Fees | Count | Unit Cost | Extended Cost |
|-----------------------------|--------------|------------------|----------------------|
| Segment 1 | 121 | \$25.00 | \$3,025.00 |
| Segment 2 | 211 | \$25.00 | \$5,275.00 |
| Segment 3 | 259 | \$25.00 | \$6,475.00 |
| Segment 4 | 125 | \$25.00 | \$3,125.00 |
| Segment 5 | 0 | \$0.00 | \$0.00 |
| Segment 6 | 19 | \$25.00 | \$475.00 |
| All Segments | 735 | \$25.00 | \$18,375.00 |

Appendix D

| Segment 1 | Footage | Mileage | Unit Cost | Total Monthly | Total Annual |
|--------------|---------|---------|-----------|-------------------|--------------------|
| CLEC | 74358 | 14.08 | \$50.00 | \$704.00 | \$8,448.00 |
| CLEC | 74358 | 14.08 | \$50.00 | \$704.00 | \$8,448.00 |
| CLEC | 74358 | 14.08 | \$50.00 | \$704.00 | \$8,448.00 |
| CLEC | 74358 | 14.08 | \$50.00 | \$704.00 | \$8,448.00 |
| ISP | 74358 | 14.08 | \$50.00 | \$704.00 | \$8,448.00 |
| ISP | 74358 | 14.08 | \$50.00 | \$704.00 | \$8,448.00 |
| Total | | | | \$4,224.00 | \$50,688.00 |

| Segment 2 | Footage | Mileage | Unit Cost | Total Monthly | Total Annual |
|--------------|---------|----------|-----------|-------------------|--------------------|
| CLEC | 72776 | 13.78333 | \$50.00 | \$689.17 | \$8,270.00 |
| ISP | 72776 | 13.78333 | \$50.00 | \$689.17 | \$8,270.00 |
| ISP | 72776 | 13.78333 | \$50.00 | \$689.17 | \$8,270.00 |
| Total | | | | \$2,067.50 | \$24,810.00 |

| Segment 3 | Footage | Mileage | Unit Cost | Total Monthly | Total Annual |
|--------------|---------|---------|-----------|-------------------|--------------------|
| CLEC | 76169 | 14.42 | \$50.00 | \$721.00 | \$8,652.00 |
| CLEC | 74358 | 14.42 | \$50.00 | \$721.00 | \$8,652.00 |
| ISP | 74358 | 14.42 | \$50.00 | \$721.00 | \$8,652.00 |
| ISP | 74358 | 14.42 | \$50.00 | \$721.00 | \$8,652.00 |
| Total | | | | \$2,884.00 | \$34,608.00 |

Appendix D

| Segment 4 | Footage | Mileage | Unit Cost | Total Monthly | Total Annual |
|-----------------------------|---------|----------|-----------|-------------------|---------------------|
| CLEC | 37625 | 7.125947 | \$50.00 | \$356.30 | \$4,275.57 |
| ISP | 37625 | 7.125947 | \$50.00 | \$356.30 | \$4,275.57 |
| ISP | 37625 | 7.125947 | \$50.00 | \$356.30 | \$4,275.57 |
| Total | | | | \$1,068.89 | \$12,826.70 |
| | | | | | |
| Segment 5 | Footage | Mileage | Unit Cost | Total Monthly | Total Annual |
| CLEC | 33993 | 6.438068 | \$50.00 | \$321.90 | \$3,862.84 |
| CLEC | 33993 | 6.438068 | \$50.00 | \$321.90 | \$3,862.84 |
| ISP | 33993 | 6.438068 | \$50.00 | \$321.90 | \$3,862.84 |
| ISP | 33993 | 6.438068 | \$50.00 | \$321.90 | \$3,862.84 |
| Total | | | | \$1,287.61 | \$15,451.36 |
| | | | | | |
| Segment 6 | Footage | Mileage | Unit Cost | Total Monthly | Total Annual |
| CLEC | 58774 | 11.13144 | \$15.84 | \$176.32 | \$2,115.86 |
| ISP | 58774 | 11.13144 | \$15.84 | \$176.32 | \$2,115.86 |
| Total | | | | \$1,640.26 | \$19,683.09 |
| Total Annual Revenue | | | | | \$158,067.16 |

Appendix D

| Segment ROI | | | | | | |
|-------------|---------------|-----|-----------------------------|--------------|-----|------|
| Segment ROI | Cost/Return | | Segment + Community Revenue | | | |
| Year | -2,969,317.93 | ROI | Year | -5938635.86 | ROI | |
| 2018 | \$158,067.16 | | 2018 | \$523,067.16 | | 2018 |
| 2019 | \$158,067.16 | | 2019 | \$523,067.16 | | 2019 |
| 2020 | \$158,067.16 | | 2020 | \$523,067.16 | | 2020 |
| 2021 | \$158,067.16 | | 2021 | \$523,067.16 | | 2021 |
| 2022 | \$158,067.16 | | 2022 | \$523,067.16 | | 2022 |
| 2023 | \$158,067.16 | | 2023 | \$523,067.16 | | 2023 |
| 2024 | \$158,067.16 | | 2024 | \$523,067.16 | | 2024 |
| 2025 | \$158,067.16 | | 2025 | \$523,067.16 | | 2025 |
| 2026 | \$158,067.16 | 13% | 2026 | \$523,067.16 | -4% | 2026 |
| 2027 | \$158,067.16 | 10% | 2027 | \$523,067.16 | -2% | 2027 |
| 2028 | \$158,067.16 | -8% | 2028 | \$523,067.16 | -1% | 2028 |
| 2029 | \$158,067.16 | -6% | 2029 | \$523,067.16 | 1% | 2029 |
| 2030 | \$158,067.16 | -5% | 2030 | \$523,067.16 | 2% | 2030 |
| 2031 | \$158,067.16 | -4% | 2031 | \$523,067.16 | 3% | 2031 |
| 2032 | \$158,067.16 | -3% | 2032 | \$523,067.16 | 4% | 2032 |

Annual Community Revenue Assumptions:

| | |
|--------------|---------------------|
| Total | \$365,000.00 |
|--------------|---------------------|

Appendix E

INTERLOCAL AGREEMENT

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Appendix E

SCOPE OF WORK

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