Broadband Access to State Highway Right-of-Way

Washington State Legislature

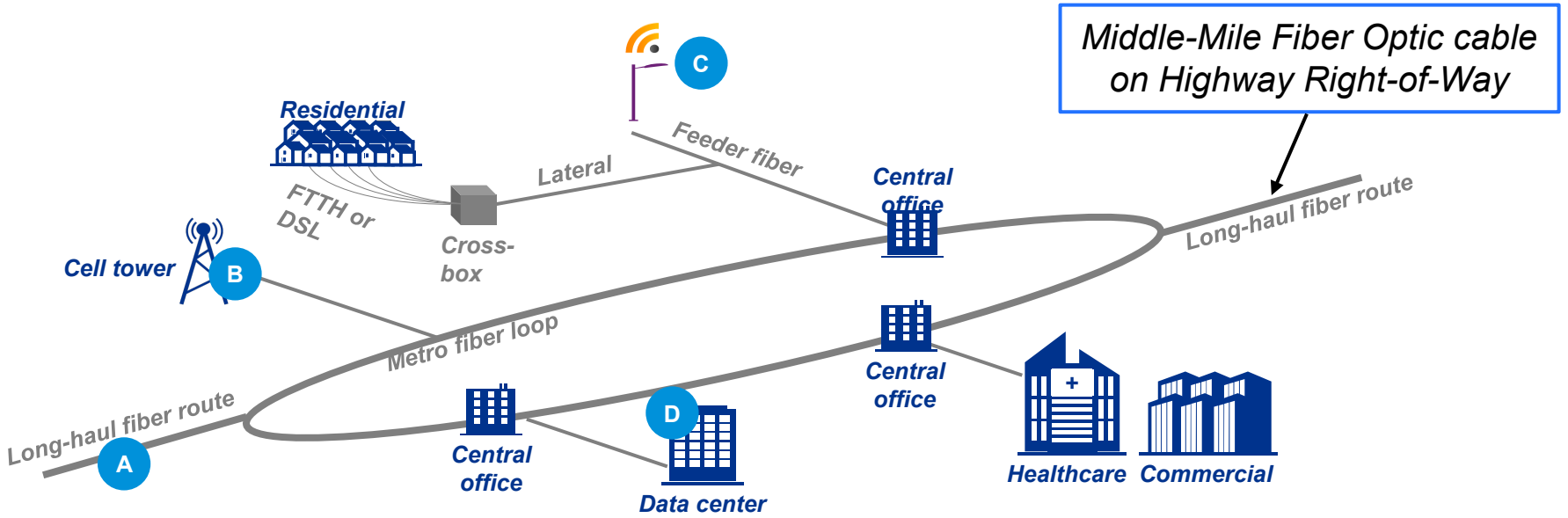
Joint Transportation Committee

October 20, 2021

Broadband Study Context

- Utility access to state highway right-of-way:
  - ✓ Generally restricted under prior law
  - ✓ Required WSDOT variance – variances granted, but process is cumbersome
- ESHB 1457 removes prohibition with regard to fiber optic infrastructure
  - ✓ Directed WSDOT to increase coordination with the State Broadband Office to collaboratively work towards state goals
  - ✓ Develop a Dig Once policy
  - ✓ Strategically "open" limited access highway rights of way to increased broadband occupancy
  - ✓ Directed JTC study to:
    - ➢ Enhance mapping of Broadband coverage
    - ➢ Assist WSDOT in developing policies governing permitting decisions and cooperative partnerships with industry
- WSDOT right-of-way permitting on hold pending results of analysis

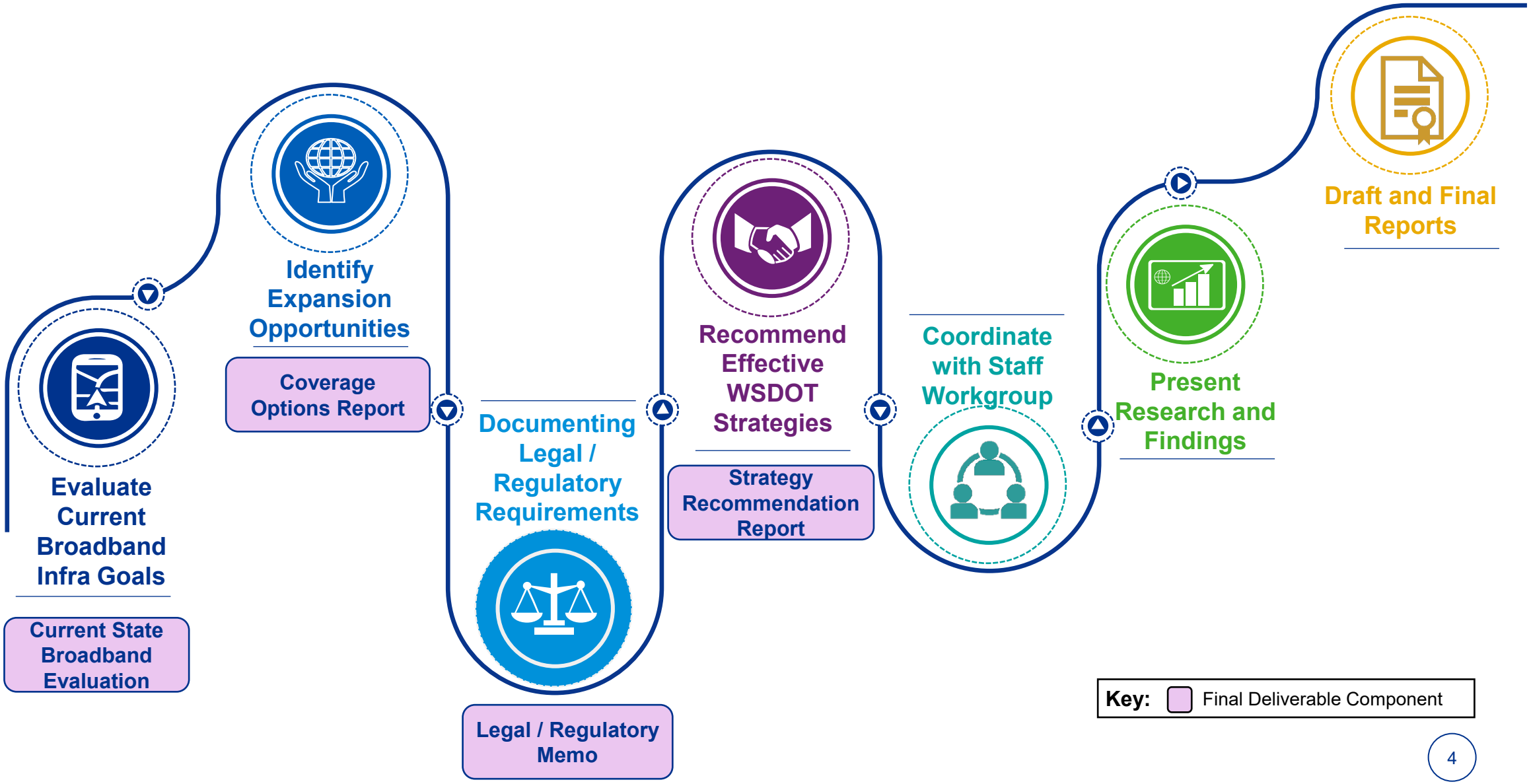
Highway Right of Way hosts “Middle Mile” Broadband



	A Fiber Providers	B Towers	C Small Cells	D Data Centers
Participant Description	Own the fiber routes and offer both lit and dark fiber services to enterprise, wholesale, and consumer segments	Steel beam structure that houses electronic equipment from carriers to transmit radio frequencies (RF)	Consist of small radio equipment and antennas that can be placed on structures such as streetlights, building sites, or poles	Data center is a physical facility that organizations use to house their critical applications and data.

Fiber Centrality

Scope of Work Overview



Staff Workgroup Members and Affiliation

Staff Workgroup Member	Affiliation
Ahmer Nizam	Washington Department of Transportation
Dawn Eychaner	Washington Statewide Broadband Office
Alistair Boudreaux	Skagit PUD
Chris Walker	NeoNet
Michael Boyle	Digital Realty
Mike Rushing	Digital Reality
Kara Riebold	Port of Whitman

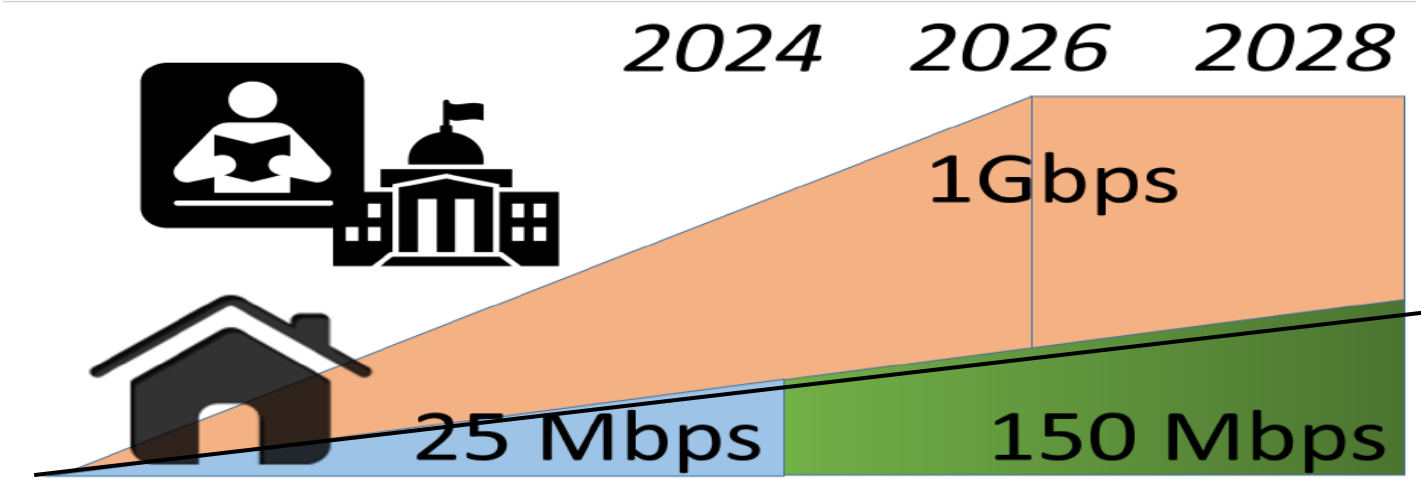
Are State Broadband Goals Reasonable and Future-proof?

Fiber Optic Network is Future Proof

- Fiber Centrality: Feeds both
  - ✓ Direct fiber to the home (FTTH) service
  - ✓ Wireless alternatives including LTE FWA and 5G FWA
- Fiber supports projected Future Use Cases
- Low technology obsolescence risk
- Aligns with the State Transportation Infrastructure/ROW strategy
- Better than Satellite service:
  - ✓ More affordable and higher performance
  - ✓ Not subject to interruption from weather
- Fiber optic technology is more than sufficient to meet state goals

Current State Residential Broadband Infrastructure Goals are Reasonable

Broadband Office Goals



By 2024

All businesses and residences have access to broadband at 25 Mbps download + 3 Mbps upload

By 2026

All communities have access to 1Gbps symmetric service at schools, libraries, hospitals and gov't buildings

By 2028

All businesses and residences have access to broadband at 150 Mbps symmetric service

Minimum Expected Residential Demand

- These are minimum statewide levels
- Levels in more densely populated areas are and will continue to be higher than minimum levels.

The State's broadband goals are consistent with the demand expectation in the short, medium and long term

Decision Matrix for Broadband Right-of-Way Permitting

Key Considerations for ROW Permit Application(s) Evaluation

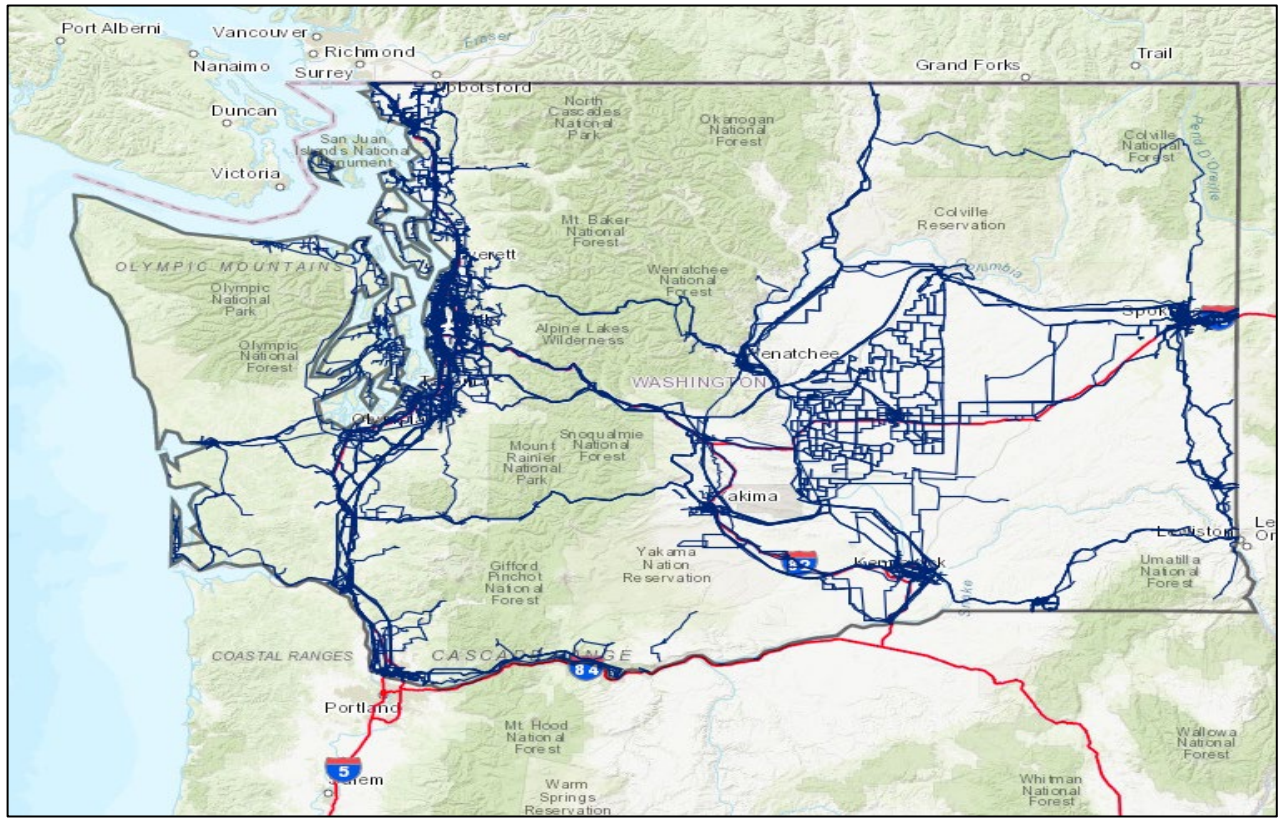
- Address long-term connectivity requirements of the public and private sector
  - ✓ Future proofing – i.e., ability to expand the network capacity in the future
  - ✓ Technical specifications
  - ✓ Performance requirements
- Open access network
  - ✓ Non-discriminatory access to all service providers and public agencies
- Compliance with state right-of-way access policies / procedures
  - ✓ Dig Once / Build Once
  - ✓ Fiber swap
  - ✓ Construction, operations and maintenance coordination with WSDOT
- Permit fees / compensation to the state

Determining Consumer Broadband Access

- Data Problem:
  - ✓ Presence of fiber does not necessarily mean open access
  - ✓ Telcos / carrier level data for existing fiber presence is proprietary
  - ✓ Multiple data sources (i.e., existing fiber presence, average internet speed, and number of service providers) are used for the analysis
- Can Estimate Coverage by looking at:
  - ✓ Where is Fiber located?
  - ✓ What are Broadband Speeds by location?
  - ✓ Where are open access providers?

Where is Fiber Located?

Current Fiber Optic Cable Coverage in Washington



Observations:

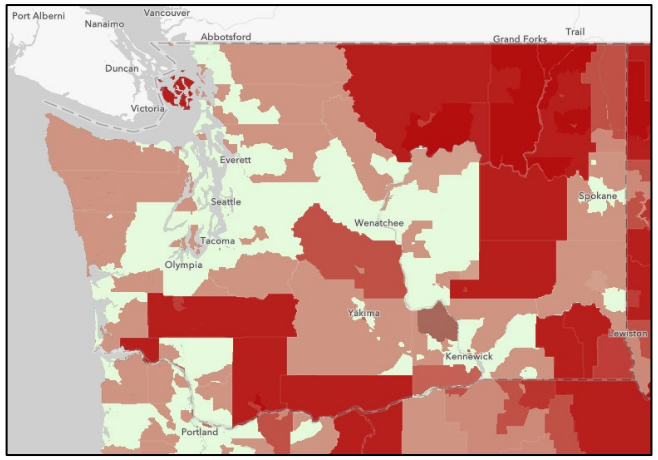
- Fiber presence shown represents proprietary private sector networks
- Not necessarily open access / non-discriminatory network(s) to serve public needs
- Analysis is leveraging multiple sources of data (fiber presence, internet speed and number of providers) to ascertain whether or not existing fiber optic networks can be leveraged for public use

Notes: Only includes fiber providers (and corresponding fiber mileage) within a 5-mile buffer range of interstate highways
Sources: ACS 2019 data

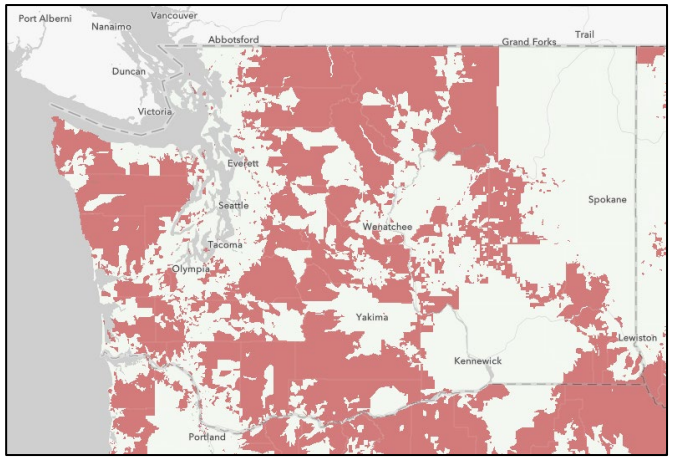
What are Broadband Speeds?

- FCC Form 407 Data
  - ✓ Widely recognized as unreliable – For example, FCC broadband score shows excellent coverage in Pend Oreille County
  - ✓ A composite score is calculated by aggregating the speeds of DSL, Cable, Broadband in the particular area adjusted by the mix of customers having these services
  - ✓ "Broadband Score" higher than 500 corresponds to >100/25 Mbps speed
- There are multiple metrics to measure average broadband speed
  - FCC broadband score
  - Ookla test
  - Microsoft device data
  - Washington Broadband Office survey

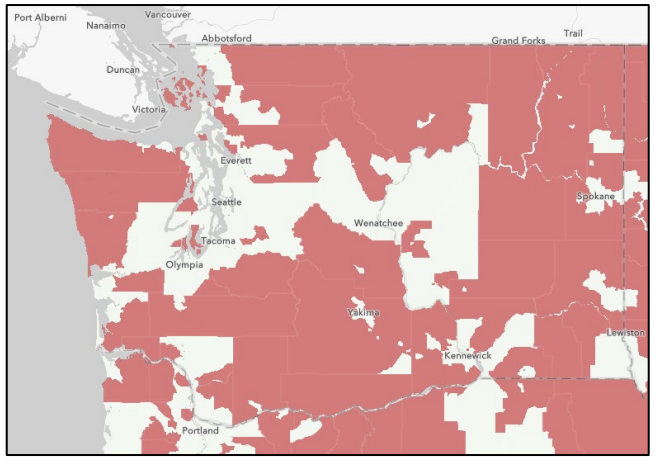
National Sources of Washington Broadband Speed Data



Source: National Telecommunications and Information Administration Data



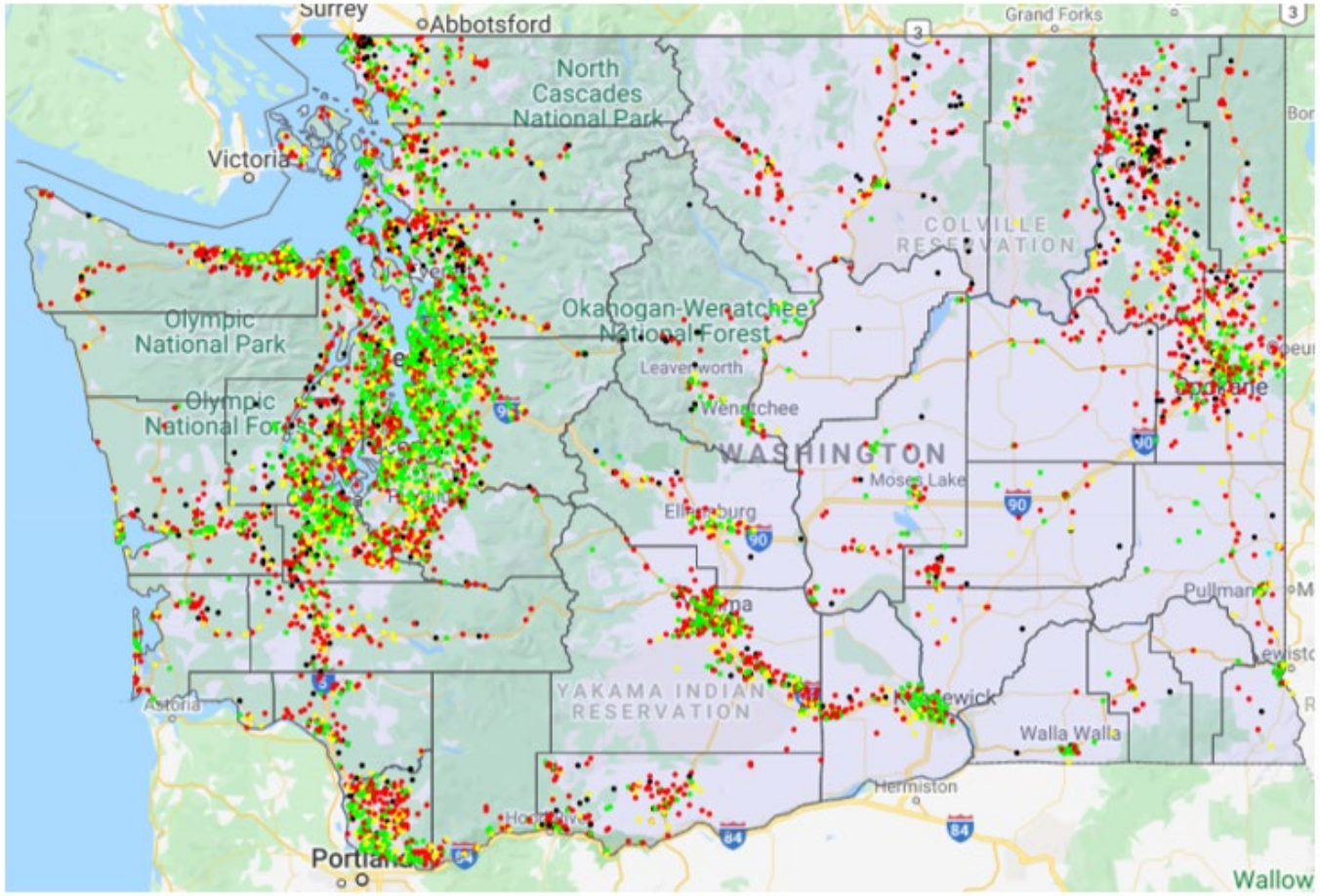
Source: FCC Form 477 Data - Fixed Broadband Services at 25/3 Mbps



Source: Ookla Median Speeds Fixed Broadband Below 25/3 Mbps (Census Tract)

- Each National Data Source has different strengths and weaknesses. Study looks to all sources to obtain aggregate estimate of coverage.

Office of Broadband Speed estimate



Broadband State and County Dashboards

Download

• No Service	5.9%
•0-10 Mbps	39.8%
•10-25 Mbps	18.6%
•25-150 Mbps	29.7%
•150+ Mbps	6.0%

Upload

No Service	5.9%
<3 Mbps	42.3%
3-10 Mbps	30.1%
10-25 Mbps	15.7%
25-150 Mbps	5.1%
> 150 Mbps	0.9%

Households	2,885,677
Population	6,724,540
Test locations	38,271
Total Tests	50,095

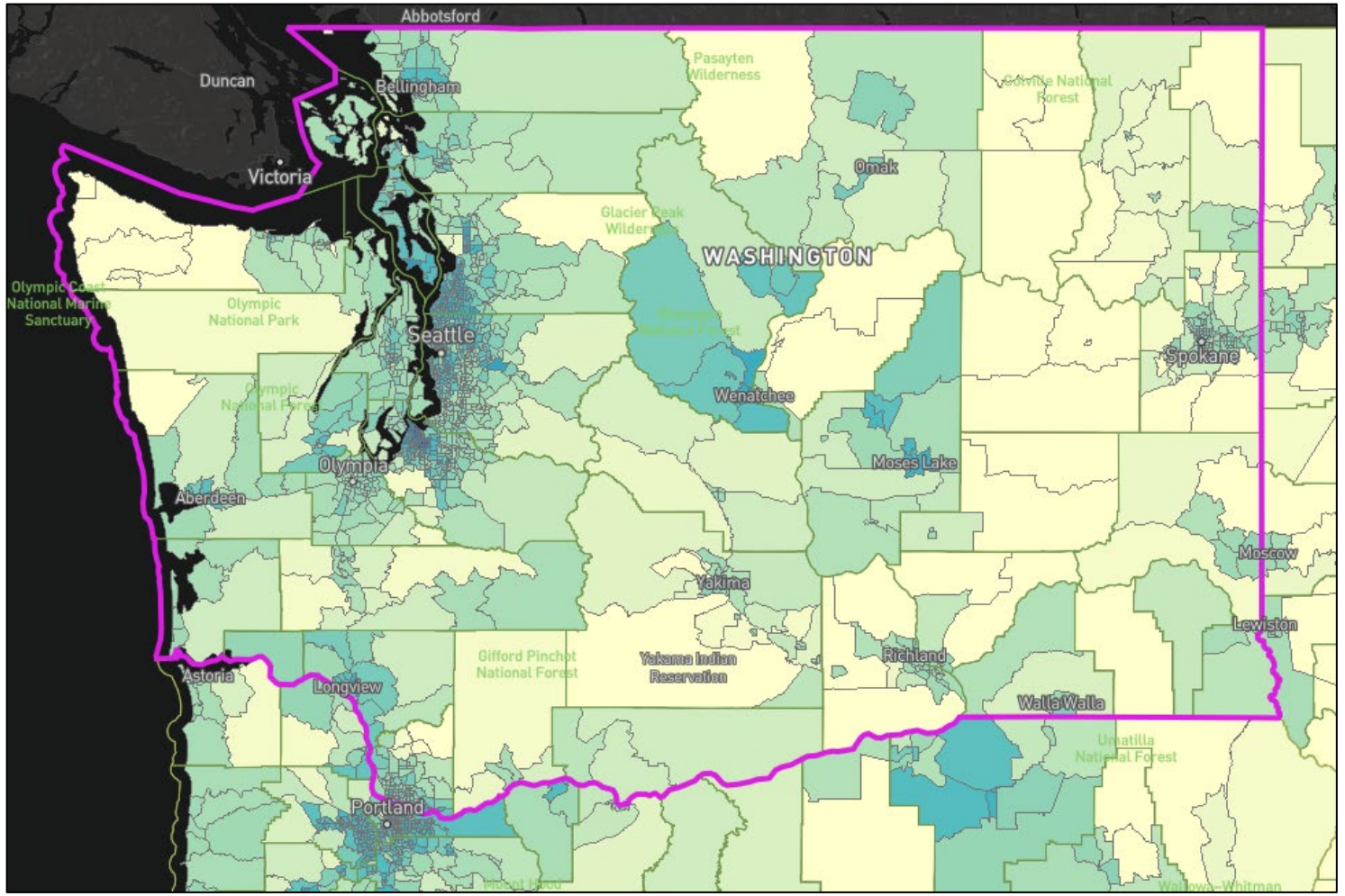
Reasons for No Service
Respondents can select all that apply

Too Expensive	16.96%
Not Available	91.17%
Use Public	0.15%
No Computer	1.61%
Don't Know How Internet	1.53%
Don`t Know How Computer	0.46%
Don't Need	0.23%
Privacy	0.15%
Physical Issues	0.08%

Sources: Washington State Broadband Office

Identifying Service Needs: Where Are Service Providers?

Number of Providers



Number of Fixed Residential Broadband Providers

0 1 2 3 4 6 12 or more

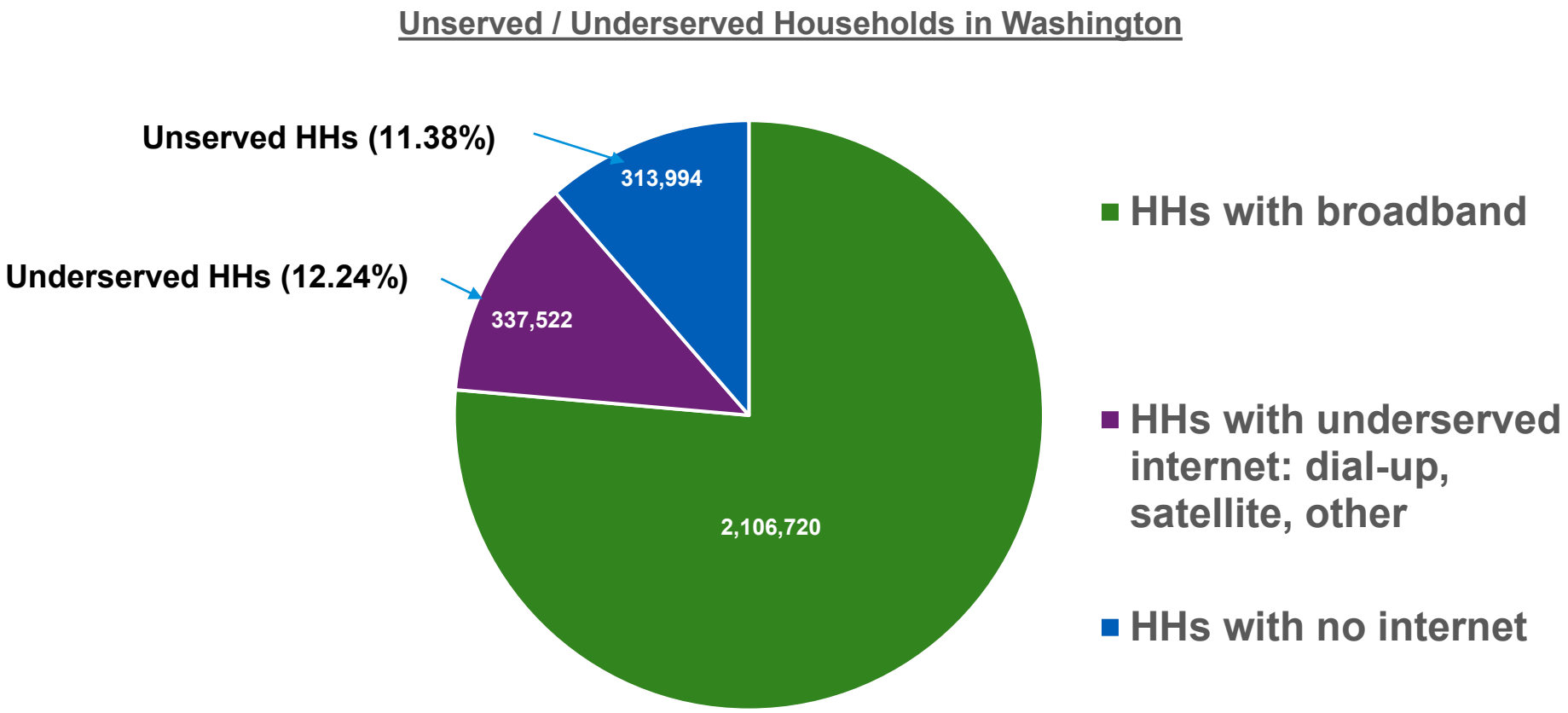
Broadband

Technology	Cable, Fiber
Speed	≥ 100/10 Mbps
Date	June 2020 *(latest public release)*

- Number of providers of one or less defines lack of access and/or affordability
- Lower number (or lighter color) indicates that lack of fiber presence to connect to or inaccessibility

Sources: ACS 2019 data

Aggregate Conclusion: Number of Unserved and Underserved Households in Washington



Notes: 1) The value for total households with no internet has been derived after reducing available input data for households with internet from the total number of households in Washington. Households with internet has further been broken up into 2 categories; (a) households with a broadband internet connection, and (b) households with underserved internet comprising of dial-up, satellite, non-subscription and any other forms of low-speed internet. Finally, households with no internet and households with underserved internet have been added to estimate total underserved households
Sources: ACS 2019 data

Prioritizing Broadband access to state highway right-of-way - Preliminary

Nos.	Evaluation Criteria	Max. Score	Definition
1	Service need: Number of unserved/underserved households	40 points	• Unserved / underserved households indicates the level of connectivity of the area considered and severity as to lack of service • Measures effectiveness of public investment to address # of unserved / underserved households within a corridor
2	Current infrastructure: Where is open access fiber optic cable lacking?	30 points	• Measures lack of open access/availability to serve the underserved market • Measure lack of excess of capacity to serve the current market inferred by fiber presence, current speed score and number of providers in the served markets • Measures extent to which new highway broadband infrastructure could be effective to introducing new service and/or drive competition
3	Population Centers Covered / Points of Presence Addressed	30 points	• Measures number of population centers / points of presence that could be addressed by a corridor
	TOTAL	**100 points**	

Evaluation Criteria # 1 – Unserved / Underserved Households Addressed

Corridor	Distance (Miles)	# of Unserved / Underserved HHs
I-90	297.0	107,421
I-5	276.1	302,835
I-82	132.5	48,964
I-405	30.2	74,183
I-182	14.5	39,457
I-205	11.1	22,189
I-705	5.8	36,448
Total Interstate Mileage / Underserved	**767.3**	**631,497**

Corridor	Distance (Miles)	# of Unserved / Underserved HHs
SR 20	418.9	27,848
SR 101	401.4	36,689
SR 2	381.1	67,601
SR 97	277.0	25,609
SR 395	273.4	43,913
SR 14	194.8	63,693
SR 18	52.6	34,200
SR 6	51.5	6,286
SR 702	9.3	3,827
Total Major State Route Mileage / Unserved and Underserved HHs	**2,060.0**	**309,666**

- # of Unserved / Underserved Households are based on a five (5) mile radius along the state routes
- Some degree of overlap exist between the interstate highways and state routes for unserved / underserved households

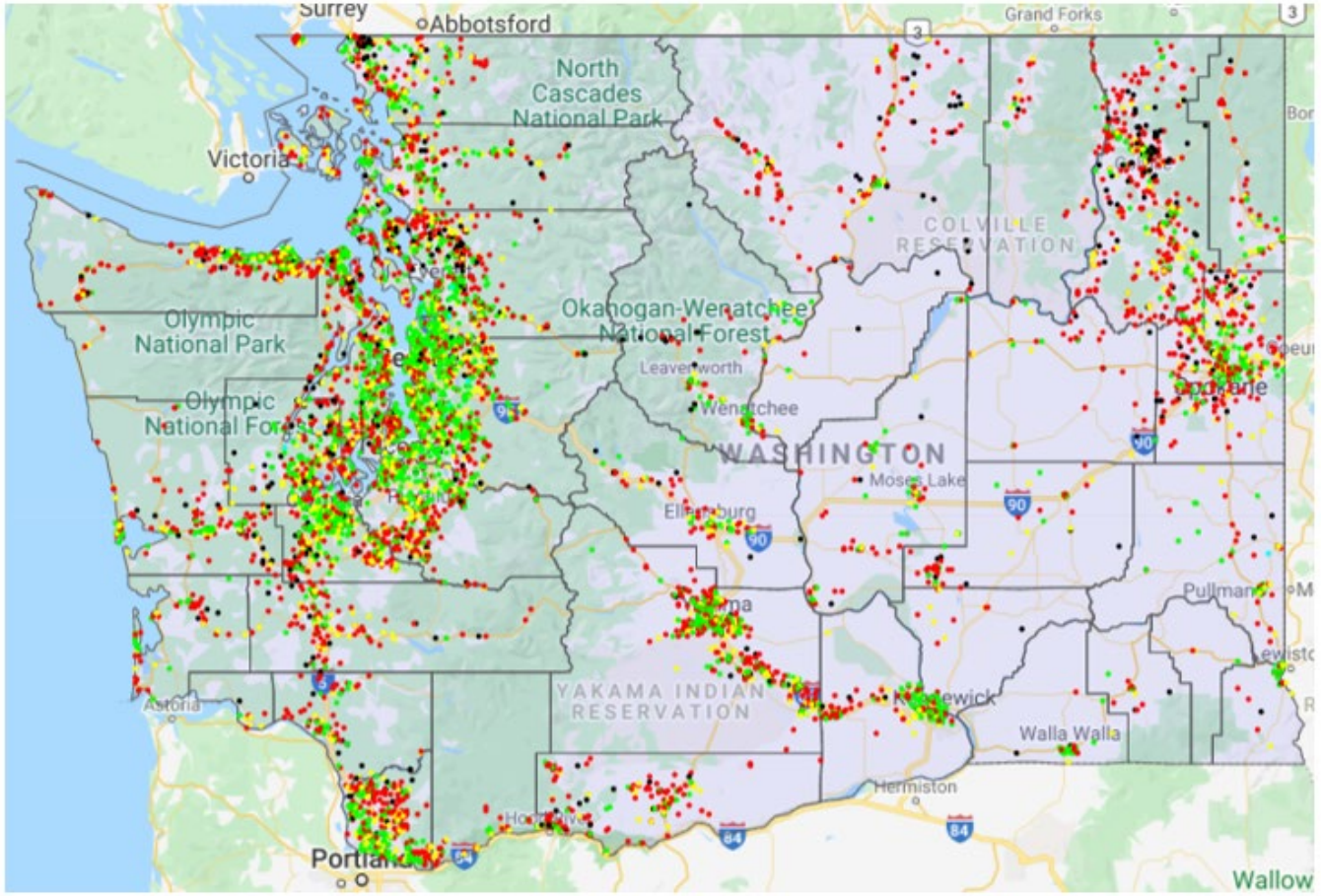
Sources: ACS 2019 and WSDOT

Evaluation Criteria # 2 – Where is Fiber Access Lacking?

Observations:

The purpose of this metric is to measure lack of excess broadband capacity to serve the current market inferred based on the following:

- Fiber presence on the long-haul routes on the interstate highways
- Overall broadband speed metric as measured by the broadband score across the corridor
- Number of service providers in the addressable market/counties served by the corridor



Sources: Washington State Broadband Office

Evaluation Criteria # 3 – Population Centers Covered / Points of Presence

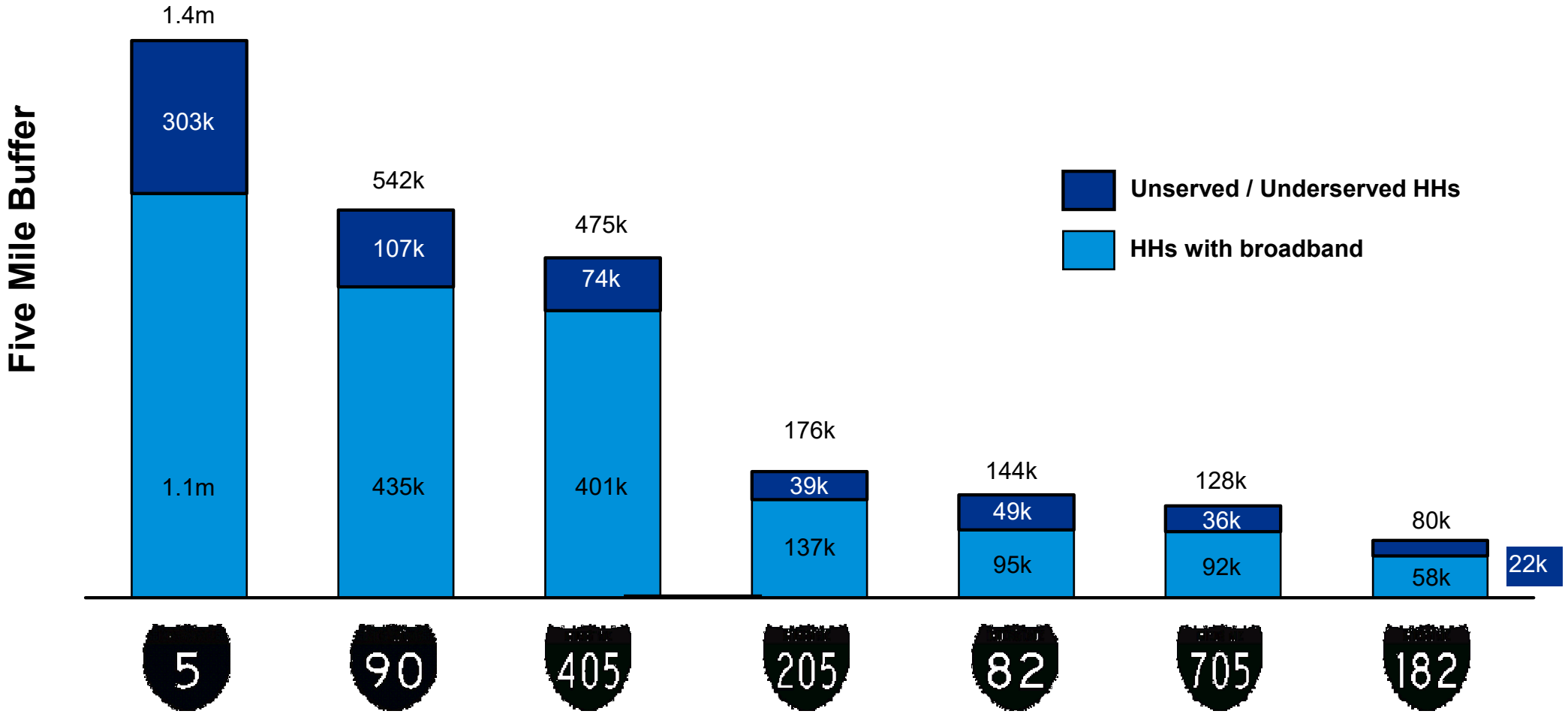
WA State Internet Highways

Corridor	Counties Covered	# of Population Centers
	King, Kittitas, Grant, Adams, Lincoln, Spokane	12
	Clark, Cowlitz, Lewis, Thurston, Pierce, King, Snohomish, Skagit, Whatcom	33
	Kittitas, Yakima, Benton	9
	King, Snohomish	3
	Benton, Franklin	2
	Clark	1
	Pierce	1

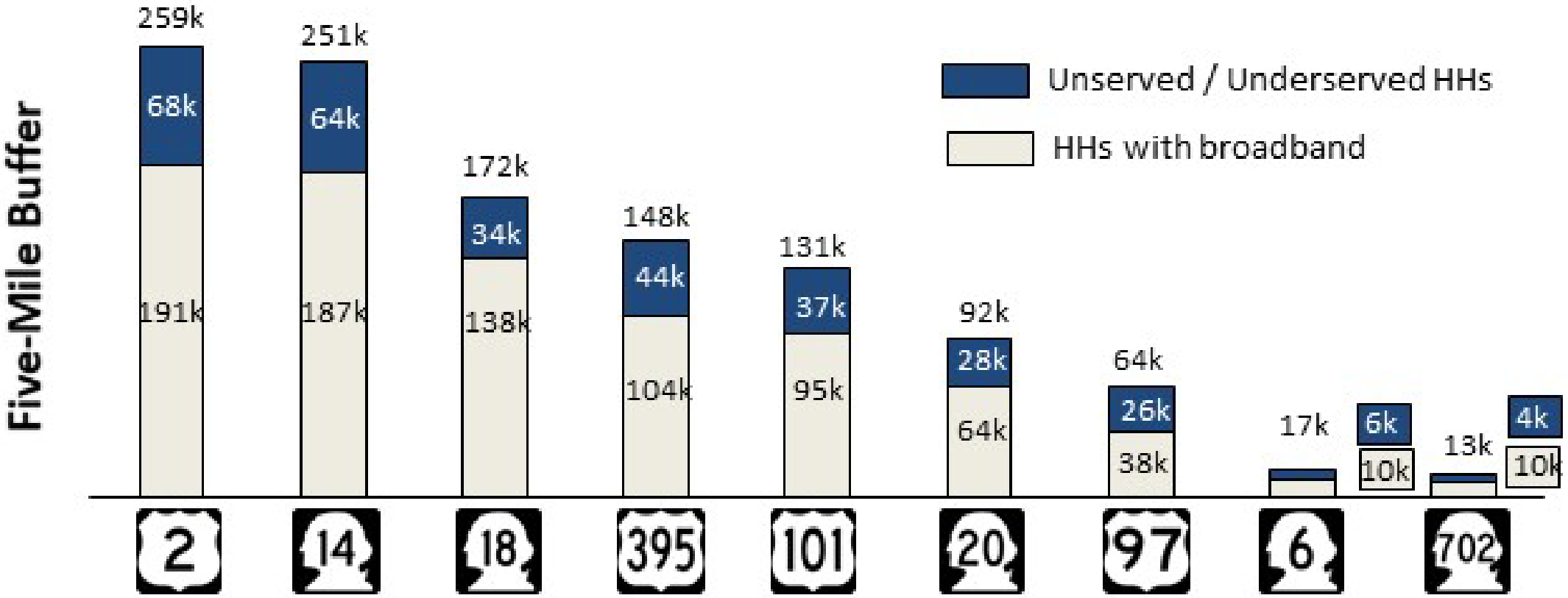
WA State Routes

Corridor	Counties Covered	# of Population Centers
	Jefferson, Island, Skagit, Whatcom, Chelan, Okanogan, Ferry, Stevens, Pend Oreille	10
	Pacific, Grays Harbor, Jefferson, Clallam, Mason, Thurston	10
	Snohomish, King, Chelan, Douglas, Grant, Lincoln, Spokane, Pend Oreille	9
	Klickitat, Yakima, Kittitas, Chelan, Douglas, Okanogan	7
	Benton, Franklin, Adams, Lincoln, Spokane, Stevens, Ferry	7
	Clark, Skamania, Klickitat, Benton	5
	King	3
	Pacific, Lewis	2
	Pierce	N/A

Prioritization of Permitting Right-of-Way Access – Interstate Highways



Prioritization of Permitting Right-of-Way Access – Select State Routes



Next Steps

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- Continued Staff Workgroup Engagement and Stakeholder Outreach
- Incorporate feedback from the Staff Workgroup and Stakeholder into the draft report
- November 16th – Draft report to the JTC Project Manager and Staff Workgroup
- December 10th – Draft final report to the JTC
- December 16th – Present findings and recommendations to the JTC
- January 1, 2022 – Final Report Due
- Presentations to the House and Senate Transportation Committees