Destination Access Baseline Study

Interim report to the Legislature

Public Transportation Division

June 2026

CONTACT

Kurt Winner, Data Analyst
Kurt.Winner@wsdot.wa.gov

Contents

Executive summary 4
Introduction 7
Legislative context 7
What is public transportation? 7
Quantitative analyses simplify what they describe 8
Why does this research matter? 8
How to read this study 9
Methodology 11
What is access? 11
Access as a performance metric 11
Technical advisory group engagement 12
Destination access analysis system developed 13
Walking profiles 13
Destination access metrics 14
Demographic analysis 16
Demand response service measurement 17
Land use context classifications 18
Overall approach and assumptions embedded in software 19
Calculated results of analysis 21
High-level statewide results 21
Detailed breakdown of access metrics calculated 22
Jobs access (a.m.) 24
Jobs access (p.m.) 25
Medical access 26
Community support services access 27
Food access 28
Parks access 29
Leisure access 30
Demand response service analysis 31
Insights about access 33
Public transportation provides critical access in all areas of the state 33
There's more access to destinations in more urbanized areas 34

Gaps in the pedestrian network are significant barriers to the value of public transportation, and those gaps are accentuated in less urban areas 34
Long distances from transit to destinations are significant barriers for slower walkers 35
Time of day is a greater barrier for public transportation in less urban areas....36
Demand response transportation 37
Demographic-based gaps and disparities....37
Analysis based on Census demographic data....38
Comparison of walking profiles 39
Comparison with access by driving 39
Additional results attainable in future applications 41
Needs for future research....42
Specific improvements to this model....42
Additional transportation applications....44
Evidence-based solutions for everyone living in Washington 44
Applications beyond transportation 45
Conclusion....46
There's a need to officially identify disparities in access based on disability and access to an automobile, and provide solutions to reduce these disparities 46
Destination access analysis provides a useful framework for identifying the presence of disparities in access based on disability and access to an automobile, and provides a way to track progress towards addressing those disparities over time 47
Roadmap to implementing potential actions 47
2027-2029 biennium 48
2029-2031 biennium 48
Additional information....50
Data sources 50
Sidewalk data: OS-CONNECT....50
Trail and road network: OpenStreetMap 50
Destinations: Overture Maps; OpenStreetMap, Washington Department of Health, U.S. Census Bureau 50
Public transportation data: General Transit Feed Specification from various providers 51
Population data: U.S. Census 51
Land use context classification data: WSDOT....52
Software tools and processes....52

Conveyal analysis 52
R 52
Other applications used 53
Land use context classifications dataset 53
List of technical advisory group members 55
Contact 61

Executive summary

In 2025, the Legislature requested WSDOT conduct a study to follow up on the agency's *2023 Frequent Transit Survey Study*, improve how the agency analyzes disparities in access, and include consideration of demand response services.[1] The Destination Access Baseline Study responds to this request.

To complete this study, we used industry best practices and community engagement to develop a technical approach for measuring access to destinations. This approach uses a variety of data sets and software to calculate the trips that are possible for people around the state from their homes to various destinations.

We worked with a technical advisory group made up of 19 organizations. We also worked in collaboration with the WSDOT Statewide Public Transportation Plan process. This allowed us to gather input and feedback from transit agencies, nonprofit transportation providers, social services groups, community-based organizations, academics, and other state agencies.

We developed a model in collaboration with our partners that measures access everywhere in the state to six different destination types based on seven different modes of transportation. Destination types include jobs, medical facilities, food stores, community support services, parks, and leisure. Modes of transportation include fixed-route transit in conjunction with four different walking profiles, driving, and walking without the use of transit. We also measured demand-response public transportation in a more limited capacity.

Based on this approach we calculated access through public transportation in Washington and completed a comparative analysis between different transit users and different public transportation modes to walking and driving. Our top three findings include:

- Public transportation provides significant access to nearly everyone living in Washington.
- Public transportation provides more access where it's supported by the pedestrian network and land use. There are examples of this improved access through public transportation in highly urban and highly rural parts of the state. Public transportation is by no means a solely urban amenity.

[1] ESSB 6005 – 2026, Section 220 (9)

- Across the state, there are significant disparities in access between people living in Washington who have access to a car and those who don't. Effective application of pedestrian infrastructure and land-use design, in addition to increased public transportation funding and services, can mitigate these disparities in rural and urban contexts.

In Table 1 below, we provide population-weighted average results for each destination metric. Cells in columns with a white background are results for access through fixed-route public transportation. Cells in columns with a green background are results for walking and driving.

Table 1: Statewide population-weighted average destination access analysis results (executive summary)

Statewide destination metric	Walking Profile 1 (no transit)	Walking Profile 1 (1 mile distance, no constraints) with transit	Walking Profile 2 (no transit)	Walking Profile 2 (0.3 miles distance, sidewalks only) with transit	Walking Profile 3 (1 mile distance, sidewalks with curb cuts only) with transit	Walking Profile 4 (0.3 miles distance, no constraints) with transit	Uncongested Driving
Jobs (a.m., total in 60 minutes)	4,400	68,000	330	26,000	56,000	32,000	---
Jobs (p.m., total in 60 minutes)	4,400	60,000	330	23,000	50,000	28,000	---
Medical (types of facilities out of 1.0 scale)	0.21	0.47	0.04	0.20	0.41	0.23	0.91
Food (minutes to 3 stores, followed by % of population with no access in 120 minutes)	---	25 (31% 121 minutes or more)	---	17 (70% 121 minutes or more)	22 (47% 121 minutes or more)	21 (60% 121 minutes or more)	18 (0% 121 minutes or more)
Community support (types of facilities out of 1.0 scale)	0.31	0.42	0.06	0.17	0.35	0.20	0.83
Parks (total acres in 20 minutes)	8.0	8.1	0.8	0.9	3.9	1.9	160
Leisure (total clusters in 30 minutes)	7.4	25	0.6	8.0	20	10	240

Table note: Units are based on metrics in Destination access metrics. We calculated jobs access by uncongested driving at 400,000 jobs. We're representing this finding in a note instead of in the table to remind the reader that our driving access calculations near the a.m. and p.m. peaks are unreliable due to not taking congestion into account. Food access metric cannot be compared for only walking because maximum walk time in each walking profile is less than the maximum transit time measured of 120 minutes. Food access averages are only based on the population in census blocks with values of 120 minutes or less.

The goal of these recommendations is to enable state and local decision makers to identify and invest in the transportation infrastructure and services that would provide the greatest benefit to the public while using limited funding efficiently.

Based on the research process and results, we make the following recommendations. These recommendations are actionable for the 2027-2029 biennium and require funding.

- Develop a proposed multimodal destination access analysis approach that reasonably accurately accounts for driving times, level of traffic stress, and biking in addition to public transportation. Design a technology system, inclusive of identified data sets, software, processes, and staffing, which enables calculation of access metrics for any prospective project in a limited period of time (e.g., 30 days) granted certain data inputs. This could support refinement of the performance-based project evaluation model, which includes rudimentary access to destination analysis.
- In collaboration with public transportation providers in the state, develop data publication standards that would enable a more accurate evaluation of public transportation services. The standards should be based on open data specifications used by other agencies nationally and globally, and include the publication of ridership data and real-time performance data that can be used to evaluate the delivery of fixed-route and demand response services.
- Collect or develop a data set accounting for expected travel speeds during different times of day across most or all Washington roads. Vet this data with an advisory group of engineers and planners from across the state, confirm reasonable assumptions about driving travel times, and scope out the key components of a statewide travel demand model that could project travel times after roadway construction projects or other transportation projects affecting roadway speeds.

Recommendations for additional follow up work in the 2029-2031 biennium are in the Conclusion.

Introduction

Legislative context

The Destination Access Baseline Study responds to two WSDOT requirements:

- A proviso in the 2026 supplemental transportation budget, which required WSDOT to conduct a study to follow up on the agency's *2023 Frequent Transit Survey Study*, improve how the agency analyzes disparities in access, and include consideration of demand response services.[2]
- An update of WSDOT's *Statewide Public Transportation Plan*, which will incorporate aspects of analysis in this study.

The budget proviso provided funding for WSDOT to continue research in the Frequent Transit Service Study, which measured the number of people who live within a half mile of fixed-route public transportation. Due to data and software gaps at the time, the Frequent Transit Service Study produced some inconclusive results and was unable to tell a compelling story of how public transportation access relates to the lived experiences of people living in Washington.

The Destination Access Baseline Study addresses areas of research requested by the Legislature (i.e., demand response service, analysis of gaps and disparities based on demographic factors) and revises the Frequent Transit Service Study's analysis framework to enable analyses that better capture the experiences of travelers.

State law[3] requires WSDOT to develop the Statewide Public Transportation Plan. The plan lays out the state's interest in public transportation and sets goals and performance measures. The plan aligns with the state's transportation system policy goals and other statewide, regional, and local plans. WSDOT Public Transportation Division last published the plan in 2016. It covered a 20-year timeline. We're working on a 10-year update of the plan to report on work to date, share new information and trends, and connect with communities we didn't talk to during the 2016 planning process.

We've conducted research in the Destination Access Baseline Study as part of the process to update the Public Transportation Plan. We see the development of a destination access metric as a way to better fulfill the requirement that the Public Transportation Plan "articulates the state vision of an interest in public transportation and provides quantifiable objectives, including benefits indicators."

What is public transportation?

This study defines public transportation more broadly than Washington state law: Public transportation is any public or publicly subsidized service that offers rides from an origin to a destination for members of the public, even if it is only for members of the public that meet specific eligibility criteria.

---

[2] ESSB 6005, Section 220 (9)

[3] RCW 47.06.110

We gathered data about and incorporated every public transportation service we could into our analysis, though we likely missed some services. We include all fixed-route transit operators in the state (i.e., bus, rail, ferry), nearly all ADA-complementary paratransit services, many public and nonprofit dial-a-ride services, and many more.

However, there are notable exceptions that some readers might expect to find included, such as Amtrak and Flixbus; taxi services or transportation network companies; and privately paid non-emergency medical transportation providers. We've excluded Amtrak and Flixbus primarily because trips on these services take longer than the trips studied in our analysis. We excluded the other services because they're generally not publicly subsidized and because data was unavailable.

Quantitative analyses simplify what they describe

Access isn't stable. It's messy and evolving.

This study interprets deeply human experiences into statistics. That process turns complexities such as personal choices, capabilities, and preferences into seemingly stable numbers. For example:

- We simplify the complex variety of ways people get around into four mathematically defined walking profiles.
- We create a metric for access to medical facilities and jobs when what actually matters to a person is getting to their doctor or their pharmacist or their place of work.
- We don't capture the social dimensions of access – a person doesn't really have access if they don't feel safe or welcome somewhere they want to be, regardless of why they don't feel safe or welcome.

Individuals interpret these factors for themselves and communities negotiate them over time through transportation systems and technology that are evolving and that none of us could change whole cloth.

In this study, we make statements that oversimplify issues that aren't simple. Our goal is to describe those phenomena according to somewhat objective language, granted the data and language we have to work with. We leave a lot out.

As such, we welcome your feedback about this study so we can improve our work. Please send your comments to Kurt Winner at Kurt.Winner@wsdot.wa.gov.

Why does this research matter?

While the WSDOT Public Transportation Division has led the development of this study, we hope it contributes to future research and policy development in other WSDOT divisions, as well as at other state and local agencies.

Access is a subject that touches on each of our state transportation policy goals: preservation, safety, stewardship, mobility, economic vitality, and environment. What's more, safety, economic vitality, and environment are multiagency goals that extend far beyond WSDOT's

work – we're just one contributor to the team of state agencies that promote these goals. WSDOT promotes these goals through a transportation system of which it manages only a part, and our highways interlock with the facilities and services of counties, cities, transit agencies and more.

We hope readers of this study consider its implications across these goals as opportunities for all state agencies and local jurisdictions to collaborate, with access being a useful guiding principle and objective measure relevant to us all. The research in this study could be a step toward quantitatively describing shared objectives of the state departments of Commerce, Health, Ecology, Labor and Industries, and others. City councils, county commissions, and transit agency boards may be able to collaborate on metrics with meaning for their respective communities by adopting destination access analysis.

The result of collaborating to understand and to improve access to destinations could support public health, reduce environmental harms, and increase economic growth.

How to read this study

This study documents the process we used to develop a method for measuring access to destinations through public transportation. It presents that method, the results, provides an initial analysis of those results, and suggests next steps.

The method we developed leverages academic and practical transportation planning research performed over decades, which may be familiar to some technical readers. This study offers the context needed for technical readers to understand the decisions we made in light of established practice, while also providing broader audiences an introduction to understand those decisions and established practice.

We've synthesized the results in the Assessment, which gives a simple overview of the most critical lessons learned. However, this work is highly technical and generated a large amount of results that tell a variety of stories, many of which overlap, some of which conflict, and all of which require ongoing investigation to refine and develop into more actionable recommendations for statewide and local policy.

As such, we intend this study to be an initial demonstration of why Washington state should consider ongoing investments in this research.

In this study:

- Methodology gives an overview of "access" as a quantitative and qualitative concept, provides different ways of measuring access in transportation planning, describes how we designed our selected analysis approach, and provides details of that approach. This section will be most useful for readers who want to position our work within established practices or learn more about who was involved and how decisions were made.
- Calculated results of analysis provides tables of all the primary statistics we calculated based on the selected analysis approach. This section will be most useful for readers who want to review the results of our analysis, interrogate the basis of specific recommendations, or come to their own conclusions about the meaning of this research.

- Assessment gives a narrative reading of our reactions to the results: what do WSDOT and its advisors believe are the lessons learned, the most interesting or alarming statistics, and the subjects most in need of more research? This section will be most useful for readers who want to understand how WSDOT is thinking about the outcomes of this research, and who want an interpretation of the meaning of the calculated results.
- Conclusion summarizes the most critical takeaways that we believe require follow-up action based on this research. This section includes next steps for WSDOT during the update of the Statewide Public Transportation Plan and recommendations for the Legislature and other state or regional leaders to consider.
- Additional information details data sources and software we used to perform the analysis.

Methodology

What is access?

This study describes access as the ease with which people can reach key destinations using available mobility options.

Providing access is the fundamental objective of all transportation systems. Transportation moves people and goods from one physical location to another. Developing a measure of access would support existing metrics representing productivity and performance of a transportation network.

Recent improvements in planning (i.e., refinement of techniques to measure access) and technology (i.e., increasing data standardization, processing power, cloud computing) have enabled the opportunity to measure access on a statewide basis. Although transportation is only one part of a complex, interconnected system that determines who and what can get where and how, it's valuable to consider the direct effect of transportation on access to destinations.

Incorporating different variables or attributes into transportation models can offer more insight into access. Analyzing transportation data along with land use, jobs, demographics, key destinations, qualitative trip reporting, and other relevant data can offer new insights that better incorporate individual trips and experiences.

Access as a performance metric

Access measures are well established in transportation research, but there has been limited uptake in practical planning applications.[4] Traditional transportation metrics and goals have focused on increasing mobility, increasing average vehicle speed, or optimizing operating cost per revenue vehicle service hour.

Although mobility measures can be related to accessibility measures, they don't inherently indicate improved access. For example, improved average vehicle speed resulting from a new highway could decrease connectivity of the pedestrian network and negatively affect access for other aspects of the transportation network.[5]

Taking access into consideration has also supported reduction in vehicle travel and associated effects on energy consumption, air quality, and societal and personal costs.[6]

Access measures have also proven to be a more approachable means to communicate transportation concepts to the public. Since these measures are often user-centric with cross-functional applications with land use, public health, and other public service providers, transportation professionals and those outside of the field, including key decision makers, can develop a shared language.[7] Traditional metrics can be challenging to convey and don't answer

[4] Sundquist et al. 2021

[5] Venter, 2016

[6] Proffitt et. al, 2019

[7] Venter, 2016

the key question: “are people able to go where they need to go when they want to?”[8] Evaluating accessibility measures can better position a project, plan, and agency to communicate benefits and burdens to the public.

Practical guides exist to show real-world planning scenarios where decision makers are using new user-centric measures. For example, The National Academies of Sciences, Engineering, and Medicine’s *Accessibility Measures in Practice: A Guide for Transportation Agencies* gives frameworks for incorporating measures of access that practitioners of varying technical skill levels can use. It also describes nine different types of accessibility measures and provides guidance for deploying the measures in appropriate scenarios.

Although the process of implementing accessibility measures is more approachable, there are complex factors to consider. Determining metrics that fit a given purpose requires careful analysis and partner engagement. It’s unlikely we’ll ever identify one perfect metric to convey access for all scenarios, but selecting meaningful access measures for different goals and needs is possible by discussing and investigating local or regional needs for a community.

Technical advisory group engagement

After we performed initial research, we held informal discussions with partners about why and how this research should proceed. We developed a briefing paper, *How can we measure access?*, which provides background information about the access-to-destinations approach and explains why a destination access analysis would be an effective performance measurement tool for public transportation and the transportation network as a whole.

The results we would develop using our methodology required extensive data collection, many assumptions, choices about how to define access, and choices about how to present results.

To develop those assumptions, we sought input from a wide range of people living and working in Washington. These included people engaged professionally in transportation and related fields, those who rely on public transportation as riders, and representatives of community-based organizations that support riders.

To have efficient and educational conversations with our partners, we organized a technical advisory group. Membership for the group is in List of technical advisory group members.

We invited every member of the Statewide Public Transportation Plan industry advisory and community advisory groups to participate in the technical advisory group. We also invited additional state agencies, public transportation agencies, and university professors with relevant technical knowledge that weren’t already participating in the Public Transportation Plan advisory groups.

We invited potential technical advisory group members to an informational meeting in August 2025, during which we reviewed the general method of destination access analysis and introduced a work plan for the technical advisory group. Beginning in September 2025, we began a series of four meetings with invitees who wished to participate that focused on specific

[8] Bhusal, 2021

aspects of the proposed analysis and the data sets and methodologies available to the team, including:

- **Sidewalks and transit ingress/egress:** What assumptions and calculations should we make about how public transportation riders get from origins and destinations to fixed-route transit stops? Review of statewide data available on sidewalks and other walking paths.
- **Destinations:** What opportunities (e.g., work, doctor's office, recreation) should we measure access to? Review of data sets available about different facilities, businesses, and services.
- **Demographics:** How should we calculate the ways access depends on demographic factors? Review of data sets and potential methodologies available to the team.
- **Demand response:** How should our research incorporate demand response transportation (i.e., general public dial-a-ride, Americans with Disability Act (ADA) complementary paratransit)? Review of data and software readiness for analyzing non-fixed-route forms of public transportation.

For each of these themes, we developed a briefing paper that reviewed background research and provided a foundation for technical advisory group members to engage with the questions we were asking. After we delivered each briefing paper, we held a 90-minute meeting to review the content of the briefing paper and left room for questions and discussion. After each meeting, we offered additional opportunities for feedback through interviews, written communications, and surveys to ensure technical advisory group members were able to express their thoughts, concerns, and desires for how we should develop our analytical approach.

Destination access analysis system developed

Based on our research and technical advisory group feedback, we developed a methodology based on an approach to each of the technical themes (i.e., sidewalks and transit ingress/egress, destinations, demographics, demand response).

Walking profiles

In collaboration with the technical advisory committee, we decided that our analysis should use available data on walkways to account for the diverse ways that different people walk[9] to and from public transportation. The available data and software allowed us to consider walking speed, presence of sidewalks, presence of curb ramps, and gradient of walkways. Currently, it isn't feasible to account for infrastructure along walkways that may provide relevant information about pedestrian comfort (e.g., barriers between walkways and high-speed traffic) because this data isn't available.

Based on these capacities, we decided to use "walking profiles" to describe different capabilities to walk to access transit and destinations. A walking profile includes how long a person can walk for, what speed they walk at, and what limitations they might have regarding infrastructure.

[9] Throughout this study, we use "walk" as an inclusive term for all the ways people move along pedestrian paths, including using mobility devices (e.g., wheelchairs).

This allows us to measure what destinations people of varying abilities can access. We decided to use four walking profiles for our analysis:

Walking Profile 1: Person who walks up to 20 minutes at 3 miles per hour (1 mile total) along any road that allows pedestrians or along a pathway, regardless of infrastructure and grade. May include people who aren't experiencing a short- or long-term disability and are unencumbered by curbs or grade.

Walking Profile 2: Person who walks up to 10 minutes at 1.8 miles per hour (0.3 miles total) along any road where there's a sidewalk present or along a pathway with a maximum grade of 8.33 percent[10]. May include people who use a cane, older adults, people with visual impairment, or people walking with a child.

Walking Profile 3: Person who walks up to 20 minutes at 3 miles per hour (1 mile total) along any road where there's a sidewalk or along a pathway with a maximum grade of 8.33 percent and where there are curb cuts at each road crossing. May include people pushing stroller or cart or people who use a power wheelchair.

Walking Profile 4: Person who walks up to 10 minutes at 1.8 miles per hour (0.3 miles total) along any road that allows pedestrians or along a pathway, regardless of infrastructure and grade. May include people who use a cane, older adults, people with a visual impairment, or people walking with a child who don't feel they have the option to use sidewalks only.

These walking profiles don't represent all the many ways people in Washington get around nor do they fully represent any group of users. They are only examples of certain patterns that we are able to measure, used to simplify and allow standard comparisons in our analysis.

Destination access metrics

There were several competing priorities in selecting destinations to which we'd measure access. We wanted to:

- Measure access broadly but also craft a metric or metrics that tell specific human stories.
- Measure access to the most important destinations but also account for the needs of riders to use transit for all parts of their daily lives and choose their destinations freely.
- Demonstrate the value of shorter trips but not devalue the need to travel longer to reach the right destination.
- Measure access to all types of destinations while being practically limited in terms of processing time and report length.

[10] This is the maximum grade allowable for a ramp under the Americans with Disabilities Act.

In collaboration with the technical advisory group, we finalized an approach where we would separately measure access to six types of destinations, with a specific metric tailored to each destination type. Final metrics are in Table 2. Each destination access category is based on a designated methodology using available data sets. The data sets used and how we processed them for each category are in Data sources.

Table 2: Proposed destination access framework

Destination access category	Travel time	Destinations included	Weight	Time of day	Scale of metric
Jobs	60 min.	All jobs	1 near origin, decays to 0.5 at 45 minutes, 0 at 60	6-8 a.m. and 6-8 p.m. Tuesdays	0 to infinity
Medical 1	60 min.	Hospitals	0.5 near origin, decays to 0.25 at 45 minutes, 0 at 60	10 a.m.-12 p.m. Tuesdays	0 or 0.5
Medical 2	30 min.	Primary/family/urgent care, pharmacy, vision, dental, specialists	0.1 for each category near origin, decays to 0 at 30 minutes	10 a.m.-12 p.m. Tuesdays	0, 0.1, 0.2, 0.3, 0.4, or 0.5 individually; between and 0 to 1 combined with hospitals
Community support services	30 min.	Libraries, banks, universities, community colleges, senior centers, childcare centers, places of worship, community centers, post offices, and in-person bill-pay locations (e.g., city hall, cell phone carriers)	0.1 for each category	10 a.m.-12 p.m. Tuesdays	0 to 1
Food	Time needed to reach 3	Supermarket, grocery store, or food bank	-	5-7 p.m. Tuesdays	0 to 120 minutes
Parks	20 min.	Total acres of parks (including city parks, state parks, and other identified greenspaces)	1 near origin, decays to 0 at 20 minutes	10 a.m.-12 p.m. Saturdays	0 to infinity
Leisure, recreation, arts, and culture	30 min.	Clusters of at least three bars, restaurants, entertainment venues, museums, retail	-	5-7 p.m. Saturdays	0 to infinity

Table note: After discussion with the technical advisory group, we left schools out of our analysis (other than the inclusion of universities and community colleges as community support services) despite their obvious importance as destinations for people in Washington. Schools require thoughtful consideration of different transportation modes, based on the context of age group, region, and other factors. We've identified schools as a subject requiring further research in Specific improvements to this model.

Demographic analysis

In collaboration with the technical advisory group, we decided that our demographic gaps analysis should consider a three-part approach:

1. Demographic characteristics

We used American Community Survey (ACS) data from the U.S. Census to measure whether our calculated statistics are notably different for different demographic groups.

The 2023 Frequent Transit Service Study used a similar methodology based on ACS data but had inconclusive results. Demographic data is generally only available from the Census at a block group level, meaning that it is difficult to determine with precision the effects of transportation infrastructure on different groups from this data. Enhancements in our methodology since 2023 had the potential to reveal some new findings using ACS data. However, we believed and communicated to our technical advisory group during design of the methodology for this report, that using ACS likely wouldn't be sufficient to describe demographic-based gaps or disparities.

2. Walking profiles

We used comparisons between walking profiles to consider how distinct users might experience the public transportation network based on different ages and abilities.

We intended the walking profiles to model common limitations for pedestrians of different ages and abilities. For example, Walking Profile 2 models slower walking speed and preference for sidewalks and low gradients, which might be related to an older adult or person who uses a cane. Walking Profile 3 models walking speeds equal to Walking Profile 1, but the requirement to use sidewalks and crossings with curb cuts in addition to low gradients. These requirements might be related to a person who uses an electric wheelchair.

By comparing these different walking profiles, we can consider the difference in experience from the same place, for example, between a young adult with no disabilities and an older adult or an adult with different mobility disabilities.

3. Driving and public transportation

Use comparisons between access for drivers versus public transportation users to consider different experiences of the transportation network based on access to a car.

In 2023, the Joint Transportation Commission released the study *Nondrivers: Population, Demographics, and Analysis*, which developed estimations of the demographics of nondrivers in Washington state. Nondrivers surveyed in the study were more likely than the Washington population to:

- Be female, African American, or Native American.

- Be renters, live in temporary housing, and have lower income.

Low-income nondrivers surveyed were also less likely to have a driver's license, access to an automobile, or be the primary driver in their household compared to higher income nondrivers.

By comparing public transportation access to access for drivers, analysis in the study considers how circumstances change if an individual loses access to a car, and how access differs for drivers as a group versus non-drivers as a group.

However, our tools for analyzing driving access require some improvement and aren't currently able to account for the effects of congestion. More information on these limitations is in Overall approach and assumptions embedded in software.

Demand response service measurement

Measuring access through demand response service is aligned with the methodology we chose for this study, but also relatively novel and experimental. The data available about demand response services is less mature and these services are also more diverse and less standardized than fixed-route transit.

Demand response public transportation also plays a critical role in the state transportation system, especially in ensuring access for riders who otherwise would have little access due to disability or living in very rural areas.

After discussion with the technical advisory committee, we decided on a goal to measure access through demand response transportation statewide using the following approach:

- Measure access through demand response transportation as a separate mode, distinct from fixed-route transit accessed through different walking profiles. We assume that riders board demand response transportation at the origin of their trip and remain on the same service until they reach their destination.[11]
- Measure access to all six destination types through demand response transportation like we measure access to all six destination types for each walking profile.
- Distinguish between general public demand response services and eligibility restricted demand response services, and most likely provide a separate measurement for each.

While we advanced towards that approach, we have not been able to achieve it by the time of publishing this study. There are more technical barriers to address and developing the intended analysis will likely take another two to three months.

As a provisional analysis demonstrating access to and through demand response public transportation in Washington, we've performed the following two analyses:

[11] This is specifically problematic for the measurement of some trips across county borders. Neighboring services often have agreements that require passengers to transfer from one provider to another. However, these agreements vary around the state and often add friction to the rider experience. It would be difficult to accurately account for service-to-service transfers at this time.

- We have performed a case study of the access to jobs gained in Grant County based on the presence of demand response service. This case study uses a similar methodology to our statewide jobs access metric, but is constrained to only Grant County and the services operating there. It includes a calculation of how much access demand response public transportation adds both in comparison to walking, and in comparison to walking and using fixed-route transit.
- We have calculated the number of people in Washington who live inside the service area of some type of demand response service.

Additionally, to further the ongoing conversation about the importance of demand response services and raise awareness about their availability around the state, we've included maps showing service areas of demand response public transportation in Demand response transportation. Maps showing multiple demand response services together are uncommon and the development of these maps is an important byproduct of our core analysis.

Land use context classifications

Our methodology calculates access statistics for about 5 million different equally-sized sections of Washington (see Overall approach and assumptions embedded in software). Presenting all the data in either tabular or map form would be difficult for readers to comprehend or to clearly understand general trends present in the data, other than the most obvious trend that access is likely to be higher in more populous areas. Thus, aggregating those calculated statistics is necessary to provide estimates of the average access value in different areas.

We knew it was important to aggregate our data on a statewide basis. Aggregation below the state level would also help describe trends in different areas within the state. The first option we considered was to aggregate data within counties. However, this presented two problems:

- There are 39 counties in Washington, and showing each of our calculations within each county would still leave the reader with almost two thousand different numbers to consider.
- Counties are exceptionally diverse, both compared to themselves and one another. As an example, Pierce County includes downtown Tacoma, the community of South Hill, and the top of Mount Rainier, three very different access contexts.

WSDOT is currently developing a land use context classification system to inform roadway design decisions, speed setting, multimodal level of service, and grant evaluation and selection processes. This system defines the land use context classification (e.g., Urban Core, Suburban Commercial, Rural Town Center)[12] of each Census block in the state, using different attributes of those blocks. More details on the methodology and status of ongoing development are in Land use context classification.

[12] Throughout this study, we've capitalized Rural, Suburban, Urban, and Urban Core where they refer to the land use context classification schema used for this analysis.

We decided that aggregating access statistics within these different land use categories across the state was a way to address both issues with county-level aggregation because there are:

- A smaller number of areas to aggregate within.
- More predictable similarities within those land use contexts.
- More predictable differences between those land use contexts.

We believe the benefit of more interpretable results outweighs the downsides of using a dataset that is still in development.

Overall approach and assumptions embedded in software

In addition to the approach and assumptions defined in collaboration with the technical advisory group we've described in the previous section, there are additional processes and assumptions we made based on the software applications and data sets we used, and how we chose to design certain calculations. Some of the most important assumptions embedded in our process:

- We only analyzed certain modes of transportation, with limited ability to combine those modes. However, while many people in Washington primarily use a single form of transportation (e.g., driving, public transportation, biking, walking) no one uses only one.

  We account for how most public transportation trips start and end with a walk. We don't account for how most driving trips do, too. We also don't account for biking, carpooling, or hitchhiking. All these experiences are important and people in Washington blend them every day. That blending is beyond the limits of our model, which separates different modal assumptions instead of combining them.

- The software application we use to calculate destination access metrics (i.e., Conveyal, based on the R5 routing engine) separates the state into about 5 million 300-meter-by-300-meter squares. We measure each destination metric from the center of each square, using pedestrian, public transportation, and roadway data sets as needed.

- After calculating access metrics for each square, we average the calculated statistic for each Census block.

- We aggregate block values to the statewide level, weighting each block value by the population of that block.

- Our population counts are based on the 2024 5-year American Community Survey block group population estimates. Within block groups, we assumed population is distributed between blocks based on the ratio of population within each block in the block group as reported in the 2020 Census.

  We used the 2020 Census blocks in this way because the land-use context classification system is partly based on the unique population densities within each block (see Calculated results of analysis and Land use context classifications). We then applied these ratios to the 2024 5-year ACS estimates for total population and demographic groups within each block group (or tract for adults with a disability).

- We don't currently have reliable access to statewide data about traffic congestion at different times of day. So, in calculating access for driving, we assumed driving speed to be at the speed limit of each road,[13] in free flow traffic, and with delays at each turn.[14] Because this assumption is especially unrealistic during the morning and evening rush hours, we didn't calculate driving access for our jobs metric, which is measured near those times of congestion. We did calculate driving access for our other metrics, which we measure outside of peak travel times.

[13] For speed limits, we used speed limit data where available for segments of roadways in OpenStreetMap. These are present for most roads in the state in urban areas and for major roadways. Where not present, we used assumptions about speed limit based on roadway classification.

[14] Our assumed driving delays at intersections are 10 seconds when turning right and 30 seconds when turning left.

Calculated results of analysis

High-level statewide results

Destination access metrics provide a way to think about and quantify the benefit that members of the public derive from transportation systems. Such a quantitative approach to describing transportation system performance could serve a variety of purposes in the future based on research and the development of appropriate processes (see Needs for future research). Based on our current process, the most important way to think about our results is as a development of a baseline for how much benefit is provided by public transportation in Washington today. That is why we also measure access by walking alone with no public transportation, as well as by uncongested driving. As will be shown in the Assessment, positioning public transportation access relative to walking and driving helps us understand how the experience of public transportation riders relates to other experiences in society.

In the statewide results table below, we provide population-weighted average results for each destination metric. Cells in columns with a white background are results for access through fixed-route public transportation. Cells in columns with a green background are results for walking and driving.

Table 3: Statewide population-weighted average destination access analysis results (study narrative)

Statewide destination metric	Walking Profile 1 (no transit)	Walking Profile 1 (1 mile distance, no constraints) with transit	Walking Profile 2 (no transit)	Walking Profile 2 (0.3 miles distance, sidewalks only) with transit	Walking Profile 3 (1 mile distance, sidewalks with curb cuts only) with transit	Walking Profile 4 (0.3 miles distance, no constraints) with transit	Uncongested driving
Jobs (a.m., total in 60 minutes)	4,400	68,000	330	26,000	56,000	32,000	---
Jobs (p.m., total in 60 minutes)	4,400	60,000	330	23,000	50,000	28,000	---
Medical (types of facilities out of 1.0 scale)	0.21	0.47	0.04	0.20	0.41	0.23	0.91

Statewide destination metric	Walking Profile 1 (no transit)	Walking Profile 1 (1 mile distance, no constraints) with transit	Walking Profile 2 (no transit)	Walking Profile 2 (0.3 miles distance, sidewalks only) with transit	Walking Profile 3 (1 mile distance, sidewalks with curb cuts only) with transit	Walking Profile 4 (0.3 miles distance, no constraints) with transit	Uncongested driving
Food (minutes to 3 stores, followed by % of population with no access in 120 minutes)	---	25 (31% 121 minutes or more)	---	17 (70% 121 minutes or more)	22 (47% 121 minutes or more)	21 (60% 121 minutes or more)	18 (0% 121 minutes or more)
Community support (types of facilities out of 1.0 scale)	0.31	0.42	0.06	0.17	0.35	0.20	0.83
Parks (total acres in 20 minutes)	8.0	8.1	0.8	0.9	3.9	1.9	160
Leisure (total clusters in 30 minutes)	7.4	25	0.6	8.0	20	10	240

Table note: Units are based on metrics in Destination access metrics. We calculated jobs access by uncongested driving at 400,000 jobs. We're representing this finding in a note instead of in the table to remind the reader that our driving access calculations near the a.m. and p.m. peaks are unreliable due to not taking congestion into account. Food-access metrics cannot be compared only for walking because maximum walk time in each walking profile is less than the maximum transit time measured of 120 minutes. Food-access averages are based on only population in census blocks with values of 120 minutes or less.

Detailed breakdown of access metrics calculated

This section contains the calculated statistics for each of the six destination categories. An explanation of the metrics we used for each destination category is in Destination access metrics.

We report each destination access metric in the same general format:

- Table of results by land use context classification.
    - In rows, each table of results provides aggregated results for each metric on a statewide basis, as well as for subregions of the state composed of four different land use context classifications: Urban Core, Urban, Suburban, and

Rural. WSDOT defined these context classifications using an evolving methodology (see appendix Land use context classifications).

- In the columns, each table lists the four different walking profiles with transit, driving, and walking without transit by Walking Profiles 1 and 2. As in Table 3, columns with white cells show values representing access for public transportation, whereas columns with green cells show values representing access for walking or driving. Access for Walking Profiles 1 and 2 without transit are near the left side to facilitate comparisons with the cells to their right, which show access for those Walking Profiles when transit is added. Driving is shown on the right side because these values generally show the most access in each row, so this facilitates a reference to "the most access one might currently expect" for that metric. Driving is absent from the jobs-access tables because our time of analysis for jobs is during peak traffic hours and we are unable to account for congestion.
- Each cell contains two values:
  - The population-weighted average calculated value across all corresponding census blocks for the relevant access metric.
  - The percentage of the census blocks used to calculate the average value for which the calculated metric is 0 (for most metrics) or null (for our food metric). This value is notable for all metric calculations, because it gives a sense of what portion of the relevant population has no access. It is especially relevant for the food metric, because for food 0 represents the most access, and 120 is the least measured access. For the purpose of averaging food metric values we ignored all census blocks with a value higher than 120. Unlike for other tables, the values we present for food are the population-weighted averages only of the census blocks that have some access.

- Table of results by demographic group
  - In rows, each table of results provides aggregated results for each metric on a statewide basis for the general population, as well as for statewide demographic groups: 17 and under, 65 and over, adults with a disability, income less than 200% of poverty line, and people of color. These groups follow American Community Survey definitions.
  - The columns follow the same pattern as the land use-focused tables described above.

We don't describe or analyze the results in this section. All interpretations of the results are in Assessment.

Jobs access (a.m.)

Table 4: Jobs accessible within 60 minutes in a.m. by statewide and by land use type (see Table 2 for full description of access metrics)

Context classification	Walking Profile 1 no transit (and percent population with no access)	Walking Profile 1 with transit (and percent population with no access)	Walking Profile 2 no transit (and percent population with no access)	Walking Profile 2 with transit (and percent population with no access)	Walking Profile 3 with transit (and percent population with no access)	Walking Profile 4 with transit (and percent population with no access)
Statewide	4,400 (6%)	68,000 (4%)	330 (58%)	26,000 (48%)	56,000 (29%)	32,000 (16%)
Urban Core	150,000 (0%)	620,000 (0%)	16,000 (5%)	430,000 (3%)	600,000 (1%)	460,000 (0%)
Urban	8,300 (0%)	190,000 (0%)	530 (25%)	83,000 (17%)	160,000 (6%)	100,000 (1%)
Suburban	1,400 (0%)	41,000 (0%)	50 (57%)	7,100 (43%)	29,000 (17%)	11,00 (9%)
Rural	200 (18%)	850 (12%)	10 (91%)	60 (83%)	390 (72%)	150 (43%)

Table 5: Statewide jobs accessible within 60 minutes in a.m. statewide by demographic group (see Table 2 for full description of access metrics)

Demographic group	Walking Profile 1 no transit (and percent population with no access)	Walking Profile 1 with transit (and percent population with no access)	Walking Profile 2 no transit (and percent population with no access)	Walking Profile 2 with transit (and percent population with no access)	Walking Profile 3 with transit (and percent population with no access)	Walking Profile 4 with transit (and percent population with no access)
General population	4,400 (6%)	68,000 (4%)	330 (58%)	26,000 (48%)	56,000 (29%)	32,000 (16%)
17 and under	2,000 (4%)	49,000 (3%)	110 (60%)	15,000 (48%)	38,000 (29%)	19,000 (16%)
65 and over	3,200 (6%)	55,000 (4%)	230 (63%)	19,000 (52%)	44,000 (34%)	24,000 (19%)
Adults with a disability	4,500 (5%)	61,000 (3%)	340 (58%)	24,000 (48%)	51,000 (30%)	29,000 (16%)
Income less than 200% of poverty line	4,700 (4%)	65,000 (3%)	340 (54%)	25,000 (44%)	54,000 (26%)	31,000 (13%)
People of color	5,900 (3%)	85,000 (2%)	470 (53%)	33,000 (42%)	70,000 (23%)	40,000 (11%)

Jobs access (p.m.)

Table 6: Jobs accessible within 60 minutes in p.m. by statewide and by land use type (see Table 2 for full description of access metrics)

Context classification	Walking Profile 1 no transit (and percent population with no access)	Walking Profile 1 with transit (and percent blocks with no access)	Walking Profile 2 no transit (and percent population with no access)	Walking Profile 2 with transit (and percent population with no access)	Walking Profile 3 with transit (and percent population with no access)	Walking Profile 4 with transit (and percent population with no access)
Statewide	4,400 (6%)	60,000 (4%)	330 (58%)	23,000 (48%)	50,000 (29%)	28,000 (17%)
Urban Core	150,000 (0%)	600,000 (0%)	16,000 (5%)	400,000 (4%)	580,000 (1%)	430,000 (0%)
Urban	8,300 (0%)	170,000 (0%)	530 (25%)	76,000 (17%)	150,000 (6%)	90,000 (1%)
Suburban	1,400 (0%)	33,000 (0%)	50 (57%)	5,200 (44%)	23,000 (18%)	8,200 (10%)
Rural	200 (18%)	620 (12%)	10 (91%)	40 (84%)	290 (73%)	100 (43%)

Table 7: Statewide jobs accessible within 60 minutes in p.m. statewide by demographic group (see Table 2 for full description of access metrics)

Demographic group	Walking Profile 1 no transit (and percent population with no access)	Walking Profile 1 with transit (and percent population with no access)	Walking Profile 2 no transit (and percent population with no access)	Walking Profile 2 with transit (and percent population with no access)	Walking Profile 3 with transit (and percent population with no access)	Walking Profile 4 with transit (and percent population with no access)
General population	4,400 (6%)	60,000 (4%)	330 (58%)	23,000 (48%)	50,000 (29%)	28,000 (17%)
17 and under	2,000 (4%)	42,000 (3%)	110 (60%)	12,000 (49%)	33,000 (29%)	16,000 (16%)
65 and over	3,200 (6%)	48,000 (4%)	230 (63%)	17,000 (53%)	39,000 (34%)	21,000 (19%)
Adults with a disability	4,500 (5%)	54,000 (3%)	340 (58%)	21,000 (49%)	45,000 (30%)	25,000 (17%)
Income less than 200% of poverty line	4,700 (4%)	57,000 (3%)	340 (54%)	22,000 (45%)	48,000 (26%)	27,000 (13%)
People of color	5,900 (3%)	75,000 (2%)	470 (53%)	29,000 (43%)	62,000 (23%)	35,000 (12%)

Medical access

Table 8: Medical destination types accessible (0-1 scale) midday weekdays by statewide and by land use type (see Table 2 for full description of access metrics)

Context classification	Walking Profile 1 no transit (and percent population with no access)	Walking Profile 1 with transit (and percent population with no access)	Walking Profile 2 no transit (and percent population with no access)	Walking Profile 2 with transit (and percent population with no access)	Walking Profile 3 with transit (and percent population with no access)	Walking Profile 4 with transit (and percent population with no access)	Uncongested driving
Statewide	0.21 (43%)	0.47 (34%)	0.04 (84%)	0.20 (69%)	0.41 (43%)	0.23 (64%)	0.91 (3%)
Urban Core	0.85 (0%)	1.00 (0%)	0.42 (1%)	0.99 (1%)	1.00 (0%)	0.99 (0%)	1.00 (0%)
Urban	0.42 (8%)	0.87 (2%)	0.09 (60%)	0.54 (30%)	0.81 (7%)	0.59 (24%)	0.99 (0%)
Suburban	0.19 (38%)	0.50 (25%)	0.02 (89%)	0.14 (73%)	0.41 (38%)	0.18 (67%)	0.95 (1%)
Rural	0.05 (83%)	0.07 (81%)	0.01 (97%)	0.01 (96%)	0.05 (86%)	0.01 (94%)	0.76 (8%)

Table 9: Medical destination types accessible (0-1 scale) midday weekdays statewide by demographic group (see Table 2 for full description of access metrics)

Demographic group	Walking Profile 1 no transit (and percent population with no access)	Walking Profile 1 with transit (and percent population with no access)	Walking Profile 2 no transit (and percent population with no access)	Walking Profile 2 with transit (and percent population with no access)	Walking Profile 3 with transit (and percent population with no access)	Walking Profile 4 with transit (and percent population with no access)	Uncongested driving
General population	0.21 (43%)	0.47 (34%)	0.04 (84%)	0.20 (69%)	0.41 (43%)	0.23 (64%)	0.91 (3%)
17 and under	0.19 (45%)	0.44 (36%)	0.02 (87%)	0.16 (73%)	0.37 (45%)	0.19 (68%)	0.91 (3%)
65 and over	0.20 (47%)	0.43 (39%)	0.03 (86%)	0.17 (72%)	0.37 (48%)	0.20 (68%)	0.88 (4%)
Adults with a disability	0.23 (42%)	0.49 (33%)	0.04 (83%)	0.21 (68%)	0.42 (42%)	0.24 (63%)	0.90 (3%)
Income less than 200% of poverty line	0.25 (36%)	0.53 (28%)	0.04 (81%)	0.23 (64%)	0.46 (36%)	0.26 (59%)	0.91 (3%)
People of color	0.24 (37%)	0.54 (26%)	0.02 (82%)	0.23 (64%)	0.47 (36%)	0.27 (59%)	0.93 (2%)

Community support services access

Table 10: CSS destination types accessible (0-1 scale) midday weekdays by statewide and by land use type (see Table 2 for full description of access metrics)

Context classification	Walking Profile 1 no transit (and percent population with no access)	Walking Profile 1 with transit (and percent population with no access)	Walking Profile 2 no transit (and percent population with no access)	Walking Profile 2 with transit (and percent population with no access)	Walking Profile 3 with transit (and percent population with no access)	Walking Profile 4 with transit (and percent population with no access)	Uncongested driving
Statewide	0.31 (22%)	0.42 (20%)	0.06 (70%)	0.17 (59%)	0.35 (31%)	0.20 (52%)	0.83 (1%)
Urban Core	0.83 (0%)	0.92 (0%)	0.44 (1%)	0.86 (0%)	0.92 (0%)	0.87 (0%)	1.00 (0%)
Urban	0.55 (0%)	0.74 (0%)	0.14 (37%)	0.43 (21%)	0.68 (3%)	0.48 (15%)	0.94 (0%)
Suburban	0.30 (11%)	0.43 (9%)	0.04 (75%)	0.12 (60%)	0.34 (21%)	0.16 (52%)	0.85 (1%)
Rural	0.12 (60%)	0.13 (57%)	0.02 (91%)	0.02 (89%)	0.09 (72%)	0.03 (83%)	0.71 (2%)

Table 11: CSS destination types accessible (0-1 scale) midday weekdays statewide by demographic group (see Table 2 for full description of access metrics)

Demographic group	Walking Profile 1 no transit (and percent population with no access)	Walking Profile 1 with transit (and percent population with no access)	Walking Profile 2 no transit (and percent population with no access)	Walking Profile 2 with transit (and percent population with no access)	Walking Profile 3 with transit (and percent population with no access)	Walking Profile 4 with transit (and percent population with no access)	Uncongested driving
General population	0.31 (22%)	0.42 (20%)	0.06 (70%)	0.17 (59%)	0.35 (31%)	0.20 (52%)	0.83 (1%)
17 and under	0.29 (21%)	0.40 (19%)	0.05 (73%)	0.14 (61%)	0.33 (30%)	0.17 (54%)	0.83 (1%)
65 and over	0.29 (26%)	0.38 (24%)	0.05 (74%)	0.15 (63%)	0.32 (36%)	0.17 (56%)	0.81 (1%)
Adults with a disability	0.32 (21%)	0.43 (19%)	0.06 (69%)	0.18 (57%)	0.37 (30%)	0.21 (50%)	0.83 (1%)
Income less than 200% of poverty line	0.35 (17%)	0.48 (16%)	0.07 (65%)	0.20 (52%)	0.41 (25%)	0.23 (44%)	0.85 (1%)
People of color	0.35 (15%)	0.48 (13%)	0.07 (66%)	0.20 (52%)	0.41 (23%)	0.24 (45%)	0.86 (1%)

Food access

Table 12: Time to access 3 food stores (0-120 min scale) midday weekdays by statewide and by land use type (see Table 2 for full description of access metrics)

Context classification	Walking Profile 1 with transit (and percent blocks with no access)	Walking Profile 2 with transit (and percent population with no access)	Walking Profile 3 with transit (and percent population with no access)	Walking Profile 4 with transit (and percent population with no access)	Uncongested driving
Statewide	25 (31%)	17 (70%)	22 (47%)	21 (60%)	18 (0%)
Urban Core	9 (0%)	14 (12%)	9 (3%)	14 (1%)	3 (0%)
Urban	21 (2%)	24 (36%)	21 (14%)	27 (20%)	10 (0%)
Suburban	30 (20%)	21 (72%)	27 (42%)	23 (61%)	18 (0%)
Rural	20 (77%)	6 (97%)	13 (87%)	11 (93%)	26 (1%)

Table 13: Time to access 3 food stores (0-120 min scale) midday weekdays statewide by demographic group (see Table 2 for full description of access metrics)

Demographic group	Walking Profile 1 with transit (and percent population with no access)	Walking Profile 2 with transit (and percent population with no access)	Walking Profile 3 with transit (and percent population with no access)	Walking Profile 4 with transit (and percent population with no access)	Uncongested driving
General population	25 (31%)	17 (70%)	22 (47%)	21 (60%)	18 (0%)
17 and under	25 (33%)	17 (73%)	22 (49%)	20 (63%)	19 (0%)
65 and over	26 (35%)	16 (74%)	22 (51%)	21 (64%)	20 (0%)
Adults with a disability	25 (30%)	18 (69%)	22 (46%)	22 (59%)	18 (0%)
Income less than 200% of poverty line	25 (26%)	20 (66%)	23 (42%)	23 (54%)	17 (0%)
People of color	25 (30%)	19 (66%)	23 (41%)	22 (54%)	16 (0%)

Parks access

Table 14: Park acres accessible midday Saturdays in 20 minutes by statewide and by land use type (see Table 2 for full description of access metrics)

Context classification	Walking Profile 1 no transit (and percent population with no access)	Walking Profile 1 with transit (and percent population with no access)	Walking Profile 2 no transit (and percent population with no access)	Walking Profile 2 with transit (and percent population with no access)	Walking Profile 3 with transit (and percent population with no access)	Walking Profile 4 with transit (and percent population with no access)	Uncongested driving
Statewide	8.0 (23%)	8.1 (22%)	0.8 (74%)	0.9 (73%)	3.9 (46%)	1.9 (57%)	160 (2%)
Urban Core	16.9 (0%)	19.4 (0%)	3.0 (9%)	4.3 (8%)	16.8 (1%)	5.0 (8%)	540 (0%)
Urban	10.7 (2%)	11.3 (2%)	1.4 (52%)	1.5 (46%)	7.2 (13%)	2.3 (46%)	220 (0%)
Suburban	7.4 (15%)	7.5 (14%)	0.8 (76%)	0.8 (75%)	3.7 (42%)	1.7 (75%)	110 (1%)
Rural	5.7 (56%)	5.7 (56%)	0.3 (92%)	0.3 (92%)	1.1 (83%)	1.7 (92%)	200 (8%)

Table 15: Park acres accessible midday Saturdays in 20 minutes statewide by demographic group (see Table 2 for full description of access metrics)

Demographic group	Walking Profile 1 no transit (and percent population with no access)	Walking Profile 1 with transit (and percent population with no access)	Walking Profile 2 no transit (and percent population with no access)	Walking Profile 2 with transit (and percent population with no access)	Walking Profile 3 with transit (and percent population with no access)	Walking Profile 4 with transit (and percent population with no access)	Uncongested driving
General population	8.0 (23%)	8.1 (22%)	0.8 (74%)	0.9 (73%)	3.9 (46%)	1.9 (57%)	160 (2%)
17 and under	7.3 (23%)	7.4 (22%)	0.8 (76%)	0.8 (75%)	3.5 (47%)	1.7 (59%)	140 (2%)
65 and over	7.9 (26%)	8.0 (26%)	0.7 (77%)	0.8 (76%)	3.6 (51%)	1.9 (60%)	160 (2%)
Adults with a disability	7.6 (24%)	7.8 (23%)	0.8 (75%)	0.8 (74%)	3.8 (47%)	1.8 (58%)	150 (2%)
Income less than 200% of poverty line	7.5 (21%)	7.7 (21%)	0.8 (74%)	0.8 (73%)	3.9 (44%)	1.8 (57%)	150 (2%)
People of color	7.9 (18%)	8.1 (17%)	0.9 (72%)	0.9 (70%)	4.3 (40%)	1.9 (54%)	160 (2%)

Leisure access

Table 16: Leisure clusters accessible evening Saturdays in 30 minutes by statewide and by land use type (see Table 2 for full description of access metrics)

Context classification	Walking Profile 1 no transit (and percent population with no access)	Walking Profile 1 with transit (and percent population with no access)	Walking Profile 2 no transit (and percent population with no access)	Walking Profile 2 with transit (and percent population with no access)	Walking Profile 3 with transit (and percent population with no access)	Walking Profile 4 with transit (and percent population with no access)	Uncongested driving
Statewide	7 (47%)	25 (43%)	0.6 (87%)	8 (80%)	20 (57%)	10 (72%)	240 (6%)
Urban Core	180 (0%)	500 (0%)	18 (12%)	270 (12%)	470 (1%)	300 (0%)	1400 (0%)
Urban	17 (9%)	70 (5%)	1.5 (64%)	20 (47%)	58 (18%)	27 (32%)	580 (0%)
Suburban	3 (46%)	7 (39%)	0.1 (93%)	0.9 (86%)	5 (58%)	1.6 (78%)	180 (4%)
Rural	0.6 (83%)	0.6 (82%)	0.1 (97%)	0.1 (96%)	0.4 (88%)	0.1 (95%)	30 (13%)

Table 17: Leisure clusters accessible evening Saturdays in 30 minutes statewide by demographic group (see Table 2 for full description of access metrics)

Demographic group	Walking Profile 1 no transit (and percent population with no access)	Walking Profile 1 with transit (and percent population with no access)	Walking Profile 2 no transit (and percent population with no access)	Walking Profile 2 with transit (and percent population with no access)	Walking Profile 3 with transit (and percent population with no access)	Walking Profile 4 with transit (and percent population with no access)	Uncongested driving
General population	7 (47%)	25 (43%)	0.6 (87%)	8 (80%)	20 (57%)	10 (72%)	240 (6%)
17 and under	4 (50%)	13 (45%)	0.3 (90%)	3 (83%)	9 (59%)	4 (76%)	190 (6%)
65 and over	6 (52%)	18 (48%)	0.5 (89%)	5 (82%)	14 (61%)	7 (76%)	200 (7%)
Adults with a disability	8 (46%)	24 (41%)	0.7 (88%)	8 (79%)	20 (56%)	10 (71%)	210 (6%)
Income less than 200% of poverty line	8 (39%)	26 (35%)	0.7 (84%)	8 (76%)	21 (50%)	11 (67%)	220 (5%)
People of color	9 (40%)	31 (34%)	0.8 (85%)	11 (76%)	26 (51%)	13 (67%)	300 (4%)

Demand response service analysis

As described in Demand response service measurement, we were not able to produce a statewide calculation of access by demand response service by the time this study was published. The data sets, software, and methodology required to do so are new and have not been performed anywhere to our knowledge. We aim to finish this work in the coming months, and may include findings in the statewide Public Transportation Plan or Mobility Report.

Statewide, at least 97 percent of people in Washington live inside the service area of some type of demand response service. These services vary greatly: some serve the general public, while others only serve eligible riders. Their presence in most areas should not be interpreted as evidence that they meet the needs in all those areas, as many of these services are capacity-constrained by limits to the number of vehicles and drivers. Some services also require traveling at certain times, and scheduling a ride hours or days ahead of travel.

Demand response services are a critical part of the public transportation network that both complement and augment the fixed-route transit network. Some riders who cannot use fixed-route services because of a disability or because those services aren't present where they live can get where they need to go through a dial-a-ride or ADA paratransit service. Others who use fixed-route service are able to get further and faster on transit by using a connecting demand response service.

Destination access can be measured through demand response service just like for other modes, although as mentioned the methods for doing so are emerging. As a case study to demonstrate the viability of this process, we have calculated jobs access by demand response service within Grant County. The table below shows jobs access in Grant County by only walking (Walking Profile 1 speed, but allowed duration of 60 minutes or 3 total miles), fixed-route transit alone (Walking Profiles 1 and 2), demand response service alone, and demand response service connecting to fixed-route transit.

Table 18: Grant County population-weighted average jobs access by demand response analysis results

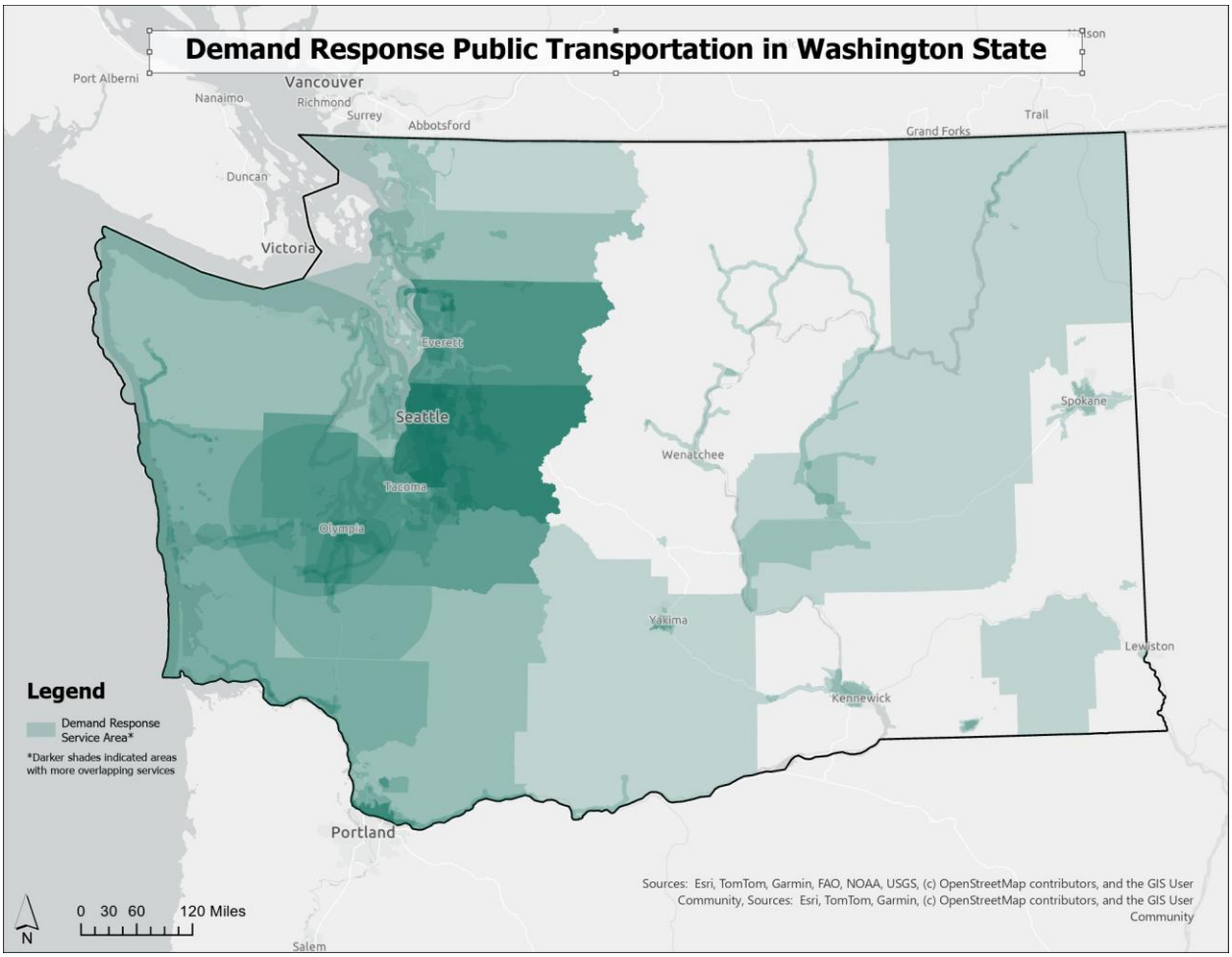
Destination metric	Walking Profile 1 (no transit, 60 minute walk allowed)	Walking Profile 1 (60 minute walk allowed, no constraints) with fixed-route transit	Walking Profile 2 (no transit, 60 minute walk allowed)	Walking Profile 2 (60 minute walk allowed, sidewalks only) with fixed-route transit	Demand response only	Demand response connecting to fixed-route transit
Jobs (a.m., total in 60 minutes)	2,084	2,157	929	987	3,016	3,043

Table note: These calculations reflect average values for everyone in Grant County. Access changes for those who live near fixed-route public transportation are considerably larger than those shown here. The primary purpose of these results is to demonstrate the feasibility of using similar data sets to calculate statewide results. These results include all fixed route transit operating in the county, plus the demand response services operated by Grant Transit. Demand response services operated by People for People are not included to focus on the access gained by adding a single demand response service operator.

Demand response feature is often less well-known than fixed-route transit, but is nearly ubiquitous statewide. Below is a map of all demand response services in Washington for which

we've collected data to date. Many of these services overlap, so darker shading indicates more overlapping services.

Figure 1: Map of demand response public transportation in Washington State



Assessment

This section provides a narrative version of the results in the last section. It identifies trends and important findings. In this section we focus on what the analysis shows about access, and what we learned in performing the analysis. Statements about what should be done or researched further based on those findings is left for Conclusion.

Insights about access

Public transportation provides critical access in all areas of the state

Across all land use types, public transportation delivers increased access for people living in Washington.

Compared to just walking, the increase for Walking Profile 1 using transit is significant in Rural and Urban Core areas, where people have access to about three and four times as many jobs, respectively, thanks to public transportation during evening service. Rural residents are more likely to have access to a medical facility when using public transportation instead of just walking, although still fewer than one medical facility on average. Urban Core residents who would otherwise be missing access to one and to half of the five different minor medical facility types when just walking generally have access to all five types using public transportation.

In Rural areas in the morning peak, riders have access to four times as many jobs by using public transportation instead of just walking. Around 6 percent of people living in Washington's in Rural areas who would have no access to jobs by walking have at least some access due to fixed-route public transportation.

The multiplier effect of public transportation on access is even greater in Suburban and Urban areas. In these areas, which have more public transportation services than rural areas, but aren't as dense and walkable as Urban Core areas, public transportation increases the number of jobs accessible in the morning peak by 22 times for Urban and 29 times for Suburban areas. Medical access more than doubles in both Urban and Suburban areas by public transportation. Leisure access is almost tripled in Suburban areas, and is quadrupled in Urban areas.

In most areas, the multiplier effect is also far stronger for people with limited mobility than for people who walk more quickly and further. When only walking, jobs accessible statewide for those who fit Walking Profile 2 are more than 90 percent less than jobs accessible to those who fit Walking Profile 1. However, when transit is added, the difference shrinks to about 60 percent. This difference in walking-only jobs access for Walking Profile 1 and Walking Profile 2 is consistent across Urban Core, Urban, and Suburban land uses. It does not quite hold in Rural areas, where the difference shrinks much less.

Public transportation also provides a greater multiplier on access for Walking Profile 2 with regard to medical and community support services access. Statewide, Walking Profile 1 has access to more than twice the medical facilities when using public transportation compared to just walking. But Walking Profile 2 has access to more than five times as many medical facilities (two minor facilities on average instead of one-third of a facility on average). In the Urban Core when only walking, Walking Profile 1 has access to more than eight community service types

and Walking Profile 2 has access to fewer than five. But when using public transportation, the two walking profiles both have access to about nine types of community services on average. As with jobs, transit delivers a greater relative increase in community support services in Urban Core, Urban, and Suburban regions, however the same trend does not apply to Rural regions where each walking profile sees similar increases in access.

There's more access to destinations in more urbanized areas

A consistent trend throughout our analysis is that access to destinations is generally better in more urban areas. This is unsurprising, but the degree and consistency of this trend is worth highlighting.

Access to all destinations, except arguably parks, by public transportation is far higher in Urban Core areas than Rural areas, with Urban and Suburban areas in between. The declining access between each land use type, in the order of Urban Core, Urban, Suburban, and Rural, is clear and significant. This trend is likely as much about the proximity of residences to destinations as it is about the presence of public transportation.

Parks are a notable exception to this trend. For parks, generally, the Urban Core still has more access to parks by public transportation than other land use types. However, the amount of additional access is much smaller, and the difference between average access for Urban, Suburban, and Rural areas is relatively small. For Walking Profile 4, Rural areas provide as much access to parks as Suburban areas and only about a quarter less than Urban areas. This is also the only destination type or land use classification where Walking Profile 4 outperforms Walking Profile 3, in Rural areas.

However, these statements refer to average access across all areas within each land use classification context. The percentage of Rural areas with no access to parks is much higher (56 percent for Walking Profile 1) than the percentage for either Suburban or Urban areas (15 percent and 2 percent respectively). So, while some Rural areas offer a high degree of parks access, other areas offer none.[15]

Gaps in the pedestrian network are significant barriers to the value of public transportation, and those gaps are accentuated in less urban areas

On a statewide basis, comparing Walking Profile 1 to Walking Profile 3, we find that if a public transportation rider is constrained to sidewalks with an accessible grade and crossings, they have access to 17 percent fewer jobs and leisure destinations, and access to half as many acres of parks.[16]

What's more, the rider constrained to accessible sidewalks and crossings is 50 percent more likely to have no access to three food stores within 120 minutes. They're also 30 percent more

[15] Our current methodology doesn't carefully distinguish access points to parks from roads and trails that are next to parks but not within them, which means these results require further investigation. We are likely not measuring important green spaces that are available to Washingtonians in some Rural blocks.

[16] This assumes those two riders move at the same pace.

likely to have no access to any medical facilities and seven times as likely to have no access to jobs through public transportation.

These barriers are present in all land use types. Even in Urban Core areas, lack of accessible paths reduces jobs access by 3 percent and parks access by 13 percent. But these gaps become more significant in Urban areas and severe in Suburban and Rural areas.

In Suburban areas, 42 percent of people living in Washington cannot access three grocery stores within two hours by public transportation using accessible pathways. However, only a fifth of people living in Suburban blocks lack this access if they're able to walk along any sidewalk or road.

In Rural areas during the morning commute time, public transportation riders fitting Walking Profile 3 have access to fewer than half the jobs accessible to those fitting Walking Profile 1. They're also six times as likely to have no access to jobs. In Suburban areas, where nearly every person fitting Walking Profile 1 has some access to jobs by public transportation, about one in six people fitting Walking Profile 3 have no access to jobs by fixed-route public transportation.

This last statistic points to one of the features of how gaps in the sidewalk network affect access, which doesn't show up in statewide or average access statistics. When accessible infrastructure is present, a person who fits Walking Profile 3 appears to have the same amount of access as a person who uses Walking Profile 1. Occasional gaps in the network, inaccessible crossings, or steep streets may only marginally reduce access. But sometimes, a few missing critical connections, or an area completely lacking accessible infrastructure, means that for many people living in Washington access disappears entirely.

Gaps in infrastructure create barriers which are unevenly distributed, and lead to greater variations in access for people who fit the Walking Profiles requiring sidewalks or accessible crossings.

Long distances from transit to destinations are significant barriers for slower walkers

On a statewide basis, our team found that Walking Profile 2 had reduced access far beyond the reduction in access calculated for Walking Profile 3. Walking Profile 4 also had lower access than Walking Profile 3, other than the exception for parks access in Rural areas.

In other words, based on our calculation, people who walk slowly and for a shorter time (0.3 mile walking distance instead of 1 mile walking distance) see a significantly larger reduction in access than those who rely on the presence of curb cuts along their path. This was true regardless of whether the walking profile required sidewalks.

Readers shouldn't take this finding to indicate that the need for curb cuts isn't a significant barrier, as we discussed in the previous section. Nor should they take it to indicate that slower walking speeds are more of a burden than the need for accessible infrastructure. Our analysis only accounts for certain material conditions. Some physical infrastructure components aren't available in our data, and we've made no considerations of social exclusion or other non-physical components (see Demographic-based gaps and disparities).

The reductions in access for Walking Profiles 2 and 4 are extreme. They're subject to the same trends we've already discussed, and the reductions are less present in Urban Core areas. But even in the Urban Core, a public transportation rider fitting Walking Profile 2 has access to 30 percent fewer jobs in the morning than a rider fitting Walking Profile 1. In Suburban areas, that reduction is about 83 percent. In Rural areas, the reduction is more than 90 percent. Walking Profile 4, which moves at a slower speed but isn't constrained by presence of sidewalks or steep grades, also has drastic reductions in access, with values that are significantly closer to Walking Profile 2, than to Walking Profile 3.

In Rural areas, a person living in Washington fitting Walking Profile 1 has, on average, a community support services access score of 0.13 by our metric, and has a 57 percent chance to have no access to community support services at all. For Walking Profile 4 those numbers are 0.03 and 83 percent.

In the Urban Core, Walking Profile 1 has access to three supermarkets or foodbanks within nine minutes, but that same trip for Walking Profile 2 takes 14 minutes. But 14 percent of people fitting Walking Profile 2 are unable to reach three supermarkets or foodbanks at all within the 120-minute timeframe measured. This statistic is one where Walking Profile 4 has results more like Walking Profile 1 or Walking Profile 3: there is only a 1 percent chance that a person fitting Walking Profile 4 in the Urban Core is unable to reach three supermarkets or foodbanks. The chance is slightly higher for Walking Profile 3 (3 percent). The relatively strong performance of Walking Profile 4 on this metric in the Urban Core may reflect the large number of steep hills in downtown Seattle, which are barriers to Walking Profiles 2 and 3, but not to Walking Profile 4.

As discussed in Public transportation provides critical access in all areas of the state, public transportation usually provides a greater relative increase in access for Walking Profiles 2 and 4 than for Walking Profile 1. But while public transportation shrinks the gap between these walking profiles compared to the experiences of people only walking, a significant gap still remains and those able to walk longer distances have much more access through public transportation than those who walk short distances.

Time of day is a greater barrier for public transportation in less urban areas

We analyzed jobs access both for the morning commute (6-8 a.m.) and the evening after the afternoon peak (6-8 p.m.). Across the state, on average, public transportation provides less access in the evening than in the morning. This is unsurprising as public transportation is known to be focused on peak service hours.

Also unsurprising, but nonetheless an important trend, is that this difference is more pronounced in less urban areas. Urban Core areas see a very modest reduction in access to jobs in the evening of less than 4 percent for Walking Profile 1. Similarly, Urban areas see an evening access reduction of about 8 percent for Walking Profile 1. These differences are slightly greater for the other walking profiles, which emphasizes that any reduction in public transportation service has a greater effect on those who are affected by other barriers to using public transportation. For Suburban areas, reductions in access in the evenings are closer to 25 percent. In Rural areas, reductions in access almost 30 percent.

Note that in considering these findings, we used the same jobs data set in measuring morning and evening access, and haven't considered the times of certain job shifts or industries that are more or less likely to have morning or evening shifts. We're accounting only for differences in the transportation network at different times of day, not for changes in what jobs are available at different times of day.

Demand response transportation

Because we have not yet performed statewide calculations of access for demand response we cannot provide a full assessment of demand response transportation access. The case study demonstrated above for Grant County nonetheless provides useful findings that demonstrate the value of demand response services to people in Washington.

Grant County is a relatively rural context, with the largest city of Moses Lake having fewer than 30,000 residents out of a countywide population of 100,000. There are two fixed-route operators (Grant Transit Authority and People for People) providing service in the county, along with some intercity services that primarily connect to Spokane and Tri-Cities. Grant Transit Authority operates Dial-A-Ride Transit (DART) which offers rides to the general public beyond the service area of fixed routes.

As demonstrated in our case study, Grant County residents have substantial additional access to jobs thanks to the DART service. The average person has access to about 50 percent more jobs thanks to the availability of this service. Because these gains are averaged across all people in the county, note that a person in the service area has substantially larger gains. We are also using conservative assumptions about the speed of these services, assuming that each trip is shared and requires a minimum 20-minute wait.

Similar gains in access are likely in other rural areas of the state, and demand response public transportation provides important increases in urban access as well, often focusing on the needs of specific frontline communities. Future analyses will expand the scope of our ability to describe the statewide value of demand response public transportation.

Demographic-based gaps and disparities

We pursued an analysis of how public transportation gaps affect different demographic groups using the three-part method in Demographic analysis. This section provides further assessment of the analysis results, focusing demographic questions using those three approaches.

Generally, there are major disparities in access throughout Washington's transportation network. We interpret the results of our study to show those disparities are best described as gaps between people with disabilities and people with no disabilities, and gaps between drivers and non-drivers.

In all land-use types, people with mobility disabilities and non-drivers have significantly less access than the general public. This could be because public transportation provides less access for them, because public transportation is the only option available to them for many trips, or because public transportation isn't available for those trips.

We came to these findings not based on a traditional analysis of demographic data, but rather based on our second and third approaches: comparative analyses of access between the walking profiles and access for drivers versus non-drivers. Unlike an analysis based purely on Census demographic data, these approaches led to clear findings about transportation disparities. Those disparities are partially disparities between different public transportation users. But even more so, they're disparities between public transportation users and those who drive.

Analysis based on Census demographic data

Like the *2023 Frequent Transit Service Study*, we believe that using Census demographic data in this study to understand how different groups experience transportation barriers has led to inconclusive results. However, unlike in that previous study, spending further time with these results and working to adapt this methodology to local and regional contexts may yield more useful findings.

At a high-level, there are some Census-designated demographic categories which tend to have somewhat more access than the general population, and others which tend to have less. These differences, generally, appear to exist both when aggregating data for demographic groups statewide and when aggregating data among different land use classification contexts. In general, people in lower income households and people of color tend to live in areas with more access to destinations by public transportation and walking than people under 18, over 65, or adults with a disability. The exact ordering of these demographic groups across destination categories and land use contexts isn't consistent, but in most cases, that pattern holds.

However, it isn't clear if that pattern is meaningful. As we noted in the 2023 study, there are many reasons why different areas tend to have different demographics. These reasons are sometimes very broad and consistent across the state, while other times they're very local or distinct from region to region.

These differences in access are also small. For example, in Suburban areas, the Census group with the lowest medical access score based on Walking Profile 1 is people under 18, with a score of 0.48. The highest corresponding score for a Census group is people in households with incomes less than 200 percent of the federal poverty line, with a score of 0.58. This difference is noticeable and may be significant, but isn't extreme, and figuring out the meaning of such a divergence is difficult.

There are enough deviations from statewide trends that further time spent with these results may bear valuable insights. There are also some surprising trends that require further investigation. For example, access to parks for people over 65 generally appears to be higher than the statewide average in Urban, Suburban, and Rural areas. In Urban Core areas, people over 65 appear to have less access to parks than the statewide average.

Demographic analysis of this type may also yield interesting findings when applied to a local level for project alternative evaluation (see Needs for future research). However, those investigations are beyond the scope of this study.

Comparison of walking profiles

We performed substantial comparison of the walking profiles Insights about access. As a summary of those findings in this context, no matter where a person lives in the state, if they require accessible walking paths or walk at a slower pace for a shorter duration than an adult with no disabilities, they have less access via the public transportation network.

The finding from these results is clear: people with disabilities that prevent them from walking at the speed and for the duration of an adult with no disabilities face major gaps in their ability to use public transportation effectively. This finding also applies to other groups that may be more likely to fit Walking Profile 2, 3, or 4. These include people with children (especially younger children), older adults, or even those who must travel or commute with additional baggage for occupational or social reasons. This finding isn't surprising, but this research demonstrates that the magnitude of these gaps is significant, especially in areas outside the Urban Core and times outside the morning commute.

Our analysis in this regard is also not complete. While we have data on presence of sidewalks and curb cuts, we don't have high-quality data about sidewalk quality, width, or other factors that could present barriers for people represented generally by our Walking Profile 3 (e.g., people who use an electric wheelchair). We also don't account for other material factors, such as availability of space for wheelchairs on board transit vehicles.

Our walking profiles are also blunt approximations of diverse individual preferences and capabilities. Each person living in Washington chooses their paths based on myriad factors, and there are many barriers that could be accounted for through more data availability as well as more local community engagement.

In addition to only accounting for some material factors that present barriers, this analysis makes no account of social factors that meaningfully enable or prevent access. There is no accounting in this methodology for discrimination, job accessibility, feelings of safety and other similar factors. Even if a person has access to a grocery store, doctor's office, or community college by way of sidewalks, curb cuts, calm traffic, frequent public transportation, and other material factors, if they don't feel welcome or the services and prices at that business or government facility don't meet their needs or budget, then they don't really have access. These factors are beyond the scope of our current research but important to keep in mind when considering our results.

Comparison with access by driving

The discussion of results in the preceding section focused primarily on access using public transportation and walking. Our research also included an analysis of access available to those who drive.

Consideration of public transportation access versus driving is important in the context of a demographic analysis because many people living in Washington are unable to drive for reasons such as age or disability. As we discussed previously, the Joint Transportation Commission's study, *Nondrivers: Population Demographics, and Analysis*, found that non-drivers were more likely to be female, African American, or Native American than the

Washington population. The study also showed that many disabilities prevent people from driving, and lack of financial resources can also make driving burdensome or infeasible.

There are some technical limitations to our analysis of access by driving (see Overall approach and assumptions embedded in software). These limitations likely result in an overstatement of access for drivers. However, while we're risking an overstatement of access for drivers, we believe the results of our comparisons to still be instructive. The factors that may reduce access by driving below our estimations (e.g., traffic, needing to walk after parking at some distance from a destination) are physical realities that accompany driving in the places where those factors present.

Our analysis found that, across all categories of access and land use types, nondrivers have much less access than drivers in uncongested conditions. On a statewide basis, if they don't have access to a car, the average person living in Washington who fits Walking Profile 1 (our least constrained walking profile) has access to:

- 50 percent of the diversity of medical facilities and community services (not accounting for reduced numbers within each service type).
- 90 percent fewer recreational opportunities.
- 96 percent less parks acreage.

They also have a 31 percent chance of not having access to 3 grocery stores within 120 minutes, and even if they do require a trip a third longer to reach them.[17]

In other words, regardless of one's exact social context, not being able to drive amounts to a form of social exclusion.

The differences between driver access and nondriver access on a statewide basis are similar in scale to the differences between driver access in Urban and Urban Core areas versus driver access in Rural areas. While our inability to account for the effects of congestion in this study likely means we have overstated this disparity at least in some trips and areas of the state, that points to the need for further research, methodological refinement, and a critical approach to considering the costs and benefits of different modes. If access by driving is lower than we have calculated, that suggests that public transportation is more efficient and valuable than we have assessed it to be.

Our analysis also found that these disparities between drivers and nondrivers are very different in different areas.

In Urban Core areas, the difference is significant, and larger than the difference between the highest and lowest access walking profiles. For leisure opportunities in Urban Core areas, non-drivers have about one-third the access of drivers. For our medical metric, both drivers and

[17] The discrepancies are likely similar for jobs access. However, because our methodology does not account for congestion during the times many people commute to work, we have chosen not to report those calculations in this section.

nondrivers in Urban Core areas score 1.00. However, readers should note that this metric doesn't consider the value of facilities taking less time to get to, only whether facilities are available within the time limits.

In Urban areas, these discrepancies rise fast. A nondriver fitting Walking Profile 1 has access to almost 85 percent fewer leisure opportunities. They lose access to an eighth of their diversity of medical facilities, and a fifth of their types of social services, even though drivers retain nearly full access to these amenities.

In Suburban areas the story for nondrivers degrades further: Walking Profile 1 has access to 96 percent fewer leisure opportunities. While Drivers in Suburban areas still have more access than Urban nondrivers to medical and community support services, nondrivers in Suburban areas have less than half the access scores of their driver counterparts.

In Rural areas, nondrivers have a tiny fraction of the access of drivers.

This analysis of public transportation access for nondrivers versus the access available to drivers demonstrates a type of disparity that is difficult to ignore. Any person living in Washington may become a nondriver at any time, by virtue of disability, economic circumstance, or a mechanical issue with a car. Rideshare and rides from family and friends may fill the gap for some, but those options are not universally available. This research demonstrates that when anyone loses access to their car, or doesn't live with that privilege in the first place, they likely face a major gap in access no matter where they live in the state. However, it also demonstrates that effective deployment of public transportation and land use can mitigate that gap considerably. We reviewed the block group-level results for each land use classification and found that there are many examples of substantially improved access for public transportation users across all land use types.

Additional results attainable in future applications

Beyond the assessment of the specific results, this research has helped WSDOT and partners identify lessons learned about transportation planning processes and opportunities to build our capacity for destination access analysis.

Destination access provides a framework that identifies areas that have effective transportation networks and destinations that provide utility for transportation system users. In this study, we've focused on applying our approach on a statewide basis. This was an appropriate first step and the right scale for testing our model, granted WSDOT's statewide role. While requiring thoughtful implementation in different contexts, the methodology and system we developed in this study is transferable to a wide array of use cases. These include:

- **Scenario and project evaluation:** Within a project area, WSDOT could run the analysis in this study based on the status of the transportation network and on possible future changes to the network, including new public transportation routes, new sidewalks, new trails, new bridges, and more.

  Caltrans and the Virginia Office of Intermodal Planning and Investment use this approach to consider potential grant-funded projects. WSDOT could use a similar

approach in Washington based on the model we developed to evaluate possible transportation grants, agency projects, or system-level policies.

- **Ongoing review of transportation needs:** While our application focused on describing a statewide access baseline, this model could be applicable at other scales, including very local scales. The tools we used to analyze Washington as a series of 300-meter-300-meter squares can also have an increased resolution to consider the differences in considerably smaller areas (e.g., a city block or smaller). Transit agencies, cities, counties, or regional transportation/metropolitan planning organizations could use this method to assess more specific transportation needs prior to or during project planning.

Needs for future research

While this research has provided a first statewide look at access through public transportation and how it relates/compares to access by walking alone and for drivers, we believe this is the beginning of a new way of understanding Washington's transportation network. In short, this isn't a complete study.

There are multiple technical gaps in the methodology and results, which WSDOT could fill by investing in specific data sets and processes. There are also other applications and new fields of research within and beyond transportation system management that WSDOT, our transportation partners, and practitioners in other professions should investigate. The following sections list some of the future research needs we've identified.

Specific improvements to this model

- **Collection of historical public transportation delivery data:** Our analysis assumes that all public transportation services operate as scheduled. But sometimes these services are disrupted or delayed. We could improve the model by collecting real-time data published by public transportation agencies through standards such as the Transit Integrated Exchange Specification (TIDES) Suite and incorporating it into the analysis.

  Collecting real-time data would allow us to measure the actual access available to people living in Washington on specific days as opposed to the access available assuming standard operations. This could be useful in advanced applications of disparities analysis. If delays aren't evenly distributed across systems, they could lead to uneven effects on different demographic groups or communities.

- **Improved use of parcel-level land use data to make better assumptions about where people live for more accurate population weighting:** In this analysis, we used very precise data about the transportation network, but relatively imprecise data about where people live. Increasing the precision of our data about residential locations could enable better alignment between our data sources and a more accurate picture of access in the state.

- **Accounting for access by bikes and e-mobility:** This study found that limitations on walking distance resulted in considerable reductions in access. Bikes and e-mobility devices, including adaptive devices, can expand the distance all people are able to travel to reach public transportation or reach destinations directly. However, using these

devices safely often requires specific infrastructure such as bike lanes. Additional data collection and model development accounting for other active transportation modes could highlight the potential benefit of incentivizing the use of bikes and e-mobility devices.

- **Incorporation of pedestrian safety and comfort considerations (e.g., Level of Traffic Stress):** Other material factors (e.g., buffers between pedestrians and cars, street lighting, sidewalk width) were unavailable for this analysis. Having access to these features and using them to calculate Level of Traffic Stress, which WSDOT's Active Transportation Division is currently developing, would allow for a more representative set of walking profiles or alternative approaches to understanding pedestrian behaviors.
- **Intercity transportation:** This study focused on day-to-day trips, measuring access for trips between 20 minutes and two hours (excluding Amtrak and most other intercity services). This was due both to the focus of our research and technical limitations to our software. But traveling to other regions is an important type of access and modest software investment and research could be useful in identifying intercity transportation gaps.
- **Continued investigation of destination datasets:** This study used a variety of data set WSDOT has never analyzed at statewide scale for transportation access. Each data set has a learning curve and quirks. Our ability to use these data sets effectively and provide feedback to publishers that would improve quality overtime will require ongoing investment in understanding those data sources and continued practical application.
- **More detailed review of complex transportation settings (e.g., schools):** After discussion with our technical advisory group, we left schools out of our analysis despite their obvious importance as destinations for people living in Washington. Schools require thoughtful consideration of different transportation modes based on the context of age group, region, and other factors. Other destinations, including those we studied, could be subject to refinement in how we measure and define access metrics and thresholds. This requires time and community engagement.
- **Development of data needed to more accurately measure access by driving, including driving speed data:** While we measured access by driving, we assumed free-flow traffic, which isn't a realistic assumption at many times during the day. Improved understanding of realistic driving travel speeds would enable more precise analyses at different times of day.
- **Development of a transportation demand model to project the effect of construction projects on roadway travel speeds:** The number of expected cars using a road changes the expected travel speed on that road. For this reason, to compare the likely access changes resulting from potential roadway projects, a statewide travel demand model would be required.

Additional transportation applications

- **Project benefit analysis:** Our method analyzed statewide access, and developed processes tuned to that level of analysis. As we discussed in previous sections, local planning applications could use destination access and the specific metrics we defined to measure the expected or achieved benefits of specific projects, including WSDOT projects, projects proposed by potential grantees, and projects performed by local agencies with any funding source around the state.

  This analysis method is multimodal in nature and could be applied to public transportation, roadway, sidewalk, bike trail, ferry, or any other transportation project. Applications at the local level would require different processes and assumptions tuned to those contexts. Appropriate teams at WSDOT and other agencies should research and develop these applications.

- **Cost-benefit analysis:** Access is a community benefit, and like all benefits, comes at specific costs. Achieving a certain access benefit for $10 million is a better deal than achieving the same access benefit for $100 million. However, the expected costs of different projects are sometimes not understood at the time of deciding whether to pursue a project.

  Developing more standardized processes within WSDOT and around the state for estimating the rough costs of projects and performing a destination access analysis early in the project life cycle would enable cost-benefit analyses that would allow for a more objective approach to project and policy prioritization.

Evidence-based solutions for everyone living in Washington

Our research has focused on describing access on a statewide basis, with a focus on describing gaps and disparities. That's an important first step in using the model we developed, but may leave the reader wondering, "So what? How can we fix these problems?"

While we're certain there are clear policy implications from our assessment of the results of this research, we can't fully describe them in this study, nor are we ready to do so. More consideration of these and future results by the Legislature, other agencies, and members of the public is necessary to identify and select the policies that would best address the gaps and disparities described throughout this study.

We do believe this study, as well as the research of other government and private institutions around the country and world, demonstrates that thinking further about how access is tied to outcomes and how access can be used as a metric to predict and validate outcomes is worth additional investigation. WSDOT and other agencies should look to find solutions to these gaps and research other jurisdictions that've successfully addressed these gaps. These should include examples and consideration of rural and urban approaches in the U.S. and globally. A solution that works for Seattle may not work Moses Lake, but there are ways that we can better cultivate access in each. The solutions may come from New York or Salt Lake City, Savannah or Missoula, Bogota or Hanoi, Ferrara or Manakara. Destination access provides an evolving framework to think about local problems with examples from around the globe, and we should continue expanding the scope of our research with an eye towards practical paths forward.

Readers should understand these solutions as the communal responsibility of numerous parties in Washington. While this report focuses on public transportation, it points at issues that public transportation providers can't solve alone. There is no one party that can be mandated to fix the access gaps and disparities identified in this report. The Legislature should define policies and provide funding; WSDOT, cities, and counties must build more accessible infrastructure; private developers and landowners must comply with laws and consider the public costs and benefits of their investments; transit agencies must provide efficient service in coordination with other jurisdictions; entrepreneurs must take the risk of investing in jobs and services.

We all have a part in building and maintaining a transportation network and economy that offers access to everyone living in Washington.

Applications beyond transportation

Access involves transportation. But, ultimately, access is as much a measure of land use efficiency as it is a measure of transportation performance. Further, while transportation and land use are the primary inputs for our model, the outputs are relevant not only for those fields, but also (and maybe more so) for environmental analysis, economic growth, and public health.

These social outcomes of transportation policy are critical to our work and are related to Washington's legislatively defined transportation policy goals.[18] WSDOT should collaborate with other state agencies and partners to consider "access" as a societal benefit from a multidisciplinary perspective, along both material and immaterial vectors. There is an established and evolving body of academic research and practical examples demonstrating the viability of this approach to improve government effectiveness and accountability.

[18] RCW 47.04.280

Conclusion

The research in this study has advanced our understanding of how public transportation provides access to people living in Washington and where gaps remain in the state transportation network.

Public transportation provides significant increases in access for the average person living in Washington, both in urban areas where transit is frequent and in rural areas where public transportation is less central to a typical traveler's most common trips. The pedestrian network and land use patterns amplify or restrict the usefulness of public transportation, depending on their status. This is also true in both more urban and rural areas. Public transportation doesn't look the same everywhere in Washington, but it can provide value everywhere.

Public transportation can't and shouldn't serve every trip. However, not every person living in Washington is able to drive or has access to someone who can drive them where they need to be. Public transportation is the most efficient and socially beneficial mode of transportation for some trips, and the only option for some others. Our state has long recognized the need to support its residents with a robust public transportation network to meet those efficiencies and those needs.

However, the public transportation network (and the pedestrian network and land use that support its value) doesn't provide sufficiently for the needs of everyone living in Washington. This is despite the quality of service public transportation providers offer with the resources available to them.

Significant gaps exist between the public transportation experiences of different people living in Washington, and between those who rely on public transportation and those with the ability to drive themselves. These gaps are as much about gaps in the pedestrian network and land use that are unconducive to effective public transportation services (problems that can't be addressed by public transportation providers) as they are about gaps in the public transportation network (which would require more resources to expand service).

WSDOT will continue developing the outcomes of this study over the second year of this biennium through these specific actions:

- Finalize the statewide demand response service analysis
- Publish the results of this study in an online interface including maps that allow easier review of our findings
- Incorporate this analysis into the Statewide Public Transportation Plan

The following sections detail key conclusions and additional protentional actions from our work.

There's a need to officially identify disparities in access based on disability and access to an automobile, and provide solutions to reduce these disparities

Identifying disparities and providing solutions would require:

- Addressing gaps in pedestrian network, meaning more sidewalks and other pedestrian paths.
- Supporting land use changes that lead to destinations being closer to where people live across all land use types.
- Improving public transportation services, meaning more funding for existing services and additional services.
- Moderating or foregoing actions that increase access for drivers, at least without a strong cost-benefit analysis and larger gains in access for other modes.[19]

Destination access analysis provides a useful framework for identifying the presence of disparities in access based on disability and access to an automobile, and provides a way to track progress towards addressing those disparities over time

The approach defined in this report can be used for these purposes, but additional research, system development, and collaboration with other divisions, state agencies, and jurisdictions is necessary to put that into practice. These investments include:

- Promotion of more standardized data from public transportation agencies and other jurisdictions, including WSDOT itself, and the development of more standardized workflows at WSDOT and other organizations to enable more efficient, precise, and faster analysis of access from prospective projects for all modes.
- Research about the ways that access plays a role as a social determinant of health, and potentially the definition in collaboration with other agencies and members of the public of thresholds indicating transportation access poverty. This could lead to clear policy recommendations on how to promote social equity and economic opportunity through transportation and land use.

Roadmap to implementing potential actions

These potential actions would require multiple years to carry out. They imply significant changes to state budgets and major reorganizations of WSDOT and other agency business processes. We've framed them, like most of the content in this study, around issues of transportation disparities to align with how the Legislature wrote the budget proviso assigning this study.

But these are actions in alignment with our statewide transportation policy goals, and advisable as much for reasons of economic development, environmental sustainability, and safety, as they are with the equitable distribution of public benefits.

[19] This is advisable both because these actions would increase a present disparity, and because research demonstrates that increasing driver access increases vehicle miles traveled, in contradiction with statewide objectives (RCW 47.01.440).

These actions are achievable over the next 10 to 20 years with focused effort and coordination. If Washington would like to pursue this work, we've identified the following steps as feasible within the next two biennia.

2027-2029 biennium

- Develop a proposed multimodal destination access analysis approach that reasonably accurately accounts for driving times, level of traffic stress, and biking in addition to public transportation. Design a technology system, inclusive of identified data sets, software, processes, and staffing that enable the calculation of access metrics for any prospective project in a limited period of time (e.g. 30 days) granted certain data inputs. This could support refinement of the performance-based project evaluation model, which includes rudimentary access to destination analysis.

- Jointly with public transportation providers in the state, develop data publication standards (which those providers would fulfill) that would enable a more accurate evaluation of provided services. Those standards should be based on open data specifications used by other agencies nationally and globally, and include the publication of ridership data and real-time performance data that can be used to evaluate the delivery of fixed-route and demand response services.

- Collect or develop a data set accounting for expected travel speeds during different times of day across most or all Washington roads. Vet this data with an advisory group of engineers and planners from across the state, confirm reasonable assumptions about driving travel times, and scope out the key components of a statewide travel demand model that could project travel times after roadway construction projects or other transportation projects affecting roadway speeds.

2029-2031 biennium

- Develop a statewide travel demand model based on the key requirements identified in the previous biennium, subject to budget. Then develop and prototype the destination access analysis approach proposed and designed in the previous biennium. Use then current prospective transportation projects at WSDOT, transit agencies, and other partners to test the outcomes and consider how they could be used in the legislative decision-making process.

- In collaboration with partners, establish a process to project future planned access available in all areas of the state based on regional transportation plans and coordinated public transportation-human services transportation plans developed by regional transportation/metropolitan planning organizations; and transportation plans developed by WSDOT and other entities, taking into account expected land use and population changes. The Department of Commerce and the Office of Financial Management should be included as participants in the development of processes for refined land use and population assumptions.

- Incentivize transit agencies to perform the system upgrades that would enable each to publish ridership and real-time performance data according to the standards established in the previous biennium.

WSDOT and partners can accomplish these next steps if appropriate resources are provided. While ambitious, taking these steps would set Washington on a pathway toward having a clear understanding of how future planned projects will benefit our residents, and offer the tools to track whether those benefits were delivered. They would form the basis of a performance management approach that would use destination access analysis to measure our state's objective progress towards meeting the policy goals already established in law.

Additional information

Data sources

This section includes a technical description of the data sets we used in our analysis. Additional documentation about the exact usage of these data sets is available upon request.

Sidewalk data: OS-CONNECT

To address the needs of *2023 Frequent Transit Service Study* and address shortcomings of existing sidewalk data, the Legislature requested WSDOT and the University of Washington to develop a statewide sidewalk inventory.[20] University of Washington's Taskar Center built upon their existing Transit Data Exchange Initiative to develop a statewide sidewalk dataset called OS-CONNECT.

You can view the OS-CONNECT dataset on the OS-CONNECT viewer website. The dataset currently has sidewalk data for areas where about 90 percent of Washington residents live, including all areas near a known fixed-route transit stop. OS-CONNECT shows each sidewalk as a line (or "edge" in data science terminology), which has the geographic location, length, and gradient (i.e., elevation difference between each end of the line) of the sidewalk. Each line represents the extent of the sidewalk between two crossings, or until the sidewalk terminates. The dataset shows crossings as lines spanning over streets, which it further notes as raised (i.e., typical curb), lowered (i.e., typical curb cut), or flush (i.e., raised crossing at sidewalk level) with the street. UW is in the process of adding sidewalk widths to the dataset, and other attributes (e.g., obstructions or barriers present along the path) are potential additions in the future. Only presence, gradient, and crossing type were used in our analysis.

The OS-CONNECT sidewalk data is in an Opensidewalks (OSW) format that is compatible with OpenStreetMap (OSM) tags, which are descriptive variables that can more accurately represent an object or pathway in OSM. A common OSM tag is the surface type, for example "surface=pavement." Aligning with an existing standardized schema means that the OSW data is flexible, can be applied broadly, and can be combined with other existing OSM data to build pedestrian networks to be used by our model and others.

Trail and road network: OpenStreetMap

OSM has an extensive coverage of infrastructure, businesses, and more spatial data across jurisdictional boundaries. The open nature of OSM allows users to input, edit, and delete map elements. Sometimes users are official, other times they may be your next-door neighbor. With its established schema of tags, map elements can be filtered to include pathways and roads that a pedestrian could use as a routable network.

Destinations: Overture Maps; OpenStreetMap, Washington Department of Health, U.S. Census Bureau

For locations of private businesses, private nonprofit, and minor public facilities locations (i.e., small medical providers, community support services, leisure businesses, supermarkets,

[20] ESHB 1125 - 2023

foodbanks) we used data from the Overture Maps Foundation, which provides several open spatial datasets, including infrastructure and points of interest (places). These datasets are derived from a combination of OSM, Meta, Google, and a few other sources. Overture Maps aims to provide data with fewer license requirements than those presented by OSM. This allows private companies to more closely monitor and control what information is shared publicly, while still making extensive spatial datasets available for public use.

Our focus is using Overture Points of Interest (POI) in Washington. These POI are sourced from public data, company's online profiles, and other sources. The POI have information including place name (e.g., businesses, monuments, parks), geographic location, address, source information, categories and sub-categories, and some data sources.

For the location of hospitals, we used the data set of locations of licensed hospitals maintained by the Washington State Department of Health.

For the location of jobs, we used the Longitudinal Employer-Household Dynamics (LEHD) Origin-Destination Employment Statistics (LODES) data produced by the U.S. Census.

For the location of parks, WSDOT collected polygons and lines describing applicable greenspaces and trails around the state, and developed a layer of parks area that describes each quarter acre of parkland as a point.

LODES data is stored and processed natively within the Conveyal product (our usage of which is described in a following section). Other data sets were processed by WSDOT and manually imported into Conveyal.

Public transportation data: General Transit Feed Specification from various providers

Public transportation agencies publish General Transit Feed Specification (GTFS) and GTFS-Flex (an extension to GTFS) data. The Federal Transit Administration's National Transit Database (NTD) requires GTFS data and the data is available for all fixed-route transit services in the state. Google Maps and other online services use GTFS data to provide scheduling information to users. WSDOT maintains a list of known and public GTFS feeds on its website. WSDOT additionally has access to a few additional GTFS feeds from smaller agencies that do not share their data publicly, which are maintained by a WSDOT contractor. GTFS-Flex, which describes demand-responsive transportation services, isn't as widely available. However, WSDOT began working with agencies and its contractor to develop these data sets in 2023 and has drafted GTFS-Flex data for nearly all public and non-profit demand-responsive service providers in the state.

Population data: U.S. Census

WSDOT gathered population data from the ACS (5-year 2024) and 2020 decennial Census. As described in the body of the study, we used ACS data at the block-group level for all general public and demographic group population counts. We used 2020 Census data at the block level to make assumptions about how population was distributed within block groups. This mixing of data aggregation levels was used because our land use context classification data set defined land use types at the block level, but we consider the ACS 5-year data to better represent total population and demographic distribution.

Land use context classification data: WSDOT

We describe the land use context classification data set in depth in its own following section.

Software tools and processes

The following software applications were used to process and calculate statistics contained in this report based on the data sets described above. More information about our exact configuration and use of these applications is available upon request.

Conveyal analysis

Conveyal is the primary application we used to calculate access to destinations across the state. It's a licensed application that provides a user interface for configuration and management of data integrated into the open source r5 routing engine. r5 could be configured and used to develop analyses identical or very similar to those produced for this report, given the same input data, although significant technical expertise would be required. Many experienced analysts use r5r, an open source R package that allows users to engage with r5 through scripting. The description below references Conveyal to describe the destination access analyses we performed, but some of the functions are technically performed by r5.

Conveyal allows us to separate the state of Washington into about five million equally sized squares (a little less than 300 meters by 300 meters), load up data sets of destinations according to our metrics, configure travel behavior according to our walking profiles and available transportation, then measure the number of destinations or travel time to destinations from everyone of those five million squares to every other. The product of this analysis is a geotiff file that contains information about our destination metrics for each of those squares. That file can then be imported into R or ArcGIS Pro for aggregation or mapping display.

R

R is a free software environment for statistical computing used widely for analyses like our own and in a variety of academic, business, and private applications globally. Generally, we built and executed R scripts in the RStudio application. We used R for two primary purposes:

- The post-processing of results exported from the Conveyal application for analysis and presentation in this report.
- The processing and preparation of various data sets prior to inclusion in Conveyal .

All code we developed and used for this analysis is available upon request.

For the post-processes of results, we wrote custom scripts that aggregate destination access metrics from each of the 5 million squares around Washington into average values for Census blocks, weighted by population in Census blocks. These results were then aggregated into statewide metric results, as well as results for each of the land use context classifications for all parts of the state. We also used R to calculate access metrics for the subpopulations of each demographic group. In this process, we also calculated additional statistics related to our metric that we used for the interpretation of the results, for example the percent of block groups where metric values were 0 (or greater than 120 for our food metric).

For the processing and preparation of various data sets, our uses of R included: destination querying from Overture, OSM, and State of Washington Geospatial Open Data Portal.

Other applications used

We merged the OS-CONNECT sidewalk data with trails and other walkways not adjacent to streets, using OSMIX.

We used Osmconvert to convert OS-CONNECT and OSM trails network data from OSM to Protocolbuffer Binary Format (PBF) files, which were needed for import into Conveyal.

We used the Transitland application programing interface to download GTFS feeds from stable URLs. GTFS data can be downloaded directly from URLs provided by agencies, but using Transitland as an intermediary allowed more consistent server performance and ensured that downloaded feeds had been pre-validated.

We used ArcGIS Pro to develop the map in this report.

Land use context classifications dataset

As we described previously (see Land use context classifications) we used a data set that's currently in development at WSDOT and available only internally in a prototype form as a key part of our aggregation of statewide results. This land use context classification data set defines the land use context classification of each Census block in the state, using different attributes of those blocks. WSDOT is currently developing this data primarily for the purpose of developing an approach to defining multimodal level of service standards for highways of statewide significance. We describe reasons for using this in development data set in previous sections. In this section, we'll provide some detail on how this data is computed and how we interpreted it in this study.

The approach developed by WSDOT defines eight different land use contexts. These contexts are calculated using Census, roadway, city boundary, and parcel-level land use data where available. Additionally, each census block is assigned a binary "rural" flag if it is in an area surrounded by Rural or Natural land use types that includes no Urban, Urban Center, or Urban Core blocks. This is done to identify "islands" of Suburban land use that are not on the fringe of an Urban Area, but rather, moderate density areas that are the center of small rural communities.

For our analysis, we combined the eight land use contexts, considering the rural flag, into four, according to the table below, which also describes the definitions used to calculate all the original eight categories.

Category in original system	Intersection density*	Population + job density	Land use proportion	City size	Category for this report
Natural	Less than 20 intersections per square mile.	Less than 2 people and jobs per acre.	There is more undeveloped land than residential, commercial, and agricultural land combined.	N/A	N/A – included in total statewide calculations
Rural general	Less than 20 intersections per square mile.	Less than 2 people and jobs per acre.	There is more residential, commercial, and agricultural land combined than undeveloped land, or at least 20% of the block is residential or commercial.	N/A	Rural
Suburban residential	At least 20 but less than 100 intersections per square mile.	Less than 10 jobs and people per acre.	No more than 12% of the block is commercial land use and more residential land use than commercial.	N/A	Rural if rural flag = true; Suburban if rural flag = false
Suburban commercial	At least 20 but less than 100 intersections per square mile.	Less than 10 jobs and people per acre.	More commercial land use than residential in the block, or at least 12% of the block is commercial land use.	N/A	Rural if rural flag = true; Suburban if rural flag = false
Rural town center	100 or more intersections per square mile.	No minimum density requirement.	No land use requirements but surrounded by rural land.	At least 0.25 miles from urbanized areas of 10,000 people or more.	Rural
Urban general	100 or more intersections per square mile.†	10 or more people and jobs per acre, but no more than 40 people and jobs per acre.	No land use requirements.‡	N/A	Urban

Category in original system	Intersection density*	Population + job density	Land use proportion	City size	Category for this report
Urban center	100 or more intersections per square mile.†	40 or more people and jobs per acre, but no more than 30 people and 45 jobs per acre.	No land use requirements.	N/A	Urban
Urban core	100 or more intersections per square mile.†	More than 30 people and 45 jobs per acre, or more than 150 people and jobs per acre.	No land use requirements.	N/A	Urban Core

Table notes:

* Each block is buffered by 0.25 miles, then the density of intersections is measured within that area.

† If the density of people and jobs per acre is at least 30,intersection density is ignored.

‡ Major college campuses are assigned to Urban General.

List of technical advisory group members

The following organizations had members in our technical advisory group. We offered all members of the WSDOT Statewide Public Transportation Plan industry advisory group and community advisory group the ability to participate, along with sending additional invites to academic and state government organizations not included in those groups.

All members of the technical advisory group were involved in discussions about the design of our approach and given opportunities to provide feedback. WSDOT made all final decisions incorporating that feedback based on our discretion and to the best of our abilities.

- Community Health of Central Washington
- Kitsap Transit
- Front and Centered
- Link Transit
- People for People
- Puget Sound Regional Council
- South Fork Valley Community Association
- Spokane Regional Transportation Council

- Spokane Regional Health District
- Spokane Transit Authority
- Transportation Choices Coalition
- Unidos Nueva Alianza
- University of Washington College of Built Environments
- University of Washington Taskar Center for Accessible Technology
- Valley Transit
- Vietnamese Community of Clark County
- Washington Department of Commerce
- Washington Department of Health
- Whatcom County Health and Community Services

English

Title VI Notice to Public

It is the Washington State Department of Transportation's (WSDOT) policy to assure that no person shall, on the grounds of race, color, national origin, as provided by Title VI of the Civil Rights Act of 1964, be excluded from participation in, be denied the benefits of, or be otherwise discriminated against under any of its programs and activities. Any person who believes his/her Title VI protection has been violated, may file a complaint with WSDOT's Office of Equity and Civil Rights (OECR). For additional information regarding Title VI complaint procedures and/or information regarding our non-discrimination obligations, please contact OECR's Title VI Coordinator at (360) 705-7090.

Americans with Disabilities Act (ADA) Information

This material can be made available in an alternate format by emailing the Office of Equity and Civil Rights at wsdotada@wsdot.wa.gov or by calling toll free, 855-362-4ADA(4232). Persons who are deaf or hard of hearing may make a request by calling the Washington State Relay at 711.

Español

Notificación de Titulo VI al Público

La política del Departamento de Transporte del Estado de Washington (Washington State Department of Transportation, WSDOT) es garantizar que ninguna persona, por motivos de raza, color u origen nacional, según lo dispuesto en el Título VI de la Ley de Derechos Civiles de 1964, sea excluida de la participación, se le nieguen los beneficios o se le discrimine de otro modo en cualquiera de sus programas y actividades. Cualquier persona que considere que se ha violado su protección del Título VI puede presentar una queja ante la Oficina de Equidad y Derechos Civiles (Office of Equity and Civil Rights, OECR) del WSDOT. Para obtener más información sobre los procedimientos de queja del Título VI o información sobre nuestras obligaciones contra la discriminación, comuníquese con el coordinador del Título VI de la OECR al (360) 705-7090.

Información de la Ley sobre Estadounidenses con Discapacidades (ADA, por sus siglas en inglés)

Este material puede estar disponible en un formato alternativo al enviar un correo electrónico a la Oficina de Equidad y Derechos Civiles a wsdotada@wsdot.wa.gov o llamando a la línea sin cargo 855-362-4ADA(4232). Personas sordas o con discapacidad auditiva pueden solicitar la misma información llamando al Washington State Relay al 711.

한국어-Korean

제6조 관련 공지사항

워싱턴 주 교통부(WSDOT)는 1964년 민권법 타이틀 VI 규정에 따라, 누구도 인종, 피부색 또는 출신 국가를 근거로 본 부서의 모든 프로그램 및 활동에 대한 참여가 배제되거나 혜택이 거부되거나, 또는 달리 차별받지 않도록 하는 것을 정책으로 하고 있습니다. 타이틀 VI에 따른 그/그녀에 대한 보호 조항이 위반되었다고 생각된다면 누구든지 WSDOT의 평등 및 민권 사무국(OECR)에 민원을 제기할 수 있습니다. 타이틀 VI에 따른 민원 처리 절차에 관한 보다 자세한 정보 및/또는 본 부서의 차별금지 의무에 관한 정보를 원하신다면, (360) 705-7090으로 OECR의 타이틀 VI 담당자에게 연락해주십시오.

미국 장애인법(ADA) 정보

본 자료는 또한 평등 및 민권 사무국에 이메일 wsdotada@wsdot.wa.gov_을 보내시거나 무료 전화 855-362-4ADA(4232)로 연락하셔서 대체 형식으로 받아보실 수 있습니다. 청각장애인은 워싱턴주 중계 711로 전화하여 요청하실 수 있습니다.

русский-Russian

Раздел VI Общественное заявление

Политика Департамента транспорта штата Вашингтон (WSDOT) заключается в том, чтобы исключить любые случаи дискриминации по признаку расы, цвета кожи, или национального происхождения, как это предусмотрено разделом VI Закона о Гражданских Правах 1964 года, а также случаи недопущения участия, лишения льгот, или другие формы дискриминации в рамках любой из своих программ и мероприятий. Любое лицо, которое считает, что его средства защиты в рамках раздела VI были нарушены, может подать жалобу в Ведомство по вопросам равенства и гражданских прав WSDOT (OECR). Для дополнительной информации о процедуре подачи жалобы на несоблюдение требований раздела VI, а также получения информации о наших обязательствах по борьбе с дискриминацией, пожалуйста свяжитесь с координатором OECR по разделу VI по телефону (360) 705-7090.

Закон США о защите прав граждан с ограниченными возможностями (ADA)

Эту информацию можно получить в альтернативном формате, отправив электронное письмо в Ведомство по вопросам равенства и гражданских прав по адресу wsdotada@wsdot.wa.gov или позвонив по бесплатному телефону 855-362-4ADA(4232). Глухие и слабослышащие лица могут сделать запрос, позвонив в специальную диспетчерскую службу штата Вашингтон по номеру 711.

tiếng Việt-Vietnamese

Thông báo Khoản VI dành cho công chúng

Chính sách của Sở Giao Thông Vận Tải Tiểu Bang Washington (WSDOT) là bảo đảm không để cho ai bị loại khỏi sự tham gia, bị từ khước quyền lợi, hoặc bị kỳ thị trong bất cứ chương trình hay hoạt động nào vì lý do chủng tộc, màu da, hoặc nguồn gốc quốc gia, theo như quy định trong Mục VI của Đạo Luật Dân Quyền năm 1964. Bất cứ ai tin rằng quyền bảo vệ trong Mục VI của họ bị vi phạm, đều có thể nộp đơn khiếu nại cho Văn Phòng Bảo Vệ Dân Quyền và Bình Đẳng (OECR) của WSDOT. Muốn biết thêm chi tiết liên quan đến thủ tục khiếu nại Mục VI và/hoặc chi tiết liên quan đến trách nhiệm không kỳ thị của chúng tôi, xin liên lạc với Phối Trí Viên Mục VI của OECR số (360) 705-7090.

Thông tin về Đạo luật Người Mỹ tàn tật (Americans with Disabilities Act, ADA)

Tài liệu này có thể thực hiện bằng một hình thức khác bằng cách email cho Văn Phòng Bảo Vệ Dân Quyền và Bình Đẳng wsdotada@wsdot.wa.gov hoặc gọi điện thoại miễn phí số, 855-362- 4ADA(4232). Người điếc hoặc khiếm thính có thể yêu cầu bằng cách gọi cho Dịch vụ Tiếp âm Tiểu bang Washington theo số 711.

Arabic - العَرَبِيّة

في ضمان عدم استبعاد أي شخص، على أساس العرق أو اللون أو االصل (WSDOT) إشعار للجمهور تتمثل سياسة وزارة النقل في والية واشنطن 6العنوان القومي من المشاركة في أي من برامجها وأنشطتها أو الحرمان من الفوائد المتاحة بموجبها أو التعرض للتمييز فيها بخالف ذلك، كما هو منصوص عليه في الباب ويمكن ألي شخص يعتقد أنه تم انتهاك حقوقه التي يكفلها الباب السادس تقديم شكوى إلى مكتب المساواة والحقوق 1964.السادس من قانون الحقوق المدنية لعام أو بشأن التزاماتنا بعدم التمييز بموجب الباب / للحصول على معلومات إضافية بشأن إجراءات الشكاوى و. التابع لوزارة النقل في والية واشنطن(OECR)المدنية السادس، يرجى االتصال بمنسق الباب
السادس في مكتب المساواة والحقوق المدنية على الرقم 7090-705 (360).

معلومات قانون االمريكيين ذوي اإلعاقة (ADA)

أو عن wsdotada@wsdot.wa.govيمكن توفير هذه المواد في تنسيق بديل عن طريق إرسال رسالة بريد إلكتروني إلى مكتب المساواة والحقوق المدنية على يمكن لألشخاص(4232) 855-362-4ADA :طريق االتصال بالرقم المجاني
على الرقم Washington State Relayالصم أو ضعاف السمع تقديم طلب عن طريق االتصال بخدمة 711.

中文 – Chinese

《权利法案》Title VI公告

<華盛頓州交通部(WSDOT)政策規定，按照《1964　　年民權法案》第六篇規定，確保無人因種族、膚色或國籍而被排除在WSDOT任何計畫和活動之外，被剝奪相關權益或以其他方式遭到歧視。如任何人認為其第六篇保護權益遭到侵犯，則可向WSDOT的公平和民權辦公室(OECR)提交投訴。如需關於第六篇投訴程式的更多資訊和/或關於我們非歧視義務的資訊，請聯絡OECR的第六篇協調員，電話 (360) 705-7090。

《美国残疾人法案》(ADA)信息

可向公平和民權辦公室發送電子郵件wsdotada@wsdot.wa.gov或撥打免費電話

855-362-4ADA(4232)，以其他格式獲取此資料。听力丧失或听觉障碍人士可拨打711联系Washington州转接站。

Af-soomaaliga – Somali

Ciwaanka VI Ogeysiiska Dadweynaha

Waa siyaasada Waaxda Gaadiidka Gobolka Washington (WSDOT) in la xaqiijiyo in aan qofna, ayadoo la cuskanaayo sababo la xariira isir, midab, ama wadanku kasoo jeedo, sida ku qoran Title VI (Qodobka VI) ee Sharciga Xaquuqda Madaniga ah ah oo soo baxay 1964, laga saarin ka qaybgalka, loo diidin faa'iidooyinka, ama si kale loogu takoorin barnaamijyadeeda iyo shaqooyinkeeda. Qof kasta oo aaminsan in difaaciisa Title VI la jebiyay, ayaa cabasho u gudbin kara Xafiiska Sinaanta iyo Xaquuqda Madaniga ah (OECR) ee WSDOT. Si aad u hesho xog dheeraad ah oo ku saabsan hanaannada cabashada Title VI iyo/ama xogta la xariirta waajibaadkeena ka caagan takoorka, fadlan la xariir Iskuduwaha Title VI ee OECR oo aad ka wacayso (360) 705-7090.

Macluumaadka Xeerka Naafada Marykanka (ADA)

Agabkaan ayaad ku heli kartaa qaab kale adoo iimeel u diraaya Xafiiska Sinaanta iyo Xaquuqda Madaniga ah oo aad ka helayso wsdotada@wsdot.wa.gov ama adoo wacaaya laynka bilaashka ah, 855-362-4ADA(4232). Dadka naafada maqalka ama maqalku ku adag yahay waxay ku codsan karaan wicitaanka Adeega Gudbinta Gobolka Washington 711.

Translation Services

If you have difficulty understanding English, you may, free of charge, request language assistance services by calling 360-705-7921 or email us at: PubTrans@wsdot.wa.gov

Español - Spanish

Servicios de traducción

Aviso a personas con dominio limitado del idioma inglés: Si usted tiene alguna dificultad en entender el idioma inglés, puede, sin costo alguno, solicitar asistencia lingüística con respecto a esta información llamando al 360-705-7921, o envíe un mensaje de correo electrónico a: PubTrans@wsdot.wa.gov

tiếng Việt-Vietnamese

các dịch vụ dịch thuật

Nếu quý vị không hiểu tiếng Anh, quý vị có thể yêu cầu dịch vụ trợ giúp ngôn ngữ, miễn phí, bằng cách gọi số 360-705-7921 hoặc email cho chúng tôi tại: PubTrans@wsdot.wa.gov

한국어-**Korean**

번역 서비스

영어로 소통하는 것이 불편하시다면, 360-705-7921 으로 전화하시거나 다음 이메일로 연락하셔서 무료 언어 지원 서비스를 요청하실 수 있습니다: PubTrans@wsdot.wa.gov

русский-Russian

Услуги перевода

Если вам трудно понимать английский язык, вы можете запросить бесплатные языковые услуги, позвонив по телефону 360-705-7921 или написав нам на электронную почту: PubTrans@wsdot.wa.gov

Arabic - اَلْعَرَبِيَّةُ

الترجمة دمات خ

عن اللغوية المساعدة خدمات طلب نًا مجا فيمكنك ،الإنجليزية اللغة فهم في صعوبة تجد كنت إذا

الإلكتروني البريد عبر مراسلتنا أو 360-705-7921 بالرقم الاتصال يق طر:PubTrans@wsdot.wa.gov

Af-soomaaliga - Somali

Adeegyada Turjumaada

Haddii ay kugu adag tahay inaad fahamtid Ingiriisida, waxaad, bilaash, ku codsan kartaa adeegyada caawimada luuqada adoo wacaaya 360-705-7921 ama iimayl noogu soo dir: PubTrans@wsdot.wa.gov

中文 **– Chinese**

翻译服务

如果您难以理解英文，则请致电：360-705-7921，或给我们发送电子邮件：PubTrans@wsdot.wa.gov，请求获取免费语言援助服务。

Contact

Kurt Winner, Data Analyst
Kurt.Winner@wsdot.wa.gov