



# 82nd Avenue of Roses Implementation Plan

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**Oregon  
Department  
of Transportation**

## Acknowledgements



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# 82nd Avenue of Roses

## Making 82nd Avenue Safer, More Comfortable

82nd Avenue is home to the most diverse populations in the state of Oregon. Destinations like the Jade District and Montavilla are making 82nd Avenue a citywide attraction with restaurants, shopping, and services. The avenue is also a busy transportation corridor serving 20,000 to 30,000 vehicle trips each day, hosting one of the busiest bus routes in the region and providing a critical north-south connection. Grassroots community groups like the 82nd Avenue Improvement Coalition, Jade District, and Brentwood-Darlington Neighborhood Association are engaged in improving the corridor and asking for funding to support projects that advance their goals.

82nd Avenue is a challenging corridor with five lanes and only 72 feet of right-of-way including sidewalks. In some places, sidewalks are narrower than 6 feet and lack distinct curb separation from the street either due to driveways (used or not) or years of repaving projects without sidewalk reconstruction. In some places with new development, sidewalks are 12-15 feet, consistent with City standards. Many stretches of 82nd Avenue have frequent or wide driveways making navigation 82nd Avenue in a vehicle or on foot challenging. For pedestrians and cyclists, 82nd Avenue can feel like a barrier with infrequent protected crossings, narrow sidewalks, and no linear bike facility.

### 82nd Avenue at a Glance

**Roadway owner:** ODOT

**Width:** About 60 feet, not including sidewalks (width varies).

**Vehicle volumes (daily):** 20,000 north of Fremont Street, 22,000 to 27,000 from Fremont Street to Clatsop Street, near 30,000 at Johnson Creek Boulevard.

**Transit ridership:** 20,000 people get on or off a bus in the corridor on weekdays.

**Safety:** Based on City of Portland analysis, 82nd Avenue is one of the top 30 high-crash streets in the city for pedestrians, bicycles, and motor vehicles. More crashes occur on the segment from SE Clinton Street to SE Schiller Street than any other similar length segment in the corridor.

**Sidewalks:** Most of the corridor has a sidewalk, but it is as narrow as 3 feet in some areas; a few areas have no sidewalk at all.

**Demographics:** 82nd Avenue is home to one of the most diverse populations in the region; the census tract around 82nd Avenue and Powell Boulevard is the most diverse in the state.

## What is the 82nd Avenue of Roses Implementation Plan?



82nd Avenue has been the focus of many visioning projects and studies over the past 10 years. The community desires expressed through these projects are an important touchpoint, but, in some cases, may take years to fully implement. Funding for improvements on 82nd Avenue is uncertain. While currently little funding is identified for 82nd Avenue, the Oregon Department of Transportation (ODOT) has a growing record of success with obtaining regional competitive funding for specific projects.

For this reason, this 82nd Avenue of Roses Implementation Plan

(Implementation Plan) took a different approach. Instead of developing a long-term vision, the Implementation Plan focuses on identifying how ODOT should invest in the corridor depending on how much funding is available. Because this is an implementation plan, it focuses on what can be achieved with smaller investments that build toward community goals and do not preclude broader changes in the future. To further refine the Implementation Plan, it recommends investments in four focus areas that represent development typologies and provide lessons for the entire corridor.

While 82nd Avenue is an ODOT facility, many agencies have an interest in the corridor. The Implementation Plan looks at how investments by corridor partners—City of Portland, Tri-County Metropolitan Transportation District of Oregon (TriMet), Clackamas County, Portland Public Schools—can be leveraged to achieve community goals.

The Implementation Plan focuses on the 6 miles from NE Killingsworth Street to SE Johnson Creek Boulevard. The area north of SE Clatsop Street is in the city of Portland; the area south is in unincorporated Clackamas County.

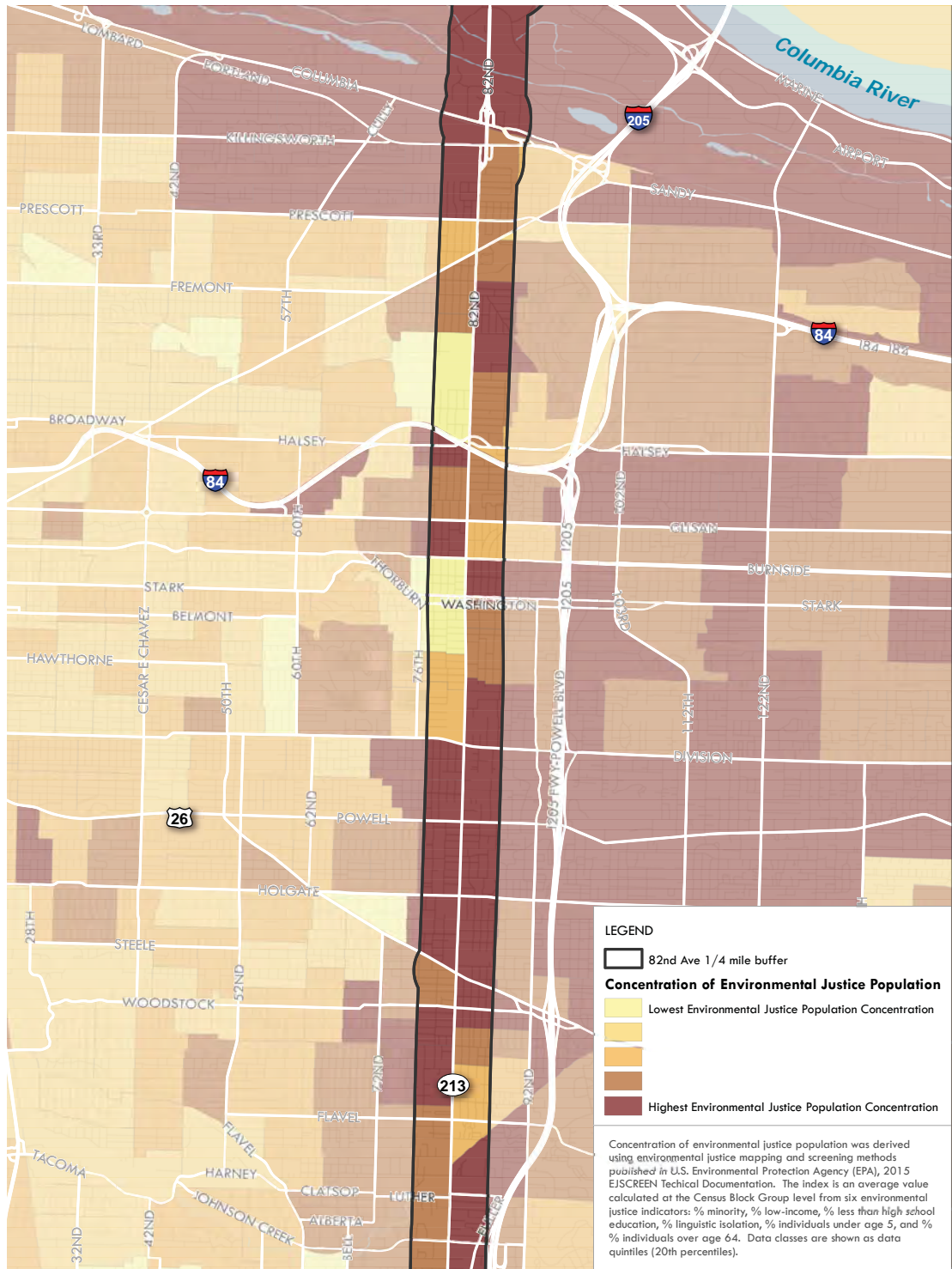
Beyond the project investment scenarios, the Implementation Plan includes two topical studies to respond to community interest in specific topics that could impact the long-term future of 82nd Avenue. These studies do not make recommendations but are intended to inform future discussions related to:

- **Jurisdictional transfer**—The community had questions about the conditions under which jurisdictional transfer of 82nd Avenue from ODOT to the City of Portland might occur. While neither party has initiated conversations about transfer, the Implementation Plan includes a technical memorandum that reviews case studies and state guidance on a jurisdictional transfer to serve as a resource for community members.
- **Cross-section design**—Community members have expressed different visions for the ultimate design of 82nd Avenue with many opinions about how right-of-way should be allocated. The Implementation Plan includes six cross-section plans that show different ways of accommodating vehicles, pedestrians, and cyclists both within and beyond the existing right-of-way constraints.

## 82nd Avenue in Context

82nd Avenue is a five-lane arterial that functions both as a major north-south artery and a community main street in the region’s geographic center. The north-south corridor provides access to jobs, retail, recreation, and education—Madison High School, Vestal Elementary School and Portland Community College are located on 82nd Avenue. 82nd Avenue is home to some of the region and state’s most diverse populations, including high concentrations of environmental justice populations as shown in Figure 1. Recognizing that 82nd Avenue serves many historically underserved communities, the equity lens creates greater urgency for making improvements.

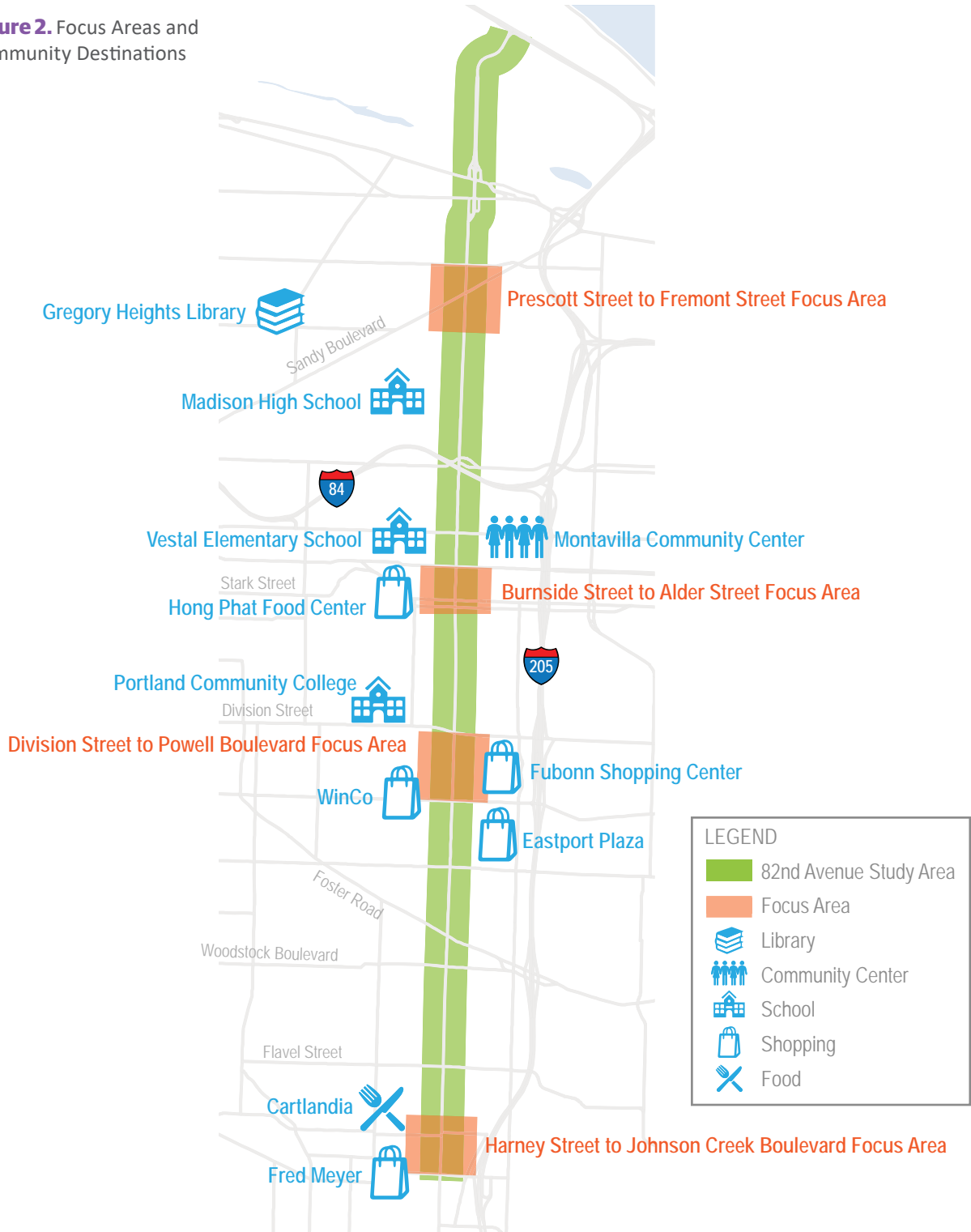
**Figure 1.**  
Environmental  
Justice Populations



## Focus Areas and Funding Scenarios

The Implementation Plan recommends improvements in the four focus areas shown on Figure 2. The focus areas represent development typologies that exist elsewhere in the corridor. Focus area improvements could provide lessons for other areas with similar characteristics.

**Figure 2.** Focus Areas and Community Destinations





### Prescott Street to Fremont Street

This focus area represents a residential typology along 82nd Avenue. Traffic volumes are lower than in other areas of the corridor, but the segment has a disproportionately high number of crashes (2014 data). The area is in the Roseway City of Portland 2035 Comprehensive Plan (Comprehensive Plan) Center, which could encourage higher densities and redevelopment.



### Burnside Street to Alder Street

This focus area is in the Montavilla Neighborhood and includes the emerging commercial nodes at Stark and Washington Streets. The area is within the Montavilla Comprehensive Plan Center, which includes provisions for higher density development. The focus area represents a town center typology.



### Division Street to Powell Boulevard

This focus area includes culturally specific community destinations in the Jade District, as well as intersections with busy east-west arterials at Powell Boulevard and Division Street. The busiest bus stops in the corridor are in this focus area. Redevelopment activities in the area will likely increase multimodal activity and drive greater demand for pedestrian and transit infrastructure. This focus area represents a town center typology. Last, the area is one of the most diverse areas of the corridor, region, and state.

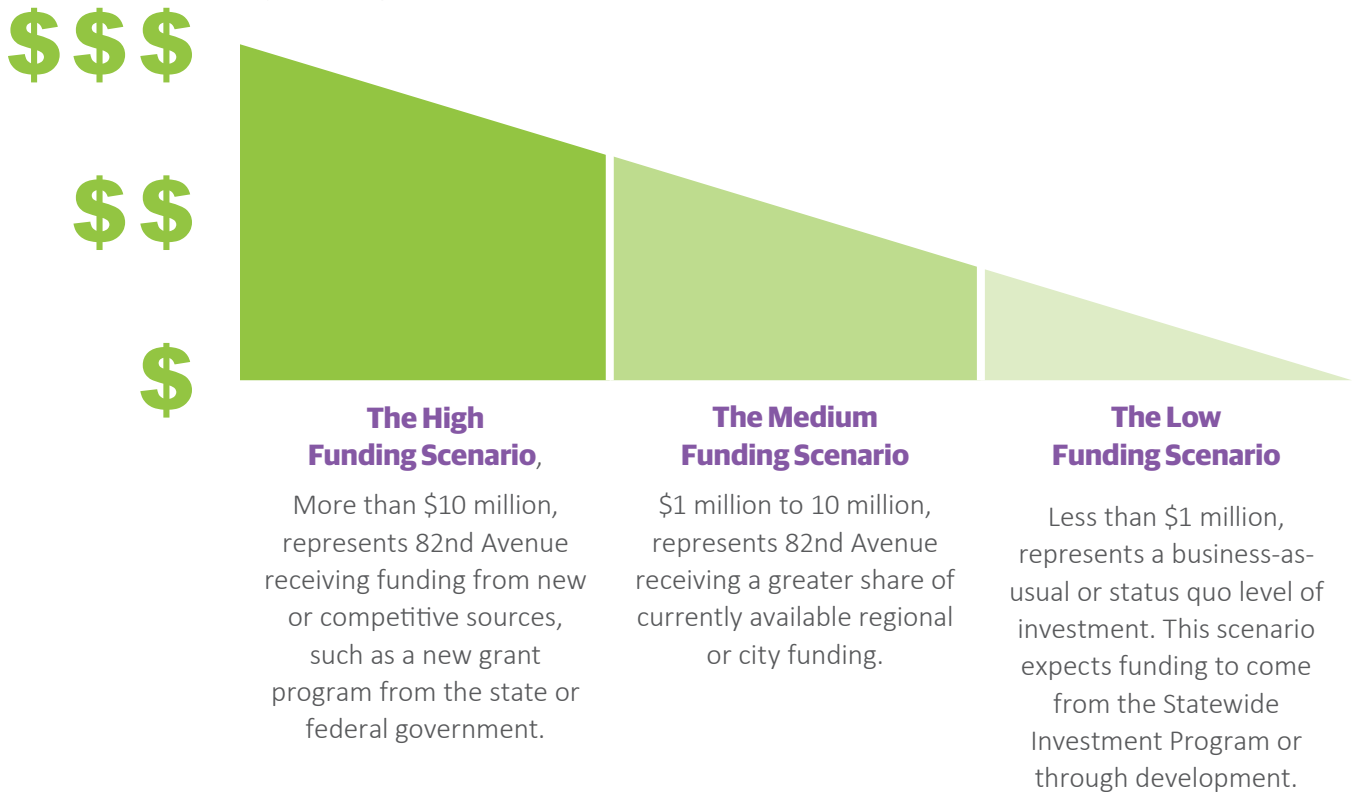


### Harney Street to Johnson Creek Boulevard

This focus area represents a suburban typology and includes community destinations at Fred Meyer and Cartlandia. The sidewalk network has many gaps, and most side streets do not have sidewalks. Bus stops are closely spaced because the lack of sidewalks creates difficult walking conditions for transit riders trying to access bus stops; this problem is especially acute for elderly riders or those relying on mobility devices.

## Implementation Plan Focus Areas

The Implementation Plan is organized around the following three funding scenarios representing different levels of annual investment in the corridor:



### 82nd Avenue Study: Understanding Barriers to Development

The Portland Bureau of Planning and Sustainability completed a concurrent study to gain an updated understanding of 82nd Avenue in the context of a new era of development and changes to the City’s 2035 Comprehensive Plan, raise the profile for opportunities for business and property development, and identify policy recommendations to address physical and social needs on the corridor.

The City conducted interviews with property owners, business owners, and community members, as well as market research to better understand barriers to redevelopment. This research indicated that access to capital, development experience, market conditions, and land use regulations are barriers. The research also found that the condition of the street itself—both the pedestrian environment and roadway condition—is a barrier to investment in the corridor.

The study includes recommendations to prioritize roadway safety and street connectivity, as well as a shift to nodal development and investments. The study identifies these emerging nodal areas: Jade District, Montavilla, Roseway/Madison South, Lents, and Brentwood-Darlington/South of Bybee. The identified nodes, except Lents, generally match the Implementation Plan’s focus areas. In nodes, the study recommends advancing place-making investments and either developing or advancing a “community-generated identity.”

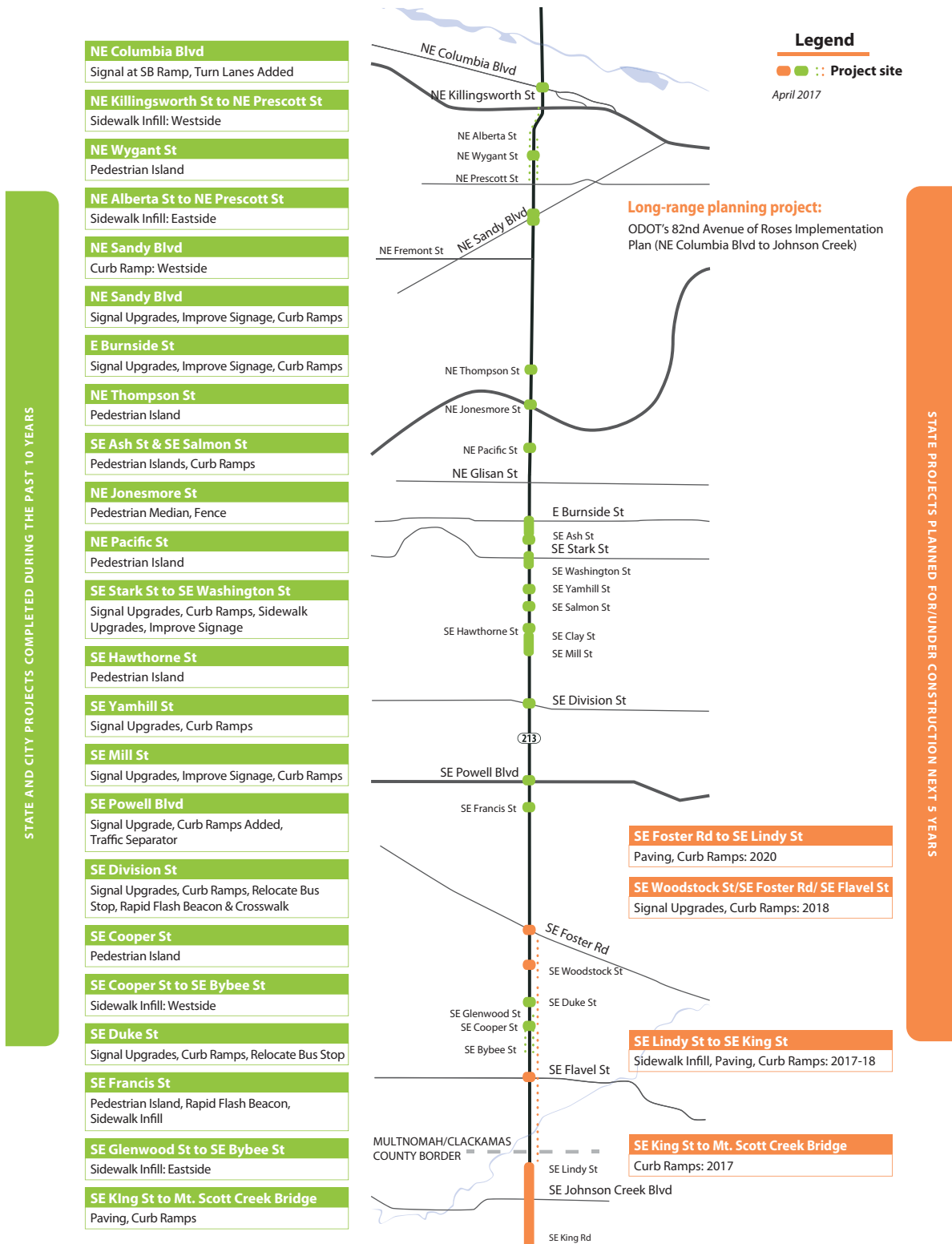
Learn more at <https://www.portlandoregon.gov/bps/72125>.



# Recent and Funded Investments in 82nd Avenue

During the past 10 years, ODOT and the City of Portland have invested more than \$35 million in 82nd Avenue. Projects have included sidewalk infill, signal upgrades, American with Disabilities Act (ADA) curb ramps, enhanced pedestrian crossings, and improved signage. ODOT has programmed funding for additional paving, signal upgrade, and curb ramp projects during the next 5 years. Recent and planned improvements are shown on Figure 3.

**Figure 3.** Planned and Recent Improvements to 82nd Avenue

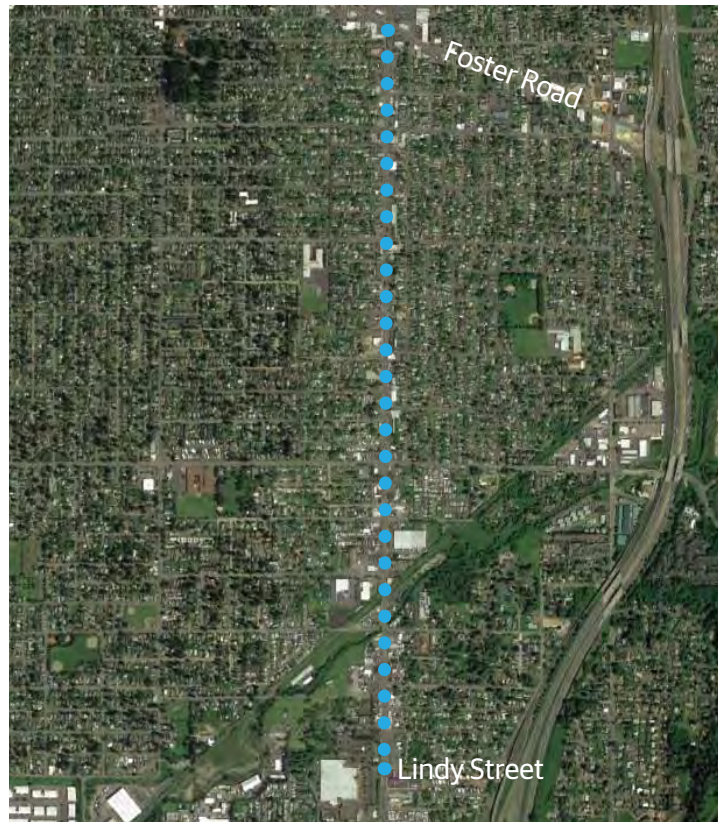


The City of Portland received Regional Flexible Funds (RFFA) for the Jade and Montavilla Connected Centers, and Safe Routes to Schools project in the Brentwood-Darlington neighborhood. Pending State Traffic Engineer approval, these projects will address specific community priorities:

- The Montavilla Connected Center project will construct a separated bike lane with physical protection on SE Washington Street from SE 72nd Avenue to SE 92nd Avenue. It will also reconfigure the left-turn movements from 82nd Avenue to the Stark/Washington couplet to reduce neighborhood cut-through traffic, particularly on SE Alder Street.
- The Jade Connected Center project will make improvements to the SE Woodward Street Neighborhood Greenway, including a crossing of 82nd Avenue by connecting the offset intersection of SE Tibbetts Street to SE Brooklyn Street or SE Woodward Street to SE Brooklyn Street with an enhanced crossing and a two-way bicycle path combined with sidewalk. The project will also improve SE Clinton Street and SE 85th Avenue.
- The Brentwood-Darlington Safe Routes to Schools project will infill sidewalks on SE Duke and SE Flavel Streets and add a neighborhood greenway on SE Knapp and Ogden Streets including a crossing of 82nd Avenue.

### SE Foster Road to SE Lindy Street Paving

ODOT will invest \$9.4 million to repave 82nd Avenue from SE Foster Road to SE Lindy Street. This project will add ADA ramps. It will be constructed in 2020.



# Corridorwide Needs and Aspirations

Through this Implementation Plan, ODOT identifies needs and aspirations that span the four focus areas to include the full length of 82nd Avenue. The corridorwide recommendations call for upgrading the roadway to provide for pedestrian safety and comfort.

## Pedestrian Safety, Comfort and Access for All

Pedestrian improvements are particularly important in this corridor because of 82nd Avenue’s dual roles as a north-south artery for transit, freight, and auto traffic and as a community main street where many people walk to reach transit, education, services, shopping, and recreation. The City of Portland’s Vision Zero process prioritized safety improvements—particularly pedestrian safety improvements—on corridors with high concentrations of Communities of Concern,<sup>1</sup> because people living in Communities of Concern may have fewer choices about how, when, and where they travel, putting them at higher risk as they move around.

Today, signalized pedestrian crossings on 82nd Avenue are as far as 0.5 mile apart. Community members desire more frequent enhanced crossings and more enhanced crossings near bus stops on 82nd Avenue. The City of Portland has committed some funding for enhanced pedestrian crossings, but meeting this goal will require additional investment and project approvals by the State Traffic Engineer. Signal timing changes such as leading pedestrian intervals or longer pedestrian crossing times are important to make 82nd Avenue accessible to a variety of users.

Sidewalks along 82nd Avenue range from a width of 14 feet to less than 3 feet. In some areas, space for a sidewalk exists but the sidewalk is not paved. In other areas, buildings are located too near the street to provide adequate sidewalk width. In many areas, narrow sidewalks cluttered with utility poles, street signs, and other obstructions create a difficult environment for pedestrians or people using mobility devices to navigate. As redevelopment occurs, the City of Portland will require property owners to construct 12-foot-wide sidewalks or 15-foot-wide sidewalks in Pedestrian Districts, consistent with City development code.

A combination of redevelopment and project investments will initiate and fund sidewalk infill and expansion along 82nd Avenue. Projects could construct infill sidewalk where gaps exist (ODOT defines a gap as places with a sidewalk that is less than 6 feet wide), increase sidewalk width beyond 6 feet, or address pavement quality. Figures 4 and 5 highlight sidewalk gaps.

### Fixing Our Streets

The City of Portland has allocated \$700,000 of Fixing Our Streets funding to constructing enhanced pedestrian crossings of 82nd Avenue.

1. Address gaps between signalized crossings in focus areas with crossings at:
  - Ash Street
  - Beech Street
2. Construct a crossing at Thompson Street to serve Madison High School.
3. Address gaps between signalized crossings outside of focus areas with crossings in as many of the following locations as possible:
  - Harrison Street
  - Salmon Street
  - Klickitat Street
  - Schuyler Street
  - Pacific Street

Learn more about Fixing Our Streets at [www.portlandoregon.gov/transportation/64188](http://www.portlandoregon.gov/transportation/64188).

1. “Communities of Concern” is a composite index of 10 equity indicators identified by TriMet, Portland’s regional transit provider: people of color, people with disabilities, low income households, youth, older adults, affordable housing, lower paying jobs, poor vehicle access, and access to services.

Today, the City of Portland requires a special setback of 45 feet from the center line of the roadway to create a 90-foot wide setback for future roadway and sidewalk enhancements. To achieve long-term community desires for a more pedestrian-friendly streetscape, the City of Portland could require a right-of-way dedication.

The City or County should look for opportunities to add pedestrian-scale street lighting to make walking along 82nd Avenue more comfortable. Street lighting that contributes to place-making is desirable, particularly in town centers. The community aspires to have pedestrian-scale lighting along the full corridor.



**Figure 4.** Sidewalk Gaps from Prescott Street to Sandy Boulevard



**Figure 5.** Sidewalk Gaps from Harney Street to Gray Street



*South of Stark Street, unused driveway extends for much of the block.*

### Maintenance Needs

ODOT has invested \$14 million in maintenance and signal improvements on 82nd Avenue over the past 10 years. Still, 82nd Avenue—like many roadways in the state—needs pavement maintenance and repair, as well as improved storm drainage. Where possible, ODOT should maintain the roadway including the stormwater system.

### Support Transit

Transit is a critical part of mobility in the 82nd Avenue corridor. Pedestrian crossing enhancements, ADA ramps and sidewalk connections near transit stops should be prioritized to ensure that people of all abilities can reach transit. Busy bus stops and transfer points (for example, Division Street and Powell Boulevard) are important places for wider sidewalks to provide more space for people to wait. Where possible, provide shelters at stops with 50 or more boardings. TriMet generally provides shelters where adequate right-of-way exists or where property owners are willing to host the shelter.

## Access Management

The corridor is rife with unused driveways with some blocks more driveway than curb. Frequent driveways can lead to congestion and safety issues for drivers and pedestrians. ODOT has initiated conversations with willing property owners to consolidate, narrow, or close driveways and will continue to this program as funding is available. As properties redevelop, ODOT and local jurisdictions will work toward current driveway spacing requirements.



*ODOT worked with the property owner to manage access at the former Chinese Village property.*

## Investment Strategies

### The Low Funding Scenario

**With business-as-usual funding, focus on small changes to improve environment for pedestrians.**

If ODOT continues to receive typical small funding allocations for 82nd Avenue, then the agency should focus on reducing width of and consolidating driveways to create a more comfortable environment for pedestrians and improve safety for pedestrians and drivers. ODOT should also rebuild sidewalks at unused driveways or where curb height does not meet ODOT’s design standards.

	Improvement	Location	Cost
1A	Coordinate with property owners to reconstruct curb where driveways are no longer used	Throughout corridor	\$10,000 to \$15,000 per driveway
1B	Rebuild curb where curb height does not meet standards	Throughout corridor	\$25,000 per property
1C	Coordinate with property owners to consolidate driveways	Throughout corridor	\$25,000 per driveway
1D	Coordinate with property owners to reduce driveway width	Throughout corridor	\$10,000 to \$15,000 per driveway

## The Medium Funding Scenario

With a little more investment, make bigger improvements for pedestrians.

If ODOT identifies more funding for 82nd Avenue, then the agency could build, reconstruct, and widen sidewalks to a minimum of 6 feet throughout the corridor. This could require sidewalk projects in the Prescott Street to Fremont Street and Harney Street to Johnson Creek Boulevard focus areas; sidewalks in the other focus areas are already at least 6 feet. ODOT may prioritize areas without sidewalks and areas that serve bus stops. Sidewalk construction could require purchasing right-of-way or narrowing travel lanes to avoid impacts to buildings.

The area around Luther and Clatsop Streets, which forms an offset intersection, is particularly challenging for pedestrians with a very narrow sidewalk on the east side of 82nd Avenue. The bus stop is currently difficult to access from the north due to the narrow sidewalk. Cyclists wanting to travel across 82nd Avenue do not have a clear path. This improvement bundle, illustrated in Figure 6, would include an improved sidewalk on the west side of 82nd Avenue, enhanced pedestrian crossing at Clatsop Street, and relocated bus stop, including a new bus pad, ADA ramps, and shelter.



**Figure 6.** Clatsop/Luther Crossing and Bus Stop Improvement

	Improvement	Location	Cost
2A	Reconstruct segments of sidewalk from 5 to 6 feet	Prescott Street to Mason Street, east	\$78,000 (excluding right-of-way)
2B	Reconstruct segments of sidewalk from 5 to 6 feet	Prescott Street to Mason Street, west	\$87,600 (excluding right-of-way)
2C	Reconstruct segments of sidewalk from 5 to 6 feet	Milton Street to Fremont Street, east	\$15,600 (excluding right-of-way)
2D	Reconstruct segments of sidewalk from 3 or 4 to 6 feet	Harney Street to Luther Street, east	\$90,000 (excluding right-of-way)
2E	Reconstruct segments of sidewalk from 4 or 5 to 6 feet	Harney Street to Clatsop Street, west	\$85,200 (excluding right-of-way)
2F	Construct a 6 foot sidewalk	Luther Street to Gray Street, east	\$11,400 (excluding right-of-way)
2G	Reconstruct segments of sidewalk from 5 to 6 feet	Cornwell Street to Gray Street, east	\$28,800 (excluding right-of-way)
2H	Construct 6 foot sidewalk	North of Cornwell Street, west	\$10,800 (excluding right-of-way)
2I	Construct 6 foot sidewalk	Cornwell Street to Lindy Street, east <sup>a</sup>	\$44,400 (excluding right-of-way)
2J	Luther Street/Clatsop Street Improvement Bundle: ADA ramps, enhanced pedestrian crossing, bus stop improvements, sidewalk improvements	Clatsop Street to Luther Street	\$1 million

<sup>a</sup> Sidewalk included in programmed Foster Road to Lindy Street paving project.

## The High Funding Scenario

With even more funding, make corridorwide upgrades to support community vision for 82nd Avenue: more frequent pedestrian crossings, upgraded sidewalks, repaving, and place-making elements appropriate to the development type in each area of the corridor.







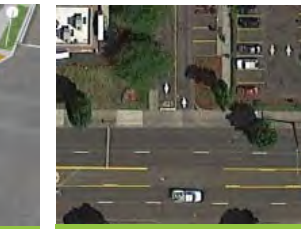
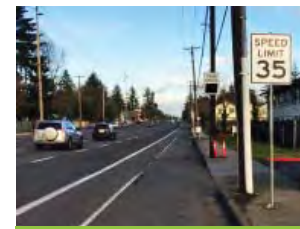
Within the existing 72-foot street right-of-way (60-foot curb-to-curb), ODOT could move toward the cross-section shown in Figure 7, while bringing the entire corridor to a state of good repair. This could include repaving the street and adding a median treatment in place of the turn lane where possible.

To improve the pedestrian environment, ODOT could also take the following actions:

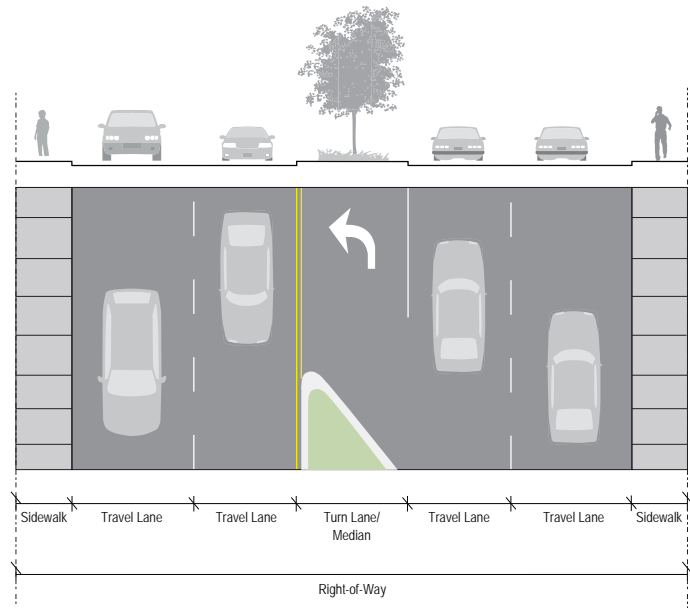
- Reconstruct all sidewalks to a minimum of 6 feet both inside and outside of the focus areas; as development occurs, the City would require developers to reconstruct sidewalks to City standards (15 feet in pedestrian districts and 12 feet elsewhere).
- Consolidate driveways either with redevelopment or with the agreement of property owners.
- Coordinate with the City to add pedestrian-scale street lighting, street furniture, and other enhancements.

82nd Avenue has several distinct development typologies, including town center (for example, Montavilla and Jade Districts), residential (for example, north of Sandy Boulevard), and suburban (for example, near Johnson Creek Boulevard). Within each development typology, different place-making treatments might be appropriate as shown in Figure 8 below.

**Figure 8.** Typology Options

 <p>Landscaped medians for short segments</p> <p>✓ All typologies</p>	 <p>Sidewalks that meet ODOT standards</p> <p>✓ All typologies</p>	 <p>Enhanced crossings with refuge islands</p> <p>✓ All typologies</p>	 <p>East-west bicycle wayfinding</p> <p>✓ All typologies</p>
 <p>Street trees/furniture</p> <p>✓ Town center typologies</p>	 <p>Curb bulb outs on side streets</p> <p>✓ Town center and residential</p>	 <p>Consolidate driveways</p> <p>✓ Town center typologies</p>	 <p>Design features to reduce speeds, reduce posted speed limit</p> <p>✓ Town center typologies</p>

All cross sections are subject to state traffic engineer approval and features such as trees in the median require design exceptions.



**Figure 7.** Possible Cross-Section Features

## Public Outreach and Decision-Making Process



CAC members identify project needs.



Walking tour participants in Jade District.

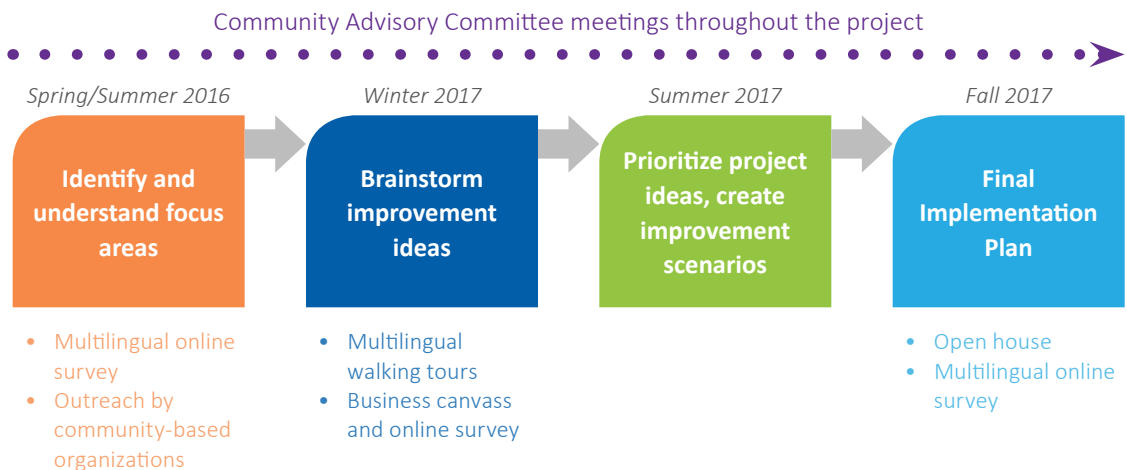
Community members were involved with each step of the process—from identifying focus areas to developing improvement strategies, as shown in Figure 9. In all cases, outreach was conducted in English, Spanish, Vietnamese, Russian, and Mandarin. Public outreach activities included the following:

- A Community Advisory Committee that met eight times during the planning process and endorsed the improvement scenarios.
- Multilingual community walks in each focus area. From the walks, staff compiled ideas about problems and potential solutions in each focus area.
- Canvassing by paid representatives of community-based organizations in each focus area to gather input about needs and solutions in each focus area.
- Three online surveys to inform the planning process. Paid representatives of community-based organizations translated the surveys and collected responses from Spanish, Russian, Vietnamese, and Mandarin speakers.

In addition, ODOT met with a Technical Advisory Committee (TAC) five times during the planning process. The TAC included representatives from institutions and agencies with an interest in 82nd Avenue, including the City of Portland, Clackamas County, Port of Portland, Portland Public Schools, Metro, TriMet, and Portland Development Commission.

Finally, a multiagency steering committee made collaborative recommendations during the process. Rian Windsheimer, ODOT Region 1 Manager; Neil McFarlane, TriMet General Manager; a City of Portland representative; State Representative Alissa Keny-Guyer, and State Senator Michael Dembrow were members of the Steering Committee.

**Figure 9.** Engagement Process





## Other Related Topics

ODOT and its partners prepared technical memorandums on two other topics of interest to elected officials and community members: (1) jurisdictional transfer of a segment of 82nd Avenue from ODOT to the City of Portland and (2) future possible roadway cross-sections. The Implementation Plan does not make recommendations on these topics, but the technical analysis provides a foundation for future community discussions.

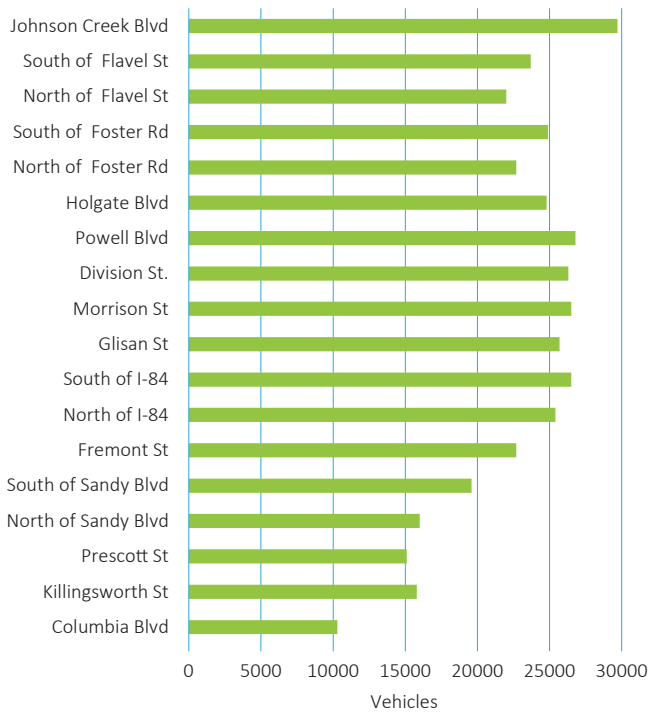
### Jurisdictional Transfer

Today, ODOT owns and operates 82nd Avenue. During project discussions, community members and stakeholders have discussed the potential advantages and disadvantages of transferring ownership of the full right-of-way from ODOT to the City of Portland. Some community members have a vision for 82nd Avenue that is like other facilities that have been transferred to local jurisdictions, with changes to streetscape, travel speeds, and pedestrian crossings that emphasize their role as community main streets. Jurisdictional transfer would require approvals from the State and City, typically through a negotiated process. Looking at other jurisdictional transfers in ODOT Region 1, transfers typically occurred when ODOT and the City of Portland could reach agreement on a combination of pretransfer projects to bring the roadway up to current design and maintenance standards.

### Possible Roadway Cross-Section Design

Today, 82nd Avenue is 60 feet wide from curb-to-curb with two travel lanes in each direction and a center turn lane. Sidewalks are present in most areas but are as narrow as 3 feet and obstructed by poles, sign posts, and other elements in some sections. In some areas with more recent development, sidewalks are 12 to 15 feet wide, consistent with City standards. ODOT, the City, and community stakeholders developed five additional cross-section options and rated each option based on how well each meets goals related to safety, mobility, place-making, and governance. The cross-section designs show curb-to-curb widths that range from 60 feet (current curb-to-curb width) to 78 feet. Total right-of-way ranges from 72 feet (generally consistent with current right-of-way) to 102 feet.





**Figure 10.** 2014 Average Annual Daily Traffic on 82nd Avenue (both directions)

Community members have raised questions about a “road diet” or repurposing travel lanes for other uses like bicycle lanes, sidewalks, or bus-only lanes. In the study area, 82nd Avenue carries 15,000 to 30,000<sup>2</sup> vehicles each day with all locations south of Sandy Boulevard carrying 20,000 or more vehicles each day, as shown in Figure 10. While neither the City of Portland or ODOT has an adopted policy that defines traffic volume thresholds for considering reducing the number of travel lanes, information from the Federal Highway Administration suggests that corridors carrying 20,000 or fewer vehicles per day are the best candidates for “road diets.”<sup>3</sup> Changing a five-lane roadway to a three-lane roadway in locations with more than 20,000 vehicles each day could result in significant increases in congestion and/or diversion to adjacent streets; thus, this change would require a detailed feasibility study to understand tradeoffs. Because traffic diversion is already an issue for adjacent neighborhoods, all cross-section configurations include two travel lanes in each direction.

2. 2014 Average Annual Daily Traffic, both directions  
 3. FHWA, Road Diet Informational Guide, [https://safety.fhwa.dot.gov/road\\_diets/guidance/info\\_guide/ch3.cfm#s335](https://safety.fhwa.dot.gov/road_diets/guidance/info_guide/ch3.cfm#s335)



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