

# Research Stage 1 Problem Statement

**PROPOSED TITLE:** Pedestrian Refuge Island Curb Design, Size & Traffic Control Device Placement Guidance

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## **1. Concisely describe the transportation issue (including problems, improvements, or untested solutions) that Oregon needs to research.**

Pedestrian refuge islands are a proven safety countermeasure intended to provide pedestrians with a safe waiting area in the middle of the road, allowing them to cross one direction of traffic at a time. They also provide a traffic calming effect to vehicles and warn drivers of the crossing area with both curb design and traffic control devices. As more pedestrian refuge islands have been installed in the last two decades, there are many locations that are struck often by vehicles, increasing pedestrian crash risk and significantly increasing maintenance costs of traffic control devices placed on the island. The AASHTO Green Book and MUTCD provide considerations for pedestrian refuge island design size and traffic control device placement for various roadway scenarios (speed, traffic volumes, geometry, etc.) but no specific recommendations for reducing vehicle strike risk while maximizing pedestrian safety. The purpose of this research proposal is to provide guidance to practitioners on optimal pedestrian refuge island design and delineation that balances both pedestrian and vehicle safety and maintenance costs.

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## **2. What final product or information needs to be produced to enable this research to be implemented?**

The final proposed product is a guidance document listing considerations for pedestrian refuge island design (curb design, size & traffic control device placement) for various roadway scenarios (speed, traffic volumes, geometry, access type, etc.) to reduce vehicle strike risk and maximize pedestrian safety. The final product will expand upon the existing guidance listed in the AASHTO A Policy on Geometric Design of Highways and Streets (2018) and 11<sup>th</sup> Edition MUTCD (2024).

The research effort will identify roadway risk factors that contribute to pedestrian refuge island strikes, considering both reported crash data, Claims Against Others (CAO) data and Maintenance logs. It will also collect an inventory on the existing pedestrian refuge island for both roadway design elements and traffic control devices.

Pedestrian refuge island design elements that should be reviewed and considered:

- Pedestrian refuge island size (length, width and height)
- Existing 6”-7” curb height standard and 8”- 9” maximum curb height option
- Bull nose island design at crossings at intersections
- Island delineation methods allowed in the MUTCD
- Sign and signal pole placements on the pedestrian refuge island and their delineation options

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**3. (Optional) Are there any individuals in Oregon who will be instrumental to the success of implementing any solution that is identified by this research? If so, please list them below.**

Name	Title	Email	Phone
Eric Leaming	ODOT State Traffic Investigations Engineer	Eric.S.LEAMING@odot.oregon.gov	971.304.4953
Kevin Haas	ODOT State Traffic Standards Engineer	Kevin.J.HAAS@odot.oregon.gov	503.986.3583
Taundra Mortensen	ODOT Senior ADA Standards Engineer	Taundra.L.MORTENSEN@odot.oregon.gov	503.400.4256
Bethany Veil	ODOT Senior Urban Design Engineer	Bethany.VEIL@odot.oregon.gov	503.586.8750

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**4. Other comments:**

**AASHTO A Policy on Geometric Design of Highways and Streets (2018) sections to reference:**

9.6.3.4 Refuge Islands

9.6.3.5 Island Size and Designation

9.6.3.6 Island Delineation and Approach Treatment

4.7.3 Curb Placement

4.17 PEDESTRIAN FACILITIES

**11<sup>th</sup> Edition MUTCD (2024) sections to reference:**

Section 2B.39 Keep Right and Keep Left Signs (R4-7 Series and R4-8 Series)

Section 2B.57 Pedestrian Crossing Signs (R9-2 and R9-3)

Section 2C.71 Object Markers for Obstructions within the Roadway

Section 3C.02 Application of Crosswalk Markings

Section 3I.02 Tubular Markers

Section 3J.06 Island Delineation

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## 5. State of Oregon Decision Making Lenses

State decision making lenses are a part of the state of Oregon's policy structure. State policy and federal policy are not always aligned. The state will prioritize research according to state policy, however ODOT may be required to skip prioritized proposals based on constraints placed on the use of federal funds. If state funds are available ODOT will attempt to fund prioritized research that is deemed ineligible for federal funding.

Please complete the following three sections. Your answers to these questions will be applied on a programmatic basis to support agency decisions. Answering yes to the questions below is not required. Resolving a narrowly focused technical research problem may meet agency needs without answering yes to any of the following questions. The ODOT Research Section will seek a balanced portfolio some projects will answer yes to one of the three categories below (e.g. climate, equity, and/ or safety) and other projects in a different category.

We are looking for an overall program balance and no one project is expected to balance all categories. Generally, a research problem statement is expected to be able to answer yes with clear and verifiable information in only one of the three categories below, some projects may be able to answer yes in two or even three categories. Some projects (i.e. needs focused on specific elements of infrastructure design), may have no 'yes' answers but may still be a high value research need.

### Climate

*Oregon recognizes the climate crisis and makes systemic changes to reduce emissions caused by travel. To that end, we seek research that reduces carbon emissions from construction activities and materials, and from maintenance equipment and operations. Oregon envisions a transportation system that is resilient, this means a system that is durable in the face of seismic events and extreme weather to avoid negative impacts, withstand them or bounce back quickly to resume system function. We seek research that improves the ability of the transportation system to adapt or cope with more frequent and extreme weather events. This may include innovations in data and data sharing, construction materials and project design, communication, emergency planning and response, and more. Similarly, we seek research that avoids negative impacts on key habitats and ecosystems that can buffer or reduce damage to infrastructure and improve environmental conditions for wildlife and native vegetation. For definitions and details please review the equity vision, goals, and objectives of the [ODOT Strategic Action Plan](#) and [Oregon Transportation Plan](#).*

5a. Will addressing the transportation issue identified as a need in Question 1 develop, or **validate methods for the estimation, measurement, or monitoring** of transportation generated greenhouse gases (GHG)?

☐Yes

☒No

☐Unsure

5b. If climate or GHG is not the focus of this **transportation issue** identified in this problem statement, will the research apply a GHG analysis to transportation infrastructure, planning, operations, maintenance, or materials?

☐Yes

☒No

☐Unsure

5c. Will addressing the **transportation issue** include development or testing of construction practices, methods, or materials to establish potential reductions in greenhouse gas emissions?

☐Yes☒No☐Unsure

5d. Will solving the **transportation issue** in question 1 study or support the reduction of vehicle miles traveled and single occupancy vehicle travel or support transition to electric vehicles (or other types of zero emission vehicles) or low-carbon alternative fuels?

☐Yes☒No☐Unsure

5e. Will the solving the **transportation issue** in question 1 lead to work that will support, measure, or monitor, transportation system resilience in response to expected climate events, effects, or natural disasters in general?

☐Yes☒No☐Unsure

5f. Will solving the **transportation issue** in question 1 lead to work that may result in better environmental conditions for wildlife and native vegetation?

☐Yes☒No☐Unsure

5g. If you answered yes to any of the climate questions above or can provide alternative details related to climate, please provide additional information:

N/A

### Equity

Equity can have many dimensions and impacts relating to communities and transportation. It is important that problem statement proposals clearly explain the equity dimensions or impacts being examined. Oregon commits to social equity in the OTP, specifically to improve access to safe and affordable transportation for all, recognizing the unmet mobility needs of people who have been systemically excluded and underserved. Create an equitable and transparent engagement and communications decision-making structure that builds public trust. We seek research that studies elements of this goal or applies analysis to specific transportation topics to ensure the resulting research recommendation is consistent with agency equity goals. For definitions and details please review the equity vision, goals, and objectives of the [ODOT Strategic Action Plan](#) and [Oregon Transportation Plan](#).

5h. Is the **transportation issue** identified as a need in Question 1 specifically focused on transportation equity?

☒Yes☐No☐Unsure

5i. If the **transportation issue** is not focused on transportation equity, will the primary topic be assessed for equity benefits or impacts within the research project?

☒Yes☐No☐Unsure

5j. Is the implementation of potential findings from this research likely to directly involve participation from an identified group that would benefit from an equitable process or outcome?

☒Yes☐No☐Unsure

5k. Is the intended final product or information expected to support ODOT's equity efforts (Including but not limited to supporting one of the equity related objectives of the [ODOT's Strategic Action Plan](#) or [Oregon Transportation Plan](#)) ?

☒Yes

☐No

☐Unsure

5l. If you answered yes to any of the equity questions above or can provide alternative details related to equity, please provide additional information:

The purpose of this research proposal is to add more data-driven elements for consideration of pedestrian refuge island design. A data-driven method supports equity by using evidence to objectively identify, understand, and address systemic disparities that may be overlooked in anecdotal observations. Additionally, it is equitable to continue to provide safe and reliable pedestrian facilities as accessible mobility options.

### Safety

Research outcomes may include interventions and countermeasures to prevent or reduce the frequency of crashes or other causes of transportation-related injury or death; or may include measures to reduce severity of injury (including prevention of death) after a crash or other injurious event. For definitions and details please review the equity vision, goals, and objectives of the [ODOT Strategic Action Plan](#), [Oregon Transportation Safety Action Plan](#) and [Oregon Transportation Plan](#).

5m. Will solving the **transportation issue** in question 1 support improving **safety culture** for either transportation workers or the traveling public?

☒Yes

☐No

☐Unsure

5n. Will the solving the **transportation issue** support improving safety through **healthy and livable communities**?

☒Yes

☐No

☐Unsure

5o. Will solving the **transportation issue** support improving safety through using **best available technologies**?

☒Yes

☐No

☐Unsure

5p. Will solving the **transportation issue** support improving safety through **communication and collaboration**?

☒Yes

☐No

☐Unsure

5q. Will solving the **transportation issue** support improving safety through **investing strategically**? 5r. If you answered yes to any of the safety questions above or can provide alternative details related to safety, please provide additional information:

Safety is the primary focus of this research proposal. Safety for vulnerable road users crossing a roadway and safety for vehicles encountering a fixed object in and around the roadway. ODOT's primary safety performance measure is to reduce actual and the risk of fatal and serious injury crashes on all roadways. Safety emphasis areas under this umbrella include reducing the risk of vulnerable road user crashes and reducing roadway departure crashes. A pedestrian refuge island is a FHWA proven safety countermeasure for vulnerable road users under certain design criteria & conditions but it is also a fixed object that a vehicle can strike in a roadway departure crash. Addressing and reducing these two crash risks is critical to the success of this proposed research study. Identifying the most cost-effective pedestrian refuge design for various roadway conditions will also allow ODOT to invest both STIP and maintenance funding strategically.

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## 6. Corresponding Submitter's Contact Information:

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## 7. ODOT Sponsor Contact Information (Required if Submitter is not an ODOT employee)

Name:	N/A
Title:	N/A
Crew Number:	N/A
Telephone:	N/A
Email:	N/A

This form is not a grant application or contract document. Please do not include proprietary information on this form. Once this form is received ODOT may revise and publish the problem statement. If selected, ODOT will assign investigator(s) of the department's choosing to conduct research.