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MEMORANDUM

Date:	January 19, 2021 Project #: 23021.006
To:	Kenneth Shonkwiler and Jessica Horning, Oregon Department of Transportation
From:	Matt Bell, Grace Carsky, and Camilla Dartnell, Kittelson & Associates, Inc.
Project:	Statewide Active Transportation Needs Inventory
Subject:	Final Evaluation Criteria

INTRODUCTION

The Oregon Department of Transportation (ODOT) is working to create safer, more walkable and bikeable networks in and between communities across the state, in alignment with the direction set out in the *Oregon Bicycle and Pedestrian Plan*. To understand the relative bicycle and pedestrian needs on each segment of state highway, the team is planning to evaluate each segment by applying a range of criteria. This memorandum, *Final Evaluation Criteria*, builds on the previous memorandum, *Draft Evaluation Criteria* and consists of the following sections:

- **Selected Factors and Evaluation Criteria** summarizes the factors and evaluation criteria ultimately selected for use in the statewide evaluation.

- **Stakeholder Feedback** summarizes input received from stakeholders at the May 20th Evaluation Criteria Workshop.

- **Final Evaluation Criteria Methodology** provides documentation of the methodology that will be used in the evaluation, noting areas that the methodology has evolved based on discussions and in-process findings.

Further background on applying the evaluation criteria and the relationship to the *Oregon Bicycle and Pedestrian Plan* are included in the *Draft Evaluation Criteria* memorandum, which included the following sections:

- **A Framework for Applying the Criteria** describes the framework of the evaluation and prioritization process for this project, drawn from national guidance.

- **Selecting Criteria** describes background on the recommended and potential criteria, including the connection the *Oregon Bicycle and Pedestrian Plan*, input from ODOT, and the already completed Regions 1, 4, and 5 ATNIs. It also provides a summary of recommended and potential criteria.

- **Evaluation Criteria Methodology** provides a more detailed description of each criterion, along with proposed data sources, methodology, and potential limitations.

- **Network Segmentation Methodology** discusses options for segmenting the ODOT highway network to conduct the evaluation criteria analysis.

- **Next Steps** summarizes the recommendations and next steps for the project team.

SELECTED FACTORS AND EVALUATION CRITERIA

As described in the *Draft Evaluation Criteria* memorandum, the evaluation process will roughly follow the framework from NCHRP 803: ActiveTrans Priority Tool (APT). The Active Transportation Needs Inventory (ATNI) will follow the methodology developed through this research and leverage the accompanying spreadsheet tool. The APT methodology is based on an extensive review of existing prioritization processes being used by agencies across the country at the state, regional, and local level. It uses a standard set of terms and definitions to describe the different steps in the process. The following definitions apply within the APT:

- **Factors** are the categories used to express community or agency values considered in the prioritization process and contain groups of variables with similar characteristics. The APT has selected nine primary factors commonly used by agencies across the country that are particularly suited for prioritization of active transportation needs. These factors align closely with some of the goals in the *Oregon Bicycle and Pedestrian Plan*.

- **Variables** (or evaluation criteria) are characteristics of roadways, households, neighborhood areas, and other features that can be measured, organized under each factor. "Variables" in the APT are synonymous with "evaluation criteria" in the terminology for the ATNI.

- **Scaling** is the process of making two variables comparable to one another (e.g., number of crashes vs. population density.)

- **Weights** are the numbers used to indicate the relative importance of different factors based on community or agency values. In order to increase transparency and legibility in the weighting step, weights are done on factors, NOT variables, which are often much more technical in nature.

To select prioritization factors and evaluation criteria, the project team reviewed NCHRP Report 803 (referenced above), the *Oregon Bicycle and Pedestrian Plan*, and the factors used in the Region 1, 4, and 5 ATNIs. As described in the following section, the project team also sought input from internal stakeholders from each of the Regions as well. Table 1 provides a summary of the selected factors and criteria, along with brief notes about each.

Table 1: Selected Statewide Evaluation Criteria

Factor	Evaluation Criterion	Statewide Goal	Urban or Rural Focus	Notes
Safety	Bicycle or pedestrian crash frequency	Strategy 1.1L; Strategy 8.2A	Both	This criterion will prioritize segments based on the frequency and severity of reported crashes involving pedestrians or bicyclists
	Bicycle or Pedestrian Risk Factors	Strategy 1.1L	Both, with more rural focus	This criterion will prioritize segments based on treatable risk factors associated with pedestrian or bicycle crashes
Connectivity	Bicycle Level of Traffic Stress	Strategy 1.1L	Both	This criterion will prioritize segments based on bicycle level of traffic stress, which rates the comfort of bicycle facilities from a user's perspective
	Fills a gap in an area surrounded by existing facilities	8.2A "Complete the System"	Both, with more urban focus	This criterion will prioritize smaller gaps in an otherwise complete system, to best leverage and connect the system that is already in place
Demand	Access to essential destinations	Strategy 1.3E; Goal 2; Goal 4	Both, with more urban focus	This criterion will prioritize segments that provide access to essential destinations (e.g. schools, parks, employment centers) on or near a State highway
	Access to transit	Strategy 1.3E; Goal 2; Goal 4	Both, with more urban focus	This criterion will prioritize segments that provide access to transit facilities on or near a State highway
	Bicycle Tourism Routes	Strategy 4.2C	Both, with more rural focus	This criterion will prioritize routes that are currently used as recreational/ touring routes and the key connections that are needed for these routes
Equity	Transportation disadvantaged communities	Strategy 2.4C; Strategy 5.3B Strategy 5.3D	Both	This criterion will prioritize segments located in or adjacent to census tracts that have relatively high concentrations of transportation disadvantaged communities
	Health	Strategy 6.1D; Strategy 6.1F	Both	This criterion will prioritize segments with a high respiratory hazard index
Stakeholder Input	Local Plan/ TSP Priorities	Goal 9 Coordination, Cooperation, and Collaboration	Both	This criterion will prioritize segments that have been previously identified through the planning efforts of a local jurisdiction
Existing Conditions	Presence of existing facility	Strategy 2.2B	Both	This criterion will prioritize locations with gaps or deficiencies in the existing pedestrian or bicycle facilities

STAKEHOLDER FEEDBACK

ODOT hosted an evaluation criteria workshop to gather feedback from internal stakeholders and to get input on the relative importance of each factor for consideration during the prioritization process. Among those who contributed were representatives from ODOT, including Active Transportation Liaisons from ODOT Regions 1-5. Their comments and input are summarized below.

Safety Factor

Safety was generally considered to be the most important factor among those who provided feedback. However, there was some concern about the **bicycle and pedestrian crash frequency** criteria and the data that would be used to support the evaluation. Based on the feedback, the data will include pedestrian and bicycle *involved* crashes and crashes where a pedestrian or bicycle was *present*. In addition, some respondents felt that **Bicycle Level of Traffic Stress (BLTS)** should be included with the connectivity factors, given how it is measured and what it means about the overall system. Therefore, BLTS was moved to the connectivity factor.

Connectivity Factor

Connectivity was also considered to be important, but most stakeholders did not support the use of the **distance between urban (or urban fringe) areas** criteria, which was subsequently removed. There was also some confusion on the methodology for the **fills a gap in an area surrounded by existing facilities** criteria and some question about the difference between the criteria and the **presence of existing facility** criteria. Others saw it as an important method for connecting the network that aligns well with local priorities to focus on bike and pedestrian infill projects. Ultimately the methodology remained, and the **presence of existing facility** criteria was moved into its own factor, existing conditions.

Demand Factor

Demand was also considered to be an important factor, but there was some concern about the methodology for the **access to destinations** and **access to transit** criteria and the distances used to determine if the destination/transit stop was on or near an ODOT facility. Others thought the distances should reflect Oregon Safe Routes to School (SRTS) measures. There were also some concerns about the use of Strava data to support evaluation of the **bicycle touring routes** criteria; however, the data was ultimately not available for the evaluation.

Equity Factor

The equity factor was also considered important and while there were few comments on the **transportation disadvantaged index** criteria, the **health** criteria drew some concern about the availability and consistency of statewide data to support the analysis.

Stakeholder Input Factor

Stakeholders input was considered important by some stakeholder because they felt it would lend community support for the project, but others were concerned that the name **in a local plan** could misrepresent the intent of the criteria. Therefore, the name was changes to **local plan/TSP priorities**.

Existing Conditions Factor

This factor and the proposed criterion were unclear to some stakeholder who thought that other factors like connectivity already address the issue. Therefore, the **presence of existing facility** criterion was moved to its own factor, existing conditions.

FINAL EVALUATION CRITERIA METHODOLOGY

The *Draft Evaluation Criteria Memorandum* outlined potential methodologies for each criterion under discussion. This section builds on that initial methodology documentation, incorporating adjustments or edits that have been discussed and implemented throughout the process of the evaluation.

Criterion	Bicycle or Pedestrian Crash Frequency
Factor	Safety
Description	This criterion looks at the severity-weighted frequency of crashes involving bicyclists or pedestrians occurring on the ODOT highway system over the past five years.
Data Needs	Most current five years of motor vehicle crash data from the ODOT Crash Analysis Reporting unit. Crash data needs to include all crashes where a pedestrian or bicyclists was involved or present.
Same method for pedestrian and bicycle?	The same methodology will be used for the bicycle and pedestrian analysis. However, the bicycle crash data will be used for the bicycle analysis and the pedestrian crash data will be used for the pedestrian analysis.
Proposed Methodology	ODOT's ARTS Program conducted pedestrian and bicycle Equivalent Property Damage Only (EPDO) safety analyses of all state and local roadways based on the frequency and severity of crashes. EPDO is one of 13 performance measures identified in the Highway Safety Manual and is applied independently to roadway intersections and segments. The equation used to develop the EPDO score is shown below: $$EPDO\ \ Index = W_K K + W_A A + W_B B + \ W_C C + P$$ where: $\quad$ W = Weighting Factor $\quad$ K = # of fatal crashes $\quad$ A = # of severe injury crashes (Class A) $\quad$ B = # of moderate injury crashes (Class B)

C = # of minor injury crashes (Class C)

P = # of property damage only crashes (PDO)

The weighting factors used are consistent with those used as part of ODOT's Safety Priority Index System (SPIS), with highest weight given to fatal or severe injury crashes and lowest weight given to PDO crashes.

- Fatal and Injury A crashes are given a weight of 100,
- Injury B and C crashes are given a weight of 10
- PDO crashes are given a weight of 1

Limitations	Pedestrian and bicycle crash data used for this analysis will only include crashes that were reported to the Oregon Department of Motor Vehicles (DMV). Crashes that do not result in injury, death, or over $1,500[1] in property or vehicle damage are not required to be reported to the Oregon DMV and are not recorded by the ODOT Crash Analysis Reporting unit. As a result, not all pedestrian and bicycle crashes are represented in this data and the quality of crash data is limited by the amount of detail provided by the person completing the crash report form.
	Moreover, in other safety analyses, crash frequency is often normalized by a measure of exposure to develop crash rates. Pedestrian and bicycle count data is not currently available; therefore, pedestrian or bicycle exposure could not be accounted for in developing this criterion.
	Finally, because numbers of pedestrian- and bicycle-involved crashes are typically low relative to all crashes and may represent random and/or behavioral/human factor causes where the specific location is not inherently a factor in the crash, this criterion alone represents only a partial assessment of bicycle and pedestrian safety.
	1. As of 2020, crashes that do not result in over $2,500 in property damage are not required to be reported (source: https://www.oregonlaws.org/ors/811.720)

Criterion	Bicycle or Pedestrian Safety Risk Factors
Factor	Safety
Description	ODOT procured funds through the National Cooperative Highway Research Program (NCHRP) to implement the findings of the *NCHRP Report 893: Systemic Pedestrian Safety Analysis.* The Implementation of NCHRP 893: The Oregon DOT Statewide Pedestrian and Bicycle Plan (Safety Implementation Plan) determined the risk factors that can be used in the evaluation of bicycle and pedestrian facilities.
Data Needs	Safety Implementation Plan analysis results.
Same method for pedestrian and bicycle?	The same method will be used in the bicycle and pedestrian evaluation, but the mode specific scores will be applied for each different mode.

Proposed Methodology	The Safety Implementation Plan provided a score for each segment of the state highway network according to the risk factors, listed below, present on the segment. The overall score for each segment was applied in this evaluation. Pedestrian risk factors: • Principal Arterial • Number of Lanes (>= 4 Lanes) • High-Access Density • No Sidewalks (or Only One Side) • Posted Speed (>=35 mph) • Mixed Use Zoning • Other Zoning • Proximity to Schools (1 Mile) • Proximity to Transit Stops (1/4 Mile) • High Population over the Age of 64 Bicycle risk factors: • Principal Arterial • Minor Arterials • Number of Lanes (>= 4 Lanes) • Posted Speed (>=35 mph) • No Bike Lane • High-Access Density • Mixed Use Zoning • Proximity to Schools (1 Mile) • Proximity to Transit Stops (1/4 Mile) • High Population over the Age of 64
Limitations	None known

Criterion	Bicycle Level of Traffic Stress
Factor	Connectivity
Description	Level of Traffic Stress (LTS) is a measure originally developed at the Mineta Transportation Institute to estimate the level of stress a bicyclist may feel while riding along a particular roadway. In general, higher vehicle speeds, higher vehicle volumes, and lower levels of separation between bicyclists and vehicles lead to higher levels of traffic stress. ODOT has adopted a refined version of the methodology in the *Analysis Procedures Manual*. While the metric is designed to represent the level of stress (or comfort) to the bicyclist, it includes many of the same attributes as the safety risk factors.
Data Needs	ODOT Transportation Planning Analysis Unit (TPAU) provided the results of the statewide bicycle LTS analysis.

Same method for pedestrian and bicycle?	This criterion will primarily be used to evaluate bicycle facilities.
Proposed Methodology	The bicycle LTS analysis results provided by TPAU will be used in the evaluation. Facilities with high levels of traffic stress (LTS 3 and 4) will be scored higher than facilities with low levels of traffic stress (LTS 1 and 2). LTS 1 and 2 will be given 0 points and LTS 3 and 4 will be given 1 and 2 points, respectively.
Limitations	Level of traffic stress has been emerging as an analysis approach and metric that is widely applicable, intuitive, and easy to understand. It can also help inform the type of design that will provide "low-stress" facilities that are attractive to all users. However, some risk factors identified through the *ODOT Pedestrian and Bicycle Safety Implementation Plan* are not included in the Level of Traffic Stress assessment (e.g., driveway density and presence of signals).

Criterion	**Fills a Gap in an Area Surrounded by Existing Facilities**
Factor	Connectivity
Description	Prioritizing an ODOT facility that can fill a gap in the network surrounded by existing facilities aligns with Goals 2 and 3, as well as Strategy 8.2A. In some cases, these gaps may be a "critical connection" and in others they represent "completing the system". This criterion places a higher priority on small gaps (infill) that are surrounded by an otherwise complete facility. The rationale behind this approach is that filling these small gaps will provide a high return on investment by connecting pieces of already existing infrastructure and removing barriers to their use.
Data Needs	This criterion will rely on the ODOT bicycle and pedestrian facility inventory.
Same method for pedestrian and bicycle?	The methodology for pedestrian and bicycle will be the same; however, the data inputs for each are different. A ½-mile analysis area will be used for both the pedestrian network and the bicycle networks.
Proposed Methodology	A pedestrian and bicycle connectivity score will be developed for each roadway segment based on the completeness of the facilities on the segment and surrounding highway segments. The higher the score, the more complete the surrounding pedestrian or bicycle network and the more isolated/noticeable the existing gap in the network. Filling a sidewalk or bike lane gap on a highway segment with a high connectivity score increases the potential walk/bikeshed along a highway more than filling a gap on a segment with a low connectivity score. The equation used to develop the segment pedestrian and bicycle connectivity scores is shown below: $$Connectivity = C_N + W_1 C_{N+1} + W_1 C_{N-1} + W_2 C_{N+2} + W_2 C_{N-2}$$ where:

W = Weighting Factor

C = % facilities complete on highway segment

N= the 0.1-mile highway segment being evaluated

	N-2	N-1	N	N+1	N+2
Milepost: 0	0.1	0.2	0.3	0.4	0.5

A half-mile analysis will be conducted for both the pedestrian and bicycle networks in urban areas - the two tenth-mile highway segments upstream and downstream from the segment being evaluated will be included in the calculation. Highway segments directly adjacent to the segment being evaluated will be assigned a higher weight than highway segments on the edge of the analysis area.

- Adjacent highway segments = 2
- Non-adjacent highway segments = 1

"Adjacent" segments will be defined as segments within 0.1-mile. "Non-adjacent" segments will be defined as segments 0.1 to 0.2 miles away

Limitations	Focused only on the ODOT highway network, so does not account for the local street grid. Data on the local street network is not readily available in the ODOT database.

Criterion	**Access to Essential Destinations**
Factor	Demand
Description	This criterion prioritizes improvements on highway segments that make walking and biking to and from essential destinations more safe and convenient. The *Oregon Bicycle and Pedestrian Plan* defines Key Destinations as: • hospitals and medical centers; • major retail sites, grocery stores; • K-12 school and higher education institutions; • Pharmacies; • parks/open space; • major social service centers; • employers with greater than 1,500 employees; • sports and attraction sites; and, • major government sites. In addition, the goals and strategies of the *Oregon Bicycle and Pedestrian Plan* emphasize safe access to schools and transit, specifically.

Data Needs	The Essential Destinations layer will be based on North American Industry Classification System (NAICS) codes. *Appendix A includes a list of essential destinations included in the analysis.*
Same method for pedestrian and bicycle?	The same methodology will be used for the bicycle and pedestrian analysis.
Proposed Methodology	The proposed methodology for the access to essential destinations score takes into account and attempts to address the following factors and conditions:

- Destinations falling on or near ODOT facilities are most likely to require people to walk or bike on the ODOT facilities to access those destinations.
- Destinations within ½ mile may also require people to walk or bike on the ODOT facility but are more likely to have alternate access routes.
- In more rural counties, the "large employers" are much smaller than those found in the Portland Metro area. However, the largest employers in each county are still key destinations.

Given these factors and conditions, a pedestrian and bicycle access to essential destinations score will be developed for each roadway segment based on the number of essential destinations nearby. The higher the score is, the greater the potential access, and the higher the priority. The equation used to develop the segment pedestrian and bicycle access to essential destinations scores is shown below:

$$Dest\_Access = F_H D_H + F_N D_N + F_L D_L$$

where:

F = Location Factor (on ODOT facility = 3; near ODOT facility = 2; on local facility = 1)
H = on an ODOT facility (300 ft from centerline)
N = near an ODOT facility (¼ mile from centerline)
L = on a local facility within ½ mile
D = weighted number of essential destinations

Destinations on or near an ODOT facility will be assigned a higher weight than other destinations, because alternate routes may be available to access those other destinations on the local network. Essential destinations "on an ODOT facility" will be defined as points within a 300' buffer of an ODOT highway centerline. Essential destinations "near an ODOT facility" will be defined as points within ¼ mile of an ODOT highway centerline, while essential destinations "on a local facility" will include those within ½ mile.

Limitations	Prioritizing based on existing essential destinations does not take into account locations of future destinations in growing urban areas.

Criterion	Access to Transit
Factor	Demand
Description	This criterion prioritizes improvements on highway segments that make walking and biking to and from transit stops more safe and convenient. The goals and strategies of the *Oregon Bicycle and Pedestrian Plan* emphasize safe access to transit.
Data Needs	Transit stops
Same method for pedestrian and bicycle?	The same methodology will be used for the bicycle and pedestrian analysis.
Proposed Methodology	The proposed methodology for the access to transit score takes into account and attempts to address the following factors and conditions: ■ Transit stops represent the highest priority destinations for safe access. ■ Transit stops falling on or near ODOT facilities are most likely to require people to walk or bike on the ODOT facilities to access the transit stop. ■ Transit stops within ½ mile may also require people to walk or bike on the ODOT facility but are more likely to have alternate access routes. ■ Transit mobility hubs typically generate more walking and biking trips than a typical transit stop and should be emphasized. Given these factors and conditions, a pedestrian and bicycle access to transit score will be developed for each roadway segment based on the number of transit stops nearby. The higher the score is, the greater the potential access, and the higher the priority. The equation used to develop the segment pedestrian and bicycle access to transit scores is shown below: $$Trans\_Access = F_H D_H + F_N D_N + F_L D_L$$ where: F = Location Factor (on ODOT facility = 3; near ODOT facility = 2; on local facility = 1) H = on an ODOT facility (300 ft from centerline) N = near an ODOT facility (¼ mile from centerline) L = on a local facility within ½ mile D = weighted number of essential destinations Transit stops on or near an ODOT facility will be assigned a higher weight than other transit stops, because alternate routes may be available to access those stops on the local network. Transit stops "on an ODOT facility" will be defined as points within a 300' buffer of an ODOT highway centerline. Transit stops "near an ODOT facility" will

be defined as points within ¼ mile of an ODOT highway centerline, while stops "on a local facility" will include those within ½ mile.

Limitations	Prioritizing based on existing transit stops does not take into account locations of future transit stops in growing urban areas.

Criterion	Bicycle Touring Routes
Factor	Demand
Description	This criterion is designed to capture routes that serve as touring or recreational bicycling routes and have helped to drive the tourist economy. It also captures ODOT highways that are adjacent or intersecting with designated scenic bikeways, since these are likely to represent connections to and from the scenic bikeways.
Data Needs	▪ Scenic bikeway GIS layer ▪ Routes specified on Adventure Cycling maps
Same method for pedestrian and bicycle?	This criterion primarily addresses bikes. However, the criterion is primarily focused on rural areas where shoulder facilities serve pedestrians and bicyclists.
Proposed Methodology	The proposed methodology for the Bicycle Touring Routes score takes into account and attempts to address the following factors and conditions: ▪ Oregon Scenic Bikeways on and adjacent to state highways ▪ Adventure Cycling Bicycle Touring Routes The Bicycle Touring Routes score will be developed for each roadway segment based on the presence and number of the above bicycle touring factors. The higher the score, the greater the potential use for bicycle touring, and the higher priority. The proposed equation used to develop the segment bicycle touring scores is shown below: $$Bike_{Touring} = AC + SB_H + SB_A$$ where: AC = part of an Adventure Cycling bicycle touring route = 1 SB = Scenic Bikeway Location Factor (H, ODOT Facility is part of Scenic Bikeway = 2; A = An ODOT Facility, not designated as a Scenic Bikeway, extending 3 miles from an intersecting Scenic Bikeway = 1) *>250 bicycles on a route not already designated as a scenic bikeway = 1* *>50 and <250 bicycles on a route not already designated as a scenic bikeway = 0.5* *>25 and <50 bicycles on a route not already designated as a scenic bikeway = 0.25*

	This equation weights Scenic Bikeways higher than Adventure Cycling Routes. .
Limitations	Strava and local touring routes were not available for this analysis.

Criterion	Transportation Disadvantaged Communities
Factor	Equity
Description	This criterion is an index of census data characteristics, designed to help prioritize improvements on highway segments that serve areas with high numbers of transportation disadvantaged residents and environmental justice communities that have been traditionally underserved.
Data Needs	Most recent available American Community Survey data at the block group level for the following attributes: ▪ Elderly populations (65 and older) ▪ Youth populations (under 18) ▪ Non-white and Hispanic populations ▪ Low-income population (households earning less than 200% of the poverty level as determined by the census) ▪ Limited English proficiency population (aggregate of census populations who speak English "not well" or "not at all") ▪ Households without access to a vehicle ▪ People with a disability (severe or non-severe disability) ▪ Crowded Households
Same method for pedestrian and bicycle?	The same methodology will be used for the bicycle and pedestrian analysis
Proposed Methodology	The Transportation Disadvantaged Communities score will be calculated at the census block group level as the sum of people 65 and older, 17 and younger, under 200% of the poverty line, non-white or Hispanic, speak English "not well" or "not at all", with a disability, or living in households without vehicle access. That sum is divided by total block group population. People fitting into multiple vulnerability categories are counted multiple times. The higher the index number the more disadvantaged the population is with respect to transportation. The equation used to develop the segment transportation disadvantaged score is shown below: $$TDP\ Index = \frac{(Eld + Yth + (NH * 1.5) + LEP + Pov + (HH * Veh) + Dis) + (Crwd * HH)}{Pop}$$

where:

Eld = # of residents over 65

Yth = # of residents under 18

NH = # of residents who identify as non-white or Hispanic

LEP = # of residents that speak English "not well" or "not at all"

Pov = # of residents with income under 200% of poverty level

HH = Average Oregon household size (2.51)

Veh = # of households with 0 vehicles

Dis = # of residents with a disability

Pop = Total population

Crwd = # of households with 1.0 or more occupants per room

Data at the household level is multiplied by the average household size for each block group. Non-white and Hispanic residents are weighted higher than other demographics in the index.

Limitations	In rural and low-population areas, census units (block groups) may be geographically large such that the actual residences of transportation disadvantaged population may not be located near the transportation facility that runs through the same block group. Additionally, this metric calculates an index of a given area for a transportation disadvantaged population, but it does not represent total numbers of people. Therefore, a block group with a lower total number but higher proportion of transportation disadvantaged people would be rated higher than a more populous block group.

Criterion	Health
Factor	Equity
Description	This criterion will prioritize improvements on highway segments that serve areas with high numbers of people with underlying health issues.
Data Needs	Respiratory hazard data for geographic areas throughout the state: EPA Air Toxics Respiratory Hazard Index (https://ejscreen.epa.gov/mapper/)
Same method for pedestrian and bicycle?	The same methodology will be used for pedestrian and bicycle needs.
Proposed Methodology	This criterion utilizes the EPA National Scale Air Toxics Assessment (NATA) Respiratory Hazard Index, which provides a sum of hazard indices for air toxics with reference concentrations based on respiratory endpoints. Each hazard index is the ratio of exposure concentration in the air to the health-based reference concentration set by the EPA. This index does not include demographic information, as that is included in the Transportation Disadvantaged Communities index.

	The index is represented as a decimal, and each roadway segment is assigned the highest index point that it touches.
Limitations	The respiratory hazard index can be influenced by many factors. These factors may be transportation related, especially due to high motor vehicle emissions, but they may also be due to other environmental variables to which exposure would be increased by biking and walking.

Criterion	**Local Plan/TSP Priorities**
Factor	Stakeholder Input
Description	This criterion will prioritize improvements on highway segments that are identified in local jurisdiction plans as a need for pedestrians or bicyclists. The criterion is intended as a way to systematically incorporate the work and input of local jurisdiction staff in identifying needs.
Data Needs	Lists of projects and plans from local jurisdictions, with the corresponding ODOT highway number and mile points.
Same method for pedestrian and bicycle?	The same methodology will be used for pedestrian and bicycle needs; however, the list of identified needs will be classified as either pedestrian, bicycle, or both.
Proposed Methodology	ODOT staff reviewed the adopted Transportation System Plans and other relevant plans of the local jurisdictions and developed a list of all pedestrian and bicycle projects on ODOT facilities that were identified in each plan. Scoring is proposed as follows: ▪ ODOT segment appears in local jurisdiction plan: 1 ▪ ODOT segment does not appear in local jurisdiction plan: 0
Limitations	Local jurisdiction plans vary in: ▪ How much detail they include regarding the needs ▪ How recently they have been updated ▪ Goals, policies, and methodologies leading to identification of a need

Criterion	**Presence of Existing Facility**
Factor	Existing Conditions
Description	Prioritize locations where existing bicycle and pedestrian facilities are not present or are substandard.

Data Needs	This criterion relies on the ODOT bicycle and pedestrian facility inventory developed through the initial phase of this project.
Same method for pedestrian and bicycle?	Separate pedestrian and bicycle existing facility scores will be calculated for each highway segment using the same methodology but reflecting the unique inventory for each mode.
Proposed Methodology	A pedestrian and bicycle existing facility score will be developed for each highway segment based on "worst" condition present within the segment. For example, a segment with a sidewalk covering half of the segment and for the other half will be scored as a "gap". The following base scores will be assigned: ▪ Facility Gap: 2 ▪ Facility Deficiency: 1 ▪ Facility Meeting Standard: 0
Limitations	This methodology does not represent an exact score for each gap or deficiency; rather, it assigns scores to each segment based on the highest-scoring condition present along the segment. Therefore, it is an approximate measure of the actual facility inventory.

Appendix A: Essential Destinations

ESSENTIAL DESTINATIONS

The *Oregon Bicycle and Pedestrian Plan* defines Essential Destinations as: hospitals and medical centers, major retail sites, grocery stores, K-12 school and higher education institutions, pharmacies, parks/open spaces, major social service centers, employers with greater than 1,500 employees, sports and attraction sites and major government sites. The Table below shows the NAICS codes used to represent essential destinations in previous ATNIs and that will be applied in this evaluation as well.

Used in R1 ATNI	Used in R4 and R5 ATNI	6-digit NAICS Code	Description
Civic			
Y	Y	491110	Postal Service
	Y	922110	Courts
	Y	921110	Executive Offices (government)
	Y	921150	American Indian and Alaska Native Tribal Governments
Y	Y	519120	Libraries and Archives
Y	Y	541930	Translation and Interpretation Services
Y	Y	561311	Employment Placement Agencies
Y	Y	561320	Temporary Help Services
Education			
Y	Y	611110	Elementary and Secondary Schools
Y	Y	611210	Junior Colleges
Y	Y	611310	Colleges, Universities, and Professional Schools
Y	Y	611410	Business and Secretarial Schools
Y	Y	611420	Computer Training
Y	Y	611430	Professional and Management Development Training
Y	Y	611511	Cosmetology and Barber Schools
Y	Y	611512	Flight Training
Y	Y	611513	Apprenticeship Training
Y	Y	611519	Other Technical and Trade Schools
Y	Y	611610	Fine Arts Schools
Y	Y	611620	Sports and Recreation Instruction
Y	Y	611630	Language Schools
Y	Y	611691	Exam Preparation and Tutoring
Y	Y	611692	Automobile Driving Schools
Y	Y	611699	All Other Miscellaneous Schools and Instruction
Y	Y	611710	Educational Support Services
Medical			
Y	Y	621111	Offices of Physicians (except Mental Health Specialists)
Y	Y	621112	Offices of Physicians, Mental Health Specialists
Y	Y	621210	Offices of Dentists
Y	Y	621310	Offices of Chiropractors
Y	Y	621320	Offices of Optometrists
Y	Y	621330	Offices of Mental Health Practitioners (except Physicians)

Y	Y	621340	Offices of Physical, Occupational and Speech Therapists, and Audiologists
Y	Y	621391	Offices of Podiatrists
Y	Y	621399	Offices of All Other Miscellaneous Health Practitioners
Y	Y	621410	Family Planning Centers
Y	Y	621420	Outpatient Mental Health and Substance Abuse Centers
Y	Y	621491	HMO Medical Centers
Y	Y	621492	Kidney Dialysis Centers
Y	Y	621493	Freestanding Ambulatory Surgical and Emergency Centers
Y	Y	621498	All Other Outpatient Care Centers
Y	Y	621511	Medical Laboratories
Y	Y	621512	Diagnostic Imaging Centers
Y	Y	621610	Home Health Care Services
Y	Y	621910	Ambulance Services
Y	Y	621991	Blood and Organ Banks
Y	Y	621999	All Other Miscellaneous Ambulatory Health Care Services
Y	Y	622110	General Medical and Surgical Hospitals
Y	Y	622210	Psychiatric and Substance Abuse Hospitals
Y	Y	622310	Specialty (except Psychiatric and Substance Abuse) Hospitals
Y	Y	623110	Nursing Care Facilities (Skilled Nursing Facilities)
Y	Y	623210	Residential Intellectual and Developmental Disability Facilities
Y	Y	623220	Residential Mental Health and Substance Abuse Facilities
Y	Y	623311	Continuing Care Retirement Communities
Y	Y	623312	Assisted Living Facilities for the Elderly
Y	Y	623990	Other Residential Care Facilities
Y	Y	624110	Child and Youth Services
Y	Y	624120	Services for the Elderly and Persons with Disabilities
Y	Y	624190	Other Individual and Family Services
Y	Y	624210	Community Food Services
Y	Y	624221	Temporary Shelters
Y	Y	624229	Other Community Housing Services
Y	Y	624230	Emergency and Other Relief Services
Y	Y	624310	Vocational Rehabilitation Services
Y	Y	624410	Child Day Care Services
Food			
Y	Y	311811	Retail Bakeries
Y	Y	445110	Supermarkets and Other Grocery (except Convenience) Stores
Y	Y	445120	Convenience Stores
Y	Y	445210	Meat Markets
Y	Y	445220	Fish and Seafood Markets
Y	Y	445230	Fruit and Vegetable Markets
Y	Y	445291	Baked Goods Stores
Y	Y	445299	All Other Specialty Food Stores
Y	Y	446191	Food (Health) Supplement Stores
Y	Y	722511	Full-Service Restaurants

Y	Y	722514	Cafeterias, Grill Buffets, and Buffets

Essential Retail

Y	Y	448110	Men's Clothing Stores
Y	Y	448120	Women's Clothing Stores
Y	Y	448130	Children's and Infants' Clothing Stores
Y	Y	448140	Family Clothing Stores
Y	Y	448150	Clothing Accessories Stores
Y	Y	448190	Other Clothing Stores
Y	Y	448210	Shoe Stores
Y	Y	444130	Hardware Stores
Y	Y	452111	Department Stores (except Discount Department Stores)
Y	Y	452112	Discount Department Stores
Y	Y	452910	Warehouse Clubs and Supercenters
Y	Y	452990	All Other General Merchandise Stores
Y	Y	453310	Used Merchandise Stores
Y	Y	453910	Pet and Pet Supplies Stores
Y	Y	454310	Fuel Dealers
Y	Y	446110	Pharmacies and Drug Stores
Y	Y	446130	Optical Goods Stores
Y	Y	446199	All Other Health and Personal Care Stores
Y	Y	541940	Veterinary Services
	Y	812310	Coin-Operated Laundries and Drycleaners
	Y	812320	Dry cleaning and Laundry Services (except Coin-Operated)

Financial/Legal Services

Y	Y	522110	Commercial Banking
Y	Y	522120	Savings Institutions
Y	Y	522130	Credit Unions
Y	Y	522310	Mortgage and Nonmortgage Loan Brokers
Y	Y	523930	Investment Advice
Y	Y	541110	Offices of Lawyers
Y	Y	541120	Offices of Notaries
Y	Y	541199	All Other Legal Services
Y	Y	541211	Offices of Certified Public Accountants
Y	Y	541213	Tax Preparation Services
Y	Y	541219	Other Accounting Services
	Y	522291	Consumer Lending
	Y	522320	Financial Transaction Processing, Reserve, and Clearinghouse Activities

Other "Destination" Codes

	Y	712110	Museums
	Y	712120	Historical Sites