

**BEFORE THE BOARD OF COUNTY COMMISSIONERS  
FOR MULTNOMAH COUNTY, OREGON**

**RESOLUTION NO. 2020-007**

Approving the Multnomah County Transportation Capital Improvement Plan and Program for Fiscal Years 2020-2024.

**The Multnomah County Board of Commissioners Finds:**

- a. Multnomah County's roads, Willamette River Bridges, bikeways, pedestrian ways, and related structures are vital to an orderly and balanced transportation system and must be maintained and preserved to provide for the safe and efficient movement of people and commerce.
- b. A unified approach to long-range facilities planning and capital investment programming is a County goal.
- c. The Multnomah County Transportation Division has established a process, consistent with County Transportation System Plan Policies #5 and #17 to develop a County Transportation Capital Improvement Plan and Program (Transportation CIPP).
- d. The Transportation CIPP establishes priorities for capital improvements that will maximize the use of financial resources and provide for the safe and reliable public use of the County roads, Willamette River Bridges, bikeways, pedestrian ways, and related structures.
- e. The Transportation CIPP is a two-part document. The Transportation Capital Improvement Plan (the Plan) identifies and scores transportation projects needed in the next 20 years. The Transportation Capital Improvement Program (the Program) assigns available revenues to high priority projects for a five-year period.
- f. The Multnomah County FY 2014-2018 Transportation CIPP was approved by this board on May 28, 2015 by Resolution 2015-049.
- g. The Program is updated biennially to reflect new and completed projects as well as the most current revenue projections. This action would approve the biennial update of the FY 2020-24 CIPP.
- h. The 2020 update includes revisions to all project prioritization criteria and project cost estimate for all non-Willamette River Bridge projects; as well as cost estimate updates for Willamette River Bridge projects.
- i. The 2020 update reflects new and better data about all capital needs and included an extensive public input process including 7 in person open houses, 3 online open houses, and presentations at multiple neighborhood associations, advisory committees, and other meetings. This resulted in over 700 comments over the course of the update.

- j. The Public Review Draft 2020 Update of the Transportation CIPP has been available online since November 7, 2019. Comments on the Public Review draft have been incorporated into the Final Draft, which has been posted online January 3, 2020.
- k. The Transportation Division staff recommends the County Board approve the attached 2020 Update of the FY 2020 - 2024 Transportation CIPP.

**The Multnomah County Board of Commissioners Resolves:**

- 1. The 2020 Update of Multnomah County Fiscal Years 2020-2025 Transportation Capital Improvement plan and program is approved.

**ADOPTED this 23rd day of January, 2020.**



BOARD OF COUNTY COMMISSIONERS  
FOR MULTNOMAH COUNTY, OREGON

*Deborah Kafoury*

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Deborah Kafoury, Chair

REVIEWED:

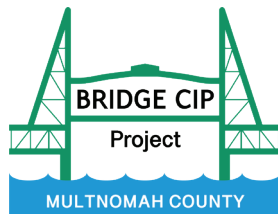
JENNY M. MADKOUR, COUNTY ATTORNEY  
FOR MULTNOMAH COUNTY, OREGON

By

*Nick Baldwin-Sayre*  
Nick Baldwin-Sayre, Sr. Asst. County Attorney

SUBMITTED BY: Jamie Waltz, Interim Director, Department of Community Services

# TRANSPORTATION CAPITAL IMPROVEMENT PLAN AND PROGRAM 2020-2024



**FINAL DRAFT**

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# Final RCIPP

## Task 5.2 – Final Roadway Capital Improvement Plan and Program (RCIPP)

**Date:** December 27, 2019

**To:** Multnomah County

**From:** Shelly Alexander, PE, David Evans and Associates, Inc.  
Hannah Polow, AICP, David Evans and Associates, Inc.  
Justin Kuenne, EIT, David Evans and Associates, Inc.

**Subject:** Roadway Capital Improvement Plan and Program (RCIPP) Update

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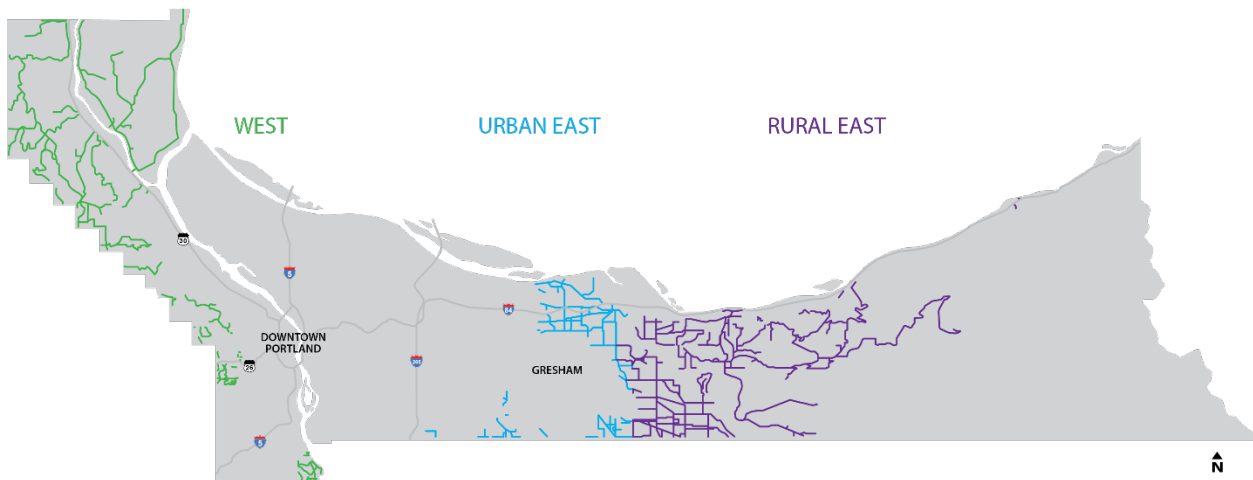
## Executive Summary

Multnomah County (County) is updating its Roadway Capital Improvement Plan and Program (RCIPP). The RCIPP identifies transportation needs in the County and establishes a strategic implementation approach.

The County aims to completely update the RCIPP at regular intervals to reflect ongoing priorities as well as changes to policies, technology and the environment. The last major update was completed in 2002, and minor updates were completed in 2005, 2010, and 2014. To update its RCIPP, the County first updated its Roadway Capital Improvement Plan, or Plan—a component part of the RCIPP, which includes a list of transportation project needs for the next 20-plus years. To update the Plan, the County conducted a detailed inventory of its transportation assets covered under the Plan—roadways, bike and pedestrian facilities, and fish passage culverts—and developed a scoring framework to rank candidate projects from highest to lowest priority. Throughout the plan update, three rounds of public engagement took place around the County to share information and collect input on the process and projects.

As part of the plan update the County identified over 100 GIS data sources with potentially useful data. After filtering down to under 30 sources, the County compiled and assessed relevant data and identified deficiencies in the roadway network. The next step involved supplementing the existing data with new, current data. With multiple options for collecting new data, the County decided to utilize LiDAR (Light Detection and Ranging) technology, which was utilized in 2014 as well. The new scan that took place in 2018 benefited from higher resolution than the 2014 scan as well as two scans per roadway. The scan enabled them to efficiently collect large amounts of accurate data of all 270 miles of County-maintained roadways. Figure 1 shows the County-maintained roadways within three different regions of the county.

*Figure 1: County Regions*



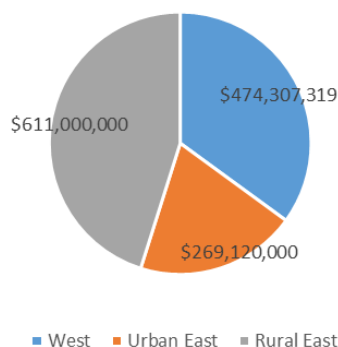
From the existing and newly captured data, the County catalogued eleven roadway features. Orbit GT was used for semi-automated data extraction, and analysis and tracking were performed with ArcGIS. Over 25,000 features were extracted, each of which includes four to six attributes.

The County also reviewed all existing Capital projects in the following documents:

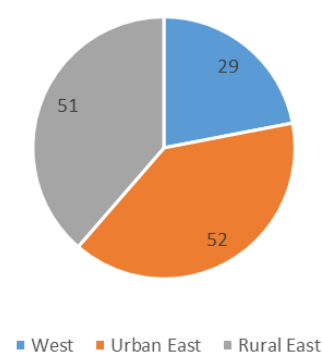
1. Multnomah County CIPP (2014-18)
2. City of Gresham TSP (2015)
3. City of Fairview TSP (2016)
4. City of Troutdale TSP (2013)
5. Urban Pockets of Unincorporated Multnomah County TSP (2006)
6. Main Streets on Halsey (2017)
7. East Metro Connections Plan (2012)
8. Multnomah County TSP (2016)
9. City of Wood Village TSP (2016)
10. Regional Transportation Plan (2014)
11. Halsey Street Corridor Study (2005)
12. 257th Avenue Enhancement Study (1997)
13. Multnomah County ADA Transition Plan Inventory (2017)

In addition to the above, projects recommended by the public at meetings and input from County maintenance and engineering staff were included in the project list. Figure 2 shows the number of RCIPP projects per region and Figure 3 shows the total RCIPP projects' costs per region within unincorporated Multnomah County.

*Figure 2: Projects' Costs per Region within Unincorporated Multnomah County*



*Figure 3: Projects per Region within Unincorporated Multnomah County*



The scoring framework was developed to evaluate projects that best reflect the County's values and priorities for the transportation system. This process was aided by a detailed review of County plans and national best practices as well as feedback received through public engagement efforts. Ultimately, it was decided to evaluate candidate projects on the following criteria: Equity, Safety, Mobility, Asset Management, Resiliency and Emergency Management, and Sustainability. Candidate projects were then scored to determine their ranking among all projects included in the updated Plan, thereby identifying the County's most critical transportation capital needs. The scoring methodology is described in the Plan Framework section and the details of each criteria is described in the Project Scoring section.

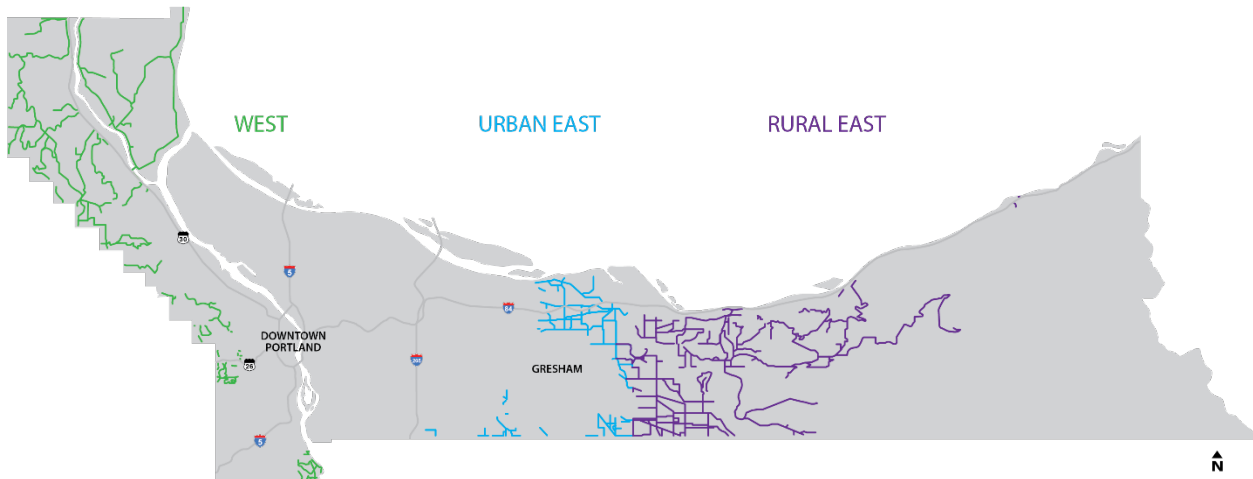
The County then updated the Roadway Capital Improvement Program (Program). The Program identifies an implementation strategy for the Plan by assigning funding to projects for construction. To update the Program, the County forecasted estimated transportation revenues over the next five years and assigned those revenues to specific projects according to priority. The total expense outlined in the 5-year program for roadway capital improvement projects is approximately \$40.4 million. The details associated with the Program can be found in the Capital Improvement section.

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## Introduction

The Multnomah County (County) Roadway Capital Improvement Plan and Program (RCIPP) is a two-part effort, consisting of the Roadway Capital Improvement Plan (Plan) and the Roadway Capital Improvement Program (Program). The plan and program identify projects within the County's road service area. Multnomah County's road service area includes roads and assets in the cities of Fairview, Troutdale, and Wood Village and in unincorporated areas including Sauvie Island, the West Hills and the Corbett area. This service area also includes 6 Willamette River bridges within the City of Portland. The Multnomah County Transportation Division is responsible for the design, construction, maintenance, operation, and planning of almost 300 miles of roads, 27 bridges, 1700 culverts, and many miles of sidewalks, bike lanes, and drainage pipes and ditches in this road service area. Figure 4 shows the County-maintained roadways within three different regions of the county.

Figure 4: County Regions



The purpose of the RCIPP is to deliver on the goals of the County, the Cities that are served by County roads, and the Transportation Division. The Cities of Fairview, Troutdale, and Wood Village have Transportation System Plans that include future capital improvements on County Roads. The County also has a Transportation System Plan for unincorporated Multnomah County which includes capital projects in unincorporated areas.

As part of the development of the RCIPP, a best practices review was conducted. This included an analysis of the goals of the County, the Department, and the Transportation System Plans. Stakeholder interviews were held with staff from other County departments and offices, staff at Fairview, Troutdale, and Wood Village, and management within the Transportation Division.

Table 1 lists the goals from each review process and highlights the common goals.

Table 1: Summary of Goal Interests by Review Process

Stakeholder Interviews	Best Practices Summary	Document Review
<ul style="list-style-type: none"> <li>• <b>Safety</b></li> <li>• <b>Strategic asset management</b></li> <li>• <b>Equity</b></li> <li>• Climate change</li> </ul>	<ul style="list-style-type: none"> <li>• DCS/Transportation: <ul style="list-style-type: none"> <li>- Reliability</li> <li>- Equity</li> <li>- Transparency</li> <li>- Integrity</li> <li>- Leadership</li> </ul> </li> <li>• Economic vitality</li> <li>• Livability</li> <li>• <b>Mobility</b></li> <li>• <b>Safety</b></li> <li>• <b>Sustainability</b></li> <li>• Diversity</li> <li>• <b>Equity</b></li> <li>• Review for Best Practices: <ul style="list-style-type: none"> <li>- Climate change</li> <li>- Health</li> <li>- Autonomous vehicles</li> <li>- Stormwater/culverts/flooding</li> <li>- Reliability</li> <li>- <b>Strategic asset management</b></li> <li>- Emergency management</li> <li>- Urban/rural</li> <li>- Active transportation</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Balance transportation options/ manage travel demand</b></li> <li>• Encourage economic prosperity</li> <li>• <b>Promote safety</b></li> <li>• Allocate limited funding efficiently</li> <li>• Ensure plans programs are consistent with existing local, state, and federal regulations</li> <li>• Promote public health</li> <li>• <b>Ensure equity</b></li> <li>• Use performance-based management</li> </ul>

Note: **Bold** indicates goals that moved forward within the analysis

From the analysis, six goals emerged (shown in the bullet list below). These goals informed the Criteria and Measures, which are outlined in the next section.

- Safety
- Equity
- Asset Management
- Mobility
- Resiliency/Emergency Management
- Sustainability

Creating a balanced system reflects the County's commitment to improving all modes of transportation. Improvements for motor vehicles, cyclists, pedestrians, and fish passage culverts are all included in the RCIPP. By regularly updating the RCIPP, the County is (1) continuing to make strategic transportation investments that provide the greatest benefits for all users, and (2) bolstering its eligibility and competitiveness for state and federal grant programs. The component parts of the RCIPP, the Plan and Program, are summarized below.



## Plan

The Plan is a comprehensive listing of transportation capital project<sup>1</sup> needs in Multnomah County for the next 20 or more years. The objective of the Plan is to identify those projects that are most crucial to maintain and enhance the transportation system to best meet the County's goals (see Figure 3). To identify the projects that address its most critical needs, the County has developed a scoring framework to assign priority to candidate projects. This scoring framework evaluates candidate projects using the following criteria: Equity, Safety, Mobility, Asset Management, Resiliency and Emergency Management, and Sustainability. The *Scoring Framework Development* section discusses this scoring framework in greater detail.

## Program

The Program seeks to implement the Plan by assigning County revenues to the candidate projects included in the Plan for a five-year period. Currently, the County receives transportation revenues from three primary sources: federal distributions<sup>2</sup>, the State Highway Fund<sup>3</sup> and the County's \$0.03/gallon gas tax. Historically, these revenues do not meet the amount the County requires to maintain its transportation system at levels consistent with its standards. As such, the Program is able to assign funding to only the most critical projects—in this case, those with scores indicating the highest level of priority.

## Update Process

The County's approach for project implementation (the Program) is constrained by similarly dynamic factors: construction costs and the availability of transportation revenues. To account for these potential changes in community needs and purchasing power, the County updates the component parts of its RCIPP, the Plan and Program, at regular intervals.

The County aims to completely update the Plan at regular intervals to reflect ongoing priorities as well as changes to policies, technology and the environment. The last major update to the Plan was completed in 2002, and minor updates were completed in 2005, 2010, and 2014. In this current major update, the County has developed a new scoring framework to prioritize roadway, bicycle and pedestrian, bridge, and culvert projects for the next 20 years. Minor updates of the Plan should be completed as necessary between major updates to keep it as effective as possible in identifying the County's most critical transportation project needs.

The Program identifies an implementation approach for the Plan by assigning funds to projects for their implementation over the next five years. Because of the shorter horizon of the Program compared to the Plan (5 years versus 20 years) and the possible volatility associated with the collection of transportation revenues and construction costs, the County completes an update at least every two years. To match available funding with transportation projects, the County performs an annual internal review. At least every other year, the County completes a formal update to the Program, during which

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<sup>1</sup> Operations and maintenance (O&M) needs are not included in the Roadway Capital Improvement Plan. Examples of O&M projects include striping, signing, or crack sealing. The County finances these projects through separate funds designated for O&M.

<sup>2</sup> The sources of federal monies distributed to the County include the Surface Transportation Program and the Highway and Bridge Program.

<sup>3</sup> The sources of revenue contributing to the State Highway Fund include the state gas tax, vehicle registration fees, and the truck weight/mile tax.

time the County engages in an extensive public engagement effort to collect citizen input on the most critical transportation needs over the next five years.

### Collecting Data and Mapping Deficiencies

To better understand the conditions of County roads, all 270 miles of County-maintained roadways were scanned using the laser surveying method, [LiDAR](#). LiDAR uses ultraviolet, visible, or near infrared light to image objects by illuminating them with laser light and measuring the return time and frequency of reflected light with a sensor to then calculate the precise distances between objects and the light-emitting source. This allows precision mapping of large areas with minimal effort. This method enabled the analysis of all County roads, and provided detailed information of 11 roadway attributes:

- Travel lanes
- Bike lanes
- Driveways
- Landscape buffers
- Legends – examples could include turn arrows, bicycle lane stencils, RR XING stencils, etc.
- Shoulders
- Obstacles
- Sidewalk data
- Turning lane/width
- Medians
- Curbs

The 11 attributes were mapped, including the size, shape, and condition of all County roadways. This data remains available for future use during operations and maintenance, project design and construction, and decision-making for leveraging funds.

The information collected and mapped using LiDAR will be added to the County's existing maps, which show attributes such as landslide hazards, guardrail conditions, culvert locations, and ditches. This information created a comprehensive dataset so the County could determine where deficiencies exist in the current roadway system to help identify and prioritize system improvements.



*The LiDAR truck used to capture the data for this project.*

## Public Process

The County engaged with the public at three phases during this project to collect input and feedback on project recommendations. A series of open houses and online open houses were held to engage with the public over the course of the following three phases:

- Phase 1 (April 2018): Initial input on needed improvement locations and project prioritization
- Phase 2 (February 2019): Feedback on prioritized list of projects
- Phase 3 (November 2019): Review of the draft RCIPP document

This section is organized by phase, summarizing the content presented and the corresponding feedback received from the public. Throughout phases 1 and 2, safety was an important consideration for the public. They showed a clear desire for this to be a top factor when making decisions about project prioritization.

### Phase 1

In spring 2018, the first round of public engagement occurred, including open houses throughout the County as well as online. The purpose of this initial round was to gather public input regarding what improvements were needed, where they may be needed, and how they should be prioritized. Feedback was encouraged on the County's evaluation criteria, project list, and priorities for the RCIPP.

The public expressed concerns regarding multiple issues, including:

- High-crash locations
- Dangerous and on-going high-speed driving locations
- The importance of walking and biking
- Increased traffic volumes
- Tourism effects on infrastructure
- Logging effects on the natural environment, specifically on the Columbia River Gorge
- Commuter traffic route choices
- The prioritization process and allocation of funds

In addition to providing feedback directly related to this project, attendees provided other comments as well. Community needs and individual concerns varied by geographical location, with the residents of the West regional area expressing the most concern regarding cut-thru commuter traffic. Residents of the Urban East regional area expressed concerns of increased traffic volumes on Marine Drive as a result of increased industry and shipping in the area. Residents of the Rural East regional area expressed concerns of the negative effects on infrastructure from the tourism industry. Multiple citizens expressed a desire for the County to address immediate maintenance and safety issues.

When asked to rank the scoring criteria in order of importance, Safety and Equity were the two criteria that ranked the highest.

As a result of concerns associated with asset management, safety, and equity, the County integrated that into the weighting methodology to have the measure scores for these three criteria carry a heavier weight than the other criteria.

## Phase 2

In winter 2019, the second round of public engagement occurred, including open houses throughout the County as well as online open house. The purpose of the second round was to inform the public about the RCIPP, share the project list, and gather public input on the project list and the criteria used in ranking the projects. Participants were asked to describe any scenario they would have preferred over the four offered. Of 35 responses, half described a scenario even more heavily weighted toward safety, or combining mobility and/or equity in interdependence with safety. This reiterated the importance of safety to be weighted as one of the top criteria, which remained one of the top weighted criteria in the final scoring.

Participants were asked to choose their top five projects from a list of 127 road capital projects. In response, 89 projects were selected — but only 30 were chosen by five or more participants (see Figure 5). The number of points means the number of times a project showed up in participants' choices.

Figure 5: Priority Projects Identified in Open Houses during Phase 2 (Winter 2019)

Project	Points
535U - SW Scholls Ferry: Humphrey to Washington County Line	56
536U - SW Scholls Ferry Road: SW Patton Road to Washington County Line	40
513U - Forest Park / SW Hills Urban Pockets Bicycle Projects	37
166R - NW Skyline Blvd (City of Portland line - Cornelius Pass Rd)	36
113R - Cornell Rd (all segments within County jurisdiction)	31
514U - Forest Park / SW Hills Urban Pockets Sidewalk Infill Projects	27
163R - Sauvie Island Loop Roads - Shoulder Improvements	26
164R - NW Skyline Blvd (Cornell Road - Greenleaf Road)	24
122R - Germantown Road: Skyline Blvd to County Line	23
110R - NW Cornelius Pass Road: Highway 30 - Skyline Blvd	20
112R - NW Cornelius Pass Road and NW Skyline Blvd Intersection	18
132R - Johnson Creek Culverts of Regional Concern	18
171R - Stark Street Bridge	16
159R - Sauvie Island Road Multi-Use Path: Bridge - Reeder Rd	14
170R - NW Springville Road (City of Portland line - County line)	14
111R - NW Cornelius Pass Road: Skyline Blvd - County Line	13
165R - NW Skyline Blvd: 50 feet SE NW Kelly Circle to 750 feet SE NW Meares Drive / City Boundary	12
135R - Larch Mountain Road: HCRCH - end of road	10
162R - Sauvie Island Road: Milepost 6 - County Line	8
502U - 223rd Ave: Halsey St to Sandy Blvd	8
511U - Dunthorpe Urban Pockets Active Transportation Projects	8
528U - NE Marine Drive: NW Frontage Road - NE Sundial Rd	8
109R - Corbett Hill Road Safety Improvements	7
161R - Sauvie Island Road: Reeder Road - Milepost 6	7
167R - NW Skyline Blvd (Cornelius Pass Road - NW Rock Creek Road)	7
174R - Thompson Road: 53rd Dr to UGB	7
108R - Corbett Hill Road/Historic Columbia River Highway	5
169R - NW Skyline Blvd (Beck Rd - Rocky Point Road)	5
519U - Halsey Street: 202nd to 223rd Ave	5
523U - Historic Columbia River Highway RR Overcrossing: Half mile east of 244th Avenue	5

### *Phase 3*

In fall 2019, the third round of public engagement occurred, including an open house and online open house. The final project scores and draft document were available for public review. The purpose of the third (final) round of public engagement was to inform the public about the RCIPP, review the draft plan (including if any projects are missing from the final plan), and provide feedback on the approximately 130 capital projects, including priority and schedule. About a quarter of the 63 submitted comments concerned projects 535U and 536U (both located on Scholls Ferry Road), mostly expressing a need for sidewalks along the whole of Scholls Ferry Road. Other projects receiving more than one comment:

- 110R and 111R (Cornelius Pass Road): 5
- 505U and 506U (238th Drive): 3
- 118R and 119R (Dodge Park Road): 3
- 122R (Germantown Road): 2
- 514U (Forest Park / SW Hills Urban Pockets Sidewalk Infill): 2

Other comments were more general, not specific to projects on the list. Topics included walking and biking, culverts and wildlife crossings, and maintenance concerns including potholes. All are represented in full in the appendix.

## Plan Framework

In the previous section, the Roadway Capital Improvement Plan (or Plan) is defined. In this section, the Plan is discussed in greater detail.

### Scoring Framework Development

Multnomah County has developed a comprehensive scoring evaluation framework for the purpose of ranking and prioritizing transportation projects for its Plan. Based on a review of its overall goals, adopted plans, national best practices, and public feedback, the County has defined six scoring criteria to evaluate projects across six different areas: Equity, Safety, Mobility, Asset Management, Resiliency and Emergency Management, and Sustainability. For each criterion, a number of measures—grouped into sub-topics—explain the details associated with evaluating each project. Figure 6: Evaluation Framework summarizes the hierarchy of these components for this framework.

These components are defined below:

- **Criteria** – Broad subject areas to structure the evaluation framework.
- **Sub-topics** – Categories within each criterion to define what topics the criterion will address.
- **Measures** – Evaluative questions associated with each criterion that result in qualitative or quantitative answers.

Figure 6: Evaluation Framework

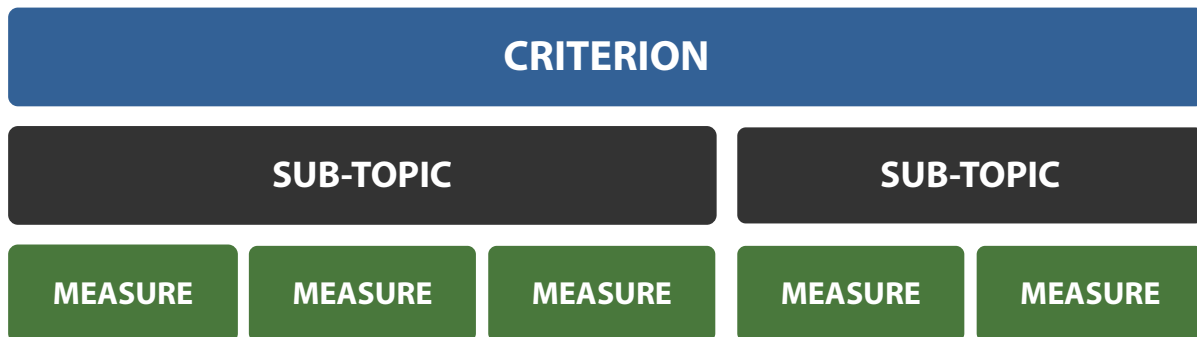
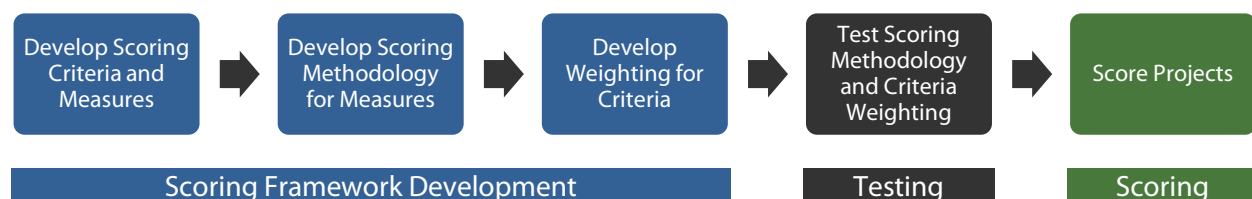


Figure 7 summarizes the steps taken to develop the scoring framework used for the Plan. The three primary steps undertaken as part of the scoring framework development process are summarized below. Additional detail and discussion on these steps can be found in the appendices.

Figure 7: Scoring Framework Development Timeline



### Scoring Criteria and Measures

As a first step in its development of a scoring framework, the County chose scoring criteria and measures, grouped into sub-topics within each criterion. These criteria and measures represent the primary components of the scoring framework used in this update to the Plan. To guide its development, the County reviewed relevant planning documents, studied national best practices, and conducted stakeholder interviews. Based on these efforts and their consistency with guiding goals for future transportation investment stated in the County's 2016 TSP, seven criteria were selected. Associated measures were also established for each criterion and grouped into sub-topics for organizational purposes. Measures were chosen based on their usefulness in evaluation and data availability. In later steps of the development and refinement of the scoring framework, one of these criteria was eliminated, for a total of six: Equity, Safety, Mobility, Asset Management, Resiliency and Emergency Management, and Sustainability. Discussions of the sub-topics and measures under these criteria and other additional details can be found in Appendix A.

### Scoring Methodology for Measures

With an established framework of criteria, sub-topics, and measures, methodologies to score each measure were defined. For each measure, a scoring methodology was developed to calculate scores ranging from zero to three. The scoring methodologies defined for the measures included a range of evaluation strategies, varying based on the nature of the measure and the characteristics of available data (e.g., quantitative versus qualitative). Higher scores were used to indicate a higher level of priority or project need, facilitating quick comparisons between multiple projects' scores for a single measure. The scale of zero to three was selected to reflect not applicable (N/A), low, medium, and high when scoring the projects (see Table 2).

*Table 2: Score Explanation*

Score	Description
0	N/A
1	Low priority
2	Medium priority
3	High priority

In preparation for the next step in the scoring framework development process, measures scores were then converted into aggregated criteria scores and converted to a 100-point scale, so they could be more readily interpreted.<sup>4</sup> See Appendix A for more details.<sup>5</sup>

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<sup>4</sup> As described in this paragraph, two different scoring scales are used in the scoring methodology. A scoring scale of zero to three is used early in the process, because it provides convenient benchmarks that pair effectively with the scoring methodologies used for the measures. For example, the scores 1/2/3 are used to correspond to low/medium/high levels of priority for a given measure, with 0 corresponding to the evaluation being "not applicable" for a given project. Later in the scoring process, conversion to a 100-point scale is performed in order to increase interpretability and to facilitate the rounding of total scores to the nearest whole number or nearest tenth without significant loss in the score's meaning.

<sup>5</sup> In the memorandum found in Appendix A, a discussion of refinements to the criteria and measures developed in the first step of the scoring framework development process, "Develop Scoring for Measures," is provided.



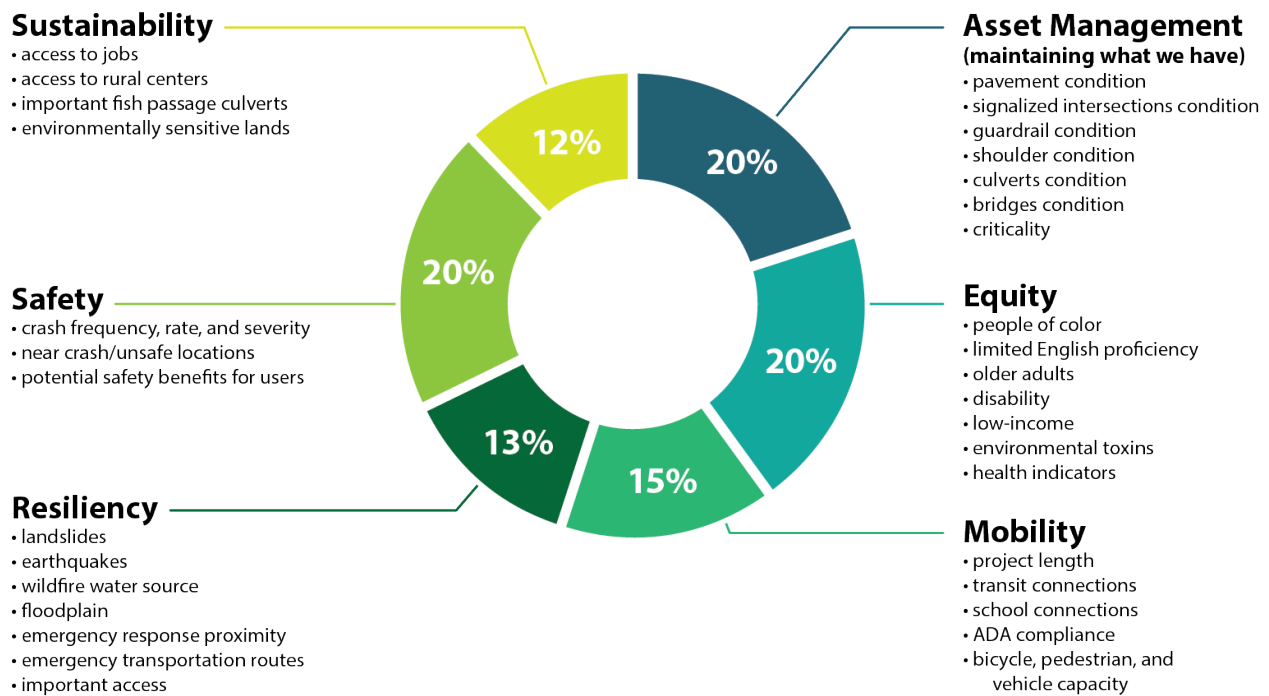
## Weighting Criteria

In the final major step of the scoring framework development process, the County established strategic criteria weightings for use in determining final scores for projects. The criteria weightings developed in this process were chosen to best reflect the County’s priorities for the future of its transportation system as well as public feedback collected at open house events, through written correspondence, and from surveys. While all six criteria were incorporated into the scoring framework because of their alignment with the County’s priorities, goals, and values, three criteria were given additional emphasis: Equity, Safety, and Asset Management. See Table 3 and Figure 8.

Table 3: Criteria Rankings and Weights

Criterion	Rank (1 = most prioritized)	Weight
Equity	1 (tied)	20%
Safety	1 (tied)	20%
Asset Management	1 (tied)	20%
Mobility	2	15%
Resiliency and Emergency Management	3	13%
Sustainability	4	12%

Figure 8: Scoring Summary



With these weights specified for application in determining final scores for projects, the scoring framework was ready. Appendix B, “Develop Normalization and Weighting for Criteria” outlines this process.



## Project Scoring

After developing the structure for the RCIPP, the County developed criteria and corresponding measures to score the projects. The criteria were developed based on a number of components, including:

- Planning documents (TSP, Bridge Capital Improvement Plan, and Strategic Capital Plan)
- Staff and upper management review
- Public involvement (stakeholder interviews and public meetings)

Within this section, an introduction is provided for each criterion, and measures are broken into the sub-topics if applicable. Following the details associated with each criterion, high-level data will be displayed for the county. For more detailed scoring information, including how scores of 0-3 are applied, see Appendix A. More detailed maps (with zoomed-in extents) can be found in Appendix C.

## Criteria and Measures

### Equity

Eight measures are divided across two sub-topics: Population Groups and Health Risk Factors. Measures under each of these sub-topics identify the relationship between a given project and (1) the distribution of vulnerable or transportation disadvantaged populations, and (2) the occurrence of health risk factors, respectively. Projects in areas with higher concentrations of these population groups or health risk factors score higher. Geographical concentrations of population groups are determined at the U.S. Census block group level.

#### *Sub-topic – Population Groups:*

The Population Groups measures are based on data from the Census Bureau. The following measures are included within this sub-topic:

- People of Color (See Figure 9)
- Limited English Proficiency (LEP) (See Figure 10)
- Older Adults (See Figure 11)
- Children (See Figure 12)
- Disability (See Figure 13)
- Low-income (See Figure 14)

#### *Sub-topic – Health Risk Factors:*

The Health Risk Factors measures are based on data from the Environmental Protection Agency (EPA) (for environmental toxins) and from the County (for body mass index [BMI]). The following measures are included within this sub-topic:

- Environmental Toxins (See Figure 15)
- BMI (See Figure 16)

Many projects, such as a major roadway or bikeway corridor project, span multiple block groups. In these cases, each segment of the project is assigned a score for each measure for every block group the project intersects. The project's overall score for a given Equity measure is assigned based on the average (mean) of all the data for that measure across all applicable block groups.

Figure 9: Map of People of Color for Multnomah County

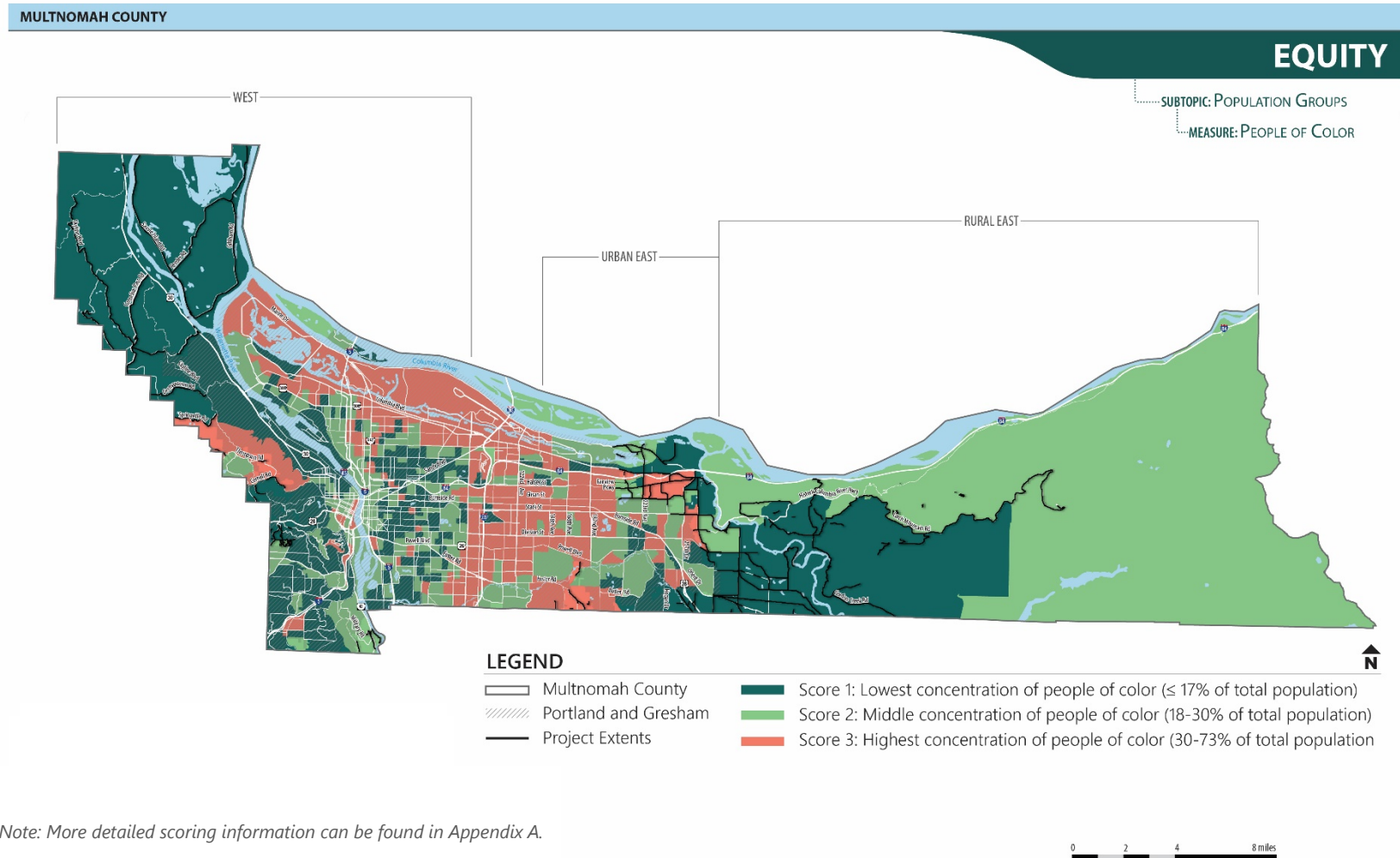
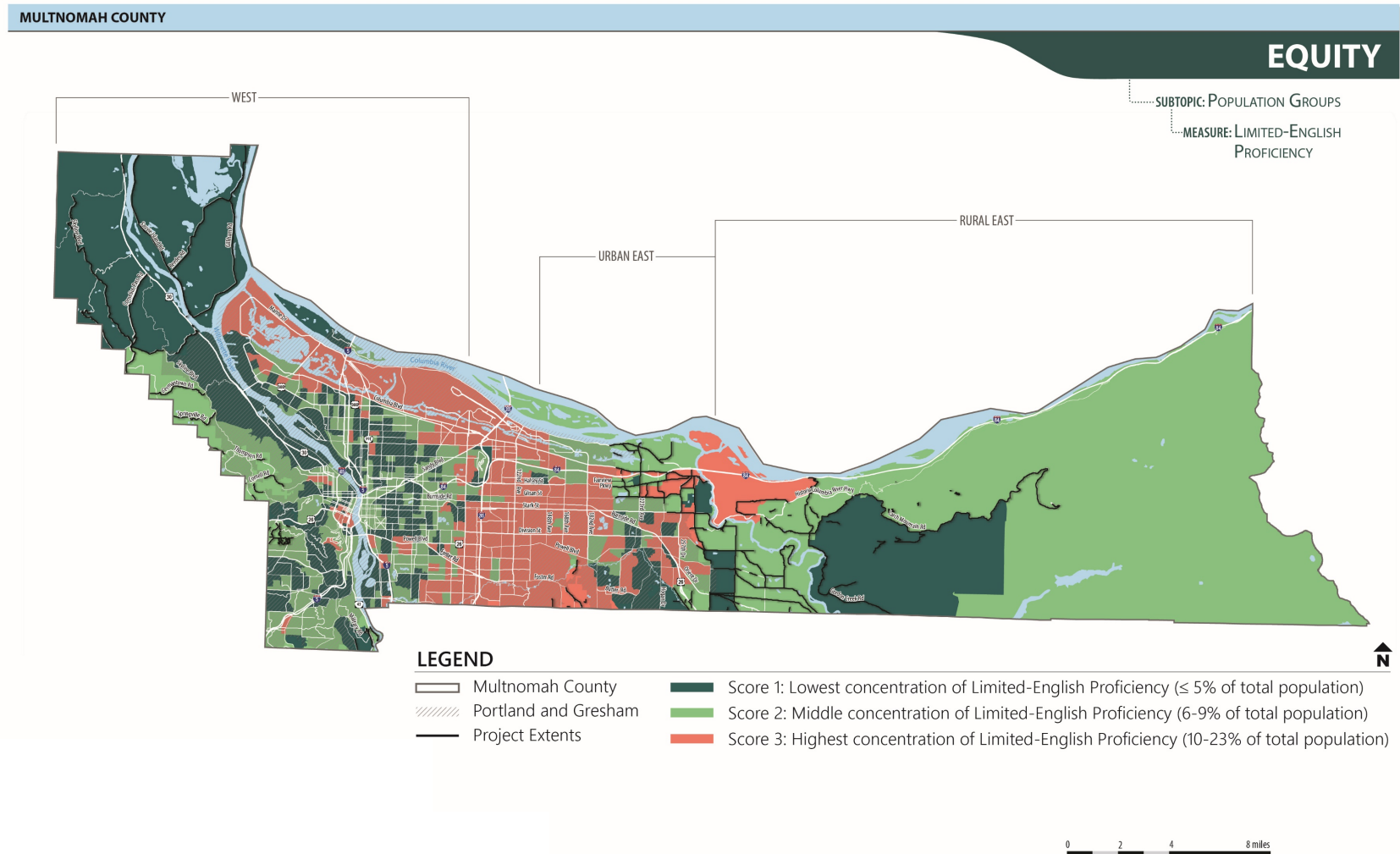
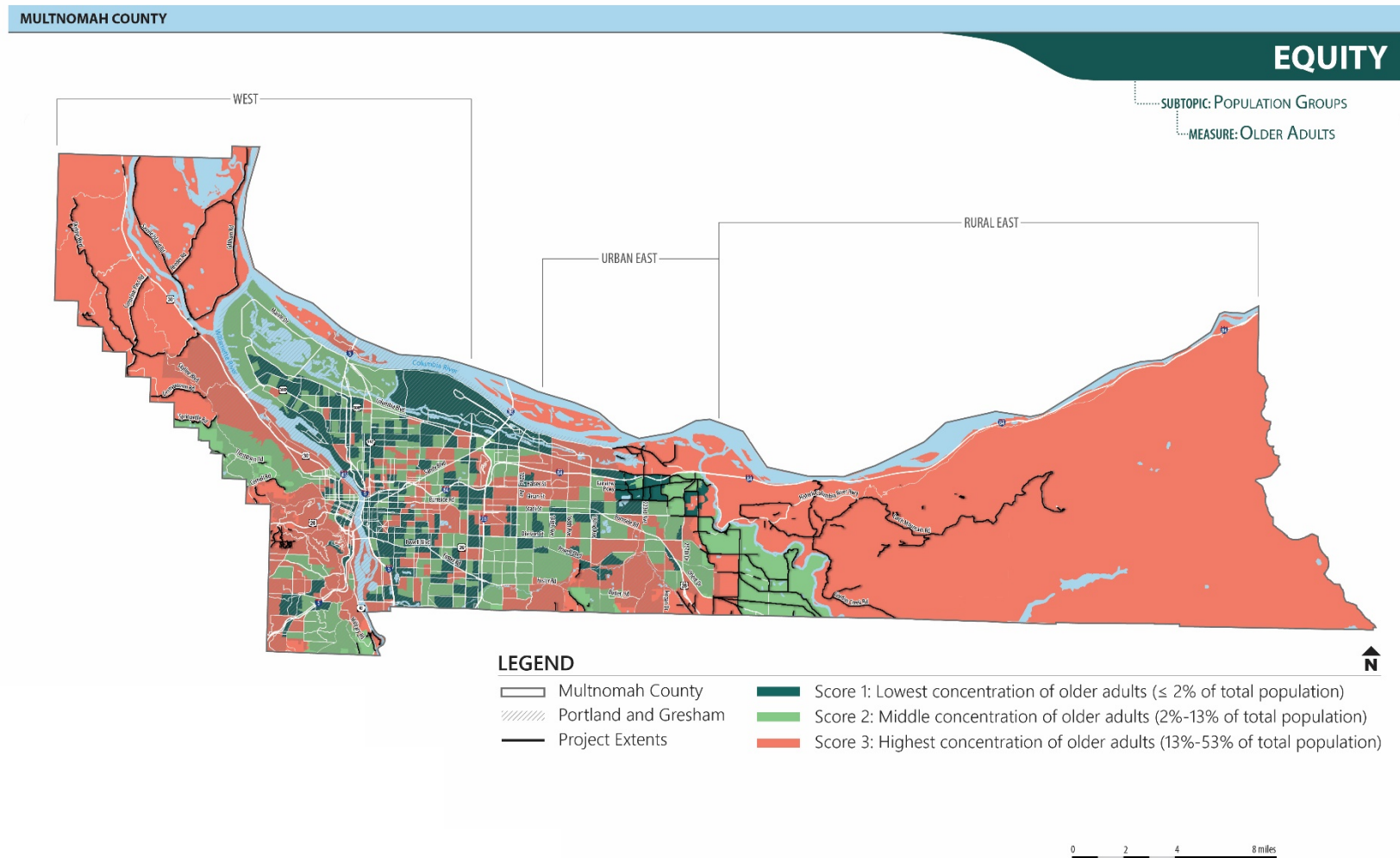


Figure 10: Map of Limited English Proficiency (LEP) for Multnomah County



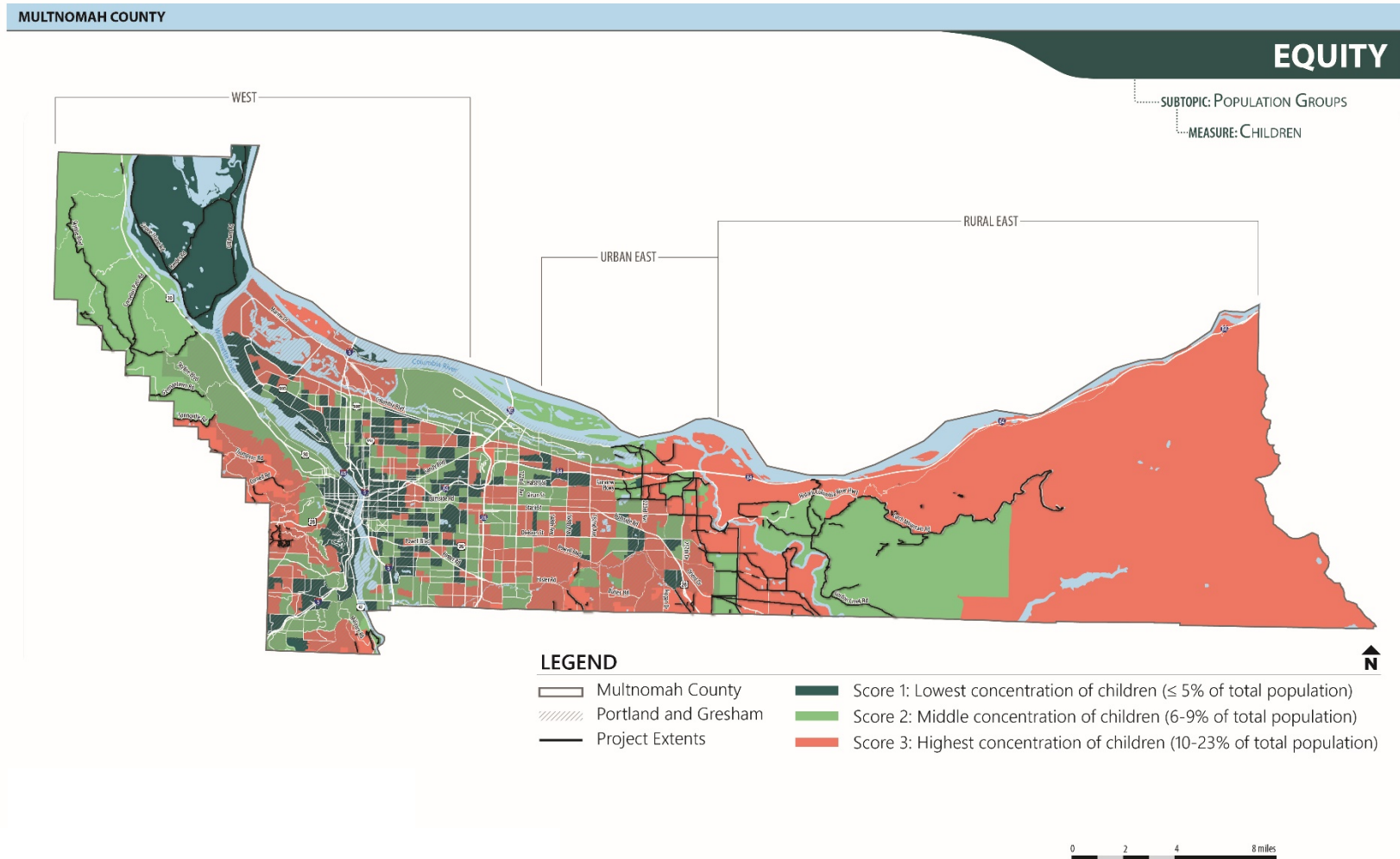
Note: More detailed scoring information can be found in Appendix A.

Figure 11: Map of Older Adults for Multnomah County



Note: More detailed scoring information can be found in Appendix A.

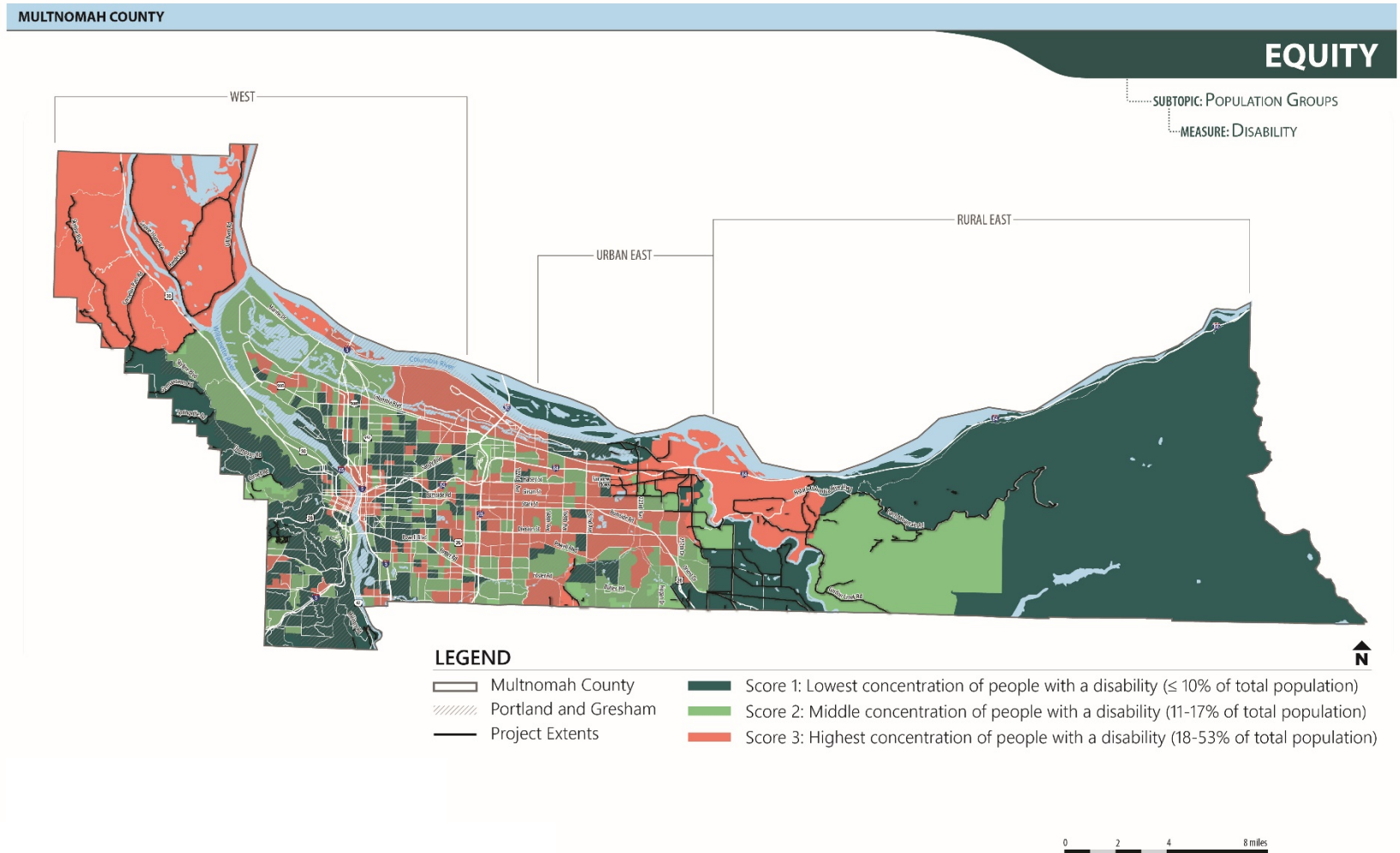
Figure 12: Map of Children for Multnomah County



Note: More detailed scoring information can be found in Appendix A.

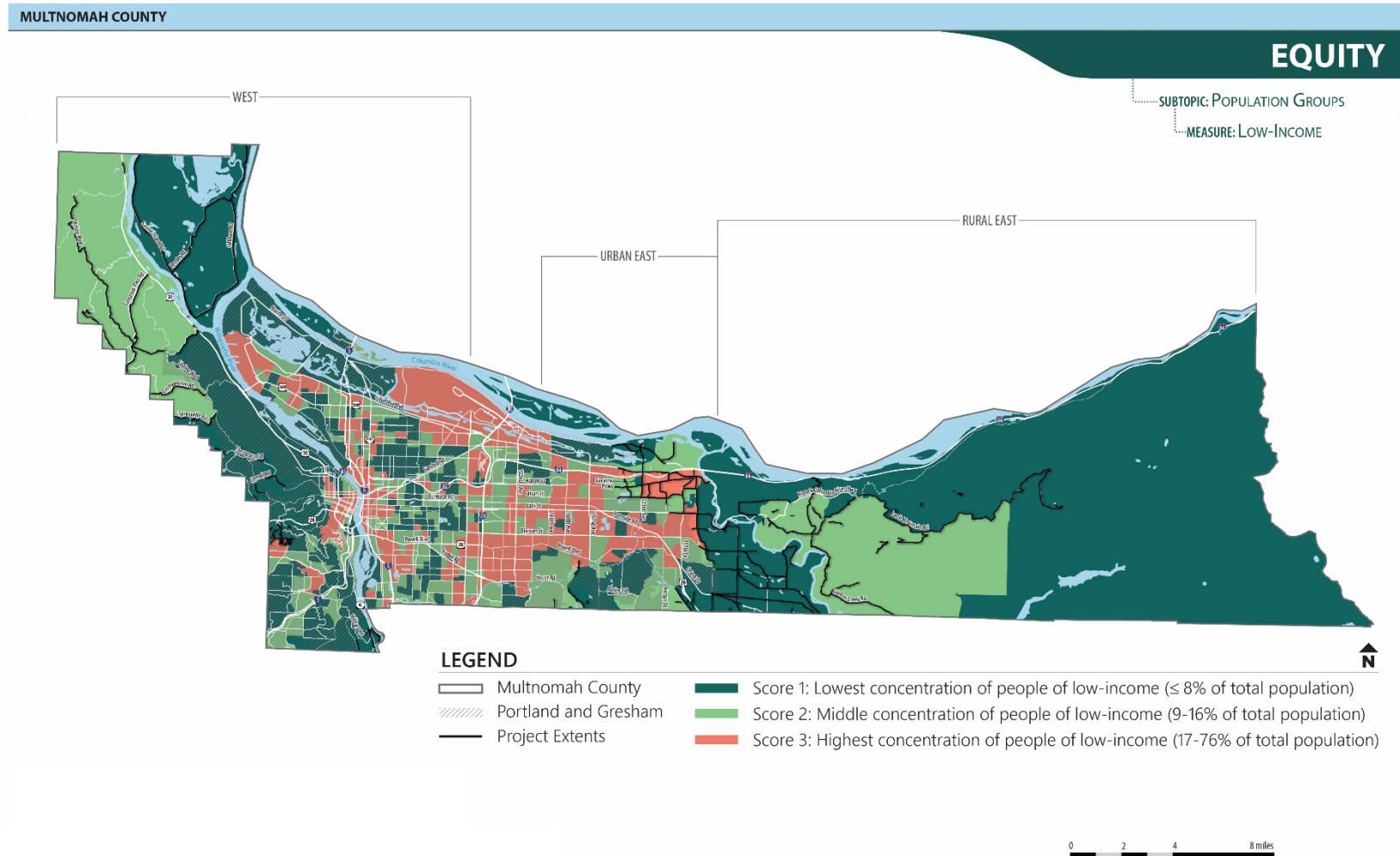


Figure 13: Map of Disability for Multnomah County



Note: More detailed scoring information can be found in Appendix A.

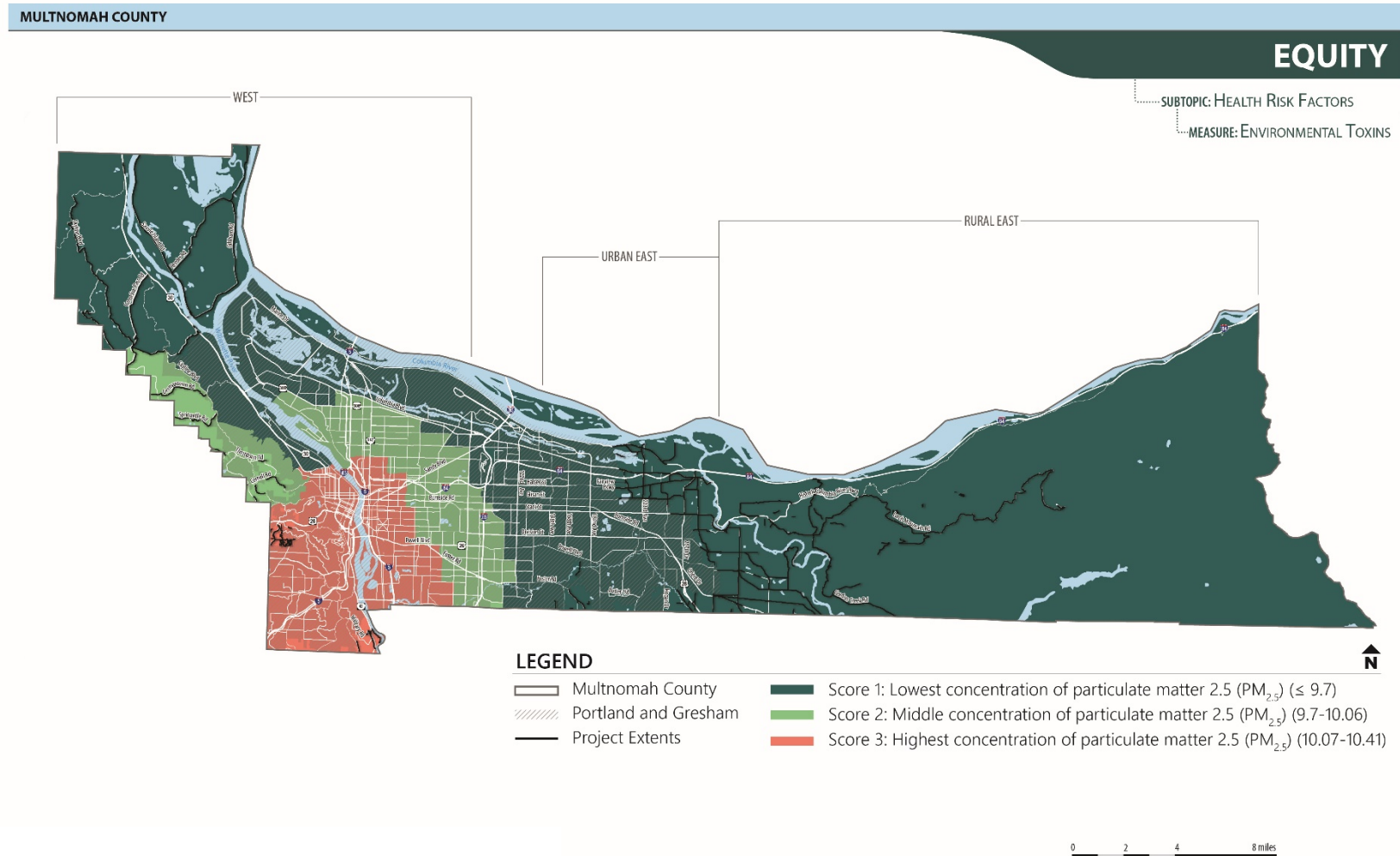
Figure 14: Map of Low-Income for Multnomah County



Note: More detailed scoring information can be found in Appendix A.

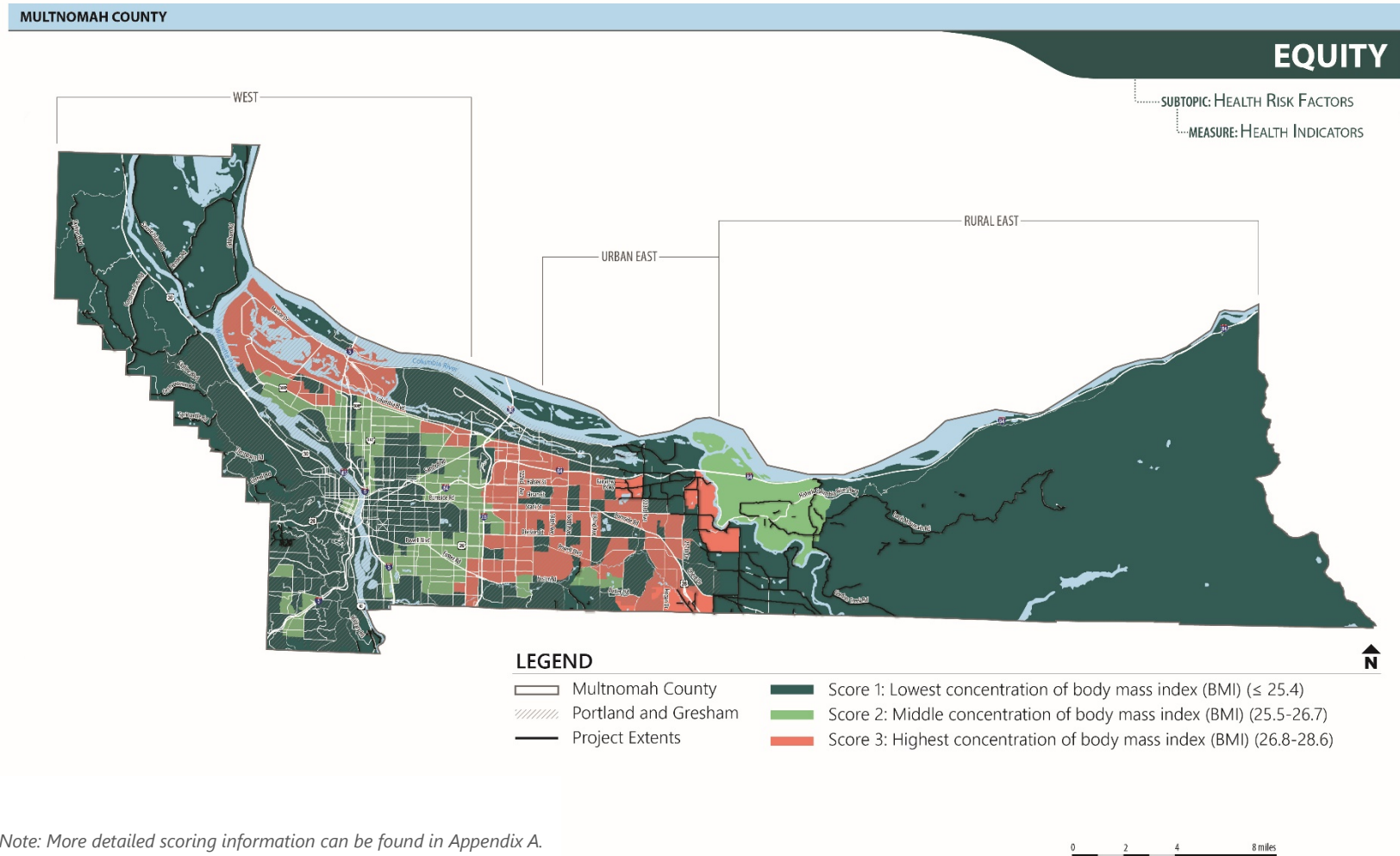


Figure 15: Map of Environmental Toxins for Multnomah County



Note: More detailed scoring information can be found in Appendix A.

Figure 16: Map of BMI for Multnomah County



## Safety

Six measures are identified for the Safety criterion, divided among three sub-topics: Existing Crash Information, Potential Crash Information, and Potential Safety Benefits. These measures evaluate projects in the context of safety needs for a transportation facility. Projects achieving the highest scores for the measures in this criterion are those in areas with a history of crashes or greater potential for crashes as well as those that incorporate specific improvements to improve safety for all users.

### *Sub-topics – Existing Crash Information and Potential Crash Information:*

Existing Crash Information and Potential Crash Information data comes from the County. The following measures are included within these sub-topics:

#### *Existing Crash Information*

- Safety priority index system (SPIS) rating (See Figure 17)
- Severity of crashes (See Figure 18)
- Pedestrian/bicycle crashes (See Figure 19)

#### *Potential Crash Information*

- Safety index (See Figure 20)

### *Sub-topic – Potential Safety Benefits:*

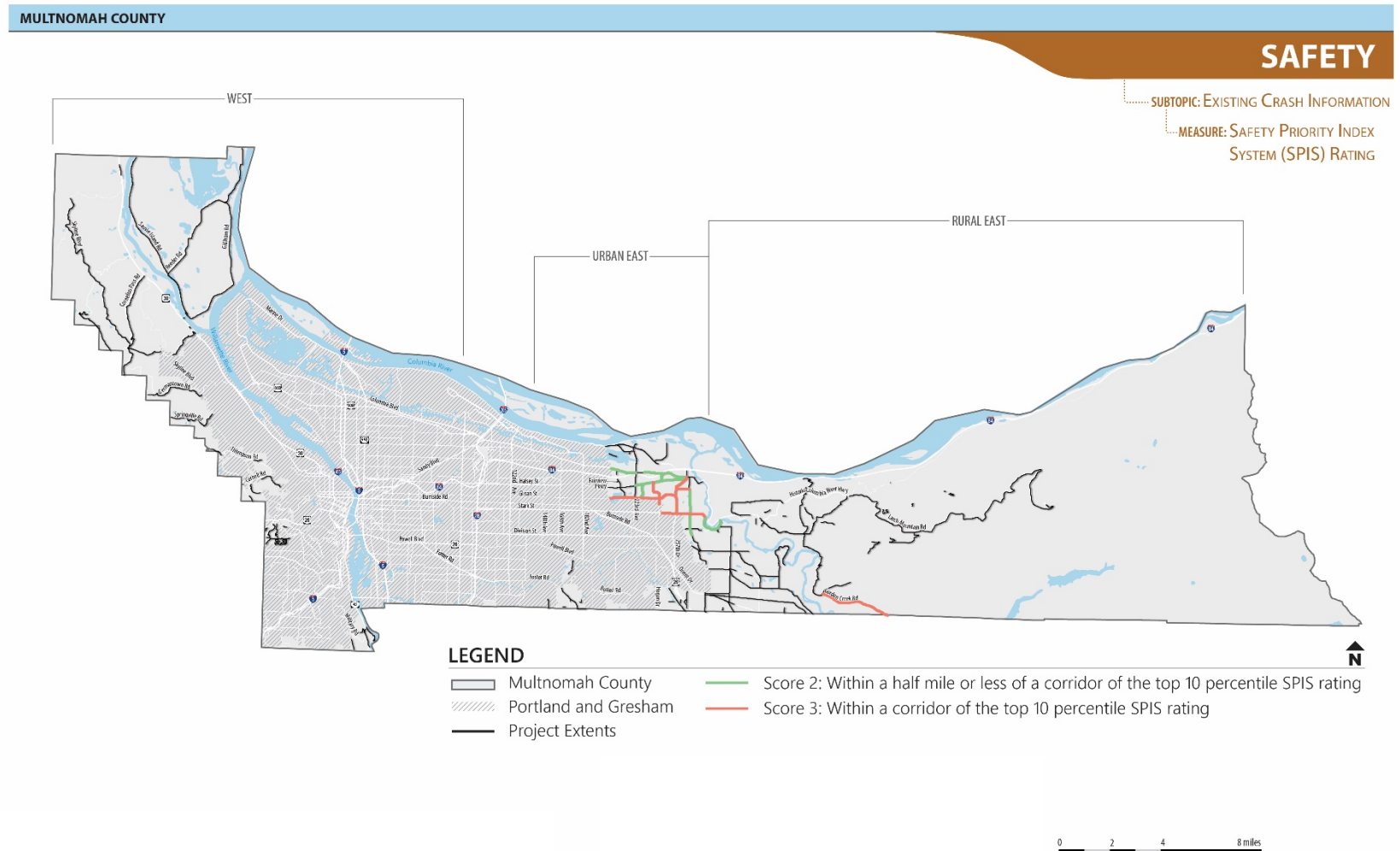
The Potential Safety Benefits sub-topic is based on details associated with the project description. The following measures are included within this sub-topic:

- Potential safety benefits for non-motorized modes
- Potential safety benefits for motor vehicles

For projects with multiple scores for multiple units of analysis (e.g., a project corridor divided into multiple street segments) for a given Safety measure, the project will score the maximum of all scores.

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Figure 17: Map of Safety Priority Index System (SPIS) Rating for Multnomah County



Note: Score of 1 was not utilized for this measure. More detailed scoring information can be found in Appendix A.

Figure 18: Map of Severity of Crashes for Multnomah County

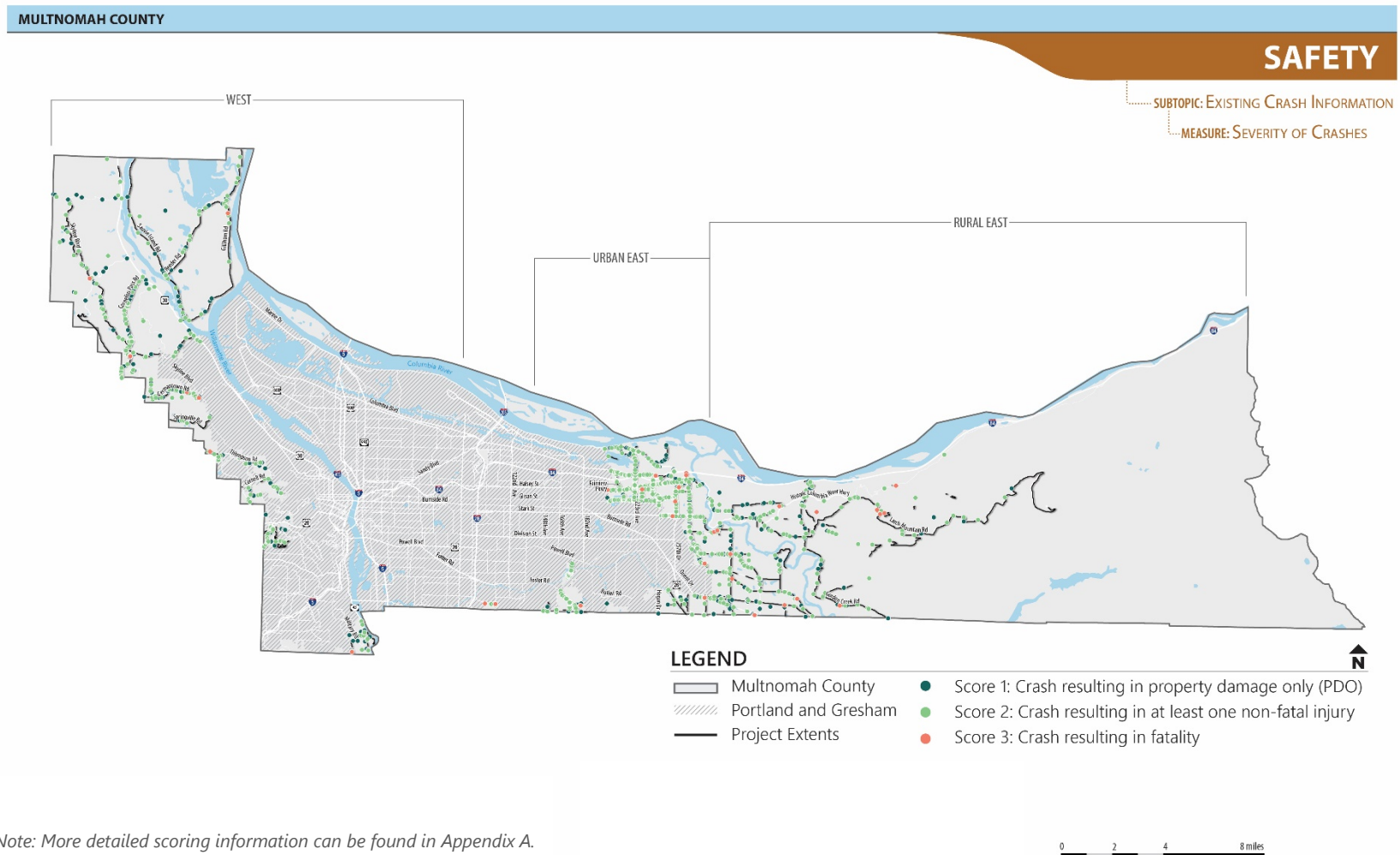




Figure 19: Map of Pedestrian/Bicycle Crashes for Multnomah County

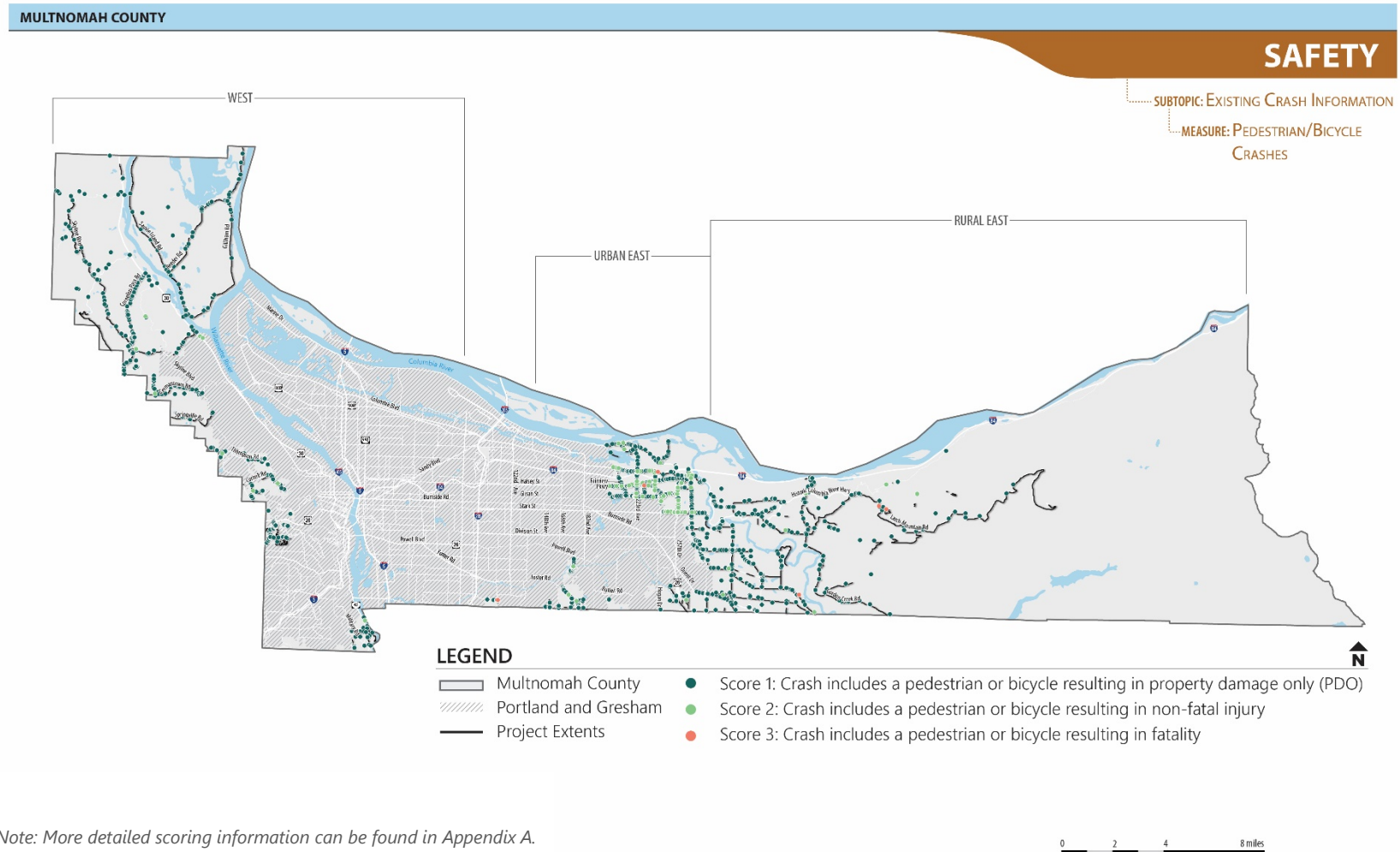
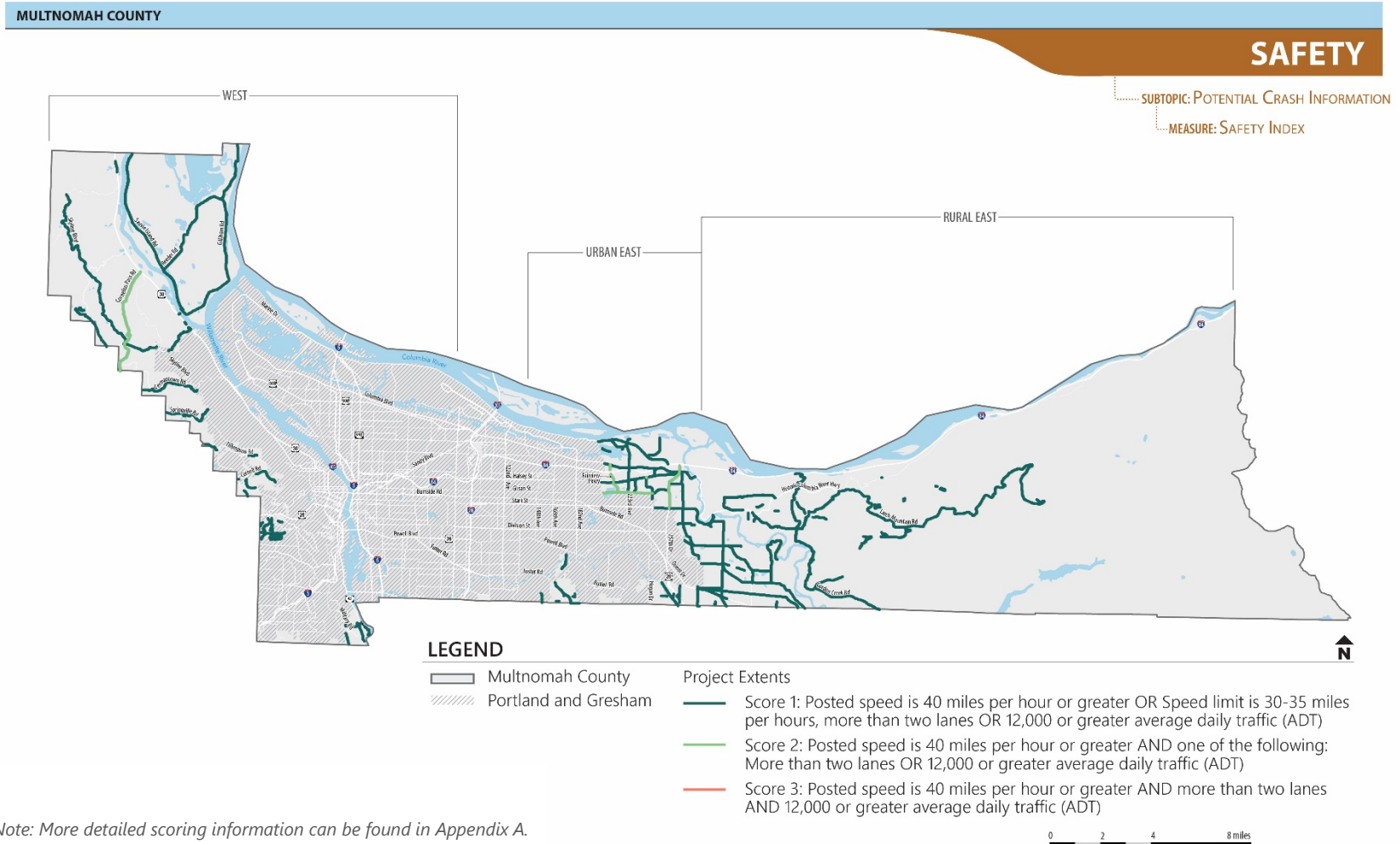


Figure 20: Map of Safety Index for Multnomah County





## Mobility

Eight measures are identified for the Mobility criterion and are divided into three sub-topics: Infrastructure, Operations, and Capacity. These measures serve to prioritize projects that best address mobility and accessibility needs in the County. Projects that score highest across the measures under the Mobility criterion provide enhanced freedom of mobility as well as improved inter-modal connectivity and accessibility for all users.

### *Sub-topic – Infrastructure:*

Most of the measures within the infrastructure topic are based on data provided by the County (Project Length is the only exception and is based on the project description). The following measures are included within this sub-topic:

- Project length
- Transit connections (See Figure 21)
- School connections (See Figure 22)
- Americans with Disabilities Act (ADA) compliance (See Figure 23)

### *Sub-topic – Operations:*

The Operations sub-topic and only measure, Congestion Relief, is based on data from the County, with boundary information from Metro. The following measures are included within this sub-topic:

- Congestion relief (See Figure 24)

### *Sub-topic – Capacity:*

The three Capacity sub-topics (Vehicle, Bike, and Pedestrian) are based on details associated with the project description. The following measures are included within this sub-topic:

- Vehicle capacity
- Bike capacity
- Pedestrian capacity

For projects with multiple scores for a given Mobility measure, the project will score the maximum of all scores.

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Figure 21: Map of Transit Connections for Multnomah County

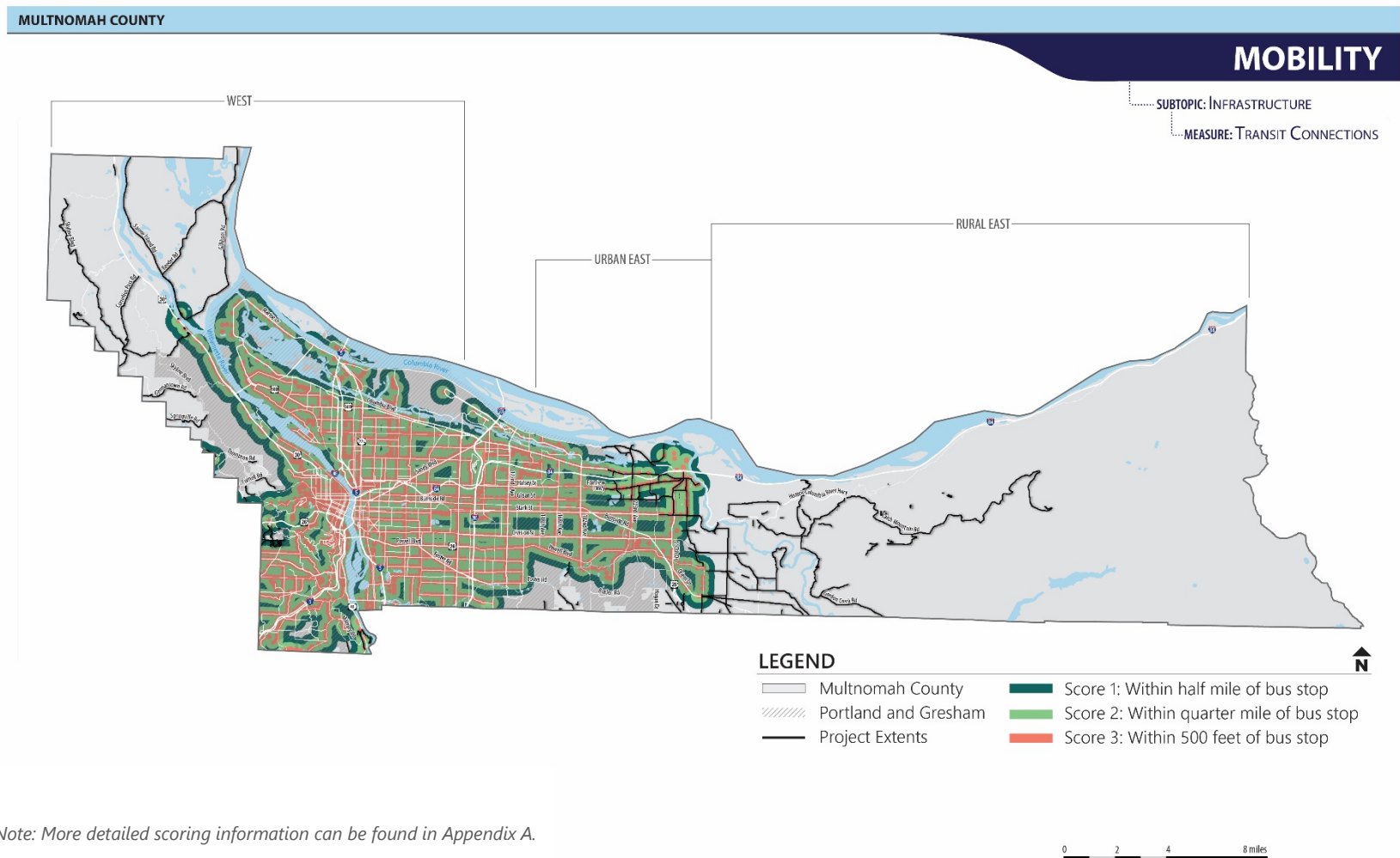
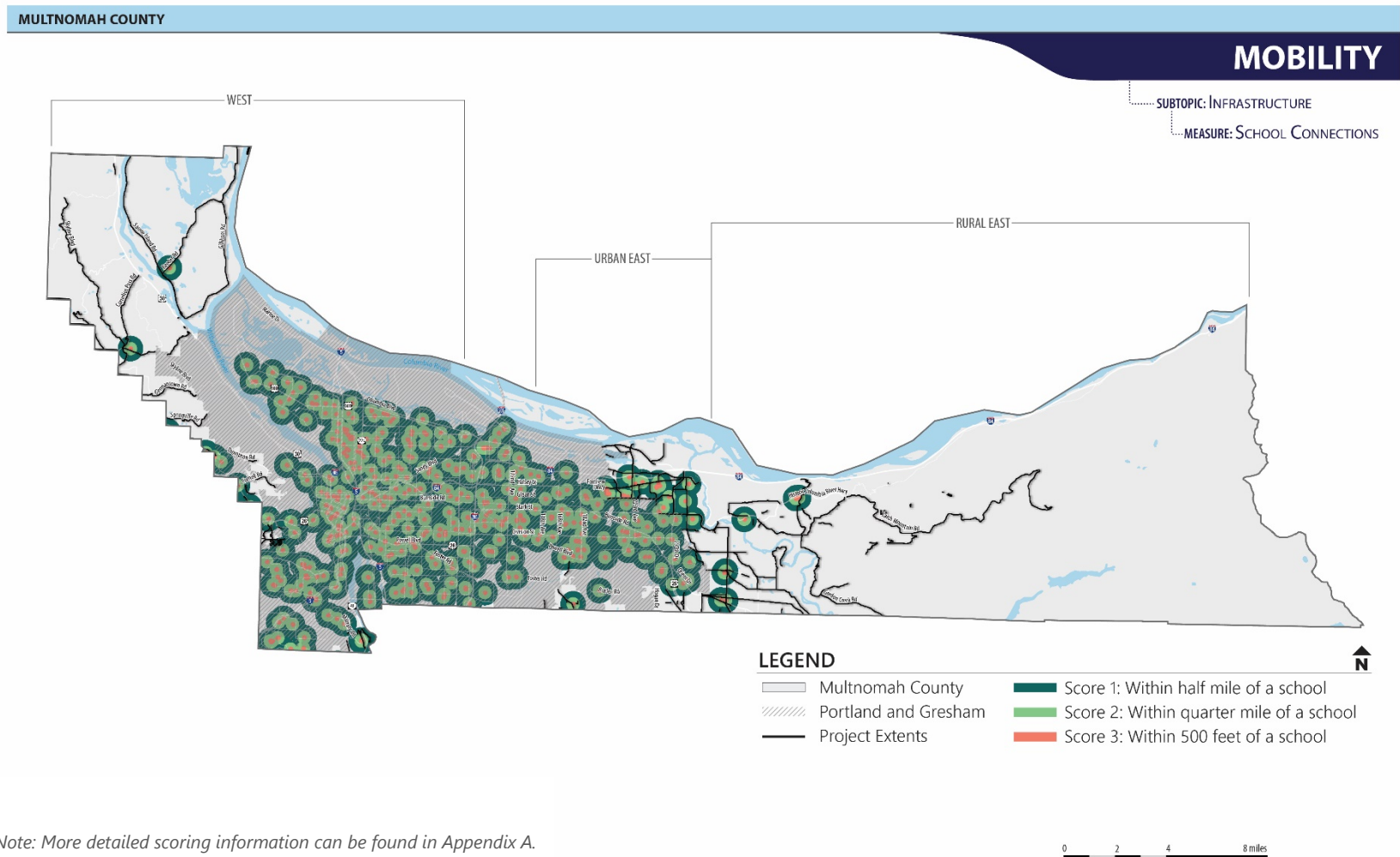


Figure 22: Map of School Connections for Multnomah County



Note: More detailed scoring information can be found in Appendix A.

Figure 23: Map of ADA Compliance for Multnomah County

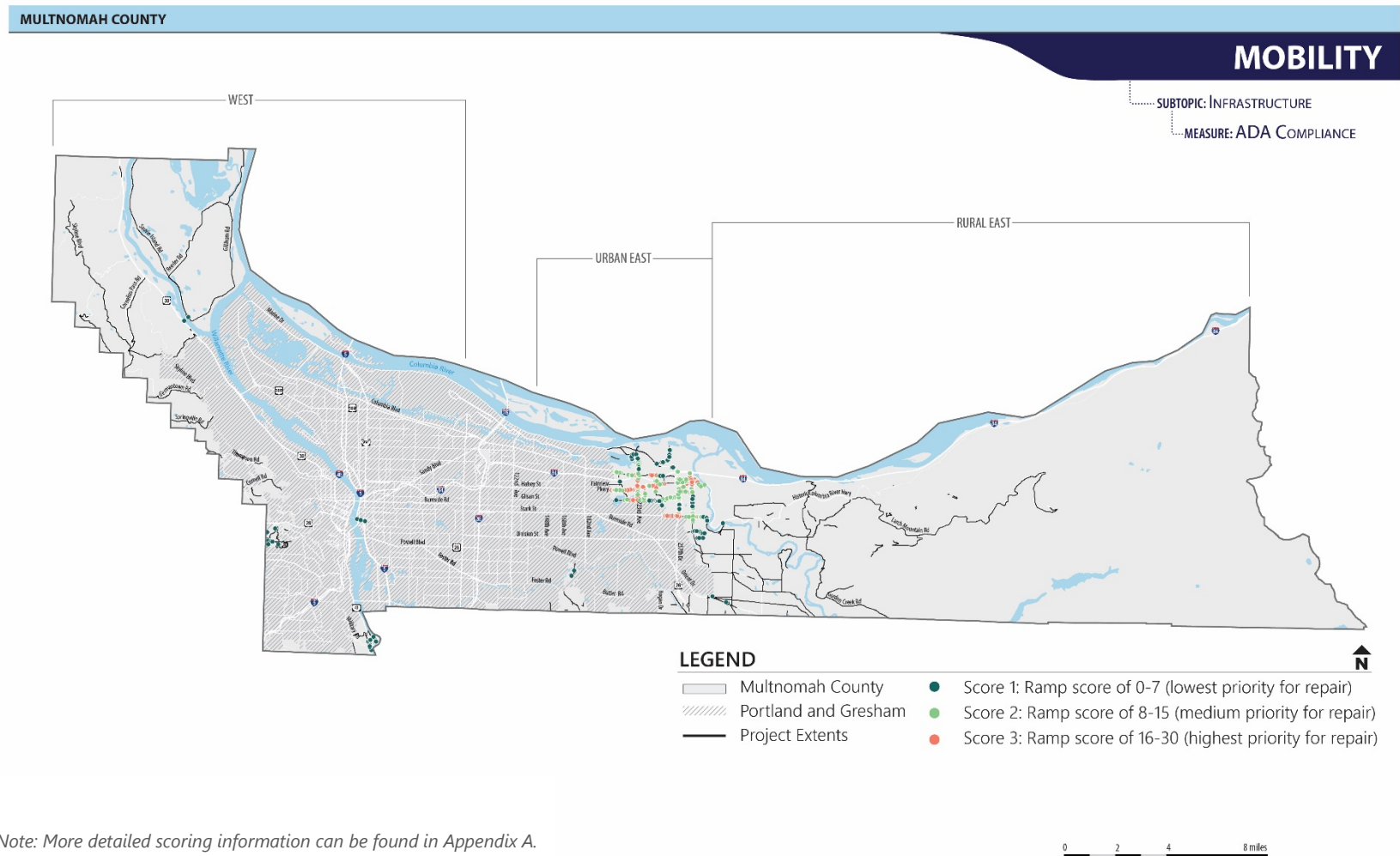
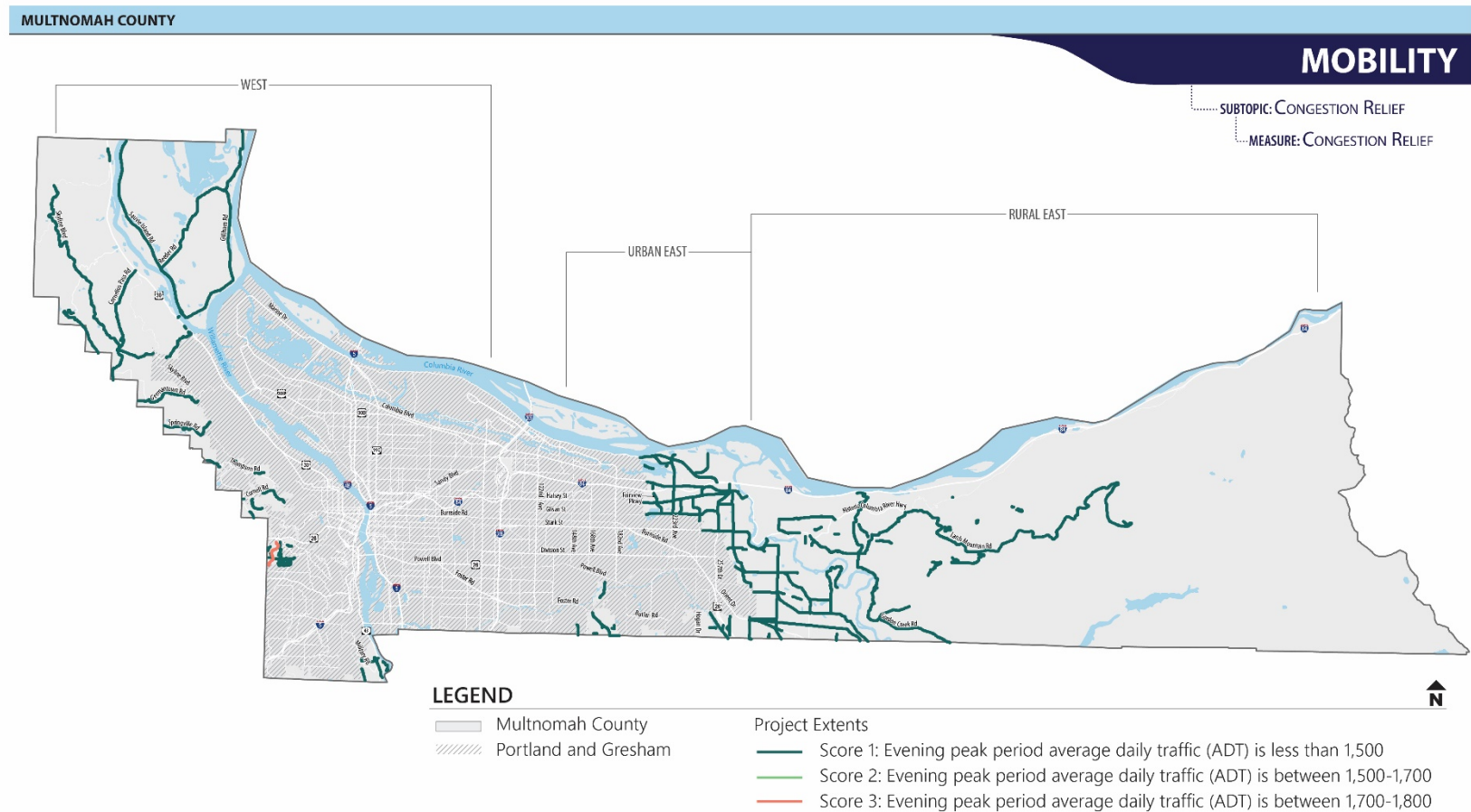


Figure 24: Map of Congestion Relief for Multnomah County



Note: More detailed scoring information can be found in Appendix A.

## Asset Management

Seven measures are under the Asset Management criterion and are divided among three sub-topics: Surface Infrastructure, Structures, and Criticality. These measures evaluate asset condition to prioritize projects that address insufficient or failing infrastructure or the County's most critical assets. Projects scoring highest for these measures are those that address areas of most urgent need or critical importance.

### *Sub-topics – Surface Infrastructure, Structures, and Criticality:*

All data used within this criterion is from the County. The following measures are included within these sub-topics:

#### *Surface Infrastructure*

- Pavement condition (See Figure 25)
- Signalized intersections (See Figure 26)
- Guardrail (See Figure 27)
- Shoulder (See Figure 28)

#### *Structures*

- Culverts (See Figure 29)
- Bridges (See Figure 30)

#### *Criticality*

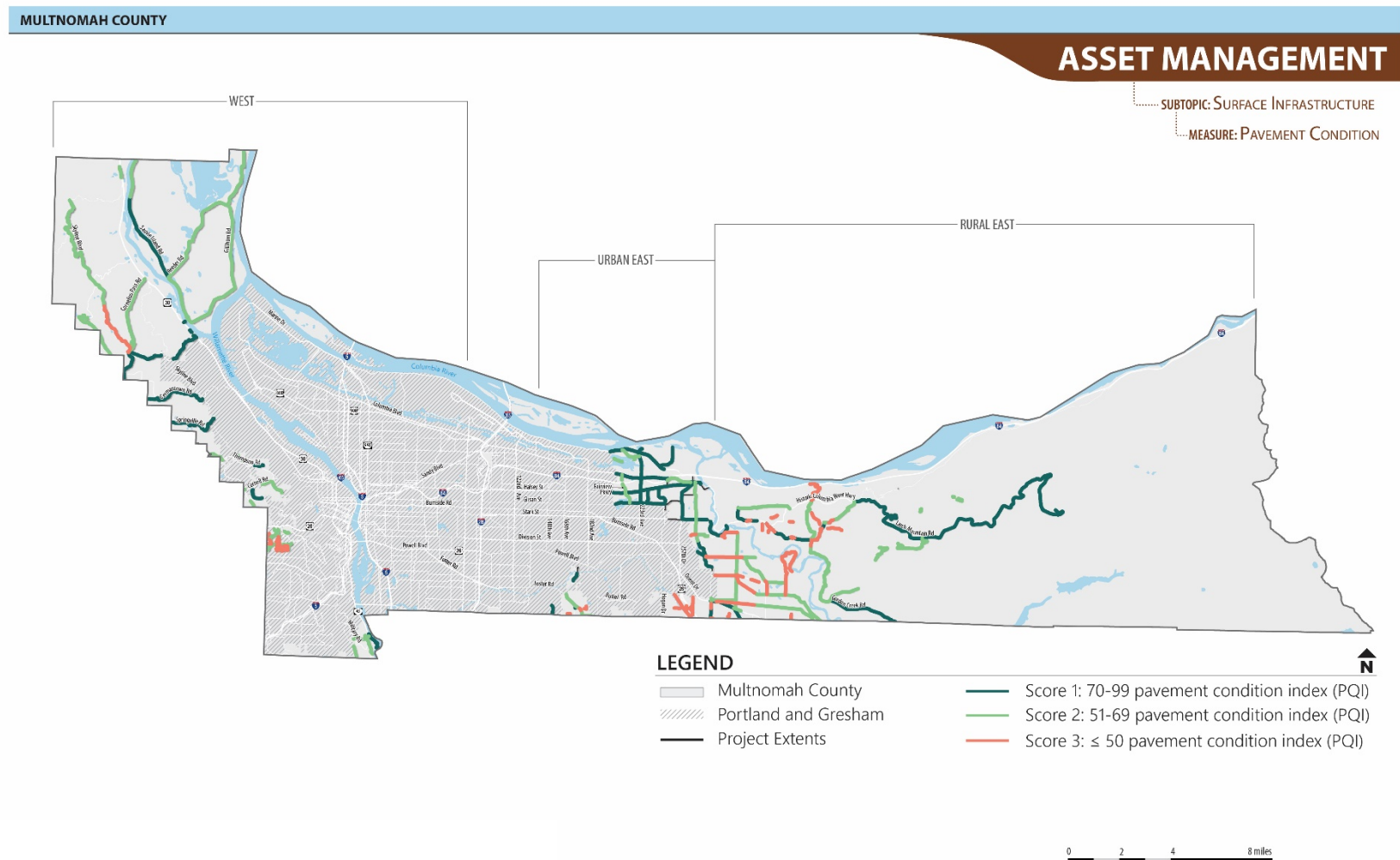
- Critical roads (See Figure 31)

For projects with multiple scores for a given Asset Management measure, the project will score the maximum of all scores.

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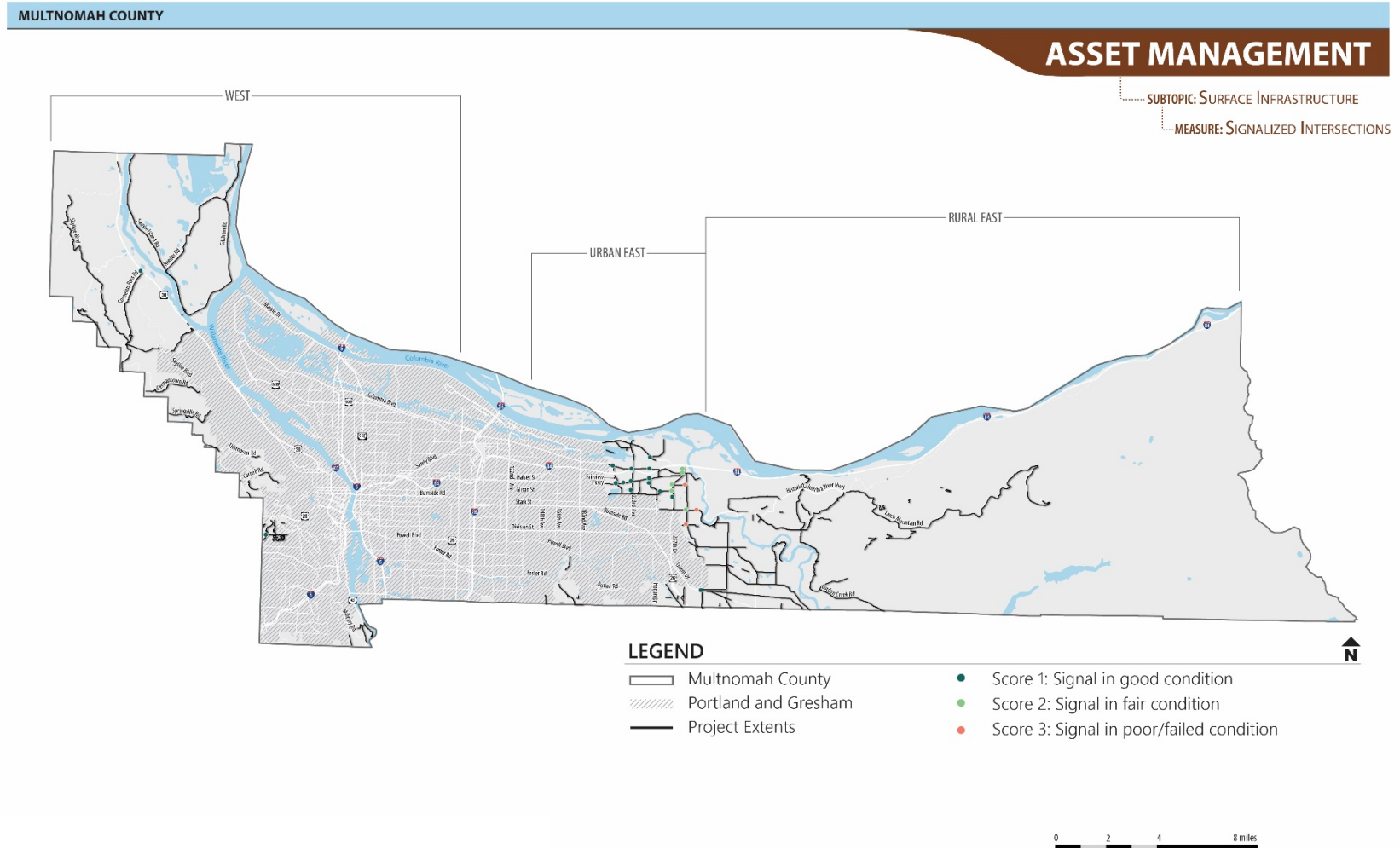


Figure 25: Map of Pavement Condition for Multnomah County



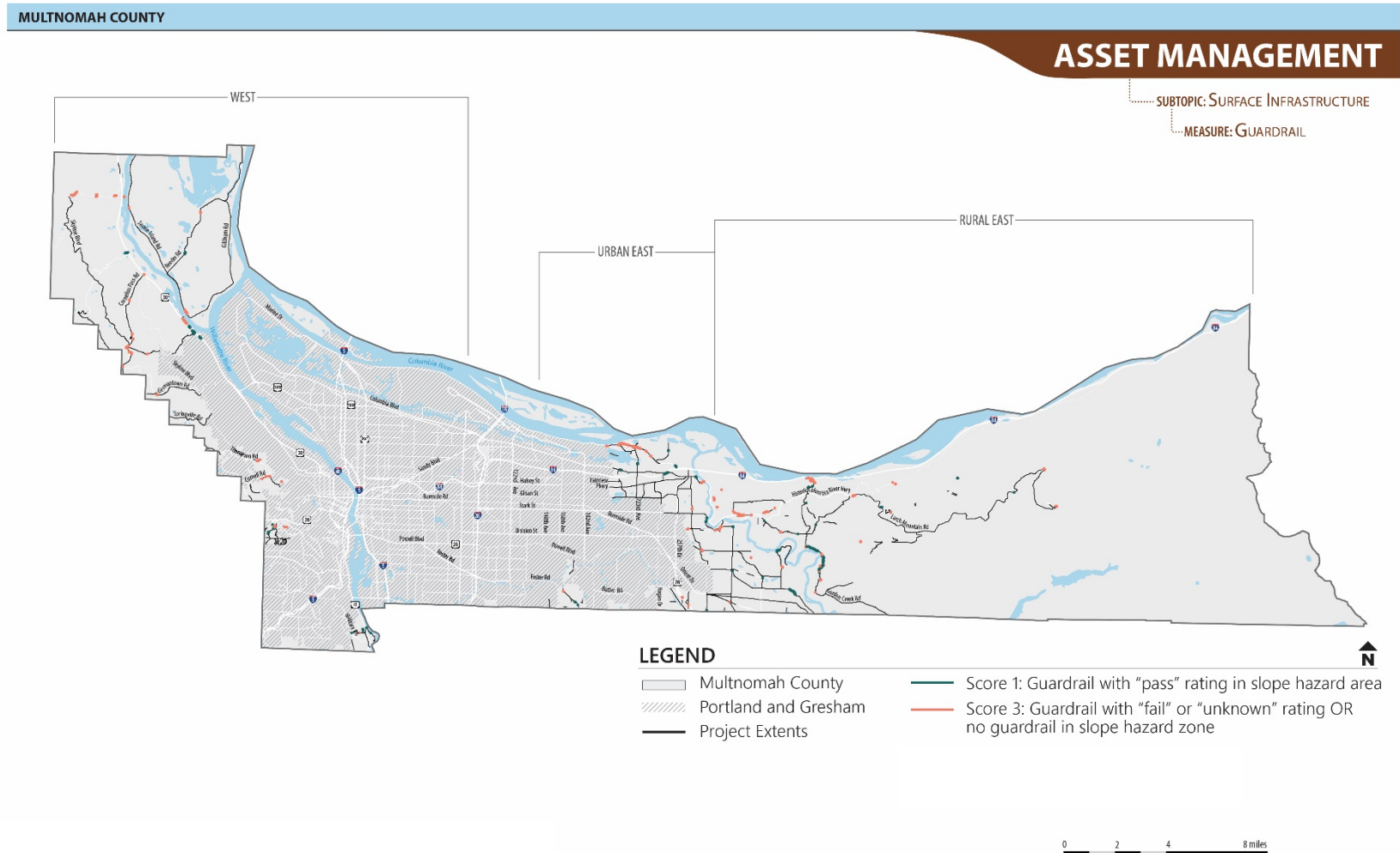
Note: More detailed scoring information can be found in Appendix A.

Figure 26: Map of Signalized Intersections for Multnomah County



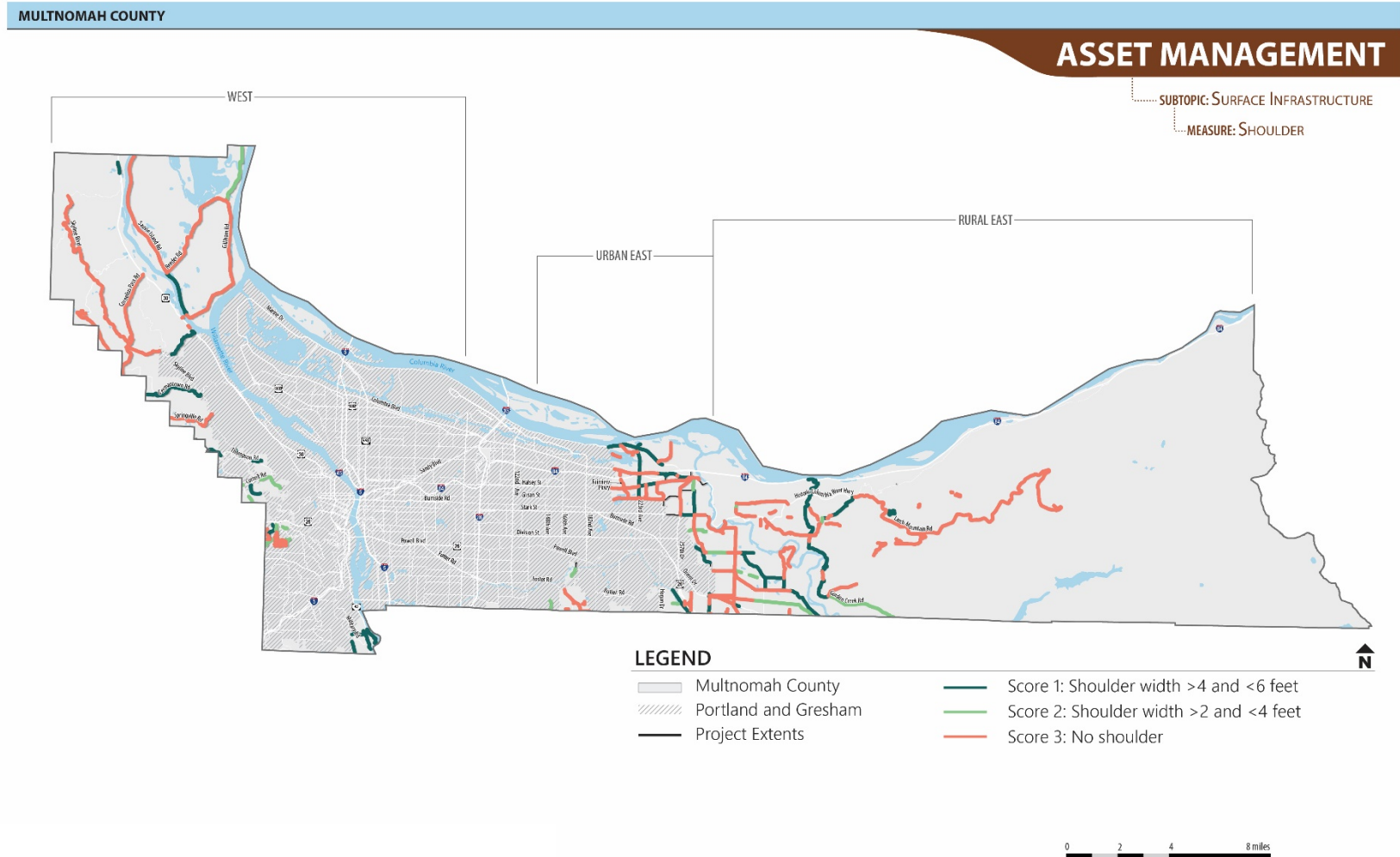
Note: More detailed scoring information can be found in Appendix A.

Figure 27: Map of Guardrail for Multnomah County



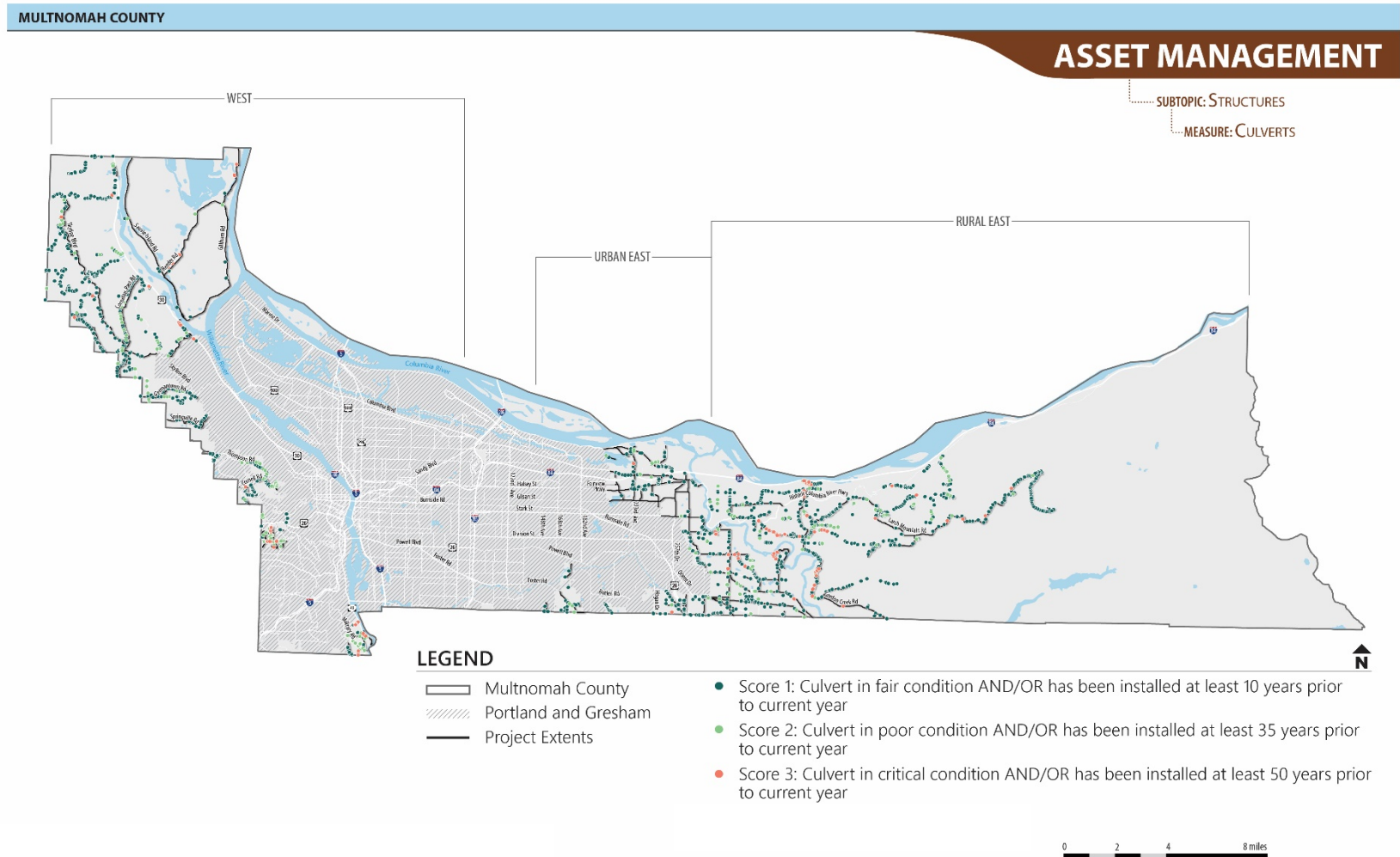
Note: Score of 2 was not utilized for this measures. More detailed scoring information can be found in Appendix A.

Figure 28: Map of Shoulders for Multnomah County



Note: More detailed scoring information can be found in Appendix A.

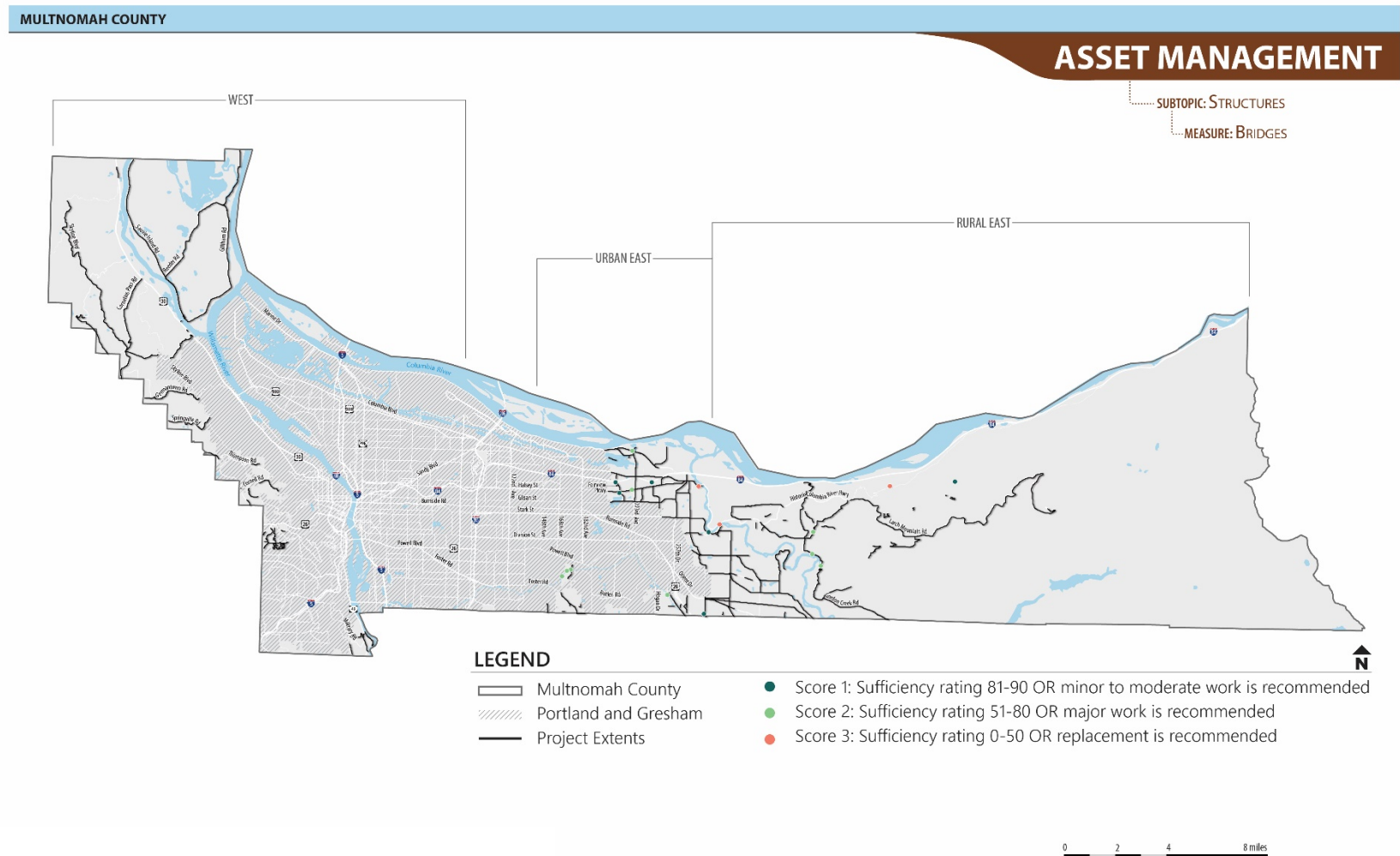
Figure 29: Map of Culverts for Multnomah County



Note: More detailed scoring information can be found in Appendix A.

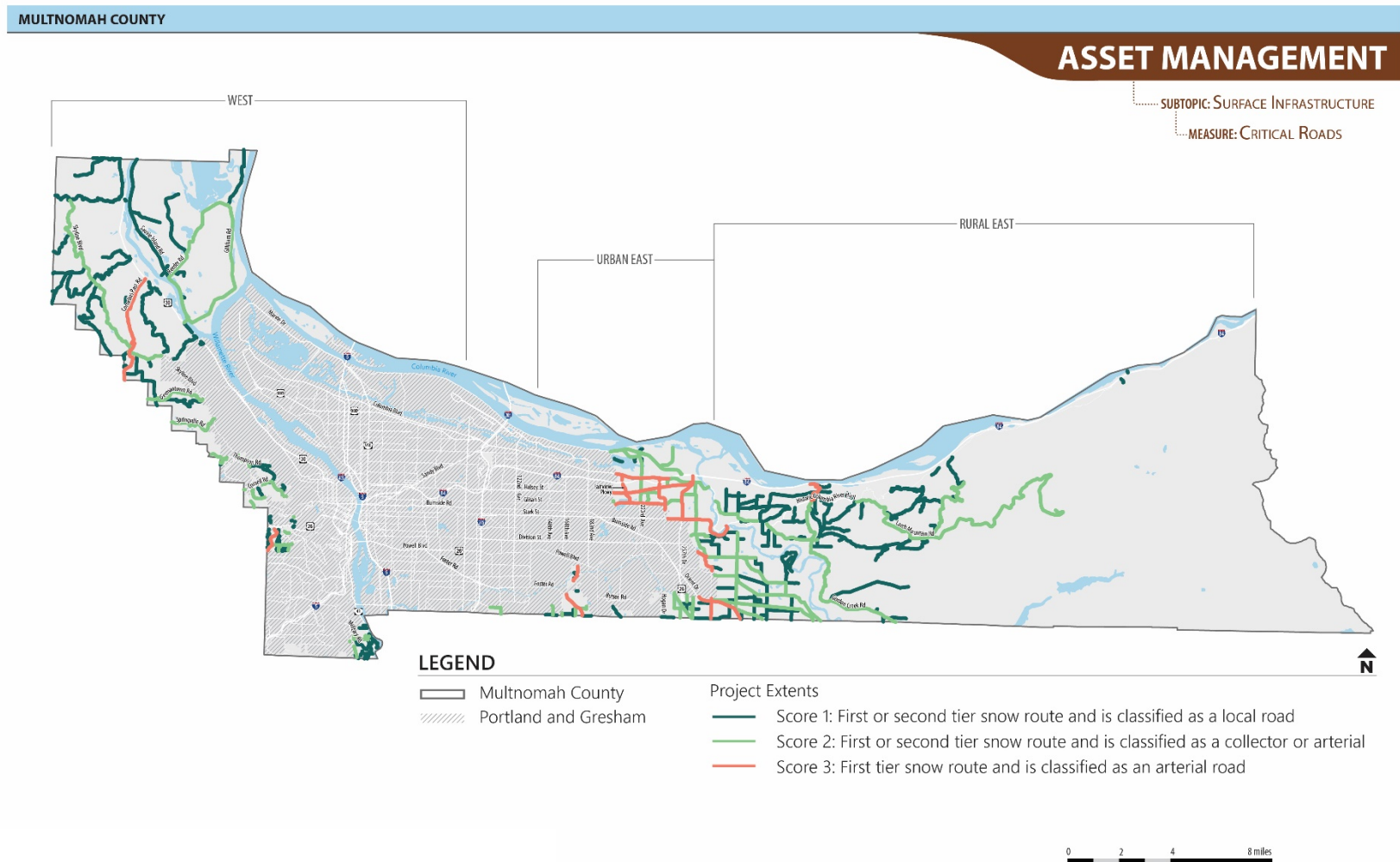


Figure 30: Map of Bridges for Multnomah County



Note: More detailed scoring information can be found in Appendix A.

Figure 31: Map of Critical Roads for Multnomah County



Note: More detailed scoring information can be found in Appendix A.

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## Resiliency and Emergency Management

Seven measures identified for the Resiliency and Emergency Management criterion evaluate how projects relate to areas associated with high risk of natural disasters and emergency response operations. The measures are divided among two sub-topics: Known Hazards and Access. The projects that score highest for this criterion are those that are located in areas of high risk hazards and enhance mobility and accessibility for emergency response services.

### *Sub-topics – Known Hazards and Access:*

All data used within this criterion is from the County. Additional data from the Oregon Department of Geology and Mineral Industries (DOGAMI) was integrated into the landslide measure within the Known Hazards sub-topic. The following measures are included within these sub-topics:

#### *Known Hazards*

- Landslides (See Figure 32)
- Earthquakes (See Figure 33)
- Wildfire risk (See Figure 34)
- Floodplain (See Figure 35)

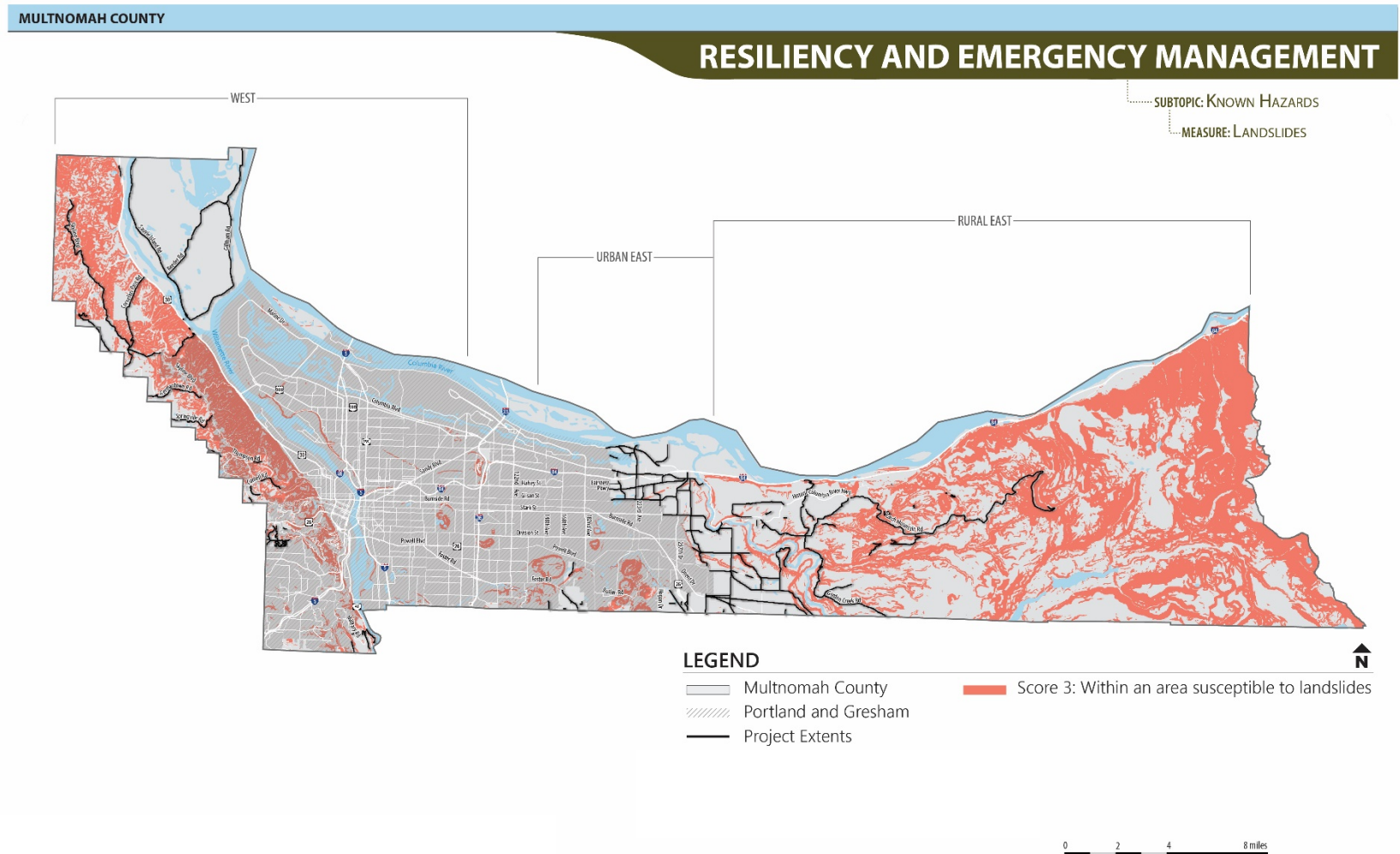
#### *Access*

- Emergency response proximity (See Figure 36)
- Emergency transportation routes (ETRs) (See Figure 37)
- Important access (See Figure 38)

For projects with multiple scores for a given Resiliency and Emergency Management measure, the project will score the maximum of all scores.

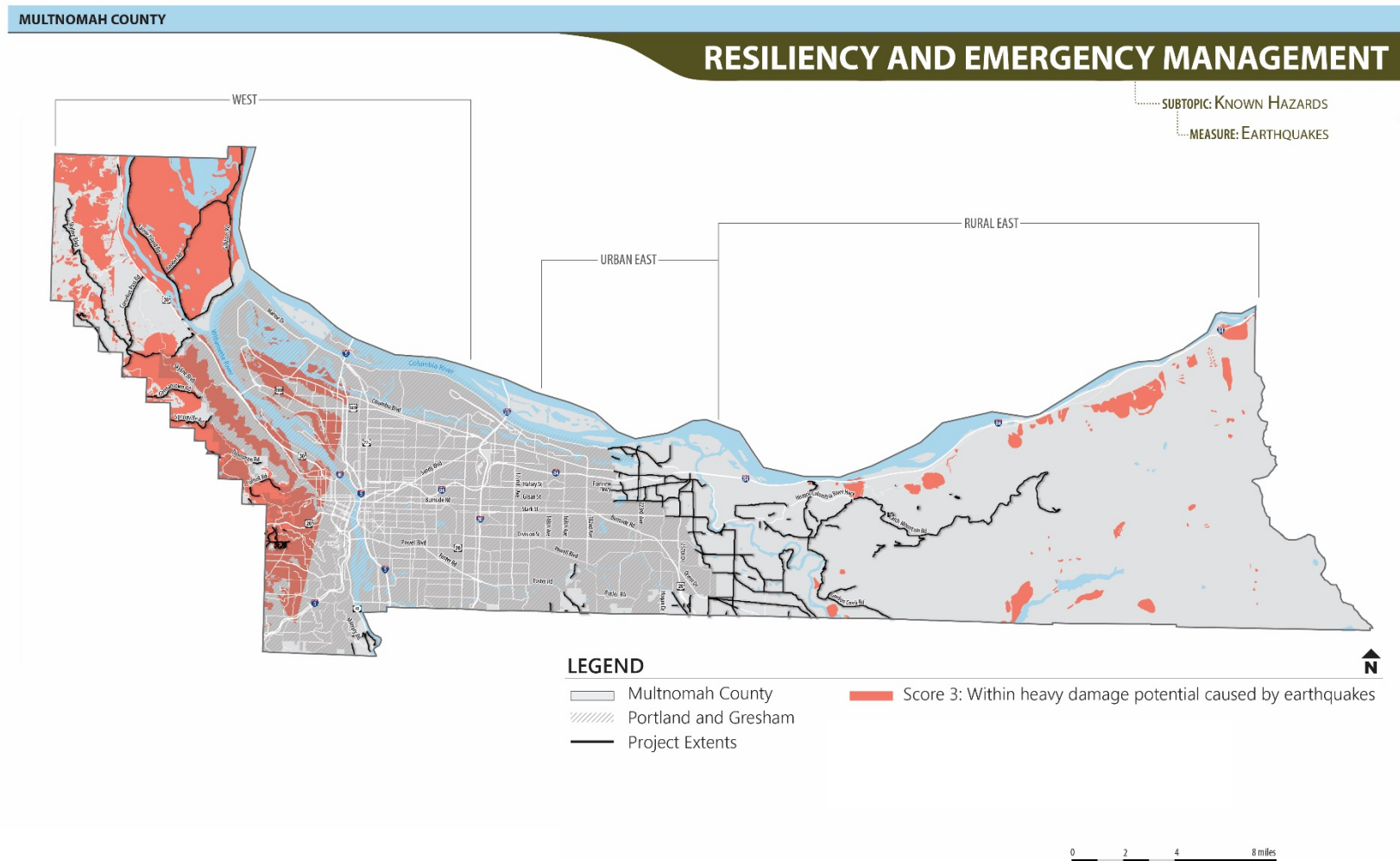
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Figure 32: Map of Landslides for Multnomah County



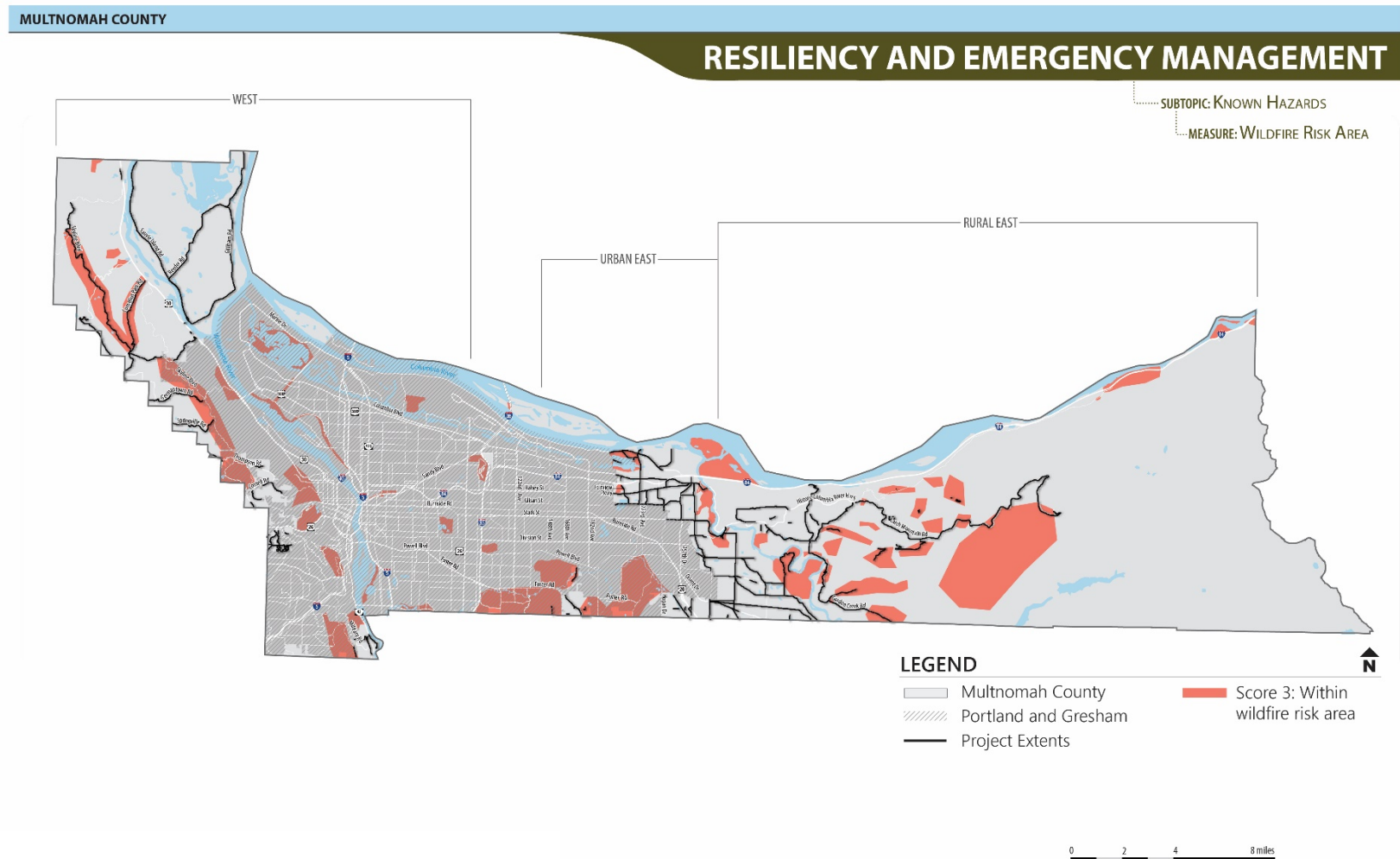
Note: Scores of 1 and 2 were not utilized for this measure. More detailed scoring information can be found in Appendix A.

Figure 33: Map of Earthquakes for Multnomah County



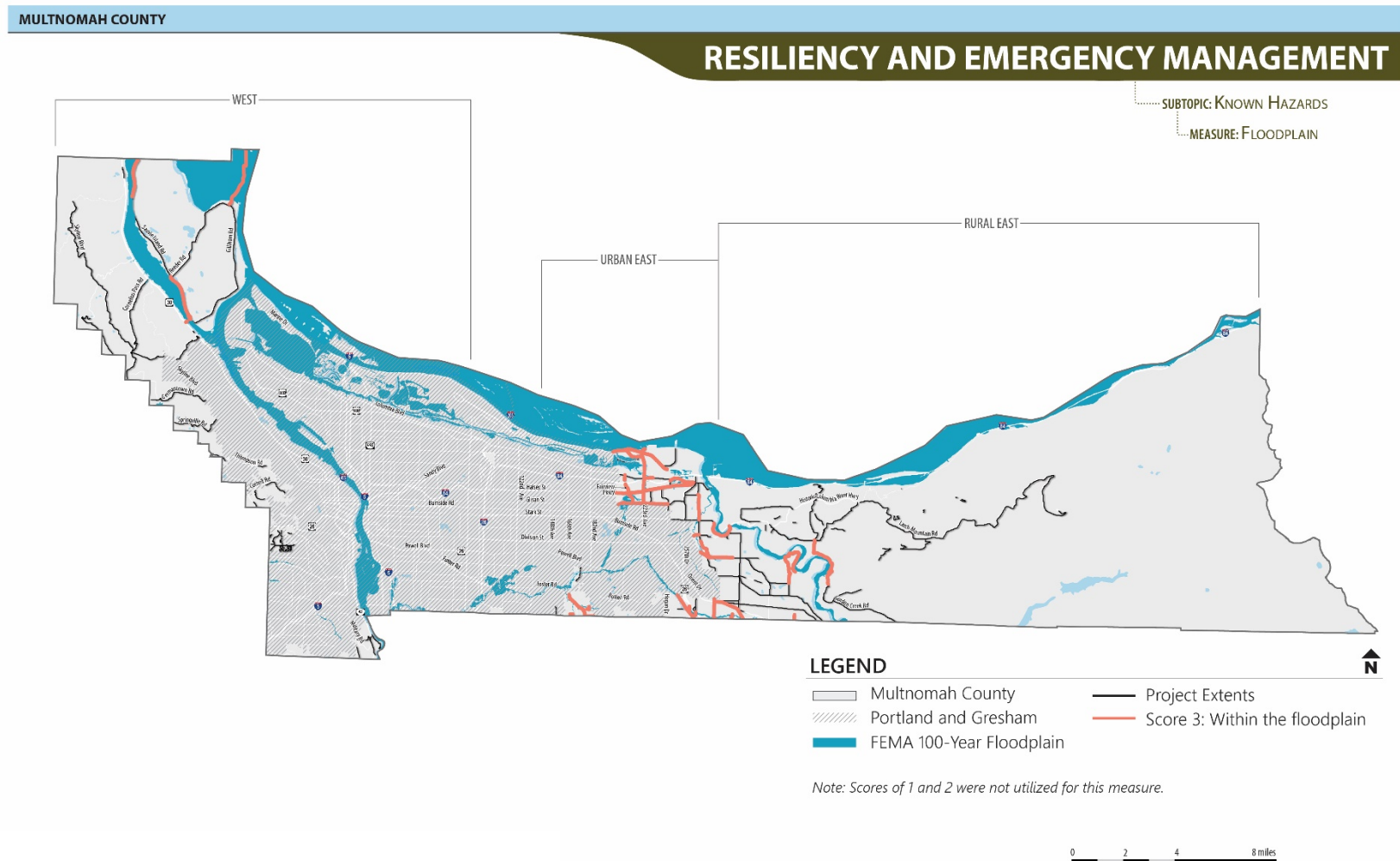
Note: Scores of 1 and 2 were not utilized for this measure. More detailed scoring information can be found in Appendix A.

Figure 34: Map of Wildfire Risk for Multnomah County



Note: Scores of 1 and 2 were not utilized for this measure. More detailed scoring information can be found in Appendix A.

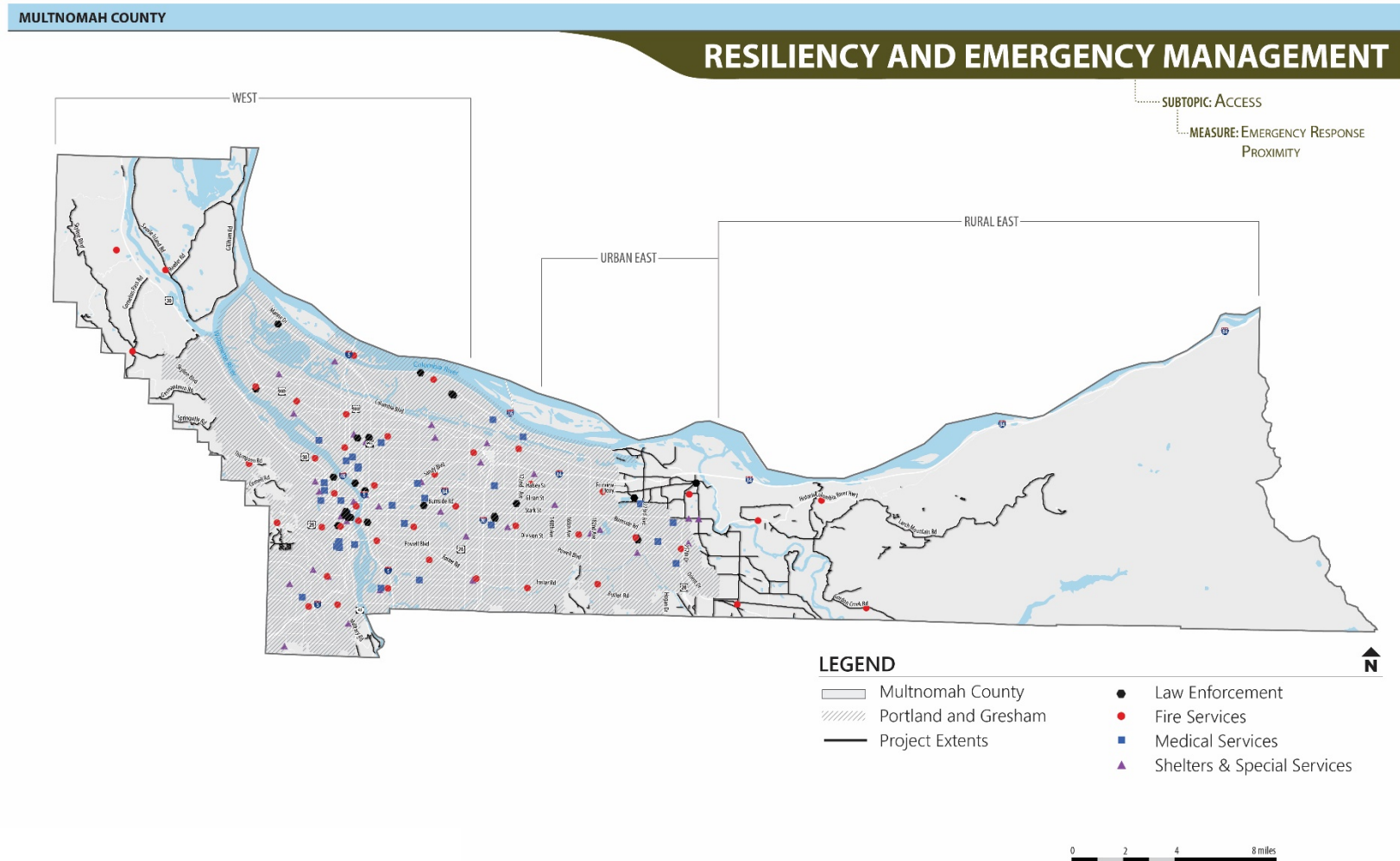
Figure 35: Map of Floodplain for Multnomah County



Note: Scores of 1 and 2 were not utilized for this measure. More detailed scoring information can be found in Appendix A.

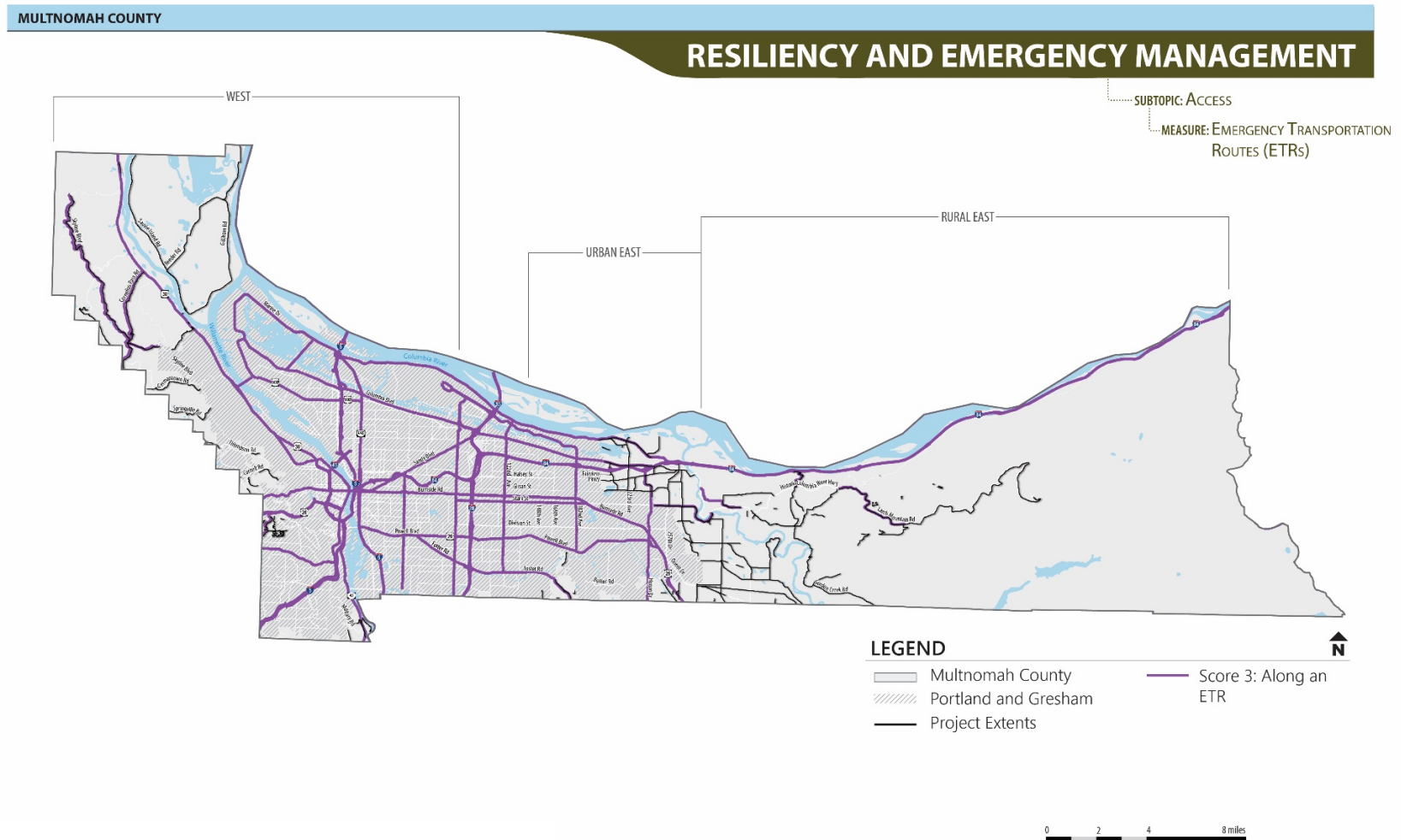


Figure 36: Map of Emergency Response Proximity for Multnomah County



Note: Scores of 1-3 are based on proximity. More detailed scoring information can be found in Appendix A.

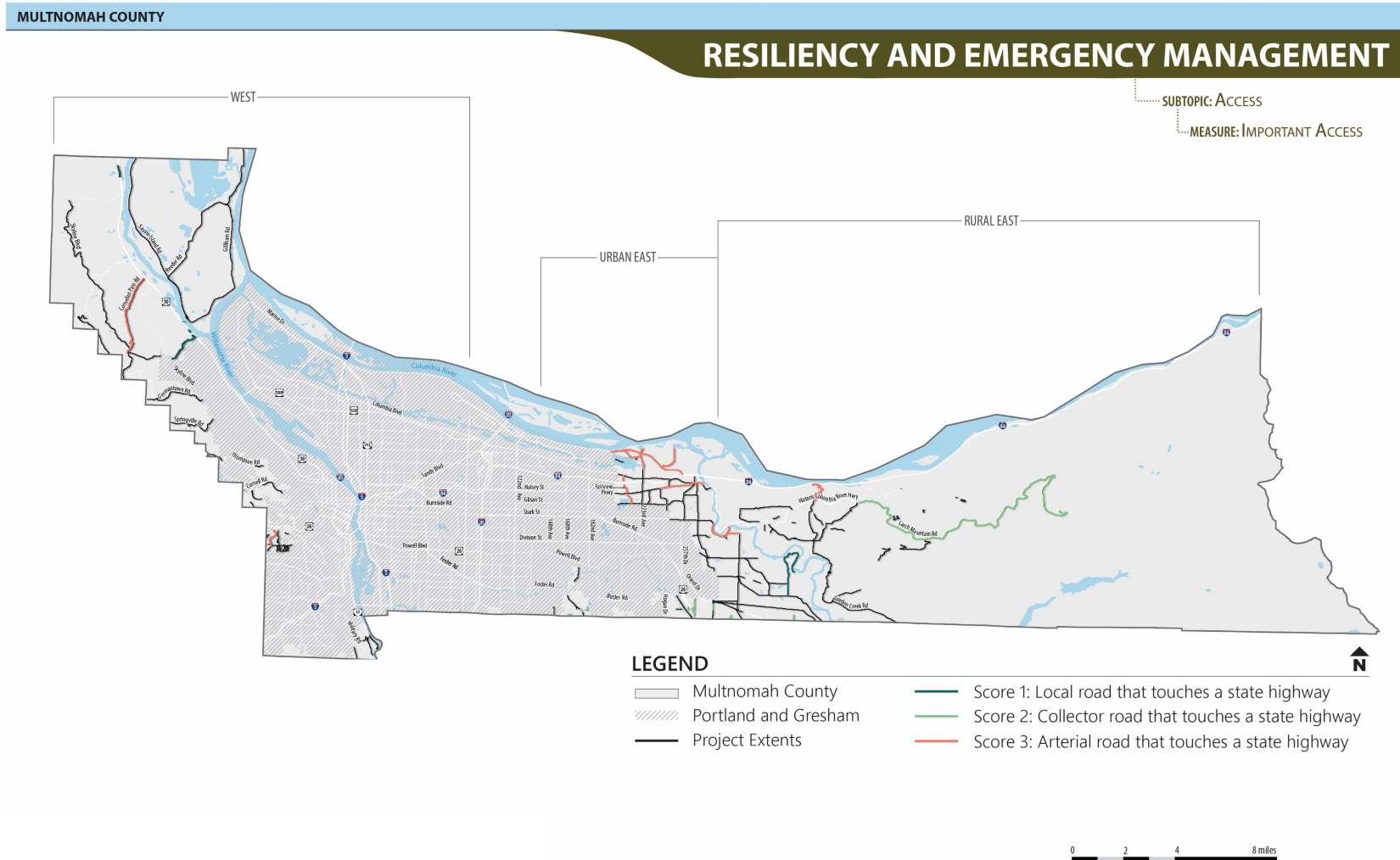
Figure 37: Map of Emergency Transportation Routes (ETRs) for Multnomah County



Note: Scores of 1 and 2 were not utilized for this measure. More detailed scoring information can be found in Appendix A.



Figure 38: Map of Important Access for Multnomah County



Note: More detailed scoring information can be found in Appendix A.

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## Sustainability

Four measures are identified under the Sustainability criterion and are divided among two sub-topics: Economic Vitality and Environmental Protection. These measures evaluate the relationship between the project location and employment opportunities and high value lands or habitats, respectively. Projects located closer to employment centers and sensitive lands score higher; it is assumed that these projects will contribute positively to increased economic activity and protection of natural resources.

### *Sub-topics – Economic Vitality:*

The Jobs measure is evaluated based on Census Bureau data. The Rural Center and Opportunity Zones measure uses data from Business Oregon and the County. The following measures are included within this sub-topic:

- Jobs (See Figure 39)
- Rural centers and opportunity zones (See Figure 40)

### *Sub-topics – Environmental Protection:*

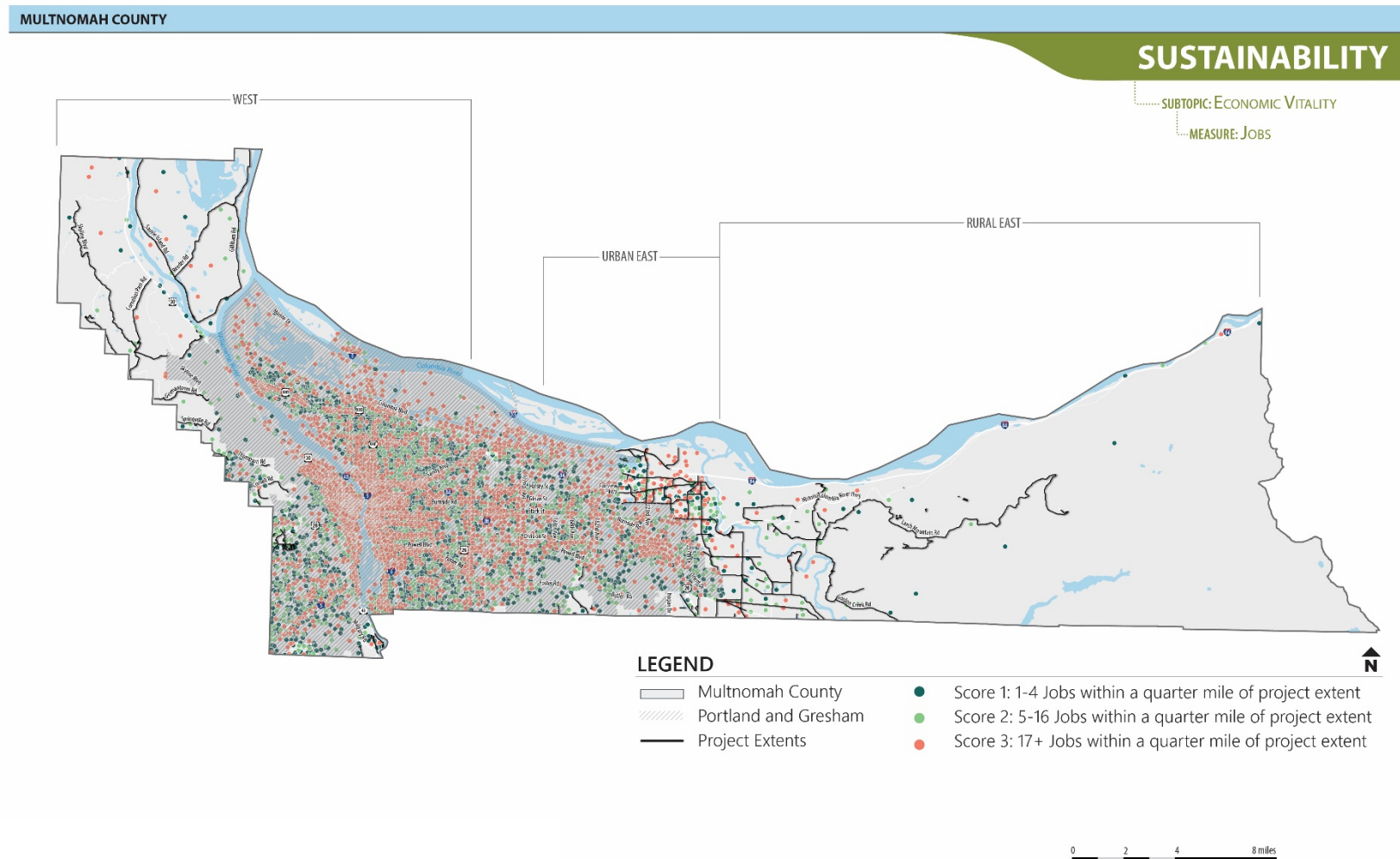
The Environmental Protection sub-topic measure of High Value Lands is based on data from the Regional Conservation Strategy. The Important Fish Passage Culverts data is from the County. The following measures are included within this sub-topic:

- High value lands (See Figure 41)
- Important fish passage culverts (See Figure 42)

For projects with multiple scores for a given Sustainability measure, the project will score the maximum of all scores.

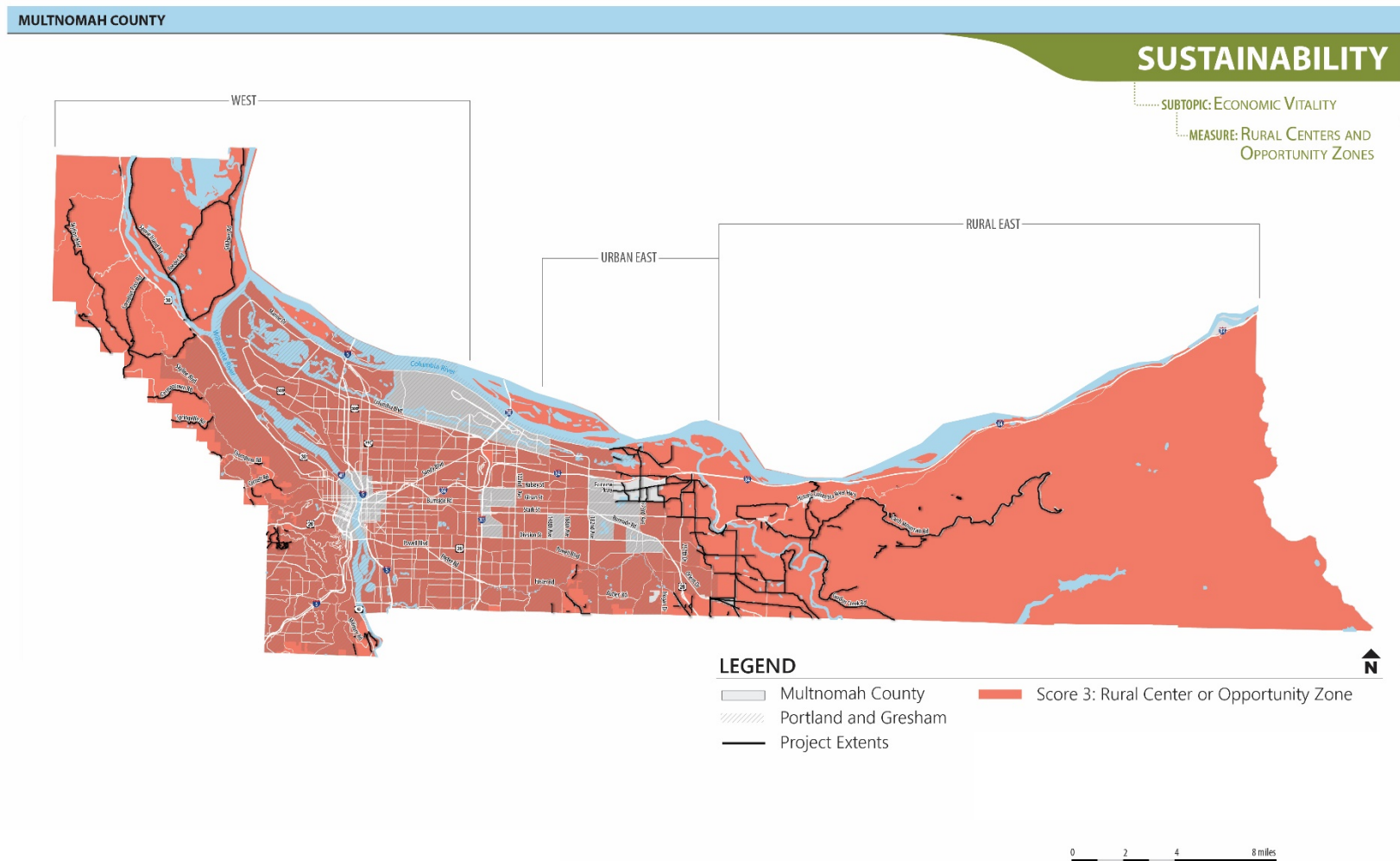
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Figure 39: Map of Jobs for Multnomah County



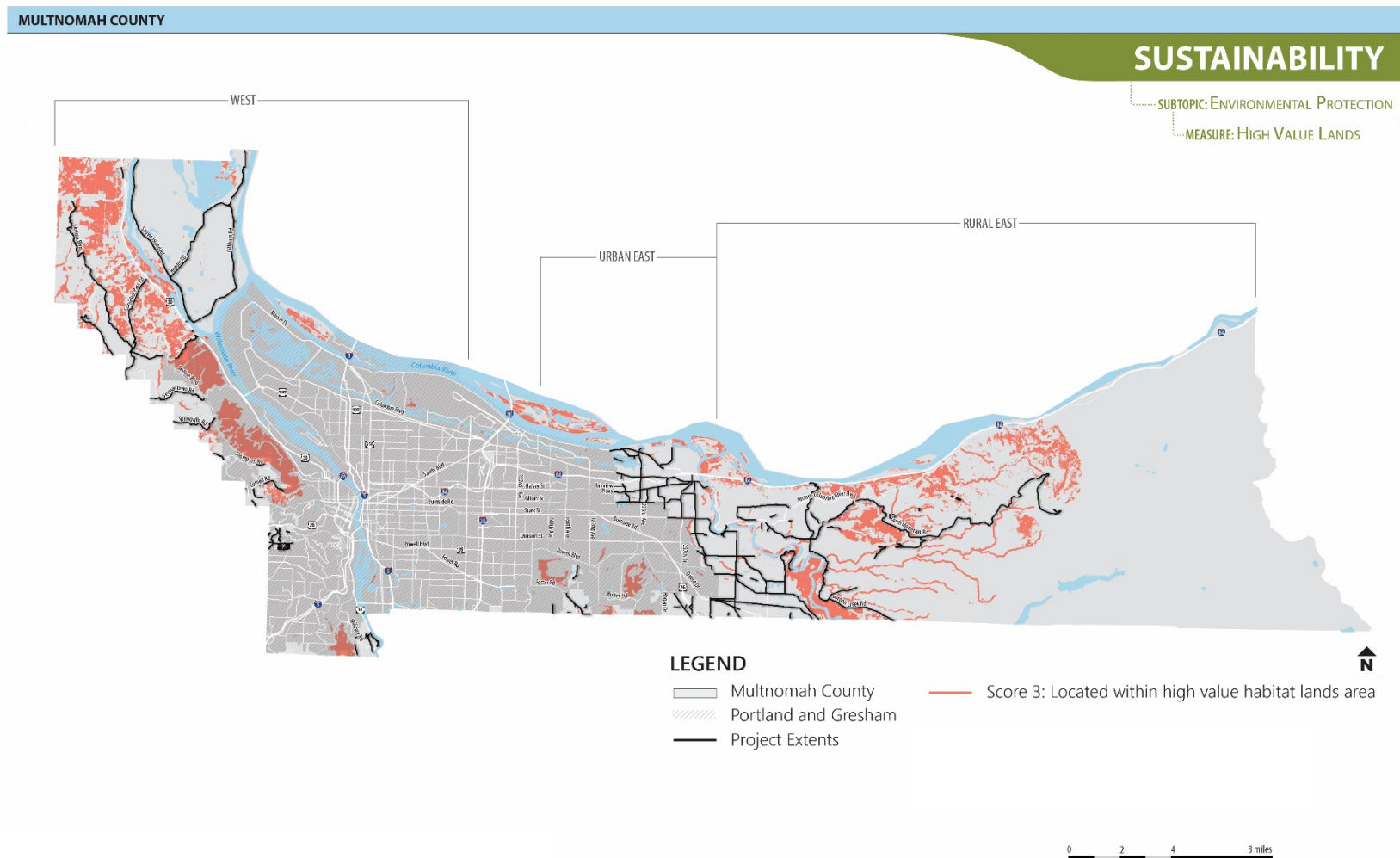
Note: More detailed scoring information can be found in Appendix A.

Figure 40: Map of Rural Centers and Opportunity Zones for Multnomah County



Note: Scores of 1 and 2 were not utilized for this measure. More detailed scoring information can be found in Appendix A.

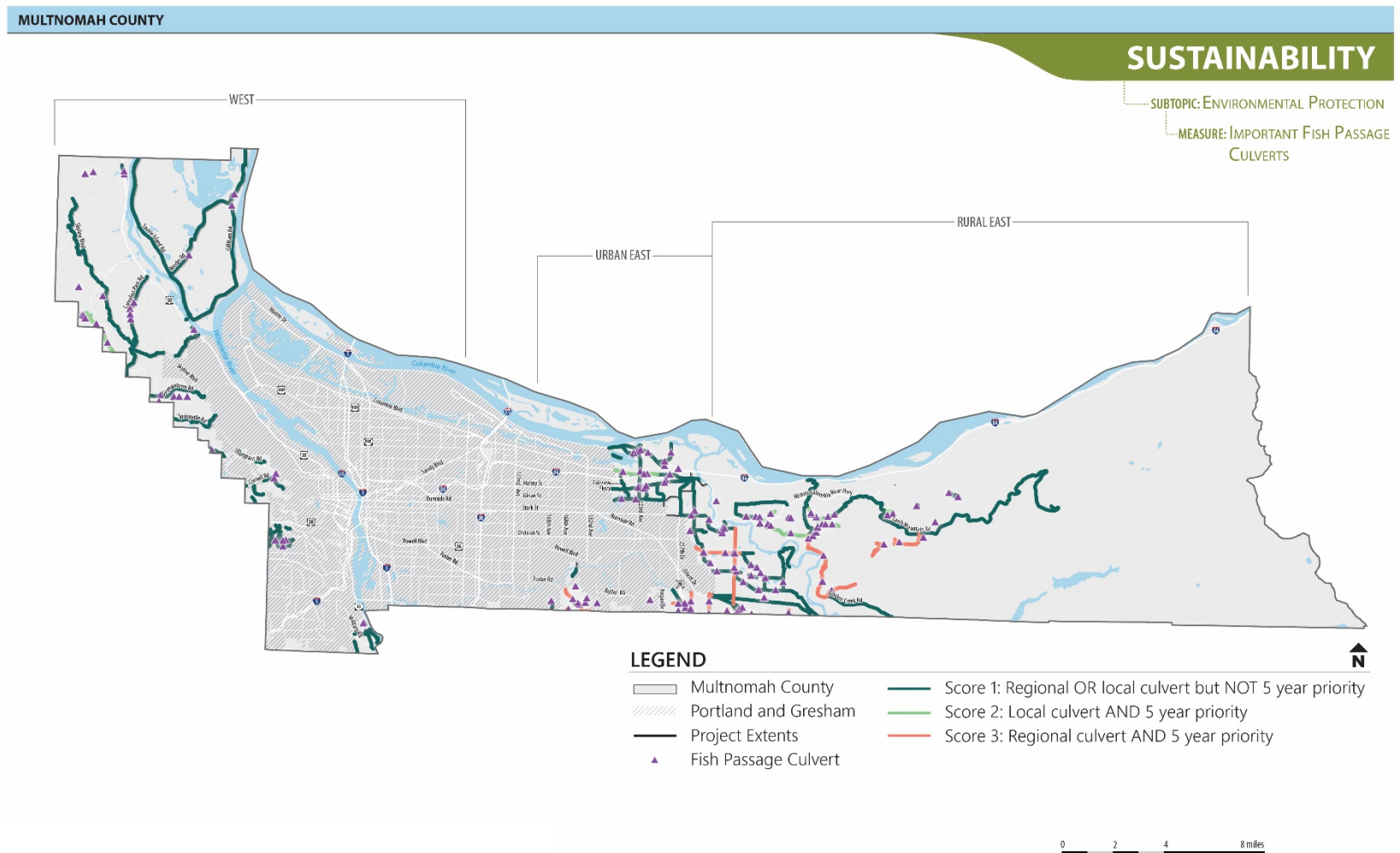
Figure 41: Map of High Value Lands for Multnomah County



Note: Scores of 1 and 2 were not utilized for this measure. More detailed scoring information can be found in Appendix A.



Figure 42: Map of Important Fish Passage Culverts for Multnomah County



Note: More detailed scoring information can be found in Appendix A.



## Criteria and Measures Summary

Table 4: Criteria and Measures Summary

	Measure	Score			
		0	1	2	3
Equity	People of Color	No population	Lowest third ≤0.1737	Middle third ≤0.3046	Highest third ≤0.7319
	LEP		Lowest third ≤0.0507	Middle third ≤0.0911	Highest third ≤0.2322
	Older adults		Lowest third ≤0.0182	Middle third ≤0.1331	Highest third ≤0.5275
	Children		Lowest third ≤0.0507	Middle third ≤0.09114	Highest third ≤0.2322
	Disability		Lowest third ≤0.1073	Middle third ≤0.1753	Highest third ≤0.5323
	Low-income		Lowest third ≤0.0832	Middle third ≤0.1641	Highest third ≤0.7557
	Environmental Toxins	No PM 2.5	Lowest third ≤9.76	Middle third ≤10.06	Highest third ≤10.41
	BMI	No population	Lowest third ≤25.413	Middle third ≤26.708	Highest third ≤28.597
Safety	(SPIS) rating	No crashes	N/A	Within 0.5 mile or less of corridor of top 10 percentile SPIS rating group	Within corridor of top 10 percentile SPIS rating group
	Severity of Crashes		PDO crashes	Non-fatal injury crash	Fatal crash
	Pedestrian/Bicycle Crashes		Pedestrian <b>OR</b> bicycle crash <b>AND</b> includes PDO	Pedestrian <b>OR</b> bicycle crash <b>AND</b> result in a non-fatal injury	Pedestrian <b>OR</b> bicycle crash <b>AND</b> result in a fatality
	Safety Index	Two situations: (1) Posted speed is 25 miles per hour (mph) or lower and (2) 30-35 mph <b>AND</b> under 12,000 average daily traffic <b>OR</b> one or two lanes	40 mph+, <b>OR</b> Speed limit 30-35 mph, more than two lanes, <b>OR</b> 12,000+ ADT	40 mph+ <b>AND</b> one of the following: More than two lanes, <b>OR</b> 12,000+ ADT	40 mph+ <b>AND</b> More than two lanes <b>AND</b> 12,000+ ADT
	Potential Safety for Non-motorized	"Shoulder," "Sidewalk," "Multi-use path" <b>not</b> in project description	"Shoulder" in project description	"Sidewalk" or "bike lane" in project description	"Multi-use path" or "buffered bike lane" in project description
	Potential Safety for Motor Vehicles	"Safety" <b>not</b> in the project description	"Safety" in project description	N/A	N/A
Mobility	Project Length	Located at intersection	Less than a mile	1-2 miles	2+ miles
	Transit Connections	No bus stops within a half mile	Within 0.5 mile of bus stop	Within 0.25 mile of bus stop	Within 500 feet of bus stop
	School Connections	No schools within a half mile	Within 0.5 mile of school	Within 0.25 mile of school	Within 500 feet of school
	ADA Compliance	No ADA deficiencies	Ramp score of 1-7 (Tiers 5 and 6)	Ramp score of 8-15 (Tiers 3 and 4)	Ramp score of 16-30 (Tiers 1 and 2)
	Congestion Relief	N/A	PM peak ADT per lane is less than 1,500	PM peak ADT per lane is between 1,500 and 1,700	PM peak ADT per lane is between 1,700 and 1,800
	Vehicle Capacity	Project does <b>not</b> add capacity	" Project adds capacity (key words utilized can be found in GIS methodology)	N/A	N/A
	Bike Capacity	Project does <b>not</b> add capacity	Project adds capacity (key words utilized can be found in GIS methodology)	N/A	N/A
	Pedestrian Capacity	Project does <b>not</b> add capacity	Project adds capacity (key words utilized can be found in GIS methodology)	N/A	N/A

	Measure	Score			
		0	1	2	3
Asset Management	Pavement Condition	100 PCI	70-99 PCI	51-69 PCI	<50 PCI
	Signalized Intersections	<b>No</b> signalized intersections	Good (County scored as 1)	Fair/Installed before 1995 (County scored as 2)	Poor/Failed signal (County scored as 3)
	Guardrail	<b>No</b> slope hazard OR Guardrail present	Pass rating	N/A	Fail or unknown rating OR no guardrail in slope hazard area
	Shoulder	Shoulder > 6 feet	>4 but <6 feet	>2 but <4 feet	No shoulder
	Culverts	Good condition, and/or has been installed recently	Fair/Installed 10+ years ago	Poor/Installed 35+ years ago	Critical/Installed 50+ years ago
	Bridges	Sufficiency rating 91-100, structure and elements in very good condition, or does not include bridge	Sufficiency rating 81-90 or minor to moderate work is recommended	Sufficiency rating 51-80 or major work is recommended	Sufficiency rating 0-50 or replacement is recommended
	Critical Roads	2 <sup>nd</sup> tier snow route and local/gravel	1 <sup>st</sup> /2 <sup>nd</sup> tier snow route and local	1 <sup>st</sup> /2 <sup>nd</sup> tier snow route and collector or arterial	1 <sup>st</sup> tier snow route and arterial
EM and Resiliency	Landslides	<b>Not</b> susceptible to landslides	N/A	N/A	Susceptible to landslides (gridcode 9 and 10)
	Earthquakes	<b>Not</b> susceptible to high damage area	N/A	N/A	Heavy damage potential (gridcode 311-478)
	Wildfire Risk	<b>Not</b> within risk area	N/A	N/A	Within risk area
	Floodplain	<b>Not</b> within floodplain	N/A	N/A	Within floodplain
	Emergency Response Proximity	<b>No</b> emergency services within a mile	1 emergency service within a mile	2-3 emergency services within a mile	4+ emergency services within a mile
	Emergency Transportation Routes (ETRs)	<b>Not</b> within ETR	N/A	N/A	Within ETR
	Important Access	Project <b>not</b> on a road that touches a state highway	Project on a local that touches a state highway	Project on a collector that touches a state highway	Project on an arterial that touches a state highway
Sustainability	Jobs	<b>No</b> jobs	Lowest third (1-4 jobs)	Middle third (5-16 jobs)	Highest third (17+ jobs)
	Rural Centers and Opportunity Zones	<b>Not</b> within rural center or opportunity zone	N/A	N/A	Within rural center or opportunity zone
	High Value Lands	<b>Not</b> within high value habitat lands	N/A	N/A	Within high value habitat lands
	Important Fish Passage Culverts	<b>Not</b> regional or local AND <b>not</b> 5-year priority	Regional or local but not 5-year priority	Local and 5-year priority	Regional and 5-year priority

## Scoring Framework Limitations

In its development of the framework, the County worked to best address or mitigate data limitations wherever possible. The following discussion summarizes some of the key limitations that informed the development of the scoring framework.

1. **Conceptual Status of Evaluated Projects** – The projects included in the Plan are generally conceptual level, meaning they are only broadly defined and may change as the result of additional design efforts. Because of this, the scoring framework is developed to distinguish projects on account of broad, rather than granular, differences. The scoring framework also does not take into consideration the anticipated outcome of the projects since much of the impacts have not been determined due to the conceptual nature of projects.
2. **Duplicative and/or Correlated Data** – Using the developed scoring framework, total scores are based on many individual measure scores, each corresponding to a unique evaluative question. Design of these measures, or evaluative questions, was carefully considered in order to avoid duplication or overlap among the measures. The County employs many sources of data to evaluate the condition of its transportation system and forecast future needs, but many of these data sources may point to similar characteristics or needs. To address this situation, the County vetted the measures to identify where multiple measures might relate to duplicative or highly correlated data. To make sure that project characteristics captured by the measures did not have a higher than desired impact on projects' total scores, the County eliminated or modified applicable measures or added a counterbalancing measure. An example is the tendency of a number of the mobility measures to result in more favorable measure scores for projects in urban areas than for projects in rural areas. To make sure rural projects were not unfairly disadvantaged (so as to deliver on the County's goals to enhance its transportation system in unincorporated communities), the Rural Centers and Opportunity Zones measure was added.
3. **Insufficient and/or Incomplete Data** – The County's ability to collect applicable transportation data can be constrained by budget and technological limitations. Therefore, while the County prioritizes the collection of data to describe the condition of many of its transportation assets or forecast future needs, it is not feasible for the County to collect rigorous and detailed data on everything associated with the transportation system and its use. These gaps in the data available were carefully considered during development of the scoring framework. Methods used to address or mitigate these data gaps included using subjective evaluations or using proxies to substitute for the missing data.
4. **Subjective Measures** – As described above, subjective measures are employed in the scoring framework to help address data gaps, where they correspond to critical scoring elements relating to the six criteria selected by the County. Subjective evaluations have a number of disadvantages compared to objective evaluations, but the County sought to mitigate these disadvantages by defining comprehensive criteria for determining the scores for measures for which subjective evaluations are used.

## Project Distribution

The purpose of this section is to evaluate the distribution of the 132 projects throughout Multnomah County with regards to geographical and financial distribution, and effects to demographic groups.

The data utilized for this analysis is the same data that is applied for the Equity criterion: U.S. Census Bureau American Community Survey (ACS) 5-Year Estimates, 2016. The following demographics are included within this analysis: people of color or minorities, LEP, older adults (ages 65+), children (ages 10-17), people with disabilities, and low-income population.

The existing project descriptions are meant to provide an overview of each project; therefore, the resulting effects (both positive and negative) of a project after completion can be assumed only to a limited degree and are somewhat unknown. Project details will be defined more as each project advances into its design phase. Though the complete effects are somewhat unknown, the equitable distribution of projects, including project type and project funds, can be obtained.

The distribution of projects was analyzed based on the geographical location of each project. Three ideas<sup>6</sup> were developed for consideration as part of the Equity analysis and are listed in Table 5.

*Table 5: Potential Ideas to Assess the Equity of Projects across the County*

Analysis Idea		Comparison Measure	Data Comparison**
1	Top 20* number	Geographic area distribution* (west/urban east/rural east)	Total projects from the top 20 highest scored projects in each area (west/urban east/rural east). This will treat line and point projects the same.
2	Type of project		Total number of projects by mode (if a project increases capacity for vehicles, bikes, pedestrians) in each area (west/urban east/rural east). This will treat line and point projects the same.
3	Total number		Total number of all projects in each area (west/urban east/rural east). This will treat line and point projects the same.

\* Arbitrary number to focus the equity analysis to only the top-scoring projects. Could be adjusted to be a smaller or larger number based on the focus for top-scoring projects. | \* Rough population estimates could be calculated based on census tract populations to show the project versus population ratio as well.

\*\*Line projects are projects with linear features, such as roadways or trails. Point projects are located at discreet points or geographical locations, such as pedestrian crossing enhancements at an intersection or culvert locations.

After the three ideas were considered, it was decided to move forward with Analysis Idea 3. As mentioned above, additional data was added for comparison purposes: a combination of looking at total number of projects and how they would be distributed across the County, and the distribution in relation to selected vulnerable population data utilized within the Equity criterion.

It is important to identify locations with high concentrations of the demographic characteristics listed above for multiple reasons. Title VI of the Civil Rights Act of 1964 protects people from discrimination based on race, color, and national origin in programs or activities that receive federal funding.<sup>7</sup> Though consideration of Title VI (race, color, and national origin) is a good start, it is also

<sup>6</sup> One analysis idea not listed here is mileage. Because of the mix of both line and point-based projects, this analysis would eliminate the point-based projects.

<sup>7</sup> U.S. Department of Transportation - Title IV of the Civil Rights Act of 1964, 42 U.S.C. § 2000d, et seq.

important to consider those who may be transportation-disadvantaged for one or more other reasons, such as being too old or young to drive, or having a disability that inhibits one's ability to drive. Providing adequate transportation options, especially to those who rely on them the most, will aid in creating a better transportation system that serves all and a balanced transportation system that is capable of handling future transportation demands.

Table 6 lists the total population and percentages of populations<sup>8</sup> within each of the three regions of Unincorporated Multnomah County, as well as the number and percentage of each demographic population within each region. The demographic populations are broken down and discussed by demographic type in the following subsections.

*Table 6: Demographic Summary and Number of Projects by Geographic Area*

Geographic Area	Population	Average Equity Score of Projects	People of Color		LEP		Older Adults		Children		Disability		Low-income		Total Projects (overlapping regions)	Total Projects (>50% in region)
			#	%	#	%	#	%	#	%	#	%	#	%		
West	28,884	1.75	4,615	16	11,260	39	4,544	16	3,446	12	713	2	741	7	48	29
Urban East	55,087	2.33	12,023	22	19,858	36	6,310	11	6,199	11	4,059	7	3,051	15	102	52
Rural East	11,986	1.80	1,164	10	4,140	35	1,883	16	1,508	13	297	2	188	5	91	51
County Total	95,957	1.78	17,802	19	35,258	37	12,737	13	11,153	12	5,069	5	3,980	4	241	132

\*Note: Population estimates include some areas outside of the County's jurisdiction. The three different geographic areas are based on block groups and include some incorporated areas based on project extents, but do not include any block groups fully within Portland or Gresham.

Each project is located in one of the three regional areas listed above; therefore, the projects are distributed throughout Multnomah County.

Table 7 shows the sum of the projects' costs within each region and throughout the County to illustrate the allocation of funds both throughout the County and within each regional area. As shown, the total cost of all projects is approximately \$1.3 billion. Of this, 36 percent is allocated to the West regional area, 20 percent to the Urban East, and 44 percent to the Rural East. All dollar amounts are shown in 2019 U.S. dollars.

*Table 7: Financial Distribution and Funds per Capita throughout the County*

Geographic Area	Population	Total Projects	Total Cost	Percentage of County Project Costs
West	28,884	29	\$479,677,319	33%
Urban East	55,087	52	\$303,250,000	21%
Rural East	11,986	51	\$652,420,000	46%
County Total	95,957	132	\$1,435,347,319	100%

<sup>8</sup> Percentages in the table and the following text are rounded to the nearest whole number.

## People of Color

The evaluation of concentration of the minority populations includes all non-White populations, including Hispanic/Latino populations, and is summarized at the regional area level in Table 8. As shown in Table 7, 19 percent of the County's population is minorities. Approximately 16 percent of the population in the West regional area and 10 percent of the population in the Rural East regional area are minorities, both of which are less than the County average. The Urban East regional area has a minority population of 22 percent, which is approximately 3 percent higher than the County average, and is the regional area with the largest percentage of minority populations. The Urban East regional area is also the area with the largest number of projects.

*Table 8: People of Color (Minority) Population per County Regional Area*

Geographic Area	Population	Minorities		Total Projects
		#	%	
West	28,884	4,615	16	29
Urban East	55,087	12,023	22	52
Rural East	11,986	1,164	10	51
County Total	95,957	17,802	19	132

## Limited English Proficiency (LEP)

The evaluation of concentration of LEP populations includes individuals who do not speak English as their primary language and may have a limited ability to read, write, speak, and understand English. Identifying LEP populations is important in order to ensure that the proper resources are provided to LEP individuals, so they are able to effectively participate in and benefit from federally assisted projects and that project actions do not violate Title VI.

As shown in Table 8, 37 percent of the County's population are LEP. The Rural East and Urban East regional areas have 35 percent and 36 percent LEP populations, respectively, which are both slightly lower than the County average. The West regional area has an LEP population of 39 percent, which is slightly higher than the County average. All of the regional areas have levels of LEP populations similar to one another (35 percent to 39 percent) and to the unincorporated county as a whole (37 percent).

*Table 9: Limited English Proficiency (LEP) Population per County Regional Area*

Geographic Area	Population	Limited English Proficiency (LEP)		Total Projects
		#	%	
West	28,884	11,260	39	29
Urban East	55,087	19,858	36	52
Rural East	11,986	4,140	35	51
County Total	95,957	35,258	37	132

### Older Adults (Ages 65+)

The evaluation of concentration of older adults is based on people age 65 and older. As shown in Table 9, 13 percent of the County's population is older than 65 years. The Urban East regional area has an elderly population of 11 percent, which is lower than the County average. The West and Urban East regional areas both have elderly populations of 16 percent, which is higher than the County average. All areas have levels of elderly populations similar to one another (11 percent to 16 percent) and to the unincorporated county as a whole (13 percent), although there is a slightly lower percentage of elderly people in the more densely populated Urban East regional area than the two more rural regions.

Table 10: Older Adults (Ages 65+) Population per County Regional Area

Geographic Area	Population	Older Adults		Total Projects
		#	%	
West	28,884	4,544	16	29
Urban East	55,087	6,310	11	52
Rural East	11,986	1,883	16	51
County Total	95,957	12,737	13	132

### Children (Ages 10–17)

The evaluation of concentration of children is based on ages 10 to 17. As shown in Table 10, 12 percent of the County's population are children between these ages. The Urban East regional area has a children population of 11 percent, which is slightly lower than the County average. The West regional area has a children population of 12 percent, which is the same as the County average, and the Urban East regional area has a children population of 13 percent, which is slightly higher than the County average. All regional areas are very close to the County average, meaning that the population of children is fairly evenly distributed throughout the County.

Table 11: Children (Ages 10–17) Population per County Regional Area

Geographic Area	Population	Children		Total Projects
		#	%	
West	28,884	3,446	12	29
Urban East	55,087	6,199	11	52
Rural East	11,986	1,508	13	51
County Total	95,957	11,153	12	132

### People with Disabilities

The evaluation of concentration of people with disabilities is based on households in which one or more persons has a disability. As shown in Table 11, 5 percent of the County's population has a disability. The West and Rural East regional areas both have disabled populations of 2 percent, which is lower than the County average. The Urban East regional area has a disabled population of 7 percent, which is slightly higher than the County average and which is the regional area with the largest percentage of people with disabilities. This area also has the largest number of projects.

Table 12: People with Disabilities per County Regional Area

Geographic Area	Population	Disabled		Total Projects
		#	%	
West	28,884	713	2	29
Urban East	55,087	4,059	7	52
Rural East	11,986	297	2	51
County Total	95,957	5,069	5	132

### Low-income Population

The evaluation of concentration of low-income populations is based on the Federal Poverty Limit from the U.S. Department of Health and Human Services (HHS). It defines low-income populations as households in which household income is at or below the HHS poverty guidelines and is based on household size. Table 12 shows the federal poverty level for one- to four-person households in Oregon as of 2016. The year 2016 was used for consistency with other ACS data used in this RCIPP.<sup>9</sup>

Table 13: 2016 Federal Poverty Guidelines Chart - Oregon

Number of People in Household	Household Income
1	\$11,880
2	\$16,020
3	\$20,160
4	\$24,300

Table 13 shows the number and percentage of low-income populations in each regional area throughout the County. Approximately 4 percent of the County's population is classified as low-income. The Rural East and West regional areas have 2 percent and 3 percent low-income populations, respectively, which are both lower than the County average. The Urban East regional area has a low-income population of 6 percent, which is higher than the County average. The Urban East area has the largest percentage and the largest number of low-income populations, with 6 percent of the total population for a total of 3,051 individuals, thus demonstrating that low-income populations are more concentrated in the urban area than in the more rural areas.

Table 14: Low-Income Population per County Regional Area

Geographic Area	Population	Low-income		Total Projects
		#	%	
West	28,884	741	3	29
Urban East	55,087	3,051	6	52
Rural East	11,986	188	2	51
County Total	95,957	3,980	4	132

<sup>9</sup> U.S. Department of Health and Human Services – Federal Poverty Guidelines, 2016



## Project Development and Cost Estimates

### Project Development

The project list reflects transportation improvement project needs for the next 20 years and beyond. Several internal and external means are used to identify transportation improvement projects for this Plan update. The primary internal source of information is the FY 2014-2018 Capital Improvement Plan and Program (CIPP). Projects included in the 2014-2018 CIPP that have been completed have been deleted from this update. Other sources of projects include agency Transportation System Plans (TSPs) and corridor plans. Additionally, projects recommended by the public at meetings and input from County maintenance and engineering staff were included.

Projects from each of the plans were evaluated and either consolidated into larger, all-encompassing roadway projects or left as stand-alone projects if their magnitude is large. Railroad undercrossings are one example of stand-alone projects that were not consolidated with other projects. In many cases, this meant that a single project in the RCIPP captures multiple projects from (for instance) the ADA transition Plan, a City TSP, and a Corridor Plan. Bundling projects allows the County to achieve maximum efficiency and cost sharing/saving when planning, designing, and constructing together. Project Cost estimates were developed based on the new, comprehensive projects, their descriptions, and the County's design standards.

The consolidation of projects was completed first to develop the initial project list (Round 1). After developing that project list, new projects were identified using new data sources (Round 2). The details associated with each project development piece is detailed below.

#### Round 1. Initial Project List

In the summer of 2018, Transportation Improvement Projects from the following documents were mapped and consolidated into one list:

- |   |  |
|---|--|
| 1. Multnomah County CIPP (2014-18)                                | 8. Multnomah County TSP (2016)                               |
| 2. City of Gresham TSP (2015)                                     | 9. City of Wood Village TSP (2016)                           |
| 3. City of Fairview TSP (2016)                                    | 10. Regional Transportation Plan (2014)                      |
| 4. City of Troutdale TSP(2013)                                    | 11. Halsey Street Corridor Study (2005)                      |
| 5. Urban Pockets of Unincorporated<br>Multnomah County TSP (2006) | 12. 257th Avenue Enhancement Study<br>(1997)                 |
| 6. Main Streets on Halsey (2017)                                  | 13. Multnomah County ADA Transition<br>Plan Inventory (2017) |
| 7. East Metro Connections Plan (2012)                             |  |

A number of considerations were addressed when defining projects:

- Smaller infrastructure improvements were bundled together within reasonable geographical ranges. Some examples include culvert replacement and fish passage improvement projects, sidewalk infill in urban, unincorporated areas, small-scale, inexpensive "safety" improvements on a corridor such as bike and pedestrian improvements on multiple intersections within a roadway segment, and other small-scale projects.

Projects were removed if they were on local non-County roads or if they were in a plan that was superseded. Projects in urban pockets (areas expected to be annexed but are currently Multnomah County) were included in the RCIPP. The outcome of the approach above was to consolidate 592 projects from 12 plans into 132 new, consolidated projects that could be evaluated against one another using the criteria and measures developed through the Plan update process. Figure 43 illustrates an example of multiple projects that have been consolidated into one large, all-encompassing project.

*Figure 43: Example of Consolidation of Projects into Large, Holistic Project*



## Round 2. Overlay/New Data

In the fall of 2018, overlay and new data was applied to the county to identify any new projects or additional components that should be added to projects identified in Round 1. Identifying projects based on new and overlay data bolsters the project list of previously identified projects. This allows as many projects as possible to be identified. The following data points were considered in identifying new projects:

- Overlay Data
  - Paving overlay priority indicates whether a roadway is identified for an overlay improvement in the near future.
  - Incorporate ADA curb ramp priorities into projects previously identified in the review of transportation documents.
  - Bundling remaining ADA curb ramp projects previously identified in the review of transportation documents.
  - Add any known non-Willamette River Bridge projects previously identified in the review of transportation documents.
- New Data
  - “Failed Roads” (Roads with a PCI <50) do not provide an adequate roadway and require extensive improvements to improve pavement quality.

### Project Cost Assumptions

New cost estimates were developed for all 132 projects in the Capital Improvement Plan. Cost estimates were developed using the County's adopted Design and Construction Manual standards. It was assumed that every capital project would be constructed to the County's preferred roadway standard, regardless of whether the project is a culvert replacement, a road reconstruction, or primarily a bicycle or pedestrian improvement. The result of this approach is that the cost estimates are higher than the prior capital improvement plan, but both the project descriptions and the cost estimates are more realistic.

The cost estimates for all projects are "planning level" estimates, and while the estimates are at varying levels of precision, each estimate includes engineering, right-of-way (ROW) acquisition, construction, any necessary environmental permitting, wetland mitigation, and hazmat costs, and a 30% contingency. The cost estimates are dependent on two additional factors: scope accuracy and engineering effort, which are outlined below.

#### Scope Accuracy:

- Level 1: Project scope well understood and well defined.
- Level 2: Project scope conceptual. Scope lacks detail due to potential permit requirements; unknown project conditions; limited knowledge of external impacts.
- Level 3: Project scope is a "vision" with limited detail.

#### Engineering Effort:

- Level A: Preliminary engineering performed. Technical information is available, engineering calculations have been performed; clear understanding of the materials size and quantities needed to execute job. Schedule understood; staff and permitting is fairly clear (possibility for further refinement). Project Development and Construction Contingencies range between 10 and 20 percent.
- Level B: Conceptual engineering performed. Technical information is available; rough engineering calculations may have been performed or similar information from previous work is utilized. Project Development Contingencies range between 15 and 25 percent and Construction Contingencies range between 20 and 30 percent.
- Level C: No engineering performed. Limited technical information available and/or analysis performed. Project Development and Construction Contingencies should be selected appropriately by Project Manager. Contingency may range up to 50 percent.

### County Specific Cost Contingencies

In general, the cost assumptions reflect standard practice for planning level cost estimates. However, in an effort to more accurately estimate costs, the County developed county-specific contingencies based on an evaluation of current capital project costs. Therefore, the contingencies are more reflective of what the County's costs are for capital projects. Table 14 lists the cost contingencies used when estimating each projects' cost.

Table 15: Cost Contingencies for Estimating Project Costs

Cost Contingencies	Percentage of Project Construction Costs
Design Engineering	40% (construction < \$500k)
	30% (construction \$501k - \$5M)
	20% (construction > \$5M)
CE and Inspection	20%
Right-of-Way	20% (high ROW need)
	10% (low ROW need)
Hazmat	6%
Traffic Control	5% (rural project)
	8% (urban project)

## Tactical Asset Management Plan

### Inventory of County Assets

Multnomah County maintains a network of 274 miles of roads, approximately 1,700 culverts, 22 small bridges (non-Willamette River), 46 signals and rapid flashing beacons, 7.8 miles of guardrail, and 6 bridges spanning the Willamette River.

While the 132 capital projects listed in this plan cover 170 miles of road, they do not encompass all the assets and replacement needs that the County has. Multnomah County has roads, bridges, culverts, guardrail, stormwater/drainage systems, retaining structures (walls), rapid flashing beacons, ADA ramps, and signals that are not addressed in capital projects. This could be for several reasons: (1) the asset does not meet the cost threshold of \$500,000, (2) it has not been adequately assessed for need, or (3) it does not yet need replacement. This section focuses on the assets which are not included in a capital improvement project in this plan.

Below is a discussion of the above assets, their level of assessment, anticipated replacement timeline, and cost of replacing a percentage of them in the RCIPP timeframe. The cost estimates include cost escalation to account for inflation and capture a more realistic expectation of the cost of replacement within the timeframe.

This document does not address or identify specific funds for non-plan identified asset replacements. This section is designed solely to inform the County's overall need. A larger, more comprehensive study and plan may be done in the future, which would look at actual lifespans of assets, both locally and using national or international standards, to determine the actual time frame for replacements.

### Ongoing Asset Management Recommendations

Inventory of most assets has been completed, which informs the county of the quantity and location of all assets. Table 16 lists the inventory progress of County assets shown in the RCIPP. The County is responsible for condition assessments of all assets and, depending on the asset, different criteria and/or regulations may need to be applied during the assessment. For culverts, the County develops the condition assessment, however, for bridges and ADA ramps, a combination of County criteria and State or Federal requirements are used during the condition assessment.

Table 16: Asset Inventory and Condition Assessment Progress

Asset Type	Inventory	Condition Assessment
Culverts (fish passage) and (in stream, non-fish passage)	Complete	Complete
Culverts (Non-In-Stream, Stormwater/Drainage)	Complete	Partially complete <sup>1</sup>
Guardrail	Complete	Complete
Pavement	Complete	Complete <sup>2</sup>
Traffic Signals and Enhanced Crossings	Complete	To be completed <sup>3</sup>
Bridge structures	Complete	Partially complete <sup>4</sup>
Storm Drainage	Complete	To be completed <sup>5</sup>

<sup>1</sup> Assessment as of summer 2018. Data analysis currently in progress. Future Stormwater/Drainage Master Plan expected to address full storm system.

<sup>2</sup> Pavement Condition Index (PCI) serves as a proxy for field condition.

<sup>3</sup> To be created and added at a future date. Staff input and age of asset serve as a proxy for inventory and condition assessment.

<sup>4</sup> Condition assessment based on ODOT sufficiency rating (how the structure is constructed) as well as other factors regarding adjacent conditions, capacity, etc.

<sup>5</sup> To be completed as part of future Storm Drainage Master Plan.

### Culverts

The County has 1700 culverts which are categorized as fish passage, in-stream (may or may not be fish passage), and drainage/stormwater culverts. All of the culverts have had condition assessments, but not all have been reviewed for quality control. Generally speaking, fish passage and in-stream culvert assessments are more likely to be accurate and complete than non-in-stream, drainage/stormwater culverts. For all culverts, the County assumes a 60-year life span, which is based on data for corrugated metal pipe (CMP). While not all county culverts are this type, this is used as a proxy for all culverts until a more in-depth analysis can occur. Additionally, it is assumed that culverts in the County are currently 40-60 years old, therefore within the RCIPP timeframe, approximately half would need to be replaced.

### Culverts (Fish Passage In-Stream, Non-Fish Passage)

Fish passage and in-stream culverts typically serve surrounding watersheds and aid in the movement of water through constructed areas, such as under a roadway that crosses a stream that would otherwise be unobstructed. They aim to minimize fish passage obstructions and allow natural migration to and from the ocean. Table 17 shows the cost estimate over the course of the RCIPP timeframe. The total cost per year in 2019 dollars is \$5,104,415.

Table 17: Culvert (Fish Passage and In-Stream, Non-Fish Passage) Cost Estimate, compiled in 2019\*

Timeframe	Cost
2025-2029	\$33,923,985
2030-2034	\$41,273,715
2035-2040	\$61,495,611
Total Cost	\$136,693,311

\*Assumptions:

1. 50 percent of assets replaced during the RCIPP timeframe.
2. 50 feet of roadway improvements necessary on each end of each culvert.
3. The earthwork necessary for construction of in-stream culverts is based on the assumption that 75 percent of the in-stream culverts require 15 feet of embankment (measured vertically) and the remaining 25 percent require 30 feet of embankment.
4. 137 in-stream pipe culverts and seven in-stream box culverts replaced during the outlined RCIPP timeframe.

#### Culverts (Non-In-Stream, Stormwater/Drainage)

Stormwater and Drainage culverts function to remove stormwater and runoff from roadside ditches and pass water under roadways at drainage points. Unlike In-Stream culverts, they typically collect runoff from manmade drainage channels. Table 17 shows the cost estimate over the course of the RCIPP timeframe. The total cost per year in 2019 dollars is \$2,041,433.

*Table 18: Culvert (Non-In-Stream and Stormwater/Drainage) Cost Estimate, compiled in 2019\**

Timeframe	Cost
2025-2029	\$13,990,710
2030-2034	\$17,021,838
2035-2040	\$25,361,622
Total Cost	\$56,374,170

\*Assumptions:

1. 50 percent of the assets replaced during the RCIPP timeframe.
2. 50 feet of roadway improvements necessary on each end of each culvert.
3. 545 non-in-stream culverts replaced during the outlined RCIPP timeframe.

#### Guardrail

County inventory and condition assessment have determined that existing guardrail does not meet current standards<sup>10</sup>. The County has approximately 41,140 linear feet of guardrail. For Capital projects in locations where the county has existing substandard guardrail, the asset will be replaced and brought up to standard. For the remaining guardrail, the County has 30 years as the replacement cycle for this asset (all guardrail should be replaced every 30 years), therefore in the 25-29, 30-34, and 35-39 timeframe, 50% of all guardrail will be replaced. Table 18 shows the cost estimate over the course of the RCIPP timeframe. The total cost per year in 2019 dollars is \$274,984.

*Table 19: Guardrail Cost Estimate, compiled in 2019\**

Timeframe	Cost
2025-2029	\$1,884,571
2030-2034	\$2,292,869
2035-2040	\$3,416,251
Total Cost	\$7,593,691

\*Assumptions:

1. 50% of the assets replaced during the RCIPP time frame.
2. Accounts for existing guardrail; does not include non-existing, needed guardrail.

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<sup>10</sup> Cornelius Pass Road and Newberry Roads are an exception to this as they were installed as part of a recent capital project.

### Pavement

The County uses pavement condition index (PCI) to assess and monitor the condition of the roads. For the 104 miles of roadways that are not included in a capital project, the cost assumption below assumes condition will worsen over the timeframe of the plan and replacement costs grow higher as condition worsens. Table 19 shows the cost estimate over the course of the RCIPP timeframe. The total cost per year in 2019 dollars is \$15,725,838.

Table 20: Pavement Cost Estimate, compiled in 2019\*

Timeframe	Cost
2025-2029	\$93,035,241
2030-2034	\$113,191,596
2035-2040	\$168,649,380
Total Cost	\$374,876,217

\*Assumptions:

1. No pavement rehabilitation projects before 2025.

### Traffic Signals and Enhanced Crossings

The County has 46 Traffic signals, rapid flashing beacons, and flashers. All signals in the County have been inventoried. Condition assessment has not been completed, therefore the County uses a proxy based on the age of the signal and staff knowledge of the condition. All rapid flashing beacons and flashers are less than 10 years old. They have not been inventoried or condition assessed, but are assumed to not need replacement as part of this cost estimating. Table 20 shows the cost estimate over the course of the RCIPP timeframe. The total cost per year in 2019 dollars is \$553,635.

Table 21: Traffic Signals and Enhanced Crossings Cost Estimate, compiled in 2019\*

Timeframe	Cost
2025-2029	\$3,97,267
2030-2034	\$4,616,305
2035-2040	\$6,878,046
Total Cost	\$11,494,351

\*Assumptions:

1. 50% of assets replaced during RCIPP timeframe.

### Bridge structures

The County has 21 bridge structures which include road bridges as well as large culvert structures. Table 21 shows the cost estimate over the course of the RCIPP timeframe. The total cost per year in 2019 dollars is \$1,586,486.

Table 22: Bridge Structures Cost Estimate, compiled in 2019\*

Timeframe	Cost
2025-2029	\$10,872,787
2030-2034	\$13,228,408
2035-2040	\$19,709,616
Total Cost	\$43,810,811

\*Assumptions:

1. 50 feet of roadway improvements necessary on each end of the bridge.
2. Based on a typical roadway section of 6-inches ACP on top of 9-inches aggregate base.
3. The bridges identified as needing replacement were based on their design life year, which was assumed to be 75 years after the original construction date.



### *Storm Drainage*

The County intends to conduct a storm drainage master plan in the future. Most County storm drain assets are undersized. Capital projects that impact a storm drain or culvert, include the cost of replacing that asset. For storm drainage assets not associated with a capital project the county did not develop a lifespan estimate, Instead the County used 50% as the number of assets to be replaced in the timeframe. This is due to the likely age of the asset 60 year for CMG pipe, and the likelihood that it was installed 40-60 years ago. Table 22 shows the cost estimate over the course of the RCIPP timeframe. The total cost per year in 2019 dollars is \$13,575,097.

*Table 23: Storm Drainage Cost Estimate, compiled in 2019\**

<b>Timeframe</b>	<b>Cost</b>
2025-2029	\$93,035,241
2030-2034	\$113,191,596
2035-2040	\$168,649,380
Total Cost	\$374,876,217

\*Assumptions:

1. 50% of assets replaced during RCIPP timeframe.
2. Drainage systems: for each new run of pipe installed, two (2) new inlets and one (1) new manhole required

### *Additional Assets*

As mentioned, the County will need to conduct a larger and more comprehensive Asset Management Plan as part of a future effort. However, this section provides a basis for analyzing all of the County's asset replacement needs. Other County assets that are included in County Capital Projects as appropriate but that have not been fully evaluated and costed for replacement outside of a capital project include the following:

- Cross Section analysis to determine the difference between existing cross section and preferred cross section by functional class. The data for this task is available, but the task should be completed after the County's pending Design and Construction Manual update.
- Clear Zone analysis to determine if guardrail or retaining wall is needed. The data for this has been created and a data layer is available to indicate where this is needed. Need for guardrail is nearly ubiquitous throughout the county.
- Roadway shoulder analysis has been completed. Condition, width and material data is available.
- Sinkholes and slides data is being collected. In addition to pavement condition index, this information is useful to project development and determining the type of roadway rehabilitation necessary.

## List of projects

Based on the scoring methodology, all 132 projects were scored and ranked. Additionally, the projects were categorized by the three sub areas of the region: West, urban East, and rural East. Tables 23 lists each RCIPP project, including its region, score, and cost estimate<sup>11</sup>. The projects are listed in order from the highest scoring (highest priority) to the lowest scoring (lowest priority). For a list of project descriptions (listed by project number), see Appendix D.

Table 24: RCIPP Projects

Project		Region	Score	Cost (2019 dollars)
500U	NE 207th Avenue (Fairview Parkway): NE Glisan Street to NE Sandy Boulevard: Arterial corridor Management (ACM) with Adaptive Signal Timing	Urban East	51.7	\$2,970,000
505U	NE 238th Drive: NE Halsey Street to NE Glisan Street	Urban East	51.2	\$31,500,000
542U	S Troutdale Road: SW Cherry Park Road to SE Stark Street	Urban East	51.1	\$8,490,000
538U	SE Stark Street: S Troutdale Road to SE Evans Avenue	Rural East	50.6	\$1,980,000
517U	NE Glisan Street: Fairview Parkway to NE 242nd Avenue: Arterial Corridor Management (ACM)	Urban East	50.2	\$2,940,000
537U	SE Stark Street: SW 257th Avenue to S Troutdale Road	Urban East	49.8	\$8,210,000
109R	NE Corbett Hill Road Safety Improvements	Rural East	49.6	\$20,870,000
507U	SW 257th Avenue Pedestrian Safety Improvements (Gresham City Limits to I-84)	Urban East	49.5	\$2,650,000
533U	NE Sandy Boulevard: NE 223rd Avenue to NE 238th Avenue	Urban East	49.4	\$8,360,000
522U	NE Halsey Street: NE 238th Drive to Historic Columbia River Highway	Urban East	49.3	\$13,350,000
110R	NW Cornelius Pass Road: Highway 30 - Skyline Boulevard	West	48.7	\$143,230,000
132R	Johnson Creek Culverts of Regional Concern	Urban East	48.3	\$5,150,000
506U	NE 238th Drive/NE 242nd Avenue/NE Hogan Drive: NE Sandy Boulevard to NE Glisan Street: Arterial Corridor Management (ACM) with Adaptive Signal Timing	Urban East	47.1	\$250,000
121R	SE Foster Road: SE Jenne Road to County Line	Urban East	47.1	\$3,760,000
532U	NE Sandy Boulevard: Gresham City Limits to NE 223rd Avenue	Urban East	46.2	\$11,100,000
519U	NE Halsey Street: NE 202nd Avenue to NE 223rd Avenue	Urban East	45.8	\$3,320,000
526U	W Historic Columbia River Highway: NE 244th Avenue and NE Halsey Street	Urban East	45.4	\$12,390,000
514U	Forest Park / SW Hills Urban Pockets Sidewalk Infill Projects	West	45.4	\$21,340,000
502U	NE 223rd Avenue: NE Halsey Street to NE Glisan Street	Urban East	45.4	\$5,490,000
511U	Dunthorpe Urban Pockets Active Transportation Projects	West	44.8	\$5,710,000
548U	NE Glisan St Overlay: SE 223rd to NE 238th	Urban East	44.5	\$5,310,000
520U	NE Halsey Street: NE 223rd Avenue to NE 238th Drive	Urban East	44.4	\$3,350,000
534U	NE Sandy Boulevard: NE 238th Drive to Roadway Terminus	Urban East	44.3	\$2,740,000
535U	SW Scholls Ferry Road: SW Humphrey Boulevard to SW Patton Road	West	44.3	\$21,970,000
545U	Wood Village Boulevard: NE Glisan Street and NE Halsey Drive	Urban East	44.2	\$1,530,000

<sup>11</sup> Cost estimates include engineering, right-of-way, construction, any necessary environmental permitting, wetland mitigation, hazmat, and a 30% contingency. Cost estimates are based on preferred alternatives and in 2019 dollars.

Project		Region	Score	Cost (2019 dollars)
179R	SE Stark Street: SE 35th Street to Stark Street Bridge/E Historic Columbia River Highway	Rural East	44.1	\$21,210,000
513U	Forest Park / SW Hills Urban Pockets Bicycle Projects	West	43.7	\$46,640,000
510U	SE Cochran Road: SE Troutdale Road to Gresham / Troutdale City Limits	Urban East	43.4	\$4,040,000
131R	SE Hurlburt Road: E Historic Columbia River Highway to SE Littlepage Road	Rural East	43.3	\$8,240,000
135R	E Larch Mountain Road: E Historic Columbia River Highway to End of Road	Rural East	42.9	\$194,720,000
560U	Stark Street Overlay: Gresham City Limit to SW 257th Ave	Urban East	42.9	\$4,060,000
157R	Sandy River Tributary Culverts of Local Concern	Rural East	42.8	\$9,030,000
101R	SE 282nd Avenue: SE Orient Drive to County Line	Rural East	42.3	\$1,840,000
530U	NE Marine Drive - NE 223rd Avenue to Gresham City limits	Urban East	42.3	\$19,350,000
171R	Stark Street Bridge	Rural East	42.1	\$19,030,000
549U	Cherry Park Rd Overlay: SW 257th Avenue to SE Troutdale Road	Urban East	41.8	\$2,130,000
177R	E Woodard Road: E Historic Columbia River Highway to SE Ogden Road	Rural East	41.7	\$21,740,000
543U	S Troutdale Road: SE Stark to SE Strebin Road	Urban East	41.5	\$5,170,000
153R	SE Oxbow Parkway: SE Oxbow Drive to End of Road	Rural East	41.3	\$10,670,000
501U	NE 223rd Avenue and NE Glisan Street Intersection Improvements	Urban East	41.0	\$660,000
508U	Buxton Road: Historic Columbia River E Highway to SE Cherry Park Road	Urban East	40.9	\$920,000
553U	Graham Rd ADA Ramp Upgrades: E Historic Columbia River Highway to I-84	Urban East	40.9	\$530,000
552U	Cherry Park Rd ADA Ramp Upgrades: NE 238th Ave to SW 257th Ave	Urban East	40.9	\$1,730,000
503Ua	NE 223rd Avenue: NE Sandy Boulevard to South of UPRR Undercrossing	Urban East	40.7	\$4,720,000
149R	SE Orient Drive: Gresham city limits to County line	Rural East	40.7	\$950,000
525U	E Historic Columbia River Highway Curb Extensions	Urban East	40.4	\$980,000
111R	NW Cornelius Pass Road: Skyline Boulevard - County Line	West	40.3	\$11,150,000
124R	SE Gordon Creek Road: SE Hurlburt Road to S curves /Milepost 2	Rural East	40.0	\$26,210,000
114R	SE Division Drive: SE Troutdale Road to SE Oxbow Drive	Rural East	39.9	\$6,490,000
547U	Historic Columbia River Hwy Overlay: approximately 632 E. Historic Columbia River Highway to Sandy River	Urban East	39.8	\$1,250,000
529U	NE Marine Drive: NW Sundial Road to NE 223rd Avenue	Urban East	39.8	\$16,680,000
176R	Tualatin River Culverts of Local Concern	West	39.5	\$4,410,000
136R	NW Laidlaw Road: NW Thompson Road to County line	West	39.5	\$7,880,000
516U	NE Glisan Street: NE 202nd Avenue to NE 207th Avenue	Urban East	39.1	\$7,560,000
133R	SE Kerslake Road: SE Wilson Road to SE 302nd Avenue	Rural East	38.9	\$5,140,000
536U	SW Scholls Ferry Road: SW Patton Road to Washington County Line	West	38.5	\$1,830,000
113R	Cornell Road (all segments within County jurisdiction)	West	38.2	\$14,650,000
550U	Jenne Rd to 174th Ave Overlay	Urban East	38.2	\$1,660,000

Project		Region	Score	Cost (2019 dollars)
125R	SE Gordon Creek Road: S curves/Milepost 2 to SE Trout Creek Road)	Rural East	38.0	\$19,000,000
170R	NW Springville Road: City of Portland line to Washington County line	West	37.9	\$7,720,000
103R	SE 302nd Avenue: SE Kerslake Road to SE Bluff Road	Rural East	37.8	\$11,980,000
116R	SE Division Drive: UGB to SE Troutdale Road	Rural East	37.7	\$2,310,000
503Ub	NE 223rd Avenue: UPRR Undercrossing to North of NE Marine Drive	Urban East	37.6	\$6,220,000
521U	NE Halsey Street and Wood Village Boulevard Signal	Urban East	37.5	\$1,060,000
169R	NW Skyline Boulevard: NW Beck Road to NW Rocky Point Road	West	37.4	\$9,330,000
528U	NW Marine Drive: NW Frontage Road to NW Sundial Road	Urban East	37.3	\$4,130,000
163R	Sauvie Island Loop Roads Shoulder Improvements	West	37.2	\$12,520,000
126R	SE Gordon Creek Road: SE Trout Creek Road to County line	Rural East	37.2	\$5,450,000
118R	SE Dodge Park Boulevard: SE Orient Drive to SE Pleasant Home Road	Rural East	37.1	\$3,440,000
119R	SE Dodge Park Boulevard: SE Pleasant Home Road to County Line	Rural East	37.0	\$24,480,000
175R	SE Troutdale Road: SE Division Drive to SE 282nd Drive	Rural East	36.8	\$16,200,000
138R	SE Lusted Road: Gresham city limit to SE Pleasant Home Road	Rural East	36.8	\$6,550,000
546U	Far Southeast Urban Pockets Active Transportation Projects	Urban East	36.8	\$3,820,000
509U	NE Blue Lake Road: NE 223rd Avenue to NE Interlachen Lane	Urban East	36.2	\$4,180,000
199R	SE Evans Road: SE Hurlburt Road to E Historic Columbia River Highway	Rural East	35.9	\$12,910,000
524U	E Historic Columbia River Highway and Buxton Avenue Intersection Signalization	Urban East	35.8	\$930,000
129R	SE Hosner Road: SE Hosner Terrace to SE Oxbow Park Road	Rural East	35.7	\$12,260,000
122R	Germantown Road: NW Skyline Boulevard to County Line	West	35.7	\$41,827,319
105R	SE Anderson State Road: SE 267th Avenue (South) to SE 267th Avenue (North)	Urban East	35.7	\$1,780,000
164R	NW Skyline Boulevard: NW Cornell Road to NW Greenleaf Road	West	35.4	\$1,620,000
167R	NW Skyline Boulevard: NW Cornelius Pass Road to NW Rock Creek Road	West	35.3	\$31,360,000
166R	NW Skyline Boulevard: City of Portland line to NW Cornelius Pass Road	West	35.3	\$2,520,000
172R	SE Sweetbriar Road: SE Troutdale Road to East City Limit	Rural East	34.8	\$2,270,000
551U	NE 242nd Dr Overlay: Cherry Park Road to Gresham City Limit	Urban East	34.5	\$1,530,000
531U	NE Marine Drive and NE 223rd Avenue Intersection Reconstruction	Urban East	34.5	\$14,910,000
108R	NE Corbett Hill Road/East Historic Columbia River Highway	Rural East	34.3	\$3,960,000
107R	Columbia River Gorge Tributary Culverts of Local Concern	Rural East	33.9	\$4,290,000
180R	SE Troutdale Road: SE Strebin Road to SE Division Drive	Rural East	33.8	\$10,980,000
161R	NW Sauvie Island Road: NW Reeder Road to Milepost 6	West	33.8	\$9,640,000
117R	SE Division Drive and SE Troutdale Road Intersection	Rural East	33.7	\$7,600,000

Project		Region	Score	Cost (2019 dollars)
159R	NW Sauvie Island Road Multi-Use Path: Bridge to NW Reeder Road	West	33.2	\$4,440,000
142R	SE Merston Road: NE Ogden Road to E Historic Columbia River Highway	Rural East	33.1	\$19,870,000
158R	Sandy River Tributary Culverts of Regional Concern	Rural East	32.9	\$4,050,000
178R	SE Stark Street: Troutdale City Limits to SE 35th Street	Rural East	32.6	\$800,000
151R	SE Oxbow Drive: SE Division Drive to SE Hosner Road	Rural East	32.5	\$16,380,000
541U	NW Sundial Road: NW Marine Drive to 40-mile loop	Urban East	32.3	\$4,710,000
523U	W Historic Columbia River Highway Railroad Overcrossing	Urban East	32.3	\$16,550,000
120R	SE Foster Road at SE 172nd Avenue	Urban East	32.3	\$8,050,000
168R	NW Skyline Boulevard: NW Rock Creek to NW Beck Road	West	31.9	\$2,450,000
518U	NE Glisan Street Culvert (east of NE 223rd Avenue)	Urban East	31.4	\$2,140,000
143R	SE McNutt Road: SE 252nd Avenue to SE 257th Avenue	Urban East	31.3	\$2,720,000
165R	NW Skyline Boulevard: 50' SE NW Kelly Circle to 750' SE NW Meares Drive / City Boundary	West	31.2	\$2,210,000
140R	SE Lusted Road: SE Cottrell Road to Clackamas County line	Rural East	30.9	\$26,210,000
112R	NW Cornelius Pass Road and NW Skyline Boulevard Intersection	West	30.6	\$1,280,000
100R	SE 267th Avenue: City of Gresham Boundary to End of Road	Urban East	30.6	\$2,550,000
155R	SE Powell Valley Road/SE Roork Road: SE 282nd Avenue to SE 302nd Avenue	Rural East	30.0	\$5,090,000
147R	SE Orient Drive/SE 282nd Avenue Intersection Improvements	Rural East	29.8	\$990,000
150R	SE Orient Drive / SE Bluff Road Intersection Improvements	Rural East	29.8	\$2,340,000
148R	SE Orient Drive / SE Dodge Park Boulevard Intersection Improvements	Rural East	29.6	\$1,920,000
137R	SE Littlepage Road: SE Hurlburt Road to E Knieriem Road	Rural East	29.3	\$2,000,000
173R	SE Telford Road: SE 252nd Avenue to Clackamas County Line	Urban East	28.9	\$4,860,000
134R	E Knieriem Road: SE Littlepage Road to E Historic Columbia River Highway	Rural East	28.8	\$24,610,000
527U	NE Interlachen Lane: NE Marine Drive to NE Blue Lake Road	Urban East	28.7	\$3,350,000
160R	NW Sauvie Island Road / US Highway 30 Intersection Upgrades	West	28.4	\$100,000
128R	Reconstruct Bridge #2 on SE Gordon Creek Road, the Gordon Creek Viaduct	Rural East	27.9	\$5,330,000
156R	NW Reeder Road: NW Gillihan Road to Columbia County Line	West	27.1	\$7,350,000
182R	NE Latourell Falls Bridge Replacement	Rural East	26.4	\$970,000
106R	Beaver Creek Culverts of Regional Concern	Rural East	26.4	\$3,960,000
145R	Newberry Road: US Highway 30 to City of Portland Boundary	West	25.6	\$36,100,000
139R	SE Lusted Road: SE Pleasant Home Road to SE Cottrell Road	Rural East	25.5	\$13,080,000
174R	NW Thompson Road: NW 53rd Drive to UGB	West	25.5	\$21,210,000
144R	Multnomah Channel Tributary Culverts of Local Concern	West	25.3	\$5,670,000
146R	NE Ogden Road: NE Merston Road to E Woodard Road	Rural East	25.3	\$390,000
504U	NE 223rd Avenue - North Railroad Crossing Bridge Replacement	Urban East	24.7	\$15,460,000
102R	SE 282nd Avenue/SE Stone Road Turn Lanes	Rural East	24.2	\$440,000

Project		Region	Score	Cost (2019 dollars)
127R	Reconstruct Bridge #1 on SE Gordon Creek Road, over Gordon Creek	Rural East	23.9	\$6,740,000
162R	NW Sauvie Island Road: Milepost 6 to the Columbia County Line	West	23.3	\$3,510,000
152R	SE Oxbow Drive/SE 327th Avenue/SE Altman Road Realignment	Rural East	21.9	\$4,190,000
104R	SE 302nd Avenue / SE Lusted Road / SE Pipeline Road Intersection Improvements	Rural East	21.7	\$14,120,000
115R	SE Division Drive from SE Oxbow Drive to SE 317th Avenue	Rural East	21.2	\$4,240,000
130R	SE Hosner Road: SE Lusted Road to SE Oxbow Drive	Rural East	21.1	\$2,900,000
123R	NW Gillihan Road / NW Reeder Road Intersection Upgrades	West	19.1	\$10,000

## Bridge Capital Improvement Plan and Program

This section of the plan addresses the capital needs of the six Willamette River bridges: Broadway, Burnside, Hawthorne, Morrison, Sauvie Island, and Sellwood. With the exception of the Sauvie Island Bridge, these bridges are located in the City of Portland and provide regional connections between the east and west sides of the metropolitan area. Figure 42 shows the four downtown, Multnomah County-operated and maintained bridges and Figure 43 shows a map with five of six bridges. As part of the 2015 Capital Improvement Plan and Program (CIPP) Update, the Willamette River Bridges Capital Improvement Plan (Bridge CIP) was incorporated. In 2019 the project list was updated to reflect changes in conditions since the 2015 inspections and cost increases for projects that were not completed in their original time period. A new five-year time period was also added at the end of the Bridge CIP timeline and the time periods for projects were shifted based on when they are likely to be completed. The excerpts from the Bridge CIP plan below are incorporated into the County RCIPP. The full Bridge CIP (with all updates) is available as a separate document, and provides more details on the projects.

**Purpose:** Multnomah County's Bridge CIP identifies a 20-year program of necessary capital projects and associated funding needs to maintain and seismically retrofit the iconic Willamette River bridges (Broadway, Burnside, Hawthorne, Morrison, Sauvie Island and Sellwood) for the period 2020-2039. These bridges connect the community and currently serve approximately 200,000 people daily. As of 2019, the four historic movable bridges lack the necessary seismic resiliency to withstand moderate to major earthquakes. This is especially true for the anticipated Magnitude 9.0 Cascadia Subduction Zone event that the Oregon Department of Geology and Mineral Industries has calculated as having a 37 percent chance of occurring before 2065.

**Bridge CIP Objectives:** The Bridge CIP meets the following objectives established by Multnomah County:

- Provide a rational basis for identifying and prioritizing capital projects.
- Establish criteria for informing program and project selection decisions.
- Provide collaborative public and stakeholder input for criteria selection.
- Identify needs, projects, and costs to maintain the bridges to identified performance standards.
- Conduct a seismic evaluation to support programmatic rehabilitation needs, projects, and costs.

*Figure 42 – Multnomah County  
Operated and Maintained  
Downtown Portland Bridges*





- Develop a comprehensive understanding of the current condition of the six bridges.
- Assess life cycle and capital maintenance needs for key mechanical, electrical and structural systems and paint.
- Obtain Board of County Commissioners (BCC) input and approval for the Bridge CIP.

**Results:** The Bridge CIP currently identifies 54 capital projects with a total cost of approximately \$1.4 billion. The Bridge CIP provides an action plan for 2020-2039 resulting in the following outcomes:

- Dependable bridge operation
- Safe and reliable river crossings
- Enhanced seismic resiliency
- Integration of project distribution analysis within the decision making processes
- Alignment with Multnomah County's Climate Action Plan

Costs for the projects account for inflation to a programmed year of expenditure. Each capital project is planned within a specified five-year time interval, as summarized in Table 25.

*Table 25: Summary of Project Costs by Target Time Interval*

Target Time Interval	Number of Projects	Cost at Target Time Interval for Construction
2020-2024	10	\$751.50 million
2025-2029	16	\$159.77 million
2030-2034	10	\$402.47 million
2035-2039	18	\$167.27 million

Bridge CIP costs summarized by bridge complex are shown in Table 26.

*Table 26: Summary of Project Costs by Bridge Complex*

Bridge Name	Number of Projects	Cost at Target Time Interval for Construction
Broadway	16	\$193.97 million
Burnside	3	\$684.94 million
Hawthorne	16	\$227.74 million
Morrison	15	\$256.22 million
Multiple	6	\$112.74 million
Sauvie Island	4	\$3.93 million
Sellwood	3	\$1.45 million

Bridge CIP costs summarized by primary work category are shown in Table 27.

Table 27: Summary of Bridge CIP Costs by Primary Work Category

Primary Work Category	Number of Projects	Cost at Target Time Interval for Construction
Accessibility	6	\$42.87 million
Driving Surface	5	\$39.25 million
Electrical and Lighting	9	\$27.21 million
Mechanical	5	\$29.87 million
Paint	10	\$285.79 million
Seismic	6	\$885.65 million
Structural	13	\$170.35 million

### Performance Attribute Criteria Assessment and Ratings

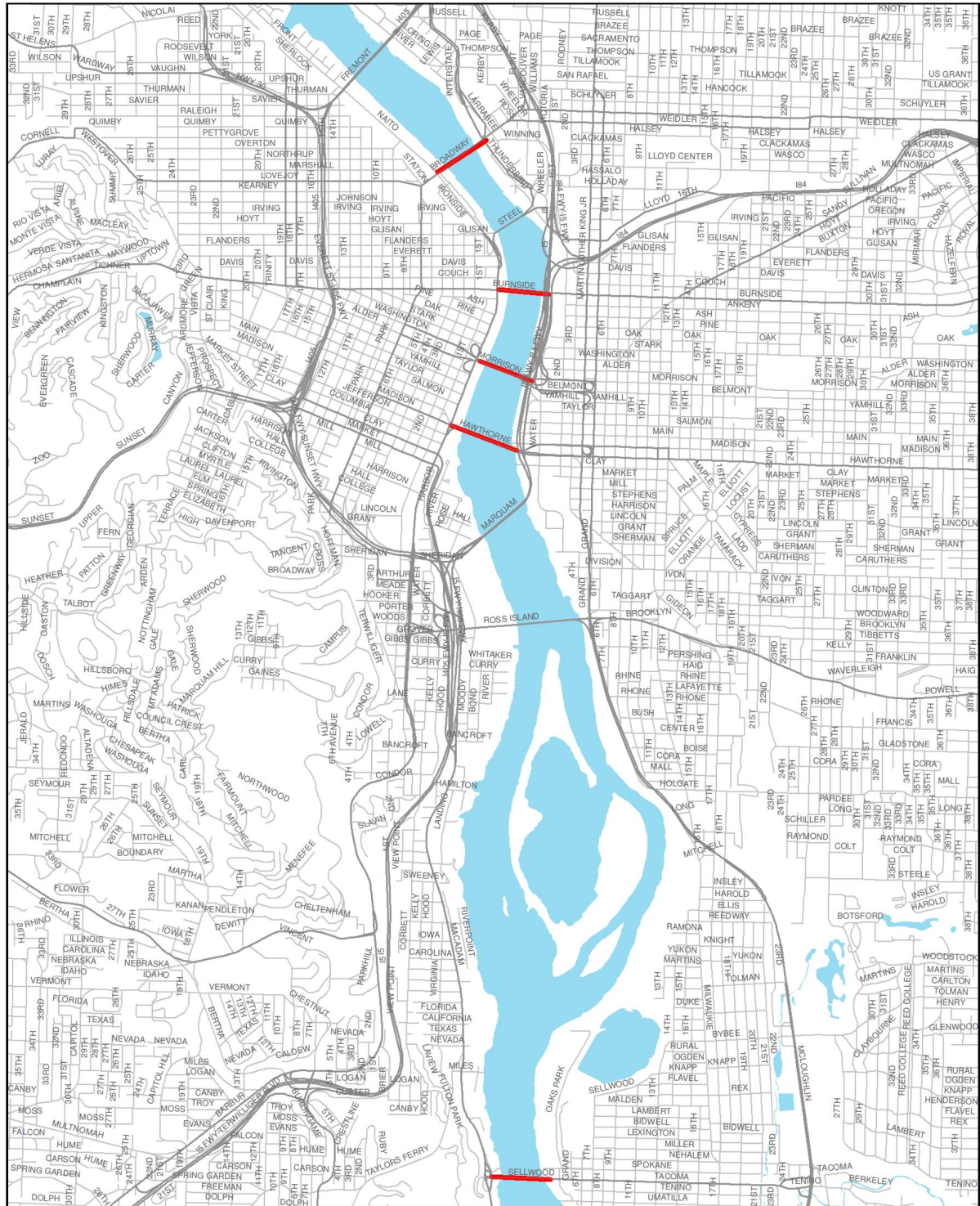
In addition to considering the cost, the prioritization process considered how each bridge project bundle rated against ten different performance attribute criteria that were derived from the County's values. Bridge projects were rated, receiving scores that ranged from -3 (poor performance) to +3 (excellent performance), and every project was evaluated at each five-year time interval. The scores at each time interval were then compared to the score based on the bridge's existing condition. The higher the resulting value of this comparison, the higher the priority of the project.

The following ten performance attributes were established for each project (in alphabetical order):

- **Emergency Preparedness** - An assessment of the structure's ability to resist anticipated seismic and flood events.
- **Livable Communities** - An assessment of how the improvement promotes a multimodal community including bicyclists, transit users and pedestrians (ADA compatibility) to encourage a more livable and healthy community.
- **Maintenance** - An assessment of the long-term maintenance needs and the safety of maintenance and operations staff. Maintenance considerations include the overall durability, longevity, and maintainability of roadway surfaces. They also include the accessibility and safety considerations for maintenance personnel.
- **Movable Operations** - An assessment of the project's ability to maintain bridge movable operations for all modes.
- **Regional Alignment** - An assessment of how well the projects align with adjacent partner agency CIP projects and regional plans, including those for emergency preparedness. (Note: Considers input from the stakeholder engagement process.)
- **Social Justice** - An assessment of project impacts on services for traditionally under-served communities (people of color, low-income, limited English proficiency (LEP), older adults, children, and people with disabilities). Services include schools, social services, faith-based organizations, community centers, police/fire/justice, and food options).
- **Structural Integrity** - An assessment of the structural condition of the bridge based on assessed condition. Projects include paint system rehabilitations that have the ability to preserve the structural condition of the various steel members.

- **Sustainability** - Assessment of the influence of the project on: (1) the long-term economic well-being of the region; (2) the long-term environmental well-being of the vicinity adjacent to the bridges; and (3) the preservation of the historic and iconic nature of the bridges.
- **Traffic Operations** - An assessment of the operations of motor vehicles, freight mobility, and congestion reduction.
- **User Safety** - An assessment of multimodal (including river traffic) safety on the bridge complex and its approach roadways. Safety considerations include horizontal and vertical geometric configurations, merging or weave distances, design speeds, sight distance, lane and shoulder widths, traffic and safety lighting, vehicle or vessel snagging, barrier rail systems, and roadway conditions.

Figure 43: Willamette River Bridge Projects



Multnomah County Capital Improvement Plan & Program 2010-14  
Willamette River Bridge Projects  
Public Review Draft



Table 28: Bridge Projects

Project Rank	Bridge Name(s)	Project Name	Primary Work Category	Target Construction Time	Total Cost at Target Construction Time
1	Burnside	Seismic Resiliency (Major Bridge Rehabilitation / Bridge Replacement) - Environmental Impact Study	Seismic	2020–2024	\$17,000,000
2	Burnside	Seismic Resiliency (Major Bridge Rehabilitation / Bridge Replacement) - Final Design and Right-of-Way (ROW)	Seismic	2020–2024	\$122,942,477
3	Burnside	Seismic Resiliency (Major Bridge Rehabilitation / Bridge Replacement) - Construction	Seismic	2020–2024	\$545,000,000
4	Morrison	Bridge Painting and Structural Rehabilitation - West Approach	Paint	2020–2024	\$17,352,088
5	Broadway	Movable Span Deck Replacement	Driving Surface	2020–2024	\$4,984,731
6	Hawthorne	Bridge Deck and Joint Improvements	Structural	2020–2024	\$10,493,304
7	Broadway, Burnside, Hawthorne, and Morrison	Bicycle and Pedestrian Improvement Project - Feasibility Study Phase	Accessibility	2020–2024	\$1,442,557
8	Morrison	Motor, Brake, and Electrical Power Rehabilitation; Operator House Improvements	Mechanical	2020–2024	\$4,265,529
9	Morrison	Bent Cap Rehabilitation - Approach Spans	Structural	2020–2024	\$4,131,652
10	Morrison	Painting and Structural Improvements - River Spans	Paint	2020–2024	\$23,883,371
11	Broadway	Bridge Deck / Rail / Illumination Improvements	Driving Surface	2025–2029	\$14,449,244
12	Morrison	Span Lock and Support Rehabilitation	Mechanical	2025–2029	\$4,361,957
13	Morrison	Roadway Approaches, Bridge Deck Overlay, and Illumination Improvements	Driving Surface	2025–2029	\$15,661,148
14	Broadway	Roadway and Structural Rehabilitation	Driving Surface	2025–2029	\$2,665,398
15	Broadway	Gate, Span Lock and Structural Rehabilitation - River Spans	Electrical and Lighting	2025–2029	\$4,881,378
16	Hawthorne	Bent Cap Rehabilitation - Approach Spans	Structural	2025–2029	\$3,814,227
17	Broadway	Broadway Bridge West Approach Structural Rehabilitation and Paint	Paint	2025–2029	\$26,325,997
18	Hawthorne	Operating Machinery, Trunnion, and Trunnion Tower Structural Rehabilitation	Mechanical	2025–2029	\$17,914,399

Project Rank	Bridge Name(s)	Project Name	Primary Work Category	Target Construction Time	Total Cost at Target Construction Time
19	Hawthorne	Span Lock and Live Load Shoe Rehabilitation	Mechanical	2025–2029	\$1,031,973
20	Broadway, Burnside, Hawthorne, and Morrison	Scour Remediation	Structural	2025–2029	\$29,405,052
21	Hawthorne	Structural Rehabilitation of Steel and Concrete Members - River Spans	Structural	2025–2029	\$13,142,165
22	Sauvie Island	Roadway Improvements - East Approach	Driving Surface	2025–2029	\$1,488,668
23	Hawthorne	Joint Rehabilitation and Replacement - West and East Approaches	Structural	2025–2029	\$2,384,383
24	Broadway, Burnside, Hawthorne and Morrison	Bicycle and Pedestrian Improvement Project - Design and Construction Phase 1	Accessibility	2025–2029	\$16,319,707
25	Burnside, Broadway, and Morrison	Submarine Cable Removal	Electrical and Lighting	2025–2029	\$4,552,476
26	Sauvie Island	Roadway and Structural Rehabilitation	Structural	2025–2029	\$1,371,606
27	Hawthorne	Hawthorne Bridge Limited Seismic Retrofit	Seismic	2030–2034	\$51,043,621
28	Broadway	Broadway Bridge Limited Seismic Retrofit	Seismic	2030–2034	\$52,628,358
29	Morrison	Morrison Bridge Limited Seismic Retrofit	Seismic	2030–2034	\$97,033,289
30	Hawthorne	Roadway, Sign Bridge, and Illumination Improvements - Approaches	Structural	2030–2034	\$38,009,187
31	Morrison	Structural Rehabilitation of Steel and Concrete Pier Members - River Spans	Structural	2030–2034	\$17,498,153
32	Hawthorne	Paint and Structural Rehabilitation of Steel and Concrete Members - East Approach	Paint	2030–2034	\$37,363,940
33	Morrison	Joint Rehabilitation - West Approach, River Spans, and East Approach	Structural	2030–2034	\$4,537,785
34	Broadway, Burnside, Hawthorne, and Morrison	Bicycle and Pedestrian Improvement Project - Design and Construction Phase 2	Accessibility	2030–2034	\$16,323,533
35	Hawthorne	Bridge Painting and Upgraded Lighting	Paint	2030–2034	\$43,328,584
36	Broadway, Burnside, Hawthorne, and Morrison	Fender Repair and Installation	Structural	2030–2034	\$44,701,438
37	Morrison	Paint, Structural Rehabilitation, and Access Improvements - East Approach	Paint	2035–2039	\$54,678,686

Project Rank	Bridge Name(s)	Project Name	Primary Work Category	Target Construction Time	Total Cost at Target Construction Time
38	Broadway	Operating Machinery Rehabilitation and Brake Replacement	Mechanical	2035–2039	\$2,300,579
39	Morrison	Warning Gate and Sign Bridge Replacement	Electrical and Lighting	2035–2039	\$7,277,240
40	Broadway	Bridge Painting - Maintenance of 2002 Paint Project	Paint	2035–2039	\$66,631,927
41	Broadway	Bridge Painting - Maintenance of 2015 Paint Project	Paint	2035–2039	\$14,891,720
42	Sellwood	Lighting Maintenance	Electrical and Lighting	2035–2039	\$326,903
43	Broadway	Electrical System Master Control Switch Installation and Miscellaneous Operator House Improvements	Electrical and Lighting	2035–2039	\$307,377
44	Hawthorne	Installation of Remote Operation and Monitoring Equipment	Electrical and Lighting	2035–2039	\$2,063,574
45	Hawthorne	ADA Improvements	Accessibility	2035–2039	\$3,472,729
46	Sellwood	Joint Rehabilitation and Replacement	Structural	2035–2039	\$353,055
47	Morrison	ADA Improvements	Accessibility	2035–2039	\$3,472,729
48	Broadway	ADA Improvements	Accessibility	2035–2039	\$1,841,966
49	Sauvie Island	Under-bridge Maintenance Traveler System	Structural	2035–2039	\$510,786
50	Morrison	Installation of Remote Operation and Monitoring Equipment	Electrical and Lighting	2035–2039	\$2,063,574
51	Broadway	Installation of Remote Operation and Monitoring Equipment	Electrical and Lighting	2035–2039	\$2,063,574
52	Sauvie Island	Routine Maintenance and Bridge Painting	Paint	2035–2039	\$560,741
53	Sellwood	Bridge Maintenance Painting	Paint	2035–2039	\$774,760
54	Hawthorne	Warning and Barrier Gate Rehabilitation	Electrical and Lighting	2035–2039	\$3,674,718



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## Capital Improvement Program

### Purpose

The Roadway Capital Improvement *Plan* included several steps to develop one consolidated and prioritized list of projects. The project list was developed based on existing plan projects, new data collected through the LiDAR scan, and conversations with partners and the public. This new list was then run through a comprehensive prioritization process that was created based on the County's vision and goals. The result of this process is a Capital Improvement Plan representing more than 20 years of future project needs. While this plan refers to the "20 year timeline" or the "20 year need", it is clear that the needs represent more projects than the County can afford to construct in that timeframe.

The Capital Improvement Plan identifies and scores all project needs for Multnomah County's transportation system, while the Capital Improvement *Program* identifies anticipated revenue and schedules projects for construction for a 5-year period. In this update, the 5 year program represents Fiscal Years 2020 – 2024. It includes projects that are currently underway by the County.

Constantly changing community needs will alter County transportation program priorities over time before all projects can be constructed. The Transportation Capital Improvement Program is reviewed by the Transportation Division staff on an annual basis with full reviews including public input on a biennial basis. The 2020 – 2024 Capital Improvement Program is based on the best available revenue and cost information. It reflects a program of projects that are in various states of delivery. The 20-year list of needs does not have to be constrained by available revenue, however the Program reflects what known revenue the County has to design and, in most cases, construct. The total cost of projects in the Program update is \$40.4 million.

The total capital need identified in the Transportation Capital Improvement Plan for the 132 candidate projects totals more than an estimated \$1.35 billion.

### Funding Influences and Decisions

The prioritized list of projects is a reflection of the order in which projects would be delivered if limitless resources existed and no emergencies or other mitigating factors occurred. However, it is necessary to be responsive to issues and funding opportunities that arise. Below are examples of mitigating factors that may act as a catalyst in project development and construction.

- Natural Disasters: Examples include landslides, wildfires, and other natural disasters affecting County assets. In the recent past, capital projects have been prioritized in rural west Multnomah County in response to landslides. These include Newberry and Germantown roads.
- Development: Sometimes development projects trigger improvements by the County. An example of this is recent bulb-outs on the Historic Columbia River Highway in the City of Troutdale. Development occurred on the south side of the road and a condition of the development was to install bulb-outs on the south side of the road. In order to be ADA compliant, the County installed bulb-outs on the north side.
- Cost Sharing: County partners' jurisdictions sometimes complete projects that the County is able to "piggyback" on for cost savings. Recently the City of Fairview provided funding and coordination services to work with the Railroad on developing a project on 223<sup>rd</sup> Street (County

2020

road) under the railroad bridge. As a result of these resources, the County is working with the City on the project development.

- Public Input and Safety: Multiple complaints, enforcement, or safety issues force work to be elevated. We try to be responsive to concerns and issues when they are raised. We have a website for this (<https://multco.us/roads/report-hazardous-road-conditions>) and a web-based app where you can report issues. The County tracks this information to understand where recurring problems are noted. When possible, the County pursues low-cost improvements to address concerns.
- Grant Availability: Projects may be eligible for grants depending upon their location and their components. For instance, there is a roadway overlay project on Larch Mountain Road that is funded with a Federal Lands Access Program grant. This is unique to this location as Larch Mountain accesses Federal Lands. The County also has a Regional Flexible Fund Allocation grant from Metro for bicycle, pedestrian, and vehicular improvements on Stark Street between 257<sup>th</sup> Street and Troutdale Road. This is a fund source that is available within the urban growth boundary.

### Five-Year Capital Improvement Program

The total cost of the roadway projects listed on the Program update is \$40.4 million. The breakdown over the next 5 year cycle (2020-2024) is shown below in Table 29.

Table 29: 5-Year Capital Improvement Program

Multnomah County // Capital Improvement Projects for 2020-24												
Roads Project Name	Urban/ Rural	District	Total Project Cost	External Grant Funds	County Funds	Anticipated Construction Timing						
						2019	2020	2021	2022	2023	2024	
NW Germantown Rd slide repair	U	1	\$251K	\$226K	\$25K							
Newberry Rd slide repair	U	1	\$990K	\$884K	\$106K							
Arata Rd	U	4	\$7.35M	\$2.08M	\$5.27M							
NE 238th Dr	U	4	\$8.39M	\$7.52M	\$868K							
NE Cochran Rd Culvert	R	4	\$3.14M	\$579K	\$2.56M							
NW Cornelius Pass Rd	R	1	\$4.24M	\$4.20M	\$45K							
Sandy Blvd sidewalk infills (201st-207th)	U	2	\$275K	--	\$275K							
SE 267th Ave Culvert	R	4	\$995K	\$650K	\$345K							
Offsite mitigation (from Sandy Blvd project)	U	2	\$475K	--	\$475K							
SE Stark St Improvements	U	4	\$4.71M	\$3.52M	\$1.19M							
NE Latourell Rd Bridge	R	4	\$1.49M	\$1.14M	\$355K							
Overlays	U/R	--	\$1.80M	--	\$1.80M							
E Larch Mountain Rd Overlay	R	4	\$3.52M	\$3.15M	\$370K							
ADA Tier 1 First 20% (Design Only)	--	--	\$500K	--	--		Design Only					
<b>TOTAL ROADS</b>			<b>\$38.1M</b>	<b>\$23.9M</b>	<b>\$14.2M</b>							
<b>Bridges Project Name</b>												
Broadway Rail Wheel Replacement	U	1	\$628K	\$64K	\$564K							
Burnside Rehabilitation	U	1	\$9.93M	\$1.02M	\$8.91M							
Morrison Paint	U	1	\$26.4M	\$2.71M	\$23.7M							
Morrison PLC Replacement	U	1	\$366K	--	\$366K							
Burnside PLC Replacement	U	1	\$366K	--	\$366K							
Broadway PLC Replacement	U	1	\$366K	--	\$366K							
Hawthorne PLC Replacement	U	1	\$366K	--	\$366K							
Hawthorne Approaches Overlay	U	1	\$8.54M	\$878K	\$7.67M							
Morrison East Approaches Strengthening	U	1	\$7.70M	\$791K	\$6.91M							
Broadway Lift Span Deck Replacement	U	1	\$3M	\$308K	\$2.70M							
<b>TOTAL BRIDGES</b>			<b>\$57.7M</b>	<b>\$5.77M</b>	<b>\$51.9M</b>							

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