Multnomah County Willamette River Bridges Capital Improvement Plan (2015-2034)

FINAL

Prepared for:

Multnomah County Department of Community Services
Bridge Division
1403 SE Water Ave.
Portland, OR 97214
503 988-3757
www.multco.us/bridges

Table of Contents

Tables

Figures

Attachments

List of Technical Contributors

Multnomah County Staff:

Name	Role
Brian Vincent	Bridge Services Management, General Program Oversight and Direction
Carl Morgan	Bridge Services Operations Manager, Needs Assessment and Historical Perspective
Charles Maggio	Bridge Services Engineer, Needs Assessment and Historical Perspective
Ed Wortman	Bridge Services Engineer, Needs Assessment and Historical Perspective
Ian Cannon	Bridge Services Management, Bridge Services Engineer, Needs Assessment and Historical Perspective, General Program Oversight and Direction
Jill Wolf	Project Manager, Oversight of Final Report
Joanna Valencia	Transportation Planner, Integration of Bridge CIP Into Overall Transportation CIP
Jon Henrichsen	Bridge Services Management, Needs Assessment and Historical Perspective, General Program Oversight and Direction
Karen Schilling	Transportation Planning Director
Mark Knieriem	Bridge Services Specialist, Needs Assessment and Historical Perspective
Mike Pullen	Public Involvement Lead, External and Internal Partner Liaison
Sonali Balajee	Equity Lens Advisor
Ty Aldana	Bridge Services Engineer, Needs Assessment and Historical Perspective
Victoria Morris	Project Manager, General Project Oversight

Consultant Team Members:

Name	Role
Adam Argo (DEA)	Bicycle, Pedestrian and Transit Subtask Lead
Amanda Blankenship (DEA)	Bridge Structural and Maintenance Subtask Lead
Alex Cousins (HDR)	Public Involvement Task Lead
Benjamin Hocker (DEA)	Hydrographic Subtask Lead
Brett Schneider (SCLLC)	Cost Estimating Subtask Lead
Douglas Lampkin (DEA)	Deputy Project Manager; Data Gathering and Report Task Lead; Bridge Deck/Sidewalk/Rail and Programmatic Replacement Subtask Lead
Kelly Burnell (DEA)	Seismic Subtask Lead
Kristine Marshall (DEA)	Environmental Subtask Lead
Matthew McGuire (HDR)	Mechanical and Electrical Subtask Lead
Mark Libby (HDR)	Paint Subtask Lead
Michael Baker (DEA)	Project Manager
Michael Hickey (DEA)	Roadway Subtask Lead
Steve Drahota (HDR)	Process Development and Technical Analysis Task Lead

Consultant Firm Key:
DEA = David Evans and Associates, Inc.
HDR = HDR Engineering, Inc.
SCLLC = Schneider Consulting, LLC

Multnomah County Willamette River Bridges Capital Improvement Plan (2015-2034)

1 Executive Summary

Purpose: This Multnomah County Willamette River Bridges Capital Improvement Plan (Bridge CIP) identifies a 20-year program of necessary capital projects and associated funding needs to maintain and seismically retrofit the County's iconic Willamette River bridges (Broadway, Burnside, Hawthorne, Morrison, Sauvie Island and Sellwood) for the period 2015-2034. These bridges connect the community and currently serve approximately 200,000 people daily. As of 2014, the County's 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% 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.
- 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 identifies 56 capital projects with a total cost of approximately $1.3 billion. The Bridge CIP provides an action plan for 2015-2034 resulting in the following outcomes:

- Dependable bridge operation
- Safe and reliable river crossings
- Enhanced seismic resiliency

Figure 1 – Multnomah County Willamette River Bridges Overview

- Integration of Multnomah County's Equity Lens in decision making processes (see Section 3.2.2)
- 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 5-year time interval, as summarized in **Table 1.**

Table 1 – Summary of Project Costs by Target Time Interval

Target Time Interval	Number of Projects	Cost at Target Time Interval for Construction
2015-2019	10	$125.43 million
2020-2024	16	$130.23 million
2025-2029	12	$877.48 million
2030-2034	18	$166.85 million

Bridge CIP costs summarized by bridge complex are shown in Table 2.

Table 2 – Summary of Project Costs by Bridge Complex

Bridge Name	Number of Projects	Cost at Target Time Interval for Construction
Broadway	14	$212.16 million
Burnside	4	$546.92 million
Hawthorne	12	$195.40 million
Morrison	13	$236.05 million
Multiple	6	$104.08 million
Sauvie Island	4	$3.93 million
Sellwood	3	$1.45 million

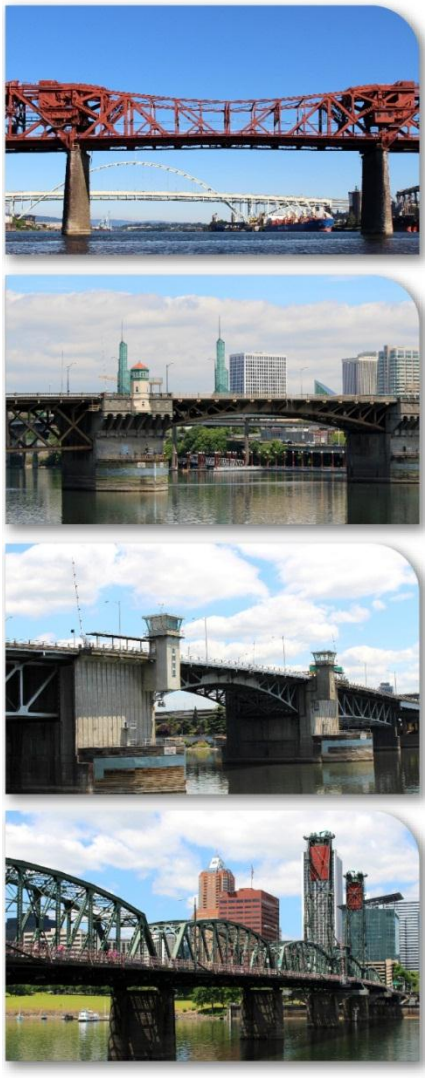


Figure 2 – Multnomah County Downtown Portland Bridges

Bridge CIP costs summarized by primary work category are shown in **Table 3**.

Table 3 – Summary of Bridge CIP Costs by Primary Work Category

Primary Work Category	Number of Projects	Cost at Target Time Interval for Construction
Accessibility	6	$43.37 million
Driving Surface	5	$32.99 million
Electrical and Lighting	9	$26.26 million
Mechanical	6	$39.62 million
Paint	11	$288.96 million
Seismic	6	$705.47 million
Structural	13	$163.33 million

2 Results

This section summarizes the methodology and results of the prioritization process used to rank the projects identified in the Bridge CIP. The first part of this section describes the concepts and steps used to compare projects or bundles containing different needs, urgencies and technical components. The second part of this section summarizes the Bridge CIP project costs according to the four time intervals for construction, the bridge complexes and the primary work categories. Further discussion of the grouping of projects into bundles can be found in **Section 3.5**. See **Attachment A** for a list of terms and associated definitions used throughout this report. Limits of assessment and potential work for the bridges was set forth at the start of the planning process and can be seen for the four downtown movable bridges in **Attachment B**. Limits of assessment and potential work for the Sauvie Island and Sellwood bridges is based upon jurisdictional boundaries and existing intergovernmental agreements.

2.1 Prioritization Process for Bridge CIP Projects

The cornerstone of the Bridge CIP process was its methodology for prioritizing and ranking the various capital improvement plan (CIP) projects, which considered the following concepts:

- **Consequence of Inaction**: All else being equal, priority was given to those projects having the highest consequence of inaction (measured in dollars).
- **Improvement Benefits**: All else being equal, priority was given to those projects maximizing benefits to the County, its residents and the community.
- **Direct Capital Cost:** All else being equal, priority was given to those projects having the lowest initial capital cost.
- **Urgency of Need:** For those projects with an identifiable urgency or predetermined time-dependency, an "override" function was applied to the numerically based prioritization process described below in this section.

To incorporate these concepts objectively, a ranking parameter was developed, defined as the project's Importance Factor that was generally used to prioritize the project bundles. The Importance Factor, consisting of individual results for each of the five-year time intervals, establishes a consistent measurement for comparing projects of different scopes and urgencies. The Importance Factor equation considers the:

- likelihood that a need or deficiency would occur within each five-year time interval;
- confidence in the appropriateness of the identified capital improvement;
- cost of inaction at each incremental time interval, assuming that no improvement was constructed;
- initial construction cost of the project;
- qualitative benefit that the project provides to the County and the community.

Importance Factors were tabulated at each time interval for each project bundle. Following this calculation, the following process was used to establish the project prioritization.

2.1.1 Step 1: Assign Project Bundles to a Time Interval

Two methods were used to assign each project bundle to its appropriate five-year time interval. Under the first method, utilizing engineering judgment, project bundles were assigned directly into a specific time interval in order to address existing or expected needs. For example, any deficiency that required immediate remedy had its associated project bundle assigned to the first five-year time interval. In other cases, it was determined that time needed to elapse before a project is required, such as for maintenance of a recently completed paint project.

For those projects with no time-dependency, the second method was applied, utilizing the Importance Factors described on the previous page. In this method, the Importance Factors across the time intervals of each project bundle were examined in order to determine whether a spike, inconsistency or anomaly in the scoring pattern of the Importance Factor existed. A noteworthy change in the Importance Factor scores between time intervals signified that the likelihood of a serious problem had increased, the cost to remedy an issue had significantly increased, or a large project benefit was observed when shifting from one time interval to another. When this was observed, the project bundle was assigned to the time interval immediately before the change, thereby avoiding a significant consequence of inaction and/or recognizing the performance benefits of implementing the project.

2.1.2 Step 2: Sort the Project Bundles within Each Time Interval by Importance Factor

Once the project bundles were assigned a time interval, the projects were then sorted by their Importance Factor (from highest to lowest) within each time interval. As a rule, all project bundles that fell within the time interval of zero to five years were prioritized before any of the other project bundles from the other time intervals, regardless of the Importance Factor scores that were generated in those time intervals. Starting with the zero-to-five-year time interval, the project with the highest Importance Factor score was ranked Number 1. The project with the second highest Importance Factor score was ranked Number 2, and so on until all of the projects in the zero-to-five-year time interval were ranked. Using this process, the time interval of 2015-2019 had ten (10) projects with Importance Factors that ranged from 64.27 to 7.73. The time interval of 2020-2024 had sixteen (16) projects with Importance Factors that ranged from 33.33 to 12.98. The time interval of 2025-2029 had twelve (12) projects with Importance Factors that ranged from 162.33 to 14.04. The time interval of 2030-2034 had eighteen (18) projects with Importance Factors that ranged from 36.11 to 2.93.

2.2 Bridge CIP Project Costs

Critical to the development of the Bridge CIP is the determination of project costs for each project bundle. The project costs include all of the components associated with all phases of a project. That is, they include the preliminary engineering (including planning and National Environmental Policy Act (NEPA) phases), the constructed value, construction engineering and inspection, right-of-way (ROW) acquisition and utility costs. The costs have been adjusted for inflation for their assigned time interval.

2.2.1 Costs for All Bridge CIP Projects

Based on the cost estimating approach described in **Section 3.4**, the results for all of the prioritized projects have been provided in **Attachment C** for all 56 bundled projects. The total cost is approximately $1.3 billion, based on the programmed time interval for each of the bundled projects. **Table 4** and **Figure 3** show the anticipated total cost for each of the five-year planning windows, or target time intervals, within the 20-year planning horizon for the Bridge CIP. Additional costs for maintenance and capital improvements that are outside of the 20-year planning horizon or outside of the scope of the Bridge CIP development are not reflected in the values presented.

Table 4 – Summary of Project Costs by Target Time Interval

Target Time Interval	Number of Projects	Cost at Target Time Interval for Construction
2015-2019	10	$125.43 million
2020-2024	16	$130.23 million
2025-2029	12	$877.48 million
2030-2034	18	$166.85 million

2.2.2 Costs for Bridge CIP Projects by Bridge Complex

Bundled projects from the prioritized list have been filtered according to the bridge complex name (Broadway, Burnside, Hawthorne, Morrison, Sauvie Island and Sellwood). There is also a category for bundled projects that incorporate multiple bridge complexes into a single project. The results for the anticipated total cost for each bridge complex, as well as for the project bundles that incorporate multiple bridge complexes, are shown below in **Table 5** and the **Figure 4**. More detailed cost summary tables can be found in **Attachment D**.

Table 5 – Summary of Project Costs by Bridge Complex

Bridge Name	Number of Projects	Cost at Target Time Interval for Construction
Broadway	14	$212.16 million
Burnside	4	$546.92 million
Hawthorne	12	$195.40 million
Morrison	13	$236.05 million
Multiple	6	$104.08 million
Sauvie Island	4	$3.93 million
Sellwood	3	$1.45 million

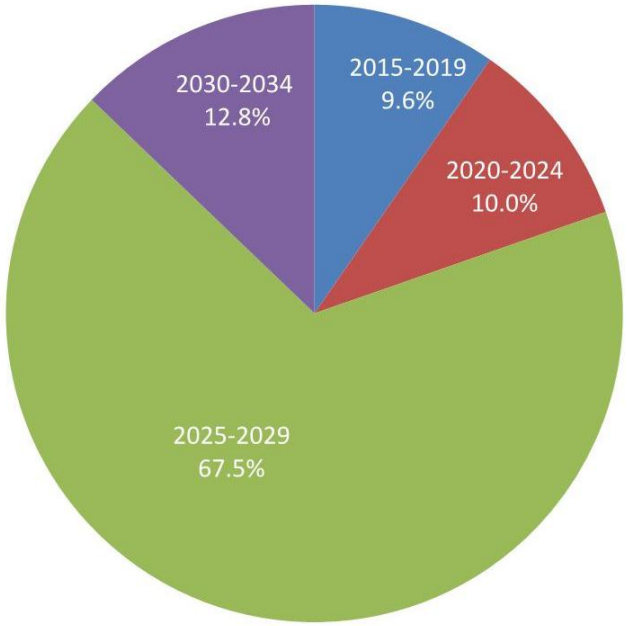


Figure 3 – Summary of Project Costs by Target Time Interval

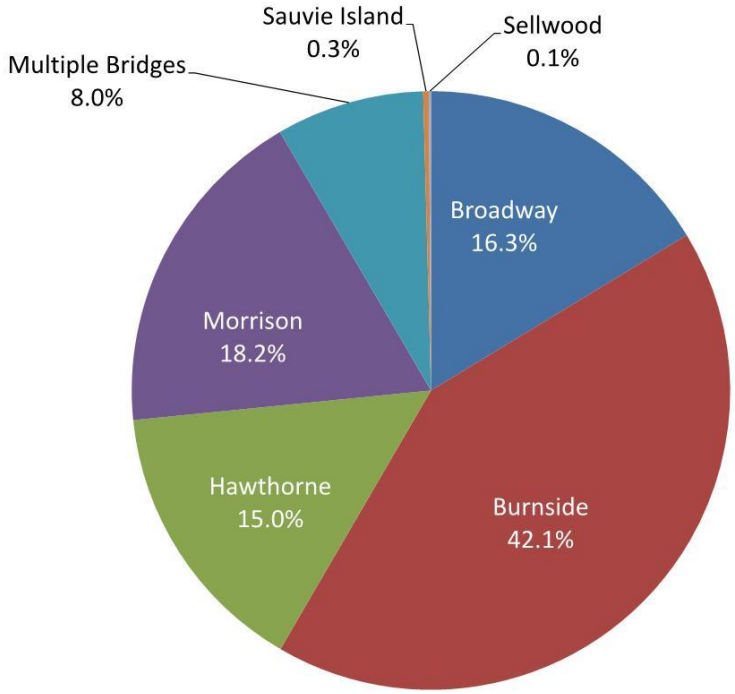


Figure 4 – Summary of Project Costs by Bridge Complex

2.2.3 Costs for Bridge CIP Projects by Primary Category of Work

Project bundles from the prioritized list have been filtered according to their primary work category (accessibility, driving surface, electrical and lighting, mechanical, paint, seismic and structural), as shown in below in **Table 6** and **Figure 5.** For bundled projects, the primary work category is the category with the highest percentage of the initial constructed value of the project. More detailed cost summary tables can be found in **Attachment E**.

Table 6 – Summary of Bridge CIP Costs by Primary Work Category

Primary Work Category	Number of Projects	Cost at Target Time Interval for Construction
Accessibility	6	$43.37 million
Driving Surface	5	$32.99 million
Electrical and Lighting	9	$26.26 million
Mechanical	6	$39.62 million
Paint	11	$288.96 million
Seismic	6	$705.47 million
Structural	13	$163.33 million

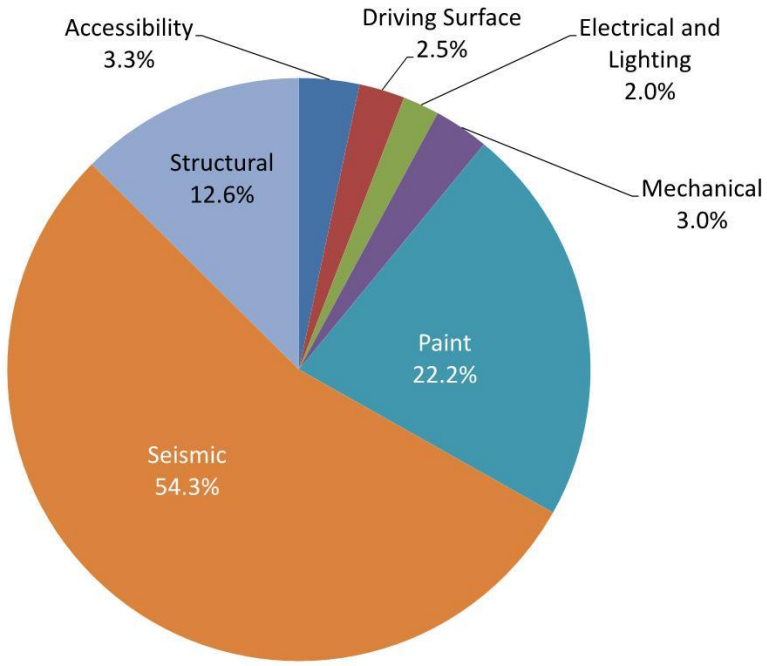


Figure 5 – Summary of Bridge CIP Costs by Primary Work Category

A single, one-page summary, including a brief narrative statement describing the problem, proposed solution, justification, performance attribute score, importance factor score, and cost components has been provided in **Attachment F** for each of the 56 project bundles.

3 Bridge CIP Development Process Summary

The Bridge CIP project was executed in two high-level phases, as follows:

- **Phase 1 – Project Initiation and Planning Phase:** The project initiation and planning phase was performed between October 2013 and January 2014, wherein the project goals and objectives were defined, the project approach was established, and an assessment of the existing information was performed. A key component of the project approach was the public outreach process, and it was during this phase that the Public Engagement Plan was conceived. As part of the data gaps analysis, critical baseline engineering and operational data were gathered, and knowledge transfer workshops with County staff were conducted. These efforts were performed to establish the context for the Bridge CIP project implementation stage.

What is a capital project for the Bridge CIP?

A physical improvement to any of Multnomah County's six Willamette River Bridges that:

- Addresses a known or anticipated deficiency within the 2015-2034 planning window
- Is within the jurisdictional limits of the County Bridge Division
- Is part of the existing maintenance responsibility of the County Bridge Division
- Has a project value over $500,000

- **Phase 2 – Implementation Phase:** The implementation phase was performed between February 2014 and February 2015. It consisted of the technical assessment work, development of programmatic cost estimates, compilation and prioritization of project bundles, and preparation of the Bridge CIP Report. As part of the technical assessment work, comprehensive bridge needs and deficiencies were identified. These included requests from partner agencies and stakeholder organizations to keep the bridges operational over the programming timeline. The project bundle priority and sequence process employed during this phase, including a cost risk assessment (CRA) process, sequenced the projects to maximize project benefits while minimizing the cost of inaction.

The process for developing the Bridge CIP is shown in **Figure 6.**

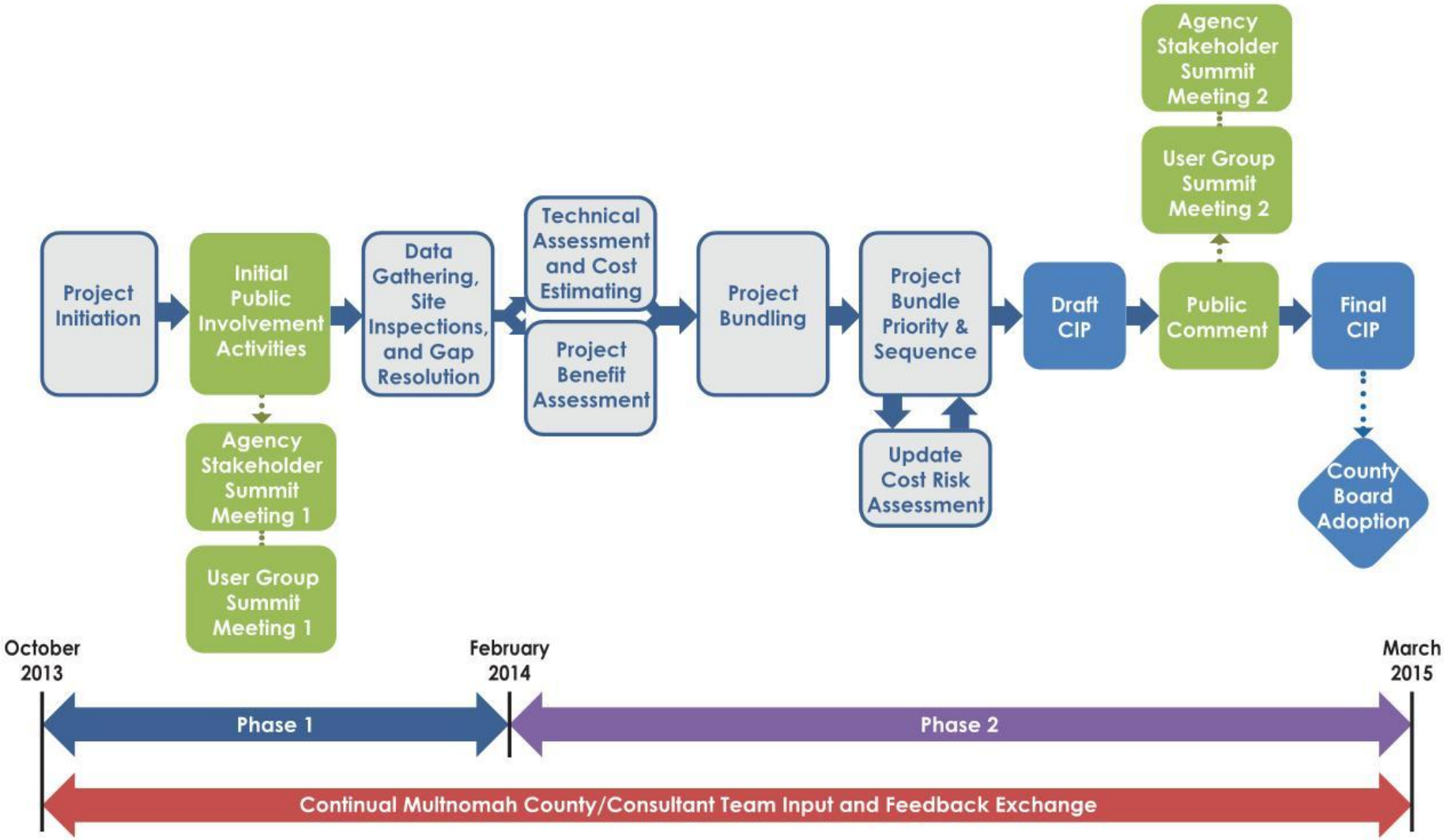


Figure 6 – Bridge CIP Development Process

3.1 Existing Information Review

A number of existing information sources were compiled and considered to make the needs determination for each of the individual bridges. The sources included inspection reports, as-built drawings, shop drawings, published technical articles, load ratings, maps, technical assessment reports, and construction specifications and planning reports. Where gaps in critical information were observed, interviews with Multnomah County Bridge

Maintenance and Engineering staff were conducted or information was supplemented by field investigations and observation of the existing bridge components.

3.2 Field Reconnaissance and Hydrographic Survey

For the field reconnaissance, specialized equipment such as lift equipment or under bridge inspection vehicles was not used, in order to lessen the impact to the traveling public during data collection. Specialized equipment often requires lane restrictions, lane closures and traffic control to use during bridge inspections. Observations were primarily made on foot from ground level as well as from existing maintenance access walkways and platforms. The portion of in-water piers above the waterline were observed visually from a boat.

In-water piers and river bottom surfaces were observed through a hydrographic investigation that utilized high resolution multibeam sonar and 3D scanning sonar. These hydrographic technologies allowed the condition of the concrete components of the piers below the waterline to be assessed. They also allowed identification of areas of potential undermining of the existing pier foundations and concrete degradation of the exposed portions of the piers. River bottom surface elevation data collected in 2014 for this project was compared to charting survey data collected for the National Oceanic and Atmospheric Administration (NOAA) in observed features. A sample of the river bottom scan with several submerged features is shown in **Figure 7**.

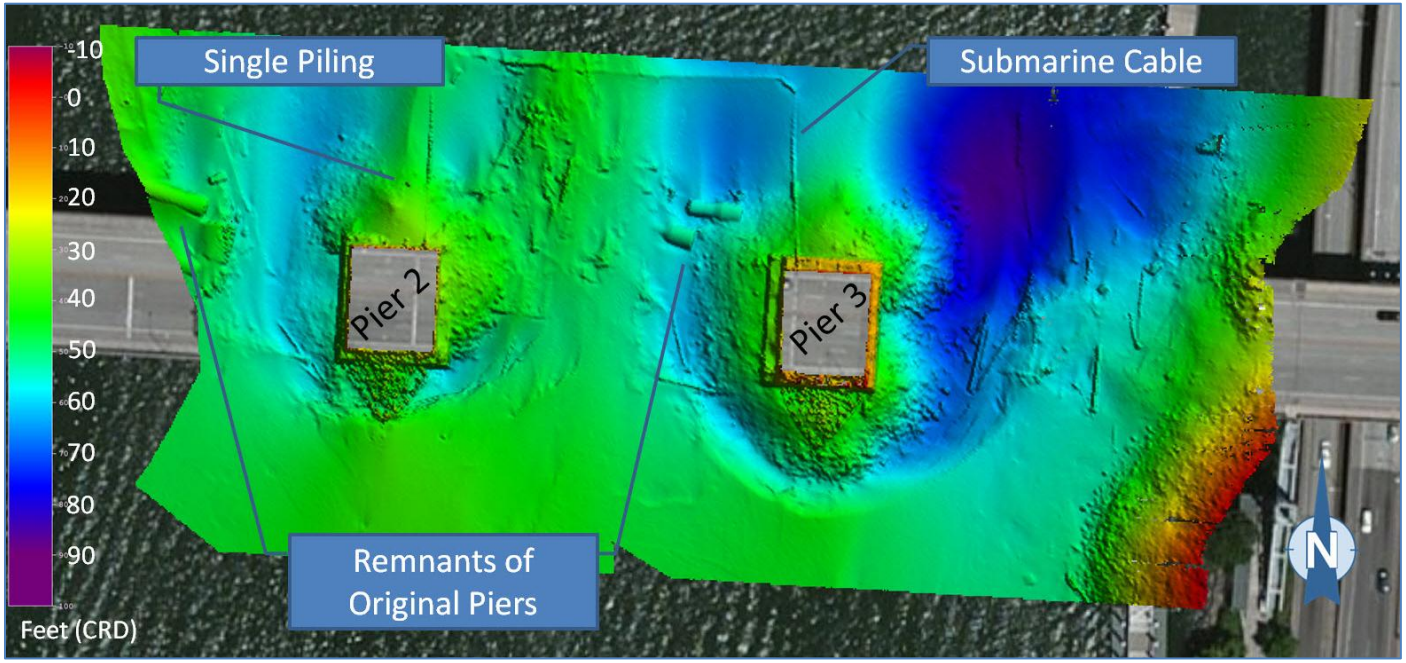


Figure 7 – Burnside Bridge Surrounding Conditions from Hydrographic Investigation

3.3 Criteria Development and Project Prioritization Process

Developing the criteria to inform project prioritization was a collaborative process that included the Multnomah County Bridge Division, the Multnomah County Roadway Division, and other key stakeholders representing County communications, planning and equity. Multiple workshops and stakeholder outreach sessions, both with Multnomah County and with external partners, were conducted to elicit information that informed the process and resulted in an appropriate balance between the Bridge Division's mission to safely operate and maintain the bridges and Multnomah County's broader mission to provide social services to its residents. The development sequence is depicted in **Figure 8** below.

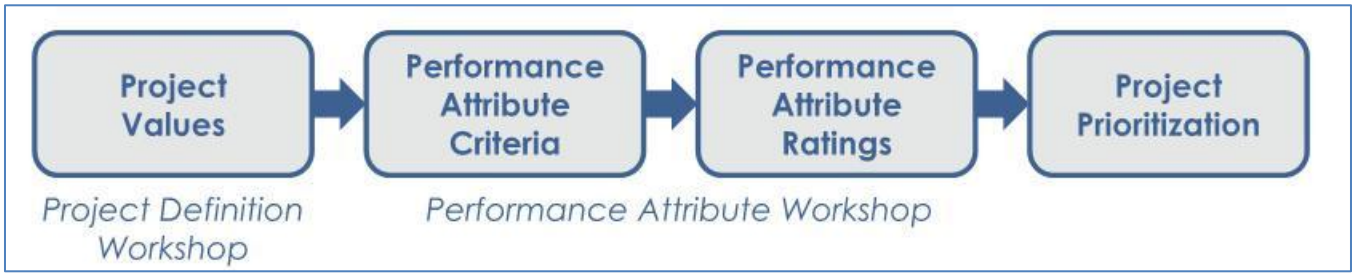


Figure 8 – Project Prioritization Process

3.3.1 Multnomah County Values and CIP Process and Project Values

The Multnomah County Board of Commissioners adopted its Values, Mission and Vision Statement on June 2, 2011, to provide a framework for making decisions that impact Multnomah County government and the community. Knowing the mission, vision and values of the organization enables leaders and employees to consider the greater good when making tough decisions.

Mission: The Multnomah County Board of Commissioners plans for the needs of a dynamic community provides leadership to ensure quality services, prioritizes the needs of our most vulnerable, and promotes a healthy, safe and prosperous community for all.

Vision:

- Build a community where everyone is healthy and anyone who needs help has a place to find it.
- The community knows about and is engaged in what we do.
- We have the resources to meet the community's needs.
- Everyone in our community shares equally in opportunity, regardless of what they look like, where they come from, what they believe in, or who they love.
- There is a fully funded safety net to protect the most vulnerable people in our community.

Values:

- **Social Justice** – Promote equity in the community, include people who have not been included in the past, help those who need help.
- **Health** – Support a healthy community from birth through adulthood.
- **Public Safety** – Maintain safe neighborhoods through prevention, intervention and enforcement.
- **Integrity** – Be honest and trustworthy, creating transparency and harmony between what we think, say and do; put the County's mission above personal goals.
- **Stewardship** – Demonstrate tangible, cost effective results from our work; decisions are clear, evidence-based and fair.
- **Creativity and Innovation** – Think in new ways, value new opinions and recognize ingenuity and resourcefulness.
- **Sustainability** – Focus on the long-term environmental and economic well-being of the community.

In December 2013, to guide Bridge CIP development and align the project with County values, the following project and process values were developed:

Bridge CIP Project Values: *To guide the identification of needs and selection of capital projects-*

- **Social Justice –** Promote community equity.
- **Health –** Support community health.
- **Public Safety –** Maintain and enhance public safety.
- **Stewardship –** Promote responsible, cost-effective use of public funds.
- **Sustainability** – Focus on the long-term environmental and economic well-being of the community.
- **Emergency Preparedness –** Be responsive and proactive in addressing the potential for disaster.
- **Community Identity –** Consider the historic, iconic status of the bridges in shaping community identity.

> "The County's work is about people and facilitating movement. We are responsible for providing access to support economic prosperity."
> *Chief Operating Officer, Marissa Madrigal*

Bridge CIP Process Values: *To guide the manner in which the County engages people in developing the Bridge CIP-*

- **Integrity –** Promote open, transparent, and honest decision making.
- **Public Input –** Consider the opinions of stakeholders and the public in decision making.
- **Stewardship –** Ensure that decisions are clear, evidence-based and fair.
- **Creativity and Innovation –** Think in new ways, value new opinions, and recognize ingenuity and resourcefulness.

3.3.2 Equity and Empowerment Lens

Throughout development of the Bridge CIP, representatives from Multnomah County's *Office of Diversity and Equity* provided valuable context for incorporating the Equity and Empowerment Lens. Specifically, this included evaluating how the Bridge CIP could positively impact the community regarding the "5 P's" (People, Place, Process, Power and Purpose) and integrating the 5 P's into project selection criteria, where appropriate, such as criteria for livable communities, social justice and sustainability.

The County acknowledged that not all of the data necessary to inform the 5 P's was available during the Bridge CIP development phase; however, identifying what those key information needs are would help provide clarity in the future. It is recognized that Multnomah County, in implementing the Bridge CIP, will take appropriate steps to foster equity in a variety of specific ways, including the following:

- Offer opportunities to disadvantaged, minority, women and emerging small business (DMWESB) firms during project delivery.
- Emphasize multimodal access to support equity.
- Equal access should be considered based on groups and locations accounting for regional population changes and future travel demands on the bridges.
- Part of achieving an equitable solution is asking what the population believes it needs through public outreach and engagement; not just assigning the needs to a given population in isolation.

3.3.3 Performance Attribute Criteria Assessment and Ratings

In addition to considering cost, the prioritization process considered how each project bundle rated against ten different performance attribute criteria that were derived from the County's values. 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, resulting in a PerfD value (see **Section 2.1** for definition), a value that was a component of the **Importance Factor** calculation. The larger the PerfD score, the higher priority the project has. The following ten performance attributes were established for the 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 (Americans with Disabilities Act (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. It also includes 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 (minority, low income, limited English speaking, youth, elderly, and disabled). 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 project's influence 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.

3.4 Cost Estimating

The Bridge CIP project cost estimates were compiled based on a combination of two development approach categories: (1) calculated costs and (2) assigned (or programmatic) costs. Calculated costs involve project-specific elements that were quantified, assigned unit costs and then multiplied together to yield an anticipated cost value. Assigned costs are programmatic in nature, and were developed based on the cost element categories shown in **Table 7**.

Table 7 – Development Approach Categories of the Bridge CIP Cost Elements

Calculated Cost Elements	Assigned Cost Elements	Hybrid Cost Elements (Calculated and Assigned Cost Elements)
Right-of-Way (ROW)	Contingency	Constructed Value (CV)(Calculated)
Utilities	Escalation	Temporary Traffic Control (Assigned)
	Preliminary Engineering (PE)	Mobilization (Assigned)
	Construction Engineering (CE)	

3.4.1 Cost Estimating Assumptions

The following assumptions were used in establishing each cost element:

- **Right of Way (ROW) (Calculated):** ROW costs were determined based on anticipated level of impact. The determinations were assessed using a percentage of constructed value ranging from 0% to 100%.
- **Utilities (Calculated):** Based on statements by Multnomah County staff that the County has a "Prior Rights" designation over all utility agencies, utility costs were assessed for County utilities only. No franchise or other utility costs were assessed. All costs associated with utility relocations were assumed to be financed by utility owners.
- **Contingency (Assigned):** Contingency costs are intended to account for uncertainty in the constructed value buildup and miscellaneous items that are unquantifiable during the planning phase. Contingency was based on a percentage of Constructed Value (CV), exclusive of escalation costs. Based on input from Multnomah County, and given that this Bridge CIP project utilized a programmatic-level estimating process for CV, contingency was set at 40% of CV, inclusive of utilities, mobilization and temporary traffic control.

- **Escalation (Assigned):** Escalation costs are intended to capture inflationary costs from the assumed CV unit pricing date of 2014. Escalation costs were based on a 3% per year increase in CV cost based on historical trends (inclusive of utilities, mobilization, temporary traffic control and contingency). Escalation was assigned a factor based on the following:

    - Bridge CIP projects programmed between years 0 and 5 were escalated using a duration of 2.5 years, equating to an 8% increase.
    - Bridge CIP projects programmed between years 6 and 10 were escalated using a duration of 7.5 years, equating to a 25% increase.
    - Bridge CIP projects programmed between years 11 and 15 were escalated using a duration of 12.5 years, equating to a 45% increase.
    - Bridge CIP projects programmed between years 16 and 20 were escalated using a duration of 17.5 years, equating to a 68% increase.

- **Preliminary Engineering (PE) (Assigned):** PE includes all Bridge CIP project costs for pre-construction services including planning, designing, permitting, coordinating with the public, bidding, and procuring and overseeing design services. PE costs were established as a percentage of CV, inclusive of utilities, mobilization, temporary traffic control, contingency and Escalation, as follows:

    - For projects with CV exceeding $100 million, PE was budgeted at 12% of CV.
    - For projects with CV less than $2 million, PE was budgeted at 25% of CV.
    - For projects with CV between $2 million and $100 million, PE was budgeted using a variable percentage that ranges linearly between 12% and 25% of CV.

- **Construction Engineering (CE) (Assigned):** CE costs include all Bridge CIP project costs for construction phase engineering support, including overseeing construction, redesigning, responding to contractor inquiries, construction inspecting, and coordinating with the public. CE costs were established as a percentage of CV, inclusive of utilities, mobilization, temporary traffic control, contingency and Escalation, as follows:

    - For projects with CV exceeding $100 million, CE was budgeted at 12% of CV.
    - For projects with CV less than $2 million, CE was budgeted at 25% of CV.
    - For projects with CV between $2 million and $100 million, CE was budgeted using a variable percentage that ranges linearly between 12% and 25% of CV.

- **Constructed Value (Calculated):** Constructed Value (CV) includes all physical elements required to construct a project, whether temporary or permanent, as well as any other incidental items required by the contractor to support its construction operation. Due to the programmatic nature of the planning-level estimate for the Bridge CIP project, only major quantities of work were calculated directly. Examples of this approach include bridge deck surface area (for bridge deck rehabilitation or replacement), steel surface area (for painting) and concrete volumes (for structural rehabilitations). Other factors used to develop the CV include:

    - Costs were developed based on 2014 unit pricing.

- Whenever possible, unit prices for the calculated items were developed based on average historical unit bid prices for similar work elements in the region. If regional unit prices were not available, projects outside of the region were used. If pricing from similar projects was not available, engineering judgment was used to develop the costs.
- Costs were modified to account for difficulty of work and/or access, based on a system of "low/medium/high" selection criteria as follows:
    - If a work item is considered to have "low" difficulty/access issues, the average cost of work for the region will be used.
    - If a work item is considered to have "medium" difficulty/access issues, the average cost of work for the region will be multiplied by a factor of 1.1 to account for added difficulty.
    - If a work item is considered to have "high" difficulty/access issues, the average cost of work for the region will be multiplied by a factor of 1.2 to account for added difficulty.
- Costs were modified to account for the duration of the construction work.
- Costs were magnified to account for identified regulatory and/or permitting work requirements or constraints (inhibited park access, in-water work to protect listed species, mitigation zones, etc.).

- **Temporary Traffic Control (Assigned):** Temporary traffic control is a cost component within the CV element and includes the necessary features to maintain traffic and a safe work zone for all modes during construction. Temporary traffic control costs were established as percentages of CV, exclusive of escalation and contingency, as follows:

    - For projects with CV exceeding $50 million, temporary traffic control was budgeted at 0.5% of CV.
    - For projects with CV less than $2 million, temporary traffic control was budgeted at 6% of CV.
    - For projects with CV between $2 million and $50 million, temporary traffic control was budgeted using a variable percentage that ranges linearly between 0.5% and 6% of CV.

- **Mobilization (Assigned):** Mobilization is a component within the CV element and represents the assumed administrative costs for the construction contractor to mobilize to the site. Mobilization was assigned a value of 10% of the CV of the project, exclusive of escalation and contingency.

3.5 Logical Groupings and Bundling Methodology

Based on Bridge CIP objectives, a process was developed to comprehensively evaluate potential deficiencies and needs for each of the County's six Willamette River bridges. Following this evaluation, a systematic approach was implemented to combine the needs and deficiencies into Bridge CIP project bundles, as shown in **Figure 9**.

An initial assessment of all bridges identified approximately 400 potential needs or deficiencies. Based on these needs and deficiencies, 200 Logical Groupings were formed to develop remedies, each exceeding a $50,000 minimum cost threshold. Engineering judgment was used to bundle individual projects that could logically be completed as a single larger project, to maximize efficiency and reduce costs for mobilization and traffic control. These groupings were then compiled into 56 capital projects (bundles), of at least $500,000, based on urgency, technical dependencies, proximity, and cost efficiencies.

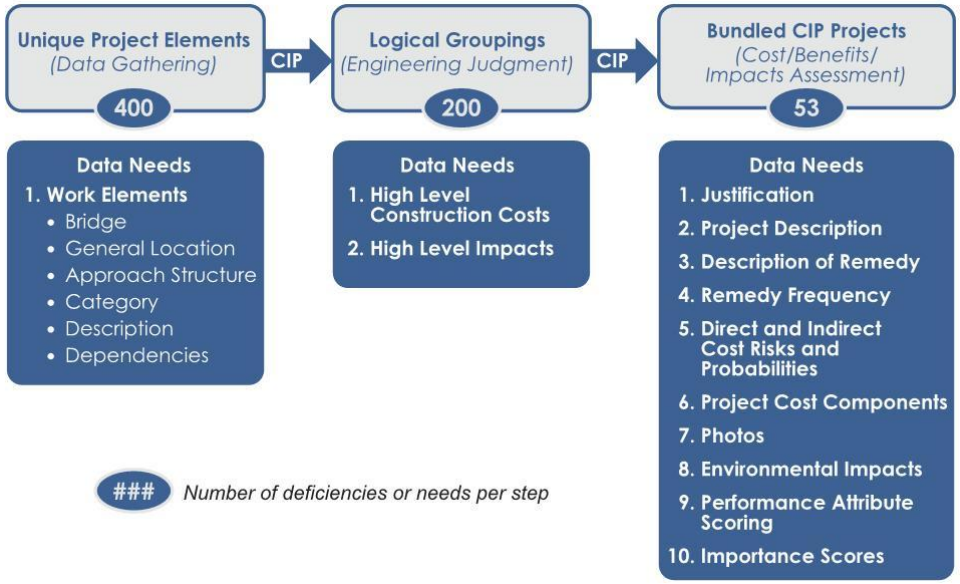


Figure 9 – Project Bundle Development Approach

3.6 Cost Risk Assessment

A cost risk assessment was performed by evaluating the current condition of various bridge features, determining the need for improvements and forecasting the cost variance of improvements over the 20-year period from 2015-2034. The following bridge features were considered:

- Mechanical and electrical systems
- Structural systems
- Bridge deck, sidewalks and railing systems
- Bridge maintenance systems
- Paint systems
- Scour
- Roadway approach systems
- Multimodal facilities (bicycle, pedestrian and transit), including ADA compliance
- Environmental compliance
- Seismic resiliency
- Bridge replacement

Each of the bridge features listed above had a different existing condition state, resulting in a variety of 20-year remedies unique to each bridge and dependent on the feature's life cycle. For this reason, four sequential five-year time intervals were established to capture the variety of potential remedies. For each of the time intervals, a needs assessment was performed assuming that nothing had been improved in the prior years.

The CRA process was influenced by four quantifiable variables for each project, spanning each five-year time interval. Each of the values was calculated and combined using a Monte Carlo-based modeling process to determine the appropriate risk threshold. The four cost variables are:

- **Occurrence Probabilities:** The likelihood that the underlying need or deficiency that would result in an improvement project will occur.
- **Direct Costs:** The capital construction cost associated with each project's physical improvement at year 2014.
- **Direct Cost Change:** The increase in direct costs required at each time interval as a result of further deterioration of the project bundle components. This variable does not include cost escalations due to inflation.
- **Indirect Costs:** Other costs borne by the County, in addition to the direct costs, if a needed improvement was not constructed and therefore a failure occurred.

3.6.1 Occurrence Probabilities

Each project bundle represents a capital project developed to address known existing or future anticipated needs and deficiencies. To help assess when the project bundle is needed, an occurrence probability (Oprob) factor was developed. This variable was developed based on engineering judgment using the best available data. In some cases, this judgment relied on field inspection data, while in other cases, it relied on previously developed inspection reports or engineering judgment from similar past projects. The Oprob value ranged from 0% to 100%, and was implemented as a direct multiplier when calculating each project bundle's Importance Factor score. For example, a 0% Oprob value meant that there was a 0% likelihood that the project would be required for the particular time interval under consideration. A 0% Oprob value was determined for some project time intervals in which the need was forecasted to exist in the future but did not exist in the current state. Conversely, a 100% Oprob value meant that there was a 100% likelihood that the project would be required. For example, a 100% Oprob value would occur if a deficiency such as severely corroded steel members was observed during an inspection.

3.6.2 Direct Costs and Cost Risk Probability

Direct costs are the capital construction costs associated with each project's physical improvement. They were derived based on the most likely solution needed to remedy a problem. The direct costs included a 40% contingency to account for cost estimating and quantity uncertainty.

After the direct costs were developed, a cost risk probability was applied to account for the uncertainty of whether the assumed project solution was accurate. For example, if a deficiency was identified as deck deterioration, improvement solutions over time could range from minor deck surface patching work to an entire full deck replacement, subject to the level of deterioration. Because costs developed for each time interval assumed a single technical solution (for example, a partial deck replacement), there is potential that the actual remedy could be more extreme (i.e., a full deck replacement). This probability value calibrated the costs to reflect the level of potential inaccuracy of the assumed solution.

3.6.3 Direct Cost Change

Because the direct cost values were determined based on 2014 conditions (the baseline), further deterioration of the project components could occur before the project is constructed. For this reason, the direct cost change variable was introduced. For each time interval where the potential for further deterioration which might alter the selected project's solution, a direct cost change value was generated. If it was deemed that the extent and therefore the cost of the improvement would increase due to the deterioration, this variable captured this increase in direct cost. Using the same deck deterioration example as stated above, the 2015 baseline project may have assumed that a limited deck patching project was all that was required. In subsequent time intervals, however, further deterioration might have resulted in the need for a partial deck replacement (in 2026) or even a full deck replacement (in 2031). For these later time intervals, a direct cost change value would be provided to increase the project costs based on those assumptions of further deterioration.

3.6.4 Indirect Costs

The final cost variable developed for each project bundle was the indirect cost. The indirect cost variable captures costs borne by the County that are in addition to the direct costs, if a needed improvement was not constructed and therefore a failure occurred. The resulting indirect cost categories consist of:

- **Physical Consequence** – To capture the most likely physical impacts and cost to a bridge if the project under consideration was not constructed. This impact, and its associated cost, is the cost that is incurred in addition to the cost of the project improvement itself. An example of a physical consequence cost is the additional cost of a bridge replacement if a Magnitude 9.0 earthquake were to occur, but only a partial bridge seismic retrofit had been constructed.
- **User Costs** – To capture the most likely user impacts and any costs borne by the County if the project under consideration was not constructed. For this category, user impacts that do not result in a capital cost borne by the County were ignored. An example of a user cost is the cost of demurrage if ship traffic was impacted by an inoperable bridge.
- **Penalty Costs** – To capture costs for penalties and/or violations that are the responsibility of the County if the project under consideration was not constructed. An example of a penalty cost is a fine from the U.S. Coast Guard for a failure to provide an operable bridge for the Willamette River.
- **Stakeholder Requests** – To capture additional costs from impacted stakeholders or partner agencies that are not directly tied to the physical improvement. Examples of stakeholder requests costs are costs that are required in order to remedy impacts to third-party agencies adjacent to the bridge.

Bridge Seismic Resiliency Plan

Within the next 20 years, the Burnside Bridge, as a designated regional lifeline route, should receive a major seismic upgrade in the form of either a Phase I and II seismic retrofit or bridge replacement. The other three downtown movable bridges should receive a Phase I retrofit. Beyond the 20-year CIP horizon, the County may choose to augment the Phase I retrofits with Phase II seismic retrofits for these three bridges at an estimated cost of $1.36 billion, assuming construction in the 2040-2044 time interval.

3.7 Seismic Philosophy and Bridge Replacement

As of 2014, the County's 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% chance of occurring before 2065. To address seismic resiliency within the Bridge CIP, a series of steps were taken to derive appropriate seismic performance criteria. These steps consist of the following:

Step 1 – Review Prior Seismic Retrofit Projects Constructed by Multnomah County: As-constructed plans for prior bridge seismic retrofit work were provided by the County. A review of these plans determined that the only bridge seismic retrofit work constructed for any of the Willamette River bridges was a partial Phase 1 retrofit on the Burnside Bridge.

Step 2 – Establish Seismic Performance Criteria: To determine the criteria for seismic resiliency, the County convened a Seismic Panel Workshop that included the Oregon Department of Transportation (ODOT) State Bridge Engineer, the ODOT Seismic Expert, and selected industry seismic experts to assess a range of potential performance criteria. Before the workshop, it was confirmed that the Burnside Bridge, as a component of Metro's Regional Lifeline Route corridor, must meet a higher performance standard than the other three downtown movable bridges. Based on the workshop and subsequent meetings with County Commissioners, the County's seismic performance criteria used in the Bridge CIP are:

- **Burnside Bridge**: This bridge should remain fully operational to vehicles and river traffic following a Magnitude 9.0 Cascadia Subduction Zone earthquake.
- **Broadway, Morrison, and Hawthorne Bridges:** The bridge superstructure, defined as its longitudinal spans, should not collapse due to small (Magnitude 4 +/-) earthquakes.

Step 3 – Develop Seismic Resiliency Project Bundles: Using the seismic performance criteria established in Step 2, bridge seismic retrofit bundles were developed for each of the bridges.

3.8 Public Involvement and Outreach

The Public Involvement and Outreach approach was designed to expand upon the relationship building and communications previously developed with public agencies, key stakeholder groups and interested parties during other Multnomah County bridge and road projects. It assumed a "consultation" level of stakeholder engagement, meaning that stakeholders helped inform the planning process by providing their own capital plans and input to the County's process. Multnomah County made the final decisions about what aspects or elements identified during the outreach process were included in project bundles.

The process was guided by targeted stakeholder outreach designed to:

- **Engage** key stakeholders (public agencies, targeted user groups and other key community groups) in capturing information concerning their long-range plans, desires and suggestions as they relate to the Multnomah County Willamette River Bridges;
- **Provide** a collaborative, transparent process to share information, exchange ideas, and inform the agencies and key stakeholders; and
- **Inform** the general public about the project purpose and need, schedule and opportunities to comment.

3.8.1 Stakeholder Engagement

The development of project bundles was informed by targeted stakeholder outreach designed to engage key stakeholders, partner agencies, interest groups and the public in obtaining input to potential bridge projects. These groups were reached through much of 2014 via stakeholder interviews, small group briefings, targeted mailings, community and agency summit meetings, phone calls and an online survey.

For the purposes of this project, stakeholders were organized into three general groups with the following engagement approaches:

1. **Agency Partners:** Direct engagement primarily via individual interviews and supplemented with small group discussions as needed; invitations to Agency Summit Meetings and Public Open House.
2. **Other Key Stakeholders:** Direct engagement primarily via phone calls or small group discussions and supplemented with individual interviews as needed; invitations to Community Summit Meeting and Public Open House.
3. **Miscellaneous Interests & Public:** Indirect engagement via email, media release, website and online survey; invitations to Community Summit Meeting and Public Open House.

Feedback on the planning process varied greatly by stakeholder group, with the partner agencies offering the most specific, informed input to aid in project bundle development. Other stakeholder input helped identify items and community priorities with respect to desired future improvements on the Willamette River Bridges. Groups that provided input helped Multnomah County score and rank the performance attributes that were used to prioritize the list of projects included as part of the prioritization process.

Bridge operability, accessibility, community livability and safety were top concerns identified through the public involvement program. There was also a fairly high degree of awareness of the seismic vulnerability of the older bridges. The need to keep the downtown movable bridges functional and safe after a large earthquake and the desirability for at least one “lifeline” bridge to remain standing was fairly well understood and commonly mentioned.

Few stakeholders had projects or plans that would be directly impacted by project bundle improvements. Therefore, only a handful of specific stakeholder requests (13) are being included in the prioritized list for future implementation (see **Table 8**). One project identified through the outreach process is the Hawthorne Street Sidewalk Widening of the East Approach which has already been completed. The types of stakeholder requests that advanced into the project bundles included special signage, storm water treatment, crash barriers, roadway ramp surfaces and transit stop considerations. Other stakeholder feedback can be characterized as helpful to know for awareness and ongoing coordination, and such feedback has been documented for future reference by the County.

Table 8 - List of Projects with Elements from Stakeholder Engagement Requests

Bundle ID	Bridge Name (s)	Bundle Name
BUN-BR-06	Broadway	Broadway Bridge Displacement Restraint Measures
BUN-BR-10	Broadway	Gate, Span Lock and Structural Rehabilitation - River Spans
BUN-BR-11	Broadway	Roadway and Structural Rehabilitation
BUN-HA-06	Hawthorne	Hawthorne Bridge Displacement Restraint Measures
BUN-HA-07	Hawthorne	Roadway, Sign Bridge, Bridge Deck and Illumination Improvements - Approaches
BUN-HA-11	Hawthorne	Paint and Structural Rehabilitation of Steel and Concrete Members - East Approach
BUN-MO-05	Morrison	Morrison Bridge Displacement Restraint Measures
BUN-MO-07	Morrison	Roadway Approaches, Bridge Deck Overlay, and Illumination Improvements
BUN-MO-12	Morrison	Paint, Structural Rehabilitation and Access Improvements - East Approach
BUN-MU-03	Broadway, Burnside, Hawthorne and Morrison	Fender Repair and Installation
BUN-MU-04	Broadway, Burnside, Hawthorne and Morrison	Bicycle and Pedestrian Improvement Project – Feasibility Study Phase
BUN-MU-05	Broadway, Burnside, Hawthorne and Morrison	Bicycle and Pedestrian Improvement Project – Design and Construction Phase 1
BUN-MU-06	Broadway, Burnside, Hawthorne and Morrison	Bicycle and Pedestrian Improvement Project – Design and Construction Phase 2

3.8.2 Public Open House

Initial Summit Meetings: Multnomah County held two initial Summit Meetings: an Agency Summit Meeting at the Multnomah Building on Thursday, March 20, 2014, from 3 p.m. to 5 p.m. followed by a Community Summit Meeting from 6 p.m. to 8 p.m. The purpose of the meetings was to provide an overview of the planning process to agency partners and the public, to collect information about other agency CIP plans and community/interest group items relative to the County-owned bridges, and to obtain feedback on the performance measures to be used to rank potential bridge improvement projects. Eleven (11) people attended the Agency Summit Meeting and sixteen (16) people attended the Community Summit Meeting, representing non-auto modal interests, automobile interests and candidates for elective office.

Final Summit Meetings: Associated with the release of the Draft Bridge CIP Report on February 12, 2015, the County held two final summit meetings in the Multnomah Building, Room 315, on Thursday, February 12, 2015. The purpose of the meetings was to present the Draft CIP Report findings and to kick-off the public comment period of the Draft CIP Report. These meetings were followed by an online survey posted to the County's website from February 12 to February 26, 2015.

3.8.3 Review and Comment Period for the Bridge CIP Report

The Draft Bridge CIP Report was released for public review and comment on February 12, 2015. Approximately 57 online comments on the Draft Bridge CIP Report were collected prior to preparing the Final Bridge CIP Report.

An additional opportunity will be provided to the public for review of the Bridge CIP components once they're incorporated with the broader County Transportation Capital Improvement Plan and Program (CIPP). The CIPP is updated every five years and is currently scheduled to be updated in the spring of 2015 which includes a public comment period.

4 Technical Analysis

This section summarizes the technical methodology and approach used to assess the technical components of each bridge. For each of the eight discipline areas discussed below, needs and deficiencies were identified, and practical remedies were developed. These remedies were ultimately compiled into bundles for inclusion within the Bridge CIP.

4.1 Mechanical and Electrical Systems and Components

The mechanical and electrical (M&E) systems and component assessment primarily focused on the movable portion of the bridges. The assessment consisted of the following steps:

- Gathering of information for each M&E system and component.
- Conducting knowledge transfer meetings with Multnomah County staff to learn about historically deficient components and/or prior rehabilitation projects.
- Evaluation of each component for its remaining service life.
- Identifying recommended work remedies if the component's service life was expected to end within 20 years.
- Developing rehabilitation cost estimates for each identified remedy.

The assessment also allowed for the identification of changes in the bridge condition compared to previously completed studies. The assessment included direct observation, a review of available existing County records on the movable bridges, and on-site interviews with County engineering and maintenance staff. M&E records such as the previous inspections performed during the previous Bridge CIP planning period, original and rehabilitation bridge plans, and design reports for future planned work were reviewed as part of the assessment.

A comprehensive list of all major M&E elements for each of the four movable bridges was compiled through a series of workshops with County staff. The field notes were then reviewed and the major deficiencies noted in the inspection were matched to the comprehensive list of elements. The merged list of elements and deficiencies was then used to develop proposed rehabilitation or repair work to address the deficiencies. The component or system-specific repairs were then reflected in the logical groupings and, ultimately, in the project bundles.

4.2 Programmatic Seismic Assessment

The Bridge CIP includes a programmatic assessment of the seismic vulnerabilities for each of Multnomah County's downtown movable bridges. Based on the findings of the vulnerability assessment, recommended retrofit measures were identified to resist various seismic events. At the conclusion of this process, a document titled *Seismic Vulnerabilities and Retrofit Report* was developed to summarize each bridge complex's vulnerabilities and their proposed retrofits using assigned performance requirements.

The following approach was used to perform the vulnerabilities assessment, identify retrofit strategies and develop the seismic retrofit construction cost estimates:

- The identification of seismic vulnerabilities was based on existing reports, examination of existing bridge plans, hand calculations and engineering judgment. No finite element models of the bridges were developed.
- Standard retrofit types were based on commonly applied retrofit measures such as those noted in the Federal Highway Administration (FHWA) Seismic Retrofit Manual, ODOT Bridge Design and Drafting Manual, and the California Department of Transportation (Caltrans) Seismic Design Criteria.
- Similar retrofit strategies and costs were applied to similar components across all of the bridges.
- Retrofit strategies that address vulnerabilities in multiple components (e.g., base-isolation) were considered as system behavior modification retrofits.
- Detailed quantities for each retrofit element location were not developed. Instead, an "averaged" retrofit estimate was developed and applied to locations using a particular retrofit measure.
- Geotechnical hazard vulnerabilities (e.g., liquefaction and lateral spreading) were assessed based on existing geotechnical data.
- Retaining walls and other miscellaneous structures were not included in the seismic vulnerability assessment.

4.3 Roadway and Roadway Maintenance

An assessment of the existing condition of the at-grade approach roadway sections was completed based on existing available documentation, direct visual observation and information obtained directly from Multnomah County staff for all six of the Multnomah County Willamette River Bridges.

Because the Sellwood Bridge and its at-grade approaches are currently under construction at this time, with an anticipated opening to service date in 2016, a review of the construction documents was used as the sole basis of the roadway assessment. Based on a review of the maintenance agreement governing the long-term responsibility for the bridge and approach roadway, Multnomah County is not responsible for the at-grade roadway approaches on the west (ODOT) or east end (Portland Bureau of Transportation) of the elevated bridge structures. Therefore, no proposed capital projects have been included for the Sellwood Bridge approaches.

The roadway assessment involved the following steps:

- Reviewing available existing documentation including as-built plans, inspection reports and photos.
- Supplemental direct visual observation of pavement, roadway signage and light standards, surface-mounted drainage structures and at-grade sidewalks.
- Conducting knowledge transfer meetings with Multnomah County staff to learn about historically deficient components and/or prior rehabilitation projects.
- Identifying maintenance needs for the 20-year Bridge CIP planning horizon for roadway items.
- Selection of repair, rehabilitation or replacement recommendations for roadway items.
- Research of comparable recently constructed roadway improvement projects for construction item pricing.

4.4 Bridge Structural Elements and Maintenance

An assessment of the existing condition of the bridge structural elements was completed based on existing available documentation, direct visual observation and information obtained directly from Multnomah County staff. Anticipated needs for the Sellwood Bridge that is currently under construction were also included, based upon assumed needs within the 20-year Bridge CIP horizon.

The bridge structural and maintenance assessment involved the following steps:

- Reviewing available existing documentation including as-built plans, inspection reports and photos.
- Supplemental direct visual observation of bridge structural condition for elevated bridge portions of the bridge complexes.
- Conducting knowledge transfer meetings with Multnomah County staff to learn about historically deficient components and/or prior rehabilitation projects.
- Identification of maintenance needs for the 20-year Bridge CIP horizon for bridge superstructure (beams, girders, trusses, etc.) and substructure (bent caps, column, foundations, etc.) elements.
- Selection of repair, rehabilitation or replacement recommendations for bridge superstructure and substructure elements.
- Researching comparable recently constructed improvement projects for construction item pricing.

4.4.1 Bridge Superstructures and Substructures

In general, the existing condition of the structural systems for the downtown Willamette River Bridges is "Good," but specific members and components are currently showing signs of deterioration that will require rehabilitation throughout the 20-year Bridge CIP horizon. The conditions for the Sauvie Island Bridge and the future Sellwood Bridge are rated as "Good," with limited anticipated repair work for the bridge structural systems.

4.4.2 Bridge Deck, Sidewalk and Rail Systems

An assessment of the existing condition of the bridge deck, sidewalk and rail systems was completed based on existing available documentation, direct visual observation and information obtained directly from Multnomah County staff for the Willamette River movable bridges and the Sauvie Island Bridge. Anticipated needs for the Sellwood Bridge, which is currently under construction, were also included, based upon assumed needs within the 20-year Bridge CIP horizon.

In general, the existing condition of the bridge deck and joint systems for the downtown Willamette River bridges is currently showing signs of deterioration that will require significant rehabilitation and targeted replacement during the 20-year Bridge CIP horizon. Many of the existing deck joints have already partially or fully failed and are allowing water to be channeled through the bridge deck and onto the underlying structural members and bearings, which will likely lead to continued degradation of these elements. The on-bridge sidewalks are generally in "Fair" condition, having isolated locations where an overlay or full replacement is recommended to maintain them in good working order for users. The rail systems, with the exception of the Burnside Bridge, are generally in "Good" condition, with minor repairs needed to maintain them in good working order. The conditions for the Sauvie Island Bridge and the future Sellwood Bridge are "Good," and, at this time, limited repair work for the bridge deck, sidewalks and rail systems is anticipated.

4.5 Paint Systems

A paint needs assessment was conducted for the Willamette River movable bridges (Broadway, Burnside, Morrison and Hawthorne), including the fixed truss spans and approach spans. A future maintenance coating assessment for the Sauvie Island and Sellwood bridges was also included. The paint assessment involved the following steps:

- Reviewing bridge plans and inspection reports.
- Conducting knowledge transfer meetings with Multnomah County staff to learn about historically deficient components and/or prior rehabilitation projects.
- Calculating surface area quantities.
- Compiling and reviewing recent paint project cost data.
- Interviewing paint contractors.

4.6 Programmatic Bridge Replacement

A baseline programmatic bridge replacement assessment was completed for each of the four movable Willamette River bridges to allow for a comparison against the anticipated rehabilitation and retrofit cost for these bridges. A programmatic bridge replacement assessment was not completed for the Sauvie Island or Sellwood bridges, because these structures are either recently constructed or are currently being constructed.

The approach taken for the development of the programmatic bridge replacement conceptual layout and associated costs included the following:

- Replacement options were based on providing the same number and types of lanes as the existing structures. Modern lane, shoulder and sidewalk widths were used for determining replacement option plan view footprints.
- Existing connectivity in terms of traffic movement from City of Portland streets and ODOT facilities was assumed to be maintained in-kind. New traffic movements or alternative routings were not considered.
- City of Portland and ODOT facility replacement costs were not evaluated.
- Approximate profile grade and vertical river channel clearance were assumed to be similar to those of the existing bridges.
- The horizontal river channel clearance was assumed to be 250 feet from face of pier to face of pier, and the assumed pier width was 35 feet, which results in a 285-foot center-to-center span surrounding the navigation channel.
- The vertical river channel clearance would be 40 feet minimum in the closed position and 140 feet minimum when fully opened for the movable span.
- A single movable span, centered about the same approximate location as the existing bridges within the river channel, is to be provided.
- A geometry deficiency analysis was not performed.
- Right-of-way impacts for temporary easements are assumed to be 10 feet from the proposed edge of deck.
- Right-of-way impacts for permanent acquisitions are assumed to be 5 feet from the proposed edge of deck.

4.7 Multimodal Elements (Bicycle, Pedestrian and Transit)

As part of the Bridge CIP project, an assessment was completed of the bicycle, pedestrian and transit (multimodal) facilities of each bridge. The purpose of this assessment was to determine the existing conditions, needs and deficiencies for these modes, and potential improvements required to support future Bridge CIP projects. Each of the six Willamette River bridge complexes, and their respective approach roadways, were considered.

The bicycle, pedestrian and transit assessment involved the following steps:

- Reviewing available existing documentation including as-built plans, inspection reports, photos and the Willamette River Bridges Accessibility project developed by Multnomah County and the City of Portland.
- Supplemental direct visual observation of multimodal condition for all portions of each bridge complex, including the at-grade approach roadways.
- Conducting knowledge transfer meetings with Multnomah County staff to learn about historically deficient components, prior rehabilitation projects, or concerns from stakeholders and other interest groups.
- Identification of the maintenance needs for the 20-year Bridge CIP horizon for the bicycle, pedestrian and transit facilities.
- Developing criteria for the incorporation of multimodal improvements into the Bridge CIP.
- Selection of repair, rehabilitation, replacement or augmentation recommendations for the multimodal facilities.
- Researching comparable, recently constructed improvement projects for construction item pricing.

A list of project bundles that include improvements that would directly benefit bicycle and pedestrian users is provided in **Table 9**. Additional information has been provided in **Attachment G** regarding projects that include improvements to address ADA deficiencies.

Table 9 - List of Projects with Bicycle and Pedestrian Improvements

Bundle ID	Bridge Name (s)	Bundle Name
BUN-BR-07	Broadway	Bridge Deck/Rail/Illumination Improvements
BUN-BR-11	Broadway	Roadway and Structural Rehabilitation
BUN-BR-15	Broadway	ADA Improvements
BUN-BR-16	Broadway	Movable Span Deck Replacement
BUN-BU-06	Burnside	2016 Burnside Rehabilitation Project
BUN-BU-07	Burnside	Seismic Resiliency (Major Bridge Rehabilitation/Bridge Replacement) – Final Design and Construction Phase
BUN-BU-12	Burnside	Seismic Resiliency (Major Bridge Rehabilitation/Bridge Replacement) - Planning Phase
BUN-BU-13	Burnside	Seismic Resiliency (Major Bridge Rehabilitation/Bridge Replacement) - NEPA Phase

Bundle ID	Bridge Name (s)	Bundle Name
BUN-HA-07	Hawthorne	Roadway, Sign Bridge, Bridge Deck and Illumination Improvements - Approaches
BUN-HA-13	Hawthorne	Bridge Painting and Upgraded Lighting
BUN-HA-14	Hawthorne	ADA Improvements
BUN-MO-07	Morrison	Roadway Approaches, Bridge Deck Overlay, and Illumination Improvements
BUN-MO-12	Morrison	Paint, Structural Rehabilitation and Access Improvements - East Approach
BUN-MO-15	Morrison	ADA Improvements
BUN-MU-04	Broadway, Burnside, Hawthorne and Morrison	Bicycle and Pedestrian Improvement Project – Feasibility Study Phase
BUN-MU-05	Broadway, Burnside, Hawthorne and Morrison	Bicycle and Pedestrian Improvement Project – Design and Construction Phase 1
BUN-MU-06	Broadway, Burnside, Hawthorne and Morrison	Bicycle and Pedestrian Improvement Project – Design and Construction Phase 2
BUN-SI-02	Sauvie Island	Roadway Improvements - East Approach
BUN-SI-03	Sauvie Island	Roadway and Structural Rehabilitation

4.8 Environmental

As part of the Bridge CIP project, an environmental assessment was completed for each final Bridge CIP project that identifies the necessary future consultation with regulatory agencies and/or each project's potential environmental impacts. This assessment was performed after the project bundles were compiled from the various logical groupings. Because the level of engineering detail for each project was programmatic in nature, this assessment should also be considered only programmatic in nature, and changes should be expected as the projects are clarified.

The federal, state and local regulatory agencies and potential permit needs were identified for each project bundle based on experience permitting similar projects and reviewing the permits identified for the OTIA III Bridge Program. Potential permit requirements and approximate permit acquisition time frames were identified, when possible, by reviewing agency websites and regulations, and through previous project experience. The timelines should be considered as guidelines, since the permit process can vary based on project complexity. Programmatic permits and timelines were not identified, because their availability over the life of the Bridge CIP is unknown. A base assumption used for the identification of potential permits was that all project bundles will receive some federal funding.

The following approach was used to determine regulatory agency coordination and anticipated permits required for each project bundle:

- All project bundles need compliance documentation under NEPA due to federal funding.
- All project bundles need documentation to comply with Acts overseen by National Marine Fisheries (NMFS) and the U.S. Fish and Wildlife Service (USFWS) due to federal funding.

- All project bundles associated with historical bridges need compliance documentation with Section 4(f) of the Department of Transportation Act and, if actions modify the appearance of the structure, coordination with State Historic Preservation Office (SHPO).
- All project bundles that impact navigation by bridge closures, encroachment on the navigational channel, in-water work and/or modifications to the bridge need coordination with the U.S. Coast Guard (USCG).
- All project bundles with in-water work need to coordinate with Oregon Department of Environmental Quality (DEQ), Oregon Department of Fish and Wildlife (ODFW), Oregon Department of State Lands (DSL), U.S. Army Corps of Engineers (USACE).
- Any project bundles that could impact National Parks Service property needs to coordinate with the State Land and Conservation Fund Manager to determine whether Section (4f) compliance with National Parks Service is required.
- A pre-application conference with the City of Portland is recommended for all project bundles to determine whether permits may be needed.

This page purposely left blank.

Attachment A

Attachment A – Report Terms and Definitions List

This page purposely left blank.

Multnomah County Willamette River Bridges CIP
Report Terms and Definitions List

Term	Term Definition or Description
ADA - Americans with Disabilities Act	The Americans with Disabilities Act of 1990 (ADA) prohibits discrimination and ensures equal opportunity for persons with disabilities in employment, State and local government services, public accommodations, commercial facilities and transportation.
Base Isolation	Base isolation or seismic base isolation, as it pertains to bridges, is one of the most popular means of protecting a structure against earthquake forces by reducing the direct connectivity of a substructure and superstructure during an earthquake.
BCC - Board of County Commissioners	The Multnomah County Board of Commissioners.
Bridge CIP	This term refers to the Multnomah County Willamette River Bridges Capital Improvement Plan that is a 20-year forward-looking plan for the maintenance and improvement needs of the six Willamette River bridges that Multnomah County currently owns and operates. The six bridges are: Burnside, Broadway, Hawthorne, Morrison, Sauvie Island and Sellwood.
Bridge Complex	Many of the six Willamette River bridges maintained and operated by Multnomah County are composed of multiple individually numbered bridges as well as approach roadways that make up a bridge complex that is commonly referred to by a single name (i.e., Burnside, Broadway, Hawthorne, Morrison, Sauvie Island and Sellwood).
Bundle ID	This is an alphanumeric designation for a logical grouping or bundled project that provides a single identifier for that project. The logical groupings use an identifier based on bridge complex, primary work category and two-digit number extension (i.e., "BR-ACCESS-01" is a Broadway Bridge complex project with a primary work category of accessibility and is the first project of that category type). Bundles use an identifier with "BUN" as the prefix, bridge complex and a two-digit number extension (i.e., "BUN-BU-03" is the third bundle for the Burnside Bridge complex). The bridge complex abbreviations are: BR = Broadway, BU = Burnside, HA = Hawthorne, MO = Morrison, SI = Sauvie Island and SE = Sellwood, and MU is used for bundles that involve multiple bridge complexes in the proposed work of that bundle.

Multnomah County Willamette River Bridges CIP
Report Terms and Definitions List

Term	Term Definition or Description
Caltrans - California Department of Transportation	Caltrans manages more than 50,000 miles of California's highway and freeway lanes, provides inter-city rail services, permits more than 400 public-use airports and special-use hospital heliports, and works with local agencies. Caltrans carries out its mission of improving mobility across California with six primary programs: Aeronautics, Highway Transportation, Mass Transportation, Transportation Planning, Administration and the Equipment Service Center.
CE - Construction Engineering	Construction phase engineering support for a Capital Improvement Plan project, including overseeing construction, redesigning, responding to contractor inquiries, construction inspecting and coordinating with the public.
CIPP - (Transportation) Capital Improvement Plan and Program	This is the County-wide plan that incorporates the Bridge CIP as part of a broader planning and implementation of the developed plan for infrastructure maintenance and improvements throughout Multnomah County.
Contingency	A portion of the estimated constructed value for a Capital Improvement Plan project to account for uncertainty in the base cost or miscellaneous items unquantifiable during the planning phase. Used to help capture the anticipated total cost of construction once the project is advanced for design and construction.
Cost at Target Time Interval for Construction/Construction Cost	The total programmatic estimated cost for a Capital Improvement Plan Project that accounts for items such as escalation, contingency, PE, CE, ROW, utilities and the constructed cost of the project. The cost shown is associated with a selected Target Time Interval for Construction.
Cost Risk Assessment (CRA)	A risk-based approach to develop project costs, develop project importance, and optimize the timing of multiple bridge project bundles. Risk costs considered include: capital cost, escalation, as well as direct and indirect cost penalties for inaction.
Cost Risk Probability	A factor used to account for the uncertainty of whether the assumed project solution was accurate based on available information.
County	Refers to Multnomah County.
CSZ - Cascadia Subduction Zone	A convergent plate boundary that stretches from Northern Vancouver Island to Northern California. It is a very long, sloping subduction zone fault that has the potential to cause large magnitude, deep earthquakes and active volcanism along the fault's length.

Multnomah County Willamette River Bridges CIP
Report Terms and Definitions List

Term	Term Definition or Description
CV - Subtotal Initial Constructed Value, Direct Costs Only	The estimated cost of construction for a Capital Improvement Plan project based in 2014 dollars. Values include direct construction costs only, which would exclude programmatic percentages for cost elements such as mobilization, temporary traffic control, escalation, PE and CE.
Definition of Problem	A narrative description that describes the needs or deficiencies that have been identified or are anticipated to need to be addressed with a proposed Capital Improvement Plan project.
DEQ - Oregon Department of Environmental Quality	A regulatory agency whose job is to protect the quality of Oregon's environment.
Description of Proposed Solution	A narrative description that describes the remedies that have been selected to address the needs and deficiencies of a bridge or bridge complex associated with a proposed Capital Improvement Plan project.
Direct Cost Change	Anticipated increases in the initial constructed value of a proposed Capital Improvement Plan project based on continued deterioration of bridge complex components over time which would potentially require a more robust repair or replacement.. The baseline year for this item is 2014.
Direct Costs	The capital construction cost associated with each project's physical improvement at year 2014.
DOGAMI - Oregon Department of Geology and Mineral Industries.	An agency who's mission is to provide earth science information and regulation to make Oregon safe and prosperous.
DSL - Oregon Department of State Lands	An agency whose goal is to ensure a legacy for Oregonians and their public schools through sound stewardship of lands, wetlands, waterways, unclaimed property, estates and the Common School Fund.
Escalation	Used in the development of programmatic costs to account for increases in costs over time due to inflation.
Fender / Fender Systems	In-water protection devices or sacrificial structures to protect in-water piers of bridges from vessel or debris impacts.

Multnomah County Willamette River Bridges CIP
Report Terms and Definitions List

Term	Term Definition or Description
FHWA - Federal Highway Administration	The Federal Highway Administration (FHWA) provides stewardship over the construction, maintenance and preservation of the nation's highways, bridges and tunnels. FHWA also conducts research and provides technical assistance to state and local agencies in an effort to improve safety, mobility and livability, and to encourage innovation.
Indirect Costs	Costs penalties that could potentially be borne by Multnomah County if a need or deficiency isn't addressed. These are used as part of the project prioritization process to minimize exposure to the potential cost penalty but are not programmed as part of the Capital Improvement Plan project cost.
Lifeline Route	A defined transportation corridor intended to be hardened and capable of withstanding major catastrophic events, so that emergency services and responders can use the route to provide aid and assistance during and immediately following a major catastrophic event.
Logical Groupings	A compilation of needs and deficiencies that have been grouped together as a sub-project based on bridge complex, work category consistency or technical or operating dependencies.
M&E - Mechanical and Electrical	An abbreviation used to encompass the mechanical and electrical components of a bridge. Within the Bridge CIP, it is used to describe moveable span machinery and electrical components as well as bridge lighting components.
Mobilization	A component of the construction cost associated with a contractor's costs to mobilize to the project site during the construction phase.
NEPA - National Environmental Protection Act	A legislative act that requires federal agencies to integrate environmental values into their decision making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions.
NMFS - National Marine Fisheries Service	An agency responsible for the stewardship of the nation's ocean resources and their habitat. NMFS provides vital services for the nation: productive and sustainable fisheries, safe sources of seafood, the recovery and conservation of protected resources, and healthy ecosystems—backed by sound science and an ecosystem-based approach to management.
NOAA - National Oceanic and Atmospheric Administration	An agency whose mission is defined by Science, Service, and Stewardship with a stated mission to: * understand and predict changes in climate, weather, oceans, and coasts, * share that knowledge and information with others, and * conserve and manage coastal and marine ecosystems and resources.

Multnomah County Willamette River Bridges CIP
Report Terms and Definitions List

Term	Term Definition or Description
Occurrence Probability	The likelihood that the underlying need or deficiency, resulting that would result in an improvement project, will occur.
ODFW - Oregon Department of Fish and Wildlife	An agency whose mission is to protect and enhance Oregon's fish and wildlife and their habitats for use and enjoyment by present and future generations.
ODOT - Oregon Department of Transportation	The Oregon Department of Transportation (ODOT) works to provide a safe, efficient transportation system that supports economic opportunity and livable communities for Oregonians. ODOT develops programs related to Oregon's system of highways, roads and bridges; railways; public transportation services; transportation safety programs; driver and vehicle licensing; and motor carrier regulation.
PE - Preliminary Engineering	The phase of a Capital Improvement Plan project that includes planning, designing, permitting, coordinating with the public, bidding, and procuring and overseeing design services.
Performance Attribute Total Score	The weighted numerical score for the ten attribute categories of a project bundle, based on the improvement from a "do nothing" baseline compared to the benefits in the target time interval for construction.
Phase 1 Seismic Retrofit	A type of seismic retrofit of an existing structure that is focused on collapse prevention of the superstructure when subjected to a seismic event.
Phase 2 Seismic Retrofit	A type of seismic retrofit of an existing structure that is focused on collapse prevention of the superstructure, substructure strengthening and improved bridge system performance when they are subjected to a seismic event.
Primary Work Category	For developed bundled projects, the category with the highest percentage of the initial constructed value is selected as the primary work category. The seven categories used for the Bridge CIP are: electrical and lighting, mechanical, paint, surface, structural, seismic and accessibility.
Project Bundles (Bundles)	A compilation of logical groupings that have been grouped together as a project based on: work category consistency and technical/operating dependencies, permanent impacts, temporary impacts, schedule compatibility, funding compatibility and general reasonableness.

Multnomah County Willamette River Bridges CIP
Report Terms and Definitions List

Term	Term Definition or Description
Project Justification	A narrative description that explains the benefits of completing a proposed capital improvement project.
Project Rank	The numerical rank of "In Progress" Bridge CIP projects, with one (1) being the highest. Projects designated as "Completed", "Deleted" or "On Hold" are not included in the list of ranked projects.
Project Status	The four categories used as part of the Bridge CIP are: In Progress, Completed, Deleted and On Hold. Only "In Progress" and "On Hold" projects are included in financial summaries for future planning purposes.
ROW - Right-of-way	Used to describe both temporary easements and permanent ROW acquisitions to support the construction of proposed Capital Improvement Plan projects.
SHPO - Oregon State Historic Preservation Office	The entity that manages and administers programs for the protection of Oregon's historic and cultural resources. When these resources disappear, communities can lose tangible and educational assets that contribute directly to Oregon's heritage, and also opportunities for local economic development. SHPO staff is available to assist city planners and other officials, property owners and preservation groups to find forward-thinking solutions to protect and preserve our past.
SSPC - Society for Protective Coatings	Founded in 1950 as the Steel Structures Painting Council, this is a non-profit professional society concerned with the use of coatings to protect industrial steel structures. In 1997, the name of the association was changed to The Society for Protective Coatings to better reflect the changing nature of coatings technology and the ever-expanding types of construction materials.
Target Time Interval for Construction	A five-year interval within the 20-year Capital Improvement Plan planning horizon that a Capital Improvement Plan project is anticipated or targeted to be built within. The primary purpose in selecting a target interval is to allow for items such as additional direct costs and escalation to be used as part of the programmatic cost estimate development. The four intervals used currently are: 2015 to 2019, 2020 to 2024, 2025 to 2029, and 2030 to 2034.
Temporary Traffic Control	A component of the programmatic cost estimating used to capture anticipated costs for necessary features to maintain traffic and a safe work zone for all modes of transportation during construction.

Multnomah County Willamette River Bridges CIP
Report Terms and Definitions List

Term	Term Definition or Description
TI# - 0.00 (Target Time Interval Score)	"TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st (2015-2019), 2nd (2020-2024), 3rd (2025-2029) or 4th (2030-2034) planning interval. "0.00" is the numerical value of the importance factor score.
USACE - United States Army Corps of Engineers	The U.S. Army Corps of Engineers has approximately 37,000 dedicated civilians and soldiers delivering engineering services to customers in more than 130 countries worldwide. Their mission is to deliver vital public and military engineering services; partnering in peace and war to strengthen our Nation's security, energize the economy and reduce risks from disasters.
USCG - United States Coast Guard	One of the five armed forces of the United States and the only military organization within the Department of Homeland Security. The USCG is an adaptable, responsive military force of maritime professionals whose broad legal authorities, capable assets, geographic diversity and expansive partnerships provide a persistent presence along our rivers, in the ports and littoral regions, and on the high seas.
USFWS - United States Fish and Wildlife Service	A bureau within the Department of the Interior that: * Assists in the development and application of an environmental stewardship ethic for our society, based on ecological principles, scientific knowledge of fish and wildlife, and a sense of moral responsibility. * Guides the conservation, development and management of the nation's fish and wildlife resources. * Administers a national program to provide the public opportunities to understand, appreciate, and wisely use fish and wildlife resources.
Utilities/Utility Reimbursement	For the Bridge CIP project, this term is used for County-owned utility infrastructure within the maintenance limits for each bridge complex. The utility reimbursement term applies for County-owned utilities for which the cost of building or relocating these features is eligible for reimbursement through federal and state funds during construction.

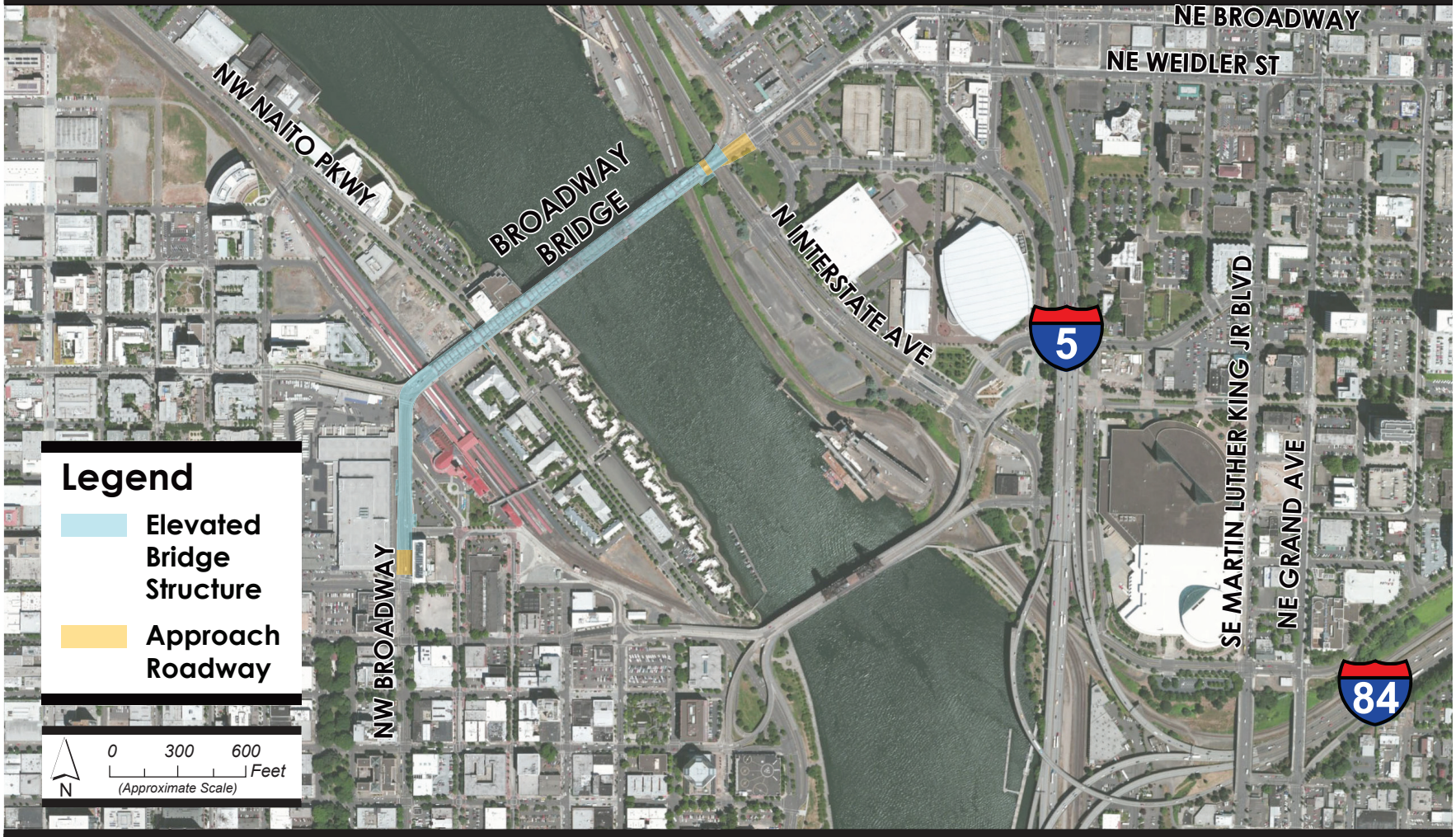
This page purposely left blank.

Attachment B

Attachment B – Multnomah County Willamette River Bridges Maintenance Limits Graphic

This page purposely left blank.

Multnomah County
Willamette River Bridges CIP
Multnomah County Maintenance Area, Sheet 1



Multnomah County
Willamette River Bridges CIP
Multnomah County Maintenance Area, Sheet 2

Attachment C

Attachment C – Bridge CIP Project Costs Summary Tables – All Projects

This page purposely left blank.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - ALL BRIDGES, ALL PROJECTS							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
1	Burnside	Seismic Resiliency (Major Bridge Rehabilitation / Bridge Replacement) - Feasibility Study	Seismic	BUN-BU-12	TI-1 64.27	2015-2019	$3,000,000
2	Burnside	Seismic Resiliency (Major Bridge Rehabilitation / Bridge Replacement) - Environmental Impact Study	Seismic	BUN-BU-13	TI-1 64.27	2015-2019	$17,000,000
3	Broadway	Rall Wheel Rehabilitation	Mechanical	BUN-BR-02	TI-1 48.03	2015-2019	$15,423,401
4	Burnside	2016 Burnside Rehabilitation Project	Structural	BUN-BU-06	TI-1 41.73	2015-2019	$30,846,519
5	Morrison	Bridge Painting & Structural Rehabilitation - West Approach	Paint	BUN-MO-09	TI-1 25.63	2015-2019	$17,159,972
6	Broadway, Burnside, Hawthorne and Morrison	Bicycle and Pedestrian Improvement Project - Feasibility Study Phase	Accessibility	BUN-MU-04	TI-1 21.96	2015-2019	$1,442,557
7	Broadway	Bridge Painting - 2015 Paint Project	Paint	BUN-BR-13	TI-1 17.14	2015-2019	$12,658,907
8	Morrison	Bent Cap Rehabilitation - Approach Spans	Structural	BUN-MO-10	TI-1 9.66	2015-2019	$3,479,386
9	Morrison	Motor, Brake, and Electrical Power Rehabilitation; Operator House Improvements	Mechanical	BUN-MO-01	TI-1 7.99	2015-2019	$1,649,105

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - ALL BRIDGES, ALL PROJECTS							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
10	Morrison	Painting and Structural Improvements - River Spans	Paint	BUN-MO-14	TI-1 7.73	2015-2019	$22,773,510
11	Morrison	Roadway Approaches, Bridge Deck Overlay, and Illumination Improvements	Driving Surface	BUN-MO-07	TI-2 33.33	2020-2024	$13,014,918
12	Broadway	Gate, Span Lock and Structural Rehabilitation - River Spans	Electrical and Lighting	BUN-BR-10	TI-2 31.07	2020-2024	$4,579,643
13	Broadway	Roadway and Structural Rehabilitation	Driving Surface	BUN-BR-11	TI-2 29.16	2020-2024	$2,209,311
14	Hawthorne	Bent Cap Rehabilitation - Approach Spans	Structural	BUN-HA-08	TI-2 25.94	2020-2024	$3,814,227
15	Morrison	Span Lock and Support Rehabilitation	Mechanical	BUN-MO-02	TI-2 24.45	2020-2024	$1,328,430
16	Hawthorne	Span Lock and Live Load Shoe Rehabilitation	Mechanical	BUN-HA-02	TI-2 22.93	2020-2024	$1,001,567
17	Broadway	Broadway Bridge West Approach Structural Rehabilitation and Paint	Paint	BUN-BR-09	TI-2 21.49	2020-2024	$20,311,661
18	Hawthorne	Operating Machinery, Trunnion, and Trunnion Tower Structural Rehabilitation	Mechanical	BUN-HA-01	TI-2 21.23	2020-2024	$17,914,399

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - ALL BRIDGES, ALL PROJECTS							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
19	Broadway	Bridge Deck / Rail / Illumination Improvements	Driving Surface	BUN-BR-07	TI-2 20.42	2020-2024	$6,130,398
20	Sauvie Island	Roadway Improvements - East Approach	Driving Surface	BUN-SI-02	TI-2 17.28	2020-2024	$1,488,668
21	Hawthorne	Joint Rehabilitation and Replacement - West and East Approaches	Structural	BUN-HA-12	TI-2 17.23	2020-2024	$1,928,296
22	Hawthorne	Structural Rehabilitation of Steel and Concrete Members - River Spans	Structural	BUN-HA-10	TI-2 16.03	2020-2024	$11,961,361
23	Burnside, Broadway, Morrison	Submarine Cable Removal	Electrical and Lighting	BUN-MU-01	TI-2 15.60	2020-2024	$4,552,476
24	Broadway, Burnside, Hawthorne and Morrison	Bicycle and Pedestrian Improvement Project - Design and Construction Phase 1	Accessibility	BUN-MU-05	TI-2 15.14	2020-2024	$16,319,707
25	Broadway, Burnside, Hawthorne and Morrison	Scour Remediation	Structural	BUN-MU-02	TI-2 14.68	2020-2024	$22,302,695
26	Sauvie Island	Roadway and Structural Rehabilitation	Structural	BUN-SI-03	TI-2 12.98	2020-2024	$1,371,606
27	Hawthorne	Hawthorne Bridge Limited Seismic Retrofit	Seismic	BUN-HA-06	TI-3 162.33	2025-2029	$44,886,391

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - ALL BRIDGES, ALL PROJECTS							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
28	Broadway	Broadway Bridge Limited Seismic Retrofit	Seismic	BUN-BR-06	TI-3 88.10	2025-2029	$52,628,358
29	Burnside	Seismic Resiliency (Major Bridge Rehabilitation / Bridge Replacement) - Final Design and Construction	Seismic	BUN-BU-07	TI-3 84.91	2025-2029	$496,070,564
30	Morrison	Morrison Bridge Limited Seismic Retrofit	Seismic	BUN-MO-05	TI-3 69.76	2025-2029	$91,883,919
31	Morrison	Structural Rehabilitation of Steel and Concrete Pier Members - River Spans	Structural	BUN-MO-11	TI-3 46.25	2025-2029	$14,103,949
32	Hawthorne	Roadway, Sign Bridge, Bridge Deck and Illumination Improvements - Approaches	Structural	BUN-HA-07	TI-3 38.96	2025-2029	$25,679,708
33	Hawthorne	Paint and Structural Rehabilitation of Steel and Concrete Members - East Approach	Paint	BUN-HA-11	TI-3 29.52	2025-2029	$35,447,056
34	Morrison	Joint Rehabilitation - West Approach, River Spans and East Approach	Structural	BUN-MO-13	TI-3 22.58	2025-2029	$3,837,233
35	Hawthorne	Bridge Painting and Upgraded Lighting	Paint	BUN-HA-13	TI-3 21.59	2025-2029	$43,328,584
36	Broadway, Burnside, Hawthorne and Morrison	Bicycle and Pedestrian Improvement Project - Design and Construction Phase 2	Accessibility	BUN-MU-06	TI-3 20.31	2025-2029	$16,323,533

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - ALL BRIDGES, ALL PROJECTS							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
37	Broadway	Movable Span Deck Replacement	Driving Surface	BUN-BR-16	TI-3 19.63	2025-2029	$10,148,330
38	Broadway, Burnside, Hawthorne and Morrison	Fender Repair and Installation	Structural	BUN-MU-03	TI-3 14.04	2025-2029	$43,142,056
39	Morrison	Paint, Structural Rehabilitation and Access Improvements - East Approach	Paint	BUN-MO-12	TI-4 36.11	2030-2034	$54,416,301
40	Broadway	Operating Machinery Rehabilitation and Brake Replacement	Mechanical	BUN-BR-01	TI-4 31.52	2030-2034	$2,300,579
41	Morrison	Warning Gate and Sign Bridge Replacement	Electrical and Lighting	BUN-MO-06	TI-4 23.01	2030-2034	$6,631,895
42	Broadway	Electrical System Master Control Switch Installation and Miscellaneous Operator House Improvements	Electrical and Lighting	BUN-BR-03	TI-4 18.66	2030-2034	$307,377
43	Broadway	Bridge Painting - Maintenance of 2002 Paint Project	Paint	BUN-BR-12	TI-4 17.26	2030-2034	$66,631,927
44	Broadway	Bridge Painting - Maintenance of 2015 Paint Project	Paint	BUN-BR-14	TI-4 14.80	2030-2034	$14,891,720
45	Sellwood	Lighting Maintenance	Electrical and Lighting	BUN-SE-01	TI-4 14.26	2030-2034	$326,903

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - ALL BRIDGES, ALL PROJECTS							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
46	Hawthorne	Installation of Remote Operation and Monitoring Equipment	Electrical and Lighting	BUN-HA-04	TI-4 13.58	2030-2034	$2,063,574
47	Hawthorne	ADA Improvements	Accessibility	BUN-HA-14	TI-4 12.02	2030-2034	$3,703,257
48	Morrison	ADA Improvements	Accessibility	BUN-MO-15	TI-4 9.57	2030-2034	$3,703,257
49	Broadway	ADA Improvements	Accessibility	BUN-BR-15	TI-4 9.57	2030-2034	$1,875,456
50	Sellwood	Joint Rehabilitation and Replacement	Structural	BUN-SE-02	TI-4 8.35	2030-2034	$353,055
51	Sauvie Island	Under-bridge Maintenance Traveler System	Structural	BUN-SI-04	TI-4 8.19	2030-2034	$510,786
52	Morrison	Installation of Remote Operation and Monitoring Equipment	Electrical and Lighting	BUN-MO-03	TI-4 8.15	2030-2034	$2,063,574
53	Broadway	Installation of Remote Operation and Monitoring Equipment	Electrical and Lighting	BUN-BR-04	TI-4 8.15	2030-2034	$2,063,574
54	Sauvie Island	Routine Maintenance and Bridge Painting	Paint	BUN-SI-01	TI-4 5.87	2030-2034	$560,741

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - ALL BRIDGES, ALL PROJECTS							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
55	Hawthorne	Warning and Barrier Gate Rehabilitation	Electrical and Lighting	BUN-HA-03	TI-4 3.86	2030-2034	$3,674,718
56	Sellwood	Bridge Maintenance Painting	Paint	BUN-SE-03	TI-4 2.93	2030-2034	$774,760
						TOTAL:	**$1,299,995,854**

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

This page purposely left blank.

Attachment D

Attachment D – Bridge CIP Project Costs Summary Tables – Grouped by Bridge Complex

This page purposely left blank.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - BROADWAY BRIDGE ONLY							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
3	Broadway	Rall Wheel Rehabilitation	Mechanical	BUN-BR-02	TI-1 48.03	2015-2019	$15,423,401
7	Broadway	Bridge Painting - 2015 Paint Project	Paint	BUN-BR-13	TI-1 17.14	2015-2019	$12,658,907
12	Broadway	Gate, Span Lock and Structural Rehabilitation - River Spans	Electrical and Lighting	BUN-BR-10	TI-2 31.07	2020-2024	$4,579,643
13	Broadway	Roadway and Structural Rehabilitation	Driving Surface	BUN-BR-11	TI-2 29.16	2020-2024	$2,209,311
17	Broadway	Broadway Bridge West Approach Structural Rehabilitation and Paint	Paint	BUN-BR-09	TI-2 21.49	2020-2024	$20,311,661
19	Broadway	Bridge Deck / Rail / Illumination Improvements	Driving Surface	BUN-BR-07	TI-2 20.42	2020-2024	$6,130,398
28	Broadway	Broadway Bridge Limited Seismic Retrofit	Seismic	BUN-BR-06	TI-3 88.10	2025-2029	$52,628,358
37	Broadway	Movable Span Deck Replacement	Driving Surface	BUN-BR-16	TI-3 19.63	2025-2029	$10,148,330

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - BROADWAY BRIDGE ONLY							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
40	Broadway	Operating Machinery Rehabilitation and Brake Replacement	Mechanical	BUN-BR-01	TI-4 31.52	2030-2034	$2,300,579
42	Broadway	Electrical System Master Control Switch Installation and Miscellaneous Operator House Improvements	Electrical and Lighting	BUN-BR-03	TI-4 18.66	2030-2034	$307,377
43	Broadway	Bridge Painting - Maintenance of 2002 Paint Project	Paint	BUN-BR-12	TI-4 17.26	2030-2034	$66,631,927
44	Broadway	Bridge Painting - Maintenance of 2015 Paint Project	Paint	BUN-BR-14	TI-4 14.80	2030-2034	$14,891,720
49	Broadway	ADA Improvements	Accessibility	BUN-BR-15	TI-4 9.57	2030-2034	$1,875,456
53	Broadway	Installation of Remote Operation and Monitoring Equipment	Electrical and Lighting	BUN-BR-04	TI-4 8.15	2030-2034	$2,063,574
						TOTAL:	$212,160,642

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - BURNSIDE BRIDGE ONLY							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
1	Burnside	Seismic Resiliency (Major Bridge Rehabilitation / Bridge Replacement) - Feasibility Study	Seismic	BUN-BU-12	TI-1 64.27	2015-2019	$3,000,000
2	Burnside	Seismic Resiliency (Major Bridge Rehabilitation / Bridge Replacement) - Environmental Impact Study	Seismic	BUN-BU-13	TI-1 64.27	2015-2019	$17,000,000
4	Burnside	2016 Burnside Rehabilitation Project	Structural	BUN-BU-06	TI-1 41.73	2015-2019	$30,846,519
29	Burnside	Seismic Resiliency (Major Bridge Rehabilitation / Bridge Replacement) - Final Design and Construction	Seismic	BUN-BU-07	TI-3 84.91	2025-2029	$496,070,564
						TOTAL:	$546,917,083

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - HAWTHORNE BRIDGE ONLY							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
14	Hawthorne	Bent Cap Rehabilitation - Approach Spans	Structural	BUN-HA-08	TI-2 25.94	2020-2024	$3,814,227
16	Hawthorne	Span Lock and Live Load Shoe Rehabilitation	Mechanical	BUN-HA-02	TI-2 22.93	2020-2024	$1,001,567
18	Hawthorne	Operating Machinery, Trunnion, and Trunnion Tower Structural Rehabilitation	Mechanical	BUN-HA-01	TI-2 21.23	2020-2024	$17,914,399
21	Hawthorne	Joint Rehabilitation and Replacement - West and East Approaches	Structural	BUN-HA-12	TI-2 17.23	2020-2024	$1,928,296
22	Hawthorne	Structural Rehabilitation of Steel and Concrete Members - River Spans	Structural	BUN-HA-10	TI-2 16.03	2020-2024	$11,961,361
27	Hawthorne	Hawthorne Bridge Limited Seismic Retrofit	Seismic	BUN-HA-06	TI-3 162.33	2025-2029	$44,886,391
32	Hawthorne	Roadway, Sign Bridge, Bridge Deck and Illumination Improvements - Approaches	Structural	BUN-HA-07	TI-3 38.96	2025-2029	$25,679,708
33	Hawthorne	Paint and Structural Rehabilitation of Steel and Concrete Members - East Approach	Paint	BUN-HA-11	TI-3 29.52	2025-2029	$35,447,056

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - HAWTHORNE BRIDGE ONLY							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
35	Hawthorne	Bridge Painting and Upgraded Lighting	Paint	BUN-HA-13	TI-3 21.59	2025-2029	$43,328,584
46	Hawthorne	Installation of Remote Operation and Monitoring Equipment	Electrical and Lighting	BUN-HA-04	TI-4 13.58	2030-2034	$2,063,574
47	Hawthorne	ADA Improvements	Accessibility	BUN-HA-14	TI-4 12.02	2030-2034	$3,703,257
55	Hawthorne	Warning and Barrier Gate Rehabilitation	Electrical and Lighting	BUN-HA-03	TI-4 3.86	2030-2034	$3,674,718
						TOTAL:	$195,403,139

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - MORRISON BRIDGE ONLY							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
5	Morrison	Bridge Painting & Structural Rehabilitation - West Approach	Paint	BUN-MO-09	TI-1 25.63	2015-2019	$17,159,972
8	Morrison	Bent Cap Rehabilitation - Approach Spans	Structural	BUN-MO-10	TI-1 9.66	2015-2019	$3,479,386
9	Morrison	Motor, Brake, and Electrical Power Rehabilitation; Operator House Improvements	Mechanical	BUN-MO-01	TI-1 7.99	2015-2019	$1,649,105
10	Morrison	Painting and Structural Improvements - River Spans	Paint	BUN-MO-14	TI-1 7.73	2015-2019	$22,773,510
11	Morrison	Roadway Approaches, Bridge Deck Overlay, and Illumination Improvements	Driving Surface	BUN-MO-07	TI-2 33.33	2020-2024	$13,014,918
15	Morrison	Span Lock and Support Rehabilitation	Mechanical	BUN-MO-02	TI-2 24.45	2020-2024	$1,328,430
30	Morrison	Morrison Bridge Limited Seismic Retrofit	Seismic	BUN-MO-05	TI-3 69.76	2025-2029	$91,883,919
31	Morrison	Structural Rehabilitation of Steel and Concrete Pier Members - River Spans	Structural	BUN-MO-11	TI-3 46.25	2025-2029	$14,103,949

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - MORRISON BRIDGE ONLY							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
34	Morrison	Joint Rehabilitation - West Approach, River Spans and East Approach	Structural	BUN-MO-13	TI-3 22.58	2025-2029	$3,837,233
39	Morrison	Paint, Structural Rehabilitation and Access Improvements - East Approach	Paint	BUN-MO-12	TI-4 36.11	2030-2034	$54,416,301
41	Morrison	Warning Gate and Sign Bridge Replacement	Electrical and Lighting	BUN-MO-06	TI-4 23.01	2030-2034	$6,631,895
48	Morrison	ADA Improvements	Accessibility	BUN-MO-15	TI-4 9.57	2030-2034	$3,703,257
52	Morrison	Installation of Remote Operation and Monitoring Equipment	Electrical and Lighting	BUN-MO-03	TI-4 8.15	2030-2034	$2,063,574
						TOTAL:	$236,045,448

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - MULTIPLE BRIDGES ONLY							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
6	Broadway, Burnside, Hawthorne and Morrison	Bicycle and Pedestrian Improvement Project - Feasibility Study Phase	Accessibility	BUN-MU-04	TI-1 21.96	2015-2019	$1,442,557
23	Burnside, Broadway, Morrison	Submarine Cable Removal	Electrical and Lighting	BUN-MU-01	TI-2 15.60	2020-2024	$4,552,476
24	Broadway, Burnside, Hawthorne and Morrison	Bicycle and Pedestrian Improvement Project - Design and Construction Phase 1	Accessibility	BUN-MU-05	TI-2 15.14	2020-2024	$16,319,707
25	Broadway, Burnside, Hawthorne and Morrison	Scour Remediation	Structural	BUN-MU-02	TI-2 14.68	2020-2024	$22,302,695
36	Broadway, Burnside, Hawthorne and Morrison	Bicycle and Pedestrian Improvement Project - Design and Construction Phase 2	Accessibility	BUN-MU-06	TI-3 20.31	2025-2029	$16,323,533
38	Broadway, Burnside, Hawthorne and Morrison	Fender Repair and Installation	Structural	BUN-MU-03	TI-3 14.04	2025-2029	$43,142,056
						TOTAL:	$104,083,024

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - SELLWOOD BRIDGE ONLY							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
45	Sellwood	Lighting Maintenance	Electrical and Lighting	BUN-SE-01	TI-4 14.26	2030-2034	$326,903
50	Sellwood	Joint Rehabilitation and Replacement	Structural	BUN-SE-02	TI-4 8.35	2030-2034	$353,055
56	Sellwood	Bridge Maintenance Painting	Paint	BUN-SE-03	TI-4 2.93	2030-2034	$774,760
						TOTAL:	$1,454,718

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - SAUVIE ISLAND BRIDGE ONLY							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
20	Sauvie Island	Roadway Improvements - East Approach	Driving Surface	BUN-SI-02	TI-2 17.28	2020-2024	$1,488,668
26	Sauvie Island	Roadway and Structural Rehabilitation	Structural	BUN-SI-03	TI-2 12.98	2020-2024	$1,371,606
51	Sauvie Island	Under-bridge Maintenance Traveler System	Structural	BUN-SI-04	TI-4 8.19	2030-2034	$510,786
54	Sauvie Island	Routine Maintenance and Bridge Painting	Paint	BUN-SI-01	TI-4 5.87	2030-2034	$560,741
						TOTAL:	$3,931,800

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Attachment E

Attachment E – Bridge CIP Project Costs Summary Tables – Grouped by Primary Work Category

This page purposely left blank.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - ACCESSIBILITY PROJECTS							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
6	Broadway, Burnside, Hawthorne and Morrison	Bicycle and Pedestrian Improvement Project - Feasibility Study Phase	Accessibility	BUN-MU-04	TI-1 21.96	2015-2019	$1,442,557
24	Broadway, Burnside, Hawthorne and Morrison	Bicycle and Pedestrian Improvement Project - Design and Construction Phase 1	Accessibility	BUN-MU-05	TI-2 15.14	2020-2024	$16,319,707
36	Broadway, Burnside, Hawthorne and Morrison	Bicycle and Pedestrian Improvement Project - Design and Construction Phase 2	Accessibility	BUN-MU-06	TI-3 20.31	2025-2029	$16,323,533
47	Hawthorne	ADA Improvements	Accessibility	BUN-HA-14	TI-4 12.02	2030-2034	$3,703,257
48	Morrison	ADA Improvements	Accessibility	BUN-MO-15	TI-4 9.57	2030-2034	$3,703,257
49	Broadway	ADA Improvements	Accessibility	BUN-BR-15	TI-4 9.57	2030-2034	$1,875,456
						TOTAL:	$43,367,767

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - DRIVING SURFACE PROJECTS							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
11	Morrison	Roadway Approaches, Bridge Deck Overlay, and Illumination Improvements	Driving Surface	BUN-MO-07	TI-2 33.33	2020-2024	$13,014,918
13	Broadway	Roadway and Structural Rehabilitation	Driving Surface	BUN-BR-11	TI-2 29.16	2020-2024	$2,209,311
19	Broadway	Bridge Deck / Rail / Illumination Improvements	Driving Surface	BUN-BR-07	TI-2 20.42	2020-2024	$6,130,398
20	Sauvie Island	Roadway Improvements - East Approach	Driving Surface	BUN-SI-02	TI-2 17.28	2020-2024	$1,488,668
37	Broadway	Movable Span Deck Replacement	Driving Surface	BUN-BR-16	TI-3 19.63	2025-2029	$10,148,330
						TOTAL:	$32,991,625

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - ELECTRICAL AND LIGHTING PROJECTS							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
12	Broadway	Gate, Span Lock and Structural Rehabilitation - River Spans	Electrical and Lighting	BUN-BR-10	TI-2 31.07	2020-2024	$4,579,643
23	Burnside, Broadway, Morrison	Submarine Cable Removal	Electrical and Lighting	BUN-MU-01	TI-2 15.60	2020-2024	$4,552,476
41	Morrison	Warning Gate and Sign Bridge Replacement	Electrical and Lighting	BUN-MO-06	TI-4 23.01	2030-2034	$6,631,895
42	Broadway	Electrical System Master Control Switch Installation and Miscellaneous Operator House Improvements	Electrical and Lighting	BUN-BR-03	TI-4 18.66	2030-2034	$307,377
45	Sellwood	Lighting Maintenance	Electrical and Lighting	BUN-SE-01	TI-4 14.26	2030-2034	$326,903
46	Hawthorne	Installation of Remote Operation and Monitoring Equipment	Electrical and Lighting	BUN-HA-04	TI-4 13.58	2030-2034	$2,063,574
52	Morrison	Installation of Remote Operation and Monitoring Equipment	Electrical and Lighting	BUN-MO-03	TI-4 8.15	2030-2034	$2,063,574
53	Broadway	Installation of Remote Operation and Monitoring Equipment	Electrical and Lighting	BUN-BR-04	TI-4 8.15	2030-2034	$2,063,574

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - ELECTRICAL AND LIGHTING PROJECTS							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
55	Hawthorne	Warning and Barrier Gate Rehabilitation	Electrical and Lighting	BUN-HA-03	TI-4 3.86	2030-2034	$3,674,718
						TOTAL:	$26,263,735

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - MECHANICAL PROJECTS							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
3	Broadway	Rall Wheel Rehabilitation	Mechanical	BUN-BR-02	TI-1 48.03	2015-2019	$15,423,401
9	Morrison	Motor, Brake, and Electrical Power Rehabilitation; Operator House Improvements	Mechanical	BUN-MO-01	TI-1 7.99	2015-2019	$1,649,105
15	Morrison	Span Lock and Support Rehabilitation	Mechanical	BUN-MO-02	TI-2 24.45	2020-2024	$1,328,430
16	Hawthorne	Span Lock and Live Load Shoe Rehabilitation	Mechanical	BUN-HA-02	TI-2 22.93	2020-2024	$1,001,567
18	Hawthorne	Operating Machinery, Trunnion, and Trunnion Tower Structural Rehabilitation	Mechanical	BUN-HA-01	TI-2 21.23	2020-2024	$17,914,399
40	Broadway	Operating Machinery Rehabilitation and Brake Replacement	Mechanical	BUN-BR-01	TI-4 31.52	2030-2034	$2,300,579
						TOTAL:	$39,617,481

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - PAINT PROJECTS							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
5	Morrison	Bridge Painting & Structural Rehabilitation - West Approach	Paint	BUN-MO-09	TI-1 25.63	2015-2019	$17,159,972
7	Broadway	Bridge Painting - 2015 Paint Project	Paint	BUN-BR-13	TI-1 17.14	2015-2019	$12,658,907
10	Morrison	Painting and Structural Improvements - River Spans	Paint	BUN-MO-14	TI-1 7.73	2015-2019	$22,773,510
17	Broadway	Broadway Bridge West Approach Structural Rehabilitation and Paint	Paint	BUN-BR-09	TI-2 21.49	2020-2024	$20,311,661
33	Hawthorne	Paint and Structural Rehabilitation of Steel and Concrete Members - East Approach	Paint	BUN-HA-11	TI-3 29.52	2025-2029	$35,447,056
35	Hawthorne	Bridge Painting and Upgraded Lighting	Paint	BUN-HA-13	TI-3 21.59	2025-2029	$43,328,584
39	Morrison	Paint, Structural Rehabilitation and Access Improvements - East Approach	Paint	BUN-MO-12	TI-4 36.11	2030-2034	$54,416,301
43	Broadway	Bridge Painting - Maintenance of 2002 Paint Project	Paint	BUN-BR-12	TI-4 17.26	2030-2034	$66,631,927

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - PAINT PROJECTS							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
44	Broadway	Bridge Painting - Maintenance of 2015 Paint Project	Paint	BUN-BR-14	TI-4 14.80	2030-2034	$14,891,720
54	Sauvie Island	Routine Maintenance and Bridge Painting	Paint	BUN-SI-01	TI-4 5.87	2030-2034	$560,741
56	Sellwood	Bridge Maintenance Painting	Paint	BUN-SE-03	TI-4 2.93	2030-2034	$774,760
						TOTAL:	$288,955,138

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - SEISMIC PROJECTS							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
1	Burnside	Seismic Resiliency (Major Bridge Rehabilitation / Bridge Replacement) - Feasibility Study	Seismic	BUN-BU-12	TI-1 64.27	2015-2019	$3,000,000
2	Burnside	Seismic Resiliency (Major Bridge Rehabilitation / Bridge Replacement) - Environmental Impact Study	Seismic	BUN-BU-13	TI-1 64.27	2015-2019	$17,000,000
27	Hawthorne	Hawthorne Bridge Limited Seismic Retrofit	Seismic	BUN-HA-06	TI-3 162.33	2025-2029	$44,886,391
28	Broadway	Broadway Bridge Limited Seismic Retrofit	Seismic	BUN-BR-06	TI-3 88.10	2025-2029	$52,628,358
29	Burnside	Seismic Resiliency (Major Bridge Rehabilitation / Bridge Replacement) - Final Design and Construction	Seismic	BUN-BU-07	TI-3 84.91	2025-2029	$496,070,564
30	Morrison	Morrison Bridge Limited Seismic Retrofit	Seismic	BUN-MO-05	TI-3 69.76	2025-2029	$91,883,919
						TOTAL:	$705,469,232

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - STRUCTURAL PROJECTS							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
4	Burnside	2016 Burnside Rehabilitation Project	Structural	BUN-BU-06	TI-1 41.73	2015-2019	$30,846,519
8	Morrison	Bent Cap Rehabilitation - Approach Spans	Structural	BUN-MO-10	TI-1 9.66	2015-2019	$3,479,386
14	Hawthorne	Bent Cap Rehabilitation - Approach Spans	Structural	BUN-HA-08	TI-2 25.94	2020-2024	$3,814,227
21	Hawthorne	Joint Rehabilitation and Replacement - West and East Approaches	Structural	BUN-HA-12	TI-2 17.23	2020-2024	$1,928,296
22	Hawthorne	Structural Rehabilitation of Steel and Concrete Members - River Spans	Structural	BUN-HA-10	TI-2 16.03	2020-2024	$11,961,361
25	Broadway, Burnside, Hawthorne and Morrison	Scour Remediation	Structural	BUN-MU-02	TI-2 14.68	2020-2024	$22,302,695
26	Sauvie Island	Roadway and Structural Rehabilitation	Structural	BUN-SI-03	TI-2 12.98	2020-2024	$1,371,606
31	Morrison	Structural Rehabilitation of Steel and Concrete Pier Members - River Spans	Structural	BUN-MO-11	TI-3 46.25	2025-2029	$14,103,949

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Capital Projects Summary - STRUCTURAL PROJECTS							
Project Rank	**Bridge Name(s)**	**Project Name**	**Primary Work Category**	**Project ID #**	**Importance Score**	**Target Construction Time**	**Total Cost at Target Construction Time**
32	Hawthorne	Roadway, Sign Bridge, Bridge Deck and Illumination Improvements - Approaches	Structural	BUN-HA-07	TI-3 38.96	2025-2029	$25,679,708
34	Morrison	Joint Rehabilitation - West Approach, River Spans and East Approach	Structural	BUN-MO-13	TI-3 22.58	2025-2029	$3,837,233
38	Broadway, Burnside, Hawthorne and Morrison	Fender Repair and Installation	Structural	BUN-MU-03	TI-3 14.04	2025-2029	$43,142,056
50	Sellwood	Joint Rehabilitation and Replacement	Structural	BUN-SE-02	TI-4 8.35	2030-2034	$353,055
51	Sauvie Island	Under-bridge Maintenance Traveler System	Structural	BUN-SI-04	TI-4 8.19	2030-2034	$510,786
						TOTAL:	$163,330,876

Importance Score Definition: "TI#-9.81"; "TI" is an abbreviation for "time interval" and is used to describe a five-year interval within the Bridge CIP 20-year planning horizon. The "#" refers to the 1st(2015-2019), 2nd(2020-2024), 3rd(2025-2029) and 4th(2030-2034) planning interval. "9.81"is the numerical value of the importance factor score.

Attachment F

Attachment F – Bridge CIP Project Data Fact Sheets

This page purposely left blank.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Seismic Resiliency (Major Bridge Rehabilitation / Bridge Replacement) - Feasibility Study							
Bridge Names(s):	Burnside		Project ID#:	BUN-BU-12	Project Status:	In Progress	
Project Rank:	1	Primary Category of Work	Seismic	Performance Attribute Total Score	60	Importance Score	TI-1 64.27
Logical Grouping Project ID #'s:	BU-STRUCT-08, BU STRUCT-09, BU-STRUCT-10						
Bridge Num and Names(s):	00511A Burnside St West Approach over Hwy 1 [Burnside] ; 00511 Willamette River, Burnside St (Burnside) [Burnside] ; 00511 Willamette River, Burnside St (Burnside) [Burnside]; 00511B Burnside St (East Approach) over Hwy 1 & Conns [Burnside]						

Definition of Problem

The existing Burnside Bridge is functionally obsolete. A programmatic bridge replacement cost for the Planning phase has been developed as part of the Multnomah County Willamette River Bridges Capital Improvement Plan. This phase includes the Feasibility Study for the bridge.

Description of Proposed Solution

The programmatic bridge replacement concept used the same number and type of lanes as the existing facilities, updated for modern widths, to determine an approximate footprint for the new structure. It also assumed that the existing connectivity to adjacent infrastructure is maintained. For the development of its programmatic cost, a steel plate girder bridge type was assumed for the West Approach; a haunched steel plate girder bridge type was assumed for the fixed river spans; a double leaf bascule bridge type was assumed for the moveable span; and a precast concrete girder bridge type was assumed for the East Approach. It also assumed that traffic would be temporarily detoured to the adjacent bridges during construction in lieu of constructing a temporary bridge at Burnside.

Project Justification

This project captures the relative cost for performing the Feasibility Study for the replacement of the Burnside Bridge West Approach, Main River Spans, Movable Span, and East Approach. The benefits of completing the bridge replacement would be to eliminate functionally obsolete components of the bridge. Additionally, the new structure would be designed to modern standards for vehicle traffic, pedestrian, bicycle and transit use thereby improving capacity and traffic operations on the bridge.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$0
Preliminary Engineering:	$3,000,000
Construction Engineering:	$0
Total Cost at Target Construction Time:	$3,000,000
Target Construction Time:	2015-2019

Notes:

Feasibility Study portion only. See also BUN-BU-13 (Environmental Impact Statement) and BUN-BU-07 (Final Design and Construction) projects. This project includes improvements for bicycle or pedestrian users.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Seismic Resiliency (Major Bridge Rehabilitation / Bridge Replacement) - Environmental Impact Study							
Bridge Names(s):	Burnside			Project ID#:	BUN-BU-13	Project Status:	In Progress
Project Rank:	2	Primary Category of Work	Seismic	Performance Attribute Total Score	60	Importance Score	TI-1 64.27
Logical Grouping Project ID #'s:	BU-STRUCT-08, BU STRUCT-09, BU-STRUCT-10						
Bridge Num and Names(s):	00511A Burnside St West Approach over Hwy 1 [Burnside] ; 00511 Willamette River, Burnside St (Burnside) [Burnside] ; 00511 Willamette River, Burnside St (Burnside) [Burnside]; 00511B Burnside St (East Approach) over Hwy 1 & Conns [Burnside]						

Definition of Problem

The existing Burnside Bridge is functionally obsolete. A programmatic bridge replacement cost for the NEPA phase has been developed as part of the Multnomah County Willamette River Bridges Capital Improvement Plan. This phase includes an assumed EIS for the bridge.

Description of Proposed Solution

The programmatic bridge replacement concept used the same number and type of lanes as the existing facilities, updated for modern widths, to determine an approximate footprint for the new structure. It also assumed that the existing connectivity to adjacent infrastructure is maintained. For the development of its programmatic cost, a steel plate girder bridge type was assumed for the West Approach; a haunched steel plate girder bridge type was assumed for the fixed river spans; a double leaf bascule bridge type was assumed for the moveable span; and a precast concrete girder bridge type was assumed for the East Approach. It also assumed that traffic would be temporarily detoured to the adjacent bridges during construction in lieu of constructing a temporary bridge at Burnside.

Project Justification

This project captures the relative cost for performing the NEPA phase (assumed as an EIS) for the replacement of the Burnside Bridge West Approach, Main River Spans, Movable Span, and East Approach. The benefits of completing the bridge replacement would be to eliminate functionally obsolete components of the bridge. Additionally, the new structure would be designed to modern standards for vehicle traffic, pedestrian, bicycle and transit use thereby improving capacity and traffic operations on the bridge.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$0
Preliminary Engineering:	$17,000,000
Construction Engineering:	$0
Total Cost at Target Construction Time:	$17,000,000
Target Construction Time:	2015-2019

Notes:

Environmental Impact Study only. See also BUN-BU-12 (Feasibility Study) and BUN-BU-07 (Final Design and Construction) projects. This project includes improvements for bicycle or pedestrian users.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Rall Wheel Rehabilitation							
Bridge Names(s):	Broadway	Project ID#:	BUN-BR-02	Project Status:	In Progress		
Project Rank:	3	Primary Category of Work	Mechanical	Performance Attribute Total Score	45	Importance Score	TI-1 48.03
Logical Grouping Project ID #'s:	BR-MECH-03						
Bridge Num and Names(s):	06757 Willamette River, Broadway St [Broadway]						

Definition of Problem

The four Rall wheels, which remain from the bridge's original construction, support the weight of the movable portions of the Broadway Bridge. Due to their age and level of deterioration, they are nearing the end of their service life and require replacement. The tracks on which the wheels roll are not well aligned and are causing unnecessary wear on other portions of the structure and machinery. As a result, other portions of the structure will also need to be repaired as a byproduct of the rehabilitation work.

Description of Proposed Solution

The solution is to replace the Rall wheels and their supporting track. This requires raising each leaf of the bridge on jacks in order to pull off the existing wheel, replace the tracks, and install the new wheels. Other worn components on the bridge will be repaired based on further investigation during the design phase of the project. Strengthening of some connecting truss members will likely also be required during the Rall wheel replacement operation.

Project Justification

This work will align the bridge, which will decrease wear on the structure and operating machinery. This work increases the bridge's life span and reduces the likelihood of an unexpected failure.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$10,438,050
Preliminary Engineering:	$2,492,676
Construction Engineering:	$2,492,676
Total Cost at Target Construction Time:	$15,423,401
Target Construction Time:	2015-2019

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: 2016 Burnside Rehabilitation Project							
Bridge Names(s):	Burnside			Project ID#:	BUN-BU-06	Project Status:	In Progress
Project Rank:	4	Primary Category of Work	Structural	Performance Attribute Total Score	46	Importance Score	TI-1 41.73
Logical Grouping Project ID #'s:	BU-MECH-02, BU-ELEC-03, BU-STRUCT-02, BU-STRUCT-03, BU-STRUCT-04, BU-STRUCT-14, BU-STRUCT-15, BU-STRUCT-16						
Bridge Num and Names(s):	00511A Burnside St West Approach over Hwy 1 [Burnside] ; 00511 Willamette River, Burnside St (Burnside) [Burnside] ; 00511 Willamette River, Burnside St (Burnside) [Burnside]; 00511B Burnside St (East Approach) over Hwy 1 & Conns [Burnside]						

Definition of Problem

Portions of the Burnside Bridge west trunnion towers, warning gates, deck, railings, on-bridge illumination, and superstructure and substructure structural elements are exhibiting signs of damage or deterioration. In some instances, the deficiencies are significant enough to affect the safe load carrying capacity of bridge elements such that structural strengthening or replacement of specific components is recommended. Cracking, concrete spalling, reinforcing steel corrosion including section loss, and other signs of damage and deterioration, were observed throughout the bridge. Portions of the West and East Approach Bridges have been netted to prevent deteriorated concrete from falling on the facilities below.

Description of Proposed Solution

The proposed solution includes the rehabilitation of the west trunnion tower bases, warning gates, sign bridges, bridge deck, sidewalks, barrier rail, on-bridge illumination system, and concrete and steel bridge structural components. Improvements to enhance bascule trunnion access will also be included. A variety of replacement and rehabilitation methods will be considered based on a more precise level of analysis during the project's development phase This project is budget constrained and may not fully alleviate all of the identified deficiencies. This project assumes that the bridge will either be replaced or that further improvements to many of the noted deficiencies will be required before 2034. This is due to this project's limited funding level.

Project Justification

The benefits of completing this project are increased safety and reliability of the Burnside Bridge west trunnion tower bases, warning gates, concrete members, bridge deck, barrier rails, and sidewalk structures through 2034. Structural repairs and targeted replacement of key components of the bridge will improve the overall safety of the travelling public, arrest ongoing degradation of structural components that affect the safe load carrying capacity of the bridges and extend its service life.

Right-of-Way:	$121,807
Utility Reimbusement:	$0
Construction:	$21,203,312
Preliminary Engineering:	$4,760,699
Construction Engineering:	$4,760,699
Total Cost at Target Construction Time:	$30,846,519
Target Construction Time:	2015-2019

Notes:

This project includes improvements for bicycle or pedestrian users.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Bridge Painting & Structural Rehabilitation - West Approach							
Bridge Names(s):	Morrison		Project ID#:	BUN-MO-09		Project Status:	In Progress
Project Rank:	5	Primary Category of Work	Paint	Performance Attribute Total Score	30	Importance Score	TI-1 25.63
Logical Grouping Project ID #'s:	MO-PAINT-01 and MO-STRUCT-14						
Bridge Num and Names(s):	02758B W Morrison Br Conn over Hwy 1W (Front Ave) & Park [Morrison] ; 02758 Willamette River, Morrison St (Morrison) [Morrison]						

Definition of Problem

The Morrison Bridge West Approach spans were identified as having a deteriorating paint system, concrete spalls with exposed rebar, and section loss in the top flange of steel cantilever beams supporting the stairs. The Multnomah County Willamette River Bridges Capital Improvement Plan Consultant Team identified the paint deterioration based on a visual inspection of the structure, an assessment of previous inspection reports, and an understanding of past paint projects. From the assessment, it was determined that the original lead-based paint is still in place.

Description of Proposed Solution

The proposed solution for the defined problem is to pressure wash, spot blast, and apply a 3-coat paint system to any deteriorated paint locations. The 3-coat paint system includes a prime, intermediate epoxy, and urethane top coat of paint. The paint removal process includes a containment system. The project will also replace the steel beams at the top of stairs, patch the concrete spalls, and perform a new load rating using the Load and Resistance Factor Rating (LRFR) method.

Project Justification

The benefit of completing the proposed solution is to avoid steel corrosion of the approximately 100-year old bridge by extending the life of the protective coating system at a lower cost than a full replacement. Additionally, the removal of the lead-based paint system would reduce the health exposure risk to maintenance staff and eliminate a potential source for environmental contamination.

Right-of-Way:	$66,433
Utility Reimbusement:	$0
Construction:	$11,592,370
Preliminary Engineering:	$2,750,585
Construction Engineering:	$2,750,585
Total Cost at Target Construction Time:	$17,159,972
Target Construction Time:	2015-2019

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Bicycle and Pedestrian Improvement Project - Feasibility Study Phase							
Bridge Names(s):	Broadway, Burnside, Hawthorne and Morrison		Project ID#:	BUN-MU-04	Project Status:	In Progress	
Project Rank:	6	Primary Category of Work	Accessibility	Performance Attribute Total Score	20	Importance Score	TI-1 21.96
Logical Grouping Project ID #'s:	None entered.						
Bridge Num and Names(s):	06757 Willamette River, Broadway St [Broadway] ; 00511 Willamette River, Burnside St (Burnside) [Burnside] ; 02758 Willamette River, Morrison St (Morrison) [Morrison]; 02757 Willamette River, Hawthorne Ave [Hawthorne]						

Definition of Problem

Large volumes of bicycle and pedestrian traffic use the bridges on a daily basis, creating potential conflicts between these modes and vehicle users. This is especially true at connections between the bridges and the surrounding street network and park resources. This concern was identified by many user and stakeholder groups during the Bridge CIP's Stakeholder Outreach process.

Description of Proposed Solution

The proposed solution is to conduct a Bicycle / Pedestrian Feasibility Study to determine if further bicycle and pedestrian improvements are warranted. The study will include outreach with effected Partner Agencies, including the City of Portland, ODOT, TriMet, Metro as well as stakeholder and user groups.

Project Justification

The benefits of completing the proposed solution is to provide improved bicycle and pedestrian operations and safety, consistent with needs of other Partner Agencies, stakeholder, and user groups. It also promotes many of the County's Sustainability values.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$0
Preliminary Engineering:	$1,442,557
Construction Engineering:	$0
Total Cost at Target Construction Time:	$1,442,557
Target Construction Time:	2015-2019

Notes:

Feasibility Study portion only. See also BUN-MU-05 (Bicycle and Pedestrian Improvement Project - Design and Construction Phase 1)and BUN-MU-06 (Bicycle and Pedestrian Improvement Project - Design and Construction Phase 2). This project includes improvements for bicycle or pedestrian users.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Bridge Painting - 2015 Paint Project							
Bridge Names(s):	Broadway			Project ID#:	BUN-BR-13	Project Status:	In Progress
Project Rank:	7	Primary Category of Work	Paint	Performance Attribute Total Score	16	Importance Score	TI-1 17.14
Logical Grouping Project ID #'s:	BR-Paint-03						
Bridge Num and Names(s):	06757 Willamette River, Broadway St [Broadway] ; 06757 Willamette River, Broadway St [Broadway]						

Definition of Problem

The Multnomah County Willamette River Bridges Capital Improvement Plan Consultant Team identified that the lead painted portions of the Broadway Bridge River Spans not painted in 2002 (i.e., the above deck truss of Spans 2, 3, and 7) are deteriorated and need replacement. This project compliments the lead paint removal project completed in 2002.

Description of Proposed Solution

The proposed solution for the defined problem is to remove the existing lead based paint system and repaint with a 3-coat moisture-cured urethane system throughout the West Approach Spans 2, 3, 4, and 7.

Project Justification

The benefits of completing the proposed solution are to arresting the potential corrosion that results in section loss of steel members, to restore protective coatings of steel for long-term bridge preservation, and to mitigate hazards related to lead and other heavy metals based paint.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$8,538,003
Preliminary Engineering:	$2,060,452
Construction Engineering:	$2,060,452
Total Cost at Target Construction Time:	$12,658,907
Target Construction Time:	2015-2019

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Bent Cap Rehabilitation - Approach Spans							
Bridge Names(s):	Morrison			Project ID#:	BUN-MO-10	Project Status:	In Progress
Project Rank:	8	Primary Category of Work	Structural	Performance Attribute Total Score	13	Importance Score	TI-1 9.66
Logical Grouping Project ID #'s:	MO-STRUCT-05						
Bridge Num and Names(s):	02758B W Morrison Br Conn over Hwy 1W (Front Ave) & Park [Morrison] ; 08589Y SE Yamhill St Ramp over Hwy 1 & Conn (Morrison Int) [Morrison] ; 08589 Willamette R & Hwy 1, SE Morrison St (Morrison Int) [Morrison]; 02758A SE Belmont St over Hwy 1 & Conns (Morrison Intchg) [Morrison]						

Definition of Problem

Portions of the Morrison Bridge West and East Approach bent caps are exhibiting signs of deterioration. Multiple bent caps show signs of concrete spalling with exposed reinforcing steel. Based on the observed condition and review of available existing documentation, it is anticipated that pier cap strengthening will be required for some of the bent caps for these bridge approaches.

Description of Proposed Solution

Concrete spalls will be repaired and patched, and bent cap strengthening solutions will be applied for all bent caps where it is determined through analysis that load carrying capacity less than required for current design vehicle loading.

Project Justification

The benefit of completing the proposed solution is to extend the service life of the bent caps and improve public safety for all users.

Right-of-Way:	$83,624
Utility Reimbusement:	$0
Construction:	$2,264,902
Preliminary Engineering:	$565,430
Construction Engineering:	$565,430
Total Cost at Target Construction Time:	$3,479,386
Target Construction Time:	2015-2019

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Motor, Brake, and Electrical Power Rehabilitation; Operator House Improvements							
Bridge Names(s):	Morrison			Project ID#:	BUN-MO-01	Project Status:	In Progress
Project Rank:	9	Primary Category of Work	Mechanical	Performance Attribute Total Score	8	Importance Score	TI-1 7.99
Logical Grouping Project ID #'s:	MO-MECH-01, MO-ELEC-01 and MO-MECH-04						
Bridge Num and Names(s):	02758 Willamette River, Morrison St (Morrison) [Morrison]						

Definition of Problem

The motors and brakes on the Morrison Bridge are over 50 years old and the expected lifespan of these components is approximately 25 years. The bridge also has waterline piping that cannot be used during the winter months due to fear of freezing. The electrical system has a number of miscellaneous repair needs, and the motor drives will be reaching the end of their service life before 2034.

Description of Proposed Solution

The proposed solution is to replace the existing motors, motor brakes and machinery brakes with new motors, brakes and machinery supports. Electrical equipment will be replaced and appropriate labeling will be installed on electrical hazards. A heat system on the existing piping systems will be installed to allow the water and sewer systems in the operator's house to be used throughout the year.

Project Justification

The benefits of the proposed solution are improved reliability and increased the service life of the brakes, motors and machinery system as a whole. Electrical maintenance helps maintain reliable operation of the bridge. Up to date drawings and documentation will assist in troubleshooting if there is a problem with the electrical system. Installation of a heat system will eliminate the maintenance cost of bringing water to the bridge during the winter months.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$1,099,403
Preliminary Engineering:	$274,851
Construction Engineering:	$274,851
Total Cost at Target Construction Time:	$1,649,105
Target Construction Time:	2015-2019

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Painting and Structural Improvements - River Spans							
Bridge Names(s):	Morrison			Project ID#:	BUN-MO-14	Project Status:	In Progress
Project Rank:	10	Primary Category of Work	Paint	Performance Attribute Total Score	9	Importance Score	TI-1 7.73
Logical Grouping Project ID #'s:	MO-STRUCT-07, MO-PAINT-02, MO-STRUCT-20						
Bridge Num and Names(s):	02758 Willamette River, Morrison St (Morrison) [Morrison] ; 02758 Willamette River, Morrison St (Morrison) [Morrison]						

Definition of Problem

The Morrison Bridge River Spans were observed to have a large percentage of the total surface area showing signs of deterioration or paint system failure, including areas of exposed metal. A review of available existing information also suggests that the current paint system contains lead. The bridge bearings were observed to have debris accumulation and deterioration of the bearing protective system. Access is limited for the fixed river span, which inhibits debris removal, bridge inspections, and maintenance activities including vessel impact repairs.

Description of Proposed Solution

The proposed solution for the deteriorating and failing paint systems includes the removal of existing lead-based paint, and the application of a new protective paint system. Bridge bearings will have current debris removed and a new protective paint system applied to metal components, which allow for continued movement of the bearings. The construction of a maintenance access catwalk for the fixed river spans would allow for improved access for ongoing monitoring, maintenance, and repair activities.

Project Justification

The benefits of completing the proposed paint system repairs are to arrest the ongoing corrosion and deterioration of the structural steel members, and to restore a protective paint system which would extend the service life of the bridge. Additionally, the removal of the lead-based paint system would reduce the health exposure risk to maintenance staff and eliminate a potential source for environmental contamination. Bridge bearing service life would be extended and ongoing maintenance costs would be reduced. The construction of an access walkway would provide health and safety improvements maintenance staff and long term reductions in total maintenance costs for the River Spans.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$15,555,283
Preliminary Engineering:	$3,609,113
Construction Engineering:	$3,609,113
Total Cost at Target Construction Time:	$22,773,510
Target Construction Time:	2015-2019

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Roadway Approaches, Bridge Deck Overlay, and Illumination Improvements							
Bridge Names(s):	Morrison			Project ID#:	BUN-MO-07	Project Status:	In Progress
Project Rank:	11	Primary Category of Work	Driving Surface	Performance Attribute Total Score	29	Importance Score	TI-2 33.33
Logical Grouping Project ID #'s:	MO-ROAD-01, MO-ROAD-02, MO-STRUCT-02, MO-STRUCT-03, MO-STRUCT 04 and MO-STRUCT-12						
Bridge Num and Names(s):	02758B W Morrison Br Conn over Hwy 1W (Front Ave) & Park [Morrison] ; 02758 Willamette River, Morrison St (Morrison) [Morrison] ; 02758 Willamette River, Morrison St (Morrison) [Morrison]; 08589Y SE Yamhill St Ramp over Hwy 1 & Conn (Morrison Int) [Morrison]						

Definition of Problem

Pavement on the bridge approaches is deteriorated and approaching the end if it's useful life. Drainage systems are composed of aging elements and are in need of repair. Portions of the Morrison Bridge West Approach deck are exhibiting signs of damage or deterioration such as wheel rutting and exposed aggregate. Portions of the Morrison Bridge East Approach deck and deck joints are exhibiting signs of damage including an isolated portion of the East Approach's Bridge No. 08589 (Morrison St.) that has significant damage.

Description of Proposed Solution

The proposed solution for the approach roadway pavement and drainage systems is to reconstruct the roadway pavement sections and update the drainage system while access to the system is available. New durable striping would be placed on the newly constructed pavement section. Bridge deck damage will be repaired and small portions replaced as required. The bridge deck joints will be replaced and the on-bridge illumination systems will be improved. Additionally, portions of damaged sidewalk would be rehabilitated with a concrete overlay.

Project Justification

The benefit of completing the proposed solutions includes minimizing service disruptions and associated costs of delay to the motoring public, and reducing maintenance costs for ongoing pavement rehabilitation, deck and joint restoration, and sidewalk components. These improvements would arrest the degradation of the driving surface, extend the service life of the remaining deck components, improve traction for roadway users and reduce the total expenditure for deck maintenance over time such that they would warrant a full deck or sidewalk replacement. Illumination system repairs would provide increased safety for bridge users, allow for the installation of modern lighting components, and deter vandalism and crime.

Right-of-Way:	$361,430
Utility Reimbusement:	$0
Construction:	$8,534,292
Preliminary Engineering:	$2,059,598
Construction Engineering:	$2,059,598
Total Cost at Target Construction Time:	$13,014,918
Target Construction Time:	2020-2024

Notes:

This project includes improvements identified during the 2014 public engagement process. This project includes improvements for bicycle or pedestrian users.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Gate, Span Lock and Structural Rehabilitation - River Spans							
Bridge Names(s):	Broadway			Project ID#:	BUN-BR-10	Project Status:	In Progress
Project Rank:	12	Primary Category of Work	Electrical and Lighting	Performance Attribute Total Score	24	Importance Score	TI-2 31.07
Logical Grouping Project ID #'s:	BR-ELEC-02, BR-ELEC-03, BR-MECH-04, and BR-STRUCT-14						
Bridge Num and Names(s):	06757 Willamette River, Broadway St [Broadway] ; 06757 Willamette River, Broadway St [Broadway]						

Definition of Problem

The span supports for the movable bridge require re-alignment to allow for even loading at each corner of the bridge. The span guide roller assemblies are worn and can cause binding of the span during operation of the bridge. All four span locks have clearance that prevents holding the bridge down when closed. The bridge warning and barrier gates are in good condition but impact damage would necessitate replacement of the warning and/or barrier gates. Some of the vertical truss members have been severed in order to avoid conflicts with the gates.

Description of Proposed Solution

The proposed solution is to analyze the current state of the span supports for the movable bridge and re-align the shoes to ensure even loading on each corner. The span guide assemblies should be removed from the bridge, disassembled, cleaned, and have wearable components replaced. The bronze span lock guide and receiver shoes will also be replaced to reduce the clearance to a closer fit. Both warning and barrier gates may be replaced in-kind. Work would include the demolition of the existing gate and installation of new gate in both cases. The vertical truss members will be strengthened in the areas where the sectional area has been reduced.

Project Justification

The benefits of completing this work are even load across all span supports on the movable bridge, which prevents a "pumping" effect created by traffic when the supports are not in hard contact. Improved bearing also ensures that the traffic load of the bridge is evenly distributed across all four corners. Improvement of the span guide and seating guide operation will allow for more reliable overall bridge operation. The benefits of replacing the shoes are increased service life of the span lock due to reduced shock loading and improved safety during a seismic event. The benefit of reconstructing the warning and barrier gates is to ensure the reliable operation of an essential safety feature.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$3,058,824
Preliminary Engineering:	$760,410
Construction Engineering:	$760,410
Total Cost at Target Construction Time:	$4,579,643
Target Construction Time:	2020-2024

Notes:

This project includes improvements identified during the 2014 public engagement process.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Roadway and Structural Rehabilitation							
Bridge Names(s):	Broadway			Project ID#:	BUN-BR-11	Project Status:	In Progress
Project Rank:	13	Primary Category of Work	Driving Surface	Performance Attribute Total Score	25	Importance Score	TI-2 29.16
Logical Grouping Project ID #'s:	BR-ROAD-01, BR-ROAD-02, BR-STRUCT-04, BR-STRUCT-15, BR-STRUCT-16, BR-STRUCT-17, BR-STRUCT-18						
Bridge Num and Names(s):	06757A NW Broadway Ramp over Broadway St Conn [Broadway] ; 06757 Willamette River, Broadway St [Broadway] ; 06757C N Broadway St over N Interstate Ave [Broadway]; 06757A NW Broadway Ramp over Broadway St Conn [Broadway]						

Definition of Problem

Pavement on the bridge approaches is deteriorated and approaching the end if it's design life. Drainage systems are composed of aging elements and are in need of repair and maintenance. Portions of the Broadway Bridge deck joints are exhibiting signs of damage or deterioration. Fixed and moveable bearings for the River Spans have debris accumulation and deteriorating protective paint systems.

Description of Proposed Solution

The proposed solution for the approach roadway pavement and drainage systems is to reconstruct the roadway's pavement section, including and update the existing drainage system. New durable striping would be placed on the newly constructed pavement section, the bridge deck joints will be replaced, and the fixed and moveable bearings will be cleaned and repainted.

Project Justification

The benefit of completing the proposed solutions includes minimizing service disruptions and associated costs of delay to the motoring public, reducing maintenance costs for ongoing pavement rehabilitation, and restoring deck components to arrest the degradation of the driving surface. As a result of the project, the service life of the remaining deck components will e extended, and the total expenditure for deck maintenance over time will be reduced by completing repairs before conditions deteriorate further.

Right-of-Way:	$82,425
Utility Reimbusement:	$0
Construction:	$1,417,924
Preliminary Engineering:	$354,481
Construction Engineering:	$354,481
Total Cost at Target Construction Time:	$2,209,311
Target Construction Time:	2020-2024

Notes:

This project includes improvements identified during the 2014 public engagement process. This project includes improvements for bicycle or pedestrian users.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Bent Cap Rehabilitation - Approach Spans							
Bridge Names(s):	Hawthorne			Project ID#:	BUN-HA-08	Project Status:	In Progress
Project Rank:	14	Primary Category of Work	Structural	Performance Attribute Total Score	18	Importance Score	TI-2 25.94
Logical Grouping Project ID #'s:	HA-STRUCT-05						
Bridge Num and Names(s):	02757D Willamette River, SW Hawthorne Blvd (Hawthorne Br) [Hawthorne] ; 02757F SE Hawthorne Blvd over SE Water Ave (Hawthorne) [Hawthorne] ; 02757B SE Madison St Ramp over Hwy 1E SB (SE MLK Blvd) [Hawthorne]; 02757A Hawthorne Blvd Ramp to Hwy 1E SB [Hawthorne]						

Definition of Problem

Portions of the Hawthorne Bridge West and East Approaches are exhibiting signs of deterioration. Multiple bent caps show signs of concrete spalling and splitting cracks. Based on the observed condition and review of available existing documentation, it is anticipated that pier cap strengthening will be required for some of the bent caps for these bridge approaches.

Description of Proposed Solution

Concrete spalls will be repaired and patched, and bent cap strengthening solutions will be applied for all bent caps where it is determined through analysis that load carrying capacity less than required for current design vehicle loading.

Project Justification

The benefit of completing the proposed solution is to extend the service life of the bent caps and improve public safety for all users.

Right-of-Way:	$66,688
Utility Reimbusement:	$0
Construction:	$2,500,573
Preliminary Engineering:	$623,483
Construction Engineering:	$623,483
Total Cost at Target Construction Time:	$3,814,227
Target Construction Time:	2020-2024

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Span Lock and Support Rehabilitation							
Bridge Names(s):	Morrison			Project ID#:	BUN-MO-02	Project Status:	In Progress
Project Rank:	15	Primary Category of Work	Mechanical	Performance Attribute Total Score	18	Importance Score	TI-2 24.45
Logical Grouping Project ID #'s:	MO-MECH-03						
Bridge Num and Names(s):	02758 Willamette River, Morrison St (Morrison) [Morrison]						

Definition of Problem

The span locks, which link the two halves of the movable bridge portions together, have a gap between the lock's jaw and receiver assemblies. This condition means that the two halves are not properly transferring loads when closed. This results in movable span supports that do not bear evenly on their supports, allowing the bridge to oscillate under traffic when closed.

Description of Proposed Solution

The proposed solution for the movable span supports is to install additional structural members to provide even bearing when the bascule spans are closed. The span locks and associated machinery will be rehabilitated to ensure the two leaves are linked together tightly.

Project Justification

The benefits of the work is a reduction in the undesirable impact loading caused by the lack of contact at the movable span supports and span lock jaws. This will reduce the wear on the structure and other machinery systems.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$885,620
Preliminary Engineering:	$221,405
Construction Engineering:	$221,405
Total Cost at Target Construction Time:	$1,328,430
Target Construction Time:	2020-2024

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Span Lock and Live Load Shoe Rehabilitation							
Bridge Names(s):	Hawthorne			Project ID#:	BUN-HA-02	Project Status:	In Progress
Project Rank:	16	Primary Category of Work	Mechanical	Performance Attribute Total Score	18	Importance Score	TI-2 22.93
Logical Grouping Project ID #'s:	HA-MECH-04 and HA-MECH-05						
Bridge Num and Names(s):	02757 Willamette River, Hawthorne Ave [Hawthorne]						

Definition of Problem

The span supports for the movable bridge require re-alignment to allow for even loading at each corner of the bridge. The span guide roller assemblies are worn and can cause binding of the span during operation of the bridge. All four span locks have clearance that prevents holding the bridge down when closed.

Description of Proposed Solution

The proposed solution is to analyze the current state of the span supports for the movable bridge and re-align the shoes to ensure even loading on each corner. The span guide assemblies should be removed from the bridge, disassembled, cleaned, and have wearable components replaced. The bronze span lock guide and receiver shoes will also be replaced to reduce the clearance to a closer fit.

Project Justification

The benefits of completing this work are even load across all span supports on the movable bridge, which prevents a "pumping" effect created by traffic when the supports are not in hard contact. Improved bearing also ensures that the traffic load of the bridge is evenly distributed across all four corners. Improvement of the span guide and seating guide operation will allow for more reliable overall bridge operation. The benefits of replacing the shoes are increased service life of the span lock due to reduced shock loading and improved safety during a seismic event.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$667,711
Preliminary Engineering:	$166,928
Construction Engineering:	$166,928
Total Cost at Target Construction Time:	$1,001,567
Target Construction Time:	2020-2024

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Broadway Bridge West Approach Structural Rehabilitation and Paint							
Bridge Names(s):	Broadway			Project ID#:	BUN-BR-09	Project Status:	In Progress
Project Rank:	17	Primary Category of Work	Paint	Performance Attribute Total Score	20	Importance Score	TI-2 21.49
Logical Grouping Project ID #'s:	BR-STRUCT-13 and BR-PAINT-01						
Bridge Num and Names(s):	06757A NW Broadway Ramp over Broadway St Conn [Broadway] ; 06757 Willamette River, Broadway St [Broadway]						

Definition of Problem

The Multnomah County Willamette River Bridges Capital Improvement Plan Consultant Team identified protective paint system deterioration for the Broadway Bridge West Approach and Span 1 of the River Bridge. These findings were based on a visual inspection of the structure, an assessment of previous inspection reports, and an understanding of past paint projects. Based on the era of the paint system, it is assumed to contain lead. Observed steel and concrete member degradation included up to 3/8" section loss for steel components, bent bearing device anchor bolts, and reinforcing steel corrosion including section loss. Main span piers adjacent to the railroad are located within the horizontal clearance requirements for the railroad and are vulnerable to train collision damage.

Description of Proposed Solution

The proposed solution for the deteriorating and failing paint systems include the removal of existing lead based paint, surface preparation, and application of a new protective paint system. The project will replace any degraded or damaged concrete with structural concrete patching, and replace bent bearing device anchor bolts. The project will also construct railroad crash walls to protect main spans piers adjacent to the UPRR tracks.

Project Justification

The main benefits of completing the proposed paint system repairs are to arrest the ongoing corrosion and deterioration of the structural steel members, and to restore a protective paint system which would extend the service life of the bridge. Additionally, the current lead paint system would be removed to reduce the health exposure risk to maintenance staff and a potential source for environmental contamination. Bearing device, steel and concrete repairs would address current damage and extend the service life of the bridges. The construction of crash walls adjacent to the railroad will protect the bridge from train collision derailment.

Right-of-Way:	$191,140
Utility Reimbusement:	$0
Construction:	$13,697,055
Preliminary Engineering:	$3,211,733
Construction Engineering:	$3,211,733
Total Cost at Target Construction Time:	$20,311,661
Target Construction Time:	2020-2024

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Operating Machinery, Trunnion, and Trunnion Tower Structural Rehabilitation							
Bridge Names(s):	Hawthorne			Project ID#:	BUN-HA-01	Project Status:	In Progress
Project Rank:	18	Primary Category of Work	Mechanical	Performance Attribute Total Score	24	Importance Score	TI-2 21.23
Logical Grouping Project ID #'s:	HA-MECH-01, HA-MECH-02, HA-MECH-03, HA-MECH-06, HA-ELEC-01						
Bridge Num and Names(s):	02757 Willamette River, Hawthorne Ave [Hawthorne]						

Definition of Problem

The motors and brakes on the Hawthorne Bridge are over 40 years old, exceeding their 25 years expected lifespan. The bearings that hold the machinery shafts in place are worn, which causes increased wear of adjacent components. The operating ropes are in good condition, however the ropes are over 20 years old and wire rope standards recommend replacement at this age. The operator house water and sewer lines cannot be operated during the winter. The electrical system requires general repair and component replacement before 2034. Past analysis has indicated that the counterweight trunnion sheaves have fatigue-prone details. The tower stairways are not OSHA compliant. The west tower appears to be leaning, as evidenced from the contact observed on the span guides.

Description of Proposed Solution

The proposed solutions for the problems are the installation of new motors, brakes and associated electrical control equipment. Bearings will be adjusted to reduce play in shafts and attached components. The operating ropes will be replaced in-kind. A heat system will be installed on the water and sewer piping to enable use during the winter months. Impacted electrical components above will be replaced as required. Tower access, walkways, and stairs will be improved to meet current OSHA standards. The tower trunnions will be rehabilitated to mitigate fatigue-prone details. The west tower will be investigated for the nature of the "out of plumb" condition, and the proposed solution assumes that the east tower will be jacked from the substructure in order to permit structural repairs to re-align the tower.

Project Justification

The benefits of the proposed solution with respect to replacement/rehabilitation of the motors, brakes, bearings, operating ropes, trunnions, west tower and electrical equipment are increased service life and reliability against an unexpected failure of the machinery system. Electrical maintenance maintains reliable operation of the bridge. Up to date drawings and documentation will assist in troubleshooting if there is a problem with the electrical system. Installation of a heat system will eliminate the maintenance cost of bringing water to the bridge during the winter. The tower stairways should be OSHA compliant to keep working areas safe for maintenance personnel.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$12,161,508
Preliminary Engineering:	$2,876,445
Construction Engineering:	$2,876,445
Total Cost at Target Construction Time:	$17,914,399
Target Construction Time:	2020-2024

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Bridge Deck / Rail / Illumination Improvements							
Bridge Names(s):	Broadway			Project ID#:	BUN-BR-07	Project Status:	In Progress
Project Rank:	19	Primary Category of Work	Driving Surface	Performance Attribute Total Score	27	Importance Score	TI-2 20.42
Logical Grouping Project ID #'s:	BR-STRUCT-01, BR-STRUCT-02, AND BR-STRUCT-03						
Bridge Num and Names(s):	06757A NW Broadway Ramp over Broadway St Conn [Broadway] ; 06757 Willamette River, Broadway St [Broadway] ; 06757 Willamette River, Broadway St [Broadway]; 06757C N Broadway St over N Interstate Ave [Broadway]						

Definition of Problem

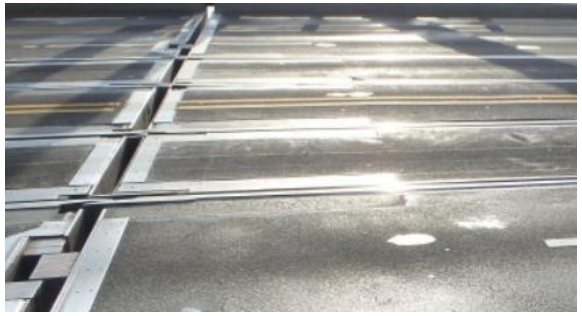
Portions of the Broadway Bridge deck and the on-bridge illumination systems are exhibiting signs of damage and deterioration, as identified by the Multnomah County Willamette River Bridges Capital Improvement Plan Consultant Team. The existing deck asphalt concrete overlay on the West Approach is cracking and beginning to break apart. The existing deck fiber-reinforced, polymer-concrete overlay of the Main River Spans has cracks forming along its deck panel joints. This project precedes BUN-BR-16, which was a full deck replacement project for the movable bridge spans.

Description of Proposed Solution

Rehabilitation measures have been selected to address both the observed damage and forecasted deterioration over the next 20-years using engineering judgment. The measures recommended to address the deck deficiencies include the removal and replacement of the asphalt concrete overlay on the West Approach, and the sealing of the cracks on the Main River Spans. Rewiring and replacement of the current light standards is also recommended to address aging components of the on-bridge illumination systems.

Project Justification

The benefit of completing the deck repairs is to arrest the degradation of the driving surface, to extend the service life of the remaining deck components, and to reduce the total expenditure for long-term deck maintenance by completing repairs before conditions deteriorate leaving a full deck replacement as the only feasible option. Illumination system repairs would provide increased safety for bridge users, allow for the installation of modern lighting components, and deter vandalism and crime.



Right-of-Way:	$74,940
Utility Reimbusement:	$0
Construction:	$4,051,675
Preliminary Engineering:	$1,001,892
Construction Engineering:	$1,001,892
Total Cost at Target Construction Time:	$6,130,398
Target Construction Time:	2020-2024

Notes:

This project includes improvements for bicycle or pedestrian users.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Roadway Improvements - East Approach							
Bridge Names(s):	Sauvie Island			Project ID#:	BUN-SI-02	Project Status:	In Progress
Project Rank:	20	Primary Category of Work	Driving Surface	Performance Attribute Total Score	17	Importance Score	TI-2 17.28
Logical Grouping Project ID #'s:	SI-ROAD-02						
Bridge Num and Names(s):	20136 Multnomah Channel, PNWR, Sauvie Island Rd. [Sauvie Island]						

Definition of Problem

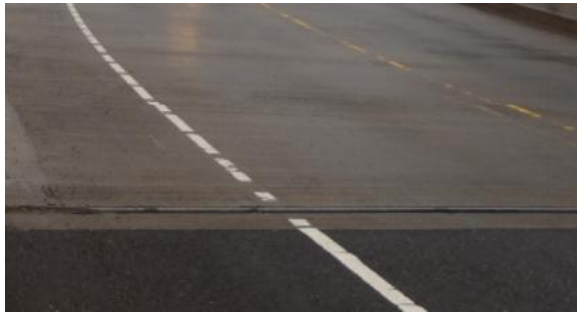
Evidence of settlement was observed by the Multnomah County Willamette River Bridges Capital Improvement Plan Consultant Team under the east abutment, east sidewalk, and around the guardrail posts. Pavement on the bridge approach has settled and further settlement is anticipated. A visual assessment of the settlement induced damage indicates that the base is failing and a simple overlay likely will not provide 20 years of service as is usual for pavement improvements.

Description of Proposed Solution

The proposed solution would include force grouting beneath the approach panel and complete pavement reconstruction where pavement has settled at or near the end panels. New durable striping placed on durable pavement.

Project Justification

The benefits of grouting under the approach panel are significant reduction of further settlement of the roadway and sidewalk surfaces as well as a reduction in long term maintenance costs for the approach roadway.



Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$992,445
Preliminary Engineering:	$248,111
Construction Engineering:	$248,111
Total Cost at Target Construction Time:	$1,488,668
Target Construction Time:	2020-2024

Notes:

This project includes improvements for bicycle or pedestrian users.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Joint Rehabilitation and Replacement - West and East Approaches							
Bridge Names(s):	Hawthorne			Project ID#:	BUN-HA-12	Project Status:	In Progress
Project Rank:	21	Primary Category of Work	Structural	Performance Attribute Total Score	12	Importance Score	TI-2 17.23
Logical Grouping Project ID #'s:	HA-STRUCT-18 and HA-STRUCT-20						
Bridge Num and Names(s):	02757D Willamette River, SW Hawthorne Blvd (Hawthorne Br) [Hawthorne] ; 02757F SE Hawthorne Blvd over SE Water Ave (Hawthorne) [Hawthorne] ; 02757B SE Madison St Ramp over Hwy 1E SB (SE MLK Blvd) [Hawthorne]; 02757A Hawthorne Blvd Ramp to Hwy 1E SB [Hawthorne]						

Definition of Problem

The Multnomah County Willamette River Bridges Capital Improvement Plan Consultant Team identified several of the joint systems on the bridge deck have reached the end of their service life. At several locations within the West and East Approaches, debris has accumulated in the joints. Water was observed to be flowing freely through the failed joints, and surrounding concrete has begun to deteriorate and spall.

Description of Proposed Solution

Bridge deck joints will be repaired or replaced according to their level of deterioration at the time of project development. This includes a repair of spalled and damaged concrete surrounding the joints.

Project Justification

The benefit of completing the proposed solutions includes a reduction in maintenance costs for ongoing joint rehabilitation, and restoring the bridge deck joints to a serviceable condition. This results in extending the service life of the deck system and underling bridge components.

Right-of-Way:	$19,116
Utility Reimbusement:	$0
Construction:	$1,272,787
Preliminary Engineering:	$318,197
Construction Engineering:	$318,197
Total Cost at Target Construction Time:	$1,928,296
Target Construction Time:	2020-2024

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Structural Rehabilitation of Steel and Concrete Members - River Spans							
Bridge Names(s):	Hawthorne			Project ID#:	BUN-HA-10	Project Status:	In Progress
Project Rank:	22	Primary Category of Work	Structural	Performance Attribute Total Score	15	Importance Score	TI-2 16.03
Logical Grouping Project ID #'s:	HA-STRUCT-06 and HA-STRUCT-16						
Bridge Num and Names(s):	02757 Willamette River, Hawthorne Ave [Hawthorne] ; 02757 Willamette River, Hawthorne Ave [Hawthorne]						

Definition of Problem

The Hawthorne Bridge River Spans were observed to have debris between bearing components, a deteriorated bearing protective system, and concrete degradation in the web walls, pier caps and deck soffit beneath the sidewalks. The concrete degradation includes exposed reinforcing steel with section loss. Based on a review of available information, there is also structural section loss in many of the lower chord gusset plates of the Fixed River span's main truss members.

Description of Proposed Solution

The proposed solution includes the structural strengthening of the main truss bottom chord components, the removal of debris and the application of a new protective paint system for the bridge bearings, and the repair of deteriorated concrete elements.

Project Justification

The benefits of completing the structural strengthening of the truss elements, the repair of the deteriorated concrete, and the application of upgraded paint systems to the bearings are a service life extension, a reduction in the long term maintenance costs, and the avoidance of a more costly bridge bearing or main structural member replacement if the elements continue to deteriorate.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$8,060,647
Preliminary Engineering:	$1,950,357
Construction Engineering:	$1,950,357
Total Cost at Target Construction Time:	$11,961,361
Target Construction Time:	2020-2024

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Submarine Cable Removal							
Bridge Names(s):	Burnside, Broadway, Morrison			Project ID#:	BUN-MU-01	Project Status:	In Progress
Project Rank:	23	Primary Category of Work	Electrical and Lighting	Performance Attribute Total Score	13	Importance Score	TI-2 15.60
Logical Grouping Project ID #'s:	BR-ELEC-05, BU-ELEC-05, MO-ELEC-04						
Bridge Num and Names(s):	06757 Willamette River, Broadway St [Broadway] ; 00511 Willamette River, Burnside St (Burnside) [Burnside] ; 02758 Willamette River, Morrison St (Morrison) [Morrison]						

Definition of Problem

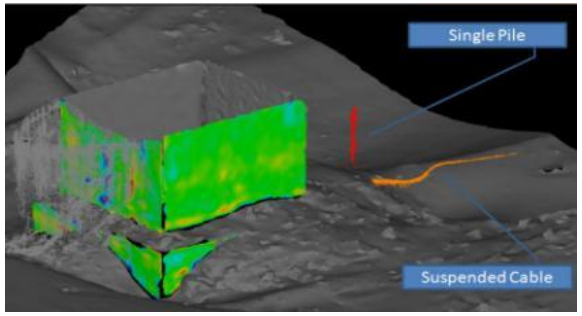
The submarine cable on the Broadway, Burnside and Morrison Bridges have been abandoned in place. The cable presents a snagging hazard to river navigation traffic and may result in damage to the cable, the bridge, or marine traffic.

Description of Proposed Solution

The proposed solution to the defined problem is to perform an underwater demolition of the cables underneath the movable bridge section of each bridge.

Project Justification

The benefit of the project is that the removal of the submarine cable will eliminate the navigation hazard within the river.



Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$3,040,580
Preliminary Engineering:	$755,948
Construction Engineering:	$755,948
Total Cost at Target Construction Time:	$4,552,476
Target Construction Time:	2020-2024

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Bicycle and Pedestrian Improvement Project - Design and Construction Phase 1							
Bridge Names(s):	Broadway, Burnside, Hawthorne and Morrison		Project ID#:	BUN-MU-05	Project Status:	In Progress	
Project Rank:	24	Primary Category of Work	Accessibility	Performance Attribute Total Score	20	Importance Score	TI-2 15.14
Logical Grouping Project ID #'s:	None entered.						
Bridge Num and Names(s):	06757 Willamette River, Broadway St [Broadway] ; 00511 Willamette River, Burnside St (Burnside) [Burnside] ; 02758 Willamette River, Morrison St (Morrison) [Morrison]; 02757 Willamette River, Hawthorne Ave [Hawthorne]						

Definition of Problem

Large volumes of bicycle and pedestrian traffic use the bridges on a daily basis, creating potential conflicts between these modes and vehicle users. This is especially true at connections between the bridges and the surrounding street network and park resources. This concern was identified by many user and stakeholder groups during the Bridge CIP's Stakeholder Outreach process.

Description of Proposed Solution

The proposed solution is to construct the improvements recommended within the Bicycle / Pedestrian Feasibility Study. A budgetary allocation has been provided as a placeholder for Phase 1 of the improvements.

Project Justification

The benefits of completing the proposed solution is to provide improved bicycle and pedestrian operations and safety, consistent with needs of other Partner Agencies, stakeholders, and user groups. It also promotes many of the County's Sustainability values.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$11,056,926
Preliminary Engineering:	$2,631,390
Construction Engineering:	$2,631,390
Total Cost at Target Construction Time:	$16,319,707
Target Construction Time:	2020-2024

Notes:

Design and Construction Phase 1 portion only. See also BUN-MU-04 (Bicycle and Pedestrian Improvement Project - Feasibility Study Phase) and BUN-MU-06 (Bicycle and Pedestrian Improvement Project - Design and Construction Phase 2). This project includes improvements for bicycle or pedestrian users.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Scour Remediation							
Bridge Names(s):	Broadway, Burnside, Hawthorne and Morrison		Project ID#:	BUN-MU-02	Project Status:	In Progress	
Project Rank:	25	Primary Category of Work	Structural	Performance Attribute Total Score	18	Importance Score	TI-2 14.68
Logical Grouping Project ID #'s:	BR-STRUCT-05, BU-STRUCT-07, HA-STRUCT-07 and MO-STRUCT-21						
Bridge Num and Names(s):	06757 Willamette River, Broadway St [Broadway] ; 06757 Willamette River, Broadway St [Broadway] ; 00511 Willamette River, Burnside St (Burnside) [Burnside]; 00511 Willamette River, Burnside St (Burnside) [Burnside]						

Definition of Problem

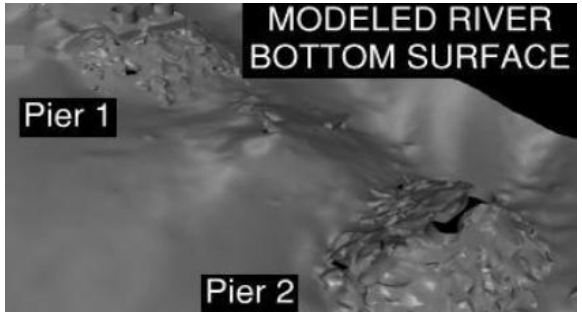
Portions of the in-water piers of the Broadway, Burnside, Hawthorne and Morrison Bridge Main River Spans were all identified as having some degree of scour vulnerability. These vulnerabilities were determined from an underwater hydrologic survey conducted in 2014. These deficiencies generally consist of incomplete or insufficient protection against scour due to a lack of revetment. In addition, evidence of limited undermining and concrete degradation of the Burnside Bridge pier substructure below the waterline was observed.

Description of Proposed Solution

The proposed solution to the defined problem includes the placement of additional rock armor for the Broadway, Burnside and Morrison Bridges at select in-water piers. Monitoring of the existing rock armor and the installation of additional rock armoring of the east riverbank of the Hawthorne Bridge is also included in the project The observed concrete degradation at the Burnside Bridge will be repaired as part of this project.

Project Justification

The benefit of completing the installation of additional scour protection measures is to reduce the risk of scour undermining of the in-water pier foundations and riverbank sections. The benefit of completing the concrete degradation repairs for the Burnside Bridge would be to restore the full cross-section of the in-water pier substructure and prevent further deterioration.



Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$15,224,572
Preliminary Engineering:	$3,539,061
Construction Engineering:	$3,539,061
Total Cost at Target Construction Time:	$22,302,695
Target Construction Time:	2020-2024

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Roadway and Structural Rehabilitation							
Bridge Names(s):	Sauvie Island			Project ID#:	BUN-SI-03	Project Status:	In Progress
Project Rank:	26	Primary Category of Work	Structural	Performance Attribute Total Score	16	Importance Score	TI-2 12.98
Logical Grouping Project ID #'s:	SI-ROAD-01, SI-STRUCT-02						
Bridge Num and Names(s):	20136 Multnomah Channel, PNWR, Sauvie Island Rd. [Sauvie Island] ; 20136 Multnomah Channel, PNWR, Sauvie Island Rd. [Sauvie Island]						

Definition of Problem

The Multnomah County Willamette River Bridges Capital Improvement Plan Consultant Team identified that several of the joint systems for the bridge deck have accumulated debris and are beginning to deteriorate. In addition, there are signs of settlement at the West Approach roadway. Additionally, the suspension cables for the tied arch span are anticipated to need routine maintenance with the 20-year window of the Capital Improvement Plan.

Description of Proposed Solution

The proposed solutions include pavement reconstruction for the West Approach roadway, replacement of bridge deck joint systems, and routine maintenance of the tied arch span suspension cables.

Project Justification

The benefit of completing the proposed solutions includes minimizing service disruptions and associated costs for delays to the motoring public, reducing maintenance costs for ongoing pavement rehabilitation, and restoring deck joint components to avoid the degradation of the driving surface and other affected bridge components.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$914,404
Preliminary Engineering:	$228,601
Construction Engineering:	$228,601
Total Cost at Target Construction Time:	$1,371,606
Target Construction Time:	2020-2024

Notes:

This project includes improvements for bicycle or pedestrian users.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Hawthorne Bridge Limited Seismic Retrofit							
Bridge Names(s):	Hawthorne			Project ID#:	BUN-HA-06	Project Status:	In Progress
Project Rank:	27	Primary Category of Work	Seismic	Performance Attribute Total Score	61	Importance Score	TI-3 162.33
Logical Grouping Project ID #'s:	HA-SEIS-04						
Bridge Num and Names(s):	02757D Willamette River, SW Hawthorne Blvd (Hawthorne Br) [Hawthorne] ; 02757 Willamette River, Hawthorne Ave [Hawthorne] ; 02757 Willamette River, Hawthorne Ave [Hawthorne]; 02757A Hawthorne Blvd Ramp to Hwy 1E SB [Hawthorne]						

Definition of Problem

The Hawthorne Bridge was identified to have seismic vulnerabilities throughout its members. The Multnomah County Willamette River Bridges Capital Improvement Plan Consultant Team identified the vulnerabilities based on an assessment of the as-built plans, previous retrofit studies and engineering judgment. From the assessment, it was determined that superstructure spans are vulnerable to falling from their existing bent caps and/or abutment seats during a major earthquake. This is primarily caused by inadequate detailing or dimensioning.

Description of Proposed Solution

The proposed solution for the defined problem would be to construct a Phase 1 bridge seismic retrofit throughout the structure. The assumed Phase 1 seismic retrofit incorporates measures that restrain each superstructure span from collapsing during a defined seismic event. This consist of installing transverse and longitudinal restraint mechanisms at every expansion joint, constructing shear lugs at each bent cap to prevent movement, and/or constructing restraining members adjacent to each movable bridge component. Existing bearings also need be replaced.

Project Justification

The benefits of completing the proposed solution are to avoid a likely loss of life associated with a bridge span collapse, reducing damage to adjacent structures, and maintaining bridge service caused by a lower level seismic event. The improved performance will also reduce economic losses associated with the event and improve compliance with current seismic design standards.

Right-of-Way:	$94,750
Utility Reimbusement:	$0
Construction:	$31,505,229
Preliminary Engineering:	$6,643,206
Construction Engineering:	$6,643,206
Total Cost at Target Construction Time:	$44,886,391
Target Construction Time:	2025-2029

Notes:

This project includes improvements identified during the 2014 public engagement process.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Broadway Bridge Limited Seismic Retrofit							
Bridge Names(s):	Broadway			Project ID#:	BUN-BR-06	Project Status:	In Progress
Project Rank:	28	Primary Category of Work	Seismic	Performance Attribute Total Score	61	Importance Score	TI-3 88.10
Logical Grouping Project ID #'s:	BR-SEIS-04						
Bridge Num and Names(s):	06757A NW Broadway Ramp over Broadway St Conn [Broadway] ; 06757 Willamette River, Broadway St [Broadway] ; 06757 Willamette River, Broadway St [Broadway]; 06757C N Broadway St over N Interstate Ave [Broadway]						

Definition of Problem

The Broadway Bridge was identified to have seismic vulnerabilities throughout its members. The Multnomah County Willamette River Bridges Capital Improvement Plan Consultant Team identified the vulnerabilities based on an assessment of the as-built plans, previous retrofit studies and engineering judgment. From the assessment, it was determined that superstructure spans are vulnerable to falling from their existing bent caps and/or abutment seats during a major earthquake. This is primarily caused by inadequate detailing or dimensioning.

Description of Proposed Solution

The proposed solution for the defined problem would be to construct a Phase 1 bridge seismic retrofit throughout the structure. The assumed Phase 1 seismic retrofit incorporates measures that restrain each superstructure span from collapsing during a defined seismic event. This consist of installing transverse and longitudinal restraint mechanisms at every expansion joint, constructing shear lugs at each bent cap to prevent movement, and/or constructing restraining members adjacent to each movable bridge component. Existing bearings also need be replaced.

Project Justification

The benefits of completing the proposed solution are to avoid a likely loss of life associated with a bridge span collapse, reducing damage to adjacent structures, and maintaining bridge service caused by a lower level seismic event. The improved performance will also reduce economic losses associated with the event and improve compliance with current seismic design standards.

Right-of-Way:	$159,750
Utility Reimbusement:	$0
Construction:	$37,309,078
Preliminary Engineering:	$7,579,765
Construction Engineering:	$7,579,765
Total Cost at Target Construction Time:	$52,628,358
Target Construction Time:	2025-2029

Notes:

This project includes improvements identified during the 2014 public engagement process.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Seismic Resiliency (Major Bridge Rehabilitation / Bridge Replacement) - Final Design and Construction							
Bridge Names(s):	Burnside			Project ID#:	BUN-BU-07	Project Status:	In Progress
Project Rank:	29	Primary Category of Work	Seismic	Performance Attribute Total Score	63	Importance Score	TI-3 84.91
Logical Grouping Project ID #'s:	BU-STRUCT-08, BU STRUCT-09, BU-STRUCT-10						
Bridge Num and Names(s):	00511A Burnside St West Approach over Hwy 1 [Burnside] ; 00511 Willamette River, Burnside St (Burnside) [Burnside] ; 00511 Willamette River, Burnside St (Burnside) [Burnside]; 00511B Burnside St (East Approach) over Hwy 1 & Conns [Burnside]						

Definition of Problem

The existing Burnside Bridge is functionally obsolete, and the cost to maintain, rehabilitate, and seismically retrofit the structure to withstand a M9.0 Cascadia Subduction Zone (CSZ) event exceeds its value. A programmatic bridge replacement cost for the Final Design and Construction phase has been developed as part of the Multnomah County Willamette River Bridges Capital Improvement Plan.

Description of Proposed Solution

The programmatic bridge replacement concept used the same number and type of lanes as the existing facilities, updated for modern widths, to determine an approximate footprint for the new structure. It also assumed that the existing connectivity to adjacent infrastructure is maintained. For the development of its programmatic cost, a steel plate girder bridge type was assumed for the West Approach; a haunched steel plate girder bridge type was assumed for the Fixed River spans; a double leaf bascule bridge type was assumed for the Movable span; and a precast concrete girder bridge type was assumed for the East Approach. It also assumed that traffic would be temporarily detoured to the adjacent bridges during construction in lieu of constructing a temporary bridge at the site.

Project Justification

This project captures the relative cost for performing the Final Design and Construction for the replacement of the Burnside Bridge West Approach, Main River Spans, Movable Span, and East Approach. The benefits of completing the bridge replacement would be to eliminate functionally obsolete and structurally deficient components of the bridge. Additionally, the new structure would be designed to modern standards for vehicle traffic, pedestrian, bicycle and transit use - improving capacity and traffic operations on the bridge. The bridge would also be designed to modern seismic standards in order to remain serviceable after a M9.0 Cascadia Subduction Zone (CSZ) earthquake.

Right-of-Way:	$2,211,502
Utility Reimbusement:	$0
Construction:	$398,273,437
Preliminary Engineering:	$47,792,812
Construction Engineering:	$47,792,812
Total Cost at Target Construction Time:	$496,070,564
Target Construction Time:	2025-2029

Notes:

Final Design and Construction only. See also BUN-BU-12 (Feasibility Study) and BUN-BU-13 (Environmental Impact Study) projects. This project includes improvements for bicycle or pedestrian users.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Morrison Bridge Limited Seismic Retrofit							
Bridge Names(s):	Morrison			Project ID#:	BUN-MO-05	Project Status:	In Progress
Project Rank:	30	Primary Category of Work	Seismic	Performance Attribute Total Score	61	Importance Score	TI-3 69.76
Logical Grouping Project ID #'s:	MO-SEIS-04						
Bridge Num and Names(s):	02758B W Morrison Br Conn over Hwy 1W (Front Ave) & Park [Morrison] ; 02758 Willamette River, Morrison St (Morrison) [Morrison] ; 02758 Willamette River, Morrison St (Morrison) [Morrison]; 02758A SE Belmont St over Hwy 1 & Conns (Morrison Intchg) [Morrison]						

Definition of Problem

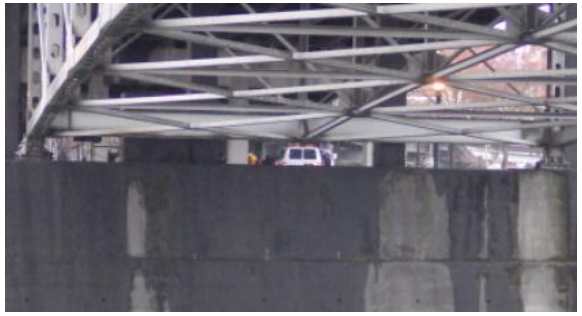
The Morrison Bridge was identified to have seismic vulnerabilities throughout its members. The Multnomah County Willamette River Bridges Capital Improvement Plan Consultant Team identified the vulnerabilities based on an assessment of the as-built plans, previous retrofit studies and engineering judgment. From the assessment, it was determined that superstructure spans are vulnerable to falling from their existing bent caps and/or abutment seats during a major earthquake. This is primarily caused by inadequate detailing or dimensioning.

Description of Proposed Solution

The proposed solution for the defined problem would be to construct a Phase 1 bridge seismic retrofit throughout the structure. The assumed Phase 1 seismic retrofit incorporates measures that restrain each superstructure span from collapsing during a defined seismic event. This consist of installing transverse and longitudinal restraint mechanisms at every expansion joint, constructing shear lugs at each bent cap to prevent movement, and/or constructing restraining members adjacent to each movable bridge component. Existing bearings also need be replaced.

Project Justification

The benefits of completing the proposed solution are to avoid a likely loss of life associated with a bridge span collapse, reducing damage to adjacent structures, and maintaining bridge service caused by a lower level seismic event. The improved performance will also reduce economic losses associated with the event and improve compliance with current seismic design standards.



Right-of-Way:	$258,750
Utility Reimbusement:	$0
Construction:	$69,342,862
Preliminary Engineering:	$11,141,153
Construction Engineering:	$11,141,153
Total Cost at Target Construction Time:	$91,883,919
Target Construction Time:	2025-2029

Notes:

This project includes improvements identified during the 2014 public engagement process.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Structural Rehabilitation of Steel and Concrete Pier Members - River Spans							
Bridge Names(s):	Morrison		Project ID#:	BUN-MO-11	Project Status:	In Progress	
Project Rank:	31	Primary Category of Work	Structural	Performance Attribute Total Score	29	Importance Score	TI-3 46.25
Logical Grouping Project ID #'s:	MO-STRUCT-15						
Bridge Num and Names(s):	02758 Willamette River, Morrison St (Morrison) [Morrison] ; 02758 Willamette River, Morrison St (Morrison) [Morrison]						

Definition of Problem

The Multnomah County Willamette River Bridges Capital Improvement Plan Consultant Team observed vertical cracks in the Pier 3 wall below the truss bearing location, and cracks in steel truss members connections. The team also identified additional section loss and pack rust of multiple truss bottom chord members in Span 2 through a review of existing available records. Relatively large spalls were observed in the deck overhang soffit along the west side of the Fixed River spans.

Description of Proposed Solution

The proposed solutions includes a repair and strengthening of the Pier 3 bearing area, a rehabilitation and strengthening of the Span 2 truss bottom chord members, and a repair of cracked steel welded connections. An updated load rating analysis will be performed to identify other potential improvements to these members.

Project Justification

The benefit of completing the proposed solution is to improve the structural condition of the damaged bridge elements, which would improve public safety and extend the service life of the bridge.

Right-of-Way:	$101,171
Utility Reimbusement:	$0
Construction:	$9,460,006
Preliminary Engineering:	$2,271,386
Construction Engineering:	$2,271,386
Total Cost at Target Construction Time:	$14,103,949
Target Construction Time:	2025-2029

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Roadway, Sign Bridge, Bridge Deck and Illumination Improvements - Approaches							
Bridge Names(s):	Hawthorne			Project ID#:	BUN-HA-07	Project Status:	In Progress
Project Rank:	32	Primary Category of Work	Structural	Performance Attribute Total Score	25	Importance Score	TI-3 38.96
Logical Grouping Project ID #'s:	HA-ACCESS-02, HA-ROAD-01, 02, HA-STRUCT-01, 02, 03, 11, and 15						
Bridge Num and Names(s):	02757D Willamette River, SW Hawthorne Blvd (Hawthorne Br) [Hawthorne] ; 02757B SE Madison St Ramp over Hwy 1E SB (SE MLK Blvd) [Hawthorne] ; 02757A Hawthorne Blvd Ramp to Hwy 1E SB [Hawthorne]; 02757F SE Hawthorne Blvd over SE Water Ave (Hawthorne) [Hawthorne]						

Definition of Problem

Pavement on the bridge approaches is deteriorated and approaching the end if it's useful life. Drainage systems are composed of aging elements and are in need of repair. The Hawthorne Bridge sign bridges, sign structures and limited portions of the concrete bridge elements are in need of repair. As an outcome of the project public outreach efforts, the need for improved connectivity for bicycle users from Naito Parkway to the West Approach of the bridge was identified.

Description of Proposed Solution

The proposed solution for the approach roadway pavement and drainage systems is to reconstruct the roadway pavement sections and update the drainage system while access to the system is available. New durable striping will be placed on the newly constructed pavement section, minor concrete repairs will be completed, and bridge deck joints will be repaired or replaced according to their level of deterioration. As part of the project, a bridge deck rehabilitation consisting of a concrete overlay and a new bridge lighting system will be constructed. The sign bridges and sign structures will also be replaced, and patching of damaged concrete bridge elements will be included.

Project Justification

The benefit of completing the proposed solutions includes minimizing service disruptions and associated costs of delay to the motoring public, and reducing maintenance costs for ongoing pavement and concrete bridge elements, which will extend the service life of these components. Replacing the sign structures will prevent these structures from becoming a hazard to the traveling public. Illumination system repairs would provide increased safety for bridge users, allow for the installation of modern lighting components, and deter vandalism and crime.

Right-of-Way:	$169,766
Utility Reimbusement:	$0
Construction:	$17,485,547
Preliminary Engineering:	$4,012,198
Construction Engineering:	$4,012,198
Total Cost at Target Construction Time:	$25,679,708
Target Construction Time:	2025-2029

Notes:

This project includes improvements identified during the 2014 public engagement process. This project includes improvements for bicycle or pedestrian users.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Paint and Structural Rehabilitation of Steel and Concrete Members - East Approach							
Bridge Names(s):	Hawthorne			Project ID#:	BUN-HA-11	Project Status:	In Progress
Project Rank:	33	Primary Category of Work	Paint	Performance Attribute Total Score	24	Importance Score	TI-3 29.52
Logical Grouping Project ID #'s:	HA-PAINT-02 and HA-STRUCT-17						
Bridge Num and Names(s):	02757F SE Hawthorne Blvd over SE Water Ave (Hawthorne) [Hawthorne] ; 02757B SE Madison St Ramp over Hwy 1E SB (SE MLK Blvd) [Hawthorne] ; 02757A Hawthorne Blvd Ramp to Hwy 1E SB [Hawthorne]						

Definition of Problem

The Hawthorne Bridge East Approach spans were observed to have a large percentage of the total surface area showing signs of deterioration or paint system failure, including areas of exposed metal. A review of available existing information also suggests that the current paint system contains lead. The bridge bearings were observed to have debris accumulation and deterioration of the bearing protective system. Based on the era of installation of the paint protective system, it is assumed to contain lead. Concrete degradation, bent bearing device anchor bolts, cracked and spalled concrete, and reinforcing steel corrosion including section loss were also observed for bridge elements and pedestrian access stairway structures.

Description of Proposed Solution

The proposed solution for the deteriorating and failing paint systems includes the removal of existing lead-based paint, and the application of a new protective paint system. Bridge bearings will have current debris removed and a new protective paint system applied to metal components, which allow for continued movement of the bearings. The project also includes a repair of degraded concrete areas, the patching of structural concrete throughout the East Approach structure, and the replacement of bent bearing device anchor bolts.

Project Justification

The benefits of completing the proposed paint system repairs are to arrest the ongoing corrosion and deterioration of the structural steel members, and to restore a protective paint system which would extend the service life of the bridge. Additionally, the removal of the lead-based paint system would reduce the health exposure risk to maintenance staff and eliminate a potential source for environmental contamination. With the project, the service life of the bridge bearings would be extended, and ongoing maintenance costs would be reduced. Repairs to the pedestrian access stairways will improve connectivity to the bridges and reduce the potential for full replacement if the elements continue to deteriorate over time. Replacement of the bent bearing device anchor bolts will allow for appropriate temperature expansion and contraction of the bridge.

Right-of-Way:	$94,851
Utility Reimbusement:	$0
Construction:	$24,547,052
Preliminary Engineering:	$5,402,577
Construction Engineering:	$5,402,577
Total Cost at Target Construction Time:	$35,447,056
Target Construction Time:	2025-2029

Notes:

This project includes improvements identified during the 2014 public engagement process.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Joint Rehabilitation - West Approach, River Spans and East Approach							
Bridge Names(s):	Morrison			Project ID#:	BUN-MO-13	Project Status:	In Progress
Project Rank:	34	Primary Category of Work	Structural	Performance Attribute Total Score	13	Importance Score	TI-3 22.58
Logical Grouping Project ID #'s:	MO-STRUCT-17, MO-STRUCT-18 and MO-STRUCT-19						
Bridge Num and Names(s):	02758B W Morrison Br Conn over Hwy 1W (Front Ave) & Park [Morrison] ; 02758 Willamette River, Morrison St (Morrison) [Morrison] ; 08589Y SE Yamhill St Ramp over Hwy 1 & Conn (Morrison Int) [Morrison]; 08589 Willamette R & Hwy 1, SE Morrison St (Morrison Int) [Morrison]						

Definition of Problem

The Multnomah County Willamette River Bridges Capital Improvement Plan Consultant Team identified several joint systems on the bridge deck that have reached the end of their service life. At several locations within the West Approach, River Spans and East Approach, debris has accumulated in the joints. Water was observed to be flowing freely through failed joints, and surrounding concrete has begun to deteriorate and spall. A tripping hazard was observed in the River Spans pedestrian sidewalk due to a misaligned sidewalk plate. Where joint seals have failed, surface rust on the steel girders, cross bracing, and bearings was observed within the East Approach bridges.

Description of Proposed Solution

Bridge deck joints will be repaired or replaced according to their level of deterioration at the time of project development. This includes a repair of spalled and damaged concrete surrounding the joints. Misaligned sidewalk plates would also be adjusted to eliminate the pedestrian tripping hazard.

Project Justification

The benefit of completing the proposed solutions includes a reduction in maintenance costs for ongoing joint rehabilitation, and restoring the bridge deck joints to a serviceable condition. This results in extending the service life of the deck system and underling bridge components. The project will also eliminating a known safety hazard to pedestrians.

Right-of-Way:	$34,000
Utility Reimbusement:	$0
Construction:	$2,537,903
Preliminary Engineering:	$632,665
Construction Engineering:	$632,665
Total Cost at Target Construction Time:	$3,837,233
Target Construction Time:	2025-2029

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Bridge Painting and Upgraded Lighting							
Bridge Names(s):	Hawthorne		Project ID#:	BUN-HA-13	Project Status:	In Progress	
Project Rank:	35	Primary Category of Work	Paint	Performance Attribute Total Score	14	Importance Score	TI-3 21.59
Logical Grouping Project ID #'s:	HA-PAINT-01, and HA-STRUCT-04						
Bridge Num and Names(s):	02757 Willamette River, Hawthorne Ave [Hawthorne] ; 02757 Willamette River, Hawthorne Ave [Hawthorne]						

Definition of Problem

The Hawthorne Bridge River spans were identified as having a deteriorating paint system. The Multnomah County Willamette River Bridges Capital Improvement Plan Consultant Team identified the deterioration based on a visual inspection of the structure, an assessment of previous inspection reports, and an understanding of past paint projects. From the assessment, it was determined that the lead-based paint has been removed. From the Bridge Inspection Report, it was found that the coating is, on average, 85% in Condition State 1 (Good), 10% in Condition State 2 (Fair), and 5% in Condition State 3 (Poor). The existing condition exhibits active surface rust on stringers and floorbeams and pack rust at gusset plates. The warning gates, barrier gates, bridge railing, and lighting all are exhibiting signs of paint deterioration and need maintenance.

Description of Proposed Solution

The proposed solution for the defined problem is to pressure wash, spot blast, and apply a 3-coat paint system to any deteriorated paint locations. The 3-coat paint system includes a prime, intermediate epoxy, and urethane top coat of paint. The paint removal process includes a containment system. The wiring and light standards will be replaced to address the aging components.

Project Justification

The benefit of completing the proposed solution is to avoid steel corrosion of the approximately 100-year old bridge by extending the life of the protective coating system at a lower cost than a full replacement.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$30,414,235
Preliminary Engineering:	$6,457,175
Construction Engineering:	$6,457,175
Total Cost at Target Construction Time:	$43,328,584
Target Construction Time:	2025-2029

Notes:

This project includes improvements for bicycle or pedestrian users.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Bicycle and Pedestrian Improvement Project - Design and Construction Phase 2							
Bridge Names(s):	Broadway, Burnside, Hawthorne and Morrison		Project ID#:	BUN-MU-06		Project Status:	In Progress
Project Rank:	36	Primary Category of Work	Accessibility	Performance Attribute Total Score	20	Importance Score	TI-3 20.31
Logical Grouping Project ID #'s:	None entered.						
Bridge Num and Names(s):	06757 Willamette River, Broadway St [Broadway] ; 00511 Willamette River, Burnside St (Burnside) [Burnside] ; 02758 Willamette River, Morrison St (Morrison) [Morrison]; 02757 Willamette River, Hawthorne Ave [Hawthorne]						

Definition of Problem

Large volumes of bicycle and pedestrian traffic use the bridges on a daily basis, creating potential conflicts between these modes and vehicle users. This is especially true at connections between the bridges and the surrounding street network and park resources. This concern was identified by many user and stakeholder groups during the Bridge CIP's Stakeholder Outreach process.

Description of Proposed Solution

The proposed solution is to construct the improvements recommended within the Bicycle / Pedestrian Feasibility Study. A budgetary allocation has been provided as a placeholder for Phase 2 of the improvements.

Project Justification

The benefits of completing the proposed solution is to provide improved bicycle and pedestrian operations and safety, consistent with needs of other Partner Agencies, stakeholders, and user groups. It also promotes many of the County's Sustainability values.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$11,059,571
Preliminary Engineering:	$2,631,981
Construction Engineering:	$2,631,981
Total Cost at Target Construction Time:	$16,323,533
Target Construction Time:	2025-2029

Notes:

Design and Construction Phase 1 portion only. See also BUN-MU-04 (Bicycle and Pedestrian Improvement Project - Feasibility Study Phase) and BUN-MU-05 (Bicycle and Pedestrian Improvement Project - Design and Construction Phase 1). This project includes improvements for bicycle or pedestrian users.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Movable Span Deck Replacement							
Bridge Names(s):	Broadway			Project ID#:	BUN-BR-16	Project Status:	In Progress
Project Rank:	37	Primary Category of Work	Driving Surface	Performance Attribute Total Score	23	Importance Score	TI-3 19.63
Logical Grouping Project ID #'s:	BR-STRUCT-19						
Bridge Num and Names(s):	06757 Willamette River, Broadway St [Broadway] ; 06757 Willamette River, Broadway St [Broadway]						

Definition of Problem

The existing deck is composed of a fiber reinforced polymer concrete overlay which is anticipated to reach the end of it's service life within the 20-year duration of the Multnomah County Willamette River Bridges Capital Improvement Plan. The existing deck fiber-reinforced, polymer-concrete overlay of the Main River Spans has cracks forming along its deck panel joints. This project proceeds BUN-BR-12, which was an interim deck rehabilitation project.

Description of Proposed Solution

The proposed solution would include the removal of the existing deck system and replace it in-kind with another fiber-reinforced, polymer-concrete overlay deck system. Rewiring and replacement of the current light standards is also recommended to address aging components of the on-bridge illumination systems.

Project Justification

The benefits of completing the deck replacement are to extend the useful service life for the bridge, reduce ongoing maintenance activities for the existing deck system. The illumination system repairs would provide increased safety for bridge users, allow for the installation of modern lighting components, and deter vandalism and crime.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$6,823,773
Preliminary Engineering:	$1,662,279
Construction Engineering:	$1,662,279
Total Cost at Target Construction Time:	$10,148,330
Target Construction Time:	2025-2029

Notes:

This project includes improvements for bicycle or pedestrian users.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Fender Repair and Installation							
Bridge Names(s):	Broadway, Burnside, Hawthorne and Morrison		Project ID#:	BUN-MU-03	Project Status:	In Progress	
Project Rank:	38	Primary Category of Work	Structural	Performance Attribute Total Score	19	Importance Score	TI-3 14.04
Logical Grouping Project ID #'s:	BR-STRUCT-12, BU-STRUCT-05, HA-STRUCT-14, and MO-STRUCT-6						
Bridge Num and Names(s):	06757 Willamette River, Broadway St [Broadway] ; 00511 Willamette River, Burnside St (Burnside) [Burnside] ; 02758 Willamette River, Morrison St (Morrison) [Morrison]; 02757 Willamette River, Hawthorne Ave [Hawthorne]						

Definition of Problem

The movable bridges in Portland have varying degrees of fender systems. The fenders help reduce the damage to the bridge piers and marine traffic by deflecting ships back towards the river spans. The Burnside and Morrison Bridges each have aging fender systems on the upstream side of the bridge's main river piers, while the Broadway and Hawthorne Bridges do not have fender systems at this time.

Description of Proposed Solution

The proposed solution to the defined problem is to conduct a vessel impact study to determine if either the volume or type of boat traffic requires a new or enhanced fender system to be installed. The project assumes that either the construction of a new fender system, or enhancements to the existing ones, will be required at all of the bridges.

Project Justification

The benefit of completing the proposed solutions are that the improved fender systems will provide protection to the piers from vessel impacts that could cause damage or even cause the bridge to be inoperable.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$30,275,479
Preliminary Engineering:	$6,433,288
Construction Engineering:	$6,433,288
Total Cost at Target Construction Time:	$43,142,056
Target Construction Time:	2025-2029

Notes:

This project includes improvements identified during the 2014 public engagement process.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Paint, Structural Rehabilitation and Access Improvements - East Approach							
Bridge Names(s):	Morrison			Project ID#:	BUN-MO-12	Project Status:	In Progress
Project Rank:	39	Primary Category of Work	Paint	Performance Attribute Total Score	29	Importance Score	TI-4 36.11
Logical Grouping Project ID #'s:	MO-ACCESS-02, MO-PAINT-03, and MO-STRUCT-16						
Bridge Num and Names(s):	08589Y SE Yamhill St Ramp over Hwy 1 & Conn (Morrison Int) [Morrison] ; 08589 Willamette R & Hwy 1, SE Morrison St (Morrison Int) [Morrison] ; 02758A SE Belmont St over Hwy 1 & Conns (Morrison Intchg) [Morrison]						

Definition of Problem

Portions of the Morrison Bridge East Approach were identified as having insufficient lighting for pedestrian safety, a deteriorating paint system and concrete degradation of several key bridge elements. The Multnomah County Willamette River Bridges Capital Improvement Plan Consultant Team identified the lighting deficiency through direct observation. This concern was echoed from the public during the project's public engagement efforts. Deterioration of the paint system is based on a visual inspection of the structure, an assessment of previous inspection reports, and an understanding of past paint projects. From the assessment, it was determined that the original lead-based paint is still in place.

Description of Proposed Solution

The proposed solution for the identified deficiencies is to add supplemental pedestrian lighting in areas of the East Approach, replace the existing lead based paint system with a modern paint system, and repair damaged concrete and exposed reinforcing steel throughout the East Approach structures by cleaning and patching of affected areas.

Project Justification

Pedestrian lighting improvements would provide increased safety for users and deter vandalism and crime. The benefits of completing the proposed paint system repairs are to arrest the ongoing corrosion and deterioration of the structural steel members, and to restore a protective paint system which would extend the service life of the bridges. Additionally, the removal of the lead-based paint system would reduce the health exposure risk to maintenance staff and eliminate a potential source for environmental contamination. Concrete repairs would improve public safety and extend the service life of the repaired bridge components.

Right-of-Way:	$140,315
Utility Reimbusement:	$0
Construction:	$38,695,463
Preliminary Engineering:	$7,790,261
Construction Engineering:	$7,790,261
Total Cost at Target Construction Time:	$54,416,301
Target Construction Time:	2030-2034

Notes:

This project includes improvements identified during the 2014 public engagement process. This project includes improvements for bicycle or pedestrian users.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Operating Machinery Rehabilitation and Brake Replacement							
Bridge Names(s):	Broadway			Project ID#:	BUN-BR-01	Project Status:	In Progress
Project Rank:	40	Primary Category of Work	Mechanical	Performance Attribute Total Score	15	Importance Score	TI-4 31.52
Logical Grouping Project ID #'s:	BR-MECH-01 and BR-MECH-02						
Bridge Num and Names(s):	06757 Willamette River, Broadway St [Broadway]						

Definition of Problem

The brakes that help slow the Broadway Bridge during its mechanical opening and closing are aging, and do not comply with current American Association of State Highway and Transportation Officials (AASHTO) code requirements. The span operating gearing also needs rehabilitation to ensure reliable service. The motor drives will reaching the end of their service life before 2034.

Description of Proposed Solution

The proposed solution is to replace the brakes with a newer type of brake system that has proven reliability and a longer service life. A second set of brakes will also be added to the system to meet code requirements. The gearing will be rehabilitated by adjusting the bearings that hold the gears in place in order to prevent excessive wear. The motor drives will be replaced with in-kind components.

Project Justification

The completion of this work adds safety and reliability to the bridge operating machinery. It also as well as brings the operating machinery into compliance with the AASHTO standards for movable bridges.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$1,533,719
Preliminary Engineering:	$383,430
Construction Engineering:	$383,430
Total Cost at Target Construction Time:	$2,300,579
Target Construction Time:	2030-2034

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Warning Gate and Sign Bridge Replacement							
Bridge Names(s):	Morrison			Project ID#:	BUN-MO-06	Project Status:	In Progress
Project Rank:	41	Primary Category of Work	Electrical and Lighting	Performance Attribute Total Score	12	Importance Score	TI-4 23.01
Logical Grouping Project ID #'s:	MO-ELEC-02,and MO-STRUCT-01						
Bridge Num and Names(s):	02758 Willamette River, Morrison St (Morrison) [Morrison] ; 02758 Willamette River, Morrison St (Morrison) [Morrison] ; 02758A SE Belmont St over Hwy 1 & Conns (Morrison Intchg) [Morrison]						

Definition of Problem

The sign bridges and structures were found to have deteriorated paint and surface rust. A replacement of the warning gates is required at all four quadrants of the movable span due to either impact damage or being at the end of their limited service life.

Description of Proposed Solution

The proposed solution is to replace the sign bridges and sign structures. The project also includes the replacement of the existing warning gates.

Project Justification

The benefit of completing the proposed solution is the reduced risk of sign bridges and structures becoming a hazard to the traveling public. Properly functioning warning gates are the first system that warns the traveling public of the danger that is present in the operation of the movable span.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$4,440,430
Preliminary Engineering:	$1,095,733
Construction Engineering:	$1,095,733
Total Cost at Target Construction Time:	$6,631,895
Target Construction Time:	2030-2034

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Electrical System Master Control Switch Installation and Miscellaneous Operator House Improvements							
Bridge Names(s):	Broadway	Project ID#:	BUN-BR-03	Project Status:	In Progress		
Project Rank:	42	Primary Category of Work	Electrical and Lighting	Performance Attribute Total Score	8	Importance Score	TI-4 18.66
Logical Grouping Project ID #'s:	BR-MECH-05, BR-ELEC-01						
Bridge Num and Names(s):	06757 Willamette River, Broadway St [Broadway]						

Definition of Problem

Numerous electrical repairs will be required over the next 20 years to ensure the reliability of the bridge machinery control system. A machinery master shut off switch should be installed, and safety warning labeling should be provided to advise employees of electrical hazards. In addition to the electrical needs, the bridge's operator house does not have running water during the winter months due to the exposed piping's vulnerability to freezing temperatures. This requires Multnomah County to regularly bring water to the operator house during the winter months.

Description of Proposed Solution

The electrical work will include the installation of wearing components, a master electrical system disconnect switch, and electrical hazard labeling. A heat system will be installed on the water and sewer piping to keep it warm enough to be used year around.

Project Justification

The electrical rehabilitation will provide greater safety and reliability to the bridge power and control systems for both users of the bridge and its operators. Electrical maintenance helps maintain reliable operation of the bridge. Updated drawings and documentation will assist in troubleshooting if a problem arises with the electrical system. The heat system will eliminate the cost of bringing water to the bridge during the winter months.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$204,918
Preliminary Engineering:	$51,229
Construction Engineering:	$51,229
Total Cost at Target Construction Time:	$307,377
Target Construction Time:	2030-2034

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Bridge Painting - Maintenance of 2002 Paint Project							
Bridge Names(s):	Broadway			Project ID#:	BUN-BR-12	Project Status:	In Progress
Project Rank:	43	Primary Category of Work	Paint	Performance Attribute Total Score	24	Importance Score	TI-4 17.26
Logical Grouping Project ID #'s:	BR-PAINT-02						
Bridge Num and Names(s):	06757 Willamette River, Broadway St [Broadway] ; 06757 Willamette River, Broadway St [Broadway]						

Definition of Problem

The Broadway Bridge River spans were identified as having a deteriorating paint system. The Multnomah County Willamette River Bridges Capital Improvement Plan Consultant Team identified the deterioration based on a visual inspection of the structure, an assessment of previous inspection reports, and an understanding of past paint projects. From the literature review, it was determined that both the floor system of Spans 2, 3, 7, and the main truss elements of Spans 4, 5, 6, were repainted in 2002. From the Bridge Inspection Reports, it was found that these elements are, on average, 90-95% in Condition State 1 (Good) and 5-10% in Condition State 3 (Poor).

Description of Proposed Solution

The proposed solution for the defined problem is to pressure wash, spot blast, and apply a 3-coat paint system to any deteriorated paint locations. The 3-coat paint system includes a prime, intermediate epoxy, and urethane top coat of paint. The paint removal process includes a containment system.

Project Justification

The benefit of completing the proposed solution is to avoid steel corrosion of the approximately 100-year old bridge by extending the life of the protective coating system at a lower cost than a full replacement.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$48,392,043
Preliminary Engineering:	$9,119,942
Construction Engineering:	$9,119,942
Total Cost at Target Construction Time:	$66,631,927
Target Construction Time:	2030-2034

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Bridge Painting - Maintenance of 2015 Paint Project							
Bridge Names(s):	Broadway		Project ID#:	BUN-BR-14	Project Status:	In Progress	
Project Rank:	44	Primary Category of Work	Paint	Performance Attribute Total Score	14	Importance Score	TI-4 14.80
Logical Grouping Project ID #'s:	BR-Paint-04						
Bridge Num and Names(s):	06757 Willamette River, Broadway St [Broadway] ; 06757 Willamette River, Broadway St [Broadway]						

Definition of Problem

The Multnomah County Willamette River Bridges Capital Improvement Plan consultant team identified that the portions of the Broadway Bridge River spans being painted in 2015 will require maintenance painting approximately 15-20 years from the 2015 paint project.

Description of Proposed Solution

The proposed solution for the defined problem is to pressure wash, spot blast, and apply a 3-coat paint system to any deteriorated paint locations approximately 15-20 years after the completion of the 2015 paint project.. The 3-coat paint system includes a prime, intermediate epoxy, and urethane top coat of paint. The paint removal process includes a containment system.

Project Justification

The benefit of completing the proposed solution is to avoid steel corrosion of the approximately 100-year old bridge by extending the life of the protective coating system at a lower cost than a full replacement.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$10,071,598
Preliminary Engineering:	$2,410,061
Construction Engineering:	$2,410,061
Total Cost at Target Construction Time:	$14,891,720
Target Construction Time:	2030-2034

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Lighting Maintenance							
Bridge Names(s):	Sellwood	Project ID#:	BUN-SE-01	Project Status:	In Progress		
Project Rank:	45	Primary Category of Work	Electrical and Lighting	Performance Attribute Total Score	12	Importance Score	TI-4 14.26
Logical Grouping Project ID #'s:	SE-ELEC-01						
Bridge Num and Names(s):	21493 Willamette River (Sellwood) Oswego Highway and Tacoma St [Sellwood]						

Definition of Problem

The Sellwood Bridge project includes a new roadway lighting system. Overall, this system is not anticipated to need replacement before 2034, but there is an expectation that minor repairs or a replacement of components will be required. There are no expected problems with the conduit or wiring runs to the light fixtures.

Description of Proposed Solution

This project will remedy routine light fixtures failures due to either service-life completion or environmental conditions.

Project Justification

To maintain a safe, functional bridge, and aesthetically pleasing bridge, routine maintenance improvements of the bridge lighting system is required..

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$217,935
Preliminary Engineering:	$54,484
Construction Engineering:	$54,484
Total Cost at Target Construction Time:	$326,903
Target Construction Time:	2030-2034

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Installation of Remote Operation and Monitoring Equipment							
Bridge Names(s):	Hawthorne			Project ID#:	BUN-HA-04	Project Status:	In Progress
Project Rank:	46	Primary Category of Work	Electrical and Lighting	Performance Attribute Total Score	8	Importance Score	TI-4 13.58
Logical Grouping Project ID #'s:	HA-ELEC-03						
Bridge Num and Names(s):	02757 Willamette River, Hawthorne Ave [Hawthorne]						

Definition of Problem

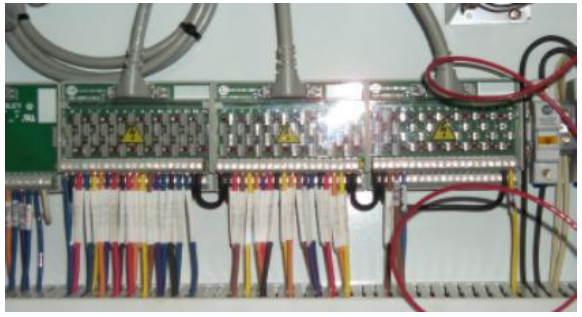
The equipment that allows for monitoring the bridge electrical system operations is not properly mounted and protected from the weather. The County would also like to operate the bridge from a single, remote location in order to allow for quicker response times for marine traffic navigation.

Description of Proposed Solution

The existing electrical equipment will be re-mounted and protected in to reduce maintenance needs and to prevent damage from in climate weather. Additional electrical equipment will be installed to allow for remote operation of the bridge.

Project Justification

Properly mounting the equipment will allow for easier troubleshooting and reduce long-term maintenance. Remote operation will reduce the number of required bridge operators, thereby reducing the operational costs and expediting response time for each bridge opening.



Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$1,375,716
Preliminary Engineering:	$343,929
Construction Engineering:	$343,929
Total Cost at Target Construction Time:	$2,063,574
Target Construction Time:	2030-2034

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: ADA Improvements							
Bridge Names(s):	Hawthorne			Project ID#:	BUN-HA-14	Project Status:	In Progress
Project Rank:	47	Primary Category of Work	Accessibility	Performance Attribute Total Score	10	Importance Score	TI-4 12.02
Logical Grouping Project ID #'s:	HA-ACCESS-01						
Bridge Num and Names(s):	02757B SE Madison St Ramp over Hwy 1E SB (SE MLK Blvd) [Hawthorne] ; 02757A Hawthorne Blvd Ramp to Hwy 1E SB [Hawthorne]						

Definition of Problem

The stairs located within the East Approach at SE Madison Street and SE Hawthorne Street are inaccessible for individuals using mobility-assistance devices and who need to access the existing TriMet bus stops from SE Water Avenue. This problem was identified as part of an assessment to determine compliance of existing facilities with the Americans with Disabilities Act (ADA).

Description of Proposed Solution

The proposed solution for the defined problem would be to replace the existing stairs at SE Madison Street and SE Hawthorne Street with elevators. The assumed construction elements follow completion of a ADA feasibility study conducted during the Preliminary Engineering phase.

Project Justification

The benefits of completing the proposed solution are the provision of an accessible bridge in compliance with ADA standards. The proposed solution will provide individuals using mobility-assistance devices access to the existing TriMet bus stops.

Right-of-Way:	$44,800
Utility Reimbusement:	$0
Construction:	$2,440,875
Preliminary Engineering:	$608,791
Construction Engineering:	$608,791
Total Cost at Target Construction Time:	$3,703,257
Target Construction Time:	2030-2034

Notes:

This project includes improvements for bicycle or pedestrian users.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: ADA Improvements							
Bridge Names(s):	Morrison			Project ID#:	BUN-MO-15	Project Status:	In Progress
Project Rank:	48	Primary Category of Work	Accessibility	Performance Attribute Total Score	8	Importance Score	TI-4 9.57
Logical Grouping Project ID #'s:	MO-ACCESS-01						
Bridge Num and Names(s):	02758A SE Belmont St over Hwy 1 & Conns (Morrison Intchg) [Morrison] ; 08589 Willamette R & Hwy 1, SE Morrison St (Morrison Int) [Morrison] ; 08589Y SE Yamhill St Ramp over Hwy 1 & Conn (Morrison Int) [Morrison]						

Definition of Problem

The stairs located within the East Approach at SE Morrison Street and SE Belmont Street are inaccessible for individuals using mobility-assistance devices and who need to access the existing TriMet bus stops from SE Water Avenue. This problem was identified as part of an assessment to determine compliance of existing facilities with the Americans with Disabilities Act (ADA).

Description of Proposed Solution

The proposed solution for the defined problem would be to replace the existing stairs at SE Belmont Street and SE Morrison Street with elevators. The assumed construction elements follow completion of a ADA feasibility study conducted during the Preliminary Engineering phase.

Project Justification

The benefits of completing the proposed solution are the provision of an accessible bridge in compliance with ADA standards. The proposed solution will provide individuals using mobility-assistance devices access to the existing TriMet bus stops.

Right-of-Way:	$44,800
Utility Reimbusement:	$0
Construction:	$2,440,875
Preliminary Engineering:	$608,791
Construction Engineering:	$608,791
Total Cost at Target Construction Time:	$3,703,257
Target Construction Time:	2030-2034

Notes:

This project includes improvements for bicycle or pedestrian users.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: ADA Improvements							
Bridge Names(s):	Broadway			Project ID#:	BUN-BR-15	Project Status:	In Progress
Project Rank:	49	Primary Category of Work	Accessibility	Performance Attribute Total Score	8	Importance Score	TI-4 9.57
Logical Grouping Project ID #'s:	BR-ACCESS-01						
Bridge Num and Names(s):	06757C N Broadway St over N Interstate Ave [Broadway]						

Definition of Problem

The stairs located at the Broadway Bridge East Approach are inaccessible for individuals using mobility-assistance devices and who need connection across the bridge from the Interstate MAX. This problem was identified as part of an assessment to determine compliance of existing facilities with the Americans with Disabilities Act (ADA).

Description of Proposed Solution

The proposed solution for the defined problem is to demolish the stairs and install an elevator with a rise of 25 feet. The assumed construction elements follow completion of an ADA feasibility study conducted during the Preliminary Engineering phase.

Project Justification

The benefits of completing the proposed solution is to provide an accessible bridge in compliance with ADA standards. The proposed solution will provide individuals using mobility-assistance devices access to the bridge from the Interstate MAX.

Right-of-Way:	$44,800
Utility Reimbusement:	$0
Construction:	$1,220,437
Preliminary Engineering:	$305,109
Construction Engineering:	$305,109
Total Cost at Target Construction Time:	$1,875,456
Target Construction Time:	2030-2034

Notes:

This project includes improvements for bicycle or pedestrian users.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Joint Rehabilitation and Replacement							
Bridge Names(s):	Sellwood			Project ID#:	BUN-SE-02	Project Status:	In Progress
Project Rank:	50	Primary Category of Work	Structural	Performance Attribute Total Score	10	Importance Score	TI-4 8.35
Logical Grouping Project ID #'s:	SE-STRUCT-01						
Bridge Num and Names(s):	21493 Willamette River (Sellwood) Oswego Highway and Tacoma St [Sellwood] ; 21493 Willamette River (Sellwood) Oswego Highway and Tacoma St [Sellwood]						

Definition of Problem

The Sellwood Bridge strip and compression seals are anticipated to reach the end of their service life before 2034. As such, the joint seals will need to be replaced.

Description of Proposed Solution

The proposed solution is to replace the strip seal and compression joints throughout the bridge deck.

Project Justification

The benefit of completing the proposed solution includes restoring the bridge deck joints to a serviceable condition, which will extend the service life of the deck system, and to protect the underling bridge components from water damage.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$235,370
Preliminary Engineering:	$58,843
Construction Engineering:	$58,843
Total Cost at Target Construction Time:	$353,055
Target Construction Time:	2030-2034

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Under-bridge Maintenance Traveler System							
Bridge Names(s):	Sauvie Island			Project ID#:	BUN-SI-04	Project Status:	In Progress
Project Rank:	51	Primary Category of Work	Structural	Performance Attribute Total Score	5	Importance Score	TI-4 8.19
Logical Grouping Project ID #'s:	SI-STRUCT-01						
Bridge Num and Names(s):	20136 Multnomah Channel, PNWR, Sauvie Island Rd. [Sauvie Island]						

Definition of Problem

The bridge structure is classified as Fracture Critical, which requires an arm's reach inspection be performed and documented every two years. Currently, inspection and maintenance staff rent a barge and lift to access the structure for required maintenance and inspection activities. This is costly and does not provide immediate access if further questions arise in between the inspection intervals.

Description of Proposed Solution

The proposed solution includes the installation of an under-bridge traveler system to provide continual bridge maintenance and inspection access.

Project Justification

The benefit of completing the proposed solutions includes improved access for maintenance and bridge inspection staff, and the ability to immediately respond to requests about bridge's below-deck condition.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$340,524
Preliminary Engineering:	$85,131
Construction Engineering:	$85,131
Total Cost at Target Construction Time:	$510,786
Target Construction Time:	2030-2034

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Installation of Remote Operation and Monitoring Equipment							
Bridge Names(s):	Morrison			Project ID#:	BUN-MO-03	Project Status:	In Progress
Project Rank:	52	Primary Category of Work	Electrical and Lighting	Performance Attribute Total Score	8	Importance Score	TI-4 8.15
Logical Grouping Project ID #'s:	MO-ELEC-03						
Bridge Num and Names(s):	02758 Willamette River, Morrison St (Morrison) [Morrison]						

Definition of Problem

The equipment that allows for monitoring the bridge electrical system operations is not properly mounted and protected from the weather. The County would also like to operate the bridge from a single, remote location in order to allow for quicker response times for marine traffic navigation.

Description of Proposed Solution

The existing electrical equipment will be re-mounted and protected in to reduce maintenance needs and to prevent damage from in climate weather. Additional electrical equipment will be installed to allow for remote operation of the bridge.

Project Justification

Properly mounting the equipment will allow for easier troubleshooting and reduce long-term maintenance. Remote operation will reduce the number of required bridge operators, thereby reducing the operational costs and expediting response time for each bridge opening.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$1,375,716
Preliminary Engineering:	$343,929
Construction Engineering:	$343,929
Total Cost at Target Construction Time:	$2,063,574
Target Construction Time:	2030-2034

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Installation of Remote Operation and Monitoring Equipment							
Bridge Names(s):	Broadway			Project ID#:	BUN-BR-04	Project Status:	In Progress
Project Rank:	53	Primary Category of Work	Electrical and Lighting	Performance Attribute Total Score	8	Importance Score	TI-4 8.15
Logical Grouping Project ID #'s:	BR-ELEC-04						
Bridge Num and Names(s):	06757 Willamette River, Broadway St [Broadway]						

Definition of Problem

The equipment that allows for monitoring the bridge electrical system operations is not properly mounted and protected from the weather. The County would also like to operate the bridge from a single, remote location in order to allow for quicker response times for marine traffic navigation.

Description of Proposed Solution

The existing electrical equipment will be re-mounted and protected in to reduce maintenance needs and to prevent damage from in climate weather. Additional electrical equipment will be installed to allow for remote operation of the bridge.

Project Justification

Properly mounting the equipment will allow for easier troubleshooting and reduce long-term maintenance. Remote operation will reduce the number of required bridge operators, thereby reducing the operational costs and expediting response time for each bridge opening.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$1,375,716
Preliminary Engineering:	$343,929
Construction Engineering:	$343,929
Total Cost at Target Construction Time:	$2,063,574
Target Construction Time:	2030-2034

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Routine Maintenance and Bridge Painting							
Bridge Names(s):	Sauvie Island			Project ID#:	BUN-SI-01	Project Status:	In Progress
Project Rank:	54	Primary Category of Work	Paint	Performance Attribute Total Score	9	Importance Score	TI-4 5.87
Logical Grouping Project ID #'s:	SI-ELEC-02 and SI-PAINT-01						
Bridge Num and Names(s):	20136 Multnomah Channel, PNWR, Sauvie Island Rd. [Sauvie Island] ; 20136 Multnomah Channel, PNWR, Sauvie Island Rd. [Sauvie Island] ; 20136 Multnomah Channel, PNWR, Sauvie Island Rd. [Sauvie Island]						

Definition of Problem

The Sauvie Island Bridge requires maintenance painting of interior and exterior portions of the structural steel. The Sauvie Island Bridge has structural portions of the bridge which allow access for maintenance and inspection work. These work areas have service area lighting and limited ventilation from the access hatches. The area requires good ventilation and adequate lighting for maintenance workers. The maintenance of the existing lighting system will need to be performed to maintain the adequate lighting.

Description of Proposed Solution

The proposed solution is to perform maintenance painting as needed. Work will also be performed to maintain the existing lighting system inside the structure over the planned 20 year period. It is expected that the relatively new lighting system will only need minor maintenance work in the form of replacing select fixtures on an infrequent basis. A new ventilation system consisting of electrically powered fans will also be installed on the structure and run off the local utility service to provide ventilation in the interior of the structure.

Project Justification

The benefit of completing the proposed solution is extended life of the paint at a much lower cost than a full re-painting the bridge. The paint prevents rust, which can lead to structural failure of the bridge. Proper work conditions in the Sauvie Island Bridge structure will allow workers to enter the area and perform work in a safe and expedient manner. Proper work in this area will help to maintain the structure and extend the serviceable life of the bridge.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$373,827
Preliminary Engineering:	$93,457
Construction Engineering:	$93,457
Total Cost at Target Construction Time:	$560,741
Target Construction Time:	2030-2034

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Warning and Barrier Gate Rehabilitation							
Bridge Names(s):	Hawthorne			Project ID#:	BUN-HA-03	Project Status:	In Progress
Project Rank:	55	Primary Category of Work	Electrical and Lighting	Performance Attribute Total Score	11	Importance Score	TI-4 3.86
Logical Grouping Project ID #'s:	HA-ELEC-02						
Bridge Num and Names(s):	02757 Willamette River, Hawthorne Ave [Hawthorne]						

Definition of Problem

The Hawthorne bridge warning and barrier gates are in good condition but impact damage will likely necessitate replacement of the warning and/or barrier gates before 2034.

Description of Proposed Solution

Both warning and barrier gates will be replaced in-kind. Work would include the demolition of the existing gate and installation of new gates.

Project Justification

The benefit of reconstructing the warning and barrier gates is to ensure the reliable operation of an essential safety feature.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$2,451,771
Preliminary Engineering:	$611,474
Construction Engineering:	$611,474
Total Cost at Target Construction Time:	$3,674,718
Target Construction Time:	2030-2034

Notes:

None entered.

Multnomah County Willamette River Bridges
Capital Improvement Plan

Project Summary Information: Bridge Maintenance Painting							
Bridge Names(s):	Sellwood			Project ID#:	BUN-SE-03	Project Status:	In Progress
Project Rank:	56	Primary Category of Work	Paint	Performance Attribute Total Score	3	Importance Score	TI-4 2.93
Logical Grouping Project ID #'s:	SE-PAINT-01						
Bridge Num and Names(s):	21493 Willamette River (Sellwood) Oswego Highway and Tacoma St [Sellwood]						

Definition of Problem

The Sellwood Bridge was identified as having a paint system that will require long-term maintenance. Painted surfaces include both the inside of arch ribs and tie girders, and the exterior faces of the weathering steel members at locations near expansion joints.

Description of Proposed Solution

The proposed solution for the defined problem is to prepare and coat the weathering steel, as required, to provide a long-term protective coating.

Project Justification

The benefit of completing the proposed solution is to extend the service life of the protective coating system in order to avoid a more expensive structural rehabilitation of the structural members.

Right-of-Way:	$0
Utility Reimbusement:	$0
Construction:	$516,506
Preliminary Engineering:	$129,127
Construction Engineering:	$129,127
Total Cost at Target Construction Time:	$774,760
Target Construction Time:	2030-2034

Notes:

None entered.

Attachment G

Attachment G – Bridge CIP Projects with ADA Components

This page purposely left blank.

MEMORANDUM

DATE: April 18, 2015

SUBJECT: **ADA Improvement Projects within the Bridge CIP**

PROJECT: MULT0000066 – Multnomah County Willamette River Bridges Capital Improvement Plan

As part of the work completed during the development of the Willamette River Bridges Capital Improvement Plan (Bridge CIP), the project team reviewed existing studies, as-built plans and conducted field surveys of the existing facilities to determine needs and improvements. Part of that investigation focused on the assessment of bicycle, pedestrian, and American with Disabilities Act (ADA) facility accessibility across all of the bridges. For disabled individuals, the project team conducted an ADA evaluation of the existing facilities against the current requirements of the act. From this assessment, a list of needs and deficiencies were developed into stand-alone projects or were combined with other observed pedestrian facility improvements to obtain cost effectiveness or to avoid safety conflicts with other modes of travel.

In general, multi-modal accessibility across all of the bridges is good, although some localized locations for some of the bridges do not satisfy AASHTO's 10 feet minimum width for shared use paths (Note: Multnomah County Design Standards do not address shared use paths). This includes pedestrian access (i.e., general ADA compliance), bicycle use (including shared-use facilities and designated bike lanes), and transit access (e.g., bus stop facilities and Streetcar for the Broadway Bridge). Where potential deficiencies were observed or identified, CIP Project Bundles were developed to include specific improvements. For the Broadway, Hawthorne and Morrison Bridges, the Bridge CIP included a more detailed ADA study in order to more accurately determine accessibility recommendations. These recommendations would be based on more technical evaluation methods such as profile measurements, surveying, and conflict analyses. A more detailed ADA study was determined to be unnecessary for the Burnside Bridge based on the project team's evaluation and has not been included in the current Bridge CIP. Because of the recent construction dates for the Sauvie Island and the Sellwood Bridge (currently under construction), both bridges were deemed acceptable for all multi-modal needs including ADA compliance.

Table 1 (below) lists the final Bridge CIP projects that include studies or proposed construction remedies to address ADA deficiencies. Further, concurrent with the Bridge CIP development, an improved sidewalk on the east approach of the Hawthorne Bridge was constructed and is not included in the list below of programmed projects. All of the ADA projects and studies were prioritized in accordance with the process identified in the Bridge CIP Report.

Table 1. Bridge CIP Projects with ADA Improvements

Bundle ID	Bridge Name (s)	Bundle Name
BUN-BR-15	Broadway	ADA Improvements
BUN-HA-07	Hawthorne	Roadway, Sign Bridge, Bridge Deck and Illumination Improvements - Approaches
BUN-HA-14	Hawthorne	ADA Improvements
BUN-MO-12	Morrison	Paint, Structural Rehabilitation and Access Improvements - East Approach
BUN-MO-15	Morrison	ADA Improvements