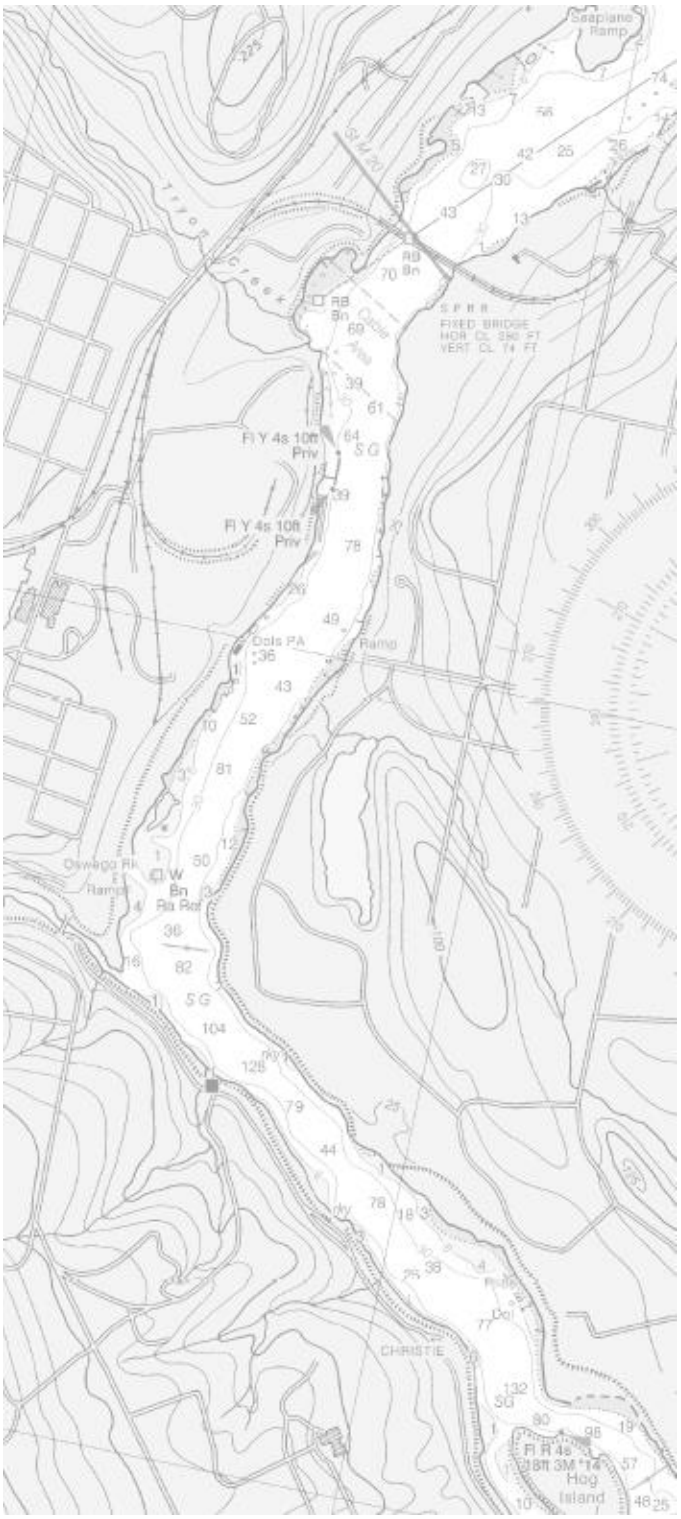


Appendix A:

Bridge Alternatives Analysis

Oak Grove-Lake Oswego Pedestrian/Bicycle Bridge Feasibility Study

Contents

Introduction

This study by Clackamas County considered the feasibility of a new bicycle and pedestrian bridge crossing of the Willamette River in the Oak Grove-Lake Oswego (OGLO) area, south of Portland, Oregon.

As a part of this study an analysis was completed to identify alternative bridge alignments. This work has been completed, and individual memos/reports have been developed to report the findings in each task. The purpose of this report is to briefly summarize the findings of each task and to analyze each alternative and determine the potential benefits and impacts associated with construction of the proposed alternatives.

Landing Site Ranking Criteria

Introduction

Many important factors must be considered to identify feasible landing site alternatives on both sides of the river and the appropriate bridge alignments that connect the landing sites. The purpose of this section is to provide ***landing site evaluation criteria*** that will help establish and support a subjective and quantitative approach for assessing various landing sites. This section identifies and describes the landing site criteria that were developed for application in this project, describes the process for applying the criteria to evaluate landing sites, and presents a landing site evaluation matrix that was used to evaluate landing sites considered in this project. Application of the evaluation criteria, matrix, and scoring process resulted in a ranking of all considered landing points and identification of the most optimal pairs of bridge landing sites to be used in this feasibility study.

Landing Site Ranking Criteria

The connectivity of a proposed new bridge over the Willamette River requires consideration of many qualitative and quantitative factors ranging from right-of-way (ROW) availability to effects on the local community and environment. With input from the Technical Advisory Committee (TAC), Community Advisory Committee (CAC), open houses, and other sources, the following criteria and sub-elements were identified as the most important factors to form the basis of the landing site evaluation and scoring process, and to guide selection of the best pairs of bridge landing sites:

Criterion A – Connectivity and Safety

This criterion is intended to connect to existing or planned bike/pedestrian routes directly or to streets with sidewalks and bike lanes that meet minimum safety and design standards for bicycle and pedestrian users. Alternative bridge alignments and landings were considered along with differing connections to existing and planned local and regional bike/pedestrian routes. In

addition, alternatives will differ in their ability to meet or exceed design standards for bikes and pedestrian facilities. Considerations for this project:

- Bike/pedestrian connections to existing east/west infrastructure.
    - Topography.
    - Width, to fit a trail or bike lane/sidewalk connection.
    - Connection to the east Trolley Trail.
    - Connection to the west Willamette River Greenway, Terwilliger Trail.
- Slope/grade of site (ADA restrictions / Metro standards).
- Directness of connection to other existing or planned pathways.
- Safety/comfort of connection.

Criterion B – Environmental Impacts

This criterion is to avoid adverse impacts on environmental resources. Impacts may vary depending on alternative bridge alignments and landing locations. Considerations for this criterion included:

- Avoid or minimize adverse impacts on wildlife habitat and trees.
- Avoid or minimize adverse impacts on waters and wetlands.
- Avoid or minimize adverse impacts on cultural and historic resources.
- Avoid or minimize light pollution emitting from aesthetic lighting.
- Avoid or minimize noise pollution resulting from the construction phase.
- Maximize project eligibility for programmatic environmental permitting.

Criterion C – Compatibility with Recreational Goals

This criterion is intended to maximize the recreational benefits the bridge would provide and enhance the current recreational activities in the area (biking, walking, boating, picnicking, etc.). There are several opportunities to improve or enhance recreational opportunities. The opportunities vary among the alternative bridge alignments and landing locations. Considerations for this criterion included:

- Maintain/improve river access.
- Preserve/maximize future use of public waterfront property.
- Maximize connections of local neighborhoods to the area to increase community opportunity to access the recreational areas.

Criterion D – Compatibility with Existing Developments and Neighborhoods

This criterion is intended to avoid displacement of and incompatibility with residences, businesses, parks and planned infrastructure improvements, and to minimize adverse effects of locating and accessing the bridge. Impacts may vary among the alternative bridge alignments and landing locations. Considerations for this criteria included:

- Avoid private property acquisition.

- Minimize size of bridge landings to reduce impacts to public property.
- Integrate with surroundings to enhance existing neighborhoods and green spaces.
- Ensure bridge appearance and aesthetics for visual integration.

Criterion E – Cost and Economic Impact

This criterion is intended to minimize the cost and adverse economic impacts of the project. There could be temporary and permanent economic impacts which could improve or hinder local and regional economics. Cost and economic impacts could differ not only among the alternative bridge alignment and landing locations, but also among the bridge types (signature vs. traditional) used to support the alignments. Considerations for this criterion included:

- Minimize up-front bridge costs and future maintenance costs.
- Avoid impacts to underwater cable and other area utilities.
- Maintain air access (float planes).
- Provide potential increase in tourism.
- Provide increases in local jobs and opportunities during construction.
- Minimize land acquisitions and/or easement required for construction of the structure.

Criterion F – Compatibility with Land Use Planning

This criterion is intended to review local and regional development plans for areas surrounding potential bridge landing locations and to minimize impacts to future development plans. Considerations for this criterion included:

- Compatibility with local and regional adopted plans.
- Avoid negative impacts to long-term plans.
- Minimize impacts to existing public view points.

Landing Site Criteria Scoring & Ranking

The criteria presented above was utilized to subjectively and quantitatively evaluate each landing site and develop a relative comparison of all landing sites considered in the evaluation. The *OGLO Landing Site Evaluation Matrix* (below) was developed to summarize results and calculate ranking scores based on input from evaluators. The following summarizes use of the evaluation matrix and how relative rankings were determined for the evaluated landing sites:

- Each criterion is worth one point, reflecting that all criteria are considered equally important in the evaluation. Six criteria were developed, so each site evaluation involves assigning six total points.
- For each landing site, evaluators assign an “X” in the column that reflects the level that the landing site meets the objectives of the criterion. Selection options include:
    - Does not meet objective
    - Meets objective

- Meets and exceeds objective

- The summary section of the spreadsheet reports individual category scores, the rank score, and overall rank determined for each landing site.
  - $\text{Individual Category Score (\%)} = \frac{\sum Criterion\ Assignments}{6}$
  - $\text{Rank Score (\%)} = \frac{\sum Criterion\ Assignments\ in\ \text{"Meets Objective"}\ and\ \text{"}Meets\ and\ Exceeds\ Objective\text{"})}{6}$

- Rank score is used to complete the overall ranking of landing sites being compared in the evaluation. The rank score is a reflection of the percentage of criterion objectives that were met or exceeded, so higher Rank Scores result in higher ranks.

- If two or more landing sites receive the same rank score, the individual category score for "Meets and exceeds objective" is used to distinguish between the equal rank scores; higher "Meets and exceeds objective" category scores result in higher rankings. Using this individual category score to distinguish between tied Rank scores rewards landing sites that exceed objectives in the criteria.

To illustrate this evaluation process and determination of individual category scores and rank scores, The below is an example of a completed evaluation matrix for two landing sites being evaluated:

Example Completed Evaluation Matrix

		Criterion A Connectivity and Safety			Criterion B Environmental Impacts			Criterion C Compatibility with Recreational Goals		
		Does not meet Objective	Meets Objective	Meets and Exceeds Objective	Does not meet Objective	Meets Objective	Meets and Exceeds Objective	Does not meet Objective	Meets Objective	Meets and Exceeds Objective
West Landing Sites										
A	Landing Site 1		X			X			X	
B	Landing Site 2			X			X			X
C										
D										
E										
F										

		Criterion D Compatibility with Developments & Neighborhoods			Criterion E Cost and Economic Impact			Criterion F Compatibility with Land Use Planning		
		Does not meet Objective	Meets Objective	Meets and Exceeds Objective	Does not meet Objective	Meets Objective	Meets and Exceeds Objective	Does not meet Objective	Meets Objective	Meets and Exceeds Objective
West Landing Sites										
A	Landing Site 1		X			X			X	
B	Landing Site 2			X			X		X	
C										
D										
E										
F										

The evaluation matrix determined the following individual category scores, rank scores, and sanks in the summary as shown in Figure 2:

Figure 2: Summary Results for Example Completed Evaluation Matrix

Summary				Rank
Does not meet Objective	Meets Objective	Meets and Exceeds Objective	Rank Score	
0%	100%	0%	100%	2
0%	17%	83%	100%	1

The following are example calculations for Landing Site 1:

- "Does not meet objective" category score: 0/6 = **0%**
- "Meets objective" category score: 6/6 = **100%**
- "Meets and exceeds objective" category score: 0/6 = **0%**
- Rank score: (6+0)/6 = **100%**

The following are example calculations for Landing Site 2:

- "Does not meet objective category score: 0/6 = **0%**
- "Meets objective category score: 1/6 = **17%**
- "Meets and exceeds objective category Score: 5/6 = **83%**
- Rank score: (1+5)/6 = **100%**

Primary ranking resulted in a tie between the two landing sites because the evaluation resulted in the same rank score for both sites. As a result, the "Meets and exceeds objective" category score was the secondary score used to establish a ranking between these two landing sites. Landing Site 2 achieved a higher rank because its "Meets and exceeds objective category score was higher than that of Landing Site 1.

Results from the assessment of the bridge locations and the completed matrix are presented in the Assessment of Bridge Locations.

Identifying Publicly-Owned Land

Publicly-available tax lot and property parcel data current to 2019 accessed by direct download from **Metro's Regional Land Information System (RLIS)** forms the primary basis of land ownership determination in this report for the stipulated geographic limits.

Publicly-Owned Land

The property data sets were filtered down to encompass only riverbank accessible ownership on the Willamette River and within the project limits. The tax-lot data was evaluated, and publicly-owned property was determined to consist primarily of the following:

1. North Clackamas Parks & Recreation District
2. Metro Parks and Recreation
3. Oregon Parks and Recreation
4. City of Lake Oswego
5. City of Portland
6. Oak Lodge Sanitary District

Railroad Property Consideration

In addition to the above specific owners, public right-of-way parcels consisting of roads and rail were identified based upon their parcel ownership. In many cases, these properties were listed without any owner and identified as infrastructure (i.e. “Road”, “Rail”) in the data sets.

Property ownership of the right of way for the rail bridge was generally identified as Union Pacific Railroad in the property data sets except for parcels of railroad property located to the north and west of Tryon Cove Park (west of the River), which seemed to indicate public ownership. Further investigation of property revealed that the branch that heads east over the river is likely still owned by the railroad, and the north/south line portion is owned by a consortium consisting of:

- City of Portland
- Oregon Department of Transportation (ODOT)
- TriMet
- Metro

The right-of-way agent for this consortium-held railroad right of way parcel is TriMet, which currently addresses all requests including permitting. For the purposes of this report and for mapping, these parcels were shown as publicly-owned property. However, the special ownership conditions should be recognized and may be an important factor in the selection of landing sites and tie-in points as it may affect both temporary and permanent access beyond the project limits in bridge connectivity.

Easement Consideration

Located between the east edge of the Portland Bureau of Environmental Services (BES) sanitary sewer facility and the west bank of the Willamette River, a Lake Oswego easement exists which currently allows access for trail users from Foothills Park to the southern edge of Tryon Cove.

Landing Site Selection for Assessment

The identified publicly-owned lands suitable to serve as landing sites for alignment connectivity options for the proposed bridge consist of the following

Eastern Bank Landing Sites and Associated Publicly-owned Parcels:

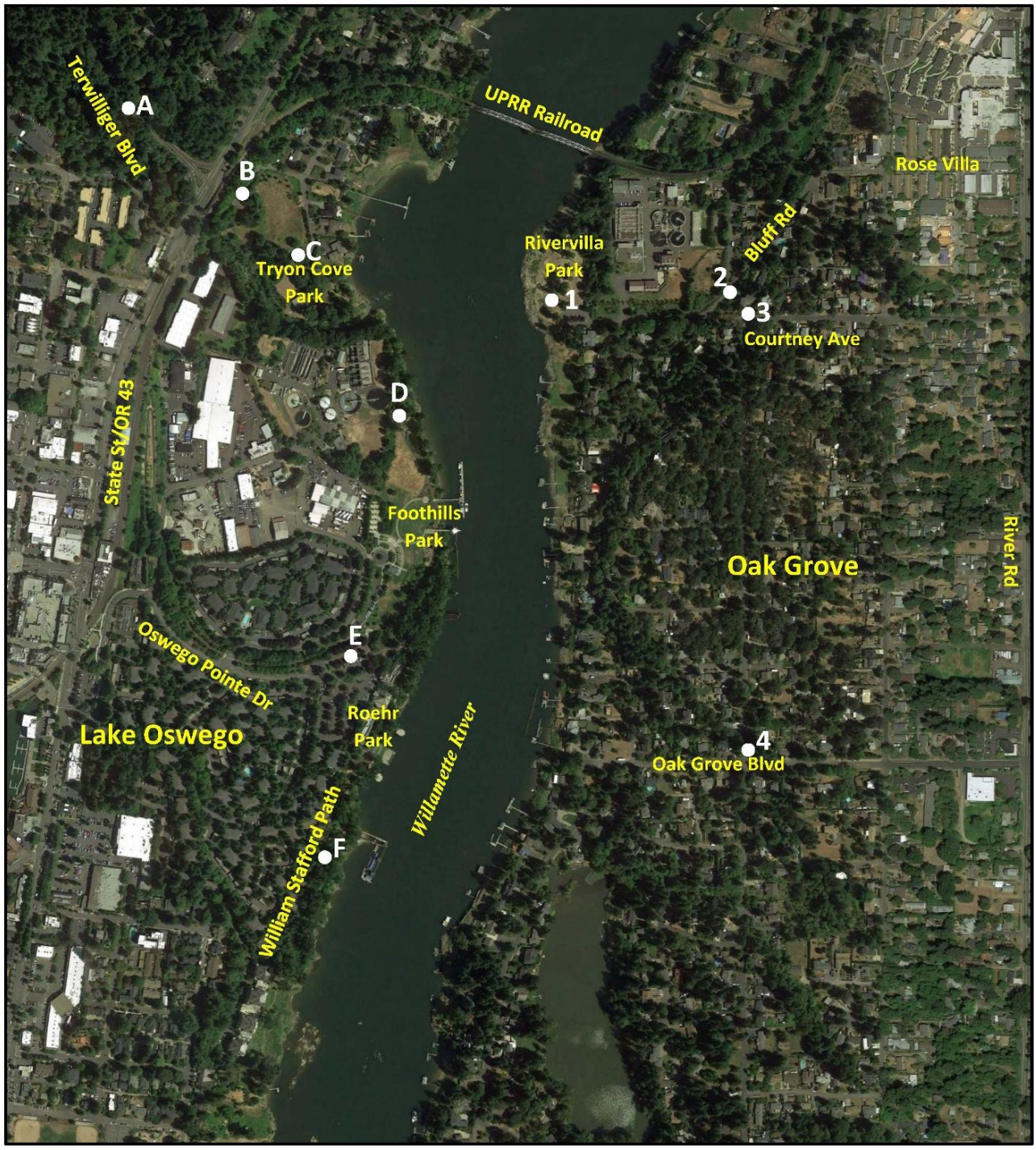
1. Rivervilla Park: North Clackamas Parks and Recreation District
2. SE Bluff Road: Public Road right of way
3. SE Courtney Ave: Public Road right of way
4. Oak Grove Blvd: Public Road right of way

Western Bank Landing Sites and Associated Publicly-owned Parcels:

A. Terwilliger Blvd:
    a. Oregon Parks and Recreation
    b. Public Road right of way
B. Tryon Cove Upper:
    a. City of Lake Oswego
    b. Public Road right of way
C. Tryon Cove Lower:
    a. Metro
    b. Public Road right of way
    c. City of Lake Oswego
D. Foothills Park: City of Lake Oswego
E. Roehr Park: City of Lake Oswego
F. William Stafford Pathway: City of Lake Oswego

A visual summary of the identified landing sites in relation to publicly-owned parcels are provided on a map image (below) and will be subject to assessment using the criteria outlined above.

Possible Bridge Landing Sites



Engineering Design Criteria

This section of the report is intended to establish and document key engineering design criteria applicable for the identification, evaluation, and determination of feasible structural bridge configurations.

Design Criteria

The technical feasibility of a new bridge over the Willamette River at the proposed project site, as well as its design in any future project phases, requires consideration of structural configurations which are directly influenced by a wide range of quantitative engineering and non-engineering-based disciplines that are identified in this memorandum.

The design criteria is anticipated to be a '*living document'* to support initial feasibility decision-making, while establishing the design-basis for any subsequent project phases. The design criteria will require future modifications due to revised or changed project objectives and design goals resulting from client or stakeholder input. Thus, revisions to the design criteria would be anticipated in any future project phases.

Environmental Design and Sustainability

This section is intended to define necessary design requirements to achieve environmental compliance and permitting. Therefore, it is expected that this section would be further developed in NEPA phase of the project. Section components would be anticipated to include:

- Permitting requirements
- NEPA compliance requirements
- Wetlands requirements and restrictions
- River requirements and restrictions
- Requirements for protecting endangered species
- Requirements envisioned as a measure of project sustainability

These components would likely influence the design process, pier placement, bridge geometry, and other key bridge layout decisions, so development of this section in any subsequent project phases would be important.

Civil Design

Requirements for vertical alignment, horizontal alignment, drainage, etc. defined in this section would guide civil design aspects of the project. Contents in this section greatly influence the bridge geometrics (vertical and horizontal) and design requirements to ensure that a new bridge and its connections would be readily accessible and usable by persons with and without disabilities.

If transit were included in any future designs, bridge layouts for transit options would have to be according to the latest edition of the TriMet Design Criteria.

Applicable Design Standards

- AASHTO *A Policy on Geometric Design of Highways and Streets*, 7th Edition, 2018.
- AASHTO *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, 1st Edition.

- Oregon Department of Transportation (ODOT) Bicycle and Pedestrian Design Guide.
- Oregon Department of Transportation (ODOT) Highway Design Manual (HDM)
- *International Building Code* (IBC), 2018.

Horizontal Alignments

Criteria should be in accordance with applicable design standards for bicycle and pedestrian multi-use paths based upon influencing factors such as speed and sight distance.

Vertical Alignments

Criteria should be in accordance with applicable design standards for bicycle and pedestrian multi-use paths based upon influencing factors such as speed, sight distance, and grade. The maximum allowable grade on the approach and main-span structure should be limited to 5%. This maximum allowable grade, combined with necessary clearance envelopes for navigation, rail, and roadway, would greatly influence the vertical alignment.

Bridge Deck Drainage

All bridge deck surfaces should provide positive drainage to shed water away from the centerline of the bridge and be directed to allowable retention areas or removed from the site by a deck drainage system meeting design and environmental standards.

Bridge deck drainage should be designed to be managed in accordance with Clackamas County Stormwater Management Plan (CCSMP).

Bridge Architecture and Aesthetic Treatments

The proposed bridge would provide bicycle and pedestrian access between Lake Oswego and Oak Grove as a grade-separated structure for users. In addition to direct user interaction and interfacing with structural elements, the proposed bridge would be a visible structure that should enhance and complement the site. Attention to details such as railings, overlook/belvedere areas, bridge lighting, and overall fit within the community would require consideration of aesthetics and architectural treatments.

Bridge architecture design criteria include the following:

A. Design a bridge structure with the least impactful span configuration and the greatest vertical clearance possible to comply with minimum vertical and horizontal clearance requirements over the Willamette River and all traversed right of way.

B. Specifiy materials that require minimal maintenance, with the exception of periodic power washing.

C. Detail all walking surfaces for slip resistance and usability during rainy weather.

D. Coordinate and integrate bridge electrical and drainage components to have the least visual impact on the overall bridge architecture.

E. Select colors and materials to complement the landscape architecture and overall fit with landing sites and surrounding community.

Landscape Design

This section is intended to define necessary design requirements that would be needed to achieve the desired level and type of permanent landscaping design at the project site. It is expected that this section would be further developed in any future design phases of the project.

Structural Engineering Design

Requirements for structural materials, design loadings, and performance requirements (vibration and user comfort) defined in this section would be used to guide the structural design.

Applicable Design Standards

Structural engineering design of the proposed bridge would be in accordance with the following specifications, codes, and guidelines:

- AASHTO *LRFD Guide Specifications for the Design of Pedestrian Bridges*, 2nd Edition with 2015 Interim (AASHTO Pedestrian).
- AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, First Edition, 2015 with current interims through 2019 (AASHTO Signs).
- AASHTO *LRFD Bridge Design Specifications*, 8th edition, 2017 (AASHTO), or latest version adopted by bridge owner.
- AASHTO LRFD Bridge Construction Specifications, 4th Edition, with 2020 Interim Revisions.
- AASHTO *Guide Specifications for LRFD Seismic Bridge Design*, 2nd edition, 2011 with 2014 and 2015 Interims (AASHTO Seismic).
- ODOT Bridge *Design Manual* (latest version).
- ODOT Standard Specifications (latest version).
- FIB Bulletin 32 Guidelines for the Design of Footbridges, November 2005.
- American Institute of Steel Construction (AISC) *Steel Construction Manual*, 15th edition.
- AISC 360-16, *Specifications for Structural Steel Buildings*, 2016.
- AISC 341-16, *Seismic Provisions for Structural Steel Buildings*, 2016 (AISC Seismic).
- American Concrete Institute (ACI) 318-19 *Building Code Requirements for Structural Concrete and Commentary*, 2019.
- American Society of Civil Engineers (ASCE) 7-16, *Minimum Design Loads for Building and Other Structures*, 2016 (ASCE 7).
- American Welding Society (AWS) D1.1, *Structural Welding Code*, 2015 Edition.
- American Welding Society (AWS) D1.5, *Bridge Welding Code*, 2015
- Oregon Structural Specialty Code, 2019 (OSSC).

- Service d'Etudes techniques des routes et auto routes (SETRA), *Footbridges, Assessment of vibrational behavior of footbridges under pedestrian loading*, 2006.
- FHWA National Bridge Inspection Standards, 2004 with 2009 revisions.

Materials

The following materials should be used unless otherwise permitted by applicable design standards.

Cast-In-Place/Precast Concrete (minimum compressive strength):

- Columns, and crossbeams: f'_c = 4,000 psi
- Drilled shafts: f'_c=5,000 psi
- Deck slab: f'_c = 4,000 psi
- Concrete box girders: f'_c = 5,000 psi

Reinforcing Steel:

- Drilled shafts, columns, cross beams, and box girder: ASTM A706 Grade 60, f_y = 60 ksi
- All other reinforcing steel: ASTM A706, Grade 60, f_y = 60 ksi
- Prestressing strands: 7-wire low-relaxation, ASTM A416, Grade 270, f_{pu} = 270 ksi

Prestressing/Tendons:

- In accordance with the latest version of the Post-Tensioning Institute DC-45.1, Recommendations for Cable Design, Testing, and Installation manual.

Structural Steel:

- Wide flange shapes: ASTM A992, Grade 50, unless otherwise noted
- Tees, channels, angles, plates, and bars: ASTM A36, unless otherwise noted
- Hollow Structural Section (HSS) rectangular or square: ASTM A500, Grade B, f_y = 46 ksi
- HSS round: ASTM A500, Grade B, f_y = 42 ksi
- Pipes: ASTM A53, Grade B, f_y = 33 ksi
- Anchor bolts: ASTM A307, Grade A or ASTM F1554, Grade 105, as applicable
- Steel deck: ASTM A653, Grade 33 (Galvanized)
- High strength bolts: ASTM F3125
- Welding: 70XX electrodes (SMAW)

Design Loadings

Dead Loading

- Cast-in-place concrete: 155 pcf
- Steel: 490 pcf

- Soil: 125 pcf (unless prescribed otherwise by project-specific geotechnical reports)
- Additional dead loads of materials as necessary if identified in design progression

Live Loading

- Pedestrian: 90 psf in accordance with the AASHTO Pedestrian Bridge Design Specification.
- Guardrail Loading: 50 plf or 200 lbs in any direction in accordance with Oregon Specialty Structural Code
- Handrail loading: 50 plf in any direction in accordance with Oregon Specialty Structural Code
- AASHTO H10 Maintenance Vehicle in accordance with the AASHTO Pedestrian Bridge Design Specification
- OPTIONAL: Transit vehicle loading and associated barrier impact loading to be determined as applicable in any future phases of the project.

Wind Loading

Wind loads should be based upon ODOT TM 671 and AASHTO Signs specification, with load combinations in according to the AASHTO Pedestrian bridge specification.

- Ultimate Wind Speed – 130 mph MRI-1700 (Mean Recurrence Interval = 1700 years)
- Serviceability Wind Speed – 82 mph MRI-10 (Mean Recurrence Interval = 10 years)

Depending upon the bridge type and span lengths that might be selected, it might be necessary to conduct an aerodynamic analysis as part of any future design.

Vessel Collision Loading

Engineering design of proposed bridge structures should meet AASHTO LRFD and provide structural stability and life safety after an extreme event. The proposed bridge would be classified as “Typical” and a vessel collision analysis would have to be conducted to support AASHTO LRFD requirements.

Vehicular Impact Loading

Structural design of bents or barriers would have to be in accordance with AASHTO LRFD to accommodate vehicular impact as an extreme event.

Bollards would have to be installed at the ends of the bridge to prevent non-emergency vehicles from entering the pedestrian portion of the bridge.

Seismic Design

Seismic design would have to be in accordance with AASHTO Guide Specifications for LRFD Seismic Bridge Design (AASHTO Seismic) satisfying:

- Life Safety Criteria at the Extreme Event Level (1000-yr Event)

- No lower level operational criteria exists for pedestrian bridges if transit alternatives are not included in the project. Additional criteria would likely be required if transit alternatives were added to the project.
- Bridge Classification: Typical.

Seismic design parameters and response spectra would have to be in accordance with future project-specific geotechnical reports based on subsurface investigations, laboratory testing, and analysis. See Appendix A for a Preliminary Geotechnical Assessment of the project site by Shannon & Wilson Geotechnical and Environmental Consultants.

Structure Vibration and User Comfort

Pedestrian- and wind-induced vibrations would have to be considered and the bridge designed to enhance the user experience. Minimum fundamental frequency of the structure in a vertical mode without live load would have to be 3.0 hertz (Hz). Minimum fundamental frequency of the structure in a lateral mode without live load would have to be 1.3 Hz. If the fundamental frequency were not able to satisfy these limitations, an evaluation of the dynamic performance would have to be made in accordance with SETRA. The structure would be considered a "Class I" structure, and the comfort level would be defined as "Average Comfort" for such an evaluation.

Foundation Design

Design of foundations for land-based and in-water bents, abutments and deep foundations would need to consider structural and geotechnical behavior and interaction. Structural loads and analysis results would have to be in accordance with the listed structural design codes. Geotechnical information would be obtained from any future project-specific geotechnical reports based on subsurface investigations, laboratory testing, and analysis. See Appendix A for a Preliminary Geotechnical Assessment of the project site by Shannon & Wilson Geotechnical and Environmental Consultants.

Foundation selection would be completed following geotechnical investigation, analysis, and recommendations provided by the geotechnical engineer and would consider the local and global aspects of the proposed bridge's alignment.

All foundation design would have to be in accordance with the service, strength, and extreme event loading combinations as identified in the applicable design codes.

Lighting Design

The functional and aesthetic lighting elements for a proposed structure would have to conform to the requirements of the Model Lighting Ordinance which aims to address integrated lighting design goals in conjunction with county and community criteria. In particular, the proposed bridge's illumination would be aimed at creating a comfortable and safe structure while also improving and enhancing the adjacent neighborhood area by encouraging pedestrian activity throughout the day.

Bridge illumination enhances safety, security, and aesthetics. Lighting equipment would have to be durable to withstand the rigors of the waterfront environment and be easy to maintain so the light levels could be sustained during the life cycle of the bridge structure. Lighting design would

need to consider and evaluate the effects to the local area in order to mitigate or eliminate light pollution and adhere to applicable local lighting standards.

Specific lighting levels for outdoor pedestrian ways and outdoor stairs are not provided in CPTED. However, its guidelines note that pedestrians require a clear path of refuge from criminal threats and vertical illumination for ease of facial recognition. These would be provided on the proposed bridge and stair landings (if included) within the project boundary.

The IESNA's Lighting Handbook does not provide specific guidance on light-levels for pedestrian walkways and bridge. However, in general, the overall bridge should achieve a 3 to 5 fc-level illumination for an extra sense of safety and security at night.

Lighting for the proposed bridge would use energy-saving LED technology whenever possible. A layered approach including railing-integrated and bridge structure up-lighting would be used throughout the project. All sources would be 3,000 degrees Kelvin or less unless noted otherwise, with a minimum 80 color rendering index (CRI).

Applicable Design Standards

Recommended practices and guidelines that would drive the lighting design should include:

- National Electrical Code
- Oregon Structural Specialty Code

Recommended practices should also be included from the following:

- Crime Prevention through Environmental Design (CPTED) guidelines
- Illuminating Engineering Society of North America (IESNA) *Lighting Handbook*, 10th edition
- Illuminating Engineering Society of North America (IESMLO) *Model Lighting Ordinance, 2011*
- Other Local Guidelines

ADA Accessibility

The ADA (42 USC. 12101 et seq.) is a federal civil rights law that prohibits discrimination against individuals with disabilities. Title II of the ADA covers state and local governments. The US Department of Transportation (USDOT) is responsible for issuing regulations to implement the public transportation parts of Title II of the ADA. The regulations issued by the USDOT include accessibility standards for the design, construction, and alteration of facilities used in the provision of public transportation.

The US Department of Justice is responsible for overall enforcement of Title II of the ADA. The Department of Justice has designated the USDOT as the federal agency responsible for investigating complaints and conducting compliance reviews "relating to programs, services, and regulatory activities relating to transportation, including highways" (28 CFR 35.190 (b)).

The design and details of the proposed bridge would have to comply with the 1991 and 2010 Federal ADA Standards. Specifically, Section 504 of the Rehabilitation Act and the ADA of 1990 require pedestrian facilities to be designed and constructed so they are readily accessible to, and

usable by, persons with disabilities. These requirements would also cover the allowable slopes on the pedestrian bridge's walking surface.

Walking Surface Slopes and Grades

The proposed bridge would have to comply with ADA requirements and meet the accessibility criteria for a pedestrian circulation path with a maximum grade of 5% as a general goal.

Cross slopes on sidewalks and walkways should not exceed 2%, but would have to be of sufficient grade to facilitate positive drainage and avoid water accumulating on the surface.

ADA Design References

- *ADA – 28 Code of Federal Regulations (CFR) Part 35*, as revised September 15, 2010 and 23 CFR Part 652, Pedestrians and Bicycle Accommodations and Projects.
- ODOT *Bridge Design Manual,* 2019.
- *ADA Standards for Transportation Facilities*, USDOT, 2006; consists of 49 CFR Parts 37 & 38 and the ADA and ABA Accessibility Guidelines for Buildings and Facilities (ADA-ABAAG; also referred to as the 2004 ADAAG), July 23, 2004, U.S. Access Board as modified by USDOT. (For transit, light rail, and similar public transportation facilities).
- *Revised Draft Guidelines for Accessible Public Rights-of-Way* (PROWAG), November 23, 2005, U.S. Access Board. This is the current best practices for evaluation and design of pedestrian facilities in the public right of way per FHWA guidelines.
- *Standard Plans for Road, Bridge, and Municipal Construction* (Standard Plans), ODOT.
- *A Policy on Geometric Design of Highways and Streets* (Green Book), AASHTO, 7th edition, 2018
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, AASHTO, 2004. Provides guidance on the planning, design, and operation of pedestrian facilities along streets and highways. Specifically, the guide focuses on identifying effective measures for accommodating pedestrians on public rights of way.
- *Pedestrian Facilities Users Guide – Providing Safety and Mobility*, FHWA, 2002. Provides useful information regarding walkable environments, pedestrian crashes and their countermeasures, and engineering improvements for pedestrians.
- *Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way*, July 26, 2011, U.S. Access Board. Federal Notice of Proposed Rule Making that gives a preview of potential future revisions to the PROWAG.
- NFPA 101: *Life Safety Code,* 2015.

Elevators and Stairs

Stairs could be utilized to provide a secondary route to primary ADA accessible routes. Elevators should not be utilized in the project without permission from the bridge owner.

Pedestrian Railings

Requirements for the pedestrian railings would have to be compliant with applicable AASHTO codes and ADA requirements. The pedestrian railings on the bridge would have to have a minimum height of 42 inches and a 54-inch tall railing adjacent to bicyclists.

A pedestrian handrail at a height of between 34 inches and 38 inches for pedestrian comfort would have to be provided to comply with the OSSC and IBC requirements. Handrail gripping surfaces would need to have rounded edges, and handrail gripping surfaces with a circular cross-section would have to have an outside diameter of 1.25 inches to 2 inches. Handrail gripping surfaces with a non-circular cross-section would be required to have a perimeter dimension of 4 inches to 6.25 inches and a cross-section dimension of 2.25 inches maximum.

Handrail gripping surfaces would have to be continuous and not be interrupted by newel posts, other construction elements, or obstructions along the entire length of the bridge. The bottoms of handrail gripping surfaces would not be allowed to be obstructed for more than 20% of their length. Where provided, horizontal projections would have to occur at least 1.5 inches below the bottom of the handrail gripping surface. An exception would permit the distance between the horizontal projections and the bottom of the gripping surface to be reduced by 1/8 inch for each 1/2 inch of additional handrail perimeter dimension that exceeds 4 inches.

Handrails at the bottom of stairs would have to continue to slope for a distance of the width of one tread beyond the bottom riser nosing and to further extend horizontally at least 12 inches.

The bridge's pedestrian railings would be required to prevent the passing of a 4-inch sphere in any direction, and meet OSCS and IBC. This requirement is also consistent with the *Life Safety Code* (NFPA 101).

Transit Separation Barriers/Railings

Section reserved for transit considerations if any future phases of the project were to include transit alternatives on the bridge. Barrier-separated transit lanes would have to be designed in accordance with national and local criteria, including the latest edition of the TriMet Design Criteria.

Project Design Lifecycle

The bridge would be designed to provide a service life of 75 years. Components of the bridge (main span and approach spans), as well as civil components of the design, would be selected to minimize operational and maintenance costs required throughout the life of the bridge.

Replaceable components such as bearing devices, expansion joints and stay cables (if used) would be designed to provide a specific service life prior to replacement and would be detailed to accommodate future replacement without the need for an extended closure of the bridge.

The bridge would be designed to accommodate maintenance inspection at regular intervals, including the installation of access details, such as fall-protection devices and anchor points, where necessary. Bridges that carry only pedestrian and bicycle traffic are not required to satisfy the FHWA National Bridge Inspection Standards (NBIS) required inspection interval of two years. However, this practice is strongly recommended.

Bridge Concepts

The purpose of this section is to present plan, elevation, and typical section information for feasible bridge alternatives on selected alignments **A-3** and **D-3** to communicate conceptual information pertaining to span arrangement, height above surrounding ground and water, and structure grades between publicly-owned landing sites. In addition to illustrating feasible bridge alternatives connecting the Oak Grove and Lake Oswego communities, information contained in this report could also be utilized to estimate project development costs, along with operations and maintenance costs.

Main Span & Approach Span Considerations

The main span portion of the alignment is considered to be the section of bridge crossing the Willamette River; the approach spans are the portions of the alignment which are not over the river, connecting the main span to the landing sites. All bridge alternatives presented in this report are considered capable of satisfying requirements defined in the last section that could be implemented in any later design phases of the project.

The approach span and main span options presented in this report illustrate a range of bridge type, structural materials, and span layouts to traverse the required clearance windows, and provide the desired aesthetic appeal. The following summarizes the main span and approach spans considered in the bridge alternatives:

- **Approach Spans**
    - Precast, Prestressed Concrete Girders
    - Steel Plate Girders
- **Main Span**
    - Segmental Haunched Concrete Box Girder
    - Haunched Steel Box Girder
    - Extradosed
    - Cable-Stayed

Each bridge alternative features a bridge deck with finished grades limited to 5% to meet ADA requirements while providing the necessary clearance envelopes for navigation, rail, and roadway. In addition, low chords for each alternative easily clear the 100-year floodplain elevation of approximately 37.6 feet, which was verified from other another nearby project (Tryon Creek Wastewater Treatment Plant).

Bicycle/pedestrian-only alternatives generally utilize a 16’-0” multi-use path (clear width) that is composed of 2’-0” shoulders and a 12’-0” bi-directional bicycle and pedestrian path; cable-supported main span alternatives generally provide the same clear width, but separated into two paths to allow for cable anchorages along the centerline of the structure. Transit alternatives accommodate a single 14’-0” bi-directional bus lane (clear width) in combination with a bicycle/pedestrian multi-use path. Transit alternatives were only investigated on

alignment D-3, which was slightly modified to accommodate the 50'-0" minimum turning radius for buses.

Bridge Types

Bridge plan sheets illustrating conceptual details of feasible bridge alternatives developed in this project were presented in the last section. The plan sheets illustrate feasible bridge alignments and conceptual bridge layouts associated with those alignments. The purpose of this section is to provide additional narrative describing the bridge alternatives, estimated costs, construction challenges and duration, expected bridge lifetime, environmental impacts, maintenance requirements, estimated permittability, and potential for US Coast Guard (USCG) acceptance of the bridge alignments and types.

Bridge Type Alternatives

Bridge type alternatives previously presented included different types for approach spans and main spans. Approach span concepts utilized conventional/economical span lengths and girder types including precast, prestressed concrete girders and steel plate girders. Main span alternatives utilized long-span bridge types including segmental haunched concrete box girder, haunched steel box girder, extradosed, and cable-stayed concepts. The bridge alternatives presented provide for variety in material type, span lengths, aesthetics, and construction methods.

Construction Challenges

Based on assumptions for construction means and methods for the bridge alternatives in this work, the largest construction challenges are estimated to be the following for each alternative:

- **A-3 Haunched Concrete or Steel Box Bridge Main Span Alternatives:** The largest construction challenge for these alternatives would likely be the construction of the tall cast-in-place pier table for the main span. In addition, working on a number of independent headings for the long approaches to ensure that the main span activities remain on the critical path, rather than the approach spans, is anticipated to be another challenge. Headings are independent construction crews that work simultaneously on a construction site so multiple components of the bridge can be constructed at the same time. Given the length of the approach spans, multiple headings would be required to keep the construction pace of the approach spans equal to or faster than that of the main spans so they are completed at approximately the same time in order to minimize the construction duration. Finally, to overcome transportation challenges, delivery of large steel box girder sections could potentially be made using barges rather than over-the-road trucks.
- **A-3 Extradosed Main Span Alternative:** The largest construction challenge for this alternative would likely be simultaneously supporting two sets of form travelers and installing stay cables. In this case, one tower would be close to the shore while the other would be out in the water and would be serviced from a temporary work trestle. Similar to the A-3 box girder options, working on a number of independent headings for the

long approaches to ensure that the main span activities remain on the critical path, rather than the approach spans, would be anticipated to be another challenge.

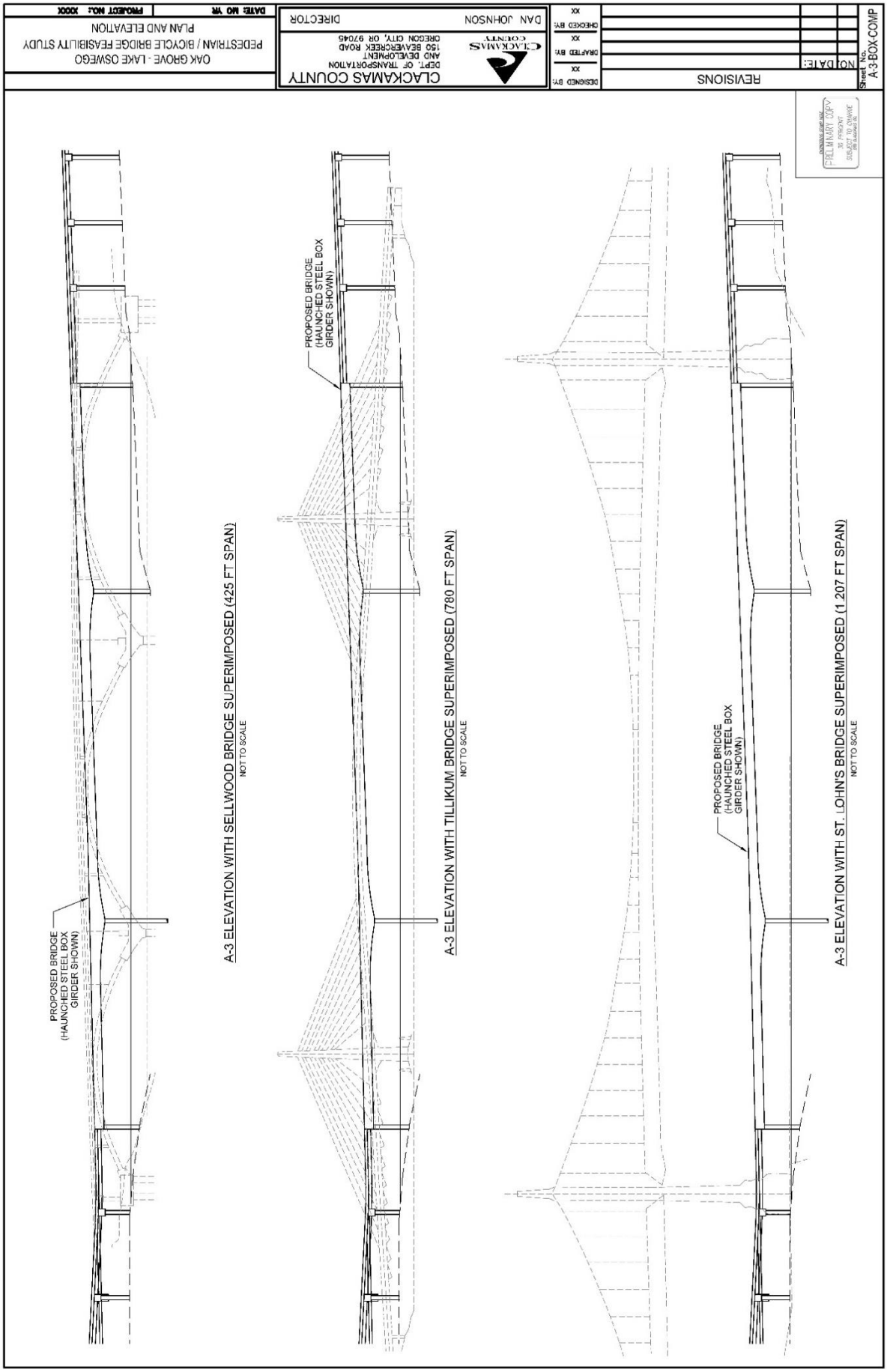
- **D-3 Haunched Steel Box Main Span Alternative:** The largest construction challenge would be anticipated to be the erection of the main span steel and the installation and removal of the temporary shoring towers that would be required for erection of the main span haunched beams.
- **D-3 Cable-Stayed Main Span Alternative:** The most challenging part of this alternative would be the installation of the stay cables and the diaphragm that encases the anchorages.
- **D-3 Haunched Steel Box (Transit) Main Span Alternative:** Similar to the no-transit option, the largest construction challenge would likely be the erection of the main span steel girders and the installation and removal of the temporary shoring towers that would be required for erection of the main span haunched beams.
- **D-3 Cable-Stayed (Transit) Main Span Alternative:** The largest challenge of this alternative would be construction of the large perched footing and the cast-in-place pier table.

Note that due to limitations on the local roads near the project, delivery of equipment and material to the project site would likely utilize a combination of land and water transportation. Land transportation would be expected to be used for delivery of smaller items, while water transportation could be beneficial for larger items not suitable for transport on local roads.

Comparisons to Local Bridges

To illustrate the size and scale of the proposed bridge concepts, a plan sheet is included on the next page that presents three elevations of a proposed steel box girder bridge overlaid with other well-recognized local bridges for comparison.

The following plan sheets present conceptual details of feasible bridge alternatives that were considered in this phase of work. Permutations of these bridge types could be investigated in any future phases of this project, but these alternatives illustrate a variety of bridge alternatives capable of providing a bicycle/pedestrian crossing in this corridor.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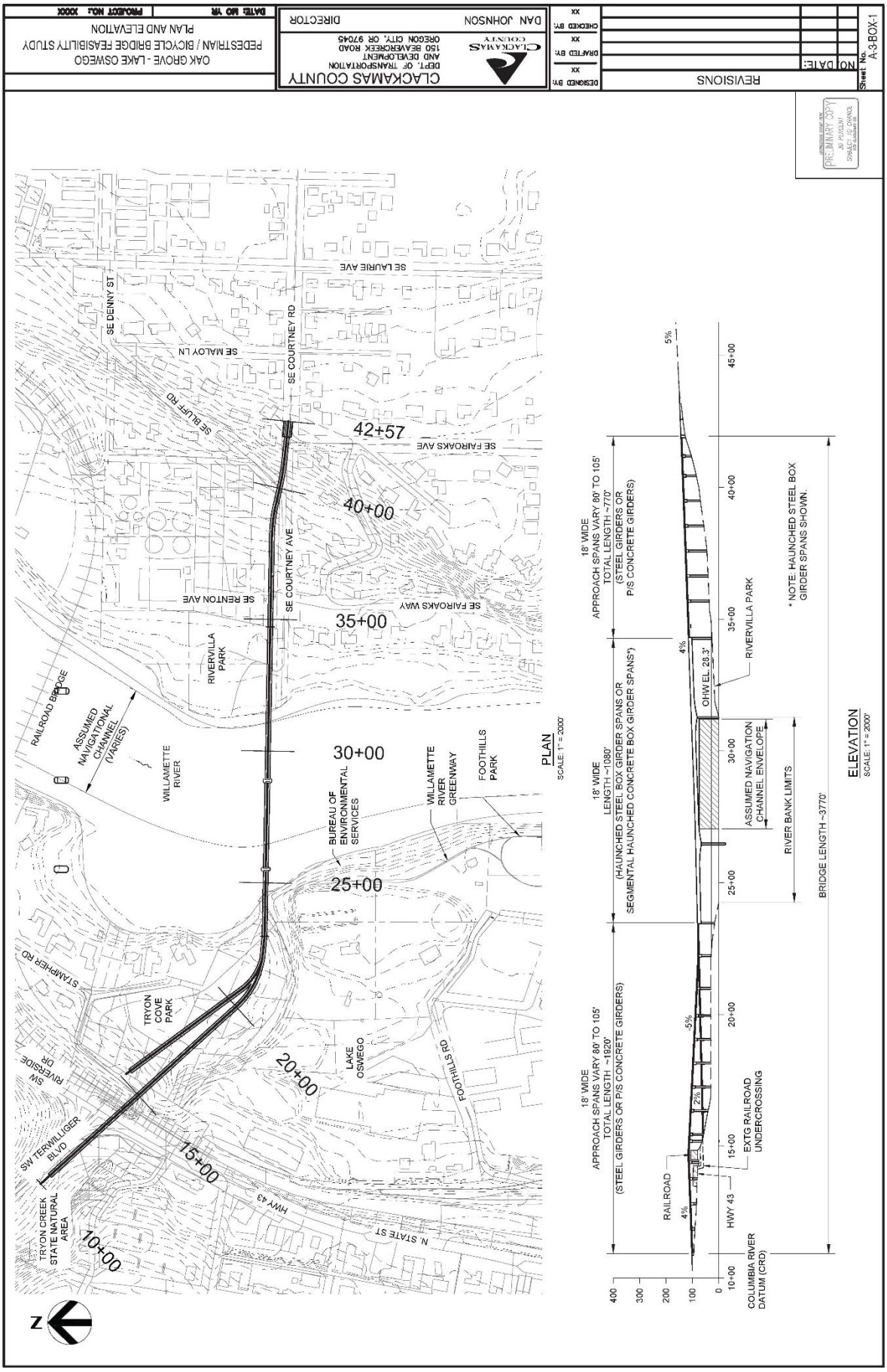
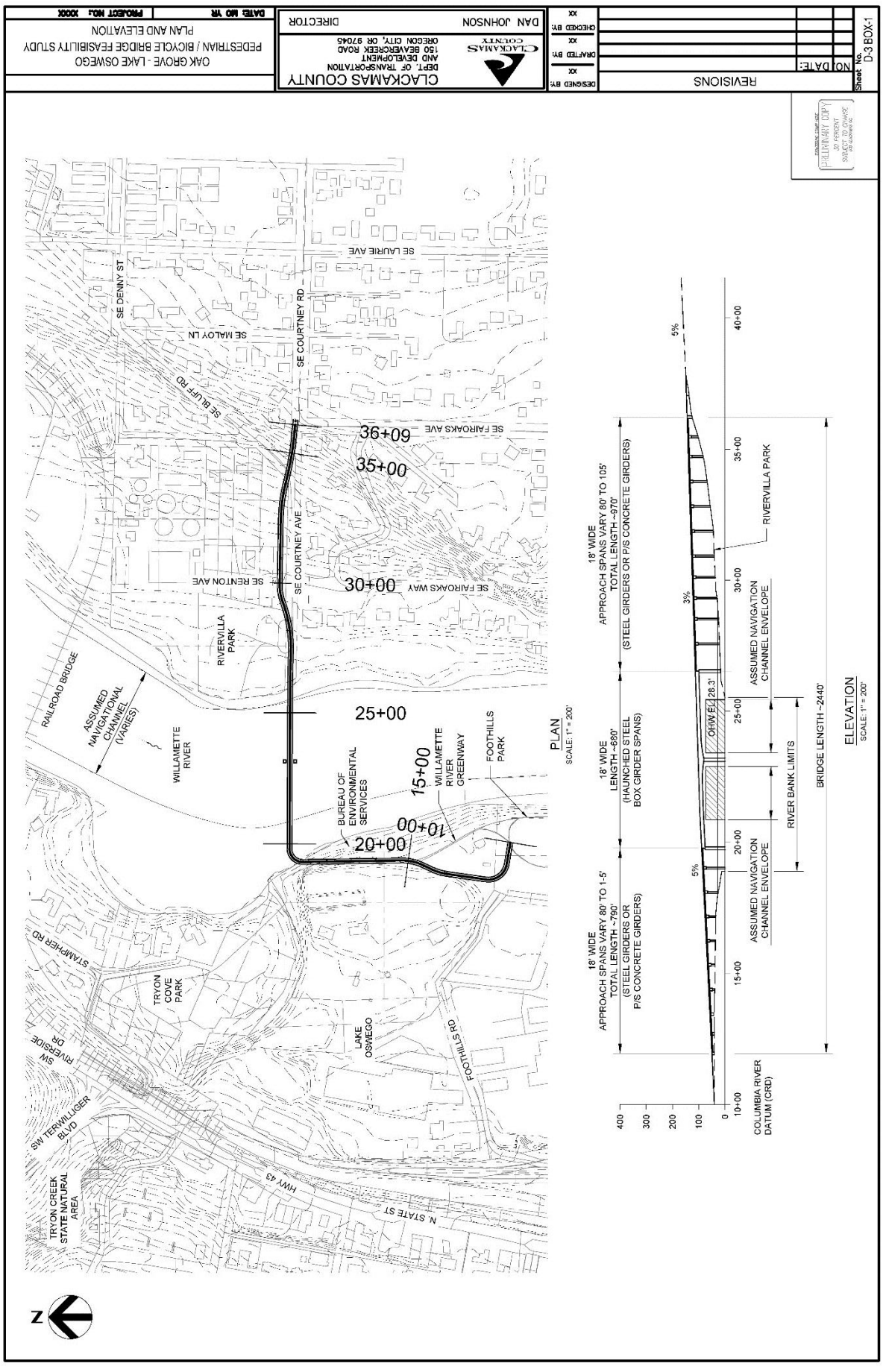
NO DATE:
DESIGNED BY: XX
DRAFTED BY: XX
CHECKED BY: XX
CLACKAMAS COUNTY
DEPT. OF TRANSPORTATION AND DEVELOPMENT
150 BEAVERCREEK ROAD
OREGON CITY, OR 97045
DAN JOHNSON
DIRECTOR
OAK GROVE - LAKE OSWEGO
PEDESTRIAN / BICYCLE BRIDGE FEASIBILITY STUDY
PLAN AND ELEVATION
DATE: MO YR
PROJECT NO.: XXXX
PRELIMINARY COPY
NOT FOR CONSTRUCTION
PROPOSED BRIDGE (HAUNCHED STEEL BOX GIRDER SHOWN)
A-3 ELEVATION WITH SELLWOOD BRIDGE SUPERIMPOSED (425 FT SPAN)
NOT TO SCALE
PROPOSED BRIDGE (HAUNCHED STEEL BOX GIRDER SHOWN)
A-3 ELEVATION WITH TILLIKUM BRIDGE SUPERIMPOSED (780 FT SPAN)
NOT TO SCALE
PROPOSED BRIDGE (HAUNCHED STEEL BOX GIRDER SHOWN)
A-3 ELEVATION WITH ST. JOHN'S BRIDGE SUPERIMPOSED (1,207 FT SPAN)
NOT TO SCALE
DRAFT


CLACKAMAS COUNTY
DEPT. OF TRANSPORTATION AND DEVELOPMENT
150 BEAVERCREEK ROAD
OREGON CITY, OR 97045
DIRECTOR
DAN JOHNSON
OAK GROVE - LAKE OSWEGO
PEDESTRIAN / BICYCLE BRIDGE FEASIBILITY STUDY
PLAN AND ELEVATION
REVISIONS
PRELIMINARY COPY
Sheet No. A-3-BOX-1
PLAN
SCALE: 1" = 2000'
ELEVATION
SCALE: 1" = 2000'
SE DENNY ST
SE LAURIE AVE
SE MALOV LN
SE BLUFF RD
SE COURTNEY RD
SE FAIROAKS AVE
SE RENTON AVE
SE FAIROAKS WAY
RIVERVILLA PARK
RAILROAD BRIDGE
ASSUMED NAVIGATIONAL CHANNEL (VARIES)
WILLAMETTE RIVER
BUREAU OF ENVIRONMENTAL SERVICES
WILLAMETTE RIVER GREENWAY
FOOTHILLS PARK
STAMPHER RD
TRYON COVE PARK
SW RIVERSIDE DR
LAKE OSWEGO
FOOTHILLS RD
SW TERWILLIGER BLVD
TRYON CREEK STATE NATURAL AREA
HWY 43
N. STATE ST
42+57
40+00
35+00
30+00
25+00
20+00
15+00
10+00
18' WIDE APPROACH SPANS VARY 80' TO 105' TOTAL LENGTH ~770' (STEEL GIRDERS OR P/S CONCRETE GIRDERS)
18' WIDE LENGTH ~1080' (HAUNCHED STEEL BOX GIRDER SPANS OR SEGMENTAL HAUNCHED CONCRETE BOX GIRDER SPANS*)
18' WIDE APPROACH SPANS VARY 80' TO 105' TOTAL LENGTH ~1920' (STEEL GIRDERS OR P/S CONCRETE GIRDERS)
OHW EL 28.3'
RIVERVILLA PARK
* NOTE: HAUNCHED STEEL BOX GIRDER SPANS SHOWN.
ASSUMED NAVIGATION CHANNEL ENVELOPE
RIVER BANK LIMITS
BRIDGE LENGTH ~3770'
EXTG RAILROAD UNDERCROSSING
RAILROAD
HWY 43
5%
4%
-5%
2%
4%
45+00
40+00
35+00
30+00
25+00
20+00
15+00
10+00
400
300
200
100
0
COLUMBIA RIVER DATUM (CRD)


CLACKAMAS COUNTY
DEPT. OF TRANSPORTATION AND DEVELOPMENT
150 BEAVERCREEK ROAD
OREGON CITY, OR 97045
DIRECTOR
DAN JOHNSON
OAK GROVE - LAKE OSWEGO
PEDESTRIAN / BICYCLE BRIDGE FEASIBILITY STUDY
PLAN AND ELEVATION
REVISIONS
DESIGNED BY:
DRAFTED BY:
CHECKED BY:
NO. DATE:
Sheet No. D-3 BOX-1
PRELIMINARY COPY
30 PERCENT
SUBJECT TO CHANGE
PLAN
SCALE: 1" = 200'
ELEVATION
SCALE: 1" = 200'
SE DENNY ST
SE MALOY LN
SE BLUFF RD
SE COURTNEY RD
SE LAURIE AVE
SE FAIROAKS AVE
SE RENTON AVE
SE FAIROAKS WAY
SE COURTNEY AVE
RIVERVILLA PARK
RAILROAD BRIDGE
ASSUMED NAVIGATIONAL CHANNEL (VARIES)
WILLAMETTE RIVER
BUREAU OF ENVIRONMENTAL SERVICES
WILLAMETTE RIVER GREENWAY
FOOTHILLS PARK
STAMPHER RD
TRYON COVE PARK
LAKE OSWEGO
FOOTHILLS RD
SW RIVERSIDE DR
SW TERWILLIGER BLVD
TRYON CREEK STATE NATURAL AREA
HWY 43
N. STATE ST
36+09
35+00
30+00
25+00
20+00
15+00
10+00
18' WIDE APPROACH SPANS VARY 80' TO 1-5' TOTAL LENGTH ~790' (STEEL GIRDERS OR P/S CONCRETE GIRDERS)
18' WIDE LENGTH ~680' (HAUNCHED STEEL BOX GIRDER SPANS)
18' WIDE APPROACH SPANS VARY 80' TO 105' TOTAL LENGTH ~970' (STEEL GIRDERS OR P/S CONCRETE GIRDERS)
OHW EL 28.3'
5%
3%
5%
ASSUMED NAVIGATION CHANNEL ENVELOPE
ASSUMED NAVIGATION CHANNEL ENVELOPE
RIVERVILLA PARK
RIVER BANK LIMITS
BRIDGE LENGTH ~2440'
COLUMBIA RIVER DATUM (CRD)
400
300
200
100
0
10+00
15+00
20+00
25+00
30+00
35+00
40+00

Construction Duration

This project would be estimated to be alternative delivery (CMGC or Design-Build), and the estimated construction duration would be estimated at 30-37 months for the bridge alternatives that have been developed in this study. The range in construction duration accounts for variability in bridge types and lengths among the alternatives, and it also assumes two foundation and substructure headings (independent working crews and equipment) for each bridge alternative. A contractor could elect to add a third foundation and substructure heading for the bridge alternatives on the A-3 alignments due to the length of bridge in those alternatives, which could help to reduce the construction duration by a few months. It should also be noted that the estimated construction duration range does not account for considerations of in-water work windows, which could extend the construction duration depending on the bridge foundation types and timing of construction.

Using alternative delivery could reduce the construction duration by a small amount since it usually has the impact of reducing the overall project schedule (combined schedule for design and construction). This is usually achieved by releasing foundation designs to begin construction at the site, and the remaining design of the bridge is completed during construction of the foundations. The simultaneous design and construction activities can result in reduced overall project schedule.

Bridge Lifetime

Bridges are typically designed for a service life of 75 years, which is consistent with the project design lifecycle applicability stated above and also with the estimated inspection operational maintenance costs presented in this project work. Achieving the intended bridge service life would require proper attention to design details in the design phase of the project, achieving quality construction, and keeping up with the required inspections and maintenance recommended following construction.

Environmental Impacts

The bridge would have impacts upon both terrestrial and aquatic environments. Impacts common to all alignments would include the following:

- All work on the main span foundations and any work on the approach structures that is below the Ordinary High Water Mark (OHWM) would have the potential to impact listed fish species and their critical habitat, as well as water quality within the Willamette River and adjacent waterways. However, these elements would be designed to minimize their footprint in the water and would utilize best management practices to limit ground disturbance and in-water impacts. Construction operations would satisfy regulatory requirements for in-water work and construction windows.
- The project could impact historic or archaeological resources in the area due to its location along the Willamette River.
- Encroachment on the Willamette River Greenway Management District.
- Encroachment on a Resource Protection Overlay District.

- Temporary construction impacts and permanent bridge substructure supports within adjacent parks.

The current alignments would not be expected to impact any heritage trees or historic landmarks designated by the City of Lake Oswego.

Please see Environmental Permitting Summary Report in Appendix B for a complete list of the potential impacts. Please see below for related permits and approvals.

Maintenance Requirements

Regular bridge inspections and maintenance would be required to keep the bridge in optimal condition to achieve its intended service life. Estimated inspections and maintenance items, as well as planning-level costs, are in Appendix C of this report.

Permittability

Because the project would require federal permits and approvals, and could require federal funding to construct, it would be subject to the requirements of the National Environmental Policy Act (NEPA). The NEPA process would be initiated because the Willamette River is a navigable waterway regulated by the US Coast Guard (USCG), which would require a federal bridge permit. The USCG would be the lead agency ensuring that all federal permits were acquired prior to issuing a bridge permit, and would coordinate with other federal agencies for permits and approvals, including any agencies providing federal funding. See Appendix C for a complete list of the potential impacts.

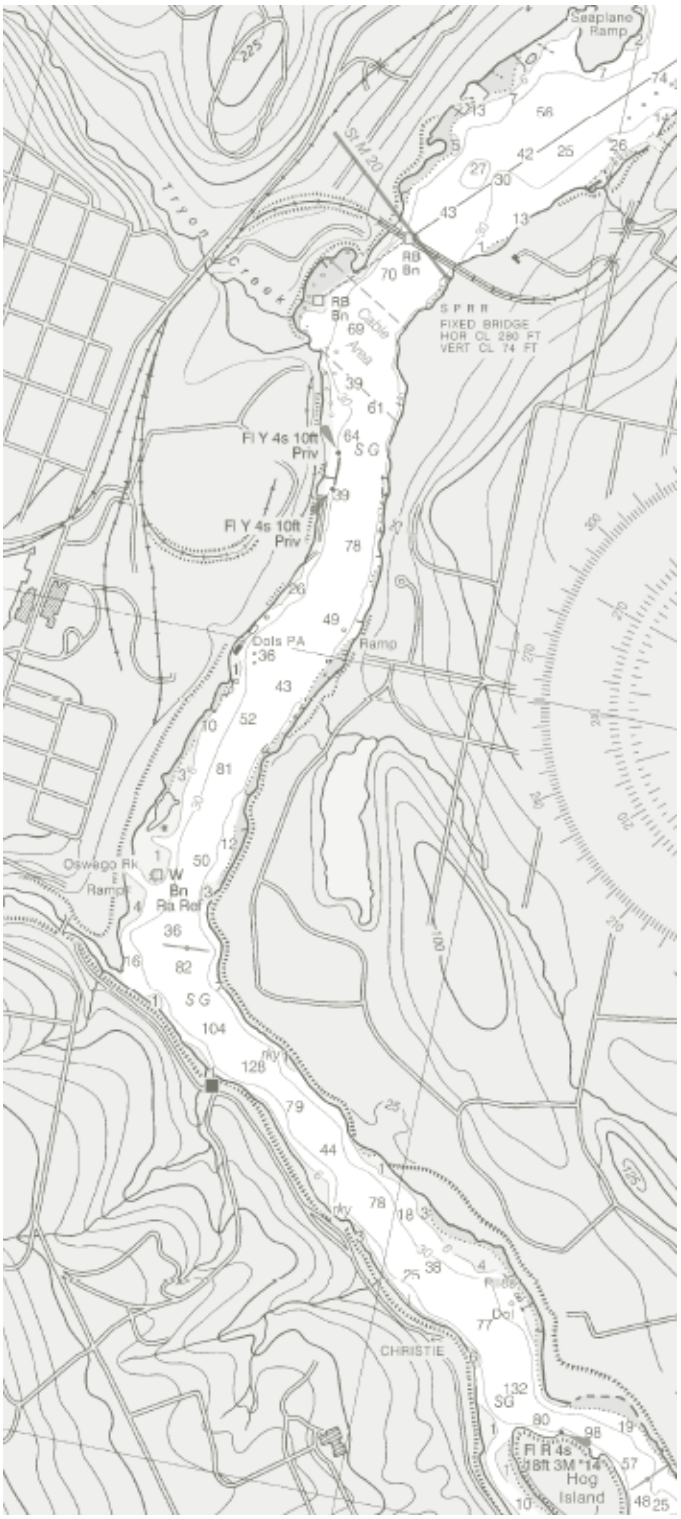
Permits and approvals would be required to construct the project as outlined below:

- Section 9 Bridge Permit from the USCG, which includes preparing a Navigation Impact Report and completing a Bridge Permit Application.
- Work below the OHWM of the Willamette River or within other regulated waters would require:
    - A Joint Permit Application (JPA) and approval from the US Army Corps of Engineers (USACE), Oregon Department of State Lands (DSL), and Oregon Department of Environmental Quality (DEQ).
    - A biological assessment (BA) to assess impacts to listed species and critical habitat under the jurisdictions of the National Marine Fisheries Service and the US Fish and Wildlife Service
- Comply with Section 106 of the National Historic Preservation Act, which would require preparation of an archaeological and historic resources report and consultation with the Oregon State Historic Preservation Office, as well as any interested Tribes.
- If the project received federal funding or required federal approval from US Department of Transportation agencies such as the Federal Highway Administration or the Federal Transit Administration, Section 4(f) would be applicable, and a 4(f) determination would have to be completed for potential impacts to park and recreation areas and historical sites.

- Section 6(f) would not apply since none of the parks adjacent to the proposed project site are known to have received Land and Water Conservation Funds; however, this would have to be confirmed if the project alignment is finalized.
- The maximum height of a "major public facility" under the City of Lake Oswego Municipal Code could conflict with the USCG's minimum requirement. A hardship variance from the City might be required depending on the bridge location.
- Within certain overlay districts in Lake Oswego and Clackamas County, impacts to trees and vegetation would require land use permits and mitigation.

Coast Guard Acceptance

The controlling navigational clearance envelopes are believed to be established by the existing Lake Oswego Railroad Bridge. According to the National Oceanic and Atmospheric Administration nautical charts, this fixed span railroad bridge has a vertical clearance of 74 feet, and other existing information on this bridge references horizontal clear span lengths of approximately 280 feet. The main span bridge alternatives that have been developed for a possible OGLO bridge provide for variation in span lengths and bent placement in the Willamette River, and are believed to be capable of achieving the vertical and horizontal clearance envelopes that will be acceptable for the United States Coast Guard.



Appendix B

Costs and Funding Opportunities

Oak Grove-Lake Oswego Pedestrian/Bicycle Bridge Feasibility Study

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Contents

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1 Project Development Costs

Technical Report 3g: Alternative Bridge Location Report summarizes the information in Reports 3a through 3f. Six landing sites on the west side of the Willamette River (Lake Oswego) and four landing sites on the east side (Oak Grove) are combined to yield a suite of potential crossing solutions. Technical Reports 3a through 3f describe, analyze, rate, and map these alternatives. The crossing location "pairs" that best met design and other criteria are SW Terwilliger Blvd to SE Courtney Avenue (Alternative A-3) and Foothills Park to SE Courtney Road (Alternative D-3).

See Technical Report 5a (see Appendix A) for details on plan-level cost estimates for these two crossing location alternatives. Mapping for these two selected location alternatives is in Technical Report 3e (see Appendix A of the OGLO Final Report).

Construction costs for the selected bridge/approach locations and types were created by developing concrete and steel quantities for large substructure and superstructure items such as river piers, columns, bridge decks, and cable support towers. Unit costs were based on as-constructed costs for similar bridge and project types. Construction methodology and cost for both the main river spans and the approach spans were also incorporated into the unit costs for each quantity. Further details on option dimensions and elements, unit costs, and other factors used for arriving at plan-level construction cost estimates are provided. Costing details for all options can be found in Technical Report 5a, Appendix A.

Bridge Span Options

Construction cost estimates were developed for the following:

- Three bridge main span type options are costed for Terwilliger to Courtney (steel, concrete, extradosed).
- Two main span options are costed for the Foothills to Courtney location (steel, cable stay), plus variations to these two main span options that incorporate a one-way bus-only transit lane.

Additional Costs

To account for unknown costs at this feasibility level of design, a 40% construction contingency was added to the final construction cost. The following percentages were also uniformly applied to the total construction cost for each alternative to develop discipline-specific costs for permitting, design, and construction.

▪ Engineering	10.5%
▪ Civil and Geotechnical	3.5%
▪ Architecture and Landscape Architecture	3.0%
▪ Environmental Permitting	1.5%
▪ Right-of-way	10.0%
▪ Construction Engineering	5.0%

2 Estimated Project Costs

SW Terwilliger Blvd to SE Courtney Road (Crossing Alternative A-3)

Total length of this alternative is 3,770 linear feet. Estimates assume 20-foot wide main decks and 18-foot-wide concrete approach decks for all three bridge type options below. Each main span option is costed for steel and concrete approaches (see Technical Report 5a, Appendix A), but total costs (see below) are based on the less expensive concrete approach treatment.

- Steel Main Span $44,500,000
- Concrete Main Span $45,300,000
- Extradosed Main Span $52,000,000

Foothills Park to SE Courtney Road (Crossing Alternative D-3)

Total length of this alternative is 2,440 linear feet. Estimates assume 20-foot-wide main decks and 18-foot-wide concrete approach decks for the two bridge type options below. Each main span option is costed for steel and concrete approaches (see Technical Report 5a, Appendix A), but total costs (see below) are based on the less expensive concrete approach treatment.

- Steel Main Span $30,300,000
- Cable Stay Main Span $36,400,000

Alternative D-3 with Transit Lane

Total length of this alternative is 2,440 linear feet. Estimates assume 34- to 37-foot-wide main decks and 34-foot-wide concrete approach decks for the two bridge type options below. Each main span option is costed for steel and concrete approaches (see Technical Report 5a, Appendix A), but total costs (see below) are based on the less expensive concrete approach treatment.

- Steel Main Span $43,600,000
- Cable Stay Main Span $54,200,000

The tables on the following page provide additional detail regarding the estimated project costs.

Oak Grove-Lake Oswego - Pedestrian/Bicycle Bridge Construction Contingency 40%	Terwilliger to Courtney: Steel Main Span A-3	Terwilliger to Courtney: Concrete Main Span A-3	Terwilliger to Courtney: Extradosed Main Span A-3	Foothills to Courtney: Steel Main Span D-3	Foothills to Courtney: Cable Stay Main Span D-3
Main Span Sub-Total/Unit Cost	$ 778 / SF $ 16,800,000	$ 801 / SF $ 17,300,000	$ 962 / SF $ 22,600,000	$ 838 / SF $ 11,400,000	$ 1169 / SF $ 15,900,000
Approach Span Steel Girders Sub-Total/Unit Cost	$ 423 / SF $ 20,500,000	$ 423 / SF $ 20,500,000	$ 429 / SF $ 20,100,000	$ 436 / SF $ 13,800,000	$ 432 / SF $ 13,700,000
Approach Span Concrete Girders Sub-Total/Unit Cost	$ 339 / SF $ 16,400,000	$ 339 / SF $ 16,400,000	$ 346 / SF $ 16,200,000	$ 350 / SF $ 11,100,000	$ 350 / SF $ 11,100,000
Total Bridge Only Cost using Steel Approaches	$ 533 / SF $ 37,300,000	$ 540 / SF $ 37,800,000	$ 607 / SF $ 42,700,000	$ 557 / SF $ 25,200,000	$ 654 / SF $ 29,600,000
Total Bridge Only Cost using Concrete Approaches	$ 474 / SF $ 33,200,000	$ 481 / SF $ 33,700,000	$ 552 / SF $ 38,800,000	$ 497 / SF $ 22,500,000	$ 596 / SF $ 27,000,000
Engineering 10.5%	$ 3,500,000	$ 3,600,000	$ 4,100,000	$ 2,400,000	$ 2,900,000
Civil and Geotechnical 3.5%	$ 1,200,000	$ 1,200,000	$ 1,400,000	$ 800,000	$ 1,000,000
Architectural and Landscape Architecture 3.0%	$ 1,000,000	$ 1,100,000	$ 1,200,000	$ 700,000	$ 900,000
Environmental Permitting 1.5%	$ 500,000	$ 600,000	$ 600,000	$ 400,000	$ 500,000
Right of Way 10.0%	$ 3,400,000	$ 3,400,000	$ 3,900,000	$ 2,300,000	$ 2,700,000
Construction Engineering 5.0%	$ 1,700,000	$ 1,700,000	$ 2,000,000	$ 1,200,000	$ 1,400,000
Subtotal of ROW, Design, & Construction Engineering costs	$ 11,300,000	$ 11,600,000	$ 13,200,000	$ 7,800,000	$ 9,400,000
Total Bridge Cost using Concrete Approaches	$ 44,500,000	$ 45,300,000	$ 52,000,000	$ 30,300,000	$ 36,400,000

Oak Grove-Lake Oswego - Pedestrian/Bicycle Bridge Construction Contingency 40% Transit Alternative	Foothills to Courtney: Steel Main Span D-3 Transit	Foothills to Courtney: Cable Stay Main Span D-3 Transit
Main Span Sub-Total/Unit Cost	$ 774 / SF $ 17,900,000	$ 1021 / SF $ 25,700,000
Approach Span Steel Girders Sub-Total/Unit Cost	$ 366 / SF $ 21,900,000	$ 366 / SF $ 21,900,000
Approach Span Concrete Girders Sub-Total/Unit Cost	$ 242 / SF $ 14,500,000	$ 242 / SF $ 14,500,000
Total Bridge Only Cost using Steel Approaches	$ 480 / SF $ 39,800,000	$ 560 / SF $ 47,600,000
Total Bridge Only Cost using Concrete Approaches	$ 391 / SF $ 32,400,000	$ 473 / SF $ 40,200,000
Engineering 10.5%	$ 3,500,000	$ 4,300,000
Civil and Geotechnical 3.5%	$ 1,200,000	$ 1,500,000
Architectural and Landscape Architecture 3.0%	$ 1,000,000	$ 1,300,000
Environmental Permitting 1.5%	$ 500,000	$ 700,000
Right of Way 10.0%	$ 3,300,000	$ 4,100,000
Construction Engineering 5.0%	$ 1,700,000	$ 2,100,000
Subtotal of ROW, Design, & Construction Engineering costs	$ 11,200,000	$ 14,000,000
Total Bridge Cost using Concrete Approaches	$ 43,600,000	$ 54,200,000

3 Project Funding

Based on the foregoing caveats, and the individual funding sources analyzed in this memorandum, the following would be recommended as the most feasible funding sources for designing *and* building OGLO.

Municipal

Municipal funding sources can be used for a bicycle/pedestrian infrastructure project such as the OGLO Bridge. However, municipal funds are limited and available only in small amounts. The best use of municipal funds is for limited improvements that are needed to connect the bridge to the existing active transportation system, or for maintenance/operations once the project has been constructed.

Metro

2019 Parks and Nature Bond – This measure went before the region's voters in November 2019. It sets aside $40 million for "walking and biking" trails, and trail funding could also come from other bond allocation (local share, complex community projects). The OGLO Bridge project was specifically identified in materials for the 2019 Parks and Nature Bond as a likely candidate for project development funding.

2020 Transportation Bond – The transportation bond is still a work in progress. The list of projects to be included for specific allocations from the bond funds has not yet received final approval, but inclusion of OGLO Bridge on that list seems unlikely. It appears there will be program funding for active transportation infrastructure and that is the most likely manner in which bond funds could be used for the OGLO Bridge project.

Regional Flex Funds (RFF) – RFF includes federally sourced funds derived from three programs under the Federal FAST Act. In the current 2022–2024 cycle, just under $30 million is available for "active transportation and complete streets." However, applications under this cycle were due June 2019, so funding for OGLO would have to wait until 2025.

State

The Oregon Department of Transportation (ODOT) administers several funds that can be used for bicycle and pedestrian facilities. All of the programs have different funds sources and different criteria for project selection. The following brief describes the available programs that could be applied to the OGLO Bridge project. None of these funds are sufficient to fully fund the project, but could be used along with funds from other sources to create a funding package sufficient to fully fund the project. State administered funds which seem to be the best fit for the OGLO Bridge project include:

- **Congestion Mitigation Air Quality Improvement Program** – The Congestion Mitigation Air Quality Improvement Program is a federally-funded program for surface transportation improvements designed to improve air quality and mitigate congestion. Reduction in vehicle emissions is usually an important criteria for funding award under this program. Eligible project types include pedestrian and

bicycle infrastructure. The OGLO Bridge project would likely be very competitive for CMAQ funds due to the high amount of emissions that would be reduced. Generally, CMAQ funds are only used for a portion of project costs and a cash match of between 20% and 50% of project cost is required. .

- ConnectOregon – ConnectOregon is a state funded, competitive grant program that invests in all types of surface transportation improvements including bicycle/pedestrian infrastructure. ConnectOregon grants can pay for up to 70% of project costs with a required match of at least 30%.

Federal

Most federal funding that would be appropriate for OGLO Bridge is a pass-through that is administered by Oregon Department of Transportation and Metro. No direct federal funding programs are recommended for OGLO.

Municipal

City of Lake Oswego Parks Bond

The Lake Oswego Parks Bond approved by local voters in May 2019 is estimated to generate $30 million in revenue. Funds can be applied to eligible projects within the city limits as well nearby unincorporated areas. Nonetheless, the Lake Oswego bond would *not* be available for funding OGLO.

System Development Charges and Similar Fees

SDCs are assessed at the time of private development. Transportation and parks SDCs could nominally be applied to an OGLO bridge. Under state law, an SDC (also called an impact fee) may be a reimbursement fee to reimburse for existing excess system capacity benefiting the development, or an improvement fee to pay for new system capital improvements to meet new demand generated by the development. The two types may be combined. State law dictates the methodology for calculating these charges.

The key provision is that the calculation (and expenditures) must be for capital improvements included in local plans adopted under state land use law (e.g., comprehensive, parks, transportation, associated capital improvement programs, and similar plans). This “duly adopted plan provision” could pose a limitation to use of SDCs for OGLO. As noted earlier, OGLO only appears in in the County’s 2013 Transportation System Plan and 2015 Active Transportation Plan. OGLO or similar is not specifically listed in Lake Oswego’s CIP associated with SDC funds, but there is a general allocation for “pathways and trail development.’” Secondly, as a regional facility crossing multiple jurisdictions, OGLO might be hard to justify for local SDC eligibility. Lastly, irrespective of eligibility and as a practical reality, total SDC funds available at any given point may fall well short of what would be needed for OGLO.

- The **City of Lake Oswego** has enacted transportation and parks SDCs. Pathways and trail development fall under the City’s SDC CIP (current as of 2018).

- **Clackamas County** also has a transportation SDC, but not one for parks. The County's current 20-year CIP list (version 1/18/17) and the 2013 Transportation System Plan include a reference to a Willamette River "bike/pedestrian crossing." The crossing is referred to as the Lake Oswego to Milwaukie Bridge, and the location is described being as between Sellwood and Oregon City (Project ID: 2022, Map: 5-11c).
- The **North Clackamas Parks and Recreation District, a special service district of Clackamas County,** has a parks SDC, and is a partner in this project.

Connecting Multiuse Trails

Existing or planned regional multiuse trails (paved 10-12 foot wide minimum) might need to be extended to connect to the OGLO bridgeheads. The locations and lengths of these connecting trails would depend on the location of the preferred OGLO bridge. Conceptual alignments in the OGLO feasibility study primarily rely on on-street connections (Oak Grove) or direct bridge ramp connections (Lake Oswego/Terwilliger) to nearby trails.

In addition, existing or planned regional trails shown on the 2018 Regional Trails System Plan might need to be improved. Connecting multiuse trails could be funded and completed separately, but the best approach would be to embed engineering and construction within the larger OGLO project budget.

Note – To secure funding, the preferred OGLO and connecting trail alignments would likely need to be added to the 2018 Regional Trails System Plan and to applicable local plans.

Additional Funding Opportunities

This OGLO assessment is scoped to identify the feasibility of a variety of bridge locations, types, and supporting infrastructure such as bridgehead improvements and connecting trails. Depending on the outcomes of this feasibility assessment, there could be the need for additional planning analysis, public outreach, or other project activities before beginning any construction engineering and permitting. There could also be opportunities to identify some physical features of OGLO for standalone funding and construction.

There are numerous grant programs that could partially fund the OGLO bridge or at least some select elements of the bridge. The relatively lower levels of funding available, narrower eligibility requirements, and award timing might make use of the following grant opportunities challenging for developing an all-at-once funding package.

Land and Water Conservation Fund

This long-established national program expired in 2018, but after some debate was subsequently reauthorized in 2019. Although primarily conceived as a tool to acquire and preserve important land and water resources, the fund could be used for trails. Under the revised reauthorization, at least 40 percent of LWCF appropriations must go to states.

The Oregon Parks and Recreation Department (OPRD) administers this matching grant program in Oregon. The next grant cycle opens January 2020. The program has historically been used to build recreational facilities as part of park development. These include active facilities such as sports fields and trails.

OPRD Local Government Grants

This program awards approximately $4 million in grants annually for public outdoor park and recreation areas and facilities, including trails, trail bridges, and trailhead facilities. The source of the funds is the Oregon Lottery. $11,772,239 was awarded in 2018. The largest possible grant is $750,000, and a match is required. The program also includes an allocation for planning grants. The 2019 grant cycle closed on May 15, 2019. Cities, counties, metropolitan service districts, parks and recreation districts, and ports are eligible.

Note: OPRD also has a County Opportunity grant program, but it is limited to campground property acquisition and development by counties.

OPRD Recreation Trails Program

These are federal pass-through funds available through FHWA supporting recreational trail development. Funds available are based on annual Congressional appropriations. Cities, counties, non-profits, state and federal agencies, tribes, and other government entities are eligible. $2.4 million was awarded in 2018. The 2019 application deadline was June 15, 2019.

Metro Nature in Neighborhoods Grants

This program is underwritten by Metro Parks Bond proceeds and has been primarily applied to land acquisition, habitat restoration, and natural area development. Facilities such as trails, boardwalks, and trail bridges have been included in program-funded developments. As of this writing, this grant program is slated to receive a $40 million capital grant allocation from the proposed 2019 Metro Parks Bond renewal (see earlier discussion in this report). Planning-level projects can also be supported by Nature in Neighborhoods

Travel Oregon

The Travel Oregon (TO) Competitive Grants Program awards eligible applicants funding for projects that contribute to Oregon's tourism economy in communities throughout the state that support Travel Oregon's vision of "a better life for Oregonians through strong, sustainable local economies."

This TO program is allocated at three funding levels: small, medium and large. Funds can apply to capital and planning projects. The medium level is $20,000 to $100,000, and the next cycle is Spring 2020. In the most recent funding cycle, medium projects included projects such as the new West Burnside footbridge and the Oregon Coast Trail. The large program funds projects that are greater than $100,000 and is opened under the direction of the Oregon Tourism Commission.

Cycle Oregon

The Cycle Oregon Fund awarded $95,000 in grants to 14 projects in 2018, mostly for improvements and programs supporting bike riding. Cycle Oregon also has committed to supporting the planning and development of the Salmonberry Trail, donating $225,000 between 2014 and 2018, and committing to raising another $1 million.

4 Operation and Maintenance Costs

Main Span Considerations

This memo compares the operations and maintenance costs for a range of main span alternatives, including box girders, extradosed and cable-stayed. A number of assumptions were made to define the comparison of alternatives. These assumptions include the following:

- All structural steel components are painted and do not include the consideration of weathering steel.
- Bearings: approach spans utilize laminated neoprene bearings while the main span utilize disk bearings.
- Epoxy deck overlay is installed as part of new construction and then replaced after 35 years.
- Transit vehicles (where applicable) consist of buses only, not rail.
- Minor differences in approach span length for transit alternatives are not evaluated separately.
- Lump sum inspection costs include labor and equipment to perform inspections. Unit costs for maintenance items only includes construction work (does not include consultant fees).

In addition, a number of assumptions were made to define the inspection interval and the level of inspection required for the various bridge types. Pedestrian bridges are not included in the FHWA-mandated National Bridge Inventory (NBI) and thus are not governed by National Bridge Inspection Standards (NBIS), which requires a routine inspection of all vehicular bridges on a two-year cycle. That being said, many pedestrian bridge owners are inspecting their inventory in accordance with these standards, and we recommend biennial inspections to help ensure public safety and to minimize overall life-cycle costs by planning for needed repair and component replacements well in advance.

Furthermore, for the cable-supported bridge alternatives, we assumed a specialty inspection of the cables and anchorages on 10-year intervals. This work will require a climbing inspection using safe rope access techniques to facilitate the inspection of the cables and the upper anchorages.

Bridge access equipment, including an underdeck inspection vehicle, often called a “snooper truck”, and aerial lift equipment would need to be considered during the design of the bridge. These inspection vehicles apply a much heavier concentrated load in

comparison to a normal maintenance truck, so it may be necessary to designate specific areas of the deck which are available for use during inspections.

Bridge alternatives which utilize steel trapezoidal box girders to carry exclusively pedestrian loads are assumed to be designed with consideration of structural steel fatigue details and adequately low stress ranges so that a specialty inspection is not warranted. However, trapezoidal box girders which carry vehicular loads are considered a "fracture critical structure" which requires that these spans undergo an arms-length inspection on a bienneal basis. This fracture critical designation does not imply that these structures are not appropriate for use, only that additional inspection is required.

Time Value of Money

The cost of conducting the assumed inspections, and performing the recommended maintainance resulting from these inspections was projected over the design life of the project. Two assumptions were used to prepare a comparison of the various bridge alternatives on an equivalent basis, including:

- 75 year design life for all bridge alternatives.
- 3% annual rate of construction/engineering cost inflation.

The estimated costs for the necessary services are based on current dollars and then projected forward to the appropriate point on the in-service timeline using the assumed rate of cost inflation. For example, the first in-depth inspection of a cable-supported span will not occur until year 10 and then will recur in year 20, 30 and so forth throughout the life of the bridge. All of these future costs were then pulled back to current day costs to form a uniform basis of comparison between alternatives. The assumed initial year of service and the recurrence interval for the most likely inspections and operational maintenance work are presented in Table 1.

Table 1: Assumed Start Year and Recurrence Interval for Inspection and Maintenance Types

Start Year	Inspection or Maintenance Type	Recurrence (# of years)
1	Initial in-depth inspection	0
1	Routine operational maintenance	1
2	Biennial maintenance inspection	2
10	In-depth inspection (main span)	10
2	Remove graffiti and repair vandalism	2
10	Painting structural steel (touchup 5%)	5
35	Painting structural steel (full repainting)	35
20	Superstructure repairs	20
25	Substructure concrete repairs	25
30	Replace expansion joints	30
25	Replace bridge deck overlay	30
10	Specialized inspection of stay cables & anchorages	10
20	Repairs to stay cables & anchorages	20

50	Replacement of stay cable	50
40	Replace approach span bearings (25%)	40
50	Replace main span bearings (25%)	50

Estimated Operation and Maintenance Costs

Estimated unit costs for inspection, operation and maintenance were developed from recent experience on similar bridge projects across the US and compared to average unit costs published by state DOT bridge owners and are presented in Table 2. These estimates were also verified by an independent consulting engineer (Armeni Consulting Services, LLC) who specializes in constructability reviews and bottom-up cost estimates for complex bridge projects. However, these estimated costs should be utilized with caution simply because the fluctuation of material and labor costs over the service life of these bridge alternatives cannot be predicted with complete certainty.

Based on the assumptions and estimated inspections and maintenance intervals described above, estimated operation and maintenance cost for each bridge alternative have been calculated and are presented in Table 3. Given the level of uncertainty in these future costs, as well as their optimal recurrence interval, it is prudent to consider a reasonable range of costs rather than a single value to represent each bridge alternative. These costs are intended as a basis of comparison between alternatives, but does not represent anything more than planning-level estimated costs at this stage of project development.

Table 2: Assumed Units Costs for Inspection and Maintenance Types

Inspection or Maintenance Type	Estimated Cost (Current Year)
Initial in-depth inspection	$ 5,000 LS
Routine operational maintenance	$12,000 LS
Biennial maintenance inspection	$5,000 LS
In-depth inspection (main span)	$30,000 LS
Remove graffiti and repair vandalism	$6,000 LS
Painting structural steel (touchup 5%)	$10 / sq. ft.
Painting structural steel (full repainting)	$6 / sq. ft.
Superstructure repairs	$25,000 LS
Substructure concrete repairs	$50,000 LS
Replace expansion joints	$120 / lin. ft.
Replace bridge deck overlay	$7.50 / sq. ft.
Specialized inspection of stay cables & anchorages	$20,000 LS
Repairs to stay cables & anchorages	$10,000 LS
Replacement of stay cable	$100,000 LS
Replace approach span bearings (25%)	$3,000 each
Replace main span bearings (25%)	$10,000 each

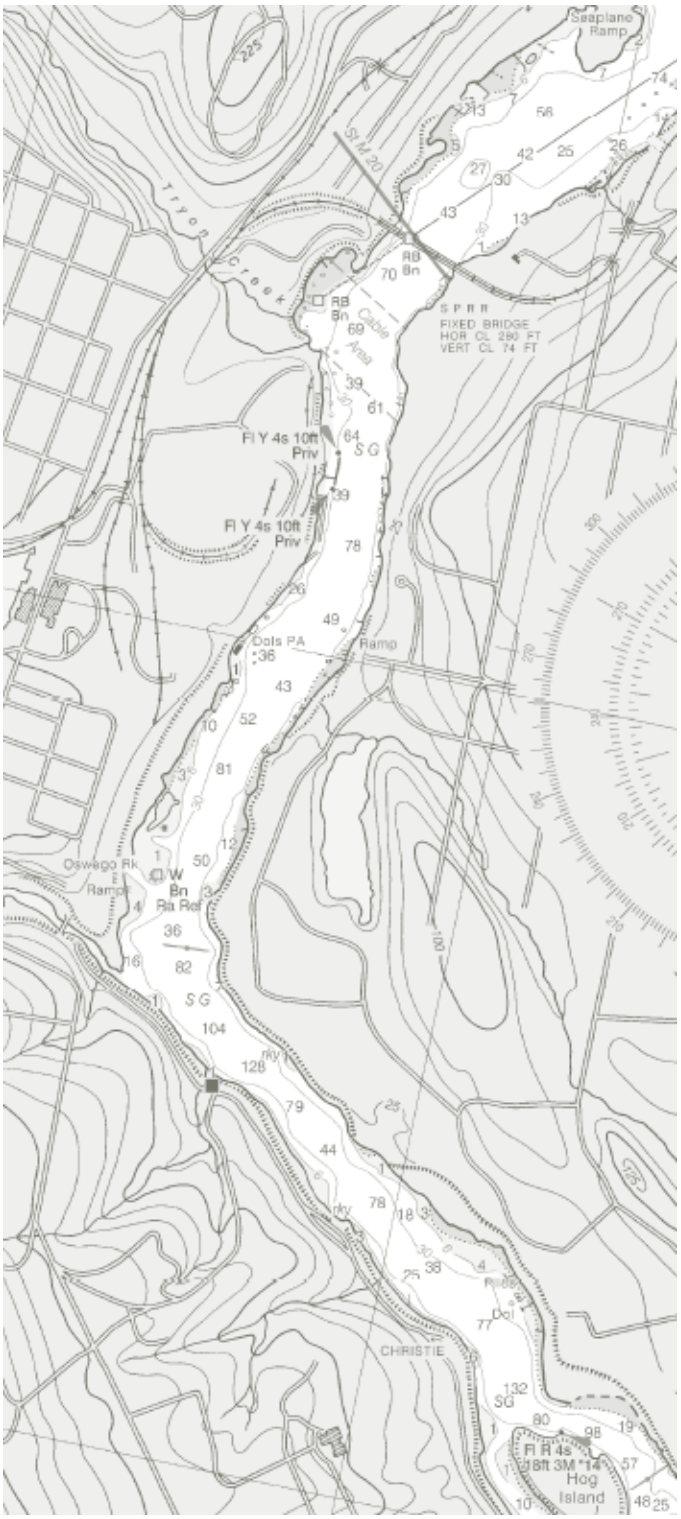
Table 3: Estimated Planning-Level Operation and Maintenance Costs for the Range of Bridge Alternatives (Total Year-of-Expenditure Costs with Escalation for 75-Year Design Life)

Alignment	Main Span Type	Approach Span Type	
		Concrete	Steel
A-3	Haunched Concrete Box	$9,950,000	$18,900,000
A-3	Extradosed	$11,900,000	$19,810,000
D-3	Haunched Steel Box	$17,140,000	$23,830,000
D-3	Cable-Stayed	$10,710,000	$16,600,000
D-3	Haunched Steel Box (Transit)	$20,190,000	$26,020,000
D-3	Cable-Stayed (Transit)	$13,110,000	$18,990,000

Based on the findings of this task, high-level recommendations to minimize operational and maintenance costs include the following:

- Painting on structural steel is a substantial life cycle cost. Limit the quantity of painting in the structure, either by selecting concrete elements or by utilizing weathering steel for structural components.
- Mobilization costs by a contractor can increase greatly if operational and maintenance items are performed in independent projects. If possible, group multiple maintenance items into each future maintenance project in order to maximize the amount of construction work completed per mobilization.

Implementation of these recommendations could likely help to reduce life cycle operational and maintenance costs for the bridge owner, and it could also potentially reduce the difference in life cycle costs between concrete and steel alternatives.



Appendix C:

Agency Permitting and Approval Requirements Summary

Oak Grove-Lake Oswego Pedestrian/Bicycle Bridge Feasibility Study

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Contents

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1 NEPA Summary

Because the project would require federal permits and approvals, and would be expected to require federal funding to construct, it would be subject to the requirements of the National Environmental Policy Act (NEPA). NEPA is a law that seeks to ensure that a federal action considers impacts on the human and natural environment. The NEPA process would be initiated on this project because the Willamette River is a navigable waterway regulated by the US Coast Guard which would require a federal permit. Issues considered in NEPA include:

- Right-of-Way Impacts
- Traffic
- Water Quality
- Threatened or Endangered Species
- Parks and Public Lands
- Hazardous Materials
- Floodplain
- Public Safety
- Land Use/Socioeconomic Impacts
- Wetlands/Waterways
- Wildlife/Fish/Birds
- Archaeology and Historical Impacts
- Air Quality
- Noise Impacts
- Stormwater
- Public Concerns

2 Environmental Impacts of the Proposed Alternatives

Potential environmental impacts were reviewed as Task 4a, Environmental Checklist (see Appendix A). Alternative-specific impacts are listed below.

- A-2: SW Terwilliger Boulevard to SE Bluff Road
    - Major impacts to Tryon Cove Park (City of Lake Oswego: Park and Natural Area (PNA) zone)
    - Minimal impacts to Rivervilla Park (Clackamas County: Open Space Management (OSM) District)
    - Impacts to Tryon Creek and its buffer
    - City of Lake Oswego
        - Willamette River Greenway Management District
        - Potentially within a Resource Protection (RP) Overlay District
        - No heritage trees or historic landmarks
- A-3: SW Terwilliger Boulevard to SE Courtney Road
    - Major impacts to Tryon Cove Park (City of Lake Oswego: PNA zone)

  - Minimal impacts to Rivervilla Park (Clackamas County: OSM District)
  - Potential impacts to Tryon Creek and its buffer
  - City of Lake Oswego
    - Willamette River Greenway Management District
    - Potentially within a RP Overlay District
  - No heritage trees or historic landmarks
- B-2: Tryon Cover Park (Upper) to SE Bluff Road
  - Minor impacts to Tryon Cove Park (City of Lake Oswego: PNA zone)
  - Minimal impacts to Rivervilla Park (Clackamas County: OSM District)
  - Potential impacts to Tryon Creek and its buffer
  - City of Lake Oswego
    - Willamette River Greenway Management District
    - Potentially within a RP Overlay District
    - No heritage trees or historic landmarks
- B-3: Tryon Cove Park (Upper) to SE Courtney Road
  - Minor impacts to Tryon Cove Park (City of Lake Oswego: PNA zone)
  - Minimal impacts to Rivervilla Park (Clackamas County: OSM District)
  - Potential impacts to Tryon Creek and its buffer
  - City of Lake Oswego
    - Willamette River Greenway Management District
    - Potentially within a RP Overlay District
    - No heritage trees or historic landmarks
- C-2: Tryon Cove Park (Lower) to SE Bluff Road
  - Significant impacts to Tryon Cove Park (City of Lake Oswego: PNA zone)
  - Minimal impact to Rivervilla Park (Clackamas County: OSM District)
  - Potential impacts to Tryon Creek and its buffer
  - City of Lake Oswego
    - Willamette River Greenway Management District
    - Potentially within a RP Overlay District
    - No heritage trees or historic landmarks
- D-1: Foothills Park to Rivervilla Park
  - Significant impacts to Rivervilla Park (Clackamas County: OSM District)
  - Minor Impacts to Foothills Park (City of Lake Oswego: PNA zone)

    - City of Lake Oswego
        - Willamette River Greenway Management District
        - Potentially within a RP Overlay District
        - No heritage trees or historic landmarks
- D-2: Foothills Park to SE Bluff Road
    - Minor impacts to Foothills Park (City of Lake Oswego: PNA zone)
    - Potential impacts to Tryon Creek and its buffer
    - City of Lake Oswego
        - Willamette River Greenway Management District
        - Potentially within a RP Overlay District
        - No heritage trees or historic landmarks
- D3: Foothills Park to SE Courtney (Upper)
    - Minor impacts to Foothills Park (City of Lake Oswego: PNA zone)
    - Minimal impact to Rivervilla Park (Clackamas County: OSM District)
    - Potential impacts to Tryon Creek and its buffer
    - City of Lake Oswego
        - Willamette River Greenway Management District
        - Potentially within a RP Overlay District
        - No heritage trees or historic landmarks
- E-4: Roehr Park to Oak Grove Boulevard
    - Minor impacts to Roehr Park (City of Lake Oswego: PNA zone)
    - City of Lake Oswego
        - Willamette River Greenway Management District
        - No heritage trees or historic landmarks
- F-4: William Stafford to Oak Grove Boulevard
    - Minor impacts to Roehr Park (City of Lake Oswego: PNA zone)
    - City of Lake Oswego
        - Willamette River Greenway Management District
        - No heritage trees or historic landmarks

3 Permitting

To determine environmental issues and permitting requirements that would need to be addressed for the proposed Oak Grove-Lake Oswego Pedestrian/Bicycle Bridge Project,

Parametrix was initially tasked with conducting a scoping workshop with applicable federal, state, and local agencies. Due to the inability to coordinate a workshop including all appropriate agencies, individual phone conversations were conducted instead. This memorandum summarizes the information gathered during these conversations so potential project partners may understand the permitting requirements, as well as how those requirements would impact project schedule and costs. Key takeaways from the conversations that could have significant impacts to engineering design and project timelines are listed below.

- The proposed project would be subject to permit approval by the U.S. Coast Guard (USCG) under the provisions of Section 9 of the Rivers and Harbors Act of 1899 and the General Bridge Act of 1946. Pursuant to these Acts, the USCG would be the federal lead agency for the proposed project. The bridge would not be exempt from USCG jurisdiction since the Willamette River is a designated Navigable Water of the U.S. Per the USCG, a minimum navigation clearance of 74 feet above the ordinary high-water mark (OHWM) is required for the proposed OGLO bridge. The USCG has a very defined framework for its permitting process and will need to be consulted at project inception for coordination on both engineering design and permitting.
- The proposed bridge would be considered a “major public facility” under City of Lake Oswego Municipal Code. Per Chapter 50.02.003.2/.3, the maximum height of any portion of a structure shall not exceed “a height as determined by the ratio of one foot in height for every 3.5 feet of distance from the portion of the structure to the lot line of the nearest residentially zoned property, to a maximum of 75 feet,” except as otherwise permitted by LOC 50.04.003.4. In addition, City Charter Section 46A also has overarching restrictions for maximum height in a residential zone of 50 feet. Depending on where the bridge is constructed this could conflict with the USCG’s height requirement noted above and may require a hardship variance from the City, along with proof that the project’s height requirements are unavoidable. Currently, it is not clear if the variance would apply to the City Charter imposed height in residential zones.
- Oregon Department of Fish and Wildlife (ODFW) says that depending on the timing of the potential bridge construction, it could bear a greater need for cumulative impact analysis depending on the level of ongoing Portland Harbor clean-up work at that time.
- The best way to ensure an efficient permitting process would be to present the proposed project and relevant permitting information to representatives from NMFS, USFWS, USACE, DSL, DEQ, and ODFW. Given the USCG’s ultimate approval of the project, they would be a key attendee for this meeting.
- Oregon SHPO did not respond to requests to provide information. Section 106 Consultation with SHPO would be required due to federal permitting, and there would be potential for encountering archaeological artifacts due to bridge landings along the shores of the Willamette River.

Table 1 below provides a list of key permitting agencies and a summary of their respective requirements for the proposed project as identified during their conversations with Parametrix. A log of the scoping conversations with the agencies is attached.

Table 1 – Summary of Anticipated Agency Permit and Approval Requirements

Permitting Agency	Required Permits/ Actions	Estimated Timeframe	Notes
US Coast Guard (USCG)*	• Bridge Permit Application	• 10 months	• A minimum navigation clearance of 74 feet above the OHWM • Permit would not be issued until all federal funding and permitting approvals are complete • Early coordination with USCG is necessary due defined to guidelines in the USCG's Bridge Permit Application Guide for engineering design and permitting timeframes
US Army Corps of Engineers (USACE)	• Nationwide Permit 14	• 3 to 6 months	• Impacts must be less than 0.5 acre or an Individual 404 Permit would be required
National Marine Fisheries Service (NMFS)	• Formal Section 7 consultation • Biological Assessment/Biological Opinion	• 6 to 9 months	• Primary contact for fish • Focus on impacts to steelhead and Lower Columbia River chinook (*Oncorhynchus* spp.)
US Fish and Wildlife Service (USFWS)	• Biological survey	• 6 to 9 months	• Prominent eagle nesting presence • Recommended "may affect, not likely to adversely affect" or "no effect" determination for bull trout (*Salvelinus confluentus*), yellow-billed cuckoo (*Coccyzus americanus*), and streaked-horned lark (*Eremophila alpestris strigata*) • Clearing and grubbing on either side of the Willamette River should be conducted during late fall or winter; unique and large trees should be avoided
Oregon Department of State Lands (DSL)	• Impacts 5 piles or less – General Authorization form • Impacts greater than 5 piles – Individual Permit Authorization; Joint Application Form • Easements require Land Use Compatibility Statement (LUCS); 30-day public review period	• Temporary easement – 60 days • Permanent easement – up to 6 months	• LUCS must be approved by Lake Oswego and Clackamas County • Permanent easements require review by the State Land Board • Short-term access could be granted while permanent easements are being processed if construction delays are anticipated. This usually takes about a week to process.

Permitting Agency	Required Permits/ Actions	Estimated Timeframe	Notes
Oregon Department of Fish and Wildlife (ODFW)	• Standard best management practices		• In-water construction schedule would be dictated by in-water work window • Consider construction sequencing for upland species (e.g. bald eagle) versus in-water work • Depending on construction schedule and context of activity in the project area, consider cumulative effects to fish • Discuss fish passage considerations with Greg Apke at ODFW once permitting and preliminary design begins • Dependent upon project start up, more defined rules for lamprey may be in place and require greater analysis
Oregon Department of Environmental Quality (DEQ)	• 401 Water Quality Certification	• 3 months	• DEQ would need a copy of the LUCS • DEQ receives notification from USACE once a decision to use an NWP or IP for the Section 404 process is made
State Historic Preservation Office (SHPO)	• Section 106 consultation if using federal funds • Cultural and historic resources survey and report • Consultation with potentially interested Tribal groups and other public stakeholders	• 6 to 18 months	• Attempts to coordinate with SHPO were not successful • Since federal permits are necessary, Section 106 consultation will be required. Given landing locations for bridge are on the shoreline of the Willamette River, potential risk for encountering archaeological artifacts is present.

Permitting Agency	Required Permits/ Actions	Estimated Timeframe	Notes
Clackamas County	• Willamette River Greenway Permit	• Up to 8 weeks	• Could be exempt from permitting requirements if construed as an exception under Subsection 705.03(G)
	• Floodplain Development Permit (FDP) • Hydraulic analysis • If a rise determination is made, a certified letter of map revision (CLOMR)		• Ideally, the proposed bridge would be elevated above base flood elevation (BFE) and all applicable standards of Section 703 would apply: ➢ Subsection 703.07(D); ➢ Applicable elements of Subsection 703.10(A); ➢ Subsection 703.10(F) if fill is proposed; ➢ Subsection 703.10(G). • FEMA approval would be needed prior to obtaining FDP from the County • Coordinate with Oak Lodge Water Services for input on erosion control • A geotech review may be needed due to the steep slopes in the project area
	• Habitat Conservation Area District (HCAD) Construction Management Plan (CMP) • HCA Map Verification • HCA Development Permit with mitigation for disturbance of the HCA		• An HCAD CMP would not be required if a Water Quality Resource Area (WQRA) CMP is completed. • Map verification does not require in-situ identification
	• WQRA CMP • WQRA Boundary Verification • WQRA Development Permit		• A WQRA CMP would not be required if an HCAD CMP is completed. • Boundary Verification requires an in-situ identification
	• Application for Open Space Review		
City of Lake Oswego	• Conditional Use Permit	• 4 to 6 months	
	• Floodplain and Floodways		• No-rise analysis • Impacts to floodplain would require cut and fill balance
	• Development Review		• Willamette River Greenway

Permitting Agency	Required Permits/ Actions	Estimated Timeframe	Notes
			• Floodplains
	• Zoning and Height Restrictions		• Proposed bridge is considered a “major public facility” under City of Lake Oswego Municipal Code • Maximum height of any portion of a structure is 75 feet • Maximum height in a residential zone is 50 feet • City Charter conflicts with USCG’s minimum navigation clearance of 74 feet above the OHWM • A variance may be required, but it is currently not clear if the variance would apply to the City Charter imposed height in residential zones
	• Resource Protection (RP) Overlay Districts		• Mitigation would be required for tree and vegetation impact or removal that ranges from 1:1 to 2:1 and up to a 3-year monitoring period (depending on the impact). • Lake Oswego Parks also has use policies for the Willamette Pathway.

*Lead Federal agency without FHWA or other federal funding.

Environmental Checklist

1. Provide a brief description of the Project

   A new bicycle and pedestrian bridge crossing of the Willamette River is being considered in the Oak Grove-Lake Oswego (OGLO) area, South of Portland, Oregon, and is currently the subject of a feasibility study by Clackamas County. The potential area is located between RM 20 and 21, south of the existing Lake Oswego Railroad Bridge.

2. Estimated Right-of-Way Impacts (Including Easements, Number of Parcels, Acreage, and Improvements)

   The current project alternatives do not require any permanent ROW. Temporary easements would be required for construction. If the alternatives advance into preliminary design it is possible that further refinements would require private ROW acquisition.

3. Estimated Traffic Volume, Flow Pattern and Safety Impacts (Including Construction Impacts, Detours, etc.)

   Depending on the alternative chosen, there could be temporary construction impacts to some local roads such as SE Courtney Avenue, SW Riverside Dr or SW Terwilliger Boulevard. The project would add safe pedestrian and bike travel that will benefit all users.

4. Estimated Land Use and Socioeconomic Impact (Including Consistency with Comprehensive Plan)

   The project would need to be permitted in accordance with City of Lake Oswego and Clackamas County land use regulations. Hydraulic analysis would be required for potential floodplain impacts, as well, and could require cut and fill balance to ensure no net-rise in base flood elevations. Additionally, the bridge would require a waterway crossing easement from the Oregon Department of State Lands (DSL).

   The project would not divide or disrupt established community, or negatively affect neighborhood character or stability. The project would have no negative effect upon minority, elderly, handicapped, low income, transit-dependent, or other specific interest group.

5. Estimated Wetlands, Waterways and Water Quality Impact

   The project would cross the Willamette River and require placement of piers/footings below the river's ordinary high-water mark (OHWM). Wetland delineation activities have not yet occurred in the project area, but some wetlands could be present within the project area. Work below the OHWM of the river or within other regulated waters such as wetlands would require permits and approvals from the US Army Corps of Engineers (Corps), DSL, and Oregon Department of Environmental Quality (DEQ). Additionally, the project would require a Section 9 Bridge Permit from the US Coast Guard (USCG); if no federal funding is involved in the project, the USCG would likely be the federal lead agency.

6. Estimated Biological & Threatened & Endangered Species Impacts

   The Willamette River contains listed threatened and endangered fish species. While no listed terrestrial species are known to occur in the area, a biological survey would be needed to assess potential presence and habitat for those species, as well as other non-listed but federally protected species such as bald eagle. A Biological Assessment would be required and would need to be submitted through the lead federal agency to the US Fish and Wildlife Service and to National Marine Fisheries Service.

   The project would also require coordination with the Oregon Department of Fish and Wildlife for fish passage requirements and other related fish protection measures.

   Where applicable within certain overlay districts in Lake Oswego and Clackamas County, impacts to trees and vegetation would require mitigation.

7. Estimated Archaeology and Historical Impacts

   The project would require an archaeological and historic investigation and report and consultation with the Oregon State Historic Preservation Office.

8. Estimated Park, Visual Impacts and 4(f) Potential

   The project would likely need a visual impact report since it would place a new bridge within the Willamette River Greenway.

   The project could occur within or adjacent to parks such as Rivervilla, Foothills and Tryon Cove. Based on desktop research, none of the parks adjacent to the project site are known to have received Land and Water Conservation Funds (6(f) funds). However, if and when the project alignment were fully determined, this should be confirmed to ensure that the project would have no 6(f) impacts.

   Unless the project receives US DOT funds or requires a US DOT approval, Section 4(f) would not be applicable. If Section 4(f) is applicable, a 4(f) determination would need to be completed for potential impacts to park and recreation areas and historical sites.

9. Estimated Air, Noise and Energy Impacts

   No air quality analysis would be required for this project. The project would be located within maintenance areas for ozone and carbon monoxide but would meet the exemption of 40 CFR 93.126 – Exempt Projects, Table 2 – Exempt Projects, Air Quality, bicycle and pedestrian facilities.

   The project would have temporary noise impacts during construction and would need to conform to County and City of Lake Oswego noise regulations.

   The project would utilize some energy for lighting, but no significant impacts to energy would be anticipated.

10. Estimated Hazardous Materials Impacts

    A hazardous materials corridor study and/or Phase I Environmental Site Assessment would need to be completed to assess potential for hazardous materials within the project area.

11. Preliminary Identification of Potential Areas of Critical Concern and Controversial Issues

The proposed bridge would be considered a "major public facility" under City of Lake Oswego Municipal Code. Per Chapter 50.02.003.2/.3, the maximum height of any portion of a structure shall not exceed "a height as determined by the ratio of one foot in height for every 3.5 feet of distance from the portion of the structure to the lot line of the nearest residentially zoned property, to a maximum of 75 feet," except as otherwise permitted by LOC 50.04.003.4. In addition, City Charter Section 46A also has overarching restrictions for maximum height in a residential zone of 50 feet.

Depending on where the bridge was constructed, it could conflict with the USCG's minimum requirement of 74 feet of vertical clearance above the OHWM in this area and could require a hardship variance from the City, along with proof that the project's height requirements were unavoidable. Currently, it is not clear if a variance would apply to the City Charter imposed height in residential zones.

12. Documentation Requirements

Biological Assessment

Wetland Delineation Report

Historic and archaeological resources report

Joint Aquatic Permit Application for Corps, DSL and DEQ

DSL General Authorization (five piles or fewer)

NPDES Stormwater Construction General Permit (if greater than 1 acre of disturbance)

Hazardous Materials Corridor Study/Phase 1 Environmental Site Assessment

Clackamas County and City of Lake Oswego Land Use Permit Applications

Land Use Compatibility Statement – DEQ and DSL

Floodplain No-Rise Analysis

Visual Analysis Report

USCG Bridge Permit Application including Navigation Impact Report

Stormwater Pollution Prevention Plan

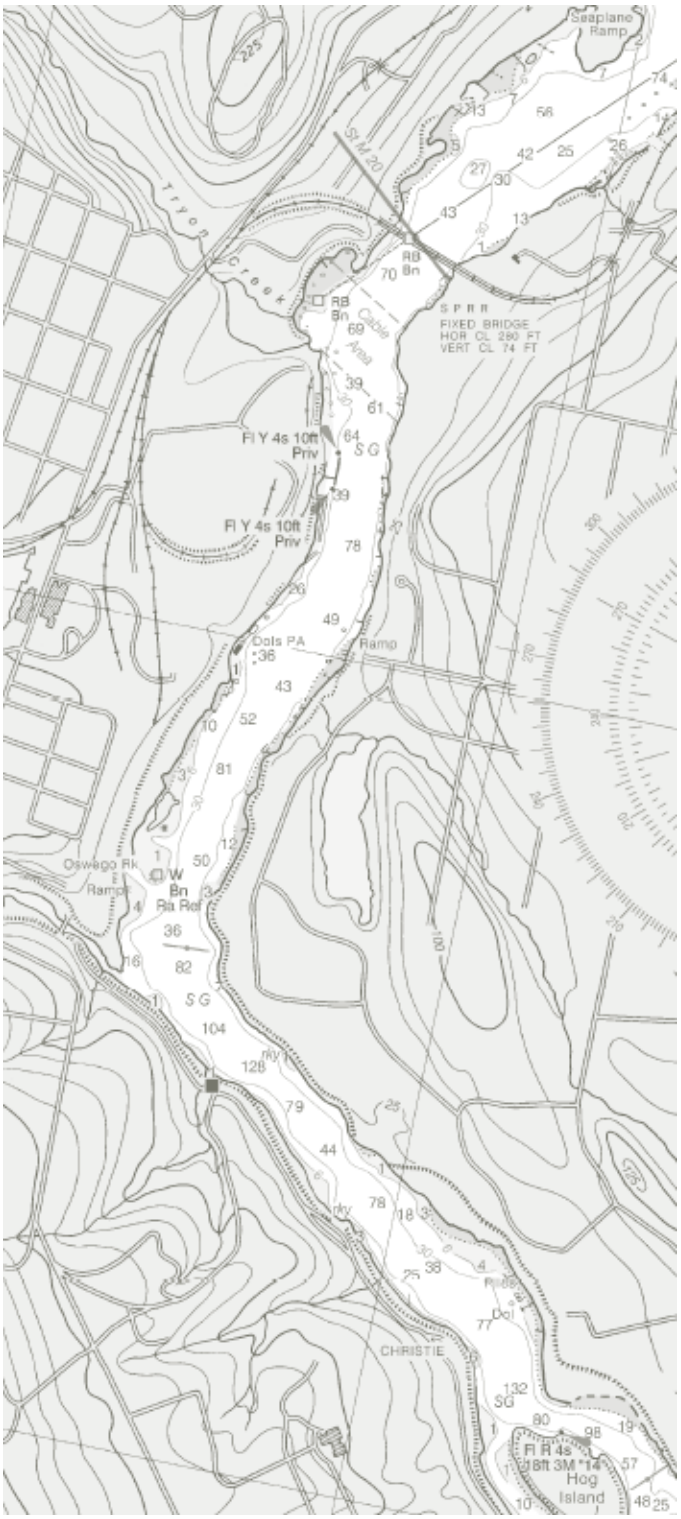
13. Estimated Pre-Construction Activity Impacts (drilling, survey work, etc.)

The project would require survey work and geotechnical testing. Geotechnical boring locations might require archaeological clearance through SHPO.

14. Preliminary Identification of Public/Stakeholder Concerns

Public concerns related to potential neighborhood impacts from the project include the following:

- *Vandalism and unsafe user conditions from transient or houseless people congregating on the bridge and within the immediate neighborhood.*
- *Visual impacts on the river and within adjacent parks.*
- *Reduction in property values.*
- *Increased neighborhood traffic.*
- *Lack of parking for bridge users who drive to the bridge.*
- *Impact on native fish and wildlife.*



Appendix D

Public Involvement Summary

Oak Grove-Lake Oswego Pedestrian/Bicycle Bridge Feasibility Study

JLA Public Involvement
December 2019

Overview of Public Involvement and Outreach

The purpose of this study was to analyze the feasibility of a pedestrian and bicycle bridge over the Willamette River between Oak Grove and Lake Oswego by looking at three issues: 1) The engineering and environmental feasibility of developing the bridge and providing connections to the existing and planned pedestrian-bicycle network; 2) The level of support for the bridge in the project area; 3) The manner in which the city, county and regional governments could work together to build and maintain a bridge.

A Policy Committee (PC) made up of elected officials from each of the partner jurisdictions and a Community Advisory Committee (CAC) made of up of a variety of stakeholders from both sides of the river provided public forums for discussion about potential bridge landings and alignments. The committees were also informed by public feedback collected through online input, two in-person open houses, and corresponding online information and input opportunities, and community presentations.

The idea of a bridge between Oak Grove and Lake Oswego has been raised in various forums over the years, including during the Clackamas County Transportation System Plan update, approved in 2013, and various other conversations with regional and local pedestrian, bicycle, and transportation committees. The feasibility study allowed for an intense period of public outreach and public comment on the deep investigation into the potential of a bridge with specific alignments that landed on public property on either side of the river within the study area.

Public involvement activities and opportunities between spring and fall 2019 included:

- A website with an introductory community questionnaire (through online survey software);
- Two in-person open houses (one held in Lake Oswego and one held in Oak Grove) with complementary online open houses (through online survey software);
- Three Community Advisory Committee meetings;
- Three Policy Committee meetings;
- One statistically significant survey;
- Postcard mailings, articles in the *Hello LO*, *Milwaukie Pilot* and ClackCo Quarterly newsletters, presentations, website updates, social media, press releases, and emails to provide broader public information and invitations to meetings;
- Presentations to the Board of County Commissioners, Lake Oswego City Council and Milwaukie City Council.

Notifications

The County used the following forms of notification to share project information and invite people to the public meetings:

- **Website –** A website was set up on the Clackamas County website in spring and regular project updates were made before and after CAC and PC meetings and in advance of open houses and the online input opportunities. Agendas, committee meeting summaries, meeting presentations, survey results, factsheets, maps including bridge alignments, etc. were posted.
- **Social media** – Facebook, Twitter, Nextdoor, local jurisdiction e-newsletters were used beginning in June.
- **Newsletter Articles –** Articles were published in the June and August *Hello LO*, August *Milwaukie Pilot*, and August *ClackCo Quarterly*
- **Postcards** – 4,346 postcards were mailed to Lake Oswego and Oak Grove residents in July 2019
- **Emails –** sent from the County to an interested parties list in advance of committee meetings and open houses; the list grew to 600 addresses as the study progressed. Emails were also distributed through existing email networks.
- **Media –** Various media reported on the study between June and November and helped generate interest in the project in advance of meetings. Reports were made by The Oregonian, LO Review, BikePortland.org, KGW, and OPB.

Community Advisory Committee (CAC)

Members of the Community Advisory Committee (CAC) were charged with making recommendations to the Policy Committee on:

- criteria to be used in the evaluation of project alternatives;
- the preferred bridge landing points to study;
- the preferred connections between the bridge and the pedestrian and bicycle network; and
- the selection of up to three bridge concepts to be advanced into the next stage of the project to be considered in detail.

The CAC's membership provided a balanced representation of a wide range of local and regional stakeholder values and interests. Committee members represented affected neighborhoods and businesses, walking/cycling enthusiasts, environmental and resource protection groups, business associations and/or groups that are under-represented in transportation decision-making. The breakdown of the representatives was set as: City of Lake Oswego - 10 representatives, Clackamas County - 10 representatives, City of Milwaukie - 4 representatives and Metro - 4 representatives. The City of Lake Oswego only filled 7 of its seats on the committee and Metro filled 3. See appendices for complete meeting

summaries, for the recruitment postcard the County sent to unincorporated areas to seek representatives and for the CAC Charter.

CAC #1 Meeting - May 29, 2019
Rose Villa Performing Arts Center, Oak Grove
Attendance: 21 CAC members; 9 members of the public
The purpose of the meeting was to build an understanding of what the feasibility study is and is not about, review the charge document, and gather feedback on community values.

The CAC discussed the landing site evaluation criteria (See appendices) and community values. In small groups they identified issues and values in the following categories: Connectivity and Safety; Environmental Impacts; Compatibility with Recreational Goals; Compatibility with Existing Developments and Neighborhoods; Cost and Economic Impact; Compatibility with Adopted Plans. These values guided the process going forward. A full meeting summary can be found in the appendices. Members of the public were included in a separate small group discussion.

CAC #2 Meeting - July 22, 2019
City of Lake Oswego Maintenance Center
Attendance: 15 CAC members; 6 members of the public
The purpose of the meeting was to share, discuss, and gather committee input on potential landing locations and alignments across the river; with input to be shared with Policy Committee. The CAC first learned about the potential landing locations/alignments and then met in small groups to discuss the pros and cons of each. Members of the public were included in a separate small group discussion.

CAC #3 Meeting - September 19, 2019
Robinwood Station in West Linn
Attendance: 11 CAC members; 27 members of the public
The purpose of the meeting was to present and gather feedback to forward to the Policy Committee for consideration in the final recommendations on preferred connections between the bridge and the pedestrian and bicycle network, and on transit. The CAC learned about the public feedback received from the two in-person open houses and online questionnaire, and was provided with more information about general bridge types and costs, landing locations, and parking options. In small groups the CAC had in-depth discussions on landing location access to ped/bike and business connections. Members of the public had small group discussions, as well.

Policy Committee (PC) Meetings

The Policy Committee, the decision-making body for this feasibility study, was tasked with making recommendations to the partner governments on key decisions:

- bridge alternatives. including bridge concepts, alignments, landing points, and plans for connection to the pedestrian and bicycle network;
- bridge conceptual costs;
- preliminary environmental screening;
- organizational plan for the development and maintenance of the bridge; and
- bridge feasibility.

The PC met four times over the course of this study. See appendices for complete meeting summaries.

PC #1 meeting - June 6, 2019
Lake Oswego City Hall Council Chambers
Attendance: 4 PC members; 7 members of the public
The purpose of this meeting was to build a foundation for decisions the PC would be tasked with for the study. The PC reviewed the context for bridge landing locations, provided direction to the project team on project evaluation criteria, and discussed the formation of a potential future governance agreement. Two people gave public testimony during this meeting.

PC #2 meeting - September 6, 2019
Milwaukie City Hall Council Chambers
Attendance: 4 PC members; 27 members of the public
The purpose of the meeting was for the project team to present the 10 alignment options and share the three top choices recommended by the Community Advisory Committee and the Technical Advisory Committee, and to determine the PC's top three alignment recommendations. The PC selected the final three alignment alternatives for further study, discussed the analysis of transit on the bridge, and reviewed the next steps in recommending project feasibility to local governments and Metro. Fourteen people gave public testimony during this meeting.

PC #3 meeting - October 25, 2019
Clackamas County Development Services Building
Attendance: 4 PC members, 100 members of the public
The purpose of the meeting was to decide whether the project was feasible and whether it should move forward for further study. The PC decided it was not yet prepared to declare whether the project was feasible or whether they were willing to move it forward for further study. The project team would present to the Lake Oswego City Council. The PC would meet again by late January 2020 to decide the feasibility question. Thirty people gave public testimony during this meeting.

Note: On November 5, the Lake Oswego City Council approved a motion to withdraw the city from any further involvement in the Oak Grove-Lake Oswego Ped/Bike Bridge Feasibility Study. The three-member Policy Committee may still meet in early 2020 to discuss the study.

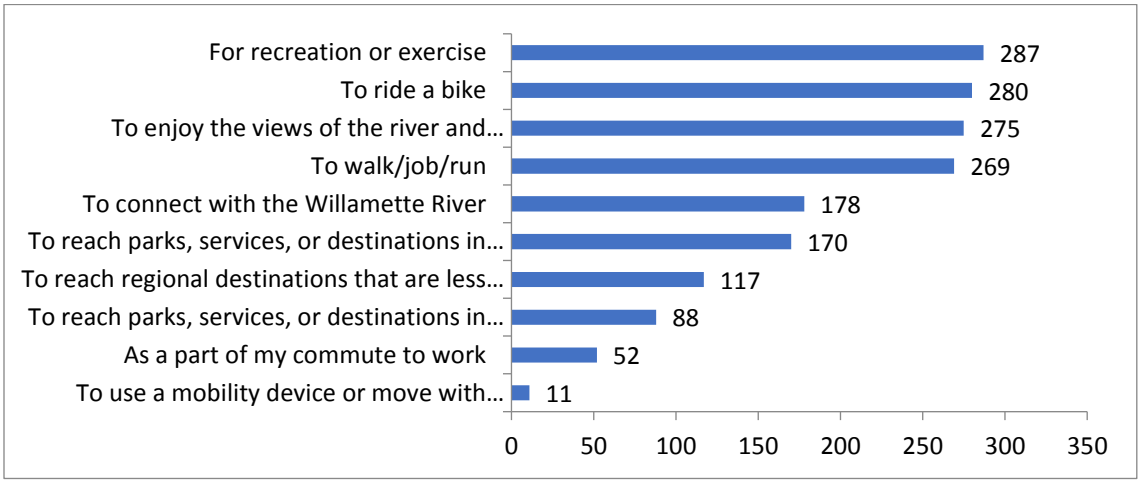
PC #4 meeting – January 28, 2020
Clackamas County Development Services Building
Attendance: 3 PC members, 23 members of the public

The purpose of this last meeting of the Policy Committee was to review and accept the final Feasibility Study Report, and provide direction to staff on next steps. Ten members of the public gave testimony at the beginning of the meeting. The Policy Committee accepted the final report, with minor wording changes, and recommended staff do the following:

- Take no further action on the proposed bridge alignments given the political realities with the Lake Oswego's withdrawal from the process and with the current landing points not being supported by the communities at this time, and
- Study pedestrian/bicycle crossings of the Willamette River on public or private land north and south of the City of Lake Oswego, consistent with adopted Clackamas County Transportation System Plan Project #2022 that identifies the project area for the bridge as being between Sellwood and Oregon City.

Project Introduction via web and online questionnaire/survey

As the committees were preparing to have their initial meetings, the County introduced the study to the public in late spring 2019 with a webpage and community questionnaire. This helped the project team collect email addresses to build a large interested parties email list that continued to grow throughout the study. A total of 546 people responded to the initial online web questionnaire between mid-May and mid-June. A little more than half of the responses came from Lake Oswego and others on the west side of the river, and about a third were from the Oak Grove/Milwaukie area. The remainder were from across the region. Of the 546 responses, 471 people indicated how they would use a new bridge.



Another question asked about frequency of use. About a quarter of respondents said they would never use the bridge, while another quarter indicated they would use it monthly. The remaining responses were distributed between daily to annually.

At the onset of the study, there was much interest in the concept of the bridge with many people expressing positive interest, many expressing negative interest, and many asking questions about topics that were still to be studied. All of the open-ended responses received in May-June were reviewed and coded for positive, negative, and neutral comments.

GENERAL RESPONSES BY AREA	Live in LO or west side	Live in OG or east side	Work/own business in LO or west side	Work/own business in OG or east side	Live elsewhere
Neutral (questions, concerns, but no direct opposition, or stated direct support)	92	43	11	6	24
Positive (explicitly stated support or express desires/hopes that indicate support)	70	64	13	8	19
Negative (explicitly stated opposition or raised concerns that strongly indicated opposition)	65	7	12	3	11

From the Online Questionnaire Survey Results. See Appendices for complete summary.

Open Houses

Clackamas County held two identical open houses in August on both sides of the Willamette River in the following locations:

- **Lake Oswego - August 5, 2019**
  Lake Oswego Maintenance Center – 17601 Pilkington Road, Lake Oswego
- **Oak Grove - August 7, 2019**
  Rose Villa Performing Arts Center – 13505 SE River Road, Oak Grove

Purpose and Format

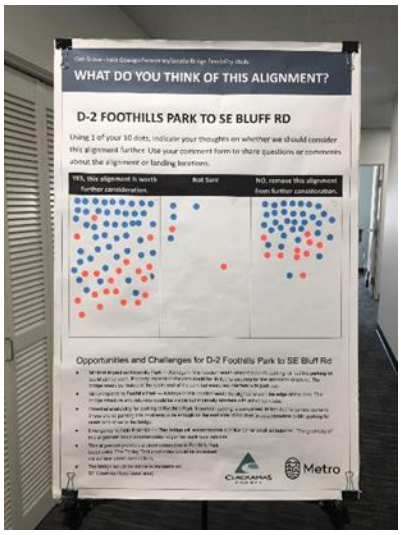
The purpose of the open houses was to provide the public with project background information and to learn their questions, concerns, and preferences regarding each of the 10 alignment options that the Community Advisory Committee and Policy Committee had previewed. The meetings were in a drop-in style format with display board stations, an interactive dot exercise to show alignment option preferences, members of the project team available to discuss the project and answer questions, and the opportunity to give written feedback.

Attendees received an informational FAQ, 10 dots, and a comment card. They were encouraged to review the display boards and place one dot on each alignment option to indicate which alignments they thought were feasible to consider further. For each alignment, attendees were asked to indicate, “Yes, this alignment is worth further consideration,” “No, remove from consideration,” or “Not sure.” They were also invited to talk to project team staff who were stationed around the room.

Participation

Of the 212 people who attended the open houses--including some people who attended both meetings—116 provided input using comment cards and nearly everyone provided input using the dot exercise. Attendance at each event was as follows:

- **Lake Oswego location**: 47 attendees, 29 comment forms (22 comment forms indicated they live in Lake Oswego)
- **Oak Grove location**: 165 attendees, 87 comment forms (73 comment forms indicated they live in/near Oak Grove)



Sample of "dot exercise" at public open houses.

The dot exercise and comment card submissions showed that the top-three alternatives for further study were:

- A-3: SW Terwilliger Blvd to SE Courtney (upper)
- B-3: Tryon Cove (Upper) to SE Courtney (upper)
- D-3: Foothills Park to SE Courtney (upper)

Common comment themes that were heard at both open houses included:

- Both support and opposition for a bridge (from people from both sides of the river)
- Funding/cost concerns
- Support for connecting across the river
- Support for active transportation
- Support for bike trail connections, paths and infrastructure
- Homeless concerns
- Concern about crime
- Concern about neighborhood/property impacts
- Ease of access to the bridge (grade)
- General traffic concerns
- Neighborhood traffic
- Increased congestion
- Minimal reduction of existing congestion
- Support for trail connections
- Parking concerns
- Environmental, wildlife, habitat impact concerns
- Support for reduction of use of single-occupant vehicles

Online Open House

An online open house hosted on Clackamas County's website was open from July 29 through August 9, 2019 to provide the broader public with project background information, details about each of the 10 alignment options and landing locations, and provide the opportunity for public comment. The information was generally the same as what was displayed during the in-person open houses. The online open house had 10 virtual stations, one for each alignment alternative, which outlined each alignment, displayed a map, listed

opportunities and challenges, bridge length, and whether the bridge could carry emergency vehicles.

Participation

A total of 602 people visited the online open house. Some of these participants also attended one or both of the in-person open houses in August. Of the online respondents, 27% were from Lake Oswego, 37% were from or near Oak Grove, and 34% were from elsewhere.

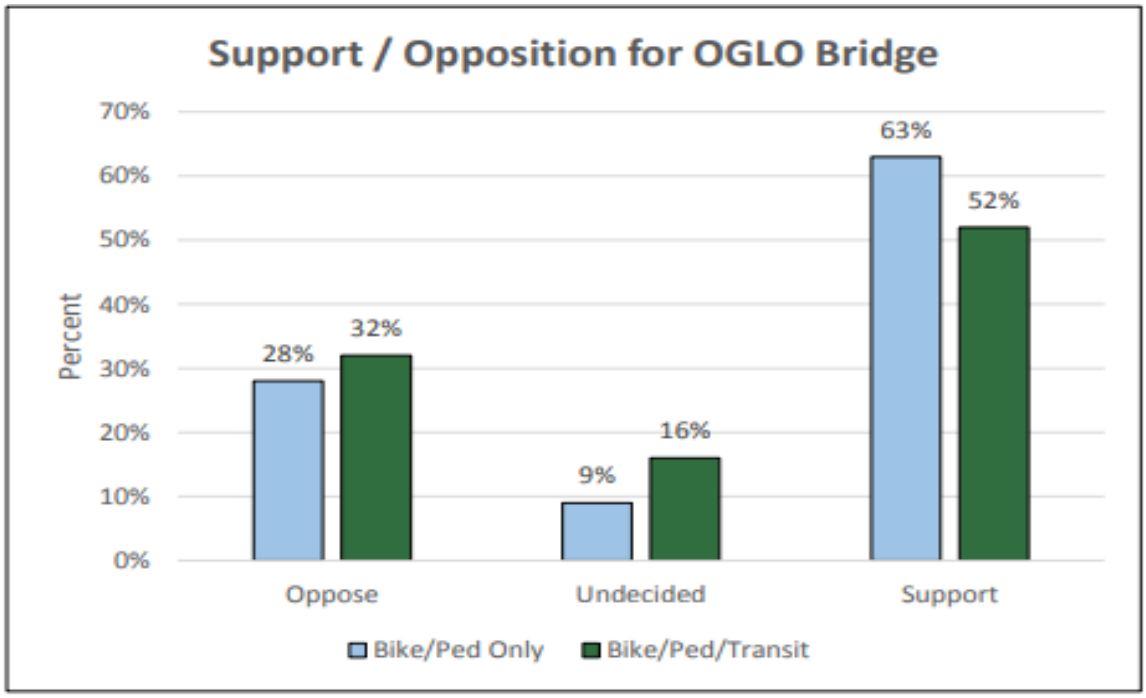
Responses showed the top-three most popular alternatives for further study were:

- A-3/A-2: SW Terwilliger Blvd to SE Courtney or Bluff
- B-3/B-2: Tryon Cove (upper) to SE Courtney or Bluff
- D-3/D-2: Foothills Park to SE Courtney or Bluff

This was consistent with the feedback from the in-person open houses. However, the online commenters had no interactive conversations with project team members or other community members while responding. The many open-ended comments collected through the online open houses are available in the appendix.

Scientific Survey/Poll

Riley Research Associates (RRA) conducted a scientific survey of 400 randomly selected individuals evenly split between the east and west sides of the Willamette River in September 2019. Survey respondents were asked 10 questions on their support or opposition to the proposed bridge and support or opposition to transit on the bridge.



When asked if they support the idea of a bridge in this location, 63% said yes, 28% said no, and 9% were unsure. There was stronger support on east side, with 71% in support from the Oak Grove/Milwaukie area and 55% in support from Lake Oswego.

The full report can be found in the appendices.

Emails / Letters / Phone Calls

This project inspired hundreds of emails/letters/phone calls from members of the public to project leadership and elected officials. Various project events – open houses, CAC meetings, PC meetings and social media notifications about meetings – sparked upswings in the number of people who contacted project staff to ask questions or express their feelings about the project. By the end of the study the "interested parties" list included over 600 separate contact emails.