

PROJECT MANAGEMENT PLAN

Rev. 6

Draft Report

March 2014



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Columbia River Crossing – Project Management Plan

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Rev. 06**

CRC Oregon Director

Date

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ACRONYMS

A&E	Architectural and Engineering
AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
AGO	Office of the Attorney General
APTA	American Public Transportation Association
APWA	American Public Works Association
ATU	Amalgamated Transit Union
B&A	Basis and Assumption
BIA	Bridge Influence Area
BIN	Budget Item Number
BNSF	Burlington Northern Santa Fe (Railway)
BO	Biological Opinion
BRT	Bus Rapid Transit
BVS	Best Value Selection
C-TRAN	Clark County Public Transportation Benefit Area Authority
CADD	Computer-Aided Design and Drafting
CAE	Computer-Aided Engineering
CATI	Context-sensitive Associated Transit Improvements
CBCP	Category B Change Proposal
CCIP	Contractor Controlled Insurance Program
CD	Collector-Distributor
CEJG	Community and Environmental Justice Group
CEVP	Cost Estimation Validation Process
CFR	Code of Federal Regulations
CIL	Certifiable Items List
CM	Construction Manager
CM/GC	Construction Manager/General Contractor
CMAP	Construction Management and Administration Plan
CN	Construction

CO	Change Order
CPCSP	TriMet Capital Projects Construction Safety Program
CPI	Cost Performance Index
CPMS	Capital Program Management System
CPTED	Crime Prevention Through Environmental Design
CQAM	Construction Quality Assurance Manager
CRA	Cost Risk Assessment
CRBA	Columbia River Bridges and Approaches
CRC	Columbia River Crossing
CREM	Cost Risk and Estimate Management
CSS	Context-Sensitive Solutions
CSSP	Construction Safety and Security Plan
CVS	Certified Value Specialist
D/M/WBE	Disadvantaged/Minority/and Women-Owned Business Enterprise
DAP	Design Approval/Acceptance Process
DB	Design-Build
DBB	Design-Bid-Build
DBE	Disadvantaged Business Enterprise
DBELO	DBE Liaison Officer
DDP	Design Documentation Package
DEIS	Draft Environmental Impact Statement
DEQ	Department of Environmental Quality
DFI	Design-Furnish-Install
DHS	Department of Homeland Security
DMV	Department of Motor Vehicles
DSDC	Design Services During Construction
EAC	Estimate at Completion
ECHO	Electronic Clearing House, Inc.
ECRB	External Civil Rights Branch
EEO	Equal Employment Opportunity

EIS	Environmental Impact Statement
ETC	Estimate to Complete
EVA	Earned Value Analysis
FAA	Federal Aviation Administration
FAI	First Article Inspection
FEIS	Final Environmental Impact Statement
FFGA	Full Funding Grant Agreement
FHWA	Federal Highway Administration
FLS	Fire/Life Safety
FLSC	Fire/Life Safety and Security Committee
FTA	Federal Transit Administration
FWG	Freight Working Group
GC	General Contractor
GEC	General Engineering Consultant
GMP	Guaranteed Maximum Price
HAR	Highway Advisory Radio
HCT	High Capacity Transit
HOV	High Occupancy Vehicle
HR	Human Resources
I-5	Interstate 5
ICP	Initial Construction Program
InterCEP	Interstate Collaborative Environmental Process
IPS	Integrated Project Staff
IRP	Independent Review Panel
IT	Information Technology
ITS	Intelligent Transportation Systems
JHA	Job Hazard Analysis
LPA	Locally Preferred Alternative
LRFD	Load Resistance Factor Design
LRT	Light Rail Transit

LRV	Light Rail Vehicles
LUFO	Land Use Final Order
MA	Master Agreement
MAX	Metropolitan Area Express
MCDD	Multnomah County Drainage District
MDL	Master Deliverable List
MDSG	Marine Drive Stakeholders Group
MOT	Maintenance of Traffic
MPO	Metropolitan Planning Organization
MTIP	Metropolitan Transportation Improvement Program
MTP	RTC's Metropolitan Transportation Plan
MUTCD	Manual on Uniform Traffic Control Devices
NEPA	National Environmental Policy Act
NHS	National Highway System
NTP	Notice to Proceed
OCIP	Owner-Controlled Insurance Program
OCS	Overhead Catenary System
ODOT	Oregon Department of Transportation
OEO	Office of Equal Opportunity
OFM	Office of Financial Management
ORS	Oregon Revised Statutes
OSHA	Occupational Safety and Health Administration
OTC	Oregon Transportation Commission
OTD	Operations Technical Director
PBAC	Pedestrian and Bicycle Advisory Committee
PCM	Project Control Manager
PCO	Potential Change Order
PCRF	Project Change Request Form
PCRO	Project Control and Reporting Office
PDA	Project Development Approval

PDPP	Project Delivery and Procurement Plan
PDT	Project Development Team
PE	Preliminary Engineering
PF	Project File
PG	Project Management Oversight Operating Guidance
PHA	Preliminary Hazard Analysis
PI	Public Information
PIN	Project Item Number
PMOC	Project Management Oversight Contractor
PMP	Project Management Plan
PNRS	Projects of National and Regional Significance
PRC	Project Review Committee
PS&E	Plan, Specification, and Estimate
PSC	Project Sponsors Council
PSU	Portland State University
PTBA	Public Transportation Benefit Area
PWG	Portland Working Group
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QAM	Quality Assurance Manual
QAP	Quality Assurance Program
QAPM	Quality Assurance Program Manual
QBS	Qualification-Based Selection
QC	Quality Control
QCP	Quality Control Plan
QMP	Quality Management Plan
RACC	Regional Arts and Cultural Council
RAMP	Real Estate Acquisition Management Plan
RAP	Rail Activation Plan
RCMP	Risk and Contingency Management Plan

RCW	Revised Code of Washington
RE	Resident Engineer
RFC	Released for Construction
RFI	Request for Information
RFP	Request for Proposal
RFQ	Request for Qualification
RMO	Risk Management Office
ROD	Record of Decision
ROS	Record of Survey
ROW	Right-of-Way
RTC	Southwest Washington Regional Transportation Council
RTP	Regional Transportation Plan
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SAPD	Systems Analysis and Program Development
SASS	Sponsor Agency Senior Staff
SAVE	Society for American Value Engineering
SC&ME	State Construction and Materials Engineer
SCC	Standard Cost Categories
SEPP	Security and Emergency Preparedness Plan
SPI	Schedule Performance Index
SPUI	Single-Point Urban Interchange
SR	State Route
SSC	Safety and Security Committee
SSMP	Safety and Security Management Plan
SSO	State Safety Oversight
SSPP	System Safety Program Plan
STHB	Stacked Transit/Highway Bridge
STIP	Statewide Transportation Improvement Program
SWR	Southwest Region
TAC	Technical Advisory Committee

TAG	Technical Advisory Group
TCC	Total Committed Cost
TCCP	Technical Capacity and Capability Plan
TCP	Traffic Control Plan
TDD	Transportation Development Division
TEAM	Transportation Electronic Award Management
TES	Traction Electrification System
TIP	Transportation Improvement Program
TMC	Transportation Management Center
TMP	Traffic Management Plan
TO	Transportation Operations
TRAINS	Transportation Reporting and Accounting Information System
TriMet	Tri-County Metropolitan Transportation District of Oregon
TSA	Transportation Security Administration
TSEM	Transit Systems Engineering Manager
TTC	Temporary Traffic Control
TVA	Threat and Vulnerability Assessment
UDAG	Urban Design Advisory Group
USC	United States Code
USDOT	United States Department of Transportation
VAST	Vancouver Area Smart Trek
VE	Value Engineering
VECP	Value Engineering Change Proposal
VM	Value Methodology
VWG	Vancouver Working Group
WAC	Washington Administrative Code
WBS	Work Breakdown Structure
WIN	Work Item Number
WSDOT	Washington State Department of Transportation
WSTC	Washington State Transportation Commission

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1. Introduction

1.1. Overview of the Project Management Plan

1.1.1 Purpose of the Project Management Plan

The purpose of the Interstate 5 Columbia River Crossing (CRC) Project Management Plan (PMP) is to provide the framework, strategies, processes, and procedures necessary to successfully deliver the I-5 CRC First Phase from preliminary engineering through final design and construction. The PMP is a living document that will be modified throughout the duration of the CRC First Phase to reflect changes in the project requirements.

The general management philosophy for the I-5 First Phase Project is that the Oregon Department of Transportation (ODOT) and Tri-County Metropolitan Transportation District of Oregon (TriMet) will cooperatively design, construct, equip, install, operate, and finance the Project. While ODOT is the lead sponsoring agency for the Project and will apply for the TIFIA Loan from the Federal Highway Administration (FHWA), TriMet will be the Grantee for the Federal Transit Administration's (FTA) Full Funding Grant Agreement (FFGA).

To enable clear and consistent communications between the agencies there will be project office jointly staffed by both agencies and by others that will assist in the overall management of the Project. The Project will be implemented through a series of interrelated Packages described in Chapter 8 - Program Delivery and Procurement. While there is a joint management team each of the Packages will be designated to either be managed by ODOT or TriMet based on which agency is better able to manage that specific Package. In this way day to day contract management will be performed by personnel that are experienced in the specific delivery mode and technical requirements of the Package using management and reporting procedures with which they are most familiar.

The PMP describes the organizational structure, array of roles and responsibilities, project management approach, and procedures to successfully deliver this multibillion dollar, multimodal, bi-state transportation program. This PMP:

- Addresses the requirements and establishes the framework for administering this complex program in accordance with the FTA's New Starts Program and the FHWA's TIFIA loan requirements.
- Follows reporting instructions for the Section 5309 New Starts Criteria, prepared by the FTA pursuant to the Transportation Equity Act for the 21st Century (Public Law 105-178 as amended by Title IX of Public Law 105-206) and the FHWA's TIFIA loan program.
- Addresses 23 USC 106(h) and FHWA guidance based on the September 24, 2012 memorandum "Interim Major Project Financial Plan Guidance."

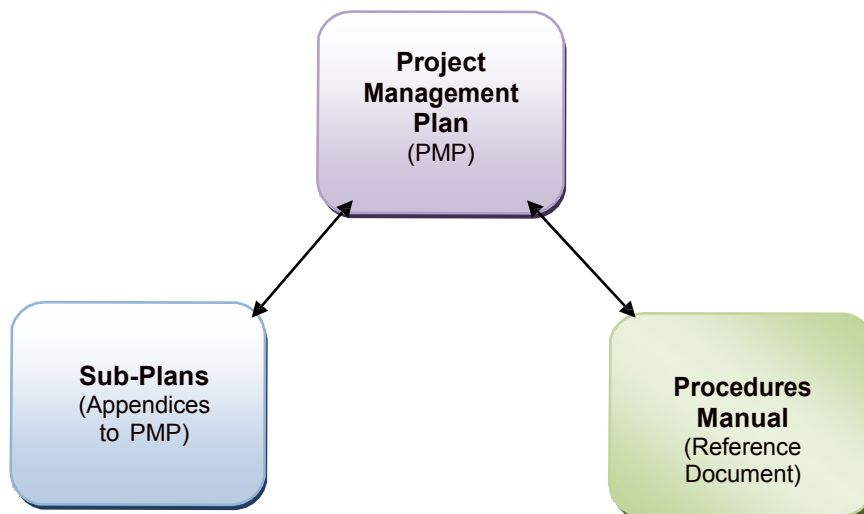
- Covers the delivery of the Interstate 5 Columbia River Crossing First Phase Project.
- Provides a uniform process for meeting all programmatic reporting requirements required by all funding parties.
- Provides a guideline for the orderly interaction of the multiple agencies, organizations, and staff involved in, and committed to, the CRC First Phase.
- Establishes standards by which program performance will be measured.

The PMP is composed of three main components, as follows:

Project Management Plan (PMP) – This is the overall document that describes the I-5 CRC Project’s Purpose and Need, background, goals and objectives, roles and responsibilities of key personnel, communication, and describes the management structure for the Project. The PMP highlights to team members the design and construction processes and procedures guiding their work on the I-5 CRC Project. The PMP includes several sub-plans as appendices. These appendices exist as separately bound documents for ease of use and future updating. A list of the appendices is included in the Table of Contents of this document.

Sub-Plans – These are tactical plans that have been developed to execute services in key program areas. Each sub-plan describes the means by which these services will be accomplished in accordance with the strategies and tasks identified in the sub-plan and includes staffing organization, roles and responsibilities of team members, task descriptions, detailed work processes and procedures necessary to deliver the work, and associated task deliverables. A complete list of the current sub-plans can be found in the Table of Contents as Appendices to this PMP.

Procedures Manual – This document describes the procedures necessary to perform the work in accordance with the tasks identified in the main PMP document. These procedures are consistent with the PMP and are frequently referenced by this document. The Procedures Manual provides procedures that the CRC Project Team will use to deliver the CRC Project. The relationship of these documents are described below.



1.1.2 Maintenance and Updating of the PMP

The PMP will be reviewed semiannually for potential updating. The I-5 CRC First Phase's Project Controls Manager is responsible for updating and maintaining the PMP. The Project Controls Manager will work closely with the CRC Executive Management Group, Technical Advisory Group and Project Management Group (see Section 2.4 of this PMP) on each update of the PMP. Individual senior managers will be responsible for disseminating new PMP information to their staff, as necessary.

The PMP is a controlled document. The principal means by which it is accessed by individuals at CRC is by electronic means via a "web link" provided for employees by the Project Controls Manager. This link provides access to the most recent version of the PMP. As a secondary source, hard copy PMP notebooks will be maintained and their distribution controlled by the Project Controls Manager to ensure that PMP updates are properly maintained.

1.2. Program Purpose and Description

1.2.1 Purpose and Need

As the only continuous north-south interstate highway on the West Coast connecting the Canadian and Mexican borders, Interstate 5 (I-5) is vital to the local, regional, and national economies. At the Columbia River, I-5 provides a critical economic connection to two major ports, deepwater shipping, upriver barging, two transcontinental rail lines, and much of the region's industrial land. Truck-hauled freight movement onto, off, and over the I-5 Columbia River crossing is critical for these industrial centers, for regional employment, and to the regional and national economies. The I-5 crossing provides the primary transportation link between Vancouver, Washington, and Portland, Oregon, and is the only direct connection between the downtown areas of these cities.

- The purpose of the I-5 CRC First Phase Project is to improve I-5 corridor mobility by addressing present and future travel demand needs in the CRC Bridge Influence Area (BIA). The BIA extends from approximately Columbia Boulevard in the south to State Route (SR) 500 in the north. The I-5 CRC First Phase Project is intended to achieve the following goals: (a) improve travel safety and traffic operations on the I-5 crossing's bridges and associated interchanges; (b) improve connectivity, reliability, travel times, and operations of public transportation modal alternatives in the BIA; (c) improve highway freight mobility and address interstate travel and commerce needs in the BIA; and (d) improve the I-5 river crossing's structural integrity (seismic stability). These goals address the following needs:
 - **Growing Travel Demand and Congestion** – Existing travel demand exceeds capacity in the I-5 Columbia River crossing and associated interchanges. This corridor experiences heavy congestion and delay lasting 4 to 6 hours during both the morning and afternoon peak travel periods and when traffic accidents, vehicle breakdowns, or bridge lifts occur. Due to excess travel demand and congestion in the I-5 bridge corridor, many trips take the longer, alternative I-205 route across the river. Spillover traffic from I-5 onto parallel arterials such as Martin Luther

King Boulevard and Interstate Avenue increases local congestion. The two river crossings (I-5 and I-205) currently carry more than 260,000 trips across the Columbia River daily. Daily traffic demand over the I-5 crossing is projected to increase by more than 35% during the next 20 years, with stop-and-go conditions increasing to approximately 15 hours each day if no improvements are made.

- ***Impaired Freight Movement*** – I-5 is part of the National Truck Network and is the most important freight freeway on the West Coast, linking international, national, and regional markets in Canada, Mexico, and the Pacific Rim with destinations throughout the western United States. In the center of the program area, I-5 intersects with deepwater shipping and barging on the Columbia River as well as two river-level, transcontinental rail lines. The I-5 crossing provides a direct and important highway connection to the Port of Vancouver and Port of Portland facilities located on the Columbia River, as well as to the majority of the freight consolidation facilities and distribution terminals in the area. Freight volumes moved by truck to and from the area are projected to more than double over the next 25 years. Vehicle hours of delay on truck routes in the Portland-Vancouver area are projected to increase by more than 90% over the next 20 years. Growing demand and congestion will result in increasing delay, costs, and uncertainty for all businesses that rely on this corridor for freight movement.
- ***Limited Public Transportation Operation, Connectivity, and Reliability*** – Because of limited public transportation options, a number of transportation markets in the area are not well served. The key transit markets include trips between the Portland Central City and the City of Vancouver and Clark County, trips between north/northeast Portland and the City of Vancouver and Clark County, and trips connecting the City of Vancouver and Clark County with the regional transit system in Oregon. Current congestion in the corridor adversely impacts public transportation service reliability and travel speed. Southbound bus travel times across the I-5 river crossing are currently up to three times longer during parts of the a.m. peak period than during off-peak periods. Travel times for public transit using general purpose lanes on I-5 in the BIA are expected to increase substantially by 2030.
- ***Safety and Vulnerability to Incidents*** – The I-5 river crossing and its approach sections experience crash rates more than two times higher than statewide averages for comparable facilities. Incident evaluations generally attribute these crashes to traffic congestion and weaving movements associated with closely spaced interchanges. Without breakdown lanes or shoulders, even minor traffic accidents or stalls cause severe delay or more serious accidents.
- ***Substandard Bicycle and Pedestrian Facilities*** – The bike/pedestrian lanes on the I-5 Columbia River bridges are about 3.5 to 4 feet wide—narrower than the 10-foot standard—and are located extremely close to traffic lanes, thus impacting safety for pedestrians and bicyclists. Direct pedestrian and bicycle connectivity is poor in the BIA.

- **Seismic Vulnerability** – The existing I-5 bridges are located in a seismically active zone. They do not meet current seismic standards and are vulnerable to failure in an earthquake.

1.2.2 First Phase Description

The I-5 CRC Project is a multimodal transit and highway improvement on and near a 5-mile segment of I-5. The area of the CRC Program stretches from SR 500 in Vancouver, Washington, to approximately Columbia Boulevard in Portland, Oregon, including the Interstate Bridge across the Columbia River. A light rail transit alignment will also extend across the river from its current terminus at the Expo Center in Portland, Oregon, to Clark College in Vancouver, Washington.

Construction of the entire program will require a number of years to complete and will be phased to provide efficient implementation while minimizing impacts on the community and corridor users. In response to legislative direction, the CRC Executive Management Group has developed a First Phase that adapts to available resources and fits into today's economic reality; thus, the construction of the selected alternative will be phased to match available funding while providing significant transportation benefits. The first construction phase is referred to as the I-5 CRC First Phase Project and includes the following multi-modal elements:

- Replacement of the existing I-5 bridge over the Columbia River and associated I-5 improvements.
- Improvements to five interchanges and associated local street network.
- Extension of light rail transit (LRT) from the Expo Center in Portland to Clark College in Vancouver and associated transit improvements, including five transit stations, three park and rides, bus route and station changes, and expansion of the Ruby Junction LRT maintenance facility.
- Upgrades and modifications to the Steel Bridge and transit command center.
- Purchase of 19 light rail vehicles (LRV) and other transit-related procurements.
- Improvements to bicycle and pedestrian facilities throughout the project corridor that connect to the existing system.
- Installation of a tolling system for interstate traffic.
- Implementation of transportation demand and system management measures.

The CRC First Phase Project will require multiple packages and procurements (see Table 1 below and Figure 1-1). Details of the individual construction packages associated with the First Phase are found in the Project Development and Procurement Plan (PDPP) which is an appendix to the PMP.

Table 1. CRC First Phase Project Packages/Procurements

Columbia River Bridges and Approaches (CRBA)
Mainland Connector Bridge and Approaches (MC)
Marine Drive Interchange Reconstruction (MD)
Washington Transit (WT)
Park and Ride Garages (PR)
Transit Systems (TS)
Ruby Junction Phase II Expansion
Steel Bridge Modifications
Light Rail Vehicle Procurement
Command Center Upgrades/Modifications
Ticket Vending Machine Procurement
Transit Owner Furnished Materials Procurement
Pre-Completion Tolling
Sandy River Habitat Mitigation

Figure 1-1 illustrates the overall program and its relationship to the region, including the existing LRT system. Figure 1-2 illustrates the I- 5 CRC First Phase Project.

1.2.3 Future Phase

A detailed description of all of the improvements included in the selected alternative is included in Chapter 2 of the Final Environmental Impact Statement (FEIS). The improvements that are not included in the First Phase are:

- Improvements to the SR 500 interchange.
- Reconstruction of the I-5 northbound to C Street (east) loop ramp at the SR 14 interchange.
- Reconfiguration of the Mill Plain interchange as a tight diamond.
- Braided southbound I-5 exit t Fourth Plain under the 39th Street exit at the Fourth Plain Interchange.
- A flyover ramp at the Marine Drive interchange.

The deferred improvements will be built once funding is available. Funding could become available during project construction, in which case the deferred improvements could be incorporated into the existing construction schedule. It is also possible that funding could become available after completion of construction of the I-5 CRC First Phase Project.

FIGURE 1-1. CRC PROGRAM AND THE LRT SYSTEM



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FIGURE 1-2. I-5 CRC FIRST PHASE



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1.3. Program History

The following is a summary of the CRC Program history:

- 1990–1998: Bi-State High Capacity Transit (HCT) Studies

Several HCT studies were performed in the 1990s related to the possibility of providing a form of HCT between Oregon and Washington. The following is a list of those studies:

- Clark County HCT Analysis – 1990
- South/North I-5/I-205 HCT Pre-Alternative Analysis – 1993
- South/North I-5 LRT Draft Environmental Impact Statement (DEIS) – 1996
- Commuter Rail and High Occupancy Vehicle (HOV) Studies – 1998

- 1999–2000: I-5 Trade Corridor Study

In 1999, a preliminary assessment for the I-5 corridor began to evaluate problems on the corridor and a range of solutions. The study ended with the following general conclusions:

- Unacceptable economic impacts and congestion will result if no corrective action is taken.
- Solution must be multimodal.
- Improvements to the I-5 corridor will require new funds.
- Region must promote transportation-efficient development.

- 2001–2002: I-5 Transportation and Trade Partnership

In 2001, the governors of Oregon and Washington formed a bi-state partnership to study transportation problems and possible solutions for the I-5 corridor. In its 2002 Strategic Plan, the I-5 Transportation and Trade Partnership recommended fixing three bottlenecks:

- I-5 at Salmon Creek in Clark County (completed in 2006)
- I-5 at Delta Park in Portland (completed in 2009)
- I-5 at the Columbia River (this CRC Program)

- Spring 2005: CRC Program begins

- In late 2004, Washington State Department of Transportation (WSDOT) and ODOT initiated work to begin the CRC Program.

- The CRC Program Team was formed around a nucleus of ODOT and WSDOT staff to include partners TriMet, C-TRAN, the Southwest Washington Regional Transportation Council (RTC), Metro, and the Cities of Vancouver and Portland.
- The 39-member CRC Task Force was formed in early 2005 by the CRC Program Team to provide advice on key decisions. The CRC Task Force consisted of leaders from a broad cross-section of Oregon and Washington communities, including public agencies, businesses, civic organizations, neighborhoods, and freight, commuter, and environmental groups.
- Fall 2005: Defining the problems and potential solutions
 - Using data developed by the I-5 Transportation and Trade Partnership, the CRC Program Team worked with the public to define the problems and needs in the program area. More than 70 different ideas were proposed as solutions, including 23 river crossing and 14 transit concepts. Evaluation criteria were also developed.
- Spring 2006: Narrowing the ideas
 - Continuing discussions with the CRC Task Force and community, the CRC Program Team studied the river crossing and transit ideas. As a result of this discussion and analysis, the ideas were further narrowed to a set of four river crossing options and five public transit options.
- Spring–Summer 2006: Testing the preliminary alternatives
 - The CRC Program Team packaged the most promising bridge and transit options into a dozen preliminary alternatives. Each alternative included several transportation components: bridge, highway, transit, freight, bicycle, and pedestrian improvements, and strategies to reduce travel demand. These preliminary alternatives were tested against the evaluation criteria. The results highlighted the strengths and weaknesses of the components.
- Fall 2006–Spring 2007: Identifying Draft Environmental Impact Statement (DEIS) alternatives
 - In collaboration with partner agencies, the CRC Program Team worked with the public to identify five project alternatives and recommended these for further analysis in the DEIS.
- Spring–Fall 2007: Analyzing the five alternatives
 - Working with the CRC Task Force, the CRC Program Team analyzed each alternative to determine how well it would relieve congestion and improve safety and mobility on I-5. The five alternatives were:
 - Replacement bridge with bus rapid transit (BRT)
 - Replacement bridge with LRT

- Supplemental bridge with BRT
- Supplemental bridge with LRT
- No build (for comparison purposes)
- Spring 2008: DEIS was released on May 2, 2008
 - The DEIS was released on May 2, 2008, with a 60-day comment period. More than 1,600 comments were received during this period.
- Summer 2008: Locally Preferred Alternative (LPA) selected
 - The partner agencies (TriMet, C-TRAN, City of Vancouver, City of Portland, Metro, and RTC) selected an LPA in late July 2008 that consisted of a replacement bridge with LRT ending at Clark College.
 - Metro Council amended the 2035 Regional Transportation Plan, Appendix 1.1, Financially Constrained System to include the CRC Program, on July 17, 2008 (Metro Resolution 08-3960B).
 - RTC adopted the Metropolitan Transportation Plan to include the LPA on July 22, 2008 (RTC Resolution 07-08-10).
- Fall 2008–2010: Refining Designs and Reviewing Work to Date
 - The governors of Oregon and Washington formed the Project Sponsors Council (PSC) to advise the departments of transportation on completion of the Environmental Impact Statement (EIS), project design, project timeline, sustainable construction methods, compliance with greenhouse gas emission reduction goals, and the financial plan. The PSC began meeting in November 2008 and was composed of two citizen co-chairs and representatives from each sponsoring agency.
 - The PSC considered several items related to bridge design in 2009. Discussions by the Urban Design Advisory Group (UDAG), Pedestrian and Bicycle Advisory Group, and regulatory and partner agencies resulted in a PSC recommendation for a two-bridge facility.
 - Two independent review panels were convened and delivered assessments on greenhouse gases and travel demand estimates. Both panels found the analyses by the CRC Program Team to be valid.
 - The PSC supported a concept in spring 2009 for a regional Mobility Council that would establish a local body to advise the state departments of transportation and transit districts on the optimal long-term performance of the Columbia River crossings. The primary purpose of the Mobility Council is to help maximize the long-term benefits of the CRC Program for all users and affected stakeholders in an equitable manner by recommending the implementation of the agreed-upon goals.

- In early 2010, the Vancouver City Council and C-TRAN Board of Directors adopted the light rail alignment for downtown Vancouver, with trains traveling north on Broadway Street, south on Washington Street, and east and west on 17th Street to the terminus station near the Marshall/Luepke Center and Clark College.
- The governors of Oregon and Washington convened an Independent Review Panel (IRP) to assess the implementation plan, review the financial plan, and review and evaluate post-construction performance measures for the CRC Program. The panel reported its findings and 30 recommendations to the governors on July 30, 2010. All recommendations were accepted by the departments of transportation.
- In August 2010, the PSC unanimously agreed on a set of recommendations to the governors of Oregon and Washington for moving ahead with development and construction of the CRC Program. The recommendations include a permanent ten-lane I-5 bridge and a change to the Hayden Island interchange design to address several community concerns. These recommendations were supported by Metro's updated land use model that found that the CRC Program would not induce sprawl in the region.
- In 2010, CRC Program Team convened a Bridge Review Panel to evaluate the bridge type under consideration. In February 2011, the panel released a report that offered three feasible bridge type options for the crossing over the Columbia River other than the bridge type under consideration at that time. The governors of Oregon and Washington responded to the panel's report by asking their respective Departments of Transportation to conduct an expedited review of the three bridge types and make a recommendation considering affordability, schedule, environmental impacts, commitments made to stakeholders, and risk. Based on these criteria, the states conducted further evaluations and made the draft recommendation of a deck truss bridge type for the crossing. After reviewing many different factors, including public comments, the governors found that the deck truss bridge type best met the multimodal transportation needs of the CRC Program while also being the most affordable and presenting the least risk to budget and schedule overruns. The governors identified in their recommendation the need to add an architect to the CRC Program Team, to establish architectural specifications for the Design-Build (DB) contractor to follow, and to engage the design community and public in the process.
- 2009: Entry into Preliminary Engineering
 - The FTA issued approval to enter into Preliminary Engineering on December 11, 2009.
- 2011: Land Use Final Order Adopted
 - Metro Council adopted the Land Use Final Order (LUFO) on August 11, 2011 (Metro Resolution 11-4280).

- 2011: Final Environmental Impact Statement (FEIS) Signed and Published
 - RTC signed the FEIS on September 6, 2011.
 - TriMet signed the FEIS on September 6, 2011.
 - WSDOT signed the FEIS on September 6, 2011.
 - ODOT signed the FEIS on September 7, 2011.
 - FTA Region 10 signed the FEIS on September 7, 2011.
 - FHWA Oregon Division signed the FEIS on September 7, 2011.
 - FHWA Washington Division signed the FEIS on September 7, 2011.
 - C-TRAN signed the FEIS on September 8, 2011.
 - Metro Council signed the FEIS on September 8, 2011.
 - The FEIS was published on September 23, 2011.
- 2011: Record of Decision (ROD) Published
 - The ROD was published on December 7, 2011.
- 2012: President's Dashboard and Major Permit Applications
- 2013: CRC Program Enters Engineering Phase
 - With the January 9, 2013 publication of a new final rule for Major Capital Investment Projects (amending 49 CFR 611), the CRC Program has been grandfathered into the Engineering phase.
 - The State of Washington fails to authorize their share of the local funding. ODOT considers funding a smaller initial phase project and submits this for consideration of the FTA and FHWA.
 - FTA Region 10 signed the CRC Phased Construction NEPA Re-evaluation on September 26, 2013.
 - FHWA Oregon Division signed the CRC Phased Construction NEPA Re-evaluation on September 26, 2013.
 - FHWA Washington Division signed the CRC Phased Construction NEPA Re-evaluation on September 26, 2013.
 - The U.S. Coast Guard granted approval of the General Bridge Permit on September 27, 2013.
 - TriMet and C-Tran enter into an operating agreement.

1.4. Program Goals and Objectives

1.4.1 Goals

To address the transportation problems on I-5, a mix of public transit and highway solutions that optimize the transportation system are needed. The goals of the I-5 CRC First Phase are to:

- Improve travel safety and traffic operations at the I-5 river crossing and nearby interchanges.
- Improve connectivity, reliability, travel times, and operations of the public transportation systems in the program area.
- Improve freight mobility and address interstate travel and commerce needs in the program area.
- Increase the structural integrity of the I-5 river crossing.

1.4.2 Objectives

The objectives of the I-5 CRC First Phase Project are to:

- Develop a financially feasible design that enhances public safety and long-term operations of I-5 while being sensitive to aesthetic, cultural, and environmental resources, and reflecting community values.
- Identify realistic and achievable approaches to contracting of I-5 CRC First Phase Project construction and financing.
- Complete the I-5 CRC First Phase Project:
 - On time;
 - Within budget;
 - Without litigated claims;
 - In a safe manner for both the individuals working on the I-5 CRC First Phase Project and for the traveling public; and
 - In a manner such that the public trust, support, and confidence in the I-5 CRC First Phase Project will be maintained.

1.5. Governance

1.5.1 Legal Authority

On July 17, 2008, Metro passed Resolution 08-3960b endorsing the LPA for the Columbia River Crossing Project and amending the Metro 2035 Regional Transportation Plan, Appendix 1.1, Financially Constrained System, to include the LPA.

On July 22, 2010, the RTC passed Resolution 07-08-10 endorsing the LPA for the Columbia River Crossing Project and amending the RTC Metropolitan Transportation Plan to include the LPA.

ODOT is the lead agency for this multimodal project, acting by and through the Oregon Transportation Commission (OTC). TriMet is the FTA grantee for transit grants on the CRC First Phase. TriMet and C-TRAN signed an agreement on September 27, 2013 for TriMet to develop, operate, manage, and maintain the new LRT extension within the C-TRAN district.

ODOT and TriMet have prepared a draft agreement for CRC project development, funding and operations and maintenance.

ODOT is authorized by:

- Oregon Revised Statutes (ORS) 190.420, Authority of public agency to make agreements with public agencies in other states; contents of agreement; liability of public agency.
- ORS 381.005 to 381.820, Interstate bridges under state jurisdiction.

TriMet is authorized by:

- ORS 267.010 through and including 267.430.
- Code of Tri-County Metropolitan Transportation District of Oregon.

Washington State Department of Transportation (WSDOT) is authorized by:

- The Revised Code of Washington (RCW) 47.52.020, Powers of Highway authorities— State facility, county road crossings.
- RCW 39.34.030, Joint powers— Agreements for joint or cooperative action, requisites, effect on responsibilities of component agencies.

C-TRAN is authorized by:

- RCW 36.57A, Public Transportation Benefit Area (PTBA).

1.5.2 Policy and Governing Agency

ODOT and WSDOT operate as stewards for the National Highway System and their respective state routes. FHWA provides oversight to ODOT and WSDOT for projects associated with the National Highway System and/or projects that utilize funding provided by FHWA. The FTA

provides oversight to TriMet, which is the FTA grantee for transit grants on the I-5 CRC First Phase Project.

ODOT reports to the Oregon governor, the OTC, and the Oregon State Legislature. The OTC is composed of five commissioners appointed by the governor and is responsible for establishing state transportation policy. Policy is implemented by the ODOT Director.

Overall policy direction for the I-5 CRC First Phase Project will be provided by an Executive Management Group consisting of the ODOT Project Director, TriMet Executive Director of Capital Projects, and other executive level staff from ODOT and TriMet, as agreed to by the agencies. They will resolve major program issues, address critical coordination issues and provide strategic direction with regards to issues of major political, financial and programmatic consequence. Overall management of the I-5 CRC First Phase Project will be provided by the Project Director assisted by a Deputy Director from ODOT and a Deputy Director from TriMet. The organization and reporting lines of the I-5 CRC First Phase Project Team are described in Chapter 2 below.

1.6. Inclusion in State Transportation Improvement Programs and Regional Transportation Plans

1.6.1 Oregon Statewide Transportation Improvement Program

The 2012-2015 Oregon Statewide Transportation Improvement Plan (STIP) was approved by FHWA and FTA on June 27, 2012.

The CRC First Phase can be found on page 50 and is identified by “Key 13136.” The 2012-2015 Oregon STIP can be found at:

2013-2016 http://www.oregon.gov/ODOT/TD/STIP/STIP/12-15Amended_STIP.pdf

1.6.2 Metro’s Regional Transportation Plan

The latest adopted version of Metro’s Regional Transportation Plan (RTP) is the 2035 RTP (adopted by the Metro Council on June 10, 2010). The RTP includes two entries in the RTP project list that include elements of the CRC Program. Basic information on these two projects is summarized below:

Project #	Jurisdiction	Description	Funding Estimate (2007\$)
10893	ODOT	Replace I-5/Columbia River bridges and improve interchanges on I-5.	\$2,982 million
10902	TriMet	MAX light rail: Yellow Line: CRC / I-5 North extension	\$755.6 million

Further details on the RTP and its references to these projects may be found at:
<http://www.oregonmetro.gov/index.cfm/go/by.web/id=25038>

1.6.3 RTC's Metropolitan Transportation Plan

The latest version of the RTC's Metropolitan Transportation Plan (MTP) 2007 Update also specifically identifies the CRC Program.

Key elements of the CRC Program description are in Chapter 5, Table 5-4 of the MTP:

Facility	Cross Streets	Description	Jurisdiction
I-5	Columbia River Crossing SR-500 in Vancouver to Columbia Blvd. in Portland	Replacement I-5 river crossing and reconstructed interchanges. Light Rail Transit with terminus in Clark College vicinity.	WSDOT

Further details on the MTP and its references to this project may be found at:

2011 <http://www.rtc.wa.gov/reports/mtp/mtp2011Update.pdf>

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2. Organization and Key Staffing

2.1. Overview

The I-5 CRC First Phase Project is a bi-state multimodal project that will be managed by two agencies that are experienced in the delivery of complex multi-modal transportation projects. ODOT will be the lead sponsoring agency for the project and will apply for the TIFIA loan and hold the toll bonds while TriMet is the grantee for the FTA's FFGA. These agencies will leverage their expertise in the recent delivery of two successful major construction programs: ODOT's Oregon Transportation Investment Act (OTIA) State Bridge Delivery Program and TriMet's Portland Milwaukie Light Rail Project (PMLR). The timing of the completion of those complex projects is such that well-seasoned key staff from those programs are available for assignment to the I-5 CRC First Phase Project. In addition the PMP for this project leverages the organization and best practices from those recent programs as the basis from this document.

This section discusses agency organization, agency responsibilities, management approach, and interface with lead federal agencies and local jurisdictional partners. It also discusses the I-5 CRC First Phase Project organization, responsibilities of key personnel, and staffing during engineering and construction.

This section also discusses how the I-5 CRC First Phase Project meshes with its agency partners' organizations, the responsibilities of partner agencies with respect to the project, and the interface with lead federal agencies and local jurisdictional partners.

2.2. Key Management Principles for the CRC Project

The I-5 CRC First Phase Project Team is committed to implementing the project on time and within budget in conformance with the policies and direction of the States of Oregon and Washington and their respective Departments of Transportation: TriMet and their Board of Directors and in conformance with the requirements of the U.S. Department of Transportation (USDOT) and applicable federal laws and regulations.

- The management principles for this project have been closely coordinated and agreed to by both ODOT and TriMet and are described in detail in a draft agreement between the two parties. The key management principles are as follows: Oregon Department of Transportation (ODOT) and Tri-County Metropolitan Transportation District of Oregon (TriMet) will cooperatively design, construct, equip, install, operate, and finance the Project.
- ODOT is the lead sponsoring agency for the Project and will apply for the TIFIA Loan from the Federal Highway Administration (FHWA) and provide any local matching funds
- TriMet will be the Grantee for the Federal Transit Administration's (FTA) Full Funding Grant Agreement (FFGA).

- There will be a co-located project office with a project team lead by key staff from ODOT and TriMet and jointly staffed by both agencies and by others that will assist in the overall management of the Project.
- The Project will be implemented through a series of interrelated Packages described in Chapter 8 - Program Delivery and Procurement.
- While there is a joint management team each Package will be designated to either be managed by ODOT or TriMet based on which agency is better able to manage that specific Package.
- Day-to-day contract management will be performed by personnel that are experienced in the specific delivery mode and technical requirements of the Package using management and reporting procedures with which they are most familiar.
- All material decisions regarding the funding, design, construction, and operation of the I-5 CRC First Phase Project require agreement of the Oregon Department of Transportation relative to highway elements and TriMet relative to transit improvements. In some cases the highway and transit components are combined and the two agencies will collaborate on the design of these project elements.
- Overall policy direction is provided by an Executive Management Group (EMG) composed of ODOT's Project Director, TriMet's Executive Director of Capital Projects and other senior/executive level principals from ODOT and TriMet. They will set the overall policy direction for the Project, resolve major project issues, address critical coordination issues between the agencies and provide strategic direction with regards to issues of major political financial, and programmatic consequence. They shall be a forum for coordinating the work of ODOT and TriMet and will resolve issues between agency staffs.
- Overall management of the I-5 CRC First Phase Project is provided by a Project Director from ODOT who will be responsible for developing and implementing a multimodal program that achieves the CRC Project's goals and objectives. (S)He will be supported by a Deputy Project Director from ODOT and a Deputy Project Director from TriMet.
- ODOT and TriMet staff have total management involvement and retain control over and/or input into all aspects and phases of the work. This includes self-performing the management functions of the I-5 CRC First Phase Project, including, but not limited to, project controls, safety and security, procurement, financial management, real property acquisition management, design management, construction management, information flow and operations of the LRT system.
- Day-to-day management responsibilities of I-5 CRC First Phase Project management and administration, design oversight, preparation of procurement documents, administration of procurement contracts for equipment and materials, and construction administration including mitigation monitoring reside with the lead representatives from ODOT and TriMet under the direction of the ODOT Project

Director, who in turn reports to the ODOT Director and the TriMet Executive Director of Capital Projects.

- ODOT staff will manage the design and construction of the highway improvements. TriMet will manage the transit design. TriMet and ODOT will manage the construction of the transit component under the direction of the Project Director. Contract bid and award will be the responsibility of ODOT and TriMet, as appropriate. Contract document preparation and construction administration of all executed contracts will be carried out under the oversight of the appropriated respective agency.
- The Public Involvement Team receives direction from the Deputy Project Directors with input from the Executive Management Group.
- The project team is responsible for developing and maintaining all scheduling, budgeting, cost estimating reviews, cost tracking, reporting, document control management, change management, quality management, policy, development and maintenance of procedures and project management plan, office information technology management, public disclosure management, and office administrative support management.
- The complete project team will likely consist of staff from ODOT, TriMet, other local agencies and consultants as needed.
- Document control procedures are being established and will be strictly observed by all ODOT, TriMet, and consultant staff working on the I-5 CRC First Phase Project.

2.3. Program Leadership and Management

The following describes the composition and interrelationship of the several management and advisory groups that the I-5 CRC First Phase Project Team relies upon for approval, support, and input:

- **Executive Management Group:** This group consists of ODOT's Project Director, TriMet's Executive Director of Capital Projects and other senior/executive level principals from ODOT and TriMet as agreed to by the agencies. They will set the overall policy direction for the Project, resolve major project issues, address critical coordination issues between the agencies and provide strategic direction with regards to issues of major political, financial, and programmatic consequence. They shall be a forum for coordinating the work of ODOT and TriMet and will resolve issues between agency staffs. They will not make decisions affecting the fiduciary responsibilities of the agencies with regard to their respective budgets, agreements with funding or financing entities, or other contracts. The EMG shall meet regularly according to a schedule agreed to be the agencies; ODOT shall be responsible for administration of EMG meetings.
- **Technical Advisory Group :** A Technical Advisory Group (TAG) consisting of senior-level staff from ODOT and TriMet, and staff, stakeholders, or others with specific technical or professional expertise, as agreed to by the agencies, and charged

with identifying, analyzing and recommending solutions to the agencies regarding engineering, contracting, legal, operations, and other technical issues. The TAG shall be staffed by ODOT and shall meet regularly and frequently according to a schedule agreed to by the agencies.

- A project management group consisting of senior-level staff from partnering jurisdictions, as agreed to by the agencies, which shall serve as a forum to keep such jurisdictions informed of the status and issues of the program and to provide information and advice to the agencies regarding jurisdictional issues that may affect the program. The project management group shall meet quarterly and shall be staffed by ODOT.
- **Transit Safety and Security Committee:** SSC involvement in the safety and security management process begins during design and continues through the construction, testing, and start-up phases. Specific processes have been developed to assure the requirements of the SSMP are performed, including but not limited to the performance of safety analyses and security assessments at the appropriate phases of the project, implementation of a Safety and Security Certification Program from the start of project activities, and a process to ensure safety issues and security concerns are addressed and tracked to resolution.
- **Change Management Committee:** A Change Management Committee (CMC) consisting of the ODOT Project Manager and the TriMet Deputy Project Manager and other staff as designated by the agencies will be charged with quickly reviewing changes to scope, schedule and budget that come up during the delivery of the project. They will be charged with coordinating changes that impact multi contracts and identifying cost or schedule impacts that need to be raised to the EMG level. The CMC will be staffed by ODOT and shall meet as required to prevent schedule or budget impacts to design or construction.

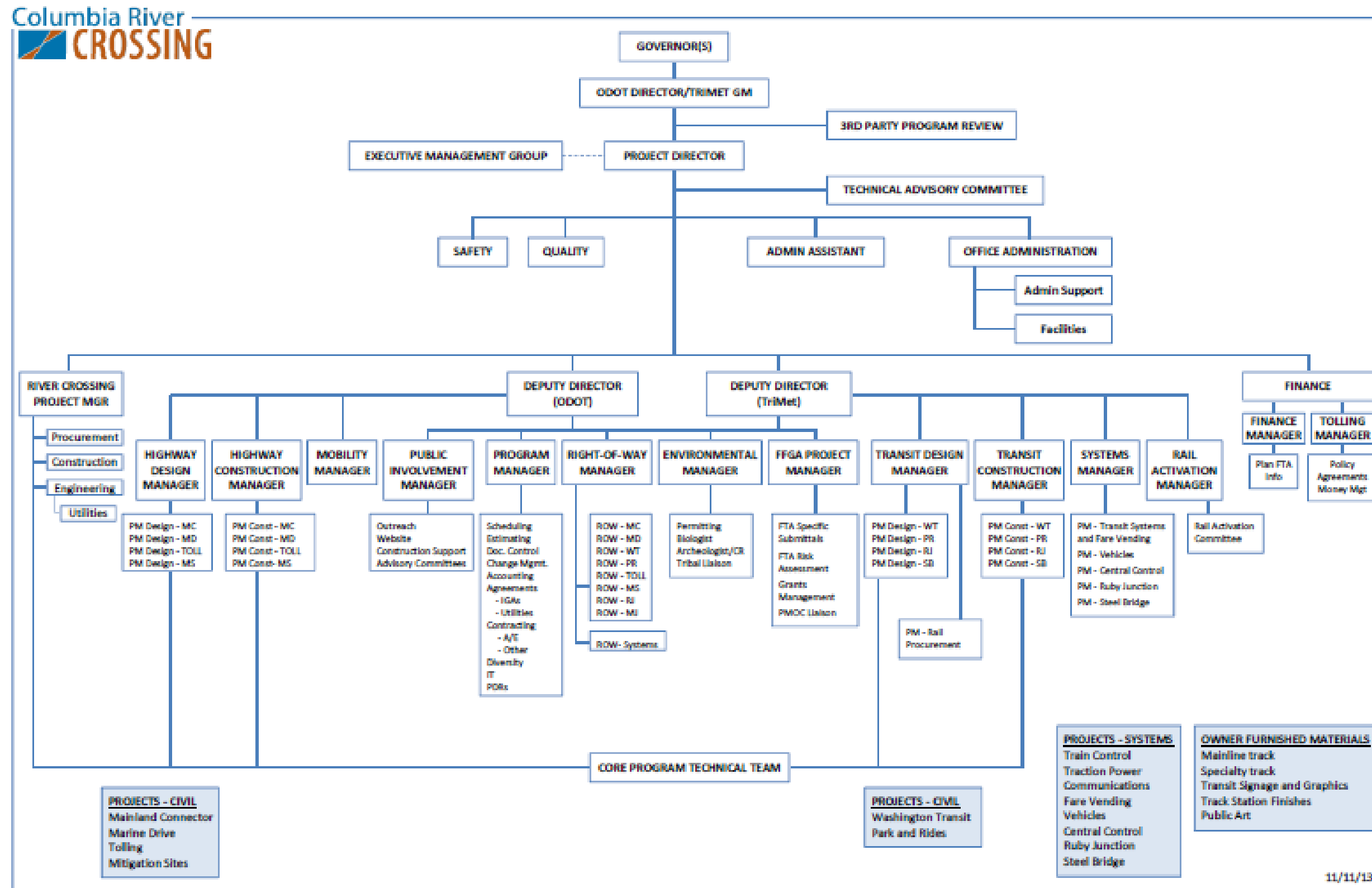
Other committees and subcommittees as agreed to by the agencies regarding specific aspects of the program may be added as the need develops. These committees and subcommittees shall be staffed by the agency establishing the committee or subcommittee, and shall meet on such schedule as determined by the agency staffing the committee or subcommittee. Additional details on the above groups can be found in the TCCP, which is Appendix A to this PMP.

2.4. CRC Project Organization

During engineering and construction, the I-5 CRC First Phase Project will utilize a team that integrates ODOT and TriMet, staff with consulting support as needed, to deliver multimodal highway and transit designs that meet FHWA and FTA requirements and the project's goals and objectives.

ODOT and TriMet will deliver the I-5 CRC First Phase Project with a combination of agency and, if necessary consultant staff under the direction of the ODOT Project Director. The number of staff engaged in the project will vary with the phase in progress, the specialties required for that phase, and the selected delivery method. An organizational chart depicting the basic structure of the I-5 CRC First Phase Project is shown in Figure 2-1.

FIGURE 2-1. I-5 CRC FIRST PHASE PROJECT ORGANIZATION CHART



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Additional details and expanded I-5 CRC First Phase Project organizational charts can be found in the TCCP, which is Appendix A to this PMP.

The TCCP also explains the roles and responsibilities of key team members who comprise the CRC Senior Management Team including the Project Director, Deputy Directors, and Senior Managers.

2.5. Interface with Partnering Federal Agencies

The success of the I-5 CRC First Phase Project requires close partnering between ODOT and TriMet and the two co-lead federal oversight agencies, FHWA and the FTA. The individual responsibilities of the co-lead federal agencies are listed below.

2.5.1 Federal Transit Administration (FTA)

Responsibilities:

- Oversight for transit planning, design, engineering, construction and testing and start-up.
- Together with FHWA, oversight and approval for I-5 CRC First Phase Project environmental compliance.
- Provides funding for the I-5 CRC First Phase Project through the FTA's New Starts program.
- Authorizes entry into Engineering and executes Full Funding Grant Agreement (FFGA).

Project Management Oversight Contractor (PMOC)

The FTA utilizes transit industry consultants to assist in monitoring grantee compliance with all applicable FTA requirements. The Project Management Oversight Contractor (PMOC) reports directly to the FTA on project progress and issues and serves as an extension of FTA staff.

Typically, the PMOC conducts monthly on-site reviews, with other subject-specific reviews (Spot Reports) taking place as needed. The PMOC is expected to focus its assessment on scope, schedule, cost, and grantee technical capacity and capability, with an emphasis on risk identification and mitigation. The PMOC consultant also participates in quarterly review meetings jointly held with the FTA and FHWA. The PMOC conducts its work in accordance with the FTA's Project Management Oversight Operating Procedures.

Quarterly Reviews

Each quarter, the FHWA and FTA, assisted by the PMOC, jointly conduct a program review. Appropriate senior members of the I-5 CRC First Phase Project Team are responsible for organizing the meetings. The project team prepares the agenda with input from the FTA and the PMOC. At the meetings, I-5 CRC First Phase Project staff present a review of the progress of the

preceding quarter and the activities planned for the upcoming quarter. Discussions from the quarterly review are recorded in meeting notes prepared by the PMOC and distributed by the FTA to all parties. Consistent with FTA requirements, the I-5 CRC First Phase Project staff, with help from other ODOT and TriMet staff as appropriate, prepares and submits quarterly electronic reports on program activities, budget, and schedule in the Transportation Electronic Award Management (TEAM) system.

2.5.2 Federal Highway Administration (FHWA)

Responsibilities:

- Oversight for the highway and bridge planning, preliminary design, engineering, and construction
- Together with the FTA, oversight and approval for the I-5 CRC First Phase Project's environmental compliance

FHWA Mega-Project

FHWA and ODOT have a longstanding relationship that spans the entire spectrum of project development and implementation from planning, to construction, to maintenance of roadway facilities. FHWA maintains an oversight role but has delegated the stewardship for development and maintenance of the interstate system to ODOT. Typically, a regional FHWA Area Engineer provides oversight and approval for projects either scoped on the interstate system and/or state and local projects with an allocation of federal funding. Because of the large size of the I-5 CRC First Phase Project, FHWA has assigned a Major Projects Manager who is dedicated full-time to the project, and who is co-located in the project office to facilitate daily coordination, including attending regular staff meetings. Additional details regarding roles and responsibilities between FHWA and ODOT are found in the FHWA Stewardship and Oversight Agreement (Feb. 19, 2008).

FHWA Reviews

As discussed above, each quarter, the FHWA and the FTA jointly conduct a program review. As the I-5 CRC First Phase Project advances into engineering and construction, FHWA will establish a formal schedule of reviews. FHWA will review and provide comments on all environmental documentation, Memorandums of Agreement or Memorandums of Understanding, agreements, and design criteria. A structured three-tiered design review, with FHWA approval at each tier, is anticipated to occur. This design review process is as follows:

- Design Approval/Design Acceptance (approximately 30% design): for scope, schedule, budget, geometric design, known deviations/exceptions, and intersection and interchange plans.
- Project Development Approval (approximately 60% design): for scope, schedule, budget design documentation, advanced roadway design, and review of current design decisions.

- Final Plan, Specification, and Estimate (PS&E) Approval: for concurrence on final plans, provisions, and estimate.

Additionally, FHWA has requirements for best project management practices that the I-5 CRC First Phase Project will need to meet, including:

- Preparing and implementing a Project Management Plan:
 - Required by the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU).
 - Guidance is found at <http://www.fhwa.dot.gov/programadmin/mega/> .
- Preparing and implementing a Financial Management Plan
 - Required by SAFETEA-LU.
 - Guidance is found at <http://www.fhwa.dot.gov/programadmin/mega/> .
- Conducting Value Engineering (VE) studies.

2.6. Interface with Local Partners

The I-5 CRC First Phase Project is a partnership between ODOT and TriMet and local jurisdictions made up of the cities of Portland and Vancouver, and Metro. Key responsibilities of ODOT and TriMet are described in the TCCP (see Appendix A to this PMP). Key responsibilities of the city of Portland and Metro are as follows:

2.6.1 City of Portland

Responsibilities

- Provide input and guidance related to local facility design in Portland.
- Provide concurrence and approval of design elements affecting its jurisdiction.
- Provide input and guidance for local coordination and community involvement in Portland.
- Provide input for transit planning in Portland.

2.6.2 City of Vancouver

Responsibilities

- Provide input and guidance related to local facility design in Vancouver.
- Provide concurrence and approval of design elements affecting its jurisdiction.

- Provide input and guidance for local coordination and community involvement in Vancouver.
- Provide input for transit planning in Vancouver.

2.6.3 Metro

Responsibilities

- Provide oversight and concurrence for traffic modeling and travel demand forecasts.
- Adopts Regional Transportation Plan (see Section 1.7.3).

2.7. Program Organization during Engineering and Construction

During engineering and construction, the I-5 CRC First Phase Project will utilize a team integrating ODOT, TriMet, and consultant staff (as needed) to deliver multimodal highway and transit designs that meet FHWA and FTA requirements and the I-5 CRC First Phase Project's goals and objectives. ODOT and TriMet will deliver the I-5 CRC First Phase Project with a combination of agency and consultant staff under the direction of the I-5 CRC First Phase Project Director. The number of agency and consultant staff engaged in the project at any given time will vary according which phase is in progress, the specialties required for that phase, and the selected delivery method.

ODOT and TriMet will utilize an integrated team composed of agency staff and where necessary, consultants. Consultants will be used for the following reasons: could include

- For specialized expertise.
- For short-term staff augmentation to assist staff during peak work periods.
- For events and under conditions for which the I-5 CRC First Phase Project may benefit from outside perspective and objectivity.
- On smaller consulting contracts for specialized services during various stages.
- For legal and claims support, environmental, consulting, materials testing, operations planning, real estate acquisition support, computer support, partnering, safety and security, and public relations, among others.
- For long-term design services in support of major project elements (e.g., transit elements). This could include the following areas:
 - Civil Engineering – provide design services in the areas of civil and structural facilities, trackwork, utilities, architecture, and landscaping. These contracts also include design services during construction.

- Right-of-Way (ROW) – provide ROW services in the areas of title, acquisition, appraisal, appraisal review, relocation, and property management.
- Systems Engineering – provide design services in the areas of operations facility revisions, electrification system, train signal system, train-to-central control communications system, LRVs, and fare collection system. These contracts also include systems design services during construction.
- Program Management – provide assistance in risk assessment, scheduling, database development, and cost estimating during engineering and construction phases.
- Construction Management – provide staff augmentation, including resident engineering, office engineering, and inspection staff.

Preparation, negotiations, and execution of agreements with consultants will follow applicable procedures outlined in the ODOT Procurement Manual.

Additional details on procurement relating to activities performed by consultants can be found in the TCCP, which is an appendix to the PMP, and the Project Delivery and Procurement Plan.

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3. Management Control

3.1. Overview

The I-5 CRC Program Management Team will execute the I-5 CRC First Phase Project during the engineering and construction phases within clearly defined program parameters as well as manage individual project packages and contracts, to approved scope, schedule, and budget baselines that will be established when funding has been secured for the I-5 CRC First Phase Project. The primary elements of management control include:

- Project Controls
- Cost Control
- Scope Control
- Schedule Control
- Configuration and Change Management
- Document Control and Records Management
- Quality Management
- Safety Management

I-5 CRC First Phase Project Management Team members as listed in Appendix A, the Technical Capacity and Capability Plan (TCCP), will monitor work progress against established baselines for management control elements, and all I-5 CRC First Phase package and contract managers will implement procedures that accurately document changes following the establishment of the I-5 CRC First Phase Project schedule and budget baselines. The CRC Project Management Team will prepare and disseminate status reports frequently to the CRC's Executive Management Team, Change Management Committee and Project Management Group to allow timely and proactive response to issues that could potentially have impacts on the approved scope, budget, and schedule.

Management and administration of the I-5 CRC First Phase Project will comply with all applicable federal, state, and local regulations. Management and administration procedures are based on those already in use at ODOT and TriMet and new or revised procedures that will be developed, as needed, specifically for the I-5 CRC First Phase. Procedures will ensure compatibility with the framework of the PMP and effective management control. Consistency in the manner in which various physical and technical aspects of the I-5 CRC First Phase Project are defined and recorded as needed.

During the Engineering and Construction phases, this definition ensures that the I-5 CRC First Phase Project's baseline (scope, budget, and schedule), that is approved with the Full Funding Grant Agreement (FFGA) with FTA and the loan agreement with Federal Highway Administration's Transportation Infrastructure Finance and Innovation Act (TIFIA) program. The I-5 CRC First Phase Project is developing procedures for identifying, evaluating, accommodating, and capturing changes that may occur during the engineering and construction phases and that have an impact on the approved baseline. Change management procedures for design and construction control, discussed in Section 3.6 below, specify responsibilities for initiating and approving changes, permitting results to be achieved rapidly, providing for full evaluation of the impact of the changes, and specifying the documentation of the changes.

The I-5 CRC First Phase Project's cost, schedule, and scope objectives will be accomplished by instituting a framework for tracking the Projects' status as provided for with the Work Breakdown Structure (WBS). The project will use:

- (a) The WBS to define and monitor costs;(b) Procedures for ensuring traceability of scope, schedule, and budget supported by the change management process described in this PMP;
- (c) A drawings and plans management system for design control;
- (d) A document management system for control of records; and
- (e) A requirements based compliance auditing process to monitor the quality assurance/quality control (QA/QC) program.

3.2. Project Controls

Project controls refer to established processes employed to manage cost and schedule goals for the I – 5 CRC First Phase Project. Project controls provide accurate and timely project cost and schedule information for the Management Team, as well as regular analyses and review of projections and variances. Project staff will also develop and employ procedures to uniformly document changes made during the engineering and construction phases of the I-5 CRC First Phase Project. This information facilitates ongoing review of individual package and contract performance as well as analyses of overall trends of the project. The goal is to ensure that all scope, schedule, and cost goals are met.

3.2.1 Work Breakdown Structure

The I-5 CRC First Phase Project Work Breakdown Structure (WBS) will provide consistent treatment of similar costs and schedule tasks. The WBS will decomposes project package elements and track all project costs and each project package and contract described in Chapter 8, Project Delivery and Procurement, using a codification convention. The WBS will also accommodate agreements, tasks, and subtasks, providing powerful reporting capabilities. The WBS will be deliverable-oriented and will be developed so that reports can be generated to track critical items across packages and contracts.

3.3. Cost Control

The Project Delivery and Procurement Plan (PDPP) describes the project delivery strategy that will divide the I-5 CRC First Phase Project, following completion of the 30% design, into separate and distinct project packages. Baseline budgets will then be established for each project package based on the engineers' cost estimate and the schedulers' forecasted durations to account for the effects of inflation and potential interim finance cost. Subsequently, changes in scope and schedule with potential impact to budget baselines must be approved by the Change Management Committee.

Baseline documentation will be available for the approved project package scope that matches it to baseline budgets that coordinate with the I-5 CRC First Phase Project WBS, including any budget transfers between project packages. Contract and package budget and progress against the budget will be tracked and reported on a monthly basis.

3.3.1 Cost Control Procedure

Cost control is a broad set of cost accounting methods and management techniques with the common goal of improving cost-efficiency by managing the rate of cost changes and/or growth in costs. The Project Management staff will use cost control methods to monitor, evaluate, and enhance the efficiency of specific areas within the I-5 CRC First Phase Project (See the Cost Control Plan, which is Appendix B to this PMP.) The objective is to conduct project delivery activities throughout the engineering and construction phases to the approved scope, budget, and schedule established when with the FFGA and TIFIA loan agreement.

3.4. Scope Control

Scope control for the I-5 CRC First Phase Project is addressed in the attached Configuration Management Plan, Appendix R, and encompasses the following elements:

- A clear listing of measurable, comprehensive, and definitive deliverables will be created for each package and/or contract of the I-5 CRC First Phase Project. The required tasks will be developed from the written project scope into an understandable format through the use of the WBS.
- Key deliverables that are products of the tasks will be identified as benchmarks in the schedule and monitored very closely for slippage.
- Modifications to the baseline scope will be identified as changes, as outlined in the Configuration Management Plan, which is Appendix R to this PMP.

Any change that could affect or potentially change the scope and WBS is managed through the change management process described in the Configuration Management Plan.

3.5. Schedule Control

Schedule management will be accomplished through the use of schedules, a change management process, and a monitoring and reporting system. It is the responsibility of all participants of the I-5 CRC First Phase Project to provide input to the project schedule.

All schedule updates, including updates to the schedule's basis and assumptions (B&As), will be reviewed by the package managers and approved by the ODOT and TriMet before the updated schedule is published. Overall I-5 CRC First Phase Project scheduling will be maintained at the project office based on input from each package or contract manager. Scheduling updates will be provided to the Project Management Team on a routine basis.

3.5.1 Scheduling Procedures

Scheduling procedures, described in the Schedule Control Plan (see Appendix N to this PMP), have been established to provide efficient, timely, and accurate methods of schedule and cost control, monitoring, and reporting.

3.6. Configuration and Change Management

Configuration Management is a management system for establishing and maintaining consistency of a facilities performance, functional and physical attributes with its requirements, design and operational information throughout its useful life. The configuration management will specify the Project's policy and methods to:

- Identify and define baseline scope attributes
- Control changes and releases scope attributes
- Report and record status of scope attributes and any changes
- Ensure completeness, consistency, and correctness of scope attributes
- Control, store, handle, and deliver scope and change data

A well planned configuration management system (CMS) is essential to achieving effective, predictable and repeatable processes over the life of the project. The activities within the processes shape the application of solid, practical procedures that result in cost avoidance and project stability.

The CMS is composed of four process groups which, when combined and integrated, create the configuration management system. The CMS process groups include the project baseline, document management, change management, and configuration status accounting and reporting.

The users' primary tool for centralizing and integrating the CMS is the Project Management Information System (PMIS). The PMIS is an automated enterprise information system that provides access to project management tools such as cost control and scheduling software, a configuration management system, an information collection and distribution system, or web interfaces to other online automated systems used to manage the project.

Change management is the process group that manages project configuration changes and variances. Changes are permanent alterations to the established baseline configuration. A change is proposed when a new requirement is received, an improvement is desired, or a problem requires a solution that deviates from the established baseline configuration. Changes may be caused from the discovery of a problem such as a design defect, a suggestion for project improvement or enhancement, a key stakeholder request, or a condition dictated by the marketplace or by public law. The purpose and benefit of change management is:

- Enable change decisions to be based on knowledge of the complete impact
- Limit changes to only those that are necessary and offer a significant benefit
- Facilitate the evaluation of cost, saving and trade-offs
- Ensure stakeholder interests are considered
- Provide orderly communication of change information
- Maintain and control current project baseline
- Maintain consistency between the project and documentation
- Document and limit variances

ODOT and TriMet intend to independently administer contract packages. With this delivery approach, each agency will govern its own projects within the change management policy of its respective agency. Both ODOT and TriMet will adhere to the fundamental principles described in this Change Management Plan. Furthermore, the structure of ODOT change management processes for its respective packages will be fundamentally consistent with the framework of OTIA III State Bridge Delivery Program, Operational Notice 1. TriMet's change management process structure for its respective packages will adhere to the TriMet Contract Administration Handbook, General Provisions and Resident Engineers Manual. The individuals authorized to approve construction changes and the dollar thresholds of their authority for ODOT are found in ODOT's Construction Manual. Individuals with approval authority from TriMet are established in TriMet's Business Procedures Manual and in the Resident Engineers Manual.

At the project level, the I-5 CRC First Phase Project will establish a well structured change management process. Senior management will ensure staff select the appropriate tools, techniques and methods suitable for the environment; plan the implementation, prepare procedures, perform training and measure project performance. The change management processes will adhere to the following principles:

- Change Identification
- Request Changes
- Classify Changes
- Document Request for Changes

- Change Impact Assessment and Coordination
- Point of Incorporation (effectivity) Determination
- Disposition Change Cost/Price Determination
- Change Approval
- Plan Change Implementation
- Change Implementation and Verification

As with the CMS, any project staff, regardless of role or level of authority in the organization is empowered to initiate a change request when they become aware of an impact to the base scope, the target budgets and/or schedule.

The configuration and change management functions for the I-5 CRC First Phase Project will be carried out as outlined in the Configuration Management Plan (SSMP) (Appendix R to this PMP).

3.7. Document Control and Records Management

The purpose of document control is to uniquely identify documents, archive historical information and ensure current versions are available and retrievable. It is a system based on principles of configuration management, which adheres to strict approval processes and version control. Document control is a system of managing, distributing and keeping records on the documents that have been created by an organization, usually as part of its overall quality system. In effect, it is a repository for centralizing files and provides version control of baseline and subsequent documents.

For purposes of this plan, a “document” is any electronic or hardcopy media designed to convey information about or on behalf of a project, including but not limited to meeting documentation, deliverables, drawings, e-mail, faxes, letters, memoranda, organizational charts, photos, presentations, project binders, reports, specifications, and spreadsheets as well as contractual documents, financial records, and grant-related records throughout the design and construction phases of the Project. Document control and records management tasks include: receipt, storage, retrieval, and distribution of all Project documents, including key project documents classified as “controlled documents.”

Document control involves controlling or regulating the creation, approval and modifications to baseline documents that are either developed or used during the implementation and management of the Project. All documents will be uniquely identified so that they may be referred to precisely and retrieved when necessary. This will be accomplished through naming conventions and control numbering system. Configuration documents will cite, or are linked to, the baseline scope element identifier and revision with which they associate.

The I-5 CRC First Phase Project intends to employ a single enterprise Electronic Data Management System (EDMS), such as using the additional capabilities of ProjectWise software, to perform all document control and records management storage functions currently served by

the two previous software database platforms. This will become an integral part of the PMIS. After such determination is made the document control processes will be further defined.

The document control and records management functions for the I-5 CRC First Phase Project - will be carried out as outlined in the Document Control Plan (Appendix L to this PMP).

3.8. Quality Management

The quality management functions for the I-5 CRC First Phase Project - will be carried out as outlined in Chapter 15 of this PMP – Quality Assurance and Quality Control and described in the Quality Assurance Plan (Appendix E to this PMP.)

3.9. Safety and Security Management

The safety and security management functions for the I-5 CRC First Phase Project - will be carried out as outlined in Chapter 11 of this PMP – Safety and Security and described in the Safety and Security Management Plan (SSMP) (Appendix G to this PMP).

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4. Program Funding

4.1. Overview

TriMet is the FTA grantee for transit grants. ODOT and TriMet are the co-lead agencies for the overall multimodal CRC First Phase. The CRC finance team is responsible for the development and implementation of the finance plan, preparation of financial plan reports for New Starts submittals, implementation of tolling, and resolving issues effecting implementation of the finance plan. The CRC Finance Manager oversees the efforts of professional staff on the CRC finance team. The CRC Finance Manager oversees tolling coordination with ODOT.

The finance plan, the “CRC Capital and Operating Finance Plan,” will be submitted to the FTA as partial fulfillment of the requirements for the Full Funding Grant Agreement (FFGA). It addresses funding for the integrated multimodal CRC First Phase. This chapter provides an overview of the funding mechanisms and procedures pertaining to the CRC First Phase. For detailed funding information, see the CRC Capital and Operating Finance Plan.

4.2. Capital Funding Sources

The CRC First Phase seeks federal funding through the FTA Capital Investment Program (49 U.S.C. § 5309) for the establishment of new rail projects. The capital portion of the CRC Capital and Operating Finance Plan for the CRC First Phase also depends on toll revenues (i.e., toll-backed borrowing proceeds and pre-completion toll proceeds) and state transportation funds from ODOT. The CRC First Phase’s expected resources and requirements are described in detail in the CRC Capital and Operating Finance Plan. In summary, the funding plan:

- Draws on a combination of local, state, and federal funding sources, as shown below.
- Includes an interim borrowing program to ensure that cash flow supports the most cost-effective project engineering and construction schedule.

SOURCE	FUND OWNER	STATE	FEDERAL	TOTAL
ODOT Balance from Prior IGA	ODOT	2,319,109	28,141,455	30,460,564
ODOT Bonds	ODOT	450,000,000		450,000,000
TIFIA	ODOT		900,000,000	900,000,000
FTA New Starts	TriMet		850,000,000	850,000,000
Tolls and Toll Bonds	ODOT			481,239,436
Total		452,319,109	1,778,141,455	2,711,700,000

4.3. Funding Partner Relations

The CRC First Phase is a collaborative effort of several partners including FTA, FHWA, and the Oregon State Legislature. Executive and elected officials of affected agencies, bond rating agencies, and private financial institutions providing interim financing are all involved in the funding program. These efforts will be supplemented as needed by experts from ODOT, TriMet, and the CRC First Phase project staff.

The Financial Management Oversight Consultant will conduct a Financial Capacity Assessment and review the CRC Capital and Operating Finance Plan prior to the execution of the FFGA. FHWA's role includes its approval of an initial finance plan, with subsequent annual updates. The initial finance plan will be approved by FHWA before its concurrence on the award of a Design-Build contract, or before authorization of federal aid funding for interstate construction.

4.3.1 Grant Administration – FTA

Overview

TriMet, as the FTA grantee for transit grants, in collaboration with ODOT and C-TRAN, will administer the FFGA and related grants in accord with FTA Circular 5200.1A, Full Funding Grant Agreements Guidance, and FTA Circular 5010.1D, Grant Management Requirements.

Grant Administration

TriMet's Capital Projects Division, TriMet's Finance and Administration Division, and the CRC First Phase staff are jointly responsible to the FTA for grant-related issues. This work will be conducted with assistance from and coordination with ODOT Public Transit Division and C-TRAN, as needed. Responsibilities include:

- Development of grant applications and amendments
- Coordination of grant application-related required activities
- Response to FTA application review comments
- Facilitation and execution of grant agreements, and notification of approval to CRC First Phase staff
- Maintenance of grant files, including all grant applications, grant agreements, grant-related correspondence, quarterly reports, and grant budgets
- Submittal of FTA quarterly reports
- Distribution of grant status, labor, and financial reports to CRC First Phase staff and stakeholders
- Distribution of information to appropriate CRC First Phase staff about new or changing federal grant-related requirements or regulations

- Guidance to CRC First Phase staff on grant eligibility issues, budget management, and use of grant resources
- Preparation and distribution of monthly reports, including a single summary report, with details on activities, schedule, forecast cost, and overall completion.

Grant Accounting – FTA

TriMet, ODOT, the CRC Project Controls team, TriMet's Capital Projects Division, and CRC Program staff will determine the most effective system for tracking project funds. The CRC First Phase, ODOT Administration Division, and TriMet will perform the following grant management accounting functions:

- Establishing all FTA grant accounting information
- Processing grant-funded project invoices and charges
- Producing monthly grant status, labor, and financial reports
- Preparing the quarterly Federal Financial Report and other reports for FTA's Transportation Electronic Award Management system (TEAM) or its successor
- Reviewing and validating expenditures before submitting grant drawdown transactions
- Processing grant drawdown transactions
- Ensuring the grant is appropriately reflected in TriMet's Report of Independent Auditors and Financial Statements Annual Report
- Submitting final reports at grant close out

Cash Management

TriMet is responsible for receiving and dispersing all transit funds.

The CRC First Phase will follow the most expedient and cost-effective engineering and construction schedule; that is, progress on the CRC First Phase Project will not be delayed awaiting federal funds.

TriMet's Financial Services Department will draw federal funds in accord with 31 CFR §205.33 and Electronic Clearing House, Inc. (ECHO) procedures. When federal funds are not available due to appropriation cycles, local funds and/or interim financing will pay expenditures.

Grant Closeout

The CRC First Phase staff will prepare final reports required by Circular 5010.1D Chapter III 5. TriMet will submit these reports in TEAM.

Full Funding Grant Agreement Reporting

TriMet will prepare and submit the quarterly Federal Financial Report and Milestone/Progress Report through TEAM. These reports include cash draw downs against awarded grant funds, and summarize budget, schedule, and scope developments, bid results, potential change orders, executed change orders, and planned and completed activities. Reporting will be conducted in accord with guidance in FTA Circular 5200.1A, Full Funding Grant Agreements Guidance.

Force Account

See the Force Account Plan, included as Appendix M to this PMP, for details. Circular 5010.1D Chapter IV 4.d requires FTA approval of force account plans exceeding \$10 million. The CRC First Phase will develop force account plans for the use of ODOT's own forces and for the use of TriMet forces during bus bridge and start up activities.

4.4. Financial Audits

TriMet and ODOT will formally and regularly coordinate with the CRC First Phase to conduct audits and prepare audit plans as needed to comply with FTA New Starts requirements. TriMet and ODOT will comply with state and federal requirements for both internal and independent external audits.

Funds budgeted, received, and disbursed under the FFGA will be subject to review by TriMet's grants compliance staff and will be included in TriMet's external auditors annual report referenced under Grant Accounting. The CRC First Phase's transit-related activities will be subject to FTA's Triennial Review and other standard reviews: Procurement, Title VI and Civil Rights, etc.

5. Insurance (Risk Management)

5.1. Overview and General Treatment

Insurance will be used as one of the risk transfer and risk finance and claims mechanisms for the CRC First Phase’s loss exposures. The goals of the CRC First Phase insurance program will be the protection of project assets and protecting the project controlling agencies (ODOT and TriMet) from adverse impacts of loss associated with claims arising out of project design and construction. In advancing those goals, the CRC First Phase will coordinate with the ODOT and TriMet risk management and legal groups to develop and enforce contract indemnification and insurance requirements sufficient to cover those risks that the CRC First Phase and project controlling agencies deem necessary to transfer via an insurance portfolio. Both project controlling agencies’ risk transfer and finance mechanisms will be coordinated and utilized.

During the Engineering, and prior to issuing the Requests for Proposals (RFP), the CRC First Phase will work with the risk management groups of both project controlling agencies to study and identify the optimal method(s) of protecting the CRC First Phase and the project controlling agencies. Using this study and identification process, the CRC Project will develop a thorough understanding of the loss exposures and identified risks associated with each contract.

The CRC First Phase will evaluate risk transfer and finance through all appropriate insurance coverage types, amounts, and other risk transfer tools. During development of the RFP, both project controlling agencies’ legal and insurance professionals will review all policy and contract language requirements regarding insurance coverage. Minimum insurance coverage types may include, but are not limited to:

Table 5-1. Minimum Insurance Coverage Types (additional and other coverage will likely be identified as the CRC First Phase progresses)

Workers' Compensation	Commercial General Liability
Automobile Liability	Environmental Liability
Excess Liability	Railroad Protective Liability
Builder's Risk	Marine Liability
Aircraft Liability	
Contractor's Protective Liability	
Subcontractor Insurance Requirements	
Waivers of Subrogation	
	Claims Relating to Differing Site Conditions
OPPI (Owners Protective Professional Insurance)	
Watercraft Liability	
Jones Act	
USL&H	
All states endorsement under workers comp, if applicable	
Revenue disruption for tolling due to catastrophic loss	
Professional Liability (including consideration of design errors and multistate inspection)	

Chapter 5 of the Risk and Contingency Management Plan (RCMP) (see Appendix C to this PMP) describes typical response actions that can be used to mitigate identified project risk events, including both threats and opportunities. Insurance is one response tool for transferring risk in procurement, design, construction, and operation and may be tailored to address specific project risk events. If this response type is deemed appropriate for an identified risk event, it will be documented and implemented by the Program Risk Manager. Program Risk Management is broken down into two areas of responsibility: enterprise risk management and project risk management. Project risk management is discussed in detail in the RCMP (see Appendix C to this PMP). Enterprise risk management involves the categories of risk that arise out of the CRC Project that may have consequences to project controlling agencies at the agency level. For instance, cost overruns may impact the non-CRC budgets and projects of either agency. Obviously, a means for mitigating these issues is critical. In consultation with ODOT and TriMet Risk Management, the enterprise risk management arm of Program Risk Management will be responsible for evaluating, administering, and coordinating the insurance and claims for the CRC First Phase. These efforts will include:

- Identifying the loss exposures of the CRC First Phase and evaluating the best methods to limit these exposures and protect the interests of the CRC Program and agencies.
- Determining the appropriate coverage types and limits.
- Developing and administering a claims management program to coordinate all claims including but not limited to property, liability, and worker's compensation claims, including property damage recoveries.
- Conducting risk analysis for insurance purposes or other means of risk transfer.
- Managing the insurance program, including managing the coordination of verifying that insurance remains in place, dealing with claims and monitoring the DB contractor insurance program.
- Assisting in litigation and arbitration management.
- Reviewing contracts, lease agreements, and other legal documents for assumption and transfer of risk.
- Coordinating insurance company loss control site visits with CRC safety as required by underwriters.
- Work with CRC Safety as needed.

The CRC First Phase will take the necessary actions to protect against risk in a fiscally responsible manner and to coordinate the insurance needs of the agencies. Insurance will be consistent with:

- TriMet standard practices for insurance requirements on contracts.

- ODOT/American Public Works Association (APWA) Oregon Chapter, Volume 1, 00170.70 and the insurance requirements specified in the RFP and Design Build Contract.
- Relevant Interagency Agreements.

During the development of the RFP for at least the I-5 Columbia River Crossings and Approaches Design Build Contract, different approaches for providing insurance will be considered, including the possibility of an Owner Controlled Insurance Program (OCIP) or a Contractor Controlled Insurance Program (CCIP), for at least some insurance coverage types. If either an OCIP or a CCIP is used, it will have an impact on some of the efforts identified above, for example, how claims will be handled. Determination of all the necessary coverage types and approaches for insurance is an ongoing effort.

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6. Real Estate Acquisition Management Plan

This chapter provides an overview of the CRC Real Estate Acquisition Management Plan (RAMP) with respect to:

- Scope of real estate activities;
- Implementation framework; and
- Implementation strategies.

For additional information, please refer to the entire RAMP document in Appendix F to this PMP.

6.1. Scope of real estate activities

Environmental impact analysis conducted during the NEPA process determined the Project would require the following acquisitions and displacements:

- 74 full parcel acquisitions.
- 143 partial acquisitions.
- 128 residential and commercial displacements.
- 6 acres of permanent airspace, subsurface or property easements.
- Approximately 20 acres of temporary construction easements distributed over 200 distinct parcels.

Appendix A of this RAMP shows the geographic location of these impacts as they were documented in the November 2011 CRC Final Environmental Impact Statement. The acquisition and relocation scope will be updated to reflect the more limited scope of the CRC First Phase.

6.2. Implementation Framework

The CRC Project seeks to implement a fair and equitable right of way acquisition and relocation process that meets the Project's right of way (ROW) needs. ODOT will manage the ROW program with assistance from TriMet. Both agencies have extensive ROW experience to ensure the integrity of the program and mitigate schedule risk. Since the majority of new ROW needed for the CRC Project is for highway use, CRC will comply with the FHWA's policies, procedures and oversight requirements. FHWA's designation as the cognizant lead for ROW will promote

uniform treatment of impacted properties and avoid inconsistent acquisition timelines that would result from inserting a second Federal agency into the program. Following a single Federal agency’s process will streamline acquisition and relocation, improve predictable delivery of ROW and promotes reliable record keeping. FHWA’s requirements are captured in the ODOT ROW Manual, which both ODOT and TriMet follow.

The CRC ROW staff will be lead by ODOT’s Assistant ROW Manager, Joseph A. Gray. Mr. Gray will report directly to the CRC Project Director. Three ROW Project Managers, one each from ODOT, WSDOT and TriMet, will report to Mr. Gray and manage all ROW activities assigned to the CRC ROW office. These include title work, appraisals, review appraisals, negotiations, relocations, transaction closing, and property management. Project Managers are also responsible to ensure all document control requirements of ROW are met.

The CRC operates as a partnership between program sponsors. Table 6-1 summarizes the role of each with respect to real property activities.

Table 6-1. Primary Sponsors of the CRC Program and Roles Related to Real Estate

Entity	Jurisdiction	Role with respect to CRC real property activities
Federal Transit Administration (FTA)	Co-lead NEPA compliance	Provide Federal Assistance administered by the FTA
Federal Highway Administration (FHWA)	Co-lead NEPA compliance; Uniform Act lead agency	Provide federal discretionary and/or formula highway funds
Oregon Department of Transportation (ODOT)	Oregon state highways and other duties designated by state legislature	Lead for CRC management including acquisition of property required for the CRC Project.
Metro	Elected regional planning and designated federal metropolitan planning organization in Oregon for the Portland Vancouver-Hillsboro Metropolitan Statistical area	ROW phase programming in the Metropolitan Transportation Improvement Program (MTIP), and STIP
Tri-County Metropolitan Transportation District (TriMet)	Public transit provider in Oregon within the Portland Vancouver-Hillsboro Metropolitan Statistical area	FTA grantee, acquisition of property required for LRT; title holder of property with FTA interest in Oregon
Clark County Public Transit Benefit Area Authority (C-TRAN)	Public transit provider in Washington within the Portland Vancouver-Hillsboro Metropolitan Statistical area	Title holder of property with FTA interest in Washington including park and ride garages. Approves condemnation for Washington transit acquisitions.
The City of Vancouver	Land use and development permitting in Washington within the city limits	Title holder of real property related to the CRC Program
The City of Portland	Land use and development permitting in Oregon within the city limits	Title holder of real property related to the CRC Program

6.2.1 Legal Requirements Influenced by Federal Funding Sources – “Color of Money”

The FTA and FHWA are anticipated to provide Federal Assistance constituting approximately 40% of the capital funds required to implement the CRC First Phase. In general, real property activities funded in whole or in part by discretionary FTA “New Starts” capital grants are subject to the legal requirements of 49 U.S.C. 5309, and real property activities that include FHWA discretionary highway funds must be conducted in compliance with 23 CFR Part 710.

6.2.2 Authority to Acquire and Dispose of Real Property

Although no enabling legislation is necessary to pursue CRC Program ROW activities, the legal basis for ROW activities stems from the statutory authority of the individual sponsors to acquire property for certain transportation uses, to evoke eminent domain, to share powers, and to act cooperatively. Table 6-2 documents the statutory authority available to the CRC Program for ROW implementation.

Table 6-2. Statutory Authority of CRC Sponsors with Respect to Real Property Powers

CRC Sponsor	Eminent Domain Authority	Other Powers
ODOT	ORS 366.320; 366.340	ORS 190.110; ORS 366.576 (intergovernmental agreements)
TriMet	ORS 267.200	ORS 267.200; ORS 267.255 (intergovernmental agreements)
C-TRAN	RCW 36.57A.090	RCW 36.57A.080 (intergovernmental agreements)

6.3. Implementation Strategies

Real estate activities required for the CRC Program will be managed by the Right-of-Way (ROW) work group.

Given the complex scope and structure of the CRC Program, ROW work group management and staff have developed a number of implementation strategies, which are described in more detail in the RAMP.

6.3.1 Utilize Third-Party Agreements

The CRC Program has a list of approximately 30 third-party agreements required to provide the statutory authority, the technical capability, and the long-term protection of federal interests required for program implementation. The scope of key agreements related to real estate activities are summarized in Table 6-3.

Table 6-3. Summary of Third-Party Agreements Related to CRC Real Property Activities

CRC Tracking Number	Agreement Name	Scope
TBD	BNSF Construction, Maintenance and Operation	Provides the project with the possession and use of the property needed for construction and outlines the roles and responsibilities of each party in the ongoing maintenance and operation.
TBD	BNSF Exchange	To address rights necessary for the project and include the land swap on HWY 14.
TBD	TriMet and ODOT Agreement	Project development, funding and operations and maintenance. Describes responsibility for ROW acquisition for construction packages.
TBD	ODOT & WSDOT Agreement	Commits WSDOT to exercise condemnation authority for acquisitions of properties with a highway purpose in Washington.

CRC Tracking Number	Agreement Name	Scope
TBD	TriMet and C-TRAN	Commits C-TRAN to exercise condemnation authority for transit-only property acquisitions in C-TRAN district.
TBD	Continuing Control Agreements	Grants necessary permanent rights for the operation and maintenance of LRT on property where a transit agency is not the underlying owner.

6.3.2 Define a Procedural Framework Compatible with FTA and FHWA Real Property Requirements and Policy

All CRC Program acquisitions must conform to The Uniform Act, as implemented by 49 CFR Part 24. The RAMP describes how the CRC Program will ensure compliance with The Uniform Act and address differences in state law. **Classify Acquisitions Prior to Starting Acquisition Activities**

To help navigate the complex policy, administrative, and funding terrain over which real estate activities take place, property interests will be classified by attributes that describe how the property interest will be managed both during and after the CRC Program. Attributes will be assigned to each property interest before starting acquisition activities and will be documented as part of the Property Interest Certification process and the CRC design control process for real estate.

The ten attributes by which all CRC acquisitions will be classified are as follows:

- Sequence
- Rights
- Extent
- Duration
- Use
- Designation
- Federal Funding
- Acquiring Agency
- Authority
- Ultimate Vesting Agent

6.3.3 Facilitate Interdisciplinary Coordination

In complex projects, effective and efficient coordination is nearly as important as a clearly defined scope, schedule, and budget. Three specific methods that the ROW work group uses to facilitate coordination are monthly coordination meetings, and interdisciplinary reviews of design documents.

6.3.4 Exercise Right to Use Judicial Procedure to Expedite Establishing the Right of Entry in Oregon

ORS 35.220 (Precondemnation Entry on Real Property) provides a method to expedite securing a Right of Entry and to lower the schedule risk associated with gaining access for certain activities such as environmental assessments, surveys, and appraisals. The FTA has determined that using this procedure does not adversely influence acquisition negotiations with respect to The Uniform Act. The equivalent procedure in Washington is authorized under RCW 47.01.170.

6.3.5 Offer Mediation

When chances of completing an acquisition, based on the offer of Just Compensation, appear unlikely, non-binding mediation can provide an alternative to condemnation.

6.3.6 Focus First on Acquisitions with High Schedule Risk

Washington and Oregon differ in their judicial abilities to gain possession of properties needed for public use. Should a property owner in Oregon refuse possession, ORS 35.235 and ORS 35.625 offer ODOT a way to gain possession without a hearing. After initiation of condemnation proceedings, ODOT does not have to wait for a jury verdict to obtain possession of the property. This procedure is not available in Washington.

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7. Community Relations

7.1. Overview

The CRC Program is employing an extensive community relations strategy to provide consistent, timely, and accurate information to interested parties, facilitate dependable lines of communication with the public, and build broad support for the CRC Program. With the expectation that construction activities will cause disruption to nearby communities, it is the goal of the CRC Program to execute an effective communications program that will serve the local community's needs and minimize harmful effects. Community relations and engagement activities support pre-construction planning and construction of the CRC Program. A description of the public involvement team and organization can be found in Section 1 of the Communications Plan, which is included as Appendix O to this PMP.

7.2. Community Outreach Tools

The community involvement efforts that have been and will continue to be undertaken on behalf of the CRC Program are outlined in the Communications Plan in Sections 2 through 4. In coordination with the CRC Program's partner agencies, the CRC Public Involvement Manager will work closely with ODOT and TriMet communications managers to develop and implement the CRC communications program. The Public Involvement Manager will write an annual communications and public involvement plan that includes detailed messages and strategies for approval by the ODOT and TriMet communications managers and CRC Program Deputy Directors from ODOT and TriMet. Additional communication plans will be designed specifically for contractor specifications, for each project delivery package. Records related to outreach activities, contacts made with the public, and comments received are kept in the CRC Program communications database and/or in the CRC Program electronic filing system.

The outreach activities will include regular briefings to a variety of stakeholders and community groups. These groups will include, but are not limited to, decision makers, interest groups, businesses, property owners, employer organizations, neighborhoods, and environmental justice communities.

As in the planning and pre-construction phase, the CRC Program's public outreach efforts will continue to employ a variety of tools, depending on the needs of the audience and whether comment is being sought or information is being delivered. The CRC Program will continue to use the following avenues for distributing information and gathering public input:

- Fairs, festivals, and community events
- Open houses and workshops
- Social service, civic, and business group updates and briefings
- Drop-in events

- Printed materials
- Project website
- Constituent contacts
- Surveys
- Social media
- Newspaper and media organizations
- Door-to-door outreach

Specific details about each of these tools can be found in Section 3 of the Communications Plan.

7.2.1 Advisory Groups

The CRC Program has used advisory groups throughout the program development process. In late 2011, most of the existing topic-based advisory groups were concluded.

- New advisory committees will be formed as the CRC Program receives funding and moves toward construction. The formation of new advisory groups could also be tied to major program milestones. The CRC Program could enlist community groups to cover topics such as additional station design, conduct of construction, business mitigation, and other topics as needed. Refer to Section 5 of the Communications Plan for a full list of advisory groups.

7.2.2 Media Relations

Communication with the media is led by the ODOT and TriMet communications managers, who may appoint media spokespeople for the CRC Program. Coordination with ODOT, TriMet, WSDOT and C-TRAN communications managers and other partner agencies occurs on a regular and ongoing basis. Communications with media include reporter briefings, press releases, editorial board briefings, minority and small press contact, and op-eds or letters to the editor.

8. Project Delivery and Procurement

Similar to other sections of the PMP, this chapter focuses on the delivery of the I-5 CRC First Phase Project that is described in Chapter 1. This chapter of the PMP provides an overview or summary of the project delivery and procurement that is described in greater detail in the Project Delivery and Procurement Plan (PDPP).

8.1. Overview

The delivery of the I-5 CRC First Phase will follow the framework developed during the project engineering phase. The framework divides the I-5 CRC First Phase Project into separate and distinct functional packages that meet broad technical and financial needs. The PDPP describes the major procurements for final design and construction of the I-5 CRC First Phase Project. Detailed information on construction management and administration is addressed in the Construction Management and Administration Plan, which is included as Appendix D to this PMP. The PDPP summarizes:

- The recommended design and construction project packages
- The recommended delivery methods to perform the design and construction activities of each project package
- The procurement options to be utilized in combination with the delivery methods
- The procuring or contracting agencies
- The procurement schedule

8.2. CRC Procurement – Laws and Policies

The I-5 CRC First Phase Project anticipates procuring Architectural and Engineering (A&E) services through the managing agencies, ODOT and TriMet. These A&E services will support preparing final construction documents for project packages delivered using the traditional Design-Bid-Build (DBB) or Construction Manager/General Contractor (CM/GC) delivery models, prepare program requirements and specifications that support Design-Build (DB) or Design-Furnish-Install (DFI) procurements, and provide design oversight reviews on construction documents prepared under the DB and DFI delivery models. The procurement of construction services, equipment, and materials for the program packages will be divided between ODOT and TriMet in a manner that best meets the requirements and objectives of the CRC First Phase. Such procurements will be governed by applicable ODOT or TriMet contracting rules, and conducted to provide maximum open and free competition consistent with Federal requirements. The CRC Management Team will provide administrative oversight on all executed procurement contracts.

The I-5 CRC First Phase Project will contain a number of contracts related to transit and highway construction. Delivery methods are being identified and may be DBB, DB, DFI, or CM/GC.

The I-5 CRC First Phase Project is authorized under Oregon laws. Procurement of A&E design, construction services, and materials and equipment will be undertaken by the applicable contracting agency (ODOT or TriMet) and will comply with all applicable state and federal procurement rules.

8.3. Preferred Sequencing

Construction of the I-5 CRC First Phase Project will require a number of years to complete. The I-5 CRC First Phase Project will itself be phased to provide efficient implementation while minimizing impacts on the community and corridor users.

- The CRC improvements described in the NEPA documents are known as the Locally Preferred Alternative (LPA). A Record of Decision was issued in December 2012. The construction of the LPA will be phased, and the initial phase is referred to as the I-5 CRC First Phase Project and includes highway, transit, and bicycle and pedestrian improvements and is described in detail in Chapter 1 of this PMP.

The CRC First Phase will be split into construction packages. A graphic presentation of the construction packages can be found in the PDPP. The general strategy of the program sequencing is to complete the revenue-generating aspects of the I-5 CRC First Phase Project quickly and to complete subsequent phases of the CRC as funding becomes available.

8.4. Contracting Agency, Delivery Methods, and Procurement Methods

The project packaging strategy divides the I-5 CRC First Phase Project into separate and distinct functional construction packages.

Key factors informing the I-5 CRC First Phase Project framework for project packaging include:

- The preferred program sequencing strategy described in Section 8.3, above
- Interdependencies of program components
- Jurisdictional changes and urban features along the alignment
- Schedule criticality
- Financial cash flow projection
- Inherent risks
- Oversight required for multiple interfaces among packages

- Lead times
- Specialty work
- Optimizing opportunities for competition and for participation by Disadvantaged Business Enterprises (DBEs)

The I-5 CRC First Phase Project packaging strategy and the assignment of project packages accounts for:

- The contracting or procuring agency
- The preferred delivery method
- The procurement strategy

The PDPP provides background information about the contracting/procuring agency, delivery methods, and procurement methods. In addition, it provides a summary of transit-related interfaces.

8.4.1 Contracting and Procuring Agencies

WSDOT was the primary agency to procure contracts with consultants during the environmental phase of the CRC Program. However, ODOT is now the lead agency, with TriMet acting as the grantee for FTA federal funding. ODOT and TriMet will be the contracting/procuring agencies as the CRC First Phase proceeds through construction.

Both ODOT and TriMet will become operators of components of the completed project and both have special skills to contribute to the contracting and procurement process. The basic division of responsibilities for contracting and procurement of general categories is summarized in Table 8-1. Any possible issues related to the ability of an agency to contract in Washington will be resolved before or during the Engineering phase.

Table 8-1. Contracting/Procuring Agency

General Package Category	Contracting Agency
I-5 Columbia River bridges and approaches	ODOT
Transit civil components in Washington	TriMet/ODOT
Transit civil components in Oregon	ODOT/TriMet
Transit system components in Washington and Oregon	TriMet
Highway components located in Oregon	ODOT

8.4.2 Delivery Methods

The delivery methods refer to the overall process by which a project is designed, constructed, and/or operated and maintained. As described in the PDPP, the range of delivery methods includes:

- Design-Bid-Build (DBB)
- Two-step low bid
- Construction Manager/General Contractor (CM/GC)
- Design-Build (DB)
- Design-Furnish-Install (DFI)

Additional details, including a description of the advantages and disadvantages of various delivery methods, are provided in the PDPP.

8.4.3 Procurement Methods

The primary procurement methods used to evaluate and select designers and construction contractors fall into two broad categories:

- **Competitive Low Bid Procurements** – This is the most common procurement method for selecting the construction contractor under the DBB delivery method, but it is rarely used for procuring designers for projects. Award is based on lowest bid price from a responsive contractor. To avoid bids from unqualified construction contractors, contractors may be required to go through a prequalification process prior to competitive bidding.
- **Negotiated Procurements** – This procurement method is used primarily for selecting the designers and/or contractors for the CM/GC delivery methods and the designer-construction contractor team for DB delivery methods. Selection could be based solely on qualifications (Qualification-Based Selection or QBS) or a combination of qualifications and price, such as a Best Value Selection (BVS), or selection criteria based on the proposed schedule and approach to the project. The final price for the work is arrived at through a negotiation process between the owner and contractor.

The CRC Management Team will finalize the procurement strategy for project packages when funding has been committed and when the program sequencing, procuring agency assignments, project packaging, and delivery method strategies are finalized. The procurement strategy for each project package will be the most suitable in combination with the delivery method assigned to that package, meets the project schedule and budget, satisfies applicable federal and state procurement requirements, and results in the best value to the I-5 CRC First Phase Project.

The I-5 CRC First Phase Project procurement strategy recognizes three contract categories:

1. A&E and Personal Services contracts
2. Construction contracts
3. Equipment, Material, and Supplies contracts

Additional details about the I-5 CRC First Phase Project procurement methods can be found in the PDPP.

8.4.4 Proposed Packaging

Table 8-2 summarizes the proposed packages and provides agency and package delivery information.

Table 8-2. Proposed Packaging – Summary

Package Title	Procuring Agency	Delivery Method
Columbia River Bridges and Approaches	ODOT	DB
Columbia River Interstate Bridge Removal	ODOT	CRBA DB
Mainland Connector Bridge and Approaches	ODOT	DBB
Marine Drive Interchange Reconstruction	ODOT	DBB
Washington Transit	TriMet	CM/GC/DBB
Park-and-Ride Garages	TriMet	DB
Transit Systems	TriMet	DFI
Transit Other:		
Ruby Junction - Phase II Expansion	TriMet	DBB
Steel Bridge Modifications	TriMet	DBB
Command Center Upgrades/Modifications	TriMet	DFI
Light Rail Vehicle Procurement	TriMet	DFI
Ticket Vending Machine Procurement	TriMet	DFI
Transit Owner-Furnished Materials	TriMet	DFI
Highway Other:		
Pre-Completion Tolling	ODOT	DBB
Sandy River Habitat Mitigation	ODOT	DBB

Additional details on the I-5 CRC First Phase Project proposed packaging, including the rationale for the selection of the delivery method, can be found in the PDPP.

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9. Labor Relations and Policy

9.1. Statutory and Regulatory Requirements

All agencies and contractors will comply with all federal, state, tribal, or local laws, ordinances, and regulations that affect work performed under the CRC First Phase project. The contractors will indemnify, defend, and hold harmless the State of Oregon (including the governor, the transportation commission, the department secretary, and any agents, officers, and employees) and TriMet against any claims that may arise because the contractor (or any employee of the contractor or subcontractor or material-person) violated an applicable regulatory requirement.

Contractors will be responsible for the safety of all workers and will comply with all appropriate and applicable state and federal safety and health standards, codes, rules, and regulations.

In instances where conflicts exist between the federal and state laws covering the same or similar areas, the CRC First Phase will consult the Oregon Department of Justice.

9.2. Federal Requirements

Concomitant with the use of federal funds, each contract will conform to certain federal requirements regarding personnel and/or labor. Each contract will enumerate all federal regulations that apply regardless of funding sources. The following sections provide more detail regarding significant labor-related requirements. All contracts will carry the federally mandated clauses pertaining to employment and human relations.

ODOT and TriMet will require all contractors to provide all information and reports required by federal and state regulations, and to permit access to the contractors' books, records, accounts, or other sources of information or facilities as may be determined to be pertinent to ascertain compliance with regulations. All contracts with FHWA funding will include all applicable forms, including FHWA-1273, as part of the contract. All contracts with FTA funding will include the latest federal requirements, similar to "Appendix A" of TriMet contracts. Material conflicts between federal agency requirements will be resolved with the FTA and FHWA before inclusion of those requirements in the contract.

9.3. Wage and Hour Requirements

Each contract will comply with all federally decreed wage and hour requirements, including but not limited to the Davis-Bacon Act, 40 USC 3141, et. seq., and the Copeland Act, 18 USC Section 874, et. seq., as supplemented by U.S. Department of Labor regulations set forth in 29 CFR Parts 1, 3, 5, 6, and 7. Workers employed are also subject to Oregon Bureau of Labor and Industry (BOLI) wage requirements.

On contracts specifying Davis-Bacon prevailing wage rates, the contractor and subcontractors will submit certified payrolls on a weekly basis. Each certified payroll will include the certification shown in Section V.2.d in form FHWA-1273, which will be included in the

contract. The Project Engineer will monitor and enforce these provisions to ensure full compliance.

9.4. Local Labor Conditions and No Strike Agreements

Operations and other functions performed by members of Division 757 of the Amalgamated Transit Union (ATU) are subject to the current labor agreement with TriMet. Article I, Section 5 of the agreement for December 1, 2009, through November 30, 2012, states:

“It is agreed the Association or any employee shall not engage in any strike, walkout, or slowdown during the period of this Agreement. It is further agreed the District shall not lock out its employees during the term of this Agreement.”

In addition, mass transit district workers are prohibited from striking under Oregon law (ORS 234.728).

ODOT, TriMet, and their contractors are in compliance with Executive Order 13202, “Preservation of Open Competition and Government Neutrality Towards Government Contractors’ Labor Relations on Federal and Federally-funded Construction Projects,” as amended by Executive Order 13208.

Because of the size and uniqueness of this CRC First Phase, project labor agreements may be negotiated for individual contracts between labor unions and the contractor.

9.5. Affirmative Action Plan

Differences between state and federal laws require a variety of guiding requirements. As a result, individual contracts may have different guiding requirements depending upon which laws were in place at the time the contract was executed and how the particular contract is funded. The special provisions, standard specifications, and amendments determine the specific requirements for each particular contract.

9.5.1 Compliance with Regulations

The contractor will comply with all civil rights program requirements that apply to transit-related projects. The applicable civil rights program areas follow Title VI of the Civil Rights Act of 1964 (Service Delivery/Benefits); Equal Employment Opportunity (EEO); the Disadvantaged Business Enterprise (DBE) Program (Section 106(c)); and the Americans with Disabilities Act (ADA) of 1990.

9.5.2 Solicitations for Subcontractors

The contractor will use best efforts to solicit bids from, and to utilize, disadvantaged, minority, and women subcontractors, or subcontractors with meaningful minority and women representation among their employees. The contractor will notify all potential subcontractors and suppliers of the EEO obligations required by the contract. The contractor will use best efforts to ensure subcontractors’ compliance with the EEO obligations.

9.5.3 Sanctions for Noncompliance

If the contractor is not in compliance with the provisions of an applicable regulation, the contracting agency may impose such sanctions as it, or FHWA, or the FTA, may determine necessary to achieve compliance including, but not limited to:

- Progress payment requests may not be honored until the noncompliance is remedied to the satisfaction of the contracting agency.
- The contract may be suspended, in whole or in part, until such time as the contractor is determined to be in compliance by the contracting agency.
- The contractor's pre-qualification may be suspended or revoked. The contracting agency may refer the matter to the applicable federal agency for possible federal sanctions.
- The contract may be terminated.

9.5.4 Disadvantaged Business Enterprise (DBE) Program

The CRC First Phase will employ TriMet's DBE program for all FTA-funded contracts, including ODOT-contracted work supported by FTA funds. The CRC First Phase will employ ODOT's DBE program for all FHWA-funded contracts.

The CRC First Phase's policy is to ensure that DBEs, as defined in Part 26, have an equal opportunity to receive and participate in DOT-assisted contracts, and to ensure non-discrimination in award and administration of DOT assisted contracts. Eligible firms are defined in the applicable DOT regulations.

DBE Liaison Officer

The Director of Diversity and Transit Equity is TriMet's DBE Liaison Officer (DBELO) and is responsible for ensuring compliance with 49 CFR Part 26, coordinating with the local community of DBE firms to achieve maximum participation of eligible DBE firms, establishing aspirational goals achieved solely through race-and-gender-neutral means, and for all other aspects of TriMet's DBE program.

The DBELO is responsible to develop, implement, and monitor all aspects of the DBE program for which TriMet is the primary recipient of FTA funds. The DBELO duties include the following:

- Gather and report statistical data and other information as required by FTA.
- Review third party contracts and purchase requisitions for compliance.
- Ensure that bid notices and requests for proposals are available to DBEs.
- Ensure the inclusion of DBE language in bid notices and request for proposals.

- Monitor ongoing progress toward goal attainment and implement race and gender neutral strategies to meet them.
- Participate in pre-bid meetings with contractors.
- Assist DBEs with information and support necessary for the preparation of bids, obtaining bonding and insurance.
- Facilitate ongoing outreach to DBEs and community as a whole of opportunities on CRC project.

The contractor will be required to submit to the Project Engineer and TriMet's DBE Liaison Officer a report of the "Amounts Credited as DBE Participation" monthly on ODOT- and TriMet-administered contracts, and upon completion of the CRC First Phase. The measurement is in accordance with the "DBE Participation" section of the contract special provisions and, for TriMet contracts, the TriMet DBE Program. This report will contain data on all DBEs utilized on the contract. The information is used to track attainment of ODOT's and TriMet's overall DBE goals. The report will be received and processed in a timely manner. For TriMet-administered contracts, the information will be used to track the percentage of DBE participation on the contract.

TriMet's DBE Liaison Officer will be responsible for conducting onsite reviews on all FTA funded contracts where there is DBE participation. Onsite reviews will be conducted at periodic intervals (or as determined by the Liaison Officer): when the DBE begins work, during the peak period of the DBE's work, and any time there is a change in the nature or methods of the DBE's work.

Contractor DBE Coordinator

The contractor will officially designate and communicate to the Project Engineer during the preconstruction period the name of the contractor's EEO Officer and DBE Coordinator. The EEO Officer and DBE Coordinator each will also be responsible for making himself or herself known to each of the contractor's employees. The EEO Officer and DBE Coordinator will possess the responsibility, authority, and capability for administering and promoting an active and effective contractor program of equal employment opportunity and DBE participation.

Monthly meetings (or regularly, as the parties agree) regarding status and progress toward DBE goals will be held with the Project Engineer, TriMet's Liaison Officer, and the contractor's EEO Officer and DBE Coordinator.

Other DBE Support Personnel

All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees or subcontractors, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement the contractor's EEO policy and DBE policy, and contractual responsibilities, in order to provide equal

employment opportunity in each grade and classification of employment and promote DBE participation in accordance with the CRC DBE Program.

Personnel from TriMet's procurement and contracts department share the responsibility for ensuring the effective implementation of TriMet's DBE program.

9.5.5 Workforce Training and Hiring

The FTA-funded transit portion of the CRC First Phase will include TriMet's workforce training and hiring program. The FHWA-funded portion of the CRC First Phase will include ODOT's workforce training and hiring program. Contractors will develop and submit management plans to implement the appropriate workforce training program.

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10. Agreements, Permits, and Environmental Mitigation

10.1. Overview

The Interstate 5 Columbia River Crossing First Phase Project encompasses two states, two cities, two counties, and two Metropolitan Planning Organizations (MPOs). It is subject to both Oregon and Washington regulations, as well as many federal requirements. Completion of the CRC I-5 CRC First Phase Project requires agreements between finance partners; agreements for services from some of these authorities; and permits from federal, state, and local agencies, some of which may include:

- Agreements between finance partners for project development and delivery of project funds (State of Oregon, TriMet, State of Washington, FTA, etc.).
- Agreements for design and construction services, maintenances, continuing control, right-of-way acquisition, and operations between partner agencies (ODOT, TriMet, WSDOT, and C-TRAN).
- Agreements for design support services from jurisdictions (Cities of Portland and Vancouver).
- Federal and state permits such as the Clean Water Act Section 404, the General Bridge Act of 1946, Section 10 of the Rivers and Harbors Act, and the Clean Water Act National Pollutant Discharge Elimination System (U.S. Army Corps of Engineers, Washington and Oregon state agencies, etc.).
- Local permits and approvals such as land use approvals, building permits, and historic demolition permits.

The Program Manager is responsible for ensuring that all agreements are obtained within the timelines identified in the I-5 CRC First Phase Project schedule. The Environmental Manager is responsible for ensuring that all permits (federal, state, and local jurisdictions) and approvals are obtained within the timelines identified in the I-5 CRC First Phase schedule. Various CRC staff will be tasked with the day-to-day coordination of establishing agreements and negotiating permits. CRC staff from all disciplines will provide support within their areas of expertise, including the Utilities Coordinator in utilities coordination and relocation.

The Executive Management Group and Senior Managers have identified all agreements, and have established the CRC Agreement Tracking Matrix to monitor progress that includes assigned responsibilities and expected dates to execute necessary agreements.

CRC Procedure 10.3B – Agreement Development and Approval (Public Entities) describes in detail the process for drafting, reviewing, and approving agreements between ODOT, TriMet,

and with partner agencies (WSDOT, C-TRAN) and local jurisdictions (Cities of Portland and Vancouver, Metro).

The CRC Environmental team has produced a Master Permit and Approval Plan that describes all federal, state, and local environmental permits that the CRC First Phase will require, and that plan is included as an appendix to this document (see Appendix Q to this PMP).

10.2. Agreements

10.2.1 Project Development and Funding Agreements

ODOT and WSDOT will enter into an agreement for project development and operations. ODOT and TriMet will have agreements for project development and funding. The funding plan will be finalized towards the end of the Engineering phase. Detailed information on the current funding plan can be found in the revised capital finance plan for the I-5 CRC First Phase Project (Draft: September 13, 2013).

TriMet will be the grantee for FTA New Starts funding. TIFIA loans and toll bonds will be issued and paid by ODOT with toll receipts. The Oregon and Washington transportation commissions will enter a tolling rate setting agreement.

10.2.2 Design and Construction Services Agreements

Negotiations between ODOT, TriMet, WSDOT, C-TRAN, and local jurisdictions (Cities of Portland and Vancouver) are ongoing to define the process and fee structure for obtaining permits and services related to utility relocations and reconstruction, land use approvals, construction management, inspections, street lighting, traffic engineering, parks, street trees, planning and plan reviews, fire permits, characterization and treatment of contaminated media, and all other permits/procedures required by the applicable local jurisdiction.

ODOT and TriMet will negotiate separate agreements with partner agencies and local jurisdictions including, but not limited to:

- WSDOT
- City of Portland
- City of Vancouver

The terms and conditions of such cost reimbursement agreements will be in writing, incorporate required FTA contract requirements if using FTA grant funds, and identify the correct federal cost standards applicable to the work.

CRC Procedure 10.3B – Agreement Development and Approval (Public Entities) describes in detail the process for drafting, reviewing, and approving agreements with partner agencies (ODOT and TriMet) and local jurisdictions (Cities of Portland and Vancouver).

In general, the design and construction services agreements establish a project manager from each agency who will act as the “point of contact” for the duration of the agreements.

Partner agencies performing work for the CRC First Phase under executed design and construction services agreements will submit invoices to the Program Manager under the terms of the agreements. These invoices are subject to the same review and approval process as other contracts.

10.2.3 Maintenance Agreements

The maintenance agreements also establish the mechanisms by which partner agencies and local jurisdictions will accept improvements in their rights-of-way for local maintenance. ODOT and TriMet will have an operations and maintenance agreement for light rail. A maintenance agreement will be established between TriMet and WSDOT. Joint facility maintenance agreements will be established between:

- TriMet and ODOT
- TriMet and WSDOT
- TriMet and the City of Portland
- TriMet and the City of Vancouver
- C-TRAN and WSDOT
- C-TRAN and the City of Vancouver

10.2.4 Continuing Control Agreements

Continuing control agreements will be established between TriMet and the various public entities whose right-of-way is necessary for the operation and maintenance of the new transit facilities. These agreements will establish the respective responsibilities of the jurisdictions and TriMet with regard to continuing control. CRC Procedure 10.3B – Agreement Development and Approval (Public Entities) describes in detail the procedure for drafting, reviewing, and approving continuing control agreements. Agreements will be required between TriMet (the transit operator) and:

- ODOT
- WSDOT
- City of Vancouver
- City of Portland

Agreements between C-TRAN and WSDOT and the City of Vancouver also will be needed.

10.2.5 Other Agreements

Agreements with BNSF Railway (BNSF) and with certain utilities to relocate individual utilities and infrastructure are also required, as well as an agreement with Multnomah County Drainage

District (MCDD) to modify portions of the MCDD levee system. The Program Manager is responsible for monitoring status and ensuring timely issuance of agreements according to the CRC First Phase schedule. These approvals and agreements that will be obtained include:

- Air space Agreement/Memorandum of Understanding between TriMet and BNSF.
- Agreement/Memorandum of Understanding with MCDD to modify the levee system. The specifics of the agreement/Memorandum of Understanding will be determined when design details have been developed.
- Utility agreements to relocate individual utilities in advance of CRC work in their areas. The Utilities Coordinator is responsible for day-to-day coordination with utilities for preparation of permit documents and for securing approval from each utility. CRC Procedure 10.3C – Agreement Development and Approval (Utilities) describes in detail the procedure for drafting, reviewing, and approving agreements with utilities.

10.3. Private Utility Interface

Numerous private utility companies maintain facilities that will be affected by construction activities or permanent facilities of the I-5 CRC First Phase Project. During the Engineering phase, composite utility base maps were created based on information gathered in meetings with the individual utilities and through other means. Preliminary relocation plans and schedules are being developed in consultation with the specific utilities.

During the Engineering phase, the CRC Senior Managers will continue working with the individual utilities to come to agreement on specific details establishing the impacts to the utilities' facilities. Each utility will be responsible for preparing relocation plans and relocating its infrastructure before CRC First Phase work in its area begins.

The Utilities Coordinator is responsible for the day-to-day coordination with private utilities in preparing relocation plans and ensuring utility relocation is completed according to the CRC First Phase's budget and schedule. The Program Manager is responsible for monitoring status and for execution of agreements according to the I-5 CRC First Phase Project budget and schedule.

10.4. Permits

Any project that has impacts to lands, waters, or resources will require environmental permitting before construction. As discussed in detail below, the Environmental Manager is ultimately responsible for obtaining and tracking regulatory permits. Some regulatory permits will be designated the responsibility of the construction contractor, and will be obtained and tracked by the contractor. The responsible party will be clearly stated in the initial DB and subsequent RFP. The Environmental Procedures Manual from ODOT was used as guidance in producing this section of the PMP. For more information on permits, please see the Master Permit and Approval Plan, which is an appendix to this document.

10.4.1 Regulatory Agency Coordination

The I-5 CRC First Phase Project is subject to both Oregon and Washington regulations, as well as many federal requirements and City of Portland and City of Vancouver requirements.

The I-5 CRC Project Team worked with state and federal agencies to develop an effective approach for coordinating their involvement, and for streamlining regulatory reviews and permits during the NEPA phase. The result is explained in the Interstate Collaborative Environmental Process (InterCEP) Agreement.

InterCEP will allow the I-5 CRC First Phase Project to efficiently plan, design, and build a solution that successfully addresses the CRC First Phase's goals and meets state and federal environmental regulations. The following regulatory agencies signed the InterCEP Agreement:

- National Marine Fisheries Service
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- Washington State Department of Ecology
- Washington State Department of Fish and Wildlife
- Washington State Department of Archaeology and Historic Preservation
- Oregon Department of Fish and Wildlife
- Oregon Department of Land Conservation and Development
- Oregon Department of State Lands
- Oregon State Historic Preservation Office Oregon Department of Environmental Quality

The main goal of this process was to ensure that the CRC First Phase Executive Management Group and Senior Managers are aware of any potential concerns that could complicate the permitting process. In addition, the I-5 CRC Project Team engaged in an ongoing dialogue with the necessary state and federal agencies before making major decisions. By getting concurrence and comments at key milestones, the I-5 CRC Project worked toward reducing environmental impacts and avoiding delays often associated with large-scale projects.

The signatory agencies of InterCEP Agreement served as a key advisory group to the I-5 CRC Project providing formal feedback to the I-5 CRC Project development team at milestones including, but not limited to:

- Project Purpose and Need

- Screening criteria for alternatives
- Methods for analyzing impacts
- Range of alternatives to carry into the DEIS
- Preliminary Draft EIS
- Draft EIS
- Biological Assessment
- Final EIS

According to the InterCEP Agreement, the contract terminated when the Final EIS and ROD were issued for the I-5 CRC Project. However, the I-5 CRC First Phase Project is continuing to use the collaborative framework with the InterCEP signatory agencies as a model throughout environmental permitting and construction.

The I-5 CRC Project has been included in a Presidential Executive Order as a surface transportation project of national or regional significance to be expedited. The Project has been placed on the Federal Infrastructure Projects Permitting Dashboard (Dashboard), which indicates target submittal and completion dates of federal permits. The I-5 CRC First Phase Project schedule corresponds with the Dashboard.

The I-5 CRC Project Team also worked directly with staff from the Cities of Portland and Vancouver during the I-5 CRC Project's planning phase, and has continued to work with these jurisdictions as design continues. Discussion issues have included, but are not limited to, design review and potential impacts related to traffic, historic resources, locally regulated sensitive habitat and water quality. This early and ongoing collaboration is intended to avoid schedule and design issues that could otherwise arise during the local permit and approval processes.

10.4.2 Obtaining Permits

For permits that the I-5 CRC First Phase Project will be obtaining, the Environmental Manager is responsible for the day-to-day coordination of negotiating the permits with agencies according to the CRC.

First Phase schedule. During the Engineering phase, the Environmental Manager created a work plan outlining all the necessary information to be submitted to obtain the permit and a schedule for its submittal (the Master Permit and Approval Plan). The Master Permit and Approval Plan has been updated for the submittal of the FFGA application and can be found as an appendix to this document. For permits that the construction contractor will be obtaining, the Environmental Manager will support the construction contractor to ensure that the permits are progressing and that deadlines are being met.

The process for obtaining regulatory permits generally consists of a pre-application meeting, production and submittal of the necessary information for the permit, an application completeness review, submittal of additional information to complete the application, public

notice/comment, agency review, a public appeal period, an applicant appeal period, and a post-appeal decision. The Environmental Manager is responsible for monitoring status to ensure the timely execution of regulatory permits and approvals as indicated in the CRC First Phase schedule.

10.4.3 Federal Permits and Approvals

Some approvals were granted from federal agencies before publication of the FEIS or granted through the ROD on the FEIS. The CRC Phased Construction NEPA Re-evaluation assessed the potential need for revised approvals. Some of these approvals are:

- Air quality conformity determination in the Regional Transportation Plan (RTP) and Metropolitan Transportation Improvement Program (MTIP).
- National Historic Preservation Act Section 106 Memorandum of Agreement: The MOA likely would need to be modified to address changes in timing of the improvements.
- Department of the Interior Section 4(f) Report (formal approval for mitigation measures addressing impacts on historic resources and parklands are outlined in the ROD): Use of some 4(f) resources would be deferred with the I-5 CRC First Phase Project, but this does not result in revised documentation, and will by definition be a lessened impact.
- Biological Opinion – Federal Endangered Species Act, Magnuson-Stevens Act: Changes due to the I-5 CRC First Phase Project do not require reinitiation. A recent reinitiation document addressed updated designs, and a phased approach to the project. On August 30, 2013, NMFS issued a supplemental biological opinion to their biological opinion on January 19, 2011. The supplemental opinion confirms the conclusions in the 2011 opinion, and adds a new conclusion that the modified proposed action will not result in destruction or adverse modification of critical habitat designated for eulachon or proposed for Lower Columbia River Coho salmon.

Following publication of the ROD, project staff proceeded with submitting the necessary Federal, state and local permit applications. At the time of writing of this document, the following permits have been obtained:

- U.S. Coast Guard General Bridge Permit
- Oregon DEQ 401 Water Quality Certification
- Washington Department of Ecology 401 Water Quality Certification

Various post-ROD environmental permits and approvals from federal agencies will be required, including:

- U.S. Army Corps of Engineers Section 408 review, including net rise analysis—ODOT will enter into an agreement with the Corps for compliance
- Clean Water Act Section 404 Permit
- Federal Aviation Administration 7460-1 Notice of Construction or Alteration
- Marine Mammal Protection Act Letter of Authorization
- Special Permit from U.S. Fish and Wildlife for compliance with the Migratory Bird Treaty Act

10.4.4 State Agency Permits

Permits from both Oregon and Washington state agencies will be required with regard to issues under their respective jurisdictions, and include:

- Construction Stormwater 1200-C Permit – Oregon Department of Environmental Quality (Oregon)
- Construction Stormwater General Permit – Washington Department of Ecology (Washington)
- Stationary Source Permit (Oregon and Washington)
- Hydraulic Project Approval (Washington)
- Removal-Fill Permit – Oregon Department of State Lands (Oregon) Lease-Easement Application (Oregon and Washington)
- Oregon Fish Passage Act – Oregon Department of Fish and Wildlife (Oregon)
- Archaeological Excavation Permit – Oregon State Historic Preservation Office (Oregon)
- Archaeological Treatment Plan – Washington Department of Archaeology and Historic Preservation (Washington)
- Application for Authorization – Washington Department of Natural Resources (Washington)

10.4.5 Local Agency Permits

Permits from both the City of Portland and the City of Vancouver will be required with regard to issues under their respective jurisdictions, and include:

- Numerous land use approvals from the Cities of Portland and Vancouver to locate facilities. For the City of Portland, this includes an Environmental Review, Design Review, and potential Adjustment Review. For the City of Vancouver, this includes Critical Area Ordinance and Shoreline Master Program compliance as well as transportation development review of designs and traffic, all of which will be bundled as part of a Public Facilities Master Plan review. The Environmental Manager is responsible for coordinating preparation of land use and master plan permit application documents and securing approval from local agencies according to the I-5 CRC First Phase Project schedule.
- Building permits and street opening permits from the cities of Portland and Vancouver to build the CRC facilities. The Environmental Manager is responsible for the coordination of securing building and street opening permits from the cities according to the I-5 CRC First Phase Project schedule.
- Demolition permits from the City of Portland and the City of Vancouver. The Environmental Manager is responsible for the coordination of securing the permits according to the I-5 CRC First Phase Project schedule.

A Land Use Final Order, or LUFO, was approved in 2011 by the Metro Council (Oregon) for the I-5 CRC Project inclusive of all the elements of the I-5 CRC First Phase Project within the state of Oregon. In order to ensure consistency with plans from multiple jurisdictions, Metro is authorized to approve LUFOs on projects in its region, and has specifically done so for the South-North Light Rail Transit Project, of which the I-5 CRC First Phase Project is a part. The LUFO consolidates the determination of consistency with Oregon Statewide Planning Goals into one process rather than requiring findings from every jurisdiction. Local jurisdictions within Oregon are unable to deny applications related to the siting of the light rail alignment, stations, park-and-rides, and highway facilities, but may impose all reasonable and necessary conditions of approval that do not preclude implementation of the project.

10.5. Environmental Mitigation

10.5.1 Project Impact Analysis

The I-5 CRC Project published the FEIS on September 23, 2011, in order to meet the requirements of NEPA. FTA and FHWA signed the CRC Phased Construction NEPA Re-evaluation on September 25, 2013. The FEIS identified environmental impacts of the I-5 CRC Project, including:

- Neighborhood impacts
- Residential and commercial displacements

- Property acquisitions
- Public service impacts
- Visual and aesthetic impacts
- Noise and vibration impacts
- Impacts to fish and aquatic habitat
- Water quality impacts
- Wetlands impacts
- Geologic impacts
- Hazardous materials
- Construction impacts
- Transportation impacts
- Historic and archaeological resources impacts
- Impacts to public parks and recreation areas

The I-5 CRC Project received a Biological Opinion (BO) on January 19, 2011, from the National Oceanic and Atmospheric Administration—Fisheries. The BO describes the impacts of the I-5 CRC Project on Endangered Species Act-listed species and essential fish habitat. Changes due to the I-5 CRC First Phase Project do not require reinitiation. A recent reinitiation document addressed updated designs, and a phased approach to the project. On August 30, 2013, NMFS issued a supplemental biological opinion to their biological opinion on January 19, 2011. The supplemental opinion confirms the conclusions in the 2011 opinion, and adds a new conclusion that the modified proposed action will not result in destruction or adverse modification of critical habitat designated for eulachon or proposed for Lower Columbia River Coho salmon.

10.5.2 Environmental Mitigation Principles

The I-5 CRC Project received the ROD on December 7, 2011. The ROD includes mitigation measures to address the adverse impacts that the I-5 CRC Project would cause. In addition to mitigation, measures to minimize impacts have been incorporated into the design and construction approach for the I-5 CRC First Phase Project. The purpose of the mitigation measures is to mitigate for unavoidable environmental effects. These mitigation measures are described in the ROD Appendix A, Mitigation Commitments. The Environmental Manager is responsible for monitoring the I-5 CRC First Phase Project's compliance with those measures. The Environmental Manager will coordinate with regulatory agencies and local jurisdictions to further develop appropriate mitigation measures, and to catalog and track those mitigation measures that are mandated as terms and conditions of authorized permits, approvals and clearances.

Implementation of the mitigation measures in the ROD are material conditions of the ROD and will be incorporated in any funding agreement or approval that the FTA or FHWA may provide for the construction of the I-5 CRC First Phase Project. Additional mitigation elements are encompassed in the terms and condition of authorized permits, approvals, or clearances. With the accomplishment of the mitigation commitments, the I-5 CRC First Phase Project will have taken all reasonable, prudent, and feasible means to avoid or minimize impacts from the I-5 CRC First Phase Project.

ODOT and TriMet will enter into agreements, as necessary, for mitigation and monitoring, including:

- Cowlitz Indian Tribe for archaeological monitoring
- National Park Service for archaeological monitoring
- Oregon Parks and Recreation Department for Sandy River mitigation

10.5.3 Tracking Environmental Commitments

The I-5 CRC Project has made commitments in environmental documents, including the ROD, BA, and Section 106 Memorandum of Agreement. Additional commitments will be prescribed by the terms and conditions of the environmental permits that the I-5 CRC First Phase Project obtains. This section outlines the processes used to track environmental commitments. Related procedures will be adopted by the Environmental Manager during the Engineering and Construction phases.

The environmental commitments are entered into a commitment tracking database along with the following information: environmental document reference, a description of the measure, and the responsible party. Commitments that are the responsibility of the contractor will be written in the contract provisions in language that is biddable by the contractor, buildable in practice, and enforceable. Once responsibilities are assigned, the progress against each measure is tracked in the commitment tracking system. This tracking ensures that the contractor and the I-5 CRC First Phase Project staff clearly know their respective responsibilities and assures the permitting agency that the CRC First Phase is fulfilling its commitments. The tracking database matrix will be updated and submitted quarterly to the FTA.

Implementation of Environmental Commitments during Engineering Phase

The Environmental Manager is responsible for ensuring, during the Engineering phase, that the environmental commitments are included in the design plans and contract provisions. The following steps will be or are being taken to verify the fulfillment of environmental commitments in the ROD, environmental permits, and other environmental approvals:

- The Environmental Manager has entered the environmental commitments into the commitment tracking matrix, and regularly monitors compliance.
- The database functions as the I-5 CRC First Phase Project's single point of environmental compliance tracking. The status of each environmental commitment is

updated regularly by the Environmental Manager, and the matrix is submitted quarterly to the FTA.

- The Environmental Manager has formed an Environmental Task Force to meet on a regular basis with design and engineering staff to ensure the coordination of design development with environmental commitments.
- The Environmental Manager or designee regularly reviews project designs (through the Environmental Task Force meetings) to ensure that the environmental commitments continue to be incorporated into design documents.
- If surveying of property occurs during the Engineering phase, the environmental resources that are at risk of impact should be fully delineated and surveyed.
- The Environmental Manager proactively coordinates with the resource agencies to ensure early and constant communication of issues and requirements.
- As permits are acquired, the Environmental Manager will ensure that any new environmental commitments described in permit terms and conditions are incorporated into design plans and contract provisions.
- Design plan sets will include Environmental Compliance Plan and Environmental Compliance Notes plan sheets (to be cross-referenced in civil and other relevant plan sets) to identify sensitive areas, which will be cross-referenced to environmental commitment type.
- The Environmental Manager will maintain consistent contact with resource agencies and a working knowledge of environmental issues to ensure that the FEIS, Re-evaluation, and permit commitments are addressed.
- The Environmental Manager or designee will attend the preconstruction conferences and will present the environmental issues using the Environmental Compliance Plan, Environmental Compliance Notes, and commitment tracking database as the basis.

Implementation of Environmental Commitments during Construction Phase

During the Construction phase, the I-5 CRC First Phase Project will use a proactive approach for monitoring and inspecting field work to help guard against environmental violations that could potentially introduce cost and schedule impacts. Requirements and procedures will be developed during the Engineering phase and described in contract provisions. Key requirements and procedures during the Construction phase are:

- Require each prime contractor to prepare and submit an Environmental Compliance Plan.
- Include a listing of environmental permits and conditions in the construction contract.

- Designate the party responsible for acquiring permits to be described in detail in the contract provisions.
- Include a listing of permit conditions in the contract provisions.
- Develop record keeping and reporting procedures that CRC staff will use during the Engineering and Construction phases.
- Include requirements for environmental protection training for the contractor's staff and subcontractors before field work begins.
- Include a requirement that the contractor will submit, before field work begins, required environmental plans for review by the Environmental Manager.
- Develop procedures for permit modification during construction, if deemed necessary, including strategies for guarding against cost and schedule impacts while still acting as a good steward to the environment.
- Continue updating the commitment tracking matrix, with quarterly reporting to the FTA.
- Monitor the contractor activities that may affect the environment.
- Coordinate the daily activities of the CRC First Phase's environmental monitoring staff with the construction contractor.
- Identify fluctuating work schedules among the environmental monitoring staff members to ensure constant coverage of field activities that may affect the environment.
- Develop and implement an archaeological monitoring and treatment plan with clear procedures for assessing inadvertent discoveries that balances significance of a discovery and ways to minimize construction delays.

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11. Safety and Security

11.1. Overview

ODOT and the partnering transit agencies, TriMet and C-TRAN, will strive to design and build a safe and secure multimodal project that delivers the needed highway and light rail transit (LRT) improvements to the growing Vancouver and Portland metropolitan areas. Providing a safe and secure environment is a core value for the CRC Program that affects all levels of the highway and transit activities, including planning, design, construction, testing, and operations.

Safety and security are not optional. All CRC Program staff and contractors are charged with the responsibility of following applicable safety and health standards as set forth by the Occupational Safety and Health Administration (OSHA) and other regulatory agencies. It is the responsibility of every CRC Program staff member to provide for workplace safety by using safe work practices and employing applicable agency standards and procedures regarding public safety in work zones, and to provide a cooperative working environment for CRC Program staff. CRC Program staff are required to promptly report to their immediate supervisor and/or the applicable safety office any unsafe conditions, incidents, and accidents, and to report to their immediate supervisor and/or the Office of Equal Opportunity (OEO) representative any discriminating or harassing behavior.

The CRC Program established the Safety and Security Committee (SSC) during engineering to develop, implement, and administer a comprehensive and integrated safety and security program in compliance with the requirements of FTA Circular C5800.1. The SSC is made up of representatives from ODOT, C-TRAN, TSA, and TriMet, many of whom are also members of the program's Fire/Life Safety and Security Committee (FLSC). Appendix G, Safety and Security Management Plan, details the specific strategies to identify, prevent, and control hazardous conditions and security issues affecting the LRT elements of the CRC Program, its customers, and those who come in contact with it.

11.2. Risk Control (Safety)

ODOT, C-TRAN, and TriMet are committed to the safety of their employees. Providing CRC Program staff (both agency and co-located consultant staff) with a safe and secure environment in which to work is a top priority. CRC Program staff operating at CRC offices in Vancouver, Washington are covered by the policies and procedures in the ODOT Safety and Health Manual and other related policy documents. CRC Program staff operating in the field are covered by the applicable ODOT Safety Policies, Programs, and Standards, or the TriMet Capital Projects, Construction Safety Program, depending on the agency-administered contract.

For staff located in offices, building-specific safety and evacuation plans are available on site.

11.2.1 LRT Safety and Security Verification

The CRC Program developed the Safety and Security Management Plan (SSMP) that lays out strategies to identify, prevent, and control hazardous conditions and security issues affecting the LRT elements of the CRC Program. The SSMP describes the integration of safety and security activities to reduce the potential for incidents and accidents and increase the efficiency of LRT operations. It establishes accountability and responsibility for safety and security during each CRC Program phase—PE through start-up; integrates the safety and security functions and activities throughout the CRC Program’s C-TRAN’s, and TriMet’s organizational structure; and identifies parties responsible for operating and maintaining the CRC Program’s LRT facilities and equipment. The Project Manager, assisted by TriMet’s Manager, Safety Risk Assessment/Construction Safety, is responsible for implementing the SSMP in collaboration with TriMet’s Safety and Security Executive and C-TRAN’s Director of Operations.

Preliminary Hazard Analysis and Threat and Vulnerability Assessment

The Transit Design Manager is responsible for ensuring that a Preliminary Hazard Analysis (PHA) and a Threat and Vulnerability Assessment (TVA) are conducted during the Engineering phase. The PHA and TVA workshops for the CRC Program were conducted in late 2012, and additional workshops will be held as the design progresses. The analyses will help determine security enhancement needs for the new main river crossing, new station locations, and park-and-ride facilities. Once the PHA and TVA risk level (criticality) matrices have been developed, the Transit Design Manager will track their respective items through design, construction, and startup for resolution. Details of the PHA and TVA processes can be found in Appendix G to this PMP, the SSMP.

Safety and Security Certification

TriMet’s Manager, Safety Risk Assessment/Construction Safety will coordinate with TriMet’s Safety and Security Executive, C-TRAN’s Director of Operations, and program technical leads on the development of Certifiable Elements, Certifiable Items Lists (CILs), and conformance checklists, followed by verification of design conformance, construction conformance, and operational conformance, including Certificates of Conformance for each Certifiable Element as completed. Details of the design safety and security certification procedure, including Design Criteria Verification, Testing/Inspection Verification, Hazard and Vulnerability Resolution Verification, and Operational Readiness Verification, are included in Appendix G to this PMP, the SSMP.

11.2.2 Highway Operational Safety

Close coordination of the safety and security for both the light rail and highway/bridge projects is needed for the CRC Program to be successful. Representatives of both disciplines sit on the SSC and the FLSC. Identified safety and security hazards, threats, and vulnerabilities are addressed and tracked through these standing committees. The CRC Program encompasses the states of Washington and Oregon and is subject to the applicable Department of Transportation’s safety requirements, depending on the work zone location. CRC Program staff (both agency and consultant staff) in the field may be routinely exposed to a variety of hazards. They must take adequate safety precautions at all times. Refer to the ODOT Safety and Health Manual and the WSDOT Safety Procedures and Guidelines Manual. Also refer to Appendix P to this PMP, the

Project Construction Safety and Security Plan, for items that represent common activities that the CRC Program staff may encounter, and that should be addressed in pre-activity safety plans and tailgate talks, as needed.

11.2.3 Incident Reporting during Field Work

Each CRC Program field crew has a plan that includes safety and security notification information related to situations that could emerge during their field work. CRC Program field crews are responsible for notifying any necessary permitting, regulatory, or other responsible agency as dictated in their scope of work. CRC Program field crews are also responsible for notifying the Project Engineer about accidents and incidents in the workplace. This information will be circulated to the CRC Program Safety Manager, Communications Outreach Manager, and the CRC Program Directors.

11.2.4 Construction Safety and Security

General

Contractors doing work for the CRC Program must provide safety and security controls for the protection of life and health of the contractor's employees and other persons, for the prevention of property damage, and for the avoidance of interruptions in the performance of the work under each executed construction contract. ODOT and TriMet, as contracting agencies represented by CRC Program staff performing day-to-day contract administration, have the responsibility for enforcement of the provisions of each construction contract. However, provisions and regulations that are by law the fundamental responsibility of other agencies, both from the standpoint of interpretation and enforcement, should be monitored by CRC Program staff, but with full recognition as to the responsibilities and authorities of those agencies. The Project Director, Deputy Directors, Discipline-Specific Managers, and Project Engineers, with support from the Regional Safety Officer, will cooperate fully with the responsible agency.

Any safety violations observed by the Project Engineer or representatives will be brought to the attention of the contractor for correction. The Project Engineer or representatives will also notify the responsible agency (if that action is deemed necessary) and utilize such sanctions as are consistent with contract terms in assisting the responsible agency in enforcing laws, rules, and regulations.

Pre-Contract Preparation

- The CRC Program field staff will review contract plans and contract provisions to identify those aspects of the work meriting special attention from the standpoint of potentially dangerous types of work, security issues, and hazard elimination.
- The CRC Program field staff will review the site to identify those aspects of the location that present hazards such as limited sight distance, confined spaces, difficult terrain, extreme temperatures, illegal encampments, or exposure to biological and physical hazards associated with animals or humans.

- The CRC Program field staff will review and become familiar with the requirements of the TriMet Capital Projects Construction Safety Program (CPCSP), included in the contract provisions on transit contracts.

Preconstruction Duties

As part of the Preconstruction Meeting, the contractor's safety and security program should be discussed. Some key items that the Project Engineer (or representative) should highlight include:

- The contractual obligation of the contractor to comply with state and federal construction safety standards and best security practices.
- The availability of the safety standards that apply to the contract, including the LRT CPCSP, if applicable.
- The contractor's site-specific Construction Safety and Security Plan (CSSP), if applicable, must be submitted for review and approved before any physical work on LRT contracts will be allowed (especially those also affecting CRC Program field staff).
- The contractor's site-specific CSSP will include the accident prevention program of the contractor—organization, staff, names of responsible individuals, meetings, training, reports, etc. Specific subplans within the CSSP might include Fall Protection, Confined Spaces, Respirators, Hearing, and Hazardous Materials plans. The CSSP must also include the implementation of a mechanism for employees to report “near misses” and/or work zone accidents.
- The contractor's responsibility for seeing that subcontractors comply with safety and security rules and regulations. Subcontractor oversight is covered in the TriMet capital projects safety program.
- The contractor's plans for meeting specific safety and security requirements and for eliminating potentially critical hazards on the project sites for all contractor employees, CRC Program field staff, and the public.

Project Engineer's Role in Safety on the Program

As professionals and representatives of the respective contracting agency and the Project Delivery Director, the Project Engineers and their supporting field staff have an obligation to take action if they become aware of a situation that presents an immediate threat. CRC Procedure 11.2.4 – Field Incident Notification – Internal Staff describes to CRC Program field staff the internal lines of communication and the process for alerting the responsible agencies, the Project Engineer, and the Project Delivery Director to serious safety hazards.

CRC Program field staff will be made aware that the contractor is obligated to make the work site safe and secure, to its satisfaction for inspection activities. Safety areas required for inspection will meet or exceed the project safety requirements set forth in the contractors' CSSP.

CRC Program field staff will also be made aware of project-specific hazards and will be trained in specific areas as the work zone warrants (for example, fall protection and confined space requirements). CRC Program field staff will be required to review and become aware of pre-activity safety plans associated with the construction. The Project Engineer is responsible for ensuring that his or her employees have attended the contractor's project site-specific safety orientation and have obtained the necessary safety training that pertains to their job duties in the field.

CRC Program field staff will be made aware that the construction contract requires the contractor to perform any measures or actions that the Project Engineer or Safety Professional may deem necessary to protect the public, and that the Project Engineer may suspend work if the contractor fails to correct unsafe conditions. Additionally, field staff will be made aware that transit contracts require the contractor to perform specific job hazard analyses (JHAs) for transit construction activities and to submit these JHAs to the Project Engineer for review and comment. CRC Program field staff will continuously monitor the contractors' work activities for potential violations of legal safety requirements, security risks, and for any condition that poses an immediate threat to the health of any person. CRC Program field staff will immediately notify the contractor to stop work upon becoming aware of any such condition.

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12. LRT Design

12.1. Overview

This chapter summarizes the design requirements, design management, and design activities for the transit portion of the first construction phase of the Columbia River Crossing Project which is referred to as “CRC First Phase.” The definition of the “design” function will normally vary by delivery method used to execute the project packaging strategy, as discussed in Chapter 8 – Project Delivery and Procurement of this PMP. The “design” function discussed in this chapter is defined as follows:

- Engineering phase activities in support of developing procurement documents (100% plans, specifications, and cost estimates) to select a contractor or contractors to build specific portions of the transit elements of the CRC First Phase under the DBB delivery model.
- Engineering phase activities to build specific portions of the transit elements of the CRC First Phase under an alternative delivery model, such as Construction Manager/General Contractor (CM/GC) and Design, Furnish, and Install (DFI).
- Conceptual engineering activities (varies from 10% to 30% level design) during the PE and Engineering phases to support preparation of the project package configuration and related procurement documents, and the selection of a Design-Builder using Best Value Selection, or BVS, procurement to design and build specific portions of the transit elements of the CRC Program. This definition applies to the Request for Qualifications (RFQ) and RFP phases of a DB delivery model.

Chapter 14 – Design Oversight for Design-Build Delivery discusses in detail the design oversight after the selection of a Design-Builder to ensure satisfactory development and management of work plans, conformance of products to the “Design Work” portion of executed DB contracts, satisfactory compliance with the design deviation process, and verification of Design-Builder compliance with design QC and QA requirements. The CRC Transit Management will take an active role in the development of the RFQ/RFP for any DB project including analysis, and DB selection and approval for alternative technical proposals.

The CRC Transit Management will oversee transit design activities to minimize costs for design, construction costs of capital facilities, and operating expense; minimize energy consumption; and minimize the disruption of local facilities and communities. The design will be consistent with maximum passenger safety, system reliability, service comfort, mode of operation, type of LRT vehicle to be used, sustainability, and ease of maintenance.

12.2. LRT Design Requirements and Standards

The CRC First Phase has adopted the TriMet Design Criteria as the applicable design standards, technical requirements, and design references for the LRT portion of the CRC Program. These design criteria leverage TriMet's extensive design experience on several LRT extensions completed and opened to service in the Portland metropolitan area and reflect lessons learned on previous work as well as industry advances. The TriMet Design Criteria establish the basic criteria to be used in the design of the LRT system and facilities. Design exceptions will be vetted through the standard process according to the governing or impacted agencies.

Updates of individual design criterion will continue on an as-needed basis during the Engineering phase as necessary changes are identified. Transit Management maintains the design criteria throughout the life of the CRC First Phase and will coordinate with engineers from Systems, Civil, Park-and-Ride, Vehicles, Signals, Communications, and Traction Electrification System/Overhead Catenary System for necessary updates. In addition, drafting standards will be prepared to standardize and guide design activities and preparation of contract documents.

The TriMet Design Criteria cover, among others, the following LRT work elements:

- Civil Engineering, Small Buildings
- Track Geometry and Trackwork Parking Facilities
- Utilities, Sustainability, Landscaping
- Associated Transit Improvements, Stations
- Electrical System, Noise and Vibration Structures
- Fare Collection, Light Rail Vehicles
- Clearances, Operations Facilities, Bus Facilities
- Traction Electrification System, Security
- Signal System, Elevators, Communications, Lighting
- Stray Current/Corrosion Control, Amenities (Station)
- Light Rail Crossing Safety, Signage and Graphics

Transit drawings and technical specifications will be prepared for each LRT project package, within both States of Oregon and Washington, designated for delivery under the traditional DBB method or other alternative delivery method in accordance with the design requirements governed by the TriMet Design Criteria.

Deviations from the approved transit design criteria may be made in particular situations. Transit Management will review and approve any deviation from established design criteria.

12.3. LRT Design Management

The CRC First Phase has developed a project implementation strategy summarized in Chapter 8 of this PMP and discussed in detail in the PDPP. It identifies the delivery method that would optimally assign roles and responsibilities for the performance of each project package activity (design and construction).

During the Engineering phase, Transit Management will oversee:

- The day-to-day transit engineering activities to support preparation of the project configuration and procurement documents for any DB procurement package or packages and the production of the LRT engineering plans, including production of construction documents for all other transit packages and improvements.
- Additional organization details and functions are outlined in Appendix A, Technical Capacity and Capability Plan (TCCP).

12.4. LRT Design Execution

Transit design execution encompasses the Engineering phase. The PE and early Engineering phase was part of the project development phase, and through this process several design alternatives were developed and analyzed, the project definition was determined, and the environmental documents (DEIS and FEIS) were prepared.

The Engineering phase is the process to develop 100% design plans and specifications for transit packages.

Chapter 14 – Design Oversight for Design-Build Delivery of this PMP discusses in detail the design oversight after the selection of a Design-Builder.

12.4.1 LRT Engineering

The goal of the Engineering phase is to elevate the preliminary plans to 100% level of design, refine project quantities, identify bid items for all work activities reflected in the 100% plans, prepare special contract provisions, and assemble biddable documents.

Transit Management will oversee preparation of contract bid documents, including plans and specifications for transit project packages identified for any and all delivery methods. During the Engineering phase, the Transit Management will:

- Control the scope, schedule, cost, and quality of the transit work;
- Coordinate regular design reviews and incorporate constructability input as engineering progresses;
- Develop an independent cost estimate at the end of Engineering;
- Manage formal transit design reviews at prescribed milestones and conduct such reviews according to the design review procedures discussed in Appendix H, Quality

Control Plan (QCP), including reviews by TriMet Capital Projects and Operations, C-TRAN and the State Safety Oversight (SSO). Note that much of this review is conducted through the established Safety and Security Committee (SSC) and Fire/Life Safety and Security Committee (FLSC);

- Manage the deviation (if any) from approved design criteria and standards and ensure the traceability of scope, schedule, and budget against the project definition;
- Implement procedures related to QA and QC, design reviews, constructability reviews, VE studies, and changes to in-progress designs;
- Manage, review, and approve the packaging of transit construction and procurement contracts, and their scopes, sequencing, schedules, and interfaces;
- Manage, review, and approve each set of transit contract bid documents including plans and specifications;
- Assist the Agreements/IGA Lead in developing third-party agreements and related relocation designs for impacted facilities and systems;

12.4.2 LRT Drawing Management

The CRC First Phase designers and technicians will comply with established procedures for preparing and delivering electronic engineering data for transit project packages.

Periodic audits of the drawing management process and the as-built drawing process, and on performed design work, will be conducted.

12.5. LRT Design Control

A critical element to successful delivery of the Engineering phase is ensuring that the design criteria and other specified requirements, including requirements of the relevant regulatory agencies, are met. Transit Management will give important consideration to the following design control activities: design coordination, design reviews, VE, constructability reviews, operations and maintenance reviews, system integration, and reliability and safety.

12.5.1 Design Coordination

Transit Management will hold regular design coordination meetings and coordinate closely with partnering local jurisdictions, advisory groups and third-party stakeholders to communicate program information and to work through engineering issues.

Internal Coordination

Transit Management will hold regular internal design coordination meetings during the engineering phase to discuss project issues and to review design production progress, program schedule, upcoming delivery milestones and safety and security through the SSC. The SSC will be responsible for all safety and security aspects for CRC LRT through design, construction, and

revenue operations. For further information, see Appendix G, Safety and Security Management Plan (SSMP).

Coordination with Local Jurisdictions

Local jurisdictions (Cities of Portland and Vancouver) involved in the CRC First Phase will be invited to participate in regularly scheduled external coordination meetings attended by transit staff to discuss various project issues, seek consensus, and provide informal guidance to staff. The meetings will be the primary forum for coordination with local jurisdictions and for exchange of views with local jurisdictions on design issues.

State and Federal Coordination

Transit Management will coordinate with and inform state and federal agencies, including SSO, as required by law and administration procedures. Such agencies include the FTA for all transit funding and grant matters, the Department of the Interior for Section 4(f) and 106 considerations, the U.S. Army Corps of Engineers for water permit concerns (such as 404 permits), the State Department of Environmental Quality (DEQ) for various environmental matters, and various other regulatory agencies.

Third-Party Coordination

The CRC First Phase will interface with BNSF to address and reach agreement on operations and maintenance of a new transit crossing in Vancouver, Washington. The CRC First Phase will hold coordination meetings with BNSF to ensure timely design input and review, resolution of issues, and execution of the operations and maintenance agreement according to the CRC First Phase schedule.

Utilities Management is responsible for substantiating that utilities within the program area (Transit and Highway areas) are properly located, impacts are identified, and relocation (or protection) designs are developed and implemented to ensure timely relocation according to the CRC First Phase schedule. This work effort requires close coordination between the Utilities Management, Transit Management and all known utility companies and agencies within the program area. The transit designers will also coordinate with the Utilities Management and the respective service utilities to develop power supply for substations, park-and-rides, etc.

12.5.2 Design Review Process

Transit Management will oversee QC design reviews at major milestones during the Engineering phase. Transit Management will coordinate formal design reviews by internal and external stakeholders following the completion of a QC review.

Quality Control Design Review Process

QC design reviews of transit work elements will be performed for major milestone submittals for the engineering phase which are assumed to be: 30% design, 60% design, 90% design, and 100% design.

QC design reviews will include checks of approved engineering criteria, applicable codes and standards, and regulatory requirements. Quality-related activities will be documented and records

will be maintained as discussed in Section 15.4, Design Quality Control, and in accordance with the CRC First Phase QC procedures as described in Section 15.

Stakeholders Design Review Process

Design documents (following completion of QC design reviews) will be provided to internal and external stakeholders, along with comment sheets on which reviewers may record their comments on the documents. Reviewers include representatives from the Cities of Portland and Vancouver, FTA and its PMOC representative, internal TriMet and C-TRAN division representatives (Facilities Management, Project Planning, Real Property, Safety and Security, etc.), WSDOT, and ODOT.

The design review process allows internal and external reviewers and the FTA and its PMOC representative to evaluate the design products (i.e., plans, specifications, and estimates) as they progress. Transit Management will compile and maintain a list of comments received and will distribute written responses to those comments. All comments will be tracked through resolution with special attention provided to design comments that may impact the CRC First Phase schedule or budget. Transit Management will meet with the agency representatives to resolve any issues identified.

12.5.3 Value Engineering

The CRC First Phase places a high degree of importance on VE studies. VE is a systematic process of review and analysis by a multi-disciplined team of persons not involved in the project. VE studies ensure that essential functions are procured at the lowest capital and life cycle cost, and that costs are consistent with needed performance, quality, reliability, aesthetics, safety, and operation.

The CRC First Phase has performed a VE study of transit package elements through a formal Value Engineering seminar for the locally preferred alternative culminating in the development of the Value Engineering Study Report, dated January 9-13, 2012.

During the Engineering phase, Transit Management is responsible for ensuring that agreed-upon VE proposals specific to the transit portion of the CRC First Phase are tracked and incorporated into the design documents.

12.5.4 Constructability Reviews

Constructability is a matter of continual evaluation of the technical details of the engineering solutions developed for the overall CRC First Phase components during the design process for the purpose of verifying that each project package is readily biddable, buildable, and maintainable. It concerns both the engineering attributes and the possible means and methods by which the program components can be constructed. Additionally, constructability reviews focus on:

- Schedule (long-lead items),
- Force account support,

- Design implications of connections to the existing TriMet system (i.e., at the Expo station),
- Interfaces with adjacent and/or inter-dependent contracts, and
- Maintainability.

Maintenance reviews within the framework of the constructability review will assess ease of maintenance, workability, and accessibility, and will involve minimizing, wherever possible, operational conflicts and the exposure of maintenance staff and equipment to moving traffic. Alternative and/or substitution recommendations may be generated that pertain to consistency with designs and details developed around a specific manufacturer.

Given the complexity of the multimodal CRC Program, constructability reviews will occur at key process steps during the engineering phase as outlined below and will focus on raising issues, resolving problems, recommending modifications, suggesting actions, and providing guidance that is endorsed by the CRC First Phase before advancing the development of the plans, specifications and estimate (PS&E).

- Conceptual/Schematic – A conceptual constructability review was held from June 16, 2008, to June 20, 2008. The constructability review panel provided feedback on several areas including staging, schedule durations, cost, risk identification, and ideas for improvement. A final report was prepared detailing the findings of the study.
- 25% Design Review – Completed January 9 through 13, 2012, in coordination with the transit 25% design VE Review.
- 60% Design Review – The 60% design constructability reviews for each package containing transit elements will include review of the bulleted items above with a focus on interfaces and connecting locations between adjacent and interdependent contract packages.
- 90% Design Review – The 90% design constructability review will be the review of the contract plans and the special provisions and will include design modifications or variations from the agreements reached at the 60% design constructability review.

Transit Management will coordinate the scheduling of constructability reviews for the transit elements. The reviews for transit and highway elements will likely be held concurrently, since both are constructed within the same area, thus aiding in identifying potential issues and overlapping construction problems.

At each constructability review meeting, the CRC First Phase staff will distribute the appropriate documents along with constructability review checklists for various project features. Reviewers may include outside professional consultants, construction trade experts, or any other agency discipline as necessary, depending on the expertise required. Decisions, agreements, and directions will be documented. A brief report may be developed that outlines the results of the review (issues raised, decisions, or solutions) and that documents the direction discussed and agreed upon for the next phase of project development. The CRC First Phase staff is responsible

for coordinating with Transit Management to resolve transit-related issues that remain at the conclusion of the review meeting and to ensure resolution of outstanding issues that affect PS&E progress. The documented action or response will be audited to ensure compliance with the final set of contract documents.

12.5.5 Operations Reviews

Under Transit Management coordination, TriMet and C-TRAN operations, safety, security, and maintenance staff will review and provide feedback regarding engineering documents, as described below, to ensure that new CRC transit facilities and equipment seamlessly mesh with those already in place and to support coordinated LRT operations linking the Portland and Vancouver communities. TriMet and C-TRAN staff will:

- Participate in constructability reviews for operations, maintenance, safety, and convenience;
- Participate in the CRC Program's Safety and Security Committee (TriMet, C-TRAN, ODOT, WSDOT, SSO) to develop, implement, and administer a comprehensive, integrated, and coordinated System Safety and Security Certification Program that identifies, prevents, and controls hazardous conditions, threats, and vulnerabilities affecting LRT resources and customers;
- Review all designs for compatibility of bus-rail passenger transfer facilities;
- Participate in establishing test requirements and provide requirements on test summary sheets for onsite tests (acceptance, systems, and pre-revenue);
- Provide support to onsite acceptance testing as required;
- Allocate operations and maintenance personnel and equipment resources as identified on test summary sheets;
- Actively participate in the planning, test procedure writing, management, and implementation of LRT systems and pre-revenue tests;
- Establish test procedures, which will include project safety rules for test operations, general operating rules for conducting test operations, equipment operating procedures, and test scheduling procedures.

12.6. System Integration

The purpose of this management function is to ensure compatibility and seamless integration of new and existing light rail systems. Transit Management is responsible for verifying system integration within the transit contract elements as it relates to other concurrent and follow-on CRC First Phase contracts and with TriMet's existing operating systems. The Systems Manager, under direction of Transit Management, oversees the day-to-day management of the overall integration effort.

12.6.1 Preliminary Design and Engineering

The Systems Manager will work closely with TriMet and C-TRAN operations and maintenance representatives to verify that:

- Documents under review at the major milestones fulfill the functional requirements of the design criteria and are consistent with operating plans, procedures, and rules; and
- Train signaling, traffic signal, vehicle traction power, fare machine, and communication system documents are mutually compatible and coordinated; and at the same time, verify that the right-of-way, trackwork, stations and storage, maintenance, and other permanent facilities, defined in the documents under review, will accommodate the system elements.

12.6.2 Pre-Revenue Testing

The Systems Manager will coordinate with TriMet and C-TRAN operations and maintenance personnel to perform pre-revenue testing. The purpose of the testing is to ensure compatibility between various elements of systems and to make sure they work together. The testing also provides assurance that there are no conflicts between the civil and systems installations that would interfere with transit operations. The pre-revenue testing program will be developed by TriMet's Test Program Coordinator in conjunction with TriMet's Manager, Safety Risk Assessment/Construction Safety, operations and maintenance representatives, and contractors, as described in detail in Chapter 17 – LRT System Testing and Start-Up.

12.6.3 Compatibility with Existing Systems

The Systems Manager oversees systems integration activities to ensure that the new facilities and systems are compatible with the existing system characteristics and CRC Transit Design Criteria. Among these characteristics are:

- Track and special trackwork compatibility with the existing system.
- Traction power voltage compatibility with the existing system.
- Communication and signal system features, including automatic train stop and train-to-wayside.
- Car body crush strength, collision post and anti-climber strength/location, and clearance envelope.
- Vehicle performance, such as motoring and braking rates, train line commands, and mechanical and electrical coupling.
- Consistent station platforms to enable all riders to board and depart.
- An integrated approach to the provision of service to elderly and disabled patrons.

12.7. Reliability, Dependability, and Safety

Quality, safety, and other review processes are described below.

12.7.1 Quality Assurance Reviews

Quality Assurance audits will be conducted after major milestone design submittals. These audits will also assess compliance with Quality requirements, which are described in detail in Appendix E, Quality Assurance Manual, and Appendix H, Quality Control Plan, respectively.

12.7.2 Safety and Security Reviews

Transit Management is responsible for implementing the components of the Safety and Security Management Plan (SSMP) (see Appendix G to this PMP), in close collaboration with TriMet's Director of Safety and Security.

Transit Management is responsible for coordinating design reviews of proposed LRT facilities and equipment designs by TriMet's operations and safety staff in coordination with ODOT and the SSO. These reviews will be conducted in accordance with the SSMP and will focus on operational safety and security of the completed system for passengers, automobile drivers, bicyclists, and pedestrians, and will ensure that designs comply with TriMet's safety and security requirements and give full consideration to concerns unique to C-TRAN's operating environment. Contracted safety specialists may also be included in the reviews, depending on the special features of the design under study.

Changes or exceptions to critical safety and security components of the design criteria during the course of the design and construction of the LRT elements will be brought to the attention of the SSC for review and approval. The committee will review the information and either approve or not approve the exception. If the exception is not approved, the SSC may require CRC First Phase staff to return with additional alternatives to review until an acceptable solution is found. This process will be in place throughout the design and construction of the LRT elements. For further details, see Appendix G to this PMP, the SSMP.

12.7.3 ADA Reviews

Design reviews will include design compliance reviews focused on the Americans with Disabilities Act (ADA). ADA compliance specialists may be brought in for this design review.

12.7.4 Peer Reviews

A peer review involves the focused review of selected program elements by a group of specialists (professionals and/or construction experts) experienced in the affected type of work. Such reviews generally entail a comprehensive study of a particularly challenging matter, subject or problem (for example, the complexities of construction of a major new river crossing, as recently done by the Bridge Expert Review Panel convened by ODOT and WSDOT executives to evaluate Columbia River bridge types and configurations).

The CRC First Phase will use peer reviews to provide technical and constructability guidance to staff where appropriate. Some LRT elements that are potential candidates for peer review are:

- Track sections; stations, park-and-rides, and associated transit improvements;
- Safety, security, signal, and communication systems;
- Major LRT structures;
- New technologies being considered for use.

Peer review panels will be composed of experienced design team personnel, experienced managers or operators from similar transit systems, and independent professionals and/or construction experts. Peer reviewers will be selected based upon several general guidelines:

- Experience in the specific areas under review
- Experience in the design and construction of other light rail systems
- Experience with the start-up period and actual operation of a similar system

A brief report may be developed outlining the results of the review (issues raised, solutions, and recommendations). Transit Management coordinates within the CRC First Phase to address transit recommendations in the report and verifies that there is an appropriate response to the recommendations in order to avoid affecting PS&E progress.

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13. Highway Design

This section summarizes the design requirements, design management, and design activities for the highway (roadway and structures) portion of the I-5 CRC First Phase Project with ODOT as the Procuring Agency. The Preliminary Engineering function will vary by delivery method used to execute a project package. The Preliminary Engineering design function discussed in this chapter is generally defined as follows:

- For Design Bid Build (DBB) Projects – Preliminary Engineering phase activities are in support of developing construction procurement documents (Final plans, specifications, and estimates) to advertise and select a construction contractor.
- For Design Build Projects (DB) – Preliminary Engineering phase activities are in support of preparation of the project package configuration and related procurement documents and used for the selection of a Design-Build contractor.

The CRC Highway Manager will manage and direct design activities toward acceptable costs for design and construction, minimize disruption to interstate commerce and the traveling public, and minimize impacts to local facilities and communities.

13.1. Design Requirements and Standards

Drawings and technical specifications for each project package will be prepared in accordance with the design requirements in the most current roadway and structures design criteria as follows:

- Highway design will be governed by the ODOT Highway Design Manual and other associated ODOT highway design documents. For highway improvements in the State of Washington, the highway design requirements will be supplemented with additional design criteria. These supplemental design criteria are in the RFP for the Columbia River Bridges and Approaches (CRBA) DB Contract. The modifications are based on the WSDOT Design Manual and City of Vancouver requirements in order to match design elements developed with the conceptual plans and to meet applicable local codes in the City of Vancouver.
- Structures design will be governed by the ODOT Bridge Design and Drafting Manual and ODOT Geotechnical Design Manual. Supplemented by the *CRC I-5 Columbia River Bridges & Approaches Structural Design Criteria*.

13.2. Design Management

A project implementation strategy is summarized in Chapter 8 of this PMP and discussed in detail in the Project Delivery and Procurement Plan (PDPP). The plan divides the I-5 CRC First Phase Project into separate and distinct project packages. The PDPP also identifies the delivery

method that would optimally assign roles and responsibilities for the performance of each project package activity (design and construction).

During the Preliminary Engineering phase, the Highway Design Manager, supported by the Project Managers, will oversee design activities. The team will include expertise by discipline-specific task leaders in various areas including roadway, structures, stormwater, geotechnical, traffic, landscaping, erosion and sediment control, right-of-way, survey, and utilities. The discipline-specific task leaders oversee:

- The day-to-day project development and engineering activities to support preparation of the project configuration and procurement documents for the Columbia River bridge and approaches, and other project packages designated for implementation under the DB delivery method.
- The production of conceptual engineering plans, including production of construction documents to approved scope, schedule, and budget for other packages designated for implementation under the DBB delivery methods.

Appendix A, Technical Capacity and Capability Plan, provides in detail the design management organization of the I-5 CRC First Phase Project team.

Chapter 14 – Design Oversight for Design-Build Delivery discusses in detail the design oversight activities that occur after the selection of a Design-Builder.

13.3. Design Execution

13.3.1 Preliminary Engineering

At the conclusion of the Preliminary Engineering phase for each package, the Highway Design Manager, supported by the various Project Managers, will have:

- Assisted in the development the baseline scope, baseline schedule, and baseline budget.
- Established the record existing conditions of the proposed site for the project areas, including geotechnical conditions, utilities, hazardous materials, and environmental/archaeological conditions.
- Completed the Type, Size, and Location of major structures, including stormwater treatment facilities. (DBB)
- Established limits of cuts and fills, and ROW impacts.
- Completed the drawing set for project packages.
- Completed the project configuration that assists in developing the scope of the project packages and supports developing the content of the RFQs and RFPs used to select a Design-Builder or Design-Builders for project packages designated for DB delivery.

- The project configuration will include the necessary base data (survey, geotechnical borings, etc.) to appropriately allocate risk between the contracting agency and the Design-Builder, define the critical elements or limitations of the project package so that they can be incorporated into the RFP, and identify and resolve early in the process major project risks that may require design exceptions, additional ROW, subsurface utilities and aboveground utilities or other considerations.).
- Identified mitigation strategies for environmentally sensitive areas.
- Prepared updated cost estimates for each project package.
- Prepared design exception requests to the requirements in ODOT Design Exception Request Form and obtained approvals following the procedures in Chapter 14 – Design Exception Process – of the ODOT Highway Design Manual. (For the DB contracts, conceptual exceptions are prepared.)(ftp://ftp.odot.state.or.us/techserv/roadway/web_drawings/HDM/2011%20HDM%20Rewrite/2012%20Chapter%2014%20Design%20Exception%20Process.pdf).
- Completed the Design Acceptance Package (DAP) for Oregon-based project package designated for DBB delivery with utilization of the ODOT Design Acceptance Checklist (<http://www.oregon.gov/ODOT/HWY/TECHSERV/BPDS%20docs/designacceptancechecklist.doc>)
- Reviewed and managed the risks discussed in the Risk and Contingency Management Plan (RCMP).
- Completed supporting traffic operational analysis.
- Prepared DAP (30% plans), Preliminary (60% plans), Advance (90% plans), and Final (100% plans) design submittals as needed. (DBB)
- Complete design reviews at the applicable DAP, Preliminary, Advance, and Final design submittal milestones. (DBB)
- Controlled the project scope, schedule, cost, and quality.
- Assisted the Program Manager in developing third-party agreements.
- Developed a Traffic Management Plan (TMP), to minimize traffic impacts on freight and commuter traffic during the construction of the I-5 CRC First Phase Project.
- Implemented procedures related to quality assurance (QA) and quality control (QC), design reviews, constructability reviews, VE studies, and changes to in-progress designs.
- Completed PS&E bid documents, including plans and specifications, to the following requirements (DBB):

- PS&E Delivery Manual
(http://www.oregon.gov/ODOT/HWY/OPL/docs/pse_delivery_manual.pdf).
- Final PS&E Checklist
(http://www.oregon.gov/ODOT/HWY/SEOPL/docs/form/final_pse_submittal_checklist.doc).

13.3.2 Drawing Management

The designers and technicians will comply with established procedures for preparing and delivering electronic engineering data for project packages. The ODOT Contract Plans Development Guide will be utilized in the development of Contract Plans.
http://www.oregon.gov/ODOT/HWY/ENGSERVICES/pages/contact_plans_dev_guide_home.aspx

The discipline-specific engineering managers are expected to manage the I-5 CRC First Phase Project's structures, geotechnical, roadway, stormwater, traffic, landscaping, erosion and sediment control, right-of way, illumination, ITS, survey, and utilities designers and technicians so that they conform to the established protocols and procedures.

13.3.3 Records Retention

General records retention procedures are described in detail in the ODOT Records Manual. The State Archivist has developed General Records Retention Schedules (General Schedules) for all state agencies; the General Schedules are contained in OAR Chapter 166, Division 300. These provide retention guidelines for records common to most state agencies. Records that are discussed include: Administrative, Facilities, Financial and Personnel. Listings include category, OAR citation, title, description and retention period.

The Department collaborates with the State Archivist to develop Special Records Retention Schedules (Special Schedules) for program and administrative records unique to the Department. Approved Special Schedules are kept by the State Archivist and available on the Secretary of State website:

(http://bluebook.state.or.us/state/executive/Transportation_Dept/transportationsched.htm). These special schedules provide retention guidelines for records unique to the Department and its programs and roles. The schedules include edition and expiration dates; title of record series; schedule/item number; description; retention period and disposition instructions.

13.4. Design Control

13.4.1 Design Coordination

The Highway Design Manager will have design coordination meetings and will coordinate with partnering local jurisdictions, advisory groups (as needed), and third-party stakeholders to communicate program information and work through engineering issues and assist in preparation of final permits.

Internal Coordination

The Highway Design Manager staff will hold internal design coordination meetings to discuss project issues and to review design production progress, project schedule, and upcoming delivery milestones.

Meetings are scheduled to include the discussion of interface design issues between transit, highway, and structures design functions and between project contracts; to coordinate on schedule, budget, and scope interface issues; and to coordinate on upcoming public meetings.

Coordination with Local Jurisdictions

Local jurisdictions (Cities of Portland and Vancouver) will be invited to participate in coordination meetings to discuss and seek consensus on design issues. The meetings will be the primary forum for coordinating with local jurisdictions, communicating program information, and working through engineering issues, and providing guidance to the design teams preparing for final permits.

State and Federal Coordination

The Highway Design Manager will coordinate with state and federal agencies as required. The Highway Design Manager is also responsible for regular coordination with FHWA's designated representative on design issues.

Coordination with Advisory Groups

The Highway Design Manager, assisted by the Communications Outreach Manager, will coordinate with the appropriate external advisory groups during the Preliminary Engineering phase to communicate program information and seek informal feedback to assist various delivery teams on design issues.

Third-Party Coordination

The Highway Design Manager is responsible for overseeing that utilities are properly located, impacts are identified, and relocation plans are developed as appropriate and implemented to ensure timely relocation.

This work effort requires coordination between the PM's , Utilities Lead, agencies, and utility companies. APPENDIX S – UTILITY MANAGEMENT PLAN discusses management of utilities.

Quality Control Design Review Process

The major milestone submittals for the Preliminary Engineering phase DAP, Preliminary, Advance, and Final design will include QC design reviews. Quality control and review-related activities will be documented and records maintained as discussed in Chapter 15 – Quality Assurance and Quality Control and in accordance with the I-5 CRC First Phase Project's QC procedures described in the QCP.

Stakeholders Design Review Process

Following completion of QC design reviews, the DAP, Preliminary, and Advance roadway and structures design documents will be distributed to internal and external stakeholders, along with comment sheets on which reviewers may record their comments on the documents. As appropriate, reviewers will consist of representatives from State, Local and Federal Agencies.

Project design team staff will compile and maintain a list of comments received and will distribute written responses to those comments. Comments will be tracked through resolution. The discipline-specific task managers will be responsible for the resolution of those comments in their respective areas.

Internal or external comments that the related discipline-specific task manager believes would be a change to the scope of work will be reviewed. Project Managers may determine that the change is minor and necessary, and direct that the design documents be revised. Comments that could pose an impact to the I-5 CRC First Phase Project's budget or schedule will be discussed with the Highway Design Manager for determination if a project change request is required according to the Configuration Management Plan (Appendix R to this PMP).

Value Engineering

Several VE studies have been completed to date for the I-5 CRC Project. Below is a list of studies conducted:

- Study No. 1 – Transit Options – May 21-25, 2007
- Study No. 2 – River Crossing Options – May 21-25, 2007
- Study No. 3 – Washington Approach – June 4-8, 2007
- Study No. 4 – Oregon Approach – June 4-8, 2007
- Study No. 5 – Transit Focused VE – January 9-13, 2012

If additional VE studies are necessary, they will follow the ODOT VE process. Additional information on the ODOT VE process is found at the web location below:

http://www.oregon.gov/ODOT/HWY/ENGSERVICES/pages/value_eng_home.aspx

Following a VE study, the Project Managers are responsible for reviewing and preparing a formal response to VE recommendations.

13.4.2 Constructability Reviews

Given the complexity of the multimodal I-5 CRC First Phase Project, constructability reviews may occur at key process step during the Preliminary Engineering phase.

Constructability reviews may occur during the phases of work described below and will focus on sequencing and scheduling, inconsistencies between plans and specifications, limitations of

access for work to be performed, compatibility of materials, coordination of trades, suggested actions, and guidance before advancing the development of the PS&E.

- **DAP Design Review** – A DAP design constructability review would focus on a constructability assessment of the Project’s primary features. Geometric details would be reviewed, and guidelines and directions would be given to structures, highway, and other disciplines so that they could develop the required, ultimate design details for the PS&E during the Preliminary Engineering phase.

The Highway Design Manager will coordinate the scheduling of constructability reviews for the various projects. The reviews for transit and highway elements may be held concurrently, when both are constructed within the same project or area. Concurrent reviews of highway and transit elements will aid in identifying potential issues and overlapping construction problems.

At each constructability review meeting, the Project Managers will distribute the design documents along with constructability review checklists for various project features. Reviewers may include outside professional consultants, construction trade experts, or other agency discipline, depending on the expertise required. The Project Managers are responsible for coordinating and addressing issues in their respective areas that remain at the conclusion of the review meeting.

13.4.3 Operations Reviews

The Highway Design Manager will coordinate with operations and maintenance staff to:

- Review and provide input to the engineering design documents.
- Participate in constructability reviews as needed in order to advise on operations, maintenance, and safety items.

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14. Design Oversight for Design-Build Delivery

14.1. Overview

This section summarizes the Owner’s design oversight procedures and organizational responsibilities related to the CRC Project contracts that are delivered as design build. It is intended to ensure satisfactory development and management of work plans, conformance of design work products to the project design requirements, satisfactory compliance with the design exception process, and verification of Design-Builder compliance with its contractually required design Quality Management Plan (QMP) requirements.

Chapter 8 discusses the project packaging and delivery strategy that includes using the DB delivery model to construct the Columbia River Bridge and Approaches Package as well as the three park-and-rides constructed in Washington. The DB delivery model allows the CRC Project to execute a single contract with one Design-Builder for the design, construction, and quality management necessary to deliver a completed project package.

The definition of the “design” function will normally vary by delivery method used to execute a project package. For ODOT Design Build contracts, ODOT General Provisions DB155 describes the design review responsibilities of the Designer, the DB’s Design Manager, and the DB’s Design Quality Manager as well as the process the agency will use to perform design reviews. General Provisions DB155 will be included in all ODOT design build contracts.

The “design” oversight function discussed in this chapter are generally defined as follows:

- **Formal Reviews:** design quality verification that consists of a combination of audits, reviews, and checks performed by the CRC Project Team , on a scheduled basis, of the Design-Builder’s production plans, including applicable Contract design standards and technical requirements, for conformity with the terms of the executed contract and compliance with the requirements of the approved Design-Builder’s QMP. The Design-Build contract will specify the frequency and duration of these reviews.
- **Informal Reviews:** regular visits by the CRC Project Team to the Design-Builder’s offices, or by other means, to review and/or discuss with the designers their progress, the designers’ Quality Plans, and to assist the Design-Builder and its designers in resolving design questions and issues. These meetings and reviews may often be referred to as “over-the-shoulder” review activities (ODOT’s design build process and required DB Quality Plan allows and encourages frequent informal communications and resolution of review comments. ODOT does not use the term “over-the-shoulder” so there is no implication that ODOT is taking responsibility or directing the design work of the DB.)

The Design-Builder will be responsible for scheduling all meetings and developing meeting agendas. The Design-Builder will also be required to record minutes of each meeting and distribute copies for review within a certain time that is agreed upon or stated in the contract.

Chapter 12 – LRT Design and Chapter 13 – Highway Design discuss in detail the requirements, design management, and design activities for project packages (transit and highway) implemented using the traditional DBB delivery methods. The design process for the CRBA and the park and rides will include coordination of those requirements as appropriate for a Design-Build contract.

The design oversight responsibilities discussed in this chapter are managed by the Project Delivery Director who is assisted by the Project Delivery Engineering Manager. The contract administration responsibility lies with the contracting agency's Project Manager. They will be supported by the CRC Project Team (agency and consultants) who will perform reviews as requested.

14.2. Design Requirements and Standards

The CRC Project Team has developed design standards and performance requirements (“design criteria”) for the transit and highway elements of the CRC Project. These standards and requirements will be included in the DB contracts. The Design-Builder must prepare all engineering documents, including construction specifications, necessary to complete and construct the design of any project package in accordance with the design criteria described in the executed contract.

14.2.1 Design Exceptions

Exceptions from the design criteria that are not included in agency pre-approved design exceptions described in the executed contract may be requested by the Design-Builder. The Design-Builder must document and justify any exception from the minimum design criteria. Project development details, including exception requests, must describe what can be met, rather than what cannot be met. The Design-Builder will be responsible for conducting all work necessary to complete any new design exceptions and modifications to exceptions pre-approved for the project. The Design-Builder will also prepare and obtain ODOT, and/or TriMet as applicable, approval for all design deviations incorporated in the project that are not included in the pre-approved design deviations. (ODOT will be responsible for coordination with FHWA for any DB requested design exceptions.) ODOT will coordinate with agency partners if any design exception affects another agency's design criteria. A complete, detailed design is not required for this determination. If required for the project, exceptions should be submitted as ATC's and processed during the proposal period. Since the final design is not provided by the CRC Project (only the requirements of the design are provided), the proposer's conceptual plan may contain design exceptions. However, these proposed exceptions are not guaranteed to be approved until the design exception has been properly submitted according to the contracting agency's process including review and approved or rejection. Final design during contract execution might discover other necessary geometric design exceptions for which the Design-Builder must prepare appropriate documentation and application materials. During contract execution, geometric exceptions requests will be processed and approved if warranted. The Design-Builder must also identify scope, schedule, and budget impacts of exceptions from the design criteria. The impacts

of design exception review and acceptance or rejection must be absorbed by the Design-Builder without contract adjustment.

14.3. Design Oversight Execution

The CRC Project Team will review all engineering documents prepared by the Design-Builder, including design criteria, for conformity with the mandatory design standards and performance requirements in the executed contract and according to the Design-Builder's approved Quality Plan. The CRC Project Team may also make regular informal visits to the offices of the Design-Builder's designers to discuss and verify design progress. The Design-Builder will be responsible for scheduling all meetings and developing meeting agendas. The Design-Builder will also be required to record minutes of each meeting and distribute copies for review within a certain time that is agreed upon or stated in the contract.

The CRC QA/QC Manager will perform a design audit on the Design-Builder's implementation of the design aspects of the Design-Builder's approved Quality Plan during the design phase.

In developing its Quality Plan, including but not limited to design reviews, the Design-Builder will be required to follow the contract requirements that specify and describe the QP.

The frequency and timing of the quality audits will depend on the duration of the design activities, the number of design units under design, and the level of problems being encountered during the design reviews. Audits by the CRC QA/QC Manager will be accomplished in accordance with Chapter 15 – Quality Assurance and Quality Control.

14.3.1 Design Oversight Philosophy

It is important for the CRC Project Team (agency and consultants) performing design oversight activities to understand that design review for a DB contract is different than design review for a traditional DBB contract. It is not the purpose of the design oversight review to provide a technical design review of the Design-Builder's engineering documents. For example, design review by the CRC Program Team does not usually include detailed review or checking of the design of major components and related details, except in unusual cases, or the accuracy with which such designs are depicted on the plans. Plan accuracy, conformance with the design guidelines described in the executed contract, and constructability of the project rests with the Design-Builder. For ODOT DB contracts, the DB Quality Manager is required to perform independent design checks and provide the results to ODOT, as required in ODOT General Provision DB 155.

The CRC Project developed the following key guiding principles for design oversight activities on DB contracts. These guiding principles state the intent and purpose of the design review and provide parameters for the expected scope of review of the Design-Builder's engineering documents:

- Use standards and design criteria identified in the executed contract.
- Reference standards when providing technical comments.
- Identify requirements in the executed contract rather than preferences.

- Skip non-value-added and minor comments.
- Refrain from providing constructability-related comments.

The Agency approved Quality Plan required of the Design–Builder describes in detail the scope of design oversight reviews of products (e.g., Definitive Design, Interim Design, Readiness for Construction (RFC) plans and technical reports) prepared by the Design-Builder.

14.3.2 Design Management Oversight

The Agency’s Project Manager, under the direction of the Project Delivery Director, is responsible for maintaining the guiding principles described above throughout the life of each contract package implemented under the DB delivery model. The Agency’s Project Manager will work throughout contract execution to continually reinforce these principles with staff assigned to perform design oversight activities. They will perform the following key responsibilities:

- Overseeing the Design-Builder’s satisfactory development and management of the Quality Plan, including the portion that pertains to design.
- Conducting design reviews of the Design-Builder’s engineering documents and participating in the interpretive engineering decision process.
- Developing timely responses to formal submittal reviews from the Design-Builder.
- Responding to the Design-Builder’s requests, such as Cost Reduction Proposals and Requests for Information (RFIs), in accordance with executed contract requirements.
- Verifying the Design-Builder’s compliance with approved design Quality Plan requirements, including the Design Builder’s performance of independent design checks and verification that the design complies with the requirements of the executed contract before formal submittal reviews by CRC Project Team.
- Verifying that all design services furnished by the Design-Builder are performed under the direction of a Professional Engineer licensed in the State or Oregon and the State of Washington, depending on the location of the finished Work product.
- Overseeing the Design-Builder’s satisfactory compliance with the design exception process.
- Verifying design progress for payment purposes.
- Providing correspondence indicating whether the design deliverables appear to be in conformance with the contract requirements at completion of design reviews at various stages.

14.3.3 Design Kick-Off Meeting

The Design-Builder is required to schedule with the Agency's Project Manager a "Design Kick-Off Meeting" (for ODOT DB contracts, this is referred to as the 'Design Mobilization Meeting,' described in ODOT General Provision DB155.) as soon as practicable after the award of a contract. The purpose of the meeting is to acquaint key personnel with the details and features of the project in order to facilitate the design process, exchange information, and address any questions pertaining to the scope or level of effort of the project. ODOT expects a collaborative partnering work relationship among the State Departments of Transportation, the Design-Builder, the transit agencies, and city representatives. A partnering session to establish a collaborative working relationship will be discussed at this meeting.

14.3.4 Design Meetings and Reviews

The CRC Project Team intends to conduct regular design coordination and review meetings with the Design-Builder to support project quality goals. These meetings and reviews will be an integral part of the design oversight process for discussing agency review comments outside of the formal review process. (For ODOT DB contracts, these design review meetings are generally known as Definitive Design review and Interim Design review(s) described in ODOT General Provision DB155.)

Preparation of design review meeting agenda and minutes is the responsibility of the Design-Builder. Attendance at coordination meetings by CRC Project Team will be determined by the Agency's Project Manager. The Design-Builder will be responsible for scheduling all meetings and developing meeting agendas. The Design-Builder will also be required to record minutes of each meeting and distribute copies for comment within a certain time that is agreed upon or stated in the contract.

14.3.5 Readiness for Construction (RFC) Document Review

For ODOT DB contracts, ODOT General Provisions DB155 describes the design review process, including the Readiness-for-Construction design review. Readiness-for-Construction design review follows the Definitive Design Review and Interim Design Review(s) which include stages of increasingly complete designs. Readiness-for-Construction design review includes review of the completed design, design builder specifications and working plans.

The CRC Project Team will perform design reviews on formal preliminary and final design submittals, prepared by the Design-Builder of all plans and performance specifications, and will resolve all review comments before the Design-Builder issues RFC documents. Any exception by the Design-Builder from the design criteria requirements must be reviewed and approval granted prior to inclusion in the Readiness for Construction plans by the design builder. The Design-Builder will follow the agreed-upon review times in the contract. The Design-Builder will also maintain close communication with the Agency Project Manager throughout design and construction. This close communication will help expedite reviews. Informal reviews will likely be employed as part of the process to discuss and resolve issues outside of the formal review process.

Preliminary Design Submittal Review

The intent of the Preliminary Design Review (for ODOT DB contracts, this is the Interim Design Review stage) is to provide a formal opportunity for the CRC Project Team and participating jurisdictions to review the design documents and confirm that the design is progressing appropriately and proceeding in accordance with the contract requirements; that the plans reflect the executed contract requirements for construction; that design features are coordinated; and that there are no fatal flaws within a given discipline or between disciplines. At the conclusion of the Preliminary Design Review, the Project Manager will ensure that the following has been completed:

- Certification has been obtained from the Design-Builder's Design QA Manager (prior to distributing the design submittal for review) that the item or segment of work:
 - (1) has been designed in accordance with executed contract requirements, and
 - (2) has been checked in accordance with the Design-Builder's approved QP.
- The design documents have been distributed with comment sheets on which agency reviewers may record their comments on the documents. The review comments have been collected and consolidated and provided to the Design-Builder. It will be the responsibility of the Design-Builder to resolve conflicting comments to the agency's satisfaction.
- Work with the appropriate authorities in each specific area of expertise has been completed to ensure that the contents of the Preliminary Design Submittal in their respective areas are as specified in the executed contract performance requirements.
- It has been confirmed that requests for exceptions from the design criteria not included in pre-approved design exceptions described in the executed contract have been documented by the Design-Builder, and approvals have been obtained from the contracting agency.

Final Design Submittal Review

The Final Design review takes place when the design for a given element or area is 100% complete. The Final Design review will include plan sheets, technical memos, reports, calculations, and other pertinent data, as applicable. It will also include all specifications, all approved amendments to the standard specifications, special provisions, performance requirements in the executed contract, necessary to construct the work elements represented in the submittal. At the conclusion of the Final Design Review, the Project Manager will ensure that the following has been completed:

- Certification from the Design-Builder's Design Quality Manager (prior to distributing the design submittal for review) has been obtained that the work: (1) has been designed in accordance with executed contract requirements, (2) has been checked in accordance with the Design-Builder's approved QP, (3) has been designed to fully provide for constructability, compatibility of materials, and conformity to acceptance

- criteria for inspections and tests as provided in the executed contract, and (4) is ready for construction to 100% completion.
- Resolution and disposition documentation for review comments have been obtained that showing that all comments made by the CRC Project Team on the Preliminary Design Review have been addressed and incorporated by the Design-Builder into the Final Design documents.
 - Work with the discipline-specific engineering managers has been completed to confirm that the contents of the Final Design in their respective areas are as specified in the executed contract and include all amendments to the standard specifications and special provisions necessary to construct the work elements represented in the submittal.
 - Written approval for exceptions from the mandatory design criteria and standards has been obtained.
 - All review comments on the Final Design have been resolved, so it may proceed through the written certification process described below in preparation for being “Readiness for Construction.”

Readiness for Construction (RFC) Documents

RFC documents are prepared after the Design-Builder has incorporated the 100% design review comments. At the conclusion of the Readiness for Construction (RFC) Document Review, the Project Engineer will ensure the following has been completed:

- Written certification from the Design-Builder’s Design QA Manager has been obtained that all plans, reports, specifications, and quantity estimates submittals and design reviews were completed in accordance with the QMP requirements and the executed contract, and that the documents are ready to be “Readiness for Construction.”
- All plans, reports, and specifications have been sealed and signed by the Professional Engineer in responsible charge licensed in the State of Oregon and State of Washington depending on the location of the finished work product, and are stamped “Readiness for Construction” by the Design-Builder’s Design Quality Manager.
- Review comments resolution and disposition documentation has been obtained showing that all comments made on the Final Design Submittal have been addressed and incorporated by the Design-Builder into the RFC documents. If necessary, the Design-Builder will resubmit revised RFC documents.
- Contract required documentation has been submitted and received by the contracting agency.

- Design Revisions Following Issuance of Readiness for Construction (RFC) Documents

Either the Design-Builder or the CRC Project Team may initiate design changes. Design changes may occur on items or segments undergoing early construction, before final designs are complete, or after completion of final design and issuance of RFC documents. The Project Manager will ensure that:

- The Design-Builder prepares Preliminary and Final (100%) Design Submittals for design review by the CRC Project Team for all design changes. For ODOT DB contracts, any design changes will repeat the design review process describes in ODOT General Provisions DB155, including Definitive Design Review, Interim Design Review(s), and Readiness-for-Construction Design Review along with Design-Builder Specifications and Design-Builder Working Plans Review.
- All design changes including revisions to the RFC documents are prepared by, or under the direct supervision of, the Professional Engineer in responsible charge licensed in the State of Oregon or State of Washington as required for the documents.
- Written certification from the Design-Builder’s Design Quality Manager has been obtained ensuring that all revised plans, reports, specifications, and quantity estimates submittals and design reviews were completed as the original documents, in accordance with the QMP requirements and the executed contract, and revised documents are ready to be again “Readiness for Construction.”
- Calculations for design revisions made during construction have been made available for CRC Project Team review and comments are incorporated into the revised documents before implementation of the revisions during construction.

14.3.6 Document Management

The Design-Builder will follow the contract requirements with regard to specifications and drawing management and will coordinate with the CRC Delivery team through the Agency’s Project Manager.

The CAE Manager oversees the drawing management system for the CRC Project’s engineering drawings. The CAE Manager will ensure that:

- The Design-Build contract requires that the Design-Builder prepares CADD files in conformance with executed contract requirements using applicable ODOT or methodologies and standards as defined in:
 - ODOT’s PS&E Delivery Manual (http://www.oregon.gov/ODOT/HWY/OPL/docs/PSE_Delivery_Manual.pdf?ga=tor)
- The Design-Builder submits the CADD files to the CRC Project office in contract required format. All CADD data will be provided in a format that can be used directly

by MicroStation with no translation and such that, when accessed within MicroStation, the data is organized according to the applicable ODOT standard levels, symbologies, colors, line weights, and basemap/sheet file organization.

The CRC QA/QC Manager will perform audits of the Design-Builder's document management systems and procedures as contained in the Design-Builder's approved Quality Plan during the design phase. Audits will be accomplished in accordance with Chapter 15 – Quality Assurance and Quality Control of this PMP. Results of the audit will be issued to the CRC Director(s).

14.3.7 Design Documentation Management

The Design-Builder will follow the contract requirements with regard to specifications and drawing management. Document control is an integral part of any project. Typically a Design-Builder will be required to use an electronic Document Control System to track and manage all project documentation. This electronic Document Control System will also have a collaborative website that is accessible to the Design-Builder and the CRC Project.

The Agency's Project Manager is responsible for ensuring that the Design-Builder completes and submits the following documentation before final acceptance:

Preconstruction:

- A completed DAP for ODOT-let project packages and/or for work elements in Oregon.
- Completed PS&E documents for ODOT-let project packages, including plans and specifications, that meet the following requirements: Final PS&E Checklist (http://www.oregon.gov/ODOT/HWY/SEOPL/docs/form/final_pse_submittal_checklist.doc).
- Reports and technical memoranda that document decisions made during completion of the design regarding components not included in the design criteria.
- Approved design exceptions.
- Design calculations and documentation.
- Electronic MicroStation and InRoads files, including all RFC sheets, reference files, and base mapping (topography).

Post-Construction:

- Three hard copies and three electronic PDF copies of the As-Built Plans and Specifications that meet the requirements of the executed contract and accurately represent the as-constructed conditions in the field. The As-Built Plans will include the following:

- A written certification by the Professional Engineer in responsible charge that the As-Built Plans accurately and completely reflect all changes and corrections made during construction.
- The stamp of the Professional Engineer in responsible charge on each reissued sheet of the revised RFC documents, and on the cover of each of the reissued, revised RFC technical specifications.
- Each sheet of the As-Built Plans stamped or clearly marked “AS-BUILT.”
- An accompanying index and instructions.
- Updated electronic MicroStation and InRoads files that show the as-constructed conditions, incorporating all revisions made during construction, and that are consistent with the software and drawing conformance requirements in the technical requirements of the executed contract.
- Reproducible originals of the shop drawings for prestressed structural elements and all structural steel components.
- Calculations for design revisions made during construction that were incorporated into the design calculation file when construction is completed in accordance with the executed contract.

14.3.8 Change Proposal

The CRC Project places a high degree of importance on VE to optimize the value of each dollar spent. DB contracting allows for innovation through the Alternate Technical Design (ATC) process during the proposal period and a Cost Reduction Proposal (CRP) approach during the executed contract phase which allows design and construction optimization by the Design-Builder. TriMet uses the term “Value Engineering” in place of CRP.

An ATC or CRP can include any of the following aspects.

- The agency is not required to accept a proposed ATC or CRP.
- Any requirement in the General Provisions.
- Any of the standards in any section of the technical requirements.
- Any change to a commitment made in the Design-Builder’s proposal documents.
- A change to any requirement found in the contract performance standards (DB 141).
- Any change to a requirement of the ODOT Standard Specifications or to the Boilerplate Special Provisions to the Standard Specifications that are included in the contract.

15. Quality Assurance and Quality Control

15.1. Overview

The goal of the I-5 Columbia River Crossing (CRC) Project Quality Management System (QMS) is to ensure conformance to governing codes and standards, official contract documents and quality requirements by the I-5 CRC Project Team during design and construction. The I-5 CRC Project QMS accomplishes this objective by providing documented evidence that all phases and features of the Project (bridge, highway, transit and all related components) are designed, procured, and constructed in accordance with established engineering criteria and applicable state and federal requirements.

The I-5 CRC Project QMS is comprised of the following:

- The I-5 CRC Project Management Plan (PMP)
- PMP Appendix E, Quality Management System (QMS) and all referenced documents and programs described by the Oregon Department of Transportation (ODOT) and the Tri-County Metropolitan Transportation District of Oregon (TriMet)
- Quality Management Programs (QMPs) developed by designers/contractors to address contractual requirements and approved by ODOT or TriMet (respectively)

The objectives of the I-5 CRC Project QMS are to:

- Instill a culture of quality throughout the I-5 CRC Project
- Continually prevent deficiencies and nonconforming work and services
- Develop effective audit plans
- Identify negative quality trends
- Keep the Project Director informed of the condition of the QMS throughout the life of the I-5 CRC Project

The I-5 CRC Project Team accomplishes these quality objectives by contractually requiring that designers, fabricators, and contractors implement quality management plans that demonstrate control over design, manufacturing, and construction processes. Compliance to contract documents and to the effectiveness of QMPs is ensured through scheduled Quality Assurance (QA) audits by the respective Agency QA representative(s).

Quality Assurance and Quality Control are related activities and are defined as:

- Quality Assurance (QA) – All those planned and systematic actions necessary to provide adequate confidence that an item is in conformance with established requirements and will satisfy given needs. The activity of providing the evidence needed to establish confidence that the quality control program and other quality functions are being performed adequately. QA is a management tool.
- Quality Control (QC) – Those functions that provide a means to control and measure characteristics as related to established requirements. The techniques and activities that sustain quality of an item to satisfy given needs. It is also the use of such techniques and activities. QC is a production tool.

Appendix E to this PMP refers to and incorporates ODOT quality related documents and programs for use on contracts that are managed and delivered by ODOT per Federal Highway Administration (FHWA) requirements and TriMet quality related documents and programs for use on contracts managed and delivered by TriMet per Federal Transit Administration (FTA) requirements, as the basis for the QMS for the I-5 CRC Project.

In addition, the Design-Build (DB) and Construction Manager-General Contractor (CMGC) contractor will provide I-5 CRC Project specific Quality Management Programs (QMPs), which will be approved by ODOT or TriMet Quality Representatives, and must be in conformance with the QMS. Design-Bid-Build (DBB) quality programs will adhere to the ODOT QA Program requirements. The I-5 CRC Project Quality Management team will monitor the contractor's efforts to ensure that the required quality elements and goals are being achieved. The QMPs describe the QA (where applicable) and QC activities implemented by the various designers/contractors to ensure conformance with the ODOT and TriMet quality programs and contractual documents.

The QMS and all related documents are "living documents" that may be modified throughout the duration of the I-5 CRC Project to reflect changes in and improvements to the quality requirements.

A summary of the overall goals and requirements of the QMS follows.

15.1.1 Management Commitment to Quality

The I-5 CRC Project Management Team is committed to planning and constructing the I-5 CRC Project with the highest regard for quality in all areas. The I-5 CRC Project Team is responsible for ensuring that design and construction is in conformance to specified quality requirements, has identified quality objectives for the I-5 CRC Project, and has designated Quality Representatives to verify that quality-related activities are being implemented during the lifecycle of the project to achieve those objectives. Every I-5 CRC Project Team member is expected to follow the QMS and approved QMPs, respectively.

15.1.2 I-5 CRC Quality Management System

The objective of the I-5 CRC Project QMS is to ensure that a planned, systematic, and documented approach to quality is specified. The QMS ensures that the implementation of activities during design and construction facilitate early identification of conditions that adversely affect satisfactory completion of the I-5 CRC Project. Administrative and control measures will be implemented by the I-5 CRC Project Team to verify and document the successful completion of a safe, reliable, economical, and convenient highway and transit infrastructure that meets the established quality standards.

15.1.3 Program Implementation

The QMS describes the necessary policies and processes for implementation of the I-5 CRC Project quality effort through written procedures and audits, including the documentation of such activities.

The objective is to ensure that the required quality is attained, beginning with the development of design, according to required engineering criteria, through construction with the implementation of effective procurement and contracting procedures. Quality will also be attained through proper manufacturing, construction, installation, and testing/start-up activities.

15.2. FHWA and FTA Quality Elements

15.2.1 FHWA Requirements for Bridges and Highways (Construction Materials)

The ODOT portion of the QMP complies with the Federal Highway Administration's (FHWA) Construction and Materials Quality Assurance guidelines in 23CFR 637(B) – Quality Assurance Procedures for Construction:

<http://www.fhwa.dot.gov/legsregs/directives/fapg/cfr0637b.htm>

The FHWA Quality Assurance guidelines identify the six critical elements of a Quality Assurance program for construction materials:

1. Quality Control by the Contractor
2. Acceptance by the Agency
3. Independent Assurance
4. Dispute Resolution
5. Use of Qualified Laboratories
6. Use of Qualified Personnel

Each of these elements is addressed in the ODOT Quality Assurance Program (Section 2 of the Manual of Field Test Procedures):

The ODOT Quality Assurance Program is used for all contracting methods including Design-Bid-Build (DBB), Design-Build (DB), and Construction Manager/General Contractor (CM/GC). References to the Quality Assurance requirements vary depending on the contracting method.

Quality Control by the Contractor (Element 1)

Quality Control is defined as: All Contractor/vendor operational techniques and activities that are performed or conducted to fulfill the contract requirements.

The Contractor is responsible for providing quality control sampling and testing, furnishing material of the quality specified, and furnishing QL levels during aggregate production, when required. The Contractor's Quality Control Technician must perform or observe the sampling operations. Testing operations will be performed by a Certified Technician unless the Training Program option is utilized (Quality Assurance Program, Appendix H – Training Program).

These requirements apply to DBB, DB, and CMGC contracting methods.

Acceptance by Agency (Element 2)

Contractor quality control tests on field-tested construction materials will be used for acceptance by the Agency only if verified by tests performed by an independent group (Agency Quality Assurance). Verification testing frequencies and requirements are outlined in the ODOT Quality Assurance Program.

The Agency will perform verification testing on field-tested construction materials for DBB, DB, and CMGC contracting methods.

Agency acceptance of non-field tested construction materials is based on the contract requirements, the Non-Field Tested Materials Acceptance Guide, and the ODOT Qualified Products List.

Independent Assurance (Element 3)

Verification is defined as: Sampling and testing performed to validate the quality of the product.

Verification samples are taken randomly (minimum 10% of specified quality control frequency) and tested by an independent group (Agency Quality Assurance) to verify that products meet the required specifications. Quality control samples are not to be used for verification.

Independent Assurance and verification testing frequencies for field-tested construction materials are identified in the Manual of Field Test Procedures, Section 4D – Field Tested Materials Guide.

Dispute Resolution (Element 4)

ODOT employs the use of Third Party Resolution when the Agency's Quality Assurance test results conflict with ongoing Quality Control test results and when verification requirements are not met or the conflict cannot be resolved. Third Party Resolution can be requested by either the Contractor or the Agency.

Third Party Resolution testing shall be performed by a Dispute Resolution Laboratory. The ODOT Central Materials Laboratory performs third party and dispute resolutions. This is normally done by testing quality control production backup samples, but may include other resolution techniques or procedures as determined by the ODOT Technical Resource for the corresponding specification section. The test result(s) of the Dispute Resolution Laboratory performing dispute resolution construction materials testing for any or all disputed test results will be considered the actual test results and will therefore be used for acceptance of the material.

Use of Qualified Laboratories (Element 5)

ODOT has developed a Laboratory Certification Program to support the Quality Assurance Program for construction materials. This program recognizes three categories of laboratories that will test materials for ODOT construction projects: Quality Control, Quality Assurance, and Dispute Resolution. To ensure that laboratories consistently provide quality test results, they shall be certified according to this program as outlined in the ODOT Quality Assurance Program.

Use of Qualified Personnel (Element 6)

The ODOT Quality Assurance Program requires all personnel performing construction materials testing on ODOT construction projects to be certified. The level of certification is dependent on the specific type of testing to be performed. The Certification Advisory Committee, described in Section I of the Quality Assurance Program, will provide approval and general oversight for the certification programs. Specific direction and administration of the individual certifications will be provided by ODOT unless other groups are specifically referenced in the description of the individual certifications.

Design Quality Management

FHWA does not have Design Quality Management requirements for federally funded transportation construction. ODOT has developed Design Quality Management requirements for consultant design contracts and for DB contracts.

Consultant Design Quality Management – Consultants are required to submit a design Quality Plan in response to ODOT’s RFP for Design work. This Quality Plan must follow the ODOT Quality Plan template for Consultants, and covers all aspects of design. The Consultant Quality Plan must be submitted and approved by ODOT prior to assignment of any design work to the Consultant.

DB Design Quality Management – Under the DB contracting method, the Design-Builder is required to comply with the Design Quality Management requirements outlined in the DB General Provisions, Section DB155 – Design Management and Design Quality Management. The Design-Builder is required to assign a Design Quality Manager who is responsible for all aspects of design quality. The Design-Builder’s Design Quality Plan is required as part of the overall project Quality Plan requirement outlined in DB General Provisions, Section DB154 – Quality Program and Quality Plan Requirements.

Construction Quality Management

Inspection Quality Assurance Program – ODOT has developed an Inspection Quality Assurance Program. The purpose of the program is to provide adequate training and resources for Construction Inspectors and to insure consistent administration of transportation construction contracts.

As part of the overall Inspection Quality Assurance program, ODOT has implemented a Training and Certification Program for Inspectors. The Inspection Certification Program document outlines the Certification Program elements and intent. The monitoring of construction activities by Certified Inspectors will promote industry best practice and will help to ensure quality materials and workmanship on ODOT transportation projects. Additional guidance for Construction Inspection include:

- ODOT Construction Manual
- ODOT Inspectors Manual
- ODOT Quality Control Compliance Specialist (QCCS) Manual

DB Construction Quality Management – As part of the required Construction Quality Management program, the Design-Builder is required to employ construction Inspectors who are certified through the ODOT Inspection Certification program. The Construction Quality Management requirements are defined in the DB General Provisions, Section DB156 – Construction Workmanship and Materials Quality Management. The Design-Builder is required to assign a Construction Quality Manager to each project, which is responsible to oversee, manage, certify and perform Construction Quality Management activities as specified in the Contract Documents and the Design-Builder's Quality Plan, as required by DB General Provisions, Section DB154 – Quality Program and Quality Plan Requirements.

Additional guidance for Construction Inspection include:

- ODOT Construction Manual
- ODOT Inspectors Manual
- ODOT Quality Control Compliance Specialist (QCCS) Manual

15.2.2 FTA Requirements (15 Elements) for Transit

The TriMet portion of the QMS complies with the Federal Transit Administration's (FTA) Quality Management System Guidelines, 2012 (FTA Guidelines) and includes the 15 elements of a quality program suggested by the FTA Guidelines.

Management Responsibility (Element 1)

The commitment to and responsibility for quality for the QAP belong ultimately to the highest level of management. Each I-5 CRC Project Team member is committed and accountable for the quality of his/her work.

Management will formally declare and communicate its quality policy and be responsible for assuring that the QMS is implemented and maintained throughout the organization.

The Owners' QA Representative will report the ongoing effectiveness of the QMS, as determined by the regular monitoring of QMP activities by scheduled quality audits.

Maintenance of the I-5 CRC QMS will be accomplished through regular documented reviews performed to ensure that the QMS remains effective.

Documented Quality Management System (Element 2)

The QMS will be implemented and maintained through a documented quality management system to ensure that the I-5 CRC Project's quality goals and objectives are met. This quality management system extends to all aspects of design, procurement, manufacturing, and construction. The written procedures and instructions address processes including inspection, testing, nonconforming product and work, corrective action, maintenance of quality records, quality audits and training.

Design Control (Element 3)

Procedures that control and verify the design will be established and maintained by the QMS. QMP procedures must further identify the QA/QC responsibilities for design and specify what information will be documented, transmitted, and reviewed. Design inputs and design outputs will be documented and design reviews will address constructability, operability and maintainability. The procedures must also clearly indicate how design changes and modifications will be identified, documented, reviewed, and approved. QA activities will be conducted to verify that QC procedures related to design are being carried out and documented according to their requirements:

- A Design-Builder (DB) will have, in its QMP, processes for design control that are compliant with the TriMet documents.
- Design Consultants will have a QC program that is compliant with the TriMet documents.

The QMS includes references and/or procedures to control and verify that the design criteria, other specific requirements, and requirements of regulatory agencies and industry standards are met.

Document Control (Element 4)

Procedures for control of project documents and data will be established and maintained. Document control measures ensure that all relevant documents are current and available to all users who require them.

Design document control procedures are discussed in the QMS. DB and CMGC contractors will address document control procedures in their respective QMPs, which will be approved by TriMet.

The following are examples of the types of documents requiring control:

- Drawings
- Specifications
- Inspection procedures
- Test procedures
- Special work instructions
- Quality Plans
- Operational procedures
- Project Management Plans
- Risk and Contingency Management Plans
- Real Estate Acquisition Management Plans
- Rail and Bus Fleet Management Plans
- Safety and Security Management Plans

Purchasing, Equipment Procurement and Construction (Element 5) (Construction Only)

All suppliers, installers, manufacturers, and contractors will be selected based on their ability to meet the contract requirements, including quality requirements. Contract documents or purchasing specifications will contain relevant criteria, standards, drawings, process requirements, and inspection and testing procedures.

The procedures for purchasing during construction are provided in further detail in the QMS, the QMPs and in respective agency documents.

Control of Materials, Product Identification and Traceability (Element 6)

Measures will be established and maintained for identifying and controlling items of production (batch, materials, parts and components) to prevent the use of incorrect or defective items.

Incorrect or defective items will be identified and either marked accordingly and/or segregated from material storage to prevent incorporation into the work.

The QMS outlines procedures for identifying and tracking items of design production. Additional procedures for product identification and traceability specific to the Construction phase of the I-5 CRC Project will be established by the construction contractor within its QMP, and must include policy, procedure, and process that is in conformance with ODOT and TriMet requirements, and must include the contracting agency's procedure for verification of production identification and traceability for materials used during construction.

Control of Special Processes (Element 7) (Construction Only)

Suppliers and contractors will identify and plan the production and installation processes that directly affect quality in order to ensure that these processes are performed under controlled conditions.

Special processes, the results of which cannot be verified by subsequent inspection and testing of the product, will be continuously monitored. Activities related to official contract documents, including expectations of the FTA and other oversight agencies will be controlled by identification of relevant specifications and determination of the most effective method of verification.

To achieve accuracy and consistency in production and installation processes, the QMPs will provide for:

- Documented work instructions to ensure quality, use of suitable production and installation equipment, a suitable working environment, personnel qualifications/certifications, and conformance with referenced standards/codes and their associated QMP.
- The monitoring and controlling of processes and product characteristics during production and installation.

Inspection and Testing Procedures (Element 8)

Performance of inspection and testing will be by qualified personnel in accordance with the established QMP and official contract documents and will verify the quality of work and products throughout the duration of the work (in-process work).

Equipment, materials, and products delivered to the project site will be inspected, marked, and tracked in accordance with the QMS and the construction contractor's QMP to ensure that only acceptable materials are used and that any rejected materials are removed from the project site.

DB and CMGC contractors will address inspection and testing procedures in their respective TriMet approved QMPs.

Final inspection and testing will be conducted to ensure that the finished product conforms to the specifications. Records will be maintained to document final inspection and testing.

Inspection, Measuring, and Testing Equipment (Element 9)

Inspection, measuring, and test equipment (IM&TE) used in the work will be identified, controlled, calibrated, and maintained in proper working order to ensure conformance to requirements, and will meet the standards of accuracy for the measurements required.

Equipment will be calibrated according to national standards when applicable or to documented standards when national standards do not exist.

Equipment will be regularly recalibrated. If inspection, measuring and test equipment is found to be out of calibration, the validity of previous inspection and testing results will be re-evaluated for acceptability. A record of the equipment calibration status will be maintained.

The QMS details the policies and procedures for IM&TE. Additional requirements and procedures related to IM&TE specific to the construction phase of the I-5 CRC Project will be addressed in the contractor's QMP.

Inspection and Test Status (Element 10)

Procedures for identifying the inspection and test status of work during production and installation will ensure that only work that has passed inspections and tests is incorporated into the I-5 CRC Project. The inspection and status will indicate conformance or nonconformance with regard to reviews, inspections and tests. Test and inspection status will be identified by means of markings (stamp), tags, labels, routing cards, inspection and test records, physical location or other suitable means.

Inspection and test status expectations are provided in further detail in the QMS and the QMPs.

Non-Conformance (Element 11)

Procedures for identifying and controlling nonconforming materials or work will ensure that nonconforming materials or work is not incorporated into the final product.

Nonconforming work will be identified, controlled, documented, and evaluated for determining the proper disposition of the nonconforming work. Documented procedures will define the responsibility and authority for the review and disposition of nonconforming work. The final disposition of nonconforming work will require the approval of the Resident Engineer, dependent upon the nature of the work, and may include rejection, repair, rework and use-as-is. Reworked or repaired work will be re-inspected and/or retested in accordance with contract requirements. All incidents of nonconformance will be resolved with the involvement of quality personnel.

The QMS and QMP detail the policies and procedures for nonconforming work related to design and construction.

Corrective Action (Element 12)

Corrective action required as a result of repetitive nonconforming work or product will be identified and controlled to ensure timely and adequate resolution. Procedures for corrective

action will be established, documented, and maintained. Corrective action procedures will be used that will:

- Investigate the root cause of repetitive nonconforming work or product to eliminate recurrence
- Initiate measures to prevent quality problems appropriate to the level of risk
- Ensure that corrective actions are implemented and effective
- Implement and record changes in procedures resulting from corrective actions

The corrective action process will be documented and controlled to final acceptance and closeout of the issue.

The QMPs provide procedures for corrective action related to design and construction.

15.2.2.13 Quality Records (Element 13)

Procedures for maintaining quality records will be established and maintained that will show the proper functioning of the quality management system. These records will be prepared, compiled, and stored so that they can be easily retrieved. Attention will be given to accuracy, completeness, legibility, retention time, final disposition and security of the quality records. Records will be kept in an environment that will help prevent their deterioration or damage. Typical quality records may include:

- Design reviews
- Inspection reports
- Test data
- Qualification records
- Calibration records
- Non-Conformance Reports (NCRs)
- Corrective Actions
- Audit reports

The QMS and QMPs documents address quality records in more detail.

Quality Audits (Element 14)

Verification for compliance to the QMS and QMP related to the Engineering phase is performed by completing audits. The I-5 CRC Project QA staff, as assigned, will perform scheduled audits, as detailed in the QMS, to verify conformance and effectiveness of the QMP. Auditors will be

qualified to perform the audit by meeting the requirements for quality auditors, as defined in the policies and procedures. Quality audits will be fully documented and findings will be tracked to their final disposition. The auditor will review audit findings with the personnel who have responsibility in the area being audited.

The QMS details the procedures and requirements related to quality audits for design and construction.

Training (Element 15)

Procedures will be established and maintained for identifying training needs and for providing training to I-5 CRC Project staff performing activities that affect quality. All I-5 CRC Project staff members will be technically qualified for their tasks and trained in the QMS. Design and construction contractors will be required to establish a training program and maintain records of the participation of key project staff in QMP training.

Training is addressed in more detail in the QMS and the QMP.

15.3. Quality Assurance and Quality Control Responsibilities

The responsibilities of the Agency Quality Representative(s), related to the elements of a quality program are described in the QMS and associated documents. In-depth details of the DB, DBB, and CMGC contractors' responsibilities will be included in their approved QMPs.

15.4. Design Quality Control

Quality control of design activities applies to the activities of defining, performing and controlling designs including, but not limited to, design of features, facilities, structures, systems, and equipment. I-5 CRC Project Team members will perform their design activities to the approved engineering criteria, applicable codes and standards, and regulatory requirements. QC reviews, including Interdisciplinary Reviews, will be performed by qualified individuals (other than those who originated the design) within the reviewer's area of professional expertise. Design changes or revisions will be subjected to the same level of checking, review and approval as the original design. Design documents will be uniquely identified and controlled to ensure the use of approved documents. Quality related design activities will be documented and records will be maintained as detailed in the QMP.

All design activities performed must adhere to the requirements of the QMS and the Agency approved QMP.

15.5. Construction Quality Control

The I-5 CRC Project will establish requirements for quality control of construction activities that the construction contractor will follow. The Design-Builder will submit for approval, a QMP that describes control of quality of its work according to contract requirements. A Project Manager (PM) or Resident Engineer (RE) and inspection staff will be assigned to each construction contract to provide on-site day-to-day oversight of the construction contractor's QMP. The

ODOT or TriMet Quality Manager is responsible for final disposition of the construction contractor's QMP.

15.6. Inspection and Test Plans

The construction contractor will be responsible for the quality of all work performed by its own employees, as well as by any manufacturers, subcontractors or suppliers, to meet contract requirements and as detailed in its approved QMP. The contractor will develop and submit to the ODOT or TriMet Quality Manager, for approval, a QMP that addresses all testing requirements in addition to the types of tests, frequency of tests, minimum qualifications of those performing the tests and required quality documentation.

15.7. In-Process Inspections

The Project Manager (PM) or Resident Engineer (RE) and inspectors will be deployed to ensure that construction QC procedures are in place, effective and ensure that quality standards are acceptable. The PM or RE and inspector activities will include:

- Verifying the construction contractor's material certifications and samples
- Inspecting materials and equipment delivered to the job site(s)
- Performing inspections of specialty equipment and fabricated construction materials
- Participating in First Article Inspections (FAIs are TriMet specific), or witness and hold point activities, as outlined in the contract specifications and established in the construction contractor's approved QMP
- Inspecting construction and installation work in progress
- Documenting the results of inspections and tests, and specifically noting any failed tests, retesting or recertification required
- Monitoring construction operations and field-testing of construction material
- Reviewing the construction contractor's QC documentation

15.8. Materials Testing Program

Contract specifications will include standards for materials and corresponding tests to ensure compliance with contract requirements. Qualified personnel will accomplish materials testing during construction in accordance with approved testing practices and procedures, as outlined in the TriMet Design Criteria (Revision 10.2, January 2010) on contracts procured by TriMet, and in the ODOT Manual of Field Test Procedures on contracts procured by ODOT.

If required to perform primary material testing by the contracting Agency, the construction contractor will prepare and submit a QMP that includes a test and inspection plan that contains a list of tests that reference each specification section. In such instances the construction contractor

will obtain the services of an independent materials testing laboratory (IMTL) to perform the tests. Laboratory and technician qualifications will be submitted as part of the QMP. The construction contractor will submit the results of QC tests to the PM or the RE. The PM's or RE's office will review and maintain test reports and direct any actions to be taken for nonconforming items.

The I-5 CRC Project's Agency staff (ODOT and TriMet) will determine if verification testing and inspection of prefabricated materials is necessary on construction contracts procured by their respective agencies. In such instances they will perform QA confidence tests/inspections to verify that the construction contractor's QC effort is satisfactory. The PM or RE will coordinate QA confidence testing/inspection by the I-5 CRC Project's agency staff or by an on-call independent materials testing laboratory (IMTL).

16. Construction Administration

16.1. Overview

As described previously under Chapter 8, construction of the CRC First Phase Project will be implemented through individual construction contracts administered by ODOT and TriMet. The agency administering a contract package will follow its procedures and policies for construction administration. The CRC First Phase Project will contain a number of contracts related to transit and highway construction; delivery methods are being identified and may be Design-Bid-Build (DBB), Design-Build (DB), Design-Furnish-Install (DFI), or Construction Manager/General Contractor (CM/GC). ODOT has experience in the delivery of highway construction with DBB and DB delivery methods. ODOT has delivered numerous bi-state contracts with past examples of successful coordination with existing structures across state lines. TriMet has extensive experience on the design and delivery of light rail transit contracts by DB, Two-step low bid, DBB, DFI, and CM/GC delivery methods.

Each section below provides a general overview of contract administration, management, inspection, material testing, third-party coordination, site logistics, changes, claims, claims avoidance, and contract closeout. The Construction Management and Administration Plan (CMAP) provides additional detail (see Appendix D to this PMP).

Additional information on the CRC First Phase Project staffing and responsibilities can be found in Chapters 2 and 3 of this PMP and in the TCCP (see Appendix A to this PMP).

16.2. Construction Management Services

The construction management function for the CRC First Phase Project is designed to maximize safety, quality, and cost-efficiency of all construction activities. Construction management practices will conform to all federal and state regulations, including QA, QC, materials testing, structural and architectural inspection, and compliance with county, state, and federal requirements covering contract procedures and fair employment.

As described previously, ODOT and TriMet are each expected to administer contracts. In cooperation with, ODOT and TriMet, the CRC First Phase Project Team will develop special contract provisions necessary to address any conditions, specifications, timing, and coordination issues not normally included in an agency's typical contract documents.

For further details see the CMAP (Appendix D to this PMP).

16.3. Construction Materials Testing Program

Contract specifications will include standards for materials and corresponding tests to ensure compliance with contract requirements. Qualified personnel will accomplish materials testing during construction in accordance with approved testing practices and procedures. The

construction contractor will have primary responsibility for testing of materials according to ODOT or TriMet specifications.

For further details see the CMAP (Appendix D to this PMP).

16.4. Construction Inspection

The construction contractor will be responsible for the quality of all work performed by its own employees, as well as by any manufacturers, subcontractors, or suppliers, to meet contract requirements and as detailed in its approved QMP. The construction contractor will develop and submit to the Project Manager for approval a Quality Plan that addresses all testing requirements, including the type of tests, frequency of tests, minimum qualifications of those performing the tests, and required quality documentation.

The Project Manager and inspectors will be deployed to ensure that construction QC procedures are in place and effective, ensuring that quality standards are acceptable.

For further details see the CMAP (Appendix D to this PMP).

16.5. Inspection of Manufactured Items

The CRC First Phase Project will likely include procurement of certain manufactured items under the DFI delivery method. Examples include possible procurement of light rail vehicles (LRVs), ticket vending machines, and track. The inspection and QC process will rely heavily on the process established and documented in the manufacturer's Quality Control Plan, which will be a requirement of the contract. Specifications and requirements will be prescribed in the contract documents prepared by the contracting agency in cooperation with the CRC First Phase Project Team.

Additional information can be found in Section 3 of the PDPP.

If procurement of LRVs is done under the option for the Portland Milwaukie Light Rail Project light rail vehicle contract, existing procedures contained within that contract will be used. All fabrication inspection of construction materials will be performed by the procuring agency, unless otherwise delegated. Items that are inspected and found to meet contract requirements are identified by a tag or stamp. This type of inspection is generally performed at the manufacturing or fabrication plants; however, there are also items that are inspected at the job site.

For further details see the CMAP (Appendix D to this PMP).

16.6. Construction Management

Management procedures are based on those already in use at ODOT and TriMet, and new or revised procedures will be developed, as needed. Procedures in place will ensure compatibility and effective management control. For information regarding management control of schedule, budget, change management, and record management, see Chapter 3 of this PMP. For the CRC First Phase Project, the contracting agency administering a contract package will follow its construction management procedures and policies.

Before the start of each construction contract within the CRC First Phase Project, a Construction Management Plan will be developed to identify the contract team's mission, roles and responsibilities, goals/strategies for success, and project schedule and budget. Each Construction Management Plan will be reviewed and endorsed by Project Team Members, specialty groups, and the CRC First Phase Project Management Committee.

For further details see the CMAP (Appendix D to this PMP).

16.7. Construction Contract Administration

As described previously, the CRC First Phase Project is composed of multiple construction contract packages to be administered by ODOT and TriMet. A description of the construction contracts for the CRC First Phase can be found in Section 3 of the PDPP. For the CRC First Phase Project, the agency administering a contract package will follow its procedures and policies. The intent of each agency's procedures and policies is to identify desired results, establish standardized requirements, and provide uniformity in the administration and construction of contracts. The CRC First Phase Project staff responsible for work on construction contracts will be familiar with the guidance and instructions included in these manuals. Special contract provisions necessary to address any conditions, and any specification, timing, and coordination issues not normally included in an agency's typical contract documents will be developed by the CRC First Phase Project.

For further details see the CMAP (Appendix D to this PMP).

16.8. Coordination with Third Parties

The CRC First Phase Project affects or is affected by multiple third-party organizations including, but not limited to, utilities, railroads, airports, river users, parks, a historic reserve, media, private businesses, public facilities, cities, counties, ports, and other public agencies.

Each construction contractor for construction contracts of the CRC First Phase Project will be advised about the relationships with third parties and the expectation they hold regarding the actions of both the CRC First Phase Project and the construction contractor.

For further details see the CMAP (Appendix D to this PMP).

16.9. Site Logistics

During the environmental process, it was determined that off-site staging or casting/fabrication areas would likely be needed. The Sundial site and Port of Vancouver Alcoa/Evergreen West site have been identified in the FEIS as potential large fabrication yards. One or more of these sites could be temporarily acquired or leased for the CRC First Phase. A site may be obtained by the state department of transportation or a contractor.

The contractor may identify staging sites other than those identified by ODOT or TriMet. If this option were chosen, the contractor would likely be responsible for all necessary improvements to the site. The contractor will seek and obtain permission from the state department of

transportation or project owner before the acquisition of that site and its active use. Before permission is given, an environmental evaluation would be necessary.

The five sites identified in the FEIS are:

- Port of Vancouver Parcel 1A
- Red Lion at the Quay Hotel site in Vancouver
- Vacant Thunderbird Hotel site on Hayden Island
- Port of Vancouver Alcoa/Evergreen West site
- Sundial site located between Fairview and Troutdale

Additional information on these sites can be found in Section 3.3.4 of the FEIS.

16.10. Processing Shop Drawings, Working Drawings, and Requests for Information

All shop drawings, working drawings, and supplemental details submitted by the contractor should be checked, in detail, for conformance to all contract requirements before forwarding to the appropriate approving authorities of the contract's administrating agency. Any conflicts with the contract plans that have been detected or revisions that may be desired by the administrating agency should be noted on one copy of the drawings being forwarded for approval. If change orders to cover any deviation from the contract plans have been issued, or are being processed, those changes should also be noted.

The Request for Information (RFI) is a means by which an individual or contractor can obtain clarification of contract documents from the contracting agency. Depending on the response, a change order may be initiated. Otherwise, the RFI will be considered to be a clarification, with no basis for increased time or cost. The contracting agency will maintain a report of RFIs showing control number, originating organization, a brief description of the issue, received date, and response date.

For further details see the CMAP (Appendix D to this PMP).

16.11. Claims Avoidance

During the course of a contract, differences of opinion may arise over decisions and plan interpretations that benefit one party at the expense of the other. It is good policy to pursue resolution of these differences at the earliest possible time and to fully recognize all of the contractual rights of the contractor during the resolution process.

For further details see the CMAP (Appendix D to this PMP).

16.12. Changes and Claims

Contract change orders are changes to a legal document (the contract) and are themselves legal documents. Once a change order is executed, it becomes part of the contract and cannot be un-executed. The only way to make further modification to a contract is to process another change order.

Section 3.6 of this document outlines the Change Management process. Sections 3.6.3-B through 3.6.3-I of the CRC Project Procedures Manual provide the CRC First Phase Project's change order objective, definition, reference documents, work process, and checklists.

During the course of a contract, differences of opinion may arise over decisions and plan interpretations that benefit one party at the expense of the other. Disagreements, disputes, and protests are the responsibility of the Project Manager until a formal claim is filed. Claims can be filed by the contractor when all other means provided in the contracting agency's standard specifications have been exhausted to resolve a dispute. Should a claim situation arise, the contractor will submit the required documents and supporting data to the Project Manager. The claim will be considered, investigated, and evaluated by the Project Manager. If the contractor does not accept the Project Manager's decision, the contractor may request additional review following a four step process for ODOT-administered contracts or submit an additional review request to the TriMet General Manager for TriMet-administered contracts.

For further details see the CMAP (Appendix D to this PMP).

16.13. Construction Completion/Closeout

Contract completion and closeout is a critical element in the life of a construction project. As the end of each contract approaches, there is the potential for diminished control and attention to detail. The contractor may often transfer key people to other projects and leave insufficient forces to supervise the contract closeout. As the workload diminishes, it must be expected that the number of people on a project will be reduced. What is essential is that there be a clearly defined closeout plan and procedures in place that allow the remaining staff to close out the project efficiently and effectively.

For further details see the CMAP (Appendix D to this PMP).

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17. LRT System Testing and Start-up

17.1. Overview

The primary goal of the CRC Program system testing and start-up program is a revenue service opening that incorporates the lessons learned and builds upon the successes achieved on previous LRT extension start-ups in the Portland metropolitan area. The CRC Program will leverage TriMet's successful integration of new and existing service on the Metropolitan Area Express (MAX) light rail system on prior extension start-ups including:

- Westside/Hillsboro Light Rail (Blue Line) Extension, September 1998
- Airport Light Rail Extension (Red Line), September 2001
- Interstate Light Rail Extension (Yellow Line), May 2004
- South Corridor Extension (Green Line), September 2009

In each case, start-up culminated over a year or more of ever-intensifying pre-revenue testing, training, and other preparatory activities.

In addition, the 7.3-mile Milwaukie extension is currently under construction from the south terminus of the Green and Yellow Lines on the Portland Mall near Portland State University (PSU) to a Park Avenue terminus south of Milwaukie. That extension is designated as the Orange Line and is scheduled to open in the fall of 2015. Preparations for the start-up of the Orange Line are under way, and start-up activities will commence on or before January 2014.

17.2. System Testing Procedures, Analysis, and Results

This section describes the objectives, methodology, management controls, and major milestones in the conduct of a test program intended to verify the readiness of LRT for revenue operations.

17.2.1 Objectives

Listed below are the objectives of the system testing and start-up program:

- Development and execution of an integrated comprehensive system testing program.
- Verification of contract compliance.
- Validation and demonstration of system performance.
- Verification that the extension performs as an integrated member of an entire system.
- Demonstration of safety, security, and service characteristics.

- Training of TriMet and/or C-TRAN personnel, and integration of personnel, equipment, and procedures into TriMet's overall operations.
- Full collaboration with TriMet and C-TRAN operations.

17.2.2 Types of Tests

Five types of tests will be required under the CRC Program system testing and start-up program. The following definitions include examples to distinguish the general uses of each of these tests.

Qualification or Proof of Design Testing

Proof of design tests are designed to verify that a proposed design can meet the specification requirements. They are usually performed on pre-production units or the first unit of a production run (for example, a substation load test or LRV crash worthiness test). The CRC Program may choose to limit design qualification tests to types and manufacturers of equipment not currently in service in the existing TriMet system.

Manufacturing Tests

Manufacturing tests are a general category of tests that are performed by the contractor and suppliers on a sampling basis or routine basis to verify the quality control and manufacturing process. They usually represent milestones for further assembly or construction activity, or as a prerequisite to the shipping of materials or equipment.

Acceptance Tests

Acceptance tests are performed by the contractors on each individual item, thereby verifying performance at the equipment/subsystem/system level, after installation or assembly. These tests are normally used as advanced milestones for contract progress payment on equipment type contracts. At the system level, these tests require interface with other system elements (for example, vehicle acceptance or ticket vending machine acceptance).

System Tests or Integrated Tests

Systems, or integrated, tests are any test or series of tests that requires the interface of more than one system or civil element and are designed to verify the integration and compatibility among individual elements. These tests are usually beyond the contractual responsibility of any single contractor. They are planned, performed, witnessed, reported, and documented by TriMet. These tests are generally required as a validation of total system performance. A detailed test plan for each test and the required sequence will be included in the Integrated Test Plan.

Pre-Revenue Testing

Pre-revenue tests utilize the complete functional capabilities of all system elements. Such tests are beyond the contractually required tests of individual contractors; are required to be performed before the introduction of revenue service; and utilize and evaluate representative system schedules, personnel, procedures, and equipment. These tests will begin after system

elements relating to systems operations are complete and accepted. A detailed test plan for each test and the required sequence will be included in the Integrated Test Plan.

17.2.3 Test Management Approach

The management of the test program has been adapted to the organization of the CRC Program and is divided into two categories.

The first category includes proof of design, manufacturing, and acceptance tests. These tests are managed by the contractor, with oversight by the Project Engineer responsible for the contract to which they relate.

The second category of tests—systems integration and pre-revenue tests—is the responsibility of the CRC Rail Activation Manager.

The Rail Activation Manager has the duty to implement the overall test plan. During the latter phases of the CRC Program, the tasks of schedule coordination and organization of other facilities or support elements will be the responsibility of the Rail Activation Manager.

There are three major activities in performing both categories of tests:

4. Establish requirements;
5. Perform tests (including remedial measures necessary to achieve successful results);
and
6. Report test status, and document and analyze results, noting any discrepancies.

The general approach to the use of TriMet personnel will be to encourage maximum test witnessing as a means of training opportunities, while at the same time avoiding the imposition of contractual obligations and costs. These objectives must be consistent with the assumption of responsibilities relating to various stages of contract acceptance and within the limits of TriMet personnel resources.

Further details on the CRC systems testing program may be found in the Appendix T to this PMP, the LRT System Testing and Start-Up Plan.

17.3. Modifications or Retrofits

During system or pre-revenue testing, necessary changes to various program elements may be identified. Any such change will take the form of a modification or retrofit. Determination of the need for any modifications or retrofits will be based on the results of the system testing and start-up program, will incorporate engineering input and judgment, and must be carefully coordinated with the management of change orders and warranties.

The Project Engineer will negotiate and administer agreement on the scope of and assignment of financial responsibility for modifications and/or retrofits.

17.4. Start-Up Planning

Start-up of the light rail line is an inherently complex process requiring exceptional intra-agency coordination and planning. Anticipated challenges are:

- The construction and integrated testing phases will be nearing completion, a point in the overall process that is often exceptionally time-sensitive and for which few “workarounds” are available to deal with unresolved issues. These will be coordinated through the track access program, with weekly (or more frequently, if necessary) meetings to prioritize access to the alignment for completion of critical activities.
- Additional operations personnel are needed to operate the new line as an extension of the existing light rail line.
- General growth in other transit service areas is needed in order to support growth in rail, fixed-route bus, and paratransit operations well in advance of the commencement of new light rail operations.

Approximately two years before revenue operations, TriMet will designate a Rail Activation Manager. The Rail Activation Manager will be responsible for managing the identification, critical path scheduling, coordination, and progress reporting of all activities directly supporting the commencement of revenue operations. Key coordination is required to manage interfaces. An initial task will involve ensuring that a coordinated training program is implemented.

TriMet and C-TRAN divisions will be involved during start-up. This includes staff from Rail Transportation, Bus Transportation, Transportation Planning, Safety and Security, Rail Maintenance, Facilities Maintenance, and Marketing and Customer Service.

17.4.1 Start-Up Plan

The Rail Activation Manager will convene a Start-up Steering team to oversee the start-up effort. The first priority of the Start-up Steering team will be to guide the development of a comprehensive Start-up Plan. The plan will outline the procedures and policies necessary to activate and operate the light rail line and the key steps (testing, staffing, training, etc.) and timetable required.

Preparation of the Start-up Plan will be the responsibility of the Rail Activation Manager. It will be based on the successful plan and implementation process used on TriMet’s previous start-ups. The plan will be used as a guide during the activation of the rail line and as a reference manual in future operation of the entire route.

The start-up activities program will continue past the date of commencement of revenue operations until all identified open items in the program have been closed.

17.4.2 Start-Up Schedule

The schedule for implementation of the Start-up Plan will be prepared as a separate document, referred to as the “Start-up Schedule.” Functional groupings of start-up activities will be represented. Activity groups will include:

- Completion of construction
- Bus/rail service planning
- Operating budgets programming
- Personnel hiring and training
- Maintenance of facilities/equipment
- System safety and security certification
- Systems activation
- Marketing/customer services/community relations activities

CRC Program transit staff will coordinate closely with TriMet and C-TRAN divisions to prepare the sequence and timing of activities in this Start-up Schedule. The stated sequence and timing of events will be followed closely to meet the established date for the start of revenue service.

17.4.3 Start-Up Target Date

An initial target date for start-up of light rail service will be established early in the overall program scheduling. Progress toward this date will be continually evaluated during the testing and start-up phases. The ultimate decision on the start-up date for revenue service will be made by the TriMet General Manager, in consultation with the CRC Project Director, only after assurance of the system’s safety and reliability. A fundamental requirement for determining the opening date will be the availability of the entire length of the line, including all line segments, operations facility, vehicles, and system elements for a period of approximately four months for purposes of testing, training, and simulated operation. Depending on the actual segment completion dates, the TriMet General Manager, in consultation with the CRC Director, will determine whether certain segments can be operated for either special or demonstration services. Full-revenue rail start-up will be integrated with the existing light rail system and bus service.

17.5. Operations Planning

Rail operations and maintenance plans are described below.

17.5.1 Basic Operating Plan

The basic operating plan for through-line operations, the location of stations, headways required to carry the expected passengers, and other similar information is determined during PE and is set forth in the FEIS.

17.5.2 Rail Activation Plan

The Rail Activation Plan (RAP), consisting of the Start-up Cost Estimate, the Rail Activities Timeline, and the Responsibility Matrix, will define the personnel and training needs required to accomplish the start-up of the CRC light rail line, meeting objectives while maintaining existing service. Changes in the basic operating plan are expected to be made as additional information becomes available regarding ridership levels, vehicle characteristics, legal and regulatory directions, and other factors that may affect the operation.

Rail Transportation team hiring and training needs, organized by time periods, will be set forth in the RAP, including consideration of the continuation of existing service, as well as demands for supporting CRC systems testing and training.

Rail Maintenance and Facilities Maintenance team hiring and training needs, organized by time periods, will be set forth in the RAP. Because of the long lead time for filling skilled-craft positions that require apprenticeship training, hiring efforts for such positions begin from two to four years ahead of start-up. A complete timeline for support to CRC systems testing and for CRC systems training for all involved Rail Maintenance and Facilities Maintenance personnel will also be set forth in the RAP, considering sustainment of all ongoing maintenance activities in continuation of the present service.

17.6. Operations Staffing

Since the CRC light rail line will be physically and operationally an extension of the existing light rail system in Portland, staffing of functions for train operators, maintenance of LRV, and facilities maintenance-of-way will be organized as additions to organizational units within existing TriMet and C-TRAN Operations. Personnel requirements for the start-up and operational phases will be developed as part of the RAP.

17.7. Operations Training

During the start-up phase, an outline of the education and training program for the TriMet and C-TRAN Operations staff will be developed through a combined effort of suppliers, vendors, consultants, and the TriMet/C-TRAN training staff. The training program will ensure that all operations personnel are cross-trained for both existing service and new system components. The training will also reinforce for trainees the importance of the safety of the system to TriMet and C-TRAN staff as well as the public.

TriMet has training programs in place for all rail operations, rail transportation, and maintenance personnel. These training programs will be updated based on recent experience and modified to include any new or unique CRC line features. Specific course requirements, lesson plans, and detailed training materials for the CRC line will be created by TriMet and C-TRAN training staff

with support from the CRC Program engineering staff, equipment suppliers and contractors, and engineering consultants. The training program will be finalized and ready to support the testing and start-up efforts.

Most systems contracts will contain a “train the trainer” program to educate TriMet and C-TRAN supervisory personnel in all details related to the safe operations and maintenance of their respective equipment. Supervisory personnel, initially trained by the contractor, will train other TriMet and C-TRAN personnel who are operating and maintaining equipment related to their disciplines.

Any training provided by contractors or suppliers as requirements of each contract will be the responsibility of that contractor, and coordinated and monitored by the Project Engineer for that contract, with support from the Rail Activation Manager. The training program will include, at a minimum, training manuals and instructor workbooks, and will focus on equipment and components that are new to the TriMet system. TriMet and C-TRAN will be responsible for maintaining and updating the training programs following the completion of initial contractor training.

Further details on the operations and maintenance training program can be found in the LRT System Testing and Start-Up Plan, which is Appendix T to this PMP.

17.8. Spare Parts and Inventory Control

TriMet has established strict procedures for the receipt and storage of all spare parts and material procured, and these procedures will be followed on the CRC Program. The CRC Program’s Transit Construction Manager and Systems Manager will coordinate timing and location for receiving inspections on all incoming material and supplies. Once spare parts are delivered and accepted, the material will be securely stored and issued in accordance with TriMet inventory procedures.

All capital assets procured by TriMet are controlled and managed in accordance with the Office of Management and Budget requirements. The TriMet parts database provides automated materials management that is capable of tracking receipt of goods, inventory accounting, and procurement forecasting.

17.9. Pre-Revenue Operations

The operational testing program—including simulation of regular operations, emergency drills, and other special situations—will be scheduled well before the start of revenue service.

All TriMet rail transportation and maintenance personnel will participate in the operational testing program. For some tests, TriMet and C-TRAN bus employees will be required. Some of the tests will call upon fire, police, and other emergency responders, as well as state highway and utility personnel. Various operating situations will be simulated, and the adequacy of response relative to system security, safety of people, protection of property, and maintenance of service will be measured.

Pre-revenue testing and simulated revenue operations will be performed in accordance with the requirements specified under Section 17.2, System Testing Procedures, Analysis, and Results, of this PMP. The Rail Activation Manager and TriMet and C-TRAN operations staff share responsibility for pre-revenue testing.

In analyzing pre-revenue performance and results, several items will be given consideration:

- Notification procedures
- Security coordination
- Central Control response
- Transportation supervisory response
- Maintenance response
- Police/fire/rescue performance
- Power sectionalization
- Performance of re-railing equipment
- Accident investigation procedures
- Simulated bus substitutions (“bus bridging”)
- Assumption of authority
- Rescue train or Hi-Rail towing dispatch
- Continuation of service
- Simulated public notification
- Single-tracking performance
- State Safety Oversight (SSO) assessment
- Emergency drills
- Safety and security certification

A baseline start-up schedule will be established based on previous start-up experience and current operations.

17.10. Crossing Order Approvals

The Transit Design Manager will coordinate with state and city agencies, including ODOT’s Rail Division and the City of Vancouver, that are responsible for approving and certifying certain safety elements of the LRT system, namely, railroad-type (gates and flashers) grade crossing protection equipment.

17.11. System Opening and Revenue Service

The primary goal of the system testing and start-up program is a revenue service opening that incorporates the lessons learned and builds upon the successes achieved on previous extension startups.

The final decision to open the extension for revenue service will be made by the TriMet General Manager in consultation with the CRC Project Director, only after assurance of the system’s safety and reliability and all necessary testing and training has been completed. That assurance is

made possible by the development, implementation, and management of the system testing and start-up program and cooperation from the many departments within TriMet and C-TRAN, including but not limited to:

- Rail Transportation
- Rail Maintenance
- Capital Projects
- Safety and Security
- Grants Administration
- Transportation Planning
- Marketing/Customer Services
- Elderly and Disabled Access
- Treasury (fare collection)
- Human Resources (hiring and staffing)
- Information Technology
- Bus Operations
- Facilities
- Programs and Communications

In addition, other agencies and groups contribute as partners in completing related improvements and providing oversight throughout the new rail line's progression to startup. This ongoing collaboration ensures the safe and timely integration of new transit services.

17.12. Operations Description

The proposed 2.9-mile CRC light rail extension will be constructed from the north terminus of the Yellow Line (Interstate MAX) at the Expo Center in North Portland to a new terminus at the Central Park and Ride near Clark College in Vancouver, Washington. This Yellow Line extension is currently anticipated to open in 2019.

A detailed description of the MAX service design, including this CRC Yellow Line extension, can be found in the Operating Plan, which is Appendix U to this PMP.

17.12.1 Routing and Frequencies

A detailed description of the MAX routing and frequencies, including this CRC Yellow Line extension, can be found in the Operating Plan, which is Appendix U to this PMP.

17.12.2 Travel Time and Ridership

A detailed description of the MAX travel time and ridership, including this CRC Yellow Line extension, can be found in the Operating Plan, which is Appendix U to this PMP.

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