WILLAMETTE RIVER BASIN REVIEW

PROJECT MANAGEMENT PLAN

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ACRONYMS

1.0 PROJECT BACKGROUND

The U.S. Army Corps of Engineers (Corps) operates a system of thirteen dams and reservoirs in Oregon's Willamette River Basin that provide many benefits to the region and Nation. Although the Willamette Basin covers less than 14% of the state's total land mass, more than 70% of Oregon's residents reside in it. It is the heart of the state's economy. The Willamette River and its tributaries make it possible to support today's population, high levels of agricultural productivity, and a healthy natural environment. Water is the key to sustaining cities and reliable jobs. Water for irrigation enhances the principal role that agriculture plays in Oregon's economy and keeps farming as a feasible vocation for future generations. Fish, vegetation, and wildlife require adequate access to clean water to support all aspects of their natural life cycle. In communities near the reservoirs, recreational uses are an important contribution to local economies. Because water is so important to every resident of the basin, and to other residents in Oregon who rely on a strong economy in the Willamette Valley, the stewardship of its water resources is critical to Oregon's future.

The thirteen federal projects in the middle and upper Willamette Basin were authorized for construction beginning in the late 1930s. Of the thirteen projects, two are re-regulation projects which do not provide significant storage. With a combined summer conservation storage capacity of about 1.6 million acre-feet, the Willamette Project provides important benefits for flood damage reduction, navigation, hydropower, irrigation, water supply, flow augmentation for pollution abatement and improved fishery conditions, and recreation. Of the 1.6 million acre-feet of conservation storage, 72,000 acre-feet of water is currently contracted through Reclamation for irrigation (Corps 2014). Stored water is also used during the conservation season to maintain minimum reservoir releases and summer flows on the mainstem at Albany and Salem. Annual visitation to the reservoirs includes 3.6 million recreation visits to Corps-managed areas, in addition to an estimated 700,000 visits to areas managed by the Forest Service, areas managed by the state of Oregon (including Detroit State Park), and to county parks located along the reservoirs (Corps 2000), which benefits the economy in many nearby communities. Population growth, increasing development, expanding irrigation, and the listing of Upper Willamette River Chinook salmon (Oncorhynchus tshawytscha), steelhead (O. mykiss), Oregon chub (O. crameri) and bull trout (Salvelinus confluentus) under the Endangered Species Act (ESA) are placing new demands on the Willamette reservoirs and could affect project operations.

The Willamette Basin Review Feasibility Study began in June 1996 and was sponsored by the Oregon Water Resources Department (OWRD). The study investigated future water demand in the basin, particularly as related to the operation of the Willamette Project during the summer conservation storage and flow release season. During scoping for the study, it was agreed by the Corps and WRD that modifications investigated for system operational changes must not affect the flood protection aspects of the projects and the system as a whole. Also, construction or modification of structural facilities at the Willamette projects was not under consideration in the alternative scenarios to be developed for the feasibility study. The goals, objectives, time frames, and costs for the feasibility study focused on conservation season-related modifications in accordance with the actions contained in the Water Management Plan for the Willamette Basin, approved by the Water Resources Commission in January 1992. Completion of the feasibility study was delayed pending completion of the ESA consultation for

the Willamette Project. The release of the BiOp in 2008 and study funding in FY14 have allowed the project to resume.

A Surplus Water Supply Letter Report was completed in July 2014. The letter report documents the availability of 437 acre-feet of water from Dorena and Cottage Grove reservoirs combined, for municipal needs in the City of Creswell, located on the Coast Fork Willamette River.

This PMP outlines the plan for completing the feasibility study for allocation of conservation storage in 11 of the 13 reservoirs in Willamette Valley Project.

[To be expanded.]

2.0 PROJECT GOALS

The Willamette River Basin Review study has been scoped to be in conformance with planning modernization initiatives. Under these initiatives, the project will be completed within 3 years of initiation, cost less than $3M (Federal and non-Federal combined), and be coordinated early and often through the USACE vertical team.

Goal 1: Allocate water for a range of beneficial purposes (municipal and industrial, irrigation, and fish and wildlife) without impacting Flood Risk Management. Water uses and needs have changed dramatically since the reservoir system was originally authorized. Congressional approval is required for reallocation of reservoir storage that would significantly affect authorized purposes or would involve major structural or operational changes. The short term and long term future conditions for the Willamette system should be identified, and authorized purposes fully recognized in storage allocations and reservoir operations, such as water supply, irrigation, water quality, and fish and wildlife.

Goal 2: Determine Appropriate Institutional Arrangements. Demands from all uses on the reservoir system will continue to increase and become more complex. The feasibility study will recognize the uncertainties associated with planning for the future and provide flexibility so that institutional constraints do not prevent optimal use of the system in the future. Some institutional changes may be necessary for making current and future allocation decisions and operating the reservoirs to meet changing needs.

3.0 PROJECT DELIVERY TEAM

Eric Stricklin, Project Manager, USACE
Alyssa Mucken, Project Manager, OWRD
Tina Teed, Technical Lead
Mary Karen Scullion, Reservoir Regulation
Kathryn Warner, Water Supply
Cindy Bowline, Hydrology
Salina Hart, Dam Safety
Russ Davidson, Hydropower Analysis Center

TBD, Environmental
TBD, Real Estate
TBD, Economics
TBD, Operations
Scott Clemans, Public Affairs
Amy Gibbons, Plan Formulation

4.0 CRITICAL ASSUMPTIONS AND CONSTRAINTS

- Return flows from existing withdrawals are already accounted for in the model via existing hydrology. Method for determining return flows due to new withdrawals (new uses of stored water) will be developed and the values incorporated into the model via new inflows.
- Model will have summarized points of withdrawal, e.g. at existing control points, and not for each individual demand (municipality, industry, or irrigator).
- No changes to Water Control Diagrams.
- BiOp flows are the necessary flows needed to support ESA listed fish. The two instream flow studies indicate that the flows listed in the BiOp are good estimations for fish flows.
- Current irrigation demands for the year 2050 will be updated.
- Conversion of minimum perennial streamflows (MPSF) to instream water rights will be performed by the State of Oregon at the conclusion of the study
- BiOp water year types will be used for modeling purposes.
- Yield will be determined using the exceedance curves, as used for the BiOp modeling efforts. This assumption will need a policy waiver to support.
- System pricing will be used to determine cost for M&I users. This will require a white paper.
- The Corps will release water to satisfy water contracts or agreements. Any discretionary releases of water will be coordinated with the State of Oregon.
- The existing ResSim model is adequate for modeling purposes. EC-HY will need to verify, specifically if we are looking at availability to the mouth, or downtown of Salem.
- Recreation benefits will be calculated using the unit-day value method.
- Willamette Valley Programmatic Agreement for impacts to cultural and historical resources will meet the requirements of the National Historic Preservation Act for this feasibility study.
- IRRMs will be lifted by the time storage and water is used to the full demands.
- The State of Oregon's Willamette Basin Program severely limits the consumptive use of natural streamflow in sections of the main-stem and most major tributaries during the summer months.

5.0 WORK BREAKDOWN STRUCTURE

The Work Breakdown Structure (WBS) is shown on the next page.

5.1 Work Breakdown Structure Dictionary

The WBS Dictionary describes the WBS individual elements and lists the predecessors and responsible organization for each element. The WBS Dictionary is shown on the next page.

- 1 Congressional Authorization of Reallocation
  - 1.1 Project Coordination
    - 1.1.1 Federal/Sponsor Management
    - 1.1.2 Cost Share Agreement
    - 1.1.3 Change Management
  - 1.2 Feasibility Study
    - 1.2.1 PMP
      - 1.2.1.1 PMP Main Report
      - 1.2.1.2 Risk Register
      - 1.2.1.3 Decision Management
      - 1.2.1.4 Decision Log
      - 1.2.1.5 Review Plan
      - 1.2.1.6 Project Study Issue Checklist
    - 1.2.2 Integrated Feasibility Report & EIS
      - 1.2.2.1 Plan Formulation
        - 1.2.2.1.1 Existing Condition/Affected Environment
        - 1.2.2.1.2 Demands Update
        - 1.2.2.1.3 Future Without Project Condition/No Action Alternative
        - 1.2.2.1.4 Planning Constraints
        - 1.2.2.1.5 Water Supply Alternatives
        - 1.2.2.1.6 Alternatives Screening Criteria
        - 1.2.2.1.7 Impacts to Authorized Purposes/Environmental Consequences
        - 1.2.2.1.8 Trade-off Analysis
      - 1.2.2.2 H&H Analysis
        - 1.2.2.2.1 Res-Sim Model Update
        - 1.2.2.2.2 Update Hydrology
        - 1.2.2.2.3 Baseline
        - 1.2.2.2.4 Yield
        - 1.2.2.2.5 Return Flows
        - 1.2.2.2.6 Climate Change Incorporation
      - 1.2.2.3 Derivation of User Cost
        - 1.2.2.3.1 Benefits/Revenues Foregone
        - 1.2.2.3.2 Replacement Cost
        - 1.2.2.3.3 Updated Cost of Storage
      - 1.2.2.4 Environmental Law Compliance
        - 1.2.2.4.1 Environmental Impact Statement & Record of Decision (ROD) [NEPA]
        - 1.2.2.4.2 Biological Assessment (BA) [ESA]
        - 1.2.2.4.3 Cultural resources Report [NHPA]
        - 1.2.2.4.4 Fish and Wildlife Coordination Act Report [FWCA]
      - 1.2.2.5 Institutional Arrangements
      - 1.2.2.6 Dam Safety Documentation
      - 1.2.2.7 Real Estate Plan
      - 1.2.2.8 QA/QC Reviews
        - 1.2.2.8.1 District Quality Control (DQC)
        - 1.2.2.8.2 Agency Technical Review
        - 1.2.2.8.3 Legal Review
        - 1.2.2.8.4 Type I Independent External Peer Review (IEPR)
      - 1.2.2.9 Value Engineering
    - 1.2.3 Policy Issue Papers
      - 1.2.3.1 System Pricing
      - 1.2.3.2 Recreation
      - 1.2.3.3 Irrigation
      - 1.2.3.4 Model Approvals
    - 1.2.4 Outreach
      - 1.2.4.1 Tribal Coordination
      - 1.2.4.2 Public Coordination
  - 1.3 Chief's Report Submittal Package
    - 1.3.1 Compile and Reproduce

WORK BREAKDOWN STRUCTURE DICTIONARY

WBS Code	WBS Element	Description	Predecessors	Responsibility	Cost Element
1	**CONGRESSIONAL AUTHORIZATION OF REALLOCATION**				
1.1	**PROJECT COORDINATION**				
1.1.1	Federal/Sponsor Management	The Federal and Sponsor project managers coordinate all aspects of the projects. Parts of this element will result in meeting summaries, emails, notes, and other informal documentation.	Project Authority	USACE Project Manager	TBD
1.1.2	Cost Share Agreement	Develop, Amend, and Administer the Feasibility Cost Share Agreement and provisions.	Project Authority	USACE Project Manager	TBD
1.1.3	Change Management	Develop and administer the decision process for documenting changes or deviations from the PMP.	1..2.1 PMP	USACE Project Manager	TBD
1.2	**FEASIBILITY STUDY**				
1.2.1	**PMP**				
1.2.1.1	PMP Main Report	The PMP documents the plan of study for both Federal and non-Federal efforts to complete an integrated feasibility report & EIS for reallocating conservation storage behind the 11 Willamette storage reservoirs.	1.2.1 sub-elements	USACE Project Manager	TBD
1.2.1.2	Risk Register	The risk register documents projects risks and is used to guide the planning decision-making. Information collected includes risks and causes, consequences, likelihood, and PDT discussions & recommendations.	1.2.1.1 PMP Main Report	USACE Project Manager	TBD
1.2.1.3	Decision Management Plan	The DMP describes a strategy for executing the work required to reach the next planning decision by describing what information will be used to make the decision; who will develop that information; how and when will it be developed; and, when the decision will be made. This project is expected to have five DMPs.	1.2.1.1 PMP Main Report	USACE Project Manager	TBD
1.2.1.4	Decision Log	The decision log captures the outcomes of vertical team discussions and agreements.	1.2.1.3 DMP	USACE Project Manager	TBD
1.2.1.5	Review Plan	Review plans are completed in accordance with EC 1165-2-214 as established by WRDA 2007. The plan covers review for the current and/or upcoming phase of work including DQC, ATR, BCOE, IEPR, and Policy and Legal Review.	1.2.1.1 PMP Main Report	USACE Project Manager	TBD
1.2.1.6	Project Study Issue Checklist	The checklist is used to identify policy compliance and to facilitate the early identification and resolution of technical, policy and legal issues via the vertical team.	1.2.1 sub-elements	USACE Project Manager	TBD
1.2.2	**Integrated Feasibility Report & EIS**				
1.2.2.1	Plan Formulation	Plan formulation will document the goals and purpose and need for the project and set project area.	1.2.1 PMP	Planner	TBD
1.2.2.1.1	Existing Conditions / Affected Environment	Document the existing conditions within the project area and area of affect.	Project area and area of effect	Planner	TBD
1.2.2.1.2	Demands Update	The demands for M&I and irrigation water supply and instream fish flows will be updated using current and forecasted values. Forecasts will range from 20-50 years.	Project area	Planner	TBD
1.2.2.1.3	Future Without Project Condition / No Action Alternative	Description of how water supply would or would not be met if the proposed project is not implemented.	1.2.2.1.2	Planner	TBD
1.2.2.1.4	Planning Constraints	Planning constraints will limit the feasible alternatives (i.e., No changes to rule curves.)		Planner	TBD
1.2.2.1.5	Water Supply Alternatives	Water supply alternatives will be developed to meet the irrigation, M&I, and fish flow demands in the project area.	1.2.2.1.2, 1.2.2.1.4	Planner	TBD

1.2.2.1.6	Alternatives Screening Criteria	The screening criteria are used to rank the larger list of alternatives and reduce them to a manageable number for detailed effects analyses.	1.2.2.1.4	Planner	TBD
1.2.2.1.7	Impacts to Authorized Purposes / Environmental Consequences	The short list of alternatives are assessed for their impacts to the authorized purposes of the Willamette Valley Project as well as the environmental criteria required by NEPA.	1.2.2.1.5, 1.2.2.2	Planner	TBD
1.2.2.1.8	Trade-off Analysis	Comparison of the alternatives to determine the tentatively selected plan, or preferred alternative.	1.2.2.1.7	Planner	TBD
1.2.2.2	H&H Analyses	Complete H&H analyses using the selected model, or models, to test the various alternatives. These analyses will be used to assess impacts to authorized purposes and environmental parameters.		Hydraulic Engineer	TBD
1.2.2.2.1	Res-Sim Model Update	Update the existing Willamette Basin Res-Sim model to reflect the needs of the WBR reallocation project.	1.2.2.1 (project area), 1.2.2.2.2	Hydraulic Engineer	TBD
1.2.2.2.2	Update Hydrology	Update and potentially expand the hydrology data set used in the Willamette Basin Res-Sim model originally developed for implementation of the Willamette BiOps.	1.2.2.1 (project area)	Hydrologist	TBD
1.2.2.2.3	Baseline	Develop a baseline model scenario for the WBR reallocation project.	1.2.2.1 (project area), 1.2.2.2.1, 1.2.2.2.2	Hydraulic Engineer	TBD
1.2.2.2.4	Yield	A methodology to determine firm yield and/or reliability of purchased storage will be developed considering the system regulation and annual drafting of the Willamette reservoirs.		Hydraulic Engineer	TBD
1.2.2.2.5	Return Flows	A methodology to determine the percentage of the withdrawal returned to the river from both irrigation and M&I withdrawals.	1.2.2.1 (project area)	Hydrologist	TBD
1.2.2.2.6	Climate Change Incorporation	A methodology to determine and incorporate climate change scenarios into the hydraulic model.	1.2.2.1 (project area)	Hydrologist	TBD
1.2.2.4	Derivation of User Cost	The methodology for determining the cost charged to M&I users for storage in the federal reservoirs.		Economist	TBD
1.2.2.4.1	Benefits/Revenues Foregone	Calculation of benefits or revenues foregone with the selected alternative		Economist	TBD
1.2.2.4.2	Replacement Cost	Calculation of the replacement cost of hydropower if there is an impact due to new allocations.		Economist	TBD
1.2.2.4.3	Updated Cost of Storage	Calculation of the updated cost of storage.		Economist	TBD
1.2.2.5	Environmental Law Compliance	Documentation of compliance with various environmental laws, i.e. Endangered Species Act, National Environmental Policy Act, National Historic Preservation Act, Fish and Wildlife Coordination Act, etc.	1.2.2.1; 1.2.2.2	Environmental Specialist	TBD
1.2.2.5.1	Environmental Impact Statement & Record of Decision (ROD) [NEPA]	Development of the EIS and ROD to support the proposed action of allocations.		Environmental Specialist	TBD
1.2.2.5.2	Biological Assessment (BA) [ESA]	Development of a biological assessment for coordination with NMFS and USFWS.		Environmental Specialist	TBD
1.2.2.5.3	Cultural Resources Report [NHPA]	Documentation of compliance with the National Historic Preservation Act.		Environmental Specialist	TBD
1.2.2.5.4	Fish and Wildlife Coordination Act Report [FWCA]	Documentation of compliance with the Fish and Wildlife Coordination Act.		Environmental Specialist	TBD
1.2.2.6	Institutional Arrangements	The administration of M&I storage agreements by the Water Resources Department will be explored. Legislative authority would likely be needed, along with a memorandum of understanding between the Corps and the OWRD. No changes to the BOR's Water Contracting Program are anticipated.	1.2.1 PMP	Sponsor Project Manager	TBD

1.2.2.7	Dam Safety Documentation	The DSAC ratings will be documented, including any additional coordination with the project sponsor.	1.2.2.1.8 Trade-off Analysis	Dam Safety Engineer	TBD
1.2.2.8	Real Estate Plan	Analysis of the nature and extent of real estate requirements including consideration and identification of the specific interests, estates, and acreage required for the project.	1.2.2.1.8 Trade-off Analysis	Real Estate Specialist	TBD
1.2.2.9	QC/QA Reviews	All USACE products will undergo extensive quality control/quality assurance reviews to ensure project safety, quality, and informed decision making.	1.2 Feasibility Study	USACE Project Manager	TBD
1.2.2.9.1	District Quality Control (DQC)	DQC is the internal quality control process performed by the supervisors, senior staff, peers and the PDT within the Portland District. All aspects of the work will undergo DQC as document in the Review Plan.	1.2.2 Integrated Feasibility Report	Technical Lead	TBD
1.2.2.9.2	Agency Technical Review (ATR)	ATR is conducted by senior USACE personnel outside the Portland District to ensure consistency with established criteria, guidance, procedures, and policy.	1.2.2.9.1 DQC	Technical Lead	TBD
1.2.2.9.3	Legal Review	All documents will be reviewed for their compliance with law and policy. These reviews will culminate in determinations that the recommendations in the report and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher authority.	1.2.2.9.1 DQC	USACE Project Manager	TBD
1.2.2.9.4	Type I Independent External Peer Review (IEPR)	IEPR will be conducted by independent, recognized experts outside USACE selected using the National Academies of Science selection policy. IEPR will be technically focused, not policy oriented.	1.2.2.9 Sub-elements	USACE Project Manager	TBD
1.2.2.10	Value Engineering	A value engineering study shall be performed on the first available document that establishes the functional requirements of the project.	1.2 Feasibility Study	USACE Project Manager	TBD
1.2.3	**Policy Issue Papers**				
1.2.3.1	System Pricing	An issue paper outlining the existing and two alternative system methodologies for pricing M&I storage will be developed and submitted to the OASA(CW) to gain approval for use the Willamette Basin.	1.2.1 PMP	Economist	TBD
1.2.3.2	Recreation	Existing travel cost method (per guidance) model will be evaluated and compared to the more commonly used unit day value methodology. An issue paper outlining use of unit day value methodology would be submitted.	1.2.1 PMP	Economist	TBD
1.2.3.3	Irrigation	Evaluation of USBR irrigation impacts methodology will be evaluated and compared to USACE procedures. If methodologies vary greatly, an issue paper would be submitted.	1.2.1 PMP	Economist	TBD
1.2.3.4	Model Approvals	All models will be evaluated to determine if model approvals or variances are required.	1.2.1 PMP	Economist	TBD
1.2.4	**Outreach**				
1.4.1	Tribal Coordination	Tribal Coordination shall begin early in the project and be conducted in accordance with the PMP.	1.2.1 PMP	USACE Project Manager	TBD
1.4.2	Public Coordination	Public Coordination is a critical component to meeting customer expectations and shall begin with the development of the PMP. Coordination will be conducted in accordance with the PMP.	Project Authority	USACE Project Manager	TBD
1.3	**CHIEF'S REPORT SUBMITTAL PACKAGE**				
1.3.1	Compile and Reproduce	Compile and reproduce all submittal requirements per ER 1105-2-100.	1.2 Feasibility Study	USACE Project Manager	TBD

5.2 Activities

The work breakdown elements are further subdivided into activities to complete the work for which costs may be estimated and durations defined. Activities are identified by their WBS identification number.

1.1.1 Federal/Sponsor Project Management

TBD

1.1.2 Cost Share Agreement

TBD

1.1.3 Change Management

TBD

1.2.1 Project Management Plan

1.2.1.1 Project Management Plan Main Report

TBD

1.2.1.2 Risk Register

TBD

1.2.1.3 Decision Management Plan

TBD

1.2.1.4 Decision Log

TBD

1.2.1.5 Review Plan

TBD

1.2.1.6 Project Study Issue Checklist

TBD

1.2.2 Integrated Feasibility Report and Environmental Impact Statement (EIS)

1.2.2.1 Plan Formulation

1.2.2.1.1 Specify Problems and Opportunities

Problems and opportunities should be defined in terms of their nature, cause, location, dimensions, origin, time frame, and importance.

1. Identify and document planning problems.
2. Identify and document planning opportunities.

1.2.2.1.2 Planning Goals and Objectives/NEPA Purpose and Need

Planning goals are developed directly from the problems and opportunities to provide an overall focus for the planning process. This should be developed in conjunction with the NEPA purpose and need. Any plans formulated that do not meet the goals and purpose and need of the study will not be considered for plan selection.

Objectives are metrics that facilitate plan selection. The objectives inform screening and selection criteria. Objectives should be more specific than goals and should be measurable, realistic and include timing.

The study will need to evaluate, display, and compare alternatives across the 4 Principle and Guideline Accounts (National Economic Development, Environmental Quality, Regional Economic Development, and Other Social Effects) as required under EC 1105-2-409. The most efficient way to ensure compliance with this policy requirement is to include as many of these accounts into the planning objectives as possible. The IWR White Paper "*Issues and Applications in Formulation and Evaluation Considering the 4 P&G Accounts*" provides helpful advice on inclusion of these accounts in the formulation process.

1. Identify and document the planning goals.
2. Identify and document the NEPA purpose and need.
3. Identify and document the planning objectives.

1.2.2.1.3 Existing Condition/Affected Environment

The first step in this effort is to identify the study area. The study area is the area within which significant project impacts will accrue from the use of storage for M&I water supplies, irrigation, and fish and wildlife, including areas that will receive direct benefits and/or incur costs from the provision of water for M&I purposes, irrigation, and fish and wildlife.

The existing condition discussion will fulfill requirements under NEPA to describe the affected environment. It describes the general conditions of the physical, biological, and social environment that may be impacted by implementation of the plan.

1. Survey existing information to identify resources that may be impacted and their current quantity and condition.
2. Identify resources with insufficient information that may require surveys or additional investigation.
3. Assign risks of impact for resources to assist in resource leveling and to focus resources to investigate high risk issues.

1.2.2.1.4 Demand Update

Prepare an analysis of all sources of supply expected to be available to for M&I, irrigation and fish and wildlife purposes. Data may be obtained from various sources, including water utilities, State and local planning agencies, and State water resources agencies. This analysis should be by

time period and include existing water supplies, institutional arrangements, additional water supplies, probability of water supplies, and water quality.

1. Document existing M&I water use and project future M&I water use.
2. Document existing irrigation water use and project future irrigation use.
3. Document existing fish and wildlife water use and project future fish and wildlife use.
4. Complete sector analysis.
5. Complete analysis by time of use.
6. Complete related factors analysis such as identifying determinants of demand for each sector, determine the relationship between existing and expected future levels of water use and determinants of water demand, and aggregation projects.

1.2.2.1.5 Alternative Without Federal Plan/No Action Alternative

Identify alternative plans that are likely to be implemented by communities, industries, and irrigation interests, in the absence of any Federal alternative. Test various alternatives to the Federal plans for acceptability, effectiveness, efficiency and completeness. These plans should be identified through analysis of the total water resources of the region, allowing for present and expected competing uses. Consideration of alternative plans is not limited to those that would completely eliminate the projected gap between supply and demand. Plans that do not completely satisfy water supply objectives should also be considered. Include such plan measures to minimize and allocate shortages when they occur (drought management measures). Balance the increased risk of occasional shortages against savings from lesser investments that would increase the probability of occasional shortages. The costs of shortages include the costs of implementing drought management measures and the costs of related public health and safety measures.

The Alternative Without Federal Plan MUST include the effects of implementing all reasonably expected nonstructural and conservation measures. These measures include: (a) reducing the level and/or altering the time pattern of demand by metering, leak detection and repair, rate structure changes, regulations on use (plumbing codes), education programs, drought contingency planning; (b) modifying management of existing water development and supplies by recycling, reuse, and pressure reduction; and (c) increasing upstream watershed management and conjunctive use of ground and surface waters.

The environmental portion of this discussion will include future changes to the built, natural, and social environment that may impact the decision-making process.

1. Identify the deficit between the future water supplies and use.
2. Identify and document the Alternative Without Federal Plan.
3. Forecast and describe conditions for all resources described in the affected environment.

1.2.2.1.6 Planning Constraints

Planning constraints are issues the effect the range of alternatives that can be considered. An alternative plan that violates a planning constraint should be removed from further consideration. This can include institutional arrangements, probability of water supply, and other project purposes.

1. Identify and document planning constraints.

1.2.2.1.7 Water Supply Alternatives

A Least Cost Analysis is completed for evaluation of the alternative plans. Rank all of the alternatives in order from the highest cost alternative to the lowest costs. Calculate the annualized costs of the alternatives on the basis of service (depreciable life) to the facility or the period of analysis, whichever is less.

Analyze all costs charged to the alternative on the basis of the Federal discount rate, no costs for taxes or insurance should be charged to the alternative; and all other assumptions and procedures used in calculating the costs of the alternatives, including external diseconomies, should be parallel to those employed in calculating the costs for the proposed Federal Project.

1. Identify and document alternative plans.
2. Prepare annualized costs for alternative plans.
3. Rank alternative plans from highest to lowest cost.

1.2.2.1.8 Identify the Most Likely Alternative

Begin identification of the most likely alternative with the least cost. If an alternative with a lesser cost is passed over for a more expensive one, present the justification for not selecting the lower cost alternative.

1. Identify and document the most likely alternative.

1.2.2.1.9 Develop NED benefits

Annualized benefits of the Federal water supply plan are equal to the annualized cost of the most likely alternative. When applicable, the evaluation should reflect differences in treatment, distribution, and other costs compared the most likely alternative.

1. Calculate NED benefits for the Most Likely Alternative.

1.2.2.1.10 Impacts to Authorized Purposes/Environmental Consequences

This analysis will identify impacts to authorized project purposes and describe the anticipated environmental consequences of implementing the most likely plan.

1. Evaluate impacts to authorized purposes.

2. Describe environmental consequences.

1.2.2.2 H&H Tasks and Descriptions

1.2.2.2.1 ResSim Model Update

Extend the model further downstream – currently the model is valid only as far downstream as Salem. The model will need to be extended further downstream with important local inflows captured, for example, such as the Tualatin River, Clackamas River, or Yamhill River. Each new local inflow will be input at the junction of that river or stream with the mainstem Willamette, and each reach (the stretch of the Willamette between each of these points) will need to be calibrated so the timing of the flows passing along that part of the river are appropriate. The reason that the ResSim model needs to be extended is that some of the municipalities interested in obtaining storage from our reservoirs are downstream of Salem and would likely pull their water from below Salem. The bulk of the time of this task will be the calibration of the new reaches.

This specific task breakdown can be summarized by:

1. Input all necessary local stream inflows downstream of Salem.
2. Calibrate each new reach.
3. May be necessary to input Scoggins Dam to the model. Scoggins Dam on Scoggins Creek, a tributary of the Tualatin River, is a Section 7 USBR project in the Willamette Basin and provides irrigation and water supply to some Portland suburb areas and cities. There are a few additional reservoirs in the Willamette Basin that are very small and are non-federal projects, and they will not be added to the model.

1.2.2.2.2 Update Hydrology

The goal of developing another hydrology dataset is to obtain the unregulated inflow at reservoirs and local control points that do not contain irrigation, municipal, or industrial withdrawals or return flows. This set of unregulated hydrology will then be used with current diversion and return flow data (in developing the Base Condition) and to apply future diversion and return flow data (for alternatives).

This specific task breakdown can be summarized by:

1. Review the current local inflows in the POR dataset and clean them up to remove negative values. At a minimum, all negative values could be replaced with minimum flow values.
2. Research appropriate general return flow values for municipal systems. Determine a percent return, any time lags associated with the return, and determine a location of the return flow relative to where the flow is diverted from the system.

3. Research appropriate general return flow values for industrial systems. Determine a percent return, any time lags associated with the return, and determine a location of the return flow relative to where the flow is diverted from the system.
4. Research appropriate general return flow values for irrigation systems. Determine a percent return, any time lags associated with the return, and determine a location of the return flow relative to where the flow is diverted from the system. Since irrigation is likely not used during rain events, develop a methodology to not divert irrigation water during an event, or else to return the flow in full and with no time lag during an event.
5. Obtain historical irrigation use and apply the general irrigation return flow from it (location, time lag, and quantity of return) and incorporate this information back into the hydrology dataset.
6. Obtain municipal and industrial withdrawal amounts and apply the general return flow and incorporate this data back into the hydrology dataset.
7. Expand the local inflow dataset to include points downstream of Salem. These new inflow records need to utilize the same techniques to estimate withdrawals and returns as those flows above Salem were.

1.2.2.2.3 Baseline

Create baseline ResSim model run for the Full Scale Study. The Baseline will be developed through three steps: a) current reservoir operations with BiOp flow targets and no withdrawals and return flows, b) current reservoir operations without BiOp flow targets but with present day withdrawals and return flows, c) current reservoir operations with BiOp flow targets and present day withdrawals and return flows. The PDT will establish which of these cases is considered to be the Base Condition.

This specific task breakdown can be summarized by:

1. Run the ResSim model with the new hydrology flow dataset. This should be done first without inputting withdrawals and return flows, but with BiOp flow targets (case a above). This run will be used to quantify the amount of storage needed to maintain the BiOp flow targets.
2. Run the ResSim model with the new hydrology, no BiOp flow targets (use WCM rules instead), and the present day withdrawals and return flows. This is case b above. This case helps quantify the amount of storage needed for current usage.
3. Run the ResSim model with the new hydrology with the present day withdrawals and return flows included, and the current BiOp flow targets. This is case c above, and this simulation is the Full Scale Study Baseline. This case quantifies the storage in the reservoirs used for BiOp flows and present day withdrawals and returns.
4. Compare all results from headwaters down to Salem to previous the Willamette Basin results from the small scale study to look at overall behavior of reservoirs in low and high water years and verify that operation sets are doing what they are supposed to do.
5. PDT establishes which of these cases is considered to be the Base Condition.

6. Develop a Baseline set of graphs and tables for use with comparisons to other modeling runs described in the Yield and Climate Change Incorporation tasks.

1.2.2.2.4 Yield

Determine the Yield of the Willamette Project. This task will use EM 1110-2-1420 for guidance, but since this is a multi reservoir system with multiple uses authorized, and projects draft to minimum storage on rule curves each year, the calculations will be different than a standard firm yield computation. The HEC program ResSim will be used for some of the analyses, and the program RiverWare will be investigated as a potential use for these calculations. There may be a role for HEC to advise the PDT on developing a suitable methodology for yield, such as utilizing reliability expectations if firm yield cannot be adequately addressed at this time.

The ResSim version 3.2 has been written to calculate the yield through an iterative process, but this option does not work well with reservoir systems like the Willamette that draw down to minimum storage every year for flood control. Basically, the version 3.2 calculates the maximum constant outflow of a project over its period of record of inflows to find the flow that could just be accommodated during the critical period, the years that are the set of driest conditions. This method works for projects that store water from one water year into the next water year, but for a project that lets all of its storage out each year, there is no carry-over water. The traditional calculation of yield for this system would be zero, and earlier trials for ResSim 3.2 produced this result. An additional difficulty with the Willamette Project is that in dry years, the projects do not fill their conservation storage completely.

The Willamette project storage allocations will need to be analyzed with some modifications to this traditional approach, with deference to the established rule curves and desired use of water. There are multiple targets to meet at multiple locations throughout the Willamette Basin, and not all reservoirs can serve all locations. For example, the data from the ResSim analyses, conducted in daily timesteps for the period of record of the new hydrology, can provide storage data as a percent - results might show that a reservoir drops to its minimum storage before the rule curve dictates 5% of the time.

The specific task breakdown can be summarized by:

1. Determine applicability of firm yield methodology to annually drafted reservoirs.
2. Determine capability of existing software programs ResSim and RiverWare.
3. Coordinate vertically for yield versus reliability findings.
4. Develop yield or reliability expectation methodology.

For Cases a), b), and c) described in Task 1.2.2.2.3, determine the yield or the reliability percent:

1. From the Case a Baseline described above, with BiOp flows but no withdrawals and returns, calculate a yield or reliability expectation for the BiOp flow targets.

2. From the Case b Baseline above, without BiOp flows but with present day withdrawals and returns, calculate a yield or reliability expectation for current municipal, industrial, and irrigation use.
3. From the Case c Baseline above, with BiOp flows and with present day use and return of water, calculate a yield or reliability expectation for the current reservoir operations.
4. Determine the future needs for municipal, industrial, and irrigation purposes and express their needs by season or month in terms of flow values. Determine the return flow value and lag time and return location for each of these uses.
5. Write the withdrawals (and associated return flows) into the model with divisions by sub-basin and type of withdrawal and return.
6. Run a ResSim simulation with the future municipal and industrial needs and the new hydrology dataset, and compare the results to those of the Base Condition. Calculate yield or reliability expectations.
7. Run a ResSim simulation with the future irrigation needs and the new hydrology dataset, and compare the results to those of the Base Condition. Calculate yield or reliability expectations.
8. Run a ResSim simulation with the future municipal, industrial, and irrigation needs and the new hydrology dataset, and compare the results to those of the Base Condition. Calculate yield or reliability expectations.
9. Determine if RiverWare should be utilized to refine or improve on the calculation results.

1.2.2.2.5 Climate Change Incorporation

The USACE is now required to assess project impacts from climate change for feasibility studies. In the Willamette Basin, climate change may have an effect on the magnitude and timing of the flows into reservoirs and at local inflow locations. The full scale study is aimed at the year 2050, at which time some of the affects of climate change may already be present. This makes it important to quantify the likely changes to all of the above storage calculations when climate change is factored in.

This specific task breakdown can be summarized by:

1. Investigate the sources of climate change flow records for the Willamette Basin. These sources may be the Columbia River Treaty work ongoing at the COE or university research programs in the Pacific Northwest. Identify the format of the data available to see how it might need to be adjusted for use in this project.
2. Obtain a new hydrology dataset that represents all the same inflow points for a climate change scenario. This may be more than one dataset, since there are multiple parameters to analyze in climate change and results are presented for all parametric changes. The datasets can be bounded by taking the “warmest wettest” dataset and “coolest driest” dataset.

3. With the two bounding datasets, run both climate change hydrology datasets. Use current reservoir operations, BiOp flow targets, and present day withdrawals and returns. Calculate yield or reliability expectations.
4. With the two bounding datasets, run both climate change hydrology datasets. Use future demand and return flow information, along with BiOp flow targets. Calculate yield or reliability expectations.

1.2.2.3 Derivation of User Cost

1.2.2.3.1 Calculate Benefits/Revenues Foregone

This specific task breakdown can be summarized by:

1. Calculate impact to hydropower generation (mwh).
2. Compute value of hydropower generation ($/mwh).
3. Coordinate hydropower results with BPA.
4. Calculate impacts to existing irrigation contracts.
5. Review recreation results from original study.
6. Develop recreation benefits methodology.
7. Calculate recreation benefits for base condition.
8. Calculate recreation benefits/impacts for alternatives.

1.2.2.3.2 Calculate Replacement Cost of Storage

1. Calculate Replacement Cost for lost hydropower.

1.2.2.3.3 Calculate Updated Cost of Storage

TBD

1.2.2.4 Environmental Law Compliance

1.2.2.4.1 National Environmental Policy Act Compliance (Environmental Impact Statement and Record of Decision)

The National Environmental Policy Act requires federal agencies making a decision or action fully disclose all aspects of the project as it relates to the human environment. This task includes all activities necessary for compliance with the NEPA. It is assumed that an Environmental Impact Statement will be required, rather than the condensed Environmental Assessment process.

1. Collect existing information. Sources include, but are not limited to, the 2000 BA and 2007 Supplement BA for Operations of the Willamette Valley Project and the 2008 BiOps from NMFS and USFWS, etc.
2. Conduct public scoping meeting.
3. Draft EIS
4. Complete draft 404(b)(1) analysis.
5. Issue Public Notice

6. Review and respond to comments
7. Finalize EIS and sign ROD.

1.2.2.4.2 Endangered Species Act Compliance

1. Obtain Concurrence/Recommendations from NMFS/ USFWS (informal)
2. Draft NMFS BA (ESA)
3. Prepare Essential Fish Habitat Evaluation
4. Review NMFS BA
5. Finalize NMFS BA
6. Submit NMFS BA for Agency Review
7. Draft USFWS BA (ESA)
8. Review USFWS BA
9. Finalize USFWS BA
10. Submit USFWS BA for Agency Review
11. Review Biological Opinion(s) and prepare response

1.2.2.4.3 National Historic Preservation Act Compliance

1. Site Evaluation
2. Determination of proposed action and coverage under draft PA for Willamette Valley Project.
3. Coordinate with SHPO
4. Complete Section 106 clearances.

1.2.2.4.4 Fish and Wildlife Coordination Act Compliance

1.2.2.5 Institutional Arrangements

1.2.2.5.1 Work with OWRD to develop an agreement for contracting for M&I storage.

1.2.2.5.2 Coordinate with BOR to verify contracting mechanisms for irrigation storage will remain the same.

1.2.2.5.3 Coordinate with OWRD and ODFW to develop institutional arrangements for contracting fish and wildlife storage.

1.2.2.6 Dam Safety Documentation

1. Drawdown & refill rates - There is a maximum rate for each and a site specific rate should be determined to avoid sloughing or stability issues of the embankment and the reservoir rim near the dam.
2. Stability analysis - Analysis based on expected operation. A longer period of not having water on the dam and then refilling increases the concern for the stability.

1.2.2.7 Real Estate Plan

TBD

1.2.2.8 QA/QC Reviews

1.2.2.8.1 District Quality Control (DQC) Review

TBD

1.2.2.8.2 Agency Technical Review

TBD

1.2.2.8.3 Legal Review

TBD

1.2.2.8.4 Type I Independent External Peer Review

The Type I IEPR will be conducted by independent, recognized experts outside USACE selected using the National Academies of Science selection policy and led by the Review Management Organization (RMO) and Planning Center of Expertise (PCX).

1. Initiate IEPR support request.
2. Develop IEPR scope of work.
3. Advertise and award contract to Outside Eligible Organization (OEO).
4. Conduct kickoff meeting with IEPR panel.
5. Coordinate responses to IEPR panel comments.
6. Draft proposed USACE responses for processing through Regional Integration Team (RIT).

1.2.2.9 Value Engineering

TBD

1.2.3 Policy Issue Papers

1.2.3.1 System Pricing

1. Document existing policy on pricing for municipal and industrial water supply from Corps of Engineers reservoirs.
2. Develop three pricing methodologies and their respective costs/benefits.
3. Document the rational for system pricing.

1.2.3.2 Recreation

1. Develop issue paper describing the proposed method for valuation of recreation and why the currently accepted method is not appropriate for the Willamette Valley Project reservoirs.

1.2.3.3 Irrigation

1. Determine if an issue paper is needed to address impacts to irrigation.

1.2.3.4 Model Approvals

1. Determine if model approvals are needed.
2. Develop documentation supporting the use of non-standard model, if needed.

1.2.4 Outreach

1.2.4.1 Tribal Coordination

TBD

1.2.4.2 Public Coordination

TBD

1.3 Chief's Report

1.3.1 Chief's Report Submittal Package

The Chief's Report submittal package triggers a series of Washington-level actions. Appendix H of ER 1105-2-100 and PB 2013-03 reissued 14 March 2014 details the requirements. Below are the major tasks.

1. Draft Proposed Report of the Chief of Engineers.
2. Draft Division Engineer's Transmittal Letter.
3. Draft Sponsor's Support Letter.
4. Draft Report Summary.
5. Develop ASA(CW) Briefing Slides.
6. Compile Checklists and Certifications.
7. Reproduce Submittal Package.

5.3 Responsibility Assignment Matrix

TBD - Insert Table

6.0 SCHEDULE

6.1 Major Milestiones

TBD

6.2 Project Schedule

TBD – Insert Chart

7.0 FUNDING

TBD

8.0 CHANGE MANAGEMENT

Throughout the project process, the schedule and budget of individual tasks developed for the PMP may require adjustments to ensure the overall project goals are achieved. While the project will be managed to comply with the schedule developed for the PMP and within the currently estimated costs, changes may be necessary and must be documented appropriately.

PDT members from every organization will be responsible for bringing changes in scope, schedule and budget to the Project Manager at the time the issue is recognized. The organization originating the change will document the change using the Schedule and Cost Change Request (SACCR) process as outlined in SOP PM-0002, Schedule and Cost Change Request (SACCR) Process. Completed SACCRs will be attached to the PMP and the Project Manager will raise the issue to management and executive teams as appropriate. As much as possible, the Project Manager and Sponsor's representative will make decisions in coordination with their management/supervisory chains. Difficult or highly controversial issues shall be elevated to the Executive Committee for input and resolution.

TBD – Forms and final process

9.0 RISK ANALYSIS

Monthly reviews by the project delivery team of progress and deliverables will assess potential problems and develop appropriate actions. Risk will be minimized through the use of schedules, metrics, the risk register and assignment of specific responsibilities. Contingencies to manage financial risk have been incorporated in the cost estimates for each WBS product, deliverable, or service. Attached is the risk register.

The PDT risk assessment is TBD.

10.0 Communications

<u>Internal</u>

Day-to Day: Internal communications for day-to-day business among team members will be conducted via email and telephone. Meetings will be utilized to update team members of progress and raise and resolve issues and will occur biweekly or as scheduled by the Project Manager or Technical Lead.

General PDT meetings will be conducted by the Project Manager and technical meetings will be conducted by the Technical Lead. Meeting summaries shall be recorded and disseminated by the Technical Lead or Project Manager.

Upward Reporting: Corporate Board briefings will be done by the Project Manager on an as requested basis.

Contractor Correspondence: Correspondence with contractors will be in writing and routed through appropriate offices (Construction, Engineering, Project Management, etc.) and finally to the Contract Administrator.

Lessons Learned: All PDT members will maintain a list of lessons learned throughout the project for documentation and inclusion with organizational assets. This will be completed during the project close-out phase in accordance with District QMS processes (https://w3.nwp.usace.army.mil/QMS/).

External

Communication with federal and state agencies, tribal entities, and stakeholders will be vital to the success of this project.

[*To be expanded.]*

Tribal Coordination

TBD

11.0 Quality Control/Objectives

The quality management plan will be in accordance with current regulations, policies and procedures including those outlined in the following:

- ER 1110-1-12, Quality Management
- EC 1105-2-412, Assuring Quality of Planning Models
- ER 1105-2-100, Planning Guidance Notebook, Appendix H
- ER 1180-1-6, Construction Quality Management
- EC 1165-2-209, Civil Works Review Policy
- PMPB Manual

Roles and Responsibilities

Project Manager: The PM is responsible for coordinating with the customer to establish customer objectives, role(s) and endorsement to provide a quality product and ensuring reviews are completed according to current regulations, policies and the PMP.

PDT: The PDT is responsible for delivering a quality product through monitoring the quality of their own work, ensuring customer quality objectives are clearly articulated and keeping commitments as documented in this plan.

Resource Providers: Resource Providers are responsible for monitoring the products and services produced by their team members or contractors.

WBS products and services shall be reviewed as developed to ensure they meet project and customer objectives, comply with regulatory and engineering guidance and meet customer expectations of quality. Informal reviews shall be documented with meeting minutes. Formal reviews of products consisting of review comments, comment back-checking and review conferences will be performed as scheduled in Tab 6.0. Dr. Checks shall be used to document all formal technical reviews. For products and deliverables prepared by another District, government agency, or A-E firm, the PDT will perform the following QA activities:

- Verify that the appropriate criteria and assumptions were used.
- Verify designers and checkers are same staff as proposed.
- Verify DQC reviewers are same staff as identified in the QCP.
- Ensure DQC is conducted appropriate to the level of complexity of the project.
- Ensure all review comments have been adequately resolved in future submittals.
- Verify the product(s) received satisfies contract requirements.

Review Plan

The project Review Plan will establish an accountable, comprehensive, life-cycle review strategy for products by providing a seamless process for review from initial planning through design, construction, and operation, maintenance, repair, replacement and rehabilitation (OMRR&R). The Review Plan shall be approved by NWD in accordance with current regulations and is attached. The review plan will address any exceptions and document waivers. This project is expected to include:

- District Quality Control/Quality Assurance (DQC)
- Agency Technical Review (ATR)
- Policy and Legal Compliance Review
- Type I Independent External Peer Review

12.0 ACQUISITION STRATEGY

Contract specific acquisition strategies will be developed for each individual contract to be advertised and awarded. Factors to be considered in determining the specific acquisition strategies include but are not limited to technical complexity of the work, whether a construction or a supply/install format will be used, environmental considerations/constraints, construction schedules and magnitude of construction. In addition, maximum consideration will be given to placing contracts with qualified small, small

disadvantaged, and women-owned business concerns in support of the District's Small and Disadvantaged Business Utilization program. Acquisition strategies will be fully staffed through the Project Delivery Team and Office of Counsel and attached here.

TBD

13.0 VALUE MANAGEMENT

The value engineering process will be applied in accordance with Engineer Regulation 1110-2-1150 (http://publications.usace.army.mil/publications/eng-regs/). A value engineering study shall be performed on the first available document that establishes the functional requirements of the project and includes a Microcomputer Aided Cost Engineering System (MCACES) cost estimate. Benefits gained through contractor means and methods shall be captured using the Value Engineering Change Proposal clauses in accordance with FAR 52.248-3. This clause shall be included in all project construction specifications.

TBD – Modified VE Plan

14.0 SAFETY AND OCCUPATIONAL HEALTH

All aspects of this project shall comply with the Portland District Safety Plan. For construction or service contracts, contractors shall submit an Accident Prevention and Site-Specific Safety Plans as identified in the contract specifications; in accordance with EM 385-1-1 (USACE Safety and Health Requirements Manual); and meeting Federal, state and local codes, regulations, and standards. Current plans, manuals and other safety documentation can be found at https://w3.nwp.usace.army.mil/so/.

15.0 CLOSEOUT

Project close out will ensure all products have been delivered, project documents have been completed, and customer expectations have been met. Physical and fiscal completion includes, but is not limited to:

- Turn over all goods, services, products or other deliverables to customers.
- Finalize design documentation report (DDR), As-builts and O&M manuals.
- Complete all close out documents (e.g. post construction reports, transfer documents, reviews, contract quality surveys, contractor evaluations).
- Review and resolve un-liquidated obligations and commitments in CEFMS for project activities. Asset transfer.
- Complete AAR/Lessons Learned.
- Archive documentation.

TBD – FCSA Closeout Activities

14. Environmental

NEPA (National Environmental Policy Act)
It is assumed an Environmental Impact Statement (EIS) will be required to document the NEPA process for the full-scale feasibility study. PM-E will review alternatives and evaluate the environmental and cultural conditions within the study area. It is expected a contractor will be responsible for developing the EIS, including but not limited to compiling existing information and data, evaluating the adequacy of existing information and data, evaluating the effects of the proposed alternatives, and completing a draft EIS.

NHPA(National Historic Preservation Act)
PM-E is currently developing a Programmatic Agreement (PA) with the Oregon State Historic Preservation Office (SHPO) for impacts of current operations of the Willamette Valley Project. It is assumed that this PA will cover actions projected under this feasibility study.

ESA (Endangered Species Act)
PM-E will initiate coordination with resource agencies to confirm degree of consultation necessary and document compliance in the EA.

FWCA (Fish and Wildlife Coordination Act)

- Planning Aid Letter/Coordination Act Report needed
- PM-E will initiate coordination with USFWS to confirm a Planning Aid Letter is sufficient for compliance and document compliance in the EA.

Clean Water Act (Section 401/404)
It is assumed that the project is compliant with the CWA and no 401 certificate or 404(b)(1) analysis will be necessary. Will confirm with Oregon DEQ and document compliance in the EA.

Clean Water Act (Section 402)
It is assumed no NPDES permit will be necessary, as there will not be any ground-disturbing activities and no construction water will be discharged within the study area as a result of this project. Will confirm with Oregon DEQ and document compliance in the EA.

Rivers and Harbors (Section 10)
Not applicable

CERCLA (Comprehensive Environmental Response Compensation and Liabilities Act)
Not applicable

RCRA (Resource Conservation and Recovery Act)
Not applicable

TSCA (Toxic Substances Control Act)
Not applicable

CAA (Clean Air Act)
Not applicable

16. Geospatial DMP

CADD/GIS data will be required. Maps, drawings, etc. Geospatial DMP attached.