



# MEMORANDUM

EUGENE WATER & ELECTRIC BOARD

*Rely on us.*

TO: Commissioners Brown, Carlson, Barofsky, McRae and Schlossberg

FROM: Lisa Krentz, Electric Generation Manager; Mark Zinniker, Generation Engineering Supervisor; and Jeremy Somogye, Generation Engineering Planner IV

DATE: April 5, 2022

SUBJECT: Goal #3(a): Leaburg Canal Triple Bottom Line (TBL) & Strategic Assessment Update

OBJECTIVE: Information and Board Feedback

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## **Issue**

This memo provides an update on our progress toward achieving the 2022 EWEB organizational goal #3(a) to work in collaboration with the Board and the McKenzie Valley Community to set the direction of the Leaburg Hydro Electric Project toward either a power producing asset or a storm water conveyance asset. This memo provides updates to the Triple Bottom Line analysis of EWEB's long-term options, as well as our near-term risk mitigation efforts.

## **Background**

The Leaburg Canal has been operating as a stormwater conveyance facility since October 2018, when observations of internal erosion of the canal embankments prompted EWEB to dewater the canal and cease power generation until the dam safety issue could be resolved. Following subsequent findings that some canal embankments may also present earthquake safety risks, EWEB initiated a comprehensive risk assessment of the entire canal to better understand the level of investment that would be required to ensure long term safe and reliable operation. This assessment indicated that the necessary level of investment would be considerable and the Net Present Value (NPV) for the Leaburg Project would be substantially negative with less than 20 years remaining on the FERC operating license. Based on this understanding, the Board determined that pursuing a rapid return-to-service was not appropriate in the short term. Instead, the Board directed staff to pursue near term risk reduction measures for safe stormwater conveyance while, in parallel, performing a Triple Bottom Line (TBL - social, environmental, and economic) analysis of long-term options. The fundamental long-term options are to pursue a return-to-service/relicensing of the Project or move toward permanent decommissioning of the Project.

EWEB staff continue to advance the development of near-term risk reduction measures, which are needed to ensure safe operation until a long-term plan is implemented. We are working with the consultant team that performed the risk assessment, led by Cornforth Consultants, as discussed below.

In order to provide the Board with information to make an informed selection on the most appropriate long-term path forward by the fourth quarter of 2022, EWEB staff retained a consulting team (led by GEI Consultants) to assist in developing detailed analyses of the social, environmental, and financial impacts of various scenarios. Progress on this effort is detailed in this memo.

## **Near Term Risk Mitigation Action Plan**

Although ceasing operation for power generation at the Leaburg Project has greatly reduced canal safety risks, potential failure modes (PFMs) remain while the canal operates as a stormwater conveyance facility. Due to this, near term risk reduction measures are being developed that focus primarily on addressing the PFMs associated with hydraulic loading from tributary creeks during the wet weather season and storm events. For example, risk reduction measures that address high flows from the larger tributary creeks, such as Johnson Creek and Cogswell Creek, are of particular interest.

Because the ultimate decision on the long-term use of the Leaburg Canal remains under evaluation, near-term risk reduction measures are intended to be flexible by providing value and reducing risk regardless of the ultimate fate of the Leaburg Project, whether it is returned to service or decommissioned and used solely for stormwater conveyance.

The prioritization of near-term risk reduction alternatives is nearly complete and will be finalized in Q2 of 2022. Risk reduction measures will include reversible canal configuration changes, such as isolating portions of the canal from the high flow creeks, and canal-wide efforts, such as proactive removal of unstable upslope vegetation that may obstruct the canal if it were to fall during a storm. In support of risk reduction scenario refinement, EWEB staff and the consultant team are also working on the development of a Drilling Program Plan (DPP) to evaluate critical subsurface conditions. This information will assist with confirming feasibility and necessary scope of design. These geotechnical findings will be of value to both near-term and long-term solutions. The DPP is expected to be completed and submitted to the FERC in late Q3 of 2022.

The value of purchasing “selective” properties adjacent to portions of the canal that provide benefit for future construction associated with both the near-term and long-term risk reduction efforts was also identified in the analysis. EWEB staff will prioritize, monitor, and evaluate if specific property purchases can provide benefit to the implementation of future risk reduction work.

## **Leaburg Canal Long Term Strategic Evaluation**

In tandem with the near-term risk mitigation planning, EWEB staff is continuing to partner with a consultant team to identify and develop feasible long-term alternatives to be evaluated using the TBL criteria. We are considering four (4) alternatives for in-depth analysis, bookended by completely renovating the facility in its existing configuration and decommissioning the facility to pre-project conditions.

EWEB staff and the consultant team completed two (2) workshops to develop, refine, and short-list potential alternatives. Eleven (11) alternatives were initially identified and ultimately narrowed to four (4) options that will be fully evaluated using the TBL and key decision parameters.

The four alternatives that have been selected for further evaluation and will presented to the Board during subsequent progress updates are:

- Decommission by returning site to pre-construction conditions.
- Full facility restoration of existing power generation configuration.
- New hydro powerhouse at Luffman Spillway and conversion to stormwater conveyance downstream of the proposed powerhouse.
- Decommissioning with a combination of storm water conveyance and return to pre-project conditions, including a new spillway at Johnson Creek and modification to the Luffman spillway. This alternative converts short-term risk reduction measures into a long-term solution.

Please see Appendix A for a more detailed description of the above noted alternatives, as well as the alternatives that were not selected for further evaluation.

The consultant team will be developing detailed planning level cost estimates for the short-listed alternatives, and an analysis of triple bottom line considerations for each alternative. Cost estimates will be accompanied by conceptual system layouts and operational descriptions.

Additionally, EWEB's Financial and Power Planning teams are providing critical analysis of the selected alternatives that will better inform the Board's decision. They will build upon consultant-provided information, including operation and maintenance costs, power generation estimates, capital cost ranges, and schedule inputs. The Finance Team will provide a summary of discount rate rationale, recommendations for sensitivity analysis, rate impact estimates, price of power production, and NPV for all scenarios. The Power Planning Team will develop a range of future power pricing for NPV sensitivity, a summary of replacement power considerations for the TBL analysis, and Integrated Resource Plan (IRP) considerations.

### **Outreach Phases, Communications Channels & Project Timeline**

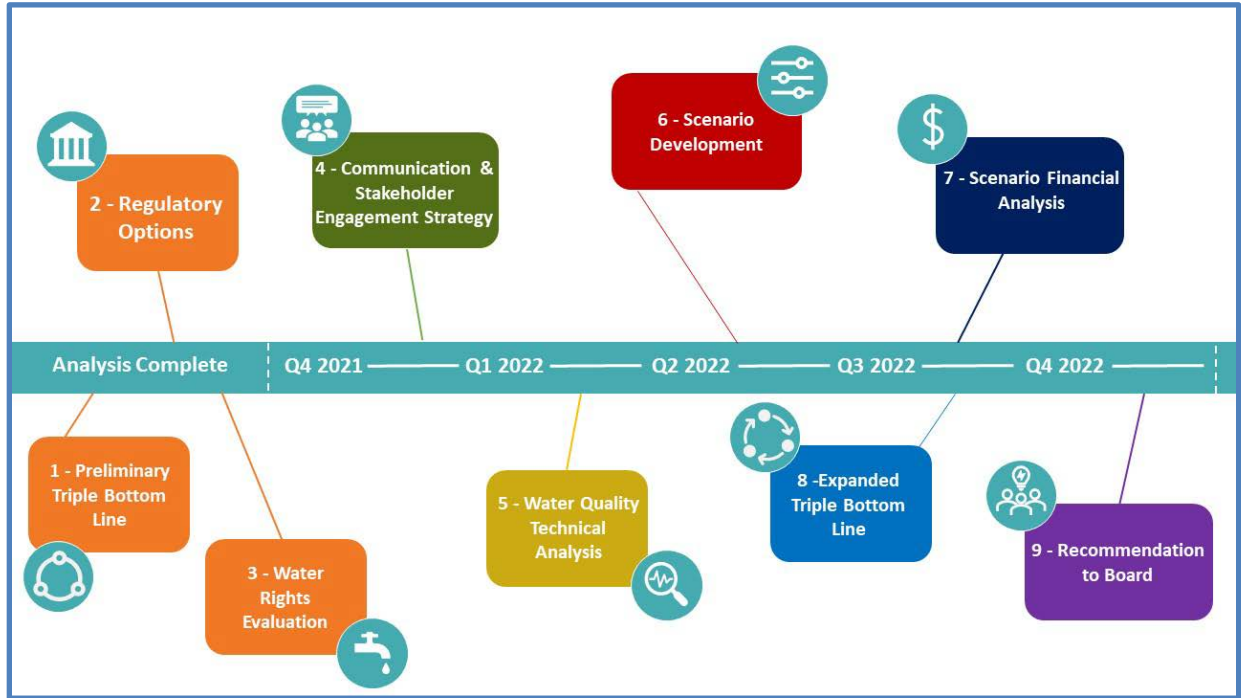
EWEB staff will continue to communicate findings from the strategic evaluation throughout the remainder of 2022. Q2 will focus on in-person meetings to present background information to key stakeholders and gather feedback, as well customer surveys on how they would prioritize the anticipated social impacts. In Q3, we will begin to report back the findings of the expanded TBL assessment and social impact surveys, and in Q4 we will work with the Board to make a decision and determine next steps. The following are highlights of recent and forthcoming outreach efforts:

- EWEB Employee News update – March 17, 2022
- McKenzie River Reflections Advertisement for Upriver Board Meeting – March 17, 2022
- Launch Leaburg Canal Strategic Evaluation Website – March 23, 2022
- Letter to Canal Neighbors providing current update – March 24, 2022
- Email update to river guides and irrigators – March 24, 2022
- McKenzie River Reflections Advertisement for Upriver Board Meeting – March 31, 2022
- Status update press releases to McKenzie River Reflections and Register Guard – April 6, 2022
- McKenzie River Reflections Advertisements for Upriver Board Meeting – April 7<sup>th</sup> & April 14<sup>th</sup>
- McKenzie River Reflections advertisement to thank the residents who attended the Upriver Board Meeting and to provide links to the website and presentations – April 21, 2022

In addition to the public outreach effort detailed above, EWEB staff will provide the Board with routine status updates and TBL analysis for the selected alternatives. We will ask the Board for feedback, questions, and comments at the following Board meetings:

- Upriver Board Meeting – April 19, 2022: Similar update as presented in the April 5<sup>th</sup> Board Memo.
- Special Meeting/Work Session – June 21, 2022: Preliminary TBL results.
- Board Meeting - August 2, 2022: Rough Order of Magnitude costs.
- Board Meeting - October 4, 2022: Summary of draft report.
- Board Meeting - December 6, 2022 (tentative as required): Final report and recommendation.
- Special Meeting/Work Session December 20, 2022 – Board action.

## Project Timeline:



The above pictorial depicts the Leaburg Strategic Evaluation Project timeline at a high level, with the following specific project milestones:

- Scenario Development Workshop – Completed on December 17, 2021
- Scenario Refinement Workshop – Completed on March 9, 2022 (4 alternatives selected)
- Preliminary Cost Review Workshop – May 9, 2022\*
- Preliminary TBL from Consultant – June 8, 2022
- Final Report due from Consultant – November 4, 2022
- Special Board Meeting & Board Action – December 20, 2022

\*Workshop date subject to minor adjustment based on stakeholder schedules

### **Requested Board Action**

No Board action is requested at this time, but we request feedback from both the Board and the public on the proposed approach and information provided to date.

Please contact Lisa Krentz, Mark Zinniker, or Jeremy Somogye with questions.

# **Appendix A**

## **Alternative Scenario Descriptions**

## Description of Alternatives Selected for Further Consideration

The primary considerations that were used to select the alternatives for further evaluation are as follows:

- Upfront capital investment.
- Operational & maintenance (O&M) costs.
- Potential power generation revenues vs. investment and O&M costs.
- Likelihood of economic and regulatory feasibility.
- Preliminary TBL considerations.
- Flexibility to incorporate near-term canal modifications into long-term solution(s) with minimal re-work.
- Retention of hydroelectric generation water rights and the FERC operating license.
- Bookended alternatives that will help define the maximum base-line scenarios from cost, regulatory compliance, and complexity perspectives.

**Decommission by returning the site to pre-construction conditions (Bookend Scenario):** This alternative was selected for further evaluation and consists of returning the site to “pre-construction conditions” to the extent necessary to meet FERC decommissioning and all other regulatory requirements. The Project features, including the dam, canal, and power generating facilities would be entirely removed, and the pre-construction drainage patterns intercepted by the canal would be re-established. The consultant team estimates that there are 8 to 11 drainage pathways that would be routed directly to the river, many of which would require crossing Highway 126. A new access bridge would be required to be constructed in place of Leaburg Dam to provide access to the south side of the river.

**Full facility restoration of existing power generation configuration (Bookend Scenario):** This alternative was selected for further evaluation and consists of a “full facility renewal” to the extent necessary to meet FERC and all other regulatory requirements. The Project features, including the dam, canal intake, canal, and power generating facilities would be rehabilitated and remediated to meet required specifications. The rehabilitated canal embankment would include lining alternatives to reduce seepage and improve slope stability where necessary. Certain reaches, such as the Ames and Cogswell reaches, would be entirely removed and reconstructed to mitigate the identified seismic liquefaction and internal erosion issues. The canal would continue to function as a full-length power canal and the existing intake at the upstream end of the canal would be rehabilitated and maintained.

**New powerhouse near the Luffman Spillway and conversion to stormwater conveyance downstream of the proposed powerhouse:** This alternative was selected for further evaluation and consists of a new powerhouse constructed near the Luffman Spillway (Sta. 66+00), with rehabilitation of the upstream length of the canal to the new powerhouse. The canal downstream of the new Luffman Spillway powerhouse location would be remediated to allow for stormwater conveyance. Due to identified seismic stability and seepage issues, certain reaches like the Cogswell and Ames reaches would be modified to provide adequate stability for stormwater conveyance. Leaburg Dam would be

maintained to continue controlling Leaburg Lake at current levels. The existing intake at the upstream end of the canal would be rehabilitated and maintained.

**Decommissioning with a combination of stormwater conveyance and return to pre-project conditions:** This alternative includes construction of a new spillway at Johnson Creek and modifications to the Luffman spillway. The canal downstream of Luffman spillway would be modified to allow for tributary isolation and stormwater conveyance. Due to identified seismic stability and seepage issues, the Cogswell and Ames reaches would be modified to provide adequate stability in those reaches for stormwater conveyance. Leaburg Dam would be removed, and the McKenzie River would be restored to a "pre-construction" configuration. A new access bridge would replace Leaburg Dam to provide access to the south side of the river. This alternative is a flexible option that converts short-term risk reduction measures that are under consideration into a long-term solution.

### **Description of Alternatives Not Selected for Further Consideration**

In addition to the primary considerations identified above for the selected alternatives, the following issues were also considered when determining which alternatives will not be further evaluated:

- The certainty that doing nothing would be unacceptable to EWEB, the public, and all regulatory stakeholders.
- The presence of significant slope instability and potential land-slide risk near the prospective powerhouse location at Hansen Creek which would require extensive mitigation.
- The limited power production revenues vs. overall investment and O&M cost for the close-coupled power generation alternatives.
- The high uncertainty of accomplishing intergovernmental partnerships for funding, obtaining the necessary non-hydroelectric water rights, and successfully completing a jurisdictional transfer of the canal to another entity for use as an environmental amenity.
- The high likelihood that long term use of portions of the canal system for stormwater conveyance will be regulatorily acceptable/preferred over returning the Project to pre-construction conditions.

**Do Nothing:** Taking no action and leaving the project facilities in their current condition was not selected as an alternative for further evaluation as it does not meet the requirements of EWEB organizational goal #3 to *work in collaboration with the Board and the McKenzie Valley Community to set the direction of the Leaburg Hydro Electric Project toward either a safe and reliable power producing asset or a safe and reliable stormwater conveyance asset.*

**New powerhouse at Luffman Spillway and canal returned to pre-construction conditions downstream of the proposed powerhouse:** This alternative consists of a new powerhouse constructed at Luffman Spillway (Sta. 66+00), with rehabilitation of the upstream length of the canal to the new powerhouse and full decommissioning of the canal length downstream of the new powerhouse. The portion of canal extending downstream of the newly constructed powerhouse would be entirely decommissioned, i.e. cut and filled to match the grade adjacent to the canal, to the extent possible, prior

to construction, and the pre-construction drainage patterns intercepted by the canal would be re-established. There are 6 to 9 drainage pathways that would be routed directly to the river, many of which would require crossing Highway 126. Leaburg Dam would be maintained to continue controlling Leaburg Lake at current levels. The existing intake at the upstream end of the canal would be rehabilitated and maintained.

**New powerhouse at Hansen Creek and stormwater conveyance downstream of the proposed powerhouse:** This alternative consists of a new powerhouse constructed at Hansen Creek (Sta 151+60), with rehabilitation of the upstream length of the canal to the new powerhouse. The canal downstream of the new powerhouse will remain in service to allow for stormwater conveyance. The rehabilitated canal embankment upstream of the new powerhouse at Sta 151+60 would include lining alternatives to reduce seepage and improve slope stability. The portion of canal extending downstream of the newly constructed powerhouse would be maintained to be used for stormwater conveyance. Due to identified seismic stability and seepage issues, the Cogswell and Ames reaches would be modified to provide adequate stability in those reaches for stormwater conveyance. The Cogswell Reach would be reconstructed and lined upstream of the new powerhouse. Leaburg Dam would be maintained to continue controlling Leaburg Lake at current levels. The existing intake at the upstream end of the canal would be rehabilitated and maintained.

**New powerhouse at Hansen Creek and canal returned to pre-construction conditions downstream of the proposed powerhouse:** This alternative consists of a new powerhouse constructed at Hansen Creek (Sta 151+60), with rehabilitation of the upstream length of the canal to the new powerhouse. The portion of canal extending downstream of the newly constructed powerhouse would be entirely decommissioned, i.e. cut and filled to match the grade adjacent to the canal, to the extent possible, and the pre-construction drainage patterns intercepted by the canal would be re-established. Leaburg Dam would be maintained to continue controlling Leaburg Lake at current levels. The existing intake at the upstream end of the canal would be rehabilitated and maintained.

**Close-coupled powerhouse at Leaburg Dam with stormwater conveyance downstream of the proposed powerhouse:** This alternative consists of a new close-coupled powerhouse constructed at Leaburg Dam, with rehabilitation of the immediate upstream length of the canal to the new powerhouse. The remaining portion of the canal downstream of the new powerhouse will be modified to allow for stormwater conveyance. Due to identified seismic stability and seepage issues, the Cogswell and Ames reaches would be modified to provide adequate stability in those reaches for stormwater conveyance. Leaburg Dam would be maintained to continue controlling Leaburg Lake at current levels. The existing intake at the upstream end of the canal would be rehabilitated and maintained.

**Close-coupled powerhouse at Leaburg Dam with canal returned to pre-construction conditions downstream of proposed powerhouse:** This alternative consists of a new close-coupled powerhouse constructed at Leaburg Dam and decommissioning of the canal length downstream of the new powerhouse. The portion of canal extending downstream of the newly constructed close-coupled powerhouse would be entirely decommissioned, i.e. cut and filled to match the grade adjacent to the canal, to the extent possible, prior to construction. A drainage plan would be developed for this

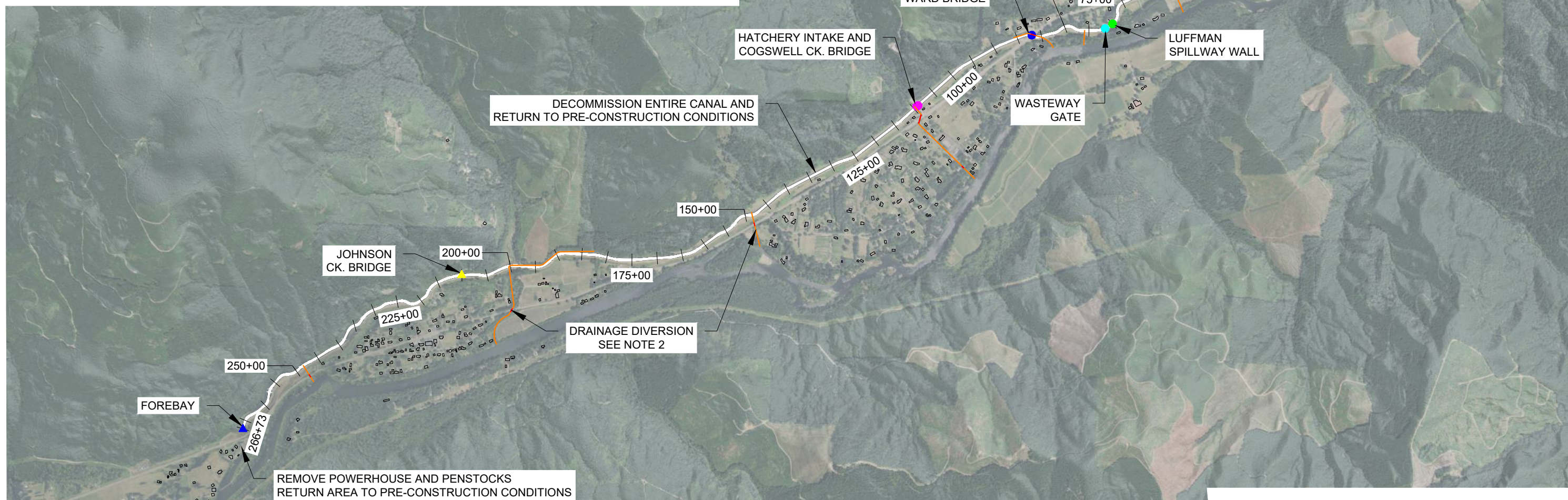


alternative to allow for previous runoff into Leaburg Canal to return to the McKenzie River. There are 8 to 11 drainage pathways that would be routed directly to the river for this alternative, many of which would require crossing Highway 126. Leaburg Dam would be maintained to continue controlling Leaburg Lake at current levels. The existing intake at the upstream end of the canal would be rehabilitated and maintained.

**Canal converted into an environmental amenity:** This alternative consists of the canal being converted into an environmental amenity through removing the existing powerhouse and penstocks and rehabilitating portions of embankment along the length of the canal. The existing powerhouse and penstocks located at the end of Leaburg Canal would be removed or decommissioned. The remaining existing canal would be maintained to continue to route runoff and convey a limited amount of flow from the McKenzie River (less than 100 cfs compared to up to 2,500 cfs for power generation). Due to identified seismic stability and seepage issues, certain reaches such as the Cogswell and Ames reaches would be removed and reconstructed to provide adequate stability. No lining alternatives would be constructed within the canal. Leaburg Dam would be maintained to continue controlling Leaburg Lake at current levels. The existing intake at the upstream end of the canal would be modified for the proposed use as a low flow diversion. This alternative would allow for continued water conveyance to the McKenzie fish hatchery and irrigators as well as other environmental uses of the canal, such as serving as a fish rearing habitat and possibly spawning habitat. This alternative would require a highly unlikely permanent transfer of the canal to a partnering State or Federal agency for ongoing operation and maintenance.

**OVERVIEW TABLE**

REACH	START STA.	END STA.	MAJOR STRUCTURES	STA.	INDICATION
LEABURG INTAKE	1+66	9+00	CANAL INTAKE	1+66	●
LURE LN.	9+00	61+00	FISH SCREENS	6+00	●
MONTGOMERY CREEK	61+00	82+00	LUFFMAN SPILLWAY WALL	65+00	●
WARD CREEK	82+00	103+00	WASTEWAY GATE	66+75	●
COGSWELL CREEK	103+00	125+00	OR 126/WARD BRIDGE	82+00	●
GREENWOOD	125+00	147+50	HATCHERY INTAKE	109+00	●
HANSEN CREEK	147+50	186+00	COGSWELL CREEK BRIDGE	109+25	●
JOHNSON CREEK	186+00	208+00	JOHNSON CREEK BRIDGE	210+00	▲
AMES	208+00	247+50	FOREBAY	266+70	▲
FOREBAY	247+50	266+70			



**NOTES:**

- PROJECT FUNCTIONS AS A NATURAL DRAINAGE WITH CANAL GRADING RETURNED TO PRE-CONSTRUCTION CONDITIONS. REMOVE POWERHOUSE AND PENSTOCKS AND RETURN AREA TO PRE-CONSTRUCTION CONDITIONS. DECOMMISSION ENTIRE CANAL AND RETURN TO PRE-CONSTRUCTION CONDITIONS. NO LINING OF CANAL. REMOVE DAM AND RESTORE RIVER TO "PRE-CONSTRUCTION" CONFIGURATION. CONSTRUCT BRIDGE TO PROVIDE ACCESS. REMOVE INTAKE AND RESTORE TO PRE-CONSTRUCTION CONFIGURATION.
- SEE FIGURES 14 AND 15 FOR A DETAILED LAYOUT OF THE DRAINAGE DIVERSION FOR A FULL CANAL DECOMMISSION.

**SOURCE:**

- PLAN BASED ON MAP PREPARED BY CORNFORTH CONSULTANTS.

**LEGEND:**

▭ FULL CANAL REMOVAL

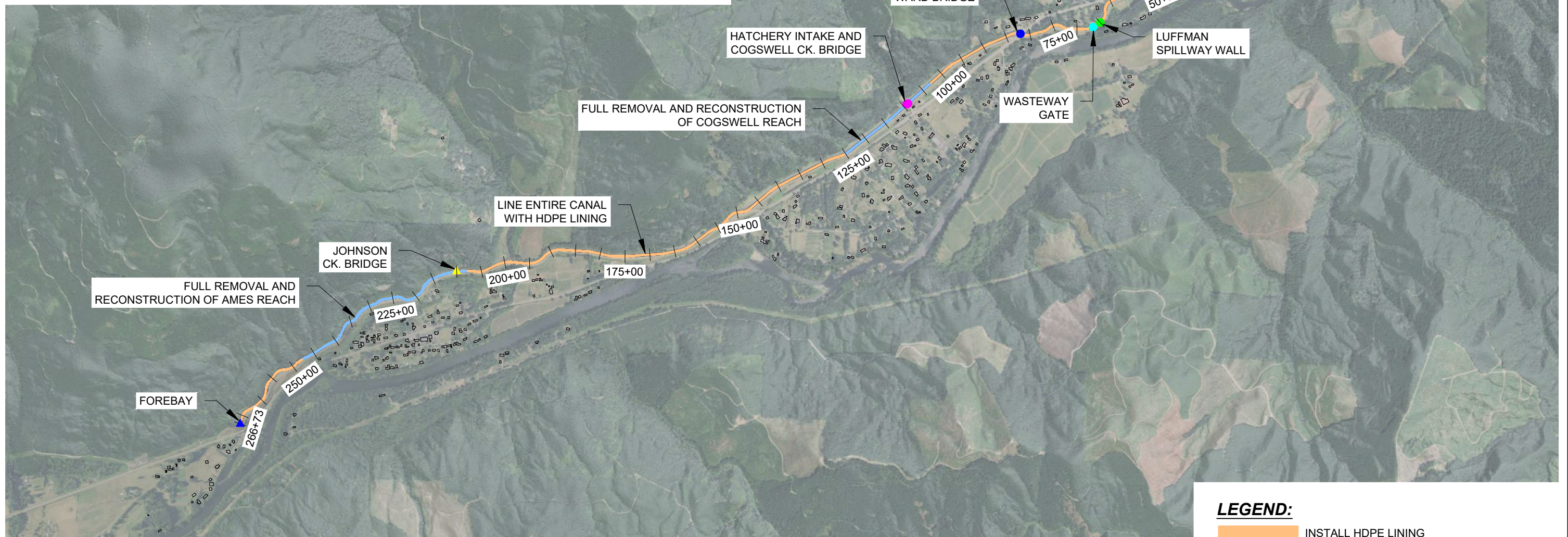


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Not Issued for Construction

Strategic Evaluation of Leaburg-Waltermville Hydroelectric Project Leaburg, OR  Eugene Water & Electric Board Eugene, OR		ALTERNATIVE 1 RETURN SITE TO PRECONSTRUCTION
		Project 2104273    March 2022    Fig. 1

**OVERVIEW TABLE**

REACH	START STA.	END STA.	MAJOR STRUCTURES	STA.	INDICATION
LEABURG INTAKE	1+66	9+00	CANAL INTAKE	1+66	●
LURE LN.	9+00	61+00	FISH SCREENS	6+00	●
MONTGOMERY CREEK	61+00	82+00	LUFFMAN SPILLWAY WALL	65+00	●
WARD CREEK	82+00	103+00	WASTEWAY GATE	66+75	●
COGSWELL CREEK	103+00	125+00	OR 126/WARD BRIDGE	82+00	●
GREENWOOD	125+00	147+50	HATCHERY INTAKE	109+00	●
HANSEN CREEK	147+50	186+00	COGSWELL CREEK BRIDGE	109+25	●
JOHNSON CREEK	186+00	208+00	JOHNSON CREEK BRIDGE	210+00	▲
AMES	208+00	247+50	FOREBAY	266+70	▲
FOREBAY	247+50	266+70			



**LEGEND:**

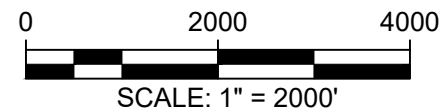
- INSTALL HDPE LINING
- FULL REMOVAL AND RECONSTRUCTION

**NOTES:**


1. PROJECT FUNCTIONS AS A FULL LENGTH HYDRO CANAL WITH STORMWATER DIVERSION CAPABILITIES. MAINTAIN EXISTING POWERHOUSE. FULL REMOVAL AND RECONSTRUCTION OF AMES AND COGSWELL REACHES. HDPE LINING OF CANAL. MAINTAIN DAM TO CONTROL LEABURG LAKE AT CURRENT LEVELS. MAINTAIN EXISTING INTAKE CONFIGURATION.

**SOURCE:**

1. PLAN BASED ON MAP PREPARED BY CORNFORTH CONSULTANTS.

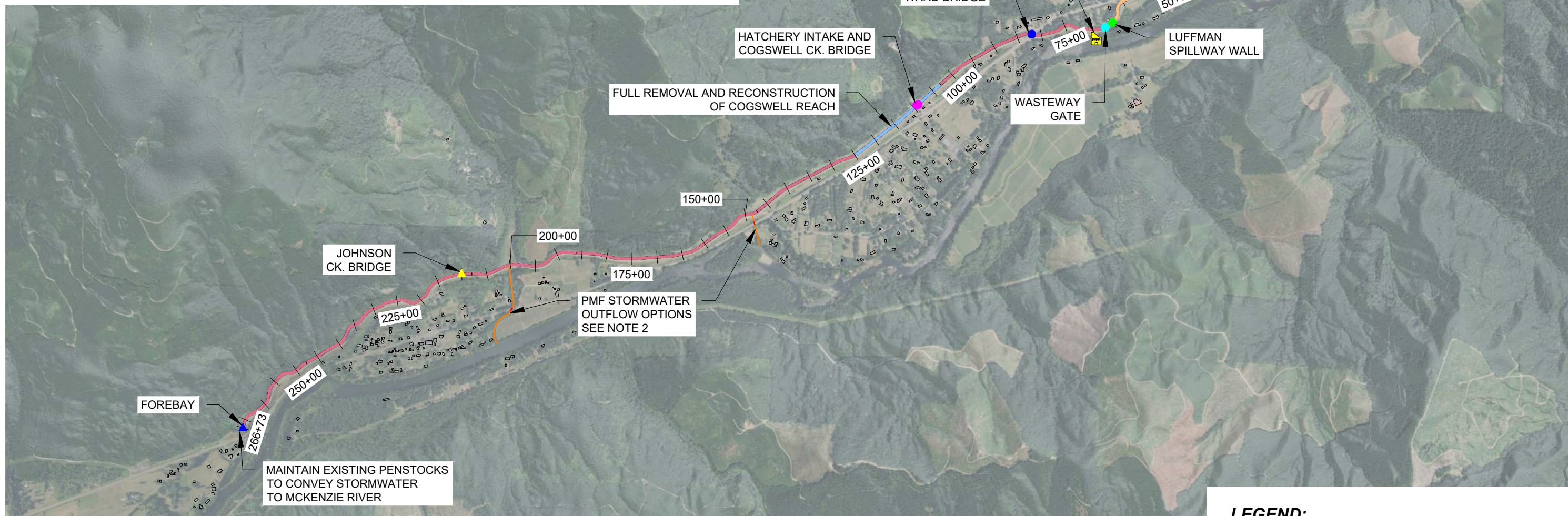


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Strategic Evaluation of Leaburg-Walterville Hydroelectric Project Leaburg, OR		ALTERNATIVE 2 FULL FACILITY RENEWAL	
Eugene Water & Electric Board Eugene, OR		Project 2104273 March 2022	Fig. 2

**OVERVIEW TABLE**

REACH	START STA.	END STA.	MAJOR STRUCTURES	STA.	INDICATION
LEABURG INTAKE	1+66	9+00	CANAL INTAKE	1+66	●
LURE LN.	9+00	61+00	FISH SCREENS	6+00	●
MONTGOMERY CREEK	61+00	82+00	LUFFMAN SPILLWAY WALL	65+00	●
WARD CREEK	82+00	103+00	WASTEWAY GATE	66+75	●
COGSWELL CREEK	103+00	125+00	OR 126/WARD BRIDGE	82+00	●
GREENWOOD	125+00	147+50	HATCHERY INTAKE	109+00	●
HANSEN CREEK	147+50	186+00	COGSWELL CREEK BRIDGE	109+25	●
JOHNSON CREEK	186+00	208+00	JOHNSON CREEK BRIDGE	210+00	▲
AMES	208+00	247+50	FOREBAY	266+70	▲
FOREBAY	247+50	266+70			




- NOTES:**
- PROJECT FUNCTIONS AS A PARTIAL LENGTH HYDRO CANAL WITH STORMWATER DIVERSION CAPABILITIES. CONSTRUCT A NEW POWERHOUSE AT LUFFMAN SPILLWAY (STA. 66+00). LINE UPSTREAM PORTION OF CANAL TO NEW HYDRO TURNOUT. FULL REMOVAL AND RECONSTRUCTION OF COGSWELL REACH. HDPE LINING OF CANAL. MAINTAIN DAM CONTROL LEABURG LAKE AT CURRENT LEVELS. MAINTAIN EXISTING INTAKE CONFIGURATION AND REHABILITATE.
  - SEE FIGURES 14 AND 15 FOR A DETAILED LAYOUT OF ALL DRAINAGE OPTIONS.

**SOURCE:**  
1. PLAN BASED ON MAP PREPARED BY CORNFORTH CONSULTANTS.



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Strategic Evaluation of Leaburg-Waltermville Hydroelectric Project Leaburg, OR  Eugene Water & Electric Board Eugene, OR		ALTERNATIVE 3 LUFFMAN SPILLWAY POWERHOUSE & DOWNSTREAM RECONSTRUCTION
		Project 2104273    March 2022    Fig. 3

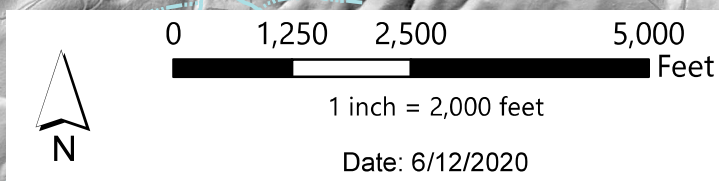
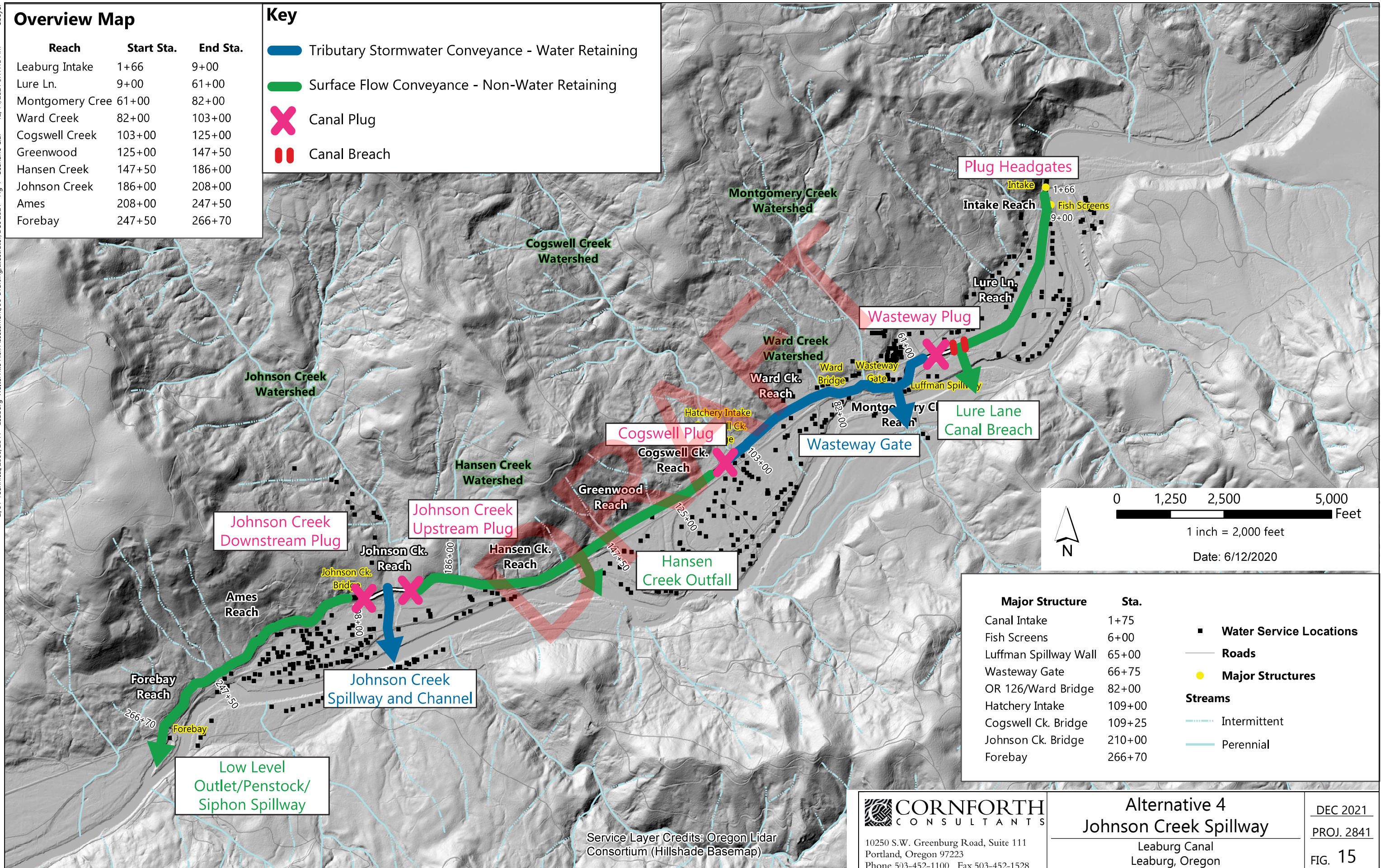
L:\01-Technical\2800\2841 - Leaburg-Walterville Risk Assessment\90-Drafting\Illustrator\Dec 2021 - Fig 4 - Scenario Cai ebeyer 12/14/2021 9:17:15 AM

### Overview Map

Reach	Start Sta.	End Sta.
Leaburg Intake	1+66	9+00
Lure Ln.	9+00	61+00
Montgomery Cree	61+00	82+00
Ward Creek	82+00	103+00
Cogswell Creek	103+00	125+00
Greenwood	125+00	147+50
Hansen Creek	147+50	186+00
Johnson Creek	186+00	208+00
Ames	208+00	247+50
Forebay	247+50	266+70

### Key

- ▬ Tributary Stormwater Conveyance - Water Retaining
- ▬ Surface Flow Conveyance - Non-Water Retaining
- ✕ Canal Plug
- ▬▬ Canal Breach



Major Structure	Sta.	
Canal Intake	1+75	■ Water Service Locations
Fish Screens	6+00	— Roads
Luffman Spillway Wall	65+00	● Major Structures
Wasteway Gate	66+75	<span style="color: blue;">▬▬▬</span> Streams
OR 126/Ward Bridge	82+00	▬▬▬ Intermittent
Hatchery Intake	109+00	▬▬▬ Perennial
Cogswell Ck. Bridge	109+25	
Johnson Ck. Bridge	210+00	
Forebay	266+70	

Service Layer Credits: Oregon Lidar Consortium (Hillshade Basemap)

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 Phone 503-452-1100 Fax 503-452-1528

**Alternative 4  
 Johnson Creek Spillway**  
 Leaburg Canal  
 Leaburg, Oregon

DEC 2021  
 PROJ. 2841  
 FIG. 15