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: October 6, 2022

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

OBJECTIVE: Informational / Direction

Memoranda Formatting

Due to the extensive amount of information included in this update, staff has formatted the memorandum to assist your review with color-coded text to distinguish between information that was previously shared, new information, and what has changed since the past update, as follows:

- Black Text is new information that has not been presented to the Board previously
- Blue Text signifies information that has been provided in past correspondence but remains herein for context and reference.
- **Bold Purple Text** signifies data and values, primarily depicted in tables, that have been updated since past briefings based on refined analysis.

Issue

This memo provides an update on our progress toward achieving the 2022 EWEB organizational goal #3a 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 the draft Triple Bottom Line Analysis (TBL) of EWEB's long term options and contains most of the information that will be included in the final TBL report. Community feedback and further sensitivity analysis are still in progress, along with additional Board discussion and deliberations; therefore, this draft report does not provide final results or a management recommendation. However, it is useful in considering trade-offs between alternatives. The final TBL report will be submitted to the Board in mid-November.

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, pursuing a rapid return-to-service (RTS) was not considered 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.

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 (GEI Consultants, Harvey Economics, Cornforth Consulting) to assist in developing detailed analyses of the social, environmental, and financial impacts of various scenarios. Current results from this effort are detailed in this memo.

Eleven alternatives were initially identified and ultimately narrowed to four options that will be fully evaluated using the TBL and key decision parameters. The four alternatives that have been selected for detailed TBL analysis are:

- **Alternative 1 – Decommission to Pre-Project:** Return site to pre-project conditions
- **Alternative 2 – Full Return to Service:** Full facility restoration of existing power generation configuration
- **Alternative 3 – Partial Return to Service:** New hydro powerhouse at Luffman Spillway and conversion to stormwater conveyance downstream of the proposed powerhouse
- **Alternative 4 – Decommission to SWC:** Combination of decommissioning to storm water conveyance (SWC) and return to pre-project conditions

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

Triple Bottom Line Assessment Overview

A Triple Bottom Line (TBL) analysis is a comparative assessment and decision-making tool typically applied in complex circumstances when the outcome of a selection among options has significant and broad consequences. The theoretical foundation for this tool is that improved decision-making will result if the full spectrum of issues are objectively and comprehensively considered. Harvey Economics (HE), the consultant leading the TBL analysis, has provided their draft TBL Report, the highlights of which are summarized in the following sections.

Methods and Information Sources

Information for the TBL analysis was gathered through multiple means, including:

- Workshops with EWEB and consultant staff
- Review of the preliminary Leaburg analysis and TBL report developed by EWEB in 2021
- Review of notes from public meetings (still in process)
- Review of results from public outreach surveys (still in process)
- Secondary source research
- Structured interviews with EWEB Subject Matter Experts (SME)

HE's TBL framework was reviewed with a broad group of EWEB staff to ensure comprehensive inclusion of potential effects and public input.

The following caveats and limitations should be kept in mind when reviewing the TBL analysis:

- The TBL is limited to the four proposed alternatives and does not consider a blending of the four options or solutions that were not selected for further evaluation
- Electric power pricing projections are subject to a high level of uncertainty due to EWEB being in the early stages of the Integrated Resource Plan (IRP) process
- Relative impacts from TBL categories were derived from EWEB SMEs, stakeholder group feedback, upriver listening sessions and social impact surveys that were not designed for statistical confidence intervals
- The TBL is a comparative analysis and not a feasibility study

Public Outreach

The EWEB Communications team and project staff have completed substantial public outreach to date and continue to inform the public about the status of the Leaburg Canal evaluation. A highlight of work completed to date includes:

- EWEB Employee News update – 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
- Status update press releases to McKenzie River Reflections and Register Guard – April 6, 2022
- Social impact survey launched – June 15, 2022
- Update letter to Canal Neighbors providing an invitation to participate in the survey – July 1, 2022
- Upriver listening sessions (6 completed)
- Listening sessions held at the ROC and Via MS Teams (2 completed to date)
- Directed outreach to the local Tribal Community
- Media Tour of the LB Canal, Cogswell Reach
- Notification of project status and social impact survey availability distributed in September customer billing

Forthcoming and ongoing outreach includes:

- In-town listening sessions at the ROC
- Webinar Information and Q&A Sessions
- Periodic advertisements and press releases in the McKenzie River Reflections, Eugene Weekly and Register Guard
- Routine updates to the hatchery stakeholders (U.S. Army Corps of Engineers, NOAA Fisheries and Oregon Department of Fish & Wildlife)

TBL Attributes

HE gathered input from EWEB staff, consultants, and public stakeholders to compile a master list of issues and organized them into TBL attribute categories. The categories considered in the TBL analysis are shown below in Table 1:

Table 1: Triple Bottom Attributes		
Social	**Environmental**	**Economic**
• Public Safety • Local Economic Activity • Wildfire Response / Mitigation • Social Justice • Environmental Justice • Recreation • Cultural / Historical Resources • Visual / Aesthetics • Domestic Groundwater Wells • Surface Water Supplies • Local Community Property Values • Fish Hatcheries • Local Transportation Networks • Noise Levels	• Water Quality – McKenzie River • Aquatic Resources • Carbon Footprint • Terrestrial / Avian Species Wetlands • Vegetation	• Project Cost / Rate Impacts • Financing and Bond Rating Impacts • Power Price Risk Reduction (via EWEB owned generation)

Attribute Scoring Approach

A scoring system was developed to define the relative impact of each attribute for each alternative in relation to current conditions. This approach allows attributes to be considered individually within the context of each alternative.

Comparative scoring ranges from +5 to -5. If the effect is significant, a score of +5 or -5 is assigned. If the effect is minor, the attribute will be assigned a +1 or -1. The range for negative effects relative to current conditions is -5 to -1. A score of -5 represents a major negative effect and -1 represents a minor negative effect, comparatively. The range for positive effects relative to current conditions is +5 to +1. A score of +5 denotes a major positive impact, while +1 denotes a minor positive impact, comparatively. A score of zero means no effect from the alternative for that attribute. For example, looking at project costs/rate impacts, Alternative 1 receives a score of -5 while Alternative 3 gets a score of -2. Project costs are highest for Alternative 1 and lowest for Alternative 3. While this attribute is relatively straightforward, many other attributes have more complexity and needed to be carefully considered with regards to scoring.

The scores for each attribute and for each Leaburg Canal alternative are based upon factual information gathered by the consultant and project team. Impact assessments for the economic category were based primarily on a quantitative analysis, whereas assessments for the environmental and social impacts were primarily determined qualitatively.

In mid-June, the consultant conducted a preliminary TBL workshop with EWEB staff to review the preliminary results. Based on the feedback, HE made minor revisions to the TBL. However, EWEB staff generally agreed with the scoring approach.

Social Impact Assessment

The social impact assessment scores were devised using input from EWEB SME's and public comments that have been received to date (outreach events, survey results, and direct contact). Table 2 shows some examples of the considerations used as inputs to their respective assessment scores.

Table 2: Social Impact Assessment Considerations	
Attribute	**Considerations**
Public Safety	• Landslides / Slope Stability • Breach Flooding • Canal Safety
Local Economic Activity	• Construction Employment, Income, Benefits • Recreation Economy • Commercial Irrigator Operations • EWEB Employment – Local Operators • Property Values / Tax Revenues
Wildfire Response /Mitigation	• Canal / Lake Availability for Water • Canal as a Fire-Break
Social Justice	• Rate Payer Impacts • Rural and Underserved Community Impacts
Environmental Justice	• River Restoration Impacts
Recreation	• Changes in Local Recreational Opportunities • Boating / Fishing on Leaburg Lake • Boating / Fishing Downstream of Dam • Hiking / Walking on Canal Trail
Cultural / Historical Resources	• Tribal Resources • Project Facilities on National Historical Registry
Visual / Aesthetics	• Change from Current Conditions o At Leaburg Lake o Along the Canal • Impacts Near Luffman Spillway (New Powerhouse)
Domestic Groundwater Wells	• Shallow Well impacts
Surface Water Supplies	• Impacts to those with and without EWEB Agreements
Local Community Property Values	• Lake vs. River Frontage • Impacts of Canal Configuration
Local Transportation Networks	• Leaburg Bridge Impacts • Construction Phase Traffic (Detours, Delays) • Operational Phase Traffic
Noise Levels	• Construction Activities • Operational Activities

The social impact assessment evaluates effects to stakeholders, such as customers or community members, and to the resources or conditions that those stakeholders value. The TBL considers a large number of social attributes and compares how those attributes are affected by the alternatives relative to current conditions. The following sections provide a description of each attribute and key differences in impacts between the alternatives that affects their scoring.

Public safety – This attribute addresses human safety associated with local landslides, slope stability related to canal embankments, canal breach flooding and other canal safety issues that pose potential risks to people. Although EWEB has fielded limited concerns about public safety risks created by the Leaburg facilities, there are differences between the alternatives in terms of public safety risk. Even though upgraded facilities under

the return to service scenarios would greatly reduce public safety risks relative to current conditions, the presence of stored water at elevation presents a greater hazard relative to the decommissioning alternatives, thus resulting in scoring between the alternatives as follows:

- Alt 1 – Decomm to Pre-Project: +4
- Alt 2 – Full RTS: +1
- Alt 3 – Partial RTS: +2
- Alt 4 – Decomm to SWC: +3

Highlighted example comments received during public outreach to date include:

- Concern that canal safety requirements such as the 10,000 year return frequency seismic event and 1,000,000 year return frequency flood event are unreasonable design criteria relative to the limited hazard presented by the Leaburg hydroelectric facilities.
- Canal related issues during a large seismic or flood event will be minor relative to all of the other impacts from such an event.
- The nuisances created by canal seepage have been of far greater concern to canal neighbors than safety issues. (Note that seepage and elevated groundwater levels were viewed as benefits rather than a nuisance by some canal neighbors)

Local economic activity – The alternatives will produce varying levels of construction benefits, such as employment and income, plus changes to the recreational economy, particularly businesses that cater to visitors and recreators. Certain alternatives can also have impacts to commercial irrigators with EWEB water supply agreements. In addition, there are local economic benefits from EWEB's local O&M expenditures on skilled labor/materials/supplies. While construction benefits are roughly equivalent among the alternatives, the decommissioning alternatives are expected to have net adverse effects on local economic activity, thus resulting in scoring between the alternatives as follows:

- Alt 1 – Decomm to Pre-Project: -2
- Alt 2 – Full RTS: +1
- Alt 3 – Partial RTS: +1
- Alt 4 – Decomm to SWC: -2

Highlighted example comments received during public outreach to date include:

- Concern that McKenzie Valley businesses catering to recreationalists at Leaburg Lake will lose a significant portion of their customer base.
- The "Save Leaburg Lake" petition highlights the economic impact concern. Signature collection is ongoing with 50 pages of signed petitions submitted to the EWEB Board at their September meeting. The petitions included signatures from McKenzie Valley and Lane County residents as well as visitors from elsewhere in the Pacific Northwest and beyond.
    - "This recreational facility brings tourists and commerce to the McKenzie valley."
    - "It is not fair to the community and visiting tourists that the dam has not been maintained as it should have all these years. The McKenzie River needs this area for tourism to help the local economy after the 2020 fires."
- Others emphasize dam removal and return of the natural river as a long-term tourism benefit:
    - "Other recreational lakes are nearby. The value of a free-flowing McKenzie River has far more value."

- "The "lake" directly borders a state highway. It is therefore very unpleasant to be on or in. I fail to see how anyone other than a wealthy lakeshore landowner would oppose removing the lake."
- "Even if Leaburg Lake were to disappear, there could still be other recreational activities, potentially both on land with trails and some water-based recreation, too, and the area would return to its more natural setting before it was created."

Wildfire response and mitigation – The ability of Leaburg Lake to provide a potential water supply source for firefighting, as well as use of the Canal as a potential firebreak. Use of surface water for outdoor irrigation to dampen areas adjacent to structures is also included here. The decommissioning alternatives experience negative impacts for this attribute, thus resulting in scoring between the alternatives as follows:

- Alt 1 – Decomm to Pre-Project: -5
- Alt 2 – Full RTS: 0
- Alt 3 – Partial RTS: -1
- Alt 4 – Decomm to SWC: -3

Highlighted example comments received during public outreach to date include:

- Concern from McKenzie Fire and Rescue about finding timely alternative sources for filling water tanks as they have historically drawn from multiple locations along the canal when fighting both structure fire and wildfires, however, McKenzie Fire and Rescue has implemented additional protocols for ensuring adequate water sources.
- Concern from canal neighbors that flammable vegetation will replace the "firebreak" effect of the canal and increase the risk of wildfire movement into residential areas.

Social justice – This attribute considers disproportionate impacts to low-income or minority populations, specifically due to changes in EWEB electric rates. The alternatives will have variable effects on electric rates, thus resulting in scoring between the alternatives as follows:

- Alt 1 – Decomm to Pre-Project: -5
- Alt 2 – Full RTS: -5
- Alt 3 – Partial RTS: -3
- Alt 4 – Decomm to SWC: -3

EWEB has not received public comment on social justice topics separate from rate escalation concerns.

Environmental justice – Disproportionate adverse effects of environmental resources (i.e. local air quality or noise effects) upon low-income or minority populations during the construction phase or as a result of operational conditions or activities.

Environmental justice impacts associated with the Leaburg decision appear to be limited. The recreation facilities (walking/biking trails, park, and lake) are free to the public, a significant benefit to local low-income populations and, thus, valuable to the low-income community. Recreation facilities are also equally accessible to underserved populations. This free and equal access to recreation is unlikely to change for any alternative, though the nature of the recreation (for example lake vs. river) would be different. Leaburg Lake currently has the only local disabled river access and there are limited nearby lakes with hand-launch craft access, such that the decommissioning alternatives may result in a slight impact to environmental justice.

- Alt 1 – Decomm to Pre-Project: -1
- Alt 2 – Full RTS: 0
- Alt 3 – Partial RTS: 0
- Alt 4 – Decomm to SWC: -1

EWEB has not received public comment on environmental justice topics.

Recreational activity – The recreational attribute incorporates impacts to boating and fishing activities on Leaburg Lake and along the McKenzie River downstream of the Leaburg Dam, as well as the use of trails along the length of the Canal for walking and biking.

Operation of the Leaburg Project includes license-required management of recreation facilities along the full length of the lake and canal. Examples include the Goodpasture Boat Landing at the upstream end of Leaburg Lake, recreational facilities at Leaburg Lake, and the embankment crest trail running the full length of the canal. There are local and regional users of the recreation facilities and, while summertime utilization is the highest, the facilities are used throughout the year.

FERC's requirement to continue providing recreational opportunities is unlikely to change for any alternative, although the nature of the recreational facilities would change. Except for the full return to service scenario, modifications to the lakeside and canal trail recreational facilities would be necessary. Lakeside recreation facilities would shift to riverside recreation facilities for the decommissioning alternatives and trails would need to be re-configured for all altered reaches of the canal. These changes would disrupt historical recreational patterns, and the most significant disruptions would be related to recreation on Leaburg Lake. The alternatives will have variable effects on recreation, thus resulting in scoring between the alternatives as follows:

- Alt 1 – Decomm to Pre-Project: -4
- Alt 2 – Full RTS: 0
- Alt 3 – Partial RTS: 0
- Alt 4 – Decomm to SWC: -4

While hosting six listening sessions at Lloyd Knox Park, EWEB received numerous comments about the recreational impacts. Highlighted example comments include:

- Concern from many recreators that comparable lakes for recreation are distant from Leaburg.
- Sentiments from some recreators that they are not concerned about their ability to find comparable recreational opportunities elsewhere.
- Strong opinions from canal trail users that every alternative should include a comparable trail system to current facilities.
    - "I use it almost daily for exercise for my dog and I."
- According to the Public Comment Form, recreation access is a polarizing issue. On the question of "How important is it to you that Leaburg Lake remain as a recreational facility?"28% (N=40) of respondents rank it "Not Important," while 37% (N=53) rank it "Extremely Important."
- The question "How important is it to you that the Leaburg Canal Trail remain as a recreational facility?" evokes a similar divergence, with 26% (N=38) ranking it "Not Important," and 32% (N=45) ranking it "Extremely Important."

- Those who rank recreational activity as "Not Important" emphasize EWEB's priorities of serving water and electricity and that EWEB "is not in the recreation business" and that the lake serves to generate electricity with recreation a secondary benefit.
- "The interests of having a healthy and viable ecosystem are far more important than maintaining recreational dams and lakes."
- "There are so many places to hike and walk in the McKenzie Valley. Walking along a manmade canal is the least inspiring area we have."
- "While the lake, park, and trails are nice, clean renewable power is extremely important and should be the pivotal concern."

Cultural and historical resources – Impact to Project facilities that are included in the Leaburg Hydroelectric Project Historic District (District) and potential impacts to Tribes or to Tribal resources. EWEB will engage with Tribes separately from this TBL analysis.

The District encompasses the vast majority of the Project facilities and any changes require mitigation to the satisfaction of the State Historic Preservation Office. The decommissioning alternatives would result in major impacts that would be challenging to mitigate to the satisfaction of all stakeholders. For some facilities, such as the Leaburg Power Plant, there may be opportunities to preserve facilities by re-purposing for alternative uses, though there is significant uncertainty about what ultimate outcome can be achieved in a decommissioning agreement. Except for the full return to service, alternatives have a range of impacts to cultural and historical resources as follows:

- Alt 1 – Decomm to Pre-Project: -3
- Alt 2 – Full RTS: 0
- Alt 3 – Partial RTS: -1
- Alt 4 – Decomm to SWC: -2

Highlighted example comments received during public outreach to date include:

- Particular concern about the potential loss of the iconic Leaburg power plant.
- On the Public Comment Form, "Retain historic structures" is the lowest-ranked priority

Visual / aesthetics – Long-term, permanent changes as compared to current scenic conditions, specifically at Leaburg Lake and along the canal.

Several Leaburg Project features are readily visible from Highway 126 and have come to characterize the visual/aesthetic presence of this portion of the McKenzie Valley over the past 92 years. The Leaburg Power Plant, Leaburg Dam, and Leaburg Lake are familiar features to people from throughout the region and any significant change to the facilities would alter the historic aesthetics of the area. Although decommissioning of the facilities would be performed in a way that intends to replace the historic visuals with comparably favorable aesthetics, the change would be drastic and could take a substantial period of time to achieve the desired visual outcome.

There are portions of the Leaburg Project that could transform into more visually appealing scenes than the existing condition. Decommissioning or conversion of portions of the canal to stormwater conveyance could result in a more natural, less industrial aesthetic that complements the McKenzie Valley surroundings. Portions returned to Pre-Project conditions would tend to have a natural or park like appearance.

Given there are such wide-ranging perspectives on this particular attribute, largely influenced by residential location and aesthetic opinion, it is difficult to score the net impacts. Considering there will be both positive and negative impacts, we estimate the overall total impact to be minor in scale. Except for the full return to service, alternatives have been assigned a range of impacts to visual and aesthetic resources as follows:

- Alt 1 – Decomm to Pre-Project: +1
- Alt 2 – Full RTS: 0
- Alt 3 – Partial RTS: -1
- Alt 4 – Decomm to SWC: -1

Highlighted example comments received during public outreach to date include:

- Some local residents selected their home in part due to the existing visual and aesthetic presence of the Leaburg Project, for example a view of Leaburg Lake.
- Some local residents have expressed that the prospect of having a re-patriated creek located adjacent to their property is highly attractive.

Domestic groundwater wells – Potential effects to properties adjacent to the canal that may have historically benefitted from Leaburg Canal seepage.

In all alternatives, there will continue to be a drastic reduction in contributions to the groundwater table from canal facilities. In the decommissioning alternatives, only the tributary creeks and stormwater will be contributing to the local groundwater. In the return to service alternatives, a canal lining will prevent diverted McKenzie River water from seeping into the subsurface. As such, all alternatives have an equally negative impact on the local groundwater table as summarized by the following scores:

- Alt 1 – Decomm to Pre-Project: -2
- Alt 2 – Full RTS: -2
- Alt 3 – Partial RTS: -2
- Alt 4 – Decomm to SWC: -2

Highlighted example comments received during public outreach to date include:

- Numerous canal neighbors have voiced frustration with the negative impacts to the groundwater table since the canal went out of service.

Surface water supplies – Access to supplemental irrigation supplies by landowners with EWEB agreements to provide water.

Over the past 92 years, EWEB has entered into 17 agreements to supply water to property owners along the length of the canal. Most of these agreements are interruptible in the event that EWEB is unable to maintain water in the canal. The vast majority of water withdrawals from the canal have been small in scale, though the McKenzie Hatchery has an interruptible agreement for the supply of 50 cubic feet per second (over 22,000 gallons per minute). Except for the full return to service, a portion or all of these agreements would be disrupted. The water supply disruption impacts are scored for the alternatives as follows:

- Alt 1 – Decomm to Pre-Project: -2
- Alt 2 – Full RTS: 0
- Alt 3 – Partial RTS: -1

- Alt 4 – Decomm to SWC: -2

Highlighted example comments received during public outreach to date include:

- Multiple commercial irrigators have advised that the canal water supply is critical to the viability of their farming activities.
- Several canal neighbors historically drawing landscaping irrigation water have voiced concerns about the increased wildfire vulnerability of their property.

Local community property values – Effects to property values under these alternatives can occur in numerous ways, including changes in canal related safety risks to property; local recreational amenities and opportunities; aesthetics / visual changes; and availability of groundwater or access to surface water supplies. Changes in property tax revenues for Lane County and other local entities may occur with changes in property values or the acquisition of properties by EWEB.

There are approximately 100 properties located in close proximity to Leaburg Project facilities, such as the power plant, 5-mile canal, Leaburg Dam, and Leaburg Lake. Depending on the specific location, property values could be altered in a variety of ways. There will be temporary construction phase, as well as long-term post-construction changes, that may influence property values. Similar to the visual and aesthetic discussion, the nature of impacts will be highly variable by location. Much of the visual and aesthetics discussion is relevant to this property value discussion as well, as there could be a mix of favorable and unfavorable impacts.

There are wide-ranging perspectives on this attribute, largely influenced by residential location and personal opinion. Considering there will be both positive and negative impacts, we estimate the overall total impact to be minor in scale. Except for the full return to service, alternatives have been assigned a range of impacts to property values as follows:

- Alt 1 – Decomm to Pre-Project: +1
- Alt 2 – Full RTS: 0
- Alt 3 – Partial RTS: -1
- Alt 4 – Decomm to SWC: -1

Highlighted example comments received during public outreach to date include:

- Many Leaburg Lake neighbors expect that a transition from lakeside to riverside conditions would adversely affect property values.
- Some canal neighbors think that a reduction of seepage and reduced risk of canal-related problems would favorably affect property values.

Fish hatcheries – Impacts to Leaburg and McKenzie Hatchery operations associated with changes in water supplies and water availability.

The Leaburg Trout Hatchery and McKenzie Salmon Hatchery have relied on Leaburg Project facilities for the majority of their water supply throughout their history. The loss of gravity supply from Leaburg Lake and the Leaburg Canal would likely force the hatcheries toward pumped water supply systems that are very expensive, both in terms of upfront capital costs and ongoing operation and maintenance costs. Substantial operational changes would require lengthy planning and implementation efforts as well as financial support from the State

and Federal agencies that own and operate the hatcheries. The potential hatchery impacts are scored for the alternatives as follows:

- Alt 1 – Decomm to Pre-Project: -4
- Alt 2 – Full RTS: 0
- Alt 3 – Partial RTS: -2
- Alt 4 – Decomm to SWC: -4

Highlighted example comments received during public outreach to date include:

- Impact to fisheries is the top-ranking concern among survey participants, with many prioritizing the return-to-service of the hatcheries as part and parcel of fisheries management.
    - "The Leaburg Project has been screened for many years to protect fish. In partnership with ODFW, hatchery and wild salmon can be separated at the dam if necessary. The salmon fishery on the McKenzie River is very important for the business community."
    - "The fish ladder and hatchery work in harmony. Migration and breeding are both enabled with the ladder"
    - "The fish need our help and the water supply alone to the hatcheries is a bigger positive impact than retaining the fish passages in my opinion."
- Others prioritize the benefits of the return to natural river flows as the best way to support the fisheries:
    - "Our salmon populations are continuing to decline, and the amount of money spent on hatchery programs has not improved those populations"
    - "We must protect our environment and the salmon. This is a world-renown fishing river- one of the best, last, cleanest rivers in the country. The salmon is our identity and our biggest source of tourism and supports our local businesses"
    - "The McKenzie, in its wild state, is a world class recreational and natural resource. The work being done on the South Fork and in the area of Finn Rock to restore salmon habitat has been extremely encouraging. Dam removal would support these efforts."
- McKenzie Salmon Hatchery staff have communicated their concern that alternatives other than the full return to service could reduce the long-term viability of the hatcheries.
- Local economic development stakeholders have voiced concern about the potential impact to tourism if the Leaburg Hatchery sturgeon ponds are lost.
- A Puget Sound orca activist voiced concern about adverse impacts to the McKenzie Salmon Hatchery as hatchery fish are valuable forage for that endangered species.
- The "Save Leaburg Lake" petition highlights the hatchery impact concern. Signature collection is ongoing with 50 pages of signed petitions submitted to the EWEB Board at their September meeting. The petitions included signatures from McKenzie Valley and Lane County residents as well as visitors from elsewhere in the Pacific Northwest and beyond.

Local transportation networks – Impacts to roads, bridges, or other transportation infrastructure during the construction phase and during operations, including potential traffic delays, temporary or permanent road closures, or other traffic related effects.

There will certainly be transportation impacts during the construction phase for all alternatives. While investigated as part of the TBL, no significant difference in impacts is discernible, except that the repatriation of all creeks in the decommissioning to pre-Project conditions alternatives would require the largest number of closures to Highway 126. As such, the potential transportation impacts are scored as follows:

- Alt 1 – Decomm to Pre-Project: -2
- Alt 2 – Full RTS: -1
- Alt 3 – Partial RTS: -1
- Alt 4 – Decomm to SWC: -1

Highlighted example comments received during public outreach to date include:

- A local farmer with operations reliant on the Leaburg Bridge expressed concern with transporting their harvest during bridge construction.
- A local resident that relies on the bridge expressed concern over detour and school bus impacts during bridge construction.
- McKenzie Fire & Rescue volunteers emphasized the challenge of staging response teams on both sides of the river during Goodpasture and Bridge Street repairs.

Noise levels – Noise generated by vehicles and equipment during the construction phase. Noise from Project facilities during operation will be minimal.

Construction noise impacts will occur for all the alternatives. However, no significant difference in impacts is discernible. As such, the potential transportation impacts are scored as follows:

- Alt 1 – Decomm to Pre-Project: -1
- Alt 2 – Full RTS: -1
- Alt 3 – Partial RTS: -1
- Alt 4 – Decomm to SWC: -1

Highlighted example comments received during public outreach to date include:

- Several residents near Luffman Spillway expressed concern about potential noise pollution from a power plant situated near their homes.

Environmental Impact Assessment

The environmental impact assessment scores were devised using input from EWEB SME's and public comments that have been received to date (outreach events, survey results, and direct contact). Table 3 shows some examples of the considerations used as inputs to their respective assessment scores.

Table 3: Environmental Impact Assessment Considerations	
Attribute	**Considerations**
Water Quality – McKenzie River	• Temperature • Turbidity / Sediments during Construction • Drinking Water Source
Aquatic Resources	• Fish Migration • Habitat Availability • Fish Sorting Capabilities • Hatchery Water Supply • Lamprey Habitat
Carbon Footprint	• Construction Phase Emissions • Manufactured Construction Materials • Low-Carbon Electric Power Portfolio • GHG Emissions from Operations
Terrestrial / Avian Species	• Construction and Operational Phases
Wetlands	• Mitigation Needs • Regulatory Requirements
Vegetation	• Extent of Removal • Extent of new planting

The environmental impact assessment evaluates effects to local natural resources as well as more global effects, such as carbon impacts. The TBL considers a number of environmental attributes and compares how those attributes are affected by the alternatives. The following sections provide a description of each attribute and the key differences in impacts between the alternatives that affects their scoring.

Water quality – This attribute takes into account two effects: changes in turbidity due to construction phase activities and ongoing operations, and water temperature changes in reaches of the McKenzie River affected by changes in flow. Other water quality parameters are not expected to exhibit appreciable differences between the alternatives.

Turbidity will be a major water quality concern during construction activities associated with all alternatives. Even though the permits required to perform construction will have extensive turbidity control requirements, any construction activity taking place below the ordinary high-water level of a river or stream will have some unavoidable turbidity impact. The decommissioning alternatives require the largest amount of construction work below the ordinary high-water level and, thus, present the most significant construction phase turbidity issues.

Turbidity impacts during ongoing operations are expected to be minimal for all alternatives. Since Leaburg Lake allows for some turbidity to settle out as silt on the lake bottom, there is some reduction effect during operation, though it is arguably offset during brief periods of maintenance when the lake or canal levels are drawn down and that sediment can mobilize or be intentionally removed.

There are small, but measurable, impacts to river temperatures associated with the diversion of McKenzie River water into the Leaburg Canal. While the narrow and deep canal itself experiences limited warming as it travels downstream, the wide, shallow bypass reach below Leaburg Dam does experience more warming than

it would in the absence of the canal diversion. The net warming effect of the Leaburg operation is a concern, due to the potential for adverse impacts on plants and animals in the aquatic environment.

Temperature impacts are widely considered to be the most significant water quality concern, so the different effects on this attribute associated with each alternative appropriately dominate the scoring. The alternatives will have variable effects on temperature, thus resulting in scoring between the alternatives as follows:

- Alt 1 – Decomm to Pre-Project: +2
- Alt 2 – Full RTS: 0
- Alt 3 – Partial RTS: +1
- Alt 4 – Decomm to SWC: +2

EWEB has fielded some public concerns about water quality as it relates to the dewatered canal. During the dry weather season, there are locations with essentially stagnant stormwater that tend to grow algae and breed insects. EWEB is currently conducting a comprehensive water quality assessment, including ongoing monitoring work, and expects that water quality issues can be appropriately mitigated in any of the alternatives.

Aquatic resources – Consideration of impacts to fish migration (particularly species listed for protection under the Endangered Species Act; Willamette Spring Chinook Salmon and Upper Willamette bull trout) and habitat availability at Leaburg Lake and in the McKenzie River. Impacts to Pacific Lamprey, a U.S. Fish and Wildlife Service Species of Concern, are also considered as part of this attribute.

Leaburg Dam is equipped with fish ladders on both the right and left banks of the river for upstream fish passage. For downstream passage, there are screens that prevent fish from entering the canal and, instead, return them to the river immediately below the dam. Both upstream and downstream fish passage facilities were improved in 2003/2004 as part of the new license requirements. EWEB has conducted extensive monitoring and evaluation of fish passage facility performance and has documented the adequacy of performance and ongoing operation to the satisfaction of State and Federal fish agencies. Although slight fish migration delay has been documented, the Leaburg Dam facilities have relatively minor impacts on fisheries, including federally listed species, in terms of fish passage effectiveness.

It is also important to note that both the upstream and downstream fish passage facilities provide Federal and State fishery managers with an opportunity to accomplish important fish population monitoring work (counting and cataloging seasonal fish movement by species). The McKenzie River basin is regarded as a stronghold for native Willamette Spring Chinook salmon, and the area upstream of Leaburg Dam is considered a wild fish sanctuary. The Oregon Department of Fish and Wildlife (ODFW) has used the left bank fish ladder to sort hatchery salmon from wild salmon in an effort to minimize breeding between hatchery and wild fish. As such, the presence of Leaburg dam provides some fisheries management value.

Pacific Lamprey use the silt deposits that have accumulated behind Leaburg Dam as rearing habitat for their lengthy larval development phase, and Leaburg Lake currently supports a large population of the lamprey ammocoetes (larvae). If Leaburg Dam were to be removed, lamprey ammocoetes would be re-distributed into silt deposition in the lower reaches of the McKenzie River.

Leaburg has relatively minor impacts on aquatic resources relative to other hydroelectric operations. Those impacts would remain under both return to service options as there would not be substantial changes to the status quo. The decommissioning options would largely eliminate impacts to fish migration in the long term,

although there would be some negative impact to fish population monitoring. The resulting scoring between the alternatives is as follows:

- Alt 1 – Decomm to Pre-Project: +2
- Alt 2 – Full RTS: 0
- Alt 3 – Partial RTS: 0
- Alt 4 – Decomm to SWC: +2

Highlighted example comments received during public outreach to date include:

- Preferences from McKenzie Watershed Protective for completely uninhibited fish movement through the McKenzie River at Leaburg.
- Desire from ODFW for continued reduction of hatchery fish above Leaburg Dam through sorting at the dam.

Carbon footprint – Impacts to local air quality and greenhouse gas effects. Local air quality can be affected from construction phase emissions (vehicles and equipment). Diesel and gas consumption during construction will also contribute to greenhouse gas emissions. Additional greenhouse gas emissions will be associated with the manufacture of canal lining products and cement, among other construction materials. During operation, the carbon footprint will be affected by the carbon content of purchased alternative power supplies.

EWEB's Carbon Analyst provided an analysis of greenhouse gas (GHG) emissions for the construction phase of the alternatives that included construction vehicle and construction material emissions. Due to the negligible amount of GHG emissions from operating a hydroelectric facility, the analysis focused solely on the construction phase of the RTS alternatives and was based on the conceptual designs and class 4 estimates provided by the consultant. The following table shows the estimated metric tons of CO2 emissions for the alternatives:

Table 4: Estimated Metric Tons of GHC Emissions for the Construction Vehicle and Materials

Alternative	GHG Emissions from Construction Vehicles (Diesel and Gasoline) CO2e: Average Fuel Price Scenario[1]	GHC Emissions from Material MT CO2e
1. Decommission to Pre-Project	42,091	169,870
2. Full Return to Service	42,989	122,587
3. Partial Return to Service	29,851	181,876
4. Decommission to Storm Water Conveyance	30,769	52,441

[1]Diesel prices taken from the ODOT Monthly Fuel Prices (MFP), Gasoline prices taken Gasoline prices taken form the US Energy Information Administration (EIA)

[2]Emmissions totals based on Construction cost estimates using the Turner Building Cost Index to adjust for inflation

EWEB has not received public comment on the carbon footprint of the construction activities to date, but several attendees at the listening sessions expressed their support for the carbon free hydro-electric options.

On the Public Comment Form, “Lowest carbon footprint as possible" ranks 4th among the rank-ordered priorities. The resulting scoring between the alternatives is as follows:

- Alt 1 – Decomm to Pre-Project: -4
- Alt 2 – Full RTS: -2
- Alt 3 – Partial RTS: -3
- Alt 4 – Decomm to SWC: -1

Terrestrial species / avian species. Effects on mammals, waterfowl, birds and other wildlife species during the construction phase and from operations. Changes in animal behavior and habitat availability are also considered.

Any decommissioned portions of the canal and lake would be largely converted into terrestrial habitat, transitioning from hosting aquatic animals to terrestrial and avian species. This shift would be favorable for the terrestrial and avian species, though comparable habitat is locally plentiful such that effect on populations relative to current conditions are not expected to be substantial. The decommissioning options would bring minor improvement, thus resulting in scoring between the alternatives as follows:

- Alt 1 – Decomm to Pre-Project: +1
- Alt 2 – Full RTS: 0
- Alt 3 – Partial RTS: 0
- Alt 4 – Decomm to SWC: +1

EWEB has not received public comment on terrestrial or avian topics.

Wetlands. Changes in the number of wetland acres, including both areas where wetlands may be reduced and areas where wetlands may be generated. Since the canal was taken offline in 2018, wetland areas that were supplied by canal seepage have substantially diminished. Any of the alternatives under consideration will reduce the historic extent of wetlands indefinitely. For the return to service alternatives, the canal will be lined to prevent excessive seepage. For the decommissioning alternatives, there will only be stormwater flows and limited potential wetland development. As such, scoring is uniform for the alternatives and the impact is minor.

- Alt 1 – Decomm to Pre-Project: -1
- Alt 2 – Full RTS: -1
- Alt 3 – Partial RTS: -1
- Alt 4 – Decomm to SWC: -1

EWEB has received some feedback from the canal neighbors that the reduction of wetland areas is not a concern, though there are other neighbors that see the change as adverse to their ponds and similar water features.

Vegetation. Changes in the amount of regional vegetation, including trees, are represented by this attribute. This category takes into account both areas where vegetation may be eliminated and areas where additional vegetation may be planted.

Any decommissioned portions of the canal and lake would transition into largely vegetated areas. This shift would generally expand the local vegetation canopy, though similar canopy is locally plentiful such that the

overall effect is not expected to be substantial. The decommissioning options would bring minor canopy expansion, thus resulting in scoring between the alternatives as follows:

- Alt 1 – Decomm to Pre-Project: +2
- Alt 2 – Full RTS: 0
- Alt 3 – Partial RTS: +1
- Alt 4 – Decomm to SWC: +2

EWEB has not received public comment on terrestrial or avian topics.

Economic Impact Assessment

The Economic component of the TBL Assessment accounts for impacts to EWEB's operating costs and profits – the "typical" bottom-line. The Economic component of the Leaburg TBL considers financial impacts to EWEB and our customer-owners directly, including project costs, revenues from power generation, and overall utility bonding capacity. The following sections explain how the economic analysis was performed and presents results for each of the alternatives under consideration.

Upfront Capital Cost Estimates

The consultant team and EWEB staff developed initial cost estimates for the upfront capital investment needed for each of the four alternatives, which are used as inputs into the Net Present Value (NPV), essentially an estimate of "all-in" cost. A variety of additional financial considerations that affect the NPV results are also discussed in the following sections of this memo.

All four alternatives are currently in the feasibility assessment and study phase, creating significant cost uncertainty such that estimates will be in an expected range of -30% to +50% from baseline, in accordance with the American Association of Cost Engineering (AACE) Class 4 guidelines detailed in Table 5.

	Primary Characteristic	Secondary Characteristic		
Estimate Class	**Maturity Level of Project Definition Deliverables Expressed as % of complete definition**	**End Usage Typical Purpose of Estimate**	**Methodology Typical Estimating Method**	**Expected Accuracy Range Typical Variation in Low and High Ranges[1]**
Class 5	0% to 2%	Concept screening	Capacity factored, parametric models, judgment, or analogy	L: -20% to -50% H: +30% to +100%
Class 4	1% to 15%	Study or feasibility	Equipment factored or parametric models	L: -15% to -30% H: +20% to +50%
Class 3	10% to 40%	Budget authorization or control	Semi-detailed unit costs with assembly level line items	L: -10% to -20% H: +10% to +30%
Class 2	30% to 75%	Control or bid/tender	Detailed unit cost with forced detailed take-off	L: -5% to -15% H: +5% to +20%
Class 1	65% to 100%	Check estimate or bid/tender	Detailed unit cost with detailed take-off	L: -3% to -10% H: +3% to +15%

Table 5: American Association of Cost Engineering Estimate Classes

Baseline cost estimates, including low and high ranges, for the four alternatives are shown below in Table 2. Estimates **include**, but are not limited to, the following categories, all of which fall into AACE Class 4:

- Subsurface Exploration & Feasibility Studies
- Legal and Administration
- Property and Water Right Acquisitions

- Permitting and Relicensing
- Design and Construction Planning
- Construction
- Post-Construction Oversight and Studies

Exclusions from the baseline capital cost include, but are not limited to:

- Inflation/Escalation after 2022 in excess of assumptions for EWEB's Long Term Financial Plan
- Unknown hazardous materials
- Unforeseen change in site conditions
- Unusual contract constraint risk, including but not limited to:
    - Fixed price contracts
    - Date certain contracts
    - Performance guarantee contracts

Baseline Capital Cost **Assumptions**:

- Typical May through November construction
- Overtime rates based on 50 hours per week
- Standard equipment rates, fuel, and maintenance cost
- Historically consistent crew and equipment productivity levels

The baseline cost estimates for Alternatives 1, 3 and 4 have been reduced slightly since the last update on August 2, 2022. Updated costs are shown below in **Bold Purple** in Table 6. There is no change in the estimate for Alternative 2.

Table 6: Baseline Cost Estimates and Expected Range*			
Alternative	**Baseline**	**-30%**	**+50%**
1. Decommission to Pre-Project	**$242,700,000** ~~$252,470,000~~	**$169,890,000** ~~$176,729,000~~	**$364,050,000** ~~$378,705,000~~
2. Full Return to Service	$257,860,000	$180,502,000	$386,790,000
3. Partial Return to Service	**$176,608,000** ~~$179,100,000~~	**$123,625,000** ~~$125,370,000~~	**$264,912,000** ~~$268,650,000~~
4. Decommission to Storm Water Conveyance	**$175,862,000** ~~$184,600,000~~	**$123,103,000** ~~$129,220,000~~	**$263,793,000** ~~$276,900,000~~

Power Generation and Price Projections

Power generation revenues for both return to service (RTS) alternatives are based on forecasted market prices and historical production patterns for the Leaburg Project with an assumption that recent operational changes at Cougar Reservoir for improved environmental performance will be an ongoing flow regime change. The annual average power generation projections, historical data adjusted for flow regime changes at Cougar in the future, are summarized in Table 7. Expected market prices, as well as high and low ranges, are shown below in Chart 1, and are based on Integrated Resource Plan (IRP) projections through December 2075.

Table 7: Annual Generation with Cougar Flow Regime				
	Alternative 1 – Decommission to Pre-Project	**Alternative 2 – RTS to Existing Power Plant**	**Alternative 3 – RTS to Power Plant at Luffman**	**Alternative 4 – Decommission to SWC**
Annual Generation with Cougar Flow Regime[1]	0 MWh	87,400 MWh	34,300 MWh	0 MWh

[1] Estimated hydroelectric power production value based on historical patterns for Leaburg Project. Rounded to nearest hundred.

Chart 1: Market Prices Over Time

Power market price forecasts are necessary for estimating the future value of electricity generation. The forecasts used in the NPV analysis represent an estimate of the future price of electricity as traded on the wholesale, short-term (spot) market at the Mid-Columbia (Mid-C) trading hub. This forecasted price represents the marginal cost of electricity at a particular trading hub based on the modeled economic dispatch of resources. This should not be confused with "forward" prices, which represent the current contract price of electricity delivered at a future date. Spot markets are typically where power is sold after utilities secure enough resources to meet their loads.

Since utilities typically do not build resources solely for their value in the spot market, the following additional value streams are considered:

- Capacity Value
- Resource Adequacy
- Ability to generate Renewable Energy Certificates (REC's)

The estimated value for each of these value streams in current dollars is summarized below in Table 8:

Table 8: Expected REC, Carbon & Capacity Values for the Return to Service Alternatives			
Alternative	REC Value[1,2]	Carbon Value[1,2]	Capacity Value[1,3]
Alt 2: Full RTS – Base Values	$3	$4	$9
Alt 3: Partial RTS – Base Values	$1	$2	$4

[1] Estimated values based on IRP projections.

[2] Expected Renewable Energy Credit (REC) and Carbon Values in Dollars Per MWH. Based on IRP projections.

[3] Expected Capacity Value in Dollars per KW. Based on IRP projections.

Price forecasting typically requires the use of complex modeling software (EWEB utilizes the Aurora model) to simulate how a dispatched unit will meet the regional load and determine the spot market price. Before a price forecast can be generated, a forecast of the future Western Electrical Coordinating Council (WECC) power generation mix (i.e. hydro, wind, solar, thermal, etc.), and regional loads, are developed. The mix of regional power generation is determined based on the least-cost resource development and procurement, with the marginal cost to dispatch each resource having a key role in forecasting market prices.

In addition, Federal, state, and even local policies play a significant role in determining which resources get developed, as well as their development cost. For example, federal tax credits favoring renewable energy, state renewable energy portfolio standards, and greenhouse gas reduction goals make carbon-free technologies more likely to be developed in the future.

Future regional electrical demand faces uncertainty due to many factors that include, but are not limited to:

- Population growth
- Electrification
- Economic conditions
- Regulation

Given the uncertainty surrounding future electric loads and new resource development, many differing perspectives on forecasted market prices exist. In order to select a market price forecast to use in the Leaburg NPV analysis, staff researched various published price forecasts used by the Mid-C trading hub to supplement EWEB's Aurora modeling. The following resources were used to develop a high, low, and median price forecast:

- Avista Corp (A large Pacific Northwest owner of hydroelectric and other generation sources)
- Energy and Environmental Economics (E3) (A national consulting firm serving electric utilities)
- Northwest Power and Conservation Council (The Congressionally authorized agency responsible for regional power planning in the Pacific Northwest)

Capital Spending Projections

All scenarios will require extensive planning, regulatory compliance negotiations, and construction. Each scenario requires that near-term risk reduction measures, which are expected to be completed by 2028, are performed in parallel. Table 9 provides an overview of the assumed timelines. We expect an increase in capital spending beginning in 2031, correlating with final design and permitting efforts, followed immediately by intensive construction activities that will take approximately 6 years (Chart 2). It is assumed the RTS scenarios will have a slightly heavier pace of upfront spending for the additional design and planning effort, and the decommissioning scenarios will have the need for additional studies at the conclusion of the work due to extensive restoration efforts.

Table 9: Assumed Project Timeline: RTS and Decommissioning			
Decommissioning	**Assumed Schedule**	**Return to Service**	**Assumed Schedule**
Implementation of Near-Term Risk Reduction Measures	**2023-2027**	**Implementation of Near-Term Risk Reduction Measures**	**2023-2027**
License Surrender & Settlement Agreement Technical Studies	**2023-2027**	**License Amendment and Settlement Agreement studies**	**2023-2027**
FERC Approval, NEPA and ESA Process	**2028-2029**	**FERC Approval, NEPA and ESA Process**	**2028-2029**
Design & Permitting	**2030-2032**	**Design & Permitting**	**2030-2032**
Decommissioning Implementation & Closeout Studies	**2033-2040**	**Re-commissioning Implementation & Closeout Studies**	**2033-2040**

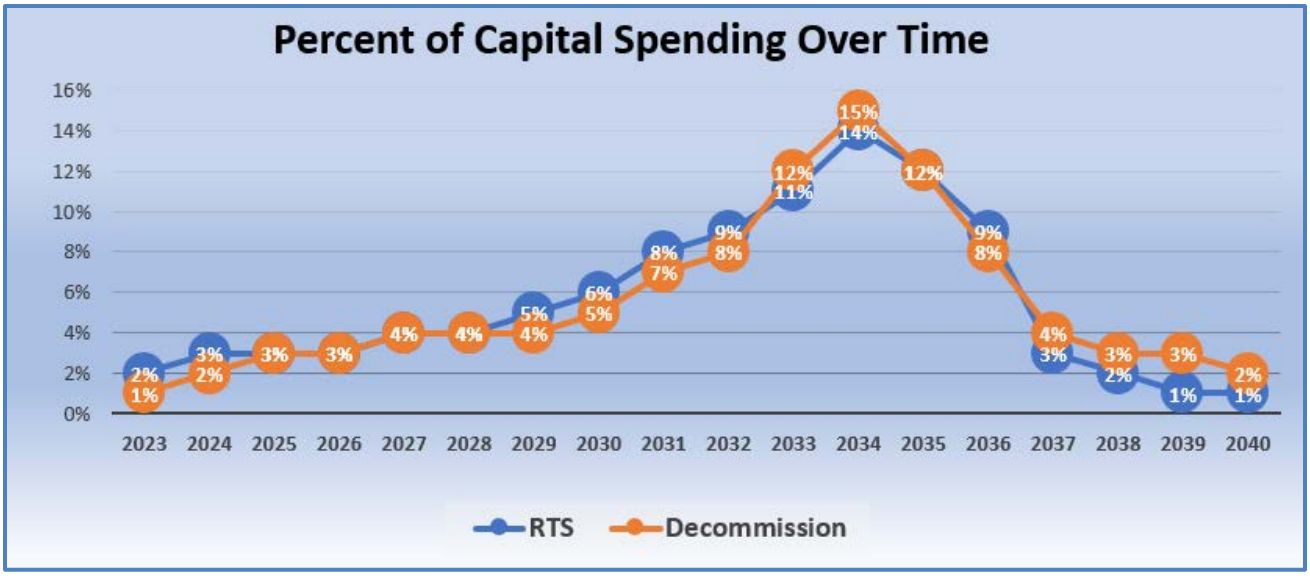

Chart 2: Percent of Capital Spending Over Time: RTS vs. Decommissioning

Net Present Value

For each of the four selected alternatives, the EWEB financial team has calculated the NPV, essentially an estimate of "all-in" cost, to inform the economic assessment portion of the TBL analysis. The primary baseline NPV analysis inputs and assumptions are shown below in Tables 10 and 11. Table 12 summarizes line-item details for the NPV results and Chart 3 graphically shows the NPV results.

Table 10: Baseline Net Present Value Inputs				
Input to NPV ($ million)	**Alternative 1 – Decomm to Pre-Project**	**Alternative 2 – Full RTS**	**Alternative 3 – Partial RTS**	**Alternative 4 – Decomm to SWC**
Initial Capital Cost[1]	**$242,700,000[1]**	$257,860,000	**$176,608,000[1]**	**$175,862,000[1]**
Ongoing Capital Cost:[2]				
Normal Year (Annually)	$125,000	$282,000	$230,000	$215,000
Major Improvements (5-yr)	$400,000	$1,474,000	$1,100,000	$923,000
Annual O&M Cost[3]	$870,000	$1,450,000	$1,305,000	$1,085,000

[1] Estimated baseline costs for each alternative.

[2] Estimated costs for equipment replacement and renewal, as necessary to maintain reliability.

[3] Annual labor, material, and support service costs.

Additional underlying NPV assumptions for all alternatives:

Table 11: NPV Assumptions for all Alternatives	
Escalation Rates:	
O&M Labor	3.0%
Non-labor Escalation	2.0%
Capital Escalation	3.0%
Capacity Value Escalation (nominal output)	2.1%
Discount Rates:	
Nominal Dollars	6.3%
Uninflated Dollars	4.2%
Historical Inflation Rate[1]	2.1%

[1] Based on historical inflation – Bureau of Labor Statistics headline inflation rate (average 2018-2021)

Table 12: NPV Baseline Summary				
Line Items	**Alternative 1 – Decommission to Pre-Project**	**Alternative 2 – RTS to Existing Power Plant**	**Alternative 3 – RTS to Power Plant at Luffman**	**Alternative 4 – Decommission to SWC**
NPV: Upfront Capital Expenses				
Yearly Base Costs	($186,200,000)	($200,800,000)	($137,500,000)	($134,900,000)
NPV: Ongoing Expenses				
O&M	($33,200,000)	($48,800,000)	($44,900,000)	($39,000,000)
Capital	($4,800,000)	($14,000,000)	($10,900,000)	($9,600,000)
NPV – Power Revenue[1]				
Expected	$0	$19,400,000	$7,800,000	$0
High Market	$0	$38,600,000	$15,500,000	$0
Low Market	$0	$5,100,000	$2,100,000	$0
Total NPV	($224,000,000)	($241,000,000)	($184,000,000)	($184,000,000)

[1] Projected generation revenue based on the wholesale market prices through 2076

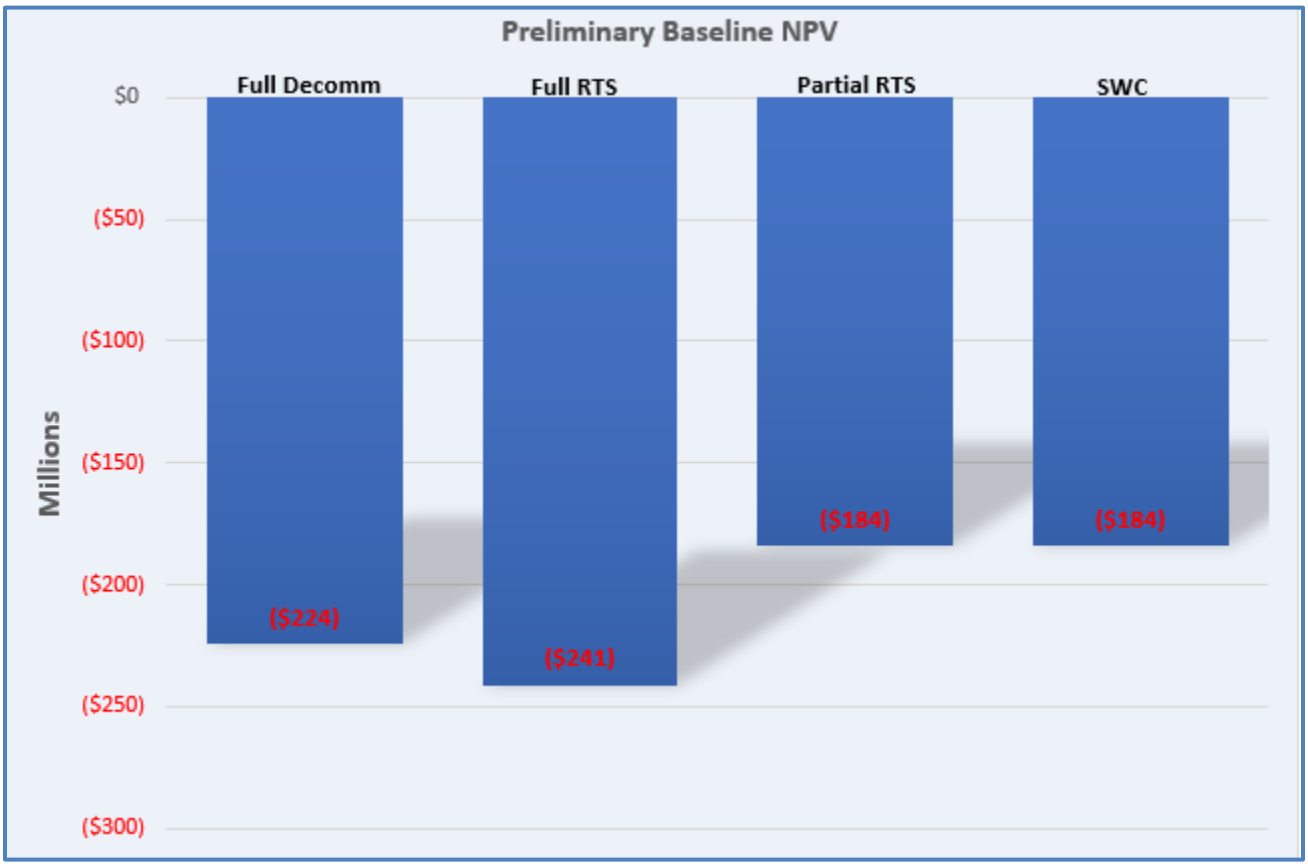

Chart 3: Preliminary Baseline NPV Results

NPV Sensitivities

In addition to the baseline NPV, staff have also performed sensitivity analyses to better inform the Board of the complexities and uncertainties associated with the financial aspects of the alternatives. Since an NPV is typically a capital planning and budgeting tool, sensitivity analysis allows for consideration of the alternatives given the inherent risk and uncertainty of relying on assumptions and forecasts. Please note the NPV is still preliminary because the upfront capital cost are based on conceptual plans. Actual cost will not be known until negotiations with key regulators and more detailed planning occurs.

The subsequent discussion, tables, and charts explains the purpose of each sensitivity and interprets the relevancy of the results.

Capital Cost and Power Price Sensitivity: The upfront capital cost estimates are believed to have an accuracy range of -30% to +50%. Future power price projections cover a substantial range of 18 to 32 $/MWH in the near term and 30 to 170 $/MWH in the year 2075. To test the sensitivity of the NPV results to these factors, the Finance team ran scenarios for high capital costs combined with low power prices, as well as low capital costs with high power prices.

As shown in Chart 4, while the bottom line NPV result was substantially different than the baseline numbers in each case, the relative ranking of the four alternatives to each other did not shift. This sensitivity analysis suggests the relative ranking of the alternatives remains consistent even if the capital cost and power price projections are drastically high or low.

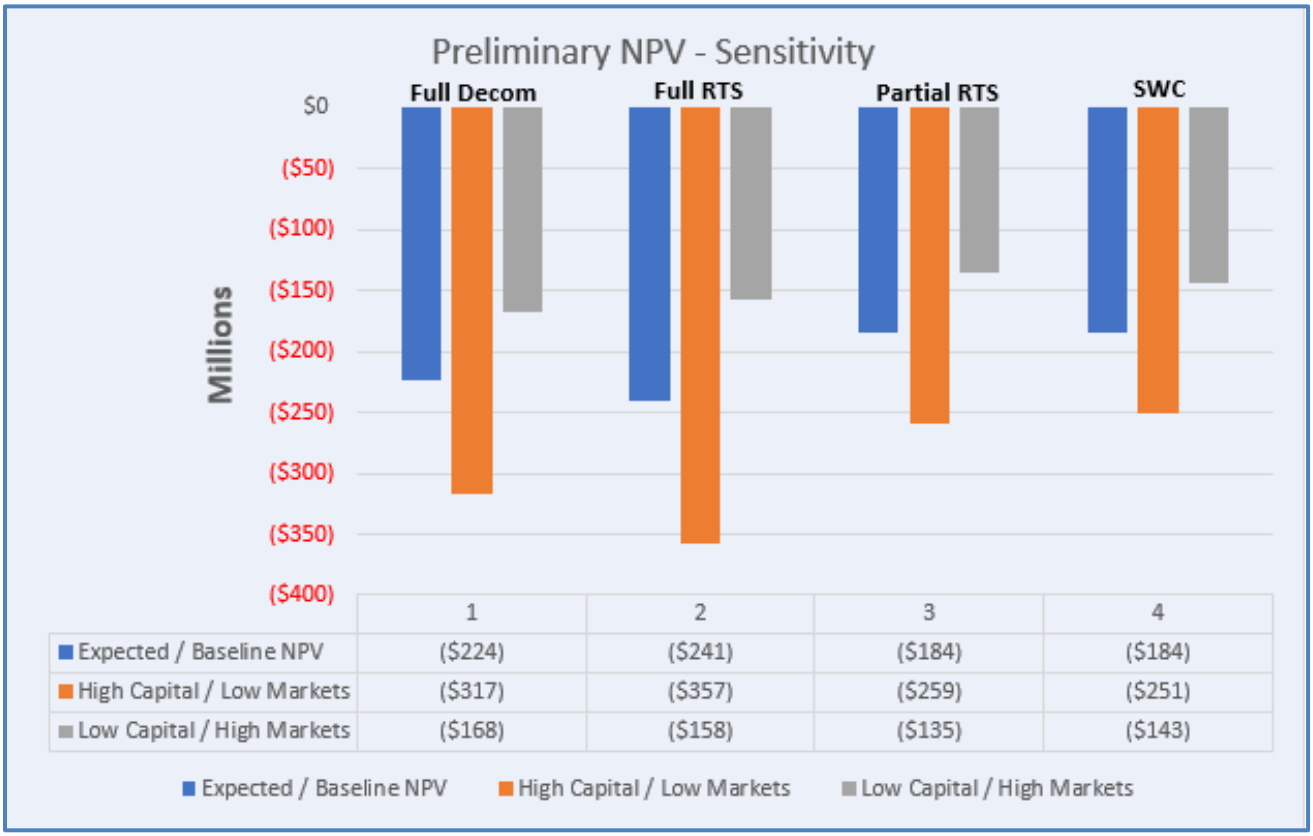

Chart 4: Preliminary NPV – Sensitivity: High Capital / Low Markets & Low Markets / High Capital

Tornado Diagram Perspective: To further clarify the scale of change associated with individual key NPV inputs, it is useful to chart the individual NPV input items in a tornado diagram. Charts 5 and 6 depict how variation

of the individual key inputs within a reasonable range would impact the NPV of the return to service alternatives. Decommissioning alternatives follow the same logic, although power values are not a factor because no generation is produced. The following charts summarizes the results from varying the capital, power price, discount rate, and inflation rate as follows:

- High Capital Cost / Low Capital Cost (-30% - +50%)
- Wholesale Power Value (High and Low Prices)
- Discount Rate (4% or 9%)
- Low Inflation / High Inflation (2% variation)

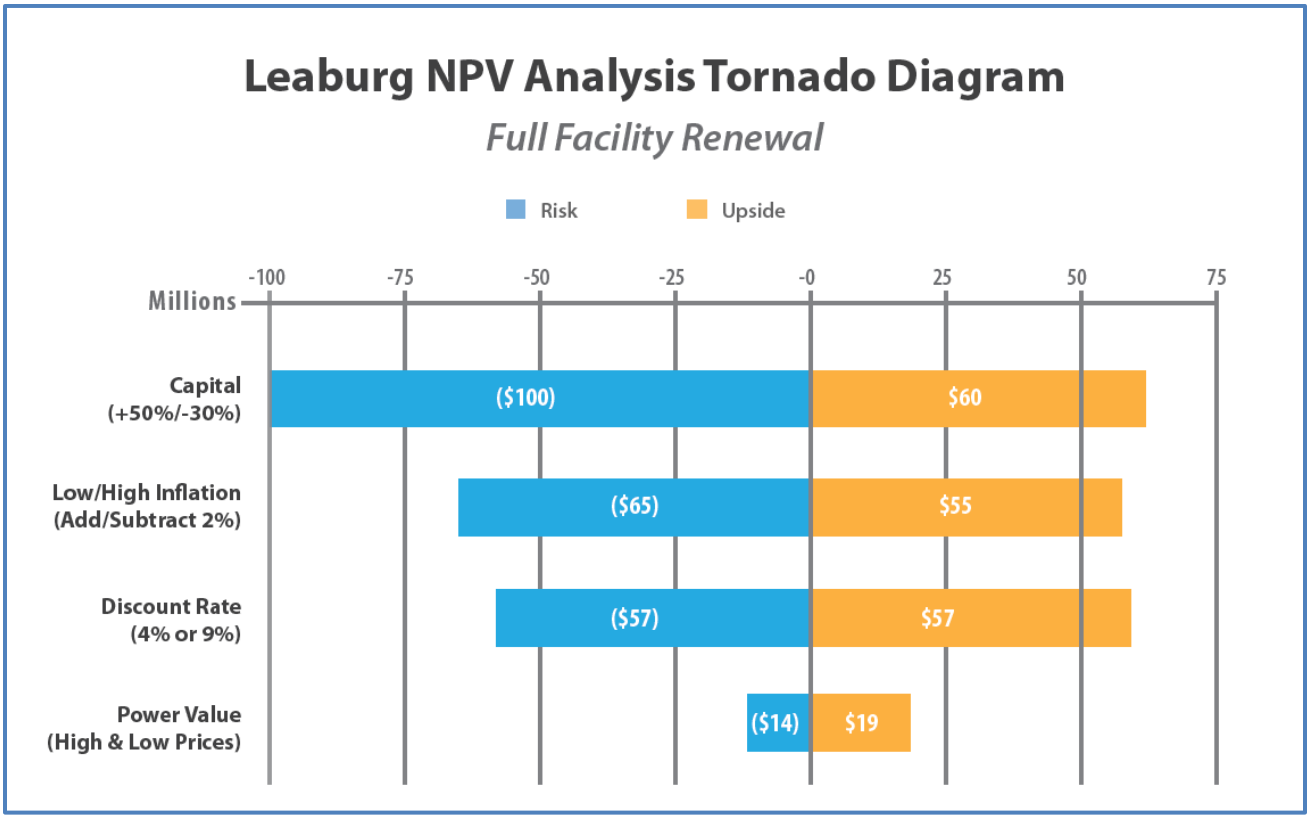

Chart 5: NPV Sensitivities for RTS – Full Return to Service, assuming Cougar Flow Regime

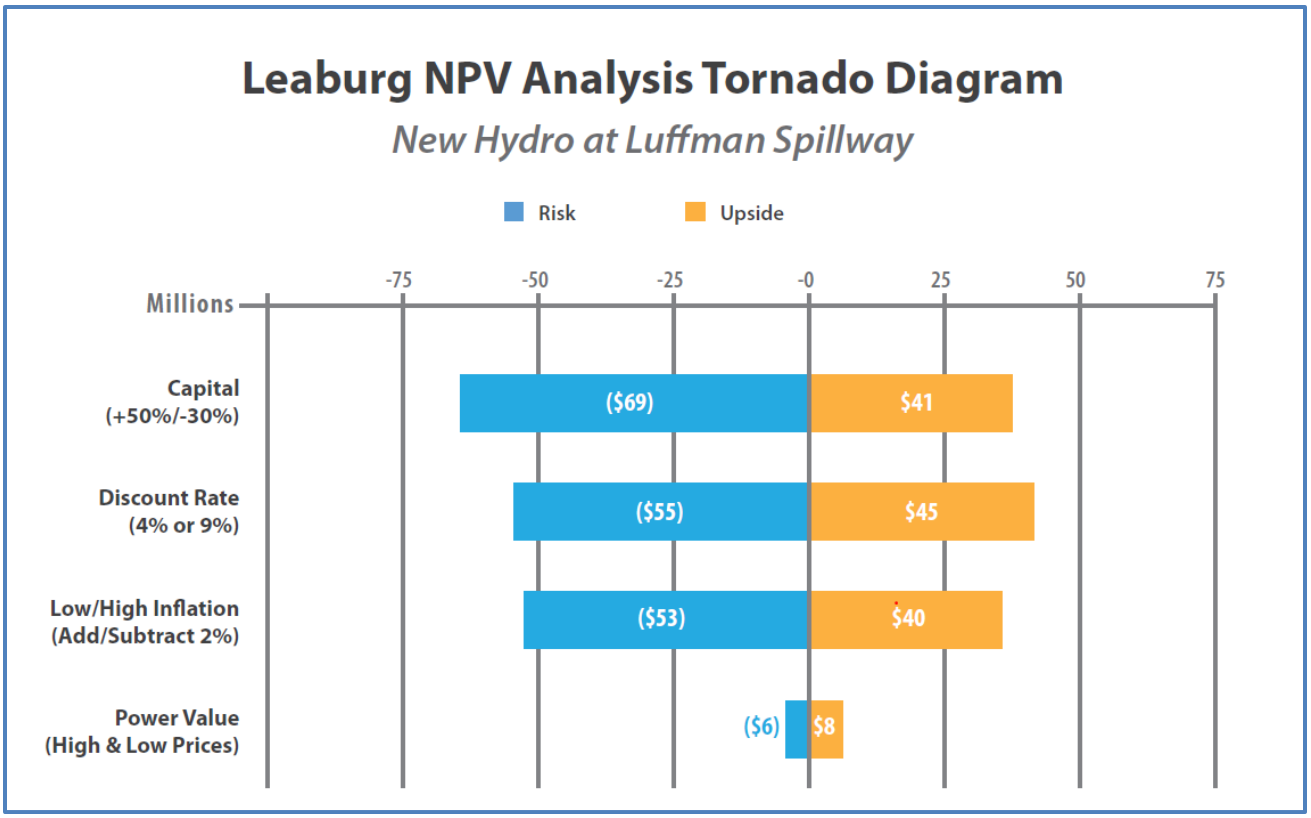

Chart 6: NPV Sensitivities for RTS – Partial Return to Service, assuming Cougar Flow Regime

For all alternatives, based on this analysis, NPV is most sensitive to the potential range of capital costs for each alternative and least sensitive to the potential range of future power prices. The effect of discount and inflation rates are in between, although high interest rates are likely to be accompanied by high discount rates and vice versa and, thus, tend to offset each other and minimize the net change in NPV. As a result, the results are unlikely to be sensitive to these parameters, reinforcing that capital costs are the most influential factor over the NPV results.

Minimum McKenzie River Flow Requirements: Under the existing FERC license, EWEB must release a minimum of 1,000 cfs into the bypass reach below Leaburg Dam at all times. Due to environmental concerns (primarily water temperature), it is possible that a new or amended FERC license would increase the minimum flow requirement. This sensitivity explores the effect of increasing the minimum flow requirement to 1,500 cfs in the future. This change would result in a reduction in the amount of water available for generation during the dry weather season, the time of year when there is not enough water available in the river for EWEB to divert its full water right. In drier years, this change would likely trigger shutdowns of the power generation facilities in the late summer when river flows are at their lowest. The results of this sensitivity analysis are shown in Chart 7.

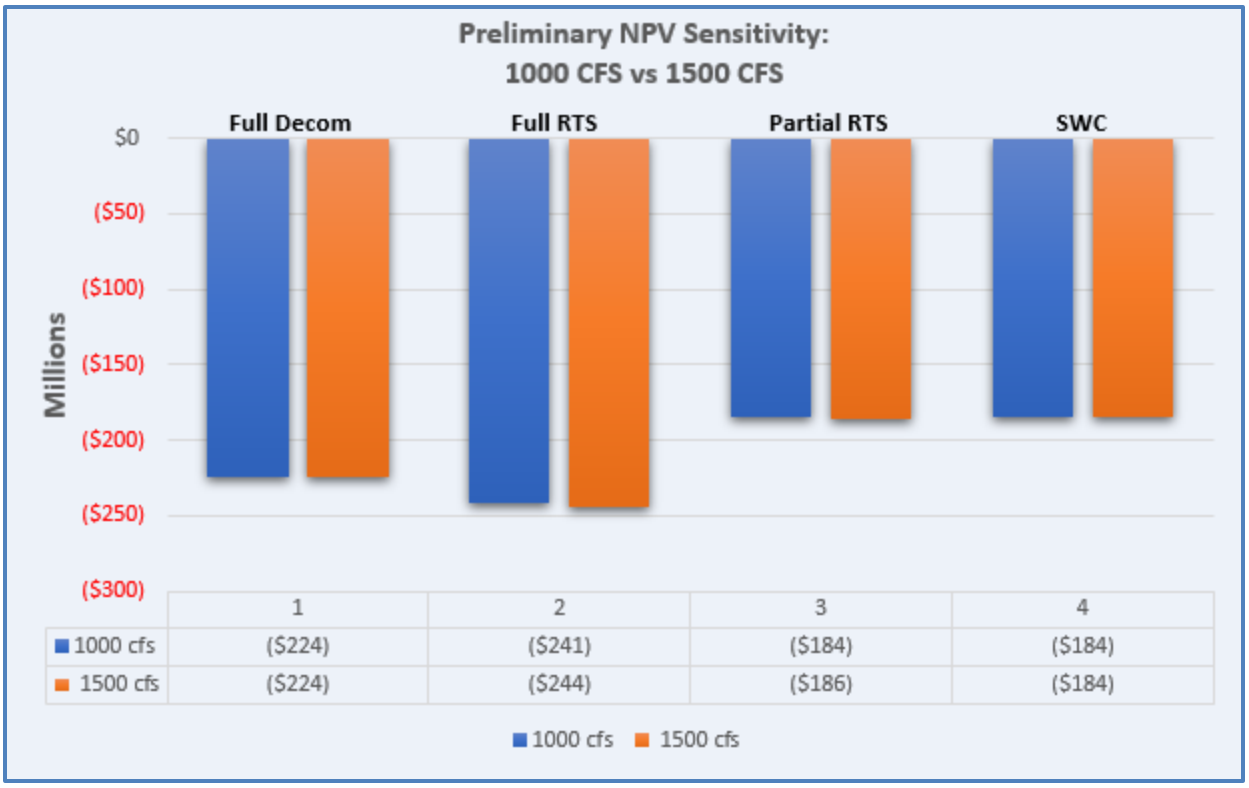

Chart 7: Preliminary NPV – Sensitivity: 1,000 CFS vs 1,500 CFS Instream Requirement (1,000 CFS is current requirement)

As shown in the chart above, an increase in the instream flow requirements would only have a slight impact on the NPV. As discussed earlier, variations in power price (and thus power revenues) have the least impact on the NPV results relative to other sensitivity variables. Since increased instream flows would only be impactful in a portion of the year, the overall impact on the NPV is not substantial.

Decommissioning Sinking Fund: Hydroelectric power projects have historically been considered to be legacy investments, meaning that the power generation facilities would be relicensed and renewed essentially in perpetuity such that the net present value of decommissioning costs were negligible since they were expected to occur in the very distant future. At this time, there is no longer the same confidence that hydroelectric investments will be relicensed and renewed in perpetuity. The possibility that the Leaburg facility will need to be decommissioned at the end of its license term creates a valid reason for factoring those costs into the economic analysis. EWEB would most likely assemble funding for those future decommissioning costs while the facility remains in operation so that future rate payers are not saddled with decommissioning costs for a facility that no longer benefits them. This sensitivity reflects the accumulation of money in a decommissioning sinking fund for the return to service scenarios during the operating license period, so that EWEB is financially prepared to fund the decommissioning work when power generation goes offline. The following chart shows that this sensitivity increases the difference in NPV between the return to service and decommissioning alternatives and Alternative 4 remains the highest ranked option.

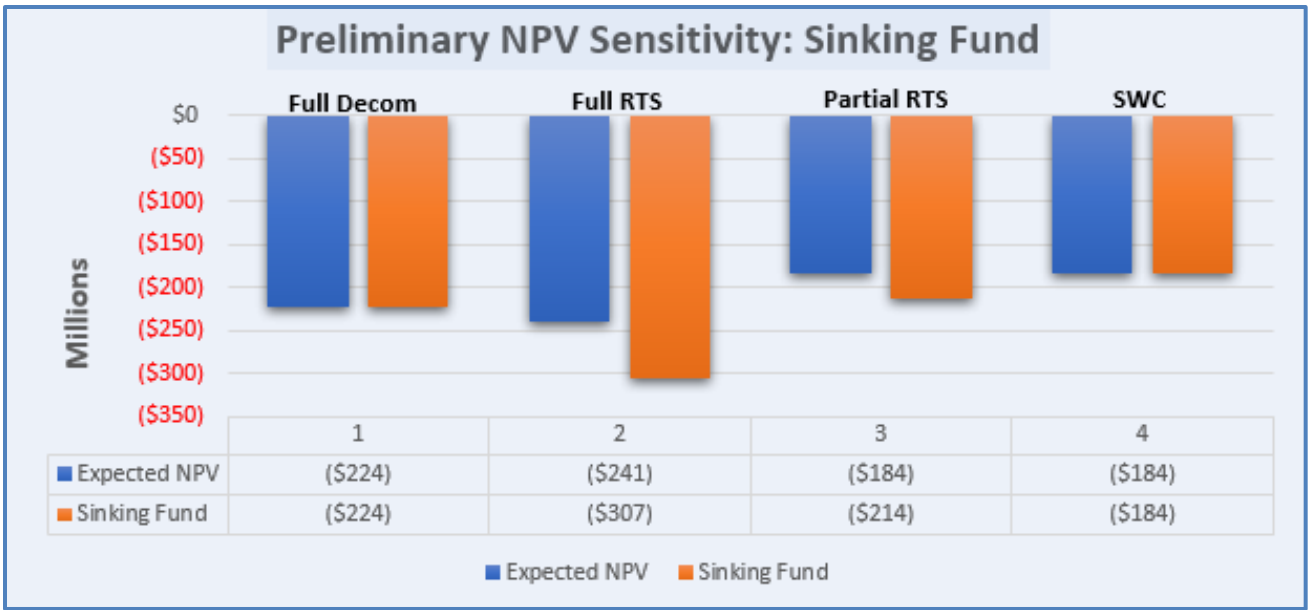

Chart 8: Preliminary NPV – Sensitivity: Sinking Fund for RTS Alternatives

Replacement Power Purchasing Sensitivity: This sensitivity considers the effect of including the replacement power purchase expenses for the decommissioning alternatives due to the loss of generation. While EWEB power portfolio is currently long on supply, it is uncertain that the current portfolio length will persist in 2036 when the Leaburg facility could be ready to return to service. Starting in 2036, this analysis reflects a discrepancy in replacement power purchases between the alternatives whereby the full return to service does not require any replacement power purchases, the partial return to service requires supplementing with some replacement, and the decommissioning alternatives require replacement power equivalent to what the Leaburg facility would be generating. The effect of replacement power purchases relative to baseline are shown in the chart below using two different sources for the cost of replacement power. One basis is the IRP future power price projections presented earlier and the other basis is a combination of current forward power pricing (actual known market conditions) and the IRP future power price projections. This sensitivity shows that the NPV differences between the return to service and decommissioning alternatives is significantly reduced, but the relative ranking remains the same: the decommissioning alternatives have a slightly better NPV relative to the corresponding return to service alternatives. Under this sensitivity, Alternative 3 shows a slight advantage over Alternative 4.

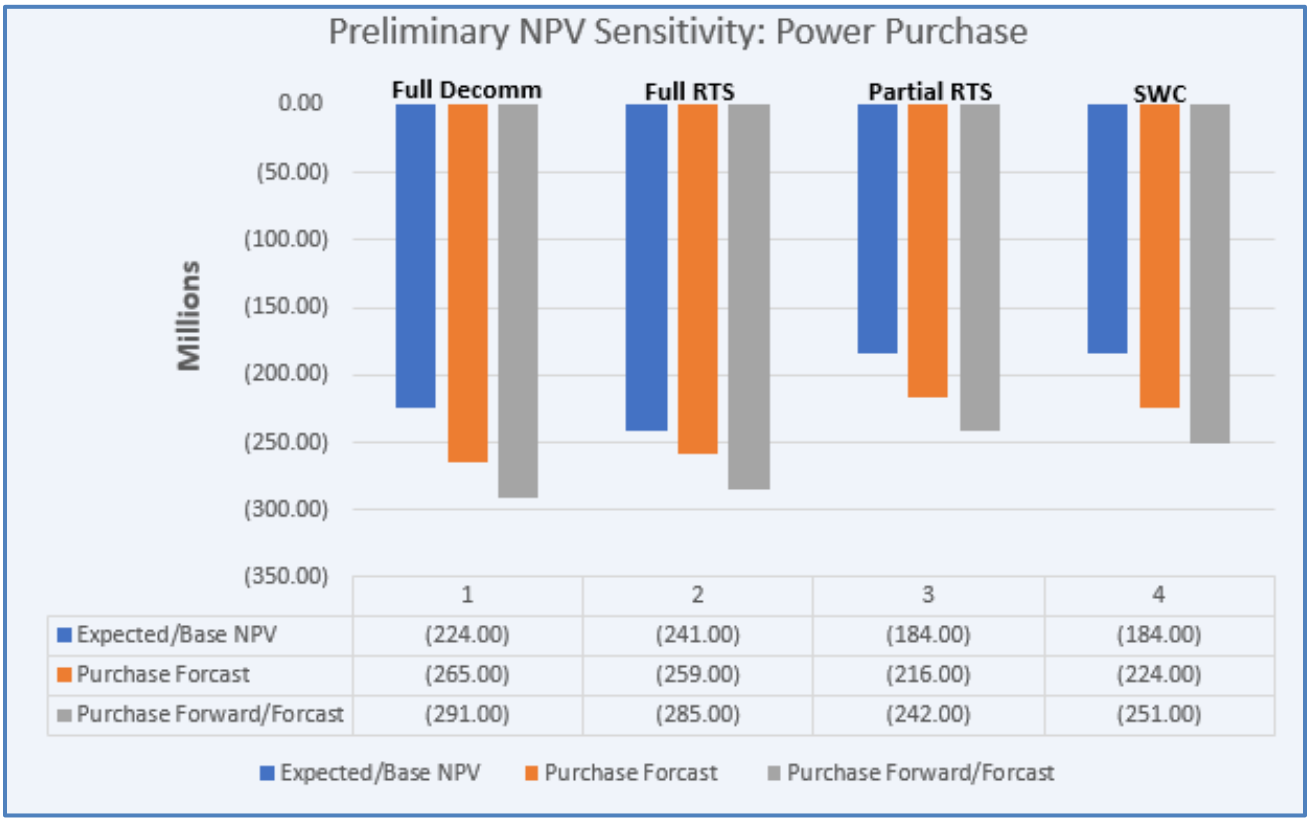

Chart 9: Preliminary NPV Sensitivity: Purchase Replacement Power

Renewable Energy Credits (RECs), Carbon Values, and Capacity Values Sensitivity: This sensitivity evaluates the effect of including power generation values that are not captured in the wholesale power pricing. The REC and carbon values are analyzed using theoretical (shadow) carbon prices to include the low, medium, and high REC prices multiplied by the baseline Leaburg generation output. This sensitivity assumes a return to service date in late 2036 and generation that extends through 2075. Although the Leaburg product is run-of-river and does not qualify for RECs under Oregon law, the REC, carbon, and capacity "replacement values" for the return to service alternatives are shown in below Table 13 and Chart 10 illustrates the effect of this sensitivity on the NPV. While including these values yields slight improvement to the return to service NPVs, the relative ranking between the alternatives remains the same. Under this sensitivity, Alternative 3 remains the highest ranked option with a slight advantage over Alternative 4.

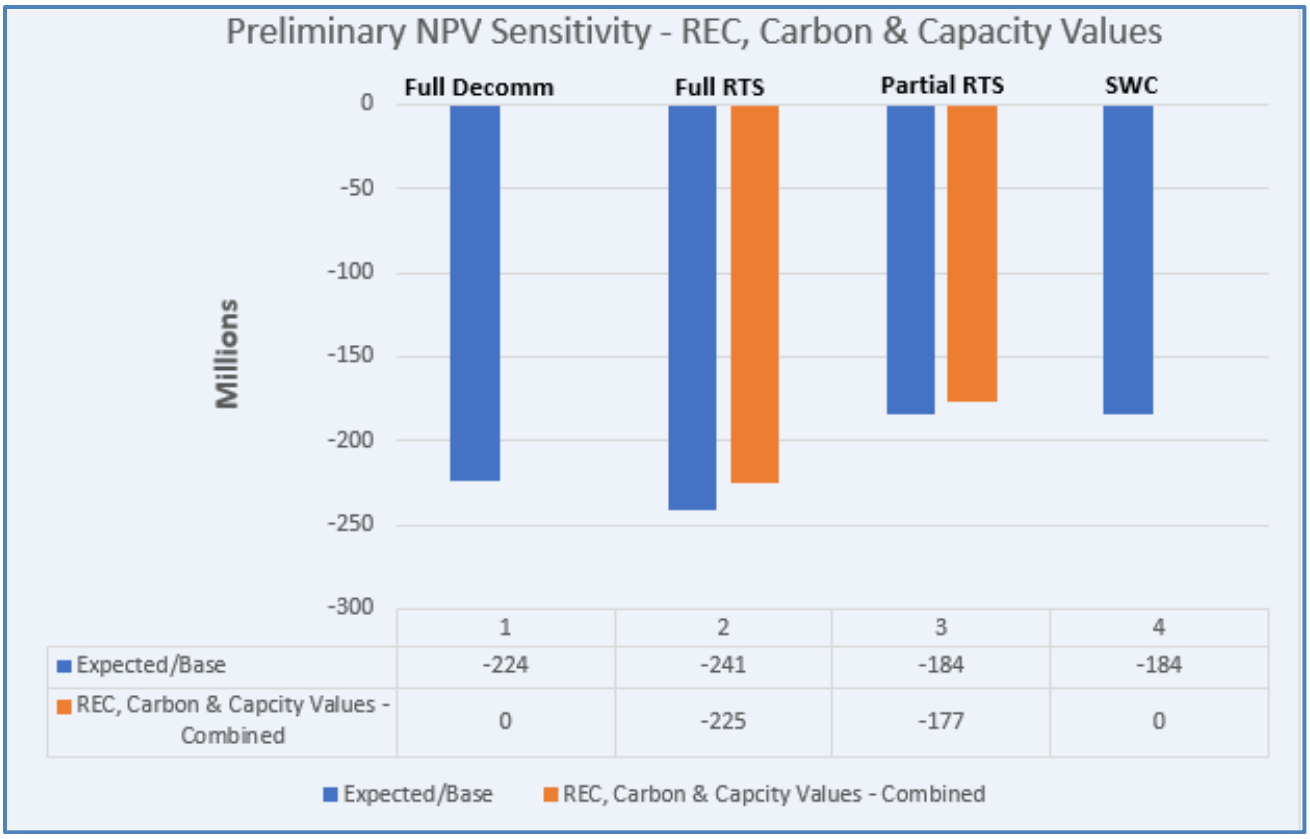

Chart 10: Preliminary NPV Sensitivity: REC, Carbon Value, Capacity Value

NPV Analysis Summary

Table 13 summarizes each of the sensitivities discussed above by showing the dollar amount change associated with the sensitivity scenario. This table can be used to combine sensitivities and quantify the magnitude of change for a combined scenario. For example, combining the effects of high capital costs and low power prices with a decommissioning sinking fund. The information available in the table allows one to assemble the scenario that seems most likely.

Table 13: Preliminary NPV Summary

$ Million	Full Decomm	Full RTS	Partial RTS	SWC
Expected NPV	($224)	($241)	($184)	($184)
High Capital / Low Markets	($317)	($357)	($259)	($251)
Low Markets/ High Capital	($168)	($158)	($135)	($143)
Value Stream Sensitivities				
REC Value	$0	$3	$1	$0
Carbon Value	$0	$4	$2	$0
Capacity Value	$0	$9	$4	$0
Cost Stream Sensitivites				
Sinking Fund	$0	($66)	($30)	$0
Purchase Power (Forcast)	($34)	($15)	($27)	($34)
Purchase Power (Forward/Forecast)	($63)	($44)	($55)	($63)

Replacement Power Considerations and Analysis

The Leaburg NPV analysis compares the investment profitability of various alternatives to one another and is included as an input into the TBL. To add additional context to the financial component of the TBL, we have conducted an incremental cost analysis that estimates the value of Leaburg as a candidate resource in EWEB's generation portfolio in a similar way to other candidate resources considered in the IRP. The key assumption in this analysis is that there is an unavoidable cost of modifying the Leaburg Canal system for safe and reliable performance that is included across all alternatives considered. Therefore, the least cost alternative represents an unavoidable expense (or a sunk cost) that could be removed from consideration when comparing alternatives.

At first glance, the severely negative NPV (through 2076) for the return to service options suggests that EWEB will easily find more affordable replacement power sources if replacement power were necessary. At a NPV of negative $241M and a discounted power generation volume of 865k MWH, the apparent levelized cost of energy (LCOE) would be $278/MWH for Alternative 2, the full return to service. The analogous calculation for Alternative 3, new powerhouse at Luffman Spillway, ($184M for 345k MWH) yields an apparent LCOE of $533/MWH. However, this analysis ignores the fact that there is not a zero-cost alternative available to EWEB. Even the lowest cost decommissioning alternative will require very large expenditures without any power supply benefit. As such, an incremental cost approach that considers only the additional investment beyond the unavoidable expenditures provides another appropriate perspective on the cost per MWH for generation at Leaburg.

The NPV analysis results show that all four alternatives may result in a substantial loss for the Utility, but different alternatives result in different impacts to EWEB's future power supply. By looking at the incremental cost of generating energy at Leaburg, instead of revenue value, relative to market, we can compare it to the breakeven costs of alternative generating resources currently being considered in EWEB's IRP process. While the method may lack the rigor of full production cost modeling, a Levelized Cost of Energy (LCOE)[1] metric may shed light on whether the return to service alternatives at Leaburg have the potential of creating added value to EWEB's power portfolio relative to our replacement power options. The cost and generation information contained in the NPV analysis can be used to create a simple levelized cost metric. Comparison of LCOE's can help to contextualize the portfolio value of the return to service alternatives.

For added context, Leaburg generation has historically served approximately 4% of EWEB's annual loads, so the incremental generation (no matter the costs) are not likely to significantly impact EWEB's total portfolio costs. Additionally, EWEB is currently "long" on an average energy basis, meaning that we typically have more power than needed in most hours to meet our customer demand. However, EWEB's long term power needs and market conditions are uncertain and are being evaluated as part of the upcoming Integrated Resource Plan.

Basic LCOE Assumptions:

- The LCOE metric inputs do not include revenue assumptions, but they can be tested against the same cost and generation sensitivities included in the core NPV analysis.
- Estimated non energy (avoided capacity cost, REC, and Low Carbon) benefits have been included as an offset to project costs, to ensure comparability to other resources with like qualities.
- MWh generation was discounted by 4.2% to align Leaburg LCOEs with EWEB's power planning consultant E3s LCOEs used in the IRP.

[1] LCOE is a metric to measure the lifetime costs divided by energy production and allows for the comparison of different technologies of unequal life spans, project size, different capital cost, risk, return and capacities.

- Decommissioning costs are excluded from LCOE calculations because they are often uncertain, subject to regulatory oversight, and can be difficult to estimate. This supports comparability with other new electricity generating assets.

Assuming Alternative 4, the least NPV cost alternative, as our minimum unavoidable cost to compare against the other alternatives, we see the incremental differences as illustrated below in Table 14.

Table 14: Incremental Cost of Generation, assuming "Alternative 4" as minimum unavoidable cost

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Incremental Cost (Total $)	($28,800,000)	($80,100,000)	($9,800,000)	NA
Discounted Generation (total MWh)	NA	864,770	344,708	NA
Levelized Cost (Average $/MWh)	NA	$ (93)	$ (28)	NA

All alternatives in Table 14 add incremental cost as compared to Alternative 4, however Alternatives 2 and 3 also add generation. We divide the incremental cost by the incremental generation to calculate an estimated levelized cost of generation for each alternative compared to the unavoidable costs of Alternative 4. Alternatives 2 and 3 have an estimated incremental cost of generation of approximately $93/MWh and $28/MWh, respectively. For context, BPA provides the vast majority of EWEB's power today which costs approximately $33/MWh (Table 15).

Table 15: IRP Candidate Resources

IRP Candidate Resources	LCOE $/MWh
MT/WY Wind	22
Utility Solar (Eastern OR)	28
Leaburg Alternative 3	**28**
North East OR Wind	29
Energy Efficiency Bin 1	33
BPA Contract (Slice & Block)	33
Natural Gas CCCT (80%)	40
Community Solar	69
Cogeneration/Biomass	74
Natural Gas SCCT (40%)	74
Small Modular Nuclear (80%)	76
Leaburg Alternative 2	**93**
Offshore Wind	102
Residential Rooftop Solar	196
Energy Efficiency Bin 2	291

By comparing the resource alternatives in this way, Alternative 3 appears to be one of the lowest cost resources available to EWEB, where Alternative 2 appears higher on the stack of potential resource alternatives, and as such is less likely be part of EWEB's least-cost future portfolios. It should also be noted that Leaburg has existing transmission, whereas new wind or solar generation may require additional investment in transmission to bring the energy to serve EWEB's load.

Both the NPV and LCOE are valuable metrics to evaluate the Leaburg alternatives. The NPV is used for capital budgeting decisions whereas the LCOE can be useful for understanding power portfolio resource decisions.

Economic Risk and Uncertainty

Each parameter of the financial analysis contains uncertainty. For example, capital cost estimates have an expected range of -30% to +50% from baseline. Given this, the NPV results should be considered preliminary until a focused and refined feasibility and design effort is completed after an alternative is selected. Additionally, although other assumptions used in the NPV and sensitivity analysis attempt to capture the myriad of uncertainty and risk associated with the following elements, several are outside of EWEB's control:

- Unknown and changing regulatory requirements
- Changing economic climate
- Future market prices and replacement power options
- Changes in available flow for power generation due to climate change or other factors

Because there is inherent risk in relying heavily on analysis that is based on many assumptions, variables, and uncertainty, the NPV analysis should be considered a tool to better understand the general outcome of the different alternatives rather than a conclusive instrument.

Rate Impacts

The financing requirements of any scenario, both to cover the upfront capital costs and ongoing expenses, are expected to have a substantial impact on customer-owner rates. Due to the myriad of uncertainty and complexities associated with projecting rate impacts on a project that has many uncertainties and a capital cost range that currently varies from -30% to +50% of the baseline planning estimates, it is difficult to provide an accurate range of rate impacts at this time. In August, staff developed a conceptual indication of potential rate impacts based on a set of assumptions such as the possible timing for expenditures, debt service coverage ratio constraints at that particular point in time, and corresponding future borrowing rates. Although these conceptual rate impact indications are undoubtedly inaccurate, the work did illustrate that a project of this magnitude will trigger rate impacts that are proportional to the NPV values shown for each alternative.

Economic Impact Assessment Summary

The economic impact assessment scores were devised using input and analysis from EWEB SME's. Table 16 shows some examples of the considerations used as inputs to their respective assessment scores.

Table 16: Economic Impact Assessment Considerations

Attribute	Considerations
Project Costs / Impacts to Rates	• NPV Capital Costs • Permitting / Licensing • Property Acquisition Cost • NPV Annual O&M • NPV Sensitivities
Financing & Bond Rating Impacts	• Impacts to other EWEB projects • Sinking Fund
Power Price Reduction (Via EWEB Owned Generation)	• EWEB Resiliency • Community Resiliency

The following discussion draws from the financial information presented above to determine relative impact scores for each economic attribute included in the TBL. Below is a description of each economic attribute and key differences in impacts between the alternatives that affects their scoring.

Net Present Value / Impacts to rates – NPV and proportional rate impact for each alternative. The NPV includes all up-front capital construction costs, land acquisition and easement costs, and on-going costs for operation, offset by power sale revenues where relevant. Costs incurred from permitting and licensure are also included. As presented by the baseline NPV results and accompanying sensitivities, the relative economic performance ranking of the alternatives is consistent in each scenario with Alternative 4 showing as the best option. Using the relative economic performance rankings, the scoring results for this attribute are as follows:

- Alt 1 – Decomm to Pre-Project: -4
- Alt 2 – Full RTS: -5
- Alt 3 – Partial RTS: -3
- Alt 4 – Decomm to SWC: -2

EWEB fielded numerous comments from the public regarding the economic analysis. Highlighted example comments received during public outreach to date include:

- Concern that the baseline projections for future power prices do not reflect the increased demand for electricity due to electrification and the ongoing migration toward carbon-free power generation.
- Concern that capital cost estimates are too high and actual costs will be substantially lower.
- Concerns about the current affordability of electric rates and potential for future increases.
- Residential customer survey respondents indicate affordability and reliability should be EWEB's top drivers of decisions.

Financing and bond rating impacts – Each of the alternatives will need to be funded through bond issuance. Like all entities, there are limits to EWEB's debt servicing and bonding capacity. This attribute looks at each alternative and analyzes the impact on the organization's overall Bonding Capacity. EWEB has many large projects in its Capital Improvement Plan (CIP) and the need to fund Leaburg work likely means that completion schedules for other projects will be affected or those projects will incur higher interest rates. The potential for financing and bond rating impacts are proportional to their NPV such that the same scoring for the NPV attribute is appropriate.

- Alt 1 – Decomm to Pre-Project: -4
- Alt 2 – Full RTS: -5
- Alt 3 – Partial RTS: -3
- Alt 4 – Decomm to SWC: -2

EWEB has not fielded public comments regarding financing and bond rating impacts.

Power price risk reduction (via EWEB owned generation) – The relative importance of power generated from Leaburg versus EWEB obtaining power from outside sources in the future. The key question is the uncertainty of power availability and cost for EWEB in the long term. There is value in possessing long term power supply control, redundancy, and resiliency as a hedge against future power price uncertainty. The return to service options provide this type of value while the decommissioning options would create new power price risks. As such, this attribute is scored as follows:

- Alt 1 – Decomm to Pre-Project: -3
- Alt 2 – Full RTS: 0
- Alt 3 – Partial RTS: -2
- Alt 4 – Decomm to SWC: -3

EWEB has fielded a few comments regarding the value of owned generation. Highlighted example comments received during public outreach to date include:

- Concern that the loss of generation due to carbon reduction efforts will result in a scarcity of affordable power.
- Concern that electrification will result in a scarcity of affordable power.
- The "Save Leaburg Lake" petition highlights the value of local renewable power. Signature collection is ongoing with 50 pages of signed petitions submitted to the EWEB Board at their September meeting. The petitions included signatures from McKenzie Valley and Lane County residents as well as visitors from elsewhere in the Pacific Northwest and beyond.

TBL Assessment Results

Although this report contains most of the information staff plan to compile for the Board's decision making, community and Board feedback is still in progress and the sensitivity analysis continues to be refined. Attribute scoring may also be subject to change in areas where analysis is still in progress. Therefore, this draft TBL report does not attempt to provide results that will fully inform a management recommendation, but it can be used to consider trade-offs between alternatives. The final TBL report will be submitted to the Board in mid-November.

Forthcoming TBL Report Items

Due to continued analysis and ongoing public outreach and feedback, the following items will be included or updated in the final TBL Report:

- EWEB Board feedback on relative TBL importance
- Updated information on community and stakeholder comments and feedback
- Updated summary of sensitivity analysis and NPV data
- Final summary and conclusion

Next Steps and Upcoming Project Milestones

- Leaburg Canal Board Round Table Session – October 25, 2022
- Update via Off-Cycle Correspondence to Board – November 18, 2022
- Final Report from Consultant – November 2022
- Board Meeting - December 6, 2022: Final report/recommendation and Requested Board Action
- Special Meeting/Work Session December 20, 2022 – TBD as needed

Requested Board Action

No Board action is requested at this time. We encourage questions, request feedback on approach, and welcome suggestions regarding ongoing work.

Attachments: Appendix A – Alternative Scenario Descriptions

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.
- 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.

Alternative 1 - 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.

Alternative 2 - 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.

Alternative 3 - New powerhouse near the Luffman Spillway and conversion to stormwater conveyance downstream of the proposed powerhouse: This alterative was selected for further evaluation and consists of a new powerhouse constructed near the Luffman Spillway (1.25 miles downstream from Leaburg Dam), 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.

Alternative 4 - Decommissioning with a combination of stormwater conveyance and return to pre-construction 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 because risk assessment results indicate a safety hazard exists that must be remedied. The no action alternative 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. This alternative was not selected due to 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.

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. This alternative was not selected due to the presence of significant slope instability and potential land-slide risk near the prospective powerhouse location at Hansen Creek which would require extensive mitigation.

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. This alternative was not selected due to the presence of significant slope instability and potential land-slide risk near the prospective powerhouse location at Hansen Creek, which would require extensive mitigation, as well as the 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.

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. This alternative was not selected due to the limited power production revenues vs. overall investment and O&M cost for the close-coupled power generation alternatives.

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. This alternative was not selected due to the limited power production revenues vs. overall investment and O&M cost for the close-coupled power generation alternatives.

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. This alternative was not selected due to 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.