



MEMORANDUM

EUGENE WATER & ELECTRIC BOARD

Rely on us.

TO: Commissioners Helgeson, Brown, Mital, Simpson and Carlson
FROM: Mel Damewood, Chief Engineering and Operations Officer
DATE: May 5, 2017
SUBJECT: Alternative Water Source Scenario Analysis
OBJECTIVE: Information Only

Issue

The Board of Commissioners (Board) will be participating in a Strategic Planning Work Session on May 16, 2017. One agenda item is a discussion of the Alternative Water Source Program. This memo is intended to help facilitate this discussion by providing a summary of various alternatives that could be implemented to provide a source of drinking water if EWEB lost its McKenzie River Supply and/or the Hayden Bridge Water Filtration Plant (HB WTP).

Background

Of the 20 largest cities in the Northwest, Eugene is the only one with a single source of supply. Over the last half of a century EWEB has explored multiple avenues to expand and or diversify its water supply portfolio. Over the last decade a comprehensive evaluation of all feasible water supply options were re-evaluated. These options included surface water, deep and shallow groundwater, regional supply options, and emergency water supply solutions such as the emergency water distribution and treatment trailers. Ultimately it was determined that developing a second source of water supply from the Willamette River was the most desirable solution. This determination was based on the realization that there were limited options to serve a community our size and that our reliability goals needed to be on a trajectory that is consistent with the Oregon Resiliency Plan framework around level of service goals for water supply organizations.

As alluded to above, our current and past efforts on developing an Alternative Water Source have been driven by concerns on the reliance of a single source and treatment plant to meet the demands of a growing population. While the existing McKenzie River supply system has been very reliable to date there are numerous events that could trigger an outage including:

- The Cascadia Subduction Zone Earthquake (CSZE). This event has most utilities working to upgrade their systems. EWEB will have completed seismic upgrades to the Hayden Bridge Filtration Plant by the end of this year. While the recent upgrades will keep the structure standing, it is still an old facility and depending on the severity of the event, it is likely that the plant could be out of service for some time following the CSZE while repairs are being made.

- An Un-Planned Outage at HB WTP. There are numerous events that could cause Hayden Bridge to shut down. These include a fire in one of our two primary electric rooms; the flooding of our finished water pump station or our intake electrical facilities; or structural failures leading to contamination of our clear wells. These are just some of the possibilities that might occur. One tries to think of everything while you are rehabilitating a facility but you can't do everything but because the plant has to be in operation at all times. This limits the amount and types of work that can be done.
- A Planned Outage at HB WTP. We have replaced most of the mechanical equipment and a significant amount of the electrical systems. One day, however, we will need to start replacing primary structural facilities and electrical systems. This work could easily require planned outages at the plant.
- Source Water Disruption. An extreme low-water drought, chemical spills in the river, wild fires in the watershed, or other incidents could lead to disruption of water availability or water quality issues that impact the ability to successfully treat the water to drinking water standards
- Disruptions of our Transmission System. EWEB has two large diameter transmission lines from the plant to the EWEB service territory, one built in the 1940s and one in the 1960s. These are located adjacent to each other in a five mile corridor. Events along this corridor could easily take out both transmission lines. We have stockpiled several pieces of large diameter pipe for possible repairs but depending on the event, a prolonged outage could occur. EWEB will also need to replace these transmission lines someday which could limit the output capacity of the HB WTP.

Given the above concerns, the Board has authorized our current effort at development of a second source, which places a new intake and water filtration plant just downstream of the confluence of the Coast and Middle Forks of the Willamette River. This work began in earnest in 2014 and the project is currently in the preliminary design stage.

Concurrent with the present preliminary design work, EWEB has been reaching out to the public to both inform and gauge public support for the project and its resiliency efforts. This work has included meetings and discussions with numerous civic and homeowner organizations, briefings with City and County elected officials, formal customer surveys, and feedback from a Blue Ribbon Panel convened for the project. EWEB has seen positive support for the current project and its resiliency efforts. A summary of the Blue Ribbon Panel results was included as Correspondence in the May 2, 2017 Board Packet. Also included is the May 2nd Board Packet is a letter of support from the State Resiliency Officer.

Recent EWEB efforts focused on affordability, however, have caused Management and the Board to question the strategic direction of the current 2nd Source Project due to the cost and the impact to customer rates. This subsequently led to the desire to discuss alternatives at the May 16th Strategic Planning Work Session.

This memo is intended to provide information on alternative water supply scenarios in order to spur discussion at the Work Session.

Discussion

The following sections will provide possible discussion points for the Strategic Planning Work Session include level of service goals and potential alternative water supply scenarios for consideration.

Level of Service Goals

One cannot begin discussing alternative water supply scenarios without considering the level of service desired. Overall both the level of service goals and EWEB's overall strategy should be consistent with the requirements of the Oregon Resiliency Plan.

With respect to alternative water supply scenarios discussed herein, the level of service topics that should be discussed include:

- Capacity – How much water should be provided by an Alternative Source?

EWEB completed an Emergency Water Supply Plan in 2012 which stated that the minimum quantity of water that should be provided to customers is approximately 2 gallons per person per day. This equals approximately 300,000 gallons per day given EWEB's customer count. This is near the bottom of the range of alternatives to be considered. At the top of the range is our maximum day demand, currently at approximately 50 Million Gallons per Day (MGD). The capacity of any alternative source of water scenario will fall between these two bookends.

For reference, Figure 1 below shows the breakdown of our current water use. This chart represents a maximum day scenario. During the winter, the green portion-irrigation/outside water use - essentially drops to zero resulting in the current minimum water demand of about 16 MGD.

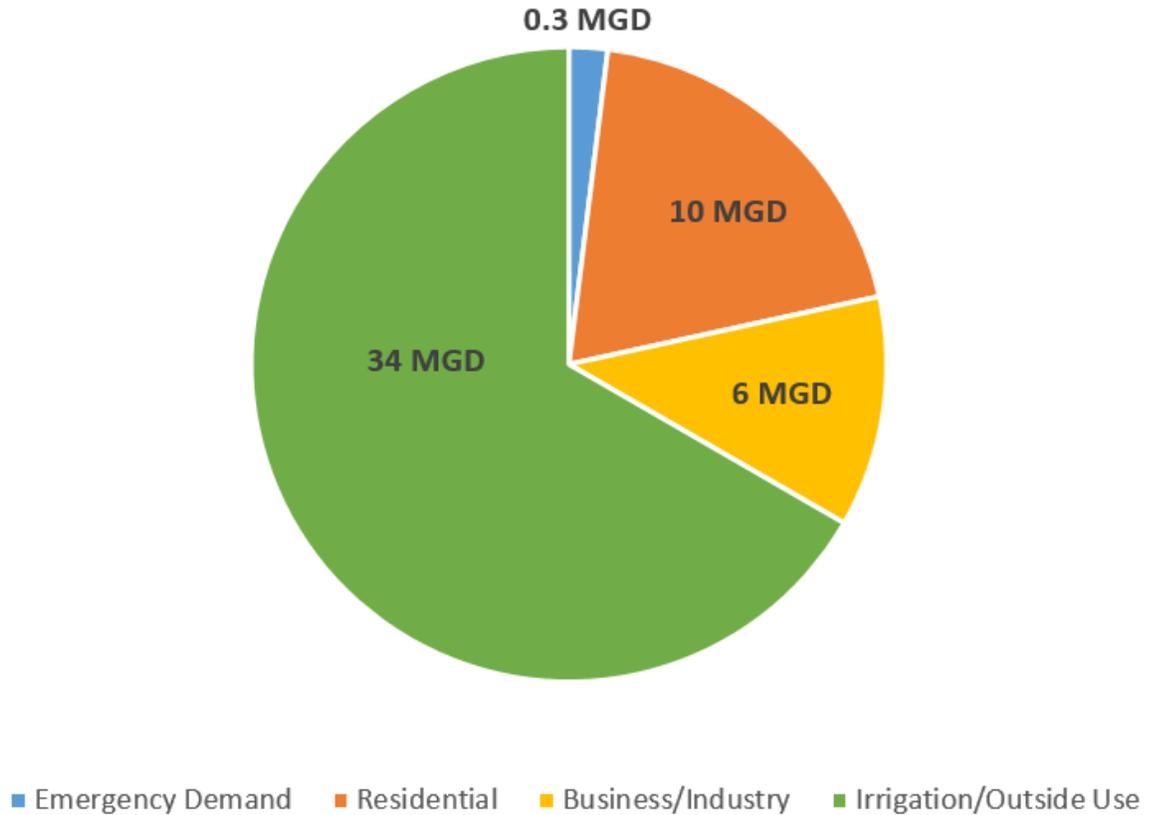


Figure 1. EWEB Current Water Use.

- Delivery Method – How should water be delivered from an Alternative Source if we lose our McKenzie River Supply?

Related to the capacity discussion is the preferred delivery method. Emergency only scenarios which only provide water for life/safety would require customers to travel to a distribution site with their own water containers to pick up water for consumption, potable or not. Scenarios which provide greater amounts of water would be able to fill and pressurize the distribution system which would provide water to customers’ homes and businesses.

The exact supply capacity level where you switch from delivery at distribution points to delivery to homes/business is difficult to determine. It really depends on the condition of the distribution system and the level of curtailment achieved. For example, a catastrophic failure at Hayden Bridge or an event in the McKenzie watershed would not impact the distribution system at all, while some damage to our distribution system is probable in a CSZE.

It is estimated that the Alternative Source of Supply would need to provide at least 10 MGD for delivery through the distribution system. Note that it takes approximately 13 Million

gallons just to fill the pipelines in the distribution system. This does not include the amount needed to fill reservoirs.

- Availability – How soon should water be available for distribution after we lose our McKenzie River Supply?
If something disrupts our McKenzie River source, there will be a maximum of one to two days of water available from storage, assuming our distribution system is intact. If the distribution system is compromised, a water outage could occur much sooner.

Some alternatives will take longer than others to prepare. Alternatives where you need to mobilize staff and equipment to distribution sites will take a longer time to deliver water (a few days) than from a facility that is already operating on a regular basis (a few hours if offline).

Alternative Water Supply Scenarios

The following provides possible discussion points surrounding various alternative water supply scenarios.

- Do Nothing – No Alternative Source of Supply (Relative Cost 0)

In a strategic discussion, one has to consider this alternative. Our McKenzie River Supply has been meeting the water demands for EWEB Customers since the 1940s without interruption. The supply system is only getting older however and someday we will lose this source. The question is for how long.

- Emergency Only Alternatives (Relative Cost \$)

An emergency only supply alternative would generally consist of several distribution sites located throughout EWEB's service territory where customers would bring water jugs to fill up for domestic use at home. EWEB's 2012 Emergency Water Supply Plan envisioned 6 distribution points located throughout the City. As mentioned above, the design criteria for this system currently is 2 gallons per person per day. Water supply could be from various sources including:

- Our existing reservoirs with water trucked to the distribution sites.
- Surface water which has been treated with portable treatment trailers then trucked to distribution sites.
- Local wells located at or near distribution sites. These sites could be at schools where microgrids could be provided for a source of electricity and where community members are likely to seek resources during emergencies
- An operable permanent surface water treatment plant.

The specific source is not as important in a strategic discussion as is the concept of this being the only supply of water when EWEB loses its McKenzie River supply.

Concurrent with EWEB's second source project, EWEB is developing an emergency supply program. The status of this program is covered in a separate Board Memo.

- Interties (Relative Cost \$)

EWEB has 5 interties with the Springfield Utility Board (SUB) and Rainbow Water District (RWD) where water can be shared back and forth if one of the entities loses its ability to produce water. These interties can produce up to about 5 MGD for EWEB under optimal conditions. Note that these interties do exist. The relative cost shown is for the further development and improvement of these facilities.

The advantages to these interties is that while there are some improvements that could be made to them, they are in place. The disadvantage is their limited capacity and the fact they will likely not be operable following events such as the CSZ earthquake or other regional events that could affect the electric grid which provides power to the SUB and RWD wells.

- Other Regional Solutions (Relative Cost \$\$\$-\$\$\$\$\$)

Expanding beyond just the interties, there is and has been the potential for a regional solution to develop a robust water source that would serve the needs of EWEB, SUB, RWD and surrounding communities. These regional solutions can take many forms and require the political will of all parties to be successful. Previous efforts over the past decade by EWEB to implement a regional solution have not been successful.

As mentioned, a regional solution beyond interties could take many forms. It is our understanding that SUB has plans to construct a 20 MGD plant on the McKenzie River to meet demands in the Thurston area. Given the fact that we have excess capacity at our Hayden Bridge Filtration Plant a potential regional solution could be:

- SUD does not build a new surface water plant and instead transfers their water rights on the McKenzie to Hayden Bridge then constructs a pipeline from Hayden Bridge to the Thurston Area. The transfer of SUBs water rights does not mean SUB would relinquish those rights, just the point of diversion would be changed.
- EWEB provides water to the Thurston Area from Hayden Bridge and uses the proceeds from the wholesale of water to SUB to help offset the costs of a new EWEB treatment plant on the Willamette.
- The new EWEB constructed/operated plant on the Willamette provides both EWEB and SUB with a robust new treatment plant to meet demands, both normal and during emergency events.

Even with the above there would be lots of alternatives to consider and whatever solution was selected would have to meet the financial goals of each utility as well as maintain the priority of each utility's respective water rights. The capacity of a regional solution will ultimately depend on what gets agreed upon by all parties.

The advantages of a regional solution is the number of surface water treatment plants in the region could be reduced and there could be cost savings for all parties involved. Note that a

regional solution does require both communities to be committed to curtailment of all systems to leverage capacity to help each other during emergencies. If this does not occur then the cost advantage to a regional solution could quickly disappear due to the construction of redundant systems.

- New EWEB Water Treatment Plant on the Willamette River (Relative Cost \$\$\$\$\$)

This is our current Second Source project. The status of this project is provided in a separate Board Memo but in summary, a new water treatment plant is proposed on the Willamette River to provide up to 16 MGD of supply in the event of a disruption of our McKenzie River source. The plant is being designed to be seismically resilient and able to be in operation within 24 hours of a seismic event. In addition, over time EWEB will be strengthening its transmission system to ensure that water from the new plant could be distributed in the event that our distribution system is compromised. As mentioned previously, delivery of water is not an issue if the event is local to Hayden Bridge or the McKenzie Watershed, however it could be following the CSZE. The new plant is a key component of the ‘resilient spine’ of our water system.

The advantages of this alternative are that it meets EWEB’s needs with respect to an alternative water source to the level that only irrigation and outdoor water use will need to be curtailed and it solidifies our most senior and important water right. The Willamette Water right is one of the most valuable assets within the region. Business and industry could continue relatively unaffected in the event of a disruption of our McKenzie River source.

A disadvantage to this Alternative is cost. Recent value engineering efforts have confirmed that the project could be constructed within the amount currently in the CIP, however, the cost is still significant.

- Scaled Down Water Treatment Plant on the Willamette River (Relative Cost \$\$-\$\$\$\$)

To meet affordability targets, the proposed new water treatment plant on the Willamette could be scaled back. Possibly reducing the capacity to provide for only domestic use or less, maybe between 5 and 10 MGD. The scaled back project could be constructed to minimize lost investment if plans for a larger plant were implemented in the future.

Water Supply Alternatives are Not Mutually Exclusive

It should be noted that the above described alternative scenarios are not mutually exclusive. For a truly robust water supply system a utility should have several alternative sources in addition to an emergency only plan. Currently for EWEB, the plan is to have multiple surface water sources, interties, as well an emergency water supply plan. These would be supplemented in the future with the potential development of groundwater sources.

Recommendation/Requested Board Action

None. This is an information item only.

If you have any questions please contact Mel Damewood, Chief Engineering and Operations Officer at 541-685-7145 or email mel.damewood@eweb.org.