

**TVWD Long-Term Water Supply Planning  
Technical Memorandum 1 – Introduction & Options**

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To: TVWD Board of Commissioners  
From: Mark Knudson, P.E., Tualatin Valley Water District  
Nicki Pozos, P.E., HDR  
Ronan Igloria, P.E., HDR  
Date: April 10, 2013  
RE: **Technical Memorandum 1 – Introduction & Options – *FINAL***



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## **1.0 INTRODUCTION**

Tualatin Valley Water District (TVWD, the District) is evaluating long-term water supply options to serve projected water supply needs through the year 2050. The current water supply evaluation efforts are summarized in a series of six technical memoranda (TMs) as follows:

- TM 1 – Introduction and Supply Options
- TM 2 – Population and Water Demand Projections
- TM 3 – Economic and Financial Evaluation
- TM 4 – Non-financial Criteria Evaluation
- TM 5 – Public Involvement and Outreach
- TM 6 – Evaluation of Supply Options

The purpose of this memorandum is to summarize the objectives and water supply options the TVWD Board of Commissioners (Board) will consider in this process.

## **2.0 WATER SUPPLY DECISION HISTORY**

Long-term water supply options for the District were most recently evaluated in 2007, when the Board identified the Tualatin Basin Water Supply Project (TBWSP) as the preferred option for the District. The 2007 water supply evaluation compared three main options: (i) continued supply from the Portland Water Bureau (Portland); (ii) the TBWSP; and (iii) supply from the Willamette River. The 2007 decision was based on a long-term economic evaluation of the water supply options combined with an evaluation of non-financial criteria. Based on the 2007 decision, the District began moving forward with further planning of the TBWSP option.

Since that time, a number of significant changes have altered the District's understanding of the costs and risks associated with the various water supply alternatives. These significant changes are summarized below:

- **Increases in funding and schedule uncertainty associated with the Tualatin Basin Water Supply Project.** There have been two significant changes to the understanding of the TBWSP since 2007. First, new understanding of the vulnerability of the existing dam to a potential Cascadia Subduction Zone Earthquake identified the need for significant seismic upgrades to

the existing structure. Initial costs for these improvements have been estimated at \$340 million. This additional cost requires federal funding for this option to remain cost-competitive with other available options, resulting in increased uncertainty in the implementation schedule. The second significant change in the TBWSP was identification of the populations of two species listed under the Endangered Species Act (Fender's Blue Butterfly is an endangered species and Kincaid's Lupin is a threatened species) in the area that would be inundated by the raised dam, increasing both environmental mitigation costs and risks that the project could not be implemented. The additional costs from these new issues have revealed long-term uncertainties and higher-than-assumed risks to the schedule and costs for implementing this supply option.

- **Decreases in projected TVWD demands.** Since 2007, the District has observed a decrease in both per capita demands and the peak day to average day peaking factor. Though attributed to the poor economy, it is thought that these changes indicate long-term changes in water use habits that will endure. In addition, the District has observed much slower population growth than anticipated in the 2007 Water Master Plan Update. Overall, these changes affect the projected costs of the various water supply options due to changes in assumptions in overall supply capacities, projected annual usage, and TVWD cost shares among partners. Revised population and demands projections are described within TM 2, and were the basis for the economic and financial evaluations described in TM 3.
- **Changes in assumed costs for the Portland supply.** Since 2007, TVWD has reduced its peak day and peak season peaking factors (ratio of peak three days to average day supply and ratio of peak three months to average day supply, respectively) off the Portland supply by 30 percent, reducing the unit cost of water. Portland also received a variance of the Long-term 2 Enhanced Surface Water Treatment Rule (LT2), allowing implementation of Ultraviolet (UV) disinfection (and the associated capital cost) to be deferred for an uncertain number of years. Both of these factors reduce the projected wholesale purchase cost of continued or expanded Portland supply.
- **Expanded interim supply options.** Options available to bridge short-term supply shortfalls include: (i) leasing capacity from JWC partners; (ii) expanded TVWD and Joint Water Commission (JWC) Aquifer Storage and Recover (ASR) projects; and (iii) interim expansion of the JWC Water Treatment Plant. These options provide schedule flexibility, allowing implementation of a long-term supply to be delayed to increase affordability while also allowing TVWD to reduce supply costs during the interim period.
- **Decreased energy costs.** Energy costs have been lower than assumed in the 2007 evaluation due to the abundance of domestic natural gas. Lower energy costs help reduce the operating costs for supply options that rely on pumping.

These changes were reviewed at the May 8, 2012 Board Work Session, at which time the consensus of the Board was to update the District's supply strategy based on these changes.

### **3.0 WATER SUPPLY OPTIONS**

For the current evaluation, the District is considering four long-term water supply options. The City of Hillsboro Water Department (Hillsboro), as part of Hillsboro's Water Master Plan update, initially developed these options. The District worked in close coordination with the City of Hillsboro in

considering the supply options. Each option assumes development of the supplies in partnership with Hillsboro and, depending on the option, other regional partners.

The four long-term water supply options are described below and presented in attached Figures 8-2A through 8-2D (adapted from TM 8 prepared for the Hillsboro Water Supply Plan by Black & Veatch). These descriptions and figures are based on the regional supply, not solely that portion that would serve TVWD.

**Portland Supply.** This option would expand the Portland supply system through which TVWD currently purchases wholesale water. As initially proposed in the Hillsboro study, this option consists of a new 54-inch diameter Washington County Supply Line (WCSL2) that would generally parallel the existing WCSL and extend over 24 miles from Portland’s Powell Butte Reservoir to a new 20-million-gallon (MG) terminal storage reservoir to be located on the north slope of Cooper Mountain near Hazeldale. This option also includes a 36-million-gallon-per day (mgd) booster pump station and an additional 6.5 miles of 48-inch diameter piping to connect to the existing Joint Water Commission (JWC) North Transmission Line (NTL). This configuration assumes improvements would be developed to serve TVWD and Hillsboro.

In September 2012, Hillsboro identified that the Portland option was not financially cost effective as compared to other options and Hillsboro “sidelined” this option. As a result, TVWD developed a “TVWD only” Portland option, which consists of a smaller, 48-inch diameter WCLS2 and eliminates the 20 MG terminal storage reservoir, booster pump station and connection to the JWC transmission system. This revised configuration assumes improvements would serve only TVWD.

**Mid-Willamette Supply.** This option would further develop the Willamette supply at Wilsonville, which is currently being used by the Cities of Wilsonville and Sherwood. This option consists of: (i) the addition of an intake screen to the existing intake and additional raw water pumping at the existing Wilsonville intake to fully utilize the existing intake capacity; (ii) 80-mgd expansion of the Wilsonville Water Treatment Plant (WTP) on an adjacent “upper site”; (iii) thirteen miles of 66-inch diameter transmission piping from the WTP to a new 20-MG terminal storage reservoir on the south side of Cooper Mountain; and (iv) six miles of a 60-inch diameter pipeline from the terminal storage reservoir to connect with the TVWD system near Hazeldale. This option also includes a 36-mgd booster pump station, an additional 6.5 miles of 48-inch diameter pipeline to connect to the existing JWC NTL, and 7.6 miles of a 54-inch diameter pipeline to connect to TVWD’s existing transmission system. This option assumes improvements would serve TVWD and Hillsboro. It is also assumed that TVWD’s Metzger service area would continue to be served from the Portland supply.

**Tualatin Basin Water Supply Project (TBWSP).** The TBWSP option is based on the planned expansion of the JWC’s existing Hagg Lake supply. This option consists of rebuilding Scoggins Dam to improve the dam’s seismic reliability and increase the height of the dam, thereby increasing the storage capacity of Hagg Lake. A new 300-mgd intake would be constructed on the Tualatin River near the existing Spring Hill Pumping Plant. A new 96-inch diameter Raw Water Pipeline (RWP) would extend over 7 miles from Hagg Lake to the JWC WTP and would serve dual purposes. In the summer the RWP would increase conveyance capacity from Hagg Lake to both the WTP and the Tualatin River, supplementing current conveyance in the river. In the winter, the pipeline would operate in a reversed “pump-back” mode from the Tualatin River to Hagg Lake to increase reliability

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of the supply. This option also includes: an 80-mgd expansion of the JWC WTP; a parallel 60-inch diameter South Transmission Line (STL2) that would extend over 11 miles from the JWC Fern Hill Reservoirs to Hazeldale; and a 36-mgd booster pump station and additional 6.5 miles of 48-inch diameter piping to connect to the existing JWC NTL.

This option would be developed to help meet municipal water demands for TVWD, Hillsboro and Beaverton as well as environmental flow requirements on the Tualatin River for Clean Water Services. It is also assumed that TVWD's Metzger service area would continue to be served from the Portland supply.

The project initially assumed cost sharing with the Bureau of Reclamation and current dam repayment contractors (which excludes TVWD) for the seismic upgrade portion of the project. In November 2012, a representative of the Bureau of Reclamation indicated that Reclamation may not fund structural upgrades to the existing dam in the foreseeable future. As a result, TVWD also developed a TBWSP option that excluded cost sharing by Reclamation for seismic improvements to the existing dam.

**Northern Groundwater Supply.** This option would develop a new source of supply using groundwater resources in the Scappoose area. This option includes: a new 80-mgd wellfield consisting of eight 10-mgd collector wells; over 7 miles of wellfield piping from 24- to 66-inches in diameter; an advanced water treatment plant on a new site in Scappoose; an 80-mgd booster pump station, over 14.5 miles of transmission piping from the WTP over Cornelius Pass to connect to the existing JWC NTL; a new 20-MG storage reservoir with location to be determined; and an additional 2.5 miles of 48-inch diameter piping to connect to the JWC STL. This option would be developed to serve TVWD and Hillsboro. It is also assumed that TVWD's Metzger service area would continue to be served from the Portland supply.