

Attachment 5

ALTERNATIVE WATER SUPPLY ANALYSIS

DRIFT CREEK DAM PROJECT MARION COUNTY, OREGON



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SECTION 1.0 INTRODUCTION

1.0 Background

The East Valley Water District (EVWD) was formally recognized in 2002 as an irrigation district under Oregon Revised Statutes, Chapter 545. Prior to organization as a special district local government, the landowners within the district boundary were organized as the Pudding River Basin Water Resources Development Association (Association) in 1993. The purpose of formation of both groups was to identify and fund the development of an alternative water supply to conserve currently stressed groundwater resources and ultimately provide a stable and environmentally sound source of water for the District's water users.

Reconnaissance Level Investigation – 1994

Between 1991 and 1994 the Association completed an extensive study to identify and estimate cost for water supply alternatives for irrigation (*Attachment 6*). The Pudding River Drainage Area of the Mid-Willamette Valley provides a major portion of the agricultural production in Marion County and a portion of value in adjoining Clackamas County to the north. Water shortages for irrigation to supply the crop needs in this section of the Willamette Basin motivated the Association to conduct the study to

- Evaluate groundwater conditions within the defined service area
- Identify current and future water needs in the service area
- Develop alternatives to meet the needed uses
- Identify an implementation strategy

The study addressed potential resolutions for the water shortage, including

- Groundwater recharge
- Purchase and importation of water
- New storage facilities

The study further explored

- Financing and implementation of the alternatives

1.1 Project Need

The District's service area is approximately 15,000 acres extending northerly from just north of Silverton to just south of Woodburn and Molalla, between the Pudding River on the west and the Cascade Mountain foothills on the east. The District's approximately 75 members are currently served by a combination of individual farm wells and direct withdrawals from local surface waters. Limited surface water supplies and lowering groundwater levels make the development of a new surface water source an imperative.

1.2 Limited Current Water Supply

Over 26,000 acres of land in the immediate area in this part of the Willamette Basin are protected by the Oregon Water Resources Department (OWRD) as designated areas that prevent additional water right applications. Nearly three square miles of high-value irrigated agriculture is at risk in these areas in which expanded groundwater use is only permitted for small domestic uses. The limited groundwater supply has substantial impact on the growers, the food processing industry and the local rural economies in this area.

Two Groundwater Limited Areas (GLA) limit the available water supply in the District service area:

- Mt. Angel Groundwater Limited Area 10,640 acres
- Gladtidings Groundwater Limited Area 16,000 acres

The northern Willamette Valley and much of the Columbia River plateau contain many sources of groundwater that are isolated in volcanic rock. These aquifers make up the Columbia River Basalt group. These two areas are among the 12 “Groundwater Limited Areas” designated by the OWRD. OWRD protects existing water rights in the GLAs by preventing excessive groundwater declines, restoring aquifer stability and preserving aquifers with limited storage capacity.

In addition, surface water supply has been fully appropriated for the area and it is regularly limited during the period of use for irrigation purposes. Conditional “time-limited” permits and temporary transfers now in place are not long-term and some of the time-limited permits have been cancelled. Development of a reservoir would relieve the over-appropriated surface water source.

1.3 Current and Future Water Supply Needs

The 1994 study recognized that within the service area of this part of the Willamette Basin there was an identified 33,360 acres of net productive agriculture land, according to the Bureau of Reclamation land classification data. (*Review study results, Attachment 6.*) Reclamation has an economic review process in place that determines viability of irrigated land for production value.

While that is a significant potential, currently about 15,000 acres are actually irrigated by groundwater and surface water. Permits and certificates for surface water equate to about 10,800 acres. Applications are on file at OWRD for an additional 940 acres. Additional acreage is irrigated from groundwater. Some of these lands are currently irrigated under temporary permits that will expire in the next few years. Currently the water rights and permits are held in the names of individuals in the District. The water right for the proposed storage project would be held in the name of the District and provide primary and supplemental use to District users to fulfill unmet needs.

Irrigation water requirements estimated for the District service area identified in a number of past investigations and planning studies. The commonly developed per-acre estimates of irrigation requirements average 1.8 acre-feet per acre. See *Attachment 6*, page III-6 for the calculations. The total estimated need of water for the District was calculated to be 23,357 a.f. annually. Depending upon the project selection (import or storage), a portion of the need would come from stored water and a portion from existing groundwater and surface water rights.

1.4 Crop Values

Vegetables, nursery stock and other crops are part of the \$493 million dollar agriculture value for Marion County, the largest agriculture producing county in the state in dollar value, according to the Oregon Department of Agriculture. Irrigated farms produce more than 80% of the total value of Oregon's harvested crops with 15% of all economic activity in Oregon tied to agriculture. The jobs provided in this area of Marion County are significant to Oregon's economy, including the after harvest jobs provided by food processing companies and wholesale nurseries in the county.

SECTION 2 PAST ALTERNATIVES REVIEWED

2.1 Groundwater

Since 1999, the OWRD has been monitoring well measurements in this area. In the 1960s and 1970s new well installation and deepening occurred with some concentrations in the two GLAs. Wells were deepened in the 1970s, not primarily due to a declining water table but due to the increasing markets for high value food and nursery crops that were developing.

Groundwater recharge was deemed infeasible in the 1994 study (*attachment 6*).

- Use of aquifers for seasonal storage requires a surface water source with accompanying diversion structures or storage reservoir.
- Water treatment would be needed to meet state mandated non-degradation standards and the cost of treatment would be excessively high.
- Several wells would be required to meet the demands for an injection well recharge system.
- All injection wells would have to be connected to the diversion or surface water reservoir, requiring a network of pipes or canals.
- Capacity of the basalt aquifer to receive and transport injected water to points of use is presently unknown; insufficient hydrogeological data exist to support consideration.

The OWRD relates there has been no activity in this area to develop a demonstration ASR (aquifer storage recovery) project.

2.2 Reclaimed Water

In the 1990s the City of Salem considered a reclaimed water project that might benefit the District farmers if the reclaimed water could be delivered effectively to the District. However, the cost of treating the water to a high enough water quality level to apply to crops and the piping infrastructure necessary to deliver the water made the project infeasible. An alternate plan to put reclaimed water into the river and then withdraw it at another diversion point from the river close to the District service area also was not workable as the water would still have to be treated to a certain level to place it in the river system. There was also a concern that there would be an impact on the fishery resource from importing water from one stream system into another. In addition, food processors were concerned that the public would not be accepting of vegetable crops irrigated with reclaimed water from refuse water facilities.

2.3 Importation of Contracted Water

The federal reservoirs on the Willamette as managed by the Army Corps of Engineers (Corps) were another source of water considered. Detroit Reservoir is the project closest to the District service area. The U.S. Bureau of Reclamation holds water rights for agriculture purposes filed with the OWRD. Reclamation has contracted with other districts (Santiam Water Control District and Greenberry Irrigation District, among others) and individuals to supply either primary or supplemental irrigation rights for crops in the basin.

The sale of water from the Detroit Reservoir is complicated by the fact that the water right held by Reclamation cannot be used for instream water rights as the right is designated for irrigation only. To surmount that problem, in the 1990s the District contemplated an exchange concept whereby water would be purchased to obtain a supply for 7,500 acres plus supplemental rights for an additional 8,400 acres, or a total of 15,900 acres. If that amount of water could be contracted with Reclamation, then under the exchange program the current surface water right holders who divert from major tributaries and from the Pudding River downstream from the project area would relinquish their rights and leave water they customarily diverted instream.

Plans included a diversion from the North Santiam River and a pumping plant just east of the City of Stayton. Then a 66" diameter pipeline would be routed along public roads to the east and around the north side of Sublimity and then follow the Cascade Highway for about 5 miles where the Pudding River crosses the highway. A 60" diameter pipeline would carry water to the areas to be irrigated. This plan anticipated adding some landowners in Sublimity to the delivery system enroute.

Water purchased from Reclamation would remain in the Pudding River until it reached the proposed pumping station at river mile 48 where it would be diverted. The resulting pipeline system would provide turnouts to Silver, Abiqua, Zollner and Butte Creeks and to tributaries of Rock Creek. Water for irrigation would be released to these streams in lieu of an area-wide pipeline distribution system. Exchange/augmentation water also would be released to each tributary and subsequently reach the Pudding River.

Under this system, the City of Mt. Angel could also acquire a water right and convert it to municipal use as part of the exchange system.

The capital cost of infrastructure estimated for the importation project was \$43 million plus approximately \$48,000 per year in water contract purchase costs. Today that cost would be \$120,000 per year (\$8.00 acre foot) for water purchase annually.



DETROIT RESERVOIR – U.S. ARMY CORPS OF ENGINEERS PHOTO

2.4 New Storage Facility

Site Identification

The 1994 study indicated over 75 reservoir sites have been identified in the mid- and late-sixties on streams in the District service area. The 1994 study evaluated 38 of the sites (see page E3, Table E-1 of Attachment 6). In applying screening criteria to the inventory identified based on sufficient inflow, environmental conditions at the site, ability to transport the water economically and potential project cost, three sites were selected for examination:

- Lower Grange at about stream mile 9 on Silver Creek
- A site at about mile 14 on Abiqua Creek
- Del Aire Ranch site at about stream mile 14 on Butte Creek.

Further analysis found the site on Abiqua Creek to be cost prohibitive as a dam to create the necessary storage would require the largest volume embankment of the three sites under consideration. The site on Silver Creek required a pumping station to lift water over a ridge, making it cost prohibitive.

Del Aire Site

Studies in the early 1990s concluded that the Del Aire site on Butte Creek was the preferred site. The projected cost for the site was \$45 to \$55 million in 1992 dollars. A plan to borrow federal funds, incorporate some grant funding for providing instream benefits, coupled with sales to irrigators and other users, would provide the necessary funds for the project. The Del Aire site would have provided 36,266 acre-feet of storage within the roller-compacted-concrete structure. The dam would have been about 200' high and would provide water for multipurpose uses: irrigation, instream benefits and municipal use. Attachment 6 details the study and plan for the reservoir.

Refer to page vii in Attachment 6 for a diagram that includes mapping of the GLAs, the Detroit importation strategy and the Del Aire site that was selected.

SECTION 3

CURRENT UPDATE OF ALTERNATIVES

Under the grant provided by OWRD, one of the tasks was to analyze the status of previously identified water supply options and respond as to whether these options were viable currently as an alternative source of water supply for the District.

3.1 Groundwater

Groundwater resources are not a viable alternative as a substantial amount of the land to be irrigated by District water users lies within the two Groundwater Limited Areas. Nothing has changed to assure that an Aquifer Storage Recovery (ASR) Project would be viable and there are no demonstration projects performed in the area to show a positive result for that technology.

3.2 Reclaimed Water

The City of Salem reclaimed water potential no longer exists as the city has developed a tertiary treatment center since the time that option was identified. There has not been a change in the food processing companies' willingness to accept vegetable crops irrigated with reclaimed water.

3.3 Importation of Contracted Water

Water service contracts are provided by Reclamation under its 1939 authorities. The District has considered a water service contract as a backup plan for water supply for a number of years. However in 1999, Reclamation, in agreement with the Army Corps of Engineers, suspended long-term contracting for the Willamette Basin Project (the 11 storage and 2 reregulating reservoir projects constructed on tributary streams of the Willamette River) pending the completion of the on-going Endangered Species Act (ESA) consultation. During that time short-term contracts were available to applicants when NEPA and ESA compliance has occurred. Long-term contract actions in the Project remain suspended. The last contract issued was to Greenberry Irrigation District (a five-year contract with potential extensions) at a price of \$8/acre foot.

There are 1,640,000 acre feet of conservation storage space in the Project for multiple use and only 50,230.8 acre feet of water has been contracted (3% of storage space). There are additional pending contract applications for 30,197 acre feet of water. If those are eventually granted, only 5% of the total storage capacity would be used. Reclamation holds permits from OWRD to use all of the storage capacity for irrigation purposes.

In July of 2008, National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) each issued a biological opinion (BiOp) on the Project to the Army Corps of Engineers, Bonneville Power Administration and the Bureau of Reclamation to ensure that the continued operation of the Willamette Valley Project dams, reservoirs, hatcheries and riverbanks will not reduce the likelihood of survival and recovery of the four ESA-listed fish. The BiOp establishes "reasonable and prudent actions" to minimize possible adverse effects on the listed species and their critical habitat. Monitoring is also required. The State of Oregon and NMFS continue their development of a long-term recovery plan for Upper Willamette River spring Chinook and the Upper Willamette River winter steelhead. Upstream and downstream passage will be required at three dams: Detroit, Lookout Point and Cougar.

NMFS and USFWS have identified measures to minimize the effects of diversions by Reclamation's contractors on listed species and their habitat. These measures include limiting

the total amount of stored water that can be provided under contracts; requiring existing and new contract diverters to install screens and fish passage; ensuring releases do not prevent minimum flow objectives; and reducing the volume of stored water diverted by contract holders in low water years to ensure minimum objectives are met.

As a result of the BiOp, no new contracts will be issued in the North and South Santiam Rivers beyond the current total of 11,574 acre feet (85 cfs) on the North Santiam and no more than 1,096 acre feet (7 cfs) on the South Santiam. Diminished flows have been identified as a limiting factor in those basins. NOAA Fisheries states this curtailment effectively protects these rivers from further flow reduction and habitat degradation. Further, Detroit Dam must have operable downstream fish passage devices installed by no later than 2023. Long term temperature improvements at Detroit Dam through operational changes or structural modifications must be made by 2018. Implementation of improved water temperature control (using existing infrastructure) downstream of Detroit Dam is to effective immediately.

The Army Corps of Engineers will update its flow exceedance models (similar to Appendix C of the Supplemental BA; USACE 2007a) every five years, and, together with results of fish flow studies, determine whether additional water is available during most years for new irrigation contracts based on this information. If, based on these analyses and other information, the Corps determines that additional water is available to serve irrigation demand (beyond the volumes specified above) without adversely affecting listed fish and their critical habitats, then the Corps will inform Reclamation and seek the written agreement of the Services (NMFS and USFWS). The Services will inform the Corps in writing whether they agree with the Corp's determination. If the result of this process is an affirmative determination that additional water is available, Reclamation may issue new contracts based on and limited by those determinations.

The BiOp may be reviewed at:

https://pcts.nmfs.noaa.gov/pls/pcts-pub/pcts_upload.summary_list_biop?p_id=26588.

3.4 New Storage Facility

3.41 *Del Air Site*

Extensive studies on the site showed it to be viable, but then the 1993 Mt. Angel earthquake of 5.7 on the Richter Scale showed that the Mt. Angel fault line in the project area was a much greater risk to the project's development than anticipated, among other hurdles that ensued.

3.42 *Rock Creek Site*

Following the determination that the Del Aire site would not be feasible to develop, the District pursued a site on Rock Creek and filed a water right application resulting in Permit R-13773 with a priority date of August 27, 1998. The permit approved storage of 7,000 acre feet per year on Rock Creek, a tributary of the Pudding River and was approved October 21, 2003.

This site proved infeasible as 2/3 of the inundated area was designated as wetlands. In further study and consultation, it was determined that the cost of mitigation was too significant to move forward with the project.

3.43 *Drift Creek Site*

Prior studies by the U. S. Department of Agriculture Soil Conservation Service (now the Natural Resource Conservation Service or NRCS) identified Drift Creek Reservoir as one of several potential projects that could benefit the Pudding River Basin agriculture industry.

Given the loss of earlier possible alternatives, the District is now pursuing the development of a new water reservoir impoundment on Drift Creek, a tributary to the Pudding River. The intended reservoir site is located approximately six miles southeast of Silverton in Marion County, and the facility would be the cornerstone of a new surface water supply system for the District. Stored winter water would be released during the summertime months and conveyed downstream to the District's service area via either a new raw water pipeline or by natural channel flow along Drift Creek and possible the Pudding River. Supplied water would be used for irrigation purposes and would require the development of a new water distribution piping system for delivery of irrigation water to served members.