CITY OF ASHLAND

EXECUTIVE SUMMARY

WATER CONSERVATION AND REUSE STUDY

FINAL

June 2011

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City of Ashland

EXECUTIVE SUMMARY

1 INTRODUCTION

The City of Ashland (City) recognizes the importance of securing water resources to support the long-term health, economic viability, and environmental sustainability of the community. The purpose of the Water Conservation and Reuse Study (WCRS) was to identify an appropriate long-term water supply strategy for the City. Specific objectives included:

- Evaluate the impacts of climate change on the City's Ashland Creek supply.
- Identify an appropriate conservation target for the City and take into account its impact on the City's water supply needs.
- Identify and evaluate future sources of supply, including expansion of the existing supplies through a new impoundment, expansion of the Talent Irrigation District (TID) supply, water reuse, groundwater, and the Talent Ashland Phoenix (TAP) Pipeline.
- Evaluate the alternative sources based on financial, environmental, and other factors.
- Select a long-term water supply strategy through an integrated public process that effectively engages stakeholders.

2 GRANT REQUIREMENTS

The WCRS was funded in part by a grant from the Oregon Water Resources Department's (OWRD) Water Conservation, Reuse and Storage Grant Program. The original grant was amended based on a letter from the OWRD dated February 26, 2010. The final grant included the objectives listed in Table 1; these objectives are shown along with the specific attachments that address each objective.

Table 1 Summary of Grant Requirements

Grant Requirement	Attached Information
1. Develop RFP and award contract	Attachment A – Request for Proposals
2. Review, analyze, validate, and identify gaps in Ashland's existing water master plans and water sources.	Attachment B – Gap Analysis Attachment F – Existing Supplies
3. Identify the City's future water needs to the year 2058.	Attachment C – Water Needs Analysis Attachment D – Conservation Analysis Attachment E – Level of Service Goals
4. Identify and fully describe all alternative water sources.	Attachment N – Alternative Supplies Attachment M – Water Rights Attachment J – Groundwater Evaluation Attachment L – Reeder Reservoir Expansion

Table 1 Summary of Grant Requirements	
Grant Requirement	**Attached Information**
5. Identify options that explore the right water for the different water uses; potable, irrigation (sources and uses).	Attachment K – Talent Irrigation District Analysis
6. Identify benefits and challenge to using irrigation water.	Attachment K – Talent Irrigation District Analysis
7. Analyze environmental harm or impacts with the long term use of various irrigation water sources for City irrigation use.	Attachment P – Environmental Analysis
8. Evaluate hydrological benefits and challenges and anticipate the effects of climate change with regard to water needs and water use.	Attachment F – Climate Change Analysis
9. Identify benefits and challenges to using recycled water.	Attachment H – Recycled Water Analysis Attachment I – Recycled Water Piping
10. Identify options and cost estimates.	Attachment N – Alternative Supplies
11. Identify potential use of a water exchange to help meet wastewater treatment plant temperature limitations (TMDL).	Attachment Q – Water Exchange Evaluation
12. Complete a consolidated engineering and financial feasibility study and cost benefit analysis of the preferred alternatives. Identify the link between conservation and enhanced conservation efforts and the preferred alternative.	Attachment O – Right Water Right Use
13. Identify the specific community and public benefits accruing from the proposed alternative including estimated project costs, financing for the project, and projected financial returns from the project.	Attachment O – Right Water Right Use

3 LEVEL OF SERVICE GOALS

As part of the WCRS, the City established an Ashland Water Advisory Council (AWAC). The AWAC process was funded wholly by the City, separate from the OWRD grant funding. The role of the AWAC was to serve as an advisory group to the Council and the City's water staff, providing a link with the community and involving impacted persons and interest groups with the WCRS and CWMP. One of the main responsibilities of the AWAC was to establish level of service (LOS) goals that would inform the water supply alternatives developed through the WCRS. The LOS goals established by the AWAC are summarized in Table 2.

Table 2 Selected LOS Goals

Goal Area	Goal
Water System Capacity	Have sufficient supply to meet projected demands that have been reduced based on 5 percent additional conservation. However, City will have a goal of achieving 15 percent conservation.
Water System Reliability	Community will accept curtailments of 45 percent during a severe drought.
Water System Redundancy	Implement redundant supply project to restore fire protection and supply for indoor water use shortly after a treatment plant outage.
Regulatory Requirements	Meet or exceed all current and anticipated regulatory requirements.

4 WATER NEEDS AND CONSERVATION

Future water needs were assessed both with and without additional conservation. Water needs under curtailment conditions were also assessed to meet the AWAC's LOS goal for 45 percent curtailment during severe drought.

The City's future water needs were initially projected through 2060 based on the current level of conservation and the following data:

- Average water use of 157 gallons per capita per day based on annual supply volumes and populations for years 2005 through 2009.
- Projected population of 30,326 people in 2060 based on the City's 1981 Comprehensive Plan.
- Peaking factor (ratio of demand on maximum day to annual average daily demand) of 2.06, based on 2005 through 2009 supply data.

The projected average and maximum day demands for 2060 with no additional conservation are 4.76 mgd and 9.81 mgd, respectively.

Potential conservation impacts were then projected based on an evaluation of the City's current conservation programs, assessment of indoor versus outdoor use and residential versus commercial use, and benchmarking against water use in other communities. Three potential conservation levels were explored: 5, 10, and 15 percent additional conservation. All conservation levels were applied assuming the 75 percent of the reductions by volume would be achieved in outdoor use and 25 percent in indoor use. The resulting average day and maximum day demands for the three conservation levels are summarized in Table 3. Potential new conservation programs were identified to support reaching the City's conservation goals. The AWAC's LOS goal for 45 percent curtailment during a severe drought was then applied, resulting in the projected monthly water use patterns for 2060. The curtailment goal was applied assuming a 45 percent reduction during the maximum month of usage.

Table 3 Projected Maximum Day Demands with Varying Levels of Conservation

Year	Projected Demands (million gallons per day)[(3)]					
	5 percent reduction		10 percent reduction		15 percent reduction	
	ADD	MDD	ADD	MDD	ADD	MDD
2010	3.38	7.14	3.38	7.14	3.38	7.14
2020[1]	3.50	7.59	3.41	7.32	3.32	7.04
2030[2]	3.69	8.00	3.49	7.40	3.30	6.79
2060	4.52	9.36	4.29	8.66	4.05	7.95

Notes:
(1) Assumes half of the targeted additional conservation level is achieved by 2020.
(2) Assumes the targeted additional conservation level is achieved by 2030.
(3) ADD – average day demand; MDD – maximum day demand.

5 EXISTING SUPPLIES

Existing water supplies were evaluated for their ability to meet the projected 2060 water needs. The evaluation included the City's two sources of supply, consisting of the Ashland Creek supply (which is stored in Reeder Reservoir) and the Talent Irrigation District (TID). Descriptions of the two supplies and a summary of the evaluation of the adequacy of the existing raw water supplies and treatment facilities are provided herein.

5.1 Ashland Creek Supply

Both the West and East Forks of Ashland Creek drain to Reeder Reservoir. Supply can be taken from the reservoir, or directly from diversions on the creeks. During the summer, the City mainly depends on the stored water in Reeder Reservoir; Ashland Creek flows are typically low and the City's use is limited based on the rights of senior water rights holders and environmental requirements.

An analysis of climate change impacts on the Ashland Creek supply was completed by Dr. Alan Hamlet of the Climate Research Center at the University of Washington. The study used a Distributed Hydrologic Surface Vegetation Model (DHSVM) to project anticipated alterations to water resources in the City's watershed. A total of eight climate change scenarios for years 1920 through 2006 were investigated; the average of the eight scenarios was used for the evaluations.

5.2 Talent Irrigation District

TID water is provided to Ashland via the Ashland Canal, the lower portion of which is operated by the City of Ashland. Water to the Ashland portion of the canal is metered by TID and regulated according to the City's water right of 769-acre feet per year (AFY), available during the irrigation season of April through October. This water is divided among three uses: losses (due to the unlined canal and operational overflows), irrigation users, and potable water (by being pumped to the Ashland WTP). TID water is used for irrigation by a number of public and private properties, including Lithia Park; these uses are generally not metered. TID water can be conveyed to the Ashland WTP via the Terrace Street Pump Station to produce potable water. It was estimated that approximately 223 AFY is available for this use. A detailed climate change evaluation was not conducted on the TID supply. Based on evaluations conducted in previous projects, it was estimated that 50 percent of the TID supply would be available in the third year of a prolonged, severe drought.

5.3 Water Supply Model

The objective of the water supply model was to compare the available supplies to the estimated demands and identify limitations of the existing supply system to meet future demands, especially under different drought conditions. Both Ashland Creek (Reeder Reservoir levels) and TID supplies were considered to generate available water for the City's use. The supplies were evaluated for three drought scenarios:

- Worst Drought (1928-1931) without Climate Change;
- Worst Drought (1924) with Climate Change; and
- 1-in-10 year drought (1987) without Climate Change.

The additional supply requirements in 2060 projected by the water supply model for the three scenarios are shown in Table 4.

Table 4 Summary of Supply Model Analysis

Additional Conservation Goal	Additional Supply Capacity Needed in 2060 (AF)(1)		
	1928-1931 No Climate Change	1924 With Climate Change	1987 No Climate Change
5 percent	238	619	849
10 percent	34	414	645
15 percent	0	210	467

Notes:
(1) MG – millions of gallons; AF – acre feet.

Required water treatment capacity to meet projected peak day water needs was also assessed. The current capacity of the water treatment plant was assumed to be 7.5 million gallons per day (mgd), based on the experience of plant staff and historical plant performance. The projected capacity deficits at maximum day ranged from 0.5 mgd for 15 percent additional conservation to 2.3 mgd for no additional conservation.

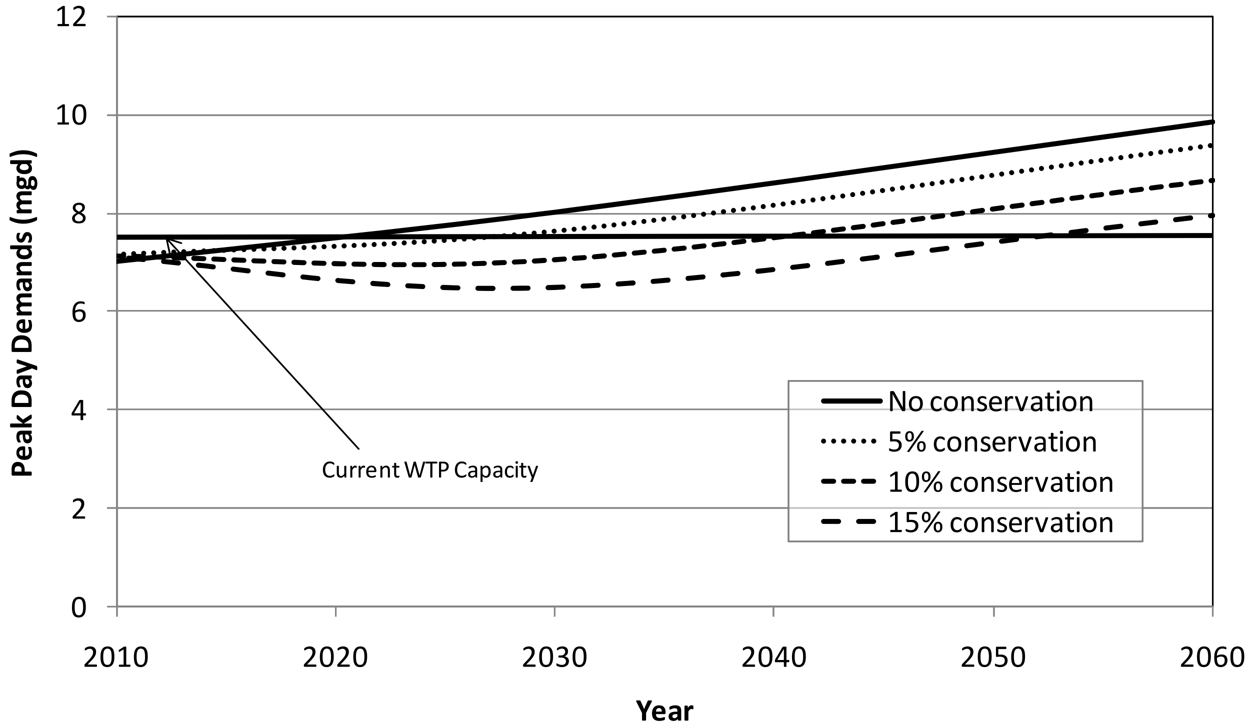

Figure 1 Project Maximum Day Demands Compared to Current WTP Capacity

6 ALTERNATIVE SUPPLIES

The WCRS considered eight water supply alternatives; some alternatives increase raw water supplies, some increase peak potable water availability, and some do both. The water supply alternatives being evaluated for this study vary greatly in the degree to which they have previously been investigated. Significant engineering has been completed on some alternatives, whereas other alternatives are being evaluated for the first time based on preliminary information. The costs and other information presented herein are based on the best information available at this time. All alternatives would require additional studies following completion of the WCRS to gather missing information and then to develop a design for the required facilities. Such further studies may reveal additional issues not identified to date that may significantly impact the cost, capacity, or feasibility of the water supply alternative. The specific alternatives are summarized herein.

6.1 Water Reuse

The Ashland Wastewater Treatment Plant (WWTP) has the ability to produce up to 2.3 mgd of Class A Reclaimed Water. Class A recycled water can be used for irrigation of crops, including crops for human consumption, and can also be used to irrigate parks, playgrounds, residential landscapes, and other landscapes accessible to the public. The WCRS evaluated delivery of the reclaimed water from the WWTP to non-residential properties within the City. The properties currently get their water from one of three sources: the City's potable water system, senior Ashland Creek water rights, or TID water (either from the City's portion of the Ashland Canal or from their own TID water rights). Three different scenarios for purple pipe systems were developed, which varied in the extent of the system and whether they assumed participation of properties with existing Ashland Creek water rights. The specific properties to be served (and their current irrigation water source) were identified for all scenarios. An additional scenario was later added consisting of delivering water only to the Imperatrice property (which is owned by the City) allowing the property's TID water rights to be used by the City. All scenarios included a new recycled water pump station to pump water from the WWTP to an equalization reservoir on the Imperatrice Property followed by a gravity piping system that would deliver water to the selected properties.

The capacities of the recycled water scenarios ranged from 831 AF to 1,657 AF (not including the Imperatrice scenario). The scenarios offset peak potable water demands by only 0.1 to 0.6 mgd, as most of the offset demands are currently served by TID water. The recycled water system would not provide a redundant potable water supply. Key issues associated with this alternative include the requirement for the participation of individual landowners (some of whom would need to transfer their existing water rights to the City) and the potential need for the City to replace a portion of the recycled water removed from Bear Creek to provide environmental benefits.

6.2 TAP Pipeline

The City participated with the cities of Talent and Phoenix, along with support from the Rogue Valley Council of Government and the Medford Water Commission, to reserve capacity and share in the cost of building the TAP Pipeline and Regional Booster Pump Station. The City of Ashland has a reserved capacity of 1.5 mgd in the existing portion of the TAP Pipeline. Under this supply alternative, the existing TAP pipeline would be extended to the City of Ashland. The new pipeline is assumed to be a 16-inch diameter ductile iron pipeline with a total length of approximately 21,050 feet. This supply alternative would also include a new pump station that would be wholly owned and operated by the City of Ashland. The raw water supply would be from the City's existing rights in Lost Creek Reservoir. A key issue associated with this alternative is the loss of water supply independence, including a lack of control over future wholesale water rates.

The capacity of the TAP pipeline was assumed to be 1.5 mgd based on previously-completed work. The TAP supply is treated, potable water, so the full capacity would be used to meet peak potable water demands. This supply would provide a redundant potable water supply. The assumed peak season capacity is approximately 690 AF, assuming the system would only be operated during the reservoir drawdown period during non-emergencies.

6.3 Expanded Talent Irrigation District Supply

Two potential alternatives were evaluated for expanding the TID supply. The first was piping the Ashland Canal from Green Springs Turnout to the Terrace Street Pump Station. It was determined that acquiring new water rights for the water saved through implementation of this alternative would likely not be possible, hence this alternative was eliminated from further consideration. The second alternative is piping the City's portion of the Ashland Canal, from the Starlite Monitoring Station to its terminus at Wright's Creek. The water gained would be in the form of reduced water losses; current losses could only be approximated, as use of TID water is generally unmetered. This alternative would have the additional benefit of preventing contamination of the TID water along that reach of the canal and ceasing overflows to Ashland Creek.

The Ashland Canal piping project would not affect available peak day supplies, assuming recovered water would be treated at the City's water treatment plant and used for potable water supply. If the City were to instead deliver recovered flows to additional properties for irrigation use, the offset would be on the order of 0.8 mgd. The estimated capacity gained through the Ashland Canal piping project is 274 AF (89 MG), based on estimated losses from the City's portion of the canal. A new Ashland Creek impoundment would not provide a redundant potable water supply; this alternative would not address the redundancy level of service goal. A key issue associated with this supply is the uncertainty of the capacity gains and their insufficiency in meeting projected capacity shortfalls on their own.

6.4 New Ashland Creek Impoundment

The current evaluation focused on a new Ashland Creek impoundment at the Winburn Site, located approximately one mile upstream of Reeder Reservoir. A potential new reservoir at this site has been evaluated in several previous studies. Due to the configuration of the site, it appears possible to "right-size" the alternative to meet the projected storage deficit of 619 AF. The new impoundment would not affect available peak day supplies, as all flows would need to be treated at the City's water treatment plant, and this alternative would not provide a redundant potable water supply. The key issues associated with this alternative include significant environmental and community impacts; over 25 acres of clear/inundated forest land, a new 9,000 foot access road, and around one million cubic yards of imported material. It also appears it would be very difficult to obtain water rights for a new impoundment.

6.5 Potable Groundwater System

An evaluation of local groundwater resources was conducted for a 700 square mile area surrounding the City, including review of over 10,000 well logs. The average production of the wells was 8 gpm, with a few wells producing more than 350 gpm. Given the uncertainty in the availability and reliability of groundwater resources, a range of cost estimates was developed for this alternative based on differences in individual well capacities, treatment requirements, and new wells versus use of existing ones.

It was assumed that the groundwater system would be sized to meet the AWAC's LOS goal for redundant capacity, providing a peak capacity of 1.5 mgd. This capacity would reduce but not eliminate the projected peak day supply deficiency. This capacity would provide an annual volume of 690 AF (based on use only during the Reeder Reservoir drawdown period), sufficient to meet the projected supply shortage. Key issues include the significant uncertainty in whether the required capacity could be achieved through a reasonable number of wells and whether those wells would be a reliable source of supply. Well water may also require significant treatment for water quality and may change the aesthetics of the water.

6.6 Aquifer Storage and Recovery

In the proposed aquifer storage and recovery (ASR) system, surface water would be stored underground during high flow periods by being pumped into the ASR wells. During drought periods when additional supply is needed, the water would be pumped out of the ASR wells and conveyed to the City via the TID system including the Ashland Canal. The area appearing most promising for an ASR system, based on available geologic data, is in the vicinity of the Howard Prairie and Hyatt Reservoirs. As there are no well logs available for this area, feasibility of this option cannot be determined at this time. There is also insufficient data available to estimate the potential capacities or costs of ASR wells, hence no cost information was developed.

6.7 Intertie with City of Talent

The City of Ashland recently signed an intertie agreement with the City of Talent. The intertie pipeline would follow the route of the proposed TAP pipeline extension, extending approximately two thirds (14,000 feet) of its total length. A temporary pump station may be required to deliver flows to the City of Ashland System. It is recommended that the City of Ashland work with the City of Talent to confirm the capacity and additional infrastructure requirements of the intertie, if implementation of this alternative is pursued. The estimated cost for this alternative does not include a pump station to lift flows into the City of Ashland's distribution system nor any capital cost sharing for facilities (e.g., their planned new reservoir) within the City of Talent system. This alternative provides the possibility of providing water to the City of Ashland during the winter, pending confirmation of feasibility given environmental flow requirements in the winter.

6.8 Water Treatment Plant Expansion

The existing water treatment plant has a capacity of approximately 7.5 mgd, based on the plant's historical performance and input from operations staff. The water treatment plant was previously designed to a capacity of 10 mgd and this design capacity could be realized by restoring two existing filters that are currently not in service. These improvements would be sufficient to meet the projected deficiency in peak day capacity, but would not affect total available supplies and would not provide a redundant source of potable water.

6.9 Water Treatment Plant Flood Wall

Implementation of a storm/flood wall at the existing water treatment plant to improve reliability of the existing facilities was evaluated. The wall was assumed to have a length of approximately 1,000 feet and height of 10 feet, based on input from City staff on water levels at the water treatment plant during previous floods. The wall would not directly meet any of the LOS goals established by the AWAC, but would decrease the vulnerability of the existing plant, thereby reducing the need for a redundant supply.

6.10 Emergency Water Treatment Plant

Two alternatives were evaluated for an emergency water treatment plant: (1) having a contract with a membrane system manufacturer to provide a membrane system in an emergency and (2) purchasing the system and putting it in operation during an emergency. The latter alternative was determined to be more cost effective, and is discussed here. The system was assumed to have an overall capacity of 1.5 mgd, including a trailer mounted membrane system, a low-lift pump station, and allowances for site preparation. The back-up treatment plant would provide a redundant source of potable water, but would not help meet peak or annual supply capacity requirements as it would only be operated in an emergency.

6.11 New Water Treatment Plant

An alternative for a new water treatment plant was developed later in the project based on input from the AWAC. This new facility would have an initial capacity of 2.5 mgd and be expandable to eventually replace the existing WTP as it reaches the end of its useful life (ultimate capacity of about 10 mgd). The intent is that the new WTP would be located in a less vulnerable location and would be operated year-round; the planned capacity of 2.5 mgd is sufficient to meet current winter demands. The existing WTP would then only be operated during the summer months, when demands are greater.

6.12 Water Exchange Evaluation

An evaluation of exchanging wastewater with TID to meet total maximum daily load (TMDL) requirements for temperature was completed as part of the City's Sewer Master Plan. This does not impact the water supply alternatives; a summary is included here as this evaluation was included in the OWRD grant funding. The TID exchange would involve discharging the City's effluent into the TID irrigation system. The likely discharge location would be Talent Canal. One of the benefits of this alternative would be the reduced chemical requirements needed to remove phosphorous, because most of the water would be reused or land applied downstream. This alternative would mitigate concerns about near field impacts to aquatic habitat, and would reduce the thermal load requirements to the extent that the effluent is reused downstream.

The TID Board identified a number of concerns associated with alternative, including real and perceived concerns with receiving effluent, presence of chemicals in the water, and the approval of their patrons. Given the significant TID concerns as well as other regulatory and O&M issues, it was recommended that this alternative not be pursued at this time. However, the plan acknowledges that it may be viable in the future as public perception changes and if drought conditions make the water resources more valuable.

7 PLANNING LEVEL COST ESTIMATES

Planning-level cost estimates were developed for each of the water supply alternatives. These estimates are presented as total project costs in August 2010 dollars, corresponding to an Engineering News Record (ENR) 20-Cities Construction Cost Index (CCI) of 8,858. Costs are at a planning level (+50/-30 percent accuracy), unless otherwise noted. Estimates should be refined as project- and site-specific requirements are further developed. Estimated capital and O&M costs for the individual alternatives are summarized in Table 5.

Table 5 Estimated Capital and O&M Costs for Water Supply Alternatives

Water Supply Alternative	Planning Level Estimated Costs		
	Capital ($ Million)(1)	O&M ($1,000/year)	NPV ($ Million)(2)
Reclaimed Water	$10.8 – 20.7	$85 - 122	$10.3 – 19.1
Reclaimed Water – Imperatrice	$5.3	$50	$5.2
TAP Pipeline	$12.2	$337	$16.0
TID – Ashland Canal Piping	$2.7	-	$2.2
Ashland Creek Impoundment	$79.7	$100	$66.6
Groundwater	$3.5 – 20.3	$82 - 164	$4.3 – 19.5
Talent Intertie	$5.3	-	$4.3
WTP Expansion	$0.8	-	$0.7
Protected WTP - Floodwall	$1.83	-	$1.5
Emergency WTP	$8.4		$6.9
New WTP	$12.0		$9.8

Notes:
(1) Costs include the following contingencies: 20 to 30 percent estimating contingency; 15 percent for contractor overhead and profit; and 20 to 25 percent for engineering, legal and administration (ELA) costs.
(2) Net Present Value (NPV) based on: capital improvements completed by 2020; O&M expenses for 2020 through 2060; discount rate of 3 percent.

8 WATER SUPPLY PACKAGES

The individual water supply alternatives were then combined into six initial water supply packages. All of the water supply packages fully met the AWAC's LOS goals. The one exception was Package 3, which did not fully meet the supply shortage. The packages were evaluated according to thirteen criteria, as presented in Table 6. The criteria rankings were reviewed by the AWAC and revised according to their input. Packages including an emergency supply to provide system redundancy included the cost for the Talent Intertie, which was the lowest-cost emergency supply alternative evaluated.

Table 6 Summary Criteria Evaluation

Criterion	Water Supply Packages					
	Package 1 - Recycled Water + Emergency Supply + WTP Expansion	**Package 2 - TAP Extension + WTP Expansion**	**Package 3 - TID Expansion (Ashland Canal) + Emergency Supply + WTP Expansion**	**Package 4 - Winburn Dam + Emergency Supply + WTP Expansion**	**Package 5 - Potable Groundwater + WTP Expansion**	**Package 6 - Aquifer Storage and Recovery (ASR) + Emergency Supply + WTP Expansion**
Reliability	**+** Includes redundant potable water supply	**+** Includes redundant potable water supply	**+** Includes redundant potable water supply	**+** Includes redundant potable water supply	**+** Includes redundant potable water supply	**+** Includes redundant potable water supply
Cost Effectiveness	**- to 0** $20.2 – 29.0 M	**0** $21.6 M	**+** $12.1 M	**-** $76.5 M	**0 to +** $9.9 – $25.1 M	**-** Undefined
Financial Risk	**0** Conceptual costs and relatively low-risk construction	**+** Well-developed option	**0** Conceptual costs and relatively low-risk construction	**-** Technical details are sparse and costs are already high	- Little information on reliable capacity (may need more wells)	**-** Technical details don't exist and potential costs are very high
Appropriateness of Use	**+** Offsets potable water use with recycled water	**0** No improvement	**0** No improvement	**0** No improvement	**0** No improvement	**0** No improvement
Environmental Friendliness	**0** Pipelines along City roadways	**0** Pipeline along highway	**0** Pipeline in open areas	**-** Massive environmental impact during construction	**0** Construction at multiple sites	**Undefined** Depends on project configuration
Public Acceptability	To be defined by AWAC	To be defined by AWAC	To be defined by AWAC	To be defined by AWAC	To be defined by AWAC	To be defined by AWAC
Independence	**+** Local resource	- Supply from Medford	- Supply from TID	**+** Local resource	+ Local resource	**-** Coordination with TID and Bureau
Community Impacts	**0** Impacts during construction only	**0** Impacts during construction only	**0** Impacts during construction only	**-** Impacts during construction and potentially thereafter	**0** Impacts during construction only	**+** Impacts during construction only, and distant from communities
Water Quality	**0** Maintain existing potable supplies	**0** Comparable to current	**-** Different quality than Reeder	**0** Provides additional Ashland Creek water	- Iron, manganese and total dissolved solids	- Provides additional TID water
Operational Flexibility	**0** Incremental expansion possible, would take time	**0** Temporary additional supplies may be available from Talent, total capacity limited	**0** Temporary additional supplies may be available	**-** Once constructed, dam expansion not likely feasible	0 Incremental expansion possible, would take time	**0** May be possible to expand supply
Operational Manageability	**-** New pump station, reservoir and distribution system	**0** New pump station and single pipeline	**+** Simplifies ongoing operations for City canal	**-** Additional dam and related facilities to operate and maintain	**-** 10 +/- new wells to operate, likely with new treatment systems	**-** Additional distant facilities to operate and maintain
Scalability	**0** Can extend to additional properties, but not at equal efficiency	**-** City has purchased 1.5 mgd capacity in pipeline	**-** No clear opportunity to develop required additional supply	**0** Storage can be sized for demand projections	+ Wells can be constructed to meet demands	**0** Wells can be added if basin supports it
Implementation Risk	**0** Requires cooperation of individual property owners	**+** Most well-developed of the alternatives	**+** City can pipe own portion of canal without cooperation	**-** Given the limited information, risk is high	**-** Risk of poor water quality, low reliability of supply	**-** Given the limited information, risk is high

9 WATER SUPPLY DECISION

The AWAC decided to divide the overall water supply plan into two separate components: (1) addressing the need for a redundant water supply and (2) increasing annual storage volumes. Given that annual storage volumes are not anticipated to be deficient until after 2030, it was decided that a decision on a water supply alternative should be delayed until the next plan. However, the AWAC did provide the following recommendations:

- A new Ashland Creek impoundment and ASR should be eliminated from consideration as a water supply alternative.
- Groundwater testing to further evaluate the groundwater alternative should be added to the City's CIP in the amount of $150,000.
- The City should move aggressively to acquire additional Ashland Creek or TID water rights as they come available.
- Additional storage should be evaluated as part of the next Water Master Plan Update, including alternative methods such as shading, snow fencing, and silviculture practices; tanks or reservoirs may or may not be included.

The AWAC was able to reduce the alternatives being considered for system redundancy to two options: the Talent intertie and a new WTP. It was decided that the rate impacts of both alternatives will be determined and presented to the City Council to make the final decision on a new redundant water supply. This decision is anticipated in Fall 2011. Regardless of the initial alternative selected, the AWAC recommended that phased replacement of the existing WTP at a less vulnerable location would be a better investment than expansion at the existing location.