CHAPTER 9

CHAPTER 9
CAPITAL IMPROVEMENT PROGRAM RECOMMENDATIONS

Introduction

Over the past decade, evaluation of alternative utility engineering solutions through the use of TBL evaluations has become commonplace. TBL decision-making is a process where evaluations consider social and environmental impacts in addition to the economic aspects of a proposed project.

Within the water and wastewater industries, TBL evaluations have been employed for projects where the capital investment and anticipated longevity of constructed facilities have long-term impacts to the image and culture of a community. Treatment facilities are the most common types of projects where TBL evaluations have been used. By including community leaders during the TBL process for evaluating alternative improvements, a measure of public involvement and consensus building can be achieved. The recommended project solution then becomes more reflective of the community's culture.

Due to the importance of this CIP, an Advisory Committee of community leaders and City Council (Council) members was assembled to assist in the evaluation and recommendation of a preferred alternative from those presented in Chapters 7 and 8. City Public Works employees integral to the project also participated to offer input on operational impacts, zoning and land use information, and necessary steps in the City approval process.

A series of four workshops were conducted over a three-month period with the Advisory Committee using an independent facilitator. The MSA Team's role in these workshops was to present information on the alternatives developed and to answer technical questions posed by committee members. Below is a summary of activities for each of the four workshops:

- Workshop 1 (May 14, 2013): Introduction of Advisory Committee members, consulting team, and public works employees; tour of the existing WTP; and dissemination of suggested TBL evaluation criteria. Draft text for Chapters 1 through 8 of this Facilities Plan Update was also made available for review.
- Workshop 2 (May 30, 2013): Discussion and finalization of TBL criteria and individual weighting; presentation and questions-and-answers period for each of the capital improvement alternatives; distribution of TBL scoring matrix spreadsheets to committee members for review and scoring.
- Workshop 3 (June 4, 2013): Review of information requested by the committee concerning alternative property constraints (setbacks and relocation of overhead power lines); discussion and scoring of alternatives; request for development of a fifth alternative.
- Workshop 4 (July 15, 2013): Presentation of requested Alternative 5, finalization of committee scoring, and development of recommendation to Council.

The following sections discuss the development of TBL evaluation criteria, considerations included within each evaluation category, scoring of alternatives, and the CIP recommendation. The final sections of the chapter outline an implementation plan for the recommended program.

Development and Weighting of TBL Criteria

For the benefit of the Advisory Committee, a list of suggested criteria for each of the TBL categories was developed from similar projects. The committee then modified and finalized the criteria, establishing appropriate weighting for each through group discussion. Each criterion was assigned a weighting from 1 to 5, with 5 representing the highest level of importance. The final criteria and weightings are offered in Table 9-1. Definitions for the economic, social, and environmental categories are discussed in the following sections.

Economic Measures

Economic variables are those that deal with the flow of money or change in financial value. These factors consider income or expenditures, taxes, business climate factors, and employment. A net present value analysis was performed by the MSA team and presented to the Advisory Committee during the workshops. The net present value analysis is summarized later in this chapter.

Social Measures

Social variables include measurements of education, equity, access to resources, health and well-being, quality of life, and social capital. The social variables identified by the Advisory Committee as most important for the selection of an alternative are described below.

Safe water supply

A safe water supply is one that is free of pathogens and microorganisms that, if ingested, can cause mild to severe illness and even death. In addition to the absence of pathogens, a safe water supply should be free of cancer-causing toxins such as heavy metals, pesticides, herbicides, and solvents.

Reliable Water Supply

Western Oregon borders the Cascadia subduction zone. A comprehensive study lead by researchers at Oregon State University published by the USGS in 2012 predicted that if an earthquake were to occur along the Cascadia fault, it would have a magnitude between 8.7 and 9.2 as calculated by the Richter magnitude scale. Buildings and infrastructure not up to current seismic code could be compromised or completely destroyed in the event of such a large earthquake. Grants Pass has only one source of drinking water. The reliability of the water supply during emergencies such as a fire, earthquake, or drought is critical to the community. Structures, mechanical equipment, and electrical infrastructure supporting the WTP need to be reliable to ensure that water is available whenever it is needed.

Table 9-1
Scoring Criteria and Weighting Summary

Criteria		Weighting
Economic Measures		
1	Capital cost	5
2	Operations and maintenance costs	5
3	Net present value	5
4	Rate impact	2
5	Sustaining existing industry	3
6	Job growth opportunities	4
7	Construction period impacts	1
	Economic Measures Weighting Subtotal	25
Social Measures		
8	Safe water supply	4
9	Reliable water supply	4
10	Community growth	3
11	Operability and staff accommodations	1
12	Construction impact	2
13	Historical values	4
	Social Measures Weighting Subtotal	18
Environmental Measures		
14	Proximity of new facilities to existing intake	1
15	Energy efficiency of structures	5
16	Solids handling	4
17	Electricity consumption	3
18	Change in land use	5
19	Construction period impacts	2
	Environmental Measures Weighting Subtotal	20
	Total Weighted score	**63**

Community Growth

Last year, MSA did a planning study for the City of Grants Pass and projected that the population will grow to 90,173 people by the year 2065. This increase in population will lead to increased demand for potable water. In addition, potential new industrial and commercial development that comes with population growth can further increase water demand.

Operability and Staff Accommodations

A good WTP design will allow for safe, efficient, straightforward operation by plant staff. Design elements such as the use of guard rails, automated pumps, leak detection systems, color coding, telemetry, and the elimination of tripping hazards are just a few examples of the many considerations engineers and contractors make to ensure operability for a safe community asset.

Construction Impact

Construction activities can have a significant impact on residents' quality of life. During construction, residents may be exposed to loud noises, trucks and heavy machinery driving through their neighborhoods, a temporary decline in air quality, and the potential for water service interruptions which may be accidental or necessary for certain phases of construction.

Historical Values

The City of Grants Pass is currently served by the second-oldest water treatment plant in the State of Oregon. The plant was designated an American Water Landmark by AWWA in 1998 and holds nostalgic value for many residents.

Environmental Measures

Environmental variables consider natural resources and the potential impacts a project may have on them. Some factors include air and water quality, energy consumption, natural resources, solid and toxic waste, and land use. Brief descriptions of the environmental variables that the Committee considered during its analysis are presented below.

Proximity of New Facilities to Existing Intake

The closer a WTP is to the location of its intake, the less the surrounding environment is impacted. Water must be conveyed to the WTP from the intake via large-diameter piping, which can be challenging to install without significant environmental impacts.

Energy Efficiency of Structures

Energy-efficient structures have several environmental benefits. These benefits include, but are not limited to, minimizing air pollution, reducing carbon footprint, decreasing thermal pollution, and reducing greenhouse gas emissions.

Solids Handling

Water treatment plant solids consist primarily of silts, sands, and organics that are transported with the river water through the intake and either settled out or filtered out at the WTP. A good solids handling plan can have many environmental benefits, but a poor solids handling plan can result in negative environmental impacts. There are many things to consider when developing a plan for solids handling including the presence of treatment chemicals, off-hauling, facility footprint, and energy usage.

Electricity Consumption

The way a WTP is designed and operated has far-reaching impacts to the plant's consumption of electrical power. New structures and treatment processes normally offer more energy conservation potential than retrofitting existing processes. Hydraulic conditions, plant location, distribution system design, valves, automated controls, and timing of production are just a few of the aspects of a WTP that affect energy consumption.

Change in Land Use

Choosing an alternative that requires a new WTP site would likely require a change in the land use designation at the new site. It is better to locate a new WTP so that it does not disrupt habitat for wildlife.

Construction Period Impacts

During construction, workers and the environment are at a heightened risk of impact. There may be exposure to toxic fumes; soil contamination; excessive runoff into surrounding surface water bodies; disturbance of lead-based paint, caulk containing PCBs, or asbestos; and inadvertent spills of asphalt or chemicals. Sound construction practices can reduce these risks and the risks are different between working on an existing structure and building a new structure.

Evaluation of Alternatives

This section describes how each alternative was evaluated against the criteria defined by the Advisory Committee. A net present value analysis was used to evaluate each alternative's economic aspects. The detailed analyses of each alternative with respect to social and environmental considerations were performed by the Advisory Committee during the course of its workshops.

Economic Considerations

A net present value analysis was performed to compare alternatives on the basis of cost. The net present value is a better way to compare costs between the alternatives than comparing the project costs developed in Chapters 7 and 8 because each alternative proposes the expenditure of different amounts of money at different times. In the present value analysis, each expenditure is escalated to the anticipated year of occurrence and then discounted back to a common year. In this analysis, the common year is 2013.

The Baseline Alternative, briefly described in Chapter 6, proposes to make approximately $12.5 million in structural upgrades to the existing WTP structures. This alternative was not included in the detailed economic study for the following reasons:

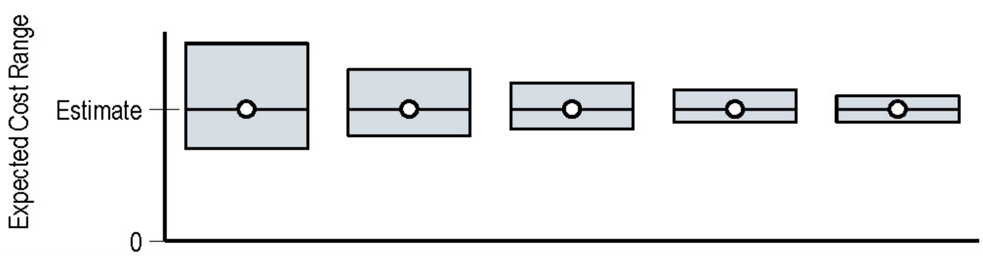
- Some of the structures that would initially be renovated would be demolished during later improvements needed to increase plant capacity. A significant portion of the investment to renovate those structures would be wasted.
- The existing plant would still operate inefficiently, so annual operations and maintenance costs would continue to be higher than other alternatives.
- This alternative does not address short-term capacity needs, long-term capacity needs, or structural longevity needs beyond year 2065. A new WTP with a capacity of 45 mgd would need to be built in a new location in 2065. The approximate cost of this new WTP would be $75.4 million (2013 dollars).

The Baseline Alternative was included during the workshops, however, and the Advisory Committee's analysis confirmed that this alternative is not a desirable solution.

Project Definition Level and Cost Index

The American Association of Cost Engineers (AACE) defines classes of cost estimating based on the level of project definition. The accuracy of cost estimates varies with the level of project definition. As shown in Figure 9-1, estimating accuracy improves as project definition increases.

Figure 9-1
Cost Estimating Accuracy Based on Level of Project Definition



Estimate Class	Class 5	Class 4	Class 3	Class 2	Class 2
Level of Project Definition	1%	10%	30%	60%	90%
Accuracy Range	-30%/+50%	-20%/+30%	-15%/+20%	-10%/+15%	-10%/+10%

Adapted from AACE International Recommended Practice No. 18R-97

AACE considers the type of planning work done for this Facility Plan Update to be a very low level of project definition, corresponding to somewhere between 1 and 3 percent complete. It is likely that changes in the construction market or overall economy, new regulatory requirements, site conditions, and other factors will affect the total project cost.

The costs prepared for this Facility Plan Update are subject to the accuracy range of –30 percent to +50 percent as shown in Figure 9-1.

Construction costs are also subject to change with time. All of the costs used in this chapter are in 2013 dollars. It will be necessary to adjust these present cost estimates in the future. An indexing method is useful for this purpose. The Engineering News Record (ENR) Construction Cost Index (CCI) is a commonly used index for this purpose. For purposes of future cost estimate updating, the December 2013 ENR CCI for Seattle, Washington is 10142.65.

Capital Costs

For the present value analysis, an escalation rate of 2 percent was assumed. A discount rate of 3 percent was used. These parameters are used to predict the effects of deferring project costs. The escalation rate is a measure of the general fall in the purchasing value of money, also called inflation. The discount rate reflects the value to the City in deferring capital costs. The analysis is carried through 2095 which is consistent with the planning period identified in Chapter 6.

Alternatives 1 and 2

Alternatives 1 and 2 propose improvements to existing plant structures and processes as discussed in Chapter 7. These improvements must occur in separate phases because the plant must remain online during construction. The capital costs for these improvements were shown in Chapter 7 and each line item was assigned to a specific project phase. To develop phase costs, the capital costs for items associated with each phase were added together and associated project costs were distributed proportionally. Phases are anticipated to occur three years apart and begin in year 2018. As discussed in Chapter 7, Alternative 1 requires the construction of a new 45-mgd plant in 2065 and Alternative 2 requires the construction of a new 15-mgd plant in 2065. Tables 9-2 and 9-3 show the net present value for project costs associated with Alternative 1 and Alternative 2, respectively.

Table 9-2
Alternative 1 Project Cost Present Value Summary

Description	Current Cost	Year Spent	Escalated Cost	Present Value
Phase A	$9,000,000	2018	$9,936,727	$8,571,508
Phase B	$12,700,000	2021	$14,880,074	$11,746,468
Phase C	$15,700,000	2024	$19,520,977	$14,102,369
New 45-mgd Plant Construction	$75,400,000	2065	$211,144,745	$45,398,823
			Net Present Value	**$79,819,168**

Note: This is a Class 5 estimate. The accuracy ranges from –30 percent to +50 percent.

Table 9-3
Alternative 2 Project Cost Present Value Summary

Description	Current Cost	Year Spent	Escalated Cost	Present Value
Phase A	$12,300,000	2018	$13,580,194	$11,714,395
Phase B	$27,200,000	2021	$31,869,135	$25,157,790
Phase C	$17,300,000	2024	$21,510,376	$15,539,553
New 15-mgd Plant Construction	$47,202,000	2065	$132,181,091	$28,420,627
			Net Present Value	**$80,832,364**

Note: This is a Class 5 estimate. The accuracy ranges from –30 percent to +50 percent.

<u>Alternatives 3, 4, and 5</u>

Alternatives 3, 4, and 5 propose construction of a new WTP at a new site as discussed in Chapter 8. If any alternative were to be implemented, the City may need to construct immediate improvements at the existing WTP to ensure disinfection reliability while planning and building the new facilities. The construction of a new WTP is not phased like improvements to the existing plant are, but an expansion will be required in 2065 under any alternative to increase plant capacity from 30 mgd to 45 mgd. The need for property acquisition and environmental studies and permitting is anticipated to delay completion of a new WTP to the year 2020. Tables 9-4, 9-5, and 9-6 show the net present value for project costs associated with Alternatives 3, 4, and 5, respectively.

Table 9-4
Alternative 3 Project Cost Present Value Summary

Description	Current Cost	Year Spent	Escalated Cost	Present Value
Near-Term Disinfection Reliability	$450,000	2013	-	$450,000
Initial Construction to 30 mgd	$47,400,000	2020	$54,447,701	$44,270,963
Expansion of WTP to 45 mgd	$32,956,000	2065	$92,287,616	$19,843,019
			Net Present Value	**$64,563,982**

Note: This is a Class 5 estimate. The accuracy ranges from –30 percent to +50 percent.

Table 9-5
Alternative 4 Project Cost Present Value Summary

Description	Current Cost	Year Spent	Escalated Cost	Present Value
Near-Term Disinfection Reliability	$450,000	2013	-	$450,000
Initial Construction to 30 mgd	$55,400,000	2020	$63,637,186	$51,742,856
Expansion of WTP to 45 mgd	$36,668,000	2065	$102,682,434	$22,078,038
			Net Present Value	**$74,270,893**

Note: This is a Class 5 estimate. The accuracy ranges from –30 percent to +50 percent.

Table 9-6
Alternative 5 Project Cost Present Value Summary

Description	Current Cost	Year Spent	Escalated Cost	Present Value
Near-Term Disinfection Reliability	$450,000	2013	-	$450,000
Initial Construction to 30 mgd	$54,200,000	2020	$62,258,763	$50,622,072
Expansion of WTP to 45 mgd	$36,990,000	2065	$103,584,140	$22,271,916
			Net Present Value	**$73,343,988**

Note: This is a Class 5 estimate. The accuracy ranges from –30 percent to +50 percent.

Operations and Maintenance Costs

All annual costs are projected based on recent existing plant operating cost records and are increased proportional to projected demand increases and escalation rates. At this planning level, no difference in annual operational costs can be justified between alternatives 1, 3, 4, and 5 even though some technologies might require slightly more power, slightly less chemical usage, or some other subtle difference. Alternative 2 has higher labor costs starting in 2065, when two separate treatment plants would begin to operate. Table 9-7 shows the assumed annual 2013 value for each operating cost category and the lump sum of each operating cost over the entire 75-year planning period in 2013 dollars.

Summary of Net Present Value Analysis

The total net present value of each project is the sum of the annual costs and the capital costs, discounted back to the same year. Table 9-8 shows a summary of all of the alternatives with the complete lifecycle cost in present value. According to the analysis, building a new WTP has a lower lifecycle cost than upgrading the existing WTP.

Table 9-7
Operations and Maintenance Costs Present Value Summary[1]

Description	Annual Cost in 2013 US Dollars	Total Present Value[2]
Power	$287,873	$32,368,433
Labor	$601,280	$61,111,423
Chemicals	$176,097	$19,759,248
General Maintenance and Equipment Recovery	$339,915	$34,161,690
Net Present Value, Alternatives 1, 3, 4, and 5		**$147,400,793**
Additional Cost to Manage Two Plants[3]	$300,640	$11,992,689
Net Present Value, Alternative 2		**$159,393,482**

Notes
1. Values are scaled annually according to increases in production and general inflation
2. Lump sum of all annual payments made over 75-year planning period
3. Alternative 2 only
4. This is a Class 5 estimate. The accuracy ranges from –30 percent to +50 percent.

Sensitivity to Economic Conditions

The present value analysis shows which alternative has the lowest overall lifecycle cost in 2013 dollars. The analysis relies on planning criteria established in Chapter 6 and assumptions which are representative of normal industry and economic conditions. It is possible that these conditions could change. Therefore, the sensitivity of the analysis was investigated by modifying parameters which reflect economic conditions, demand projections, and assumptions about risk associated with construction at the existing WTP. This section presents a summary of these analyses and their effects on the lifecycle costs of the five alternatives.

The escalation and discount rates used in the base present value analysis are 2 percent and 3 percent, respectively. These parameters are representative of the economic climate of the past several decades. In a robust economy, the difference between the escalation and discount rates would be larger. In a more depressed economy, the difference would be smaller. In order to simulate these two types of economies, the present value analysis was repeated. To represent a robust economy, an escalation rate of 2 percent and discount rate of 5 percent were selected. In the depressed economy scenario, the escalation rate is 2.8 percent and the discount rate is 3 percent. Table 9-9 shows how these different economic conditions affect the results of the present value analysis.

The results of the sensitivity analysis indicate that in an unusually robust economy, Alternatives 1 and 3 are comparable in lifecycle cost over the planning period. In any other situation, Alternative 3 has the lowest lifecycle cost. In a typical or depressed economy, Alternative 3 has a lower lifecycle cost than the other alternatives, and building a new WTP costs less than upgrading the existing WTP.

Table 9-8
Net Present Value Analysis Summary

Item Description	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Capital Costs					
Phase A	$8,572,000	$11,715,000	-	-	-
Phase B	$11,747,000	$25,158,000	-	-	-
Phase C	$14,103,000	$15,540,000	-	-	-
New 15 MGD Plant Construction	-	$28,421,000	-	-	-
New 45 MGD Plant Construction	$45,400,000	-	-	-	-
New 30 MGD Plant Construction	-	-	$44,271,000	$51,743,000	$50,622,000
Expansion to 45 MGD	-	-	$19,844,000	$22,079,000	$22,272,000
Near-Term Disinfection Reliability	-	-	$450,000	$450,000	$450,000
Annual Costs					
Power	$32,369,000	$32,369,000	$32,369,000	$32,369,000	$32,369,000
Labor	$61,112,000	$61,112,000	$61,112,000	$61,112,000	$61,112,000
Chemicals	$19,760,000	$19,760,000	$19,760,000	$19,760,000	$19,760,000
General Maintenance and Equipment Recovery	$34,162,000	$34,162,000	$34,162,000	$34,162,000	$34,162,000
Additional Cost to Manage Two Plants	-	$11,993,000	-	-	-
Total Present Value	**$227,200,000**	**$240,200,000**	**$212,000,000**	**$221,700,000**	**$220,700,000**

Note: This is a Class 5 estimate. The accuracy ranges from –30 percent to +50 percent.

Table 9-9
Economic Sensitivity of Present Value Analysis Summary

Alternative	1	2	3	4	5
Robust Economy, Escalation Rate = 2 percent, Discount Rate = 5 percent					
Capital Cost Present Value	$45,973,000	$55,245,000	$46,445,000	$53,798,000	$52,889,000
Annual Cost Present Value	$67,983,000	$71,155,000	$67,983,000	$67,983,000	$67,983,000
Rounded Total Present Value	**$114,000,000**	**$126,400,000**	**$114,400,000**	**$121,800,000**	**$120,900,000**
Depressed Economy, Escalation Rate = 2.8 percent, Discount Rate = 3 percent					
Capital Cost Present Value	$104,938,000	$98,563,000	$76,998,000	$88,246,000	$87,352,000
Annual Cost Present Value	$213,660,000	$234,409,000	$213,660,000	$213,660,000	$213,660,000
Rounded Total Present Value	**$318,600,000**	**$332,900,000**	**$290,700,000**	**$301,900,000**	**$301,000,000**

Note: This is a Class 5 estimate. The accuracy ranges from –30 percent to +50 percent.

Construction Risk at Existing Water Treatment Plant

In Chapter 7, the risk of constructing improvements at the existing WTP was discussed. These risks are due to unpredictable construction conditions at the WTP and the difficulty associated with making the improvements while keeping the existing WTP on-line. The cost estimates for Alternatives 1 and 2 accounted for those risks by incorporating additional costs using methodologies explained in Chapter 7. These added costs influence the lifecycle cost of Alternatives 1 and 2. To examine the effects of those assumptions on the present value analysis, the analysis was repeated without those added costs. This analysis was done under the base economic conditions of 2 percent escalation and 3 percent discount. The results of analysis without addition of any risk to Alternatives 1 and 2 are summarized in Table 9-10.

Table 9-10
Present Value Analysis Results with No Additional Risk at Existing WTP

Alternative	1	2	3	4	5
Capital Cost Present Value	$74,945,000	$72,437,000	$64,565,000	$74,272,000	$73,344,000
Annual Cost Present Value	$147,403,000	$159,396,000	$147,403,000	$147,403,000	$147,403,000
Rounded Total Present Value	**$222,300,000**	**$231,800,000**	**$212,000,000**	**$221,700,000**	**$220,700,000**

Note: This is a Class 5 estimate. The accuracy ranges from –30 percent to +50 percent.

If there is no additional risk associated with construction of improvements at the existing WTP, the initial capital costs of Alternatives 1 and 2 are lower as expected. However, Alternatives 3 and 4 have lower lifecycle costs than Alternatives 1 and 2, even under these unlikely assumptions.

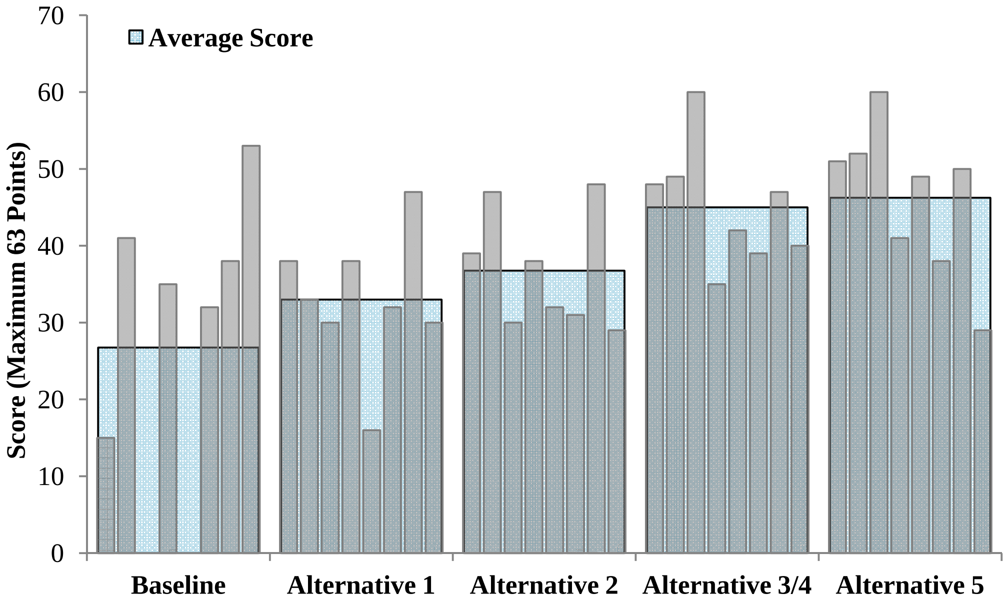
Social and Environmental Considerations

The net present value analysis used to compare the economic aspects of each alternative is considered an objective process because it relies on quantities and calculations. The social and environmental analyses of the alternatives are subjective processes because they cannot be easily quantified and are subject to interpretations based on opinions. Therefore, the detailed analyses with respect to social and environmental considerations were left to the members of the Advisory Committee. The details of the social and environmental analyses are beyond the scope of this report. The results are presented below.

Alternative Selection and Recommendation

Following presentations and discussions of each Alternative, the members of the Advisory Committee independently scored the alternatives by each of the established TBL criteria. Scores were given on a scale of 1 to 5, with a score of 5 meaning that the alternative in question was considered the most desirable with respect to the given criterion. The scores assigned were scaled and multiplied by each criterion’s weighting factor to derive individual and composite scores for each alternative. Alternatives 3 and 4 were scored collectively as a composite alternative representing a new WTP on an undefined property. The individual and composite scores are summarized in Figure 9-2.

Figure 9-2
Advisory Committee Alternative Scoring Results



Workshop results and scoring were presented to the City Council during its August 5, 2013 Workshop and then discussed further during its September 9, 2013 workshop. In reviewing the materials developed and scoring performed, the Council approved completion of this Facility Plan Update with the recommendation to move forward in the planning process to construct a new WTP. Due to the close scoring between Alternatives 3, 4, and 5, the Council instructed that a detailed investigation of prospective properties be conducted to identify the optimal site from a cost, facility layout, permitting, and constructability standpoint.

Capital Improvement Program Implementation Plan

As detailed in Chapter 8, the conceptual project cost to construct a new WTP is estimated to be approximately $56 million, with an accuracy range of -30% to +50% (Class 5 estimate). It is recommended that the City establish a capital budget for this project which reflects this estimate and the level of uncertainty and risk associated with the current level of project definition. This budget should be updated and refined over time as the implementation plan progresses and planning and design uncertainties are addressed.. The budget should include decommissioning and demolition of the existing WTP. If pilot testing and other near-term activities demonstrate the ability to use higher-rate treatment processes which require less space and have lower construction costs, such as Alternative 3, then it may be possible to reduce the total project expenditures accordingly.

The recommended schedule to implement the new WTP is presented in Figure 9-3. It is possible to have a new WTP online by the middle 2019 using a traditional design-bid-build (DBB) project delivery approach.

The City should implement the new WTP as quickly as possible to avoid extensive investments in the existing plant. Keeping the current WTP online presents structural and seismic risks and risks related to other deficiencies. The required capital investment in the existing WTP to mitigate these risks will increase as time goes on. The Advisory Committee was not tasked with addressing this schedule-related risk challenge, but the City staff and City Council should discuss this topic as part of its planning and budgeting process for fiscal year 2014-2015 and beyond.

It is recommended that the City complete an Emergency Response Plan for the existing WTP and related water supply infrastructure to allow the City to make informed decisions related to the risks at the existing WTP. This Emergency Response Plan is the minimum investment that the City should make while it waits to have a new WTP designed and constructed. This planning work may identify additional investments needed to mitigate for risks that cannot be effectively managed.

Table 9-11 presents a summary of anticipated yearly capital expenditures (project costs) for the next 10 years to implement a new WTP based on the Implementation Schedule discussed above. The considerations and recommended tasks to undertake a project of this magnitude are presented in the following sections. There are no capital investments required for the City's water treatment and supply system in the next 10 years after the new WTP becomes operational in 2019, so the CIP planning horizon is 10 years.

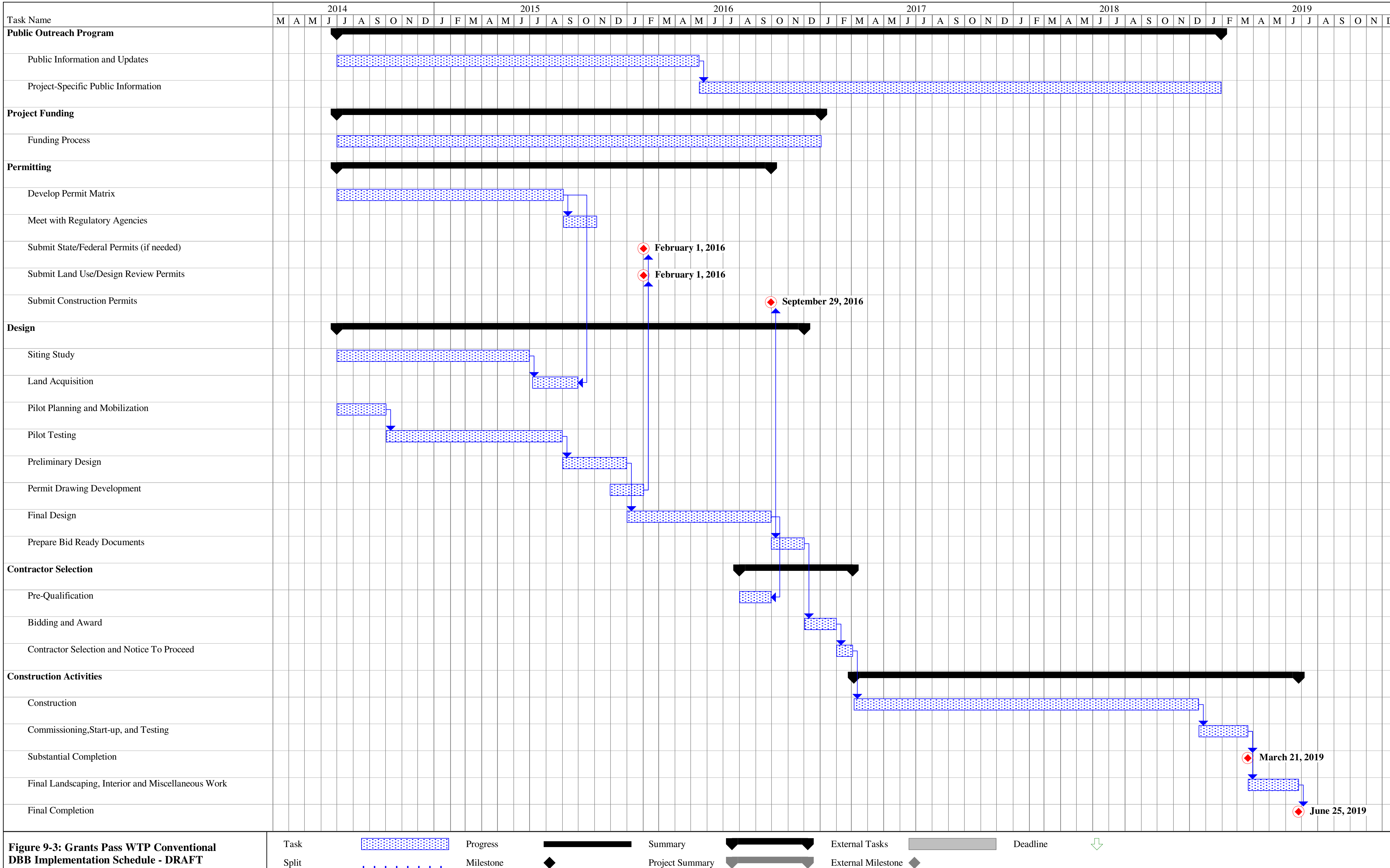


Figure 9-3: Grants Pass WTP Conventional DBB Implementation Schedule - DRAFT

Table 9-11
Recommended Capital Improvement Program Summary[1,2,3,4]

CIP Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Anticipated CIP Expenditures for Project Component**
Fiscal Year	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**2023-24**	
New Water Treatment Plant Implementation											
Pilot Plant Study	$400,000	$100,000									$500,000
Siting Study and Property Acquisition	$200,000	$1,100,000									$1,300,000
Funding Study and Rate Impact Study[5]	$100,000	$100,000									$200,000
Project Implementation Approach and Procurement Strategy	$50,000										$50,000
Public Information/Involvement	$50,000	$50,000	$50,000	$50,000	$50,000						$250,000
Permitting and Land-Use Approvals	$50,000	$75,000	$75,000								$200,000
Preliminary Design		$1,000,000									$1,000,000
Final Design		$1,000,000	$3,000,000								$4,000,000
Bidding and Award			$250,000								$250,000
Construction			$10,200,000	$18,500,000	$18,500,000						$47,200,000
Post-Construction and Warranty Period						$100,000	$100,000				$200,000
Existing Water Treatment Plant Investments											
Emergency Response Plan	$50,000										$50,000
Decommission and Demolition of Existing Plant[6]							$250,000	$250,000	$250,000	$250,000	$1,000,000
Total Anticipated Annual Expenditures	**$1,000,000**	**$3,525,000**	**$13,375,000**	**$18,550,000**	**$18,550,000**	**$100,000**	**$350,000**	**$250,000**	**$250,000**	**$250,000**	**$56,200,000**

Notes
1. Schedule assumes design-bid-build project delivery.
2. From fiscal year 2014-15 to 2023-24, based on Alternative 4 project costs
3. All costs are in 2013 U.S. dollars.
4. This is a Class 5 estimate. The accuracy ranges from –30 percent to +50 percent.
5. Funding and rate impact study costs assume that separate studies are not performed for the distribution system capital improvements program.
6. Costs for decommissioning and demolishing the existing water treatment plant were not included in the project costs presented in Chapter 8.

Project Initiation Activities

It is recommended that the City accomplish the following tasks during the first year of planning for construction of a new WTP:

- Develop a funding strategy
- Select a site for the new WTP
- Conduct a pilot plant study to evaluate high-rate filtration, high-rate clarification processes, and intermediate ozonation processes
- Confirm the project schedule and project delivery strategy
- Plan and implement a public outreach program
- Develop a permitting and regulatory approval plan

It is anticipated that the City will need to allocate approximately $1 million to complete these activities. Once significant progress has been made on each of these tasks, the detailed design phase may begin. Each of the tasks is briefly described below.

Funding Strategy

The City will need to decide how to fund this large capital improvement project. Impacts to customer rates from the WTP project will need to be determined. The rate study should also consider the financial impacts of other potential water system capital improvement projects which will be determined during preparation of the upcoming Water System Master Plan. This effort should begin as soon as possible and will take at least 12 months to complete, depending on when the Water System Master Plan CIP is finalized.

Site Selection

Per Council direction, the City needs to evaluate potential locations for the new WTP and then select a preferred site for acquisition. This task should be initiated as soon as possible and will likely take 12 to 18 months to complete.

There are currently a number of potential sites near the existing WTP which are considered suitable. This includes the property across the street from the existing WTP. This property is currently owned by the City.

After an initial screening of potential sites, testing should be performed at the selected properties to assess geotechnical conditions, determine whether hazardous materials are present, and identify anything else which may present obstacles to developing the property. The siting study should include a permitting review to identify potential permitting issues and development conditions.

Pilot Plant Study

In order to take advantage of the lower capital costs and smaller space requirements offered by high-rate clarification and filtration processes, a pilot plant study is needed to proof-test these processes with Rogue River water. The OHA requires a one-year long pilot plant study for use of filtration rates above 6 gpm/sf. Continuous pilot testing of alternative clarification technologies, such as ballasted flocculation, throughout the year may not be required, but a "reasonable" duration of testing during each season is necessary. This duration can range from 4 to 8 weeks per season depending on a number of testing and performance evaluation parameters. It is also recommended to pilot test the use of intermediate ozonation to determine its impacts to water quality and other processes.

Pilot testing should ideally be conducted on a seasonal basis to determine performance under variable water quality conditions which are experienced at the existing WTP, especially winter, summer and fall/transitional periods. If the City begins the pilot testing work in July 2014, the testing can be completed by spring 2015 and the final reporting completed during summer 2015.

The following tasks are suggested as part of the pilot plant study:

- Develop a testing plan, determine equipment needs, and confirm budget
- Procure equipment, deliver to site and install
- Seasonal pilot testing and data collection
- Reporting, including interim reports after first two seasons of testing
- Report submittal to OHA and review meeting
- Confirmation of treatment process selection

The costs to complete a pilot plant study can be highly variable and depend on factors like equipment costs and labor assigned to operate and monitor the pilot plant equipment. The most economic approach is to have City staff assume the daily operations and data collection duties after receiving training and startup assistance from consultant staff and equipment suppliers.

Project Schedule and Delivery Method

The City needs to confirm the appropriate project schedule for the new WTP and to verify the desired method to deliver the project. The schedule will ultimately depend on the method of project delivery. There are multiple project delivery options for the City to consider in addition to a traditional design-bid-build approach. For example, design-build may allow earlier completion. The City may also consider a public-private partnership. Public-private partnerships are becoming more common for large capital projects because they are partially or completely funded by a private party as part of the program.

In addition to project schedule and method of project delivery, the City should consider the following:

- Whether improvements to the water supply system which are necessary to integrate the new WTP should be designed and constructed as unique projects or completed as part of the WTP project
- Early procurement of key process equipment
- Long-term strategy for operating the new WTP (continuing with City staff operation or using a third party as in design-build-operate)

Public Outreach

Public support will be an important component in the overall success of the project. Experiences from recent similar projects in the region has shown that the public is interested in and aware of its source of drinking water supply and will be very active in expressing their opinions in this matter.

The City has laid the foundation for a very open, transparent, and active public information program over the past year to keep the public updated on the various water supply alternatives. This program should continue until long after the new plant is constructed to ensure a level of transparency that the community demands. As the City has gathered all of the information needed to properly evaluate all of its future water supply alternatives, the information program should be expanded to include a range of activities from a broader public education campaign to inclusion of a public involvement component to assist in the final design decision-making process as it relates to public amenities.

Permitting and Regulatory Approvals

The City should develop an inventory of permitting requirements and submittals that will be required for the project. Assignments of responsibility should be made to ensure that all of the required permits and regulatory approvals are obtained within the appropriate time frame. The scope of permitting will become clearer as the level of project definition increases. This task is of critical importance and should begin in the first year of planning. Experience has shown that permitting can take longer than any other part of a project. Failure to address permitting issues early enough in the project can delay the schedule.

Preliminary Design Activities

Once a site has been acquired, the funding method has been determined, and pilot testing has been completed, the next steps in the plant design process will include:

- Development of Basis of Design Report (BoDR) which reflects approximately 10 percent design completion
- Initial opinion of probable construction cost (OPCC) based on BoDR

- Continuance of public outreach program
- Refinement of permitting requirements

It is anticipated that this activity will begin during fiscal year 2 in fall 2015 and will take approximately four months to complete.

Final Design Activities

After preliminary design activities have been completed, final design will commence. Final design tasks include:

- Early equipment procurement, if determined to be beneficial to the project
- Development of detailed plans, specifications, and bidding documents
- Additional OPCCs at selected intermediate and final design stages
- Project permitting and approvals
- Continuance of public outreach program

It is anticipated that this activity will begin during the latter half of fiscal year 2 in early 2016 and will take approximately 10 months to complete. This would allow bidding to begin in fall 2016 during fiscal year 3.

Bidding and Award

After final design has been completed, bidding activities will commence. These activities will include:

- Pre-qualification of bidders
- Advertisement for bids and pre-bid meeting with prospective bidders
- Receipt of questions from prospective bidders and issuance of addenda as necessary
- Receipt and review of bids
- Recommendation of award to apparent low bidder
- Project permitting and approvals, if needed
- Continuance of public outreach program

With bidding set to begin in fiscal year 3, it is anticipated that this activity will take approximately three months to complete to allow the award to be made in the latter half of fiscal year 3. This schedule and list of tasks assumes that a design-bid-build project delivery will be used. Conditions could change if the City uses a different project delivery method.

Construction, Startup, and Commissioning

A 28-month construction duration is anticipated which would provide for final completion in June 2019. The last few months of this activity include time for startup, testing, commissioning, and operator training. It is anticipated that the City will desire a two-year warranty period which would conclude in 2021. The project costs for this activity include construction, inspection, construction management, and engineering services during construction.

Investments in the Existing Water Treatment Plant

Since a new WTP will be constructed, the City should limit its investment in the existing WTP. With the exception of the intake structure, investments in the existing WTP structures would be lost as soon as the new WTP is online and the existing WTP is decommissioned. However, the City should budget some money for the existing WTP including the following items:

- The existing intake may require modifications to improve the handling of silts and solids which accumulate in the pumping wetwell. The City has completed designs for low-cost upgrades of the de-silt system to help alleviate these issues. Completion of these improvements or a more permanent, long-term improvement should be deferred and re-evaluated based on observation of siltation in the spring of 2014 and the overall sequencing of the Project Initiation Activities described earlier in this chapter.
- The City will need to determine the ultimate fate of the existing WTP after the new WTP becomes operational. A budget of $1 million has been allocated for decommissioning and demolition activities in the final four years of the CIP presented in Table 9-11.
- The City should develop an Emergency Response Plan. Specific attention should be given to areas of the plant which are highly susceptible to partial or complete failure in a seismic event.

Summary

The City of Grants Pass should immediately begin the process to construct a new WTP due to the age and structural condition of the existing WTP. In order to minimize the risks to the City's only drinking water supply, and to reduce continued investment in the existing plant, the City should plan to have a new WTP online in 2019. The estimated project cost to plan, design, and build a new WTP is $56.2 million. This project cost will be incurred in capital expenditures made over the next 10 years.

Critical early planning activities should begin in the next fiscal year to ensure that the new WTP is online in 2019. The City should budget approximately $1.0 million for this initial planning work which includes site selection, a pilot plant study, and a funding analysis.

The City will need to determine how to pay for this significant investment and should also consider potential investments in its distribution system, which will not be identified until after the upcoming Water System Master Plan is completed. A public outreach program can help the City engage its citizens to help explain why these investments are important to the community.