Council Meeting Date: May 7, 2012 **Agenda Item:** 7(a)

CITY COUNCIL AGENDA ITEM

CITY OF SHORELINE, WASHINGTON

AGENDA TITLE:	Council Goal No. 2 Action Step Update: Acquisition of Seattle Public Utilities Water System in Shoreline – Due Diligence Review
DEPARTMENT:	Public Works
PRESENTED BY:	Mark Relph, Public Works Director
ACTION:	____ Ordinance ____ Resolution ____ Motion __**X**__ Discussion ____ Public Hearing

PROBLEM/ISSUE STATEMENT:

City Council Goal #2, Improve Shoreline's utility, transportation, and environmental infrastructure, includes an action step to acquire the Seattle Public Utility's (SPU) water system in Shoreline. In November of 2011, the City of Seattle and the City of Shoreline announced a tentative agreement in principle to the sale of the water system assets at a price of $25 million in the year 2020.

In late 2011, the City began the next step in the process, which was to perform an engineering and financial analysis to test the viability of creating a City water utility. This "due diligence" process has been aided by a citizen steering committee, created by the City Manager to review the analysis and process. The City Manager tasked the committee to make a recommendation to her, for which she will then evaluate and make a recommendation to City Council as to how to proceed or not.

The Council was briefed on the progress of the citizen steering committee on March 5th. Tonight's briefing is to review their progress since that date, review the due diligence information, review the continued negotiations with SPU in developing a formal agreement, and finally, to review the next steps in the process.

FINANCIAL IMPACT:

There is no immediate impact to Shoreline residents. However, if the acquisition is to proceed, the financial mechanism to purchase the system would be a revenue bond issued at the time of acquisition and paid for only by the utility rate payers within the SPU service area. Citizens who receive their water service from the Shoreline Water District (SWD) are not financially affected by this decision. Repayment of the revenue bond, or debt service, would be incorporated within a rate structure approved by City Council.

RECOMMENDATION

No action is required. This is intended as an update and for Council discussion.

Approved By: City Manager: City Attorney:

INTRODUCTION

The goal to acquire the SPU water system within the City of Shoreline has been a specific Council goal since 2009; however, the issue has been discussed perhaps as far back as the time of the City's incorporation. The central issues have been no direct citizen representation on issues such as rates and service, plus limited control over decisions that affect infrastructure improvements since the utility is owned and operated by Seattle. The Council's goal with the acquisition has been to address such concerns, but within a rate structure that would be equal to or less than the forecasted SPU rate structure.

The Council was briefed on the progress of the citizen steering committee on March 5th. Tonight's briefing is to review their progress since that date, review the due diligence information, review the continued negotiations with SPU in developing a formal agreement and finally to review the next steps in the process.

BACKGROUND

The SPU water system is located approximately west of I-5 and a small section in the south-east corner of Shoreline (see attachment A) and serves roughly two thirds of the City. The water system within Shoreline is a distribution system. It includes water storage tanks and pump stations, but does not include a watershed or water treatment. There are larger transmission lines that pass through the City, providing treated water supply to larger wholesale customers (e.g. Shoreline Water District, Olympic View Water & Sanitation District) and south to the Seattle distribution systems. With the SPU system in Shoreline being solely a distribution system, the costs and responsibilities are more narrowly focused and less substantial had it included the water supply system.

The infrastructure itself varies in age from the 1930s to present day with a large phase of construction in the 1950s through the 1960s, as the Shoreline area developed into an unincorporated suburb of King County. While the pipelines are perhaps moderate in age, the question that many have raised is whether or not the level of maintenance performed over that time has been adequate, and if the investment in capital improvement programs (CIP) has met the demands of redevelopment and fire protection. This has been one of the central issues staff has discussed with SPU during the past several months.

On April 18, 2011, staff presented to City Council an update on the negotiations with SPU, including:

1. The reasons for acquiring the system;
2. What are the parameters to decide if the acquisition would be successful; and
3. The extent of the public participation process.

A copy of the full staff report may be found at:

http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/Council/Staffreports/2011/staffreport041811-7b.pdf

In November 2011, the City of Seattle and the City of Shoreline announced a tentative agreement to the sale of the water system assets at a price of $25 million in the year 2020. With the announcement of the tentative agreement, the City began a more detailed engineering and financial analysis for creating a City water utility. This "due diligence" phase is being completed by the firm EES Consulting. The team assembled has considerable experience in the financial analysis of utilities and has added two key engineering personnel tasked with the development of an operations and maintenance plan for the water utility.

EES will complete four key tasks:

1. Performing a preliminary engineering due diligence on the distribution and general plant water system
2. Completing a financial analysis and feasibility study
3. Developing a Business or Operating Plan
4. Providing an overview and study of water supply options in the region

The detailed staff report explaining the contract and this "due diligence" may be found on the City's website at:

http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/Council/Staffreports/2011/staffreport052311-8a.pdf.

On January 23, 2012, staff provided Council another update on the project and specifically discussed the due diligence work along with the formation and responsibilities for the citizen steering committee. A copy of this staff report may be found at:

http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/Council/Staffreports/2012/Staffreport012312-8c.pdf.

On March 5, 2012, staff provided Council another update on the project and specifically discussed the status of the public steering committee's review of the due diligence work. A copy of this staff report may be found at:

http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/Council/Staffreports/2012/Staffreport030512-7a.pdf.

DISCUSSION

SPU Citizen Steering Committee

Prior to the March 5 Council briefing, the steering committee had met on three different occasions. The first meeting on January 24th was a general introduction to the issues and process. The second meeting on February 8th provided the committee a preliminary review of the revenue forecasts based upon information developed by EES, including rate classifications and consumption data specific to Shoreline customers and rate forecasts developed in large part by SPU. The third meeting on February 22nd was a presentation by EES staff on the draft engineering report. This report was intended to document an assessment of the SPU assets and maintenance practices, provide cost estimates on the operation and maintenance of a City utility, plus propose a level of capital investment (initial and on-going).

The detail behind each of the first three meetings can be found on the City's webpage at the following locations:

1. January 24th Steering Committee meeting: http://shorelinewa.gov/Modules/ShowDocument.aspx?documentid=10679.
2. February 8th Steering Committee meeting: http://shorelinewa.gov/Modules/ShowDocument.aspx?documentid=10719.
3. February 22nd Steering Committee meeting: http://shorelinewa.gov/Modules/ShowDocument.aspx?documentid=10782.

Since the March 5th Council briefing, the committee has had three regular meetings, plus they decided to create two subcommittees to review in more detail the engineering and financial analysis. The topics and meeting materials can be found on the City's webpage.

4. March 14th Steering Committee meeting topics:
    - Costs of Operating the Utility
    - Preliminary Financial Analysis
    - Meeting materials: http://shorelinewa.gov/Modules/ShowDocument.aspx?documentid=10926.

5. April 3rd Steering Committee meeting topics:
    - This meeting provided an opportunity for the committee and the City Council to tour SPU facilities in Shoreline
    - Base Financial case
    - Financial Sensitivities
    - Water Supply Options
    - Meeting materials: http://shorelinewa.gov/Modules/ShowDocument.aspx?documentid=10975.

6. April 25th Steering Committee meeting:
    - Draft Financial Report
    - Operational Efficiencies Report
    - Fire Department Operational Issues
    - Meeting materials: http://shorelinewa.gov/Modules/ShowDocument.aspx?documentid=11196

<u>Engineering Subcommittee:</u>

A. March 8th meeting materials: http://shorelinewa.gov/Modules/ShowDocument.aspx?documentid=10896.
B. April 11th meeting materials: http://shorelinewa.gov/Modules/ShowDocument.aspx?documentid=11122.

<u>Financial Subcommittee:</u>

A. March 26th meeting materials: http://shorelinewa.gov/Modules/ShowDocument.aspx?documentid=10956.
B. Next Scheduled Meeting – May 2nd

Since the March 5th Council briefing the citizen committee has reviewed the details of the engineering report and made suggestions which resulted in the updated report

included with this staff report. The engineering discussion has focused on such issues as:

- Separation costs along 145th
- Other Capital Investment Program (CIP) cost estimates
- Department of Health standards for storage
- After separation, modeling the performance of the City system

As a result of these discussions, the City has hired a third party engineering firm (CH2MHill) to critique the capital cost estimates and SPU's hydraulic modeling results for a separated system. This work should be available later in May.

The financial discussions have included such issues as:

- Interest & inflation rates
- Conservation programs and effects on consumption
- Population and business growth rates
- SPU rate forecasts and the effect on revenue projections
- Fixed costs relative to revenue
- Variability of the sensitivity analysis

As a result of these discussions, the draft financial report was modified and resubmitted to the committee at the April 25th meeting for further discussion. Also submitted to the committee for the April 25th meeting was a report prepared by City staff making an assessment of the operational efficiencies the water utility would gain from integration into the City organization. These efficiencies translate into cost savings for the utility as either initial cost reductions in facilities, equipment, etc., or annual cost savings typically associated with staffing (i.e. personnel costs). After review and discussion by the committee, the results will be incorporated into the financial analysis and operating plan.

Due Diligence

The purpose of the due diligence is to evaluate the feasibility of the acquisition from an engineering and financial perspective.

Engineering Report (Attachment B) and Financial Report (Attachment C)

The Council reviewed the draft engineering report on March 5. The engineering report is the building block for identifying the anticipated cost of maintaining and operating the water utility. The engineering report includes a review of the following:

- Status & Condition of Existing System
- Current SPU Maintenance Program
- Current SPU Capital Improvement Program
- Proposed Maintenance Prior to Shoreline Acquisition
- Proposed Post-Acquisition Maintenance Program
- Proposed Post-Acquisition O&M Budget
- Separation Options, Issues & Costs
- Proposed Post-Acquisition Capital Improvements and Budget
- Additional Water Utility Functions
- Further Engineering Review & Evaluation

Acquisition and Initial Capital Costs

The $25 million tentative acquisition price includes the acquisition of two pump stations (North City and Dayton), storage tanks (Richmond Highlands Tanks 1 & 2), and

distribution mains (614,962 feet). The report notes that Shoreline would need to invest $7.5 million (2012 dollars) at the time of acquisition for the addition of a two million gallon storage tank, improvements to the North City and Dayton pump stations and control systems, acquisition of office and shop space, and acquisition of required tools and equipment to operate the system. The cost estimates for the new storage tank, the pump station improvements and control system improvements include a 25% contingency within the base cost estimates.

Water storage is provided in accordance with the Washington Department of Health (DOH) standards. In order to provide for future growth while meeting the DOH standards of reliability for standby storage, the acquisition and initial capital costs, assume that the Richmond Highlands Tank 1 will be decommissioned and a new two million gallon tank will be constructed in its place at the Richmond Highlands location. One outstanding item is the required water storage for the southeast section of the system. Storage for this area would need to be provided through contractual arrangements with SPU. The feasibility of continued reliance on SPU storage for this small area is being explored with DOH.

SPU has determined that the City will need to physically separate the Shoreline system from the SPU system. The engineering report examined six different separation alternatives for the system west of I-5, a recommended separation for the south-east corner and the related costs for each alternative. The recommended west I-5 separation (Alternative B3) would have Shoreline constructing 7,300 feet of main in N 145th between Greenwood Ave N. and I-5. A wholesale connection to the SPU system would be located at Aurora Ave N. The southeast separation would include installing 2,300 feet of 8" main in NE 145th from 25th Ave NE to Bothell Way NE and would be fed by a wholesale connection from an existing SPU line. The total estimated separation cost, in 2012 dollars, is $5.2 million.

The southeast portion of the SPU service area continues to be negotiated between the City and SPU, specifically on the timing of the acquisition (i.e. could be a later acquisition after 2020). SPU and City staff have agreed that the City would purchase this area, but options are still being considered on how the separation would occur and how reasonable water storage standards might be achieved. Some of these options have also been discussed with the DOH. Currently, staff is proceeding with the SE area as part of the initial acquisition. If staff believes there might be some advantage in delaying the acquisition of this section, staff would present this to the citizen's committee for discussion later in May.

Given that the acquisition of the SPU assets and the other required capital improvements to operate the system will not take place until 2020 (capital improvements will likely be initiated in 2018), the costs in 2012 dollars must be adjusted for inflation to reflect the anticipated cost in 2020. The following table summarizes the anticipated acquisition and initial capital costs in both 2012 and 2020 dollars:

Acquisition and Initial Capital Costs		
	2012 Value	**2020 Value**
Acquisition Price	$25,000,000	$25,000,000
Separation Cost	$5,204,400	$7,486,551
2 MG Storage Tank	$4,072,000	$5,857,589

Acquisition and Initial Capital Costs		
Pump Stations & Controls	$1,134,400	$1,631,839
Utility Buildings	$1,043,590	$1,501,208
Heavy Equipment & Vehicles	$933,900	$1,343,419
Tools & Inventory	$275,880	$396,854
Total	$37,664,170	$43,217,460
Annual Debt Service		$2,811,358

Based on the assumed interest rate (5%) and financing terms (30 years), the debt service payment associated with the acquisition and initial capital costs is $2.8 million per year. The debt service payment will remain fixed over the expected 30 year repayment period.

Operating & Maintenance Costs

The engineering report identifies the anticipated operating and maintenance (O&M) budget for the future utility and the anticipated long-term capital program. The financial report then takes the base estimates from the engineering study and applies projected inflationary increases (base case inflation is 4.6% annually) to take the 2012 estimated costs to those anticipated in 2020 and then for 20 years into the future (2040).

The annual O&M costs include labor costs (salary and benefits), materials and supplies, and administrative overhead. In 2012, these costs are estimated at $3.9 million. Adjusted for inflation, the costs escalate to $5.5 million in 2020 and to $13.7 million by 2040. While costs were developed assuming that the City conducts all of the required tasks internally, it might be cost-effective to outsource certain activities. The City may consider this option as the acquisition date approaches; however, it would only include outsourcing to the extent it would reduce costs or provide enhanced service for the same costs. The following table summarizes the anticipated O&M costs for operating the utility.

Forecast of Annual O&M Costs						
	2012	**2020**	**2025**	**2030**	**2035**	**2040**
Labor	$1,227,799	$1,759,465	$2,203,125	$2,758,656	$3,454,268	$4,325,282
Materials/ Supplies	$659,681	$945,339	$1,183,712	$1,482,191	$1,855,935	$2,323,920
Employee Benefits	$491,120	$703,787	$881,251	$1,103,463	$1,381,708	$1,730,114
Administrative	$1,500,000	$2,149,536	$2,691,554	$3,370,246	$4,220,073	$5,284,190
Total	$3,878,600	$5,558,127	$6,959,642	$8,714,557	$10,911,984	$13,663,506

Annual Capital Improvements Program (CIP)

In addition to the upfront capital improvement projects previously discussed as part of the system acquisition, it is expected that additional CIP will be required each year. The Engineering Report estimates such CIP to be $1.37 million per year in 2012 dollars. The three largest categories include service replacements, distribution main relocations and extensions, and vehicle replacements. It is assumed that this amount will escalate each year with inflation, to reach a sum of $2 million in 2020. The following table provides the detail of the ongoing capital improvements in 2012 dollars.

Ongoing Capital Improvements	
Category	**Estimated Cost**
Vehicle Replacements	$93,390
Tool Replacements	$17,413
Distribution Main Extensions	$71,000
Distribution Main Relocations	$213,000
Service Replacements	$710,000
Meter Replacements	$72,000
Hydrant Replacements	$50,000
Category	**Estimated Cost**
Valve Replacements	$50,000
Water Quality Improvements	$10,000
Cathodic Protection Improvements	$10,000
Pump & Storage Improvements	$50,000
Scada & Communications Improvements	$20,000
Total	$1,366,803

The other ongoing CIP item is replacement of certain existing distribution mains. Two reports have been written describing improvements needed to provide adequate fire flows and to meet service standards in the SPU service area in Shoreline. The June 2000 SPU report, *590 Richmond Highlands Pressure Zone Hydraulic Analysis Report,* evaluated upgrades for fire flow deficiencies http://shorelinewa.gov/Modules/ShowDocument.aspx?documentid=10427. This report identified the need for 1,263 feet of 6" main and 28,824 feet of 8" main, including hydrants.

A review of the existing SPU mains in Shoreline was conducted by RH2 Engineers in the November 2004 report, *Seattle Public Utilities within the Cities of Shoreline and Lake Forest Park, Water System Valuation Report,* prepared for the Shoreline Water District (SWD) http://shorelinewa.gov/Modules/ShowDocument.aspx?documentid=10429. This report evaluated the distribution mains against SWD's standards, which are substantially more in line with the best management practices identified in the EES engineering report. The review identified mains, in addition to those identified in the June 2000 SPU report, in need of upgrade to bring the system into compliance with the SWD standards. The proposed mains within the City of Shoreline consisted of 15,435 feet of 4", 4,990 feet of 6", 71800 feet of 8", 12,260 feet of 12" and 4,345 feet of 16" main. It is important to note that the standards for new construction are more stringent than the standards that would have been in place at the time these mains were constructed. There is no DOH standard requiring main replacements. However, evaluating existing mains against current standards provides a reasonable means to help identify and prioritize mains for an ongoing main replacement program. More specific prioritization of main replacements will require that the hydraulic model for the Shoreline system be accurately calibrated as noted earlier.

The lists of deficient mains in the 2000 and 2004 reports are presently being reviewed by the Shoreline Fire Department to ensure that all known areas of deficiency are

addressed. Additional areas of deficiency should be further evaluated by hydraulic modeling and flow tests.

Total length of the mains identified in these two reports equals approximately 139,000 feet, which constitutes 23% of the system's 615,000 feet. Replacement of these mains would bring the water system into compliance with more standard management practices and would provide distribution system capacity and hydrants to provide sufficient fire flows.

The Engineering Report estimates the main replacement cost at $32.7 million in 2012 dollars (Table 9, Engineering Report), or $46.9 million in 2020 dollars. This amount represents 23% of the total system and it is expected that costs would be spread out over time. If the cost is spread out over 23 years, as recommended in the Engineering Report, the annual cost would be $2 million per year in 2020, and would escalate with inflation after that time.

As with any utility with aging infrastructure, Shoreline can expect to eventually need to replace its entire distribution system as it reaches the end of its service life. Shoreline has an advantage over older utilities in that only 5% of the Shoreline system is currently more than 70 years old. A system that is constructed of good materials and that is well maintained can expect a service life of 100 years or more from its distribution mains. Viewed purely from the perspective of infrastructure age, Shoreline would not need to begin replacing most of its mains until about 25 to 30 years from now. This gives Shoreline a window of opportunity to establish a main replacement program to address the deficiencies, discussed in the previous paragraph, during the next 25 to 30 years and then to shift the main replacement program's focus to ongoing replacement of infrastructure due to age.

Other Costs

As the City is purchasing a distribution system it is not acquiring any of the water resources to provide water to the new utility. The new utility will be able to purchase water from SPU on a wholesale basis, as do many of the other water utilities in the region. The pricing and contract terms are expected to be the same as for SPU's other wholesale customers. Rates for wholesale water supply are developed by SPU in its *2012-2014 Water Rate Study* and differ between peak and off-peak periods.

Wholesale customers are expected to contract for a quantity of water that is sufficient to cover the variation from year to year. SPU provided Shoreline with the consumption by month for each rate class for the years 2006 through 2011. Water sales are reported in hundred cubic feet (CCF), which is the same unit of measure used for billing purposes. One CCF is equal to 748 gallons of water. The projections of water use are relatively flat for the new water utility, with sales of roughly 1.31 million CCF in 2020 increasing to 1.40 million CCF by 2040. The assumed wholesale contract water amount is 1.52 million CCF, which includes a 10% buffer for growth and variability and water losses of 5%. Based on historic usage, the water amount is split with 44% during the peak months and 56% during the off-peak months.

Based on the contract amount and the SPU rates, the total wholesale annual purchase cost is $2.8 million based on 2014 rates. Given price increases, this amount is forecast to be $3.4 million in the initial year 2020. Wholesale water rates are projected to increase by 3.5% annually between 2020 and 2040.

Forecast of Wholesale Water Costs from SPU						
	2014	2020	2025	2030	2035	2040
Annual Cost	$2,815,664	$3,443,399	$4,128,903	$4,953,646	$6,005,443	$7,285,781

The water utility will face two taxes on revenue from operating the water utility. There is a state tax rate of 5.029% that will be applied to all revenue. There is also a 6% franchise fee currently collected by SPU and paid to the City of Shoreline. We have assumed that post-acquisition the City will replace the 6% franchise fee with a 6% utility tax once the new water utility begins operations. SPU rates for Shoreline are currently 21% higher than rates within the City of Seattle. This surcharge includes the 6% franchise fee. The state utility tax is also included in the SPU rates.

Revenue Forecast

The Financial Report (Attachment C), "Development of Post-Acquisition Revenues" section, provides a detailed analysis of the revenue projections that have been used in the financial models. Revenues for Shoreline customers were projected starting with 2011 actual billings, and are forecast through the year 2040. Forecasts were completed for each rate class. This approach takes into account different growth rates for each customer class.

In order to provide the detailed revenue forecast a series of separate components were forecast individually and then appropriately combined to determine the results. The specific components are as follow:

- Number of customers by class
- Average use per customer by class
- Total water sales by class (Number of customers times average use per customer)
- Basis service charge by class and by meter size
- Consumption charges per CCF by class, including seasonal and block rates

The results provide revenues for 2011 through 2040 for each of the following customer classes:

- Residential Single-family
- Multi-family
- Commercial
- Master Meter Residential Developments (RRMD)
- Fire Service
- Other Revenue

The total number of customers is not projected to increase substantially in the Shoreline SPU system from 2011 to 2040 (Tables 6 and 7 of the Financial Report). In fact, the growth for all customer classes is only 5% over this time period, with the system growing from 10,911 customers in 2011 to 11,464 in 2040.

As discussed previously, water usage is projected to grow marginally over the next 30 years. Residential water usage, the largest customer class, is projected to decline by 5% over the next 30 years, with multi-family and commercial usage growing by 42% and 43% respectively (Tables 8 and 9 of the Financial Report).

SPU recently completed a cost of service study and established rates for the 2012 to 2014 period. The new rates represent significant rate increases. Because the rate increases differ by component and rate class, EES calculated the revenues for Shoreline customers using the new rates for each year. SPU rates are established as the baseline with the goal of having rates for the new Shoreline water utility that are no higher than SPU rates. During the 2011-2019 period Shoreline (Non- SWD customers) residents will remain on SPU rates. While EES did not complete a full financial evaluation for those years, they did calculate the revenues at SPU rates so that there would be a good basis for the starting revenues in the year 2020 when the acquisition takes place. To the extent that there are surplus revenues after the acquisition, the Shoreline water utility would have the option of reducing rates or improving capital facilities, or some combination of the two.

Based on average rates per CCF for Shoreline (Non-SWD) residents as a whole, the rate increases resulting from the new SPU rates are an average of 6% in 2012, 12% in 2013 and another 9% in 2014.

Short-Term Forecast of Total Annual Revenues by Class

	2011 Actual	2012	2013	2014
Residential	$5,489,547	$6,059,065	$6,549,043	$7,053,795
Multi-Family	$958,677	$1,128,424	$1,272,765	$1,426,212
Commercial	$1,452,391	$1,581,273	$1,976,882	$2,224,593
MMRD	$224,812	$292,744	$317,341	$342,797
Fire	$139,497	$163,411	$178,031	$193,279
Other	$193,997	$186,754	$203,463	$220,889
Total	$8,458,920	$9,411,672	$10,497,526	$11,461,564

To project the long-term revenues of the water utility, the 2014 revenues by class were used as the starting point. Revenues were based on the CCF forecast by class times the average rate per CCF forecast. SPU's long-term revenue forecasts project that rates will increase at 0.4% above inflation. For purposes of developing the financial model, the citizen subcommittee recommended that a 4.6% annual inflation factor be used. Since SPU has not provided rate increases by component beyond 2014, EES applied the expected 5% rate increase per year (4.6% annual inflation plus 0.4%) to the average rate per CCF equally for each customer class. The revenues reflect both the growth in CCF sales and the projected rate increases over time.

Long-term Forecast of Total Annual Revenues by Class

	2020	2025	2030	2035	2040
Residential	$9,013,687	$11,319,943	$14,216,281	$18,143,977	$23,156,823
Multi-Family	$1,993,200	$2,669,388	$3,567,171	$4,885,389	$6,690,742
Commercial	$3,195,274	$4,267,246	$5,698,851	$7,516,315	$9,913,400
MMRD	$445,770	$561,852	$708,163	$903,815	$1,153,523
Fire	$259,012	$330,572	$421,903	$538,467	$687,236

Long-term Forecast of Total Annual Revenues by Class					
	2020	2025	2030	2035	2040
Other	$296,012	$377,795	$482,172	$615,388	$785,408
Total	$15,202,956	$19,526,796	$25,094,541	$32,603,351	$42,387,132

Revenues are projected to be $15.2 million in 2020, increasing to $42.4 million by the year 2040. These numbers are very high in the later years but they must be looked at in terms of the costs that are also increasing significantly over the same time period. And because they are in nominal dollars, they include the general inflationary increases that make future dollars much higher than they are in today's terms. As the City monitors rate changes starting in 2020 and beyond, future City Council's will have an opportunity to manage the balance between the cost of operating the utility, future capital investment and the required rates. The previous forecast assumes that rates stay on the same trajectory as that anticipated by SPU.

Base Case Outcome

In order to determine the financial feasibility of the SPU acquisition, the projected revenues need to be compared to the projected costs. Not only must the overall financial forecast result in a positive cash flow, the operating revenues must exceed projected operating expenditures (does not include debt service or capital costs) by enough cushion to cover the anticipated debt service payment for the acquisition and initial capital costs of the utility. This cushion is called "debt service coverage" (DSC). SPU has a debt service coverage policy of 1.5. Most bond rating agencies expect that a utility will plan for a 1.7 DSC. This means that the difference between operating revenues and operating expenses result in a net cash flow that is 1.7 times the expected annual debt service payment. The projected debt service payment for the acquisition and initial capital costs is projected at just over $2.8 million, which means that the Shoreline utility should target a net difference between operating revenues and operating expense of nearly $4.8 million. ($2.8 million X 1.7).

The following table summarizes the projected bottom line for the base case scenario for 2020 through 2040:

Summary of Base Case Results					
	2020	2025	2030	2035	2040
Operating Revenues	$15,274,607	$19,618,243	$25,211,254	$32,752,308	$42,577,244
Operating Expenses	$10,678,260	$13,242,155	$16,435,880	$20,513,251	$25,624,164
Net Operating Income	$ 4,596,347	$ 6,376,088	$ 8,775,374	$16,760,943	$16,953,080
Debt Service	$2,811,358	$2,811,358	$2,811,358	$2,811,358	$2,811,358
Net Cash Flow Before CIP	$1,784,989	$3,564,730	$5,964,015	$9,427,699	$14,141,722
Annual CIP	$1,784,989	$2,452,550	$3,070,975	$3,845,339	$4,814,965
Net Available for Mains Replacement	$0	$1,112,181	$2,893,041	$5,582,360	$9,326,758
Debt Service Coverage	1.6	2.3	3.1	4.4	6.0
Cumulative Mains Replacement	($0)	$2,818,676	$13,500,413	$35,674,639	$74,329,264
Cumulative Percent	0%	4%	19%	51%	107%

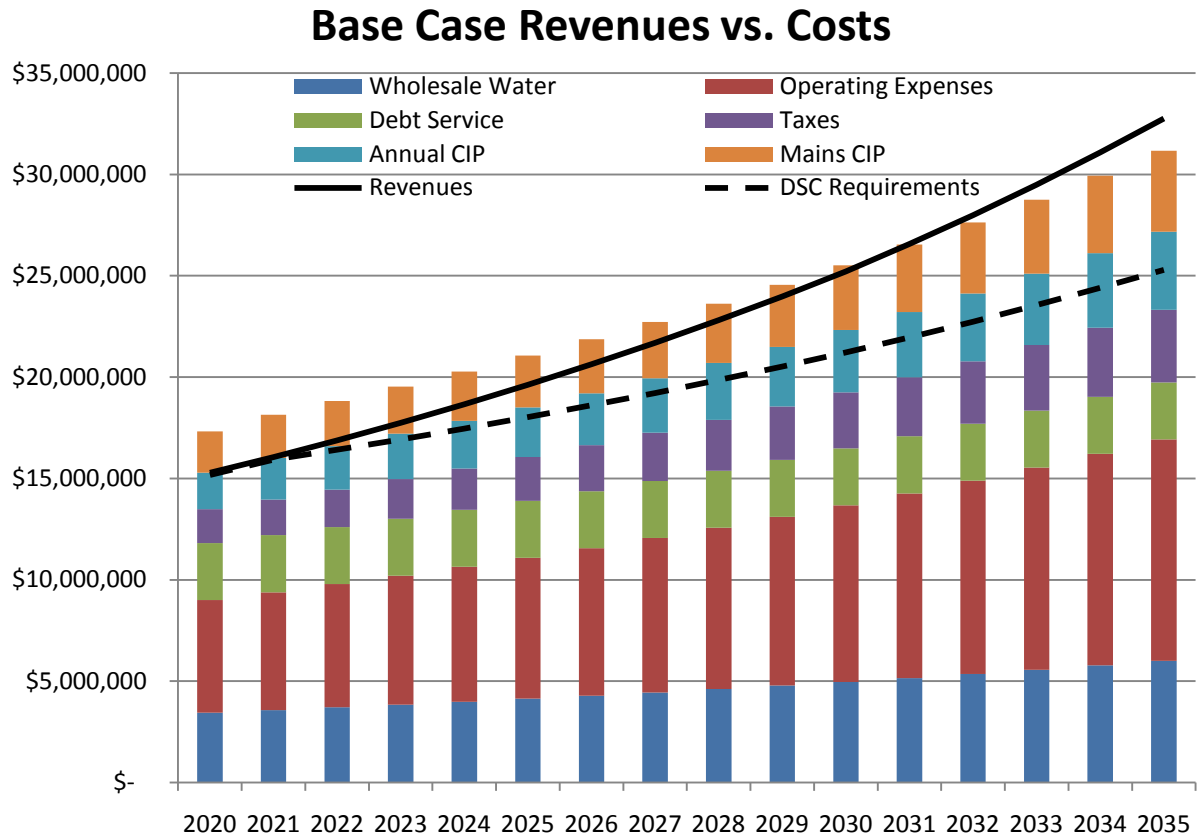
Although an annual CIP of $2 million is expected to be required every year, the main replacement program will have some options in terms of timing and funding. Given the

fact that rates must be set sufficiently high to meet the required debt service coverage level required by the bonds, it is expected that there will be cash left over each year that can be used to fund the CIP program. Given the current revenue and cost projections and the initial debt service payment of $2.8 million, net income for the year 2020 is $1.8 million, which provides a 1.6 DSC level. This amount can be used to fund the annual CIP. This is slightly below the level of the $2 million in ongoing CIP; however, that amount may be too high for the initial year. Because the amount includes replacement of vehicles, tools and Scada improvements, all of which will be brand new in 2020, it is not likely they will need replacement or improvements in the first several years.

Funding for the distribution mains replacement can be funded with any additional cash available, through additional debt, or some combination of both. It is recommended that the funding of this project be initially based on the amount of funds available without raising rates above the level of SPU. Once the City begins operations of the water utility, it can better assess whether that level of funding is adequate. If additional funds are shown to be needed, based on a prioritized list of replacements that need to be made immediately, then additional debt can be issued to cover a large portion of the replacements at once rather than doing an incremental amount each year.

The bottom line is that it appears that Shoreline would be able to operate the SPU system at or below the projected SPU rates while making substantial investment in the Shoreline system over time.

The following graph summarizes the outcomes of the base case scenario.

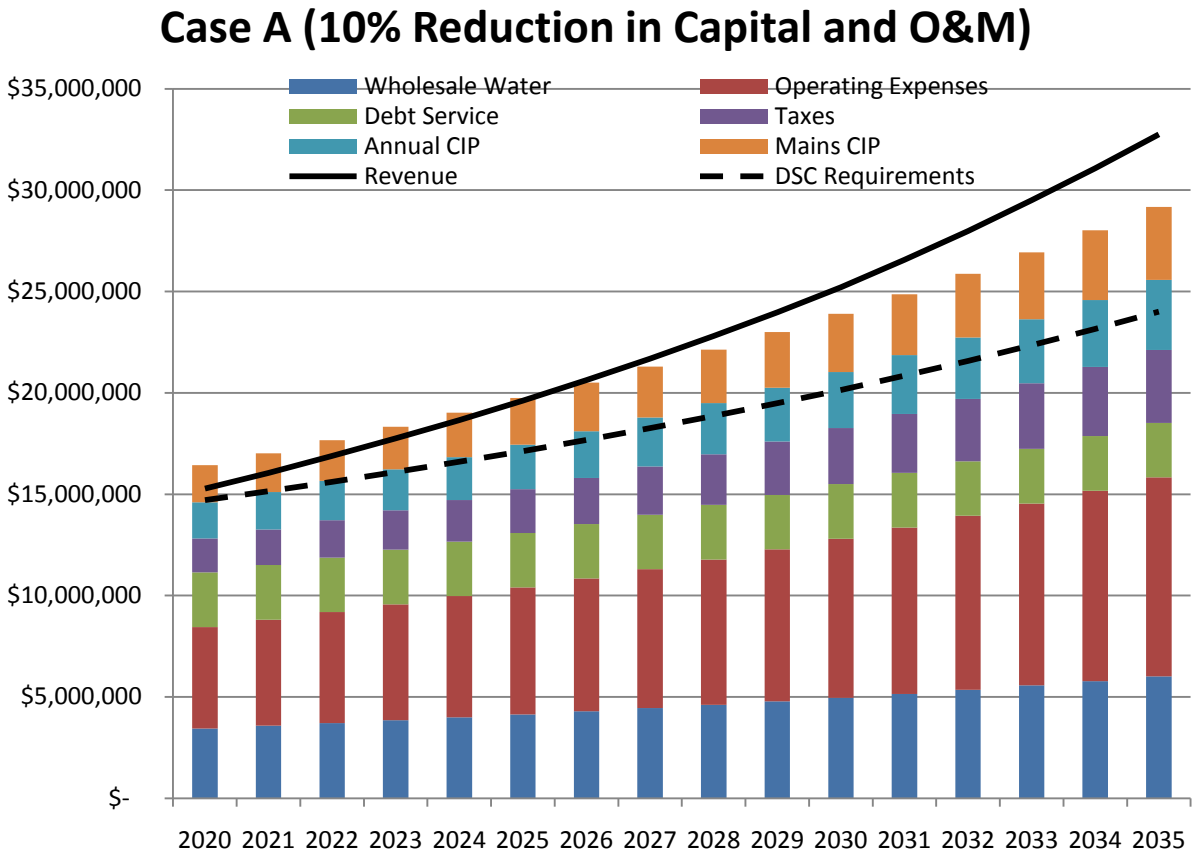


Sensitivity Analysis

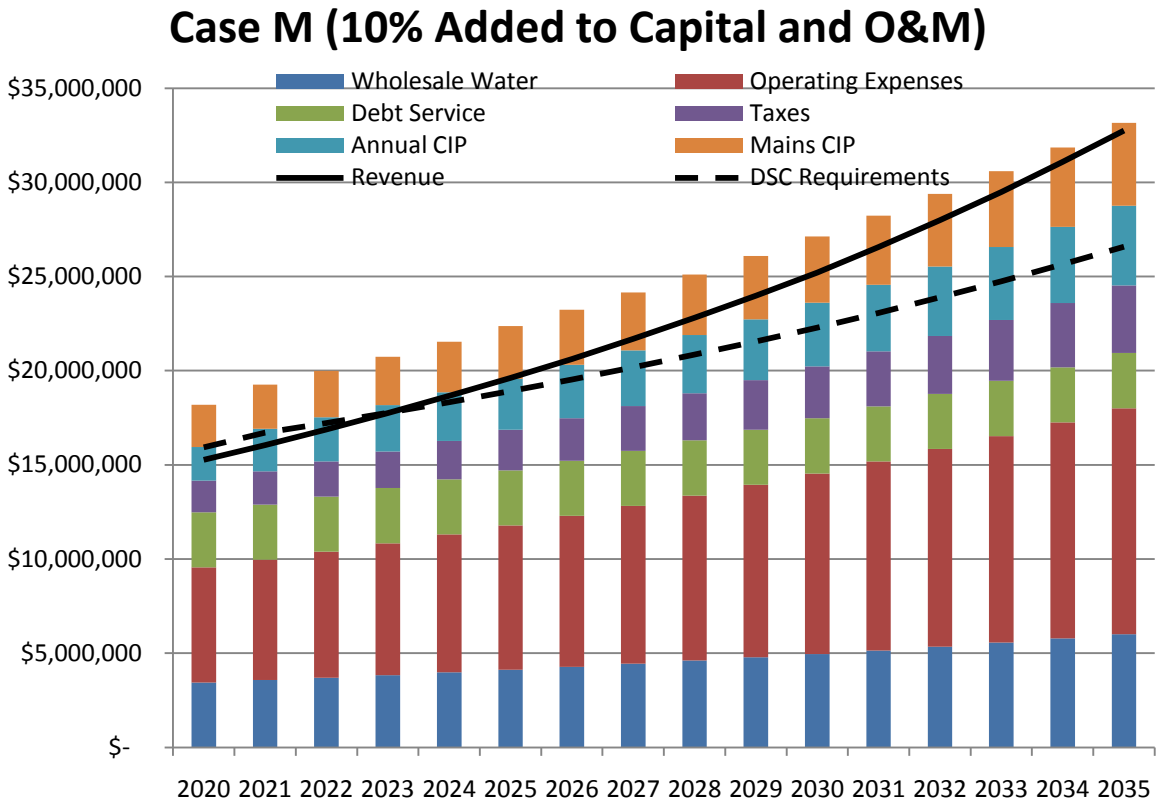
As with any long-term planning study, there is uncertainty and risk surrounding the analysis because the future is unknown. While EES provided detailed research and analysis to support the assumptions contained in this report, there are many factors outside the control of the City that will influence the projected revenues and costs. For that reason EES conducted a sensitivity analysis to determine what the financial results would be under various different assumptions. This was completed by looking at individual changes in assumptions first to see which had the largest impacts. Then both a high and low case with changes to multiple assumptions were created to determine the combined financial risks to the utility. A full discussion of the sensitivity analysis can be found in the Financial Report (Attachment C), "Sensitivity of Financial Results." A total of 15 different scenarios were developed as part of the sensitivity analysis.

The two bookends of the sensitivity analysis are Case A (best case) and Case M (worse case). These cases represent two of the most extreme cases. In the best case (Case A) all O&M and CIP costs are reduced by 10% initially. In the worse case (Case M) all O&M and CIP costs are increased by 10%. Thereafter the O&M and CIP costs increase at the base case escalation rates. The adjustments are made to labor, materials and administrative costs for O&M as well as to separation costs, upfront capital, ongoing CIP and mains replacement costs.

In Case A, costs are reduced by $400,000 and the DSC increases to 1.9 in the year 2020. This case provides the largest cost savings to the utility.



In Case M, costs are increased by nearly $700,000 and the DSC is 1.4 in 2020. This is the second most extreme case and would require the utility to enact other cost saving measures in the early years. Over time Case M would allow for 64% of the main replacements that were identified in the Engineering Report.



Efficiency Case

Shoreline staff has developed an Efficiency Report, Attachment D, that can overlay any of the financial scenarios that were developed as part of EES's Financial Report. This report evaluates the start-up operational cost impacts associated with the proposed City of Shoreline's acquisition of the SPU water system prepared by EES and evaluates how those costs may be affected by integration into City operations.

As with any acquisition of this magnitude, it is important to understand management responsibilities, liabilities and the short and long term costs of managing a Water Utility. The report focuses primarily on the initial integration of management and operation of maintaining a water system service into the City.

There are inherent costs that come with managing a Water Utility System; however, there are opportunities to reduce cost impacts through efficiencies whenever an existing governmental agency acquires such an entity. In this case, the City could reduce some of the costs of the operating a water utility by looking at the requirements against similar technical skills, equipment, and space already existing in the City of Shoreline. For instance, the City has an established infrastructure with similar technical skills in engineering, management, and fleet management (heavy equipment). Additionally, the City has available office space and facilities where the water utility can be housed and existing equipment that can be utilized to support a water utility. Combining these

resources could lower initial capital outlay significantly as well as annual costs to the utility.

The following table summarizes a comparison between the EES recommended acquisition of heavy equipment and tools and those recommended by City staff as part of the efficiency review. The efficiency review anticipates that the required initial investment in these areas could be $275,500 less than the EES recommendation.

Proposed Heavy Equipment & Tools and Cost						
Equipment	EES Proposed Quantity	**City Proposed Quantity**	Existing in City Inventory	**Recommended Quantity to Purchase**	Unit Cost	**Subtotal Cost**
Backhoe	2	**2**	1	**1**	$96,000	**$96,000**
Backhoe trailer	2	**1**	1	**0**	$5,500	**$0**
Shoring Box	2	**2**	0	**2**	$11,000	**$22,000**
Shoring box trailer	2	**1**	0	**1**	$4,400	**$4,400**
Dump truck	2	**2**	0	**2**	$180,000	**$360,000**
Boom truck	1	**1**	0	**0**	$154,000	**$0**
Service van	3	**2**	0	**2**	$36,000	**$72,000**
Pickup	5	**4**	25	**4**	$26,000	**$104,000**
Shop Tools					$46,970	**$46,970**
Field Tools					$127,160	**$127,160**
Spare Parts					$101,750	**$101,750**
SCADA	1	**1**	0	**1**	$400,000	**$400,000**
Total Equipment and Tool Cost Proposed by City						**$1,334,280**
Total Equipment and Tool Cost Proposed by EES						$1,609,780

Staff also anticipates that the start-up facility costs could be $114,500 less than those projected by EES given the consideration for space that was planned with City Hall. The following table compares those projected by EES and those projected in the Efficiency Report.

Proposed Facilities and Cost						
Building	EES Proposed Area (Sq Ft)	**Gross City All Functions Area (Sq Ft)**	Percent Contribution to Water Utility	**City Water Utility Recommended Area (Sq Ft)**	Unit Cost (Sq Ft)	**Subtotal Cost**
City Hall (Administrative)	2,625	**590**	100%	**590**	$55	**$32,450**
Maintenance Facility (Administrative)	0	**21,696**	25%	**5,424**	$110	**$596,640**
Maintenance Facility (Shops)	5,290	**7,500**	25%	**1,875**	$160	**$300,000**
	Total Facility Cost Proposed by City					**$929,090**
	Total Facility Cost Proposed by EES					$1,043,590

In summary the savings from the heavy equipment, tools, and facilities could result in the initial capital investment being $390,000 less than was used in the base case financial model. This would result in a slight reduction in the anticipated debt service payment.

More significantly, staff believes that there could be efficiencies gained through a reduction to the anticipated labor costs used in the base case scenario. Much of the savings results in the ability to share staffing with other City operations, as opposed to functioning as a stand-alone utility operation. The following table compares the anticipated differences in projected labor and administrative costs in 2012 dollars.

Proposed Staffing and Cost					
Equipment	EES Proposed FTEs	**City Proposed FTEs**	**Recommended FTEs**	Unit Cost (Annual Base Salary)	**Subtotal Cost (Annual Base Salary)**
Water Utility Manager	1	**1**	**1**	$110,807	**$110,807**
Water Operations Supervisor	1	**1**	**1**	$76,485	**$76,485**
Water Quality Technician	1	**1**	**1**	$57,450	**$57,450**
GIS Mapping Technician	1	**½**	**½**	$75,376	**$37,688**
Revenue Manager	1	**¾**	**¾**	$86,563	**$64,922**
Utility Billing/Customer Service Technician	3	**2 ½**	**2 ½**	$44,221	**$110,552**
Field Crew Worker, Lead	4	**1**	**1**	$54,683	**$54,683**
Field Crew Worker 2	4	**5**	**5**	$48,318	**$241,590**
Field Crew Worker 1	4	**4**	**4**	$46,446	**$185,784**
Warehouse Technician	1	**½**	**½**	$41,080	**$20,540**
Total	21	17¼	17¼		
				Total Base Salary Cost	**$960,501**
				Total Base Salary Cost Proposed by EES	$1,227,799
Annual Overhead Expenses (Employee Benefits)					
				City of Shoreline Proposed Overhead[1]	$414,705
				EES Proposed Overhead[2]	$491,120
Total Staffing Costs (Base Salary + Overhead) Proposed by City					**1,375,206**
				Total Staffing Costs (Base Salary + Overhead) Proposed by EES	$1,718,919

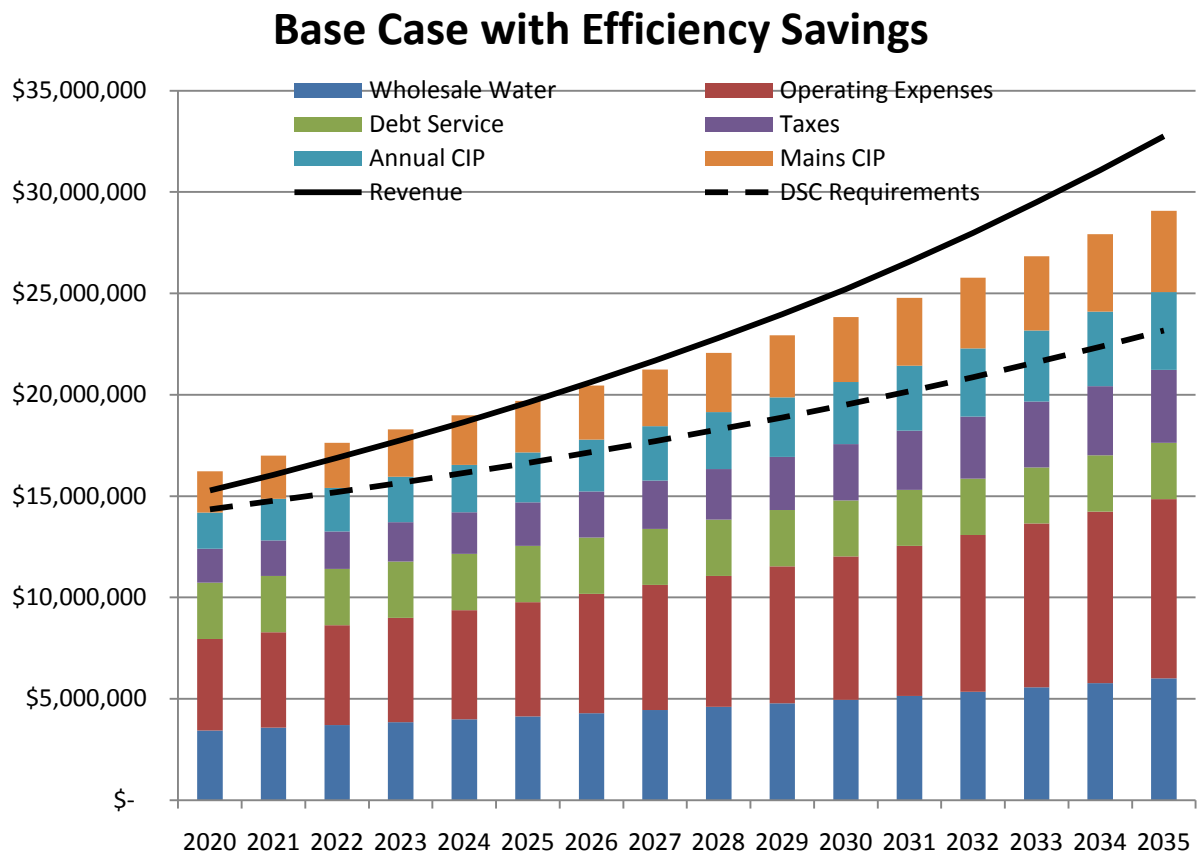
In addition to the $343,713 anticipated savings in labor costs, staff believes that the $1.5 million projected for administrative costs in the EES report may be able to be lowered to $1.1 million. Given that the base case financial scenario examined earlier in this report results in a positive bottom line that allows Shoreline to operate the water utility at or below the future anticipated SPU rates, the efficiency savings allow for even more assurance that this can be done. The following table summarizes the bottom line financial results for the efficiency case:

[1] Based upon existing City compensation schedule
[2] 40% of the direct salary cost proposed by EES

Summary of Base Case with Efficiency Savings Results					
	2020	2025	2030	2035	2040
Operating Revenues	$15,274,607	$19,618,243	$25,211,254	$32,752,308	$42,577,244
Operating Expenses	$ 9,626,008	$11,924,571	$14,786,060	$18,447,418	$23,037,419
Net Operating Income	$ 5,648,599	$ 7,693,672	$10,425,194	$14,304,890	$19,539,825
Debt Service	$2,774,863	$2,774,863	$2,774,863	$2,774,863	$2,774,863
Net Cash Flow Before CIP	$2,873,736	$4,460,668	$7,650,331	$11,530,027	$16,764,962
Annual CIP	$1,784,989	$2,452,550	$3,070,975	$3,845,339	$4,814,965
Net Available for Mains Replacement	$1,088,747	$2,466,259	$4,579,356	$7,684,688	$11,949,997
Debt Service Coverage	2.0	2.6	3.8	4.8	7.0
Cumulative Mains Replacement	$1,088,747	$10,123,310	$28,542,295	$52,674,061	$111,040,936
Cumulative Percent	1.6%	14.5%	41%	75.7%	159.6%

Sharing equipment and administrative services, such as finance, human resources, and legal services, will allow the water utility to achieve operational efficiencies. As resources continue to become more limited, consolidation of utilities makes good sense. The City will move closer to consolidation as we prepare for the assumption of Ronald Wastewater District (RWD) in 2017.

The following graph provides a long-term summary of the efficiency case:



Due Diligence Summary

To date, the base financial model continues to demonstrate that the SPU system could be operated by Shoreline within the projected future SPU rate structure. This includes costs related to replacing nearly a quarter of the existing water mains along with regular reinvestment though other capital projects and the debt service related to the acquisition and up-front capital costs of the system. This is prior to any consideration for anticipated City efficiencies as a result of operating within the City's structure as opposed to a stand-alone operation. To provide further assurance the financial modeling included a "worse case" scenario (Case M) which assumed that the base case underestimated the operating and capital costs by 10%, and therefore increased these costs by 10%. This is on top of the 25% contingency that was included in the cost estimates for the new storage tank and the pump station and control system improvements. The worse case scenario requires that the City find other cost saving measures, in the early years, in order to meet the required debt service coverage within the projected SPU rate structure, but over time the debt service coverage requirement is met. Even under the worse case scenario the City is able to start a main replacement program, although only 64% of the mains are replaced during the first 20 years of the utility's operation.

Other Considerations

Although the majority of this report has focused on the results of the financial analysis, that demonstrate that that Shoreline would be able to operate the SPU system within the projected SPU rate structure while substantially increasing the maintenance investment within the system, there are other reasons that both the citizens committee and the Council should consider. These are briefly outlined below.

Fire

The Shoreline Fire Department has shared with the committee their operational challenges with the SPU system. Inadequate line size, lack of fire hydrants, low water volume and pressure are historic problems scattered throughout the system. It is clear, the City utility would have to work closely in the future with the Fire Department as the system is modeled and priorities are established for capital projects.

The Fire Department has also expressed a desire to review the codes and standards of water systems, specifically for fire protection. There are several national and state codes that at times create ambiguity or inconsistencies. This is an issue that should be discussed for not only the SPU system, but should include the Shoreline Water District in an attempt to find one common standard within the City of Shoreline.

Lack of Representation

Currently all rate and capital reinvestment decisions are made by the Seattle City Council. Shoreline residents do not have any direct representation through these elected officials. Shoreline customers in the SPU system also pay a 14% surcharge on water rates, compared to Seattle rates, along with a 15.4% City of Seattle utility tax which provides funding for Seattle parks and police. In fact, using the 2020 projected utility revenue of $15.3 million, Shoreline residents would be contributing $1.2 million to Seattle's general fund in 2020. Acquisition of the SPU system would allow for those dollars to stay local in Shoreline and be reinvested in the Shoreline utility system.

One-Stop Permitting and Development Coordination
One-stop permitting reduces confusion, shortens the processing time and lessens the expense of obtaining the necessary permits for home improvements or property redevelopment. Consolidation of utilities allows investors to have a single point of contact with the City.

Nine out of 13 of Shoreline's comparable cities own their water and sewer utilities. Consolidating utilities under the control of cities has been a a regional goal for some time. The Growth Management Act states, "In general, cities are the units of local government most appropriate to provide urban governmental services." RCW 36.70A.110(4).

Next Steps
The due diligence work continues with Steering Committee with meetings scheduled through the end of June. The committee's proposed meeting topics and schedule is shown as Attachment E.

Running parallel to this process is the continued negotiations with SPU in the development of a formal agreement. This contract with SPU (i.e. City of Seattle) is anticipated to address such issues as the final contract price, the level of system maintenance to be provided by SPU until the City takes ownership in 2020, how the wholesale water contract would be addressed, any services the City may still contract with SPU after ownership (permanently and/or temporarily), separation of the two systems and so on.

City staff will also contract for polling of Shoreline residents regarding the potential acquisition of the SPU system. It is anticipated that this work will be completed during May. The information gathered through the polling will help inform staff on the level of understanding of the SPU issue by the Shoreline electorate.

All of the due diligence work, the Steering Committee recommendation and the draft SPU contract is anticipated to be complete in early July. At the conclusion of this work, the City Manager will review the recommendation of the Steering Committee, the draft contract with SPU and supporting information to make her own recommendation to the City Council as to whether or not to proceed with the acquisition. This is anticipated to be complete and submitted to the City Council by early summer 2012.

If the City Council decides to move forward with the acquisition, then the Council would have to approve the SPU agreement and forward it to the City of Seattle. Approval by Seattle City Council would then allow the Shoreline City Council to set the ballot language sometime this summer for a vote of the entire City in November 2012. If Shoreline voters approve the acquisition, then the City would move to the last phase of the project – the detailed development of a transition plan to move the utility from the City of Seattle to the City of Shoreline.

STAKEHOLDER OUTREACH

The City is committed to an extensive public process, which will occur over the next few months. Sharing the details and soliciting input on the level of water service problems, the CIP, maintenance, rates, and expectations on customer service will be important to

determine if a proposed budget will meet the public expectations and ultimately the financial parameters established by Council.

Coordinated with the Steering Committee are other types of opportunities for public participation which include:

- Attending neighborhood, business, and civic group meetings;
- Providing open houses and workshops;
- Distributing information to neighborhood newsletters, *Currents*, the cable channel, direct mailers to the affected rate payers as well as all the citizens of Shoreline; and
- Conducting formal public hearings.

City staff has already attended several neighborhood meetings to provide information about the SPU acquisition and are scheduling two public open houses in June.

RECOMMENDATION

No action is required. This is intended as an update and for Council discussion.

ATTACHMENTS

Attachment A – SPU Water Service Area within the City of Shoreline
Attachment B – March 2012 EES Engineering Report
Attachment C – April 2012 EES Financial Report
Attachment D – April 2012 Operational Efficiency Report
Attachment E – SPU Acquisition Citizen Steering Committee, Proposed meeting Topics and Schedule.

Attachment A

SHORELINE

Geographic Information System

Shoreline Utilities 2011

Water District

- Other
- Shoreline Water District
- Seattle Public Utilities

Utility districts occupying entire City Limits:
Ronald Wastewater District
AT&T Broadband
Puget Sound Energy
Seattle City Light

City Boundary

1 inch = 2,000 feet

0 495 990 1,980 2,970 3,960 Feet

Updated on: February 16, 2006

Attachment B

City of Shoreline

Shoreline Water System Engineering Review

Draft

March 2012

Prepared by:

EES Consulting

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Contents

Introduction

The City of Shoreline is evaluating the feasibility of acquiring and operating Seattle Public Utilities' water system infrastructure within the city limits of Shoreline. The acquisition would take place in the year 2020. This report provides an initial engineering review of the Seattle Public Utilities (SPU) water system assets which are under consideration for acquisition by the City of Shoreline. The author based the review on his experience of operating and managing staff and infrastructure at a large water utility, along with review of relevant engineering documents related to the Shoreline water system, interviews with SPU and Shoreline staff, and site visits to key facilities. The report outlines the overall operation of the system, including pump stations, storage facilities, pressure reducing stations and distribution system infrastructure. Condition of the facilities is evaluated, and deficiencies and other issues are identified. The Shoreline water system is presently an integral part of the SPU system and will need to be modified to become a separate water system, so separation alternatives, issues and costs are outlined. Operation and maintenance costs of the new utility are estimated, as are staffing levels and capital improvement budgets. Since the acquisition will occur a number of years in the future, recommended maintenance and capital improvements are also listed for the period prior to acquisition. During the years prior to the transfer of assets to Shoreline, additional engineering review and evaluation work will need to be carried out. Next steps in the engineering process are identified in this report.

Status and Condition of Existing System

Summary of Existing Facilities and Operations

The City of Shoreline receives water service from Seattle Public Utilities and from the Shoreline Water District, as shown on Figure 1. Most of the SPU service area is located west of I-5, although a small area in the southeast corner of the City also is served by SPU.

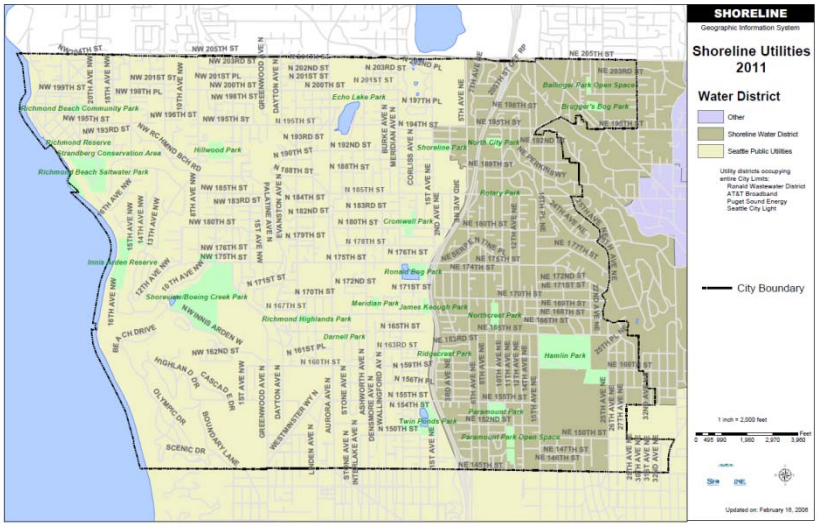

Figure 1-Water utility service areas

Water is supplied to the City of Shoreline from SPU's Tolt system through the 550 Pipeline, although water from the Cedar River system can also be delivered if the Tolt system is unavailable. Most of the system to be acquired from SPU is located to the west of I-5. This area is presently supplied through the North City Pump Station, the Foy Pump Station, and at times, the Bitter Lake Pump Station. A small area in the southeast corner of the City of Shoreline would also be acquired. This area would be fed from the adjacent SPU distribution system through a metered connection.

SPU provides wholesale water service to the Olympic View Water District through connections located on the north boundary of the City of Shoreline. Water for these connections is pumped through the Shoreline area by the North City and Foy Pump Stations. SPU also provides wholesale water service to the Shoreline Water District using the North City Pump Station.

Storage in the Shoreline area is provided by the 2 million gallon Richmond Highlands elevated Tank 2, located at Fremont Ave and N 195th Street, the adjacent 1 million gallon Richmond Highlands elevated Tank 1, and by the 1 million gallon Foy Standpipe, located at Dayton Ave N and N 145th Street.

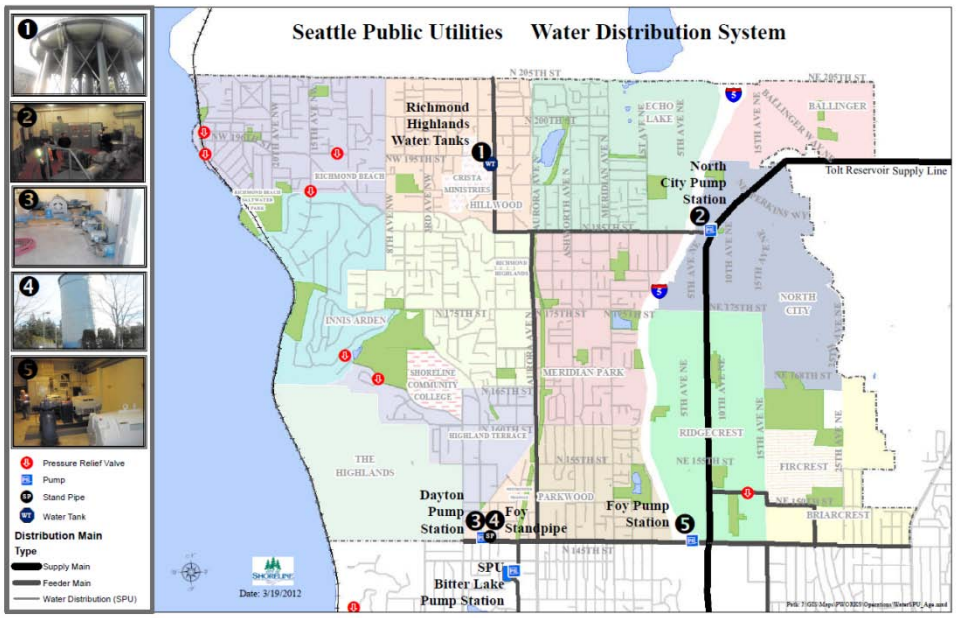

Figure 2- SPU water facilities within Shoreline

The largest pressure zone in the Shoreline area is the 590 zone, fed by pumping from the Tolt 550 Pipeline. The 590 pressure zone extends into Seattle to the south of Shoreline as shown in Figure 3. The 590 zone supplies the 480, 430, 290 and 210 pressure zones through pressure reducing valves. The lower zones are equipped with pressure relief valves. The closed loop 660 pumped zone is fed by the Dayton Pump Station, located by the Foy Standpipe.

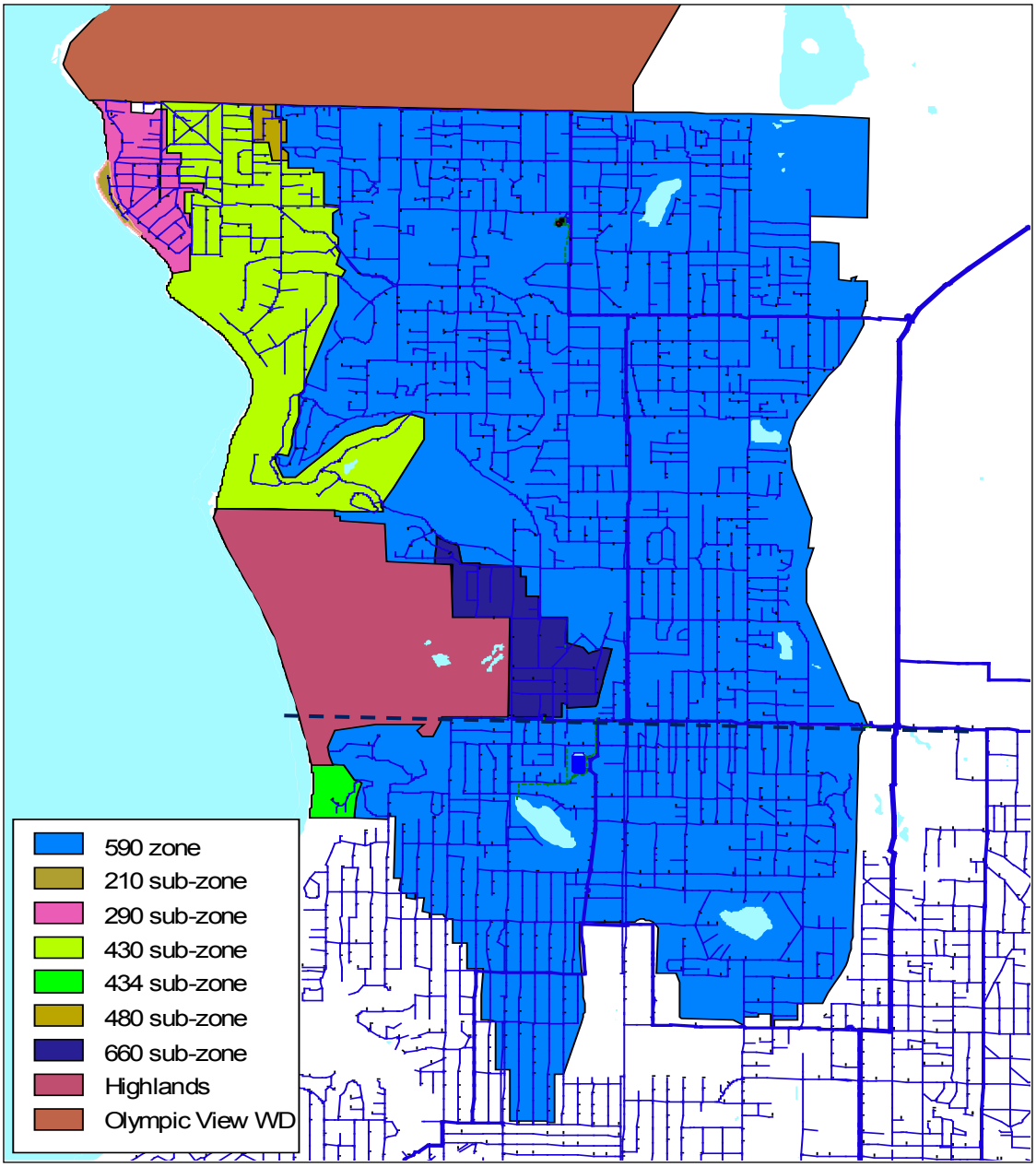

Figure 3- 590 pressure zone and sub-zones

Pump station capacities are summarized below. North City and Dayton Pump Stations would be acquired by Shoreline under all scenarios, and Foy Pump Station would provide service to Shoreline under some alternatives. Bitter Lake Pump Station would not be acquired and would not provide supply to Shoreline, and consequently is not listed here.

North City Pump Station	11,000 gallons per minute
Foy Pump Station	11,000 gallons per minute

Dayton Pump Station	1,400 gallons per minute

Storage facility capacities are also summarized. Richmond Highlands Tanks 1 and 2 would be acquired by Shoreline under all scenarios. Although Foy Standpipe would not be acquired, Shoreline would be required to upgrade or replace the facility for SPU's use, so it is listed here.

Richmond Highlands Tank 1	1,000,000 gallons
Richmond Highlands Tank 2	2,000,000 gallons
Foy Standpipe	1,000,000 gallons

Summary of System Demands

SPU has 10,570 services in the 590 zone in Shoreline, and 340 services in the 430 zone located in the southeast portion of Shoreline.

Figure 4 shows annual billed consumption converted to average day demand for the SPU system within the City of Shoreline. Total consumption would include an additional amount of non-revenue water, estimated at 5%.

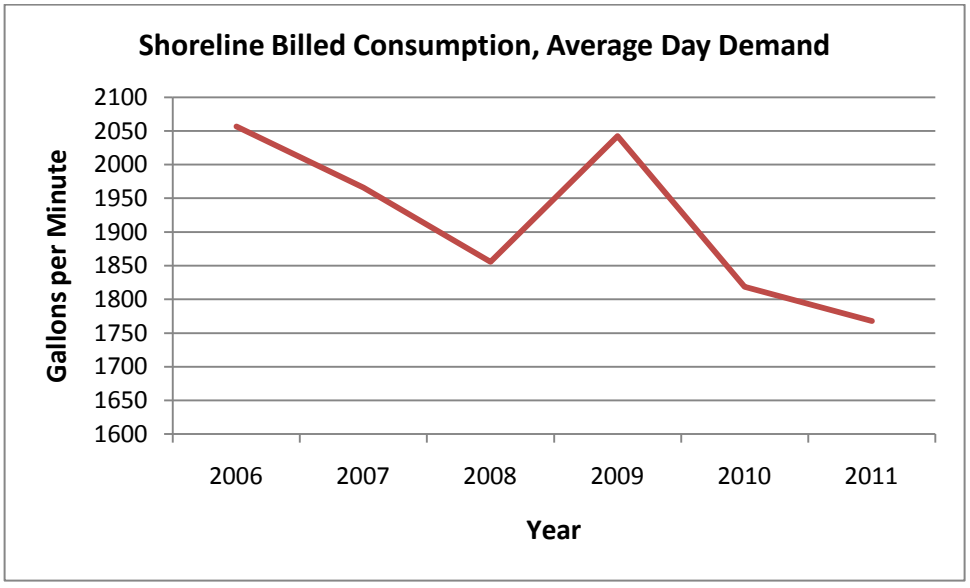

Figure 4-Average Day Demand

Maximum day demand is estimated at 1.8 times average day demand, and is shown in Figure 5. These demands also reflect billed consumption, and would increase by an estimated 5% to provide total maximum day demand.

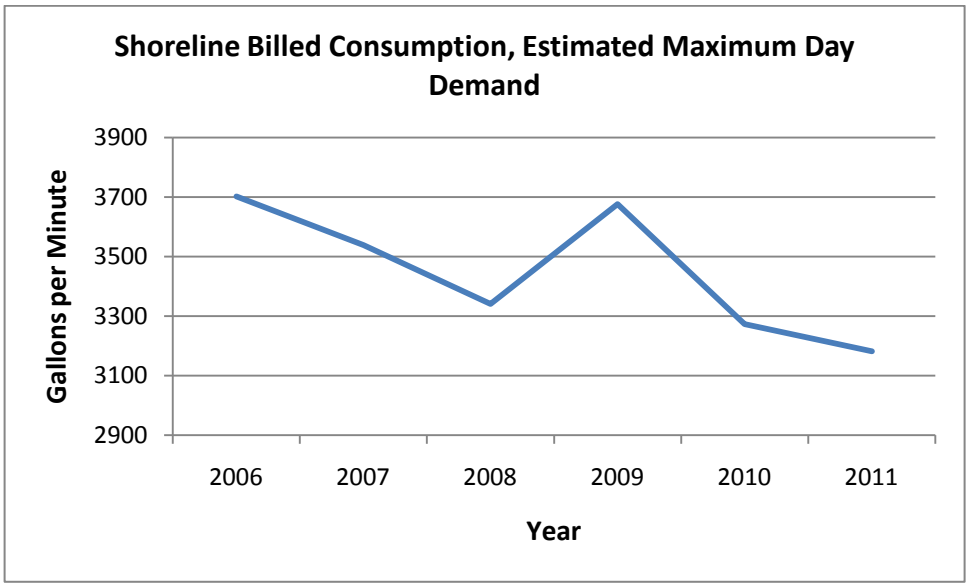

Figure 5- Maximum Day Demand

In addition to the water used within the SPU sytem in Shoreline, wholesale water is also pumped through the Shoreline area to the Olympic View Water & Sewer District and Shoreline Water District. Average annual supply through the 590 pressure zone to these services is approximately 700 gallons per minute.

Description of Facilities and Operations

North City Pump Station

Figure 6 – North City Pump Station Interior

North City Pump Station is located on NE 185th Street, between 8th and 9th Ave NE. North City Pump Station is used as the primary feed to the Shoreline area. The underground station was constructed in 1968 and is located adjacent to the 550 Pipeline. The station includes two pumps, each rated at 6,500 gpm and powered by a 250 hp motor. The pumps can be operated in parallel, with a combined output of 11,000 gpm. The inlet flow meter at the pump station is used for operational purposes but would not be suitable as a revenue meter.

Telemetry at the station includes pump start/stop control from SPU's Operations Control Center (OCC), pump status, suction and discharge pressure, inlet flow, and a station intrusion alarm. The station has a flood alarm but not a fire alarm. OCC operators start and stop the pumps as needed to maintain the water level in the Richmond Highlands tanks.

Figure 7 – North City Pump Station Exterior

In the event of loss of power at the pump station, a check valve along with remotely controlled 12" and 24" bypass valves can be opened to allow 550 Pipeline pressure to feed the Shoreline area at sufficient pressure to keep the system pressurized. The bypasses are also used when SPU's Lake Forest Reservoir is taken offline and the 550 Pipeline is operated at 590 feet. The station does not have standby power or a connection for portable standby power.

Foy Pump Station

Figure 8 – Foy Pump Station Interior

Figure 9 – Foy Pump Station Exterior

Foy Pump Station is located at the intersection of 5th Ave NE and NE 145th St. The pump station is an above ground concrete building with a pitched roof. It can draw suction from either the 550 Pipeline or the 430 pressure zone, with the station normally drawing from the 550 Pipeline. The building and piping were originally constructed in 1933. New pumps were installed in the early 1990's, including two 400 hp 4,400 gpm pumps and one 6,000 gpm pump. A separate set of

impellers is kept at the station for use when pumping from the 430 zone; however they are no longer used due to the similarity of pump performance with either set of impellers installed.

Telemetry at the station includes pump start/stop control from the OCC, pump status, suction and discharge pressure, smoke, flood, and station intrusion alarms. A circular chart recorder is installed but is not in use. OCC operators start and stop the pumps as needed to maintain the water level in Foy Standpipe and the Richmond Highlands tanks.

The station does not have standby power or a connection for portable standby power.

Bitter Lake Pump Station

This pump station would not be acquired by Shoreline, and would continue to serve SPU's portion of the 590 zone. Its relevance to Shoreline is that it currently provides the only pumped backup source if North City and Foy Pump Stations are offline. After system acquisition, this station will no longer provide a backup source. To replace this function, North City Pump Station would be equipped with backup power, as discussed later in this report.Bitter Lake Pump Stationis located south of Shoreline, at Bitter Lake Reservoir at Linden Ave N and N141st St. It can be used to pump from the reservoir to the 590 zone, and presently can be used as a backup supply to the Shoreline area. The station includes three pumps rated at 4,000 gpm each, one of which has a diesel powered standby generator. This location also includes a pressure relief valve for the 590 zone. The pump station's normal use is to improve turnover of the storage at the reservoir. When operated on standby power, the generator must be started onsite, and must be staffed continuously while running. Due to the need to have onsite staffing, this backup source is not immediately available to replace other sources if needed.

Dayton Pump Station

Figure 10 – Dayton Pump Station Exterior

Figure 11 – Dayton Pump Station Interior

The Dayton Pump station was constructed in 1978 to supply the higher elevation area to the north of Foy Standpipe. The pump station building is located in an above ground concrete building next to Foy Standpipe on N 145th St and Dayton Ave N. The station operates as a closed loop system, with two pumps. A 3 hp, 70 gpm pump operates continuously, and a 50 hp, 1,400 gpm pump cycles as needed to maintain pressure within a 20 psi operating band. Two 10,000 gallon hydropneumatic tanks are used to allow the pumps to cycle based on pressure. At peak demands,

the large pump is reported to cycle as much as 80 times a day. The station does not have standby power, but is equipped with check valves to feed from the 590 zone if needed.

Scada includes pump start/stop control, discharge flow and pressure. Alarm functions include intrusion and flood, but no smoke alarm is installed.

Richmond Highlands Tanks 1 and 2

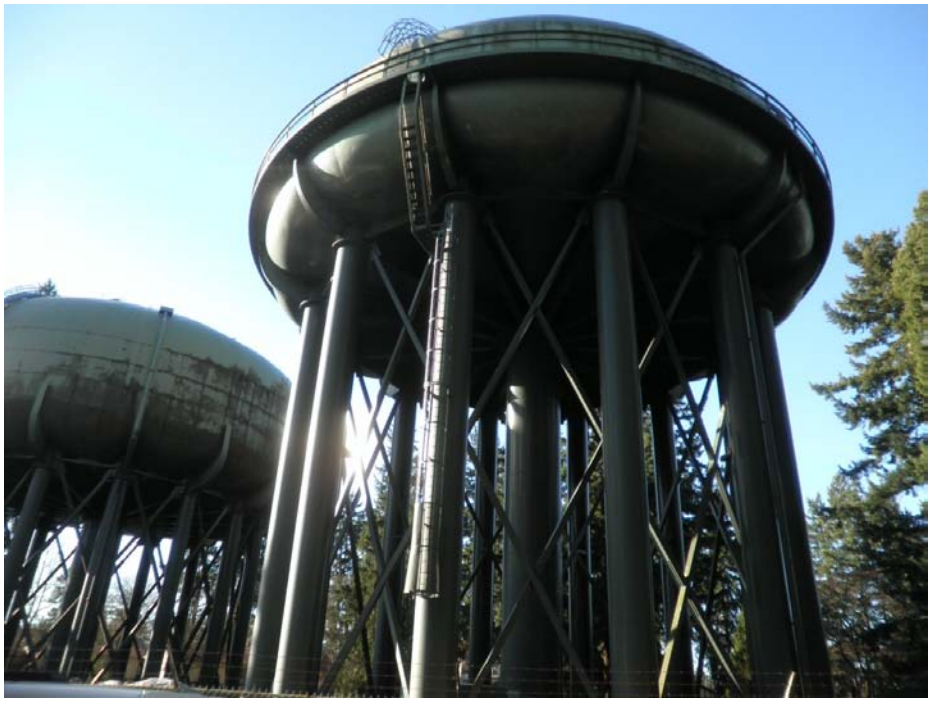

Figure 12 – Richmond Highlands Tank 1 (right) and Tank 2 (left)

The Richmond Highlands Tanks are located at N 195th St and Fremont Avenue N. Both are elevated steel tanks of similar design. Tank 1 was constructed in 1954 and Tank 2 was built in 1958. Both were seismically upgraded in 1994. Tank 1 has a bowl diameter of 86 feet and height of 25 feet, providing 1 million gallons of capacity. Tank 2 has a bowl diameter of 101 feet and height of 35 feet, providing 2 million gallons of capacity. Both tanks have a spill elevation of 590 feet. The top of the concrete base is at elevation 492.5 for Tank 1, and 488.5 for Tank 2.

Tank 1 has interior coal tar lining, which was found to need replacement in the most recent inspection by SPU. The tank bowl's exterior is painted with lead based paint which also was found to need replacement. Tank 1's legs were repainted as part of the 1994 seismic upgrade work, but the coatings on the bowl were not replaced during the seismic work.

Tank 2 is currently being internally and externally recoated, with the exception of the legs and substructure. Tank 1 is planned to be taken out of service once Tank 2 is recoated. The current plan is to leave Tank 1 empty and out of service but intact and physically connected to the system. SPU proposes Tank 1 would be minimally maintained and placed into service in its current

condition during times that Tank 2 is out of service for scheduled cleaning or other maintenance. Tank 1's failed internal and external coatings are not scheduled for replacement, but the tank would be maintained in mothballed condition such that it could be recoated and returned to regular service at some point in the future.

The Richmond Highlands tanks have telemetry to monitor water level. The tanks are not outfitted with internal cathodic protection systems to prevent internal corrosion and subsequent coating failure. The tanks do not have intrusion alarms on the hatches but are padlocked. Ladders are caged with locked gates at the bottom of the cages.

Foy Standpipe

Figure 13 – Foy Standpipe

Foy Standpipe is located on the north side of NE 145th St at Dayton Avenue N. It is a riveted steel standpipe and was constructed in 1933, with a diameter of 46 feet and height of 85 feet. Its capacity is 1 million gallons, of which 130,000 gallons are available to support a minimum pressure of 30 psi in the 590 zone. An additional 290,000 gallons support a minimum pressure of 20 psi. The standpipe is used as an antenna mount by a cellular communications provider.

The tank exterior was last repainted in 1980. An inspection in 2005 found the coal tar interior lining to be in good condition. The roof was determined to need repair and recoating. The exterior coating is presently in poor condition particularly on the south face, and results in periodic complaints from neighbors.

The structure has not been seismically upgraded. A ribbon anode cathodic protection system is reported to be installed.

Telemetry at the site consists of water level. There is no intrusion alarm.

Distribution Mains

SPU's distribution system within the Shoreline city limits consists of 614,962 feet of main, or about 116 miles. The predominant materials are cast and ductile iron, which together make up 89% of the system. The galvanized iron total on Table 1 also includes piping listed as galvanized steel. The miscellaneous materials included in the 'Other' category consist of copper, polyvinylchloride, concrete cylinder, kalamein, plastic, and a small amount of pipe listed as unknown material.

Table 1
Distribution Main Materials

Material	Length (ft)	Percent of Total
Cast Iron	395,487	64.3
Ductile Iron	152,689	24.8
Steel	51,029	8.3
Galvanized Iron	10,221	1.7
Other	5,535	0.9
Total	614,962	100

Table 2 shows the distribution of ages and lengths in feet for the various types of piping used in the system. Note that the oldest material in the system is steel pipe, followed closely by cast iron. SPU transitioned from using unlined cast iron to lined pipe approximately 65 years ago; however a significant amount of lined cast iron appears to have been used well into the 1970's. Unlined cast iron loses capacity over time as internal corrosion reduces available flow area. Cast iron, whether lined or unlined, is more susceptible to main breaks than is ductile iron.

Table 2 Main Material & Length by Age							
	Cast Iron	Ductile Iron	Steel	Galv. Iron	Other	Total, ft	% of Total
0 - 10 years	0	11,524	0	0	131	11655	1.9
10 - 20 years	0	26,547	0	0	12	26559	4.3
20 to 30 years	117	25,051	0	30	336	25535	4.2
30 to 40 years	12,339	79,072	6	30	1,244	92691	15.1
40 to 50 years	146,954	10,215	18,619	310	808	176906	28.8
50 to 60 years	150,766	5	12,228	3,258	503	166760	27.1
60 to 70 years	72,003	0	1,918	3,289	7	77217	12.6
70 to 80 years	11,020	159	18,260	3,155	0	32594	5.3
over 80 years	300	0	0	0	0	300	0.0
unknown	1,986	115	0	90	2,494	4686	0.8

Approximately 75% of the system is over 40 years old. About 6% of the system has been installed in the last 20 years, and 2% has been installed in the last ten years.

In general, a good quality distribution main that is properly installed can be expected to last 100 years. However, mains are not normally replaced solely based on age. Some of the oldest cast iron pipe was made using a process that resulted in very thick pipe walls which have proven to have very long life. Some other types of pipe such as small diameter galvanized iron will have much shorter service lives. Main replacement is typically carried out based on frequency of repairs and adequacy of size or capacity. From a long term perspective, average service life of the water mains in a system can be expected to be approximately 100 years.

Summary of Existing Operations

Most water delivered to the Shoreline area is pumped at North City Pump station, which is manually controlled by the OCC operators as they monitor the water level at Richmond Highlands Tanks. North City Pump Station provides the most economical source of supply to the Shoreline area. Additional water is pumped by Foy Pump Station using the same manual control method, based on the OCC operators monitoring the water level in Foy Standpipe and in Richmond Highlands Tanks. The Bitter Lake Pump Station provides a third available supply, and is the only one of the three pump stations which has backup power. SPU has determined that backup power is not considered necessary at North City or Foy Pump Stations due to the availability of gravity pressure in the 550 Pipeline. North City Pump Station is equipped with a bypass system, including a check valve and two remotely controlled valves.

Due to power failures caused by storms, North City and Foy Pump Stations have simultaneously failed in the past. In this situation, the 590 zone including the Shoreline area would be fed by storage at Richmond Highlands Tanks and by Foy Standpipe storage. The only available pumped supply to the area would be provided by the Bitter Lake Pump Station; however it requires staff onsite to start the pump station, which takes up to 2 hours. Depending on demand and on storage tank levels, Richmond Highlands and Foy Standpipe storage can be expected to last a minimum of

12 to 24 hours. Should storage be depleted before the Bitter Lake pump is started, or should demand exceed the capacity of the Bitter Lake pump, the check valve from the 550 Pipeline at North City Pump Station would open to provide a reduced level of system pressure. The bypass valves at North City can also be manually opened, but not by remote control during a power failure, due to lack of battery backup for the valve operators. Given several hours to reconfigure valves on SPU's transmission system, the 550 Pipeline can be operated at elevation 590, in which case the area could be returned to near normal pressure.

Olympic View Water District has about 5,000 services and is supplied from the 590 zone on the north side of Shoreline. Olympic View has its own 2.5 million gallon tank and several emergency interties with the City of Edmonds. Check valves on the Olympic View supply points would allow Olympic View to maintain normal pressure in the event of a loss of pressure in Shoreline and the 590 zone.

Water storage at a utility is provided in accordance with Washington Department of Health requirements which break storage capacity into five components. The top portion of storage is defined as operational storage, and consists of the range that the storage fluctuates as pumps are turned on and off. Next is equalizing storage, which is the amount that gets drawn down when demand exceeds pump capacity at peak demands, and which refills in time for the next day's peak demands. Both of these storage components must be available at a minimum of 30 psi to all customers. Next is standby storage, which is provided in order to deal with pump outages or other disruptions that may occur, and which must provide a minimum of 20 psi. The next lower volume of storage is fire suppression storage, which also must be at a sufficient elevation to maintain 20 psi for all customers during fire fighting. Any remaining volume is considered dead storage. In general, standby storage and fire suppression storage can be 'nested' in determining overall storage requirements, in which case the larger of the two components is considered to suffice for both components.

In order to provide sufficient storage to the 590 zone and the Shoreline area, SPU relies on three large reservoirs in the SPU system, Lake Forest Park, Maple Leaf, and Bitter Lake. A portion of the storage in these reservoirs, along with the Richmond Highlands Tanks and Foy Standpipe, provides needed storage for the area. However, should Shoreline become a wholesale customer, the reservoirs outside of the Shoreline boundaries would no longer be designated to provide storage for Shoreline, unless Shoreline were to negotiate an arrangement with SPU which allowed reliance on SPU storage. Without such an agreement, Shoreline would need additional storage capacity, as discussed later in the capital improvements section.

SPU staff has recommended that Foy Standpipe be decommissioned. Once it is out of service, and assuming Richmond Highlands Tank 1 is mothballed as proposed by SPU, Richmond Highlands Tank 2 will be the only operational storage facility at 590 elevation in the zone. When Richmond Highlands Tank 2 is out of service for cleaning or maintenance, the zone will no longer have a storage facility online which can be used to regulate pressure in the zone. One of two methods would need to be used in order to operate without Richmond Highlands Tank 2: Tank 1 could be temporarily returned to service, or water in excess of demand can be pumped at North City or Foy Pump Station, with the excess water released to Bitter Lake Reservoir through the pressure relief

valve at that location. The feasibility of temporarily placing Tank 1 in service is unknown and would need to be discussed with the DOH engineer. The tank would need to be cleaned and disinfected prior to being returned to service, and after an extended period of being out of service, it may be difficult to return the tank to a condition suitable for storing potable water due to the poor internal coating condition.

Facilities Condition

Based on site visits, review of documentation, and discussions with SPU and Shoreline staff, the following observations on facility conditions are noted:

Pump Stations

North City, Foy and Dayton Pump stations were toured. They were found to be clean, dry and generally appeared in good repair. Paint was in good condition both internally and externally. Safety measures were in place, including signage and cages around moving parts. All had overhead cranes marked with load limits. The Dayton pump station appeared to be less maintained than the larger North City and Foy pump stations.

North City Pump Station is located in a large underground vault which is not considered by SPU as a confined space. The station is accessed by stairs rather than by ladder, and at the time of the tour, a ventilation fan was in continuous operation.

Chart recorders are no longer in service, which makes it more difficult for field staff to diagnose failures. The control panel for the North City bypass valve did not appear to be functioning correctly and may not have been fully in service. Staff reported they did not carry out wire-to-water pump and motor efficiency testing, and pump performance does not appear to be tracked. Vibration monitoring was carried out at North City pumps in the past but was discontinued. Electrical switchgear is not checked by infrared scan for loose connections or overheated wires, however an annual switchgear inspection is carried out and connections are checked at that time. As part of the annual electrical check, larger motors are reported to be meggered to check winding insulation quality.

SPU staff reported that all stations are checked weekly. North City and Foy Pump Stations are manually controlled by the OCC operators, who operate the stations by monitoring water levels in the receiving reservoirs. While this process easily lends itself to automation, SPU prefers the manual approach as a way to more actively engage the OCC operators in the operation of the water system. SPU also relies on OCC operator intervention to protect pumps against failures such as pump control valves not opening or closing as needed. Standard industry practice relies on automated control systems to protect equipment in the case of local malfunctions.

North City, Foy and Dayton Pump stations are all without backup power systems. In the event of loss of line power, check valves and alternate sources such as the Bitter Lake Pump Station are relied on to provide sufficient pressure to keep the distribution system pressurized once local storage is depleted. Storage at Richmond Highlands Tank 2 would last less than a day at average

day demand. It is expected that the alternate means of supplying the area could be initiated within the amount of time that local storage would last.

Dayton Pump Station uses a hydropneumatic system, where pumps cycle based on the pressure in two hydropneumatic tanks. The large pump at this station has been reported to cycle off and on up to 80 times per day at peak demands, with the station's discharge pressure cycling between 60 psi and 80 psi. This type of system is not state-of-the-art. Variable speed pump control systems are commonly used in this application which allow the pumps to run at any speed needed to maintain a constant discharge pressure. Pump speed is automatically controlled by altering the frequency of the power supplied to the pump motor. This type of system also has the advantage of being energy efficient.

Control systems at the pump stations appear to be fairly basic. They are appropriate for a system which uses control system operators but would need modification to be suitable for a system that did not have control station operators but that instead relied on automated control. Some flow and pressure readouts are provided but circular charts or data loggers are not in service at the stations. Stations do not appear to have programmable logic controllers (PLC's) for overall station local control, alarms and motor protection; instead some or all functions either appear to be handled by the operator at the OCC or by local relay systems.

Pump controls include Hand-off-Auto control, which allows pumps to be turned on at the station or by the OCC. Transducers are labeled according to function.

All stations had sufficient space to accommodate their equipment and to provide ample work space.

Storage Tanks

The Foy Standpipe and Richmond Highlands Tank sites were toured. Foy Standpipe is in need of exterior paint, with numerous rust streaks visible from the street. Richmond Highlands tanks also need exterior paint, and recoating work on Tank 2 is presently underway. Tank 1 has extensive rusting on the roof, which is visible from the street. The legs of the tanks were repainted in 1994 and the paint remains in fair to good condition, with some oxidation on the south faces and some areas in need of touch up.

The bowl of Richmond Highlands Tank 2 is currently being relined and repainted. The tank's structure was seismically updated and painted in 1994. Richmond Highlands Tank 1 is reported to have poor internal coal tar enamel coating and has poor exterior paint on the tank bowl. SPU plans to take this tank out of service with the possibility of returning it to service at some future time after recoating.

SPU staff has recommended that Foy Standpipe be decommissioned. Its exterior coating is in poor condition and draws complaints from neighbors. The tank has been found to need substantial work if kept in service, including roof repair, new internal and external coatings, and seismic upgrade work. The standpipe has lead based paint on the exterior (under the visible coat of paint which was installed in 1980) and coal tar internal coating.

Hydrants

Hydrants are not routinely exercised by either SPU or by the local fire jurisdiction. SPU responds when a hydrant is reported in need of repair, but does not have a regular hydrant exercising or testing program. SPU relies on local fire jurisdictions to notify SPU if a hydrant is in need of repair. The Shoreline Fire Department reports that there are numerous hydrants with inadequate flow capacity. The Fire Department also reports that SPU responds in a timely manner when hydrants are reported out of service.

Mains, Services & Meters

Gate valves are not routinely exercised. Also, Shoreline staff reported difficulty in getting SPU to raise gate boxes in response to street paving. This, along with the gates not being exercised, increases the possibility that some gate boxes have been paved over or lost.

Mains are not routinely flushed. The local fire jurisdiction reported that mud, sand and rocks are often discharged when hydrants are flowed. Flow tests are infrequently done, and would be SPU's responsibility except in emergency situations.

Services and meters are replaced as needed.

Pressure Reducing Valve Stations

Figure 14 – Pressure Reducing Valve, 9th Ave NW & Innes Arden Way

Discussion with SPU maintenance staff indicated that pressure reducing valves are maintained on a 2 to 8 year interval, depending on criticality rating, activity of the valve, and valve size. The valves and pilot systems are standardized with units from high quality manufacturers. Most

pressure zones that are fed by pressure reducing valves are also equipped with pressure relief valves. Pilot lines are copper or, in some cases, stainless steel.

One station was toured, at 9th Ave NW & Innes Arden Way. This station has ductile iron main with galvanized bypass piping. Reducing valves have isolation valves installed. Access is through a standard circular manhole equipped with a steel ladder. The vault is located out of traffic, and provides sufficient space to access and maintain the valves. The vault had no standing water and appeared to be well drained. The floor of the vault was partially covered by sand and gravel. The station appeared to be consistent with standard utility practices, with the minor exception of sand and gravel on the floor. While a rectangular access hatch is preferable to circular manhole access, the industry practice of using rectangular access hatches at pressure reducing valve stations is relatively recent and most pressure reducing vaults in service typically still have manhole access.

The PRV station at 23rd Ave NW and NW 197th St is connected to Scada to monitor the 430 and 290 zone pressures.

Current Maintenance Programs

SPU's maintenance plans, as described in the 2007 Comprehensive Water System Plan (CWSP), are summarized below. Following the description from the CWSP, maintenance practices as reported by SPU staff are noted where different from the CWSP descriptions:

Pump Stations

At pump stations, the CWSP reports that a mechanic checks the station twice weekly and grounds maintenance staff checks the sites weekly. Pump motor starters are maintained twice a year. Annual maintenance includes a building inspection and valve operator inspection and maintenance. Every two to five years, flow meters are inspected and overhauled if needed, and pressure regulator valves are overhauled. Every five to seven years, pump efficiency is tested and pumps are overhauled if needed. Emergency maintenance is carried out when a critical piece of equipment has failed. Each pump's criticality has been predetermined and is incorporated into SPU's work management system in order to minimize the length of time that critical equipment is out of service.

SPU staff reported they carry out weekly station checks. Pressure regulating valves are serviced monthly based on criticality. Meters are serviced monthly or semiannually depending on lubrication requirements.

Storage Tanks

The CWSP indicates that elevated storage facilities supplied by the Tolt system are inspected every 5 years and internally cleaned every 25 years unless it is determined cleaning is needed sooner for water quality purposes. The water supplying the Shoreline area is filtered so sediment load in the water delivered to Shoreline is negligible. Tanks are painted approximately every 15 years or as needed.

SPU staff reported that the actual practice is to clean tanks every three to five years and to conduct sanitary inspections annually.

Hydrants

The CWSP reports that maintenance of hydrants consists of repair or replacement of broken or obsolete hydrants. SPU does not routinely exercise or test hydrants, instead relying on local fire jurisdictions to report defective hydrants to SPU. Hydrants are classified either as In Service or as Out of Service. As soon as a hydrant is identified as out of service and until it is repaired, a white engine port cap is installed to alert fire authorities that the hydrant is unavailable. SPU replaces broken or obsolete hydrants when the opportunity arises and as a result of other construction occurring at the hydrant's location. Hydrants are normally repainted on a five year cycle.

Mains, Services & Meters

The CWSP indicates that maintenance of mains, services and meters is primarily in response to failure of components, such as replacement of broken valves, repair of main breaks, replacement of nonfunctioning small meters, and replacement of leaking service lines. SPU does not routinely exercise distribution valves. Internal condition of the distribution mains is noted when main breaks are repaired, but there is no overall condition assessment of the internal condition of the mains. Main flushing is carried out as needed to address water quality issues including low chlorine residuals, but is not done routinely throughout the system. Large meters are tested and repaired; however this category of meters consists of only 3% of all retail meters. For smaller meters, particularly residential meters, it is more economical to replace rather than repair the meters. Problems with meters are generally identified through the billing system.

Leaking service lines are replaced with copper lines.

Pressure Reducing Valve Stations

No documented maintenance practices are described in the CWSP for these facilities. Similar pressure regulator equipment at pump stations is overhauled every two to five years.

Discussion with SPU maintenance staff indicated that pressure reducing valves are maintained on a 2 to 8 year interval, depending on criticality rating, activity of the valve, and valve size.

Current Capital Improvement Plan

SPU's 2007 Comprehensive Water System Plan addresses capital improvements, in some cases specifying individual projects, but in other cases focusing more on broad programs. Within the Shoreline area, one specific project in the CWSP was the recoating of Richmond Highlands Tank 2, work on which is presently nearing completion. The CIP also included budget for replacing mains that are impacted by other projects, which would include the Aurora Avenue work in Shoreline. Beyond these two projects, specific work in the Shoreline area cannot be identified. While the CIP includes funding for categories such as relining and replacing mains, replacing leaking services, or replacing service meters, these types of work are system-wide and, while some work can be assumed to fall within Shoreline, it is not specifically identified in the CIP.

An approximation can be made for the proportion of general distribution capital improvement work in the Shoreline area by assuming such work is carried out uniformly across the SPU distribution system. This assumption is likely to be more accurate for general categories such as meter or service replacements and less accurate for categories where the work consists of larger, more discrete projects such as water main relocations or main extensions. Table 3 is based on the premise that the distribution CIP is spread uniformly across the SPU distribution pipe network, which consists of 1640 miles of distribution mains. This number does not include SPU's 160 miles of transmission mains. The City of Shoreline includes 116 miles of SPU mains, or 7.1% of the SPU system. Table 3 allocates 7.1% of SPU's annual distribution CIP to the SPU mains located within Shoreline. Actual expenditures may be less than indicated in the table.

Table 3
SPU Distribution CIP Estimated for Shoreline
Based on Proportional Length of Mains

SPU Distribution CIP Category	SPU Annual CIP	Proportionate Share in Shoreline
Reline or replace aging water mains and improve pressures and fire flows where cost effective.	$5,500,000	$390,500
Extend water mains to new developments.	$1,000,000	$71,000
Relocate water mains impacted by other projects and upgrade water mains in redevelopment areas.	$3,000,000	$213,000
Replace leaking service connections and install new services.	$10,000,000	$710,000
Replace meters.	$600,000	$42,600
Total	$20,100,000	$1,427,100

Proposed Maintenance Prior to Shoreline Acquisition

Shoreline would not be acquiring the SPU water system until 2020, or approximately eight years from the present time. During this period, SPU would continue to own, operate and maintain the system. Shoreline has an interest in having the system be in a well maintained condition at time of acquisition. In addition to SPU's current maintenance practices, the following are recommendations for Shoreline to request of SPU.

Pump stations

Wire-to-water pump and motor efficiency tests should be carried out on each pump at the pump stations to be acquired and data should be provided to the City of Shoreline. Any units needing repair or replacement should be identified and repairs should be made. Wire-to-water efficiency testing evaluates the combined efficiency of the pump and motor, and measures the percent efficiency of the conversion of electrical power input to hydraulic energy output. Acceptable minimum efficiency varies by pump and motor size, but ranges from about 45% for small pumps to 60% for large pumps. Pump units that fall below the normal acceptable range for their size often have older, inefficient motors, worn internal pump clearances, or other condition issues that should be remedied.

Infrared scans should be taken of the electrical switchgear, pumps and motors. Infrared scans detect locations that are hotter than would be expected, such as loose electrical connections. Identifying and correcting such problems can prevent fires, and detect failing bearings, undersized wiring, and other issues which otherwise may not be detected. Any deficiencies should be identified and repaired.

Storage Tanks

Richmond Highlands Tank 2's legs were repainted in 1994 as part of the seismic upgrade, and the reservoir bowl exterior will be repainted in 2012. Based on a 15 year painting cycle, the legs were due to be repainted in 2009, however the 1994 paint remains in fair to good condition at present. The legs and substructure will need repainting prior to 2020.

Richmond Highlands Tank 2 presently does not have an internal cathodic protection system. A system should be installed as soon as possible following completion of recoating the tank interior.

Richmond Highlands Tank 1 is not in service but will still need exterior painting for aesthetic purposes prior to 2020. Prior to repainting the exterior, a determination should be made regarding if the tank will eventually be returned to service or decommissioned.

If not decommissioned, Foy Standpipe would need exterior painting in the near future.

Hydrants

Responsibility needs to be established for monitoring hydrant condition. SPU's policy is that the local fire jurisdiction is responsible for reporting hydrant problems. Hydrants should be tested for basic operation and repaired as needed. Any broken or inadequate hydrants should be clearly marked as out of service.

Mains, Services & Meters

An initial priority should be to exercise distribution gate valves and hydrants. In order to do so without causing widespread dirty water complaints, a planned main flushing program should be carried out, in conjunction with exercising the distribution system gates and hydrants. SPU has used the unidirectional flushing process in the past, a method which would be appropriate in this area. Unidirectional flushing begins at the upstream end of a system and works downstream, so increased velocities due to flushing only occur in mains that have already been flushed, and water always flows in the same direction. Discharged water is dechlorinated and filtered as required by the receiving sewer utility or environmental requirements. Planning a main flushing program is often done using a hydraulic pipe model.While the water supplying the Shoreline area is presently filtered, most of the Shoreline piping system predates construction of the Tolt filter plant, which began service in 2000. If system-wide flushing was not carried out prior to construction of the filter plant, the mains are likely to still contain significant amounts of settled sediment which restricts flow in the mains and which generates dirty water during fire flows, peak demands, or when flow direction is changed as system valves are operated.

The main flushing program will also provide an opportunity to further calibrate the hydraulic pipe model in the Shoreline area. Models are typically calibrated by flowing hydrants and by comparing modeled results with actual pressures and flows. A well-calibrated model is essential for efficient operation of a water system, including prediction of available fire flows and prioritizing individual main replacement projects.

If distribution gates have not been operated for years, it can be expected that some valves will break when operated. A program should be in place to replace or at least identify and document broken valves as they are found.

Pressure Reducing Valve Stations

Pressure reducing valves are presently maintained but specific tasks and frequency are unclear. Pressure reducing valves should be maintained regularly in order to avoid valve failures which can overpressure lower elevation zones. While pressure relief valves can reduce the consequences of over pressurization, they are considered to be a safety feature rather than relied on to allow the main pressure relief valve to run to failure. Pressure reducing and pressure relief valve pressure settings and basic operation should be checked on a six month cycle. Depending on the activity and criticality of the valve, pilot systems should be rebuilt on a one to three year cycle. Galvanized piping in vaults should be inspected and replaced if needed.

Proposed Post-Acquisition Maintenance Program

When Shoreline assumes responsibility for operating and maintaining the water system infrastructure, long-term operation and maintenance plans will be needed. The following maintenance programs and activities are recommended to be implemented upon Shoreline's acquisition of the water system.

General Practices

- Make arrangements for on-call staff to respond to after-hours emergencies
- Maintain written and electronic maintenance records for all equipment
- Determine criticality of equipment and respond to failures accordingly
- Critical equipment will not be run to failure
- Preventive maintenance will be carried out on all equipment
- Staff will be equipped with the tools and training they need
- Spare parts will be stocked for typical repair needs
- A safety program will be established or expanded to include the water utility
- Staff in responsible charge of daily operations will be State certified
- Staff responsible for water quality sampling will be State certified

Pump Stations

- Conduct a weekly station check by a mechanic
- Check and adjust pump control and pressure relief valves in accordance with pressure reducing valve maintenance procedures
- Check and maintain oil levels weekly
- Remove motors for repair as needed
- Change out or repair pumps and meters as needed
- Paint piping and structure as needed
- Rebuild control valve pilots in accordance with pressure reducing valve maintenance procedures
- Overhaul relief valves and control valves in accordance with pressure reducing valve maintenance procedures
- Change charts weekly, or install data loggers at stations
- Electrical maintenance including cleaning switchgear every five years, checking connections, infrared scans and megging motors (checking winding insulation) every five years or more frequently as needed
- Conduct periodic wire to water efficiency tests and track results in a database

Storage Tanks

- Inspect tanks every 5 years to evaluate cathodic protection systems, screens and vents, lining systems and structural integrity.
- Clean tanks at 5 year intervals.

- Periodically clean exterior of tanks as needed (contracted work)
- Remove graffiti within one week if possible
- Conduct weekly site checks
- Perform spot painting as needed
- Check and maintain ladders, climbing systems and security features as needed

Hydrants

- Exercise hydrants and valves annually to ensure working order
- Lubricate the operating shaft bearing as needed
- Check accessibility of control valves
- Clear any brush and debris around the hydrant
- Repair any faults found during inspection
- Paint hydrants every five years or as needed

Mains & Services

- Exercise inline valves every five years or as part of the flushing program
- Repair or replace inoperable valves
- Clean out valve boxes, and ensure they are visible and at grade
- Flush dead end mains as needed to maintain water quality
- Carry out unidirectional flushing to help maintain system capacity and water quality
- Repair or replace service lines as needed
- Install new services as needed
- Abandon old services as needed
- Respond to turn on / turn off requests
- Provide locate service (contract)
- Take water quality samples as required

Meters

- Replace meters 1” and smaller as needed or when renewing service lines
- Test, repair or replace meters 1 ½” and larger based on age or as needed
- Read meters bimonthly

Pressure Reducing Valves

- Visually inspect the pilot valve and related piping every 6 months
- Clean the pilot screen and check the valve operation every 6 months
- Check and reset the pressure annually
- Rebuild the pilot valve every 1 to 3 years, depending on activity of the valve
- Rebuild the main valve every three to five years
- Replace pilot piping in the chamber every five years
- Inspect & replace galvanized piping as needed

Structures

- Clean roofs & gutters annually
- Repair and replace roofs and gutters as needed
- Paint as needed
- Maintain landscaping to a defined standard appropriate to the location

Proposed Post-Acquisition O&M Budget

Projected Annual Labor Expense

SPU presently operates and maintains its system in the Shoreline area with crews that are assigned to work throughout SPU's northern service area. Labor hours and costs are not directly tracked with regard to city boundaries, and complete estimates of labor and cost were not available from SPU at the time this report was written.

In the November 2004 report prepared for the Shoreline Water District, *Seattle Public Utilities within the Cities of Shoreline and Lake Forest Park, Water System Valuation Report,* RH2 Engineers assessed the level of effort needed to operate and maintain the SPU system located within the City of Shoreline, plus a small portion of the SPU system located within Lake Forest Park. RH2 Engineers surveyed the Cities of Bellingham, Renton and Kirkland regarding their water utility staffing and level of effort applied to typical water utility activities. Based on unit levels of effort, RH2 Engineers determined that 15.17 full time equivalent (FTE) staff would be required to service the study area, consisting of 1.54 FTE office/clerical, 11.83 FTE field, and 1.79 FTE supervision.

In evaluating the current validity of the 2004 RH2 Engineers report's staffing evaluation, the following are considered:

- The full area evaluated in the 2004 RH2 report included 626,283 feet of main. Shoreline presently has 614,962 feet of main, or 98% of the amount in the 2004 study area. Adjustment of the results to compensate for the small amount of Lake Forest Park service area in the 2004 report falls within the rounding error and does not affect the results as applicable to Shoreline.
- Census results for the years 2000 and 2010 indicate a stable population at 53,000 in Shoreline.
- No major changes have occurred since 2004 which would alter general productivity or job duties in water utility field or office work.
- The 2004 report was based on the assumption that the additional staff would be added to existing staff at Shoreline Water District (SWD). In the case of the City of Shoreline establishing a new water utility, staff will be required beyond those identified in the 2004 report.

The 2004 RH2 report defined additional staff positions in terms of SWD classifications, but in more general terms, the identified staff positions would consist of 3 customer service staff, 4 lead or senior field crew workers, 4 crew workers and 4 crew helpers. These staff would be needed to support field operations and maintenance, customer service, and meter reading functions.

Since Shoreline would need to form an entirely new water utility, other functions will need to be supported. These include a water utility manager, water operations manager, office manager, mapping technician, water quality technician, warehouse technician and administrative and financial support. Some of these functions may be handled by existing City staff or by utility staff supporting the planned wastewater utility. For estimating purposes, all

these functions with the exception of administrative and financial support will be assumed to be included as water utility staffing. Administrative and financial support expense is included as a separate cost in the O&M budget calculations.

Determination of market based salaries will require salary surveys of utilities considered comparable to the proposed Shoreline water utility. For estimating purposes, the salaries in Table 4 are based on salaries in the 2004 RH2 report, escalated to 2011 dollars. Costs shown are direct costs and do not include overhead expense.

Table 4
Staffing Requirements and Salary Cost

Classification Title	Required Staff	Classification Salary	Total Salary Cost
Water Utility Manager	1	$117,973	$117,973
Water Operations Manager	1	$85,471	$85,471
Water Quality Technician	1	$59,329	$59,329
Mapping technician	1	$63,018	$63,018
Office Manager	1	$64,420	$64,420
Customer Service Assistant	3	$47,468	$142,404
Lead Field Crew Worker	4	$68,354	$273,416
Field Crew Worker	4	$47,468	$189,872
Field Crew Helper	4	$46,107	$184,428
Warehouse Technician	1	$47,468	$47,468
Total	21		$1,227,799

Projected Annual Non-Labor Expense

The 2004 RH2 report also estimated the unit material and supply costs required to support the operation and maintenance of the SPU system within Shoreline, based on SWD unit costs. The report noted that reliance on the SWD unit costs assumes the SPU system is in comparable condition with the SWD system, which appears to not be the case. Material and supply costs for a system in need of more maintenance can be expected to be higher than those for a more updated system. Table 5 shows the SWD unit costs, escalated to 2011 dollars. To reflect increased maintenance materials expenses and engineering services, proposed unit costs for Operations and Engineering are two times the SWD unit costs. Proposed unit costs reflect additional costs for hydrant and valve maintenance and repair, and for additional engineering services related to the transition to an independent water utility.

Table 5 Estimated O&M Material & Supply Costs					
Program Area	**SWD Unit Cost**	**Proposed Unit Cost**	**Measure**	**Number of Units in System**	**Estimated Costs**
Operations	$0.43	$0.86	ft of main	614962	$528,867
Engineering	$0.04	$0.08	ft of main	614962	$49,197
Water Quality	$5.56	$5.56	connections	10739	$59,709
Customer Service	$2.04	$2.04	connections	10739	$21,908
Total					$659,681

Projected Annual O&M Budget

Table 6 includes labor cost from Table 4, materials and supplies from Table 5, employee benefits estimated at 40% of base salary and administrative expense. Administrative expense is the general fund overhead estimated cost used in a preliminary 2010 budget prepared by Shoreline staff.

Table 6 Annual O&M Budget	
Category	**Annual Budget**
Labor	$1,227,799
Materials & Supplies	$659,681
Employee Benefits	$491,120
Administrative	$1,500,000
Total	$3,878,599

Separation Options, Issues & Costs

The water system in Shoreline is presently an integral part of the SPU system. Physically separating the Shoreline portion of SPU's system will involve construction of additional infrastructure in order to enable the two systems to operate independently. At present, most of the storage that supports the Shoreline area is located in large regional reservoirs outside of Shoreline. By policy, SPU does not allow wholesale customers to rely on SPU storage capacity for planning purposes; wholesale customers must provide their own storage as needed to meet regulatory requirements. Any physical separation option may need to include construction of additional storage in Shoreline, or possibly a financial arrangement where Shoreline gains formal access to a portion of existing SPU storage. Additional storage is discussed in the Capital Improvements section.

Separation Options

SPU has presented the following two conceptual or base options:

Alternative A

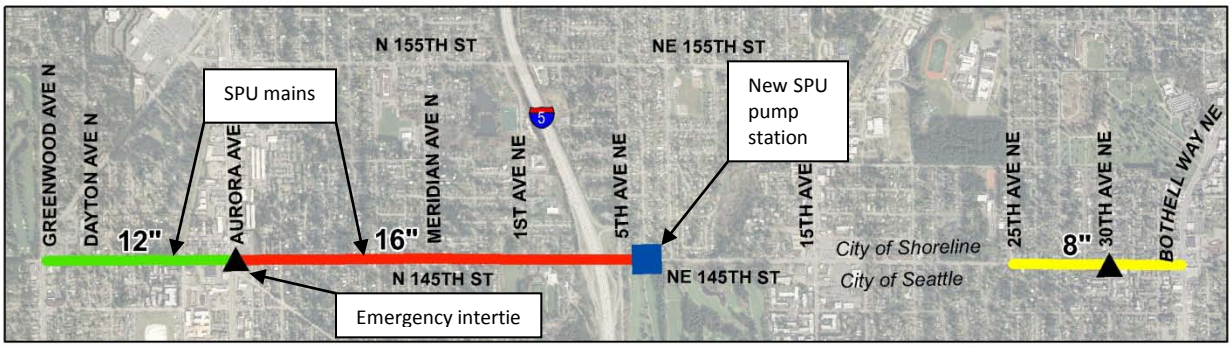

Figure 15 – New mains, connections and pump station, Alternative A

Shoreline would acquire North City and Foy Pump Stations. Shoreline would also acquire the 24" main in N 145th St. Shoreline would install a new pump station for SPU adjacent to the 550 Pipeline in the vicinity of Foy Pump Station, and approximately 8, 600 feet of 12 and 16" of new SPU main in 145th St. from the new pump station to Greenwood Avenue. Mains and services feeding south from the 24" line in N 145th would be disconnected and transferred to the new main. Shoreline would install a new elevated tank for SPU in the vicinity of Bitter Lake Reservoir, or, if a new tank is not acceptable to the community, Shoreline would refurbish Foy Standpipe for SPU and connect it to the new SPU main in N 145th St. A bi-directional emergency metered intertie would be added at a point along N 145th St. and an agreement would be made between SPU and Shoreline allowing use of the intertie when SPU's 590 zone storage facility is out of service for cleaning or maintenance. The new mains and pump station constructed under Alternative A would be for SPU's use, with the exception of the 8" main between 25th

Ave NE and Bothell Way NE, which would be a Shoreline main. This section of 8" main is included in all alternatives.

Alternative B

Shoreline would acquire North City Pump Station. Foy Pump Station and the 24" main in N 145th would remain with SPU, and mains and services to the north of N 145th would be disconnected from the main. Shoreline would make modifications elsewhere in its system to replace the function of the 24" main. These modifications are described in the following Alternatives B1 through B5. Foy Pump Station would be modified to operate with the smaller SPU 590 pressure zone. Shoreline would install a new elevated tank for SPU in the vicinity of Bitter Lake Reservoir, or, if a new tank is not acceptable to the community, Shoreline would refurbish Foy Standpipe for SPU. A bi-directional emergency metered intertie would be added at a point along N 145th St. and an agreement would be made between SPU and Shoreline allowing use of the intertie when SPU's 590 zone storage facility is out of service for cleaning or maintenance.

Discussion of Alternatives A and B

An underlying concept for any separation alternative is that SPU's existing 590 zone is being divided into two adjacent but independent zones, each of which will need storage and supply mains. Alternatives A and B are identical with regards to storage needs for SPU, and with regards to a mutually beneficial emergency intertie. The primary difference is in who retains the Foy Pump Station and the existing 24" line in N 145th St. Alternative A requires construction of a new main across I-5. Although not described in Alternative B, Shoreline would need a means to receive water from the 550 Pipeline at or near the southern city limits, and any new Shoreline main from the 550 Pipeline would also need to cross I-5.

Under any alternative, provision for flow in either direction between SPU's 590 zone and Shoreline's 590 zone would need to be provided for the benefit of both utilities. Also, SPU would deliver wholesale water to current SPU wholesale customers at the boundary between the SPU and Shoreline water systems. Shoreline would transmit the water to the customers' existing points of delivery.

There are five variations of Alternative B that could be considered as options for Shoreline to replace the function of the 24" main as mentioned in SPU's Alternative B. These each provide a different means to supply the southern part of Shoreline but are otherwise as described by SPU's Alternative B. Alternatives B1 and B5 include construction of new pump stations and alternatives B2, B3 and B4 rely on pumped supply from SPU's Foy Pump Station, which would require payment of an additional surcharge in the supply contract with SPU. This cost will need to be included as part of the cost of water supply for Shoreline. All of the B alternatives also include costs to retrofit Foy Pump Station.

All new mains, connections and pump stations shown for the following alternatives would be owned by Shoreline.

An 8" main and wholesale service connection is provided in all alternatives to supply the area in southeast Shoreline that is currently served by SPU.

Alternative B1

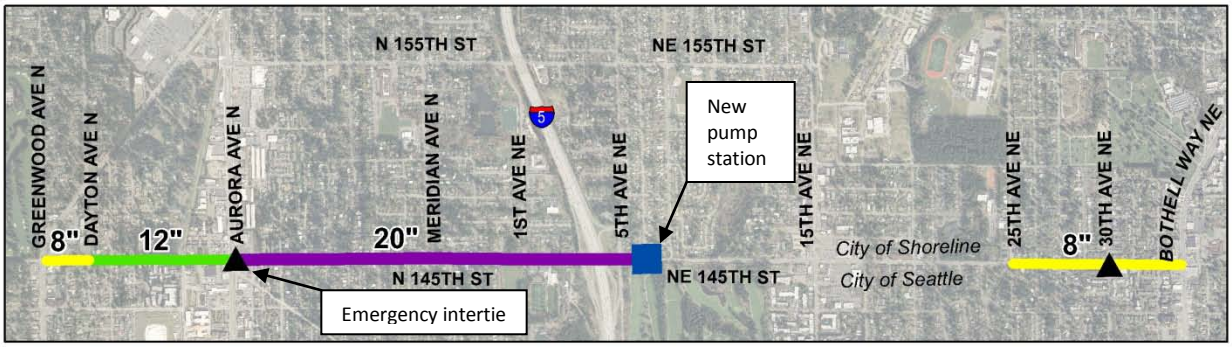

Figure 16- New mains, connections and pump station, Alternative B1

Alternative B1 would have Shoreline construct a new pump station near Foy Pump Station on N 145th, along with 20", 12" and 8" mains in N 145th St, similar to the description in Alternative A. Under Alternative B1, the new pump station and all new mains would be part of the Shoreline system. All mains and services presently connected to the north side of the 24" main in N 145th would be transferred to the new main. An emergency intertie would be provided at Aurora Avenue. A major drawback to this option is the cost of construction of infrastructure that duplicates the function of the existing SPU infrastructure.

Alternative B2

Figure 17- New mains and connections, Alternative B2

Alternative B2 is a variation on Alternative B1. Rather than Shoreline constructing a new pump station, Shoreline would build only the portion of new main beginning west of I-5 and extending to Greenwood Ave N., consisting of 7,300 feet of main varying from 20" to 8". This main would connect with all existing mains and services on the north side of N 145th St. and would be fed by

SPU through a meter near 1st Ave NE and N 145th St. An emergency intertie would also be provided at Aurora Avenue. The connection to the SPU system may require a check valve to prevent the connection from reversing flow as Shoreline filled its storage using the North City Pump Station. SPU would continue to operate Foy Pump Station, and supply to Shoreline through this connection would depend on the level in Shoreline's storage as well as how North City Pump Station was operated. This option has the advantage that if in the future, should Shoreline wish to receive supply through its own pump station from the 550 Pipeline, the new pump station could be built on N 145th, along with construction of the main from the pump station across I-5 to the main as described in this alternative. It has the disadvantage that the new main would be larger than needed should Shoreline decide not to construct the future pump station.

Alternative B3

Figure 18- New mains and connections, Alternative B3

Alternative B3 assumes Shoreline does not have future plans to construct its own pump station to replace the functionality of the Foy Pump Station. In this case, Shoreline would construct the 7,300 feet of main in N 145th St between Greenwood Ave N. and I-5, but the diameter would be 8" and 12". A wholesale connection to the SPU system would be located at Aurora Ave N. The connection may require a check valve as described in Alternative B2. This option relies on the use of SPU's Foy Pump Station at times, however most water received by Shoreline can be delivered by North City Pump Station. This option allows for use of Foy Pump Station as an additional supply when needed.

Alternative B4

Figure 19- New mains and connections, Alternative B4

Alternative B4 is similar to Alternative B3 except that the south side of Shoreline west of I-5 would be served by three wholesale connections to SPU, at Dayton, Aurora, and Meridian Ave. N. With three feeds, the entire new main in N 145th St. could be 8" diameter. These connections may also need check valves. The additional complexity of having three service connections in the 590 zone on 145th Street makes this alternative less attractive than Alternative B3.

Alternative B5

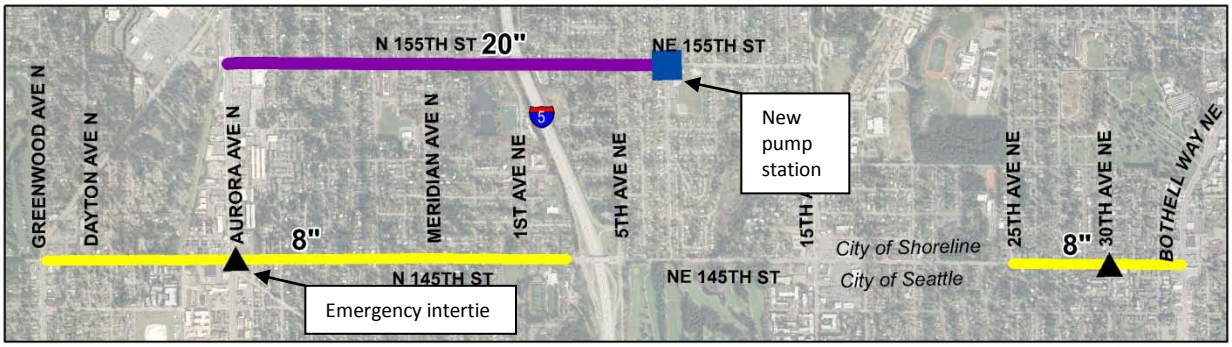

Figure 20- New mains, connections and pump station, Alternative B5

Alternative B5 would have Shoreline construct a pump station adjacent to the 550 Pipeline at N 155th St, and 6,000 feet of 20" main from the new pump station to Aurora Ave N. This alignment would take advantage of the underpass under I-5. An emergency intertie would be located on 145th at Aurora Avenue. Although the N 155th St. alignment provides a less expensive location to cross I-5 than the N 145th St. alignment in Alternative B1, it has the disadvantage that approximately 7,300 additional feet of 8" main would still need to be constructed in N 145th St. to tie in the existing mains and services that would be disconnected from the 24" main. This new 8"main is needed to strengthen the east-west distribution grid in south Shoreline, as well as to connect to dead end mains and customers that would be

disconnected from SPU's 24" line. This main needs sufficient capacity to provide fire flows from the Shoreline water system along N 145th St. Alternative B5 also has the disadvantage that by adding a new pump station and discharge line, it is incurring the costs of duplicating existing infrastructure.

Separation of the Southeast Shoreline Area

Approximately 2,300 feet of 8" main would be needed in NE 145th St. to serve the current SPU customers in southeast Shoreline. This section of new main would connect to the mains and services on the north side of NE 145th St from 25th Ave NE to Bothell Way NE, and would be fed by a wholesale connection to the 24" SPU line. It would have sufficient capacity to provide fire flows to Shoreline residents along NE 145th St. One wholesale connection and 2,300 feet of 8" main are included in all alternative estimates. Storage would need to be provided through contractual arrangements with SPU. While SPU does not guarantee availability of fire flows through wholesale connections, such flow can be used on an as-available basis. The feasibility of continued reliance on SPU storage for this small area is being explored with the Department of Health.

Table 7 summarizes separation alternative costs for the alternatives as discussed above. Unit costs are for ductile iron distribution mains, and are listed in Table 9. Costs include 10% contingency for distribution mains and 25% contingency for all other projects, 5% surveying & permitting, 12% engineering, 8% construction inspection, and 10% sales tax.

Table 7
Separation Alternative Costs

Table 7 Separation Alternative Costs						
	A	**B1**	**B2**	**B3**	**B4**	**B5**
8" main	$529,000	$678,500	$678,500	$1,150,000	$2,208,000	$2,208,000
12" main	$765,850	$578,000	$578,000	$1,32,400	--	--
16" main	$2,493,050	--	--	--	--	--
20" main	--	$3,111,850	$2,431,950	--	--	$3,138,000
I-5 Crossing	$863,000	$863,000	--	--	--	--
Pump Stations	$2,215,000	$3,210,000	$500,000	$500,000	$500,000	$3,210,000
Foy Standpipe	$1,765,000	$1,765,000	$1,765,000	$1,765,000	$1,765,000	$1,765,000
Metering	$646,000	$646,000	$646,000	$460,000	$636,000	$646,000
Total	$9,276,900	$10,852,350	$6,599,450	$5,204,400	$5,109,000	$10,967,000

Hydraulic modeling is being carried out to verify adequate pipe sizes, to ensure that Foy Pump Station can be modified to satisfactorily meet SPU's and Shoreline's needs, and to further define SPU's storage needs in the 590 zone. The Foy Standpipe cost in Table 7 is a preliminary estimate of the cost to recoat and retrofit the existing standpipe. Once SPU's storage needs are better defined, this estimate will be refined as needed. The metering costs in Table 7 are based on SPU wholesale water rates facility charges.

The recommended alternative at this time is Alternative B3. Although the estimated cost is marginally higher than Alternative B4, Alternative B3 has the advantage of requiring only a single service connection with SPU on 145th St west of I-5.

Operations Issues Related to System Separation

SPU presently uses mains within the City of Shoreline to deliver water to several of its wholesale customers. When the mains are acquired by Shoreline, water for the SPU wholesale customers will be delivered at the boundary between SPU and the Shoreline water utility.The wholesale customers, SPU and the City of Shoreline will need to arrive at suitable arrangements to provide for transmission of wholesale water through Shoreline mains.

SPU also presently uses the Foy and North City Pump Stations to provide water to these wholesale customers. If SPU retains Foy Pump Station and Shoreline acquires North City Pump Station, operation of the pump stations will need to be coordinated and operating and cost sharing agreements will be needed for North City Pump Station production related to SPU wholesale customer demands. North City and Foy Pump Stations are presently operated using a ten foot range of depth in the storage tanks. If North City Pump Station is modified as discussed below in the Post- Acquisition Capital Improvements section, it will be able to operate with approximately a three foot range of depth. During most times of the year, the

result would be that North City Pump Station would carry most of the load, including that attributable to SPU's wholesale customers that are fed by the 590 zone.

Shoreline would also need to establish emergency intertie agreements with SPU's adjacent wholesale customers.

Shoreline may need access to additional storage capacity at the time of system separation. This capacity would either need to be constructed by Shoreline, or provided through an agreement with SPU, possibly on an interim basis until new storage could be constructed in the Shoreline service area.

Proposed Post-Acquisition Capital Improvements and Budget

System Reliability Standards

A key driver of capital improvement costs is the standard of service which the utility establishes for its system. In the *2009 Water System Design Manual,* the Washington Department of Health (DOH) recommends the following standards, intended to promote high levels of water system reliability:

Source

Two or more supply sources are available with a capability to replenish depleted fire suppression storage within 72-hours while concurrently supplying the maximum daily demand (MDD) for the water system.

1. Combined source capacity for the water system is enough to provide the MDD in a period of 18 hours or less of pumping.

2. With the largest source out of service, the remaining source(s) can provide a minimum of the average day demand (ADD) for the water system.

3. Pump stations have power connections to two independent primary public power sources, or have portable or in-place auxiliary power available.

4. The firm yield of surface water sources is consistent with the lowest flow or longest period of extended low precipitation on record.

Booster Pump Stations

1. Multiple pumps are installed with capacity to provide the MDD of the service area when the largest pump is out of service.

2. At least 20 psi at the intake of the pumps under peak hourly demand (PHD) or fire flow plus MDD rate-of-flow conditions is always maintained.

3. An automatic shutoff is in place for when the intake pressure drops below 10 psi.

4. Power connections are available to two independent primary public power sources, or there is a provision for in-place auxiliary power if the pumps provide fire flow or are pumping from ground level storage.

Distribution Storage

1. More than one gravity storage tank (wherever feasible) exists with the ability to isolate

each tank while continuing to provide service.

2. Storage is sufficient to give standby capacity of at least two times the ADD for all users, and to ensure that fire suppression service will be available while not allowing pressure to drop below 20 psi at any service connection.

3. A minimum standby volume of 200 gallons per day per residential connection, or equivalent, is provided regardless of the capacity of the sources available.

4. An alarm system is included that notifies the operator(s) of overflows, or when the storage level drops below the point where the equalizing storage volume is depleted. This should only occur during abnormal operating conditions.

Distribution System

1. Distribution mains are looped wherever feasible.

2. Pipeline velocities do not exceed eight feet per second under PHD conditions.

3. All pipelines can be flushed at a flow velocity of at least 2.5 feet per second.

4. All mains and distribution lines have appropriate internal and external corrosion protection.
5. If fire flow is provided, the engineer should conduct a hydraulic analysis to determine whether high fire fighting demands may cause very low pressure (below 30 psi) in the distribution system. Very low water system pressure presents an increased risk of contamination from cross-connections and pathogen intrusion at joints.

DOH recognizes that different communities and utilities may want to operate at different standards of reliability, and notes that doing so is acceptable as long as public health is not put at risk and as long as the standards are consistent with WAC 246-290. DOH requires that all points in the system maintain a minimum of 30 psi at peak hourly demand with all equalizing storage depleted, and a minimum of 20 psi during fire flows at maximum daily demand with all standby and fire suppression storage depleted, in accordance with WAC 246-290.

SPU has established its own design standards, which are included as an appendix to SPU's *2007 Water System Plan.* As a complex system, SPU calculates storage requirements based on hydraulic modeling scenarios rather than on the methodology in the DOH *2009 Water System Design Manual.* New construction in the SPU system is done in accordance with the DOH minimum pressure requirements, but some older areas were built when the minimum pressure requirement was 20 psi, and some of these areas are unable to meet the current 30 psi requirement.

If the City of Shoreline acquires the water system within its boundaries, it is recommended that the DOH guidelines be used as system reliability standards. Any new construction, such as new storage, will need to be designed in accordance with the current edition of the DOH *Water System Design Manual.*

Storage Capital Improvement Recommendations

As presently operated, Foy Standpipe and Richmond Highlands Tank 1 are in service, with Richmond Highlands Tank 2 out of service for recoating and repainting. Upon completion of the Tank 2 work in May 2012, SPU's intent is to take Tank 1 out of service and only perform minimum aesthetic maintenance on Tank 1 as required. Tank 1 would need recoating and repainting prior to being returned to normal service.

Foy Standpipe would not be acquired as part of the Shoreline water system. SPU will still need to use either Foy Standpipe or a replacement as storage for the SPU 590 zone. SPU has proposed that this expense be part of Shoreline's system separation cost. A preliminary estimate of this expense is included in the separation costs listed in Table 7.

The Richmond Highlands Tanks are presently operated with a 10 foot operating range. A 10 foot range is larger than would typically be used for pumped storage, but in this case the large range is necessary in order to avoid excessively cycling the North City and Foy Pump Station pumps off and on. If at least some of the pumps supplying the zone were equipped with variable speed drives, a much narrower range, such as 3 feet, could be used for operational storage.

For a utility the size of the proposed Shoreline system, DOH recommends a minimum amount of standby storage equal to 200 gallons per Equivalent Residential Unit (ERU), or approximately 3,280,000 gallons. If both Tank 1 and Tank 2 were in service and if the operating range were reduced from 10 feet to 3 feet, the tanks would provide approximately 2,874,000 gallons of standby and fire suppression storage. If only Tank 2 were in use, and assuming a 3 foot operating range, only 1,918,000 gallons would be available for standby and fire suppression storage.

To meet the minimum recommended amount of storage per the DOH system reliability standards, additional storage is needed beyond what is available in the existing tanks. In order to provide for future growth while meeting the DOH standards of reliability for standby storage, it is recommended that Tank 1 be decommissioned and a new 2.0 million gallon tank be constructed in its place at the Richmond Highlands location. An alternate approach would be to renovate Tank 1 and return it to service as an interim measure until additional storage could be built at a future date. While this approach falls short of providing the DOH minimum storage recommendation, it provides 89% of the recommended minimum, and with Shoreline's strong interconnections with the SPU system and the proposed addition of standby power at North City Pump Station, it may be an appropriate solution. However, the cost estimate for additional storage is based on construction of a new 2.0 million gallon tank which would provide the minimum recommended amount of standby storage.

In addition to providing sufficient standby storage, having a second tank in service in the 590 zone improves the utility's ability to carry out planned or emergency maintenance of its storage facilities. With two tanks online, one tank can be quickly taken offline if needed in response to potential contamination or vandalism which potentially endangers water quality.

Estimated cost for the 2.0 million gallon 590 zone tank is $4,072,000, including 25% contingency, 5% surveying & permitting, 12% engineering, 8% construction inspection, and 10% sales tax.

Recoating Tank 1 was estimated to cost $1,075,000 in SPU's 2009 evaluation of storage facilities in the Richmond Highlands 590 zone.

Pump Station & Control System Capital Improvement Recommendations

North City Pump Station

It is recommended that both pumps at this station be equipped with variable frequency drives to allow use of a smaller operating range at the Richmond Highlands tanks. It is also recommended that by the time of system acquisition that this station be equipped with a standby generator sized to operate one pump. The generator installation should include an automatic transfer switch to automatically start the generator and transfer the station to backup power should line power fail. Provision of standby power would reduce reliance on local storage and would allow the Shoreline system to have a higher reliability of remaining at normal operating pressure in the case of extended power outages.

Foy Pump Station

The recommended separation alternative leaves Foy Pump Station with SPU. Costs of modifying Foy Pump Station are estimated at $500,000 and are included in Table 7. Modifications are necessary to enable Foy Pump Station to satisfactorily serve the SPU 590 zone while also supporting the Shoreline 590 zone.

Dayton Pump Station

It is recommended that the hydropneumatic system used at this station be replaced with a variable frequency drive closed loop pumping system. Such a system allows pumps to run more efficiently and to avoid cycling off and on. The station should also be equipped with a standby generator sufficient to operate the largest pump in the station. This installation should also include an automatic transfer switch for the generator. Without backup power, in the event of a power failure at Dayton Pump Station, the hydraulic gradient in the Dayton 660 zone drops to slightly less than that in the adjacent 590 zone, or about 20 to 25 psi at the highest locations in the Dayton 660 zone. In the event of a widespread loss of power that also affects the North City and Foy Pump Stations, pressure in the 590 zone is initially supported by storage at Richmond Highlands Tanks and Foy Standpipe. Under both current and proposed practices, backup power would be used to support the 590 zone prior to storage being excessively drawn down. Should

backup power fail or otherwise not be available, the 590 zone would be supported by gravity flow from the Tolt 550 Pipeline. In this situation, the hydraulic gradient in the Dayton 660 zone would be less than elevation 550 and the highest locations in the zone would be only minimally pressurized at about 5 psi or less. Addition of backup power at the Dayton Pump Station would enable sufficient pressure to be maintained even if the only supply to the 590 zone is gravity flow from the Tolt 550 Pipeline.

Hydraulic modeling of the distribution system may indicate that the Dayton 660 zone could be enlarged to include adjacent areas that have marginal pressure. If so, the existing 50 hp pump at this station may require upsizing, however this cannot be determined until hydraulic modeling is carried out to define the expanded pressure zone boundaries. Costs associated with upsizing the 50hp pump are not included in this report.

Supervisory Control and Data Acquisition (SCADA) System Upgrades

Shoreline will need to establish its own scada system in order to operate the water utility independently of SPU. To do so, Shoreline will need to have its own control center, which would consist of a central PLC, data logger, modems and other equipment including a desktop terminal which would be located in the Water Operations manager's office. The new system would be designed to be much more automated than the existing SPU system, such that the primary operational requirement of staff will be to respond to alarms as needed. The new system should be designed to include an autodialer to direct alarms to an assigned duty person. The pump stations should be equipped with distributed control systems so they can function automatically at times the control center is offline or otherwise unavailable. The pump station systems will require station PLCs that are programmed to respond to reservoir levels and alarm conditions without direction from the control center.

Shoreline's Scada system will connect its central control station to North City Pump Station and Dayton Pump Station, to wholesale meter connections from the SPU system, to the 590 zone wholesale connections to Olympic View Water & Sewer District and Shoreline Water District, and to the Richmond Highlands tanks. The system will also need to be connected to SPU's Scada system to obtain status information on Foy Pump Station..

Cost of the upgraded scada system is dependent on the required complexity of design, software licensing costs, features desired by Shoreline and by the state of the art at the time the system is designed and constructed. For preliminary estimating purposes, cost of the scada system is estimated at $400,000.

Table 8 includes costs for pump station and control system upgrades. Pump station costs include 25% contingency, 5% surveying & permitting, 12% engineering, 8% construction inspection, and 10% sales tax.

Table 8 Pump Station & Control System Capital Improvements	
Project	**Estimated Cost**
North City PS standby power	$339,200
North City PS variable frequency drives	$192,000
Dayton PS variable frequency drive	$14,400
Dayton PS standby power	$188,800
Scada system	$400,000
Total	$1,134,400

Distribution System Capital Improvement Recommendations

Two reports have been written describing improvements needed to provide adequate fire flows and to meet service standards in the SPU service area in Shoreline. The June 2000 SPU report, *590 Richmond Highlands Pressure Zone Hydraulic Analysis Report,* evaluated upgrades for fire flow deficiencies. This report identified the need for 1,263 feet of 6" main and 28, 824 feet of 8" main, including hydrants.

A review of the existing SPU mains in Shoreline was conducted by RH2 Engineers in the November 2004 report, *Seattle Public Utilities within the Cities of Shoreline and Lake Forest Park, Water System Valuation Report,* prepared for the Shoreline Water District (SWD). This report evaluated the distribution mains against SWD's standards, which are substantially equivalent to the DOH system reliability standards. The review identified mains, in addition to those identified in the June 2000 SPU report, in need of upgrade to bring the system into compliance with the SWD standards. The proposed mains within the City of Shoreline consisted of 15,435 feet of 4", 4,990 feet of 6", 71800 feet of 8", 12,260 feet of 12" and 4,345 feet of 16" main. It is important to note that the standards for new construction are more stringent than the standards that would have been in place at the time these mains were constructed. There is no DOH standard requiring main replacements. However, evaluating existing mains against current standards provides a reasonable means to help identify and prioritize mains for an ongoing main replacement program. More specific prioritization of main replacements will require that the hydraulic model for the Shoreline system be accurately calibrated as noted earlier.

The lists of deficient mains in the 2000 and 2004 reports are presently being reviewed by the Shoreline Fire Department to ensure that all known areas of deficiency are addressed. Additional areas of deficiency should be further evaluated by hydraulic modeling and flow tests.

Total length of the mains identified in these two reports equals approximately 139,000 feet, which constitutes 23% of the system's 615,000 feet. Replacement of these mains would bring the water system into compliance with current DOH reliability standards and would provide distribution system capacity and hydrants to provide sufficient fire flows.

Unit costs in Table 9 are based on 2011 unit construction costs from Tacoma Water, which has an active main replacement program in place, using ductile iron pipe. Unit costs shown in Table 9 include construction cost plus 5% survey & permitting, 12% engineering design, 8% inspection, 10% sales tax and 10% contingency. Contingency cost for distribution main construction is less than the contingency used in this report for other construction types due to the lower level of complexity in main construction. Note that Table 9 does not include any additional deficiencies which the Shoreline Fire Department and additional engineering review may identify.

Table 9
Distribution Main Replacements

Diameter	4	6	8	12	16	Total
Length, ft	15,435	6,250	10,0622	12,261	4,345	13,8913
Unit cost	185	217	230	289	419	--
Total	$2,855,560	$1,355,931	$23,115,238	$3,548,223	$1,820,205	$32,695,157

As with any utility with aging infrastructure, Shoreline can expect to eventually need to replace its entire distribution system as it reaches the end of its service life. Shoreline has an advantage over older utilities in that only 5% of the Shoreline system is currently more than 70 years old. A system that is constructed of good materials and that is well maintained can expect service life of 100 years from its distribution mains. Viewed purely from the perspective of infrastructure age, Shoreline would not need to begin replacing most of its mains until about 25 to 30 years from now. This gives Shoreline a window of opportunity to establish a main replacement program to address the deficiencies in Table 9 during the next 25 to 30 years and then to shift the main replacement program's focus to ongoing replacement of infrastructure due to age. Replacing the mains in Table 9 over a 23 year period would equate to replacing an average of 1% of the system annually, ultimately resulting in replacing the entire system on a 100 year cycle. As a main replacement program is developed and individual projects are prioritized, some mains identified above may be found to have lower replacement priority than others which have not yet been identified, such as mains in need of replacement due to new development. In any case, an assumption of replacement of approximately 1% of the system per year, on average, provides for a reasonably conservative ongoing replacement rate.

Water Utility Buildings, Tools & Equipment Capital Improvement Recommendations

A new water utility will require shops, office space and yard space to store materials. It will also require heavy equipment, service vehicles and tools for the field crews. Some functions, such as office space and a customer service counter, may be incorporated into existing space at City Hall or combined with similar functions at the wastewater utility which is anticipated to be established prior to establishment of the water utility. Similarly, the water utility's shop and

yard space may be combined with the wastewater utility or with other City field operations facilities.

Table 10 shows the estimated required square footage and cost for office and shop space sufficient to support the level of staffing discussed earlier in this report. Office space is assumed to be available in City Hall, and is estimated at 50% of the cost of new construction. Shop space is assumed to be located at the same site as other city utility shops. Estimated costs include construction, outfitting and furnishing the office and shop space but do not include land or site development cost. The City is presently pursuing options to obtain a suitable site for consolidated utility shops through an intergovernmental land trade.

Table 10
Water Utility Buildings

Building	Area, sq. ft.	Cost
Office	2,625	$329,440
Shops	5,290	$714,150
Total	7,915	$1,043,590

Crews will require heavy equipment, service vehicles and tools. Table 11 lists estimated quantities and costs of heavy equipment and vehicles. Service van costs include outfitting with work benches, cabinets, generator sets and work lighting. Costs reflect retail internet pricing plus 10% tax. The equipment in Table 11 is intended to meet the routine needs of the utility. Large equipment such as track hoes or mobile cranes are not included and would typically be rented for jobs where such equipment is needed. In case of emergencies requiring large equipment, mutual aid agreements with other utilities may also provide access to larger or specialized equipment.

Table 11
Heavy Equipment & Vehicle Cost

Equipment	Quantity	Unit Cost	Total
Backhoe	2	$96,800	$193,600
Backhoe trailer	2	$5,500	$11,000
Shoring Box	2	$11,000	$22,000
Shoring box trailer	2	$4,400	$8,800
Dump truck	2	$77,000	$154,000
Boom truck	1	$154,000	$154,000
Service van	3	$66,000	$198,000
Pickup	5	$38,500	$192,500
Total			$933,900

Table 12 lists the initial cost of tools and materials to outfit the utility shops and the field crews. Inventory cost represents a minimum needed to deal with day to day operations and assumes that supplies can be readily replenished by local suppliers. Costs in this table were developed by itemizing typical tools and materials and their estimated costs, plus 10% tax.

Table 12
Initial Tools & Inventory Cost

Category	Estimated Cost
Shop Tools	$46,970
Field Tools	$127,160
Inventory	$101,750
Total	$275,880

Summary, Post-Acquisition Capital Improvements

Table 13 summarizes the capital improvements discussed above, including a 2 million gallon reservoir and the items listed in Tables 8 through 12, but does not include the separation costs shown in Table 7. Separation costs are additive to those in Table 13.

Some capital improvements are recommended to be in place at the time of system acquisition, including all pump station & controls improvements in Table 8. Shoreline will also need access to sufficient storage to meet system reliability standards, which either requires construction of an additional storage tank as listed in Table 13, or a storage access agreement with SPU for use of a portion of capacity at Maple Leaf, Bitter Lake, or Lake Forest Park reservoirs. As discussed earlier, an alternate approach to construction of the 2 million gallon storage tank may be to renovate the existing Richmond Highlands Tank 1 as an interim measure until the new 2 million gallon tank is constructed at a future date. If this option were found to be feasible, Tank 1's renovation cost of $1,075,000 could be substituted for the construction cost of the 2 million gallon reservoir.

Costs related to starting up the new water utility's operations (Tables 10, 11 & 12) may be incurred at the time of acquisition or may be phased, depending on operating arrangements Shoreline may make with SPU or other utilities.

The largest capital improvement expense facing Shoreline is the cost of bringing the distribution system up to current standards. Depending on available funding, this cost could be addressed as soon as economically possible, or could be spread over as much as 30 years if it were approached as an ongoing main replacement program. Assuming the cost was spread over 20 years (starting upon system acquisition in 10 years, and ending 30 years from now when other mains will begin to need replacing due to age), the annual cost of distribution main replacements would be approximately $1.7 million/year.

Table 13 Post Acquisition Capital Improvements	
Category	**Estimated Cost**
2 MG Storage Tank	$4,072,000
Pump Stations & Controls	$1,134,400
Distribution Mains	$32,695,157
Utility Buildings	$1,043,590
Heavy Equipment & Vehicles	$933,900
Tools & Inventory	$275,880
Total	$40,154,927

Ongoing Capital Improvement Costs

In addition to the capital improvements in Table 13, Shoreline's water utility will also have ongoing capital expenses. Table 14 summarizes estimated annual capital costs, with vehicle replacement and tool replacement costs estimated at 10% of the initial costs from Tables 11 and 12. Costs for distribution main extensions and relocations, and servicereplacements are as shown in Table 3, based on SPU's capital costs. Meter replacement cost has been increased beyond SPU's cost to reflect meter replacement based on age rather than on replacement due to failure. The main replacement cost shown in Table 3 is not included here since that cost category is represented as a lump sum in Table 13. If the recommended distribution main improvements discussed above are addressed on an ongoing basis as a main replacement program, the distribution main line item in Table 13 would be deleted and the annual main replacement cost would be an additional line item in Table 14. The remaining costs in Table 14 are approximations based on system size.

Table 14 Ongoing Capital Improvements	
Category	**Estimated Cost**
Vehicle Replacements	$93,390
Tool Replacements	$17,413
Distribution Main Extensions	$71,000
Distribution Main Relocations	$213,000
Service Replacements	$710,000
Meter Replacements	$72,000
Hydrant Replacements	$50,000
Valve Replacements	$50,000
Water Quality Improvements	$10,000
Cathodic Protection Improvements	$10,000
Pump & Storage Improvements	$50,000
Scada & Communications Improvements	$20,000
Total	$1,366,803

Additional Water Utility Functions

In addition to the core functions supported by a water utility's field operation and maintenance staff, customer service support, and by billing and administrative staff, certain other functions must be addressed. Some may be covered by existing City staff, by contracting, or possibly by addition of utility staff.

Grounds Maintenance

Reservoir and pump station sites, shops and offices grounds, and non-street right-of-way areas will need to be maintained to a level comparable to neighborhood standards. This typically includes mowing, landscaping maintenance, and removal of litter and illegal dumping.

Property Management

Adjacent property owners may have complaints about the utility's property, or may wish to obtain easements, permits, or other property rights on utility property, in particular any undeveloped or right-of-way properties outside of City streets. Cellular phone providers may inquire about installation of antennas on the utility's storage tanks, and any resulting contracts will need to be administered.

Water Quality Testing

Routine bacteriological and chlorine residual sampling is required, as are a number of organic and inorganic samples as required by the EPA. In addition, sampling will be required in order to put newly constructed projects in service or in cases where the system has been subject to contamination. While the utility's water operations manager and water quality technician can track required samples and field staff can take samples under the technician's guidance, the samples will need to be processed by a certified laboratory. SPU has a water quality laboratory that is used by other utilities in the region, and other private laboratories are also available.

Scada Maintenance and Modifications

Expert support is needed when scada components fail or when system changes require programming changes and revision of scada screens. This level of expertise is often provided through contract support from the vendor that originally designed and started up the system.

Electrical Maintenance and Modifications

Some basic electrical work can be performed by the utility's trained field operations and maintenance staff, but more involved work requires a licensed electrician, typically on an as-needed contract.

Cathodic Protection Systems Maintenance and Modifications

Cathodic protection systems are in place on the large diameter steel mains in Shoreline, and are recommended in existing and proposed steel storage tanks. A cathodic protection engineer should verify that all large diameter steel mains in Shoreline are bonded and under adequate levels of protection against external corrosion. After the cathodic protection systems are known to be operating as needed, periodic inspection of the systems is required to ensure continued satisfactory operation. This function is typically contracted out to a cathodic protection engineer.

Meter Reading

The proposed level of staffing provides for meter reading by field operations and maintenance staff. Shoreline may consider contracting this function out to an adjacent utility that has an established meter reading function.

Permits and Inspections

New services will require permits and inspections, which may be a function to be addressed by the City's existing building inspection staff. Other permits will be required such as for the use of hydrants by contractors or other special purposes. Construction inspection of new mains and other capital projects can be provided by existing City inspection staff if available, or can be contracted out to inspection and testing services providers.

Extraordinary Maintenance

Some maintenance functions occur infrequently or are highly specialized, and are typically contracted out, such as cleaning or painting large structures such as storage tanks.

Locating

One-call locating service is often contracted out.

Main Tapping

While smaller service taps such as routine residential connections may be installed by utility staff, larger connections are often made by specialty tapping services.

Large Meter Maintenance

Small residential meters are more economical to replace rather than repair, but larger sized meters are typically tested, repaired and returned to service. This function is commonly carried out by larger water utilities, but Shoreline may find it more cost effective to contract this function out to a utility that has an existing meter testing and repair facility.

Professional Services

Engineering and financial services are typically contracted for tasks such as preparation of comprehensive water system plans, rate setting, long range planning, or for evaluation of complex operational changes.

Further Engineering Review & Evaluation

Shoreline may need additional engineering expertise to provide assistance in discussions with SPU regarding separation issues, and to provide hydraulic modeling expertise in addition to that provided by SPU. Engineering support will also be required for evaluating and modeling the operation of the system as outlined below.

Separation Issues

The separation alternatives as presented by SPU are not yet at a detailed level, and the alternatives developed in this report have not yet been hydraulically modeled to verify optimal pipe sizes. As discussions continue with SPU, specific components of the separation plans may need to be reviewed and modeled.

Hydraulic modeling of the overall operation of the proposed Shoreline system will be an important aspect as the separation process develops. A key consideration will be to evaluate how the North City and Foy Pump Stations will be used, in particular if Shoreline's North City Pump Station is updated to allow for a smaller operating range at Richmond Highlands Tanks and SPU's Foy Pump Station is not. It is anticipated that most of the supply to Shoreline will be delivered through the North City Pump Station. Modeling is presently being carried out by SPU to evaluate potential changes at Foy Pump Station and to determine the amount of storage capacity that will be needed for the SPU 590 zone.

SPU's proposed separation alternatives include new or renovated storage facilities for SPU as a Shoreline expense. Engineering assistance may be needed as replacement or renovation proposals are considered.

Additional Review of Distribution Grid Deficiencies

The Shoreline Fire Department has extensive experience in working with the distribution system in Shoreline. As the Department reviews the deficient areas noted in this report, additional areas with insufficient fire flow capacity may be identified. These areas should be hydraulically modeled and reviewed to verify that low flows are a result of undersized mains rather than closed line valves, improperly set pressure regulating valves, or other operational problems. Those areas identified as having undersized mains should be added to the list of known distribution main deficiencies to be considered for replacement in the main replacement program.

The pumped Dayton 660 zone is adjacent to some points in the 590 zone that may have low pressure. Hydraulic modeling of expansion of the 660 zone would be required to determine the extent and feasibility of expanding the zone to encompass potential low pressure areas. If the zone expansion exceeds the capacity of the existing Dayton Pump Station, replacement of an existing pump with a larger size pump, or addition of another pump may be required.

The hydraulic model for the Shoreline system can be expected to be in need of further calibration, as discussed earlier in the report. Models are typically calibrated by flowing hydrants and by comparing modeled results with actual pressures and flows. A well-calibrated model is essential for efficient operation of a water system, including prediction of available fire flows and prioritizing individual main replacement projects.

Storage Issues

With only Richmond Highlands Tank 2 in service, Shoreline would have insufficient storage capacity to meet the Department of Health minimum storage recommendations. This engineering review provides an estimate of the additional storage Shoreline would need to construct to meet the recommended minimum reliability standards, but additional engineering evaluationshould also be conducted to optimize the capacity of a new storage facility with regard to payment of wholesale rate storage demand charges to SPU. Shoreline may also have the option of purchasing use of existing storage capacity at SPU's Lake Forest Park Reservoir. If so, this option may warrant consideration in determining an overall plan for meeting Shoreline's storage needs.

Attachment C

City of Shoreline

Shoreline Water System Financial Analysis

Draft

April 2012

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Contents

Introduction

The City of Shoreline (the City) has entered into a verbal Agreement with Seattle Public Utilities (SPU) to purchase SPU's water facilities inside the City boundaries in the year 2020. Currently water service is provided to approximately two-thirds of City residents directly by SPU. The acquisition will allow the City to operate its own water utility on behalf of its residents. It is important to note that approximately one-third of the residents in the City are served by the Shoreline Water District (SWD) and this acquisition will not impact SWD customers.

Prior to finalizing the purchase agreement, the City is conducting due diligence on the acquisition and will put the issue up for a city-wide vote. As part of the due diligence, the City retained EES Consulting to provide three inter-related analyses. The first is an Engineering Review to assess the SPU assets that are included in the acquisition, develop operating costs and procedures for the new utility, and develop the short-term and long-term capital needs of the utility. The second piece is a long-term financial analysis to determine the projected revenues and costs associated with operating the water utility, along with the associated financial risks. The final component is a Business Plan to address how the tasks and responsibilities required of the new water utility will be carried out.

The findings of the financial analysis are presented in this report. While an initial financial analysis was conducted to determine the feasibility of entering into the agreement with SPU, this report provides a more comprehensive and detailed analysis based on updated information as well as incorporating the findings from the Engineering Review.

This report contains six sections. The first section addresses the general financial assumptions, including cost escalation, financing and growth assumptions. In the next section the development of the revenue forecast is discussed. Costs for operations as well as capital requirements are then presented. The base case financial results are then provided, followed by a section on sensitivity analysis for the results. Finally, the results are summarized and recommendations are provided.

General Financial Assumptions

To determine the financial results associated with the acquisition, the analysis looks at the expected revenues and costs for the period 2020 through 2040. To get to the initial operation date, assumptions were also required to get from revenues and costs in terms of 2012 levels into terms for the year 2020. In order to accomplish this, several basic assumptions were needed to project both revenues and costs into the future. These basic assumptions include the financing of debt and the escalation rates for both revenues and costs. It is assumed that January 1, 2020 is the start date for the new utility and all revenues and costs are projected for full calendar years. This start date simplifies the analysis, however, we would not expect a start date other than January 1st to impact the overall findings of the results.

Financing

Based on the $25 million agreed upon acquisition price plus any additional capital required for the start-up and separation of the utility, Shoreline plans to issue revenue bonds to cover the costs. For a municipal utility, these bonds are tax-exempt. The bonds will be fully backed by the revenues of the new utility, and will not impact the City's non-utility borrowing capabilities. When issuing bonds, the new utility will need to provide adequate financial analysis to support the payment of the bonds and the analysis will be reviewed by the various rating agencies. We have been involved in similar bond issuances for numerous utilities and the financial analysis undertaken for this report is similar to what is required for purposes of issuing bonds.

It was assumed that the borrowing cost for the bonds will be 5%. This is higher than current rates, however, given that the acquisition will not occur for another 8 years, the 5% level reflects the 20-year average of historic rates. To reflect the risk associated with bond rates, alternative rates are included in the sensitivity analysis.

It was assumed that the acquisition cost would be 100% debt financed over a 30 year period.

Standard terms for revenue bonds require that operating revenues exceed operating costs by an amount sufficient to cover the bond payments under all circumstances. This extra amount to cover the bond payments is referred to as the debt service coverage ratio (DSC). A DSC of 1.2 is generally required for municipal revenue bonds, and if the utility dips below that level they can be in default of the bond covenants. For that reason it is important to plan for a DSC level well above 1.2. SPU has recently raised its DSC target to 1.7. This may be a reasonable DSC target for the City as well. In the case of this analysis, revenues are set equal to the projected rates from SPU and therefore the DSC is calculated from the projected revenues and costs. Looking at the resulting level of the DSC is one indication of whether the financial results provide for a financially sound utility.

SPU Rates

To determine the revenues associated with the new water utility, it was assumed that rates will be at the same level as SPU would charge Shoreline non-SWD customers without the acquisition. The

City has committed to keeping rates at or below the level that would otherwise by charged by SPU at the time of acquisition. For the financial analysis using projected SPU rates provides the base amount of revenues expected. If there are surplus revenues, they could be used to lower future rates for Shoreline (Non-SWD) rate payers.

Currently Shoreline SPU (Non-SWD) customers pay rates that are 21% higher than SPU customers within the City of Seattle. A portion of this premium is due to the 6% franchise fee that is collected in rates and paid to the City. The other portion is a 14% surcharge that SPU assesses to non-Seattle customers. SPU has announced rates for the 2012 through 2014 period that include significant rate increases. These approved rates are the starting point for determining the revenues for the water utility, and are shown in the following table.

Table 1
SPU Water Rates for the City of Shoreline

	1/1/2011	1/1/2012	1/1/2013	1/1/2014
Residential Charges				
Monthly Charge Per Meter (3/4")	$15.80	$16.05	$16.35	$16.70
Off-peak per CCF	$4.39	$4.90	$5.55	$6.23
Peak Up to 5 CCF	$4.83	$5.26	$5.85	$6.43
Peak Next 13 CCF	$5.62	$6.25	$7.05	$7.90
Peak Over 18 CCF	$14.31	$14.31	$14.31	$14.31
Commercial Charges				
Monthly Charge Per Meter (1")	$16.30	$16.30	$16.85	$17.20
Off-Peak per CCF	$4.39	$4.39	$5.55	$6.23
Peak per CCF	$5.62	$5.62	$7.05	$7.90
Residential Percent Change				
Monthly Charge Per Meter (3/4")		*1.6%*	*1.9%*	*2.1%*
Off-peak per CCF		*11.6%*	*13.3%*	*12.3%*
Peak Up to 5 CCF		*8.9%*	*11.2%*	*9.9%*
Peak Next 13 CCF		*11.2%*	*12.8%*	*12.1%*
Peak Over 18 CCF		*0.0%*	*0.0%*	*0.0%*
Commercial Percent Change				
Monthly Charge Per Meter (1")		*0.0%*	*3.4%*	*2.1%*
Off-Peak per CCF		*0.0%*	*26.4%*	*12.3%*
Peak per CCF		*0.0%*	*25.4%*	*12.1%*

On-peak rates cover the period May 16 - September 15 while off-peak rates cover the period September 16 – May 15. These rates have taxes built into the rate levels. This includes 5.029% for the state utility tax and 6% for the current Shoreline franchise fee.

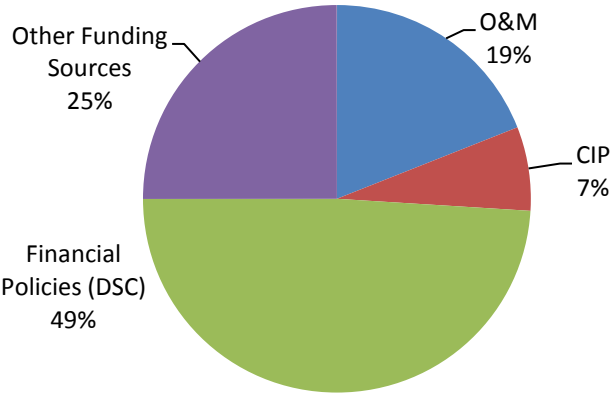
Rates do not increase uniformly for each rate component, but average above 9% for all three years. Generally the increases in the monthly customer charge are small. The bulk of the increases occur to the consumption charges, which are billed on a per CCF basis. Note that CCF

stands for 100 Cubic Feet and is equivalent to 748 gallons. Several of the consumption rates increase by an average of over 10% per year. These rate increases are especially dramatic given the low level of inflation at the current time.

In SPU's *2012-2014 Water Rate Study*, dated July 2011, SPU discusses the need for these large rate increases and provides the following chart on page 5 of its report to show the driving factors behind the increase in its revenue requirements.

The chart shows that the smallest driver of rate increases is the Capital Improvements Plan (CIP) of the utility. O&M represents the operations and maintenance costs of the utility. Together, the capital and operating costs of the utility only drive about one quarter of the total increase in the revenue requirements. Another quarter is driven by a reduction in other funding, primarily water tap fees. About half of the total increase is due to the need to meet more conservative financial policies driven by the debt service coverage ratio (DSC) which ensures that the utility has adequate funds to cover its debt obligations.

Figure 1
SPU Revenue Requirements Drivers



The increase in the revenue requirements is only a portion of the need for a rate increase. Rates are basically equal to the utility's required revenues to cover all costs, including debt coverage, divided by the quantity of water sold. In SPU's case, the expected quantity of water sold is projected to drop significantly and is a contributing factor towards the rate increases. The following table is taken from page 7 of the SPU report and shows that reduced consumption on its own represents a rate increase above 5% in 2012 and around 1% on average for 2013 and 2014.

Table 2
SPU Impacts of Demand on Rate Increase

	2012	2013	2014
Revenue Requirement Increase	4.3%	8.2%	8.8%
Demand Impact	5.6%	1.2%	0.7%
Rate Assistance Impact	-0.6%	0.1%	0.1%
Average Rate Increase	9.3%	9.5%	9.6%

In looking at the long-term projections of SPU rates for Shoreline, EES used the rates for 2012 through 2014 as the starting point. It was not expected that the rate increases projected for 2012 through 2014 would continue indefinitely. Therefore we looked at the increases of SPU rates for the period of 2004 through 2011 as a source for predicting future retail rate increases. The average over that period was roughly 5% per year. Another source considered included a compilation of data from water utilities in Washington. The Washington Public Utility Districts Association (WPUDA) provides a Sourcebook each year with general information on the PUDs in the state. For the water PUDs, the average increase in water rates for the years 2004-2010 was 5.7%. This compares to the average increase in operating costs of 5.4% for the same utilities over the same time period. Further, SPU stated on page 7 of its *2013 Water System Plan Official Yield Estimate and Long-Range Water Demand Forecas*t, dated December 2011, that the rates for retail water are expected to go up by 0.4% above the rate of inflation.

Given these various data sources, the escalation for SPU's retail rates is assumed at 5% per year for the period 2014 through 2040. This assumption is adjusted to reflect both higher and lower increases in the sensitivity analysis.

Cost Escalation

Based on SPU's own statements and the differences in the WPUDA rate and cost increases, it is assumed that the 5% projected retail rate increases is 0.4% higher than the increases in the costs for both CIP and O&M. Therefore, the cost escalation for 2012 through 2014 is assumed to be 4.6%. Both the capital costs and the annual O&M costs developed in the Engineering Review were in 2012 dollars and are escalated to reflect the year in which they are spent.

Water Wholesale Costs

The new water utility will likely purchase wholesale water from SPU. Wholesale rates for the years 2012 to 2014 are available, as shown below. While wholesale rates had a significant increase in 2012, the increases in 2013 and 2014 are fairly small.

Table 3
SPU Wholesale Water Rates

	1/1/2011	1/1/2012	1/1/2013	1/1/2014
Wholesale Charges				
Off-peak per CCF	$1.29	$1.52	$1.53	$1.53
On-peak per CCF	$1.91	$2.25	$2.26	$2.27
Wholesale Percent Change				
Off-peak per CFF		*17.8%*	*0.7%*	*0.0%*
On-peak per CCF		*17.8%*	*0.4%*	*0.4%*

Over the 3-year period, wholesale water rates have increased an average of about 6% compared to the average increase in retail rates of nearly 9.5%. During the 2004-2011 period, wholesale rates increased an average of 3.2% per year. Because SPU wholesale rate increases have been consistently lower than SPU retail rate increases, it is assumed that wholesale rates will increase by 3.5% per year in the future.

Retail Rate Comparison

While it is not used in the development of the financial analysis, a comparison of customer bills was done for the Shoreline (non-SWD) residents at SPU rates compared to other nearby water utilities. A table showing the actual rates for each utility can be found in the Appendix. The following tables show the comparison of bills for both the residential and commercial class. In each case, the average use per customer per SPU customer in Shoreline was used to calculate the bill. For residential customers the average usage was 8.2 CCF per month in the on-peak period and 5.4 CCF per month in the off-peak period. For commercial customers the average usage was 75.7 CCF per month in the on-peak period and 42.4 CCF per month in the off-peak period. Other utility projections reflect their 2012 rates.

Table 4
Annual Residential Bill Comparison of Seattle-Area Utilities

	Average Monthly Basic Charge	Average Monthly bill Off-peak	Average Monthly bill On-peak	Total Annual Bill
SPU Shoreline residents 2012	$16.05	$26.46	$46.30	$589.48
SPU Shoreline residents 2013	$16.35	$29.97	$51.81	$643.20
SPU Shoreline residents 2014	$16.70	$33.64	$57.43	$699.26
City of Edmonds	$10.30	$11.56	$17.55	$286.24
City of Bothell	$10.51	$11.56	$20.05	$298.80
Tacoma Water	$16.76	$7.39	$12.31	$316.31
Northshore Utility District	$15.00	$14.85	$22.55	$389.00
City of Everett	$16.02	$14.42	$21.89	$395.16
City of Bellevue	$14.81	$15.98	$24.27	$402.62
Shoreline Water District	$18.98	$14.20	$21.57	$427.58
Lake Forest Park Water District	$18.50	$16.20	$24.60	$450.00
SPU Seattle residents	$13.25	$21.82	$38.18	$486.25

For residential customers, SPU has relatively low monthly basic charges but the highest rates during the on-peak period. Overall the 2012 Shoreline rates yield average bills that are higher than most of the nearby utilities. By 2014 those rates will exceed all of the surrounding rates, however, this does not account for the likely rate increases for the other utilities.

Table 5
Annual Commercial Bill Comparison of Seattle-Area Utilities

	Average Monthly Basic Charge	Average Monthly bill Off-peak	Average Monthly bill On-peak	Total Annual Bill
SPU Shoreline residents 2012	$16.30	$186.14	$425.43	$3,386.42
SPU Shoreline residents 2013	$16.85	$235.32	$533.69	$4,219.50
SPU Shoreline residents 2014	$17.20	$264.15	$598.03	$4,711.74
Tacoma Water	$41.91	$63.47	$113.32	$1,463.99
City of Edmonds	$25.36	$90.74	$162.00	$1,678.14
City of Everett	$26.70	$59.81	$272.00	$1,789.27
Lake Forest Park Water District	$34.00	$127.20	$227.10	$2,334.00
City of Bothell	$31.97	$105.15	$320.97	$2,508.73
SPU Seattle residents	$13.65	$153.49	$350.49	$2,790.67
City of Bellevue	$26.20	$127.62	$319.45	$2,793.67
Northshore Utility District	$30.00	$158.37	$293.24	$2,960.10
Shoreline Water District	$124.04[1]	$147.13	$262.68	$3,716.22

1. Assumes building is 3,000 square feet. The monthly basic charge is $34.73×square feet÷840.

For commercial customers, the SPU rates also have the highest customer charge and moderate usage charges. Combined, the SPU Shoreline rates for commercial customers are higher than all of the other utilities included in the comparison.

Development of Post-Acquisition Revenues

Overview

Revenues for the new Shoreline water utility are calculated on the basis of many different inputs to best reflect the complexity of the rates. Revenues for Shoreline customers were projected starting with 2011 actual billings, and are forecast through the year 2040. Forecasts were completed for each rate class based on the number of customers times the basic charge plus the projected use per class times the usage charge. This approach takes into account different growth rates for each customer class.

Rates projected for SPU are the baseline for revenues for all years. During the 2011-2019 period Shoreline (Non-SWD) residents will remain on SPU rates. While we did not complete a full financial evaluation for those years, we did calculate the revenues at SPU rates so that we would have a good basis for the starting revenues in the year 2020 when the acquisition takes place.

SPU rates are established as the baseline with the goal of having rates for the new Shoreline water utility that are no higher than SPU rates. To the extent that there are surplus revenues after the acquisition, the Shoreline water utility would have the option of reducing rates or improving capital facilities, or some combination of the two.

Components of the Revenues Projections

In order to provide the detailed revenue forecast a series of separate components were forecast individually and then appropriately combined to determine the results. The specific components are as follow:

- Number of customers by class
- Average use per customer by class
- Total water sales by class (Number of customers times average use per customer)
- Basis service charge by class and by meter size
- Consumption charges per CCF by class, including seasonal and block rates

The results provide revenues for 2011 through 2040 for each of the following customer classes:

- Residential Single-family
- Multi-family
- Commercial
- Master Meter Residential Developments (RRMD)
- Fire Service
- Other Revenue

The following sections discuss the components of the revenue forecast followed by a summary of the results.

Development of the Customer Forecast

SPU provided Shoreline with the actual number of customers served by SPU within the City of Shoreline for the years 2006-2011. The forecast was developed using the 2011 actual customers and allowing for growth over the 30-year period.

Several different sources were looked at to determine the appropriate customer growth rates for Shoreline. In terms of growth between 2006 and 2011 actual data, the number of customers was relatively flat for the residential (single-family and multi-family) and commercial classes. Because this was a period with a strong recession, these results are not surprising. However, we would not expect customer growth to continue to be flat as we enter into the recovery period and over a longer term. In fact, customers for 2011 are higher than in 2010 for both the multi-family and commercial classes.

SPU provided its own load forecast completed in the *2013 Water System Plan Official Yield Estimate and Long-Range Water Demand Forecast.* Within this forecast SPU has projected average annual population growth of 0.20% per year for single-family households and 1.7% for multi-family households. Employment is projected to grow at an average annual rate of 1.5%. These projections apply to the entire SPU retail area and specific growth rates or forecast numbers are not provided for Shoreline. We do not expect Shoreline to grow in exactly the same manner as the City of Seattle.

To determine projections specific to Shoreline, we looked at projections from the Puget Sound Regional Council (PSRC) 2006 Forecast. Because the PSRC forecast is a few years old, we used the growth rates rather than the actual numbers to provide the forecast of customers. This allows for the correct starting point for 2011 based on the actual results for the year. The PSRC projects single-family growth of 0.21% from 2010 to 2020, 0.18% from 2020 to 2030 and -0.11% from 2030 to 2040. For multi-family households the projected growth rates were 1.21% for 2010 to 2020, 1.22% for 2020 to 2030, and 1.42% for 2030 to 2040.

Although the SPU forecast is more current, it is more specific to the City of Seattle. Therefore, we used the PSRC forecast growth rates to reflect the growth in water customers for single-family and multi-family customers. The growth rate is comparable to SPU's for single-family but has lower growth for multi-family customers than expected by SPU. This is consistent with expectations as Shoreline is not as urban as Seattle and will likely have less multi-family housing. One exception is that while the PSRC forecast has an annual decline in single-family customers from 2030-2040, we have changed this to reflect zero growth in customers.

For commercial customers, SPU does not list a specific growth rate for commercial customers. However, it is forecasting a growth rate of 1.5% for employment and overall commercial usage of around 1% per year on average. The PSRC has an employment projection specific to Shoreline with average annual growth rates of 0.59% for 2010 to 2020, 0.49% for 2020 to 2030 and 0.62% for 2030 to 2040. Another source of data is from the King County Countywide Growth Planning Polices (12/2010) which shows a growth projection of 5,000 new jobs in Shoreline for the period

2006 – 2031. When compared to current employment levels of roughly 28,000 this represents growth of 0.66% per year.

While commercial customers may not grow at exactly the same rate as employment levels, they will be highly correlated. Given the various sources of data, an average growth rate of 0.66% based on the King County forecast is applied to commercial customers for the entire period. This is newer and just above the level of the PSRC forecast growth rate, but lower than the SPU forecast growth rate.

For the Mater Meter Residential Development (MMRD) and Fire Service Classes, the number of customers is expected to remain constant.

Table 6
Forecast of Customer Growth Rate by Class

	2015	2020	2025	2030	2035	2040
Residential	0.21%	0.21%	0.18%	0.18%	0.00%	0.00%
Multi-Family	1.21%	1.21%	1.22%	1.00%	1.42%	1.42%
Commercial	0.66%	0.66%	0.66%	0.66%	0.66%	0.66%
MMRD	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Fire	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Other	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total	0.24%	0.24%	0.21%	0.21%	0.07%	0.07%

Table 7
Forecast of Customers by Class

	2011 Actual	2015	2020	2025	2030	2035	2040
Residential	9,671	9,753	9,858	9,946	10,035	10,035	10,035
Multi-Family	236	248	263	279	296	318	341
Commercial	399	410	423	437	452	467	483
MMRD	4	4	4	4	4	4	4
Fire	136	136	136	136	136	136	136
Other	465	465	465	465	465	465	465
Total	10,911	11,016	11,149	11,268	11,389	11,425	11,464

Note that in all cases we expect that growth will follow economic cycles and are not likely to be equal from year to year. However, for planning purposes, it was assumed that growth rates would be applied evenly among the time periods.

Development of the Water Use Forecast

SPU provided Shoreline with the consumption by month for each class for the years 2006-2011. Water sales are reported in hundred cubic feet (CCF), which is the same unit of measure used for billing purposes. One CCF is equal to 748 gallons of water. The CCF sales figures were divided by

the number of customers in each class to develop the average CCF use per customer. Generally, average use is forecast independently to see the trends in usage separate from the growth in the number of customers. The average use per customer was then multiplied by the number of customers for each year to develop the total sales by class forecast.

Actual average use per customer fluctuated from year to year based on weather conditions. For that reason it is difficult to measure the actual growth rate for the 2006-2011 period. The years 2006 and 2009 appear to have particularly high use while 2008 and 2011 have particularly low use. In looking at the 3-year average for 2006-2008 as compared to 2009-2011, we see that average annual usage per customer decreased by -1.2% for single-family, stayed flat for multi-family, and increased by 0.4% for commercial. As this was during a recessionary period, we would not necessarily expect these trends to continue indefinitely.

Because of weather variations, we used the 3-year average use per customer for 2009-2011 as a smoothed out usage level to better reflect average conditions. This adjusted amount was used as the starting point for 2011 for developing the load forecast.

The SPU forecast did not provide growth rates for usage per customer but did provide growth rates for total use by class. The customer growth rates and total usage growth rates were used to develop the average use forecast. For single-family the number of customers is increasing slightly; therefore, average use is decreasing more to offset customer growth. The resulting usage forecast is a decrease of about 1% per year. Multi-family total use is projected to increase by 1% per year. Given the customer growth rate of 1.7%, this means average usage per customer would decline by about 0.7% per year. For commercial, total sales are also forecast to increase by about 1% per year. In all three classes, use per customer is slower through 2020 and then picks up (or levels off in the case of declining use) starting in 2030.

The SPU forecast was used as a guide is setting the growth rates for Shoreline. Single-family usage per customer was projected to decline by 1% per year from 2012 to 2020 and by 0.5% from 2020 to 2030. It was assumed that consumption would be flat after 2030. These annual reductions in average use result in CCF per customer that is over 20% lower than the usage in 2006. Multi-family and MMRD growth rates were forecast to be half of those for multi-family. Commercial use per customer was forecast to increase by 0.5% per year for 2012 to 2020, 0.25% for 2020 to 2030 and remain flat after 2030. This would reflect a shift from smaller to bigger commercial customers. Usage for the MMRD class was projected to decline by half the rate as the single-family and multi-family customers. In all cases it was assumed that a continued percentage increase or decrease in usage was not sustainable due to the exponential nature of percent changes as well as the fact that there is some natural minimum level of consumption expected.

The results of the number of customers times the average use per customer yield resulting sales by customer class that decline by about 0.3% for single-family, increase by 1% for multi-family and increase by 0.8% for commercial. The total system water sales forecast is relatively flat with a small average annual growth rate of 0.2% through 2040.

Table 8 Forecast of Use per Customer Growth Rate by Class						
	2015	2020	2025	2030	2035	2040
Residential	-1.00%	-1.00%	-0.50%	-0.50%	0.00%	0.00%
Multi-Family	-0.50%	-0.50%	-0.25%	-0.25%	0.00%	0.00%
Commercial	0.50%	0.50%	0.25%	0.25%	0.00%	0.00%
MMRD	-0.50%	-0.50%	-0.25%	-0.25%	0.00%	0.00%
Fire	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Other	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Table 9 Forecast of Total Annual CCF by Class							
	2011 Actual	2015	2020	2025	2030	2035	2040
Residential	732,074	744,585	715,651	704,201	692,934	692,934	692,934
Multi-Family	180,889	196,654	203,655	213,702	223,756	240,106	257,651
Commercial	256,160	295,905	313,512	328,055	343,274	354,741	366,592
MMRD	38,208	43,792	42,708	42,177	41,652	41,652	41,652
Fire	199	798	798	798	798	798	798
Other	34,735	38,366	38,366	38,366	38,366	38,366	38,366
Total	1,242,265	1,320,100	1,314,689	1,327,298	1,340,779	1,368,597	1,397,992

Development of the Revenue Forecast by Class

SPU recently completed a cost of service study and established rates for the 2012 to 2014 period. The new rates represent significant rate increases. Because the rate increases differ by component and rate class, we calculated the revenues for Shoreline customers using the new rates for each year. Revenues consist of both base service charges and commodity charges.

While we were provided with monthly usage by class for Shoreline (Non-SWD) residents, we did not have a breakdown of usage in the different summer season blocks. In developing revenues for 2012-2014, we first multiplied actual 2011 usage by the 2011 rates to true-up to the reported 2011 actual revenues. Based on actual single-family usage, 57% of consumption fell into the 8-month off-peak season of September 16-May 15. The summer period has a three-tier structure with block 1 up to 5 CCF per month, block 2 for the next 13 CCF, and block 3 for over 18 CCF per month. We determined that 26.5% would occur in block 1 based on 5 CCF times the number of customers, another 14% would be within block 2 and the remaining 2.5% would be in block 3. For the multi-family class, the loads were split between 61% off-peak, 3% in block 1, 35% in block 2 and 1% in block 3. For the commercial class there are no block rates and usage was split 53% off-peak and 47% on-peak.

After developing the breakdown of consumption by rate period/block, we could then split the 2012 annual forecast of consumption into the appropriate seasons and blocks. Usage was then multiplied by the SPU rates for 2012-2014 for each season and block. The resulting revenues are $9.4 million in 2012.

Based on average rates per CCF for Shoreline (Non-SWD) residents as a whole, the rate increases resulting from the new SPU rates are an average of 6% in 2012, 12% in 2013 and another 9% in 2014.

Table 10
Short-Term Forecast of Total Annual Revenues by Class

	2011 Actual	2012	2013	2014
Residential	$5,489,547	$6,059,065	$6,549,043	$7,053,795
Multi-Family	$958,677	$1,128,424	$1,272,765	$1,426,212
Commercial	$1,452,391	$1,581,273	$1,976,882	$2,224,593
MMRD	$224,812	$292,744	$317,341	$342,797
Fire	$139,497	$163,411	$178,031	$193,279
Other	$193,997	$186,754	$203,463	$220,889
Total	$8,458,920	$9,411,672	$10,497,526	$11,461,564

Note that these revenues, along with all future revenues projected, include the 5.029% state utility tax and the City of Shoreline franchise fee, which will be converted to a City utility tax after the acquisition.

Long-Term Revenue Projections

To project the long-term revenues of the water utility, the 2014 revenues by class were used as the starting point. Revenues were based on the CCF forecast by class times the average rate per CCF forecast. Because we do not have SPU rates by component beyond 2014, we applied the expected 5% rate increase per year to the average rate per CCF equally for each customer class. The revenues reflect both the growth in CCF sales and the projected rate increases over time.

Table 11
Long-term Forecast of Total Annual Revenues by Class

	2020	2025	2030	2035	2040
Residential	$9,013,687	$11,319,943	$14,216,281	$18,143,977	$23,156,823
Multi-Family	$1,993,200	$2,669,388	$3,567,171	$4,885,389	$6,690,742
Commercial	$3,195,274	$4,267,246	$5,698,851	$7,516,315	$9,913,400
MMRD	$445,770	$561,852	$708,163	$903,815	$1,153,523
Fire	$259,012	$330,572	$421,903	$538,467	$687,236
Other	$296,012	$377,795	$482,172	$615,388	$785,408
Total	$15,202,956	$19,526,796	$25,094,541	$32,603,351	$42,387,132

Revenues are projected to be $15.2 million in 2020, increasing to $42.4 million by the year 2040. These numbers are very high in the later years but they must be looked at in terms of the costs that are also increasing significantly over the same time period. And because they are in nominal dollars, they include the general inflationary increases that make future dollars much higher than they are in today's terms.

Development of Post-Acquisition Costs

Overview

Annual costs for operating the new Shoreline water utility are made up of five major components, including the cost of the initial acquisition, costs of ongoing capital projects, costs of wholesale water purchases, operating & maintenance costs (O&M) and taxes. Costs associated with each of these components were developed based on current estimates in 2012 dollars. Most of the costs were taken directly from the Engineering Review, and included a combination of capital costs and annual O&M cost items. To develop the long-term forecast of costs for the period 2020 through 2040, the basic financial assumptions were applied as needed to estimate costs in each year.

Acquisition and Initial Capital Costs

The negotiated price for the acquisition is $25 million in the year 2020. This price does not need to be escalated to account for inflation as it reflects the price to be paid at the time the transaction occurs. While there are details that still need to be worked out in the contract, it is expected that there may be some adjustments to this purchase price to reflect any new capital that is spent over the next 8 years, any retirements in assets, and any changes in the assets that are to be included.

The Engineering Review includes additional facilities and capital that are required at the time of the acquisition, including separation costs. The recommended separation alternative has a cost of $5.2 million in 2012. Other initial capital costs include $4.1 million for a storage tank, $1.1 million for pump station & controls, and $2.2 million for buildings, equipment and inventory. It is assumed that all of these capital items will be acquired and constructed in 2019 using a construction loan, with interest accruing during 2019. Given the expected inflation and interest during construction, the cost to be financed in the year 2020 is $18.2 million.

The combined acquisition cost and initial capital totals $43.2 million. Given the assumed interest rate and financing terms, the debt service payment associated with the acquisition is $2.8 million per year.

Table 12
Acquisition and Initial Capital Costs

	2012 Value	2020 Value
Acquisition Price	$25,000,000	$25,000,000
Separation Cost	$5,204,400	$7,486,551
2 MG Storage Tank	$4,072,000	$5,857,589
Pump Stations & Controls	$1,134,400	$1,631,839
Utility Buildings	$1,043,590	$1,501,208
Heavy Equipment & Vehicles	$933,900	$1,343,419
Tools & Inventory	$275,880	$396,854
Total	$37,664,170	$43,217,460
Annual Debt Service		$2,811,358

Operating & Maintenance (O&M) Costs

The annual O&M costs come directly from the Engineering Review and include labor costs, materials and supplies, employee benefits and administrative costs. In 2012, these costs are estimated at $3.9 million. Inflation is added to each item, with costs escalating to $5.5 million in 2020 and to $13.7 million by 2040. While costs were developed assuming that the City conducts all of the required tasks internally, it might be cost-effective to outsource certain activities. The City may consider this option as the acquisition date approaches; however, it would only include outsourcing to the extent it would reduce costs or provide enhanced service for the same costs.

Table 13
Forecast of Annual O&M Costs

	2012	2020	2025	2030	2035	2040
Labor	$1,227,799	$1,759,465	$2,203,125	$2,758,656	$3,454,268	$4,325,282
Materials/ Supplies	$659,681	$945,339	$1,183,712	$1,482,191	$1,855,935	$2,323,920
Employee Benefits	$491,120	$703,787	$881,251	$1,103,463	$1,381,708	$1,730,114
Administrative	$1,500,000	$2,149,536	$2,691,554	$3,370,246	$4,220,073	$5,284,190
Total	$3,878,600	$5,558,127	$6,959,642	$8,714,557	$10,911,984	$13,663,506

Wholesale Water Purchases

As the City is purchasing the distribution system only it is not acquiring any of the water resources to provide water to the new utility. The new utility will be able to purchase water from SPU on a wholesale basis, as do many of the other water utilities in the region. The pricing and contract terms are expected to be the same as for SPU's other wholesale customers. Rates for wholesale water supply are developed by SPU in its *2012-2014 Water Rate Study* and differ between peak and off-peak periods. The rates between 2012 and 2014 are provided in Table 14.

Table 14
SPU Forecast of Wholesale Water Rates

	2012	2013	2014
On-Peak	$2.25	$2.26	$2.27
Off-Peak	$1.52	$1.53	$1.53

Wholesale customers are expected to contract for a quantity of water that is sufficient to cover the variation from year to year. The projections of water use are relatively flat for the new water utility, with sales of roughly 1.31 million CCF in 2020 and increasing to 1.40 million CCF by 2040. We have assumed that the contract water amount is 1.52 million CCF, which includes a 10% adder for growth and variability and water losses of 5%. Based on historic usage, the water amount is split with 44% during the peak months and 56% during the off-peak months.

Based on the contract amount and the SPU rates, the total purchase amount is $2.8 million based on 2014 rates. Given price increases, this amount is forecast to be $3.4 million in the initial year 2020.

Table 15
Forecast of Wholesale Water Costs from SPU

	2014	2020	2025	2030	2035	2040
Annual Cost	$2,815,664	$3,443,399	$4,128,903	$4,953,646	$6,005,443	$7,285,781

Taxes

The water utility will face two taxes on revenue from operating the water utility. There is a state tax rate of 5.029% that will be applied to all revenue. There is also a 6% franchise fee currently collected by SPU and paid to the City of Shoreline. We have assumed that post-acquisition the City will replace the 6% franchise fee with a 6% utility tax once the new water utility begins operations. SPU rates for Shoreline are currently 21% higher than rates within the City of Seattle. This adder includes the 6% franchise fee. The state utility tax is also included in the SPU rates.

Based on the expected revenues the state tax is expected to be $764,557 in 2020 and the franchise fee is expected to be $912,177. The tax rates are assumed to remain constant over time but the payments will increase as the revenues grow.

Table 16
Forecast of Tax Expenses

	Rate	2020	2025	2030	2035	2040
State Tax	5.029%	$764,557	$982,003	$1,262,004	$1,639,623	$2,131,649
Shoreline Utility Tax	6.000%	$912,177	$1,171,608	$1,505,672	$1,956,201	$2,543,228
Total		$1,676,734	$2,153,610	$2,767,677	$3,595,824	$4,674,877

Annual Capital Improvements Program (CIP)

In addition to the upfront capital improvement projects previously discussed, it is expected that additional CIP will be required each year. The Engineering Review estimates such CIP to be $1.37 million per year in 2012 dollars. The three largest categories include service replacements, distribution main relocations and extensions, and vehicle replacements. It is assumed that this amount will escalate each year with inflation, to reach a sum of $2 million in 2020.

The other ongoing CIP item is replacement of certain existing distribution mains. The Engineering Review estimates this cost at $32.7 million in 2012 dollars, or $46.9 million in 2020 dollars. This amount represents 23% of the total system and it is expected that costs would be spread out over time. If the cost is spread out over 23 years, as recommended in the Engineering Review, the annual cost would be $2 million per year in 2020, and would escalate with inflation after that time.

While the annual CIP of $2 million is expected to be required every year, the main replacement program will have some options in terms of timing and funding. Given the fact that rates must be set sufficiently high to meet the required debt service coverage level required by the bonds, it is expected that there will be cash left over each year that can be used to fund the CIP program. Given the current revenue and cost projections and the initial debt service payment of $2.8 million, net income for the year 2020 is $1.8 million, which provides a 1.6 DSC level. This amount can be used to fund the annual CIP. This is slightly below the level of the $2 million in ongoing CIP, however, that amount may be too high for the initial year. Because the amount includes replacement of vehicles, tools and Scada improvements, all of which will be brand new in 2020, it is not likely they will need replacement or improvements in the first several years.

Funding for the distribution mains replacement can be funded with any additional cash available, through additional debt, or some combination of both. It is recommended that the funding of this project be initially based on the amount of funds available without raising rates above the level of SPU. Once the City begins operations of the water utility, it can better assess whether that level of funding is adequate. If additional funds are shown to be needed based on a prioritized list of replacements that need to be made immediately, then additional debt can be issued to cover a large portion of the replacements at once rather than doing an incremental amount each year.

Base Case Financial Results

While the previous sections provided the detail that went into the forecasting of revenues and costs for the new water utility, the financial results for the base case scenario are presented here.

Table 17 summarizes the budget items for 2020 through 2040. Operating Revenues include revenues from retail sales as well as a small amount for other income. Operating expenses include labor, materials, administrative costs and taxes. The debt service is the annual bond payment amount (principal and interest) for the initial purchase price plus any upfront capital needs.

The net cash flow equals the revenues minus the operating expenses and debt service payments, and ranges from $1.8 million in 2020 to $14 million in 2040. That net cash flow allows the utility to meet its DSC requirements, and the cash can be used to fund capital projects during the year. The cash will first be used to fund any ongoing annual CIP projects. Any surplus amounts are available to develop a capital or reserve fund, pay for mains replacement, or lower rates for customers.

For purposes of the analysis, it was assumed that all surplus funds go towards the mains replacement program and the cumulative amount paid is shown. In this case it is $74 million over the 20-year period. When compared to the recommended mains replacement budget, escalated over time, the base case allows for 107% of the program to be funded.

Table 17
Summary of Base Case Results

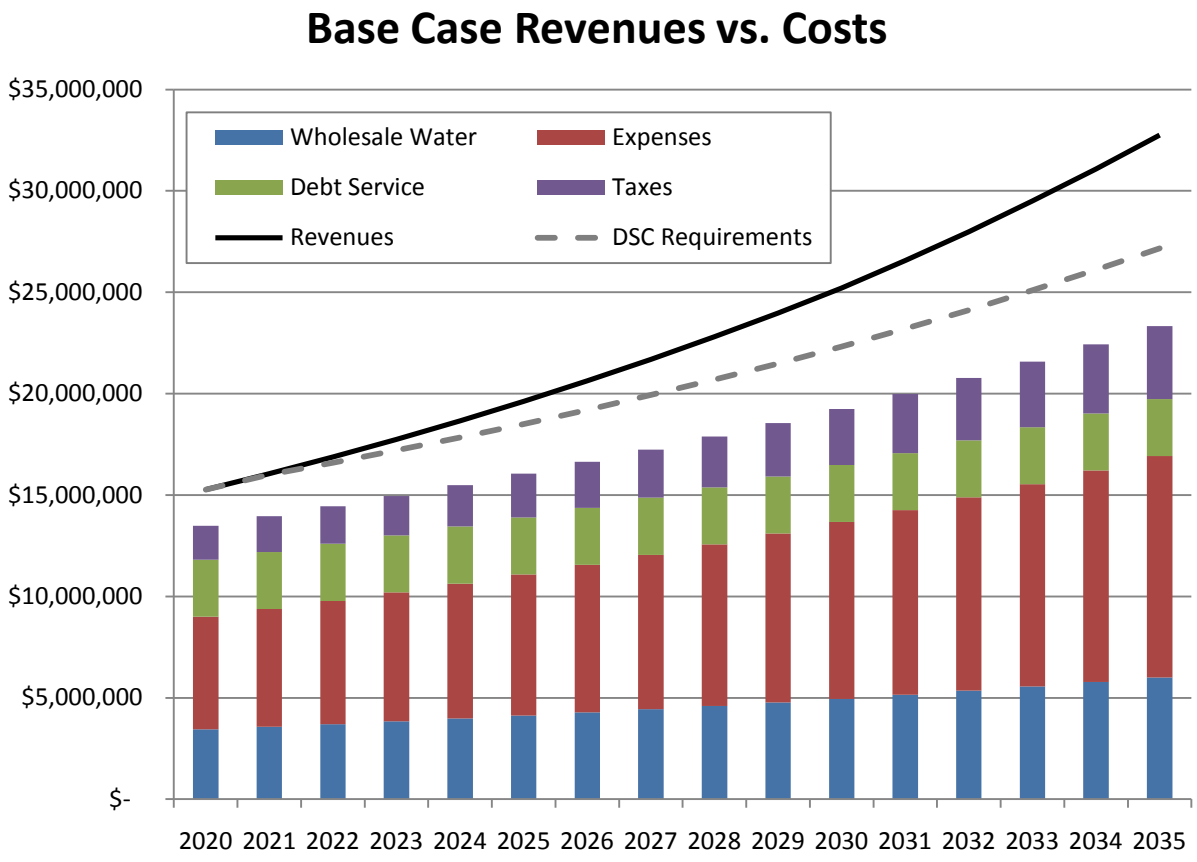
	2020	2025	2030	2035	2040
Operating Revenues	$15,274,607	$19,618,243	$25,211,254	$32,752,308	$42,577,244
Operating Expenses	$10,678,260	$13,242,155	$16,435,880	$20,513,251	$25,624,164
Debt Service	$2,811,358	$2,811,358	$2,811,358	$2,811,358	$2,811,358
Net Cash Flow Before CIP	$1,784,989	$3,564,730	$5,964,015	$9,427,699	$14,141,722
Annual CIP	$1,784,989	$2,452,550	$3,070,975	$3,845,339	$4,814,965
Net Available for Mains Replacement	$0	$1,112,181	$2,893,041	$5,582,360	$9,326,758
Debt Service Coverage	1.6	2.3	3.1	4.4	6.0
Cumulative Mains Replacement	($0)	$2,818,676	$13,500,413	$35,674,639	$74,329,264
Cumulative Percent	0%	4%	19%	51%	107%

The results show that the new water utility would have sufficient funds to meet its DSC obligations and fund the recommended CIP program in 2020 and beyond. The first year is the tightest year financially, with both DSC and the net amount available for CIP growing over time. Full results on an annual basis are included in the Appendix.

The results are also shown by year in the following chart. The chart compares the forecast of revenues to the forecast of costs. The costs are broken down into wholesale water purchases,

operating costs, debt service for the acquisition, separation and upfront costs, plus the State and City utility taxes. The difference between the revenues shown and the costs in the chart reflect the amounts that can be used to meet the DSC requirement and fund CIP programs. To the extent that this difference is not needed for CIP, it could be used to reduce rates or provide reserve funds. While in the early years the entire difference is needed to meet DSC requirements and CIP, in the later years the difference grows substantially and there is likely to be more options for using the available funds.

Figure 2
Base Case Revenue vs. Cost Comparison
2020-2035



While it can be seen that the revenues increase faster than the costs this is due to three factors. First, the debt service amount is fixed over time and does not increase. Second, the wholesale water rates grow less than the retail rates, as has been the case for SPU since 2004. Because the bulk of the water resource costs are fixed capital-related costs, we believe the lower increase is appropriate. Finally, the SPU rates are expected to increase a little more than costs. This has been the case historically and is driven in part by SPU's declining load levels which are projected to continue.

Sensitivity of Financial Results

As with any long-term planning study, there is uncertainty and risk surrounding the analysis because the future is unknown. While we provided detailed research and analysis to support the assumptions contained in this report, there are many factors outside the control of the City that will influence the projected revenues and costs. For that reason we conducted a sensitivity analysis to determine what the financial results would be under various different assumptions. This was completed by looking at individual changes in assumptions first to see which had the largest impacts. Then both a high and low case with changes to multiple assumptions were created to determine the combined financial risks to the utility.

It is important to keep in mind that the majority of factors driving increased costs or reduced revenues will also impact SPU. For example, if costs grow faster than projected, it is likely that SPU will also see increased costs and have to increase their rates. Similarly, if retail rates are lower than projected, it is likely that SPU could do this because costs for operating the utility declined, which would also mean the Shoreline water utility might see lower costs.

The sensitivity cases were all performed with both a low and high case surrounding each financial assumption. The following is a list of the sensitivity adjustments made:

- Separation Option B5 (most costly case)
- All capital and O&M costs 10% higher or lower
- Wholesale charges 10% higher or lower
- Bond rate higher or lower
- Escalation of rates and costs higher or lower
- Load growth higher or lower
- Cost escalation equal to rate escalation
- Low case for multiple factors
- High case for multiple factors

Once all of the cases were completed the results were placed in order of net revenues before CIP for the year 2020 for the comparison in Table 16 and labeled cases A through N. The various cases are described in more detail following the table and are grouped according to the preceding list. The full results by year for each case are included in the Appendix.

One other option was evaluated to determine the impact over the base case. The City undertook an *Operation Efficiency Report* to determine if there were any savings associated with operating the water utility in conjunction with the wastewater utility to be acquired in 2017 and with other City functions. This report resulted in savings in both the initial capital requirements and annual operating costs. The City also looked at the expected $1.5 in assumed administrative costs to cover services provided by existing City departments and calculated what it would be based on existing overhead allocation methods. The calculated amount was roughly $1.1 million.

Table 18 Summary of Sensitivity Analysis						
		2020 Surplus/ Shortfall After Full CIP	2020 Net Before CIP	2020 Debt Service Coverage	2025 Debt Service Coverage	% of Mains with Proposed Replacement Completed
Base	Base Case	$0	$1,784,989	1.6	2.3	107%
Efficiency	Base with Efficiency Savings	$0	$2,873,736	2.0	2.8	160%
A	Low Costs - 10% less CIP and O&M	$0	$2,459,309	1.9	2.6	163%
B	All Low Case	$0	$2,365,837	2.0	2.4	102%
C	Low Wholesale - 10% less	$0	$2,129,329	1.8	2.4	122%
D	Low Bond Rate - 4%	$0	$2,107,110	1.8	2.6	117%
E	Load growth 0.5% higher	$0	$2,081,459	1.7	2.5	159%
F	High Escalation - 7% retail, 5% wholesale, 6.6% costs	$0	$2,030,263	1.7	2.6	124%
G	Equal Escalation - 5% retail, 5% costs	-$202,199	$1,582,790	1.6	2.1	72%
H	Load growth 0.5% lower	-$293,136	$1,491,853	1.5	2.0	61%
I	Low Escalation - 3% retail, 2.5% wholesale, 2.6% costs	-$344,262	$1,440,727	1.5	1.9	66%
J	High Wholesale - 10% more	-$344,340	$1,440,649	1.5	2.1	92%
K	Separation Option B5	-$539,246	$1,245,743	1.4	1.9	92%
L	High Bond Rate - 7%	-$699,346	$1,085,643	1.3	1.8	88%
M	High Costs - 10% more CIP and O&M	-$674,320	$1,110,669	1.4	1.9	64%
N	All High Case	-$1,379,788	$405,201	1.1	1.9	102%

The cases range from providing a net amount before CIP of $405,000 to $2.6 million in the first year. In four cases, the DSC falls below 1.5 in the first year. While there is positive cash flow in those cases, the low DSC might be problematic. In all cases, the conditions improve each year and within the first five years the DSC is more than adequate. Because the funding of mains replacement is funded with any surplus revenues beyond the annual CIP, the cumulative funding for the program runs from 61% to 163%.

As with any utility, there will be some cost items than can be managed in the event that net revenues are insufficient. Operating and CIP budgets can be reduced, CIP items can be deferred, additional bonds can be issued to fund capital rather than funding it all from cash, or allocations of costs to cover City provided services can be deferred.

Further, if the efficiencies identified by the City are achieved, all cases see reduced costs of roughly $1 million in the first year and an increase in the DSC of 0.4 points.

Separation Option B5 (Case K)

With this case option B5 rather than B3 is used for the separation of the facilities. This involves a capital cost of $10.9 million rather than $5.2 million.

This case increases the debt service payment by roughly $500,000 per year, from $2.8 to $3.35 million per year. This reduces the 2020 Net Before CIP to $1.2 million and the DSC to 1.4. The additional cost means that fewer funds are available for the mains replacement program resulting in 92% of the main replacements being funded over the first 20 years.

All Capital and O&M Costs 10% Higher or Lower (Cases A and M)

These cases represent two of the most extreme cases. In the low case (Case A) all O&M and CIP costs are reduced by 10% initially. In the high cases (Case M) all O&M and CIP costs are increased by 10%. Thereafter the O&M and CIP costs increase at the base case escalation rates. The adjustments are made to labor, materials and administrative costs for O&M as well as to separation costs, upfront capital, ongoing CIP and mains replacement costs.

In the low case, costs are reduced by $400,000 and the DSC increases to 1.9 in the year 2020. Apart from the efficiency savings, the case provides the largest cost savings to the utility.

In the high case, costs are increased by nearly $700,000 and the DSC is 1.4 in 2020. This is the second most extreme case and would require the utility to enact other cost saving measures.

Wholesale Charges 10% Higher or Lower (Cases C and J)

The starting cost for wholesale purchases are changed in these cases to be either 10% lower (Case C) or 10% higher (Case J). Thereafter the costs would escalate at the base case assumptions. This changes costs in 2020 by about $350,000 in either direction. Even with the high wholesale rates, the DSC level is 1.5 which is adequate for the first year.

Bond Rate Higher or Lower (Cases D and L)

A low bond rate of 4% (Case D) and a high bond rate of 7% (Case L) were looked at for these cases compared to the base bond rate assumption of 5%. With the lower bond rate the debt service decreases by over $300,000 to $2.5 million per year. In the high case, the payment increases by $700,000 to $3.5 million per year.

With the high bond rate case the DSC is only 1.3 in 2020 and the utility would need to undertake further cost saving measures in the first few years. The analysis assumes that the higher bond rates would occur for the entire 20-year period. In reality, the utility would likely have opportunities to refinance debt during that 20-year period when bonds rates became lower than 7%.

Escalation of Rates and Costs Higher or Lower (Cases F and I)

Under the low escalation case (Case F), the escalation for retail rates was reduced to 3.0%, the escalation for wholesale rates was reduced to 2.5% and the escalation of costs was reduced to 2.6%. Under the high case (Case I), the escalation for retail rates was increased to 7.0%, the escalation for wholesale rates was reduced to 5% and the escalation of costs was increased to 6.6%. The changes were not symmetrical because it was believed that there was more room for costs to go up than to go down.

Note that it is likely that the cost increases or decreases would be driven by economic conditions that might also impact borrowing rates. However, for these cases the bond rates remained at the base case of 5%.

In these cases the Net Before CIP changed by roughly $300,000 in either direction. Because the revenues and costs both move in the same direction, the impacts are not as great as some other factors in the first year. The impacts do become more pronounced over time. Both cases provide a sufficient DSC level.

Load Growth Higher or Lower (Cases E and H)

A change in the growth rate of plus or minus 0.5% was applied to the CCF for each rate class in these cases. Change in the load growth had one of the smallest impacts with Net Before CIP changing by about $300,000 in either direction. In both cases the 2020 DSC was sufficient at 1.5 or above.

Cost Escalation Equal to Rate Escalation (Case G)

To reflect a case where the costs facing the utility escalate at the same rate as the SPU rates and the resulting revenues, the cost escalation was increased to 5% per year. This escalation factor applied to all O&M costs as well as all CIP amounts. This case increased costs in the first year by roughly $200,000 and provided an adequate DSC of 1.6 (the same as in the base case). The biggest impact is that less funds would be available for the mains replacement program over time.

Low Case for Multiple Factors (Case B)

A low case was created to reflect the low assumptions for multiple factors, including O&M, CIP and water supply costs reduced by 10%, low escalation for retail rates (3%), wholesale rates (2.5%) and costs (2.6%), borrowing costs of 4%, and load growth reduced by 0.5%. This

combination reflects a prolonged economic downturn affecting all factors and is not considered to be very likely.

With the low case, the Net Before CIP increases by $600,000 to $2.4 million in 2020 with debt service reduced to $2.3 million. The DSC increases to 2.0.

High Case for Multiple Factors (Case N)

The high case was created to reflect the high assumptions for multiple factors, including O&M, CIP and water supply costs increased by 10%, high escalation for retail rates (7%), wholesale rates (5%) and costs (6.6%), borrowing costs of 7%, and load growth increased by 0.5%. This combination reflects a period of hyper-inflation as was seen in the 1970's, or a period of prolonged strong economic conditions affecting all factors and is not considered to be very likely.

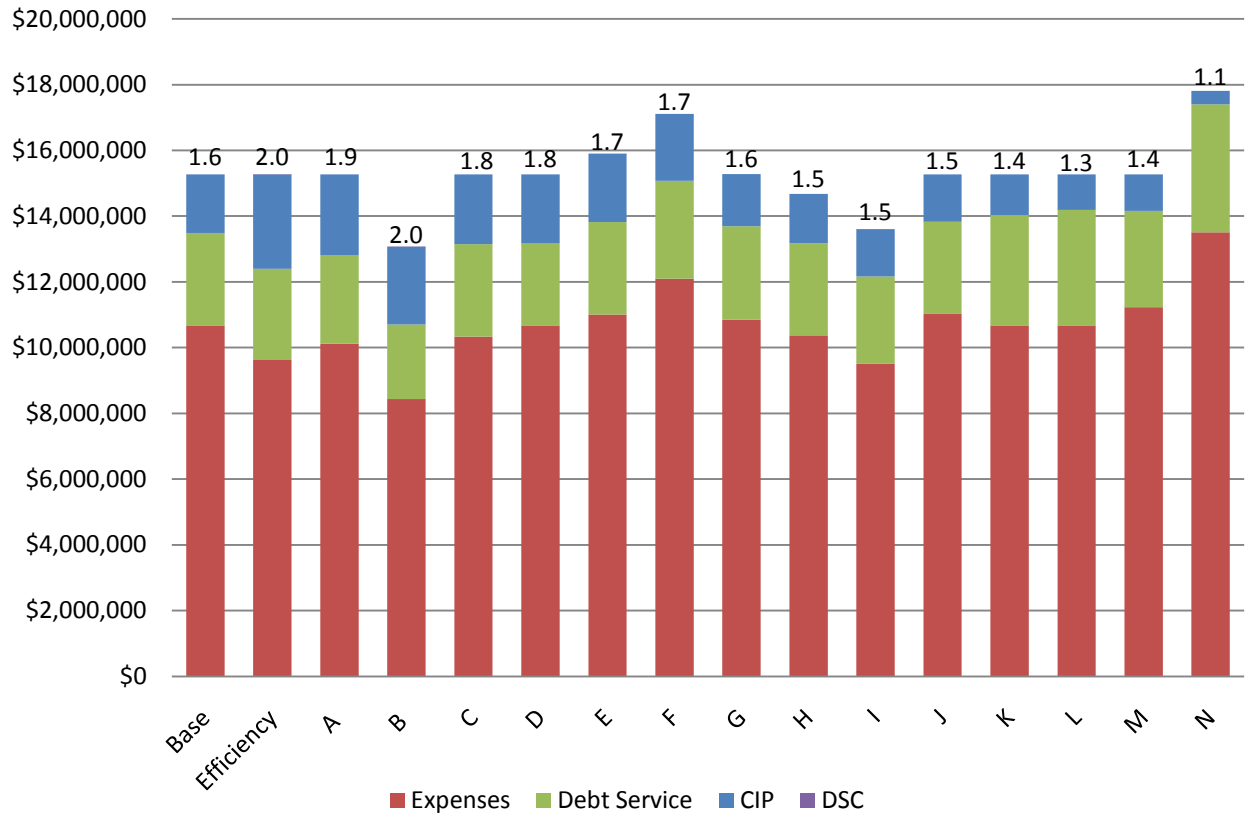
With the high case, the costs increase by the maximum amount of $1.3 million in 2020with Net Before CIP at only $400,000. The DSC would fall to 1.1 and serious cost cutting measures would be required to make the utility viable.

Summary

The following chart provides a graphic comparison of the sensitivity cases in terms of the costs for 2020. In all cases the expenses sum to the total expected revenues for the year. The operating expenses (represented in red) include the labor, maintenance and overhead costs as well as the wholesale water purchases. This amount varies in most of the cases as it is driven by the assumed escalation rates, changes to load levels and any changes to the starting values. The debt service (shown in green) varies based on the starting cost and escalation for the separation and upfront capital costs and depends on the assumed bond rate for each case. The final cost is the CIP (shown in blue) and any funds remaining after operating expenses and debt service is assumed to be spent first for ongoing annual CIP requirements followed by mains replacement. When all costs are added, they equal the revenue forecast for each case. Therefore the total amount for each bar is the revenue amount. Finally, the 2020 debt service coverage ratio (DSC) is shown at the top of each column.

For the majority of the cases, the revenues in 2020 are expected to be in the range of $14 to $15 million. The exceptions are cases B and I where there is low escalation to the retail rates. For cases F and N revenues are above $17 million due to high escalation of retail rates. For nearly all cases, there is an adequate amount remaining to pay for CIP and to meet the DSC levels required to meet bond covenants. Three cases (K –M) contain revenues that exceed costs, however, the resulting DSC is marginally high enough to cover the expected risk. The final case N, where all assumptions are based on the high case, still has slightly positive net revenue but the DSC of 1.1 is insufficient to meet the 1.2 DSC level generally required in bond covenants. However, with the expected efficiency savings shown in the City's report, that case would improve and results would become within the acceptable range.

Figure 3
Comparison of Sensitivity Cases
2020 Cost Breakdown



In summary, while there are many risks facing the new water utility, in nearly all cases the utility is forecast to have sufficient revenues with rates set at the same level as with SPU. In the most extreme case revenues are still expected to be greater than projected costs, although there would be insufficient funds to meet DSC and CIP requirements in the first year prior to the identified efficiency savings. It is expected that in this extreme case the utility would likely see the expected efficiency savings as well as undergo short term cost cutting measures to ensure adequate financial results. After the first year, the DSC improves and there is additional funding for CIP in all of the cases.

Summary and Conclusions

Appendix

OPERATIONAL EFFICIENCY REPORT
City of Shoreline-SPU Water System Acquisition

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April 2012
City of Shoreline

Contents

INTRODUCTION

This report will evaluate the start-up operational cost impacts associated with the proposed City of Shoreline's (City) acquisition of the Seattle Public Utilities (SPU) water system prepared by EES Consulting (EES) and evaluate how those costs may be affected by integration into the City Operation.

As with any acquisition of this magnitude, it is important to understand management responsibilities, liabilities and the short and long term costs of managing a Water Utility. This report will focus primarily on the initial integration of management and operation of maintaining a water system service into the City.

There are inherent costs that come with managing a Water Utility System; however, there are opportunities to reduce cost impacts through efficiencies whenever an existing governmental agency acquires such an entity. In this case, the City could reduce some of the costs of the operating a Water Utility by looking at the requirements against similar technical skills, equipment, and space already existing in the City of Shoreline. For instance, the City has an established infrastructure with similar technical skills in Engineering, Management, and Fleet Management (Heavy Equipment). Additionally, the City has available office space and facilities where the Water Utility can be housed and existing equipment that can be utilized to support a Water Utility. Combining these resources could lower initial capital outlay significantly as well as annual costs to the utility.

The City has a 15-year history of solid financial management since the City's incorporation. The City also has a strong reputation for being a well managed municipality with one of the lowest cost per capita in King County. Through program efficiencies, a highly multi-skilled workforce and experienced leadership, the City has been on the leading edge of being an efficient public service agency supported by citizen surveys and contrasted with others in the region.

Since incorporation, the City has developed a well managed Surface Water Utility that addressed many years of County neglect. Since 1996, the City has addressed 98% of all citizen flooding concerns through a series of short and long range capital improvement projects, while still maintaining a reasonable rate structure. When compared within King County, the rate is below the median average. Today, the City's Surface Water Utility has completed a 5–Year Surface Water Master Plan designed to improve the service levels, addresses water quality, habitat restoration and meet Federal and State regulations.

In preparing this programmatic cost analysis, it is important to understand that we must look carefully and realistically what might be the short and long range impacts, as well as look for opportunities to reduce costs, avoid duplication and redundancy, and implement efficient programs. This report will focus on the programmatic elements associated with the establishment of a Water Utility Maintenance Division.

This report is separated into four main sections: Equipment and Tools, Staffing, Facilities, and Summary. Each section will evaluate EES's recommendations, what are the City's existing systems, adjustments to the staffing levels and the recommended initial procurements prior to ownership of the SPU's Water System. The analysis will look at program efficiencies, facilities co-locating, heavy equipment sharing, staffing alignments, efficient fleet maintenance programs, and reducing labor costs.

EQUIPMENT AND TOOLS

EES Consulting has recommended that the City procure various equipment and materials prior to acquiring SPU's Water System. Table 1 identifies equipment and Table 2 identifies the tools recommended by EES to obtain prior to acquisition:

Table 1
Heavy Equipment & Vehicles

Equipment	Proposed Quantity
Backhoe (Case 580)	2
Backhoe trailer	2
Shoring Box (6 ft)	2
Shoring box trailer	2
Dump truck (6 yd)	2
Boom truck	1
Service van (6200 Lb)	3
Pickup (F250)	5

Table 2
Tools/Spare Parts

Category	Tools/Parts List
Shop	Basic hand tools, forklift, engine hoist, band saw, welder, pressure washer, personal safety equipment, bearing press, drill press, lathe, grinder, sandblasting cabinet, air compressor, air tools.
Field	Basic hand tools, gate keys, welder, hoses, traffic control devices/signs, digging bars and spoons, gas pump, hoses, hydrant fluid diffusers, generator, tapping machine, copper pipe tools, gas powered cut off saw, tamper, jack hammer, ventilation fan, mechanical/electrical equipment, paint sprayer, pressure washer, traffic plates, chainsaw, grinder, light tower, personal safety equipment
Spare Parts	DI pipe (few sticks of harder to obtain sizes), paint, hardware, lumber, meter boxes and lids, residential meters, copper tubing and fittings, typical fittings, repair clamps, pressure reducing valves, hydrants and hydrant parts, gate valves and boxes, spare box lids, backfill material, miscellaneous basic field tools.

The City has an existing fleet management program that provides support for all service vehicle acquisition, maintenance and repair. Using the City's established vehicle condition assessment program, the City has been able to ascertain a more accurate need for and replacement of service for vehicles and heavy equipment. Under the Fleet Condition Assessment Program, vehicles and heavy equipment are evaluated annually by a certified mechanic to determine life cycle of all vehicles, thus creating a more accurate vehicle replacement schedule, avoiding early replacement and obtaining a longer use life of all vehicles and heavy equipment. This program has created an annual cost savings in the repair and replacement program. The City's detailed assessment program provides the City with accurate information to properly assess what vehicles and equipment will be in service at the time of the water system acquisition and what can be utilized to supplement the needed equipment and tools for operating a water system.

Heavy Equipment

The City currently has some pieces of heavy equipment within its inventory that can be used to maintain a water system. The City currently has a backhoe and trailer housed within its Roads Division. These items can be shared with the Water Utility providing a cost savings to the overall start up cost. The additional acquisition of one more backhoe and one more trailer will meet the needs for the Water Utility. Current use of the existing backhoe and trailer is periodic with both pieces remaining idle for weeks at a time. A backhoe trailer can be reduced to one. Given the relatively small service area, sharing of the trailer to deliver the backhoe to each site is reasonable and could be managed with proper planning.

Two shoring boxes will be needed as identified by the EES report but only one trailer has been identified as necessary by the City. As with the backhoe trailer, the relatively small service area will allow sharing of the trailer to deliver shoring boxes to each site is again manageable with proper planning.

The boom truck has not been identified as necessary. The backhoe can be operated to lift/place the shoring boxes and other materials within a work site. Use of the boom truck would be limited to difficult to reach areas. In such rare situations, renting of a boom truck would be more efficient use of funds.

Tools and Vehicles

Service vans would be utilized by two main field crews versus three identified in the EES report. The third service van would be replaced with a standard truck and used by a third field crew. The total number of trucks would be reduced by one with the City acquiring four new trucks. Although most City fleet vehicles are dedicated to specific work groups, with the City's fleet of vehicles, some personnel identified for the Water Utility will be able to utilize vehicles within the existing fleet.

The tools/parts listed are a general list of items recommended for operation of a Water Utility. Some of the tools listed are currently in the City's inventory and could be shared with the Water Utility by other existing division. However, as a conservative approach it is assumed that all tools listed will be purchased for the Water Utility.

A Supervisory Control and Data Acquisition (SCADA) system will be required to operate and monitor the water system. This system currently does not exist within the City's inventory and must be purchased prior to acquisition of the water system.

The City reviewed the unit cost for each equipment and tool listed and concurred with some of the unit costs listed within the EES report but adjusted some costs based upon discussions with local suppliers. Table 3 summarizes the equipment and tools recommended, what is proposed to acquire at time of ownership of the water system and the proposed cost.

Table 3
Proposed Heavy Equipment & Tools and Cost

Equipment	EES Proposed Quantity	**City Proposed Quantity**	Existing in City Inventory	**Recommended Quantity to Purchase**	Unit Cost	**Subtotal Cost**
Backhoe	2	**2**	1	**1**	$96,000	**$96,000**
Backhoe trailer	2	**1**	1	**0**	$5,500	**$0**
Shoring Box	2	**2**	0	**2**	$11,000	**$22,000**
Shoring box trailer	2	**1**	0	**1**	$4,400	**$4,400**
Dump truck	2	**2**	0	**2**	$180,000	**$360,000**
Boom truck	1	**1**	0	**0**	$154,000	**$0**
Service van	3	**2**	0	**2**	$36,000	**$72,000**
Pickup	5	**4**	25	**4**	$26,000	**$104,000**
Shop Tools					$46,970	**$46,970**
Field Tools					$127,160	**$127,160**
Spare Parts					$101,750	**$101,750**
SCADA	1	**1**	0	**1**	$400,000	**$400,000**
Total Equipment and Tool Cost Proposed by City						**$1,334,280**
Total Equipment and Tool Cost Proposed by EES						$1,609,780

STAFFING

According to the report prepared by EES, SPU labor hours and costs are not tracked with regard to city boundaries, making it difficult to use SPU labor and cost calculations. There are standard Utility Job Classifications that have been identified in the EES consulting report. EES has recommended that the City staff the Water System based upon staffing identified within a 2004

RH2 Engineering analysis should Shoreline Water District assume ownership of the SPU water system in the City of Shoreline. Table 4 identifies the level of staffing recommended by EES to obtain prior to acquisition.

Table 4
Staffing Recommendations

Classification Title	FTEs Proposed
Water Utility Manager	1
Water Operations Supervisor	1
Water Quality Technician	1
GIS Mapping Technician	1
Revenue Manager	1
Utility Billing/ Customer Service Technician	3
Field Crew Worker, Lead	4
Field Crew Worker 2	4
Field Crew Worker 1	4
Warehouse Technician	1
Total	**21**

FTE: Full Time Employees

In general, the City concurs with the EES report on the number of Full Time Employees that would be required to start up a Water Utility within the City. EES initially proposed a ratio of two field staff to one lead worker. The City proposes that one lead crew worker could adequately manage a crew of 10-12 field staff thereby reducing overall staffing costs. According to the Washington State Washington State Performance Audit Report No. 1002121 of the SPU Operations:

> "SPU supervisors supervise fewer employees than their peers in similar government agencies, a condition that increases costs".

In fact, a 2004 report by King County's internal audit department cited numerous management experts who concluded that the ideal span of control range between 10-15 employees per manager. Further, the State Auditor's report recommended at least as a starting point, SPU should seek to increase the number of individuals assigned to each supervisor with an average goal of 10 employees per supervisor.

The City concurs with the State Auditor's Report (2009) and King County's audit report (2004), increasing the number of field staff to supervisor ratio as a key efficiency approach to cost containment.

With starting a new utility within the City, certain positions will be required and cannot be supplemented with existing staff. However, some staff identified in Table 4 could assume additional City duties, reducing the actual cost to the Water Utility. Table 5 identifies those positions that would be shared with other City divisions (less than one full time employee recommended by the City).

EES derived their salary costs from the 2004 RH2 report, escalating the values to 2011 dollars. The City looked at the job classifications in EES's report and corresponding annual salaries and compared them with existing City descriptions of similar nature. The salary and corresponding benefit cost for each classification was used to determine the cost for each staff position. Table 5 identifies staffing needs as proposed by the City and the associated cost.

Table 5
Proposed Staffing and Cost

Equipment	EES Proposed FTEs	**City Proposed FTEs**	**Recommended FTEs**	Unit Cost (Annual Base Salary)	**Subtotal Cost (Annual Base Salary)**
Water Utility Manager	1	**1**	**1**	$110,807	**$110,807**
Water Operations Supervisor	1	**1**	**1**	$76,485	**$76,485**
Water Quality Technician	1	**1**	**1**	$57,450	**$57,450**
GIS Mapping Technician	1	**½**	**½**	$75,376	**$37,688**
Revenue Manager	1	**¾**	**¾**	$86,563	**$64,922**
Utility Billing/Customer Service Technician	3	**2 ½**	**2 ½**	$44,221	**$110,552**
Field Crew Worker, Lead	4	**1**	**1**	$54,683	**$54,683**
Field Crew Worker 2	4	**5**	**5**	$48,318	**$241,590**
Field Crew Worker 1	4	**4**	**4**	$46,446	**$185,784**
Warehouse Technician	1	**½**	**½**	$41,080	**$20,540**
Total	21	17¼	17¼		
				Total Base Salary Cost	**$960,501**
				Total Base Salary Cost Proposed by EES	$1,227,799
Annual Overhead Expenses (Employee Benefits)					
				City of Shoreline Proposed Overhead[1]	$414,705
				EES Proposed Overhead[2]	$491,120
Total Staffing Costs (Base Salary + Overhead) Proposed by City					**1,375,206**
				Total Staffing Costs (Base Salary + Overhead) Proposed by EES	$1,718,919

FTE: Full Time Employees

FACILITIES

[1] Based upon existing City compensation schedule
[2] 40% of the direct salary cost proposed by EES

The City of Shoreline has capacity to accommodate a Water Utility maintenance operation. Shoreline has completed construction of the City Hall Civic Center that includes a planned 20 year growth capacity. We have utilized the space programming criteria adopted in the 2007 City Hall Space standards in developing space allocation requirements for the Water Utility field staff at both City Hall and at outlying facility maintenance buildings. The space allocations adopted included an assumption of all Water, Sewer[3] and Surface Water Utilities. City Hall has capacity to accommodate all management and administrative staff, which would include the Utility Manager, Office Manager, administrative support staff, a GIS technician, and a water quality technician that minimizes space accommodation costs.

Maintenance Facility Space Requirements

According to the EES Report, office and shop space will be required for operation of a water system. Table 6 indicates EES's proposed facility needs for the Water Utility.

Table 6
Water Utility Buildings

Building	Area, sq ft
Office (at existing City Hall)	2,625
Shops	5,290
Total	**7,915**

The City currently owns a 3+acre site sufficient to accommodate Water, Sewer, and Surface Water utilities. The development of a general maintenance shop facility to accommodate all necessary heavy equipment, rolling stock and parts inventory for all utilities, sign shop, etc , is projected to be approximately 7,500 Sq. Ft. at a cost of $160.00 per square foot (Sq. Ft.) for a total of $1.2 million. Accommodating all field supervisory staff, field workers, technicians, and maintenance workers representing Water, Sewer, Surface Water and Streets Operations will require the construction of a Field Maintenance Administrative facility. Based on City adopted space standards, 12,696 Sq. Ft. will be needed at a cost of approximately $109.46 per Sq. Ft. for an approximate total of $1.4 million. All Square Foot costs assume a "Tilt-Up"/Pre-Fab. Construction rather than a designed/build construction. It is expected that the Water Utility would share in approximately ¼ of costs for both facilities noted.

The 3 plus acre property has sufficient capacity for both a Public Works maintenance yard and a fully operational Water Utility program. The programmed plan includes the co-locating of the Surface Water Utility field staff, Sewer Utility field staff, Streets Division field staff and Water

[3] To properly plan for space needs, the maintenance facilities assume the assumption of the Ronald Wastewater District per the agreement dated October, 2002.

Utility field staff with the appropriate ratio of supervisory staff. The co-location of staffing at the maintenance yard would consist of field superintendents, leads and field staff, while management / executive level personnel and administrative staffing would co-locate at the City Hall building. As noted above, the City Hall has the capacity for planned expansion over the next 20 years. In addition, any and all costs would be shared at the rate of 1/4 of operational costs for each of the four (4) divisions thus reducing the facility/building costs for establishing a Water Utility. Table 7 summarizes facility needs as proposed by the City and the associated cost.

Table 7
Proposed Facilities and Cost

Building	EES Proposed Area (Sq Ft)	**Gross City All Functions Area (Sq Ft)**	Percent Contribution to Water Utility	**City Water Utility Recommended Area (Sq Ft)**	Unit Cost (Sq Ft)	**Subtotal Cost**
City Hall (Administrative)	2,625	**590**	100%	**590**	$55	**$32,450**
Maintenance Facility (Administrative)	0	**21,696**	25%	**5,424**	$110	**$596,640**
Maintenance Facility (Shops)	5,290	**7,500**	25%	**1,875**	$160	**$300,000**
	Total Facility Cost Proposed by City					**$929,090**
	Total Facility Cost Proposed by EES					$1,043,590

SUMMARY

Based upon review of existing City inventory and available staffing, the City recommends procurement of equipment, tools, staffing, and facilities as summarized in Table 8 below:

Table 8 (a)
Summary of Initial Startup Operational & Maintenance Cost

	EES Proposed Cost	**City Recommended Cost**
Equipment/Tools	$1,609,780	**$1,334,280**
Facilities	$1,043,590	**$929,090**
Total Recommended Startup O&M Cost		**$2,263,370**
Total EES Recommended Startup O&M Cost		$2,653,370

Table 8 (b)
Annual Operating Costs

	EES Proposed Cost	**City Recommended Cost**
Staffing	$1,718,919	**$1,375,206**
Total Recommended Startup O&M Cost		**$1,375,206**
Total EES Recommended Startup O&M Cost		$1,718,919

This operational efficiency analysis does not account for the projected acquisition of the Ronald Wastewater District, other than the space needs when determining a proper site for field operations and the separate administrative space at City Hall. Integration of the sewer utility in 2017 would see additional savings in the Water Utility's initial operational and maintenance costs as well as annual operating costs, plus savings to the Sewer Utility.

SPU Acquisition Citizen Steering Committee

Name
1. Jim Abbott
2. Gretchen Atkinson
3. Joe Bozick
4. Mark Bunje
5. Cynthia Esselman
6. Kevin Grossman
7. David Harris
8. Marcia Harris
9. Bruce Hosford
10. Joseph Irons
11. Warren Johnson
12. Jeff King
13. Cynthia Knox
14. Lee Michaelis
15. William Montero
16. Edie Loyer Nelson
17. Les Nelson
18. Rick O'Leary
19. Sis Polin
20. Johanna Polit
21. Diane Pottinger
22. Bob Ransom
23. Kyle Roquet
24. Jesse Sycuro
25. Dan Thwing
26. Mark Torrance

SPU ACQUISITION CITIZEN STEERING COMMITTEE
PROPOSED MEETING TOPICS AND SCHEDULE

Meeting Date	Meeting Location	Proposed Topics
January 24 6:30 p.m. – 8:00 p.m.	Council Chambers	Introductory Meeting
February 8 6:30 p.m. – 8:00 p.m.	Council Chambers	Preliminary Revenue Forecast
February 22 6:30 p.m. – 8:00 p.m.	Neighborhood Room 301	Draft Engineering Report
March 8 – Engineering Subcommittee 5:30 p.m. – 7:00 p.m.	Legacy Room 303	Continued review of Engineering Report
March 14 6:30 p.m. – 8:30 p.m.	Council Chambers	Costs of Operating the Utility Preliminary Financial Analysis
March 26 – Finance Subcommittee 5:30 p.m. – 7:00 p.m.	Legacy Room 303	Review of Detailed Financial Analysis
April 3 6:30 p.m. – 8:30 p.m.	Council Chambers	Base Financial Case & Sensitivities Water Supply Options
April 11 – Engineering Subcommittee	Legacy Room 303	Continued review of Engineering Report
April 25 6:30 p.m. – 8:30 p.m.	Neighborhood Room 301	Draft Financial Report and Operational Efficiencies Report
May 2 – Finance Subcommittee **6:00 p.m. – 7:30 p.m.**	Legacy Room 303	Review of Draft Business Plan & Draft Financial Report
May 9 6:30 p.m. – 8:30 p.m.	Neighborhood Room 301	Review Draft Business Plan
TBD – Engineering Subcommittee		Review Hydraulic Model Information
May 30 6:30 p.m. – 8:30 p.m.	Neighborhood Room 301	Polling Data/Follow-Up, Final Business Plan, Final Engineering Report and Final Financial Plan
June 13 6:30 p.m. – 8:30 p.m.	Council Chambers	Committee Draft Initial Recommendations
June 20 6:30 p.m. – 8:30 p.m.	Council Chambers	If needed - Continued Draft Initial Recommendations
June 27 6:30 p.m. – 8:30 p.m.	Council Chambers	Committee Finalize Recommendations

Updated April 20, 2012