# SECTION 8
# CAPITAL IMPROVEMENT PROGRAM

## Introduction

This section presents proposed water system improvements recommended for construction or implementation within the City of Battle Ground's (City's) 20-year planning period under this plan. The water system improvements recommended in this section address the existing and anticipated future system deficiencies described in Section 3 and recommendations of the City's wellhead protection plan presented in Section 5. Implementing these improvements will help ensure that the City's customers will continue to receive reliable, high-quality water service.

This section also presents the planning-level Capital Improvement Program (CIP), planning-level project cost estimates, and an implementation schedule and budget. The information presented is intended to assist the City with its annual budgeting process, but more definitive project costs should be developed as the design for each recommended improvement is developed.

## Cost Estimating Data

An estimated project cost has been developed for each improvement project presented in the CIP. Cost estimates represent opinions of cost only, acknowledging that final costs of individual projects will vary depending on actual labor and material costs, market conditions for construction, regulatory factors, final project scope, project schedule and other factors. The Association for the Advancement of Cost Engineering International (AACE International) classifies cost estimates depending on project definition, end usage and other factors. The cost estimates presented here are considered Class 4 with an end usage being a study or feasibility evaluation and an expected accuracy range of -30 percent to +50 percent. As the project is better defined the accuracy level of the estimates can be narrowed. Estimated project costs include approximate construction costs and an allowance for administrative, engineering and other project related costs. Since construction costs change periodically, an indexing method to adjust present estimates in the future is useful. The Engineering News-Record (ENR) CCI is a commonly used index for this purpose. For purposes of future cost estimate updating; the current ENR CCI for Seattle, Washington is 9418 (October 2012).

## Water System Improvements

This section provides a description of the water system improvements proposed and recommended as a part of this Comprehensive Water System Plan. The proposed water system improvements are illustrated on Plate 1 in Appendix A. All proposed water system improvements are assigned a CIP number.

### *Wellhead Protection*

The wellhead protection plan, presented in Section 5, recommended several protection strategies for the City's groundwater supply. Battle Ground has implemented the following wellhead protection measures:

- Contaminant source management
    - All customers within the City of Battle Ground are required to connect to the public sewer system thereby reducing the likelihood of groundwater contamination from private septic tanks.

- Regional coordination
    - Battle Ground is coordinating with the City of Ridgefield and Clark Public Utilities (CPU) to develop a long term regional supply.

- Planning and policy review
    - In the next five years, the City plans to enhance existing emergency response planning including:
        - Sharing wellhead protection area locations and establishing an emergency communication plan with first responders
        - Preparing a contingency plan for short and long term responses to the loss of a well

These wellhead protection strategies are not anticipated to require additional capital funds outside of the water system operating budget.

### *Proposed 2012 Water System Improvements*

The proposed water system improvements presented in this section are grouped into categories representing improvement type. Each improvement type includes a range of project numbers assigned to individual projects.

1. System Supply Improvements (SS1 – SS3)
2. System Storage Improvement (ST1)
3. Water Main Improvements (WM1 – WM4)

The proposed water system improvements were identified from the results of distribution and transmission system hydraulic analyses presented in Section 3. Considerations were also given to the non-hydraulic issues related to repair, rehabilitation, operation, and maintenance while identifying the proposed water system improvements. The improvement types listed above are discussed in detail the following sections.

*System Supply Improvements*

Furnishing additional system supply to meet existing and projected demands associated with City growth is an urgent need. This issue was identified in the 2004 Water System Plan, with alternative new supply strategies evaluated. Since that period, the City has made the decision to maintain existing wells at their current operational production levels and seek additional water through new interties with Clark Public Utilities (CPU). The supply analysis in Table 3-2 shows the current sources to be sufficient under existing maximum day demand (MDD) conditions, and becoming deficient during the 6-year planning horizon. The City has already moved towards addressing this critical need, and has identified property and performed design engineering for a new intertie.

CIP SS1: New Intertie/Pump Station on NE 219th Street

**Deficiency:** Based on water billing and production data for the City over the last several years, the current City sources of supply cumulatively are not capable of fully meeting the projected MDD within the next six (6) years, as required by the State and evaluated within Section 3. This deficiency is due to operational constraints resulting from diminished well yields. Within the planning horizon the City's supply is deficient by existing water rights as well.

**Improvement:** A new intertie pump station, with an initial firm capacity of 1,000 gallons per minute (gpm), and space and facility provisions for an ultimate capacity of 3,000 gpm, has already been identified and much of the facility design completed. The pump station building will initially be equipped with two (2) 1,000 gpm pumps, but is designed with space provisions to ultimately install a total of four (4) 1,000 gpm pumps for a reliable source of supply with a firm capacity of 3,000 gpm. The facility is planned in the vicinity of NE 219th Street, between NW 92nd and 29th Avenues, and would also necessitate the construction of approximately 2,600 linear feet (LF) of 16-inch ductile iron discharge main along NE 219th Street in order to tie in to the western extent of the current distribution system.

**Conceptual Cost:** A planning level cost of $1.4 million for this project is established using estimates developed and included within an August 2009 draft project report on the project. The cost estimate within the report was adjusted to increase the installed construction cost of the 16-inch ductile iron pipe to $225 per LF to reflect conservative values recently observed within the industry, as well as including a 15 percent additive to the construction cost to account for remaining construction period engineering, legal, administrative, and other incurred project costs.

CIP SS2: 219th Street Intertie/Pump Station Upgrade

**Deficiency:** The initial 1,000 gpm intertie capacity will adequately sustain City supply requirements until approximately 2023. Two (2) additional pumps and associated mechanical/electrical appurtenances are recommended to be installed in 2021 to achieve the ultimate 3,000 gpm capacity. This ultimate capacity, without significant further

diminishment of current well production, will allow the City to meet supply requirements through the year 2032.

**Improvement:** The 219th Street Pump Station will be upgraded with two (2) additional 1,000 gpm capacity pumps to, with the existing two (2) pumps, bring the reliable pump station capacity up to 3,000 gpm. Associated manifolding, appurtenances, instrumentation, and programming is anticipated with this work, but no upgrading of initially constructed mechanical or site civil facilities is anticipated.

**Conceptual Cost:** A planning level cost for this project of $60,000 is established based on quotations received for the installed pumps, with a $35,000 allowance for associated mechanical and electrical appurtenances and programming. The total cost estimate of $140,000 includes escalation by a 45 percent contingency to account for market fluctuation, engineering, legal, administrative, and other incurred costs.

CIP SS3: Regional Source and Transmission Development

**Deficiency:** The City's current agreements with CPU allow for the supply of up to 1,000 gpm from CPU to the City to meet water demands. Future water demands will exceed the combined capacity of the City's wells and the 1,000 gpm intertie capacity. The City must develop additional water supply to meet water demands beyond the 6-year planning horizon.

**Improvement:** Supply capacity in excess of 1,000 gpm from CPU required the development of expanded supply facilities and transmission piping from the CPU Paradise Point Wellfield and treatment facilities to the City's 219th Street Intertie and Pump Station. Preliminary planning and cost sharing agreements have been developed to support CPUs development of additional wells, expanded treatment facilities (iron and manganese removal) and a 24-inch and 16-inch diameter transmission main south from La Center (the location of the Paradise Point Wellfield) to the City.

**Conceptual Cost:** Planning level cost estimates for the City's $12,850,000 share of the projected project cost have been developed by CPU to support development of necessary agreements and funding strategies. These cost estimates are very preliminary in nature but are intended to provide an appropriate level for long-range budgeting and revenue requirement analysis.

Well Replacement

**Deficiency:** The City has experienced declines in well capacity at Well No. 7 and 8. Based on the timing of regional supply development, loss of well capacity could result in a need to develop additional source capacity to meet peak demands prior to the development of regional supply sources.

**Improvement:** Based on hydrogeologic investigations recent efforts to rehabilitate Well No. 7 and 8, construction of a replacement well is recommended if well performance continues to decline.

**Conceptual Cost:** The planning level cost estimates for construction of a replacement well is $800,000. It is anticipated that this CIP line item will serve as a placeholder for potential rehabilitation, or replacement, as may be needed to maintain adequate source capacity. This improvement is identified for completion in 2015 based on current investigations of well performance.

*System Storage Improvement*

The storage analysis performed in Section 3 indicates the need to increase storage capacity within the 20-year planning period to continue to provide adequate operational, equalizing, fire and standby storage to the system. Construction of a new reservoir within the Main Zone would also enhance the system's reliability in an abnormal future condition such as needing to take the Horsethief Reservoir off line for maintenance during a peak demand period.

CIP ST1: New 1.4 million gallon (MG) Reservoir

**Deficiency:** Analysis performed indicates that the City will become storage deficient under this document's growth projections in approximate year 2023. This deficiency occurs due to the increased recommended volumes for equalizing and standby storage, with the recommended requirements for each component being directly proportional to growth and the City's equivalent residential unit capacity. The analysis performed in Section 3 indicates the system to be in need of as much as 1.3 MG of additional system-wide storage by 2032. Without a site chosen and preliminary design work performed, a 1.4 MG reservoir is used for purposes of this planning document, which provides a small allowance for operational and dead storage components with the new facility.

**Improvement:** The planned storage facility is assumed to be a 1.4 MG ground level reservoir that will be located within the existing Main Zone service area such that additional pumping facilities will not need to accompany it for integration into the system. This might be achieved by either locating it such that the overflow elevation can match the existing hydraulic grade line within the zone, or by locating it such that the existing Horsethief Pump Station facilities might be used to transmit the volume to acceptable system pressures. For cost estimating, the reservoir is assumed to be steel construction.

**Conceptual Cost:** A planning level cost of $1.8 million for this project is established after reviewing recent bidding information from other steel reservoir construction projects. The construction costs from this survey ranged from $0.75 to $2.00 per gallon, on average, with the higher range attributable to factors such as small tank size, required pumping or extensive reservoir mixing systems, and elevated tank construction. Assuming this reservoir to be constructed as a ground level tank, without pumping or extensive mixing systems, a

conceptual level cost of $1.30 per gallon is assumed for this facility's project cost including an allowance for engineering, legal, administrative, and other incurred costs.

*Water Main Improvements*

Three (3) distribution system deficiencies were identified under this plan, and are itemized within the water main improvements below. Additionally, an item is allocated for an annual water main replacement program that will allow the City to continue replacing mains due to age, failure, or pipe material, such as, asbestos cement (AC) or steel.

CIP WM1: Annual Water Main Replacement Program

**Deficiency:** As inventoried in Section 1, the City's distribution system still contains several thousand LF of older AC and steel water lines remaining in service. These facilities are vulnerable to leaks and failures which will only increase over time as they continue to be in operation. A systematic replacement program should be continued on an annual basis, with individual yearly improvements identified through prioritization of the most vulnerable remaining facilities and input provided by operational staff.

**Improvement:** Locations and scope of water line replacement will be defined by the City on an annual basis. New waterlines will be designed of acceptable materials, coatings, and linings that meet current City standards. Replacement diameter will be of equal or greater diameter to the existing pipeline, with a minimum of eight (8) inches.

**Conceptual Cost:** A planning level cost for this project is established at $50,000 per year through 2018 to allow the City to allocate more capital improvement funds to supply related projects. Beyond 2018 to the end of the planning period, water main replacement is estimated at $100,000 annually which would likely allow the remainder of the City's older water mains to be replaced within the 20-year planning period.

CIP WM2: 8-inch Diameter Distribution Main on SW 2nd Court

**Deficiency:** The existing 2-inch main for this portion of the distribution system is old, does not meet current City standards, and does not provide minimum required pressures or acceptable velocity ranges under fire flow conditions. The main is in need of replacement as well as upsizing to improve the capacity and reliability of the City's distribution system.

**Improvement:** Replace approximately 550 LF of existing 2-inch steel distribution main along SW 2nd Court, north of SW 4th Street, with new 8-inch diameter pipe meeting City standards.

**Conceptual Cost:** A planning level cost for this project is established as $105,000. Assumptions used in developing this cost include a conservative construction installation cost of $130 per LF for 8-inch ductile iron pipe, and a 45 percent additive to escalate

construction cost to a total project cost, inclusive of engineering, legal, administrative, and other incurred project costs.

CIP WM3: 8-inch Diameter Distribution to Hydrant on SW 3rd Street

**Deficiency:** The existing 2-inch main for this portion of the distribution system is shown to be connected to a fire hydrant, does not meet current City standards, and does not provide minimum required pressures or acceptable velocity ranges under fire flow conditions. The main is in need of replacement as well as upsizing to improve the capacity and reliability of the City's distribution system.

**Improvement:** Replace approximately 50 LF of existing 2-inch steel distribution main, along SW 3rd Street between S Parkway Avenue and the existing hydrant, with new 8-inch pipe meeting City standards.

**Conceptual Cost:** A planning level cost for this project is established as $10,000. Assumptions used in developing this cost include a conservative construction installation cost of $130 per LF for 8-inch ductile iron pipe, and a 45 percent additive to escalate construction cost to a total project cost, inclusive of engineering, legal, administrative, and other incurred project costs.

CIP WM4: 8-inch Diameter Distribution on NE Grace Avenue

**Deficiency:** The existing 6-inch main for this portion of the distribution system, does not meet current City standards, and does not provide minimum required pressures under fire flow conditions. The main is in need of replacement as well as upsizing to improve the capacity and reliability of the City's distribution system.

**Improvement:** Replace approximately 2,520 LF of existing 6-inch distribution main, along NE Grace (142nd) Avenue between NE 1st Street and NE 10th Street, with new 8-inch diameter pipe meeting City standards.

**Conceptual Cost:** A planning level cost for this project is established as $475,000. Assumptions used in developing this cost include a conservative construction installation cost of $130 per LF for 8-inch ductile iron pipe, and a 45 percent additive to escalate construction cost to a total project cost, inclusive of engineering, legal, administrative, and other incurred project costs.

12-inch Diameter Transmission on SW 20th Street

**Deficiency:** Future transmission improvements to improve looping and fire service in the southwest corner of the City's service area are recommended for completion, and were originally anticipated to be completed as part of infrastructure improvements driven by development in this area. Upcoming City street improvements may present an opportunity to construct the transmission main improvements as part of the road project.

**Improvement:** Construct approximately 2,700 LF of 12-inch diameter transmission main extending west on SW 20th Avenue from SR 503 (SW 10th Avenue) to NE 112th Avenue.

**Conceptual Cost:** A planning level cost for this project is established as $565,000. Assumptions used in developing this cost include a conservative construction installation cost of $145 per LF for 12-inch ductile iron pipe, and a 45 percent additive to escalate construction cost to a total project cost, inclusive of engineering, legal, administrative, and other incurred project costs.

## Capital Improvement Program

Based on the analysis and cost estimating discussed, a planning-level, phased CIP was prepared. The recommended CIP consists of the proposed water system improvements grouped by their respective improvement categories, planning-level project cost estimates, and an implementation schedule and budget. Table 8-1 summarizes the recommended CIP.

# Table 8-1
# Capital Improvement Program

| Category | CIP No. | Project Description / Location | CIP Schedule and Project Cost Summary (2012 dollars) | | | | | | | Estimated Project Cost [1, 2] |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019-2032 | |
| | | | | | | | | | | |
| **Supply System Improvements** | **SS1** | New Intertie/Pump Station on NE 219th | $ 1,360,000 | | | | | | | $ 1,360,000 |
| | **SS2** | NE 219th Intertie/Pump Station Upgrade (2021) | | | | | | | $ 140,000 | $ 140,000 |
| | **SS3** | Regional Source and Transmission Development | | | $ 1,375,000 | $ 675,000 | $ 675,000 | $ 675,000 | $ 9,450,000 | $ 12,850,000 |
| | | Well Replacement | | | $ 800,000 | | | | | $ 800,000 |
| | | *Sub-Total* | *$ 1,360,000* | *$ -* | *$ 2,175,000* | *$ 675,000* | *$ 675,000* | *$ 675,000* | *$ 9,590,000* | *$ 15,150,000* |
| **Storage Improvements** | **ST1** | New 1.4 MG Reservoir (2023) | | | | | | | $ 1,800,000 | $ 1,800,000 |
| | | *Sub-Total* | *$ -* | *$ -* | *$ -* | *$ -* | *$ -* | *$ -* | *$ 1,800,000* | *$ 1,800,000* |
| **Water Main Improvements** | **WM1** | Annual Water Main Replacement Program | $ 50,000 | $ 50,000 | $ 50,000 | $ 50,000 | $ 50,000 | $ 50,000 | $ 1,400,000 | $ 1,700,000 |
| | **WM2** | SW 2nd Court 8-inch Main | | | | | | | $ 105,000 | $ 105,000 |
| | **WM3** | SW 3rd Street 8-inch Main to Hydrant | | | | | | | $ 10,000 | $ 10,000 |
| | **WM4** | NE Grace Avenue 8-inch Main | | | | | | | $ 475,000 | $ 475,000 |
| | | SW 20th Avenue 12-inch Transmission | | | | | | $ 565,000 | | $ 565,000 |
| | | *Sub-Total* | *$ 50,000* | *$ 50,000* | *$ 50,000* | *$ 50,000* | *$ 50,000* | *$ 615,000* | *$ 1,990,000* | *$ 2,855,000* |
| **Capital Improvement Program (CIP) Total** | | | **$ 1,410,000** | **$ 50,000** | **$ 2,225,000** | **$ 725,000** | **$ 725,000** | **$ 1,290,000** | **$ 13,380,000** | **$ 19,805,000** |

[1] Cost estimates are based on an Engineering (ENR) construction cost index of 9418 for Seattle, Washington (October 2012).

[2] Cost Estimates are in current dollars. (October 2012)

| 6 Year Total |
|---|
| $6,425,000 |
| Annual Avg |
| $1,070,833 |

| 20 Year Total |
|---|
| $19,805,000 |
| Annual Avg |
| $990,250 |