SECTION 9
CAPITAL IMPROVEMENT PLAN

9.1 OVERVIEW

Previous sections of this plan have presented an overview of the District's existing system, planning data, system analysis, water resources, and operations and maintenance. This chapter presents a Capital Improvement Plan in accordance with the requirements of WAC 246-290. Recommended water system improvements and associated cost and scheduling information are presented in the following sections according to the analyses, deficiencies, and recommendations identified in earlier sections of the plan. This section describes the District's planned improvements. Scheduling and financing of these improvements is discussed in Section 10 of this report.

9.2 POTENTIAL CAPITAL IMPROVEMENT PROJECTS

The District has compiled a list of potential capital projects and summarized them into categories in Table 9.1. The full list of potential projects, with brief descriptions, is shown in Table 9-2. The projects are a result of analysis of deficiencies of fire flow and capacity, as well as improvements for water quality, cost, water use efficiency, and emergency planning.

TABLE 9-1
WATER DISTRICT 19
POTENTIAL CAPITAL IMPROVEMENT PROJECTS

Project Category	Description
Water Main Replacement	24 projects, for fire flow and maintenance [1]
Source Development	5 projects, for expanding capacity [1]
Water Quality Improvement	2 projects [1]
Treatment Plant Improvements	6 projects [1]

[1] See Table 9-2 for descriptions. Some projects involve a set of smaller projects.

Table 9-2 lists primarily distribution main improvement projects, many of which resulted from a hydraulic model analysis of the entire District distribution system and identified inability to provide 1000 gallons per minute (gpm) fire flow in some residential areas and 2250 gpm in some Vashon town commercial areas. One of the projects, the tank farm booster station, will significantly improve fire flows in the areas identified as deficient.

TABLE 9-2
CAPITAL IMPROVEMENTS PLAN

	Project (Purpose)			Diam. (in.)		QTY		
	Along	From	To	Exist.	New	(LF)	Unit Cost	Cost
1	**Ridge Rd SW WM Replacement (replace and upsize existing steel main to increase fireflow availability)**							
	SW 184th St	Beall Rd SW	Ridge Rd SW	4	8	1,025	$ 250	$ 256,250
	Ridge Rd SW	SW 184th St	Ex. 8" DI	4	8	3,930	$ 250	$ 982,500
							Project Total	$ 1,238,750
2	**Vashon Hwy SW WM Replacement (replace and upsize existing steel main to increase fireflow availability)**							
	Vashon Hwy SW	SW 216th St	3,000 lf North	6	8	3,000	$ 250	$ 750,000
							Project Total	$ 750,000
3	**Beall Rd SW WM Loop (construct loop and replace existing AC main to increase reliability and fireflow availability)**							
	Beall Rd SW	SW 192nd St	Ex. 8"AC	None	8	1,700	$ 250	$ 425,000
	SW 188th St	Beall Rd SW	Ex. 8" DI	None	8	1,050	$ 250	$ 262,500
	Beall Rd SW	SW 184th St	Prop. 8" DI	8	8	950	$ 250	$ 237,500
							Project Total	$ 925,000
4	**Kingsbury Rd SW WM Replacement (replace and upsize existing AC and steel main to increase fireflow availability)**							
	Kingsbury Rd SW	SW Quartermaster Dr	SW 234th St	6	8	4,300	$ 250	$ 1,075,000
	80th Ave SW	Kingsbury Rd SW	SW 234th St	6	8	1,550	$ 250	$ 387,500
	SW 234th St	Kingsbury Rd SW	550 lf East	6	8	525	$ 250	$ 131,250
							Project Total	$ 1,593,750
5	**SW 222nd Pl WM Replacement (replace and upsize existing steel main to improve reliability)**							
	SW 222nd Pl	Kingsbury Rd SW	2,600 lf Southeast	4	8	2,600	$ 250	$ 650,000
							Project Total	$ 650,000
6	**Small Main Replacements: 4-inches and Smaller (replace and upsize old existing mains to improve reliability)**							
	SW Bank Rd	107th Ave SW	2,850 lf West	1, 2	8	2,850	$ 250	$ 712,500
	107th Ave SW	SW Bank Rd	1,550 lf South	3	8	1,550	$ 250	$ 387,500
	98th Ave SW	SW Gorsuch Rd	410 lf North	2	8	410	$ 250	$ 102,500
	SW 204th St	Vashon Hwy SW	900 lf West	2	8	900	$ 250	$ 225,000
	SW 192nd St	Vashon Hwy SW	1,300 lf West	1	8	1,300	$ 250	$ 325,000

TABLE 9-2
CAPITAL IMPROVEMENTS PLAN

	Project (Purpose)			Diam. (in.)		QTY		
	Along	From	To	Exist.	New	(LF)	Unit Cost	Cost
	SW 216th St	Vashon Hwy SW	1,200 lf West	1	8	1,200	$ 250	$ 300,000
	SW 181st St	Vashon Hwy SW	1,100 lf East	4	8	1,100	$ 250	$ 275,000
	SW 211th Pl	Vashon Hwy SW	1,100 lf West	4	8	1,100	$ 250	$ 275,000
							Project Total	$ 2,602,500
7	**87th Ave SW WM Replacement (replace and upsize existing DI main to improve fireflow availability)**							
	87th Ave SW	SW Cemetary Rd	3,100 lf South	6	8	3,100	$ 250	$ 775,000
							Project Total	$ 775,000
8	**96th & 97th Pl SW WM Replacement (replace and upsize existing AC and steel main to improve fireflow availability)**							
	96th Pl SW	SW Bank Rd	1,000 lf North	4	8	1,000	$ 250	$ 250,000
	Ex. 8" AC	Vashon Hwy SW	96th Pl SW	8	8	1,150	$ 250	$ 287,500
	97th Pl SW	SW Bank Rd	SW 174th St	6	8	725	$ 250	$ 181,250
							Project Total	$ 718,750
9	**Tank Farm Booster Station (increase 494 Zone to 512 HGL, utilize dead storage water)**							
	Booster Station Bldg, Yard Piping, Controls							$ -
	Constant Pressure/Variable Speed Pump System (3 Pumps)							$ -
	Fire Pump with Backup Generator							$ -
							Project Total	$ 500,000
10	**McLean Rd SW WM Replacement (replace and upsize existing old AC main to improve fireflow availability)**							
	McLean Rd SW	SW 184th St	1,175 lf Northeast	4	8	1,175	$ 250	$ 293,750
							Project Total	$ 293,750
11	**Source Improvements (rough estimates that need to be refined)**							
	Surface Water Impoundment Reservoir/Pond (55 acre-ft = ~18 MG storage)					1	$ 3,500,000	$ 3,500,000
	Connection to Tacoma Water 2,400 gpm (12" main, ~2mi by sea, ~4mi by land)					1	$ 17,500,000	$ 17,500,000
	Reverse Osmosis Desalinization 1MGD (treatment package only, intake not included)					1	$ 4,000,000	$ 4,000,000
	Additional Well Developments (to be determined)							$ -
							Project Total	$ 25,000,000
12	**SW 183rd St WM Replacement (replace and upsize existing AC main to improve reliability)**							

TABLE 9-2
CAPITAL IMPROVEMENTS PLAN

	Project (Purpose)			Diam. (in.)		QTY		
	Along	From	To	Exist.	New	(LF)	Unit Cost	Cost
	SW 183rd St	Beall Rd SW	2,850 lf West	4, 6	8	2,850	$ 250	$ 712,500
							Project Total	$ 712,500
13	**SW 188th St WM Loop and Replacement (loop main and replace existing AC main to improve reliability)**							
	SW 188th St	Vashon Hwy SW	650 lf West	4	8	650	$ 250	$ 162,500
	SW 188th St	103rd Ave SW	650 lf East	None	8	650	$ 250	$ 162,500
	SW 188th St	103rd Ave SW	400 lf West	8	8	400	$ 250	$ 100,000
							Project Total	$ 425,000
14	**Prospect Ave SW WM Loop (loop existing main to improve fireflow availability)**							
	77th Pl SW	Prospect Pl SW	Emerson Ave SW	None	8	500	$ 250	$ 125,000
	81st Ave SW	Ex. 8" AC	Prospect Ave SW	None	8	375	$ 250	$ 93,750
							Project Total	$ 218,750
15	**SW 225th St WM Replacement (replace and upsize AC main to improve fireflow availability)**							
	SW 225th St	Vashon Hwy SW	775 lf East	6	8	775	$ 250	$ 193,750
							Project Total	$ 193,750
16	**SW Soper Rd WM Replacement (replace and upsize existing steel main to improve reliability)**							
	SW Soper Rd	SW Bank Rd	1,150 lf Northeast	6	8	1,150	$ 250	$ 287,500
							Project Total	$ 287,500
17	**SW Cemetery Rd WM Replacement (replace existing AC main to improve reliability)**							
	SW Cemetery Rd	Vashon Hwy SW	2,300 lf West	8	8	2,300	$ 250	$ 575,000
							Project Total	$ 575,000
18	**SW 190th St & 87th Pl SW Loop Replacement (replace and upsize existing AC main to improve fireflow availability)**							
	SW 190th St	Ridge Rd SW	87th Pl SW	6	8	1,525	$ 250	$ 381,250
							Project Total	$ 381,250
19	**SW 188th St & 103rd Ave SW Loop (loop existing main to improve fireflow availability)**							
	Private Property	Connect 3 dead-end mains to existing mains		None	8	475	$ 250	$ 118,750
							Project Total	$ 118,750

TABLE 9-2
CAPITAL IMPROVEMENTS PLAN

	Project (Purpose)			Diam. (in.)		QTY		
	Along	From	To	Exist.	New	(LF)	Unit Cost	Cost
20	**103rd Ave SW Loop (loop existing main to improve fireflow availability)**							
	103rd Ave SW	SW 192nd St	Ex. 10" DI Main	None	10	350	$ 300	$ 105,000
	103rd Ave SW	Ex. 10" DI Main	Ex. 8" DI Dead-End Main	None	10	400	$ 300	$ 120,000
	Coordinate with Project 6 - SW 192nd St West of Vashon Hwy SW							$ -
							Project Total	$ 225,000
21	**SW 180th St WM Loop (loop existing 8" and 12" mains)**							
	SW 180th St	Vashon Hwy SW (12" DI)	400 lf East	None	8	400	$ 250	$ 100,000
	Private Property (Directional~~-~~ Drill)	SW 180th St	325 lf North (8" dead-end)	None	8	325	$ 250	$ 81,250
							Project Total	$ 181,250
22	**SW 216th St WM Replacement (replace and upsize existing steel main to improve fireflow availability)**							
	SW 216th St	Vashon Hwy SW	Tramp Harbor Rd SW	6	8	5,300	$ 250	$ 1,325,000
							Project Total	$ 1,325,000
23	**East-Central AC Main Replacement (replace existing AC main to improve reliability and fireflow avail.)**							
	Varies	Varies	Varies	6	8	5,050	$ 250	$ 1,262,500
	Varies	Varies	Varies	8	8	8,525	$ 250	$ 2,131,250
							Project Total	$ 3,393,750
24	**Miscellaneous Small Works AC Main Replacement (replace and possibly upsize existing AC main to improve reliability)**							
	101st Pl SW	SW 178th St	500 lf South	8	8	500	$ 250	$ 125,000
	Monument Rd SW	SW 216th St	1,675 lf North	8	8	1,675	$ 250	$ 418,750
	86th Ave SW	SW 216th St	600 lf North	6	8	600	$ 250	$ 150,000
							Project Total	$ 693,750

TABLE 9-2
CAPITAL IMPROVEMENTS PLAN

	Project (Purpose)			Diam. (in.)		QTY		
	Along	From	To	Exist.	New	(LF)	Unit Cost	Cost
25	**Miscellaneous Treatment Plan Improvements**							
	Replace chemical feed pumps						$ 1,500	$ 9,000
	Evaluate feasibility of smaller finished water pumps versus variable frequency drives							$ 5,000
	Evaluate feasibility of installing variable frequency drives at the creek stations							$ 5,000
	Implement SCADA improvements							$ 10,000
	Evaluate feasibility of covering recycle storage ponds to inhibit algae growth							$ 5,000
	Evaluate feasibility of converting a recycle storage pond into a sedimentation basin							$ 16,000
							TOTAL CAPITAL IMPROVEMENTS COST	$ 22,328,750 **

**The total Capital Improvements Cost assumes an impoundment (Project 11) is constructed. Total Capital Improvements Cost could be as high as approximately $36,000,000 if the connection to Tacoma Water is constructed (Project 11).

9.3 PRIORITY CAPITAL PROJECTS

The District mission is to provide a sufficient quantity of good quality water at a reasonable cost to our customers, in perpetuity. To meet that mission requires balancing on-going capital expenditures among priority projects, since not all projects can be funded. The total cost of the projects listed in Table 9-2 is in excess of $20 million, which is out of range for a District with roughly $1 million in annual revenues. The projects described below represent the highest priority projects, and ones that can reasonably be accomplished during the next six-year planning period Prioritization of projects in future years will be evaluated on an on-going basis.

1. Treatment Plant Chlorination project – Estimated cost -$10,000

This project will improve chlorination control by adding chlorine monitoring at the end of surface water treatment process. By identifying any chlorine deficiencies after the roughly hour-long chlorination process (near the finished water pump), operators can better control the amount of chlorination. Implementation is planned for late 2007 – 2008.

2. Beall well implementation project – Estimated cost $100,000 - $200,000

The Beall test well has been completed. Water was found at about 600 feet and pump tests indicate it is capable of providing 50 gpm sustainably, and 80 gpm for short periods. This project covers engineering services and infrastructure implementation to add this source to the distribution system and integrate the well with the existing SCADA control system. Implementation is planned for 2008.

3. Tank farm booster station – Estimated cost $100,000 - $500,000

The fire flow at areas near the two main tanks can be increased by boosting the pressure at the tanks. This project will also enable more of the storage in the million gallon tank to be used to meet peak day demand, which is a limiting factor in system capacity. The project includes engineering services and implementation costs (booster pumps, control system, pressure reducing stations, piping, etc.) Implementation is planned for 2008.

4. On-going water main replacement projects – Estimated average cost $100,000 per year.

The hydraulic model analysis shows deficiencies in meeting 1000 gpm (residential) and 2250 gpm (commercial) fire flows in a number of areas. The total cost of all suggested main replacements would be in excess of $18 million. The improvements at the tank farm booster station in project 3 will improve the fireflow situation. While on the whole the District distribution system has relatively low leakage, there are some mains that are undersized and/or deteriorating that need replacement. This project addresses the need to replace water mains over the life of this Plan during years when other higher priority capital projects allow funding.

5. Evaluation of Source Development Alternatives – Estimated cost $50,000

This project will evaluate alternatives for further source development. The potential sources described below will be among the alternatives considered.

Wells - The District has drilled nine deep wells inside its service area in an attempt to locate additional water supplies for future customers. These wells are referred to as the Ellis, Morgan Hill, Cemetery, Gerrior, Vashon Household, Beall, Well #1, Well #2 and Well #4 wells. Of these, Ellis, Cemetery and Vashon Household did not produce water with sufficient quality and/or quantity to be viable public water sources. Gerrior had hydraulic continuity with Judd Creek, and would not be approved by the Department of Ecology (DOE). Wells #1, #2 and #4 are located close together at the wellfield, and while each generally had good production when drilled, they have all declined. Redevelopment efforts have been expensive, but temporarily successful in some cases. In total, the wellfield can currently produce only 150 gpm of its 250 gpm water right. Past over-pumping has resulted in expensive failures of the wells. Morgan Hill produces about 35 gpm, and the District will attempt to transfer some unusable water rights from the wellfield to Morgan Hill. The District expects 50 gpm from its new Beall well. In summary, the District has had mixed success with wells, which produce the best quality and lowest cost water.

Conservation – In terms of a cost effective method to allow more service connections, conservation is the most cost effective alternative. The conservation program described in Section 4 is expected lead to reduction in peak season (summertime) water demands by 2% annually. Once documented over multiple years, it is recommended that the District re-evaluate source requirements and the availability of water for new users.

Surface water impoundments - A surface water impoundment reservoir is an idea being considered as a potential way to meet peak day demands in the summer. Water quality and high cost are difficult issues with a large surface water pond or reservoir.

Rainwater Collection Systems - A potential alternative for non-potable water that the District has expressed interest in is to encourage and help facilitate surface water retention by customers through rain barrels or more substantial rain water storage mean. The goal of this would be retaining rainwater to be used for summer irrigation, thus reducing peak day demand. This potential use of rain barrels faces at least near-term regulatory hurdles and does not provide a potable water solution. The District is encouraged to work with DOE and DOH on applicable uses for these facilities and/or regulatory changes.

Desalination – Reverse osmosis desalination is an alternative that the District intends to study. Cost, energy use, and disposal of byproducts are issues.

Pipeline from mainland sources of supply – Construction of a pipeline from the mainland has been discussed as a potential solution to water source limitations on the Island.

Restrictions to this alternative include the fact that King County policy specifically prohibits such a pipeline and the high cost (estimated $17 million) that puts this alternative well beyond the District's financial capabilities.

Purchase water or sources from other entities on the Island – Other suitable sources of water may be available, though at this time, most other water purveyors on the Island are in a similar shortage situation. Issues include the cost of transmission pipelines, water rights, and lack of availability of suitable sources.

Artificial aquifer recharge – A study commissioned in 1999 examined this approach, which involves pumping winter water into the aquifer for later use in the summer. Issues include attaining acceptable water quality to use for recharge (surface water with chlorination by-products is not always acceptable to the Department of Ecology) and the ability to retrieve the water after it's pumped into the aquifer. Those issues could not be surmounted in 1999, but further consideration may be warranted.

Reclaimed Wastewater – The Island wastewater treatment plant (operated by King County) may be a source for non-potable irrigation water. Issues include the cost of a parallel distribution system for irrigation water (particularly in a rural situation), limited effluent availability, and cross-connection risks.

In summary, all reasonable alternatives for source development either have or will be evaluated to address the long term source issue that faces Water District 19 and other Island water purveyors. Despite major efforts, the District has been relatively unsuccessful obtaining additional sources of supply and providing water service to customers on its waiting list. Efforts have included very substantial and costly projects in drilling wells, studying artificial aquifer recharge, promotion of conservation, treatment plant improvements, transfer of water rights, attempting to increase production from existing wells, and support of major groundwater studies to find new sources. The District has remained optimistic that the next well or the next effort would be successful, and zoning in the Vashon Town area reflects that optimism. In some cases the optimism has led to unrealistic expectations. It has also led to District water rates that have risen to among the highest in the state. The District remains committed to maintaining a sustainable system that provides good quality water to customers at a reasonable cost, and to evaluating and pursuing all practical alternatives for further source development.