WATER FACILITY PLAN

ADOPTED AUGUST 11, 2004

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INTRODUCTION

Using standard engineering planning criteria tailored to meet the specific preferences of the Albany community, this plan (the 2004 Water Facility Plan) evaluates the existing and future needs of the Albany water system. While this plan describes the projects and programs that are needed now to improve the existing system and will ultimately be needed to meet future water system requirements, a separate Water System Financial Plan has been prepared that identifies annual revenue requirements necessary for near-term implementation of the Water Facility Plan. Together, these two documents represent the short-term and long-term strategy for maintenance, improvement, and development of Albany's water system.

WATER TASK FORCE

Development of the Water Facility Plan began in Fall 2001 and was guided by a 15-member citizen Task Force (Water Task Force). The Task Force was appointed by Mayor Chuck McLaran to participate in the development of the facility plan and to ensure that different community groups' concerns and view points were considered. Citizens representing residential, commercial, and industrial customers, Albany Public Schools, and the Willamette Valley Home Builders Association were included on the Task Force. The Mayor and one City Councilor were also members of the Task Force. The meetings were open to the public.

FACILITY PLANNING PROCESS

The water system facility planning process evaluates existing system deficiencies and reviews current and projected regulatory requirements, including compliance with the Federal Safe Drinking Water Act (SDWA). In addition, the facility planning process quantifies future water demands by projecting population growth, reviewing potential development areas within the current Urban Growth Boundary (UGB), and estimating future residential, commercial, and industrial water demands. This planning process results in a listing of projects and programs required to improve the existing system and to meet future water system requirements. New facility plans should be prepared every 7 to 10 years to reflect changes in the community and the regulatory environment.

Beyond identifying general sizing and location requirements, the facility planning process normally does not examine specific projects in significant detail. Once a project has been identified as a need, more specific engineering design effort is required to verify the size and location of a particular project prior to construction. Thus, this document should only be used

as a general planning tool to ensure that the water system is prepared to meet the needs of the developing Albany community.

THE 2004 WATER FACILITY PLAN

Work on this plan began in Fall 2001. The engineering firm Montgomery Watson Harza (MWH) worked with Albany staff to analyze the existing system and project future requirements. Two previous planning documents, the *1988 Albany and Millersburg Water System Facility Plan*[1] and the *1996 North Albany Water Facility Plan*[2] were reviewed as part of the planning process. This plan evaluates the City of Albany's (City) water system including, the Santiam-Albany Canal (Canal), the Vine Street Water Treatment Plant (WTP), and the water distribution system including water lines, pump stations, and storage facilities.

Subsequent to the facility planning-level work completed by Montgomery Watson Harza[3], two additional studies have been performed on the water system. The first study, completed by CH2M-Hill[4], provides additional detailed distribution system and reservoir analysis. This study was prepared as part of the design effort for construction of the Joint Water Supply Project with the City of Millersburg. The second study, completed by the City of Albany[5], reevaluates water demand allocations in the upper pressure zones (Zones 2, 3 and 4).

The combined results of the three analyses have been used to produce this plan. This document represents the most current thinking regarding the current and future needs of the Albany water system.

ADMINISTRATIVE POLICIES

The following statements are based on the results, conclusions, and recommendations of this facility plan and the Water Task Force:

Engineering Criteria

It shall be the policy of the City to follow the engineering planning criteria for water lines, pump stations, reservoirs, and treatment facilities as shown in Chapter 3 of this plan and supporting documents to evaluate design and construction of improvements to Albany's water system. The City is currently in the process of developing water distribution system design standards. Once these standards are adopted they shall supplement the criteria presented in this report. Ultimately, the Public Works Director or his/her designee will make

[1] *Albany and Millersburg Water System Facility Plan*, February 1988, Brown and Caldwell, Inc.
[2] *North Albany Water Facility Plan*, July 1996, Brown and Caldwell, Inc.
[3] *City of Albany Water Facility Plan*, December 2003, Montgomery Watson Harza.
[4] *Water Distribution Modeling for the Albany/Millersburg Joint Water Supply Project* January 15, 2004, CH2MHill.
[5] *Revised Water Demand Allocations*, February 2004, City of Albany

the final decisions on design of all water system facilities including the alignment and size of future water lines.

Future Water Line Alignments and Sizing

It shall be the policy of the City that future water line alignments and sizes shown in this plan are approximate due to the limited amount of detail contained in a planning document. A final decision concerning alignment and sizing of water lines will be made during engineering plan review and will take into consideration the existing and projected water demands, existing and planned line configurations, and available pump station and reservoir capacity.

Water Main Configuration

In general, it shall be the policy of the City that distribution mains shall be looped to minimize water service from dead-end lines. Looped water lines provide increased pressure, flows, water quality and reliability, and customers connected to a looped water line are less likely to be without water service when a line segment is shut down for construction or repairs.

Water Service Area

It shall be the policy of the City, for those properties located outside the city limits but inside the urban growth boundary, to require annexation or consent to annex agreements prior to receiving water service.

It shall be the policy of the City, for those properties located outside the urban growth boundary, to prohibit extension of water service except as provided by Albany City Council policy or resolution, or specific contracts.

Prioritize Water System Capital Improvements

It shall be the policy of the City to consider the following criteria in setting priorities for capital improvements to the water system. These criteria are not necessarily ranked in order of priority.

- Projects need to meet regulatory requirements
- Projects needed to maintain capacity and reliability of critical system components, such as pump stations, reservoirs, and structural integrity of water lines
- Projects related to street improvements
- Projects needed to address other issues such as alleviating health hazards

SUMMARY RECOMMENDATIONS

Improvement projects have been scheduled into the four planning stages listed below based on relationships between projects, ties to levels of growth, and understanding maintenance priorities:

- Stage 1 from Year 2005 through 2009 – Population 46,600
- Stage 2 from Year 2010 through 2014 – Population 49,800
- Stage 3 from Year 2015 through 2024 - Population 56,900
- Stage 4 from Year 2025 through buildout (2074) – Population 109,000

The staged improvements are intended to be a long-term guide for the development of the City's water system. While projects are scheduled for construction in a specific stage, staging is intended only to provide a general guideline of priorities. Actual timing for construction of each project should be based on a regular review of system needs, actual water demands and available funding. For example, it is impossible to predict when development driven projects shown in Stage 4 will actually be needed. Timing for those projects is entirely development dependent and it is important that the plan have flexibility to respond to development as it occurs.

Table ES-1: Recommended Improvements by Category

Project Category	*Stage 1*[1]	*Stage 2*[1]	*Stage 3*[1]	*Stage 4*[1]	*Total*[2]
Canal	$3,460,000	$2,830,000	$2,110,000	$0	***$8,400,000***
Vine Street WTP	$2,535,000	$3,077,000	$1,997,000	$0	***$7,600,000***
Distribution System	$14,350,000	$15,794,000	$23,148,000	$80,817,000	***$134,100,000***
Joint Water Project	$32,300,000	$0	$0	$3,900,000	***$36,200,000***
TOTAL[2]	***$52,600,000***	***$21,700,000***	***$27,300,000***	***$84,700,000***	***$186,300,000***

1) 2002 Dollars
2) Rounded to the nearest $100 K.

The above table shows the broad categories for recommended improvements by planning stage. These recommendations represent approximately $74 million in improvements by 2015 and total $186.3 million in improvements by 2074, the projected date for buildout of the urban growth boundary (UGB). The Water Financial Plan incorporates the first two stages of Facility Plan projects (2005-2014). A more detailed discussion of the proposed improvement projects, including cost estimates, is presented in each of the respective system component chapters (Canal, Distribution, etc.) and in *Chapter 9 - Recommended Plan.*

Chapter 1 – Existing System Description

This chapter reviews Albany's existing water system including service area, water rights, water supply, and the distribution system including pump stations, reservoirs, and piping.

SERVICE AREA

Albany's existing water service area is shown in ***Figure 1-1***. The City purchased the water system from Pacific Power and Light (PP&L) in 1984. At the time of purchase, PP&L provided water service for the City of Albany, the City of Millersburg, and the North Albany County Service District (NACSD). Since purchasing the system, the City has acquired ownership of the NACSD assets (July 1991) and is currently working with Millersburg to develop a Joint Water Supply Project (JWP) that includes a jointly owned and operated treatment facility. In 2006, when this plant is brought on line, Millersburg will be responsible for its own water distribution system. Consequently, facilities specific to the City of Millersburg are not evaluated in this plan. A detailed discussion of the joint water supply project can be found in *Chapter 8 – Joint Water Supply Project.*

Figure 1-1 shows some areas located outside the city limits, and some outside the urban growth boundary (UGB) in North Albany, that receive water service from the City. North Albany customers located outside the UGB were previously served by the NACSD. When Albany took over the NACSD assets, the City entered into an agreement that outlined the level of service for these customers. The agreement states that the City shall provide, at a minimum, the water services provided by the District on June 30, 1990[6]. Goal 11 of Oregon's Statewide Planning Goals also intends that cities limit the level of urban services provided outside their UGB. Consequently, the City's policy is to maintain, but not expand or improve the level of service to the former NACSD customers located outside the UGB.

It is also the City's policy not to extend City water service to properties located inside the UGB but outside the city limits without meeting certain conditions (see ***Appendix C***). However, in some instances there are unique circumstances that necessitate the extension of City services to these properties. For example, an individual may have a contaminated well, no other source of drinking water, and their property is not eligible for annexation. Approval for water service under these conditions may be authorized by City Council and is usually accompanied by an agreement to annex into the City when eligible.

[6] *Albany/NACSD Sewer and Water Maintenance Transition Plan and Management Agreement*, May 23, 1990

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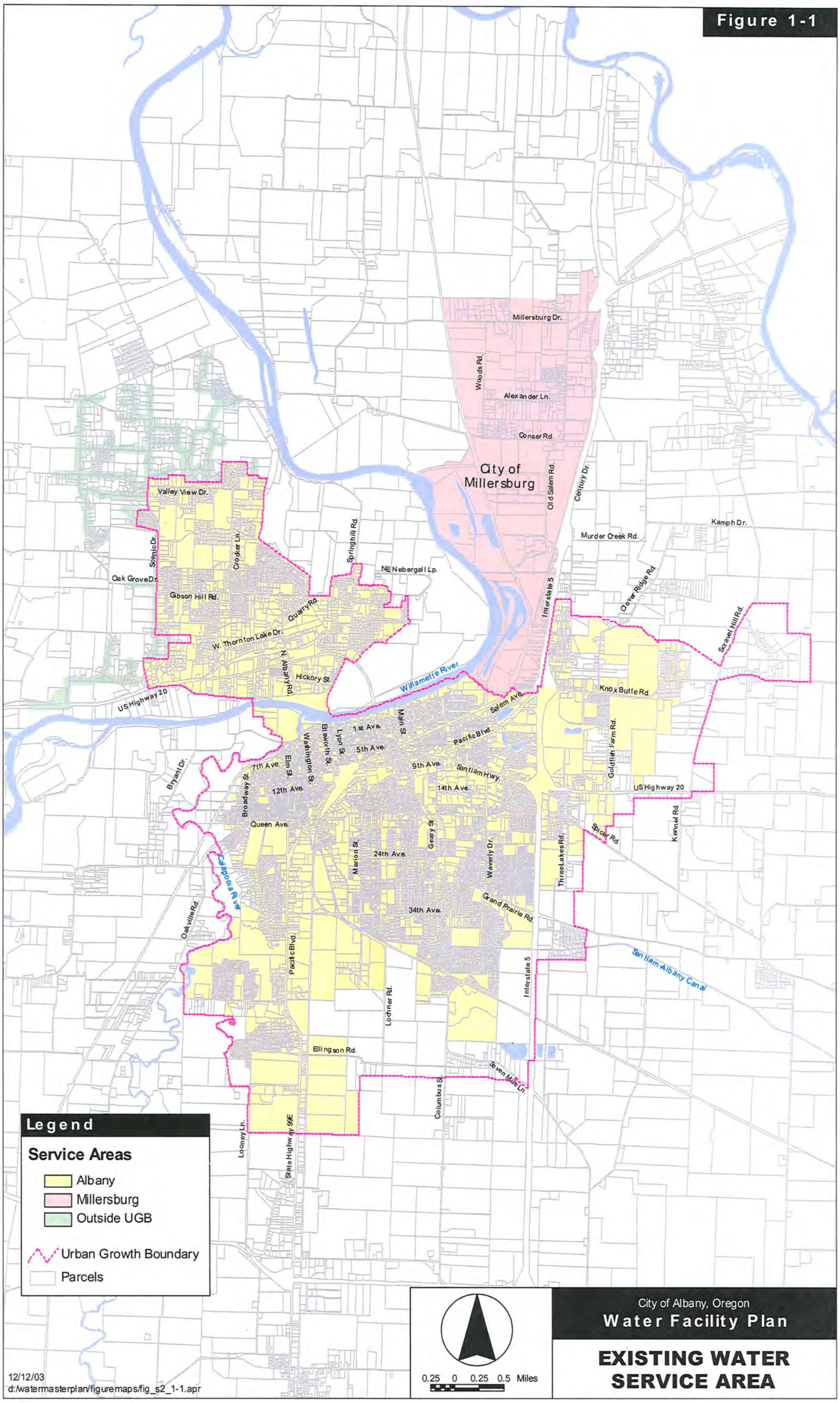
Figure 1-1


Millersburg Dr.
Woods Rd.
Alexander Ln.
Conser Rd.
City of Millersburg
Old Salem Rd.
Century Dr.
Kamph Dr.
Murder Creek Rd.
Clover Ridge Rd.
Scravel Hill Rd.
Knox Butte Rd.
Valley View Dr.
Scenic Dr.
Crocker Ln.
Springhill Rd.
NE Nebergall Lp.
Oak Grove Dr.
Gibson Hill Rd.
Quarry Rd.
W. Thornton Lake Dr.
N. Albany Rd.
Hickory St.
Willamette River
US Highway 20
Salem Ave.
Pacific Blvd.
1st Ave.
5th Ave.
9th Ave.
14th Ave.
Santiam Hwy.
Main St.
Ellsworth St.
Lyon St.
Washington St.
Elm St.
Broadway St.
7th Ave.
12th Ave.
Queen Ave.
Bryant Dr.
Calapooia River
Oakville Rd.
Marion St.
24th Ave.
Geary St.
Waverly Dr.
34th Ave.
Grand Prairie Rd.
Goldfish Farm Rd.
US Highway 20
Kennel Rd.
Spicer Rd.
Three Lakes Rd.
Interstate 5
Santiam-Albany Canal
Lochner Rd.
Pacific Blvd.
Ellingson Rd.
Seven Mile Ln.
Columbus St.
Looney Ln.
State Highway 99E
Legend
Service Areas
Albany
Millersburg
Outside UGB
Urban Growth Boundary
Parcels
0.25 0 0.25 0.5 Miles
12/12/03
d:/watermasterplan/figuremaps/fig_s2_1-1.apr
City of Albany, Oregon
Water Facility Plan
EXISTING WATER SERVICE AREA

WATER SUPPLY

Albany currently holds two municipal use water rights on the South Santiam River, totaling 50 cubic feet per second (cfs). One water right for 21 cfs has been perfected (put to full beneficial use) with a priority date of 1878. The 29-cfs permit has a priority date of 1979, but has not been perfected. A dam located on the South Santiam River approximately 1 mile east of Lebanon backs water up for diversion into the Santiam-Albany Canal (Canal). The 18-mile-long canal travels through the City of Lebanon, unincorporated parts of Linn County, and the City of Albany before it discharges to the Calapooia River in Albany. The Vine Street Water Treatment Plant (WTP) withdraws water from the Canal approximately 150 feet upstream from its point of discharge as shown in ***Figure 1-2***. Canal water quality was evaluated as part of the Vine Street WTP evaluation discussed later in this document.

The City of Albany is not the only water user on the Canal. Other water users include the City of Lebanon, for municipal use, and several other individual property owners that use Canal water for irrigation or other agricultural processes. ***Table 1-1*** summarizes water rights for water users along the Canal.

VINE STREET WATER TREATMENT PLANT

As shown in ***Figure 1-2***, the Vine Street WTP is located at 4th Avenue and Vine Street in downtown Albany. The Plant was constructed in 1912 and has gone through several expansions and upgrades to meet growing water demands and to respond to the changing regulatory environment. Today, the Plant has an estimated capacity of 16 million gallons per day (MGD) and includes the following key components:

- 9 raw water pumps
- 2 clarifiers (Accelators)
- 10 mixed-media gravity filters
- Backwash system
- 4 transfer pumps
- Chlorine contact chamber (Maple Street Reservoir)
- High Service Pump Station (HSPS)
- 2 backwash lagoons
- 2 drying beds

Figure 1-2: Vine Street WTP Site Map

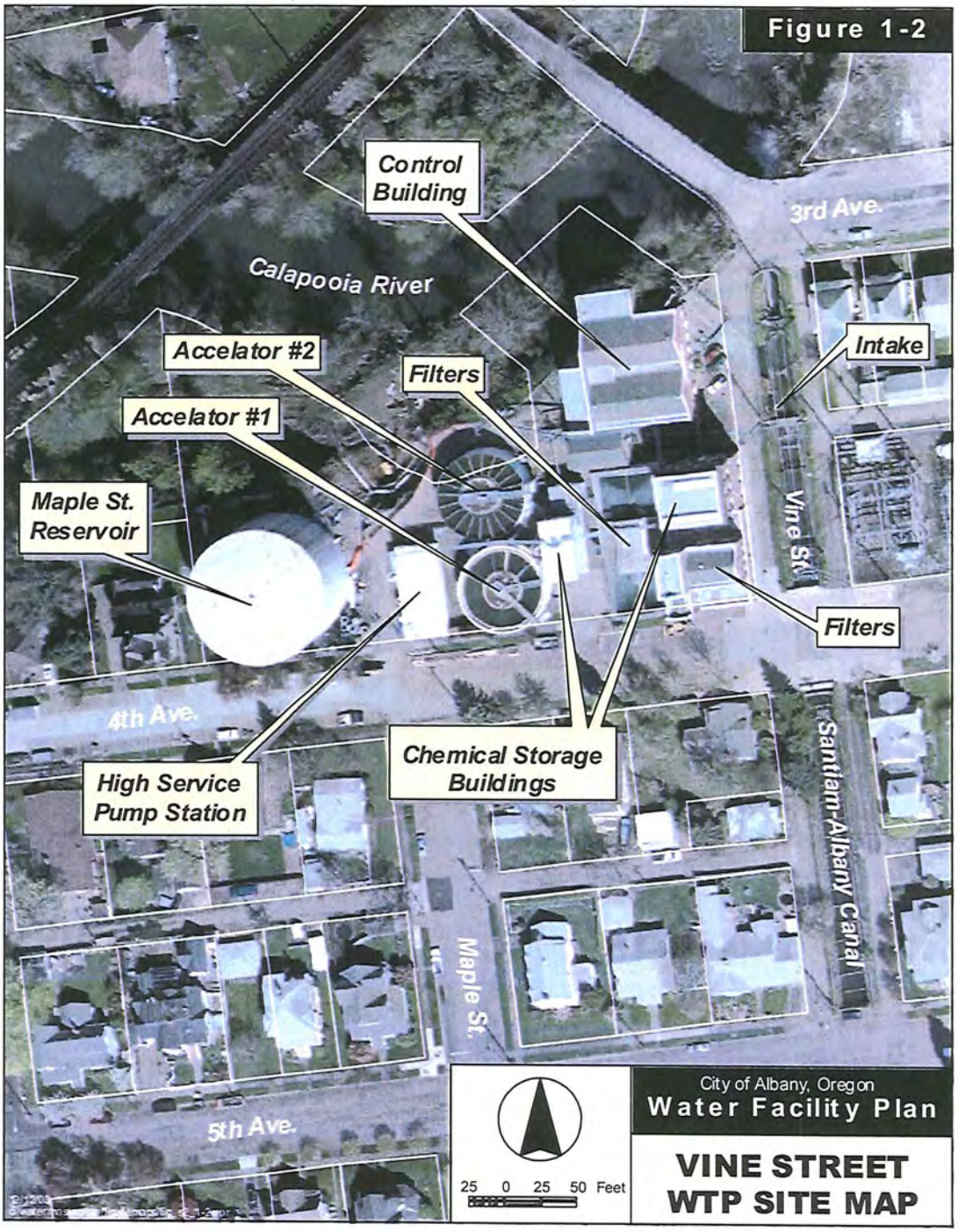


Table 1-1: Summary of South Santiam Water Rights Along the Canal

Name	*Quantity (cfs)*	*Priority Date*	*Use*	*Certificate Number*
Pacific Power & Light (City of Albany)	275	1874	Hydroelectric Power	C-49387
City of Albany	29	1979	Municipal in Albany	P-44388
Pacific Power & Light (City of Albany)	21	1878	Municipal in Albany	C-49386
City of Albany	5	1970	Recreation/Fish	P-34667
City of Albany	2	1968	Recreation/Fish	C-45179
Sub-Total	***332***			
City of Lebanon	18	1979	Municipal	P-44389
City of Lebanon	10	1890	Municipal	TR-6110
Pacific Power & Light Co	9	1900	Municipal (Lebanon)	C-49385
Grand Prairie WCD	3.1	1966	Irrigate 249.5 acres	C-44767
Inez Gilbert Trust	1.86	1974	Irrigate 148.5 acres	C-44642
Grand Prairie WCD	1.71	1967	Irrigate 137.1 acres	C-43277
Jacob Leichty	1.49	1965	Irrigate 119.3 acres	C-39223
Grand Prairie WCD	1	1969	Irrigate 137.4 acres	C-43283
Inez Gilbert Trust	0.5	1977	Irrigate 196 acres	C-57775
IOOF & Masonic Cemeteries	0.48	1970	Irrigate 38.3 acres	C-43405
Robert Sipe	0.4	1952	Irrigate 32.3 acres	C-23767
Grand Prairie WCD	0.24	1971	Irrigate 19.3 acres	C-43287
David Hickey	0.15	1975	Irrigate 11.8 acres	C-47834
Duane Eicher	0.015	1968	Agricultural	C-42012
Crown Zellerbach Crop	0.01	1972	Irrigate 1.1 acres	C-49938
Walter Jackson	0.01	1872	Irrigate 0.8 acres	C-49359
Albert French	0.005 0.038	1900 1900	Agricultural Irrigate 3 acres	C-49345
Daniel Stutzman	0.005	1873	Agricultural	C-49412
Glenn Huston	0.005	1873	Agricultural	C-49358
Jacob Leichty	0.005	1873	Agricultural	C-49365
John Kennel	0.005	1900	Agricultural	C-49362
Mildred Curths	0.005	1873	Agricultural	C-49336
Zella Burkhart	0.005	1873	Agricultural	C-49329
Zella Burkhart	0.005	1873	Agricultural	C-49330
Total Rights Along Canal =	***380***			

DISTRIBUTION SYSTEM

The City's distribution system is comprised of 3 pressure zones that are served by 228 miles of pipe, 5 pump stations, and 8 storage reservoirs.

Pressure Zones

In areas with significant elevation changes, water systems are typically separated into pressure zones. Pressure zones enable a water system to serve customers over a wide range of elevations while maintaining relatively consistent service pressures throughout the distribution system. Albany's distribution system is comprised of three pressure zones. Pressure zone boundaries and major facilities such as the Vine Street WTP, pump stations, and reservoir sites are shown in ***Figure 1-3.*** ***Figure 1-4*** shows a schematic profile of how each pressure zone is served.

- Zone 1 is comprised of industrial, commercial, and residential customers and is served by the High Service Pump Station at the Vine Street WTP, and the Queen, 34th, and Broadway Reservoirs. It ranges in elevation from 185 to 230 feet and has typical system pressures that range from approximately 40 to 85 pounds per square inch (psi). Millersburg is also located in Zone 1. It should be noted that the *1996 North Albany Water Facility Plan* identified that Zone 1 may be extended up to an elevation of 252 while maintaining a minimum pressure of 40 psi with the Broadway Reservoir empty.

- Zone 2 is comprised primarily of residential customers and is served by the Wildwood Reservoir and the North Albany Pump Station. It ranges in elevation from 230 to 350 feet and has typical system pressures from approximately 40 to 95 psi.

- Zone 3 is the smallest pressure zone and is comprised primarily of residential customers. It is served by the Valley View Reservoirs and the Gibson Hill Road Pump Station. Zone 3 elevations extend from 350 to 510 feet and typical system pressures vary from approximately 20 to 95 psi. Zone 3 also serves customers located outside the urban growth boundary that were previously served by the North Albany County Service District (NACSD). Some of the piping serving these customers is located at pressure Zone 2 elevations. In these locations, system pressures can approach 120 psi. In addition, a small low-pressure area exists within the boundaries of Zone 3. This area is centered around the Valley View Reservoirs on Valley View Drive. The topography and operating levels of the reservoirs result in low water pressure in this area. Solutions to address high and low-pressure problems are discussed later in this document.

Figure 1-3: Existing Pressure Zone Boundaries and Major Facilities

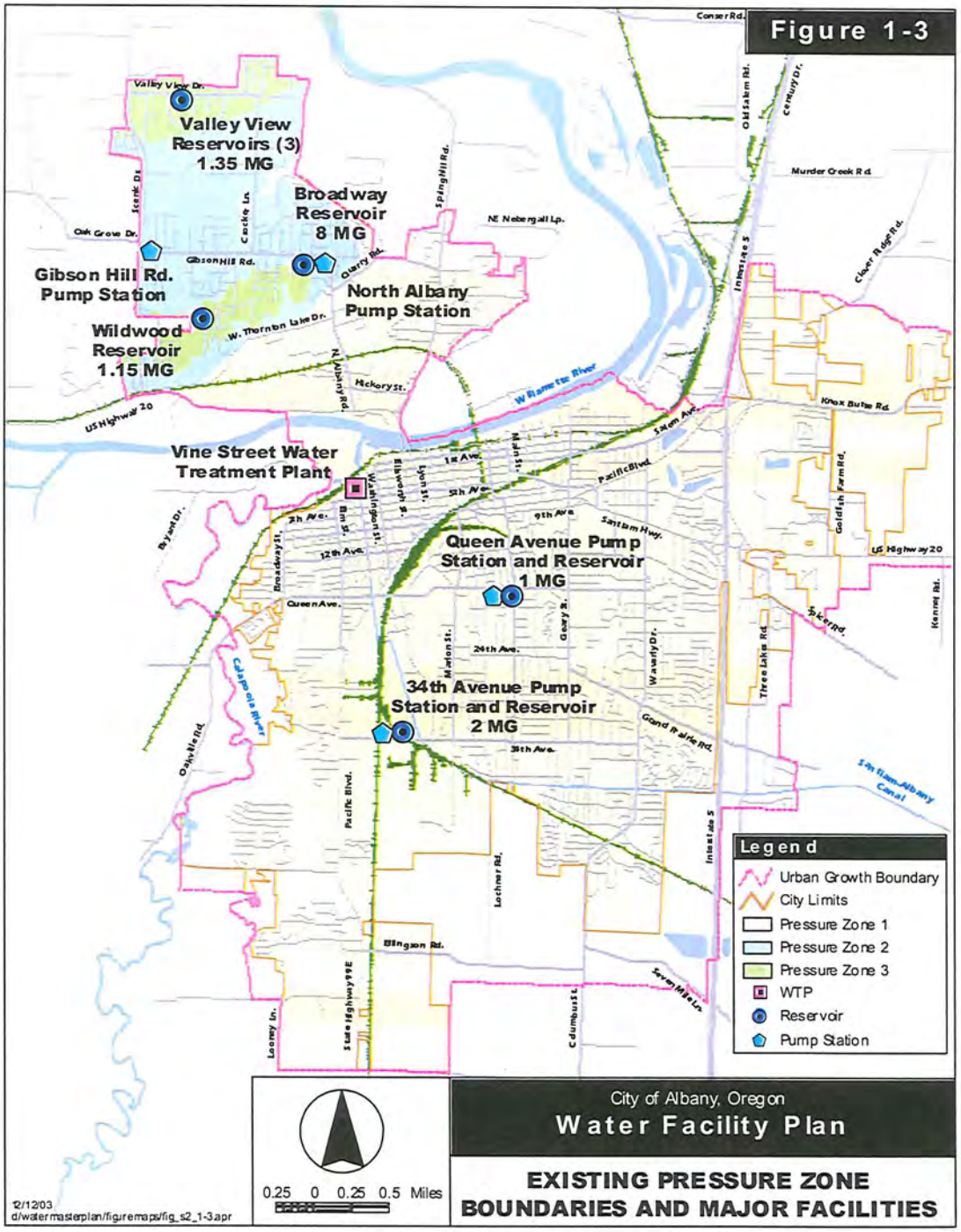



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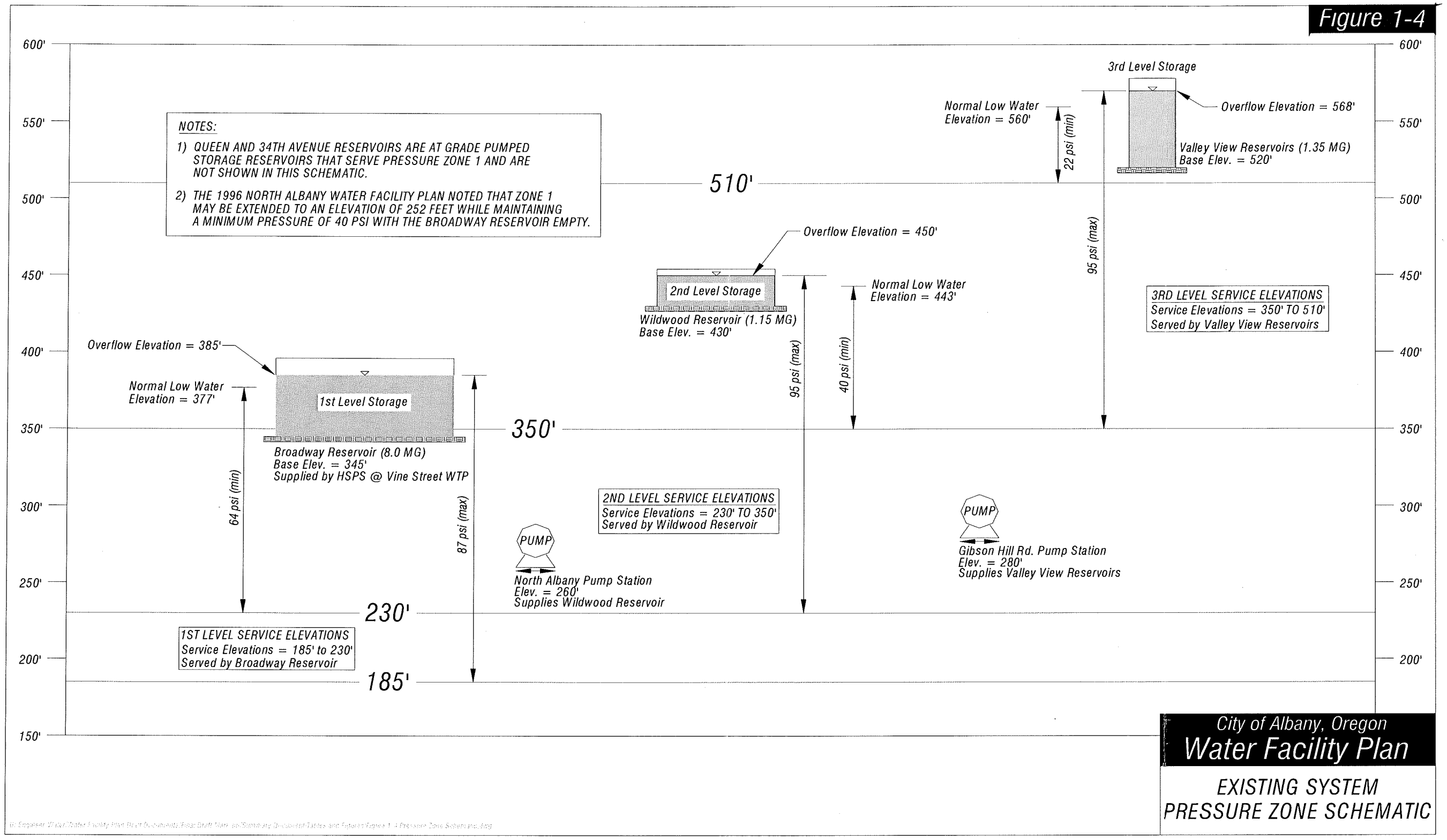
Figure 1-4: Existing System Pressure Zone Schematic



Pipelines

Including water lines located in the City the Millersburg, the City of Albany maintains a pipeline network comprised of more than 228 miles of pipe ranging from 2 inches to 30 inches in diameter. Water lines with a diameter of 16 inches or larger are classified as transmission lines. These lines are typically designed to convey large volumes of water from one point to another without numerous service connections. Twenty-eight miles of the 228 miles of pipe, or approximately 12 percent, are classified as transmission lines. Water lines less than 16 inches in diameter are considered distribution lines. Distribution lines are typically used to convey water from the transmission lines to the water users. The remaining 200 miles, or 88 percent, of water lines are considered distribution lines.

Material types for both transmission and distribution lines vary. Pipe materials include asbestos cement (AC), cast iron (CIP), wrought iron (WI), ductile iron (DI), galvanized (GI), polyvinyl chloride (PVC), outside diameter dipped and wrapped steel (ODDW), and steel (STL). ***Figure 1-5*** shows pipeline material as a percentage of total pipeline length. Standard construction materials for water lines have changed over time. ***Table 1-2*** shows estimated installation periods for the types of pipes in Albany's water system. As indicated in the table, pipe ages vary from new to pipe installed about 1890.

Figure 1-5: Percentage of Total Pipeline Length by Material Type

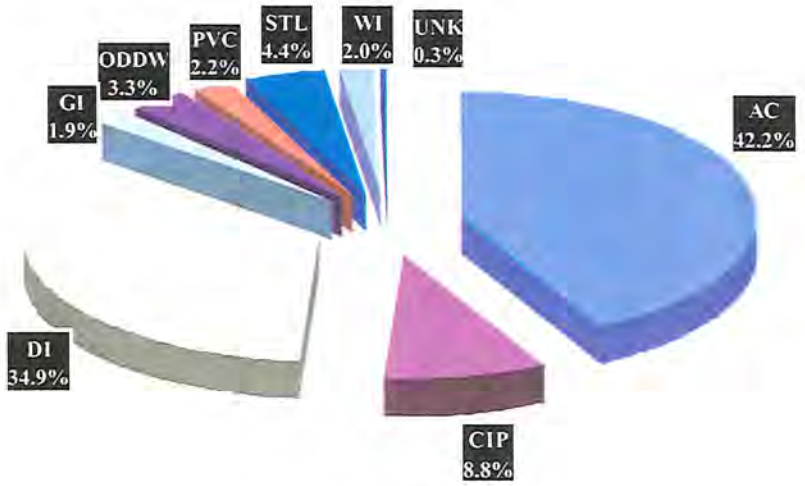


Table 1-2: Pipe Installation Periods[7]

Pipe Type	<1900	1900/10	1910/20	1920/30	1930/40	1940/50	1950/60	1960/70	1970/80	1980/90	1990/2000
CIP	1890								1980		
WI	1900							1960			
GI						1947				1983	
STL						1946				1980	
ODDW						1942		1970			
AC						1943				1984	
PVC								1964		1987	
DI									1970		

CIP = Cast Iron Pipe
WI = Wrought Iron Pipe
GI = Galvanized Steel Pipe
STL = Steel Pipe
ODDW = Outside Diameter Dipped and Wrapped Steel Pipe
AC = Asbestos Cement Pipe
PVC = Polyvinyl Chloride Pipe
DI = Ductile Iron Pipe

The material types listed in ***Table 1-2*** typically have a service life of 30 to 75 years with the exception of ductile iron pipe, which has an estimated service life of approximately 100 years. In addition to pipe age, specific conditions such as corrosive soils can adversely affect a pipe's service life. Pipes that have exceeded their service life often lead to excessive leaking and pipe failures. A good example of this is Albany's steel water lines. The City has approximately 29 miles of steel lines in its system; steel pipe being classified as wrought iron, galvanized iron, steel, outside diameter dipped and wrapped steel, and unknown pipe types. These pipes have exceeded, or are approaching, the end of their service life, deteriorating as shown in ***Photograph 1-1***. Maintenance records show that the majority of water line leaks observed in Albany's system occur in steel water lines. These failing water lines must be replaced in order to minimize service interruptions, water loss, and the amount of time and money spent on repairing these lines. Replacement strategies for steel water lines are discussed in *Chapter 7 - Distribution System Evaluation.*

[7] Young, Jim *City of Albany Steel Pipe Replacement Report*, January 2001.

Photograph 1-1: Deteriorating Steel Water Line

Pump Stations

The City maintains five water pumping stations plus treatment process pumps, transfer pumps, and raw water pumps at the Vine Street WTP. Information about the five pump station facilities is summarized in ***Table 1-3***, and locations are as shown in ***Figure 1-3***. The firm capacity indicated in ***Table 1-3*** is the capacity of the pump station with the largest pump out of service. These capacities will vary with system pressures and, therefore, will not be realized under all demand scenarios.

Reservoirs

The City's water system has eight reservoirs, seven used for finished water storage and one, the Maple Street Reservoir, used for treatment process storage. The seven finished water storage reservoirs provide a total storage capacity of 13.5 million gallons. However, only 12.35 million gallons is effective storage based on operational limits for the Valley View Reservoirs. Effective storage is defined as storage available for use. Reservoir locations are shown on ***Figure 1-3*** and storage volumes are summarized in ***Table 1-4***.

Due to the high elevations of several homes served by the Valley View Reservoirs, the full capacity of the reservoirs cannot be utilized. When the water surface elevation in the reservoirs approaches 560 feet, homes at an elevation of 468 feet and higher (approximately 40 homes) experience service pressures less than 40 psi and customers at elevations near 510 feet (approximately 10 homes) experience pressure approaching the state minimum of 20 psi. To avoid this situation, the Gibson Hill Road Pump Station is programmed to turn on and fill the Valley View Reservoirs when the water surface elevation in the reservoir drops to 560 feet. Limiting the minimum water level in the three Valley View Reservoirs results in an effective storage capacity of 0.2 million gallons for the three tanks.

Table 1-3: Distribution Pump Station Characteristics

Facility Name	Pump Name	Pump Size (hp)	Pump Flow Rate (gpm)	Pump TDH (ft)	Station Firm Capacity (gpm)	Station Nominal Capacity (gpm)	Total Horsepower (hp)	Year Built	Source/ Reservoir	Service Area/ Reservoir
High Service Pump Station (701 4th Avenue SW)	11	150	3,250	145	15,950	22,650	1,050	Original: 1959 Improvements: 2001	WTP, Maple Street Reservoir	Zone 1; Queen Ave, 34th Avenue and Broadway Reservoirs
	12	300	6,700	145						
	13	100	2,000	145						
	14	200	4,000	145						
	15	300	6,700	145						
34th Avenue Pump Station (475 34th Avenue SW)	41	50	800	150	2,800	5,800	275	Original: 1971 Improvements: 1990	34th Ave. Reservoir	Zone 1
	42	100	2,000	150						
	43	125	3,000	150						
Queen Avenue Pump Station (950 Queen Avenue SE)	21	30	500	150	500	1,900	105	Original: 1955 Improvements: 1990	Queen Ave. Reservoir	Zone 1
	22	75	1,400	150						
North Albany (Zone 2) Pump Station (1552 North Albany Road)	51	75	1,400	82	1,400	2,800	150	Original: 1980 Improvements 1998	Broadway Reservoir	Zone 2 and Wildwood Reservoir
	52	75	1,400	82						
Gibson Hill Road (Zone 3) Pump Station (3400 Gibson Hill Road NW)	61	75	900	138	900	1,800	150	Original 1998	Wildwood Reservoir	Zone 3 and Valley View Reservoirs
	62	75	900	138						

Notes:

1 Firm capacity represents the combined pump station capacity with the largest pump out of service.

2 Pump flow rate and TDH are based on design flow characteristics

Table 1-4: Storage Reservoir Characteristics

Facility Name	*Type*	*Volume (MG)*	*Diameter (ft)*	*Bottom Elevation (ft)*	*Overflow Elevation (ft)*	*Source / Pump Station*
Maple Street Reservoir	At Grade Steel	2*	93	220.0	259.8	Vine Street WTP
Queen Avenue Reservoir	At Grade Steel	1	74	229.0	260.5	High Service Pump Station
34th Avenue Reservoir	At Grade Steel	2	104	224.0	255.5	High Service Pump Station
Broadway Reservoir	At Grade Concrete	8	210	345.0	385.0	High Service Pump Station
Wildwood Reservoir	At Grade Concrete	1.15	140	430.0	450.0	North Albany Pump Station
Valley View Reservoir 1	At Grade Steel	0.25	25	520.0	567.5	Gibson Hill Road Pump Station
Valley View Reservoir 2	At Grade Steel	0.25	25	520.0	567.5	Gibson Hill Road Pump Station
Valley View Reservoir 3	At Grade Steel	0.85	55	520.0	569.5	Gibson Hill Road Pump Station
	*Total **	*13.5*				

Notes:

* The Maple Street Reservoir volume is not included in the total system volume of 13.5 MG.
The Maple Street Reservoir is used as a chlorine contact chamber and is not considered system storage.

EXISTING SYSTEM SUMMARY

Albany's existing water service area includes the cities of Albany and Millersburg, limited service to customers located outside the city limits but within the urban growth boundary, and limited service to customers located outside the urban growth boundary in North Albany that were previously served by the North Albany County Service District. The water system is separated into three pressure zones with the majority of the service area in pressure Zone 1. Albany receives its water from the South Santiam River via the Santiam-Albany Canal. The Canal delivers South Santiam River water to the Vine Street WTP located in downtown Albany. The Vine Street plant treats the water and then distributes it to Albany customers through the use of 5 pump stations (including the High Service Pump Station at the Vine Street WTP), 8 reservoirs (including the Maple Street Reservoir also located at the Vine Street WTP), and approximately 228 miles of pipe.

Chapter 2 - Population and Water Demand Projections

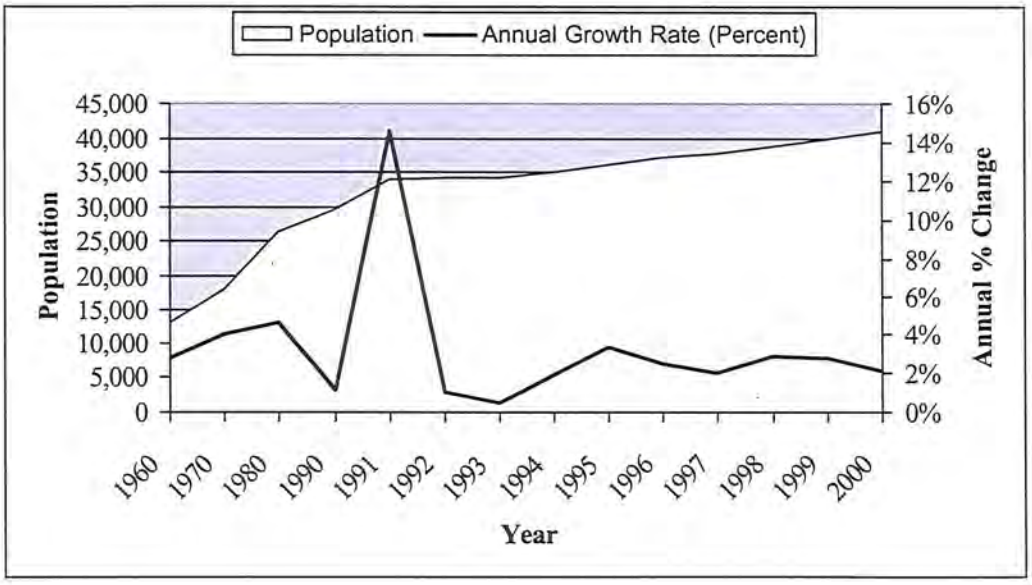
An essential step in evaluating future conditions of a water system is developing population and water demand projections. The size, location, and timing for future improvements are largely dependent on the water demands placed on the system by a growing population. This section outlines the process used to determine population and water demand projections.

POPULATION

Current Population

The City of Albany's current population (2000) is 40,852[8] based on data provided by the U.S. Census Bureau. The Center of Population and Research and Census at Portland State University (PSU) also maintains historic population data for Albany as summarized in ***Figure 2-1***. On average, Albany's population has increased at a rate of approximately 2.8 percent annually since 1950. Since 1992, Albany's population has grown at a rate of approximately 2.0 percent annually. The large spike in population shown in 1991 is due to the annexation of North Albany which added approximately 3,860 people to Albany's population base.

Figure 2-1: Albany's Population Growth, 1960-2000



[8] US Census Bureau, *2000 Census of Population and Housing*, Oregon, May 2001.

Population Projections

The projected population at buildout (full development) of the UGB is based on 2000 census data and an estimate of additional population as undeveloped residential areas are fully developed over time. Estimates of additional population were based on an inventory of residentially-zoned land available for development within the UGB. These lands were identified using current levels of development as shown in the City's Geographic Information Systems (GIS) database and zoning as defined in the City's *Comprehensive Plan*[9]. Locations identified as "Rural Residential" in the *Comprehensive Plan* were evaluated by City planning and engineering staff; staff projected urban residential, commercial, and public land uses in these locations. Population projections for undeveloped residential lands are based on land uses shown in ***Figure 2-2***.

An estimated number of future homes was generated using the available acreage for development within each residential zone. From this estimate, and assuming an average household density of 2.46 persons per household, a projected population increase was developed. The population increase was then added to the current (2000 census) population to determine the total projected population at buildout. ***Table 2-1*** summarizes these population projection calculations.

Table 2-1: Projected Population at Buildout

Residential Land Use		*Vacant*		*Partially Developed*		*Total*
Description	*LU Code*	*Acres*	*Population*	*Acres*	*Population*	*Population*
Low density SFD[a]	RS 10	806	7,931	947	6,989	14,920
Low density urban SFD	RS 6.5	1,706	25,181	1,157	11,385	36,565
Low-medium density SFD	RS 5	55	812	7	86	898
Low-medium density MFD[b]	RM 5	268	7,911	115	2,829	10,740
Medium-high density MFD	RM 3	95	4,674	10	394	5,068
	Total	*2,930*	*46,509*	*2,236*	*21,682*	*68,191*
					2000 population	*40,852*
					Total	109,043
					Total buildout population (rounded)	***109,000***

[a]SFD = Single Family District

[b]MFD = Multiple Family District

[9] City of Albany, *Comprehensive Plan*, January 1989 as amended.

Population Growth Rate

The City of Albany coordinated with Linn and Benton Counties to develop a population projection of 53,200 for 2020. This population was used to establish the rate of change, or growth, from the 2000 census population. The projected 2020 population of 53,200 is an increase of approximately 12,400 people and represents an average annual growth rate of approximately 1.34 percent. This growth rate was assumed to continue until the buildout population of 109,000 occurred. ***Table 2-2*** illustrates projected changes in population over time based on the 1.34 percent growth rate. ***Table 2-2*** also shows the estimated date for buildout of the urban growth boundary – 2074.

It should be noted that the projected growth rate is lower than Albany has experienced in the past and may understate the pace of actual growth. This rate has been used, however, for consistency with the City's *Comprehensive Plan*. If historic growth patterns continue as discussed above, buildout of the urban growth boundary will occur at an earlier date.

Table 2-2: Projected Population Growth through Buildout of UGB

Population	*2000*	*2005*	*2010*	*2015*	*2020*	*2025*	*2074*
Current	40,852	-	-	-	-	-	-
Projected	-	43,600	46,600	49,800	53,200	56,900	109,000

WATER DEMAND

Historic Water Demand

A record of demands, as determined by water treatment plant production during the period from 1994 to 2000, is presented in ***Table 2-3***. Even though the 7-year annual average day demand (ADD) is estimated at 7.8 MGD, an 8.0 MGD estimate was selected to represent more current average day demands and is based on the average of the last 5 years (1996 to 2000). The data in ***Table 2-3*** was also used to determine demand multipliers as discussed later.

Projected Water Demand

Projecting future water demands involved evaluating existing and future levels of development for residential and non-residential areas as zoned in the *Comprehensive Plan.* As previously mentioned, areas identified as "Rural Residential Reserve" were evaluated by City staff to project potential future urban land uses. ***Figure 2-2*** shows the buildout land uses used to forecast water demands.

Residential

Residential demands were based on projected population estimates for single and multi-family properties and unit demands per capita. Utility billing data for single-family residential customers was used to estimate average annual residential water demands. Residential billing data for four years (July 1995 to July 1999) were analyzed and a residential average per capita demand of approximately 95 gpcd was determined. Based on this data and a desire to be slightly conservative for planning level estimates, a per capita demand factor of 100 gpcd has been used to project future residential demands.

Non-Residential Demand

Non-residential demands include all commercial, heavy and light industrial, school and park demands. Demand estimates for these uses are estimated based on land use and a corresponding unit demand per acre. ***Table 2-4*** shows the unit demands used for forecasting non-residential demands. These values are based on a published range of typical water demands provided by the American Water Works Association (AWWA) and a limited survey of Albany-specific demands. AWWA is a nationally recognized data source used to forecast water demands.

Table 2-3: Summary of Demands from 1994 to 2000

Historic Demand (MGD) [1]									
		Peak Season [2]	Off Season [3]	Minimum Monthly		Maximum Monthly Average		Maximum Daily [4]	
Year	Annual Average	Average	Average	Dates	Flow (MGD)	Dates	Flow (MGD)	Dates	Flow (MGD)
1994	7.5	10.1	6.2	2/1-2/28	5.9	7/1-7/31	12.1	7/20	15.5
1995	7.4	9.9	6.2	2/1-2/28	5.9	7/1-7/31	11.2	7/17	14.8
1996	7.8	10.3	6.6	1/1-1/31	6.1	7/1-7/31	8.8	7/12	14.3
1997	7.6	9.6	6.5	2/1-2/28	6.2	7/1-7/31	10.8	8/20	*17.4*
1998	8.2	11.0	6.8	2/1-2/28	6.4	7/1-7/31	12.1	7/27	*16.1*
1999	8.2	10.7	7.0	2/1-2/28	6.7	7/1-7/31	11.7	7/27	15.0
2000	8.2	11.0	6.8	2/1-2/28	6.5	7/1-7/31	12.5	8/1	15.0
7 YR AVG	*7.8*	*10.4*	*6.6*		*6.2*		*11.3*		*15.4*
5 YR AVG	*8.0*	*10.5*	*6.7*		*6.4*		*11.2*		*15.6*

[1] Calculated based on Raw Water Flow - 1.5 x Backwash Water Used - Total Water Stored
(On average, raw water pumping is approximately 5% higher than plant production. This 5% is assumed in the 1.5 X Backwash water Used.]

[2] Peak season is June through September

[3] Off season is October through May

[4] Values Exceeding 16.0 MGD for Max Daily Flow are potentially suspect due to possible internal overflows and meter inaccuracies.

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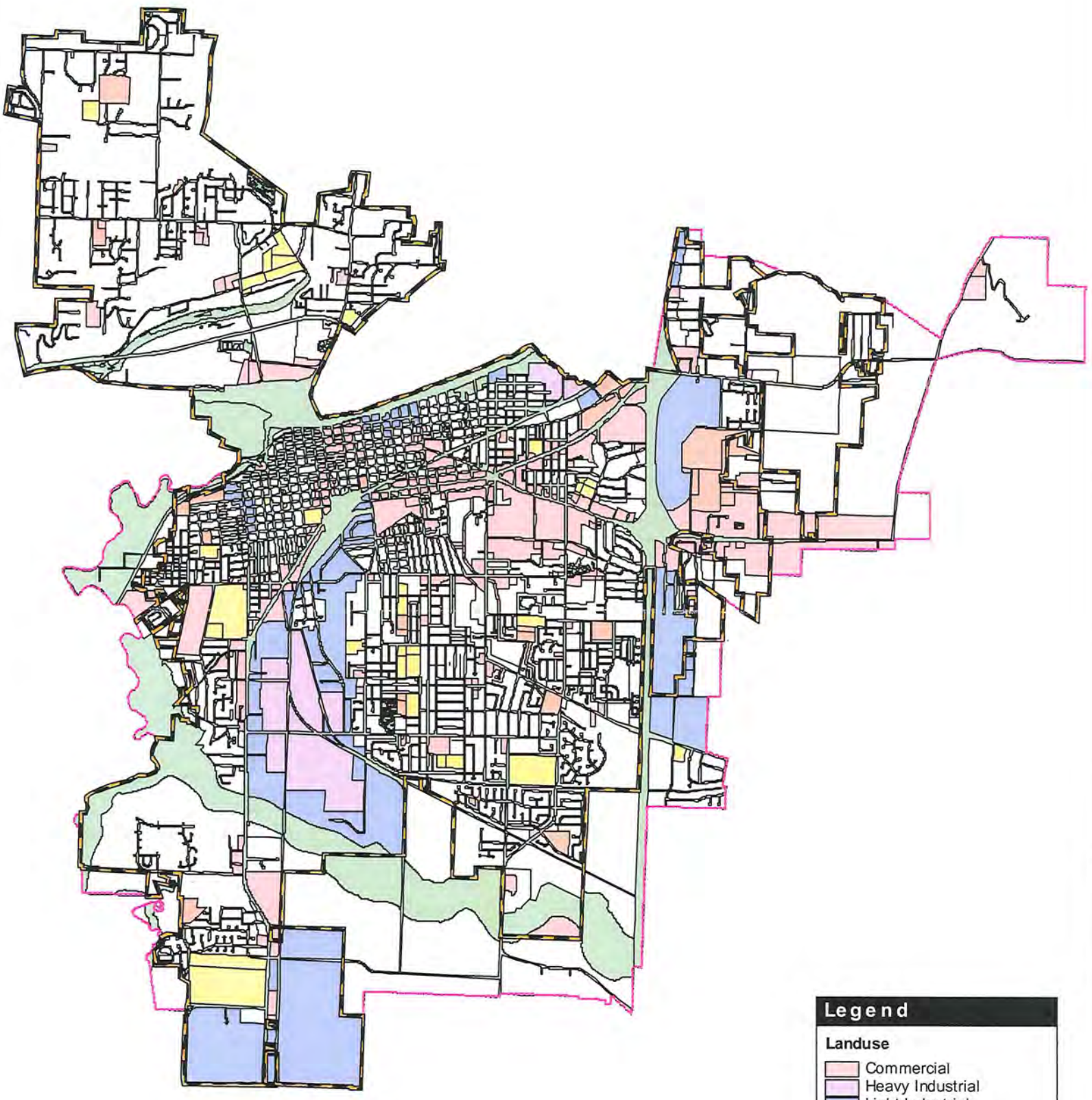
Figure 2-2



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City of Albany, Oregon
Water Facility Plan

BUILDOUT LAND USES USED TO FORECAST WATER DEMAND

Table 2-4: Non-Residential Demand Estimates

Land Use	*Water Demand (gpad)*
Commercial	2,000
Light Industrial	1,600
Heavy Industrial	4,800
Schools	600
Parks	700

Reserve

A three million gallon per day non-residential reserve water demand is included in the total water demand forecast at buildout. This is a policy recommended by the Water Task Force. The non-residential reserve is intended to provide flexibility and capacity to accommodate more water intensive commercial and industrial customers. For facility planning purposes, the added demand for a non-residential reserve has been assumed to be phased, with the first 1-mgd capacity provided by 2025 and the remaining 2-mgd capacity provided between 2025 and buildout of the UGB. Unlike other demands, peaking factors have not been applied to the non-residential reserve in anticipation that these more water intensive uses will be relatively consistent demands. The reserve has been allocated to commercial and industrial areas in Zone 1.

Water Loss

Water loss is defined as the difference between water that is produced and water that is sold or otherwise accounted for. Unmetered uses that are often accounted for as estimates include such activities as street sweeping, construction, hydrant flushing, and fire suppression. Water loss is typically attributed to leaks, unmetered and unaccounted for water use, and inaccurate metering equipment both at the source (Water Treatment Plant) and individual customer water meters. An acceptable water loss rate is considered to be no greater than 15 percent. Based on production estimates and available historic utility billing data, approximately 20 to 25 percent of Albany's water production is currently unaccounted for on an annual basis. The majority of this loss is assumed to be the result of leakage from deteriorated steel water lines. A steel pipe replacement program, discussed later in this document, is expected to replace all steel water lines over the next 10 to 15 years and will reduce the current water loss rate. As shown in *Chapter 3 - Planning Criteria and Cost Estimates* the Water Task Force has recommended establishing a long-term goal of reducing the current loss rate to 15 percent. This rate is consistent with industry standards and this allowance is included as part of the projected water demand requirement at buildout of the UGB.

Demand Variations

The water demands discussed above are average daily demand (ADD) values expressed on a per capita or per acre basis. Variations in these average demands are used to size treatment plant, reservoir, pump station and transmission and distribution facilities. Treatment plants, transmission lines, and pump stations serving a pressure zone with reservoir storage are sized to meet maximum day demands (MDD). Peak hourly demands (PHD) are used as one of the criteria for sizing distribution water lines, reservoirs, and pump stations serving a pressure zone without reservoir storage.

Maximum Day Demand (MDD)

As shown in ***Table 2-3***, Albany's average MDD peaking factor (MDD/ADD) is approximately 2.0 from 1994 to 2000. This peaking factor is consistent with peaking factors for other Willamette Valley communities. Consequently, a peaking factor of 2.0 has been used to project future MDDs.

Peak Hour Demand (PHD)

The PHD is the greatest hourly demand expected during the MDD. Because meter information used to develop the MDD/ADD multiplier did not provide hourly data; a PHD/ADD ratio of 4.0 was used based on the higher-end of the "common range" developed in the *AWWA Water Distribution System Handbook*[10].

Minimum Hour Demand (MHD) (Maximum Storage Replenishment)

The MHD is the minimum hourly demand expected during the maximum day. This demand scenario represents a maximum storage replenishment rate condition and may be the limiting condition for the piping and pumping systems. Because meter information used to develop the MDD/ADD multiplier did not provide hourly data; a MHD/ADD ratio of 0.5 was used. This multiplier is within the "common range" of 0.2 – 0.6 provided in the *AWWA Water Distribution System Handbook*.

Summary of Projected Demands

Projected unit demands per capita and per acre have been multiplied by the projected buildout population and inventory of land uses to develop a total water demand at buildout. These calculations are summarized in ***Table 2-5*** and result in a projected MDD of 40 MGD. A demand curve representing this incremental growth rate and additional non-residential demands is shown as ***Figure 2-3***. Projected average and maximum day demands are also shown in ***Table 2-6***. Both ***Figure 2-3*** and ***Table 2-6*** reflect a 1-mgd demand decrease (MDD) in 2006, as Millersburg demands will be met by the Joint Water Project.

[10] AWWA, *American Water Works Association (AWWA) Manual 32, Distribution Network Analysis for Water Utilities*, 1989.

Table 2-5: Projected Water Demand at Buildout

Customer Type	*Demand Rate*	*Units*	*Population/ Acres*	*Buildout Land Use (acres)*	*Average Day Demand (MGD)*	*Maximum Day Demand (MGD)*
Residential	100	gal/capita/day	109,000		10.9	
Commercial	2,000	gal/day/acre	1,100	1,100	2.2	
Light Industrial	1,600	gal/day/acre	1,200	1,200	1.9	
Heavy Industrial	4,800	gal/day/acre	300	300	1.4	
Parks	700	gal/day/acre	300	300	0.2	
School District & LBCC	600	gal/day/acre	300	300	0.2	
				Subtotal (rounded)	*16.9*	*34*
				Water Loss (15% of ADD)	2.5	3
				Total, w/o Reserve (rounded)	*19.4*	*37*
				Industrial Reserve	*3.0*	*3*
				Total, w/ Reserve (rounded)	***22.4***	***40***

Figure 2-3: Projected Water Demand Curve

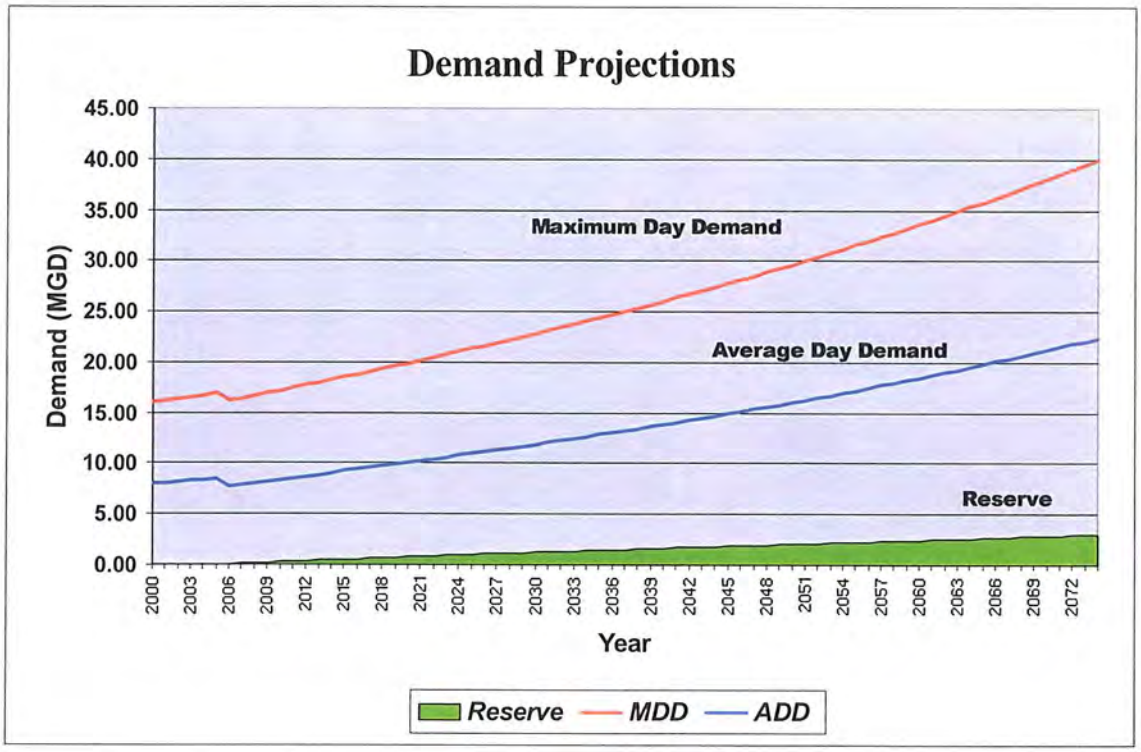

Table 2-6: Projected Demands to Buildout of the UGB

Demand	*2000*	*2005*	*2010*	*2015*	*2020*	*2025*	*2050*	*Buildout*
ADD	8.0	8.5	8.4	9.2	10.1	11.0	16.0	**22.4**
MDD	16.0	16.4	17.2	18.5	19.9	21.4	29.6	**40.0**

PROJECTED POPULATION AND WATER DEMANDS SUMMARY

A summary of projected population and water demands by pressure zone at buildout is shown in ***Table 2-7***. This table includes population and demand projections for pressure Zone 4, an area currently within pressure Zone 3 that will be separated into a higher service level as discussed in *Chapter 7 - Distribution System Evaluation.*

Table 2-7: Projected Population and Demands at Buildout of the UGB by Pressure Zone

Pressure Zone	*Buildout Population*	*ADD (MGD)*	*MDD (MGD)*
1	97,000	20.8	37.0
2[a]	8,400	1.0	1.9
3[a]	2,700	0.5	0.9
4	900	0.1	0.2
Total	***109,000***	***22.4***	***40.0***

[a] NACSD population (123 Zone 2, 984 Zone 3) is not included in population data but is accounted for in the demands.

Chapter 3 - Planning Criteria & Cost Estimates

PLANNING CRITERIA

Planning criteria have been used to evaluate and plan Albany's water system. They are not intended to be rigid requirements, but were used as the basis for evaluation in field inspections, modeling, operational tests, and review of historic data.

Planning Period

The Water Facility Plan considers two planning horizons. The first horizon extends to 2024 and was used to determine detailed improvements for Vine Street and joint water project (JWP) treatment facilities. The second horizon extends to "buildout" of the Urban Growth Boundary (UGB) and was used to determine improvements to pipelines, pump stations, and reservoirs, and to determine ultimate treatment plant capacity requirements. In order to help prioritize recommended improvement projects the planning horizons have been divided into four stages as shown below.

- Stage 1: 2005 to 2009
- Stage 2: 2010 to 2014
- Stage 3: 2015 to 2024
- Stage 4: 2025 to 2074 (buildout)

Planning Area

As previously mentioned the Cities of Albany and Millersburg are working on a joint water supply project that will serve both communities. Once this project is complete, Millersburg's distribution system will be independent of Albany's. Consequently, although Millersburg is part of Albany's existing service area, this plan focuses entirely on Albany's water demands and water system. Therefore, the service area considered in this plan includes the area within Albany's UGB and limited service outside the UGB in North Albany.

Limitations for additional water service to areas outside Albany's UGB in North Albany are established by Albany City Council Resolution #3363 (included as ***Appendix B***), and limit service to:

- Residential, non-fire flow service,
- Limit of one residential meter per tax lot (tax lots existing on July 1, 1991),
- Service will only be provided to lots adjacent to existing water lines,

- No service will be provided to any future property development outside the city limits if it adversely impacts existing customers.

As discussed in *Chapter 1 – Existing System Description,* the City agreed only to maintain the current level of service at the time the City took over responsibility for operation and maintenance of the North Albany County Service District (NACSD) distribution system. Therefore, areas outside the UGB in North Albany have not been evaluated for planning criteria but their water demands were considered on the system.

Summary of Planning Criteria

Planning criteria were developed by using industry standards, and input from the Water Task Force. The Task Force concentrated their review on policy-related planning criteria. One of the key concepts reviewed by the Task Force was how the system, and consequently planning criteria, will change once the joint water supply project is brought into service. The City will have two sources of supply with the completion of the joint water project. Communities that have two sources of supply are less likely to experience a complete loss of water service than a community with a single source.

For water systems like Albany's existing system with a single source of supply, it is important to develop an emergency source of supply in case their primary source becomes temporarily unavailable. In addition, a city with a single source of supply should also have a greater amount of water stored (emergency storage) in the distribution system. In general, the purpose of emergency storage is to provide water during emergencies such as power outages, equipment failures, pipeline failures, natural disasters, or loss of source of supply. The amount of emergency storage provided is dependent upon an assessment of risk and the desired degree of system reliability. For a water system like Albany's existing system, with one source of supply, emergency storage volumes typically range from two to three average day demands.

The use of two sources of supply reduces the need for an emergency source as well as reduces the amount of emergency water storage contained in the City's reservoirs. With two sources of supply and recognizing all the other needs within the water system, the Task Force felt that there was not enough risk to justify allocating funds to the development of an emergency source of supply. In addition, the Task Force felt that with the two sources of supply in operation by 2006, one average day demand would be adequate for emergency storage resources.

Planning criteria used in this plan to evaluate Albany's water system is summarized in ***Table 3-1.***

Table 3-1: Planning Criteria

Criteria		***Criteria***	***Notes***
Service Area		Albany UGB + NACSD	No fire service to NACSD
Planning Period			
WTP Facilities		2025	
Trans./Dist./Storage/WTP Capacity		Buildout	
Phasing	Phase 1	2005-2009	
	Phase 2	2010-2014	
	Phase 3	2015-2024	
	Phase 4	2025 to Buildout	
Water loss rate @ BO			
Loss Rate		15%	
WTP Capacity			
Capacity		MDD	
Distribution System			
Size	Distribution	8"-<16"	Use standard pipe diameters
	Transmission	= and >16"	8,12,16,20,24,30,36,42,48
Maximum Velocity	Distribution	10 fps	
	Transmission	5 fps	
Maximum Headloss	Distribution	10'/1,000'	
	Transmission	3'/1,000'	
Pressure	Zone	1st/2nd/3rd/4th	
	Minimum operating	40	
	Maximum operating	80	
	Fire (MDD+FF) Minimum	20	
Reservoirs			
Volume	Equalization	25% MDD	
	Fire	Largest fire demand in zone	Balance storage for most hydraulically efficient transmission lines
	Emergency	1 ADD	2 sources of supply
		2 ADD	1 source of supply
Operating Level		75% or within 10' of overflow, whichever is higher	
Reservoir Fill or Drain Rate	Flow Rate (Q) / Reservoir Volume (V)	$1 \leq (Q/V) \leq 2$	
Pump Stations			
Capacity	Serving Zone w/ Reservoir Storage	Greater of MDD or MHD	MHD = maximum storage replenishment
	Serving Zone w/o Reservoir Storage	Greater of MDD+FF or PHD	
	Draining pumped storage reservoirs	Capacity (MGD) = 1 to 2 times reservoir volume (MG)	
Power		2 sources (sub-stations) or 1 source & generator	
PRV			
Capacity	Continuous	PHD	
	Intermittent	Greater of MDD+FF or PHD	
Emergency Supply Source			
Source		Not Required	JWP - Scravel Hill WTP
Fire Flows/Durations			
Residential	Low density	1,500 gpm	2 hours
	Medium density (SF & MF)	2,500 gpm	2 hours
	High density (MF)	3,500 gpm	3 hours
Commercial	Office Professional	3,500 gpm	3 hours
	Neighborhood	3,500 gpm	3 hours
	Community/Heavy	3,500 gpm	3 hours
	Tourist services	3,500 gpm	3 hours
Industrial	Park	5,000 gpm	4 hours
	Light	5,000 gpm	4 hours
	Heavy	5,000 gpm	4 hours
Other	Mixed use	3,500 gpm	3 hours
	Schools	5,000 gpm	4 hours
	Institutional (hospital/Jail)	3,500 gpm	3 hours

Abbreviations:

ADD = Average Day Demand
MDD = Maximum Day Demand
PHD = Peak Hour Demand
MDD+FF = Maximum Day Demand Plus Fire Flow
gpm = Gallons per minute
fps = Feet per second
UGB = Urban growth boundary
NACSD = North Albany County Service District
JWP = Joint Water Supply Project

BASIS OF COST ESTIMATES

Estimated project costs for water line, pump station, and reservoir improvements were developed on the basis of "unit costs." Individual project cost estimates were developed for improvements to the Canal and treatment plants. Both unit cost estimates and individual project cost estimates are planning level or "order of magnitude" estimates. Planning level estimates were based on a combination of published cost data, Montgomery Watson Harza's experience with projects of similar scope, a review of Albany's recent bid tabulation data, and regional cost information where local data wasn't available. Cost estimates for water line, pump station, and reservoir improvements do not include allowances for unique conditions such as railroad crossings or bores for water line projects.

Since construction costs change over time, cost estimates are indexed for ease in updating the costs to reflect future market conditions. The Engineering News-Record (ENR) Construction Cost Index (CCI) is commonly used for this purpose. Therefore, costs used in this plan are based on a Seattle ENR CCI of 7560 for March 2002.

Total capital costs for each project include three components: direct construction costs, an allowance for contingencies, and an allowance for engineering, legal, and administrative costs. The allowance for contingencies covers items such as changes in project scope during design and unforeseen site conditions encountered during construction. The contingency allowance does not include major project scope additions or additional costs resulting from permit mitigation requirements. The engineering, legal, and administrative allowance provides for design, construction management, legal, and administrative costs.

For Canal, pump station, reservoir, and pipeline projects, construction costs were increased by 20 percent for contingencies and 15 percent for engineering, legal, and administrative costs. Cost estimates for the Vine Street Water Treatment Plant (WTP) projects are planning level estimates and include a 20 percent contingency allowance and a 20 percent allowance for engineering, legal, and administrative expenses. A greater allowance for engineering, legal, and administrative fees has been assumed for the Vine Street WTP due to the inherent complexities associated with plant design and retrofitting an existing facility.

Costs for each of the Canal and Vine Street WTP improvement projects were developed as independent individual estimates. Cost estimates for these projects are included later in this document in the evaluation of each facility. Costs for pipeline, pump station, and reservoir improvements are based on unit cost estimates as shown in ***Table 3-2***. Cost estimates for the Joint Water Project have been prepared under a separate contract between the City of Albany and the firm of CH2M-Hill and incorporated from that project report.

Table 3-2: Unit Costs

Pipeline Unit Costs				
Diameter (inches)	*Construction ($/ft)*	*Contingency (20%) ($/ft)*	*Engineering, Legal & Administrative (15%) ($/ft)*	*TOTAL ($/ft)*
8"	$100.44	$20.10	$15.10	$135.60
12"	$130.67	$26.10	$19.60	$176.40
16"	$164.44	$32.90	$24.70	$222.00
20"	$178.67	$35.70	$26.80	$241.20
24"	$192.89	$38.60	$28.90	$260.40
30"	$237.04	$47.40	$35.60	$320.00
36"	$253.33	$50.70	$38.00	$342.00
Concrete Reservoir Unit Costs				
Size (Million Gallon)	*Construction ($/gallon)*	*Contingency (20%) ($/gallon)*	*Engineering, Legal & Administrative (15%) ($/gallon)*	*Total Cost ($/gallon)*
0.5	$1.02	$0.20	$0.15	$1.37
1.0	$0.92	$0.18	$0.14	$1.24
1.5	$0.82	$0.16	$0.12	$1.10
2.0	$0.72	$0.14	$0.11	$0.97
3.0	$0.62	$0.12	$0.09	$0.83
3.5	$0.60	$0.12	$0.09	$0.81
4.0	$0.55	$0.11	$0.08	$0.74
5.0	$0.52	$0.10	$0.08	$0.70
Steel Reservoir Unit Costs				
Size (Million Gallon)	*Construction ($/gallon)*	*Contingency (20%) ($/gallon)*	*Engineering, Legal & Administrative (15%) ($/gallon)*	*Total Cost ($/gallon)*
0.25	$0.70	$0.14	$0.11	$0.95
0.50	$0.57	$0.11	$0.09	$0.77
0.75	$0.48	$0.10	$0.07	$0.65
1.00	$0.45	$0.09	$0.07	$0.61
1.50	$0.39	$0.08	$0.06	$0.53
2.00	$0.35	$0.07	$0.05	$0.47
3.00	$0.30	$0.06	$0.05	$0.41
Pump Station Unit Costs				
Size (Installed HP - Firm Capacity)	*Construction ($)*	*Contingency (20%) ($)*	*Engineering, Legal & Administrative (15%) ($)*	*Total Cost (Rounded $)*
50	$138,479	$27,696	$20,772	$186,900
75	$207,718	$41,544	$31,158	$280,400
100	$276,958	$55,392	$41,544	$373,900
200	$553,916	$110,783	$83,087	$747,800
300	$830,873	$166,175	$124,631	$1,121,700
400	$1,107,831	$221,566	$166,175	$1,495,600
500	$1,384,789	$276,958	$207,718	$1,869,500
1,000	$2,769,578	$553,916	$415,437	$3,738,900

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Chapter 4 - Water System Regulatory Review

All water systems must operate in compliance with the Federal Safe Drinking Water Act (SDWA). In Oregon, the SDWA is administered by the Oregon Department of Human Services Drinking Water Program (ODWP) under the Oregon Drinking Water Quality Act. This chapter identifies current and potential future drinking water quality regulations as administered by the ODWP. This chapter also summarizes the Vine Street Water Treatment Plant's (WTP) compliance history and its ability to comply with potential future regulations. The Joint Water Supply Project currently under construction (discussed in Chapter 8 – Joint Water Supply Project) is designed to meet or exceed current drinking water quality regulations and will be well positioned for compliance with potential future regulations. In addition to water quality regulations, water systems must comply with master planning, National Pollution Discharge Elimination System (NPDES), and security and counter-terrorism requirements. This regulatory summary is current as of January 2003.

CURRENT DRINKING WATER QUALITY REGULATIONS

There are currently drinking water quality standards for 96 primary contaminants (those with health concerns) and 12 secondary contaminants (those with only aesthetic impacts) regulated by the ODWP. Each contaminant has either an associated established maximum contaminant level (MCL) – a measurable maximum amount of the contaminant that may be present - or a recommended treatment technique (a requirement to install and operate a certain type of water treatment process). These contaminants are grouped into six general categories:

- Microbial Contaminants
- Disinfectants and Disinfection By-Products
- Inorganic Chemicals
- Organic Chemicals
- Radiologic Contaminants
- Unregulated Contaminants

Microbial Contaminants

Surface water systems are protected from microbial contamination through a combination of treatment plant performance and distribution system monitoring. Turbidity removal and microorganism inactivation must be assured at the treatment plant. The absence of coliform bacteria is assured through the presence of chlorine residuals in the distribution system.

Turbidity Monitoring Requirements

In January 2002, filtered water turbidity requirements were revised and a more stringent standard adopted. These new requirements apply to each individual filter in addition to the combined filter effluent. The City's Vine Street WTP has historically met or exceeded the regulatory requirements for filtered water turbidity. Although the plant has had no difficulties in meeting the new, lower turbidity requirements, instrumentation such as turbidimeters are dated and should be replaced with more current metering equipment. These improvements are included in *Chapter 6 - Vine Street Water Treatment Plant.*

Disinfection Performance

Disinfection performance requirements to inactivate *Giardia*, viruses and bacteria that may be present in the raw water supply to the WTP, measured as a level of inactivation, have consistently been met or exceeded at the Vine Street WTP based on the monitoring data. Free chlorine has been employed as the primary disinfectant to achieve this purpose.

In order to determine the level of microbial inactivation that is achieved during disinfection with chlorine, the EPA developed the "CT" concept. "CT" is the product of disinfectant residual concentration (or "C"), measured at the outlet of a disinfection section, and the available reaction time (or "T"). A tracer test was recommended and performed on the Maple Street Reservoir to determine the appropriate time value (known as T_{10}/T) for use in the "CT" calculation. Results from the tracer tests over a range of treatment plant flows and reservoir levels suggest the reservoir's interior baffle wall and inlet piping need to be repaired or replaced to maximize contact time through the reservoir. This is particularly important if Albany decides to move the point of chlorine addition to just ahead of the filters, in order to reduce disinfection by-products. Recommended improvements to the Maple Street Reservoir and baffle are discussed in *Chapter 6 - Vine Street Water Treatment Plant.*

Historic distribution system monitoring data indicates consistent compliance with the ODWP requirements for levels of coliform bacteria. Free chlorine is also used to maintain a residual in the distribution system. The Albany water system data shows consistent compliance with disinfection residual monitoring and disinfection residual concentrations in the distribution system.

Disinfectants and Disinfection By-Products (DBPs)

Disinfection treatments used to inactivate pathogens in drinking water can react with naturally occurring organics and inorganic matter in water to form disinfection byproducts (DBPs). The type and concentration of DBPs in treated water depends largely on the type of disinfectant and concentrations of DBP precursor material. For Albany, the two most important classes of DBPs are total trihalomethanes (TTHMs) and haloacetic acids (HAA_5).

TTHMs have been regulated for a number of years. Albany's historic data indicates that total trihalomethanes have consistently been below the MCL, included as the new, lower MCL that came into effect in January 2002.

In January 2002, new regulations also came into effect for HAA_5. If monitoring results are within 80% of the regulatory levels, additional studies (called disinfection profiling) are required. Recent quarterly samples for disinfection by-products, taken over a two-year period, show HAA_5 concentrations approaching the disinfection profiling action level. As a result, studies intended to better understand HAA_5 formation at the water treatment plant were performed. Based on these studies, the City has decided to relocate the point of chlorine addition at the Vine Street WTP just ahead of the filters. Relocation of the point of chlorine addition should reduce HAA_5 levels.

Inorganic Chemicals, Organic Chemicals, Radionuclides

Sixteen inorganic compounds and six radionuclides are currently regulated. The Vine Street WTP has consistently complied with all inorganic chemical and radionuclide MCLs.

The Vine Street WTP has consistently complied with all organic chemical MCLs. No concentrations of regulated volatile organic carbons (VOCs) or soluble organic carbons (SOCs) above the detection limit are on record. The Vine Street WTP does not have continuous protection against organic contaminants that may be present in the raw water. The WTP is equipped with powder activated carbon (PAC) that can be used to remove organic contaminants, but this system requires detection and intervention by the WTP staff. The Canal source is vulnerable to contamination from agricultural and urban runoff that may contain some organic contaminants. Future replacement of current anthracite filter media with granular activated carbon (GAC) will provide continuous protection from organic contaminants and thereby enhance treatment reliability and safety.

Unregulated Contaminants

The federal Environmental Protection Agency (EPA) and the state periodically require water systems to conduct monitoring for contaminants that are not regulated at the time of monitoring. The purpose of this monitoring is to gather data about these contaminants for

potential future regulations. The City of Albany has remained in compliance with unregulated contaminant monitoring requirements.

FUTURE DRINKING WATER REGULATIONS

A number of EPA rules that could impact the operation of the City of Albany's water system are currently pending or in development. Estimates of the timetable for promulgation for these rules and the projected effects on the City of Albany are presented below.

Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR)

The purpose of the LT2ESWTR is to improve the control of microbial pathogens in drinking water, especially *Cryptosporidium*, in public water systems serving more than 10,000 people. The rule is currently anticipated to come into effect in 2004, with compliance in 2006. At the moment, there is no reason to believe that additional treatment process steps will be needed under this rule. However, this can be confirmed with additional raw water sampling for *Cryptosporidium*. If Albany is required to add treatment to inactivate *Cryptosporidium* in the future, installation of a disinfectant stronger than chlorine (e.g. ultraviolet (UV) irradiation) may be necessary at the Vine Street Water Treatment Plant.

Stage 2 Disinfection By-product Rule (DBPR)

A companion rule to the LT2ESWTR is the Stage 2 DBPR. The purpose of the Stage 2 DBPR is to further reduce health risks associated with disinfection by-products. Based on available data, moving the point of chlorine addition in the Vine Street WTP to just ahead of the filters should be sufficient for continued compliance when the Stage 2 DBPR is adopted. However, relocation cannot be done during high demand periods until the Maple Street Reservoir baffle is improved. Baffle related improvements are discussed in *Chapter 6 - Vine Street Water Treatment Plant*. In addition, results of ongoing monitoring for disinfection by-products should be reviewed as this rule is developed to assure that no additional steps will be needed to comply.

Arsenic Rule

EPA recently lowered the MCL for arsenic to 0.010 mg/L from 0.050 mg/L. Compliance with this new MCL is required by January 2006. The Vine Street WTP is not expected to have problems meeting this rule. The most recent testing for arsenic was completed on July 23, 2002, and arsenic was not detected with a detection limit of 0.002 mg/L.

MASTER PLAN REQUIREMENTS—OAR 333-061-0060 (5)

Oregon communities with 300 or more service connections are required by the ODWP to maintain a current water master plan. These plans must be prepared by a professional

engineer, and must consider the needs of the water system for at least a twenty-year period. Upon completion, the plan must be submitted to the Health Department for review and approval. This document meets the requirements set forth by the ODWP and will be submitted to the Health Department for approval.

NPDES Requirements

In addition to the requirements of the Safe Drinking Water Act, the City of Albany's water system must operate in compliance with the federal Clean Water Act. This Act is administered in Oregon by the Department of Environmental Quality (ODEQ) and establishes wastewater discharge limitations for backwash lagoons at the WTP. The City must ensure discharges from backwash lagoons and settling basins at the Vine Street Treatment Plant comply with conditions of a NPDES permit to assure there is no pollution of receiving waters. The backwash lagoons and settling basins are currently operating under an NPDES General Permit dated January 8, 1998. The City has requested a renewal of this permit and the current permit remains in force pending DEQ's action on the renewal permit.

Public Health Security and Bioterrorism Preparedness and Response Act of 2002

Drinking water utilities today find themselves facing new responsibilities. While their mission has always been to deliver a dependable and safe supply of water to their customers, the challenges inherent in achieving that mission have expanded to include security and counter-terrorism. In the Public Health Security and Bioterrorism Preparedness and Response Act of 2002, Congress recognized the need for drinking water systems to undertake a more comprehensive view of water safety and security. The Act amends the Safe Drinking Water Act and specifies actions community water systems and the U.S. Environmental Protection Agency (EPA) must take to improve the security of the nation's drinking water infrastructure.

The Bioterrorism Preparedness and Response Act requires every community water system that serves a population of greater than 3,300 persons to conduct a vulnerability assessment. A project to meet this requirement is discussed in *Chapter 6 - Vine Street Water Treatment Plant.*

REGULATORY REVIEW SUMMARY

This chapter outlined the changing regulatory environment the City operates under in order to meet federal and state drinking water quality standards. There are currently 96 primary contaminants (those with health concerns) and 12 secondary contaminants (those with only aesthetic impacts) that are regulated through ODWP. As discussed, the City meets or exceeds current standards with the existing treatment facilities. *Chapter 6 – Vine Street Water Treatment Plant* discusses recommended improvement projects to provide continued compliance within the changing regulatory environment.

In addition to water quality standards, the City is required to comply with master planning, NPDES, and security requirements. The City is currently meeting these requirements.

Chapter 5 - Canal Evaluation

As discussed earlier, the Santiam-Albany Canal is an 18-mile long canal that delivers South Santiam River water to the Vine Street WTP in downtown Albany. The City uses Canal water for municipal domestic use, hydropower generation, and for flow augmentation in local streams. However, the City of Albany is not the only water user along the Canal. Other water users include the City of Lebanon, for municipal use, and several other individual property owners that use Canal water for irrigation or other agricultural processes. During the rainy season the Canal is also used for stormwater conveyance. Although this is an existing use of the Canal, the City has a long-term goal of removing the majority of stormwater inflows. Stormwater inflows can reduce water quality and increase sediment deposits that in turn reduce the capacity of the Canal.

As shown in ***Table 1-1*** the Oregon Water Resource Department has issued approximately 380 cfs in water rights to water users along the Canal. However, the type of use permitted by these water rights varies between certificates. As a result, the concurrent use of all these water rights is not likely. Therefore, based on the seasonal needs of water users along the Canal, and the need for interim capacity for stormwater conveyance, adequacy of the Canal was evaluated based on a flow requirement of 310 cfs, which is consistent with earlier studies of the Canal completed for Albany's hydropower license. Flow control structures, bridges, culverts, and open channel capacity were evaluated based on the 310 cfs flow rate. A preliminary hydraulic analysis was performed on these structures to identify facilities that could potentially limit Canal capacity at 310 cfs. In addition to hydraulic analysis, the condition of the Canal was evaluated during a field inspection conducted in the spring of 2001. The field inspection was used to identify points of structural damage, sediment deposits, encroachments, inflows and outflows. These locations were recorded with a global positioning system (GPS) location device and hand notes were taken at each point. Based on the hydraulic analysis and field inspection results, this plan identifies four improvement projects that include updating control structures, ensuring Canal capacity, channel restoration, and improving Canal capacity. ***Figure 5-1*** shows an overview of the Canal including the locations of existing, and proposed, control structures.

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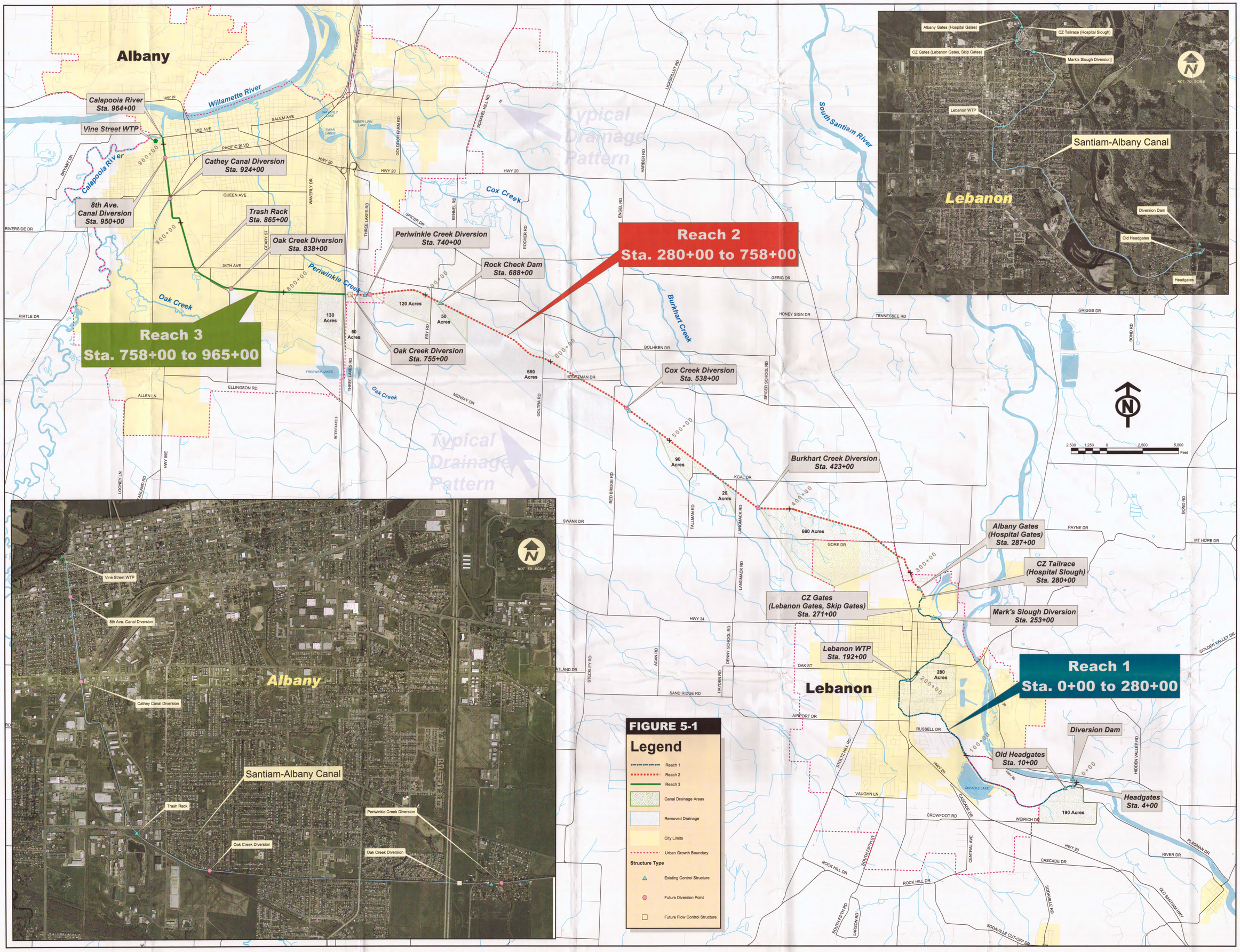
FIGURE 5-1


Albany
Lebanon
Willamette River
South Santiam River
Cox Creek
Burkhart Creek
Periwinkle Creek
Oak Creek
Calapooia River
Typical Drainage Pattern
Typical Drainage Pattern
Calapooia River Sta. 964+00
Vine Street WTP
Cathey Canal Diversion Sta. 924+00
8th Ave. Canal Diversion Sta. 950+00
Trash Rack Sta. 865+00
Oak Creek Diversion Sta. 838+00
Periwinkle Creek Diversion Sta. 740+00
Rock Check Dam Sta. 688+00
Oak Creek Diversion Sta. 755+00
Cox Creek Diversion Sta. 538+00
Burkhart Creek Diversion Sta. 423+00
Albany Gates (Hospital Gates) Sta. 287+00
CZ Tailrace (Hospital Slough) Sta. 280+00
CZ Gates (Lebanon Gates, Skip Gates) Sta. 271+00
Mark's Slough Diversion Sta. 253+00
Lebanon WTP Sta. 192+00
Diversion Dam
Old Headgates Sta. 10+00
Headgates Sta. 4+00
Reach 1 Sta. 0+00 to 280+00
Reach 2 Sta. 280+00 to 758+00
Reach 3 Sta. 758+00 to 965+00
960+00
900+00
800+00
700+00
600+00
500+00
400+00
300+00
200+00
100+00
0+00
120 Acres
50 Acres
130 Acres
60 Acres
680 Acres
90 Acres
20 Acres
660 Acres
280 Acres
190 Acres
Albany Gates (Hospital Gates)
CZ Tailrace (Hospital Slough)
CZ Gates (Lebanon Gates, Skip Gates)
Mark's Slough Diversion
Lebanon WTP
Santiam-Albany Canal
Diversion Dam
Old Headgates
Headgates
NOT TO SCALE
2,500 1,250 0 2,500 5,000 Feet
Vine Street WTP
8th Ave. Canal Diversion
Cathey Canal Diversion
Trash Rack
Periwinkle Creek Diversion
Oak Creek Diversion
Oak Creek Diversion
Santiam-Albany Canal
Albany
NOT TO SCALE
Legend
Reach 1
Reach 2
Reach 3
Canal Drainage Areas
Removed Drainage
City Limits
Urban Growth Boundary
Structure Type
Existing Control Structure
Future Diversion Point
Future Flow Control Structure
HWY 20
HWY 34
3RD AVE
SALEM AVE
PACIFIC BLVD
QUEEN AVE
RIVERSIDE DR
34TH AVE
PIRTLE DR
ELLINGSON RD
ALLEN LN
MIDWAY DR
SPICER DR
GERIG DR
HONEY SIGN DR
BOLHKEN DR
STOLTZMAN DR
KGAL DR
SWANK DR
GORE DR
PAYNE DR
MT HOPE DR
GOLDEN VALLEY DR
SAND RIDGE RD
AIRPORT DR
OAK ST
RUSSELL DR
VAUGHN LN
CROWFOOT RD
WEIRICH DR
CASCADE DR
ROCK HILL DR
SCIO-VILLE CUT-OFF DR
TENNESSEE RD
GRIGGS DR
PLAGMAN DR
RIVER DR
OLD SANTIAM HWY
BRYANT DR
WAVERLY DR
GEARY ST
THREE LAKES RD
GOLDFISH FARM RD
SCRAVEL HILL RD
LOCKWILLET RD
HARBER RD
KENNEL RD
ENGEL RD
EOCHER RD
FRY RD
GOLTRA RD
SPICER SCHOOL RD
TALLMAN RD
LANGMACK RD
RED BRIDGE RD
DENNY SCHOOL RD
HAYDEN RD
AGAN RD
STECKLEY RD
STOLTZ HILL RD
SOUTH FIFTH ST
SOUTH FIFTH RD
LARSON RD
CENTRAL AVE
SCIO-VILLE RD
BOND RD
HIDDEN VALLEY DR
OLD SANTIAM HWY
INTERSTATE 5
HWY 99E
LOONEY LN
OAKLAND RD
HWY 99E
WILLOWBY LAKE
TIMBER-LINN LAKE
SWAN LAKES
FREEWAY LAKES
CHEADLE LAKE

UPDATE CONTROL STRUCTURES (PROJECT NUMBER C1)

Flow control structures include control gates, weirs, check dams, and other features that directly influence Canal capacity and flow control. Coordinated use of the Canal flow structures is recommended to provide relief during high flow periods. Improvements to existing gate structures, addition of new control gates, and automation and instrumentation of the gates will provide a complementary and flexible system to minimize flooding adjacent to the Canal.

Existing Control Structures

There are six existing control structures that should be improved to either increase Canal capacity or to reroute excess Canal flow. Two structures, the Lebanon WTP and Hydropower intake (Sta 192+00) and the Rock Check Dam (Sta 688+00), are identified as potentially limiting Canal capacity at a 310 cfs flow rate. The capacity analyses, although adequate for facility planning purposes, were preliminary in nature. These sites should be further evaluated to verify that these structures are capacity limited at high flow rates. Cost estimates for improving these structures are shown in ***Table 5-1***.

Four structures, Mark's Slough Weir (Sta 253+00), Crown Zellerbach (CZ) Tailrace Weir (Hospital Slough, Sta 280+00), Albany Gates (Sta 287+00), and Cox Creek (Sta 538+00), are identified as structures that should be modified to route excess flow in the Canal to Mark's Slough, Hospital Slough, and Cox Creek to minimize flooding along portions of the Canal. Cost estimates for these improvements include costs for adding automated gates and allowances for completing structural and safety inspections and related improvements. ***Table 5-1*** shows the cost estimates for improvements to these facilities.

Table 5-1: Cost Estimates for Improvements to Existing Control Structures

Control Structure	*Cost Estimate*
Lebanon WTP and Hydropower Intake (Station 192+00)	$300,000
Mark's Slough (Station 253+00)	$520,000
CZ Tailrace (Hospital Slough, Station 280+00)	$350,000
Albany Gates (Station 287+00)	$480,000
Cox Creek (Station 538+00)	$400,000
Rock Dam and Siphon (Station 688+00)	$200,000
Total	***$2,250,000***

New Control Structure

In addition to improving existing control structures, a new control structure should be constructed close to the east end of Albany's urban growth boundary (Sta 755+00). This is a logical site, as it would allow for flood relief downstream of all the large inflow areas and before the Canal enters the City. Consideration should be given to locating the structure near Interstate-5 and diverting flow to Oak Creek. This structure would help reduce flooding in Albany during major storm events as observed during the floods of 1996. The project cost estimate totals $700,000 and includes construction of a new control gate and hydraulic analysis for Oak Creek to ensure adequate capacity during periods of high runoff.

Instrumentation and Control for Canal Flow Control Structures

Instrumentation and controls will be a key component of regulating Canal flows in the future. Automation of gates is recommended for several of the control structures discussed above. Instrumentation and control costs referenced in this section include controller circuits, programming, radio antennas for a telemetry based system, and related components necessary to have a full and functioning telemetry control system. Addition of this type of system would allow all major structures to be controlled from a central location. Costs for these improvements are shown in ***Table 5-2***. ***Table 5-2*** also includes costs for developing flow rating curves for the existing remote depth sensors located along the Canal at the locations shown in ***Table 5-3***.

Costs estimates for equipment and installation include costs for integrating the instrumentation and controls of the CZ Gates into Albany's central control system. This structure is owned by the City of Lebanon and a cooperative management agreement will be needed to integrate these systems.

Table 5-2: Cost Estimate for Automation of Canal Flow Control Structures

Automate Control Structures	*Cost*
Equipment and Installation (9 Sites)	$300,000
Master Station (equipment & installation)	$50,000
Develop Rating Curves (9 sites)	$100,000
Total	***$450,000***

Table 5-3: Existing Remote Sensor Locations

Station	*Description*
004+00	Remote sensor on downstream side of headgate structure
011+00	USGS remote stream gage sensor, ID Number 14187600, Near Lebanon
271+00	Remote sensor, used for automatic gate control at Crown Zellerbach gates
287+00	Remote sensor, upstream side of Albany Gates
287+00	Remote sensor, downstream side of Albany Gates
441+00	Remote sensor by SE corner of Langmack Rd. bridge, upstream side
548+00	Remote sensor on upstream abutment on south side of Red Bridge Road crossing
787+00	Remote sensor (level gage) on upstream end of Waverly Dr. culvert head wall on south side
962+00	Remote sensor at radial gate downstream from WTP intake

Hydraulic Analysis Allowance for Receiving Drainage Channels

Four structures were identified as structures that should be modified to route excess flow in the Canal to Mark's Slough, Hospital Slough, and Cox Creek. However, there is not any recent data available regarding the capacity of these drainage ways and there is concern that they may be capacity limited during high flow periods. A $500,000 budget allowance is included to address initial analysis of the receiving drainage ways prior to modifying any of the control gates.

Flow Augmentation

Another goal identified during the Canal analysis was to convert the City's surplus hydropower water right for use in augmenting urban stream flows for fish and other beneficial uses during typical summer low-water periods. In 2003 the City submitted a water right transfer application to the Oregon Water Resource Department to allocate the excess hydropower water rights to the six streams listed in ***Table 5-4***. Diversion locations are shown in ***Figure 5-1*** at the approximate stations shown in ***Table 5-4***. An allowance of $100,000 is provided to configure manual control release facilities at the identified sites.

Table 5-4: Potential Sites for Flow Augmentation

Station	*Name / Drainage Course*	*Flow Amount (cfs)*
423+00	Burkhart Creek	15
538+00	Cox Creek	20
740+00	Periwinkle Creek	20
838+00	Oak Creek	15
924+00	Cathey Canal	13
950+00	8th Avenue Canal	2
	Total	*85*

ENSURE CANAL CAPACITY (PROJECT NUMBER C2)

Recommended improvements for ensuring Canal capacity include investments in select bridges and culverts, sediment removal, raising Canal banks, and removal of lateral inflows.

Bridges and Culverts

Bridges and culverts have the potential to control and/or restrict flow in the Canal, as they are limited in capacity under high flow conditions. Based on the limited data collected during the Canal inventory, a preliminary hydraulic analysis was performed for each of the bridges and culverts to identify structures that may be undersized for the 310 cfs design flow.

The analysis identified two bridge locations, a private driveway bridge (Sta 117+00) and the Franklin Street Bridge (Sta 137+00), and one culvert, the KGAL Road culvert (Sta 455+00), with suspect capacity and the need for more detailed analysis and possible replacement. Cost estimates for these improvements are shown in ***Table 5-5***.

Table 5-5: Potential Locations of Bridge and Culvert Improvements

Bridge/Culvert Location	*Replacement Cost*
Private Driveway Bridge (Station 117+00)	$100,000
Franklin Street Bridge (Station 137+00)	$300,000
KGAL Road Culvert (Station 455+00)	$300,000
Total	***$700,000***

Sediment Removal

Removal of sediment in the Canal will be required to achieve the 310 cfs design flow. An analysis of sediment removal was outside the scope of the facility plan. However, a previous study conducted in 2000 by Harza Engineering Company[11] evaluated sediment removal in the Canal as part of their cost analysis for the Albany hydropower project. Based on this study

[11] Harza Engineering Company, *Albany Hydroelectric Project Development Cost Analysis Study, A FERC Minor License, FERC Project No. 11509-000*, April 17, 2000.

and observations made during the field inspection, an allowance of $1.5 million has been included for sediment removal. Removal of small or localized areas of sediment is addressed under Channel Restoration below.

Raise Canal Banks

A detailed hydraulic study of the Canal was completed by Kramer, Chin, and Mayo (KCM) in 1999[12]. The study evaluated channel, bridge, and culvert capacities west of the Interstate-5 crossing. The study stated that flooding would likely occur between 7th Avenue and Pacific Boulevard, downstream of the railroad bridge and around the trash rack at a 310 cfs flow rate. The study further stated that to increase the flow capacity in areas where the Canal cannot convey 310 cfs, water surface elevation must be lowered, bank elevations must be raised, or a combination of the two. A budget allowance of $400,000 has been included to raise Canal banks.

Lateral Inflow Reduction

Based on a rough assessment of drainage areas, approximately 1,600 acres drain into the Canal as shown in ***Figure 5-1***. Drainage from these areas creates a flooding risk during periods of high runoff. Removal of lateral inflows will require diversion of ditch/culvert inflows to cross-over culverts that re-establish historic drainage patterns. This will include separation of the City of Lebanon's stormwater system from the Canal and will be difficult in other areas due to topography and upstream conditions.

In addition to reducing flooding risks, elimination of these inflows will reduce sedimentation problems in the Canal by removing sediment sources. Sediment reduction will help maintain Canal capacity and improve water quality. Any re-routing of lateral in-flows will have to weigh Canal benefits against potential upstream and downstream impacts on the drainage way. Hydraulic analysis should be completed to ensure that flooding problems are not being created by re-routing storm runoff. A budget allowance of $300,000 has been included for removal of lateral inflows.

CHANNEL RESTORATION (PROJECT NUMBER C3)

Channel restoration work is recommended to rehabilitate the Canal and protect water quality. Restoration includes local sediment removal, debris removal, bank repair, excess vegetation and fallen tree removal to maintain capacity, and evaluation of any water quality concerns.

[12] KCM, *Canal Hydraulic Study – 3rd Avenue to I-5 (Project WC-98-5)*, Prepared for the City of Albany, March, 1999.

Water quality concerns include the effects of Cheadle Lake (located southeast of Lebanon, Sta 70+00 to 95+00) on Canal water quality. An evaluation of potential seepage from Cheadle lake to the Canal is recommended.

An allowance of $1.0 million is provided for channel restoration and ensuring water quality based on an evaluation of needs identified in field inspection.

IMPROVE CANAL ACCESS (PROJECT NUMBER C4)

Maintaining access along the length of the Canal is very important for the City and adjacent landowners. Canal access allows the City to routinely inspect and maintain the Canal as well as respond to emergency conditions. These are essential activities to ensure reliable supply at the Vine Street Water Treatment Plant.

Actions recommended under this project include removing excessive bank vegetation and securing legal and physical access along the Canal where practical, such as commissioning a right-of-way survey and removing right-of-way encroachments. A cost allowance of $500,000 is included to begin improving Canal access.

SUMMARY OF RECOMMENDED CANAL IMPROVEMENT PROJECTS

Table 5-6 presents a summary of recommended Canal improvement projects. Engineering estimates of probable cost include a 20 percent contingency allowance, and a 15 percent allowance for engineering/administration fees. Staging of improvements is discussed in *Chapter 9 - Recommended Plan*.

Table 5-6: Recommended Canal Improvement Projects

Project Description	***Cost Estimate***
Update Control Structures (Project Number C1)	
Lebanon WTP and Hydropower Intake (Station 192+00)	$300,000
Mark's Slough (Station 253+00)	$520,000
CZ Tailrace (Hospital Slough, Station 280+00)	$350,000
Albany Gates (Station 287+00)	$480,000
Cox Creek (Station 538+00)	$400,000
Rock Dam and Siphon (Station 688+00)	$200,000
New Control Gate (Oak Creek, Station 755+00)	$700,000
Communication for all Structures	$300,000
Master Station	$50,000
Develop Rating Curves for Remote Sites	$100,000
Hydraulic Analysis Allowance for Receiving Drainage Channels	$500,000
Flow Augmentation Allowance	$100,000
Sub-Total	*$4,000,000*
Ensure Canal Capacity (Project Number C2)	
Private Driveway Bridge (Station 117+00)	$100,000
Franklin Street Bridge (Station 137+00)	$300,000
KGAL Road Culvert (Station 455+00)	$300,000
Sediment Removal	$1,500,000
Raise Canal Banks	$400,000
Lateral Inflow Removal	$300,000
Sub-Total	*$2,900,000*
Channel Restoration (Project Number C3)	
Allowance to Repair Bank Damage, Remove Debris and Excess Bank Vegetation, Complete preliminary Cheadle Lake Seepage Analysis	$1,000,000
Sub-Total	*$1,000,000*
Improve Canal Access (Project Number C4)	
Allowance for Removing Encroachments, Securing ROW, and Removing Heavy Bank Vegetation	$500,000
Sub-Total	*$500,000*
Total	***$8,400,000***

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Chapter 6 - Vine Street Water Treatment Plant

The Vine Street Water Treatment Plant (WTP) has served as Albany's sole source of drinking water supply since it was built in 1912. Initial construction included two settling basins and six rapid sand filters (filters 1-6). Over the years the Vine Street WTP has experienced several modifications and upgrades. Today, the Vine Street WTP includes two clarifiers, ten mixed-media filters, and a backwash system with backwash lagoons and drying beds. ***Figure 6-1*** is a plan-view layout of the Vine Street plant in its current configuration, and ***Figure 6-2*** is a process flow schematic of the plant indicating key processes, chemical addition points, and sample locations.

In order to meet the projected maximum day demand (MDD) of 40 MGD at buildout, the Vine Street WTP will need to have a capacity of 20 MGD. The remaining 20 MGD will be met by the joint water supply project (JWP) as discussed in *Chapter 8 – Joint Water Supply Project.* Approximately $7.6 million in improvements are recommended to meet regulatory and capacity requirements and to optimize plant performance with new technology. In order to achieve a 20 MGD capacity, a hydraulic bottleneck between the clarifiers and the filters must be removed. In addition, the water surface elevation above filters 1 through 6 must be raised by improving the media and underdrain configuration. These and other improvements required for the Vine Street WTP are discussed in the following paragraphs. Recommended improvements for the High Service Pump Station (HSPS) are included in this evaluation; however, the capacity analysis of the station is included in *Chapter 7 -Distribution System Evaluation*.

WATER QUALITY MONITORING UPGRADES (PROJECT NUMBER WTP01)

This project provides additional on-line and bench-top water quality analysis capabilities by installing two on-line turbidimeters (one for each Accelator's effluent pipeline), ten on-line particle counters (one for each filter), and bench-top water quality analysis capabilities for total organic carbon (TOC) analysis. The estimated cost for these improvements is $84,000 and includes integration with the existing System Control and Data Acquisition (SCADA) system.

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Figure 6-1

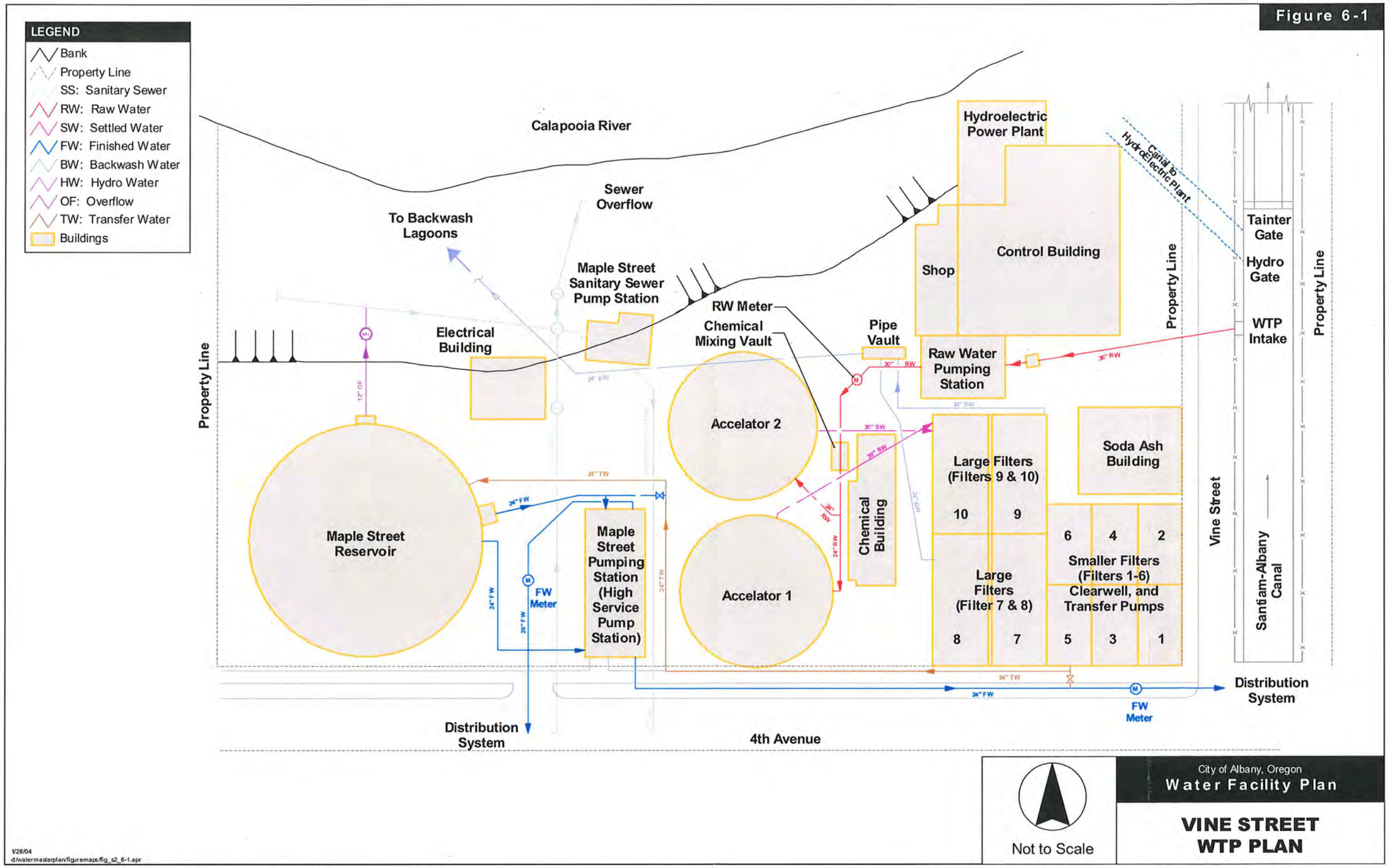
LEGEND
Bank
Property Line
SS: Sanitary Sewer
RW: Raw Water
SW: Settled Water
FW: Finished Water
BW: Backwash Water
HW: Hydro Water
OF: Overflow
TW: Transfer Water
Buildings
Calapooia River
To Backwash Lagoons
Sewer Overflow
Maple Street Sanitary Sewer Pump Station
Electrical Building
RW Meter
Chemical Mixing Vault
Pipe Vault
Hydroelectric Power Plant
Canal to Hydroelectric Plant
Shop
Control Building
Raw Water Pumping Station
Tainter Gate
Hydro Gate
WTP Intake
Property Line
Property Line
Accelator 2
Accelator 1
Chemical Building
Large Filters (Filters 9 & 10)
10
9
Large Filters (Filter 7 & 8)
8
7
Soda Ash Building
6
4
2
Smaller Filters (Filters 1-6) Clearwell, and Transfer Pumps
5
3
1
Vine Street
Santiam-Albany Canal
Maple Street Reservoir
Maple Street Pumping Station (High Service Pump Station)
FW Meter
Distribution System
4th Avenue
FW Meter
Distribution System
Not to Scale
City of Albany, Oregon
Water Facility Plan
VINE STREET WTP PLAN
1/28/04
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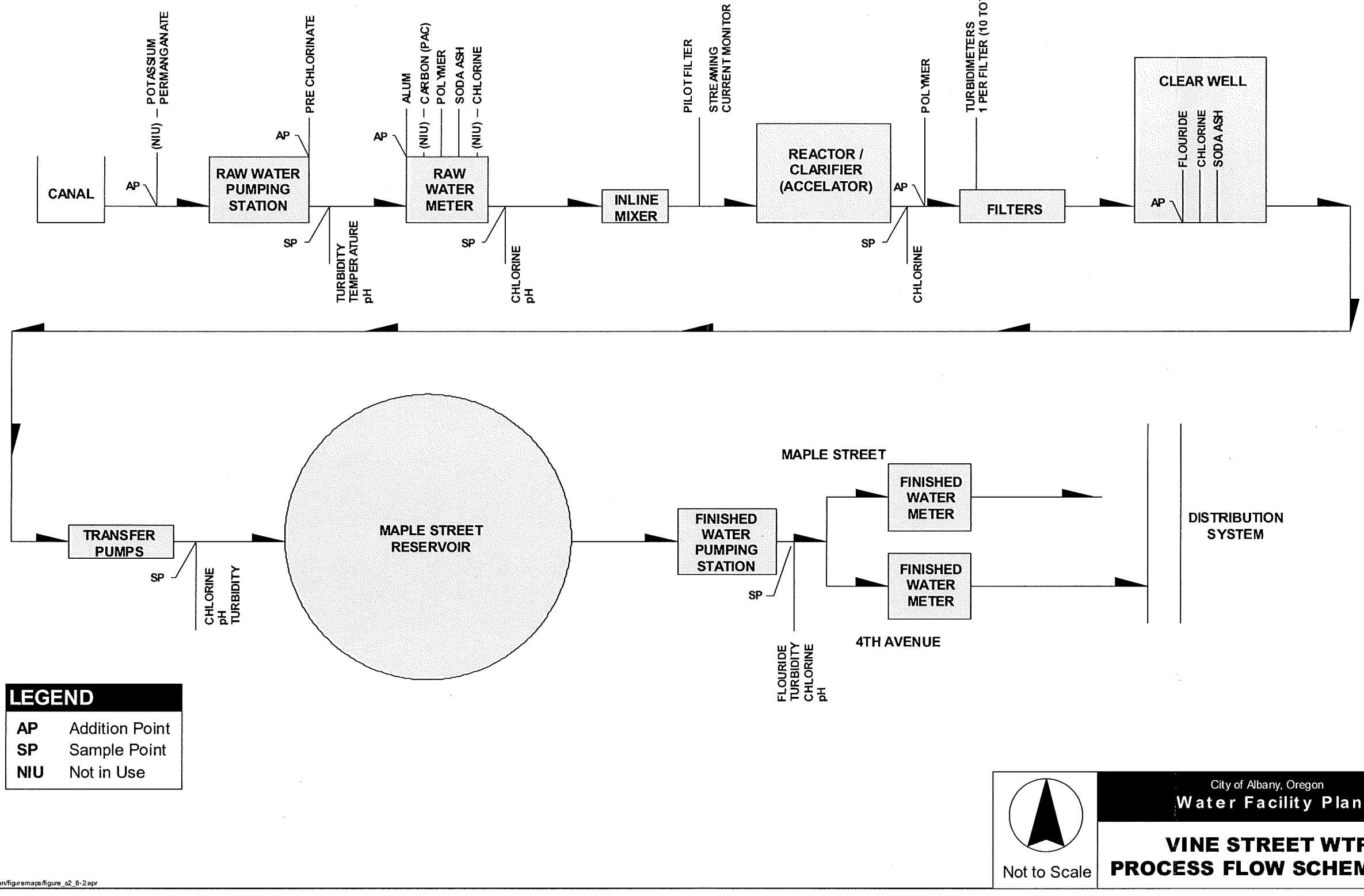
Figure 6-2



LEGEND

AP	Addition Point
SP	Sample Point
NIU	Not in Use

Not to Scale

City of Albany, Oregon
Water Facility Plan

VINE STREET WTP PROCESS FLOW SCHEMATIC

V23/04
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BACKWASH/SURFACE WASH PIPING SYSTEM IMPROVEMENTS (PROJECT NUMBER WTP02)

Surface wash improvements include automatic backwash control capabilities to optimize performance, enhance reliability, and reduce risk of filter damage. This project replaces the existing surface wash system and upsizes filter-to-waste system pipes and valves in filter bays 1-6 from four to eight inches. The project includes a redundant 75 hp, 7,500 gpm variable speed backwash pump for filters 7-8 that replaces the existing smaller constant speed backwash pump. Improvements also include valve and piping modifications where necessary, as well as instrumentation and control work to control backwash flow. The cost estimate for these improvements totals $329,000.

REPLACE ACCELATOR SETTLING TUBES (PROJECT NUMBER WTP03)

This project includes a thorough inspection of Accelator No. 2. Cost estimates include inspection, replacement of the tube settlers, and sand blasting/re-coating the Accelator's interior during the replacement. The estimated cost for this project is $213,000.

PLANT PIPELINE INSPECTION AND CLEANING (PROJECT NUMBER WTP04)

This project installs several new pipeline clean-outs for introduction and retrieval of pipe cleaning equipment. Once the cleanouts are installed, a video inspection of all larger diameter pipelines can be completed to determine the degree of corrosion/material accumulation. The cost estimate for the improvements and inspection is $112,000.

REPAIR MAPLE STREET RESERVOIR BAFFLE AND IMPROVE DISINFECTION PERFORMANCE (PROJECT NUMBER WTP05)

This project includes repair or replacement of the baffle and improvements to the inlet and outlet piping, including closure of a gap between the baffle and interior reservoir wall that may be contributing to short circuiting and less than expected chlorine contact times. The cost estimate for these improvements total $115,000.

CHLORINE SYSTEM SAFETY IMPROVEMENTS (PROJECT NUMBER WTP06)

This plan recommends changing from gas to liquid chlorine (sodium hypochlorite) storage and feed systems at the plant. The plant is in close proximity to residential properties and the change would increase protection to surrounding properties should a major failure occur at the plant. Cost estimates total $140,000 and include two new 6,000 gallon storage tanks and two new chemical metering pumps.

REPLACE/REPAIR CONTROL ROOM BUILDING HVAC SYSTEM (PROJECT NUMBER WTP07)

Improvements to update heating and cooling systems in the control building are recommended and may need to be coordinated with improvements to the electrical system to ensure an adequate power supply is available. The cost for these improvements is estimated to be $70,000.

VFD HARMONICS EVALUATION (PROJECT NUMBER WTP08)

This project involves a thorough evaluation of the plant's electrical system, including the harmonics, transient currents, and other factors that may have limited the life of drive units in the past. The study will include an evaluation of the grounding grid and circuit breaker testing and is estimated to cost $20,000.

ADA/OSHA COMPLIANCE UPGRADE (PROJECT NUMBER WTP09)

Although not required unless substantial structural modifications are made, some access and safety improvements should be completed. Several locations at the WTP do not meet current employee protection standards against falls and accidents. An allowance of $50,000 has been included in the plan to complete access and safety related improvements.

WTP AUTOMATION UPGRADE, PLANT WORK (PROJECT NUMBER WTP10)

This project replaces the existing Texas Instruments Program Logic Controller (PLC) system at the Vine Street WTP with a redundant Allen-Bradley PLC5 system. Proposed improvements include preliminary design, programming modifications, PLC/radio hardware and software, electrical installation, and system start-up. The cost for these improvements is estimated to be $535,000.

WTP AUTOMATION UPGRADE, DISTRIBUTION WORK (PROJECT NUMBER WTP11)

Instrumentation and control improvements are recommended in the distribution system to enhance coordination of the WTP with system-wide distribution system needs. This project replaces on-site monitoring and control instrumentation at the following sites:

- 34th Avenue Reservoir and Pump Station,
- Queen Avenue Reservoir and Pump Station,
- Broadway Reservoir,

- North Albany Pump Station,
- Gibson Hill Road Pump Station, and
- Valley View Reservoir sites.

Costs for these improvements are estimated at $127,000.

WTP Security Upgrade (Project Number WTP12)

This project involves installation of security improvements identified through the system-wide security assessment (Project Number Planning-1, discussed later in this chapter). A cost estimate of $150,000 is provided to complete anticipated required improvements such as, installation of cameras, gate keypads and integration of the new system into the City's SCADA network.

WTP Filter Gallery Maintenance (Project Number WTP13)

This project replaces valves and actuators associated with filters 1-8, with the exception of filter-to-waste valves in filters 1-6 that have been accounted for in project WTP02. The project includes re-coating pipelines in both the old and new filter pipe galleries. The cost estimate of these improvements is $560,000.

Clearwell Repairs (Project Number WTP14)

The clearwell beneath the small filters (filters 1-6) is suspected to be leaking and in need of structural repair. Also, there is currently no way to drain or bypass the clearwell for maintenance. In addition to repairing any leaks, the cost estimate of $70,000 for this project includes installation of a new drain line and valve.

Chemical Storage Improvements (Project Number WTP15)

The liquid alum tank on the second floor of the chemical storage building is not protected from leaks should the tank become damaged. $28,000 has been included for construction of a containment wall around the base of the alum tank to contain potential leaks.

Solids Handling (Project Number WTP16)

This project reshapes and relines the two existing backwash ponds to improve storage capacity and minimize leaching. The project also includes installation of a sump on each of the ponds. In addition to improved solids handing at the Vine Street WTP, this project will

help ensure continued compliance with NPDES permit requirements. The estimated cost of these improvements is $220,000.

SEISMIC UPGRADES (PROJECT NUMBER WTP17)

All of the existing plant buildings and piping are vulnerable to damage during an earthquake. The liquid alum storage tank is also considered "at risk" during an earthquake, especially considering its location on the 2nd floor of the chemical storage building. This plan recommends completing a detailed seismic evaluation of the Vine Street WTP and installing pipeline restraints and structural reinforcements. These improvements are estimated to cost $570,000.

DISTRIBUTION SYSTEM PRESSURE MONITORING IMPROVEMENTS (PROJECT NUMBER WTP18)

This project involves installation of five new pressure transmitters on distribution system piping to increase overall system monitoring. The pressure monitors will allow operators to better respond and manage changes in the system as demands and pressures fluctuate. Installation of five pressure transmitters and instrumentation and control upgrades are estimated to cost $70,000.

REPLACE ACCELATOR SETTLING TUBES (PROJECT NUMBER WTP19)

The useful life of the Accelator settling tubes is approximately 20 years. Tube settlers were installed in Accelator No. 1 in 1998. Although the tube settlers in Accelator No. 1 appear to be in good condition, they will likely need to be replaced within the 2024 planning window. Replacement should be coordinated with sand blasting and recoating of the Accelator's interior. The cost estimate for these improvements is $210,000.

REPAIR/REPLACE FILTER MEDIA/UNDERDRAIN SYSTEM (PROJECT NUMBER WTP20)

This project involves removal and disposal of all existing filter media and underdrains. New underdrains are recommended to be "gravel-less" plastic blocks. Replacement media should be at least 30-inches of dual media (sand and anthracite coal). Existing troughs should be removed and replaced with fiberglass troughs and existing surface-wash system piping and agitators installed on filters 7-10 (surface wash improvements to filter 1-6 are included in WTP02). The cost estimate for replacing the filter media and underdrain system is $682,000.

ADD GRANULAR ACTIVATED CARBON (GAC) TO FILTER MEDIA (PROJECT NUMBER WTP21)

This project incorporates GAC in lieu of anthracite coal as part of the filter media improvements. GAC offers greater protection against potential organic contaminants which may be present in the raw water and consequently will increase the reliability and safety of finished water. The cost estimate of $150,000 is based on the incremental costs of GAC over anthracite.

VALVE MAINTENANCE (PROJECT NUMBER WTP22)

Replacement of the remaining WTP plant valves and actuators, those not replaced through projects WTP02 and WTP13, will be needed within the 2024 planning horizon as these facilities reach the end of their service lives. Replacement valves include raw water isolation valves, check valves, settled water isolation valves, Accelator drain valves, and backwash inlet/outlet valves. The cost for replacement of these valves and actuators is estimated at $994,000.

PLANT HYDRAULICS (PROJECT NUMBER WTP23)

This project removes a hydraulic bottleneck between the Accelators and filters. This bottleneck currently limits the flow to the six smaller filters (filters 1-6), resulting in approximately 2,400 gpm (3.5 MGD) reduction in capacity. The $280,000 cost estimate for this project includes improvements to minimize air entrainment in the settled water pipelines, filter gallery-piping improvements and replacement of the existing open channel between filters 1-6 and filters 7-10 with a closed conduit.

INSTRUMENTATION AND CONTROL IMPROVEMENTS (PROJECT NUMBER WTP24)

Instrumentation and controls will need to be replaced at the conclusion of the Vine Street WTP planning period (2024). The $840,000 cost estimate for this project includes preliminary design, upgrades to the remote telemetry units (RTUs), replacement of the main plant PLC, and upgrades to the SCADA system at the WTP.

REPLACE MAPLE STREET RESERVOIR BAFFLE (PROJECT NUMBER WTP25)

The baffle installed in the Maple Street Reservoir as part of project number WTP05 will reach the end of its expected service life near the end of the planning window for the Vine Street WTP. The estimated cost for baffle replacement is $80,000. This replacement will not require any piping modifications as required in WTP05.

REPLACE HSPS PUMP NO. 14 (200 HP) (PROJECT NUMBER PS8)

The *High Service Pumping Evaluation*[13] by Brown and Caldwell recommended replacement of pump No. 14 to allow the pump to operate in tandem with the other pumps at the HSPS. This project replaces pump No. 14, a 200 HP pump, at the HSPS. Pump replacement is estimated to cost $75,000.

HSPS BACKUP POWER OUTLET (PROJECT NUMBER PS9)

This plan recommends installing a backup power outlet for use with a portable generator at the HSPS to provide limited power and pumping capacity during power outages. The outlet would be configured to allow a quick connection and transition to a portable power generator. The cost for installation of a backup power outlet is estimated at $30,000.

ANALYSIS OF OPERATING CONDITIONS, INCLUDING VARIABLE FREQUENCY DRIVES (VFDS) AT THE HSPS (PROJECT NUMBER PS10)

This project involves an analysis of operating conditions at the HSPS and includes the possible use of VFDs to address gaps in the range of available flows for the pump station. The need for VFDs should be evaluated, and if found beneficial, a control strategy using the VFDs should be developed. The estimated cost for this evaluation is $55,000.

SYSTEM-WIDE SECURITY ASSESSMENT (PROJECT NUMBER PLANNING-1)

As discussed earlier, a system-wide security assessment is required under the Public Health Security and Bioterrorism Preparedness Response Act amendment to the Safe Drinking Water Act. This project provides funding for preparation of a plan meeting the requirements of the Act. The estimated cost for the assessment is $150,000. An allowance for WTP improvements identified as a result of this evaluation is included in project number WTP12.

FACILITY PLAN UPDATES (PROJECT NUMBER PLANNING-2)

Water facility plan updates are required periodically to reflect changes in expected growth patterns and demands, the regulatory environment, and capital improvement needs. On average, facility plan updates are completed on 10-year cycles. Two water facility plan updates have been included in the plan at an estimated cost of $300,000 each.

[13] Brown and Caldwell, *City of Albany Water System, High Service Pumping Evaluation*, January, 2001

SUMMARY OF RECOMMENDED VINE STREET WTP IMPROVEMENT PROJECTS

Table 6-1 presents a summary of recommended improvement projects for the Vine Street WTP. Cost estimates include a 20 percent allowance for engineering/administration fees, and a 20 percent contingency allowance. Staging of improvements is discussed in *Chapter 9 - Recommended Plan*.

Table 6-1: Recommended Vine Street WTP Improvement Projects

Project No.	*Project Title*	*Description*	*Total Project Cost*
WTP01	Water quality monitoring improvements	Bench top UV spectrophotometer	**$84,000**
WTP02	Surface wash improvements	Surface wash, backwash pump, valves & piping	**$329,000**
WTP03	Accelator #2 improvements	Sand blast/re-coat, replace tube settlers	**$213,000**
WTP04	Pipeline cleaning/inspection	Inspect pipeline system, install pipe clean-outs	**$112,000**
WTP05	Disinfection performance improvements	Repair/replace baffle at Maple Street Reservoir	**$115,000**
WTP06	Chlorine system improvements	Sodium hypochlorite storage and feed system	**$140,000**
WTP07	Plant HVAC evaluation	Inspection & report	**$70,000**
WTP08	VFD harmonics evaluation	Inspection & report	**$20,000**
WTP09	ADA/OSHA Compliance Evaluation	Inspection	**$50,000**
WTP10	Automation upgrade, WTP	Hardware/software programming	**$535,000**
WTP11	Automation upgrade, distribution system	Hardware/software programming	**$127,000**
WTP12	WTP security upgrade	Engineering, equipment installation	**$150,000**
WTP13	WTP filter gallery improvements	Pipeline improvements	**$560,000**
WTP14	Clearwell repairs	Crack/leak repairs, install drain pipe	**$70,000**
WTP15	Chemical storage improvements	Alum containment facility	**$28,000**
WTP16	Solids handling	Reshape/reline ponds and sump installation	**$220,000**
WTP17	Seismic restraint upgrades	Reinforce control building process units	**$570,000**
WTP18	Distribution system monitoring equipment	Pressure transmitters, I&C improvements	**$70,000**
WTP19	Accelator #1 improvements	Settling tube replacement	**$210,000**
WTP20	Filter improvements	Install new underdrains, replace filter media	**$682,000**
WTP21	Filter media improvements	Install GAC filter media	**$150,000**
WTP22	Plant valve/actuator replacement	Replace all valves and actuators	**$994,000**
WTP23	WTP filter gallery improvements	Pipeline improvements	**$280,000**
WTP24	Instrumentation and control improvements	Hardware/software programming	**$840,000**
WTP25	Disinfection performance improvements	Replace baffle in Maple Street Reservoir	**$80,000**
PS8	High pressure pump station improvements	Replaces HSPS Pump No. 14	**$75,000**
PS9	HSPS backup power oulet	Installs outlet for backup power from a generator	**$30,000**
PS10	Analysis of HSPS operating conditons	Evaluate station operation and potential use of VFDs	**$55,000**
Planning-1	Security evaluation	System-wide vulnerability assessment	**$150,000**
Planning-2	Water Facility Plan updates	Update of plan	**$600,000**
		Total, Vine Street WTP Improvements	***$7,609,000***

Chapter 7 - Distribution System Evaluation

This section summarizes the evaluation of Albany's water distribution system including pipelines, pump stations, and reservoirs. Albany's distribution system was evaluated through the development of a hydraulic model; a comparison of pipelines, pump stations, and reservoirs to the planning criteria; field inspections of pump stations and reservoirs; and meetings and interviews with City staff.

PIPELINES

A hydraulic model of Albany's distribution system was created using WaterCAD version 5.0 software. The model was developed from the City's Geographical Information Systems (GIS) data base of the existing water system. The model analyzes the system at one point in time with known boundary conditions (e.g. fixed reservoir levels, pumping rates, and demands) – known as a "steady state model" This type of model is used for planning purposes and allows multiple demand conditions to be reviewed and compared to planning criteria.

Two scenarios were analyzed with the model: the existing system with current demands, and a representation of the buildout system with ultimate demands. The buildout system evaluation was the basis for the recommended pipeline improvement projects. Since ultimate demands, and consequently recommended improvement projects, are based on land uses as projected in the City's Comprehensive Plan, it is important that the effects of potential zoning changes be considered prior to adoption.

Improvements identified through the existing system evaluation were compared to improvements identified through the buildout system evaluation in order to determine which projects are growth-related and which are related to existing system deficiencies. Identifying growth-related needs is important for assisting in development of cost allocations used in the water financial plan.

Pipeline planning criteria, as outlined earlier in this document, were used to correct existing deficiencies and to size water lines required to meet growth-related water demands. Four demand scenarios were analyzed. Criteria used to identify required pipeline improvements for each scenario are outlined below.

Peak Hour Demand Scenario

Based on the planning criteria presented in *Chapter 3 – Planning Criteria and Cost Estimates,* distribution pipelines (pipelines less than 16-inch diameter) should not experience a velocity greater than 10 feet per second or a head loss greater than 10 feet per 1,000 feet during peak hour demand conditions. In the hydraulic model, distribution pipelines not meeting these criteria in the initial model run were increased in diameter until criteria were met. These improvements are the basis of the pipeline improvement projects outlined in this document that are required to meet peak hour demands.

Maximum Day Demand Scenario

Based on the planning criteria presented in *Chapter 3 – Planning Criteria and Cost Estimates,* transmission pipelines (pipelines 16-inch diameter and larger) should not experience a maximum velocity greater than 5 feet per second or a head loss greater than 3 feet per 1,000 feet during maximum day demand conditions. In the hydraulic model, transmission pipelines not meeting these criteria in the initial model run were increased in diameter until criteria were met. These improvements are the basis of the pipeline improvement projects outlined in this document that are required to meet maximum day demands.

Minimum Hour Demand (Maximum Storage Replenishment Scenario)

In the hydraulic model, transmission and distribution lines were evaluated for velocity and head loss criteria during maximum storage replenishment conditions. Based on the planning criteria presented in *Chapter 3 – Planning Criteria and Cost Estimates* distribution pipelines should not experience velocities greater than 10 feet per second or head losses greater than 10 feet per 1,000 feet; transmission pipelines should not experience velocities greater than 5 fps or head losses greater than 3 feet per 1,000 feet. Pipelines were increased in diameter until they met velocity and head loss criteria while also meeting storage replenishment criteria. These improvements are the basis of the pipeline improvement projects outlined in this document that are required to meet maximum storage replenishment criteria.

Maximum Day Demand Plus Fire Flow Scenario

In the hydraulic model, improvement projects were identified to raise pressures in locations where system pressures fell below 20 psi during maximum day demand plus fire flow (MDD+FF) conditions. These improvements are the basis of the pipeline improvement projects outlined in this document that are required to meet MDD+FF conditions.

Pipeline Improvement Projects

The modeling process was concluded by optimizing improvement strategies for correcting any deficiencies identified in each of the demand scenarios. Resulting improvement projects

with like characteristics were grouped together and named for ease in identification. ***Figure 7-1*** shows project groupings and the following project descriptions discuss why these projects are required. Finished water transmission piping associated with the joint water project (JWP) is discussed in *Chapter 8 - Joint Water Supply Project.*

East End Transmission Project (Project Numbers P1, P2, P3, P4, P5, P6, & P7)

The East End Transmission Project is required to fully utilize the initial 10 MGD capacity generated for Albany by the JWP and to raise service pressures in the southeast Albany area. These transmission lines include approximately 10,300 feet of 24, 20, 12, and 8-inch water lines. The estimated cost for this project is $2,379,000.

South Albany Transmission Project (Project Number P8)

The South Albany Transmission Project consists of a 16-inch transmission line that begins at the intersection of Pacific Boulevard and 34th Avenue and ends at Cougar Avenue. This $1,029,000 transmission line project is needed to improve fire flows and service pressures, and to provide a redundant supply line to the southwest Albany area.

North Albany Distribution Projects (Project Numbers P9, P10, P11, P12, P13, P14, P15, P16, PS1, PS2, & PS11)

The North Albany Distribution Projects include upsizing approximately 14,300 feet (750 feet of steel) of undersized water lines to 8 and 12-inch water lines in order to meet fire flow requirements. This project group also includes a pump station and piping necessary to create a fourth pressure zone that is discussed later in this section. In addition, this project group includes a Pressure Regulating (Reducing) Valve (PRV) in Zone 3. This valve should reduce high pressures on pressure Zone 3 piping that is located at pressure Zone 2 elevations. The valve location is along the pipeline serving NW Winn Drive in North Albany outside the UGB. The cost estimate for these improvements is $3,397,000.

Zone 1 Distribution Projects (Project Numbers P17, P18, P19, P20, P21, P22, & P23)

Zone 1 Distribution Projects include approximately 2,700 feet of water lines necessary to meet fire flow requirements and approximately 1,500 feet of water lines required to meet future peak hour and maximum day demands. These projects are dispersed throughout pressure Zone 1 and are estimated to cost $677,000.

Ellingson Road Reservoir Project, Phase 1 (Project Numbers P24, S6 & PS13)

The Ellingson Road Reservoir Project, Phase 1, includes a new 4 MG concrete reservoir located on Ellingson Road and approximately 2,100 feet of new 24-inch pipeline necessary to

connect the reservoir to the existing water line on Pacific Boulevard. This project is needed to meet future storage requirements in Zone 1 and will provide local fire protection storage and enhanced service pressures in the Southwest Albany area. The cost estimate for the piping associated with this project is $44,000. Pump station and reservoir costs total $4,235,000 and are discussed later in this chapter.

Central Albany Transmission Project (Project Numbers P25 & P26)

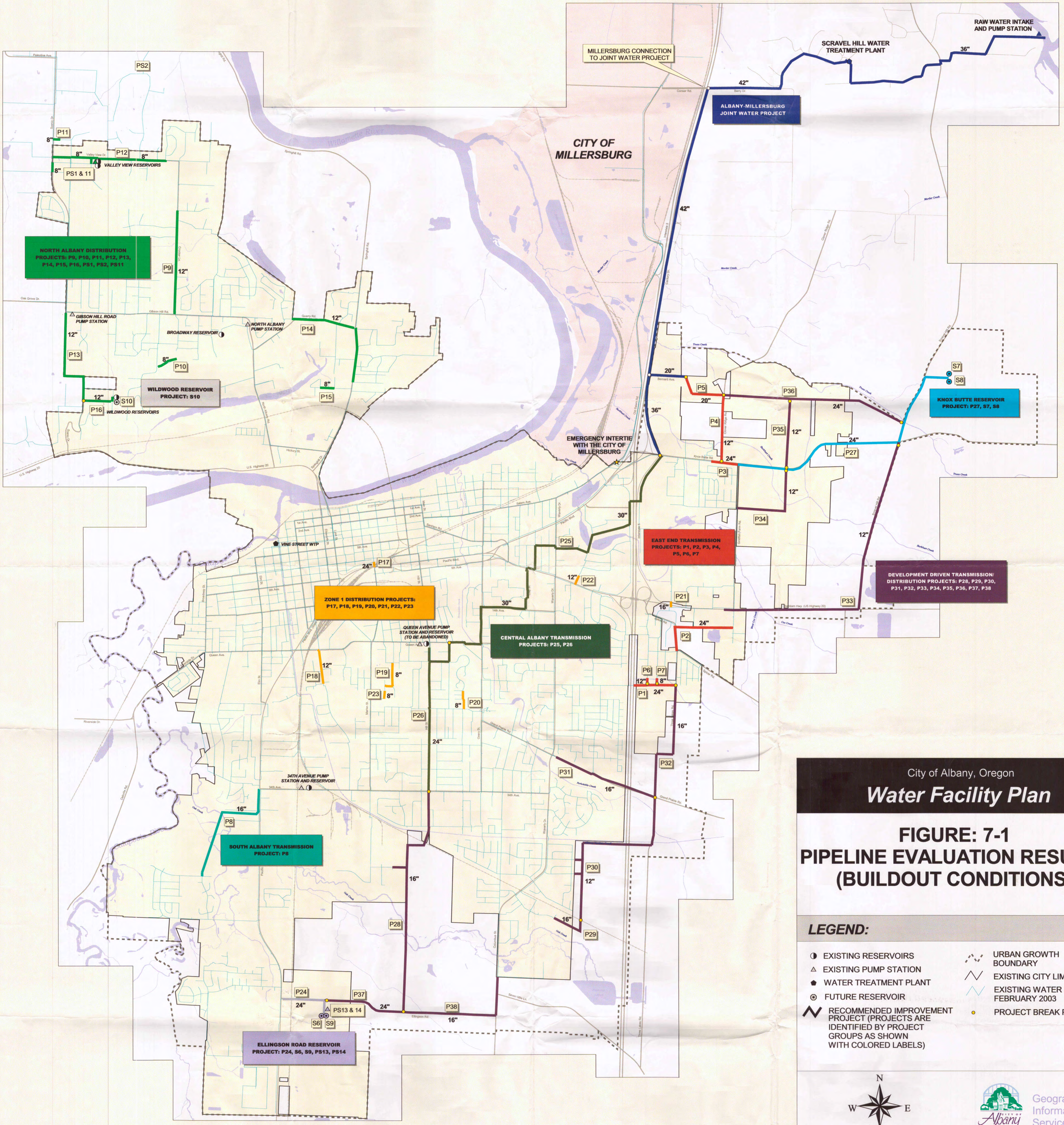
The Central Albany Transmission Project is required to meet future maximum day demand conditions and is also required to realize the benefit of future Scravel Hill WTP expansions. The project consists of approximately 14,300 feet of 30-inch water line from Knox Butte Road to Main Street and approximately 6,700 feet of 24-inch water line along Hill Street from Queen Avenue to 34th Avenue. This project incorporates the replacement of approximately 1.25 miles of deteriorated steel water lines. The Central Albany Transmission Project is estimated to cost $6,318,000. Alternate alignments for the 30-inch water line could be investigated if the City decides to incorporate this transmission project with steel pipe replacement along Pacific Boulevard.

Knox Butte Reservoir Project, Phase 1 (Project Numbers P27, S7)

The Knox Butte Reservoir Project, Phase 1, includes a 5 MG concrete reservoir located on Knox Butte and approximately 9,700 feet of 24-inch water line necessary to connect it to the distribution system. This reservoir is needed to meet future storage requirements in Zone 1. Piping costs associated with this project total $2,520,000. The Knox Butte reservoir is estimated to cost $3,500,000 and is discussed in more detail in the reservoir portion of this chapter.

Development Driven Transmission/Distribution Projects (Project Numbers P28, P29, P30, P31, P32, P33, P34, P35, P36, P37, & P38)

The Development Driven Transmission/Distribution Projects include approximately 11 miles of 12, 16, and 24-inch pipelines needed to serve future development. Timing for these projects is development dependent. The estimated cost for Albany's portion of these projects is $4,301,000. The remaining cost, projected to be an 8-inch equivalent, is assumed to be the responsibility of the developer of adjacent properties and is not included as a cost for Albany.



City of Albany, Oregon

Water Facility Plan

FIGURE: 7-1
PIPELINE EVALUATION RESULTS (BUILDOUT CONDITIONS)

LEGEND:

- EXISTING RESERVOIRS
- EXISTING PUMP STATION
- WATER TREATMENT PLANT
- FUTURE RESERVOIR
- RECOMMENDED IMPROVEMENT PROJECT (PROJECTS ARE IDENTIFIED BY PROJECT GROUPS AS SHOWN WITH COLORED LABELS)
- URBAN GROWTH BOUNDARY
- EXISTING CITY LIMITS
- EXISTING WATER LINES AS OF FEBRUARY 2003
- PROJECT BREAK POINTS

N W E S

1250 0 1250 2500 Feet

Geographic Information Services

G: Engineer/Water/Water Facility Plan/Draft Documents/ Maps/arc_view project/basemap.apr

2/03/04

Pipeline Replacement Programs

As part of the pipeline evaluation process, three pipeline replacement programs were identified. These programs are discussed below.

Steel Pipeline Replacement Program (Program 1)

In January 2001 the City completed a steel pipe inventory and developed replacement strategies to effectively manage system maintenance efforts and reduce system water loss due to leakage[14]. Most of the City's water line leaks are thought to occur in steel pipes (steel pipes being classified as wrought iron, galvanized iron, steel, outside diameter dipped and wrapped steel, and unknown pipe types). These pipes have exceeded, or are approaching, their service life and must be replaced. The City has been replacing failing steel water lines as funds are made available but 28.7 miles of steel water lines still exist within Albany's water system; 24.0 miles within Albany's urban growth boundary (UGB), 1.4 miles of which will be replaced through the improvement projects listed above, and 4.7 miles located outside the UGB. This plan recommends replacing all steel pipes within the urban growth boundary by 2020. ***Figure 7-2*** depicts the locations of the remaining 28.7 miles of steel water lines. $16,000,000 is estimated to be needed for replacement of the 22.6 miles of steel water lines within the urban growth boundary that are not being replaced through other required distribution system improvement projects. Costs for steel pipe replacement outside the urban growth boundary were not considered in this plan.

Undersized Pipelines with Hydrants Replacement Program (Program 2)

The Undersized Pipelines with Hydrants Replacement Program is needed to replace small water lines unable to provide necessary fire flows to existing hydrants. This program includes lines that are 6-inches in diameter, non-steel, non-looped, and support a hydrant, or are less than 6-inches in diameter, non-steel, and support a hydrant. The program will replace approximately 25,600 feet, or 4.8 miles, of these undersized lines by 2025. ***Figure 7-3*** depicts the locations of these undersized water lines. $3,471,000 is estimated to be needed for replacement of the 4.8 miles of undersized lines within the urban growth boundary that are not being replaced through other required distribution system improvement projects. Costs for pipeline replacement outside the urban growth boundary were not considered in this plan.

Perpetual Life Pipeline Replacement Program (Program 3)

The Perpetual Life Pipeline Replacement Program was developed to plan for replacement of water lines as they reach the end of their expected service life. This program considers the

[14] Young, Jim *City of Albany Steel Pipe Replacement Report*, January 2001

estimated service life of the existing water lines in Albany's water system and schedules their replacement. Ductile iron water lines were considered to have a 100-year service life and all other pipe types were considered to have a 75-year service life. Pipelines included in the previous two programs and required pipeline replacements based on model results are not included as part of this program. This program identifies approximately 15 miles of pipe that will need to be replaced by 2025 and another 86 miles by 2074 (buildout). This replacement program is estimated to cost $76,914,000. Pipeline replacement outside the urban growth boundary was not considered in this plan.

Figure 7-2

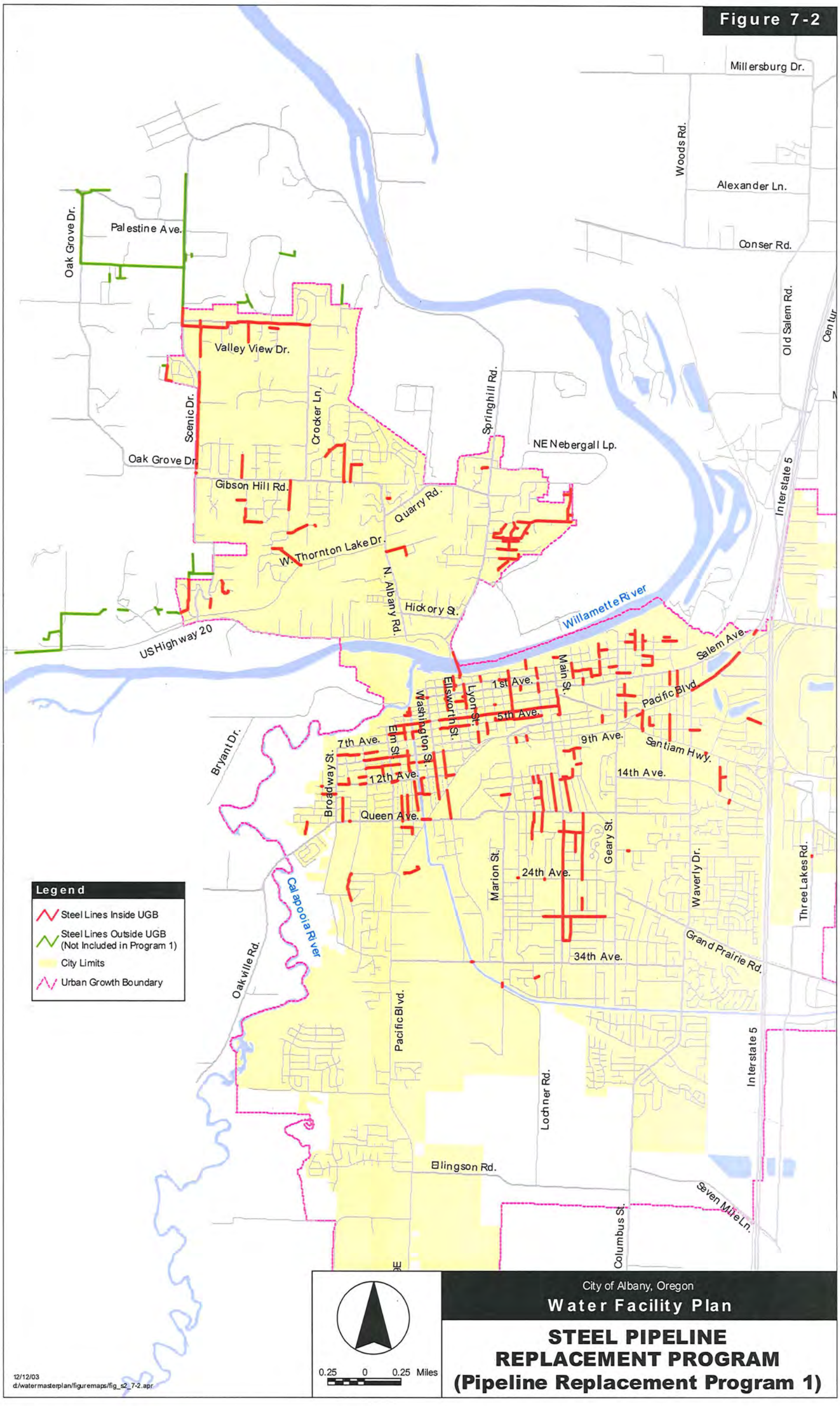
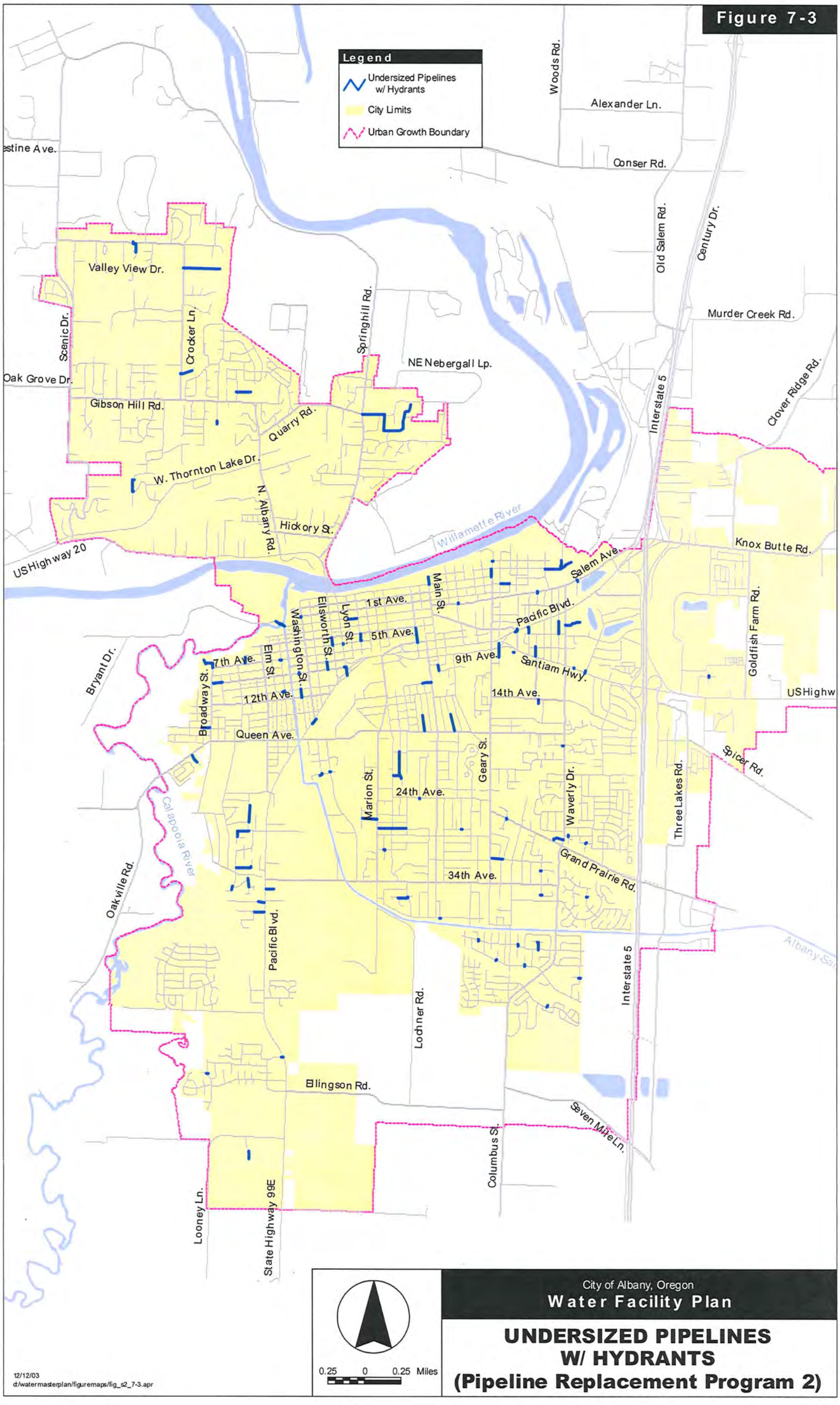

Millersburg Dr.
Woods Rd.
Alexander Ln.
Conser Rd.
Old Salem Rd.
Oak Grove Dr.
Palestine Ave.
Valley View Dr.
Scenic Dr.
Crocker Ln.
Springhill Rd.
NE Nebergall Lp.
Interstate 5
Gibson Hill Rd.
Quarry Rd.
W. Thornton Lake Dr.
N. Albany Rd.
Hickory St.
Willamette River
US Highway 20
Salem Ave.
Main St.
1st Ave.
Ellsworth St.
Lyon St.
5th Ave.
Pacific Blvd
Washington St.
Elm St.
7th Ave.
9th Ave.
Santiam Hwy.
Bryant Dr.
Broadway St.
12th Ave.
14th Ave.
Queen Ave.
Marion St.
Geary St.
24th Ave.
Waverly Dr.
Three Lakes Rd.
Calapooia River
Oakville Rd.
Grand Prairie Rd.
34th Ave.
Pacific Blvd.
Lochner Rd.
Ellingson Rd.
Seven Mile Ln.
Columbus St.
Legend
Steel Lines Inside UGB
Steel Lines Outside UGB (Not Included in Program 1)
City Limits
Urban Growth Boundary
0.25 0 0.25 Miles
12/12/03
d:/watermasterplan/figuremaps/fig_s2_7-2.apr
City of Albany, Oregon
Water Facility Plan
STEEL PIPELINE REPLACEMENT PROGRAM
(Pipeline Replacement Program 1)

Figure 7-3


Legend
Undersized Pipelines w/ Hydrants
City Limits
Urban Growth Boundary
Woods Rd.
Alexander Ln.
Conser Rd.
Old Salem Rd.
Century Dr.
Murder Creek Rd.
Clover Ridge Rd.
Interstate 5
Springhill Rd.
NE Nebergall Lp.
Valley View Dr.
Scenic Dr.
Crocker Ln.
Oak Grove Dr.
Gibson Hill Rd.
Quarry Rd.
W. Thornton Lake Dr.
N. Albany Rd.
Hickory St.
Willamette River
US Highway 20
Salem Ave.
Knox Butte Rd.
Main St.
1st Ave.
Ellsworth St.
Lyon St.
5th Ave.
Pacific Blvd.
Washington St.
Elm St.
7th Ave.
9th Ave.
Santiam Hwy.
Goldfish Farm Rd.
Broadway St.
12th Ave.
14th Ave.
Bryant Dr.
Queen Ave.
Spicer Rd.
Marion St.
24th Ave.
Geary St.
Waverly Dr.
Three Lakes Rd.
Calapooia River
Oakville Rd.
Grand Prairie Rd.
34th Ave.
Pacific Blvd.
Lochner Rd.
Albany-Sa
Ellingson Rd.
Seven Mile Ln.
Columbus St.
Looney Ln.
State Highway 99E
0.25 0 0.25 Miles
12/12/03
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City of Albany, Oregon
Water Facility Plan
UNDERSIZED PIPELINES
W/ HYDRANTS
(Pipeline Replacement Program 2)

PUMP STATIONS

Albany's water system has five pump stations located in three different pressure zones as shown in ***Figure 1-3***. Pump stations were evaluated based on a capacity analysis and observation made during the field inspection.

The stations range in firm capacity from 500 gallons per minute (gpm) to almost 16,000 gpm. ***Table 7-1*** shows a comparison between existing pump station capacities and the capacity required at buildout. While the existing pump station capacities are adequate for current maximum day demand conditions, some stations require backup power improvements and other minor operational improvements. As demands increase, additional pumping capacity will need to be added at the North Albany Road Pump Station. Recommended improvements are discussed below.

34th Avenue Pump Station (Project Number PS3)

This pump station works with the 34th Avenue Reservoir to boost service pressures to customers in the vicinity of the reservoir. Currently, this station is not equipped with a backup power supply. In order to maintain its ability to operate during a power outage, a backup power outlet that will allow it to be connected to a portable generator should be installed. The estimated cost for installation of a backup power outlet at this station is $30,000.

Queen Avenue Pump Station (Project Numbers PS4, PS5, PS6 & PS7)

This pump station works with the Queen Avenue Reservoir to boost service pressures to customers in the vicinity of the reservoir. This plan recommends abandoning this pump station and reservoir in the future as it only provides 1 MG of storage. However, due to an existing deficiency in reservoir storage, abandonment is not immediate. Consequently, interim improvements have been recommended for this site. Improvements include the addition of a backup power outlet, conducting a security evaluation, control valve replacement, and pump replacement (Pump No. 21). Timing for abandonment of this facility is discussed further in the reservoir portion of this chapter. The estimated cost for these improvements is $105,000.

North Albany (Zone 2) Pump Station (Project Number PS12)

Table 7-1 shows that the existing pumping capacity of the North Albany Pump Station is insufficient to meet buildout demands. This plan recommends increasing the pump impeller size to increase the pump capacity when needed to meet future water demands. The estimated cost for increasing the size of the impeller is $10,000.

Future Zone 4 Pump Station (Project Numbers PS1 & PS11)

As discussed earlier, a low-pressure area exists at the upper elevations of Zone 3. The surrounding topography is such that if the reservoir levels drop below an elevation of 560 feet, some customers will experience lower than desired water pressures. To better serve these customers a 4^{h} pressure zone should be created. Initially, this would require a 7.5 hp booster pump station plus a fire flow pump to be installed at the Valley View Reservoir site. In addition to improving service pressures, the completion of this project will increase fire protection in pressure Zone 3 by removing the existing operational limits for the Valley View Reservoirs. This zone separation and the effects on Valley View Reservoir storage are discussed in more detail in the Existing System Storage Requirements section of this chapter. The cost for the zone separation is included in the cost estimated for the North Albany Distribution Projects discussed earlier.

Future Ellingson Road Pump Station (Project Number PS13 & PS14)

This pump station is needed to pump ground level storage at the Ellingson Road Reservoir site. Reservoir improvements for the Ellingson Road site are discussed in the Future Storage Requirements section of this chapter. Recommended improvements for that site include the addition of eight million gallons of pumped storage. A 6 MGD pump station, with room for expansion, should be constructed when the first 4 MG reservoir is built. Initial construction, including the structure and piping, should be sized for the ultimate capacity of 12 MGD. In addition, pedestals should be installed to allow for the addition of pumps and motors that will be required to expand the pump station's capacity to 12 MGD at the time that the second 4 MG reservoir is constructed. The pump station facilities and backup generator are estimated to cost $1,700,000.

Table 7-1: Pump Station Capacities and Demands

Pressure Zone	*Facility Name*	*Total Installed HP*	*Source*	*Service Area/Reservoir*	*Firm Capacity Flow rate (gpm)*	*Total Nominal Flow rate (gpm)*	*Buildout Pump Station Demand (gpm)*	*Surplus or (Deficit) (gpm)*
				EXISTING PUMP STATIONS				
Zone 1	**High Pressure Pump Station**	1,050	Vine Street WTP	Zone 1 Broadway, Queen and 34th Reservoir	15,950	22,650	13,889	2,061
Zone 1	**Queen Avenue**[1]	105	Queen Avenue Reservoir	Zone 1 (local area)	500	1,900	n/a	n/a
Zone 1	**34th Avenue Pump Station**[2]	275	34th Avenue Reservoir	Zone 1 (local area)	2,800	5,800	-	-
Zone 2	**North Albany Pump Station**	150	Broadway Reservoir	Zone 2 and Wildwood Reservoir	1,400	2,800	2,050	(650)
Zone 3	**Gibson Hill Road Pump Station**	150	Wildwood Reservoir	Zone 3 and Valley View Reservoirs	900	1,800	725	175
				FUTURE PUMP STATIONS				
Zone 1	**Ellingson Road Pump Station**[2]	500	Vine Street WTP	Zone 1 (local area)	8,333	-	-	-
Zone 4	**4th Level Pump Station**	122.5	Valley View Reservoirs	Zone 4	-	-	1,635	-

1. Queen Avenue Pump Station and Reservoir are planned to be taken off line.
2. These pump stations do not have discrete service areas or unique buildout demands. Consequently, they were sized based on the volume of the reservoir they are served by.

RESERVOIRS

Including the Maple Street Reservoir, Albany currently has eight reservoirs serving three pressure zones as shown in ***Figure 1-3***. The reservoirs range in size from 0.25 MG to 8 MG and are constructed of either concrete or steel. Observations made during the field inspection and capacity analyses guided recommendations for reservoir improvements. Improvements resulting from the field inspection and those resulting from the capacity analyses are discussed separately in following paragraphs.

Field Inspection Results

The field inspection resulted in recommended improvements for seismic protection, overflow piping, dechlorination facilities, and reservoir circulation.

Increased Seismic Protection (Project Numbers S1 and S2)

Several of the reservoirs in Albany's water system are vulnerable to damage during a significant earthquake. This plan recommends installing seismic restraints on Maple, 34th, Queen, and Valley View reservoirs. Seismic valves are recommended for Maple, 34th, Queen, Broadway, Wildwood, and Valley View reservoirs. The estimated cost for seismic improvements is $740,000.

Replace/Repair Overflow Piping (Project Number S3)

Based on observations made during the field inspection this plan recommends replacing/repairing undersized overflow piping that is installed on six of the reservoirs. The size of overflow piping should be increased on Maple, Queen, 34th and Valley View reservoirs. Costs for these improvements are estimated at $234,000.

Addition of Dechlorination Facilities (Project Number S4)

Six reservoirs currently drain to the stormwater system when drained for cleaning/repairs or if an overflow occurs. Dechlorination of drain water is required by the Oregon Department of Environmental Quality (DEQ). The current configuration of facilities requires that City staff be on site to add a dechlorination agent. This plan recommends routing the drain/overflow lines through a vault that will automatically inject a dechlorination agent. Dechlorination facilities are recommended for 34th, Broadway, Wildwood, and Valley View reservoirs. The cost for installing four dechlorination vaults is estimated at $90,000. The drain lines for the three Valley View Reservoirs can be routed though a single dechlorination vault.

Increase Reservoir Circulation (Project Number S5)

34th and Queen Avenue reservoirs are pumped storage reservoirs that are more susceptible to poor circulation and may have difficulty maintaining minimum desired chlorine residuals. The two reservoirs should be evaluated to determine turnover rates and to identify any changes that may be required to optimize performance. The cost of the evaluation is estimated to be $45,000.

Water Storage Capacity Analysis

Similar to the distribution system piping, existing and future storage requirements were evaluated separately to determine which projects are growth-related and which are related to existing system deficiencies.

Existing System Storage Requirements (Project Number P11, P12, PS1)

Based on the planning criteria presented in *Chapter 3 – Planning Criteria and Cost Estimates* a deficiency in reservoir storage of 9.71 MG exists within the distribution system; 8.93 MG in Zone 1 and 0.78 MG in Zone 3 as shown in ***Table 7-2***. However, the storage deficit in pressure Zone 1 will be temporarily eliminated when the Scravel Hill WTP comes online in 2006 with the completion of the joint water supply project. This project will add a second source of supply, thus reducing emergency storage requirements, and add 2.0 MG of available storage in pressure Zone 1. In addition, the overall system demands will decrease with the separation of Millersburg.

Table 7-2: Existing Storage Requirements

Pressure Zone	*ADD (mgd)*	*MDD (mgd)*	*Fire Flow (gpm - hrs)*	*Equalization Storage (MG)*	*Emergency Storage (MG)*	*Fire Flow Volume (MG)*	*Total Storage Required (MG)*	*Existing Storage[1] (MG)*	*Surplus or (Deficit) (MG)*
Zone 1	7.49	14.99	5000 - 4	3.75	14.98	1.20	19.93	11.00	(8.93)
Zone 2	0.19	0.37	1500 - 2	0.09	0.38	0.18	0.65	1.15	0.50
Zone 3 & 4	0.32	0.64	1500 - 2	0.16	0.64	0.18	0.98	0.20	(0.78)
Total	***8.00***	***16.00***	-	***4.00***	***16.00***	***1.56***	***21.56***	***12.35***	***(9.71)[2]***

1) Effective storage
2) Does not consider surplus in Zone 2

The storage deficit of 0.78 MG in Zone 3 is created by the inability to use all the storage in the Valley View Reservoirs. These reservoirs have a combined capacity of 1.35 MG but only 0.2 MG is available as effective storage as noted in *Chapter 1 - Existing System Description.* The surrounding topography is such that if the reservoir levels drop below 560 feet, some

customers will experience water pressures approaching the state minimum of 20 psi. In order to fully utilize the storage in these reservoirs, a 4th level pressure zone must be created. Once a 4th pressure zone is created, the total Valley View storage capacity can be realized and customers in the upper end of Zone 3 (future Zone 4) will have water pressures in the desired operating range.

In order to complete this separation, a 4th Level booster pump station is required at the Valley View Reservoir site and approximately 5,200 feet of pipe will need to be installed. The Zone 4 boundary and required piping are shown in ***Figure 7-4***. The cost estimate for completing the zone separation is included in the estimate for the North Albany Distribution Projects.

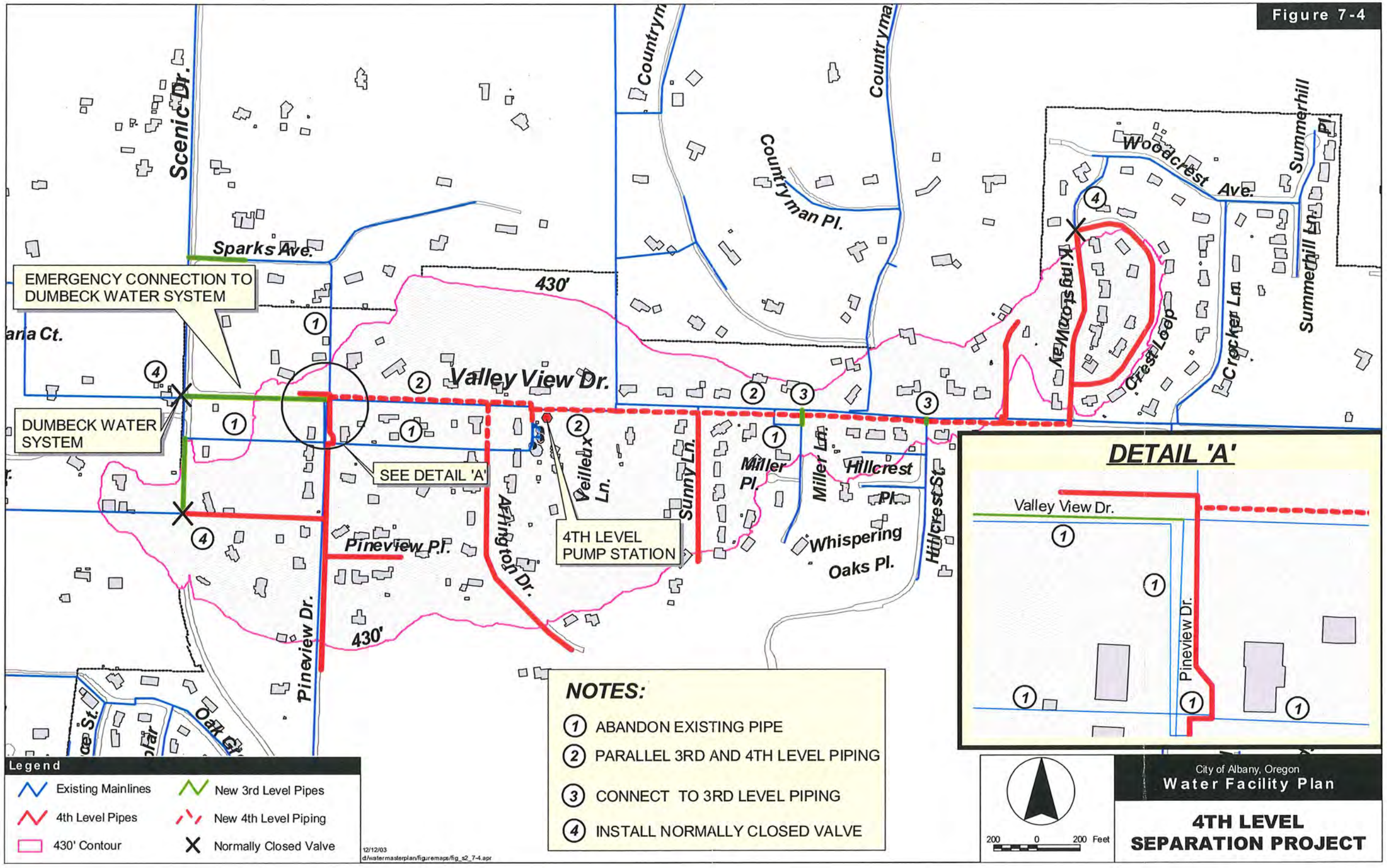
Future Storage Requirements (Project Numbers S6, S7, S8, S9, & S10)

As Albany's population and water needs increase, more reservoir storage will be required to meet the recommended planning criteria. ***Table 7-3*** shows future storage requirements at buildout based on population and water demand forecasts. ***Figure 7-5*** shows the estimated time of construction of new reservoirs in order to meet future requirements. In all, seven new reservoirs are planned for construction as shown in ***Table 7-4***. Excluding the reservoirs located at the Scravel Hill WTP, the estimated cost for these reservoirs total $13,605,000.

Figure 7-5 also shows the estimated time to take Queen Avenue Reservoir off line. In order to meet planning criteria, the reservoir would need to be abandoned at a time when pressure Zone 1 has a surplus in storage of at least 1 MG. Therefore, its abandonment was coordinated with the construction of a new, larger reservoir, the second Ellingson Road Reservoir in 2027. A more distant time frame was selected to allow the City operational flexibility in timing for abandonment.

Table 7-4 and ***Figure 7-5*** show two 4 MG reservoirs to be constructed at the Ellingson Road site. An alternative option may be to construct two 5 MG reservoirs at the Ellingson Road site and abandon the 34th Avenue Reservoir. The number of pump stations and reservoirs the City maintains would be reduced, while not changing the total storage within the water system. Although not called for with this plan, this is an alternative approach to meeting storage needs that should be considered at the time the first Ellingson Road Reservoir is constructed.

Figure 7-4


Scenic Dr.
Sparks Ave.
EMERGENCY CONNECTION TO DUMBECK WATER SYSTEM
DUMBECK WATER SYSTEM
SEE DETAIL 'A'
430'
Valley View Dr.
Countryman Pl.
Woodcrest Ave.
Summerhill Pl.
Summerhill Ln.
Kingston Way
Crest Loop
Cracker Ln.
Miller Pl.
Hillcrest Pl.
Hillcrest St.
Whispering Oaks Pl.
Veillette Ln.
Sunny Ln.
Arlington Dr.
4TH LEVEL PUMP STATION
Pineview Pl.
Pineview Dr.
Oak Ct.
DETAIL 'A'
Valley View Dr.
Pineview Dr.
NOTES:
1 ABANDON EXISTING PIPE
2 PARALLEL 3RD AND 4TH LEVEL PIPING
3 CONNECT TO 3RD LEVEL PIPING
4 INSTALL NORMALLY CLOSED VALVE
Legend
Existing Mainlines
4th Level Pipes
430' Contour
New 3rd Level Pipes
New 4th Level Piping
Normally Closed Valve
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City of Albany, Oregon
Water Facility Plan
4TH LEVEL SEPARATION PROJECT

Table 7-3: Buildout Storage Requirements

Pressure Zone	*ADD (MGD)*	*MDD (MGD)*	*FIRE FLOW (gpm - hrs)*	*Equalization Storage (MG)*	*Emergency Storage (MG)*	*Fire Flow Volume (MG)*	*Total Storage Required (MG)*
Zone 1	20.8	37.0	5,000 - 4	9.2	20.8	1.2	31.2
Zone 2	1.0	1.9	1,500 - 2[a]	0.5	1.0	0.2	1.7
Zone 3 & 4	0.6	1.1	1,500 - 2	0.3	0.6	0.2	1.1
Total	***22.4***	***40.0***	-	***10.0***	***22.4***	***1.6***	***34.0***

a Fire flow based on residential development only. The *Revised Water Demand Allocations* report by the City of Albany identified the potential for a school to be constructed in Zone 2. If a school is constructed in Zone 2, either additional storage will be required or it will need to be constructed of materials such that the fire flow requirement is 1,500 gpm for two hours.

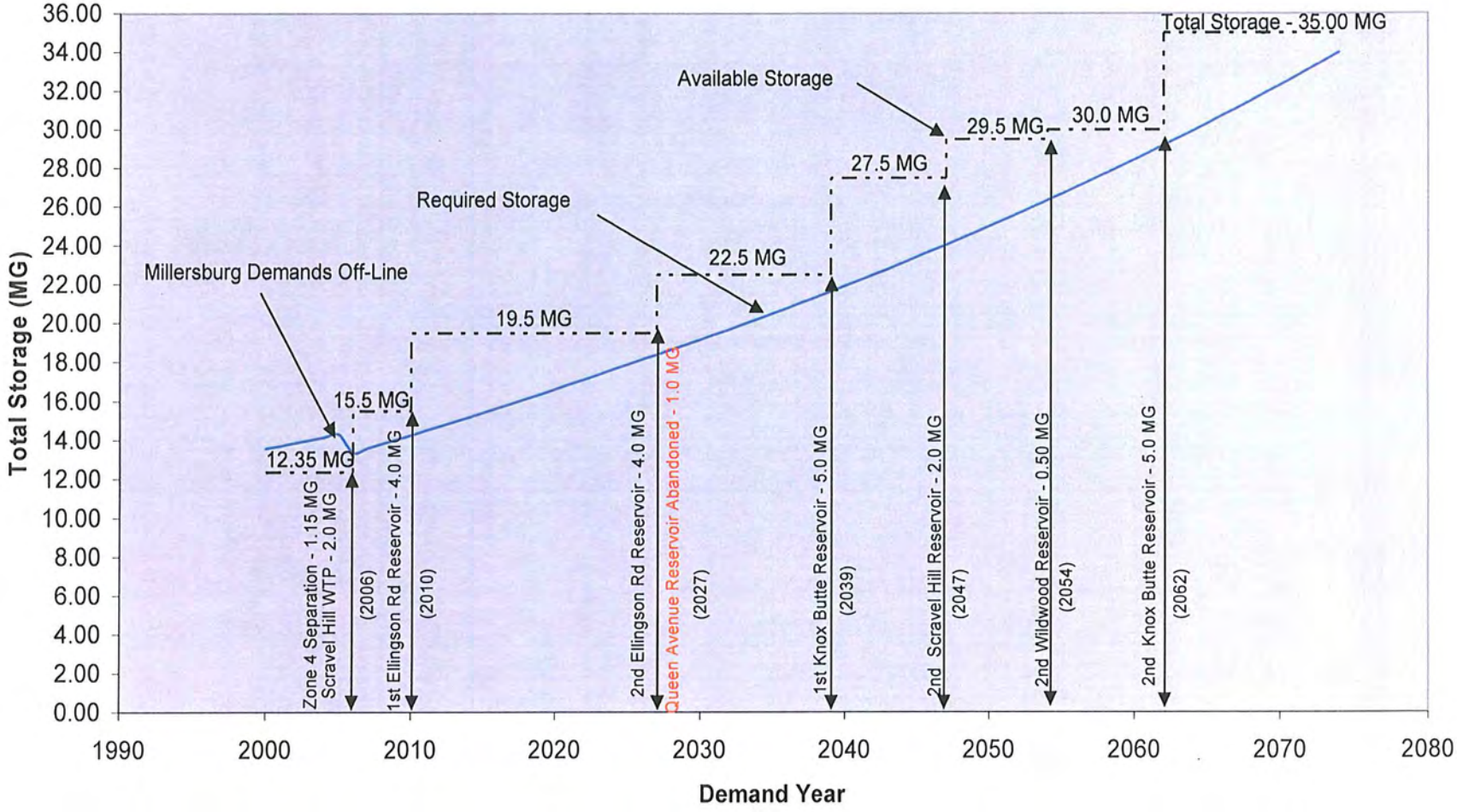
Table 7-4: Future Reservoirs

PROJECTED YEAR	*RESERVOIR*	*STORAGE SITE*	*PRESSURE ZONE*	*MATERIAL*	*EFFECTIVE STORAGE VOLUME (MG)*
2006	Scravel Hill #1	Scravel Hill WTP	Zone 1	Concrete	2.00[a]
2010	Ellingson Road #1	South West Albany, on Ellingson Road	Zone 1	Concrete	4.00
2027	Ellingson Road #2	South West Albany, on Ellingson Road	Zone 1	Concrete	4.00
2039	Knox Butte #1	Knox Butte	Zone 1	Concrete	5.00
2047	Scravel Hill #2	Scravel Hill WTP	Zone 1	Concrete	2.00[a]
2054	Wildwood #2	Wildwood	Zone 2	Concrete	0.5[b]
2062	Knox Butte #2	Knox Butte	Zone 1	Concrete	5.00
				Total	***22.50***

[a] This volume does not include storage required for CT (0.8 MG for reservoir #1 and 1.0 MG for reservoir #2) or the City of Millersburg.

b Zone 2 storage requirement is based on residential fire flows. The *Revised Water Demand Allocations* report by the City of Albany identified the potential for a school to be constructed in Zone 2. If a school is constructed in Zone 2, either additional storage will be required or it will need to be constructed of materials such that the fire flow requirement is 1,500 gpm for two hours.

Figure 7-5: Estimated Time for Construction of New Reservoirs



SUMMARY OF DISTRIBUTION SYSTEM IMPROVEMENT PROJECTS

A summary of the recommended distribution system improvement projects is provided in ***Table 7-5***. Cost estimates provided in ***Table 7-5*** include a 15 percent allowance for engineering/administration fees, and a 20 percent contingency allowance. Staging of improvements is discussed in *Chapter 9 -Recommended Plan.*

CITY OF

Albany

OREGON

Table 7-5: Summary of Recommended Distribution Projects

PROJECT NAME	PROJECT ID	PROJECT DESCRIPTION	PROJECT DRIVER	EXISTING DIAMETER (inches)	PROPOSED DIAMETER (inches)	TOTAL LENGTH (LF)	UNIT COST $/LF	PROJECT COST[1, 2]
East End Transmission Project	P1	Pipeline along 21st Avenue from east of I-5 to Three Lakes Road, coordinate project with P6 & P7	MDD	N/A	24	1,530	$260.40	$398,000
	P2	Pipeline along Spicer Road from 18th Avenue to 24-inch pipeline along Goldfish Farm Road alignment south of Hwy 20	MDD	N/A	24	2,992	$260.40	$779,000
	P3	Pipeline along Knox Butte Road from Clover Ridge Road to Goldfish Farm Road	MDD	N/A	24	970	$260.40	$253,000
	P4	Pipeline along Clover Ridge Road from Santa Maria Avenue to Knox Butte Road	MDD	N/A	12	2,459	$176.40	$434,000
	P5	Pipeline from the east end of Bernard Avenue to Santa Maria Avenue	MDD	N/A	20	1,807	$241.20	$436,000
	P6	Pipeline from the south end of Fescue Street, connect pipeline to Project P1 along 21st Avenue	MDD + FF	N/A	12	255	$176.40	$45,000
	P7	Pipeline from the south end of Rye Street, connect pipeline to Project P1 along 21st Avenue	MDD + FF	N/A	8	248	$135.60	$34,000
							Project Total	***$2,379,000***
South Albany Transmission Project	P8	Pipeline from 34th Avenue and Hwy 99E along 99E to 36th Avenue to Elk Run Drive along Elk Run Drive to Cougar Avenue	MDD	N/A	16	4,633	$222.00	$1,029,000
							Project Total	***$1,029,000***
North Albany Distribution Projects	P9	Pipeline north along Crocker Lane from Gibson Hill Road	MDD + FF	6	12	3,766	$176.40	$664,000
	P10	Pipeline along Maier Lane from Skyline Drive to Chad Avenue	MDD + FF	2	8	746	$135.60	$101,000
	P11	Zone 4 separation - New 3rd level piping along Sparks Avenue, Scenic Drive, and Valley View Drive	MDD + FF	N/A	8	1,367	$135.60	$185,000
	P12	Zone 4 separation- New 4th level piping parallel to 3rd level pipeline along Valley View Drive	MDD + FF	N/A	8	3,790	$135.60	$514,000
	P13	Pipeline along Scenic Drive from Gibson Hill Road to Wildwood Drive	PHD	10	12	3,856	$176.40	$680,000
	P14	Pipeline along Quarry Road from Christmas Tree Lane to Springhill Road, along Springhill Road to Cherry Lane	MDD + FF	6-8	12	4,276	$176.40	$754,000
	P15	Pipeline along Green Acres Lane from Shady Lane to Green Acres Loop	MDD + FF	6	8	522	$135.60	$71,000
	P16	Pipeline along Wildwood Drive from Scenic Drive to Wildwood Reservoir site	MDD + FF	8	12	1,175	$176.40	$207,000
	PS1	Zone 4 separation- Pump station with emergency backup generator (Two 7.5 HP and one 100 HP pumps)	Service Level					$186,000
	PS2	Install NA PRVs	Service Level					$15,000
	PS11	Expand Zone 4 booster pump station (add one 7.5 HP pump)	-					$20,000
							Project Total	***$3,397,000***
Zone 1 Distribution Projects	P17	Pipeline along Jackson Street north from Highway 99	MDD	18	24	203	$260.40	$53,000
	P18	Pipeline along Ferry Street from Queen Avenue to 22nd Avenue	PHD	8	12	1,274	$176.40	$225,000
	P19	Pipeline along Jefferson Street from 20th Avenue to 22nd Avenue to Jackson Street	MDD + FF	6	8	1,147	$135.60	$156,000
	P20	Pipeline along Oak Street north from 24th Avenue	MDD + FF	6	8	675	$135.60	$92,000
	P21	Pipeline along Price Road north from Highway 20	MDD + FF	8	16	217	$222.00	$48,000
	P22	Pipeline along Bain Street north from Highway 20	MDD + FF	6-N/A	12	363	$176.40	$64,000
	P23	Pipeline along Jackson Street north from 23rd Avenue	MDD + FF	N/A	8	289	$135.60	$39,000
							Project Total	***$677,000***

Table 7-5: Summary of Recommended Distribution Projects

PROJECT NAME	PROJECT ID	PROJECT DESCRIPTION	PROJECT DRIVER	EXISTING DIAMETER (inches)	PROPOSED DIAMETER (inches)	TOTAL LENGTH (LF)	UNIT COST $/LF	PROJECT COST[1, 2]
East End Transmission Project	P1	Pipeline along 21st Avenue from east of I-5 to Three Lakes Road, coordinate project with P6 & P7	MDD	N/A	24	1,530	$260.40	$398,000
	P2	Pipeline along Spicer Road from 18th Avenue to 24-inch pipeline along Goldfish Farm Road alignment south of Hwy 20	MDD	N/A	24	2,992	$260.40	$779,000
	P3	Pipeline along Knox Butte Road from Clover Ridge Road to Goldfish Farm Road	MDD	N/A	24	970	$260.40	$253,000
	P4	Pipeline along Clover Ridge Road from Santa Maria Avenue to Knox Butte Road	MDD	N/A	12	2,459	$176.40	$434,000
	P5	Pipeline from the east end of Bernard Avenue to Santa Maria Avenue	MDD	N/A	20	1,807	$241.20	$436,000
	P6	Pipeline from the south end of Fescue Street, connect pipeline to Project P1 along 21st Avenue	MDD + FF	N/A	12	255	$176.40	$45,000
	P7	Pipeline from the south end of Rye Street, connect pipeline to Project P1 along 21st Avenue	MDD + FF	N/A	8	248	$135.60	$34,000
							Project Total	***$2,379,000***
South Albany Transmission Project	P8	Pipeline from 34th Avenue and Hwy 99E along 99E to 36th Avenue to Elk Run Drive along Elk Run Drive to Cougar Avenue	MDD	N/A	16	4,633	$222.00	$1,029,000
							Project Total	***$1,029,000***
North Albany Distribution Projects	P9	Pipeline north along Crocker Lane from Gibson Hill Road	MDD + FF	6	12	3,766	$176.40	$664,000
	P10	Pipeline along Maier Lane from Skyline Drive to Chad Avenue	MDD + FF	2	8	746	$135.60	$101,000
	P11	Zone 4 separation - New 3rd level piping along Sparks Avenue, Scenic Drive, and Valley View Drive	MDD + FF	N/A	8	1,367	$135.60	$185,000
	P12	Zone 4 separation- New 4th level piping parallel to 3rd level pipeline along Valley View Drive	MDD + FF	N/A	8	3,790	$135.60	$514,000
	P13	Pipeline along Scenic Drive from Gibson Hill Road to Wildwood Drive	PHD	10	12	3,856	$176.40	$680,000
	P14	Pipeline along Quarry Road from Christmas Tree Lane to Springhill Road, along Springhill Road to Cherry Lane	MDD + FF	6-8	12	4,276	$176.40	$754,000
	P15	Pipeline along Green Acres Lane from Shady Lane to Green Acres Loop	MDD + FF	6	8	522	$135.60	$71,000
	P16	Pipeline along Wildwood Drive from Scenic Drive to Wildwood Reservoir site	MDD + FF	8	12	1,175	$176.40	$207,000
	PS1	Zone 4 separation- Pump station with emergency backup generator (Two 7.5 HP and one 100 HP pumps)	Service Level					$186,000
	PS2	Install NA PRVs	Service Level					$15,000
	PS11	Expand Zone 4 booster pump station (add one 7.5 HP pump)	-					$20,000
							Project Total	***$3,397,000***
Zone 1 Distribution Projects	P17	Pipeline along Jackson Street north from Highway 99	MDD	18	24	203	$260.40	$53,000
	P18	Pipeline along Ferry Street from Queen Avenue to 22nd Avenue	PHD	8	12	1,274	$176.40	$225,000
	P19	Pipeline along Jefferson Street from 20th Avenue to 22nd Avenue to Jackson Street	MDD + FF	6	8	1,147	$135.60	$156,000
	P20	Pipeline along Oak Street north from 24th Avenue	MDD + FF	6	8	675	$135.60	$92,000
	P21	Pipeline along Price Road north from Highway 20	MDD + FF	8	16	217	$222.00	$48,000
	P22	Pipeline along Bain Street north from Highway 20	MDD + FF	6-N/A	12	363	$176.40	$64,000
	P23	Pipeline along Jackson Street north from 23rd Avenue	MDD + FF	N/A	8	289	$135.60	$39,000
							Project Total	***$677,000***

Table 7-5: Summary of Recommended Distribution Projects

PROJECT NAME	PROJECT ID	PROJECT DESCRIPTION	PROJECT DRIVER	EXISTING DIAMETER (inches)	PROPOSED DIAMETER (inches)	TOTAL LENGTH (LF)	UNIT COST $/LF	PROJECT COST [1,2]
Ellingson Road Reservoir Project, Phase 1	P24	Pipeline along Ellingson Road from Pacific Boulevard to Ellingson Road Reservoir	MDD	N/A	24	2,091	$260.40	$544,000
	S6	A 4 MG concrete reservoir	Service Level					$2,960,000
	PS13	6 MGD pump station with room for expansion						$1,275,000
							Project Total	$4,779,000
Ellingson Road Reservoir Project, Phase 2	S9	A 4 MG concrete reservoir	Service Level					$2,960,000
	PS14	Expand Ellingson Road Pump Station to 12 MGD	Service Level					$425,000
								$3,385,000
Central Albany Transmission Project	P25	Cross town transmission pipeline from Knox Butte Road to Main Street	MDD	8/12/20	30	14,303	$320.00	$4,577,000
	P26	Cross town transmission pipeline from Queen along Main Street and Hill Street to 34th Avenue	MDD	N/A	24	6,686	$260.40	$1,741,000
							Project Total	$6,318,000
Knox Butte Reservoir Project, Phase 1	P27	Pipeline along Knox Butte Road and Scravel Hill Road from Goldfish Farm Road to proposed Knox Butte Reservoir	MDD	N/A	24	9,679	$260.40	$2,520,000
	S7	A 5 MG concrete storage reservoir	Service Level					$3,500,000
							Project Total	$6,020,000
Knox Butte Reservoir Project, Phase 2	S8	A 5 MG concrete storage reservoir	Service Level					$3,500,000
							Project Total	$3,500,000
Development Driven Transmission/Distribution Projects [3]	P28	Pipeline from 34th Avenue along Hill Street alignment to Lochner Road, along Lochner Road to Ellingson Road	MDD	N/A	16	9,368	$222.00	$809,000
	P29	Pipeline from 47th Avenue across railroad right-of-way then southeasterly parallel to railroad	MDD	N/A	16	1,458	$222.00	$126,000
	P30	Pipeline from P29, parallel with Shortridge Street, to 40th Avenue, east to Three Lakes Road, north to Grand Prairie Road	MDD	N/A	12	7,640	$176.40	$312,000
	P31	Pipeline along Grand Prairie Road from Three Lakes Road to pipeline stub out east of Waverly Drive	MDD	N/A	16	3,900	$222.00	$337,000
	P32	Pipeline along Three Lakes Road from Grand Prairie Road to 21st Avenue	MDD	N/A	16	4,719	$222.00	$408,000
	P33	Pipeline along Hwy. 20 from Goldfish Farm Road to Scravel Hill Road, along Scravel Hill Road to Knox Butte Road	MDD	N/A	12	10,838	$176.40	$442,000
	P34	Pipeline from Knox Butte Road south to existing 24-inch pipeline along Goldfish Farm Road	MDD	N/A	12	3,269	$176.40	$133,000
	P35	Pipeline from Santa Maria Avenue to Knox Butte Road east of Project P4	MDD	N/A	12	2,565	$176.40	$105,000
	P36	Pipeline along Santa Maria Avenue from Scravel Hill Road to Clover Ridge Road	MHD	N/A	24	6,762	$260.40	$844,000
	P37	Pipeline along Ellingson Road from elevated storage to Lochner Road	MDD	N/A	24	2,991	$260.40	$373,000
	P38	Pipeline along Ellingson Road from Lochner to Columbus Street, Columbus Street to existing 16-inch pipeline	MDD/PHD	N/A	16	4,766	$222.00	$412,000
							Project Total	$4,301,000

Table 7-5: Summary of Recommended Distribution Projects

PROJECT NAME	PROJECT ID	PROJECT DESCRIPTION	PROJECT DRIVER	EXISTING DIAMETER (inches)	PROPOSED DIAMETER (inches)	TOTAL LENGTH (LF)	UNIT COST $/LF	PROJECT COST[1, 2]
Pipeline Replacement Programs	Program-1	Steel pipeline replacement program	Service Level		8	117,994	$135.60	$16,000,000
	Program-2	Undersized pipelines with hydrants replacement program	Fire Flow		8	25,600	$135.60	$3,471,000
	Program-3	Perpetual life pipeline replacement program	Service Level		8 / 20	530,340	$135.60 / $241.20	$76,914,000
							Project Total	*$96,385,000*
Reservoir Projects	PS3	34th Avenue backup power outlet	Service Level					$30,000
	PS4	Queen PS building security enhancements	Safety					$15,000
	PS5	Queen motorized control valve replacement	Capital Maintenance					$25,000
	PS6	Replace Queen pump No. 21 (30 HP)	Capital Maintenance					$35,000
	PS7	Queen backup power outlet	Service Level					$30,000
	S1	Maple Street, 34th, Queen, and Valley View (3), seismic restraints	Seismic					$500,000
	S2	Maple Street, Broadway, Wildwood, Valley View, 34th, and Queen seismic valves - 9 valves	Seismic					$240,000
	S3	Replace/Repair overflow piping at Maple, Queen, 34th, and Valley View (3) Reservoirs	Service Level					$234,000
	S4	Dechlorination facility for 34th, Broadway, Wildwood, and Valley View Reservoirs - 4 vaults	Regulatory					$90,000
	S5	Increase reservoir circulation for 34th and Queen reservoirs	Regulatory					$45,000
	PS12	Increase level 2 pump station capacity	Service Level					$10,000
							Project Total	*$1,254,000*
Wildwood Reservoir Project[4]	S10	Add a 0.5 MG[4] concrete storage reservoir	Service Level					$685,000
							Project Total	*$685,000*
							Total Cost for Distribution System Improvements =	*$134,100,000*

Footnotes:

1) Estimated project costs are based on March 2002 Seattle ENR CCI= 7560
2) Costs are based on individual projects being rounded to the nearest $1 K, grouped projects to the nearest $1 K, and total distribution system improvements to the nearest $100 K.
3) Costs shown for development driven projects reflect anticipated costs for oversizing. The cost for an 8-inch equivalent is assumed to be the responsibility of the developer of adjacent properties and is not included as a cost for Albany.
4) Zone 2 storage requirement based on residential fire flows. The *Revised Water Demand Allocations* report by the City of Albany identified the potential for a school or non-residential structure to be constructed in Zone 2. If a structure with high fire flow requirements, like a school, is constructed in Zone 2, either additional storage will be required or it will need to be constructed of materials such that the fire flow requirement is 1,500 gpm for two hours.

Abbreviations:

MDD = MAXIMUM DAY DEMAND
PHD = PEAK HOUR DEMAND
MDD + FF = MAX DAY DEMAND PLUS FIRE FLOW
MHD = MINIMUM HOUR DEMAND (MAXIMUM STORAGE REPLENISHMENT)

Chapter 8 - Joint Water Supply Project

As discussed earlier, the Joint Water Project (JWP) is a cooperative project between the cities of Albany and Millersburg to develop a jointly owned and operated WTP east of the two cities in order to meet existing and future water demands. Historically, the City of Millersburg has received their water service from the City of Albany, but in 1999 Millersburg notified Albany of their intent to construct an independent water treatment plant and disconnect from Albany's water system. Millersburg's 1999 facility plan update[15] recommended constructing an intake on the Santiam River just downstream of the confluence of the North and South Santiam Rivers. Albany, whose 1988 facility plan[16] also recommended developing an eastside plant, began discussions with Millersburg as the concept of a regional water supply system developed. In July 2002, discussions between the two City's Councils resulted in the development of a cooperative intergovernmental agreement to construct and operate a joint water supply project serving both communities.

The JWP will include an intake structure on the Santiam River, raw water transmission lines, construction of the Scravel Hill WTP, finished water storage, and finished water transmission lines. The Scravel Hill WTP will be supplied by an intake on the Santiam River located approximately one-quarter mile downstream of the confluence of the North and South Santiam Rivers. Raw water will be pumped from the intake to the treatment plant located on Scravel Hill. The treatment plant will have an initial capacity of 12 MGD (10 MGD dedicated to Albany and 2 MGD dedicated to Millersburg) and an ultimate capacity of 26 MGD (20 MGD dedicated to Albany and 6 MGD dedicated to Millersburg). Following treatment, finished water will be conveyed using a shared gravity flow water line from the Scravel Hill WTP reservoir(s) to Century Drive and Berry Drive. At this point the water line splits with branches to each community's distribution system. This system is shown in ***Figure 8-1***.

The design of the Scravel Hill WTP is based on use of a membrane filtration system. Membrane filtration is a treatment process that relies on an extremely "fine mesh" fabric that acts as a selective barrier, allowing treated water to pass while blocking contaminants. A vacuum is typically applied to draw raw water across the membrane. Some of the advantages of membrane treatment systems include operational simplicity, ease of expansion, requires small land area, and it is a reliable treatment process relatively independent of raw water quality. In addition, current and forthcoming drinking water regulations recognize membrane

[15] January 1999, *City of Millersburg Water System Master Plan*, CH2M-Hill
[16] February 1988, *Albany and Millersburg Water System Facility Plan*, Brown and Caldwell

technologies as the state of the art filtration technology for surface water treatment. Membrane filtration provides a positive barrier to pathogens such as *Giardia* and *Cryptosporidium.*

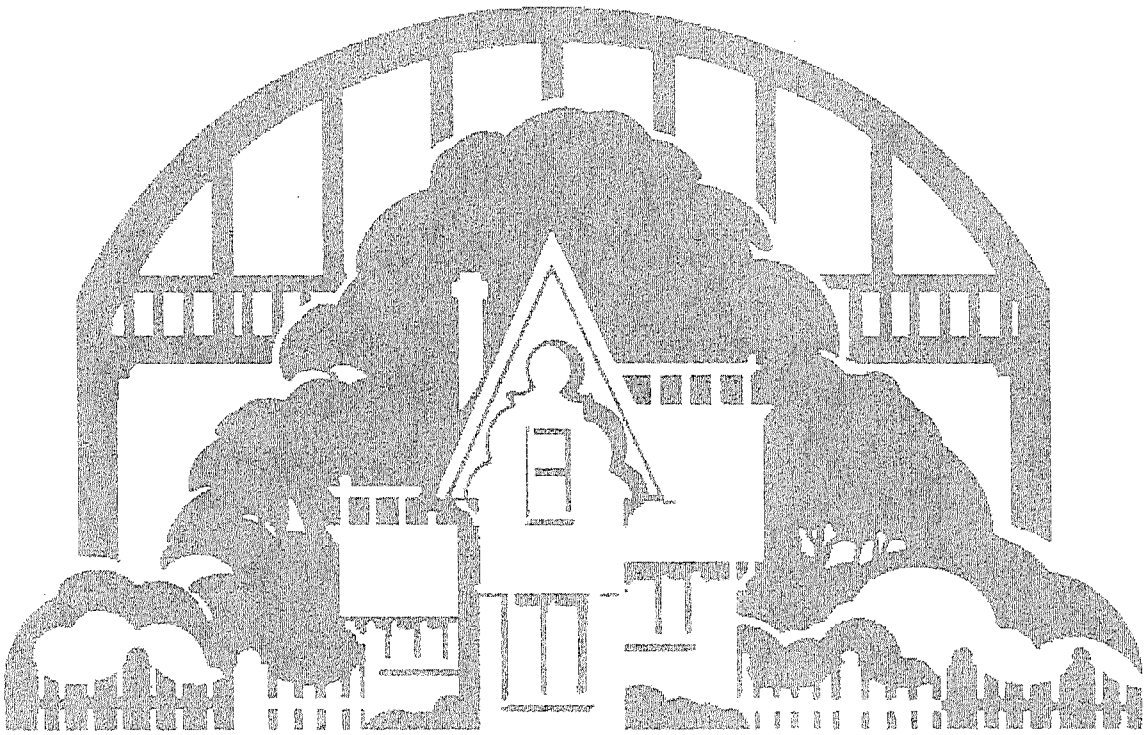
As noted above, the ultimate capacity for Albany's portion of the JWP is 20 MGD, half of the 40 MGD projected capacity requirement at buildout of the Urban Growth Boundary (UGB). The remaining 20 MGD will be met by the Vine Street WTP once the existing hydraulic constraints, which limit the capacity to approximately 16 MGD, are removed. The cost estimate for Albany's share of the initial phase of construction (project JWP1), which is expected to be completed in January 2006, is $32,300,000. ***Table 8-1*** shows the detail of the cost estimate for each major component of the JWP. The expansion (project JWP2), which is not anticipated to be needed until the mid 2040s, is estimated to cost an additional $3.9 million.

Table 8-1: Joint Water Project Cost Estimate Detail (Project number JWP1)[1]

Improvement/Funding	*Cost Allocation*		*Total*
	Albany	*Millersburg*	*Cost*
Raw water Intake/Transmission			
Intake facility	$ 732,000	$ 218,000	$ 950,000
Raw water pump station	$ 1,325,000	$ 345,000	$ 1,670,000
Raw water transmission (to JWP WTP)	$ 1,372,000	$ 410,000	$ 1,782,000
Sub-total	$ 3,429,000	$ 973,000	$ 4,402,000
Scravel Hill WTP			
Treatment Plant	$ 10,927,000	$ 2,238,000	$ 13,165,000
Instrumentation and Control	$ 1,851,000	$ 379,000	$ 2,230,000
Backwash ponds	$ 77,000	$ 23,000	$ 100,000
Sub-total	$ 12,855,000	$ 2,640,000	$ 15,495,000
Finished water Storage	$ 860,000	$ 844,000	$ 1,704,000
Sub-total	$ 860,000	$ 844,000	$ 1,704,000
Finished water transmission lines			
Shared transmission line	$ 1,129,000	$ 337,000	$ 1,466,000
Albany transmission line	$ 2,931,000	$ -	$ 2,931,000
Sub-total	$ 4,060,000	$ 337,000	$ 4,397,000
Credits			
Intake site purchase	$ (300,000)	$ 300,000	$ -
Initial engineering	$ 1,200,000	$ (1,200,000)	$ -
Sub-total	$ 900,000	$ (900,000)	$ -
Other			
General Conditions	$ 1,533,000	$ 407,000	$ 1,940,000
Contingency	$ 3,410,000	$ 780,000	$ 4,190,000
Engineering	$ 5,218,000	$ 1,208,000	$ 6,426,000
Sub-total	$ 10,161,000	$ 2,395,000	$ 12,556,000
Total[2]	**$ 32,300,000**	**$ 6,300,000**	**$ 38,600,000**

[1] *Planning level estimate. Financial Plan will incorporate bid results.*

[2] *Total costs are rounded to the nearest $100,000.*



CITY OF

Albany

OREGON

Figure 8-1

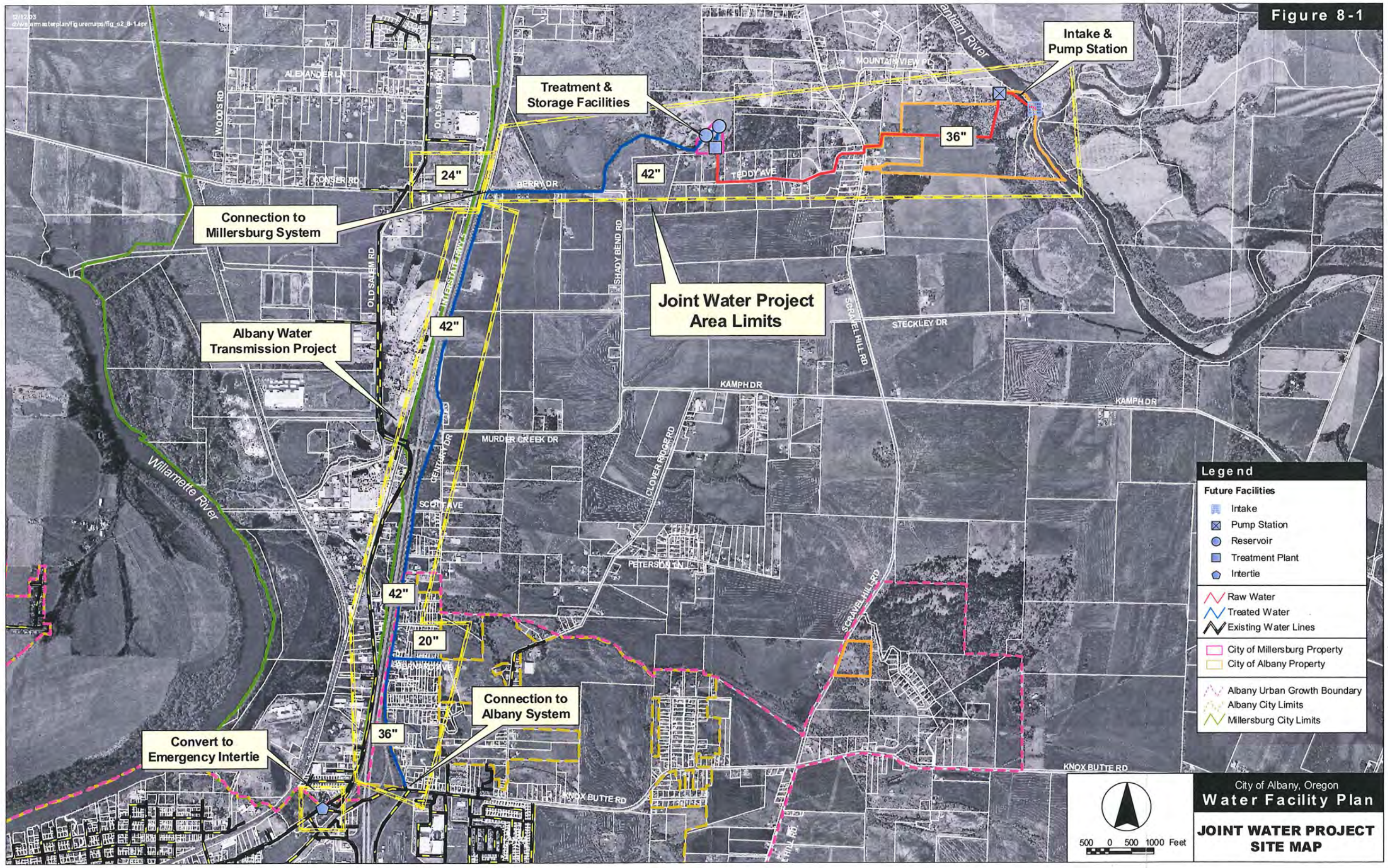

Intake & Pump Station
Treatment & Storage Facilities
36"
42"
24"
Connection to Millersburg System
Albany Water Transmission Project
42"
Joint Water Project Area Limits
42"
20"
36"
Connection to Albany System
Convert to Emergency Intertie
Willamette River
Santiam River
WOODS RD
OLD SALEM RD
BERRY DR
TEDDY AVE
SHADY BEND RD
INTERSTATE 5
MURDER CREEK DR
KAMPH DR
STECKLEY DR
SCRAVEL HILL RD
CLOVER RIDGE RD
PETERSON DR
KNOX BUTTE RD
Legend
Future Facilities
Intake
Pump Station
Reservoir
Treatment Plant
Intertie
Raw Water
Treated Water
Existing Water Lines
City of Millersburg Property
City of Albany Property
Albany Urban Growth Boundary
Albany City Limits
Millersburg City Limits
500 0 500 1000 Feet
City of Albany, Oregon
Water Facility Plan
JOINT WATER PROJECT SITE MAP

Table 9-1: Recommended Improvements by Category

Project Category	*Stage 1* [1]	*Stage 2* [1]	*Stage 3* [1]	*Stage 4* [1]	*Total* [2]
Canal	$3,460,000	$2,830,000	$2,110,000	$0	***$8,400,000***
Vine Street WTP	$2,535,000	$3,077,000	$1,997,000	$0	***$7,600,000***
Distribution System	$14,350,000	$15,794,000	$23,148,000	$80,817,000	***$134,100,000***
JWP	$32,300,000	$0	$0	$3,900,000	***$36,200,000***
TOTAL [2]	***$52,600,000***	***$21,700,000***	***$27,300,000***	***$84,700,000***	***$186,300,000***

1) 2002 dollars

2) Rounded to the nearest $100 K.

Table 9-2: RECOMMENDED PLAN, 2005 - 2074

STAGE	PROJECT NAME	PROJECT ID	PROJECT DESCRIPTION	PROJECT DRIVER	EXISTING DIAMETER (inches)	PROPOSED DIAMETER (inches)	TOTAL LENGTH (LF)	UNIT COST $/LF	PROJECT COST[1,2]	COST ALLOCATION NON-SDCi	COST ALLOCATION SDCi
Stage 1, (2005 - 2009)	Joint Water Project, Phase 1	JWP1	Intake, raw water transmission line, WTP, reservoir, finished water transmission line	Service Level					$32,300,000	$16,500,000	$15,800,000
								Project Total	*$32,300,000*	*$16,500,000*	*$15,800,000*
	East End Transmission Project	P1	Pipeline along 21st Avenue from east of I-5 to Three Lakes Road, coordinate project with P6 & P7	MDD	N/A	24	1,530	$260.40	$398,000	$149,000	$249,000
		P2	Pipeline along Spicer Road from 18th Avenue to 24-inch pipeline along Goldfish Farm Road alignment south of Hwy 20	MDD	N/A	24	2,992	$260.40	$779,000	$292,000	$487,000
		P3	Pipeline along Knox Butte Road from Clover Ridge Road to Goldfish Farm Road	MDD	N/A	24	970	$260.40	$253,000	$95,000	$158,000
		P4	Pipeline along Clover Ridge Road from Santa Maria Avenue to Knox Butte Road	MDD	N/A	12	2,459	$176.40	$434,000	$163,000	$271,000
		P5	Pipeline from the east end of Bernard Avenue to Santa Maria Avenue	MDD	N/A	20	1,807	$241.20	$436,000	$163,000	$273,000
		P6	Pipeline from the south end of Fescue Street, connect pipeline to Project P1 along 21st Avenue	MDD + FF	N/A	12	255	$176.40	$45,000	$45,000	$0
		P7	Pipeline from the south end of Rye Street, connect pipeline to Project P1 along 21st Avenue	MDD + FF	N/A	8	248	$135.60	$34,000	$34,000	$0
								Project Total	*$2,379,000*	*$941,000*	*$1,438,000*
	South Albany Transmission Projects	P8	Pipeline from 34th Avenue and Hwy 99E along 99E to 36th Avenue to Elk Run Drive along Elk Run Drive to Cougar Avenue	MDD	N/A	16	4,633	$222.00	$1,029,000	$1,029,000	$0
								Project Total	*$1,029,000*	*$1,029,000*	*$0*
	North Albany Distribution Projects, Phase 1	P9	Pipeline north along Crocker Lane from Gibson Hill Road	MDD + FF	6	12	3,766	$176.40	$664,000	$664,000	$0
		P10	Pipeline along Maier Lane from Skyline Drive to Chad Avenue	MDD + FF	2	8	746	$135.60	$101,000	$101,000	$0
		P11	Zone 4 separation - New 3rd level piping along Sparks Avenue, Scenic Drive, and Valley View Drive	MDD + FF	N/A	8	1,367	$135.60	$185,000	$185,000	$0
		P12	Zone 4 separation- New 4th level piping parallel to 3rd level pipeline along Valley View Drive	MDD + FF	N/A	8	3,790	$135.60	$514,000	$514,000	$0
		PS1	Zone 4 separation- Pump station with emergency backup generator (Two 7.5 HP and one 100 HP pumps)	Service Level					$186,000	$186,000	$0
		PS2	Install NA PRVs	Service Level					$15,000	$15,000	$0
								Project Total	*$1,665,000*	*$1,665,000*	*$0*
	Reservoir Projects, Phase 1	PS3	34th Avenue backup power outlet	Service Level					$30,000	$30,000	$0
		PS4	Queen PS building security enhancements	Safety					$15,000	$15,000	$0
		PS5	Queen motorized control valve replacement	Capital Maintenance					$25,000	$25,000	$0
		PS6	Replace Queen pump No. 21 (30 HP)	Capital Maintenance					$35,000	$35,000	$0
		PS7	Queen backup power outlet	Service Level					$30,000	$30,000	$0
		S1	Maple Street, 34th, Queen, and Valley View (3), seismic restraints	Seismic					$500,000	$500,000	$0
		S2	Maple Street, Broadway, Wildwood, Valley View, 34th, and Queen seismic valves - 9 valves	Seismic					$240,000	$240,000	$0
		S3	Replace/Repair overflow piping at Maple, Queen, 34th, and Valley View (3) Reservoirs	Service Level					$234,000	$234,000	$0
		S4	Dechlorination facilities for 34th, Broadway, Wildwood, and Valley View Reservoirs - 4 vaults	Regulatory					$90,000	$90,000	$0
		S5	Increase reservoir circulation for 34th and Queen reservoirs	Regulatory					$45,000	$45,000	$0
								Project Total	*$1,244,000*	*$1,244,000*	*$0*

Table 9-2: RECOMMENDED PLAN, 2005 - 2074

STAGE	PROJECT NAME	PROJECT ID	PROJECT DESCRIPTION	PROJECT DRIVER	EXISTING DIAMETER (inches)	PROPOSED DIAMETER (inches)	TOTAL LENGTH (LF)	UNIT COST $/LF	PROJECT COST[1,2]	COST ALLOCATION NON-SDCi	COST ALLOCATION SDCi
Stage 1, (2005 - 2009)	Canal Project, Phase 1	C1	Update control structures	Service Level					$760,000	$760,000	$0
		C2	Ensure Canal capacity	Service Level					$1,450,000	$1,450,000	$0
		C3	Channel restoration	Service Level					$1,000,000	$1,000,000	$0
		C4	Improve Canal access	Service Level					$250,000	$250,000	$0
								Project Total	*$3,460,000*	*$3,460,000*	*$0*
	Vine Street WTP Projects, Phase 1	Planning-1	System wide security assessment	Safety					$150,000	$150,000	$0
		PS8	Replace HSPS pump No. 14 (200 HP)	Capital Maintenance					$75,000	$75,000	$0
		PS9	HSPS backup power outlet	Service Level					$30,000	$30,000	$0
		PS10	Analysis of operating conditions including VFDs at the HSPS	Service Level					$55,000	$55,000	$0
		WTP01	Water quality monitoring upgrades	Regulatory					$84,000	$84,000	$0
		WTP02	Backwash/Surface wash piping system improvements	Capital Maintenance					$329,000	$329,000	$0
		WTP03	Replace accelator #2 settling tubes	Capital Maintenance					$213,000	$213,000	$0
		WTP04	Plant pipeline inspection and cleaning	Capital Maintenance					$112,000	$112,000	$0
		WTP05	Repair Maple Street Reservoir baffle and improve disinfection performance	Regulatory					$115,000	$115,000	$0
		WTP06	Chlorine system safety improvements	Safety					$140,000	$140,000	$0
		WTP07	Replace/Repair control room building HVAC system	Capital Maintenance					$70,000	$70,000	$0
		WTP08	VFD harmonics evaluation	Capital Maintenance					$20,000	$20,000	$0
		WTP09	ADA/OSHA compliance upgrade	Safety					$50,000	$50,000	$0
		WTP10	WTP automation upgrade--plant work	Service Level					$535,000	$535,000	$0
		WTP11	WTP automation upgrade--distribution work	Service Level					$127,000	$127,000	$0
		WTP12	WTP security upgrade	Safety					$150,000	$150,000	$0
		WTP13	WTP filter gallery maintenance	Capital Maintenance					$280,000	$280,000	$0
								Project Total	*$2,535,000*	*$2,535,000*	*$0*
	Pipeline Replacement Programs, Phase 1	Program-1	Steel pipeline replacement program	Service Level		8	44,248	$135.60	$6,000,000	$6,000,000	$0
		Program-2	Undersized pipelines with hydrants replacement program	Fire Flow		8	1,845	$135.60	$250,000	$250,000	$0
		Program-3	Perpetual life pipeline replacement program	Service Level		8	13,150	$135.60	$1,783,000	$1,783,000	$0
								Project Total	*$8,033,000*	*$8,033,000*	*$0*
	STAGE 1 TOTAL								**$52,600,000**	**$35,400,000**	**$17,200,000**

Table 9-2: RECOMMENDED PLAN, 2005 - 2074

STAGE	PROJECT NAME	PROJECT ID	PROJECT DESCRIPTION	PROJECT DRIVER	EXISTING DIAMETER (inches)	PROPOSED DIAMETER (inches)	TOTAL LENGTH (LF)	UNIT COST $/LF	PROJECT COST[1, 2]	COST ALLOCATION NON-SDCI	COST ALLOCATION SDCI
Stage 2, (2010 - 2014)	North Albany Distribution Projects, Phase 2	P13	Pipeline along Scenic Drive from Gibson Hill Road to Wildwood Drive	PHD	10	12	3,856	$176.40	$680,000	$680,000	$0
		P14	Pipeline along Quarry Road from Christmas Tree Lane to Springhill Road, along Springhill Road to Cherry Lane	MDD + FF	6-8	12	4,276	$176.40	$754,000	$382,000	$372,000
		P15	Pipeline along Green Acres Lane from Shady Lane to Green Acres Loop	MDD + FF	6	8	522	$135.60	$71,000	$71,000	$0
		P16	Pipeline along Wildwood Drive from Scenic Drive to Wildwood Reservoir site	MDD + FF	8	12	1,175	$176.40	$207,000	$207,000	$0
		PS11	Expand Zone 4 booster pump station (add one 7.5 HP pump)	-					$20,000	$0	$20,000
								Project Total	*$1,732,000*	*$1,340,000*	*$392,000*
	Zone 1 Distribution Projects	P17	Pipeline along Jackson Street north from Highway 99	MDD	18	24	203	$260.40	$53,000	$0	$53,000
		P18	Pipeline along Ferry Street from Queen Avenue to 22nd Avenue	PHD	8	12	1,274	$176.40	$225,000	$0	$225,000
		P19	Pipeline along Jefferson Street from 20th Avenue to 22nd Avenue to Jackson Street	MDD + FF	6	8	1,147	$135.60	$156,000	$156,000	$0
		P20	Pipeline along Oak Street north from 24th Avenue	MDD + FF	6	8	675	$135.60	$92,000	$92,000	$0
		P21	Pipeline along Price Road north from Highway 20	MDD + FF	8	16	217	$222.00	$48,000	$48,000	$0
		P22	Pipeline along Bain Street north from Highway 20	MDD + FF	6-N/A	12	363	$176.40	$64,000	$64,000	$0
		P23	Pipeline along Jackson Street north from 23rd Avenue	MDD + FF	N/A	8	289	$135.60	$39,000	$39,000	$0
								Project Total	*$677,000*	*$399,000*	*$278,000*
	Ellingson Road Reservoir Project, Phase 1	P24	Pipeline along Ellingson Road from Pacific Boulevard to Ellingson Road Reservoir	MDD	N/A	24	2,091	$260.40	$544,000	$0	$544,000
		S6	A 4 MG concrete reservoir	Service Level					$2,960,000	$0	$2,960,000
		PS13	6 MGD pump station with room for expansion	Service Level					$1,275,000	$0	$1,275,000
								Project Total	*$4,779,000*	*$0*	*$4,779,000*
	Canal Projects, Phase 2	C1	Update control structures	Service Level					$1,130,000	$1,130,000	$0
		C2	Ensure Canal capacity	Service Level					$1,450,000	$1,450,000	$0
		C4	Improve Canal access	Service Level					$250,000	$250,000	$0
								Project Total	*$2,830,000*	*$2,830,000*	*$0*
	Vine Street WTP Projects, Phase 2	Planning-2	Facility Plan update	Service Level					$300,000	$135,000	$165,000
		WTP13	WTP filter gallery maintenance	Capital Maintenance					$280,000	$280,000	$0
		WTP14	Clearwell repairs	Capital Maintenance					$70,000	$70,000	$0
		WTP15	Chemical storage improvements	Safety					$28,000	$28,000	$0
		WTP16	Solids handling	Capital Maintenance					$220,000	$220,000	$0
		WTP17	Seismic upgrades	Seismic					$570,000	$570,000	$0
		WTP18	Distribution system pressure monitoring improvements	Service Level					$70,000	$70,000	$0
		WTP19	Replace accelator #1 settling tubes	Capital Maintenance					$210,000	$210,000	$0
		WTP20	Repair/Replace filter media/underdrain system	Capital Maintenance					$682,000	$682,000	$0
		WTP21	Add granular activated carbon (GAC) to filter media	Service Level					$150,000	$150,000	$0
		WTP22	Valve maintenance	Capital Maintenance					$497,000	$497,000	$0
								Project Total	*$3,077,000*	*$2,912,000*	*$165,000*
	Pipeline Replacement Programs, Phase 2	Program-1	Steel pipeline replacement program	Service Level		8	44,248	$135.60	$6,000,000	$6,000,000	$0
		Program-2	Undersized pipelines with hydrants replacement program	Fire Flow		8	7,375	$135.60	$1,000,000	$1,000,000	$0
		Program-3	Perpetual life pipeline replacement program	Service Level		8	11,844	$135.60	$1,606,000	$1,606,000	$0
								Project Total	*$8,606,000*	*$8,606,000*	*$0*
	STAGE 2 TOTAL								**$21,700,000**	**$16,100,000**	**$5,600,000**

Table 9-2: RECOMMENDED PLAN, 2005 - 2074

STAGE	PROJECT NAME	PROJECT ID	PROJECT DESCRIPTION	PROJECT DRIVER	EXISTING DIAMETER (inches)	PROPOSED DIAMETER (inches)	TOTAL LENGTH (LF)	UNIT COST $/LF	PROJECT COST[1,2]	COST ALLOCATION NON-SDCi	COST ALLOCATION SDCi
Stage 3, (2015 - 2024)	Central Albany Transmission Project	P25	Cross town transmission pipeline from Knox Butte Road to Main Street	MDD	8/12/20	30	14,303	$320.00	$4,577,000	$1,017,000	$3,560,000
		P26	Cross town transmission pipeline from Queen along Main Street and Hill Street to 34th Avenue	MDD	N/A	24	6,686	$260.40	$1,741,000	$605,000	$1,136,000
								Project Total	*$6,318,000*	*$1,622,000*	*$4,696,000*
	Reservoir Projects, Phase 2	PS12	Increase level 2 pump station capacity	Service Level					$10,000	$0	$10,000
								Project Total	*$10,000*	*$0*	*$10,000*
	Ellingson Road Reservoir Project, Phase 2	S9	A 4 MG concrete reservoir	Service Level					$2,960,000	$0	$2,960,000
		PS14	Expand Ellingson Road Pump Station to 12 MGD	Service Level					$425,000	$0	$425,000
								Project Total	*$3,385,000*	*$0*	*$3,385,000*
	Canal Projects, Phase 3	C1	Update control structures	Service Level					$2,110,000	$2,110,000	$0
								Project Total	*$2,110,000*	*$2,110,000*	*$0*
	Vine Street WTP Projects, Phase 3	Planning-2	Facility Plan update	Service Level					$300,000	$158,000	$142,000
		WTP22	Valve maintenance	Capital Maintenance					$497,000	$497,000	$0
		WTP23	Plant hydraulics	Service Level					$280,000	$0	$280,000
		WTP24	Instrumentation and control improvements	Capital Maintenance					$840,000	$840,000	$0
		WTP25	Replace Maple Street Reservoir baffle	Capital Maintenance					$80,000	$80,000	$0
								Project Total	*$1,997,000*	*$1,575,000*	*$422,000*
	Pipeline Replacement Programs, Phase 3	Program-1	Steel pipeline replacement program	Service Level		8	29,499	$135.60	$4,000,000	$4,000,000	$0
		Program-2	Undersized pipelines with hydrants replacement program	Service Level		8	16,380	$135.60	$2,221,000	$2,221,000	$0
		Program-3	Perpetual life pipeline replacement program	Service Level		8	53,200	$135.60	$7,214,000	$7,214,000	$0
								Project Total	*$13,435,000*	*$13,435,000*	*$0*
STAGE 3 TOTAL									**$27,300,000**	**$18,700,000**	**$8,500,000**

Table 9-2: RECOMMENDED PLAN, 2005 - 2074

STAGE	PROJECT NAME	PROJECT ID	PROJECT DESCRIPTION	PROJECT DRIVER	EXISTING DIAMETER (inches)	PROPOSED DIAMETER (inches)	TOTAL LENGTH (LF)	UNIT COST $/LF	PROJECT COST[1,2]	COST ALLOCATION NON-SDCI	COST ALLOCATION SDCI
Stage 4, (2025 - 2074)	Development Driven Transmission/Distribution Projects[3]	P28	Pipeline from 34th Avenue along Hill Street alignment to Lochner Road, along Lochner Road to Ellingson Road	MDD	N/A	16	9,368	$222.00	$809,000	$0	$809,000
		P29	Pipeline from 47th Avenue across railroad right-of-way then southeasterly parallel to railroad	MDD	N/A	16	1,458	$222.00	$126,000	$0	$126,000
		P30	Pipeline from P29, parallel with Shortridge Street, to 40th Avenue, east to Three Lakes Road, north to Grand Prairie Road	MDD	N/A	12	7,640	$176.40	$312,000	$0	$312,000
		P31	Pipeline along Grand Prairie Road from Three Lakes Road to pipeline stub out east of Waverly Drive	MDD	N/A	16	3,900	$222.00	$337,000	$0	$337,000
		P32	Pipeline along Three Lakes Road from Grand Prairie Road to 21st Avenue	MDD	N/A	16	4,719	$222.00	$408,000	$0	$408,000
		P33	Pipeline along Hwy. 20 from Goldfish Farm Road to Scravel Hill Road, along Scravel Hill Road to Knox Butte Road	MDD	N/A	12	10,838	$176.40	$442,000	$0	$442,000
		P34	Pipeline from Knox Butte Road south to existing 24-inch pipeline along Goldfish Farm Road	MDD	N/A	12	3,269	$176.40	$133,000	$0	$133,000
		P35	Pipeline from Santa Maria Avenue to Knox Butte Road east of Project P4	MDD	N/A	12	2,565	$176.40	$105,000	$0	$105,000
		P36	Pipeline along Santa Maria Avenue from Scravel Hill Road to Clover Ridge Road	MHD	N/A	24	6,762	$260.40	$844,000	$0	$844,000
		P37	Pipeline along Ellingson Road from elevated storage to Lochner Road	MDD	N/A	24	2,991	$260.40	$373,000	$0	$373,000
		P38	Pipeline along Ellingson Road from Lochner to Columbus Street, Columbus Street to existing 16-inch pipeline	MDD/PHD	N/A	16	4,766	$222.00	$412,000	$0	$412,000
								Project Total	*$4,301,000*	*$0*	*$4,301,000*
	Knox Butte Reservoir Project, Phase 1	P27	Pipeline along Knox Butte Road and Scravel Hill Road from Gold Fish Farm Road to proposed Knox Butte Reservoir	MDD	N/A	24	9,679	$260.40	$2,520,000	$0	$2,520,000
		S7	A 5 MG concrete storage reservoir	Service Level					$3,500,000	$0	$3,500,000
								Project Total	*$6,020,000*	*$0*	*$6,020,000*
	Knox Butte Reservoir Project, Phase 2	S8	A 5 MG concrete reservoir	Service Level					$3,500,000	$0	$3,500,000
								Project Total	*$3,500,000*	*$0*	*$3,500,000*
	Wildwood Reservoir Project[4]	S10	Add a 0.5 MG[4] concrete storage reservoir	Service Level					$685,000	$0	$685,000
								Project Total	*$685,000*	*$0*	*$685,000*
	Joint Water Project, Phase 2	JWP2	Added capacity at WTP, and 2 MG additional reservoir storage	Service Level					$3,900,000	$0	$3,900,000
								Project Total	*$3,900,000*	*$0*	*$3,900,000*
	Pipeline Replacement Programs, Phase 4	Program-3	Perpetual life pipeline replacement program	Service Level		8 / 20	452,146	$135.60 / $241.20	$66,311,000	$66,311,000	$0
								Project Total	*$66,311,000*	*$66,311,000*	*$0*
STAGE 4 TOTAL									**$84,700,000**	**$66,300,000**	**$18,400,000**
PROGRAM TOTAL (ALL STAGES)									**$186,300,000**	**$136,500,000**	**$49,700,000**

PROGRAM SUMMARY[1, 2]	
Stage 1	$52,600,000
Stage 2	$21,700,000
Stage 3	$27,300,000
Stage 4	$84,700,000
Total	**$186,300,000**

Footnotes:

1) Estimated project costs are based on a March 2002 Seattle ENR CCI = 7560.
2) Costs are based on individual and grouped projects being rounded to the nearest $1,000 and stages and total program cost to the nearest $100,000.
3) Costs shown for development driven projects reflect anticipated costs for oversizing. The cost for an 8-inch equivalent is assumed to be the responsibility of the developer of adjacent properties and is not included as a cost for Albany.
4) Zone 2 storage requirement based on residential fire flows. The *Revised Water Demand Allocations* report by the City of Albany identified the potential for a school or non-residential structure to be constructed in Zone 2. If a structure with high fire flow requirements, like a school, is constructed in Zone 2, either additional storage will be required or it will need to be constructed of materials such that the fire flow requirement is 1,500 gpm for two hours.

Abbreviations:

MDD = MAXIMUM DAY DEMAND
PHD = PEAK HOUR DEMAND
MDD + FF = MAXIMUM DAY DEMAND PLUS FIRE FLOW
MHD = MINIMUM HOUR DEMAND (MAXIMUM STORAGE REPLENISHMENT)

MILLERSBURG CONNECTION TO JOINT WATER PROJECT

RAW WATER INTAKE AND PUMP STATION

SCRAVEL HILL WATER TREATMENT PLANT

ALBANY-MILLERSBURG JOINT WATER PROJECT

CITY OF MILLERSBURG

PS2

P11

P12

PS1 & PS11

4TH LEVEL PUMP STATION & VALLEY VIEW RESERVOIRS (1 @ 0.85 MG, 2 @ 0.25 MG)

P9

GIBSON HILL RD. PUMP STATION

NORTH ALBANY PUMP STATION

BROADWAY RESERVOIR 8 MG

P13

P10

P14

P15

S10

P16

WILDWOOD RESERVOIRS (1 @ 1.15 MG, 1 @ 0.5 MG) SEE NOTE BELOW

EMERGENCY INTERTIE WITH THE CITY OF MILLERSBURG

P5

P4

P36

P35

P27

P3

P34

P33

S7

S8

KNOX BUTTE RESERVOIRS (5 MG EACH)

VINE STREET WTP

P17

P25

P22

P21

P2

QUEEN AVENUE RESERVOIR & PUMP STATION 1 MG (TO BE ABANDONED)

P18

P19

P23

P20

P26

P6

P7

P1

34TH AVENUE RESERVOIR & PUMP STATION 2 MG

P8

P31

P32

P30

P29

P28

P24

P37

PS 13 & 14

P38

S6

S9

ELLINGSON RD. RESERVOIRS (4 MG EACH)

NOTE:

ZONE 2 STORAGE REQUIREMENTS ARE BASED ON RESIDENTIAL FIRE FLOWS. IF NON-RESIDENTIAL DEVELOPMENT WITH HIGH FIRE FLOW REQUIREMENTS, OR A SCHOOL, IS CONSTRUCTED IN ZONE 2, EITHER ADDITIONAL STORAGE WILL BE REQUIRED OR THE STRUCTURE WILL NEED TO BE CONSTUCTED OF MATERIALS SUCH THAT THE FIRE FLOW REQUIREMENT IS 1,500 GPM FOR 2 HOURS.

4/16/04

City of Albany, Oregon

Water Facility Plan

FIGURE: 9-1 RECOMMENDED DISTRIBUTION SYSTEM IMPROVEMENTS AT BUILDOUT

LEGEND:

- EXISTING WATER LINES AS OF FEBRUARY 2003
- EXISTING RESERVOIRS
- EXISTING PUMP STATION
- URBAN GROWTH BOUNDARY
- PRESSURE ZONE 1
- PRESSURE ZONE 2
- PRESSURE ZONE 3
- PRESSURE ZONE 4
- WATER TREATMENT PLANT
- EXISTING CITY LIMITS

Recommended Pipeline Improvement Projects

- STAGE 1: 2005 - 2009
- STAGE 2: 2010 - 2014
- STAGE 3: 2015 - 2024
- STAGE 4: 2025 - 2074
- Project Break Points

Recommended Pump Station Improvement Projects

- STAGE 1: 2005 - 2009
- STAGE 2: 2010 - 2014
- STAGE 3: 2015 - 2024
- STAGE 4: 2025 - 2074

Recommended Storage Improvement Projects

- STAGE 1: 2005 - 2009
- STAGE 2: 2010 - 2014
- STAGE 3: 2015 - 2024
- STAGE 4: 2025 - 2074

N W E S

1250 0 1250 2500 Feet

Geographic Information Services

COST ALLOCATION METHODOLOGY

As part of the facility planning process, it is important to determine what projects are needed to correct existing system deficiencies, meet future water demands, or to both correct existing deficiencies and to meet future water demands. This distinction is required in order to develop funding options during development of the Water Financial Plan.

Projects that are only required to meet future water demands are eligible to be fully funded through the improvement fee component of the water system development charge (SDCi). In contrast, projects that are required entirely to correct existing system deficiencies are not eligible to be funded through SDCi, and are generally funded through rates. Shared projects, or projects identified as being needed to meet existing and future water demands, are eligible to be partially funded through SDCi. Montgomery Watson Harza, City staff, the Water Task Force, and the City's financial consultant, Galardi Consulting, worked together to develop a defensible and equitable methodology, based on capacity, for defining cost sharing options for the shared projects. The methodology used to determine the SDCi eligible portion of each shared project is outlined in the following paragraphs and the results are summarized in ***Table 9-3***. It should be noted that ***Table 9-2*** distinguishes between improvement costs that are SDCi eligible and those that are not.

Table 9-3: Shared Project Allocation Summary

Project Name (Project #'s)	*Non-SDCi Eligible (Percent)*	*SDCi Eligible (Percent)*
Joint Water Project, Phase 1 (Entire Project)	51%	49%
East End Transmission Project (Only Projects P1, P2, P3, P4, & P5)	37%	63%
North Albany Distribution Projects, Phase 2 (Only Project P14)	51%	49%
Central Albany Transmission Project (Entire Project)	26%	74%
Water Facility Plan Updates (Entire Project)	49%	51%

Joint Water Project (JWP), Phase 1 (Entire Project)

The JWP will provide a redundant water supply and add capacity to the water system. A second supply increases the reliability of the water system by substantially reducing the risk of a loss of water supply. Due to the increased reliability, the water system is subject to different planning criteria for emergency storage and emergency water supply than if a single source of supply were maintained. As a result, existing customers benefit through reduced investments in emergency supply and onsite backup power at the Vine Street Water Treatment Plant, and through the reduction of emergency reservoir storage volume. Completion of the JWP also results in the elimination of major new water transmission lines that would otherwise be required. The approach used to allocate costs is based on existing and future capacity requirements. Excluding Millersburg, existing capacity requirements are 15 MGD and are projected to increase to 40 MGD at buildout. Costs for each major facility at the Joint Water Project are allocated based on the portion of the facility's capacity meeting existing and future needs. As an example, Albany's share of the cost for the intake structure was allocated as 15/40ths or approximately 37 percent non-SDCi eligible with the balance being SDCi eligible. ***Table 9-4*** summarizes the cost sharing analysis used for each of the major components of the Joint Water Project.

Table 9-4: Joint Water Project, Phase 1, Cost Sharing Analysis (Entire Project)

Facility	*Criteria*	*Albany's Total*	*Non-SDCi Eligible*	*SDCi Eligible*
Intake	15 MGD existing demand / 40 MGD buildout demand	$794,000	$298,000	$496,000
Raw Water	Pumps at 15 MGD existing demand / 26 MGD interim demand, remainder at 15 MGD / 40 MGD	$4,331,000	$1,768,000	$2,563,000
WTP	15 MGD existing demand / 26 MGD interim demand	$20,120,000	$11,608,000	$8,512,000
Storage	CT at 15 MGD existing demand / 26 MGD interim demand, remainder split 50/50	$1,285,000	$672,000	$613,000
Finished Water	15 MGD existing demand / 40 MGD buildout demand	$5,733,000	$2,150,000	$3,583,000
	Total	***$32,300,000***	***$16,500,000***	***$15,800,000***
		Percent	***51%***	***49%***

East End Transmission Project (Only Projects P1, P2, P3, P4, & P5)

The East End Transmission Project is critical to fully realize benefits of the Joint Water Project. This transmission line will increase system reliability, address low-pressure concerns in the southeast portions of the existing water system, and ultimately provide greater system capacity. New customers will benefit from the greater reliability and the increased capacity this project provides. Existing customers will also benefit from increased system reliability, enhanced system pressure and avoidance of transmission line replacements that would otherwise be required.

Project costs are allocated based on existing needs and the future capacity requirements. Current capacity requirements are 15 MGD and are projected to increase to 40 MGD at buildout. Therefore, 15/40ths, or 37 percent of the project and associated costs, are estimated to benefit existing customers and are not considered SDCi eligible. The remaining 63 percent associated with growth is considered SDCi eligible. A summary of the cost allocation is shown in ***Table 9-5***.

Table 9-5: East End Transmission Project, Cost Allocation Summary (Only Projects P1, P2, P3, P4, & P5)

Non-SDCi Eligible	*SDCi Eligible*	*Total*
$862,000	$1,438,000	$2,300,000
37%	63%	100%

North Albany Distribution Projects, Phase 2 (Only Project P14)

The North Albany Distribution Project addresses existing needs identified through evaluation of the water system under current demands. This evaluation identified replacement and upsizing of approximately 660 feet of 6-inch water line with 8-inch water line to meet existing fire flow demands. This project replaces a substantially greater length of 6, 8, and 10-inch pipelines with a 12-inch water line to provide a secondary connection to the Broadway Reservoir site and benefits both existing and future customers through more reliable service to and from the Broadway Reservoir site.

The cost of replacing 660 feet of six-inch water line with 8-inch water line is attributed entirely to non-SDCi funds. The incremental cost to upsize the 660 foot section of water line from 8 to 12 inches and the balance of the project costs are allocated based on the increased capacity provided by the new pipeline. Planning criteria presented in *Chapter 3 – Planning Criteria and Cost Estimates* have been used to determine a weighted average capacity of the existing water lines and to contrast this with the expected capacity from the new 12-inch water line. The 660 feet of 6-inch water line are assumed to be upsized to 8-inches in allocating the balance of the project cost.

The weighted average diameter of the existing pipeline is approximately 8 inches. Using the planning criteria, an 8-inch water line has a maximum capacity of about 3.5 cfs. Using the same criteria, a 12-inch water line has a maximum capacity of approximately 7.9 cfs. Consequently costs have been allocated to non-SDCi funds based on $90,000 to upsize the existing 660 feet of 6-inch water line and a ratio of 3.5 cfs/7.9 cfs or 44% of remaining project costs. A summary of the cost allocation is shown in ***Table 9-6***.

Table 9-6: North Albany Distribution Projects, Phase 2, Cost Allocation Summary (Only Project P14)

Non-SDCi Eligible	*SDCi Eligible*	*Total*
$382,000	$372,000	$754,000
51%	49%	100%

Central Albany Transmission Project (Entire Project)

This project is required at the time the Scravel Hill treatment plant is increased in capacity from 10 MGD to 20 MGD (Albany's share). The Central Albany Transmission Project removes bottlenecks in the existing system that limit its ability to except the full 20 MGD and benefits future customers by providing additional capacity within the distribution system. The Central Albany Transmission Project also benefits existing customers through replacement of approximately 1.2 miles of deteriorated steel water lines and reductions in the perpetual life water line replacement program through replacement of existing non-steel water lines.

Costs were allocated based on the increased capacity provided by the new transmission pipeline. Planning criteria presented in *Chapter 3 – Planning Criteria and Cost Estimates* have been used to determine a weighted average capacity of the existing water lines and to contrast this with the capacity from the new transmission lines. The weighted average diameter of the existing water lines is 10 inch. Based on the planning criteria, a 10-inch water line has a maximum capacity of 5.5 cubic feet per second (cfs). The Central Albany Transmission Project consists of replacing these existing water lines with 30 and 24-inch water lines. Based on the planning criteria, a 24-inch water line has a capacity of 15.7 cfs and a 30-inch water line has a capacity of 24.5 cfs.

The ratio between the capacities of the existing and proposed water lines was used to allocate costs for each respective section of the project. The portion of the project that installs the 24-inch water line was considered 65 percent SDCi eligible based on the ratio of capacities between the 10 and 24-inch water lines ((15.7 – 5.5) / 15.7). In contrast, the portion of the project that includes the 30-inch water line was considered 78 percent SDCi eligible based on

the ratio of capacities between the 10 and 30-inch water lines ((24.5 – 5.5) / 24.5). A summary of the resulting cost allocation is shown in ***Table 9-7***.

Table 9-7: Central Albany Transmission Project, Cost Allocation Summary (Entire Project)

Non-SDCi Eligible	*SDCi Eligible*	*Total*
$1,622,000	$4,696,000	$6,318,000
26%	74%	100%

Water Facility Plan Updates (2) (Entire Project)

Updates of facility plans are required periodically to reflect changes in expected growth patterns and demands, the regulatory environment, and capital improvement needs. On average, facility plan updates are completed on 10-year cycles.

Water facility plans are used as the guiding documents for development of a water system. Ensuring that these plans accurately reflect system needs and regulatory requirements benefits both existing and future customers in terms of system reliability and cost effective investments. Cost allocations were based on projected demands at the time the updates are expected to be completed. As noted above, facility plans are typically updated on a 10-year cycle. Consequently projected demands at 2012 (18 MGD) and 2022 (21 MGD) have been used with the projected 40 MGD demand at buildout to allocate costs. The 2012 update is considered to be 55 percent SDCi eligible based on the ratio of capacities between 2012 and 2074 ((40 MGD-18 MGD) / 40 MGD). The 2022 update is considered to be 47 percent SDCi eligible based on the ratio of capacities between 2022 and 2074 ((40 MGD-22 MGD) / 40 MGD). The resulting cost allocation with this approach is shown in ***Table 9-8***.

Table 9-8: Water Facility Plan Updates (2), Cost Allocation Summary (Entire Project)

Non-SDCi Eligible	*SDCi Eligible*	*Total*
$293,000	$307,000	$600,000
49%	51%	100%

CITY OF

Albany

OREGON

Glossary of Terminology

Beneficial Use (of Water) — A use of water resulting in appreciable gain or benefit to the user, consistent with state law, which varies from one state to another.

Clean Water Act (CWA) [Public Law 92–500] — More formally referred to as the *Federal Water Pollution Control Act*, the Clean Water Act constitutes the basic federal water pollution control statute for the United States. The 1966 amendments to this act increased federal government funding for sewage treatment plants. Additional 1972 amendments established a goal of zero toxic discharges and "fishable" and "swimmable" surface waters. Enforceable provisions of the CWA include technology-based effluent standards for point sources of pollution, a state-run control program for nonpoint pollution sources, a construction grants program to build or upgrade municipal sewage treatment plants, a regulatory system for spills of oil and other hazardous wastes, and a *Wetlands* preservation program (Section 404).

Clean Water Act (CWA), Section 319 — A federal grant program added by Congress to the CWA in 1987 and managed by the *U.S. Environmental Protection Agency (EPA)*, Section 319 is specifically designed to develop and implement state *Nonpoint Source (NPS) Pollution* management programs, and to maximize the focus of such programs on a watershed or waterbasin basis with each state. Today, all 50 states and U.S. territories receive Section 319 grant funds and are encouraged to use the funding to conduct nonpoint source assessments and revise and strengthen their nonpoint source management programs. Before a grant is provided under Section 319, states are required to: (1) complete a Nonpoint Source (NPS) Assessment Report identifying state waters that require nonpoint source control and their pollution sources; and (2) develop Nonpoint Source Management Programs that outline four-year strategies to address these identified sources.

Cryptosporidium – A microorganism commonly found in lakes and rivers which is highly resistant to disinfection.

Cubic Feet Per Second (CFS) — A unit expressing rate of discharge, typically used in measuring stream flow. One cubic foot per second is equal to the discharge of a stream having a cross section of 1 square foot and flowing at an average velocity of 1 foot per second. It also equals a rate of approximately 7.48 gallons per second, 448.83 gallons per minute, 1.9835 acre-feet per day, or 723.97 acre-feet per year.

Firm Capacity — The capacity of a facility when the largest component of the facility is not on-line. For example the firm capacity of a pump station is the maximum pumping capacity of the station when the largest pump is turned off, or in the case of equal capacity pumps, when any one of the pumps is turned off. In a water treatment plant the components used as the basis for the firm capacity rating are the filters.

Fiscal Year (FY) — The 12-month period, from July 1 through June 30, used by the City of Albany in budget formulation and execution.

Flood, or Flood Waters — (1) An overflow of water onto lands that are used or usable by man and not normally covered by water. Floods have two essential characteristics: The inundation of land is temporary; and the land is adjacent to and inundated by overflow from a river, stream, lake, or ocean. (2) As defined, in part, in the *Standard Flood Insurance Policy (SFIP)*: "A general and temporary condition of partial or complete inundation of normally dry land areas from overflow of inland or tidal waters or from the unusual and rapid accumulation or runoff of surface waters from any source."

Gallons per Capita (Person) per Day (GPCD) — An expression of the average rate of domestic and commercial water demand, usually computed for public water supply systems. Depending on the size of the system, the climate, whether the system is metered, the cost of water, and other factors, *Public Water Supply Systems (PWSS)* in the United States experience a demand rate of approximately 60 to 150 gallons per capita per day. Also see *Gallons per Employee per Day (GED)* for information on the application of this concept to commercial water use by *Standard Industrial Classification (SIC) Code*.

Ground Water, also Groundwater — (1) Generally all subsurface water as distinct from *Surface Water*; specifically, the part that is in the saturated zone of a defined aquifer. (2) Water that flows or seeps downward and saturates soil or rock, supplying springs and wells. The upper level of the saturate zone is called the Water Table. (3) Water stored underground in rock crevices and in the pores of geologic materials that make up the earth's crust. Ground water lies under the surface in the ground's *Zone of Saturation*, and is also referred to as *Phreatic Water*.

HAA5 — Refers to the five regulated haloacetic acids: Dibromoacetic Acids (DBAA), Dichloroacetic Acids (DCAA), Monobromoacetic Acid (MBAA), Monochloroacetic Acid (MCAA), and Trichloroacetic Acid (TCAA). When water containing natural organic matter is treated with any disinfectant, disinfection by-products including HAAs form. These by-products are thought to cause cancer and thus health-based standards have been set by the US

Environmental Protection Agency (EPA) for the maximum allowable concentration of HAAs in public water systems. The content of HAAs is usually measured in parts per million (ppm) or mg/L.

Perfected Water Right — (1) A completed or fully executed water right. A water right is said to have been perfected when all terms and conditions associated with it have been fully accomplished, e.g., the diversion has been effected and the water applied to beneficial use. (2) A water right to which the owner has applied for and obtained a permit, has complied with the conditions of the permit, and has obtained a license or certification of appropriation. (3) A water right that indicates that the uses anticipated by an applicant, and made under permit, were made for *Beneficial Use*. Usually it is irrevocable unless voluntarily canceled or forfeited due to several consecutive years of nonuse. Also referred to as a *Certified Water Right*.

Permit — (1) (Water Right) A written document that grants authority to take unused water and put it to *Beneficial Use*. If all requirements of the permit are satisfied, then the permit for water appropriation can mature into a license or *Perfected Water Right*. (2) (Discharge) A legally binding document issued by a state or federal permit agency to the owner or manager of a point source discharge. The permit document contains a schedule of compliance requiring the permit holder to achieve a specified standard or limitation (by constructing treatment facilities or modifying plant processes) by a specified date. Permit documents typically specify monitoring and reporting requirements to be conducted by the applicant as well as the maximum time period over which the permit is valid. Also see *Water Right*.

pH — A measure of the relative acidity or alkalinity of water. It is defined as the negative log (base 10) of the hydrogen ion concentration and is also known as the hydrogen potential of a solution. Pure water with a pH of 7 is neutral; lower pH levels indicate increasing acidity, while pH levels above 7 indicate increasingly basic solutions.

Planning — A comprehensive study of present trends and of probable future developments, together with recommendations of policies to be pursued. Planning embraces such subjects as population growth and distribution; social forces; availability of land, water, minerals, and other natural resources; technological progress; and probable future revenues, expenditures, and financial policies. Planning must be responsive to rapidly changing conditions.

Planning Horizon — The overall time period considered in the planning process that spans all activities covered in or associated with the analysis or plan and all future conditions and effects or proposed actions which would influence the planning decisions.

River Mile (RM): Specific location along a river or stream that designates how far that point is upstream from the mouth of the river.

Safe Drinking Water Act (SDWA) (Public Law 93–523) — An amendment to the *Public Health Service Act* that established primary and secondary quality standards for drinking water. The SDWA was passed in 1976 to protect public health by establishing uniform drinking water standards for the nation. In 1986 SDWA Amendments were passed that mandated the *U.S. Environmental Protection Agency (EPA)* to establish standards for 83 drinking water contaminants by 1992 and identify an additional 25 contaminants for regulation every 3 years thereafter.

SDC (Systems Development Charge) — A fee charged to new development to recover past expenses that provided reserve capacity and to help pay for the capital costs associated with growth. This fee is usually assessed as part of the permitting fees and is based on development's demand on the community's infrastructure.

Surface Water — (1) An open body of water such as a stream, lake, or reservoir. (2) Water that remains on the earth's surface; all waters whose surface is naturally exposed to the atmosphere, for example, rivers, lakes, reservoirs, ponds, streams, impoundments, seas, estuaries, etc., and all springs, wells, or other collectors directly influenced by surface water. (3) A source of drinking water that originates in rivers, lakes, and run-off from melting snow. It is either drawn directly from a river or captured behind dams and stored in reservoirs.

Total Dissolved Solids (TDS) — (Water Quality) A measure of the amount of material dissolved in water (mostly inorganic salts). Typically aggregates of carbonates, bicarbonates, chlorides, sulfates, phosphates, nitrates, etc. of calcium, magnesium, manganese, sodium, potassium, and other actions that form salts. The inorganic salts are measured by filtering a water sample to remove any suspended particulate material, evaporating the water, and weighing the solids that remain. An important use of the measure involves the examination of the quality of drinking water. Water that has a high content of inorganic material frequently has taste problems and/or water hardness problems. The common and synonymously used term for TDS is "salt" usually expressed in milligrams per liter.

Total Organic Carbon (TOC) — Refers to the total content of organically bonded carbon in a sample of water. This carbon is differentiated from inorganically bonded carbon such as that occurring in bicarbonate groups.

Transfer (Water Right) — (1) The process of transferring a water right from one person to another. (2) A passing or conveyance of title to a water right; a permanent assignment as opposed to a temporary lease or disposal of water. Most states require that some formal notice or filing be made with an appropriate state agency so that the transaction is officially recorded and the new owner is recorded as the owner of the water right.

TTHM (Total Trihalomethanes) — Refers to the total content of trihalomethanes in water. Trihalomethanes are derivatives of methane, CH_4, in which three halogen atoms are substituted for three of the hydrogen atoms. These molecules, known as THMs, are Trichloromethane (chloroform), Dibromochloromethane, Bromodichloromethane, and Tribromomethane (bromoform). When water containing organic material is treated with any disinfectant, by-products including THMs form. These chemicals are suspected of causing cancer and thus are regulated by the US Environmental Protection Agency. The maximum allowable annual average of TTHMs is set by the EPA and is usually measured in parts per billion (ppb).

Turbidity — A measure of the reduced transparency of water due to suspended material that carries water quality implications. The term "turbid" is applied to waters containing suspended matter that interferes with the passage of light through the water or in which visual depth is restricted. The turbidity may be caused by a wide variety of suspended materials, such as clay, silt, finely divided organic and inorganic matter, soluble colored organic compounds, plankton and other microscopic organisms and similar substances.

UGB (Urban Growth Boundary) — A site-specific line on a map that separates existing and future urban development from rural lands. Urban levels and densities of development, complete with urban levels of services, are planned within the UGB. Outside the UGB, rural lands are planned for farm and forest uses or for rural levels of development with accompanying rural levels of services.

Water Conservation — The physical control, protection, management, and use of water resources in such a way as to maintain crop, grazing, and forest lands, vegetative cover, wildlife, and wildlife habitat for maximum sustained benefits to people, agriculture, industry, commerce, and other segments of the national economy. The extent to which these actions actually create a savings in water supply depends on how they affect new water use and depletion.

Water Plan — A document of issues, policies, strategies and action plans intended to effectively and economically execute a *Water Planning* process.

Water Right — (1) The legal right to use a specific quantity of water, on a specific time schedule, at a specific place, and for a specific purpose. (2) A legally-protected right, granted by law, to take possession of water occurring in a water supply and to put it to *Beneficial Use.* (3) A legal right to divert state waters for a beneficial purpose.

Water Rights — (1) The legal rights to the use of water. (2) A grant, permit, decree, appropriation, or claim to the use of water for beneficial purposes, and subject to other rights of earlier date or use, called *Priority* or *Prior Appropriation.* They consist of *Riparian Water Rights*, *Appropriative Water Rights*, *Prescribed Water Rights*, and *Reserved Water Rights*.

List of Acronyms

AC	asbestos cement pipe
ADD	average daily demand
AWWA	American Water Works Association
Canal	Santiam-Albany Canal
cfs	cubic feet per second
CIP	cast iron pipe
City	City of Albany
CWA	Clean Water Act
CZ	Crown Zellerbach
DBAA	dibromoacetic Acids
DBP	Disinfectants and Disinfection By-Products
DBPR	Stage 2 Disinfection By-product Rule
DCAA	dichloroacetic Acids
DI	ductile iron pipe
ENR / CCI	Engineering News-Record (ENR) Construction Cost Index (CCI)
EPA	Environmental Protection Agency
FF	fire flow
FY	Fiscal Year
GAC	granular activated carbon
GED	gallons per employee per day
GI	galvanized pipe
GIS	Geographic Information Systems
GPCD	gallons per capita (person) per day
gpm	gallons per minute
GPS	Global Positioning System
HAA_5	haloacetic acids
hp	horsepower
HSPS	high service pump station
JWP	Joint Water Project (Albany-Millersburg Joint Water Supply Project)
KCM	Kramer, Chin, and Mayo
LT2ESWTR	Long Term 2 Enhanced Surface Water Treatment Rule
MBAA	monobromoacetic acid
MCAA	monochloroacetic acid
MCL	maximum contaminant level

MDD	maximum day demands
MFD	multiple Family district
mg	million gallons
MGD	million gallons per day
MHD	minimum hour demand
MWH	Montgomery Watson Harza
NACSD	North Albany County Service District
NPDES	National Pollution Discharge Elimination System
NPS	Nonpoint Source
ODDW	outside diameter dipped and wrapped steel pipe
ODEQ	Oregon Department of Environmental Quality
ODWP	Oregon Department of Human Services Drinking Water Program
PAC	powder activated carbon
PHD	peak hourly demands
PLC	Texas Instruments Program Logic Controller system
ppb	parts per billion
ppm	parts per million
PRV	Pressure Regulating (Reducing) Valve
psi	Pounds per square inch
PVC	polyvinyl chloride pipe
PWSS	Public Water Supply Systems
RM	river mile
RTU	remote telemetry units
SCADA	System Control and Data Acquisition
SDCi	Water system development charge
SDWA	Federal Safe Drinking Water Act
SFIP	Standard Flood Insurance Policy
SIC	Standard Industrial Classification code
SOCs	soluble organic carbons
STL	steel pipe
TCAA	trichloroacetic Acid
TDS	total dissolved solids
TOC	total organic carbon
TTHM	total trihalomethanes
UGB	Urban Growth Boundary
UV	ultraviolet irradiation

VFD	variable frequency drives
VOCs	volatile organic carbons
WI	wrought iron pipe
WTP	Vine Street Water Treatment Plant

CITY OF

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OREGON

APPENDIX A

Joint Water Project Worksheets

LEGEND

- ***SCRAVEL HILL WTP***
- ***RAW WATER PUMP STATION***
- ***PROPOSED WATERLINE***
- ***EXISTING WATERLINE***

The Joint Water Project, Phase 1

Project ID(s): *JWP1*

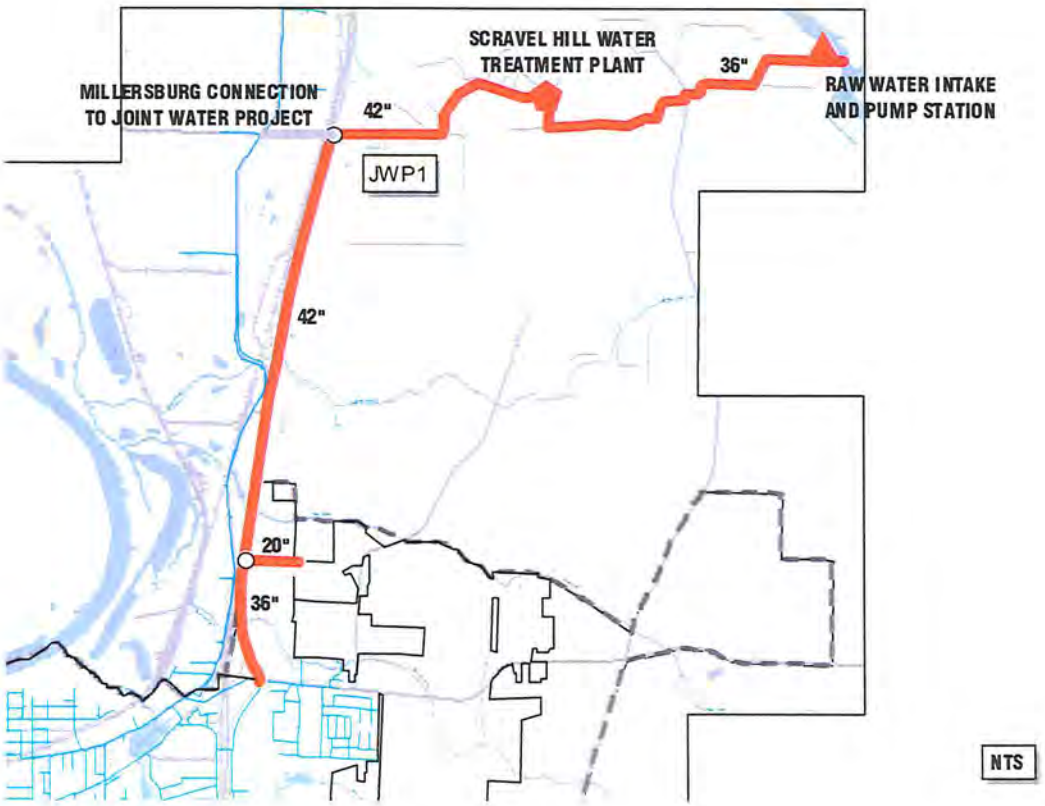
Stage(s): 1

Project Description: The Joint Water Project will be supplied by an intake on the Santiam River located approximately one-quarter mile downstream of the confluence of the North Santiam and South Santiam Rivers. Raw water will be pumped from the intake to a treatment plant located on Scravel Hill. Following treatment, finished water will be conveyed using a shared gravity flow water line from the Scravel Hill Treatment Plant Reservoir to Century Drive and Berry Drive. At this point the water line splits with branches to each community's distribution system. The plant's initial firm capacity will be 12 MGD with 10 MGD allocated to the City of Albany. Project costs listed below are for Albany's portion of the project.

Proposed improvements include:

JWP1 Intake, raw water transmission line, WTP, reservoir, finished water transmission line

Cost: $32,300,000



The Joint Water Project, Phase 2

Project ID(s): *JWP2*

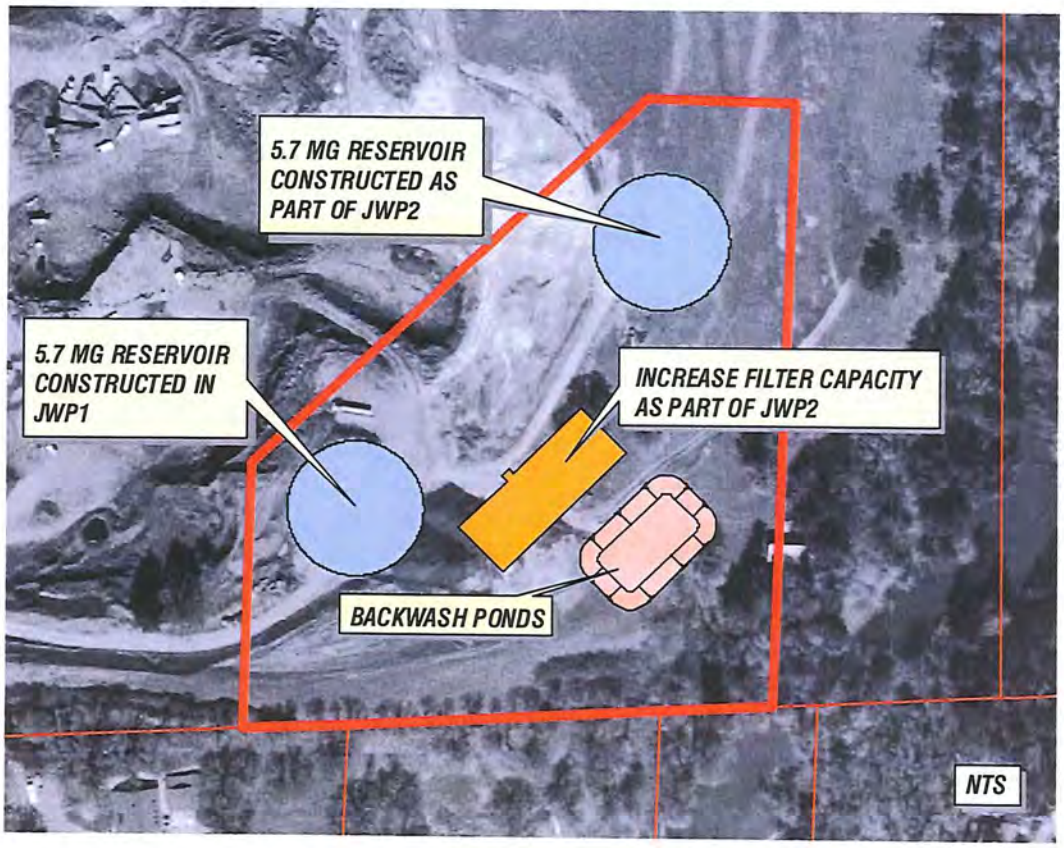
Stage(s): 4

Project Description: The Joint Water Project will be expanded by adding treatment capacity and reservoir storage at the Scravel Hill Water Treatment Plant site. The JWP2 project will satisfy the buildout treatment capacity needed for both Millersburg and Albany. Once this project is completed, the Scravel Hill WTP firm capacity will be increased to 26 MGD with 20 MGD allocated to the City of Albany. Project costs listed below are for Albany's portion of the project.

Proposed improvements include:

JWP2 Added capacity at WTP and additional reservoir storage

Cost: $3,900,000



Distribution System Worksheets

(Pipelines, Pump Stations and Reservoirs)

LEGEND

EXISTING FACILITIES

- *WTP*
- *RESERVOIR*
- *PUMP STATION*
- *WATERLINE*

FUTURE WATERLINE

- *STAGE 1*
- *STAGE 2*
- *STAGE 3*
- *STAGE 4*

FUTURE PUMP STATION

- *STAGE 1*
- *STAGE 2*
- *STAGE 3*
- *STAGE 4*

FUTURE RESERVOIR

- *STAGE 1*
- *STAGE 2*
- *STAGE 3*
- *STAGE 4*

East End Transmission Projects

Project ID(s): *P1, P2, P3, P4, P5, P6, & P7*

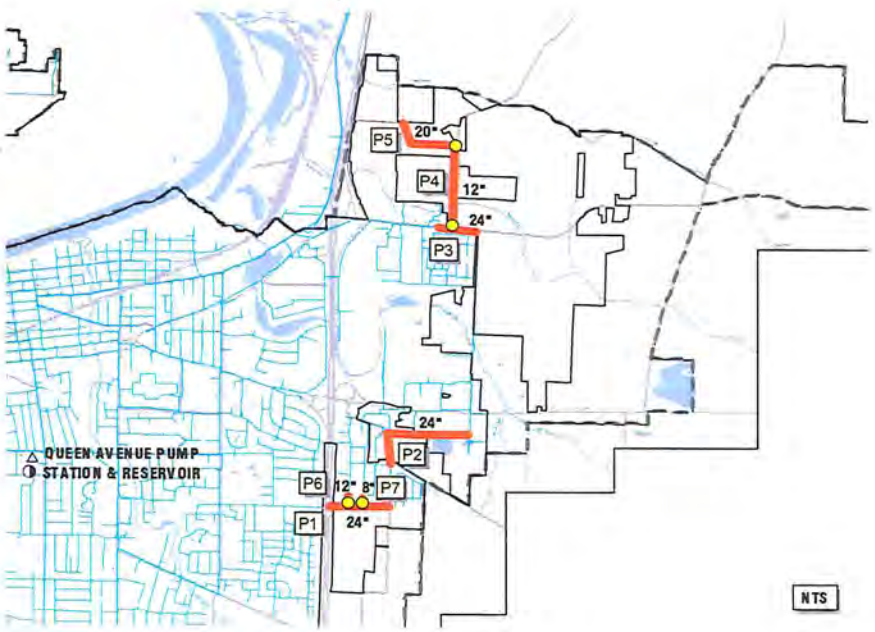
Stage(s): 1

Project Description: The East End Transmission Project is required to fully utilize the initial 10-MGD capacity generated for Albany by the Scravel Hill Water Treatment Plant. These transmission lines include approximately 10,300 feet of 24, 20, 12, and 8-inch water lines. These water lines are also needed to raise service pressures in the southeast Albany area.

Proposed improvements include:

- P1 Pipeline along 21st Avenue from east of I-5 to Three Lakes Road, coordinate project with P6 & P7.
- P2 Pipeline along Spicer Road from 18th Avenue to 24-inch pipeline along Goldfish Farm Road alignment south of Hwy 20.
- P3 Pipeline along Knox Butte Road from Clover Ridge Road to Goldfish Farm Road.
- P4 Pipeline along Clover Ridge Road from Santa Maria Avenue to Knox Butte Road.
- P5 Pipeline from the east end of Bernard Avenue to Santa Maria Avenue
- P6 Pipeline from the south end of Fescue Street, connect pipeline to Project P1 along 21st Avenue.
- P7 Pipeline from the south end of Rye Street, connect pipeline to Project P1 along 21st Avenue.

Cost: $2,379,000



South Albany Transmission Project

Project ID(s): *P8*

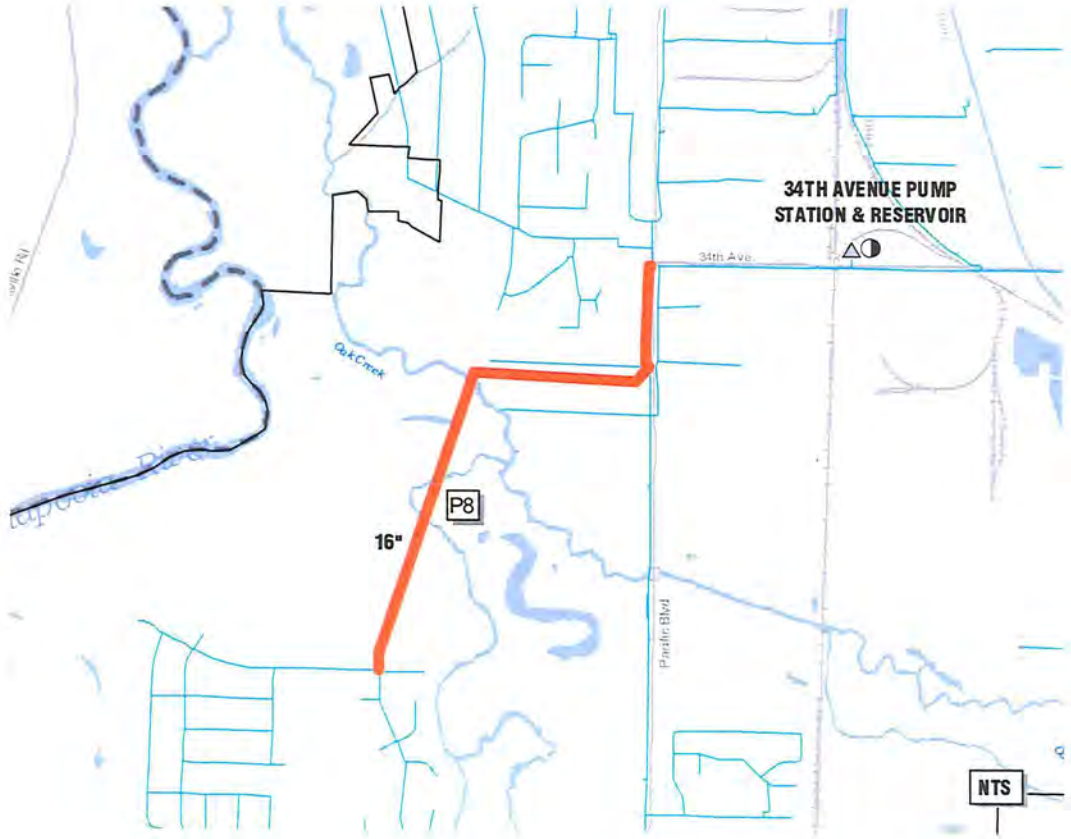
Stage(s): 1

Project Description: The South Albany Transmission Project consists of a 16-inch transmission line that begins at the intersection of Pacific Boulevard and 34th Avenue and ends at Cougar Avenue. This transmission line is needed to improve fire flows and service pressures and to provide a redundant supply line to the southwest Albany area.

Proposed improvements include:

P8 Pipeline from 34th Avenue and Hwy 99E along 99E to 36th Avenue to Elk Run Drive along Elk Run Drive to Cougar Avenue

Cost: $1,029,000



North Albany Distribution Projects, Phase 1

Project ID(s): *P9, P10, P11, P12, PS1, & PS2*

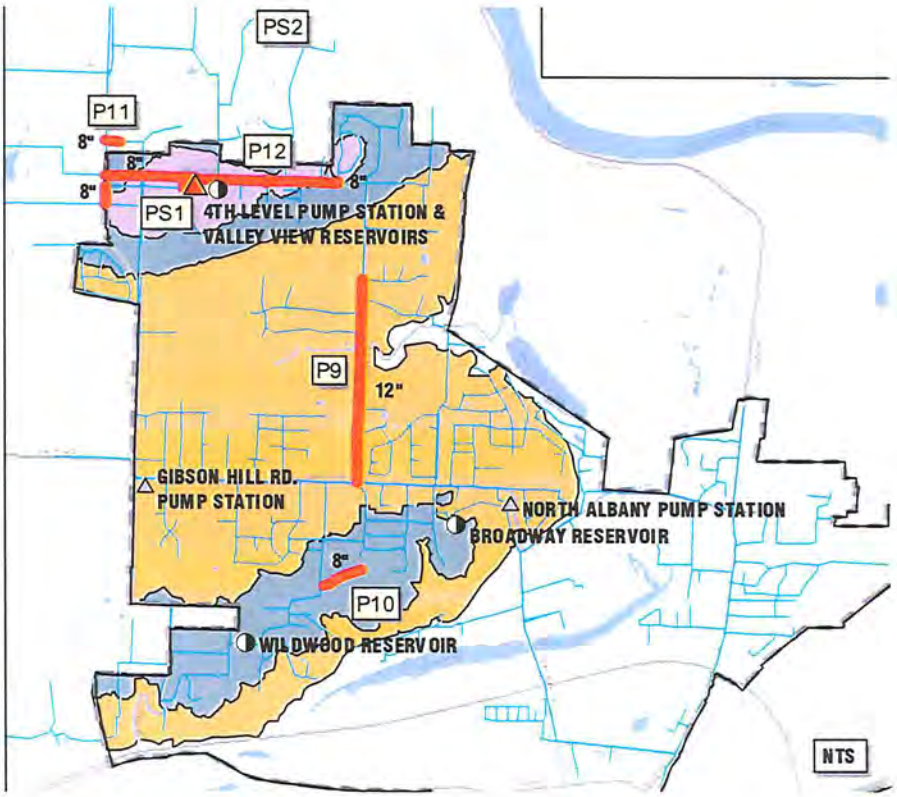
Stage(s): 1

Project Description: The North Albany Distribution, Phase 1 projects include upsizing approximately 4,500 feet (750 feet of steel) of undersized water lines located along Crocker and Maier Lanes to 8 and 12-inch water lines in order to meet fire flow requirements. This project group also includes a pump station and piping necessary to create a fourth pressure zone.

Proposed improvements include:

- P9 Pipeline north along Crocker Lane from Gibson Hill Road
- P10 Pipeline along Maier Lane from Skyline Drive to Chad Avenue
- P11 Zone 4 separation - New 3rd level piping along Sparks Avenue, Scenic Drive, and Valley View Drive
- P12 Zone 4 separation- New 4th level piping parallel to 3rd level pipeline along Valley View Drive
- PS1 Zone 4 separation- Pump station with emergency backup generator (two 7.5 HP and one 100 HP pumps)
- PS2 Install NA PRV on pipeline serving NW Winn Drive

Cost: $1,665,000



Reservoir Projects, Phase 1

Project ID(s): *PS3, PS4, PS5, PS6, PS7, S1, S2, S3, S4, S5*

Stage(s): 1

Project Description: This group of projects is needed to improve existing reservoirs in the distribution system. Projects include improvements to overflow piping and reservoir circulation, installation of seismic protection, dechlorination facilities, and back-up power outlets, and replacement of valves and pumps.

Proposed improvements include:

- PS3 34th Avenue backup power outlet
- PS4 Queen pump station building security enhancement
- PS5 Queen pump station motorized control valve replacement
- PS6 Replace Queen pump stations pump No. 21 (30 HP)
- PS7 Queen pump station backup power outlet
- S1 Seismic restraints – Maple Street, 34th Avenue, Queen Avenue, and Valley View (3)
- S2 Seismic valves – Maple St., 34th Avenue, Queen Avenue, Broadway, Wildwood, Valley View (3)
- S3 Replace/Repair overflow piping – Maple Street, 34th Avenue, Queen Avenue, and Valley View (3)
- S4 Dechlorination facilities – 34th Avenue, Broadway, Wildwood, and Valley View
- S5 Increase reservoir circulation for 34th and Queen reservoirs

Cost: $1,244,000

Pipeline Replacement Programs, Phase 1, 2, 3, & 4

Project ID(s): *Program-1, Program-2 & Program-3*

Stage(s): 1, 2, 3 & 4

Project Description: These programs are required to replace deteriorating and failing steel water lines, undersized water lines that serve fire hydrants, and other pipes that have surpassed their service life.

Proposed improvements include:

Program 1	Steel pipeline replacement program
Program 2	Undersized pipelines with hydrants replacement program
Program 3	Perpetual life pipeline replacement program

Cost: $96,385,000

North Albany Distribution Projects, Phase 2

Project ID(s): *P13, P14, P15, P16, PS11*

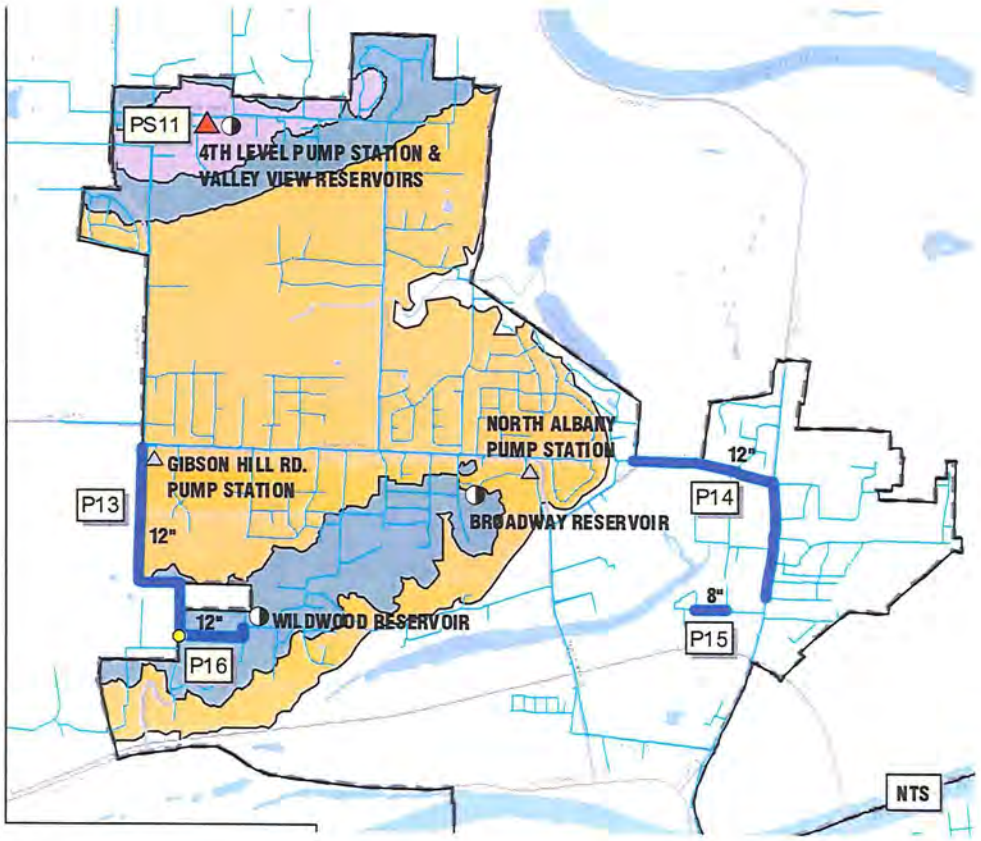
Stage(s): 2

Project Description: The North Albany Distribution Projects, Phase 2, are needed to meet fire flow requirements in the North Albany area and to expand the Zone 4 booster pump station to meet future water demands. These projects will upsize approximately 9,800 feet of water lines to 8 and 12-inch diameter water lines.

Proposed improvements include:

- P13 Pipeline along Scenic Drive from Gibson Hill Road to Wildwood Drive
- P14 Pipeline along Quarry Road from Christmas Tree Lane to Springhill Road, along Springhill Road to Cherry Lane
- P15 Pipeline along Green Acres Lane from Shady Lane to Green Acres Loop
- P16 Pipeline along Wildwood Drive from Scenic Drive to Wildwood Reservoir site
- PS11 Expand Zone 4 booster pump station (add one 7.5 HP pump)

Cost: $1,732,000



Zone 1 Distribution Projects

Project ID(s): *P17, P18, P19, P20, P21, P22, & P23*

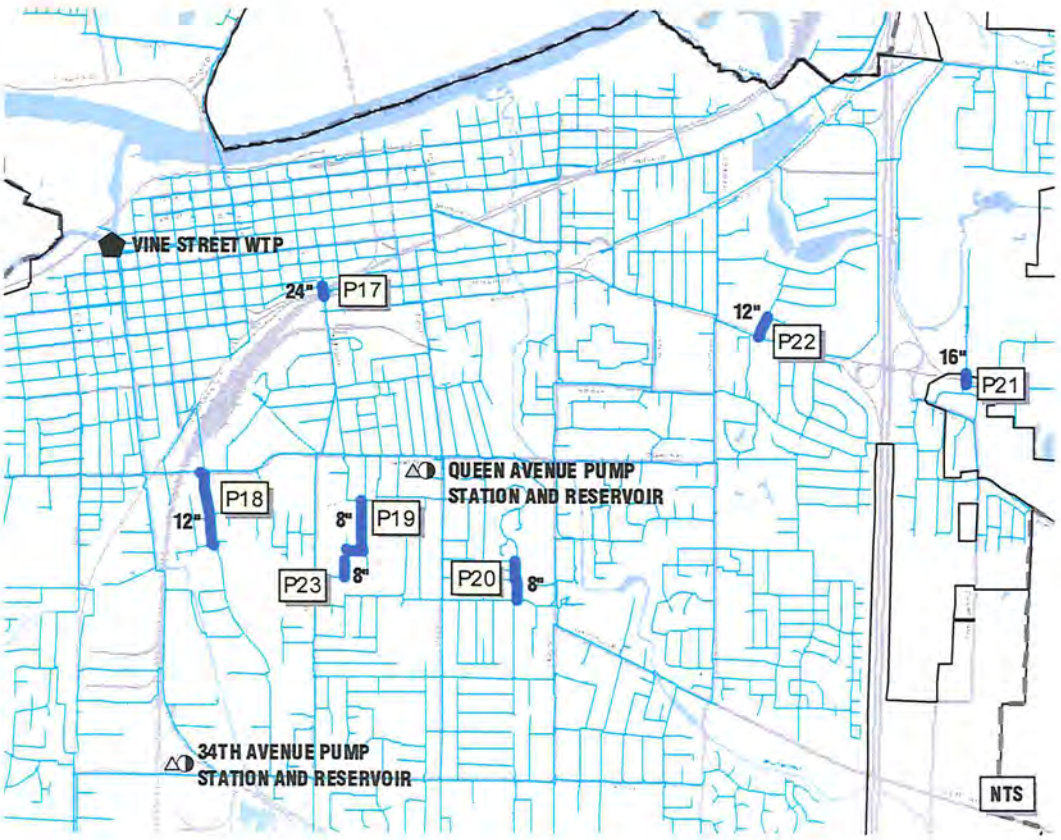
Stage(s): 2

Project Description: Zone 1 Distribution Projects include approximately 2,700 feet of water lines necessary to meet fire flow requirements and approximately 1,500 feet of water lines required to meet future peak and maximum day demands. These projects are dispersed throughout pressure Zone 1.

Proposed improvements include:

- P17 Pipeline along Jackson Street north from Highway 99
- P18 Pipeline along Ferry Street from Queen Avenue to 22nd Avenue
- P19 Pipeline along Jefferson Street from 20th Avenue to 22nd Avenue to Jackson Street
- P20 Pipeline along Oak Street north from 24th Avenue
- P21 Pipeline along Price Road north from Highway 20
- P22 Pipeline along Bain Street north from Highway 20
- P23 Pipeline along Jackson Street north from 23rd Avenue

Cost: $677,000



Ellingson Road Reservoir Project, Phase 1

Project ID(s): *P24, S6, PS13*

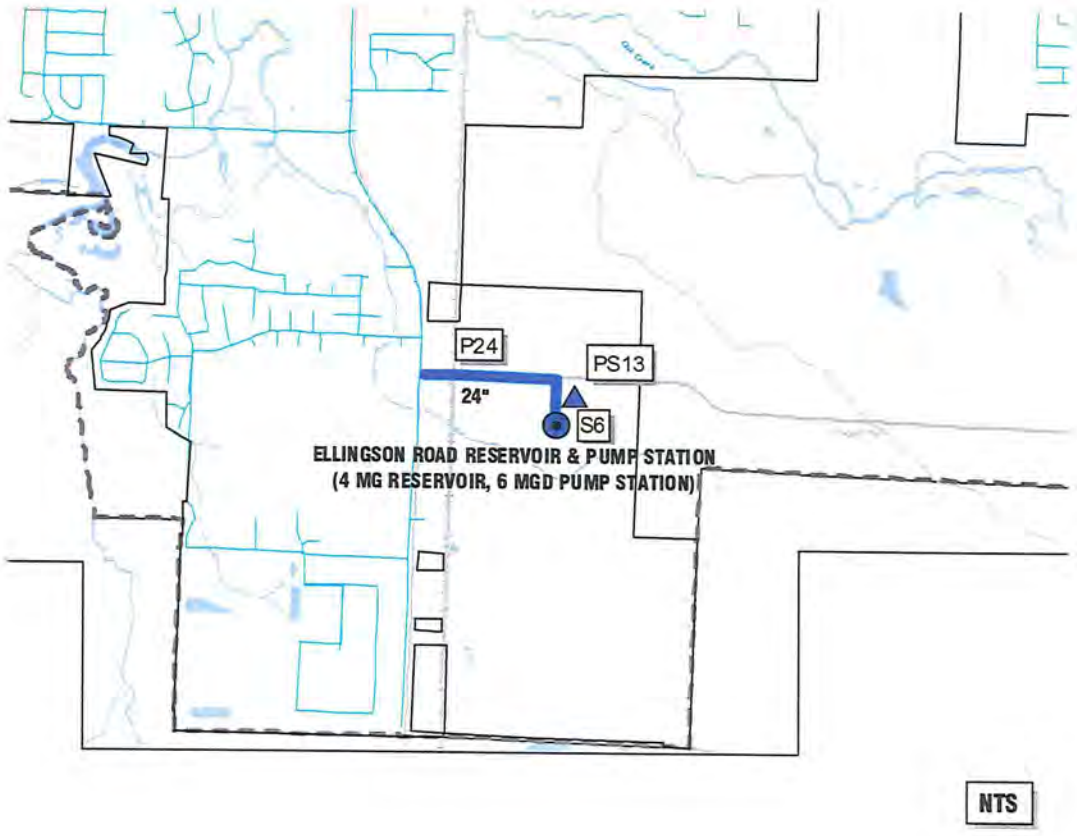
Stage(s): 2

Project Description: Phase 1 of the Ellingson Road Reservoir Project includes a 4-MG concrete reservoir and 6-MGD pump station located on Ellingson Road. This project also includes approximately 2,100 feet of new 24-inch pipeline necessary to connect the reservoir to the existing water line on Pacific Boulevard. This project is needed to meet future storage requirements in Zone 1 and will provide local fire protection storage and enhanced service pressures in the Southwest Albany area. The pump station should be constructed with room for future expansion to provide 12-MGD firm capacity and include a backup power generator.

Proposed improvements include:

P24 Pipeline along Ellingson Road from Pacific Boulevard to reservoir
S6 A 4 MG concrete reservoir
PS13 A 6 MGD pump station with room for future expansion

Cost: $4,779,000



Central Albany Transmission Project

Project ID(s): *P25 & P26*

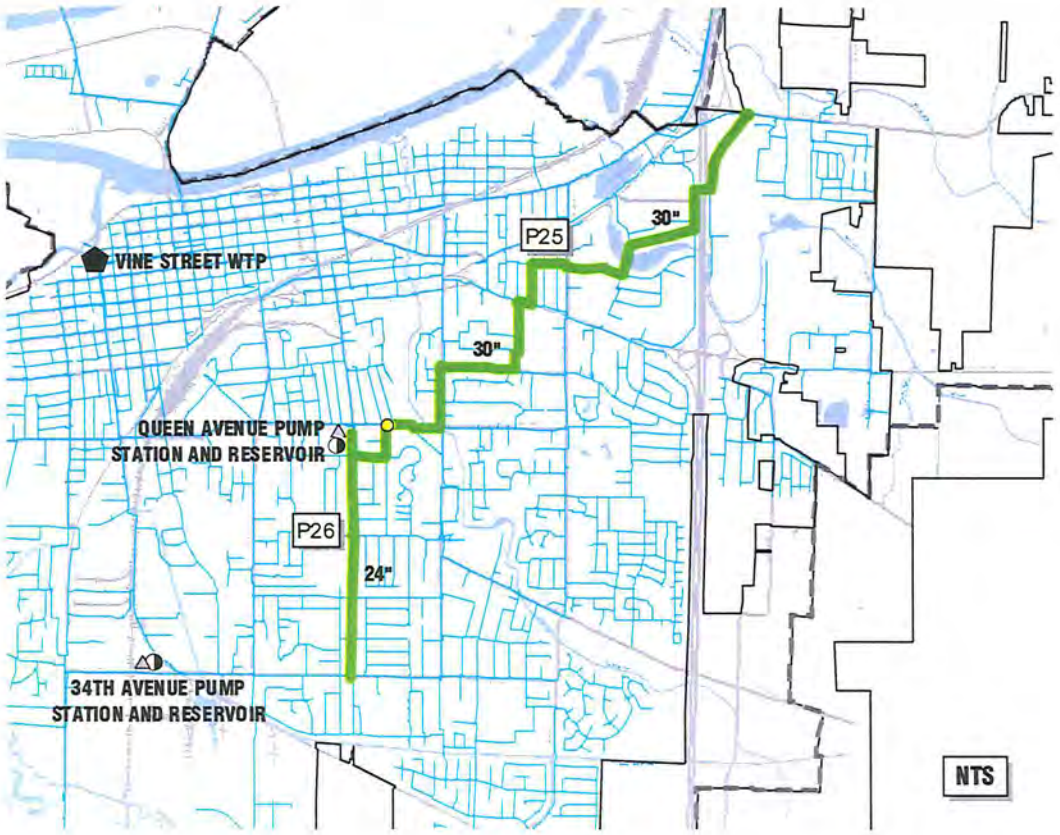
Stage(s): 3

Project Description: The Central Albany Transmission Project is required to meet future maximum day demand conditions and is required to fully realize the benefits of the future Scravel Hill WTP expansion. The project consists of approximately 14,300 feet of 30-inch water line from Knox Butte Road to Main Street and approximately 6,700 feet of 24-inch water line from Queen Avenue to 34th Avenue. This project incorporates the replacement of approximately 1.25 miles of deteriorated steel water lines. Alternate alignments for the 30" water line could be investigated if the City decides to incorporate this transmission project with steel pipeline replacement along Pacific Boulevard.

Proposed improvements include:

P25 Cross town transmission pipeline from Knox Butte Road to Main Street
P26 Cross town transmission pipeline from Queen Avenue along Main Street and Hill Street to 34th Avenue

Cost: $6,318,000



Reservoir Projects, Phase 2

Project ID(s): *PS12*

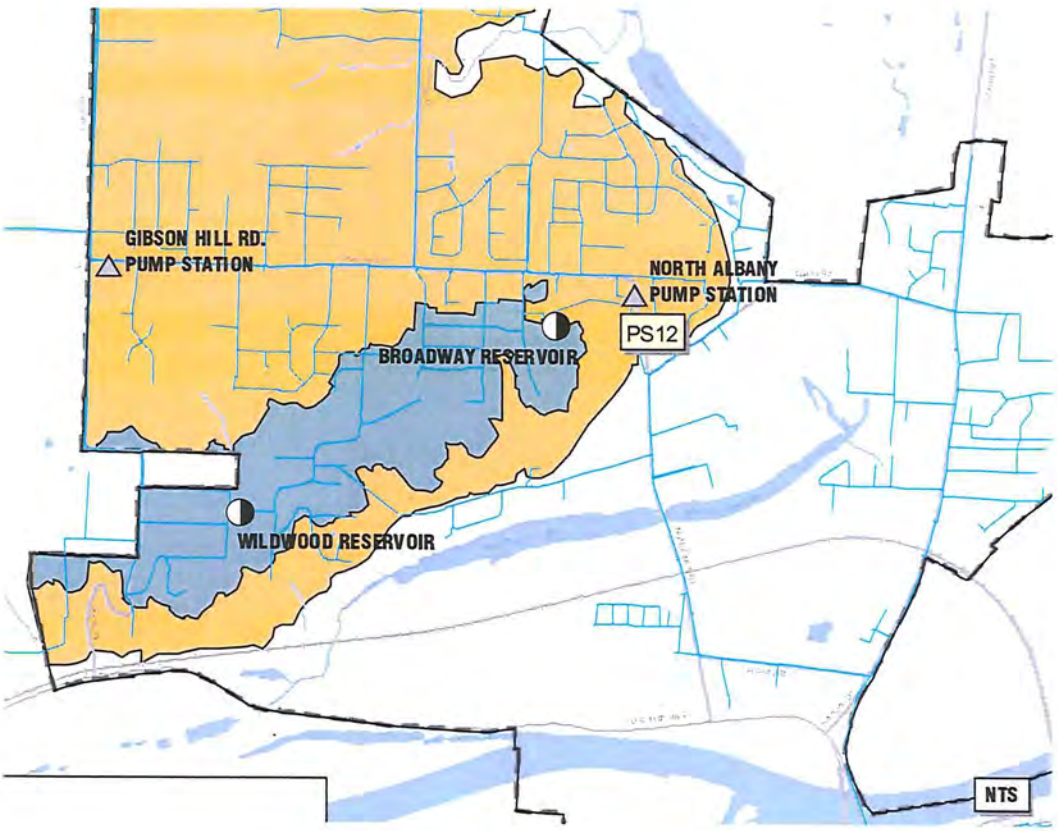
Stage(s): 3

Project Description: Improvements include replacing impellers in the North Albany Road Pump Station to increase capacity as upper service level demands increase.

Proposed improvements include:

PS12 Increase level 2 pump station capacity

Cost: $10,000



Ellingson Road Reservoir Project, Phase 2

Project ID(s): *S9 & PS14*

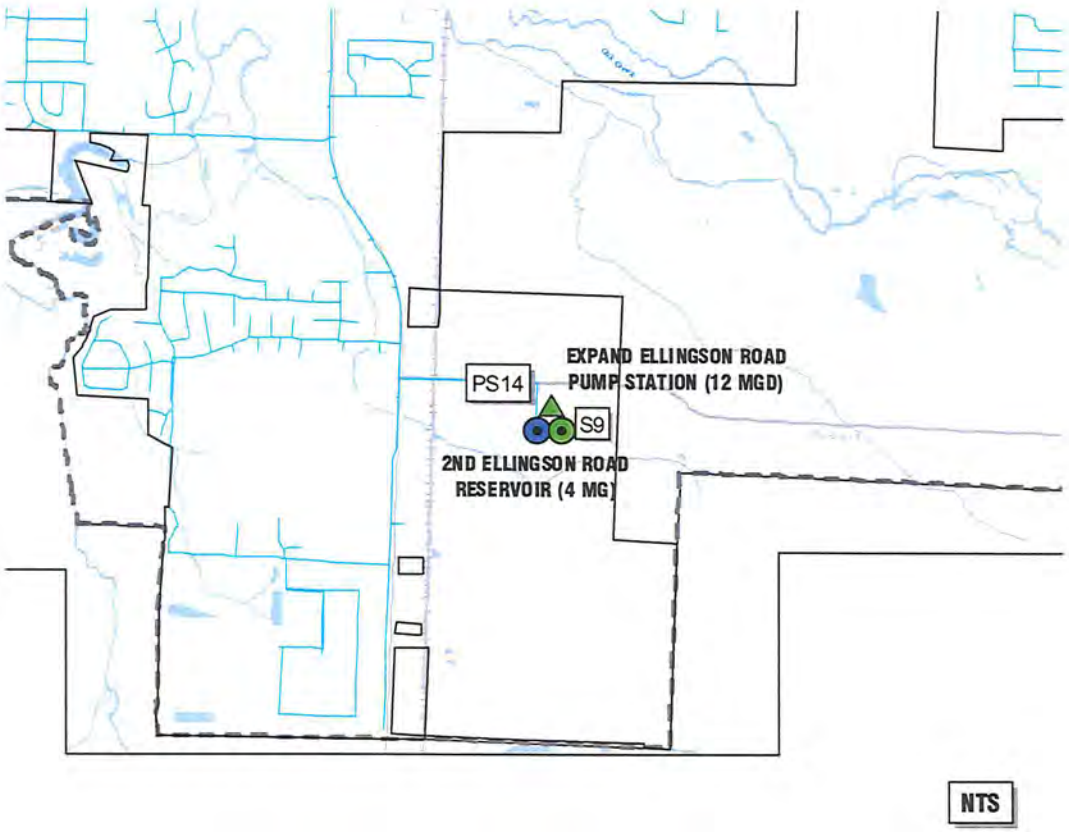
Stage(s): 3

Project Description: This project involves constructing a second 4 MG concrete reservoir at the Ellingson Road Reservoir site and expanding the pump station installed in Phase 1 to 12 MGD firm capacity.

Proposed improvements include:

S9 2nd 4 MG Ellingson Road Reservoir
PS14 Expand Ellingson Road Pump Station to 12 MGD

Cost: $3,385,000



Development Driven Transmission/Distribution Projects

Project ID(s): *P28, P29, P30, P31, P32, P33, P34, P35, P36, P37, & P38*

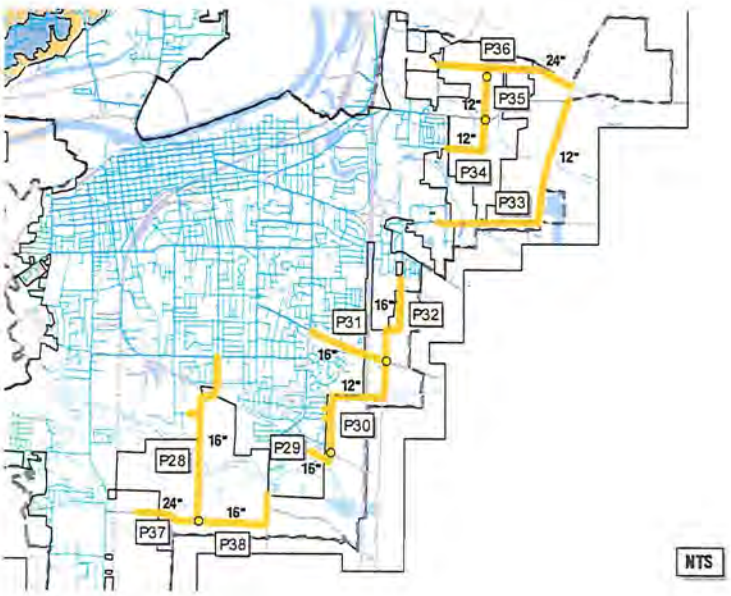
Stage(s): 4

Project Description: The Development Driven Transmission/Distribution Projects include approximately 11 miles of 12, 16, and 24-inch pipelines needed to serve future development. Timing for these projects is development dependent. Project costs presented below only include the anticipated cost to the City for oversizing. Costs for an 8-inch equivalent water line are assumed to be funded by development and are not included in the project cost shown below.

Proposed improvements include:

- P28 Pipeline from 34th Avenue along Hill Street alignment to Lochner Road, along Lochner Road to Ellingson Road
- P29 Pipeline from 47th Avenue across railroad right-of-way then southeasterly parallel to the railroad
- P30 Pipeline from P29, parallel with Shortridge Street, to 40th Avenue, east to Three Lakes Road, north to Grand Prairie Road
- P31 Pipeline along Grand Prairie Road from Three Lakes Road to the pipeline stub-out east of Waverly Drive
- P32 Pipeline along Three Lakes Road from Grand Prairie Road to 21st Avenue
- P33 Pipeline along Hwy. 20 from Goldfish Farm Road to Scravel Hill Road, along Scravel Hill Road to Knox Butte Road
- P34 Pipeline from Knox Butte Road south to the existing 12-inch pipeline along Goldfish Farm Road
- P35 Pipeline from Santa Maria Avenue to Knox Butte Road east of Project P4
- P36 Pipeline along Santa Maria Avenue from Scravel Hill Road to Clover Ridge Road
- P37 Pipeline along Ellingson Road from the elevated storage reservoir to Lochner Road
- P38 Pipeline along Ellingson Road from Lochner to Columbus Street, Columbus Street to an existing 16-inch pipeline

Cost: $4,301,000



Knox Butte Reservoir Project, Phase 1

Project ID(s): *P27 & S7*

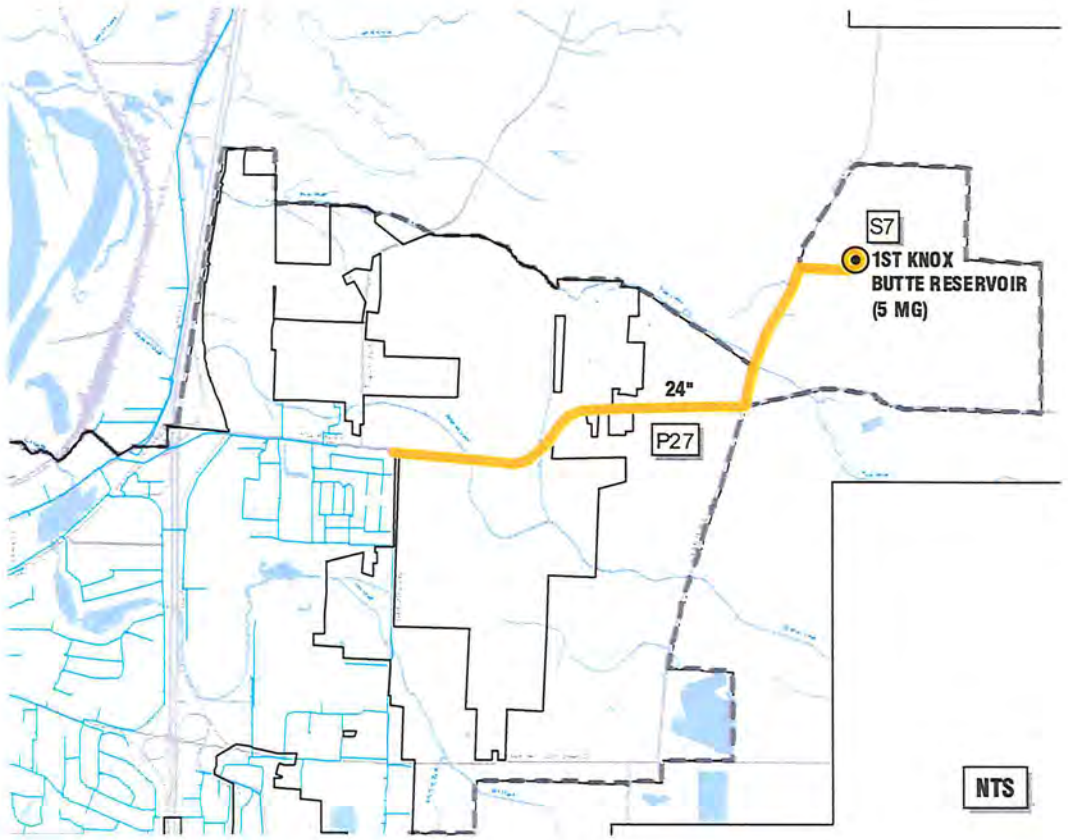
Stage(s): 4

Project Description: The Knox Butte Reservoir Project, Phase 1, includes a 5-MG concrete storage reservoir and approximately 9,700 feet of 24-inch water line necessary to connect it to the distribution system. This reservoir is needed to meet future storage requirements in Zone 1.

Proposed improvements include:

P27 Pipeline along Knox Butte Road and Scravel Hill Road from Goldfish Farm Road to proposed Knox Butte Reservoir
S7 A 5 MG concrete storage reservoir

Cost: $6,020,000



Knox Butte Reservoir Project, Phase 2

Project ID(s): *S8*

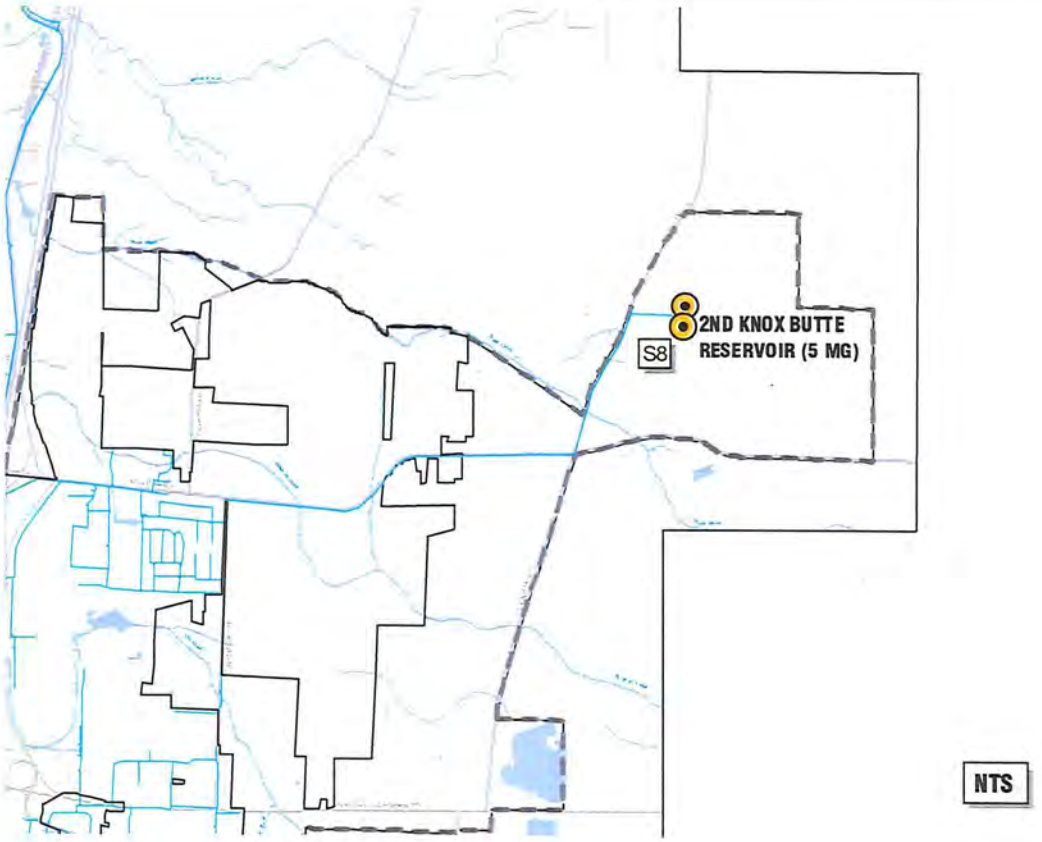
Stage(s): 4

Project Description: The Knox Butte Reservoir Project, Phase 2, includes a second 5-MG concrete storage reservoir at the Knox Butte site. This reservoir is needed to meet future storage requirements in Zone 1.

Proposed improvements include:

S8 A 5 MG concrete reservoir

Cost: $3,500,000



Wildwood Reservoir Project

Project ID(s): *S10*

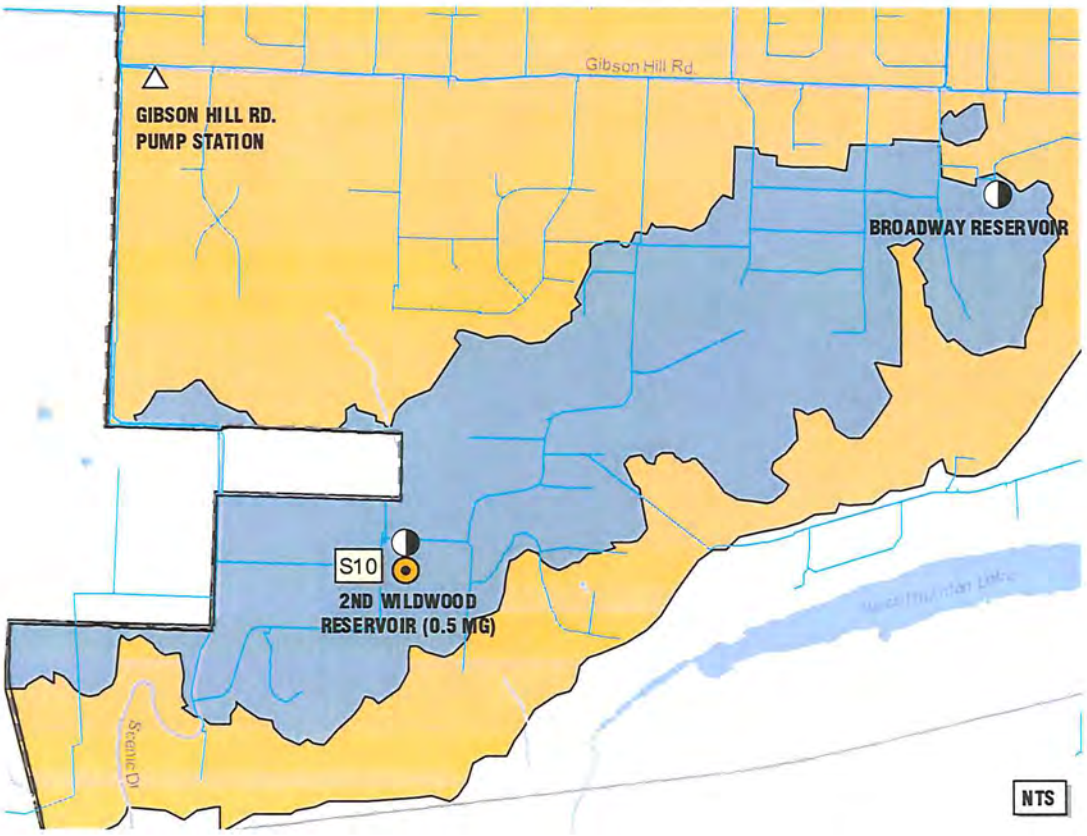
Stage(s): 4

Project Description: As water demands in pressure Zone 2 increase due to residential development, additional reservoir storage capacity will be required. This project provides an additional 500,000 gallons of reservoir storage to meet capacity requirements in pressure Zone 2 through buildout of the urban growth boundary.

Proposed improvements include:

S10 Construct a 0.5 MG concrete storage reservoir.

Cost: $685,000



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Canal Worksheets

Update Control Structures

Project ID(s): *C1*

Stage(s): 1, 2 & 3

Project Description:

Flow control improvements were identified to improve existing control capabilities along the Canal, and to provide instrumentation and control of Canal structures. Coordination of the Canal flow structures is recommended to provide relief during high flow periods. Improvements to existing gate structures, addition of new control gates, and automation and instrumentation of the gates will provide a complementary and flexible system to minimize flooding adjacent to the Canal. The picture below shows the Albany Gates. The Albany gates are one of the six existing control structures with recommended improvements.

Proposed improvements include:

- Lebanon WTP and Hydropower Intake (Station 192+00)
- Mark's Slough (Station 253+00)
- CZ Tailrace (Hospital Slough, Station 280+00)
- Albany Gates (Station 287+00)
- Cox Creek (Station 538+00)
- Rock dam and siphon (Station 688+00)
- New control gate (Oak Creek, Station 755+00)
- Communication for all structures
- Master station
- Develop rating curves for remote sites
- Hydraulic analysis allowance for receiving drainage channels
- Flow augmentation allowance

Cost: $4,000,000

Ensure Canal Capacity

Project ID(s): *C2*

Stage(s): 1 & 2

Project Description:

Based on the analysis of bridge, culvert, and sedimentation issues, the following recommendations are made to ensure the Canal will be able to convey a design flow of 310-cfs. The picture below shows a location of sedimentation build-up in the Canal.

Proposed improvements include:

- Private driveway bridge (Station 117+00)
- Franklin Street Bridge (Station 137+00)
- KGAL Road Culvert (Station 455+00)
- Lateral inflow removal
- Raise Canal banks
- Sediment removal

Cost: $2,900,000

Channel Restoration

Project ID(s): *C3*

Stage(s): 1

Project Description:

Channel restoration work is recommended to rehabilitate the Canal and protect water quality. Items addressed for this category include local sediment removal, debris removal, bank repair, excess vegetation and fallen tree removal to maintain capacity, and water quality issues. The picture below shows a reach of the Canal with excessive bank vegetation.

Proposed improvements include:

- Allowance to repair bank damage, remove debris and excess bank vegetation, complete preliminary Cheadle Lake seepage analysis.

Cost: $1,000,000

Improve Canal Access

Project ID(s): *C4*

Stage(s): 1 & 2

Project Description:

Actions recommended under this category include removing excessive bank vegetation and securing legal and physical access along the Canal where practical, such as commissioning a right-of-way survey and removing right-of-way encroachments. The picture below shows an example of an encroachment on Canal right-of-way.

Proposed improvements include:

- Allowance for ROW survey, removing encroachments, securing ROW, and removing heavy bank vegetation.

Cost: $500,000

Vine Street WTP Worksheets

Replace HSPS Pump No. 14 (200 HP)

Project ID(s): *PS8*

Stage(s): 1

Project Description: The engineering firm of Brown and Caldwell completed an evaluation of the HSPS in 2001. This project is in response to needs identified in the evaluation of Pump No. 14. This improvement will allow pump No. 14 to operate in tandem with the other pumps at the HSPS.

Proposed improvements include:

- 200 HP pump

Cost: $75,000.

HSPS Backup Power Outlet

Project ID(s): *PS9*

Stage(s): 1

Project Description: This project is needed to increase the reliability of the HSPS. A backup power outlet for use with a portable generator is recommended for the HSPS to provide limited power and pumping capacity during power outages. The outlet would be configured to allow a quick connection and transition to power generated on site.

Proposed improvements include:

- Install backup power outlet at the HSPS

Cost: $30,000.

Analysis of Operating Conditions Including VFDs at HSPS

Project ID(s): *PS10*

Stage(s): 1

Project Description: This project involves an analysis of operating conditions at the HSPS and includes the possible use of VFDs to address gaps in the range of available flows for the HSPS.

Proposed improvements include:

- Completion of a study that evaluates the operating conditions at the HSPS including the potential use of VFDs.

Cost: $55,000.

Water Quality Monitoring Upgrades

Project ID(s): *WTP01*

Stage(s): 1

Project Description: Provide additional on-line and bench-top water quality analysis capabilities at the WTP, including instrumentation for settled water turbidity, filtered water particle counters and TOC analysis. Cost estimates include integration with the existing SCADA system.

Proposed instrumentation improvements include:

- 2 new on-line turbidimeters—one on each of the Accelator's effluent pipelines,
- 10 new on-line particle counters—one for each of the existing filters, and
- 1 bench-top UV Spectrophotometer to measure TOC surrogate.

Cost: $84,000.

Backwash/Surface Wash Piping System Improvements

Project ID(s): *WTP02*

Stage(s): 1

Project Description: Provide automatic backwash control capabilities to optimize treatment performance, enhance reliability and reduce risk of filter damage. Replace existing surface wash system and upsize filter-to-waste system pipes and valves to 8-inch in filters 1 through 6. Provide redundant backwash pump for the larger filters by replacing the existing smaller constant speed backwash pump. Improvements include valve and piping modifications where necessary, as well as instrumentation and control facilities to control backwash flow.

Proposed improvements include:

- One new 75 hp, 7,500 gpm vertical turbine backwash pump with VFD,
- Six new surface wash systems for the smaller filters, and
- Six new filter-to-waste pipeline/valves for the smaller filters.
- Incorporation of automatic backwash capabilities, and
- Backwash flow control.

Cost: $329,000

Replace Accelator Settling Tubes

Project ID(s): *WTP03*

Stage(s): 1

Project Description: This project includes a thorough inspection of the mechanical systems and replacement of the tube settlers within Accelator #2.

Proposed work includes:

- Engineering report to evaluate mechanical systems
- Replacement of the existing tube settlers in Accelator #2
- Sand blast/re-coat Accelator's interior

Cost: $213,000

Plant Pipeline Inspection and Cleaning

Project ID(s): *WTP04*

Stage(s): 1

Project Description: Routine, thorough inspections and cleaning of the large diameter pipelines (> 20-inch) at the WTP are required to minimize the accumulation of material in these water lines. This project includes the installation of several new pipeline clean-outs for introduction and retrieval of pipeline cleaning equipment. Once completed, the City will be able to perform video inspections of all larger diameter pipelines to determine degree of corrosion/material accumulation, particularly the 24-inch steel transfer line.

Proposed improvements include:

- Installation of 5 new above-ground pipeline clean-outs,
- Installation of 5 new below-grade pipeline clean-outs, and
- Inspection and report.

Cost: $112,000

Repair Maple Street Reservoir Baffle and Improve Disinfection Performance

Project ID(s): *WTP05*

Stage(s): 1

Project Description: Repairs to the interior baffle wall and inlet/outlet piping to minimize short-circuiting through the Maple Street Reservoir are needed. With proper baffling, chlorine contact time (represented by T_{10} values greater than or equal to 0.60) should be achieved.

Proposed improvements include:

- Installation of new baffle curtain, and
- Improvements to existing inlet/outlet piping configuration – install new deflector pipe to divert flow away from new curtain.
- Close gap between the reservoir wall and baffle curtain that may be contributing to the short circuiting of the baffle.

Cost: $115,000

Chlorine System Safety Improvements

Project ID(s): *WTP06*

Stage(s): 1

Project Description: Modify the current chlorine storage and feed system at the plant to comply with current UBC/UFC requirements. Install liquid sodium hypochlorite delivery and storage facility, as well as a chemical metering facility. Cost estimates include integration with existing SCADA system.

Proposed improvements include:

- Installation of 2 new 6,000 gallon storage tanks, and
- Installation of 2 new chemical metering pumps (1 duty, 1 standby), and piping.

Cost: $140,000

Replace/Repair Control Room HVAC System

Project ID(s): *WTP07*

Stage(s): 1

Project Description: Install new heating and ventilation/air conditioning system in the Control Room Building.

Proposed improvements include:

- Detailed HVAC system evaluation, and
- Installation of heating, ventilation and air conditioning system.

Cost: $70,000

VFD Harmonics Evaluation

Project ID(s): *WTP08*

Stage(s): 1

Project Description: The Vine Street WTP's electrical capacity is adequate to meet current demands; however, harmonics, phasing, and grounding should be evaluated. This project provides a thorough evaluation of the plant's electrical system, including the grounding grid.

Proposed evaluation includes:

- Inspection and report.

Cost: $20,000

ADA/OSHA Compliance Upgrades

Project ID(s): *WTP09*

Stage(s): 1

Project Description: Although not required unless substantial structural modifications are made, an allowance of $50,000 has been included to complete access and safety improvements consistent with the historic nature of the structure.

Proposed upgrades include:

- Handrails
- Walkways
- Platforms
- Other facilities required to meet ADA and OSHA compliance.

Cost: $50,000

WTP Automation Upgrade – Plant Work

Project ID(s): *WTP10*

Stage(s): 1

Project Description: Replace the existing Siemens TI PLC (control hardware and software) system with a redundant Allen-Bradley PLC5 System.

Proposed improvements include:

- Preliminary Design
- System design and programming modifications,
- PLC/radio hardware and software,
- Electrical installation, and
- System start-up, testing and commissioning.

Cost: $535,000

WTP Automation Upgrade – Distribution Work

Project ID(s): *WTP11*

Stage(s): 1

Project Description: Replace the six on site communications and control units (located at the 34th Avenue Reservoir and Pump Station site, Queen Avenue Reservoir and Pump Station site, Broadway Reservoir, North Albany Pump Station, Gibson Hill Road Pump Station, and the Valley View Reservoir site.) with new, Scadapak RTU units. These six units would be configured to utilize DataRadio communications via the new DataRadio master installed at the WTP.

- Preliminary Design,
- System Design and programming modifications,
- PLC/radio hardware and software costs, and
- System start-up, testing and commissioning.

Cost: $127,000

WTP Security Upgrade

Project ID(s): *WTP12*

Stage(s): 1

Project Description: This project includes the evaluation and implementation of a cost effective security system at the Vine Street WTP based on the results of the system-wide security assessment (Project Planning-1).

Proposed improvements include:

- Engineering investigation and report
- Installation of cameras, gate keypads and integration into the City's SCADA network.

Cost: $150,000

WTP Filter Gallery Maintenance

Project ID(s): *WTP13*

Stage(s): 1 & 2

Project Description: This project replaces all valves and actuators associated with Filters 1-8; filter-to-waste valves in Filters 1-6 have been accounted for in project WTP02. In addition, the piping in both filter pipe galleries will be re-coated.

Proposed improvements include:

- Re-coat filter gallery piping,
- Replace filter influent valves and actuators (2 x 20-inch, 6 x 10-inch),
- Replace filter effluent valves and actuators (2 x 20-inch, 6 x 10-inch),
- Replace filter-to-waste valves and actuators (2 x 10-inch),
- Replace backwash inlet valves and actuators (2 x 24-inch, 6 x 12-inch), and
- Replace backwash outlet valves and actuators (2 x 24-inch, 6 x 12-inch).

Cost: $560,000

Clearwell Repairs

Project ID(s): *WTP14*

Stage(s): 2

Project Description: Investigate and confirm structural damage and cracks in the clearwell; repair if needed. Install new clearwell drain line and valve for dewatering.

Proposed improvements include:

- Structural investigation and possible repairs to the clearwell, and
- Installation of drain pipeline and valve for clearwell dewatering

Cost: $70,000

Chemical Storage Improvements

Project ID(s): *WTP15*

Stage(s): 2

Location: Chemical Building—2nd Floor

Project Description: Construction of containment area around the liquid alum storage tank to contain potential leaks.

Proposed Improvements Include:

- Construction of a containment wall around the existing alum storage tank.

Cost: $28,000

Solids Handling

Project ID(s): *WTP16*

Stage(s): 2

Project Description: Improve the storage capacity and minimize leaching from the existing backwash ponds. Install a sump on each of the two existing ponds for dewatering.

Proposed improvements include:

- Reshape and re-line two existing backwash ponds.
- Install two sumps.

Cost: $220,000.

Seismic Upgrades

Project ID(s): *WTP17*

Stage(s): 2

Project Description: Conduct detailed evaluation and design of seismic compliance upgrades at the WTP to define plant vulnerability to seismic events.

Proposed evaluation includes:

- Engineering inspection and report, and
- Structural improvements to the WTP including:
- Pipeline restraints
- Structural reinforcement of brick structures.

Cost: $570,000

Distribution System Monitoring Improvements

Project ID(s): *WTP18*

Stage(s): 2

Project Description: Install 5 pressure transmitters on distribution system piping to increase overall system monitoring. Pressure transmitters should be installed in close proximity to existing wastewater pumping stations to facilitate ease of data acquisition and transfer. Data will be transmitted to the control room at the Vine Street WTP.

Proposed improvements include:

- 5 pressure transmitters, wiring and manholes
- Instrumentation and control upgrade.

Cost: $70,000

Replace Accelator Settling Tubes

Project ID(s): *WTP19*

Stage(s): 2

Project Description: This project replaces Accelator #1's worn settling tubes. Settling tubes will degrade due to normal wear and tear and light degradation of the plastic.

Proposed improvements include:

- Replace settling tubes on Accelator #1

Cost: $210,000

Repair/Replace Filter Media / Underdrain System

Project ID(s): *WTP20*

Stage(s): 2

Project Description: This project removes existing filter media and underdrains. The underdrains will be replaced with new, "gravel-less" plastic block underdrains. Install at least 30-inches of dual media (18-inches of anthracite over 12-inches of sand, for a total bed depth of 30-inches). Remove existing troughs and replace with new fiberglass troughs. Replace existing surface-wash system piping and agitators on filters 7 through 10 only.

Proposed equipment improvements include:

- Installation of 3,250 sf of "gravel-less" plastic block underdrains,
- Installation of 4,900 cf of 1.0 mm anthracite,
- Installation of 3,250 cf of 0.5 mm sand,
- New fiberglass troughs, and
- Four new surface wash systems for the larger filters.

Cost: $682,000

Add Granular Activated Carbon (GAC) to Filter Media

Project ID(s): *WTP21*

Stage(s): 2

Project Description: Incorporate granular activated carbon (GAC) to protect against organic contaminants which may be present in the raw water. GAC will increase the reliability and safety of the WTP. Note: costs associated with this CIP only include the additional incremental costs of GAC over anthracite as discussed in WTP20.

Proposed improvements includes:

- Installation of 4,900 cf of GAC.

Cost: $150,000

Valve Maintenance

Project ID(s): *WTP22*

Stage(s): 2 & 3

Project Description: This project replaces remaining plant valves and actuators not replaced through projects WTP02 and WTP13.

Proposed improvements include:

- Raw water isolation valves
- RWPS pump isolation, and check valves
- Settled water isolation valves
- Accelator drain valves
- Filter influent valves and actuators
- Filter effluent valves and actuators
- Filter-to-waste valves and actuators
- Backwash inlet valves and actuators
- Backwash outlet valves and actuators
- Backwash drain isolation valve
- Maple Street Reservoir inlet/outlet valves

Cost: $994,000

Plant Hydraulics

Project ID(s): *WTP23*

Stage(s): 3

Project Description: This project removes a hydraulic bottleneck that exists between the Accelators and filters. This bottleneck limits the flow to the six smaller filters, resulting in approximately 2,400 gpm (3.5 MGD) reduction in capacity. Costs associated with this improvement project include improvements to minimize air entrainment from the accelators in the pipeline, as well as related filter gallery-piping improvements.

Proposed Improvements Include:

- Replace the open channel that separates the old and new filters with a pipeline, and
- Install equipment to minimize air entrainment between the Accelators and filters.

Cost: $280,000

Instrumentation and Control Improvements

Project ID(s): *WTP24*

Stage(s): 3

Project Description: This project replaces the control hardware with a new control system. Costs associated with this improvement project include: preliminary design, upgrades to the remote telemetry units (RTUs), as well as replacement of the main plant PLC and upgrades to the SCADA system at the WTP.

Proposed instrumentation and control improvements include:

- Preliminary design,
- Upgrades to the remote telemetry units (RTUs)
- Replacement of the main plant PLC and upgrades to the SCADA system.

Cost: $840,000.

Replace Maple Street Reservoir Baffle

Project ID(s): *WTP25*

Stage(s): 3

Project Description: The useful life of the baffle replaced in project WTP05 is expected to be reached within the 2024 planning window. This project addresses the need for replacement of the baffle curtain inside the Maple Street Reservoir near the end of the Vine Street WTP planning window.

Proposed improvements include:

- Installation of new baffle curtain

Cost: $80,000

Planning Projects Worksheets

System-Wide Security Assessment

Project ID(s): *Planning-1*

Stage(s): 1

Project Description: A system-wide security assessment is required under the Public Health Security and Bioterrorism Preparedness Response Act amendment to the Safe Drinking Water Act. This project provides funding for preparation of a plan meeting the requirements of the act, including a system vulnerability assessment and follow-up emergency preparedness plan sufficient to meet regulatory requirements.

Proposed improvements include:

- System-wide security assessment

Cost: $150,000

Facility Plan Updates

Project ID(s): *Planning-2*

Stage(s): 2 & 3

Project Description: Water facility plan updates are required periodically to reflect changes in expected growth patterns and demands, the regulatory environment and capital improvement needs. On average facility plan updates are completed on 10-year cycles. Two water facility plan updates have been included in the cost estimate below.

Proposed improvements include:

- 2 water facility plan updates by 2024

Cost: $600,000

APPENDIX B

RESOLUTION – NORTH ALBANY CONNECTION POLICY OUTSIDE CITY LIMITS

RESOLUTION NO. 3363

WHEREAS, the City of Albany has assumed responsibility for the operation of the water system in North Albany formerly operated by the North Albany County Service District; and

WHEREAS, the water system in North Albany includes water mains outside the Albany city limits; and

WHEREAS, a connection policy is required to address requests for water service outside the city limits.

NOW, THEREFORE, BE IT RESOLVED that the connection policy outside the Albany city limits in the North Albany area shall be as follows:

1. No waterline extensions shall be allowed outside the Albany city limits.

2. Service shall be provided only to parcels immediately adjacent to existing waterlines, as the parcel existed on July 1, 1991.

3. One 3/4-inch water meter connection may be allowed for each unserved property adjacent to an existing waterline, as the parcel existed on July 1, 1991.

4. In the event of the partitioning of land, additional 3/4-inch meter connections may be allowed provided the applicant is able to present multiple unused water shares that were not extinguished, invalidated, or acquired by the North Albany County Service District, from one of the non-profit corporate entities that predated the North Albany County Service District. The water shares must be for property that is owned or was formerly owned by the original grantee of the share and which was owned by the applicant on November 17, 1993. Multiple shares are required for connections in excess of that allowed without water shares. For example, two shares are required for one additional connection, and three shares are required for two additional connections. No new parcel, for which a water connection is granted pursuant to this policy, shall be eligible for additional connections upon subsequent partitioning or subdividing.

5. A connection may be made only if the City is satisfied the requested connection, by itself or cumulatively with others, will not degrade water service to any existing water customer, either inside or outside the city limits, or to any future water customer inside the city limits, below minimum standards necessary for domestic and fire safety purposes.

DATED this 25th day of May 1994.

Mayor

Attest:

Deputy City Recorder

CITY OF

Albany

OREGON

APPENDIX C

Albany Municipal Code

AMC 11.01.140 SERVICE OUTSIDE CITY LIMITS

(1) Application for Service. Each application for service outside the City may be acted upon on its merits without regard to any other past or present application or service. If service is approved, the cost of service connection fees plus applicable rates will be those charges and regulations set forth and approved by the Council and the same as they may be amended from time to time unless otherwise set forth in a service contract.

(a) Service Limitation. The utility shall not provide water service to any property outside the Albany City limits when such property is contiguous to the City limits and eligible for annexation to the City of Albany unless Council finds that it is in the public interest to do so. The property owners requesting water service must submit a signed and notarized irrevocable request to annex before receiving water service.

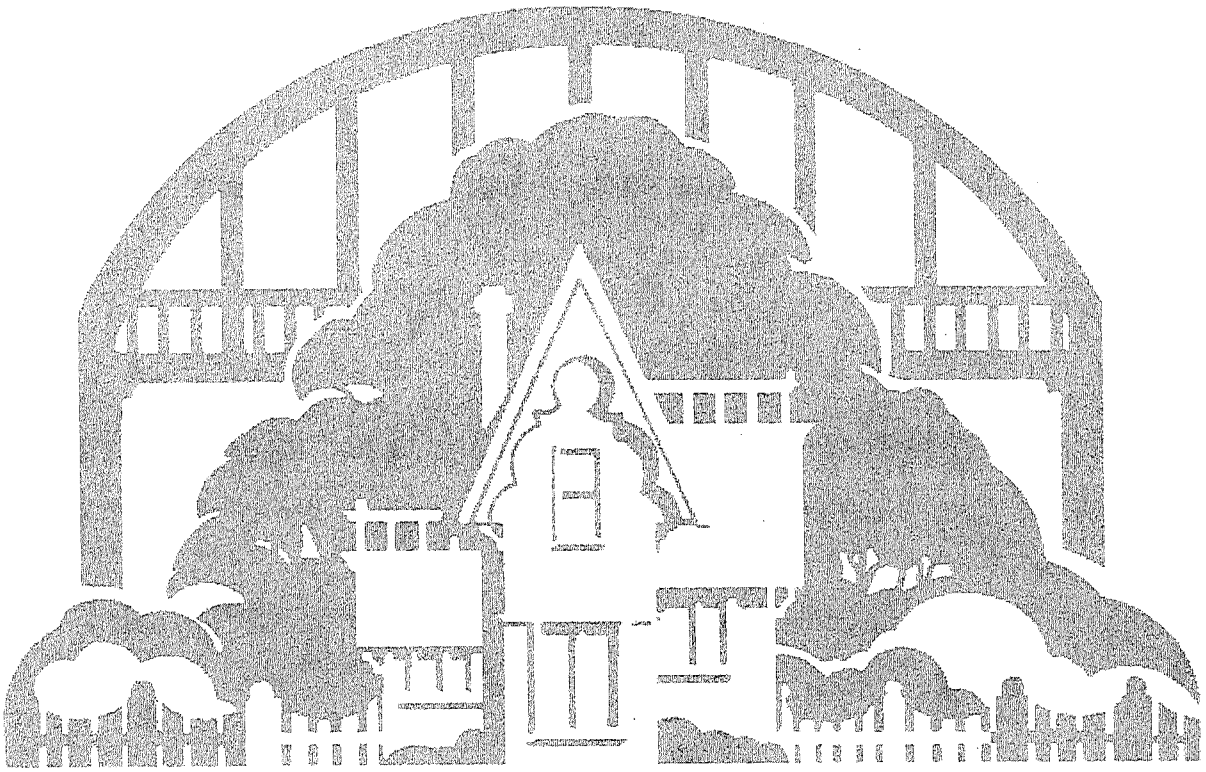
(b) Users. No use or benefits of the City water system shall be extended to or made available to any property outside the City limits, except under a contractual agreement with the owners of said property, and only then when the property is not contiguous to the City of Albany at the time the water service is requested unless Council finds that it is in the public interest to do so.

(c) Contract. Use and benefits of the water system may be granted to property owners outside of the Albany City limits on a contractual basis only. Except for contracts with another public agency, the contract shall require that in order to continue to receive water service, the property owner shall annex the property to the City of Albany at the earliest date that the property becomes eligible for annexation under the laws of the State of Oregon. A contract for water service may further require provisions for financing of the water extensions, annexation of property served by contract to a public agency, termination of the service contract if any conditions are not met, and any other requirements which are deemed in the best interest of the utility.

(2) Rules and Regulations.

(a) All customers receiving water from the utility shall comply with and be bound by these rules and regulations.

(b) Customers shall cooperate to a reasonable and practical extent with other customers with regard to the extension or enlargement of common facilities. (Ord. 5564 § 1, 2003; Ord. 4878, 1989; Ord. 4664, 1985).



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