ORDINANCE NO. 712

AN ORDINANCE UPDATING THE CITY OF SCAPPOOSE WATER MASTER PLAN

THE CITY OF SCAPPOOSE ORDAINS AS FOLLOWS:

Section 1. The City of Scappoose Water Master Plan is updated as provided in Exhibit A.

CITY OF SCAPPOOSE, OREGON

Glenn E. Dorschler, Mayor

First Reading: November 19, 2001

Second Reading: December 3, 2001

Attest: Debi G. Schmit, City Recorder

CITY OF SCAPPOOSE
WATER MASTER PLAN
UPDATE

August 2001

Prepared by:

LEE ENGINEERING, INC.
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August 31, 2001

Project No. 2488.010

City of Scappoose
P.O. Box P
Scappoose, OR 97056

Re: Water Master Plan Update

Gentlemen:

Enclosed are five copies of the final version of the *City of Scappoose Water Master Plan Update*.

The report generally concludes that with your new water source, the Miller Road Well, your combined sources should provide sufficient water to the City through the next 20 years. The City's existing storage capacity is not sufficient, and there is the need to add another reservoir. Also, in order to provide adequate fire protection and flows to certain areas of the City, it is suggested that some pipeline improvements also be considered. The total estimated project cost for the recommended Priority 1 and 2 Capital Improvements is about $6,660,000. This includes the new water treatment plant, well, reservoir(s) and piping. The remaining costs are in the proposed improvements to distribution mains.

As with any report of this type, the document is intended to be a guidebook. However, time and circumstances may change the findings in this report. The report should be reviewed regularly, at least every five years, and updated to reflect the current status of affairs in the City. Further, in the event the City should decide to proceed with the recommended Capital Improvement Program, additional preliminary engineering studies should be undertaken to refine issues such as the location of the reservoir, actual lengths of the pipe that may be needed, cost estimates updated to the time in which construction will actually occur, and other details. Cost estimates contained herein are only estimates at this time and are very preliminary in nature.

Thank you for this opportunity to be of continuing service to the City of Scappoose.

Very truly yours,

LEE ENGINEERING, INC.

Richard P. (Phil) Beverly, P.E.
RPB:nj
Enclosures

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CITY OF SCAPPOOSE

WATER MASTER PLAN UPDATE

August 2001

Prepared by:

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WATER MASTER PLAN UPDATE
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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

1.1.1 General

In 1997, the City of Scappoose had a Water Master Plan completed that evaluated in detail the existing capabilities and limitations of the water system, projected future demands, and established a schedule of capital improvements needed to provide water to the existing and future service area.

This document is a periodic update of the original Water Master Plan. Population projections are updated and future water supply issues are emphasized and capital improvements projects developed, which will increase the City's ability to meet current and future water demands.

1.1.2 History

At the time of this report, the City's existing water system consists of two water treatment plants at the same location, including a package water treatment component used to treat the City's supply of surface water and a greensand filter used to treat the groundwater from the Dutch Canyon Well. (The well water has iron, iron bacteria and manganese, which are above acceptable limits.) There are three storage reservoirs, totaling 1.6 million gallons, and transmission and distribution piping totaling approximately 20 miles in length. Two pressure zones and two distribution pump stations complete the system.

In the five years since the 1997 Water Master Plan was published, improvements have been made to the surface water filtration system, a new groundwater treatment system has been constructed, the Dutch Canyon Well has been upgraded, and the distribution system has been improved. The improvements to the original filtration system were based upon an evaluation of the treatment plant capacity completed in 1996 by Lee Engineering, Inc.

1.1.3 Justification for Update

The City of Scappoose decided that a Water Master Plan Update was necessary to summarize improvements, discuss future water supply issues, and create a Capital Improvement Plan based on current conditions. An updated analysis of projected growth and demand was also needed to reprioritize proposed improvements.

Although the 1997 Water Master Plan estimated that the City would need to develop new sources of supply before 2005, the emphasis of its Capital Improvement Plan (CIP) was on improvements to the existing treatment plant, distribution system, and transmission system. Since publication of the Water Master Plan, peak day demands have approached the capacity of

the combined surface water sources and the Dutch Canyon Well, and the City requires specific recommendations for solving its water supply needs.

1.2 SCOPE OF STUDY

1.2.1 Planning Period

This Water Master Plan Update recommends improvements to the water system that will provide a safe and reliable source sufficient to supply growth over the 20-year planning period, in accordance with the guidelines set forward in the City's Comprehensive Land Use Plan. This Water Master Plan will also address the subjects of water supply and availability over the 20-year period.

1.2.2 Itemized List of Tasks

The goal of this study is to develop a recommended list of Capital Improvement Projects that will meet the City's immediate needs in a cost-effective manner, as well as outline a plan to provide for the water system's future needs. The Water Master Plan Update will fulfill the Oregon Health Department's requirement that the City maintain a current and approved master plan as described in the Oregon Administrative Rules (OAR 333-61-060 (5)).

A detailed hydraulic analysis of the distribution system is not included in this report. The current study relies on the network modeling performed as part of the 1997 Water Master Plan. Conclusions and recommendations from the previous report are reviewed as part of this update.

The tasks included in the scope of study for the Water Master Plan Update include:

1. Revise the mapping of the existing water system, existing and future service area, and update the distribution system requirements.

2. Provide population projections based upon current census figures, historical trends and discussions with City staff.

3. Calculate water demands based on average and peak day consumption.

4. Analyze immediate and long-term supply system requirements.

5. Describe storage issues and recommend improvements within the 20-year planning period.

6. Propose improvements and provide a revised Capital Improvement Plan consisting of improvements needed most during the next 10 years, as well as plan for the next 20 years.

1.3 AUTHORIZATION

The City of Scappoose authorized work on this Water Master Plan Update in a letter agreement dated September 21, 2000.

1.4 ACKNOWLEDGMENTS

City Staff

- Jerry Gillham, City Manager
- Steve Wabschall, Water and Wastewater Superintendent
- Jon Hanken, Director of Community Development
- Gene Smith, P.E., City Engineer
- Terry Andrews, Superintendent of Field Services and Maintenance
- Joe Lewis, Chief Operator

Oregon Health Department (OHD)

- Bonnie Waybright, P.E., Regional Engineer, Drinking Water Section

Oregon Water Resources Department (OWRD)

June Pandion, Water Master

Portland State Center for Population Research and Census (CPRC)

Barry Edmonton

Department of Environmental Quality

Andy Shoedel, Water Quality Division Director Northwestern Region

Lee Engineering, Inc.

- Phil Beverly, P.E., Client Manager
- Jim Shaver, P.E., Project Manager
- Susan Foreman, E.I.T.
- Nancy Jelinek, Secretary

CHAPTER TWO

DESCRIPTION OF PLANNING AREA AND EXISTING SYSTEM

2.1. SERVICE AREA DESCRIPTION

The water service area is shown in Figure 2-1. The shaded area represents unincorporated properties within the Urban Growth Boundary. The incorporated area within the city limits has increased approximately 10 percent since the 1997 Water Master Plan was submitted. The water system serves the entire population within the City and a group of customers in the Dutch Canyon Road and Raymond Creek areas southwest of the current city limits.

There has been significant growth within the service area. During the period 1995 - 2000, the City issued 454 permits for new homes and 70 permits for manufactured homes. The 2000 Census recorded the population at 4,976.

The following narrative gives a brief description of the City's water system. Further details and analysis are provided in subsequent chapters.

2.2 EXISTING WATER SYSTEM

2.2.1 Overview of Supply and Treatment

The City has surface water rights to withdraw water at three locations in the South Scappoose Creek Basin: South Scappoose Creek, Lazy Creek, and Gourlay Creek. (See Table 4.1.) Reliable supply from these sources is limited by low stream flows during dry weather, which are estimated at 0.7 to 1.0 MGD. The surface water from these three sources is treated at the City's filtration plant on Keys Road.

Improvements were made to the filtration plant in 1998 based on the results of a 1993 Comprehensive Treatment Plant Evaluation by the Oregon Health Department and a subsequent capacity evaluation by Lee Engineering, Inc. in 1996. The 1998 improvements included replacing the filter media, installing two new turbidimeters, and adding a filter-to-waste system to the two package treatment units.

In addition to the surface water sources, the City has groundwater rights for 650 gpm for the Dutch Canyon Well. The groundwater from the well is pumped to the treatment plant, where it is treated separately from the surface water in a greensand filter to remove iron. In December 2000 the Dutch Canyon Well was upgraded to 530 gpm by installing a new pump and motor. It was decided not to increase it beyond 530 gpm to reduce stress on the well.

2.2.2 Water System Overview: Transmission, Distribution and Storage

The existing water system, including transmission and distribution systems and storage reservoirs, is shown in Figure 5-1.

Raw Water

A 12-inch steel transmission line most of which was installed in 1955, transports raw water from the three surface water diversions to the junction of Dutch Canyon Road and E. M. Watts Road. This line plus lines connecting the individual sources to the primary transmission line total approximately seven miles. From the junction of Dutch Canyon Road and E. M. Watts Road to the treatment plant the line has recently been replaced with 12-inch C-900 PVC.

Water from the Dutch Canyon Well is transported through a 12-inch ductile iron pipe to the junction of Dutch Canyon Road and E. M. Watts Road and then through a 12-inch PVC line, installed in 1998, to the treatment plant.

Distribution System

The distribution system consists of approximately 20 miles of pipe, ranging in size from 4-inches to 18-inches in diameter. The majority of the pipe in the current water system is PVC, although there is a significant percentage of older steel pipe and some cast iron which may contribute to water system losses from leakage.

The City's distribution system is comprised of two pressure zones. The lower zone serves the majority of residential, commercial, and industrial customers. Static pressures in this zone range from 50 to 80 psi and are regulated by the two concrete reservoirs located near the water treatment plant.

The high pressure zone is exclusively residential. Pressures are regulated by the Green Tower Reservoir and vary from 40 psi to 160 psi.

The two reservoirs at the water treatment plant have a combined volume of 1.3 MG and a nominal water surface elevation of 200 feet. The Green Tower Reservoir, which serves the high pressure zone, has a volume of 0.3 MG and has an overflow elevation of 432 feet.

A booster pump station is located near the water treatment plant to elevate water to the high zone reservoir. A second booster pump station at the corner of Glen View Lane and Dutch Canyon Road is used to service seven houses on Glen View Lane from zone 1.

SEE MAP
FIGURE 2-1
AT
CITY HALL

CHAPTER THREE

POPULATION PROJECTIONS AND DEMAND ANALYSIS

3.1 POPULATION

3.1.1 Historical Population Data

The population reported by Census 2000 for the City of Scappoose is 4,976. Table 3-1 outlines the population growth in Scappoose from 1930 to 2000.

TABLE 3-1
HISTORICAL POPULATION GROWTH

Year	City Population	Average Annual Growth %	County Population	Average Annual Growth %
1930	248		20,047	
1940	336	3.08	20,971	0.46
1950	659	6.97	22,967	0.95
1960	923	3.43	22,379	0.26
1970	1,859	7.25	28,790	2.86
1980	3,213	5.62	35,646	2.38
1990	3,529	0.94	37,557	0.54
2000	4,976	3.50	43,200	1.50

3.1.2 Population Projections

The 1997 Water Master Plan used a procedure for calculating population growth that assumed the annual growth rate would increase 0.5% every five years, starting in 1995. The assumed increase in the annual growth rate is shown in Table 3-2: Comparison of Population Projections.

The 1997 Water Master Plan predicted that the average annual growth rate would continue to increase until 2015. Although the average annual growth rate increased in the period from 1995 through 1999, most of this growth was in 1996 and 1997. In the past three years, growth has leveled off. Therefore, the prediction of an increasing annual growth rate appears out of date.

Columbia County developed population projections for the City of Scappoose based upon an average number of units per year. Empirical data from 1990-1997 indicated an average population increase of 120 per year. The County population projection was revised in 2000 based on projected growth rates. The resulting County estimates for 2015 are also shown in Table 3-2. The revised estimates reflect an annual growth rate of less than 1% and an average population increase of 58 persons per year.

Building permits issued by the City of Scappoose for new homes and manufactured homes from 1995-1999 averaged 90 per year. Assuming an occupancy rate for Columbia County of 2.68

persons per dwelling unit, according to the 1990 Census, this is equivalent to a population increase of 241 people per year.[1] Although this rate has leveled off in recent years, there were more than 50 building permits issued in 2000. Based on these numbers the County projections may have underestimated growth in Scappoose.

Population projections in this report were developed from certified census figures from 1930 through 2000 by fitting a curve to the historical data. The best-fit curve projects a rate of population growth that is between population projections made by Columbia County and estimates from the 1997 Water Master Plan. A comparison of these curves is presented in Figure 3-1.

In discussions with the City, it was decided that the best-fit curve based on the historical data from the Center for Population Research and Census (CPRC) represents an estimate of population growth that is more accurate than the projection in the 1997 Water Master Plan and the projection by the County, for the reasons cited above. The 1997 Water Master Plan overestimates current growth rates and the County projections are considered conservative for purposes of estimating future demands.

The *U.S. 30 Corridor Plan* published by ODOT used estimates of growth for Columbia, Multnomah and Clatsop Counties that were developed by CPRC in 1993 for the period from 1990-2010. Although growth rates for Columbia County as a whole have been lower than those experienced within the City of Scappoose, the projections indicate a pattern of gradually decreasing annual growth similar to that predicted by the best-fit curve projection. The best-fit curve from the census data predicts a growth rate that decreases gradually from a current annual average growth of 2.64% to 2.01% in 2020.

TABLE 3-2

COMPARISON OF POPULATION PROJECTIONS

Year	BEST-FIT CURVE		1997 MASTER PLAN		COUNTY PROJECTIONS					
	Pop	Growth	Pop	Growth	Population			Growth		
					Low	Med	High	Low	Med	High
1999					4,970	4,970	4,970			
2000	4,976	2.64%	4,678	4.0%						
2005	5,667	2.42%	5,830	4.5%						
2010	6,338	2.23%	7,440	5.0%						
2015	7,152	2.17%			5,563	5,841	6,450	.71%	1.01%	1.64%
2020	7,961	2.01%	10,220	1.0%						
2030	9,713	1.83%								
2040	11,641	1.68%								
2050	13,747	0.77%	10,852							

[1] Note: Housing Analysis of Census 2000 results will not be available until the summer of 2001.

3.1.3 Buildout Population

The City's Comprehensive Plan, published in 1991, established an Urban Growth Boundary that provided sufficient buildable lands for a population of 10,000, which was the projected population for the year 2000. Since the Comprehensive Plan was published, the Urban Growth Boundary has been redefined to include additional areas of growth north of the city limits.

The buildout population is the maximum population that can be accommodated within the Urban Growth Boundary, given the densities and zoning designations defined by the City. If buildout was underestimated, long range plans for water supply will be inadequate. In this situation, water supply may limit the City's growth even though land and other resources are available.

In order to make recommendations for water sources, including the transmission and distribution systems, it is necessary to estimate the population at buildout as accurately as possible. The population that will ultimately be served is the basis for estimating the System Development Charge (SDC) for the water system.

The population of the City at buildout has been reevaluated using current planning and zoning maps that were updated in 1999. The zoning map, which indicates zoning designations within the City limits, and the planning map, which defines areas of Suburban-Residential, Industrial, and Commercial use within the entire Urban Growth Boundary, have been combined in Figure 3-2. It is assumed that the Suburban Residential areas in the Urban Growth Boundary, north and west of the city limits, will be zoned as Low Density Residential (R-1), since currently Suburban Residential areas within the city limits have this zoning designation.

The total acreage included in each zoning designation is presented in Table 3-3. The estimated population at buildout is based upon saturation densities stipulated in the Comprehensive Plan, and an average household size in Columbia County of 2.68 persons. Projections indicate full development of the City will be approached by 2050.

TABLE 3-3
PROJECTED POPULATION AT BUILDOUT BASED ON ZONING MAP

ZONE	MHR	A-1	R-4	R-1	C	I	P
EDU/Acre *	7	20	6.5	5	3	2.37	
Total Acres	95	34	385	795	299	647	61
ROW Acreage**	21	7	85	175	90	142	
Unbuildable Lands				125			
Aggregate Lands						144	
Airport						90	
Available Acreage in UGB	74	27	300	495	209	271	
EDU's (Calculated)	519	530	1,952	2,476	628	860	
Total Residential EDUs							5,477
Total Estimated Population at Buildout***				14,677 = Total Residential EDUs x 2.68			

Legend:

MHR - Mobile Home Residential
A-1 - High Density Residential
R-4 - Medium Density Residential
R-1 - Low Density Residential
C - Commercial
I – Industrial
P - Public

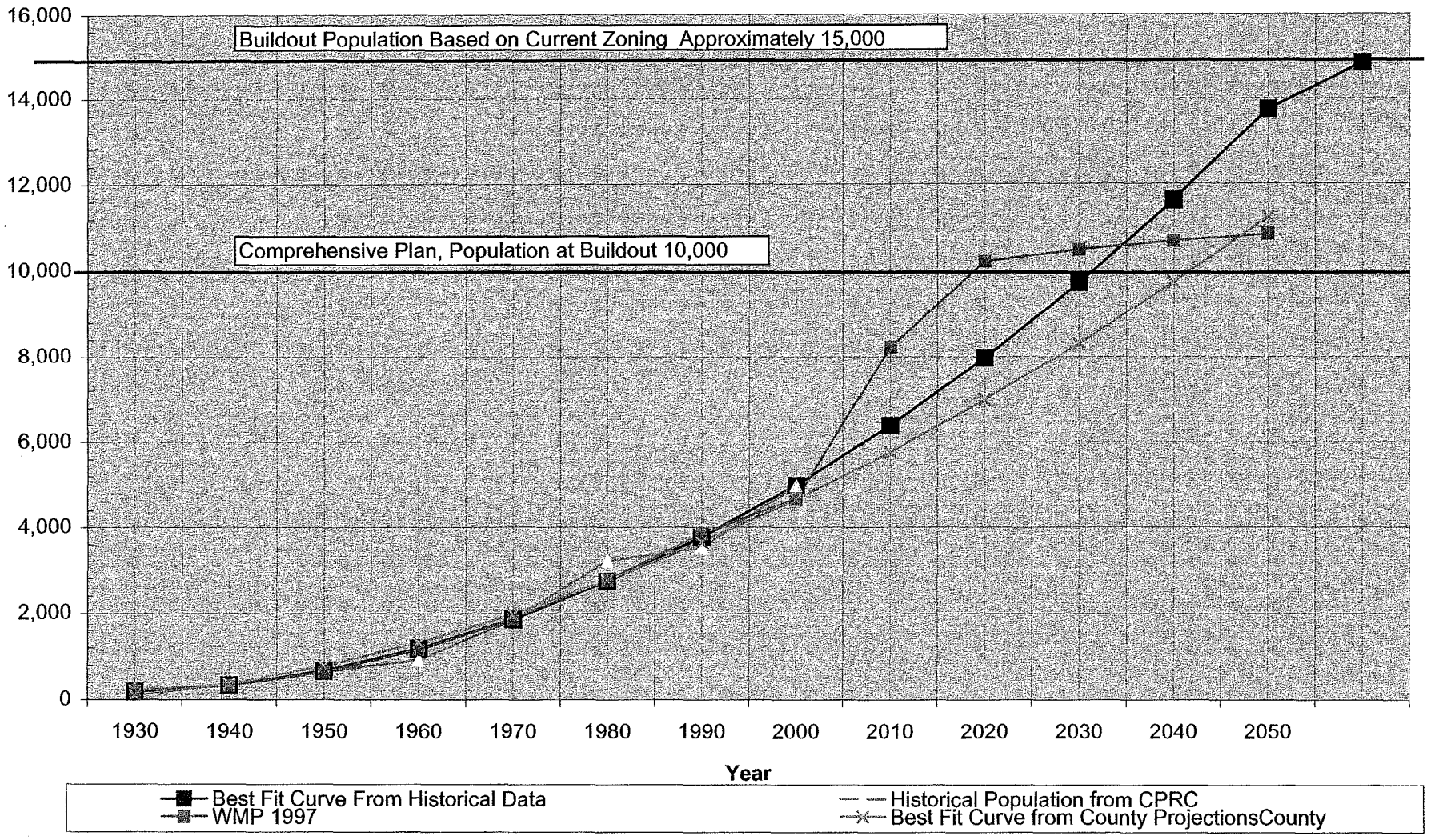
Notes:

* Densities are based on the City of Scappoose Comprehensive Plan

** ROW (right-of-way) acreage is estimated as 22% of total acreage based on the Comprehensive Plan. In Commercial areas, 30% of total acreage is included in the ROW due to presence of the railroad and highway.

*** EDU's calculated from MHR, A-1, R-4, and R-1 zones only. Estimated EDU's x 2.68 persons per EDU = Estimated population at buildout.

FIGURE 3-1: CITY OF SCAPPOOSE
POPULATION PROJECTION



SEE MAP
FIGURE 3-2
AT
CITY HALL

3.2 DEMAND ANALYSIS

3.2.1 Past and Current Water Use

Estimates of the average daily water use from 1995 to 2000 were developed from the total of the flow meters at Dutch Canyon Well and the conventional water treatment plant. Until June of 2000, the combined production numbers were obtained by adding the daily totals from the two flow meters.

As part of the 1999 treatment plant expansion, two new flow meters were put in place. They were a venturi meter on the flow from the Dutch Canyon Well prior to the greensand filter, and an ultrasonic meter on the combined effluent flow from the greensand filter and the surface water or conventional filters. Combined flow, measured through this flow meter, does not include losses from filter backwashes. Prior to installation of the effluent flow meter, average unmetered use due to backwash was estimated at 5% or less. Table 3-4 summarizes water treatment plant production between 1996 and 2000.

TABLE 3-4
WATER PRODUCTION / USE

	Well	Surface Water	Combined Production	Production (Without Backwash)	Metered Usage	Unmetered	Usage
Year	MG	MG	MG	MG	MG	MG	%
1996	45.700	127.200	173.090				
1997	27.600	170.800	198.422				
1998	80.600	127.500	208.153				
1999	38.990	114.400	220.770				
2000	----	----	267.920	262.951	168.320	94.63	36 %

This loss exceeds the 10% considered acceptable by AWWA and the State of Oregon Water Resources Department for most water systems However, further research with the City staff indicates that meters installed on services for non-paying accounts (City Hall, parks, etc.) were not being read on a consistent basis. Publicly owned facilities can be a large consumer of water in a small community. Estimates of public water usage by the City staff including unread meters, hydrant testing, fire fighting training, and backwash waste at the treatment plant, lowered the unaccounted for water to less than 15%.

In addition to unread meters, the staff informs us that the Water Department has not had a meter replacement policy. A random test of 20 meters by staff showed an average error of 9% of actual flow. Assuming that unread water meters account for most of the tabulated 36% unaccounted-for water, the primary causes for the remainder appear to be inaccurate meters or leaks.

The American Water Works Association Leak Detection and Water Accountability Committee recommends a goal of less than 10% for unaccounted-for water. Another way to look at water loss is to visualize it in terms of the cost of production. If unaccounted-for water is reduced by

5% to 10% the cost to the City can be reduced by $50-$60,000. Of course not all water is billable, but this demonstrates a value for unaccounted-for water to the City.

In order to further reduce losses and unaccounted-for water, the following steps are recommended:

1. All "free" connections should be metered and the consumption entered into the monthly totals in order to provide an accurate measure of water used.

2. Meters 1" and larger should be tested on a revolving 2 to 3 year cycle in order to eliminate the possibility of non-registering or under-estimating meters.

3. There are a number of old and undersized waterlines in the city. Do to their age we recommend a $2,000,000 pipe replacement program over the next five years. After that a more modest replacement program of 40-$50,000 per year could be implemented (item #4, Figure 7-1). Please note that this does not include waterline replacement for improved fire flow or growth.

4. The old steel transmission lines should be prioritized for replacement or lining.

5. The City should begin or continue an education program for users of fire hydrants, showing the importance of notifying the City of specific fire hydrants used and the duration of use. This is especially important for non-emergency users such as construction and clean up crews and fire fighter training.

6. Begin a meter replacement program to keep all meters accurate and in good working order. This is discussed in more detail in Section 5.4.3 of this report.

3.2.2 Demand Summary

An estimate of per capita demand based on total water production from the combined surface and Dutch Canyon Well sources is presented in the following table. The average demand for the period was 124 gallons per capita per day (gpcd). Peak day production data was available for 1998, 1999 and 2000 and is used as the basis for calculating peak day demand. A peaking factor is defined as the ratio of peak day demand to average demand.

The capacity of the water supply sources should be greater than the peak day demand. The peak demand should not be more than 80% to 90% of the available capacity. When it exceeds that recommendation, planning should be begun for an additional source of water. Although instantaneous peak flow, fire flow, and diurnal fluctuations in demand are provided for by storage, the City should have a supply that can meet peak day demands without reliance on storage.

Currently, peak day demand is just being met by the combined surface water sources and the Dutch Canyon Well. In the summer in a dry year the filtration plant treating the combined surface water sources has a capacity on a sustained basis and for purposes of estimating daily

supply of 550 gpm. The recently upgraded Dutch Canyon Well has a capacity of 530 gpm. Water production capacity of the combined sources is then 1,080 gpm (1.56 MGD). As shown in Table 3-5 peak day production for the last three years approaches this capacity. In fact, instantaneous influent flows of 1,000 gpm were recorded for several days in 2000.

TABLE 3-5

DEMAND SUMMARY BASED ON PRODUCTION

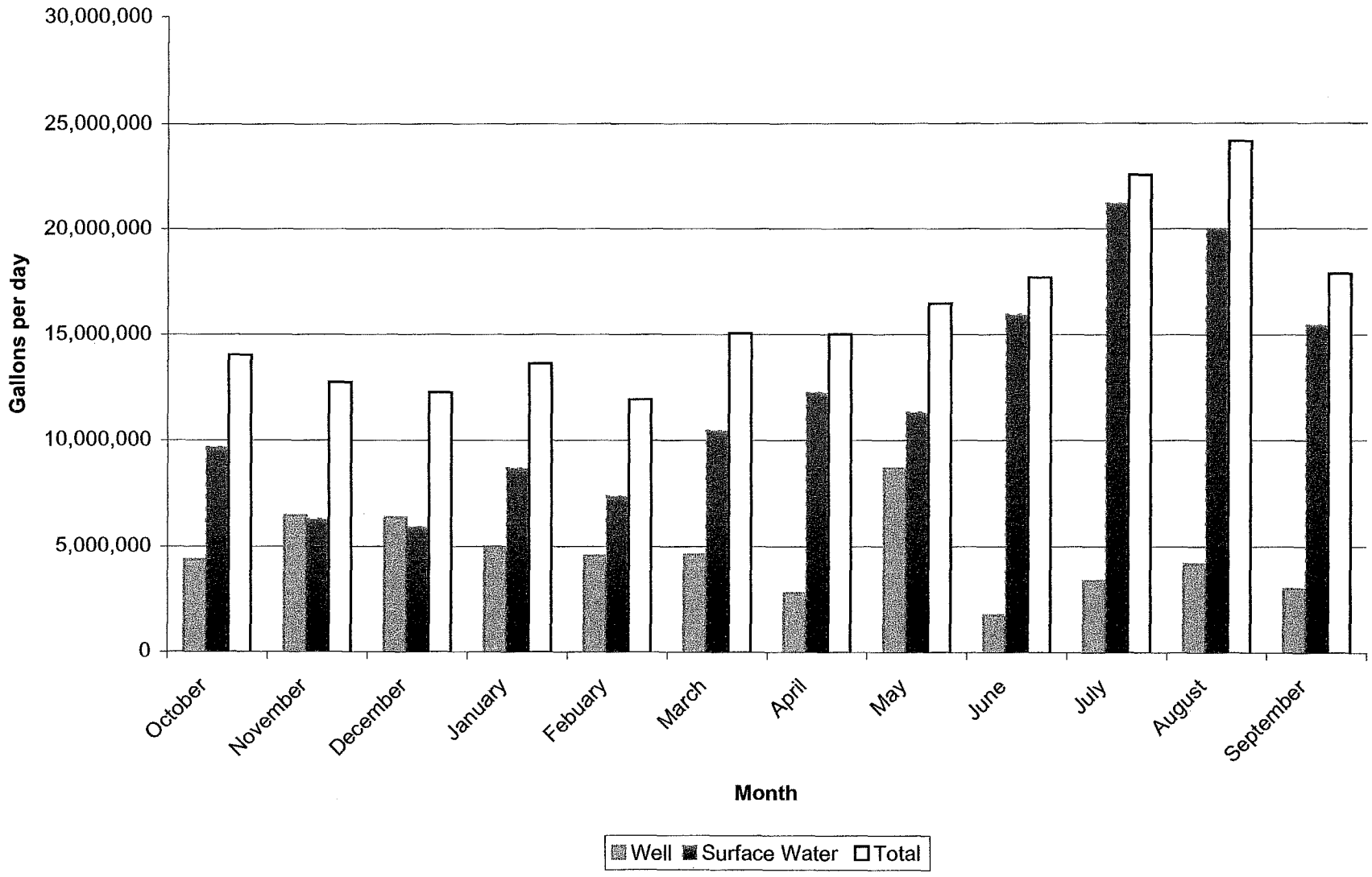
Year	Annual MG	Avg. MGD	Avg. Gpm	Peak MGD	Peak gpm	Peak Factor	Pop.	Avg. gpcd	Peak gpcd*
1996	173.09	0.47	329	___	___	___	4130	115	241
1997	198.42	0.54	378	___	___	___	4350	117	246
1998	208.15	0.57	396	1.13	784	1.98	4855	117	247
1999	220.77	0.60	420	1.43	993	7.36	4970	122	256
2000	267.92	0.73	510	1.39	965	1.89	4976	148	310
Avg.	232.28	0.64	442	1.32	914	2.10	___	124	260

* Peak Demand is estimated as the average demand times the peaking factor.

The annual pattern of water usage based on average production for the period from 1995 through 1999 is shown in Figure 3-3. Note that the proportion of water supplied from Dutch Canyon Well increases in the winter when surface water turbidity makes that source harder to treat.

Note: The available water sources have dictated the way the system has been operated in the past. During design of the new Miller Road Well and treatment plant, different methods of operating the system as a whole will be evaluated.

FIGURE 3-3: ANNUAL PATTERN OF WATER USE
WATER PRODUCTION AVERAGES 1995-1999



3.2.3 Water Demand Projections

Future water needs are estimated by applying the average demand in gallons per capita to the projected population. The peak flow is estimated by multiplying the average daily demand by the peaking factor. The resulting demand curve is shown in Figure 3.4, and is generated from the data in Table 3-6.

Since this curve is generated by applying an average demand and peaking factor to the projected growth curve, the actual recorded peak days may be slightly higher than shown on the projected demand curve. As reported in the previous section, the actual peak flow in the year 2000 was 1.39 MGD (965 gpm).

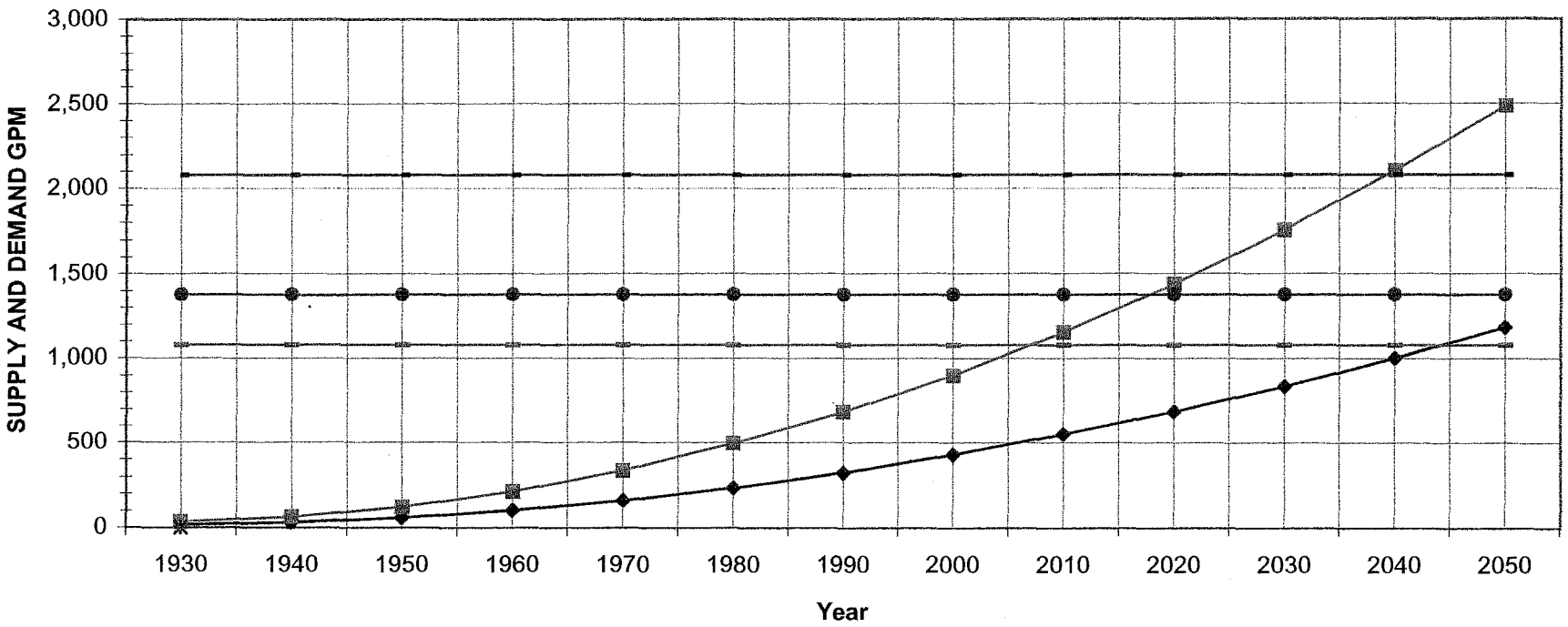
Per capita water use includes commercial, industrial and public uses. In the projection presented above, it was assumed that the percentage of total production utilized by each of these divisions will be relatively constant, and therefore demand will increase in direct proportion to the population. This projection does not take into account the potential for increased industrial and commercial development at the airport north of town.

TABLE 3-6

DEMAND PROJECTIONS

		Average Demand		Peak Demand	
Year	**Population**	**Gpm**	**MGD**	**gpm**	**MGD**
2000	4976	428	.62	900	1.30
2010	6388	550	.79	1155	1.66
2020	7961	686	.99	1440	2.07
2030	9713	836	1.20	1756	2.53
2040	11641	1002	1.44	2105	3.03
2050	13747	1184	1.71	2486	3.58

FIGURE 3- 4: CITY OF SCAPPOOSE
PROJECTED DEMAND



AVERAGE DEMAND
PEAK DEMAND
SUPPLY FROM DUTCH CANYON WELL AND SURFACE WATER SOURCE 1080 GPM
SUPPLY WITH SUPPLEMENTAL WELL, DUTCH CANYON WELL,& SURFACE WATER SOURCES 1380 GPM
SUPPLY WITH NEW WELL, DUTCH CANYON WELL & SURFACE WATER SOURCES 2080GPM
Note1:Capacities Shown are 24-Hr Operation With No Redundancy
Note 2: Demand Data Assumes All Growth is Residential With No Allowance For Potential Industrial Development

CHAPTER FOUR

WATER SUPPLY AND TREATMENT

4.1 CURRENT SUPPLY SOURCES

4.1.1 Surface Water

Surface water sources from points of diversion within the South Scappoose Creek Watershed currently provide 60% to 65% of the City's water supply. The City's water rights are summarized in Table 4-1. Figure 4-1 identifies the location of the diversions.

TABLE 4-1
CITY OF SCAPPOOSE WATER RIGHTS

	Permit	Priority	Amount		
Surface Sources			**(cfs)**	**(gpm)**	**(MGD)**
S. Scappoose Creek	25918	Nov. 24, 1958	2.5	1,122	1.6
Lazy Creek	25918	Nov. 24, 1958	1.5	676	0.97
Gourlay Creek	5813	Jan. 24, 1923	10	4,488	6.5
Groundwater Source					
*Dutch Canyon Well	GR8615	April 30, 1979	0.89	400	0.58

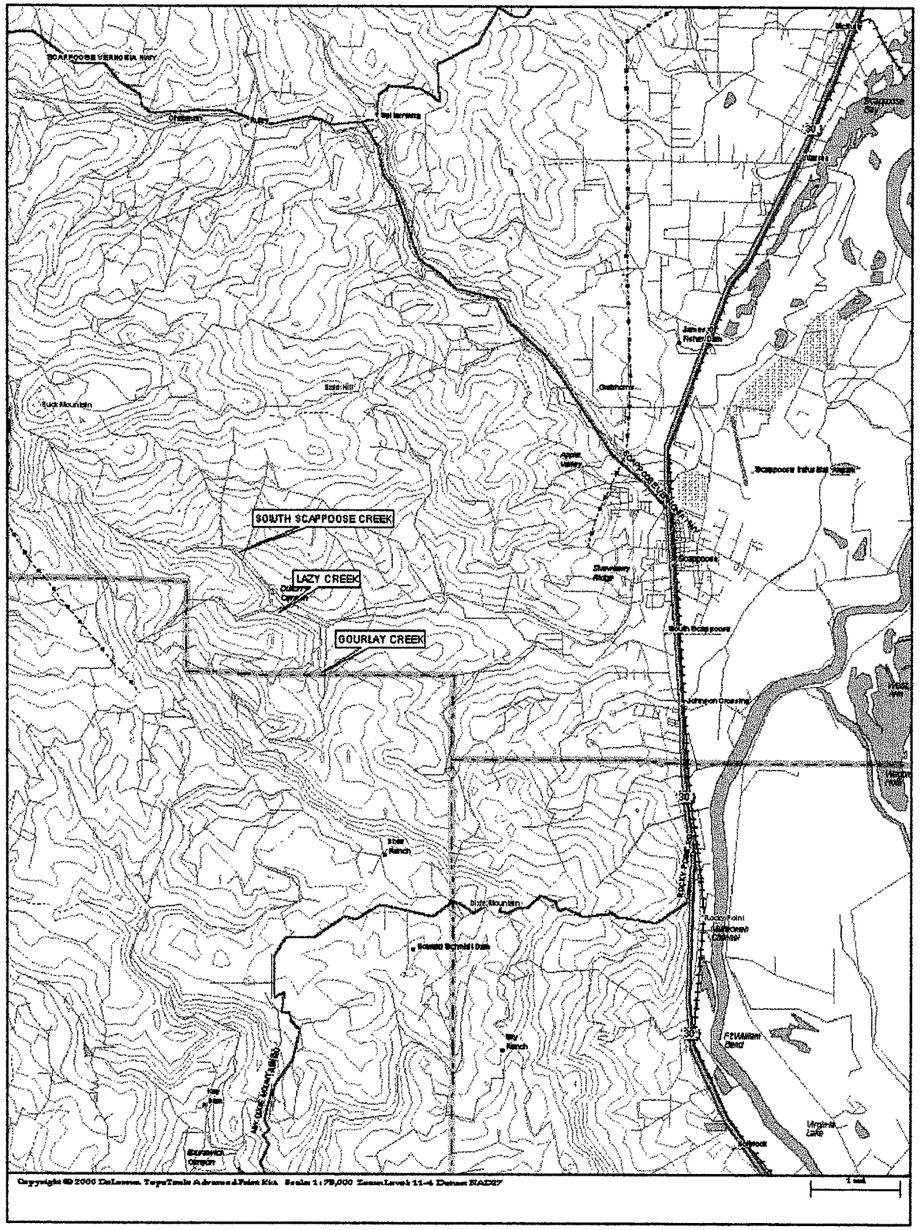
* Water use permit application G-15135 for an additional 0.557 cfs from Dutch Canyon Well, priority date March 20, 2000, is under review by the Water Resources Department.

Diversion facilities and a dam with a water surface elevation of 420 feet were constructed in 1921 on Gourlay Creek, the City's original water supply. A diversion dam was constructed in 1955 on South Scappoose Creek west of its junction with Gourley Creek. A third diversion dam was added at Lazy Creek in 1967. The water surface elevations of the impoundments on South Scappoose Creek and Lazy Creek are also 420 feet.

The Gourlay Creek impoundment was repaired after the flooding in 1996. There are small cement sedimentation basins and simple screening structures on the three creeks, all of which are reported to currently be in good repair.

The capacity of the transmission main from the three diversions is estimated, from hydraulic calculations, to be 2.0 MGD. According to the 1997 Water Master Plan, flows between 1.7 MGD and 1.9 MGD were measured at the plant during its first month of operation. The Water Master Plan also reported that flow may be limited to 1.0 MGD in the summer months, which agrees with our previous discussions and water availability estimates published by the Water Resources Department, as discussed below.

Although there is no gaging station for continuous monitoring of Lazy Creek, Gourley Creek, or South Scappoose Creek, the Water Resources Department has made estimates of water availability for these sources based on surface water models and periodic measurements. Availability estimates are based on the 80% exceedance level, which is the stream flow that will be exceeded 80% of the time.



OWNER:

CITY OF SCAPPOOSE

LEE ENGINEERING, INC.
1300 JOHN ADAMS ST.
OREGON CITY, OR, 97045

DWG TITLE:

WATER SOURCE LOCATIONS

DATE:	REVISED:	
AUG 2001 FILE NO: 2488FG4-1		**FIGURE 4-1**

For South Scappoose Creek above Raymond Creek, the natural stream flow at the 80% exceedance level for the low flow period of August is 1.0 MGD (715 gpm). Since Raymond Creek is below the three points of diversion, this flow is the maximum amount available from all three sources before any water is withdrawn.

By definition, the streamflow available for transmission to the treatment plant is lower than the 80% exceedance level 20% of the time. Flow in periods of drought or adverse conditions could be lower than the 80% exceedance level, especially if more senior water rights are fully utilized.

The turbidity of the surface water sources is generally below 2 NTU in the summer months, but higher peaks can occur during the wet season. The water treatment plant operator reports turbidities of up to 20 NTU during the rainy season. The plant flow rate is reduced to 400 gpm or less during periods of higher turbidity to optimize treatment, and reliance on water from Dutch Canyon Well is increased.

4.1.2 Dutch Canyon Well

The Dutch Canyon Well, located just south of Dutch Canyon Road near the intersection with Old Columbia River Highway, was drilled in 1978 and rated at a capacity of 400 gpm. In August 2000 the well was rehabilitated and a new 60 HP vertical turbine pump installed.

The current capacity of the Dutch Canyon Well is 530 gpm. It was decided to not raise the flow rate higher in order to protect the well. This flow was verified in March of 2001 by a flow test measuring the rise rate at the filter. There is a venturi flow meter in a vault at the plant, which monitors flow from the well prior to the greensand filter, and a magnetic flow meter at the well.

The well is 228 feet deep, with a static water level at 61 ft. It has a 12-inch diameter steel casing to 186 feet and a 10-inch diameter, 40-foot stainless steel well screen. The well test indicated a specific capacity of 6.8 gpm/ft. at 530 gpm which is equivalent to a drawdown of 78 feet..

4.2 TREATMENT

4.2.1 Conventional Treatment Plant

The City of Scappoose Water Treatment Plant, completed in 1979, consists of two parallel aluminum package plants. Treatment processes include chemical addition, flocculation, sedimentation/clarification and filtration.

The two coagulation/flocculation basins each have a volume of 8,630 gallons. Rapid mixing is achieved with a single in-line mixer and each basin contains a flocculator with a 3/4 HP, 1,725 rpm variable speed motor. The two sedimentation basins have a combined surface area of 336 square feet and are equipped with tube settlers to enhance solids removal efficiency.

Two constant-rate mixed media filters provide a total filter area of 388 square feet. The filters contain 30 inches of mixed media, consisting of anthracite coal, garnet sand, and silica sand plus support gravel. The filters are rated at 5.0 gallons per minute per square foot (gpm/sf) and would

be able to handle a peak load of 2.8 MGD. Surface wash is achieved using a rotary type wash that operates at a rate of 1.0 gpm/sf for four minutes. Backwashing is accomplished with a single pump operating at 950 gpm for seven minutes.

4.2.2 Oregon Health Department Evaluation

The Oregon Health Division (OHD) performed a comprehensive performance evaluation of the plant in 1993. Although the plant was originally designed to produce an average flow of 1.15 MGD and a maximum flow of 2.8 MGD, the tube settlers were designed at an overflow rate of approximately 2.5 gpm/sf at the average design flow. That rate is above the currently accepted average rate of 1.5 gpm/sf and maximum rate of 2.0 gpm/sf for tube settlers. At the accepted average loading rate the tube settlers would have a capacity of 500 gpm and 672 gpm at the maximum loading rate.

The OHD evaluated the plant at a peak flow of 700 gpm. It concluded that at this flow the treatment plant operates more like a direct filtration plant than a conventional treatment plant, with more reliance on the flocculation and filtration steps. It was determined that the plant could meet required 3.0 log (99.9 %) reductions for pathogens such as *Giardia lamblia* based on a 1.5 log removal in the filters and a 1.5 log removal through disinfection.

The 1993 evaluation included a turbidity profile taken after a backwash cycle.The plant could not meet minimum treatment levels (0.5 NTU) for filtered water when first put back into service, much less the optimum levels of 0.1 NTU. Since the evaluation, improvements have been made to the filtration system and operating procedures, as discussed in the following section.

4.2.3 Improvements to the Conventional Filter

Improvements made to the filters in January, 1998 included the replacement of filter media, installation of two new turbidimeters, and addition of a filter-to-waste system. The filter-to-waste system consists of new 4-inch butterfly valves and piping to divert the first few minutes of filtered water-to-waste. When the filter begins to make an acceptable quality of water, the filter-to-waste valves close and the normal effluent valve opens to deliver water to the clearwell.

Prior to the improvements, the primary coagulant, aluminum sulphate (alum), was only used during periods of very high turbidity. The plant relied on a coagulant-aid polymer (573C) and a filter aid polymer (985N) for removal of the solids, and the use of alum was reduced because it resulted in shorter filter runs. The improved condition of the filter media has allowed for the use of alum as the primary coagulant, which has resulted in better operation and solids removal efficiencies.

4.2.4 Groundwater Treatment Expansion

A new expansion at the treatment plant was completed in 2000 to treat the well water separately from the surface water sources. With only the surface water being treated by the package plant, the hydraulic loading rate on the filter during periods of high demand is much lower than when

SEE MAP
FIGURE 4-2
AT
CITY HALL

combined flows from the well and surface water source were treated together, reducing it to acceptable limits for the package plant.

Groundwater treatment consists of a greensand filter designed to remove iron and manganese. The raw water source for the facility expansion comes from the Dutch Canyon Well. The new expansion was necessary for more treatment capacity and to treat the well water separately for iron and iron bacteria removal. The groundwater exceeds the secondary maximum contaminant level of 0.3 mg/l for iron and 0.05 mg/l for manganese. Although not a violation of primary water quality standards, iron concentrations in excess of the secondary contaminant level are generally considered cosmetic in the concentration levels from this well. The use of water containing iron and manganese may result in staining of plumbing fixtures and clothes during laundering and plugging of water lines. Some industrial processes cannot tolerate excessive levels of iron.

The use of manganese greensand is a proven technology for iron removal at the concentrations found in the Dutch Canyon Well water. Manganese greensand will consistently meet the Maximum Contaminant Level (MCL) parameters. The manganese greensand used in the new filter for removing soluble iron, manganese, and hydrogen sulfide from well water supplies is a purple-black filter medium processed from glauconitic greensand.

Continuous regeneration (CR) operation is the method used at the Scappoose water treatment facility for iron removal. This method involves feeding a predetermined amount of potassium permanganate ($KmnO_4$), usually in combination with chlorine (Cl_2), directly to the raw water prior to the greensand filter unit.

Recommended flow rates for a greensand filter are from 2-4 gpm/sf, with 4 gpm/sf being the normal design rate for low levels of iron and manganese. Following pilot testing, the filters were designed for future expansion of the groundwater source and to allow for some variations in source iron concentrations. The greensand filter has an area of 200 square feet and the current loading rate is 2.65 gpm/sf. The amount of additional capacity in this filter would depend upon the concentration of iron in the groundwater source.

Future expansion of the groundwater treatment system was planned for by allowing space for the construction of an additional one or two filters.

4.2.5 Treatment System Capacity

The conventional treatment plant is currently operated with a peak surface water flow of 600 gpm. Effluent turbidity for periods of time when the plant is operated at this level are well below the target treatment level of 0.1 nephelometric turbidity units (NTU's) (a measure of light transmission).

At flows greater than 500 gpm, the loading rate on the tube settlers is greater than recommended by the OHD and the treatment plant is considered to be operating in direct filtration. A direct filtration plant, one without sedimentation, may be given credit for a maximum 2.0 log removal, compared to a maximum of 3.0 log removal credit for a conventional plant.

Discussions with the OHD indicate that they currently require a 2.0 log reduction in the filtration step. For the filters to be given credit for a 2.0 log reduction in pathogens, as a direct filtration plant they would need to receive a perfect score from the OHD comprehensive plant evaluation. Filters are assessed based on their ability to achieve a water quality of 0.1 NTU 95% of the time Although the treatment plant has not been reevaluated during a CPE by the OHD since the improvements to the filters were made in 1998, it consistently achieves these treated water quality limits.

Although the treatment plant could theoretically be operated as a direct filtration plant up to the limit of 861 gpm imposed by the detention time in the flocculation basin, it is probable that treatment would deteriorate. New treatment standards will require that the filter meet a maximum turbidity limit of 0.3 NTU and have average turbidities less than 0.1 NTU.

The plant is currently operated at an average rate of 500 gpm and a peak rate of 600 gpm. The treatment system has been consistently able to meet turbidity standards at these rates. The operator has stated that treatment is compromised above a rate of 600 gpm. Therefore, it is reasonable to consider 600 gpm the peak capacity on an instantaneous basis. The plant capacity on a sustained basis, and for purposes of estimating daily supply, is considered to be 550 gpm.

4.3 QUALITY AND CONFORMANCE WITH STANDARDS

4.3.1 Disinfection

The City of Scappoose provides filtration and continuous chlorination for its surface water sources as required by the Safe Drinking Water Act (SDWA) Amendments of 1986 and later. The comprehensive performance evaluation of the filtration, treatment, and disinfection systems by the OHD in 1993 indicated that at least a 3.0 log reduction of pathogens such as *Giardia lamblia* cysts is provided. As discussed in the previous section, the evaluation credited filtration with a 1.5 log removal and chlorination with 1.5 log removal.

It is expected that improvements to the filters, the use of alum as a primary coagulant, and reduced loading because of the groundwater treatment separation will result in an increased rating for the filters. If reevaluation of the filters by the OHD results in a 2.0 log removal rating, disinfection will only need to provide the minimum treatment of at least 1.0 log removal.

The reservoirs at the treatment plant are unbaffled contact basins and detention time is based on a hydraulic efficiency of 10%. The two low level reservoirs, including 290 feet of 16-inch transmission line, have a theoretical available contact volume of 138,400 gallons.

At a summertime peak flow of 1,080 gpm, 128 minutes of contact time are available in the two low level reservoirs. At a chlorine residual of 0.5 mg/l, the CT is 64. Assuming a minimum temperature for combined well and surface water of 53.6°F (12° C), and a maximum pH of 7.5, the required CT for a 1.5 log removal is 56. Therefore, at the current plant capacity of 1,080 gpm the reservoirs have adequate detention time to meet CT requirements for disinfection.

In the rainy season the peak demand is 500 gpm, the minimum temperature is 10°C and the maximum pH is 7.5. The required CT for a 1.5 log removal is 63. The reservoirs have an adequate detention time of 276 minutes to meet this requirement with a minimum chlorine residual of 0.4 mg/l. This would be adequate for 1.0 log removal in the summer months, but not for a 1.5 log removal.

4.3.2 Bacteriological Sampling

The City is required to sample for total coliform according to the population served. Based on a population of 4,970 in 1999, a minimum of six samples must be collected every month. The OHD has records for these tests posted back to February 1998, and no positive results are indicated.

4.3.3 Chemical Sampling

The results of the latest analysis indicate that all regulated Volatile Organic Chemicals (VOC), Synthetic Organic Chemicals (SOC), and Inorganic Chemicals (IOC) were well below the Maximum Contaminant Level (MCL) established by OAR 333-061 drinking water regulations. Most were below detection levels.

Total trihalomethanes (TTHMs), which are formed from chlorinated organics and are a health concern, are regulated under the Disinfectants and Disinfection By-Products Rule, and Scappoose will be subject to Stage 1 of this rule when it is finalized. When TTHMs were last tested in 1991, they measured 0.0074 mg/l, well below the MCL of 0.080 mg/l.

4.3.4 Corrosion Control

Treatment requirements and performance standards for corrosion control (OAR 33-061-0034) require corrosion control treatment if levels exceed 0.015 mg/l (15 ppb) for lead or 1.3 mg/l for copper. The City's lead and copper samples exceeded the action level for lead, with a concentration of 0.067 mg/l on October 18, 1992 and 0.041 mg/l on January 9, 1993.

At this plant caustic soda is used for pH adjustment after treatment to neutralize acid compounds in the water.

After implementation of corrosion control, the OHD requires the City to conduct tap sampling for lead and copper. Two sets of samples taken six months apart are required the first year. Once Round 2 sampling is completed, the compliance levels can be set and lead and copper monitoring can be reduced to once a year for three years. According to the OHD, the City is required to conduct Round 2 sampling, which is presently in progress, with the first set of samples already submitted.

4.4 FUTURE SUPPLY SOURCES AND TREATMENT REQUIREMENTS

4.4.1 Supply Alternatives

Specific recommendations are included below regarding the City's water system needs within the 20-year planning period. The issues of water supply and availability over the longer term are also addressed. It is desirable to look at supply needs over a 20-year interval, especially since projections indicate that the City will not reach ultimate development until then.

Three supply alternatives for providing the City of Scappoose with a safe and reliable source of drinking water were investigated in detail.

- Scappoose Creek
- New Groundwater Source
- The Multnomah Channel

4.4.2 Additional Water Availability from Scappoose Creek Watershed

The Water Resource Department stipulates in the Willamette Basin Program (OAR690-502-150(1)(b)) that Scappoose Creek "is withdrawn, by act of the Legislature, from further appropriation, except for protecting fish life therein, domestic livestock, municipal, fish culture, aesthetic, recreation and public park purposes." Appropriation for these specific uses is based on water availability.

Water availability is the amount of water that can be appropriated from a given point on a given stream for new out-of-stream consumptive uses. It is obtained from the natural stream flow by subtracting existing in-stream water rights and out-of-stream consumptive uses. Water availability data supplied by the WRD for the Scappoose Creek Watershed (Table 4-2) indicates that there is no water available for additional use during the months of August and September. Therefore, no new permits for consumptive uses will be granted for Scappoose Creek or any of its tributaries for these months. Unfortunately, that time period is when water is most needed for domestic use.

The City has water rights to more water than it uses from South Scappoose Creek and its tributaries. To withraw this water during the winter for use during the summer months would require an additional permit for storage. This option and the availability of water for storage is discussed in more detail in Section 4.4.3.

Discussions with the Water Master indicate that any application to transfer upstream water rights for diversion from South Scappoose Creek and its tributaries to downstream, would be considered based on historic water use, the excess water rights could not be transferred. Scappoose Creek downstream of South Scappoose Creek is therefore not a viable source of new supply for the City and since the availability of water in North Scappoose Creek is limited by the downstream watershed, new permits would not be issued for North Scappoose Creek.

TABLE 4-2: WATER AVAILABILITY

Month	Watershed	Stream Name				Available	Net
1	30201202	SCAPPOOSE CR>SCAPPOOSE	BAY	AT	MOUTH	YES	116
2	30201202	SCAPPOOSE CR>SCAPPOOSE	BAY	AT	BAY	AT	137
3	30201202	SCAPPOOSECR>SCAPPOOSE	BAY	AT	MOUTH	YES	126
4	30201202	SCAPPOOSE CR>SCAPPOOSE	BAY	AT	MOUTH	YES	87.4
5	30201202	SCAPPOOSE CR>SCAPPOOSE	BAY	AT	MOUTH	YES	49.5
6	30201202	SCAPPOOSE CR>SCAPPOOSE	BAY	AT	MOUTH	YES	17.8
7	30201202	SCAPPOOSE CR>SCAPPOOSE	BAY	AT	MOUTH	YES	3.1
8	30201202	SCAPPOOSE CR>SCAPPOOSE	BAY	AT	MOUTH	NO	-0.6
9	30201202	SCAPPOOSE CR>SCAPPOOSE	BAY	AT	MOUTH	NO	-1.5
10	30201202	SCAPPOOSE CR>SCAPPOOSE	BAY	AT	MOUTH	YES	6.4
11	30201202	SCAPPOOSE CR>SCAPPOOSE	BAY	AT	MOUTH	YES	15.9
12	30201202	SCAPPOOSE CR>SCAPPOOSE	BAY	AT	MOUTH	YES	67.6
Storage	30201202	SCAPPOOSE CR>SCAPPOOSE	BAY	AT	MOUTH		

4.4.3 Impoundment

The Willamette Basin Program allows storage in off-stream impoundments from November 1 to June 30. Water availability for storage is based on the 50% exceedance as calculated by the WRD. South Scappoose Creek above Raymond has water available for storage for the months of December through March.

Since water can only be stored in the winter months, an impoundment that could supply the City's projected water supply needs during periods of high demand would be prohibitively large. It would be necessary to store the difference in peak day demands and available supply over the period of low flows.

An estimate of the number of days in which the projected demand exceeded supply was made for the months of July, August, September and October. Using the current treatment capacity of 1,080 gpm, the size of the impoundment would need to be approximately 93 acre-feet in 2020 and 238 acre-feet in 2040.

One potential area for an impoundment has been identified, north of the intersection of J. P. West road and Keys Road. A preliminary cost estimate is included below.

TABLE 4-3
OUT-OF-STREAM WATER IMPOUNDMENT OF 240 ACRE – FT.
PRELIMINARY COST ESTIMATE

Site Work and Dike Construction	$450,000
Liner	$250,000
Piping	$200,000
Property Purchase	$250,000
Pump Station	$300,000
Contingency @ 20%	$800,000
1,000 GPM Surface Water Treatment Plant (to be located at existing plant)	$2,500,000
Total Estimated Cost:	$4,750,000

Out-of-stream impoundments to store water can be a viable option in some cases. However, the large land area and storage volume required make this option difficult to implement. In addition, storing water for long periods will result in a deterioration in water quality due to algae growth.

4.4.4 New Well

- **Test Well**

The City has recently drilled a test well to investigate development of new groundwater on Miller Road. Factors taken into account in siting the test well included: the zone of influence, potential occurrence of high iron concentrations in the groundwater, proximity to existing wells, proximity to the existing treatment plant, and availability of land. Zones of influence and existing wells are shown in Figure 4-1.

To eliminate the potential for a hydraulic connection with a surface water source, the Oregon Health Division requires that wells be drilled at a minimum distance of 1,500 feet from the nearest surface water source. Therefore, sites for new wells are limited by the zones of influence on either side of Scappoose Creek and Jackson Creek.

Siting a new well near the treatment plant was considered, however sites near the treatment plant are known to have higher iron concentrations than the Dutch Canyon Well. Also a test well has been drilled previously at the treatment plant which yielded no water at all. The City then decided to drill a test well east of the Columbia River Highway and outside of the zone of influence of any surface water sources. The Miller Road site was selected because it was outside the zone of influence of the surface water sources, it is not in close proximity to other high production wells, and the land was available for purchase by the City.

A test well was drilled at the Miller Road site to a depth of 190 feet in March 2001. The well casing is 8 inches in diameter, with a 6-inch liner. The stainless steel well screen is in gravel from a depth of 170 to 190 ft. The water-bearing zone extends from approximately 150 ft. to 190 ft.

Pumping tests at the test well indicate that a production well could have a capacity of 1,000 gpm, which would be able to satisfy the City's projected water needs through 2020. The iron content has been tested at 0.7 mg/l, which is similar to the Dutch Canyon Well. Treatment will be required to oxidize and filter the iron.

- **Treatment**

A new iron removal treatment plant will need to be built at the Miller Road site or iron removal treatment capacity at the existing plant will need to be expanded. Treatment at the existing plant would require construction of new filters and a larger backwash waste pond.

The cost of constructing a new treatment facility at the Miller Road site is compared to pumping the groundwater from the proposed well to the existing treatment plant in the Table 4-4. According to the data presented in Table 4-4 construction of a new treatment plant at the Miller Road site is the most economical alternative.

TABLE 4-4

WATER TREATMENT PLANT LOCATION EVALUATION

	MILLER ROAD SITE	EXISTING TREATMENT PLANT SITE
Raw Water Pipe	-----	$1,500,000
Treatment Plant	$2,150,000	$1,100,000
Generator	Included Above	$115,000
Backwash Basin	Included Above	$60,000
Well	$300,000	$300,000
Finished Water Pipe	$290,000	---
Backwash Waste Pipe	$50,000	---
Property Purchase (Well Site)	$180,000	$180,000
Subtotal	$2,920,000	$3,255,000
Contingency (20%)	$584,000	$651,000
TOTAL	$3,504,000	$3,906,000

- **Supplemental Well**

As discussed in detail in the section on projected needs, the demand on peak days currently approaches the maximum capacity of the Dutch Canyon Well and combined surface water sources. The test well at the Miller Road site is capable of supplying an estimated 300 gpm.

A new production well and treatment plant will not be on line for at least two years. Meanwhile, expected drought conditions and possible limitations on the surface water sources in the summers of 2001 and 2002 provide additional impetus for bringing the supplemental well on line. Upgrade of the test well involves installation of a new pump, flow meter, and level probe at the well. A transmission line will be needed to connect the well to the distribution system.

The water will need to be treated with a sequestering agent to keep the iron in solution so that it does not come out of solution in dishwater and clothes washing machines. It is therefore being considered as an emergency source to satisfy peak demand only. The supplemental well is currently in construction.

4.4.5 The Multnomah Channel

A preliminary investigation of the suitability of the Multnomah Channel as a water source for the City was investigated before the test well at Miller Road was completed. If the test well had proved to be of limited capacity or if the iron concentration of the groundwater was higher, a more detailed investigation of the Channel as an alternate source would have been recommended.

- **Water Quality and Public Health**

Information is provided by the Department of Environmental Quality (DEQ) on water quality in the Lower Willamette River. Municipal and industrial point sources and urban nonpoint sources of pollution primarily influence water quality in the Willamette River, although rural nonpoint sources also contribute to water quality conditions via the Middle Willamette, Tualatin, and Clackamas River Subbasins.

Downstream of the downtown Portland area, the Willamette River is heavily used for transportation of goods. Various industrial storage facilities and shipyards line the contained riverbanks. A maintenance yard complete with dry dock facilities exists on Swan Island, which is really a peninsula made of dredge tailings. The harbor bottom is contaminated. On December 1, 2000 it was listed as a Federal Superfund Site because of concerns about DDT complexes, polychlorinated biphenyls (PCB's), and other organochlorines that adhere to the sediments and may accumulate in the fatty tissue of aquatic species.

The DEQ samples the Willamette River at the SP&S Railroad Bridge six miles downstream of the Hawthorne Bridge. This is the last site monitored prior to the Multnomah Channel. The river at this site is impacted by industrial and nonpoint sources upstream, and in the winter is subject to overflows from Portland's combined sewer. Sampling results indicate high concentrations of fecal coliform, total phosphates, and biochemical oxygen demand, with additional influence from moderately high concentrations of nitrate and ammonia nitrogen and total solids.

The U.S. Geological Survey (USGS) collected a series of monthly grab samples at the mouth of the Multnomah Channel during 1994. The data is valuable because it monitored many trace metals and VOC's that are regulated under the Clean Water Act. No water quality criteria or MCL's for drinking water were exceeded for the contaminants measured.

The samples taken by the USGS in the Multnomah Channel do not have the high concentrations of fecal coliform, total phosphates and BOD indicated by DEQ sampling on the lower Willamette River, and concentrations of nitrate ammonia nitrogen and total solids were also low. Chlorophyll A monitoring did not indicate significant algae growth. Algae growth due to high levels of phosphous can lead to eutrophication, symptomized by low oxygen levels.

Because they were limited in scope, the results of sampling in the Multnomah Channel may not accurately indicate the impact of events such as combined sewer overflows, but it is to be expected that impact from these events will be less than is experienced upstream. Organic pollutants are oxidized and the oxygen is then replenished by reaeration as the water moves downstream. DEQ water quality indexes also indicate that water quality in the lower Willamette River is improving. This improvement may be expected to continue due to combined sewer overflow separation work in Portland.

Without further sampling over a range of flows and over a period of time it is difficult to draw any conclusions about the suitability of the Multnomah Channel as a drinking water source. Sampling should include high flow events to determine the effect of upstream combined sewer overflows and also give some indication of possible increased turbidity levels in the Multnomah Channel.

Monitoring would also need to determine what priority pollutants are present and what treatment processes would be required to meet drinking water standards. Priority pollutants are defined by the Environmental Protection Agency (EPA) based upon levels considered safe for the protection of aquatic life and human health. Those priority pollutants for which maximum contaminant levels (MCLs) for drinking water have been set are regulated by the OHD.

Potential toxins include arsenic, PCBs, DDT, furans from pesticide use, and TCDD (Dioxin) from wood treatment plants such as the one at Oregon City. The dock facilities at Swan Island are a potential source of organic industrial chemicals. DEQ sampling at the S&P Railroad Bridge did not include organic chemicals.

- **Overview**

If it was decided that the Multnomah Channel was a suitable drinking water source, the City would need to investigate siting an intake structure and treatment plant east of Honeyman Road next to the Multnomah Channel. Treatment issues include the possible presence of organic chemicals or other regulated contaminants that would add to the cost of treatment. High turbidities in winter may require some form of pre-treatment such as screening or sedimentation.

The Multnomah Channel is over a mile from the existing UGB and 2.5 miles from the large distribution main on 4th Street. When added to the cost of an intake structure and treatment plant, this length of new finished water pipe would make this alternative much more expensive than groundwater treatment at the Miller Road site.

- **Public Opinion and Education**

More information is needed regarding the suitability of the Multnomah Channel for treatment, but current information does not preclude such use. If the City were to pursue this alternative, we would recommend a pilot study that would include extensive raw water sampling for regulated contaminants. The study should include toxicity testing using native aquatic organisms.

There have been recent studies on the Willamette River of bioaccumulation in fish of 11 toxic chemicals - mostly banned pesticides. Average levels were below state standards for all of the contaminants but PCB's. (PCB's were formerly used to insulate electrical transformers.) After being linked to cancer, they were banned in 1996, but persist in the environment and decay slowly. They are only slightly soluble in water, but are considered a carcinogen at very low concentrations.

There are potential health risks incurred at very low concentrations of pesticides, PCB's and other organochlorines. If detected, these organic compounds must be removed by carbon adsorption, adding to the cost of treatment. Because health risks are a very real public concern, the public's acceptance of the Multnomah Channel as a water source would need to be evaluated before initiating a monitoring program. The results of the sampling and pilot tests would also need to be discussed in a series of public meetings before there is any decision on the use of this source.

CHAPTER FIVE

WATER TRANSMISSION AND DISTRIBUTION

5.1 GENERAL DESCRIPTIONS

The transmission and distribution system was analyzed in detail in the 1997 Water Master Plan. This update relies upon the information in that report with regard to a detailed description of the existing transmission and distribution systems. With the help of the City staff, improvements and changes to the existing system since completion of that report have been recorded and included in an updated map of the system, Figure 5-1.

5.1.1 Raw Water Transmission Lines

A raw water transmission main collects water from the three separate surface water sources. The primary transmission line is a 12-inch diameter steel pipe that carries raw water miles via gravity from the three sources to the junction with the Dutch Canyon Well waterline. This primary line replaced the City's original 5-inch wooden line in 1955. Feeder transmission lines merging with the main line include an 8-inch steel line from the Gourlay Creek Diversion that was installed in 1967, a 12-inch steel line installed in 1955 that transports water 3,500 feet from the South Scappoose Creek Diversion, and an 8-inch steel line built in 1968 that transports water from the Lazy Creek Diversion. The total length of 12-inch and 8-inch transmission lines is approximately seven miles.

From the junction of E. M. Watts Road with Dutch Canyon Road, a 12-inch PVC line transports the combined surface water sources to the treatment plant.

Water from the Dutch Canyon Well is transported through a 12-inch ductile iron line to Dutch Canyon Road and E. M. Watts Road and then through a separate 12-inch PVC line to the treatment plant.

5.1.2 Distribution System

The City's distribution system consists of an array of pipes, valves, and pumps installed over a period spanning more than 50 years. During the late 1980's a comprehensive pipe replacement project was undertaken to remove wooden service lines and many of the mains considered too small for reliable service. Today all of the wooden lines have been replaced. However, many undersized steel and cast iron mains still exist. They are in need of replacement with larger pipes made from material less susceptible to corrosion.

The City's distribution system is comprised of two pressure zones. The lower zone serves the majority of residential, commercial, and industrial customers. Low zone pressures are regulated by the two concrete reservoirs located near the water treatment plant. The overflow elevation for these reservoirs is 198 feet. Static pressure in the low zone ranges from 50 to 80 psi.

zones on the 6-inch line south of Scappoose-Vernonia Road and north of N.W. 5th is at an elevation of 60 ft. Static pressures in the high zone currently vary from 40 psi to 160 psi.

Several homes are served off of the raw water transmission line along Dutch Canyon Road. The City is obligated by court order to provide treated water to these homes. Installation of a finished waterline from the distribution system will be discussed in detail in the subsequent section.

Recent expansions include housing developments at the south end of the City such as Rolling Hills, Seven Oaks, Kings Brook, Norfolk, and Meadowbrook, as well as a new Fred Meyer Shopping Center off of the Columbia River Highway (U.S. Highway 30). The most significant pipe replacement project involved installation of an 18-inch PVC line along S.E. Elm and up S.E. 4th Street. In addition to this replacement, a new 18-inch line was installed along West Lane Road supplying water to the airfield in the northeast section of the City.

5.1.3 Pumping Facilities

A booster pump station is located near the water treatment plant to elevate water to the Green Tower Reservoir. The station contains two 25-hp pumps, each rated at a nominal design capacity of 250 gpm at a total dynamic head (TDH) of 250 feet. The station also contains a third pump of 50-HP with a nominal capacity of 500 gpm at 250 feet TDH.

No standby power supply is currently available. However, the 50-HP pump can be connected to a portable generator if necessary. All three pumps are provided with pump control valves to help prevent surge problems and water hammer. The pumps are controlled by means of pressure switches in the discharge line and an altitude valve at the Green Tower Reservoir.

A second booster pump station is used to service houses on Glen View Lane southwest of town. A small pump house at the corner of Glen View Lane and Dutch Canyon Road contains two 1/2 HP pumps operated periodically to fill a buried pressure tank. Only seven homes are currently served by this pump station.

A new telemetry system has recently been installed to link the Green Tower Reservoir, high level pump station, treatment plant and storage reservoirs together and coordinate their operation.

5.2 HYDRAULIC ANALYSIS

5.2.1 General

Hydraulic modeling of the Scappoose water distribution system was completed as part of the 1997 Water Master Plan. Since network analysis is not included in the scope of this update, this discussion relies upon the modeling and analysis done in the 1997 report.

In general, conclusions and recommendations are presented in the following sections. See Table 5-1 for recommended improvements.

5.2.2 Requirements for Fire Flow

Fire flow requirements were determined as part of the 1997 Water Master Plan based on discussions with the Scappoose Fire Department. In residential areas a minimum fire flow of 1,000 gpm must be available for one hour, with a residual pressure of 20 psi. Where the area contains larger industrial buildings or schools, a fire flow of 3,000 gpm with a 20 psi residual is required. Commercially zoned areas also require a fire flow of 3,000 gpm. The distribution system was analyzed under these demand and fire flow scenarios. Based on these results, recommendations were made for Priority 1 improvements.

5.2.3 Capacity and Recommendations

A. High Zone

Although the high zone distribution system appears adequate for meeting peak daily demands through 2020, difficulties will arise in delivering fire flows. Many of the branches in the high zone are connected by single 6-inch or even 4-inch pipes, with no alternative paths for the water to follow. These small, unlooped pipelines are inadequate for carrying fire flow demands. Therefore, as many of these smaller sized pipes as possible should be replaced in order to meet fire flow requirements throughout the high zone.

The initial outflow pipe from the Green Tower Reservoir was a single 8-inch diameter cast iron pipe, insufficient for supplying adequate fire flows throughout the high zone. A second 8-inch PVC line has been constructed to connect the Green Tower Reservoir with N.W. Bella Vista. (Distribution Project D1.)

Other recommendations include the addition of three new 8-inch lines (Projects D2-D4) and replacement of an existing 4-inch line with an 8-inch (Project D5). Each of these were added to the model and simulations performed. The recommended pipe replacements resulted in adequate fire flows.

The 1997 Water Master Plan included a recommendation that the homes below the 80 foot elevation be transferred to the low zone by installing a pressure reducing valve on the new 8-inch line west of N.W. 7th Street on Peak Street. Installation of this PRV would also allow for connection between the high and low systems with the completion of Distribution Project D-6 on Smith Road.

To maintain 40 psi in the low zone with a hydraulic grade line of 200 feet, the maximum allowable elevation would be 110 feet. It is, therefore, advisable that any significant changes made to the high zone distribution system allow for homes below the 110 foot elevation line to be transferred to service via the low zone if possible.

The recommendation in the 1997 Water Master Plan that the new PRV be placed at an elevation of 80 feet results in a static pressure of 150 psi, which is still much higher than desirable. It should be possible to place the pressure reducing valve at the higher elevation of 110 feet. More

residences would be included in the lower zone and the maximum pressure in the high zone would be reduced.

Services between the elevations of 110 and 220 feet will continue to have higher than optimum pressures. An intermediate pressure zone could be created east of the Green Tower Reservoir but would require the installation multiple pressure reducing valves and is complicated by the fact that the main feed line to the tank currently serves homes in both pressure zones. Creation of an intermediate pressure zone is not considered of value at this time. It is recommended that the City require pressure reducing valves on services with a static pressure that exceeds 90 psi.

B. Low Zone Area 1 - Dutch Canyon Road/Raymond Creek

The primary region of concern in the City's low zone is the area to the southwest of the City, just off of Dutch Canyon Road. It was not possible to maintain a flow of 1,000 gpm from the hydrants in this zone during the calibration testing completed previously. Replacement of all the 4-inch and 6-inch lines in the Raymond Creek housing area is recommended, and either a pump station for fire flow or replacement of 2600 ft of 8-inch line along Dutch Canyon Rd with 12-inch line (Project D10).

The primary concern in this area is fire protection. The existing piping is not large enough to carry the required flow as mentioned above. One alternative is using raw water for fire protection. The raw water transmission pipe, from the impoundments in the South Scappoose Creek Basin, is close to this area. (Figure 5-1.) It also has enough pressure for that purpose. Any hydrants using raw water would need to have separate piping and could not be connected to the potable system. The existing potable water lines in the Raymond Creek area would be left in service and new 8-inch line would be put in place for fire flows. However, there would be a savings of $244,000 associated with not having to replace the 8-inch line along Dutch Canyon Rd. Although this is an economical solution, it is not the recommended alternative because during low flow periods in South Scappoose Creek the raw water line may not be able to supply 1,000 gpm required for fire flow.

C. Low Zone Area 2 – City Center

Apart from the homes in the southwest Dutch Canyon Road area, there are several other areas within the low zone where fire flow demand needs must also be addressed.

1. Replace the 2-inch, 4-inch and 6-inch lines, along with 8-inch PVC pipe (Project D6), connecting low-lying areas of the high zone to the low zone via a new 8-inch line installed under Smith Road.

2. The 4-inch steel pipe along S.W. Eggleston Lane should also be replaced by an 8-inch line in order to provide adequate fire flow (Project D7). At present, according to the model, the capacity of the existing hydrant at the end of this line is approximately one-third the required fire flow.

3. Low capacities for fire flows are predicted by the model at several locations at the southeast end of the City between S.E. 3rd Place and S.E. 6th Street. At the end of the line under S.E. 3rd Place, for instance, available flow at minimum pressure may be as low as 300 gpm, even after the proposed 18-inch main is installed along S.E. Elm Street. Therefore, the 4-inch line under S.E. 3rd should be replaced with a 12-inch line in order to provide adequate fire flow capacities (Project D-8). The 4-inch line under S.E. 4th Street and the 4-inch line on S.E. Elm, east of 4th Street, should be replaced by an 8-inch line. Replacement of the 4-inch line on S.E. 6th Street with an 8-inch line is also advised. (All these replacements are included in Project D9 of the Capital Improvements Plan.)

D. Industrial and Commercial Fire Flows

The low zone has several areas that are zoned for commercial or light industrial use. Fire flows of 3,000 gpm must therefore be available for these sites. The current zoning map provided by the City designates five areas for light industrial use within the city limits. One of these areas, a gravel pit at the northeast end of the City, is not in immediate need of fire flow service. Two other areas to the northwest of the gravel pit have also been designated for industrial use, although no major industries that require high fire flows are currently located within either.

The Scappoose Industrial Airpark has potential for growth in the near future. This area is served by an 18-inch main on West Main Road that transitions to a 12-inch line at the northern border of the airpark. These lines are adequate for future demand.

The final area zoned for industrial use borders on S.E. Elm Street and Highway 30. The primary industry contained within this area is the Steinfeld Pickle and Kraut Processing Plant. Acceptable fire flow is already available for this site and should remain available throughout the planning period.

Previous model simulations indicated that fire flows for all other commercially zoned areas along the Columbia River Highway, including the newly constructed Fred Meyer Shopping Center, will be adequate through the 20-year planning period.

E. Distribution Piping Needed to Extend Current Service Area

In order to anticipate future growth within the Urban Growth Boundary, several new distribution mains have been recommended in the Capital Improvement Plan as Distribution Projects D12 - D17 (see Table 5-1 and Figure 5-2). Appropriate sizing of the pipes to supply growth areas was determined based on the CYBERNET model. It was assumed that industrial fire flows will need to be available at the north end of the City, along the Columbia River Highway, Scappoose-Vernonia Road, and West Lane Road. This will require new pipes between 12 and 16 inches in size (D14-15), and the replacement of 8-inch steel lines on West Road and NW 1st Street with a 12-inch line (D13).

Two 12-inch mains will be necessary on the south end of the City to accommodate anticipated commercial growth along the Columbia River Highway (Project D17). The plan also includes

addition of two 8-inch mains in this area. Other expansions add nearly 12,000 feet of 8-inch lines to serve residents on the east side of town in the vicinity of E. Columbia Ave. (Project D16.)

5.3 PUMP STATIONS

5.3.1 Canyon Creek Booster Pump Station

The City is currently under a court order to provide potable water to several customers living along the raw water transmission line outside the city limits. The Court Order dated April 14, 1995 upheld an earlier judgement in 1984 that parties which were receiving water from the City at that time would continue to be provided with domestic water service. The court order also stated that obligation of compliance with regulatory water quality standards is upon the City.

Serving these homes on Dutch Canyon Road which are outside of the city limits will require a small booster pump station with a buried pressure tank similar to the station at Glen View Lane. The cost of such a pump station has been estimated at $50,000. This includes installation and setup of two 1/4 HP pumps, a 50-gallon pressure tank, and all necessary controls and telemetry. In addition, 10,000 feet of 4-inch PVC will need to be installed connecting the booster pump station to the various homes it will serve.

A 4-inch line is sufficient for providing domestic water service, but not for fire flow service. Other provisions can be made for fire flow, perhaps utilizing the existing connections on the raw water transmission line.

5.3.2 Existing Pump Station

The existing booster pump station supplying the City's high zone is capable of providing a maximum of 1,000 gpm, or 1.44 MGD, to the high zone reservoir. This is approximately four times the anticipated high zone demand in 2020. No improvements will be necessary, in terms of capacity, during the planning period.

Some property does exist in the Urban Growth Boundary, above the existing high level reservoir. If that property is ever developed in the future, another booster pump station will be required to serve that area. Such a future pump station would probably be located adjacent to the existing Green Tower Reservoir.

5.4 RECOMMENDED IMPROVEMENTS

5.4.1 Raw Water Transmission System

The steel raw water transmission lines between the surface water sources and the Dutch Canyon Road / Watts waterline are extremely old and unreliable. The City currently spends approximately $10,000 to $12,000 per year repairing breaks and leaks in these lines. There are approximately 7 miles of 12-inch transmission line and several hundred feet of 8-inch line that need to be replaced. These costs are included in the Capital Improvement Plan.

5.4.2 Distribution System

In addition to problems associated with outdated piping, many of the City's service lines have become inadequate due to requirements for residential and industrial fire flows. Recommended improvements, based on the previous hydraulic analysis, are presented in Table 5-1. In general, the recommendations made by the 1997 Water Master Plan have been adopted as part of this Water Master Plan Update and are included in the Capital Improvement Plan. In several instances further investigation was recommended.

Projects D12 – D17 will be necessary to expand the service area, allowing for growth within the UGB. Growth is assumed to be primarily commercial/industrial north of the existing city limits, and will require distribution mains with diameters between 12 and 16 inches. Extensions of the distribution system to the northwest, east, and south of the City will primarily serve residential areas, and are therefore sized with 8 and 10-inch water mains (two 12-inch lines are also planned south of the City). It is expected that completion of these secondary priority projects will be aided by funding from developers and industries wishing to use the currently unserved areas.

Pipe installation and replacement projects are presented on a service area map in Figure 5-2. Projects are labeled according to the project numbers designated in Table 5-1.

In order to maintain acceptable pressures throughout the distribution system, it will also be necessary to transfer several pipe loops formerly served by the high zone into the low zone. The 1997 Water Master Plan recommends that a pressure reducing valve vault be placed on the line connected to the high zone under Peak Road, just west of N.W. 7th Street to include the homes lying below the 80-foot elevation between N.W. 7th Street and Scappoose-Vernonia Road in the low pressure zone. The cost of installing this control valve within a utility vault has been estimated at $30,000, and is included in Distribution Project No. D5.

Placement of a new pressure reducing valve and the inclusion of additional area in the low pressure zone have been discussed previously. The vault could be placed at the 110-foot elevation on the same line, thus eliminating the service connections with greater than 138 psi, while providing adequate pressure to all services in the low area. Although creation of an intermediate pressure zone is not recommended at this time, higher than optimum pressures in areas within the high pressure zone should be addressed by the City by a requirement for pressure regulating valves on each service.

Also included in the Capital Improvement Plan is a pipe replacement program to remove old steel lines which make up a significant percentage of the distribution system. Lines mentioned as a priority in the 1997 WMP include: the: 2-inch steel line on S.E. Oak Street, a 4-inch steel line on Vine Street, a 6-inch steel line on S.E. 6th Street, and 4-inch steel lines on N.W. 7th and Smith Road. Replacing a section of 6-inch steel line on N.W. Bella Vista is also a priority.

There is approximately 3.5 miles of steel pipe which will need to be replaced and is not included in the improvements necessary for fire flow or growth. It is recommended that the City plan to replace all steel pipe in the distribution system within the next five years. There is also over a

mile of cast iron pipe which is a leak concern if the pipe is very old, the soil is poor, or the pipe has sheared.

TABLE 5-1
DISTRIBUTION AND TRANSMISSION SYSTEM
CAPITAL IMPROVEMENT PLAN

PROJECTS NECESSARY FOR FIRE FLOW

Project	Location	Di. In.	Unit Cost	Length ft.		P
D1	Complete					
D2	Five Peak Terrace to Peak Rd	8	$67	250	$16,750	1
D3	NW Smith to North End of Sandburg	8	$67	1,050	$70,350	1
D4	NW 7th to Olepha Dr.	8	$67	400	$26,800	1
D5	Peak Rd /E.J. Smith to NW 7th	8	$67	790	$52,930	1
D5	New Pressure Reducing Valve				$30,000	
D6	NW 1st/Laurel to Wickstrom	8	$67	1350	$90,450	
D6	Smith Rd /NW 1st to NW 4th	12	$94	680	$63,920	1
D7	Eggleston Lane	8	$67	700	$46,900	1
D9	SE 4th St – to Elm; SE Elm – 4th to 6th; SE Rose Lane; and SE 6th – to Everett Way	8	$67	1200	$80,400	1
D10	Raymond Creek Rd, Meadow Ln, and Branch Rd from Dutch Can. Rd to Existing Hydrants	8	$67	2,600	$174,200	1
D10	Dutch Canyon Rd- Raymond Cr. Rd.	12	$94	2600	$244,400	1
D11	Dutch Canyon Rd – Raymond Creek to last home served (potable water only)	4	$48	13,000	$624,000	1
D11	Canyon Rd Pump Station				$50,000	1
Priority 1 Project Construction Totals:					$1,571,100	
Priority 1 Projects Plus Contingency, Engineering and Administrative					$2,042,430	

TABLE 5-1
DISTRIBUTION AND TRANSMISSION SYSTEM
CAPITAL IMPROVEMENT PLAN

PROJECTS NECESSARY FOR GROWTH

Project	Location	Dia. In.	Unit Cost	Length ft.		P
D12	Green Tower Reservoir to new Zone 3 Reservoir	10	$79	2,000	$158,000	2
D13	JD West Rd – SW 4th to SW 1st & SW 1st – JP West Rd to Laurel	12	$94	2,630	$247,220	2
D14	Columbia River Hwy – NE Williams to West Lane Rd; West Lane Rd – Hwy 30 to N. Honeyman Rd	16	$138	8,432	$163,616	2
D15	Crown Zell. Logging Rd – Col. Riv. Hwy to existing 12 –Inch	12	$94	1,200	$156,600	
D15	; Sawyer to Logging Rd; 3rd St; 2nd St; SE 1st, Santosh to Myrtle	8	$67	1,900	$127,300	2
D16	Railroad Right-of-Way at E. side of City; North Road; Bird Road; and Miller Road	8	$67	9,040	$605,680	2
D17	Columbia River Hwy – from Old CRH split to new Fred Meyer;	12	$94	2,500	$235,000	
D17	Oak Ridge Dr; and S. end of SE 6th St. to new Fred Meyer	8	$67	1,200	$80400	2
Priority 2 Projects Construction					$2,782,816	
Priority 2 Projects including Contingency Engineering and Administration					$3,617,661	
Transmission Line from surface water sources to E. M. Watts Road		12	$94	36,960	$3,474,240	
Transmission Line, including Contingency, Engineering and Administration					$4,516,512	

5.4.3 Meter Replacement Program

The metering information collected by the City is currently considered unreliable because of the age of the meters. A meter replacement system should be instituted which targets the oldest sections of town first. The City has 34 meters, which are larger than ¾-inch. Any of these commercial, municipal, or industrial meters which are older than 10 years should be targeted for replacement.

Since there has not been a meter replacement program in place it is necessary to replace the majority of meters in the system. An annual expenditure of $64,500 will be necessary to replace existing meters within the next 10years. Following that, residential meters should be replaced every 15 years and larger meters every 10 years, at an estimated annual cost of $43,000. The following Table summarizes meter replacement cost.

TABLE 5-2:
ESTIMATED METER REPLACEMENT COST

METERS	ESTIMATED #	COST (EA)	COST
Residential	1,721	$350	$602,350
1-Inch	12	$500	$6,000
2-Inch	16	$1,500	$24,000
3-inch	5	$2000	$10,000
4-Inch	1	$2,400	$2,400
		TOTAL	$644,750

SEE MAP
FIGURE 5-1
AT
CITY HALL

SEE MAP
FIGURE 5-2
AT
CITY HALL

CHAPTER SIX

STORAGE FACILITIES

6. STORAGE

6.1 DESCRIPTION OF EXISTING STORAGE

The water system is served by three reservoirs with a total storage capacity of 1.6 MG, see Figure 5-1. The storage reservoirs include a 1.0 MG and a 0.3 MG concrete reservoir at the treatment plant on Keys Road and an elevated 0.3 MG steel tank, the Green Tower Reservoir, off of N.W. Bella Vista Road.

6.2 REQUIREMENTS

Storage must make up the difference between supply capacity and peak hourly demands, provide emergency storage for short-term interruptions in supply, and provide fire flows. Accepted engineering practice to meet these needs is to provide three times the average daily demand plus storage volume for fire flow.

Fire flow requirements were based upon discussions with the Scappoose Fire District for the 1997 Water Master Plan. There is a minimum requirement of 1,000 gpm for residential fire flows for one hour, which must be available throughout the system with a residual pressure of 20 psi. Where the area is zoned for commercial / industrial use or schools are served, a minimum of 3,000 gpm for three hours must be available for fire flow. The following table summarizes storage based on these fire flows.

TABLE 6-1
FIRE FLOW REQUIREMENTS

	Fire Flow	Duration	Storage
Residential	1,000 gpm	60 minutes	0.06 MG
Commercial/ Industrial	3,000 gpm	180 minutes	0.54 MG

6.2 PROPOSED IMPROVEMENTS

Increased storage is needed in both Zone 1, which supplies the majority of the service area, and Zone 2, which serves a residential area at elevations from 80 feet to 260 feet. Deficiencies are summarized in Table 6-2.

Demand in the high zone is estimated at 19% of the total. Average demand in the high zone was based on the estimated 288 acres zoned for residential use. Requirements for fire flow storage in Zone 2 are based on residential development only. The upper zone reservoir should be able to store water for emergency equalization and residential fire flows without pumping from the lower level reservoirs.

Storage in the high zone can, however, help equalize normal demands and meet fire demands in the low zone. In the following table the required storage in the lower reservoir is equal to three times the average day demand plus commercial fire flow demand minus storage in the upper reservoir.

TABLE 6-2
PROJECTED STORAGE NEEDS

	Low Level Storage (Zone 1)		High Level Storage (Zone 2)	
	Required	**Deficiency**	**Required**	**Deficiency**
2000	1.98 MG	0.68 MG	0.41 MG	0.11 MG
2010	2.40 MG	1.10 MG	0.51 MG	0.21 MG
2020	2.88 MG	1.58 MG	0.62 MG	0.31 MG
2030	3.41 MG	2.11 MG	0.75 MG	0.45 MG
2040	3.99 MG	2.69 MG	0.88 MG	0.58 MG
2050	4.62 MG	3.32 MG	1.03 MG	0.73 MG

Currently, there are storage deficiencies in both the upper and lower pressure zones. In 2020 the additional volume required in the lower zone will be 1.58 MG, and in the upper reservoir another 0.31 MG will be required.

There is space at the existing treatment plant for an additional Zone 1 (lower) storage tank. Some constraints on construction of the reservoir at this site are that it must be partially buried to match the overflow elevations of the existing reservoirs and fit into the available space.

Structural requirements for a buried tank require that it be concrete. The cost of constructing two concrete tanks is much greater than for one large tank. Therefore, it is recommended that one large tank with a minimum volume of 1.58 MG be built at this site.

The single large tank, besides taking advantage of economies of scale, takes maximum advantage of the space available at the existing reservoir site. A rectangular reservoir (shown in Figure 6-1) is proposed.

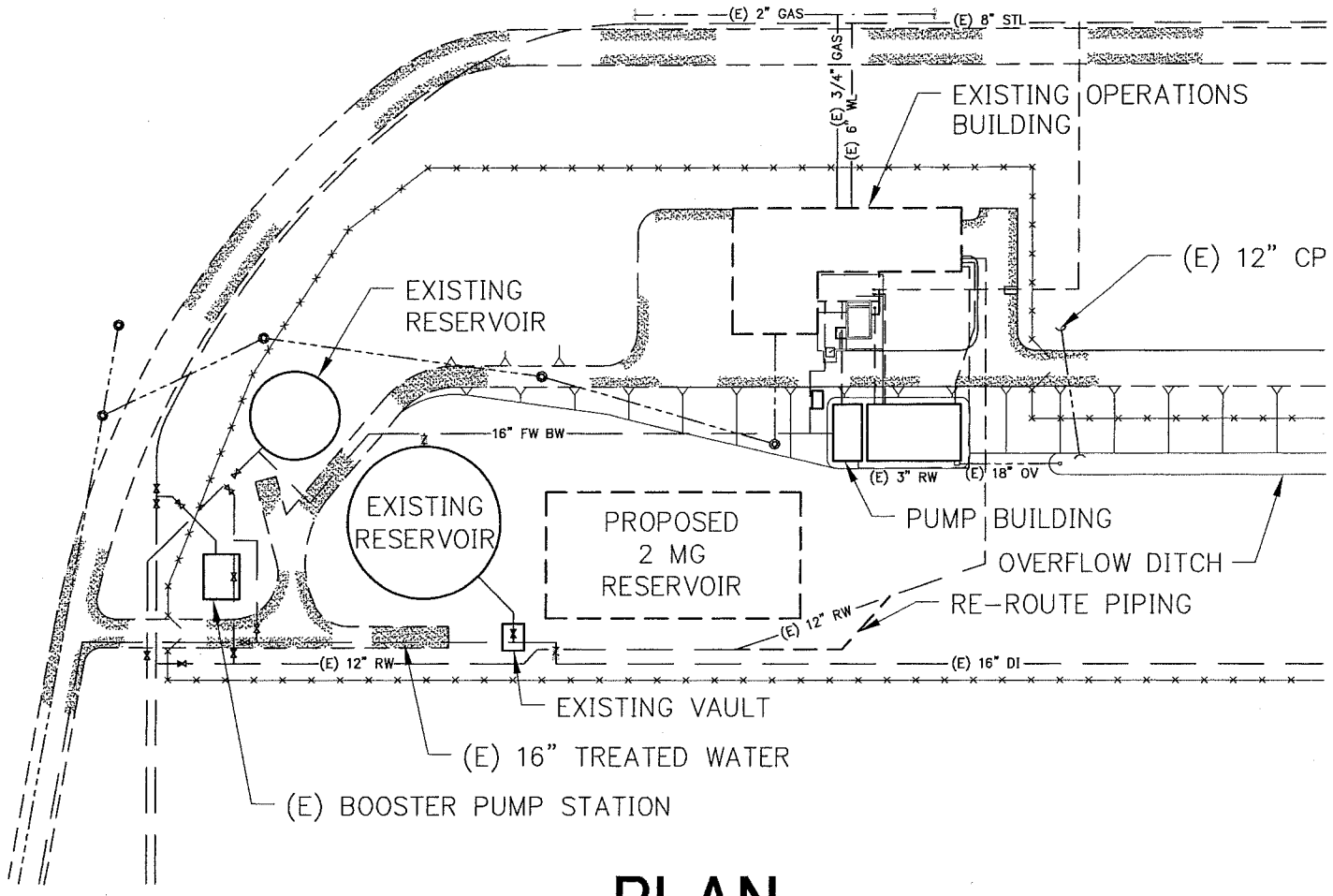
Steel tanks are less expensive for normal applications. A steel tank of 300,000 gallons capacity is proposed for Zone 2. There is space available at the Green Tower Reservoir site for this second tank.

OWNER:

CITY OF SCAPPOOSE

DWG TITLE:

SITE OF PROPOSED RESERVOIR



PLAN

SCALE: 1"=100'±

LEE ENGINEERING, INC.
1300 JOHN ADAMS ST.
OREGON CITY, OR, 97045

DATE: AUG 2001
FILE NO: 248BF66-1

REVISED:

FIGURE 6-1

CHAPTER SEVEN

PROPOSED CAPITAL IMPROVEMENT PLAN

7.1 RECOMMENDED IMPROVEMENTS

7.1.1 Supply

- **New Source**

It is recommended that Scappoose develop a new production well and treatment plant at the Miller Road site, which was identified by Lee Engineering and City staff, to fulfill the City's water supply needs through 2020. The choice of a new well and treatment plant at that site is the lowest cost option, and also the easiest to implement. The test well drilled at this site indicates that a production well will be able to provide 1,000 gpm.

The groundwater will need to be treated to reduce iron and manganese concentrations. Two options for siting the treatment plant were evaluated, and construction of a new treatment plant at the Miller Road site was determined to be the most cost effective, as opposed to piping the raw water up to the existing plant and constructing an addition to that plant.

The new plant will have gravity concrete greensand media filters similar to the existing plant.

- **Interim Source**

The surface water treatment plant and the Dutch Canyon Well are currently being operated at or near capacity on peak days, and this problem may be compounded by limitations on the surface water sources during a drought year.

It is therefore recommended that the Miller Road test well be developed to provide a "supplemental source" of water while the production well and treatment plant are designed, funded and constructed. The City has applied for a temporary permit to obtain 300 gpm from this well. Implementation of this recommendation is currently under way.

The "supplemental well" will be used for peak days and may continue to be used as a back-up well after the main production well is brought on line. The decision to apply for a permanent permit will depend upon whether pumping from the supplemental well affects the main production well after it is constructed.

7.1.2 Storage

There is an immediate need for increased storage. It is recommended that a new 2.0 MG rectangular reservoir be built at the site of the existing treatment plant. Depending on the

funding used, the size of the reservoir may be limited to 1.58 MG, as shown on Table 6-1 for the year 2020.

It is recommended that the City also construct a second Zone 2 tank at the Bella Vista site. The volume of the proposed steel tank should be 300,000 gallons to supply high pressure zone needs through 2020.

7.1.3 Distribution

An annual pipe replacement program should be implemented immediately. All steel lines in the distribution system should be replaced within the next five years A list of the highest priority projects is given in Chapter Five.

Improvements to the distribution system necessary to supply fire flow (D1-D10) are summarized in Chapter Five and have been listed in order of priority. In the distribution cost summary, fire flow to the Raymond Creek area is provided by a 12-inch line along Dutch Canyon Road (D10). A pump station for this area has also been discussed as an alternative.

Distribution system costs include an estimate for constructing a pump station and a potable water service line that will supply treated water to homes along Dutch Canyon Road. (D11).

The phasing of improvements to the water system to serve areas of growth within the Urban Growth Boundary (D12–D17) will depend upon development patterns.

7.1.4 Raw Water Transmission Line

Replacement of the approximately four miles of steel transmission line from the junction of Dutch Canyon Road and E. M. Watts Road to the sources will cost more than $3 million and has been included in Phase 2 of the improvements.

7.2 PRIORITIES FOR RECOMMENDED IMPROVEMENTS

- **Priority 1: Supply**

The City's first priority is to ensure that a safe and reliable source of drinking water is provided within its service area. The water supply needs to be sufficient to provide the projected needs of the growing community within the Urban Growth Boundary, according to the guidelines set forward in the Comprehensive Plan. An adequate water supply is also necessary to encourage economic development in the form of new industries and commercial enterprises.

Immediate supply needs will be provided by the Miller Road supplemental well while the production well and treatment plant are going through the funding, design, and

construction phases. At the current rate of per capita demand, the Miller Road production well will supply the City's needs through 2020.

- **Priority 2: Storage**

Storage is an integral part of providing an adequate and reliable source of water. Deficiencies in Zone 1 and Zone 2 storage will be addressed with new reservoirs to supply equalization storage, emergency storage and fire flow needs through the 20-year planning period.

- **Priority 3: Pipe Replacement to Minimize Losses**

An annual pipe replacement program which includes leak detection is recommended. All steel pipe in the distribution system should be replaced within the next five years.

- **Priority 4: Meter Replacement Program**

The metering information collected by the City is currently considered unreliable because of the age of the meters. A meter replacement system should be instituted to replace existing meters within the next ten years.

- **Priority 5: Distribution Improvements for Required Fire Flow**

The lines that need to be replaced to supply fire flow to residential, commercial, and industrial areas were determined by hydraulic analysis in the 1997 Water Master Plan. Some priority improvements have been made, including supplying required fire flow to a school on S.E. 3rd.

Priority 6: Replacement of Steel Raw Water Transmission Line from Surface Water Sources

The 12–inch steel raw water transmission line is old and needs to be replaced to reduce losses. Replacement of this line is a necessary conservation measure. However, since the supply of the surface water sources is limited by low stream flow during dry weather and there are currently no plans to increase the capacity of the existing treatment plant upsizing this line is not recommended.

- **Priority 7: Additional Well at the Industrial Park**

Based on the projected growth rate and a per capita water usage that remains the same for the 20-year planning period, the Miller Road Well should be able to supply demands through the 20-year planning period. However, there is potential for significant industrial development near the airport, which would increase demand.

This increase in demand has not been quantified, but to ensure an adequate water supply an additional well at the industrial park is included in the Capital Improvement Plan. The

available sites for wells are limited due to the proximity of surface water and distance from other wells. The industrial park is the next location that fits the criteria.

- **Priority 8: High Level Reservoir**

The area in the Urban Growth Boundary that cannot be served by the Bella Vista Tank includes 80 acres of publicly owned land zoned as Low Density Residential. The City may construct a reservoir to serve future development in this area between the elevations of 360 feet and 480 feet. It is estimated that the overflow elevation of the proposed reservoir would need to be approximately 570 feet.

- **Distribution System Improvements for Growth**

The phasing of improvements to the water system to serve areas of growth within the Urban Growth Boundary will depend upon development patterns. In the 1997 Water Master Plan and the City of Scappoose 1998 System Development Charges, it is assumed that the City will be able to retrieve the cost of distribution system improvements in areas of growth from private developers.

7.3 SUMMARY OF PROBABLE COST

7.3.1 Estimates

There are three stages of cost estimating during a project, as defined by the American Association of Cost Estimating Engineers. These include order-of-magnitude, budget, and definitive estimates. The probable costs in the Capital Improvement Plan are order-of-magnitude estimates, according to the definitions developed by the American Association of Cost Estimating Engineers. No attempt has been made to develop projects to a level of preliminary engineering. Rather, standard cost guidelines have been used when they were appropriate, and are intended to be conservative. In other cases, information was obtained from similar projects in the Pacific Northwest or in Oregon. The accuracy of the estimates is anticipated to be within +50% to –30% of the actual cost. The cost estimates are current to 2001 and include allowances for construction contingencies, engineering fees, and legal and administrative requirements.

The opinions of probable costs have been prepared for guidance in project planning from the information available at the time this study was completed. The engineer has no control over the cost of labor, materials, equipment or services furnished by others, over the contractor(s)' methods of determining prices, or over competitive bidding or market conditions. Consequently, the estimates of probable costs reflect professional experience as a qualified engineer familiar with the construction industry. The engineer cannot and does not guarantee that proposals, bids or actual project costs or construction costs will not vary from these estimates.

7.3.2 Probable Costs and Phasing of Recommended Improvements

The recommended improvements are broken into two phases.

Phase 1 improvements include the immediate need for developing a new source, providing storage, and a replacement project to replace deteriorated and leaking pipes. It is recommended that the City plan to replace all steel pipes within the next five years. A meter replacement program should also be implemented with the majority of existing meters to be replaced within the next 10 years and following that on a fifteen year replacement schedule.

Phase 2 includes additional improvements to the distribution system, replacement of the transmission line from the surface water sources, an additional well at the Scappoose Industrial Airpark, and a Zone 3 reservoir. It is estimated that these improvements will not need to be funded for 10 years unless there is substantial commercial or industrial growth.

The phasing of capital improvements is summarized in the following table, for more detail refer to the bar chart of projected cash flow Figure 7-1.

TABLE 7-1
PHASING AND PROBABLE COST OF RECOMMENDED IMPROVEMENTS

PHASE	PRIORITY		COST
		2001-2003	
1	1	Site Piping	$140,000
1	1	Supplemental Well	$130,000
1	1	Production Well and Water Treatment Plant	$3,504,000
1	1	Property	$180,000
1	2	Zone One 2.0 MG Reservoir	$2,100,000
1	2	Zone Two 0.3 MG Reservoir	$560,000
		2001-2005	
1	3	Annual Pipe Replacement Program ($400,000/yr)	$2,000,000
		2005-2020	
1-2	3	Annual Pipe Replacement Program ($40,000/yr-)	
		2001-2020	
1-2	4	Meter Replacement Program ($64,500 / yr.– 43,000 / yr.)	$1,075,000
1-2	5	Fire Flow &Potable Water for Raymond Creek	$2,042,430
1-2	---	Improvements Necessary for Growth	$3,617,661
		2010-2011	
2	6	Replacement of 12-inch steel transmission line	$4,516,512
2	7	Airpark Well (Including raw waterline to Miller Rd. plant)	$2,500,000
2	8	Zone Three 0.2 MG Reservoir (Including Pump Station)	$335,000

7.4 FUNDING

The City staff attended a "One-Stop Funding Meeting" on June 15, 2001. The intent of this meeting was to determine the availability of funding for the Priority 1 projects identified by the City, which include a new well and treatment plant for additional capacity, and two new storage reservoirs and distribution system improvements. The total

cost of that project is approximately $6,974,000, of which the City will contribute approximately $660,000 in available funding, leaving a balance of $6,314,000 to be funded. The City has acquired the necessary property and is preparing to begin engineering because of the immediate need for additional capacity in the system.

The following discussion is a summary of the results of the "One-Stop Funding Meeting."

7.4.1 Funding Qualifications

The City of Scappoose had a population in 2000 of 4,976, which was a 40.9% increase over the last 10 years. The population is composed of 38.11% low and moderate income persons, which does not qualify the City for Community Development Block Grant funds. The population is less than 10,000, so it does not qualify for USDA – Rural Utilities funding. The median household income is $27,547, which also may qualify the project for USDA – Rural Utilities funding. The community "distress index" is less than 1.1, so the City does not qualify as "distressed." The City's affordability rate is $40.17 per month. This means that water rates for a 7,500 gpm customer should exceed $40.17 per month before the applicant would be eligible for grants, principle forgiveness, or a 1% Safe Drinking Water Loan.

A Safe Drinking Water Revolving Loan Fund (SDWRLF) loan will probably not exceed $4 million. Therefore, it was recommended that the City submit two letters of interest for the project along with an application for special Public Works funds as well as the SDWRLF. The first phase of the project would be the new well and treatment plant, and the second phase would be two new storage reservoirs and distribution system improvements. The City was also asked to submit information about property tax assessments that are directly attributed to the water utility, which might make more grant assistance possible. Funding alternatives are listed in the table below.

FIGURE 7-1: CAPITAL IMPROVEMENT PROJECTS

	PROJECT DESCRIPTION	TOTAL COST	----CASH FLOW																		
		(PRESENT WORTH)	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1	PRODUCTION WELL AND TREATMENT PLANT	$4,000,000	$500,000	$1,560,000	$2,163,200																	
2	ZONE 1: 2 MG RESERVOIR	$2,100,000	$500,000	$130,000	$540,800																	
3	ZONE 2: 0.3 MG RESERVOIR	$560,000	$125,000	$322,400	$140,608																	
4	PIPE REPLACEMENT	$2,000,000	$400,000	$416,000	$432,640	$449,946	$467,943	$48,666	$50,613	$52,637	$54,743	$56,932	$59,210	$61,578	$64,041	$66,603	$69,267	$72,038	$74,919	$77,916	$81,033	$84,274
5	METER REPLACEMENT	$1,075,000	$64,500	$67,080	$69,763	$72,554	$75,456	$78,474	$81,613	$84,878	$88,273	$91,804	$63,651	$66,197	$68,844	$71,598	$74,462	$77,441	$80,538	$83,760	$87,110	$90,595
6	FIRE FLOW	$2,042,430	$102,122	$106,206	$110,455	$114,873	$119,468	$124,246	$129,216	$134,385	$139,760	$145,351	$151,165	$157,211	$163,500	$170,040	$176,841	$183,915	$191,272	$198,923	$206,879	$215,155
7	GROWTH	$3,617,661	$180,883	$188,118	$195,643	$203,469	$211,608	$220,072	$228,875	$238,030	$247,551	$257,453	$267,751	$278,461	$289,600	$301,184	$313,231	$325,760	$338,791	$352,342	$366,436	$381,093
8	AIRPORT WELL	$2,500,000										$1,779,140	$1,850,305									
9	ZONE 3 RESERVOIR AND PUMP STATION	$335,000										$238,405	$247,941									
10	RAW WATER TRANSMISSION PIPE	$4,516,512										$3,214,202	$3,342,771									
	YEARLY TOTAL		$1,872,505	$2,789,805	$3,653,109	$840,841	$874,475	$471,459	$490,317	$509,930	$530,327	$5,783,287	$5,982,793	$563,447	$585,985	$609,424	$633,801	$659,154	$685,520	$712,940	$741,458	$771,116
	NOTE: Future costs and annual replacement baseed on estimated 4 % inflation																					

TABLE 7-2: FUNDING ALTERNATIVES					
Project Amount		$6,314,000			
Funding Source	Amount	Rate	Term (yrs)	Debt Service Per EDU	New Monthly Water Rate Amount Per EDU
1. USDA Loan*	$6,314,000	4.75%	40	$16.10	$46.60
USDA Grant	None				
2. SDWRLF	$6,314,000	1.00%	30	$10.07	$40.57
3. W/W-	$5,814,000	5.60%	25	$17.95	$48.45
W/W Grant	$500,000	Grant			
4. SPWF	$6,064,000	5.60%	25	$18.72	$49,22
SPWF Grant	$250,000	Grant			

* Available FY 2003

- W/W: Wastewater Fund of OECDD; OECDD: Oregon Economic and Community Development Department; SPWF: Special Public Works Fund; SDWRLF: Safe Drinking Water Revolving Loan Fund; USDA: United States Department of Agriculture

7.4.2 Funding Status

Subsequent to this One-Stop Funding Meeting, both of the two projects listed above made the cut for funding in the upcoming year. At the time of this report, the City was preparing to implement both of the projects using the Safe Drinking Water Revolving Loan Fund (SDWRLF) as the source of funding.

7.4.3 Conclusions of the One Stop Funding Meeting

- Proceed with plans for Well and Water Treatment Plant (WTP) at the Miller Rd. Site.
- Proceed with developing funding for providing well, WTP, reservoirs, and distribution system improvements.
- Revise rates and System Development Charges in order to implement the recommendations of the Water Master Plan.
- Implement meter replacement program.
- Begin implementing distribution system improvements.

BIBLIOGRAPHY

April 1, 2000 Census and Revised Estimates for July 1, 2000 for Oregon, its Counties and Cities, Population Research Center, Portland State University, and U.S. Census Bureau.

Camp, Dresser and McKee, *City of Scappoose Dutch Canyon Well 2 Rehabilitation and Testing Report,* March 28, 2001.

City of Scappoose Comprehensive Plan, City of Scappoose City Council and Planning Commission, 1991.

David Evans and Associates, *Scappoose Bay Watershed Assessment,* January 2000.

Geotechnical Resources Incorporated, *Aquifer Testing and Site Specific Investigation for Proposed Municipal Water Well, City of Scappoose, Oregon.*

Oregon Water Resources Department Water Rights Information Services, http://www.wrd.state.or.us.

Water Master Plan for the City of Scappoose, Economic and Engineering Services, Inc., 1997.

APPENDIX A

Water Rights Information

*** O R E G O N W A T E R R E S O U R C E S D E P A R T M E N T ***

8/31/2001

Select by name CITY OF SCAPPOOSE

Name: County : COLUMBIA

Application: S 27859

CITY OF SCAPPOOSE Status : NON-CANCELLED

Permit : S 25918

Certificate type: OR

Certificate: 42700

SCAPPOOSE, OR 97056 Certificate date: 12/ 5/1975

Supercedes certificate:

Related documents:

Remarks :

Source / Location	LOT/DLC	Status	Use	P/S	Priority	Quantity	
LAZY CR > S SCAPPOOSE CR			MU	P	11/24/1958	1.5000CFS	3 N 2 W 18 SENW
		V					

Legal description: 1470 FT S & 2680 FT W FM NE COR, S18

S SCAPPOOSE CR > SCAPPOOSE CR			MU	P	11/24/1958	2.5000CFS	3 N 2 W 7 NWSE
		V					

Legal description: 1930 FT N & 1970 FT W FM NE COR, S18

Points of appropriations:	Use	P/S	Location	DLC/LOT	Acres	Status	Remarks

*

*** O R E G O N W A T E R R E S O U R C E S D E P A R T M E N T ***

8/31/2001

Select by name CITY OF SCAPPOOSE

Name: CITY OF SCAPPOOSE

Application: S 8815

Permit : S 5813

Certificate: 5573

SCAPPOOSE, OR 97056

Supercedes certificate:

County : COLUMBIA

Status : NON-CANCELLED

Certificate type: OR

Certificate date: 11/30/1925

Related documents:

Remarks :

Source location	LOT/DLC	Status	Use	P/S	Priority	Quantity	
GOURLAY CR > S SCAPPOOSE CR W 12 NESE		V	MU	P	1/24/1923	10.0000CFS	3 N

Points of appropriations:	Use	P/S	Location	DLC/LOT	Acres	Status	Remarks
	MU	P	3 N 2 W 12 NESE			V	

*** O R E G O N W A T E R R E S O U R C E S D E P A R T M E N T ***

8/31/2001

Select by name CITY OF SCAPPOOSE

Name: County : COLUMBIA

Application: G 9218

CITY OF SCAPPOOSE Status : NON-CANCELLED

Permit : G 8615

PO DRAWER P Certificate type:

Certificate: 0

SCAPPOOSE, OR 97056 Certificate date: 8/31/1979

Supercedes certificate:

Related documents:

Remarks :

Source	Use	P/S	Priority	Quantity	Location	LOT/DLC	Status
A WELL > S SCAPPOOSE CR	MU	P	4/30/1979	0.8900CFS	3 N 2 W 13 NESW	V	

Legal description: 1563.91 FEET NORTH & 1935.8 FEET EAST FROM SW CORNER, SECTION 13

Points of appropriations:	Use	P/S	Location	DLC/LOT	Acres	Status	Remarks

*** O R E G O N W A T E R R E S O U R C E S D E P A R T M E N T ***

8/31/2001

Select by name CITY OF SCAPPOOSE

Name: County : COLUMBIA

pplication: GR 926

CITY OF SCAPPOOSE Status : NON-CANCELLED

Permit : GR 899

Certificate type:

ertificate: 0

SCAPPOOSE, OR 97056 Certificate date: / /

Supercedes certificate:

Related documents:

Remarks :

Source / ocation	LOT/DLC	Status	Use	P/S	Priority	Quantity	
A WELL > JACKSON CR			MU	P	12/31/1950	50.0000GPM	3 N
W 12 NESE		V					

Legal description: 726.51 FEET SOUTH & 525.78 FEET WEST FROM E1/4 CORNER, SECTION 12

Points of appropriations: / emarks	Use	P/S	Location	DLC/LOT	Acres	Status
	MU	P	3 N 2 W 12 NESE			V

*

*** O R E G O N W A T E R R E S O U R C E S D E P A R T M E N T ***

8/31/2001

Select by name CITY OF SCAPPOOSE

Name: County : COLUMBIA

pplication: G 14103

CITY OF SCAPPOOSE Status : NON-CANCELLED

Permit : G 12955

52432 SE FIRST Certificate type:

ertificate: 0

SCAPPOOSE, OR 97056 Certificate date: 10/29/1996

Supercedes certificate:

Related documents:

Remarks :

Source / ocation	LOT/DLC	Status	Use	P/S	Priority	Quantity	
A WELL > SCAPPOOSE CR			MU	P	6/21/1995	2.0000CFS	3 N
2 W 13 NWNE	V						

Legal description: 870 FEET SOUTH & 1800 FEET WEST FROM NE CORNER, SECTION 13

Points of appropriations: / emarks	Use	P/S	Location	DLC/LOT	Acres	Status
	MU	P		V		

ITHIN SERVICE AREA OF CITY OF SCAPPOO

*

Application No. G15135 Permit No. .....

STATE OF OREGON WATER RESOURCES DEPARTMENT

Application for a Permit to Appropriate Ground Water

RECEIVED
JAN 2 7 2000
WATER RESOURCES DEPT
SALEM, OREGON

I, City of Scappoose (Name of Applicant)

of P.O. Drawer "P" (Mailing Address), Scappoose (City)

State of Oregon, 97056 (Zip Code) Phone No. 503-543-7146 do hereby make application for a permit to appropriate the following described ground waters of the State of Oregon:

1. The development will consist of One Well (Give number of wells, tile lines, infiltration galleries, etc.)

having a diameter of 12" and an estimated depth of 227 feet.

2. The well or other source is to be located 1563.91 ft. North (N. or S.) and 1935.80 ft. East (E. or W.)

from the S.W. corner of Sec. 13, TWP 3N, R2 WWM (Public Land Survey Corner)

..... (If there is more than one well, each must be described)

..... being within the N.E. ¼ of the S.W. ¼ of

Sec. 13 Tp. 3N R. 2W, W. M., in the county of Columbia

3. Location of area to be irrigated, or place of use if use other than irrigation.

Township	Range	Section	List ¼ ¼ of Section	List use and/or number of acres to be irrigated
City of	Scappoose	Water	System - see	Municipal
Attachment One		for Description of the		
Property	on which	water is	to be used.	
* Copy of Appl. G-9218 (Permit G-8615)				

4. It is estimated that 227 feet of the well will require Steel (Kind) casing.

5. Depth to water table is estimated 61.0' (Feet) Well drilled by S & M Drilling & Supply, Inc. Canby, Oregon

Form 690-3-0-1-77

6. *The amount of wat hich the applicant intends to apply to b ficial use is* ..... ***cubic feet per second or*** 400 ***gallons per minute.***

7. *The use to which the water is to be applied is* Municipal

8. *If the flow to be utilized is artesian, the works to be used for the control and conservation of the supply when not in use must be described.*

–

9. *If the location of the well, or other development work is less than one-fourth mile from a natural stream channel, give the distance to the channel and the difference in elevation between the stream bed and the ground surface at the source of development.*

–

10. *DESCRIPTION OF WORKS*

Include length and dimensions of supply ditch or pipeline, size and type of pump and motor, type of irrigation system to adequately describe the proposed distribution system.

Pump: Worthington Oil Lubricated-Lineshaft, Vertical Turbine, 10M41 Bowls, 11 stage, 185' in length, airline, gauge and flowmeter.

Motor: U.S. Motors 364T-21, Type RU, 60 HP, 1770 RPM.

Distribution Pipeline:

Well water discharges through pump into 100 LF of 8" Diameter Ductile Iron Pipe, through 3300 LF of 12" Diameter Ductile Iron Pipe, ties into existing 12" I.D. Steel supply line, and flows 5700 LF to Water Treatment Plant. From there water is distributed throughout existing Municipal Water System.

11. *Construction work will begin on or before* September 7, 1978

12. *Construction work will be completed on or before* June 30, 1979

13. *The water will be completely applied to the proposed use on or before* June 30, 1979

14. *If the ground water supply is supplemental to an existing supply, identify the supply and existing* *ter right.* 1. Gourley Creek, Permit No. 5813.
2. Lazy Creek and South Fork Scappoose Creek, Permit No. 25918

pplication No...... *Permit No.*.....

ATTACHMENT ONE

Application for a Permit to Appropriate Ground Water

City of Scappoose, Oregon

April, 1979

3. A description of the place of use is as follows:

NE¼ SW¼
SE¼ SW¼
NW¼ SW¼
Section 17
To 3N., R.1W., W.M.

S½ SW¼
NE¼ SE¼
S½ SE¼
Section 1

SE¼ SE¼
Section 2

E½ NE¼
N½ SE¼
SE¼ SE¼
Section 11

All
Section 12

N½ NE¼
SW¼ NE¼
NW¼
N½ SW¼
SE¼ SW¼
W½ SE¼
Section 13

E½ NE¼
N½ SW¼
SE¼ SW¼
N½ SE¼
Section 14
T.3N., R.2W., W.M.

W½ NE¼
N½ NW¼
NE¼ SE¼
Section 15

W½ NW¼
Section 16

S½ NE¼
N½ NW¼
Section 17

NE¼ NE¼
Section 18

W½ NE¼
NE¼ NW¼
Section 24
T.3N., R. 2W., W.M.

G-15135

RECEIVED
JAN 2 7 2000
WATER RESOURCES DEPT.
SALEM, OREGON

Oregon Water Resources Department

FORM M

FOR MUNICIPAL AND QUASI MUNICIPAL WATER SUPPLIES

Unless otherwise noted, water use information should be in acre-feet per year (AFY).
1 acre-foot is equal to 325,851 gallons.

Name of water supplier: City of Scappoose

Name and size of area to be served: _____
(in square miles)

Present population of service area: 4650
(Contact county planning staff, if needed.)

Projected population in 20 years: _____
(Cite source and year. For example: "20,595 Based upon 1995 Portland State University projections.")

List present water rights and permits held:

Date of Issuance:	Natural Source of Water:	Amount Permitted:	Utilization:
1/24/1923	Gourlay Creek	10 cfs	Municipal
12/31/1950	Jackson Creek	50 gpm	Municipal
~~11/24/1958~~	~~Lazy Creek~~	~~1.5 cfs~~	~~Municipal~~
11/24/1958	S. Scappoose Creek	2.5 cfs	Municipal
4/30/1979	Dutch Canyon Well	0.89 cfs	Municipal

Average demand: 660 AFY Year: 1997-1998

Per-capita daily consumption (in gallons): _____
(Divide average annual water sales by population to arrive at consumption, then divide by 365 to get daily values.)

(by month/day): 7/1 to 9/30 Total demand: 213 Acre-feet

per-capita daily consumption: 166 gallons
(Divide total peak season demand by population and the number of days during the peak.)

Annual amount of water:

produced: 215,091,000
(diverted or pumped)

delivered: Not available

Is your system fully metered? ☒ Yes ☐ No

Describe your rate structure: Increasing block rate
(e.g. flat rate, increasing or decreasing block rate or combination of different systems)

RECEIVED
JAN 2 7 2000
WATER RESOURCES DEPT.
SALEM, OREGON

A. Discuss the reason(s) for your request for additional water
(e.g. loss of current supply, peak demand, growth, or other): We would like to increase our Dutch Canyon Well's output to meet increased water demands due to growth.

B. How long is the amount of water requested in this application expected to meet future needs?
(e.g. until the year 2040) 1 year

C. Briefly discuss operation of water system and the most constraining component of the system:
The City uses three surface sources whose expansion would be very difficult. We have one well which we hope to use to its fullest capacity and would hope to find another well. The other source possibility is river water.

D. Percentage of water use by type:

Residential:	98%	Commercial:	.6%
Public Authority:	3 accounts	Agricultural:	
Unaccounted for use:		Industrial:	1 account
Other (specify use):			

E. List cost to implement proposed request.
Compare cost and benefits with other water supply, or combination of supply options. This should include water efficiency measures such as replacing current showerheads with low-flow types. (Attach documentation, as available.)
The expansion of the Dutch Canyon Well capacity provides a good ratio of dollars per gallon.

F. How and by how much will your proposed water use efficiency programs increase efficiency?
(Express as a percentage of per-capita consumption.)

GW-1 Feb. 24 1999

State of Oregon
Water Resources Department
158 12th Street NE, Salem, OR 97310
(503)378-8455 • (800)624-3199
www.wrd.state.or.us

Application for a Permit to Use
Ground Water

Please type or print in dark ink. If your application is found to be incomplete or inaccurate, we will return it to you. If any requested information does not apply to your application, insert "n/a." Please read and refer to the instructions when completing your application. Thank you.

1. APPLICANT INFORMATION

A. Individuals

Applicant: N/A
First Last

Co-applicant: _____
First Last

Mailing address: _____
City State Zip

Phone: _____
Home Work Other

*Fax: _____ *E-Mail address: _____

B. Organizations

(Corporations, associations, firms, partnerships, joint stock companies, cooperatives, public and municipal corporations)

Name of organization: City of Scappoose

Name and title of person applying: Jon G. Hanken, Director, Community Development Dept.

Mailing address of organization: P.O. Box P
Scappoose Oregon 97056
City State Zip

Phone: (503) 543-7185 (503) 543-7910
Day Evening

*Fax: (503) 543-5679 *E-Mail address: scappw@Columbia-Center.org

**Optional information*

For Department Use
App. No. G-15135 Permit No. _____ Date 3-10-2000

RECEIVED
JAN 2 7 2000
WATER RESOURCES DEPT.
SALEM, OREGON

2. PROPERTY OWNERSHIP

Do you own all the land where you propose to divert, transport, and use water?

☐ Yes *(Skip to section 3 "Ground water Development.")*

☒ No Please check the appropriate box below.

☒ I have a recorded easement or written authorization permitting access.

☐ I do not currently have written authorization or easement permitting access.

List the names and mailing addresses of all affected landowners.*

N/A (See attached map.)

**If more than 25 landowners are involved, a list is not required. See instructions.*

3. GROUND WATER DEVELOPMENT

A. Number of well(s): 1 B. Name of nearest surface water body: Scappoose Creek

C. Distance from well(s) to nearest stream or lake: 1) 3,000 ft

2) _____ 3) _____ 4) _____

D. If distance from surface water is less than one mile, indicate elevation difference between nearest surface water and well head. 1) 20 ft

2) _____ 3) _____ 4) _____

E. Well Characteristics

Wells must be constructed according to standards set by the Department for the construction and maintenance of water wells. If the well is already constructed, please enclose a copy of the well constructor's log and the well ID number, if available, for each well with this application. Identify each well with a number corresponding to the wells designated on the map and proceed to question F in this section of the form. If the well has not been constructed, or if you do not have a well log, please complete the following:

Well ~~(s) will be~~ was constructed by: S & M Drilling & Supply

Address: 399 S.E. Walnut Street

Canby, OR

Completion date: 11/2/79

2. Please provide a description of your well development. *(Attach additional sheets if needed.)*

Well No.	Diameter	Type and size of casing	No. of feet of casing	Intervals casing is perforated (in feet)	Seal depth	Est. depth to water	Est. depth to water bearing stratum	Type of access port or measuring device	Total well depth
1	12"	welded 12" .375GA	186	None	Cement 45'	Static 61'	158'	N/A	228'
		Screen 12" Sts	Screen 40						
		*Well completed	10/10/78	(copy of well log attached.)					

F. Artesian Flows

If your water well is flowing artesian, describe your water control and conservation works:

N/A

4. WATER USE

Please read the instruction booklet for more details on "type of use" definitions, how to express how much water you need and how to identify the water source you propose to use. You must fill out a supplemental form for some uses as they require specific information for that type of use.

A. Type(s) of Use(s)

See list of beneficial uses provided in the instructions.

- If your proposed use is **domestic,** indicate the number of households to be supplied with water: 1,634
- If your proposed use is **irrigation**, please attach Form I
- If your proposed use is **mining**, attach Form R
- If your proposed use is **municipal or quasi-municipal**, attach Form M
- If your proposed use is **commercial/industrial**, attach Form Q

JAN 2 2000

WATER RESOURCES DEPT.
SALEM, OREGON

B. Amount of Water

Provide the production rate in gallons per minute (gpm) and the total annual amount of water you need from each well, from each source or aquifer, for each use. You do not need to provide source information if you are submitting a well log with your application.

Well No.	Source or aquifer	Type of use	Total rate of water requested (in gpm)	Total annual quantity (in gallons)	Production rate of well (in gpm)
1	N/A	Municipal	250*	N/A	650
	*Additional from existing source - see 7. Remarks				

C. Maximum Rate of Use Requested

What is the maximum, instantaneous rate of water that will be used? 650 gpm

(The fees for your application will be based on this amount.)

D. Period of Use

Indicate the time of year you propose to use the water: year-round

(For seasonal uses like irrigation give dates when water use would begin and end, e.g. March 1–October 31.)

E. Acreage

If you will be applying water to land, please give the total number of acres where water will be applied or used: N/A

(This number should be consistent with you application map.)

5. WATER MANAGEMENT

A. Diversion

What equipment will you use to pump water from your well(s)?

☒ Pump (give horsepower and pump type) 60 HP, Worthington vertical turbine

☐ Other means (describe) _____

B. Transport

How will you transport water to your place of use?

☐ Ditch or canal (give average width and depth)

Width _____ Depth _____

Is the ditch or canal to be lined? ☐ Yes ☐ No

☒ Pipe (give diameter and total length)

Diameter 8" D.I. Pipe Length 100 ft.

☐ Other (describe) _____

C. Application/Distribution Method

What equipment will you use to apply water to your place of use? N/A

Irrigation or land application method (check all that apply):

- ☐ Flood
- ☐ High-pressure sprinkler
- ☐ Low pressure sprinkler
- ☐ Drip
- ☐ Water cannons
- ☐ Center pivot system
- ☐ Hand lines
- ☐ Wheel lines
- ☐ Siphon tubes or gated pipe with furrows
- ☒ Other, describe City water distribution network

Distribution method

- ☐ Direct pipe from source
- ☐ In-line storage (tank or pond)
- ☐ Open canal

D. Conservation

What methods will you use to conserve water? Why did you choose this distribution or application method? For example, if you are using sprinkler irrigation rather than drip irrigation, explain. If you need additional space, attach a separate sheet.

Low flow shower heads in developments

6. PROJECT SCHEDULE

Indicate the anticipated dates that the following construction tasks should begin. If construction has already begun, or is completed, please indicate that date.

Proposed date construction will begin Existing source - see remarks.

Proposed date construction will be completed

Proposed date beneficial water use will begin

7. REMARKS

If you would like to clarify any information you have provided in the application, please do so here and reference the specific application question you are addressing.

The City wishes to increase withdrawal from existing municipal well from 400 gpm to 650 gpm. The water is required to meet domestic requirements.

Oregon
John A. Kitzhaber, M.D., Governor

Water Resources Department
Commerce Building
158 12th Street NE
Salem, OR 97301-4172
(503) 378-3739
FAX (503) 378-8130

September 22, 2000

CITY OF SCAPPOOSE (503)543-7185
JOHN HANKEN, DIRECTOR - COMMUNITY DEVELOPMENT DEPT
PO BOX P
SCAPPOOSE, OREGON 97056

Reference: File G-15135

Dear Applicant:

THIS IS NOT A PERMIT AND IS SUBJECT TO CHANGE AT THE NEXT PHASE OF PROCESSING.

This letter is to inform you of the favorable preliminary analysis of your water use permit application and to describe your options. In determining whether a water use permit application may be approved, the Department must consider the factors listed below, all of which must be favorable to the proposed use if it is to be allowed. Based on the information you have supplied, the Water Resources Department has made the following preliminary determinations:

Initial Review Determinations:

1. The proposed use **is not prohibited** by law or rule.

2. The use of 250.0 GALLONS PER MINUTE (GPM), or 0.557 cubic foot per second (CFS), of water from a WELL, within the South Scappoose Creek Basin, for MUNICIPAL USE **is allowable** under OAR 690-502-160(2), the Willamette Basin Program.

3. In order to meet current municipal demands, this Application #G-15135 is to be used in conjunction with existing Permit #G-8615 (Application #G-9218) to affect an increase in the amount of groundwater available for municipal purposes in the City of Scappoose. Permit #G-8615 allows for the use of 400.0 GPM (0.891 CFS) from the same well as being requested under this application. The requested amount of water, along with the amount allowed under the existing permit, equals a total of 650.0 GPM (1.45 CFS) of groundwater available for the City of Scappoose.

4. Based upon the Groundwater Division 690-09 review currently in effect, the Department has determined that the proposed groundwater use **will not have** the potential for substantial interference with the nearest surface water source.

5. Based upon available data, the Department has also determined that the proposed use of groundwater **will likely be available** in the amounts requested without injury to prior rights and/or within the capacity of the resource.

Summary of Initial Determinations

The use of 0.557 CFS (250.0 GPM) of water from a Well, within the South Scappoose Creek Basin, for Municipal Use is allowable Year Round.

Because of these favorable determinations, the Department can now move your application to the next phase of the water rights application review process. This phase is where public interest factors will be evaluated.

Please reference the application number when sending any correspondence regarding the conclusions of this initial review. Comments received within the comment period will be evaluated at the next phase of the process.

To Proceed With Your Application:

If you choose to proceed with your application, you do not have to notify the Department. Your application will automatically be placed on the Department's Public Notice to allow others the opportunity to comment. After the comment period the Department will complete a public interest review and issue a proposed final order.

Withdrawal Refunds:

If you choose not to proceed, you may withdraw your application and receive a refund (minus a $50 processing charge per application.) To accomplish this you must notify the Department in writing by **Friday, October 6, 2000**. For your convenience you may use the enclosed "STOP PROCESSING" form.

If A Permit Is Issued It Will Likely Include The Following Conditions:

1. Measurement, recording and reporting conditions:

   A. Before water use may begin under this permit, the permittee shall install a meter or other suitable measuring device as approved by the Director. The permittee shall maintain the meter or measuring device in good working order, shall keep a complete record of the amount of water used each month and shall submit a report which includes the recorded water use measurements to the Department annually or more frequently as may be required by the Director. Further, the Director may require the permittee to report general water use information, including the place and nature of use of water under the permit.

   B. The permittee shall allow the watermaster access to the meter or measuring device; provided however, where the meter or measuring device is located within a private structure, the watermaster shall request access upon reasonable notice.

2. If substantial interference with a senior water right occurs due to withdrawal of water from any well listed on this permit, then use of water from the well(s) shall be discontinued or reduced and/or the schedule of withdrawal shall be regulated until or unless the Department approves or implements an alternative administrative action to mitigate the interference. The Department encourages junior and senior appropriators to jointly develop plans to mitigate interferences.

3. The priority date for this application is March 10, 2000.

The water source identified in your application is in an area that is currently developing a an Agricultural Water Quality Management Area Plan. These plans are developed by the Oregon Department of Agriculture (ODA) with the cooperation of local landowners and other interested stakeholders. These plans help make sure that current and new appropriations of water are done in a way that does not adversely harm the environment. You are encouraged to contact Mike Wolf, (503) 986-4711 at the ODA to learn more about the plan and how it may affect your proposed water use.

If you have any questions:

Questions about the status of your application, processing timelines, or your upcoming Proposed Final Order should be directed to our Water Right Information Group at (800) 624-3199 or (503) 378-8455, extension 201. Feel free to call me at (800) 624-3199 or (503) 378-8455, extension 264, if you have any questions regarding the contents of this letter. Please have your application number available if you call. Address all other correspondence to: Water Rights Section, Oregon Water Resources Department, 158 12th ST. NE Salem, OR 97301-4172, Fax: (503)378-2496.

Sincerely,

Lisa J. Juul
Water Rights Specialist

cc: Regional Manager, Watermaster 20, Water Availability Section
enclosures: Flow Chart of Water Right Process
Stop Processing Form

G-15135
wab 02 -n/a
pou 02-n/a
gw B

APPLICATION FACT SHEET

Mail to: Applicant, Watermaster, District Biologist (ODFW)
If necessary, also mail to : Regional Water quality manager (DEQ), and DOA

Application File Number: G-15135

Applicant: CITY OF SCAPPOOSE; HANKEN, JOHN

County: COLUMBIA

Watermaster: District 20

Priority Date: March 10, 2000

Source: A WELL IN SOUTH SCAPPOOSE CREEK BASIN

Use: MUNICIPAL USE.

Quantity: 0.557 CUBIC FEET PER SECOND (TO BE IN ADDITION TO ORIGINAL PERMIT #G-8615 (APPL #G-9218)

Basin Name & Number: Willamette, #02

Stream Index Reference: Volume 26 MULTNOMAH CHANNEL & TRIBS

Point of Diversion Location: 1544.48 FEET NORTH & 2000.48 FEET EAST FROM SW CORNER, SECTION 13 **TOWNSHIP 3 NORTH, RANGE 1 WEST, W.M.

Place of Use: NESW, SESW, NWSW, SECTION 17, T 3N, R1W, WM; SWSW, SESW, NESE, SWSE, SESE, SECTION 1, SESE, SECTION 2, NENE, SENE, NESE, NWSE, SESE, SECTION 11, ALL OF SECTION 12, NENE, NWNE, SWNE, NENW, NWNW, SWNW, SENW, NESW, NWSW, SESW, NWSE, SWSE, SECTION 13, NENE, SENE, NESW, NWSW, SESW, NESE, NWSE, SECTION 14, NWNE, SWNE, NENW, NWNW, NESE, SECTION 15, NWNW, SWNW, SECTION 16, SWNE, SENE, NENW, NWNW, SECTION 17, NENE, SECTION 18, NWNE, SWNE, NENW, SECTION 24, T 3N, R2W, W.M.

14 DAY STOP PROCESSING DEADLINE DATE: Friday, October 6, 2000

PUBLIC NOTICE DATE: Tuesday, October 10, 2000

30 DAY COMMENT DEADLINE DATE: Thursday, November 9, 2000

file

LEE ENGINEERING, INC.
CONSULTING ENGINEERS

TRANSMITTAL LETTER

DATE: April 20, 2001

ATTENTION: Jake Szramek

TO: Oregon Water Resources Department
158 12th Street NE
Salem, OR 97310

SUBJECT: Test Well Limited License

PROJECT NO.: 2413-02

WE ARE SENDING YOU: ☒ ATTACHED ☐ UNDER SEPARATE COVER

THE FOLLOWING:
☐ PRINTS ☐ PLANS
☐ SHOP DRAWINGS ☐ SPECIFICATIONS
☐ CHANGE ORDER ☐ COPY OF LETTER
☐ DISK ☐ PARTIAL PAYMENT
☒ OTHER Copy of permit materials

COPIES	DATE	SET NO.	DESCRIPTION
1	4/16/01		Application for Limited Water Use License
1			Ownership and Legal Description
1	Mar 2001		Test Well Log
1	4/18/01		Water Availability Report
4	Apr 2001		Figure 1
4	Dec 2000		Existing Water System Drawing
			Check for $100

THESE ARE TRANSMITTED AS CHECKED ABOVE:

☐ FOR APPROVAL ☐ FOR REVIEW AND COMMENT
☒ FOR YOUR USE ☐ AS REQUESTED
☐ APPROVED AS SUBMITTED ☐ RETURNED FOR CORRECTIONS
☐ APPROVED AS NOTED ☐ OTHER _____

REMARKS:

cc: Jon Hanken, City of Scappoose

SIGNED: _____
Phil Beverly, P.E.

1300 John Adams Street • Oregon City, OR 97045 • office: 503.655.1342 • fax: 503.655.1360 • e-mail: general@lei-ce.com

License No. _____

STATE OF OREGON

WATER RESOURCES DEPARTMENT

APPLICATION FOR LIMITED WATER USE LICENSE

Applicant(s): City of Scappoose

Contact Person: Jon Hanken

Mailing Address: P.O. Box P, Scappoose, OR 97056

Telephone No: 503 543-7146

I (We) make application for a Limited License to use or store the following described surface waters or groundwater-not otherwise exempt, or to use stored water of the State of Oregon for a use of a short-term or fixed duration:

1. **SOURCE(S) OF WATER for the proposed use:** groundwater **a tributary of** aquifer (170' - 180' screen interval)

2. **TOTAL AMOUNT OF WATER to be diverted:** 0.67 **cubic feet per second, or** 300 **gallons per minute. If water is to be used from more than one source, give the quantity from each:** _____.

3. **INTENDED USE(S) OF WATER: (check all that apply)**
   - ☐ **Road construction or maintenance;**
   - ☐ **General construction;**
   - ☐ **Forestland and rangeland management; or**
   - ☒ **Other:**
     Municipal, supplemental to meet daily peak demand

4. **DESCRIPTION OF PROPOSED PROJECT: Include a description of the intended place of use as shown on the accompanying site map, the method of water diversion, the type of equipment to be used (including pump horsepower, if applicable), length and dimensions of supply ditches and pipelines:**

5. PROJECT SCHEDULE: (List day, month, and year)
Date water use will begin Aug. 1, 2001
Date project will be completed N.A.
Date need for water will be completed December 31, 2005

NOTE: A completed water availability statement from the local watermaster, fees and a site map meeting the requirements of OAR 690-340-030 must accompany this request. The fee for this request is $100 for the first point of diversion plus $10 for each additional point of diversion. The license, if granted, will not be issued or replaced by a new license for a period of more than five consecutive years. The right granted will be subordinate to all other authorized uses that rely upon the same source, or water affected by the source, and may be revoked at any time it is determined the use causes injury to any other water right or minimum perennial streamflow.

REMARKS: Supplemental source to be used when peak daily demand exceeds available supply from existing surface and groundwater sources.

SIGNATURE of Applicant: Jerry Sidar DATE: 4/16/01
Title: CITY MANAGER

I certify that I have examined the foregoing application and accompanying data, and hereby grant a Limited License to use said water as described in the application, subject to all water rights of record, and subject to any valid public interest concerns which may become evident.

This license shall be in effect beginning _____, 20___, and shall expire _____, 20___.

WITNESS my hand this _____, 20___.

_____
Paul R. Cleary
Water Resources Department
Director

The licensee shall give notice to the Department (Watermaster) at least 15 days in advance of using the water under the Limited License and shall maintain a record of use. The record of use shall include, but need not be limited to, an estimate of the amount of water used, the period of use and the categories of beneficial use to which the water is applied. During the period of the Limited License, the record of use shall be available for review by the Department upon request.

The application was first received at the Water Resources Department at Salem, Oregon, on the _____ day of _____, 20___, at _____ o'clock, ___M.

SCAPPOOSE TEST WELL
OWNERSHIP AND LEGAL DESCRIPTION

The property that contains the Miller Road Test Well is currently Tax Lot 100 of Tax Map 3173, Section 7, R1W, T3N (Figure 1). The property is currently owned by Brian Richards; however the City of Scappoose and Brian Richards have signed a real estate agreement for the City's purchase of the easterly three-acre portion of the property. The closing date listed on the agreement is June 30, 2001.

The current legal description is:

> *PARCEL 1: Beginning at a point which is North 82°44' East 1,597.91 feet from the quarter section corner on the West side of Section 7, Township 3 North, Range 1 West of the Willamette Meridian, Columbia County, Oregon, and thence running North 64°14' West a distance of 400.00 feet; thence North 20°06' East a distance of 198.00 feet, more or less, to the Southerly right-of-way line of the Portland and Southwestern Railroad; thence South 69°12' East a distance of 398.00 feet; thence South 20°06' West a distance of 232.60 feet, more or less, to the place of beginning. EXCEPTING THEREFROM that portion conveyed to Columbia County, Oregon, recorded April 5, 1961 in Book 145, page 43, Deed Records of Columbia County, Oregon.*
>
> *PARCEL 2: Beginning at an iron pin set North 82°44' East a distance of 1,597.91 feet from the quarter corner on the West side of Section 7, Township 3 North, Range 1 West of the Willamette Meridian, Columbia County, Oregon, and from thence running North 20°06' East a distance of 232.6 feet to a 1-inch iron pipe; thence South 69°12' East 398.00 feet to an iron pipe; thence South 69°06' West a distance of 257.20 feet to an iron pipe; thence North 64°14' West 400 feet to the point of beginning.*

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)
Instructions for completing this report are on the last page of this form.

WELL I.D. # L
START CARD # 126454

(1) OWNER: Well Number 2 - 03
Name City of Scappoose
Address 33568 E. Columbia Av
City Scappoose State OR Zip

(2) TYPE OF WORK
☑ New Well ☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:
☑ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger
☐ Other

(4) PROPOSED USE:
☐ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☒ Other Test well

(5) BORE HOLE CONSTRUCTION:
Special Construction approval ☐ Yes ☑ No Depth of Completed Well 190 ft.
Explosives used ☐ Yes ☑ No Type ____ Amount ____

HOLE Diameter	From	To	SEAL Material	From	To	Sacks or pounds
12	0	19	Cement	0	19	15 Bags
8	19	170				
6	170	220				

How was seal placed: Method ☐ A ☐ B ☒ C ☐ D ☐ E
☐ - Other
Backfill placed from — ft. to ____ ft. Material
Gravel placed from — ft. to ____ ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	8	+1	170	250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:	6	+2	170		☒	☐	☒	☐
					☐	☐	☐	☐

Final location of shoe(s) 170

(7) PERFORATIONS/SCREENS:
☐ Perforations Method
☒ Screens Type S.S. Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
190	130	20		5.5	5.5	☐	☒
180	170	30		5.5	5.5	☐	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
100+		170	1 hr.

Temperature of water 52 Depth Artesian Flow Found
Was a water analysis done? ☐ Yes By whom
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata:

(9) LOCATION OF WELL by legal description:
County Col Latitude Longitude
Township 7N N or S Range 1W E or W. WM.
Section 7 NW 1/4 NW 1/4
Tax Lot 1200 Lot Block Subdivision
Street Address of Well (or nearest address) End of Miller St
Scappoose

(10) STATIC WATER LEVEL:
8 ft. below land surface. Date 16 March
Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:
Depth at which water was first found

From	To	Estimated Flow Rate	SWL
8	190	100+	8

(12) WELL LOG:
Ground Elevation

Material	From	To	SWL
clay Brown	0	11	
gravel clay Brown	11	14	
clay Blue	14	30	
gravel sand Brown	30	58	
gravel sand green	58	80	
gravel ~~sand~~	80	110	
gravel sand	110	120	
gravel	120	135	
gravel sand	135	140	
gravel lite sand	140	160	
gravel clean	160	195	
clay Blue gravel	195	210	
clay Blue	210	220	
Boulders & cobbles	60	70	

Date started 9 March Completed 16 March

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
WWC Number
Signed Date

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
WWC Number
Signed D McMullen Date

ORIGINAL - WATER RESOURCES DEPARTMENT FIRST COPY - CONSTRUCTOR SECOND COPY - CUSTOMER

This page to be completed by the local Watermaster.

WATER AVAILABILITY REPORT-SURFACE WATER APPLICATION

Name of Applicant: City of Scappoose Application Number: _____

1. To your knowledge, has the stream or basin that is the source for this application ever been regulated for prior rights?

   ☐ Yes ☒ No

   If yes, please explain:

2. Has the stream or basin that is the source for this application ever been regulated for minimum stream flows?

   ☐ Yes ☒ No

   If yes, please explain:

3. Do you observe this stream system during regular fieldwork?

   ☒ Yes ☐ No

   If yes, what are your observations for the stream?

   Surface water system closed for most purposes.

4. Based on your observations, would there be water available in the quantity and at the times needed to supply the development proposed by this application?

   ☒ Yes ☐ No

   What would you recommend for conditions on a permit that may be issued approving this application?

   Include permit conditions on interference with other domestic wells in vicinity.

5. Any other recommendations you would like to make?

   Periodic reporting by City of static water levels.

Signature Dawn C Hellin WM District #: 18 Date: 4/18/01

1/2 MILE

T3N, R1W, SECTION 7, TAX MAP 3173, LOT 100

EXISTING MILLER ROAD TEST WELL AND NEW CHEMICAL INJECTION SYSTEM. PUMP, PIPING AND CHEMICAL INJECTION SYSTEM TO BE DESIGNED.

200'

50'

WATERLINE FOR TEST WELL

370'±

1/4 CORNER

3490'±

SEE EXISTING WATER SYSTEM DRAWINGS FOR ADDITIONAL INFORMATION. CONNECTION TO EXISTING DISTRIBUTION SYSTEM WILL MOST LIKELY BE HERE.

SCAPPOOSE CREEK

JACKSON CREEK

800 0 400 800 1600 3200

GRAPHIC SCALE (IN FEET)

OWNER: CITY OF SCAPPOOSE		LEE ENGINEERING, INC. 1300 JOHN ADAMS ST. OREGON CITY, OR, 97045	
DWG TITLE: AREA MAP MILLER ROAD TEST WELL	DATE: APR 2001 FILE NO: 2413-03FG01	REVISED:	FIGURE A-1

2413-03FG01.DWG 04/09/01 11:12:00